2020 ARCTIC YEARBOOK

Climate Change and the Arctic: Global Origins, Regional Responsibilities?

Edited by Lassi Heininen, Heather Exner-Pirot and Justin Barnes

Arctic Yearbook 2020

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The Arctic Yearbook is the outcome of the Northern Research Forum (NRF) and UArctic joint Thematic Network (TN) on Geopolitics and Security. The TN also organizes the annual Calotte Academy.

The Arctic Yearbook seeks to be the preeminent repository of critical analysis on the Arctic region, with a mandate to inform observers about the state of Arctic politics, governance and security. It is an international and interdisciplinary peer-reviewed publication, published online at [https://arcticyearbook.com] to ensure wide distribution and accessibility to a variety of stakeholders and observers.

Arctic Yearbook material is obtained through a combination of invited contributions and an open call for papers. For more information on contributing to the Arctic Yearbook, or participating in the TN on Geopolitics and Security, contact the Editor, Lassi Heininen.

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Introduction

Climate Change and the Arctic: Global Origins, Regional Responsibilities?

Lassi Heininen, Heather Exner-Pirot & Justin Barnes

The theme of this year's Arctic Yearbook, "Climate Change and the Arctic: Global Origins, Regional Responsibilities?", is two-dimensional: on the one hand, recognizing the global origin of climate change/global warming, and on the other, identifying the Arctic region as a linchpin and laboratory of climate change, and discussing and brainstorming possible responsibilities, and even ideas for problem-solving, from Arctic and regional actors. We have been successful in inviting and challenging analysis on the interrelations between the two scales (global and regional), and from the point of view of different activities on the scales (oil and gas development, aquaculture, tourism, science, mitigation), as well as from the aspects of relevant actors (Arctic Council) and groups of actors (Indigenous, gender), and their interests - as the rich lineup of authors and articles clearly shows.

Climate change in the Arctic

The Arctic region is becoming increasingly integrated into world affairs while the region is simultaneously experiencing the growing impacts of climate change and environmental pollution, two of the world's major 'wicked' problems. Rapidly advancing climate change, and in particular the warming of the Arctic region, was largely discussed after the launch of the Arctic Climate Impact Assessment Report in 2004 (ACIA, 2004). The phenomenon has been known for seventy years or so, scientifically at least, and even in some political circles, that climate change became a U.S. national security concern even before the Cold War became heated. Now, the IPCC reports that the polar regions are experiencing climate change at twice the rate as the rest of the globe. In

Lassi Heininen is the Editor, Heather Exner-Pirot is the Managing Editor, and Justin Barnes is the Assistant Editor of the Arctic Yearbook.

the summer of 2020, Arctic sea ice extent was reported to be the second-lowest annual minimum on record.

Indeed, the Arctic is considered and has been redefined, at least since 2004, as a linchpin of global warming, like a canary in a coal mine, as well as a laboratory or workshop for climate change research supported by TEK (Traditional Ecological Knowledge) and Indigenous knowledge. Furthermore, climate change, in particular the Arctic as a victim of global warming, has become one of the major ways of looking at the Arctic. This is partly true and partly paradoxical, as small island states in the Indian Ocean and the Pacific, and low-level coastal areas of developing countries, are the first real victims of climate change, simply due to the global nature of climate warming.

Actors seeking to develop the Arctic, as well as actors from outside the region, however, do not necessarily align with a current geopolitical narrative that presents the region as a pristine and fragile environment in need of heightened protection and preservation. This lack of consensus is problematic in the face of climate change, pollution (in particular long-range air and water pollution) and loss of biodiversity, all wicked problems for the Arctic region, and consequently for the Northern Hemisphere, if not the entire globe.

Paradox/ambivalence vis-à-vis a focus on science

As if this would not be enough, there is ambivalence "whenever a balance is sought between environmental protection and climate change mitigation vis-à-vis an increase of (new) economic activities for Arctic (regional) development" (Heininen et al, 2019: 253). This is largely due to 'political inability', when the Arctic states are hesitating to implement climate change mitigation, or putting it bluntly, to make the hard decisions. But we must also reflect on why these decisions are so hard.

Following from this, there is a paradox in Arctic development, with environmental protection and climate change mitigation sought alongside an increase in economic activities by the Arctic states as the sovereign actors of the region, and with many of the Arctic Council observer states identifying themselves as Arctic stakeholders. Neither are ready to consider, study and further develop learned lessons about the value of mutually-beneficial common interests of Arctic geopolitics/governance as a foundation for stability and peaceful development, as well as for international efforts to tackle climate change.

At the same time, due to the rapid advancement of climate change, growing pollution in Arctic waters (including micro-plastics in the Arctic Ocean) and the ambivalence (or paradox) between environmental protection and economic activities, Arctic stakeholders (Arctic states, Permanent Participants, Observer states) "are dependent for problem-solving on scientific research, as well as international cooperation in science" (Heininen et al., 2019: 253).

In addition to this wicked problem and the related ambivalence, in 2020 the world saw a novel coronavirus becoming a new kind of non-military threat and the COVID-19 pandemic an invisible enemy threatening all societies worldwide. The pandemic became a global crisis, forcing public authorities to make exceptional decisions. When emergency laws were passed, many restrictions were imposed on daily life and borders were closed, opened, and closed again. In many cases, decisions were implemented very quickly, without real discussion and political debate, even though

they often affected and possibly endangered basic rights of citizens. Consequently, the economic well-being of companies and individuals were put in danger, and for many, collapsed.

On the other hand, the pandemic saved energy, resources and time as most adults started to work, and students to study, virtually at home, as well as conferences, meetings and lectures went online. Most developed countries were able to demonstrate their flexibility, resilience and ability to operate during the pandemic, thanks to high-technology, good infrastructure, and advanced knowledge in distance learning, though many people have started to experience digital fatigue. Furthermore, there is less air pollution, urban car traffic has been diverted in favor of more space for pedestrians, bikes and cafes. Significant new investments and "Green (New) Deal" policies were pledged for energy efficiency and saving, alternative energy sources, and CO^2 neutrality.

Finally, globally COVID-19 brought new premises and forces us to consider globalization's dark side and the fragile nature of our modern societies. It awakened us to the need to bring up new premises of security including non-military threats, such as pandemics, environmental degradation, climate change - more importantly to apply the concept of 'comprehensive security' when facing them, and "searching for a paradigm shift" (Heininen & Exner-Pirot, 2019). On the other hand, it also supports the importance of scientific research and its applications, as well as digitalization and distance-learning, when handling and solving global crises and wicked problems.

When we decided (in December 2019) this year's theme, including its two-dimensional nature, we did not know what was coming. There is, however, a connection, though not necessarily obvious, between the COVID-19 pandemic - in particular how it is interpreted and treated as a global shock, preferring a 'social order' and leaning on authoritarian solutions - and the Arctic region, which has moved successfully from military tension to high geopolitical stability and constructive international cooperation, in particular functional cooperation on environmental protection and climate change.

Like climate change, pollution, and also economic development and globalization, the pandemic has demonstrated how the Arctic as a region cannot insulate itself from phenomena arising from the South.

From theory into action and problem-solving

We face a post-pandemic question and a potential lesson to learn. The globalized Arctic – an exceptional political space and unique regime – has the potential to nudge a shifting world order toward mutually beneficial cooperation and comprehensive security. As the current Arctic regime does not result from the Hobbesian zero-sum approach but derives from the application of a critical, constructivist and cooperative approach to governance, geopolitics and security, it can help to ameliorate currently turbulent and uncertain world politics. Arctic cooperation is mutually beneficial and inclusive, as all relevant actors – states, nations, Indigenous peoples, regions, NGOs, civil societies, individuals – are involved. This is essential, since ultimately power and responsibility are borne by people and civil societies, and it is they who benefit the most having a paradigm shift on security (e.g. Heininen & Exner-Pirot, 2019).

We need not be fatalistic, as an "Arctic paradox" is not inevitable. The rapid warming of the Arctic climate could be interpreted as the last warning revealed by western science and traditional/Indigenous knowledge, as well as an opportunity to find solutions by policy-shaping and leaning on science. Much depends on the criteria by which the Arctic states make their

decisions: to believe they can (re)construct, and already have reconstructed, their reality of post-Cold War Arctic geopolitics by following their commitments on climate change mitigation. Finally, considering these as global, ethical questions the global Arctic offers a common ground for lessons-to-learn, as well as for brainstorming, as this Arctic Yearbook aims to do.

About the Arctic Yearbook & the 2020 volume

As an international, interdisciplinary, online journal with open access, the Arctic Yearbook provides accessible, reliable information in a sea of pay-walled articles and fake news, and a high quality forum for ideas and research about Arctic politics, governance and development, established at a time when open access was still a relatively new idea. The Arctic Yearbook's application, peer review, and copy-edit processes are truly author centred. Its unintended but highly welcomed outcome includes being a go-to option for post-docs, PhD candidates and other early career researchers. Many of them and other researchers appreciate the Yearbook due to its accommodating style, open access nature, fast peer-review process, and visibility on social media.

Due to its open access nature, the more than 170 scholarly peer-reviewed articles and 136 briefing notes and commentaries (from 2012-2019) have shared Arctic social science research far beyond the usual halls of academia, receiving tens of thousands of reads. This makes the Arctic Yearbook a leading international Arctic peer-reviewed journal in a few fields including regional IR (international relations), Arctic shipping, the Arctic Council, and Arctic state policies. An active social media presence, and more than 4000 followers, has allowed the Arctic Yearbook to further disseminate Arctic research to new audiences.

The Arctic Yearbook has run on volunteer efforts since its initiation. In addition, thanks to Arctic Portal's invaluable role in hosting the Arctic Yearbook website, only some small financial contributions have been needed to assist with launch events, cover design and printing. Instead, the Yearbook's application is built on several strengths, as prerequisites for success: expertise, networking based on individuals, willingness & capabilities, and encouragement & innovations. All this has allowed the Yearbook to remain independent, quick and flexible, and focused on publishing new research findings rather than being occupied with seeking funding.

By this theme, the 2020 volume seeks to explore, analyze, critique, and further inform narratives about the Arctic, roles and responsibilities for adaptation and mitigation, and the potential for sustainable development in the midst of global climate change and pollution. What are the main risks and challenges of climate change in the Arctic? How are actors responding to climate change in the Arctic and who are the primary players? Whose responsibility is it to respond to this global issue? How do we overcome the above-mentioned paradox? What policies can or have already been put in place to support regional and local development in a time of global change? What policy developments can, should, or have been made?

This volume is divided into four sections. The first examines geopolitics and economics in a warming Arctic. As always, our authors provide nuance to what are often superficial and oft-repeated narratives about the region's politics and economies. Climate change looms large, but there is value and necessity in analyzing how and where it is affecting states, communities, security, governance and development – in practice.

The second section provides an intersectional lens on issues of climate change and more, and tests our assumptions about how policies, research and adaptations to climate change should be developed and implemented. These are strengthened, inevitably, by ensuring space for and respect of diverse voices and perspectives.

The third section assesses and critiques some of the policies that are meant to address the wicked problem of climate change. This is a field that must be ambitious and innovative, for addressing the challenges of Arctic climate change require a disruption to the status quo. Do we have the governance tools to tackle these problems? Can these policies create winners without concomitantly having losers? Is there an Arctic future that we can be optimistic about, rather than just counting the losses? These authors tackle the challenge of identifying solutions rather than identifying problems.

Our final section examines the role that the Arctic Council might play – but has not yet fulfilled – in addressing climate change. The Arctic Council was not designed to develop or implement climate change policy, and yet to many stakeholders and observers that is what it must do, and only it can do. Our authors provide insight into how its role has evolved and how it might progress in the future. The question can be rightly asked: is the Arctic Council up to the task, or is a new organization needed to address the challenges of climate warming for the region?

Lastly, our cover is meant to provoke thought on the nature of the Arctic and its relationship to the outside world. Is it a mere curiosity, or a victim to be saved? Is the Arctic an object, or is it an agent of its own fate? Is it a collection of states, as represented by flags, or a homeland of diverse nations with sometimes competing interests and values? Can it be allowed to change and evolve, or must it remain the land of explorer's diaries and exoticisms? Our authors explore many of these questions, implicitly and explicitly, as we move beyond simple global-regional dichotomies.

All in all, the Arctic Yearbook consistently provides high quality, peer-reviewed articles from diverse researchers of Arctic social science and the humanities. It does so through open access, because it is a labour of love for the region, its people, and its decision makers. The Yearbook is an idea, initiative and institution for use by Arctic communities, as well as a perfect platform for the current state of the world that merits a global audience.

We welcome you to have a look at the rich contents of the 2020 Yearbook, and look forward to hearing from you and your comments, possible ideas and proposals concerning the Arctic Yearbook, as well as your contributions for future volumes.

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Section I: Geopolitics and Economics in a Warming Arctic

The Elusive Norm of Climate Responsibility: The Belt and Road Initiative and COVID-19

Sanna Kopra & Matti Nojonen

Based on the premise that climate responsibility had emerged as an international norm in the pre-coronavirus era, this paper studies to what extent the coronavirus is challenging the policies and strategies of China's Belt and Road Initiative (BRI) and its offspring the Polar Silk Road. We begin with a critical overview of the BRI and illustrate the practical implications of the fact that the BRI lacks an official strategy, a definition and a governing institution. We elaborate what kind of discourses and standards are attached to the BRI in general, and its latest addition, the Polar Silk Road, in particular. On the one hand, we analyze how China's pre-COVID-19 era Arctic policy and BRI documents (and norms) manifested and set the standards of climate responsibility, and, on the other hand, based on original Chinese policy documents, we debunk how these lofty political goals were rapidly and completely set aside as the new coronavirus epidemic was spreading around. Instead, the Party hastily made stipulations and policies and refocused the BRI to save Chinese overseas investments and the reputation of China in the post-coronavirus era.

Introduction

During the past decade or two, climate responsibility (or environmental responsibility in general) has emerged as an international norm that all states must comply with if they wish to be recognized as responsible international players (e.g. Falkner & Buzan, 2019; Kopra, 2018). Despite the shared objective of limiting "the increase in the global average temperature to well below 2°C above pre-industrial levels" (UNFCCC, 2015) agreed in Paris in 2015, the implementation of climate responsibility has been only partial and subject to competing interpretations (in some cases, even denial) around the globe. After the US announced its intention to withdraw from the Paris Agreement, President Xi Jinping (2017a) promised that China, the biggest carbon emitter in the world, would take the "driving seat in international cooperation to respond to climate change." For the time being, however, China has not taken any significant international climate initiatives or implemented considerable emissions reductions on the national level. Conversely, the lion's share of China's Belt and Road Initiative (BRI) projects focus on fossil fuels (e.g., Zhou et al., 2018). To

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meet the objectives of the Paris climate agreement, making the BRI "sustainable and climate friendly" is of utmost importance; otherwise, "we put the world at risk from worsening pollution and severe climate change" (UN Environment, 2017a). Against this backdrop, this paper analyzes how the BRI has conceptualized climate responsibility and the ways in which it has sought to operationalize that norm in practice, if at all. As climate change proceeds much faster in the Arctic than in other parts of the globe (AMAP, 2017), we pay special attention to the northern dimensions of the BRI. The melting of the Arctic will open up new shipping routes and economic opportunities—the key reason that many non-Arctic states have become increasingly interested in taking part in Arctic affairs. China, which published its first Arctic strategy in 2018, is no exception to this pattern: It has begun to construct an identity of "near-Arctic" state and renamed the series of planned Arctic shipping routes "the Polar Silk Road." In June 2017, the Polar Silk Road was added to the BRI, which indicates that Chinese investments in the Arctic can be expected to increase in the coming years. Yet the pace, scope, and focus of such investments will undoubtedly be affected by the outbreak of the coronavirus pandemic, or COVID-19, that began in late 2019/early 2020.

In addition to health risks and human suffering, COVID-19 is expected to affect long-term social, economic, and political changes in international society (e.g., Aaltola, 2020; Allen et al., 2020; Stiglitz et al., 2020). Due to the ongoing globalization of the Arctic (see Finger & Heininen, 2018), there is no reason to expect that the Arctic will represent an exception in that regard. Although it may be too early to say whether China will emerge a stronger player in the Arctic after COVID-19, it is not difficult to imagine that the far-ranging consequences of the pandemic will reshape the economic and political dynamics of the region. We analyze the ways the Chinese government has sought to readjust the BRI after the outbreak of COVID-19 and discuss potential implications for China's activities along the Polar Silk road. We ask: What could the BRI investments in general, and their northern dimensions in particular, look like after COVID-19, and what kind of role can the norm of climate responsibility be expected to play in those processes?

We begin with a critical overview of the BRI and illustrate the practical implications of the BRI's lack of an official strategy, a definition and a governing institution. Then we move to study how China's Arctic policy, BRI documents (and norms) manifest and set the standards of climate responsibility. Finally, we analyze China's policies to mitigate the impact of the coronavirus epidemic on the BRI or even efforts to benefit from the pandemic, and discuss their ramifications in the Arctic. Based on an analysis of China's new regulations and policy guidelines that were promulgated at the early stage of the escalating coronavirus epidemic in 2020, we argue that the central government reacted rapidly in its attempt to tackle the negative economic consequences of the epidemic. In the process, norms of environmental responsibility were largely dismissed, and the focus was on restarting the Chinese economy and limiting financial damages. We will demonstrate that major rhetorical and actual practical measures were taken in developing public health-related BRI operations and in illustrating China as a source of solution rather than as an origin of the pandemic. Some Chinese policy analysts seem to regard the economic setback of Western powers caused by coronavirus as an opportunity to advance China's interests and BRI operations at a regional level. We will conclude that in the light of our analysis, there seems to be little prospects that the BRI, or its offspring Polar Silk Road, would constitute a driver of sustainable development or low-carbon coronavirus recovery in the Arctic or beyond.

Belt and Road Initiative – what is it?

Chinese President Xi Jinping launched the BRI in Kazakhstan in March 2013. Later, in November 2013, in Jakarta he broadened the BRI to include a sea-bound "21st Century Maritime Silk Road." At the 19th Chinese Communist Party Congress in October 2017, Xi encouraged Chinese enterprises to "go out," especially along the Silk Road Economic Belt and 21st Century Maritime Silk Road to ensure the future "improvement of living standard through sustainable development." Eventually, at the same Party Congress, the BRI was lifted into the Constitution of the Communist Party. At a juncture of this process, Beijing launched a third Silk Road strategy; the "Polar Silk Road" in 2017.

Currently more than 70 countries are taking part in the BRI across Eurasia, Africa, and the maritime Asia–Pacific, covering more than two thirds of the global population and over one third of the world's GDP (Wang & Zhao, 2019: 4). As the Chinese Communist Party has injected political prestige and finance into the BRI, Beijing utilises these initiatives to decrease China's dependence on the US markets and at the same time China is increasing its global foothold. A massive flow of investments and turnkey infrastructure projects is not only changing the competitive environment and balance of power in various corners of the world, but moreover the rather low standard of corporate social and environmental responsibility of Chinese companies is further constraining the environment of recipient countries.

As these continent-shifting changes are taking place, despite various central government organizations and Xi Jinping himself has released numerous speeches on BRI it is impossible to find or construct any concrete strategy of BRI — a fact that raises questions and concerns about the BRI around the world. On the one hand, concerning the concept as such, the phrase Belt and Road *Initiative* suggests that the notion should be understood as a functional concept and process. Functional concepts are by definition inherently polyvalent, incomplete, and loose (Löwy, 1992). On the other hand, Beijing has attempted to explain or enhance the attractiveness of the BRI by attaching to it or explaining it with equally loose notions that are intended to generate a sense of hope, progress, values, and collective intentions. Consequently, we can hear Beijing repeating notions of "win-win," "equality," "right to development," "green," "sustainable development," and the new global catchword of Xi Jinping, "community of common destiny of humankind," side by side with the notion of BRI (Xi, 2016, 2018, 2019).

Although the BRI is the flagship project of China's internationalization process, Beijing has not nominated any governing body to control or to provide approvals for the numerous BRI projects being launched by central, provincial, or local-level state-owned or private businesses. In addition, in December 2017, Beijing announced new restrictions and regulations guiding the approval process of outbound investments. The regulations encourage financial institutions to prioritize finance and smooth out the red tape of BRI projects. As in China all companies carefully follow the changes of the political wind, they are now driven to grasp the opportunity of the national priority of the BRI rage and novel financial BRI supportive policies. Consequently, in the pre-COVID-19 era, hundreds if not thousands of Chinese delegations from all corners of China were travelling on a weekly basis all around the world claiming to be part of the Chinese BRI, despite there being no centralized body providing the official BRI stamp. (As with Chinese economic data in general, this also means that the Chinese official statistics of BRI investments is inaccurate.) Despite an obvious lack of transparent strategy or governing body, the official documentation of

BRI exists in the form of political speeches, a wide array of stipulated regulations, research reports, and countless news announcements produced relating to BRI.

The BRI documents and the framing of climate responsibility

In 2015, Beijing issued the "Vision and Actions on Jointly Building Silk Road Economic Belt and 21st-Century Maritime Silk Road." It lists the guiding principles of the BRI, which emphasize cooperation and peaceful coexistence, and confirm the compliance with international norms but do not explicitly mention environmental responsibility. Although climate change is mentioned a few times in this pronouncement, the document does not seek to promote the norm of climate responsibility under the BRI. For instance, it states that "*efforts* should be made to promote green and low-carbon infrastructure construction and operation management, taking into full account the impact of climate change on the construction" (NDRC, 2015, emphasis added). Yet the document does not require that those efforts should actually be effective and aspiring: no quantitative emissions reductions are stipulated.

In 2017, the "Vision for Maritime Cooperation under the Belt and Road Initiative" was issued to "build a peaceful and prosperous 21st-Century Maritime Silk Road" (NDRC & SOA, 2017). This time, green development was elevated as one of the cooperation priorities; the document emphasizes the protection of the marine environment and acknowledges the necessity of "strengthening cooperation in addressing climate change" (ibid.). It expresses China's willingness to support small island states to adapt to climate change and pledges to encourage the development of low-carbon projects in the maritime sector. Yet it makes no concrete proposals as to how BRI projects could address climate change mitigation.

In May 2017, the first Belt and Road Forum for International Cooperation was held in Beijing. As expected, environmental issues were not high on the agenda. In his opening speech, President Xi (2017b) mentioned climate change only once: He proposed the establishment of an international coalition for green development on the Belt and Road, and promised to "provide support to related countries in adapting to climate change." Yet he acknowledged that "we should pursue the new vision of green development and a way of life and work that is green, low-carbon, circular and sustainable" (ibid). Likewise, the joint statement issued by the forum participants did not put forward an ambitious approach toward climate responsibility but only encouraged parties that had ratified the Paris Agreement to fully implement it (*Joint Communique of the Leaders Roundtable of the Belt and Road Forum for International Cooperation*, 2017).

Some efforts to incorporate environmental issues into the BRI have been made. For example, the Belt and Road Green Development Partnership was launched by various Chinese and international think tanks, environmental NGOs, and foundations in September 2016 to "help China leverage and improve its leadership in global green governance" (China Global Green Leadership). The partnership seeks to promote the fulfillment of UN sustainable-development goals and the Paris agreement, and it has organized side events at UN Climate Conferences in 2017 and 2018, for instance. The Chinese Ministry of Environmental Protection (2017) formulated the "Belt and Road Ecological and Environmental Cooperation Plan," which ensures that "China attaches high importance to eco-friendly Belt and Road" and seeks to "integrate the concepts of ecological civilization and green development into the Belt and Road Initiative and create a favorable pattern of well-grounded cooperation on eco-environmental protection" by 2025.

Furthermore, "Guidance on Promoting Green Belt and Road" was issued in May 2017. Although it defines the concepts of ecological civilization and green development as the guiding principles of the BRI, it seems to take a very reactive approach to environmental issues. It does not call for urgent action to mitigate climate change but only refers to the international *trend* of green development (CPC Central Committee and the State Council, 2017). Thus, the document does not take a strong normative stance in the name of environmental protection, nor does it represent China as a pacesetter in international environmental politics. Instead, it refers to a very general "shared responsibility for countries in the world to prevent and curb environmental pollution and ecological damage" and states that "efforts will be made to incorporate" green principles into BRI projects (ibid). Yet, the document states that "promoting green Belt and Road is an essential effort to participate in global environmental governance and promote green development concept." Thus, the Chinese government seemed to have broadened the agenda of BRI: it not only exerts "efforts to implement the United Nations 2030 Agenda for Sustainable Development in the field of coasts and oceans" (NDRC & SOA, 2017) but also constitutes an "important measure to implement the 2030 Agenda for Sustainable Development" (Ministry of Environmental Protection, 2017). According to China's minister of environmental protection Li Ganjie, "To strengthen cooperation with countries involved in the Belt and Road Initiative through ecological protection is our joint effort to achieve sustainable development goals by 2030" (Yang, 2018).

The international community has also begun to pay attention to the role of the BRI in international governance. Acknowledging that "if Belt and Road investments lock countries into unsustainable infrastructure, technology, and resource extraction, this will create long-lasting negative environmental consequences" (UN Environment, 2017b), the UN Environment Programme and China's Ministry of Environmental Protection launched the International Coalition for Green Development on Belt and Road at the Belt and Road Forum in May 2017. The coalition seeks to be an "open, inclusive and voluntary international network which will bring together the environmental expertise of all partners to ensure that the Belt and Road brings long-term green and sustainable development to all concerned countries in support of the 2030 Agenda for Sustainable Development" (UN Environment, 2017b). By February 2019, 23 countries (Finland and Russia being the only Arctic states), 21 UN agencies and other international organizations had joined the coalition, among others (UN Environment, 2019). In April 2018, the UN Environment also prepared the Green Belt and Road Strategy, which envisions an engagement in the BRI to "incorporate environmental sustainability considerations across the different areas of focus of Belt and Road Initiative and strengthen environmental governance" (UN Environment, 2018). The ultimate goal of the strategy is "to ensure that investments made under the Belt and Road Initiative are 'green' and contribute to the achievement of the 2030 Agenda for Sustainable Development at the global level" (ibid). For the time being, however, there is no evidence that these efforts have succeeded in making the BRI "green."

China's Arctic policy and climate responsibility

China's Arctic involvement has grown steadily during the 2000s (see Koivurova & Kopra, 2020). In 2004, the first Chinese research station was built on Svalbard, and since 2007, China has taken part in the work of the Arctic Council, the key intergovernmental forum in the region. Today, Chinese scholars conduct polar research onboard the icebreaker research vessels MV *Xuelong* and MV *Xuelong 2*—the latter, delivered in 2019, being China's first domestically built icebreaker.

Meanwhile, Chinese corporations have become partners in various economic projects in the Arctic, especially in Russia's Siberia, where massive projects producing liquefied natural gas (LNG) take place. The development of infrastructure along the Polar Silk Road is also of interest to Chinese investors. As of September 2020, China has not assessed its environmental footprint on the Arctic and it is difficult to estimate the amount of airborne and marine pollutants coming to the Arctic that originate from China. Given its large countrywide carbon emissions and enormous demand for extractive resources, however, it is probably fair to say that China plays a decisive role in shaping the resilient future of the Arctic region.

While the Arctic was not addressed during the early stages of the BRI, the Arctic Ocean was incorporated into the BRI in 2017 (NDRC & SOA, 2017). In the same year, China's high-level representative presented a speech titled "The Arctic in the Belt and Road Initiative" at the opening ceremony of the Arctic Circle Assembly in Reykjavik. In January 2018, China published its long-awaited Arctic strategy that maintains that the BRI "will bring opportunities for parties concerned to jointly build a 'Polar Silk Road,' and facilitate connectivity and sustainable economic and social development of the Arctic" (State Council Information Office of the People's Republic of China, 2018). In the efforts to build a Polar Silk Road, the development of the Arctic shipping routes plays an important role. According to China's Arctic white paper, the state's goals in the region include "to understand, protect, develop and participate in the governance of the Arctic, so as to safeguard the common interests of all countries and the international community in the Arctic, and promote sustainable development of the Arctic" (ibid). When it comes to climate responsibility, on the one hand, these policy goals call for scientific research on Arctic climate change and stress the importance of addressing climate change. On the other hand, they celebrate economic possibilities offered by the melting of the Arctic ice.

Climate change is one of, if not *the*, biggest problem in the Arctic (e.g. AMAP, 2017). Against this backdrop, it is unfortunate that China's Arctic white paper does not introduce additional measures to tackle climate change although it notes that "China's emission reduction measures have a positive impact on the climatic and ecological environment of the Arctic" (State Council Information Office of the People's Republic of China, 2018). Given the "highly insufficient" score of China's nationally determined contribution under the Paris Agreement to limit the global temperature rise to 2°C or 1.5°C (Climate Action Tracker, 2019; Harris, 2017), raising the level of ambition of climate mitigation would be necessary to live up to China's climate responsibility in the Arctic and beyond. However, China's Arctic white paper pays more attention to the link between the Arctic climate change and the adverse effects of climate change in China than the ways in which the world's largest carbon emitter could tackle climate change.

The BRI can be characterized as technologically agnostic; it does not prioritize "green" technologies over others. Hence, it is unsurprising that China's Arctic white paper hardly identifies any difference between green and brown economies but "encourages them [Chinese enterprises] to participate in the exploitation of oil, gas and mineral resources in the Arctic" (State Council Information Office of the People's Republic of China, 2018). As for clean energy cooperation, the strategy directs the country to "work with the Arctic States to strengthen clean energy cooperation, increase exchanges in respect of technology, personnel and experience in this field, explore the supply of clean energy and energy substitution, and pursue low-carbon development" (ibid). For the time being, energy cooperation in the Yamal Peninsula, northern Russia, constitutes the key

focus of China's energy interests in the Arctic (see Stepien et al., 2020). As LNG is considered less harmful for the environment than traditional fossil fuels, China's involvement in the Yamal LNG project supports its aims to reduce dependence on coal, and that in turn will reduce carbon emissions in the atmosphere.

COVID-19 pandemic and the fate of BRI

Political leaders and economic actors "do not have a monopoly on historical change" but "diseases, too, make history, although we often seem to have difficulties acknowledging this" (Hämäläinen, 2006: 2). Diseases "tend to strike undetectably and unexpectedly, ignoring all human attempts to contain them, and they trigger changes whose magnitude and nature often defy comprehension" (ibid.: 3). The coronavirus pandemic may well trigger fundamental changes in international society in a similar way that previous pandemic diseases, such as yellow fever, the Black Death, and the Spanish flu, among others, have initiated over the past centuries (e.g. Aaltola, 2012; McNeill, 2006; Myrdall, 2006). Thinkers around the globe are debating whether the post-COVID-19 world will be "less open, less prosperous, and less free," "poorer, meaner, and smaller," and more China-centric, among other things (Allen et al., 2020; see also Stiglitz et al., 2020; Nye, 2020). No doubt the tiny virus also poses a severe challenge to the BRI and Xi Jinping's promise of doubling the Chinese GDP, completely eradicating poverty, and doubling GDP per capita by the centennial celebration of the establishment of the Chinese Communist Party in 2021 as compared with 2010.

After the initial critical cover-up of the coronavirus outbreak in Wuhan, Beijing recognized the outbreak of the new respiratory epidemic in the mid-January 2020. Within weeks the first coronavirus cases were reported in Thailand, South Korea, Japan, Vietnam, Italy and the US. It is likely that the Chinese top leadership recognized at an early stage that the virus was very contagious, represented a serious threat to public health, and would severely hurt the economies of impacted countries and threaten Chinese overseas interests. By summer 2020, Beijing began to develop a complex set of debt restructuring and aid-package programs that eventually will open channels for a number of defaulting developing countries to begin bilateral negotiations with Beijing (Albert, 2020; Sun, 2020).

A coordinated response effort began earlier in the last days of February 2020, when the Chinese central government made readjustments to its BRI strategies and image campaign. On February 28, the Ministry of Foreign Trade and Commerce (MOFCOM) and the China Development Bank (ministry level development bank) jointly issued the "Notice on the Development of Financial Services in Support of the New Corona Pneumonia Epidemic to Support High-Quality Co-construction of the Belt and Road Projects and Enterprises" (Shangwubu, 2020). This ministry level notice is a legally binding policy paper stipulating how regions and institutions should support BRI companies that were affected by the coronavirus. Notably, the notice does not mention climate change, sustainability, or the Arctic Silk Road at all.

In practical terms, the notice outlines a series of new financial and economic measures for companies that have labeled their foreign investments as BRI investments and are affected by the coronavirus epidemic. The notice also calls for smoothening horizontal and vertical collaboration between local provincial- and central government-level institutional actors. The process of selecting eligible projects and companies is assigned to the provincial-level branches of the China Development Bank and the regional headquarters of the Central Enterprises Group, the biggest

and most important state-owned conglomerates. The notice also requires companies to report if their employees have coronavirus and to carry out prevention and control measures. In this manner, China aims at "winning a double victory" of controlling the epidemic and continuing the buildup of Belt and Road projects without losing economic momentum (Shangwubu, 2020).

After the central government notice, a number of provinces launched their own response plans, based on their particular strengths and development areas, for stimulating BRI projects and investments under the new corona situation. Some of these response plans are more detailed, like the cases of Guangdong and Shaanxi provinces that have 22 and 28 key tasks, respectively, while some plans, like Ningxia province's, list only a handful of targets and elaborate on a more abstract level how to develop certain business models or hubs for their BRI activities (CABRI, 2020). In June 2020, the Chinese government issued a white paper detailing its fight against COVID-19, but the document does not deal with the BRI or mention environmental impact.

Importantly, at the same time the Communist Party launched a coordinated strategic shift toward developing a public health-centered Belt and Road labeled the Health Silk Road (HSR) and began discussion of activating a Digital Silk Road (DSR) initiative. The HSR is a framework that was jointly launched by the BRI and WHO in 2017 as a cross-border health collaboration platform (Beg, 2020). The Digital Silk Road was launched in 2015 to support the development of global supply-line management, smart-port technology, ICT, and the sophisticated usage of big data (Wheeler, 2020).

Both the HSR and the DSR operate under the umbrella of the BRI. The HSR was occupying almost the complete limelight until the coronavirus outbreak when that became the top priority of the BRI due to the strategic shift of Beijing (Beg, 2020). As a matter of fact, it seems that HSR became one of the leading themes of the BRI discourse and overshadowed the voices of sustainability and green development of the BRI. Intriguingly, we came across only one policy paper that took into regard the importance of sustainability in developing the BRI projects in the post-COVID-19 world (AIIB, 2020). The document was produced by the Asian Infrastructure Investment Bank (AIIB), which is the first Chinese-established multilateral finance institution and currently has 102 member states. During the last five years, AIIB has approved finance to 75 projects with the accumulated sum of its loans being 2 billion USD, a sum that is minuscule in comparison to the five-year accumulated direct overseas investments of China, amounting to 759 billion USD.

Arguably, the strategic shift is Beijing's response to the amounting global criticism of its early cover-up of the coronavirus epidemic in Wuhan: It is an attempt to turn the crisis into a geo-economic opportunity and to depict China as a responsible international actor and source of solutions in this global crisis. The HSR activities include concrete and positive policy measures requiring health tests of dispatching personnel, implementing a zero epidemic human resource system, and reducing staff rotation of the Chinese labor force operating abroad. As a part of HSR strategy, China has also offered coronavirus-related medical help and equipment to more than 90 nations expanding the original pan-European scope of HSR to cover the whole world (RMHB, 2020). A number of Chinese scholars are pointing out that China should identify opportunities in risks and name public health collaboration and assistance as an important activity that will not only help the local communities but also safeguard the operative environment of Chinese companies in host countries (Chinanews, 2020). However, some western countries have pointed out that not all assistance is as altruistic as Beijing portrays it to be, but it should rather be understood as a "mask-diplomacy"

operation, i.e. a ploy to win over local's hearts by providing them COVID-19 related medical assistance (Escobar, 2020; Beg, 2020).

The overall academic and public discussion of BRI was lying dormant at the beginning of the coronavirus pandemic. However, some Chinese scholars point out that the pandemic is generating an unprecedented global crisis and as a consequence will affect the BRI activities of China as well (Chinanews, 2020). China is worried about a larger outbreak of the COVID-19 epidemic in developing countries. Jin Cairong, one of the leading international relations scholars in China, writes, "If it spreads to countries in the South, South Asia and Africa will cause great humanitarian disasters, and even lead to the collapse of the social order of these countries, which will have a great impact on our Belt and Road Initiative" (Chinatalk, 2020). In Jin Cairong's opinion, the crisis should be turned into an opportunity. He analyzes the BRI in a global context and points out that as Western European and North American economies are heavily affected by the virus and countries in Northeast and Southeast Asia have suffered less from the coronavirus, China should take "…this opportunity to fully advance cooperation with these two subregions ... If this is done well, in fact, our 'Belt and Road' base is particularly good" (ibid).

Concluding remarks

Over the past decade, Beijing has produced guidelines to make the BRI appear "green." Currently, China is fully aware that the COVID-19 is handicapping the BRI. As the headline-grabbing BRI fell dormant during the first months of 2020, the central government reacted swiftly. In late February it issued a legally binding notice and policy recommendations aiming at deterring the negative impact of the coronavirus on the BRI, without assessing the environmental impact of those efforts. Immediately after the notice, provinces drafted their own policies aiming at stimulating the BRI projects. The Communist Party quickly turned the crisis into a geo-economic opportunity, by altering the BRI into a global public health campaign under the label of the Health Silk Road framework. In the public discussion, Chinese scholars are also affirming that the crisis should be seen as an opportunity to support the development of public health in host countries and to gain a stronger foothold in BRI countries. Strikingly, neither the central government, the provincial plans and notices nor the scholars even mention climate responsibility, green development, or sustainability in their BRI-related policies or scholarly opinions. As of September 2020, the only policy paper that has discussed issues of sustainability in the post-COVID-19 era was produced by the Chinese-governed multilateral AIIB that is an insignificant operator in financing BRI operations. On the other hand, China's president Xi Jinping announced at the UN General Assembly in the same month that China's carbon emissions will peak before 2030 and the state strives for carbon neutrality before 2060. Clearly, it is of utmost importance to incorporate the BRI into these targets; otherwise, global emissions will not necessarily decrease but Chinese actors continue to invest in fossil fuel-intensive projects abroad.

What does this broader context mean for the future of the Arctic? Evidently, with regard to the BRI there have not yet been signs that China would act as a driver of sustainable development in the Arctic or promote low-carbon coronavirus recovery plans at a global level. Furthermore, our analysis indicates that the Polar Silk Road is not likely to be prioritized in any way but will continue to be a sub-initiative of the broader BRI. Instead, there might be a risk that China will take further advantage of the global economic predicament and attempt to gain stronger control of the two major sectors in the Arctic region: infrastructure building and natural resources.

It is expected that the coronavirus pandemic will accelerate digitalization around the globe, including the Arctic, where the northernmost areas lack "reliable, accessible and affordable broadband" (Arctic Council, 2017a: 10) and the enhancement of "connectivity" has been identified as one of the regional priorities (Finnish Chairmanship, 2017; see also Lanteigne, 2020). For China, investments in digital infrastructure constitute one of the key interests in the Arctic and are part of the broader Digital Silk Road initiative. For the time being, Chinese investors are involved in the Arctic Connect project seeking to connect Europe and Asia via the Northeast Passage. The Chinese telecommunication giant Huawei has also unveiled plans to deploy high-speed internet in Canada's remote regions—a plan that creates new kinds of vulnerabilities in the area (Levinson-King, 2019). Given the frosty relations between Canada and China, however, the realization of these plans remains uncertain. As the expansion of 5G is viewed as a critical element of China's economic recovery after COVID-19, it can nevertheless be expected that China will intensify its efforts to build a Digital Silk Road in the Arctic (see Blanchette & Hillman, 2020; Jüris, 2020).

Due to the BRI's new-found interest in health care and public health infrastructure, it is also likely that the Chinese actors will be interested in investing in such developments in the Arctic region—a sector that the Arctic Council's One Health project introduced during the US chairmanship (2015-2017) seeks to improve. Yet it should be noted that the One Health project takes a holistic approach to health issues: it pays attention to participatory community-based approaches, addresses the "human-animal-ecosystem interface" and seeks to "identify, prevent, and manage health risks in humans, animals and their shared environment" (Arctic Council, 2017b: 6). In the Arctic, hence, transboundary investments in health should promote the operationalization of the One Health concept "to enhance resiliency of the Arctic inhabitants through an enhanced understanding of climatic change impacts on health risks to people, animals, and the environment" (ibid). In other words, the norm of climate responsibility should not be dismissed in the development of health care and public health infrastructure projects, not to mention specific needs of Indigenous peoples—a normative foundation that all Arctic investments should adhere to.

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Effect of Corporate Sustainability Policies and Investment Risks for Future Arctic Oil and Gas Development in Alaska

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The feasibility of new Arctic oil and gas development activity is strongly tied to global supply and demand. The evolution of oil development in Alaska represents responses to external pressures such as economic viability, and changes in domestic and foreign oil production. Climate change is another external pressure that affects the cost of developing Arctic oil and gas. Direct impacts can occur from improved access routes for ships in ice-free waters, or increased costs from infrastructure damage due to permafrost thaw or coastal inundation. An emerging globally-driven factor that may limit future oil and gas activity in the Arctic is the recent trend in corporate sustainability goals driven by social responsibility to mitigate climate change. In 2020 several major US banks expressed policies that would prohibit financing of Arctic oil and gas exploration or development. The extent that such corporate policies could impact future oil development in Alaska is explored in the context of changing regulatory environments, and the diversity of oil companies invested in Alaska. Indicators on company interests are used to assess threats for future Alaska oil and gas development. The results emphasize that financing challenges would make it difficult for smaller companies to share the investment risk in Arctic oil exploration and development. Comparisons of oil and gas investments in other Arctic states show that the strength of state-backed oil and gas companies, investments from Asia, and access to technology innovations are important factors that may offset the effects of more limited Arctic oil and gas financing by major US and European banks.

Introduction

Increasing access to the Arctic and its resources could draw potentially significant investments to the region from non-Arctic states. While physical models provide scenarios of Arctic sea ice loss (Wang & Overland, 2009; 2012) and facilitate the development of models on increasing ship traffic (Smith & Stephenson, 2013), or improved access to marine and coastal resources, predicting the effects of global economic drivers on Arctic development remain a challenge. New developments in the oil and gas sector is of particular interest in the Arctic because of large estimates of oil and

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gas reserves north of the Arctic Circle (Gautier et al., 2009). However, the high cost of operations and limited infrastructure in the region make Arctic oil and gas development a potentially risky investment. This article explores indicators to track non-environmental factors that could limit future Arctic oil and gas development in Alaska. While the price of oil plays a key role in the profitability of Arctic oil development, access to capital is an important factor in new development projects. The indicators explored here look at trends in corporate sustainability policies that affect future Arctic investment, consistency in policy incentives to support development, and the diversity of corporations involved in oil and gas exploration. Since the United States does not have a state-owned oil and gas company, there is no guarantee of a stable oil or gas company presence in Alaska's oil development. Comparing some of these indicators of corporate interests in Alaska oil and gas development to the conditions in other Arctic states provides insights on how global pressure for more corporate responsibility to address climate change could influence future scenarios for Arctic oil and gas activity.

Policies and incentives affecting Alaska oil development

Commercial interest in Alaska Arctic oil development over the last century is briefly summarized with a focus on policies that influenced access to resources, and financial investments for oil development in Alaska.

1920-1967: Early commercial exploration

1922 marked the beginning of industry exploration of the North Slope, and in 1923 the U.S. government designated the National Petroleum Reserve-Alaska (NPR-A) in anticipation of future oil development in the Alaska Arctic. Domestic oil development in Alaska was not yet a major industry by 1959 when President Eisenhower put in place the Mandatory Oil Import Program. This program acted to limit oil imports so that it could not exceed 9% of domestic consumption.

1968-1988: Infrastructure development and economic boom

The development of oil reserves in the North Slope of Alaska began with the discovery of Prudhoe Bay in 1968. Despite a lack of infrastructure in the region and challenging environmental conditions, the development of Prudhoe Bay was carried through based on large estimates of recoverable oil. The development of the 800 mile Trans Alaska Pipeline (TAPS) provided a necessary transportation corridor for oil produced in the North Slope to reach ice-free port facilities in Valdez. Although Alaska is still ranked as the 6th largest state producer of oil in the United States (EIA, 2020), production has been declining since 1988. TAPS was developed by a consortium of eight separate private companies that jointly formed the Alyeska Pipeline Service Company to design and construct the pipeline. The pipeline was completed in 1977. During this period, President Nixon also ended the Mandatory Oil Import Program, at which time US oil imports increased from approximately 30% of domestic consumption in 1973 to almost 50% of consumption by 1977 (Council on Foreign Relations, n.d.). U.S. domestic oil production was clearly not meeting national needs.

The economic boom from the peak in oil development and pipeline construction resulted in an influx of migration into Alaska and sharp increases in per capita income, but these effects were relatively short-lived (James, 2016). Today much of the existing infrastructure in the North Slope is associated with the greater Prudhoe Bay field complex with continued use of seasonal ice roads in winter, and the Dalton Highway that connects Prudhoe to the greater road system.

1989-2005: Oil development plans after peak production

The Clinton Administration (1993-2001) supported continued protection of the Arctic National Wildlife Refuge (ANWR), although President Clinton stopped short of declaring the ANWR a national monument, believing that current protections against oil development in the ANWR were sufficient. The subsequent administration under President Bush proposed oil development for part of the ANWR, but this did not result in policy to begin leasing on the coastal plain of the ANWR. During the Bush Administration, total US domestic crude oil production fell from 5.8 million barrels per day in 2001 to 5 million barrels per day in 2008 (US Energy Information Administration, 2019) and in the Alaska North Slope production continues to decline. Offshore oil production in the US Beaufort Sea began in 2001 with the Northstar facility, but offshore oil in the Chukchi Sea did not get much development activity. Revenue from the oil industry remained the primary source of income for the state of Alaska. Interest remained in developing a gas pipeline, along with interests in transporting LNG by ship to markets in Asia. However, the emphasis on oil development in Alaska made the region vulnerable to the volatile nature of the global oil market. This issue had been particularly challenging for the revenues for the State of Alaska, which had seen drastic declines in income from oil production in previous years.

2006-2020: Changing U.S. policies on Arctic oil development

Over the past decade, different levels of political support for Arctic oil and gas development has been expressed at the national level. The oil and gas fiscal system in Alaska also began introducing more frequent changes in 2006, adding to greater investor uncertainty (Agalliu, 2020; Goldsmith, 2014). Despite the more frequent changes in oil and gas fiscal policies, the State of Alaska continues to promote Alaska oil and gas development. Between 2005 and 2014, oil revenue made up approximately 90% of Alaska's unrestricted revenues, but such high dependence on resource revenues may be a source of concern for investment by companies that fear the potential for sudden, large increases in taxes (Knapp, 2015). Beyond the impact of tax policies on the profitability of Alaska oil development, there is little evidence that tax policies greatly affected the optimal timeline for industry oil development (Leighty & Lin, 2012). This suggests that tax policies alone have not greatly influenced the rate of oil development in Alaska. The current and proposed fiscal policy on oil development in Alaska makes it one of the least competitive locations for new oil development (Agalliu, 2020).

Offshore oil development gained attention in Alaska in 2009 when Royal Dutch Shell obtained leases for exploring the development of offshore oil in the Chukchi Sea. The process to obtain approval for offshore drilling in the Chukchi Sea was fraught with controversy including objections from some Indigenous and environmental groups, but nevertheless drilling proceeded in 2012. Royal Dutch Shell exploration activities did not occur without mishaps, including two marine incidents in 2012: the near-grounding of the drilling vessel Noble Discoverer near Dutch Harbor, and the grounding of the drilling rig, Kulluk near Kodiak. After disappointing assessments of the offshore oil reserves in the Burger Prospect in 2015, Royal Dutch Shell decided to stop their operations and surrender their leases in the Chukchi Sea at an estimated cost of $7 billion. Following the departure of Royal Dutch Shell there was no major oil exploration activity. Continued declining North Slope oil production meant that there was little effect from the change in US policy to end the ban on crude oil exports that occurred at the end of 2015. In December

2016, President Obama used his authority under the Outer Continental Shelf Lands Act to permanently exclude all of the Chukchi Sea planning area and the majority of the Beaufort Sea planning area from future leasing. President Trump attempted to reverse this act and reopen Arctic offshore development using an Executive Order, but the District Court for the District of Alaska ruled that an Executive Order did not give the President authority to revoke prior presidential withdrawals. Only a small portion of the US Arctic offshore is currently open to leasing. The number of leases in the Beaufort Sea has dropped from 147 in the Beaufort Sea planning area in January of 2015, to 40 leases in January 2020 (BOEM, 2020).

In contrast to the lack of offshore activity, onshore oil developments are still being explored. The Bureau of Land Management (BLM) is responsible for leasing land in the National Petroleum Reserve-Alaska (NPR-A) which began in 1999. BLM is now moving forward with the process to open up the controversial 1002 coastal area of the ANWR. Developing the ANWR has been a controversial issue for four decades since the 1980 Alaska National Interests Land Conservation Act (ANILCA). Section 1003 of the act prohibited the leasing or other development activities that would lead to oil and gas production until authorized by an Act of Congress. This authority was finally granted in the 2017 Tax Cuts and Jobs Act, when Congress granted the authority to open the 1002 area of the ANWR for leasing as part of a budget resolution to generate income and offset the proposed tax cuts. The legal authority to open ANWR for leasing has been welcomed by the State of Alaska, but it is not without strong opposition from some Indigenous organizations and environmental groups. Obtaining the social license to operate in sensitive areas of Arctic Alaska remains a challenge moving forward.

Impacts to Alaska revenues continued through 2020 with unprecedented drops in the price of oil in 2020. Arctic North Slope oil is forecasted to remain below $30 a barrel for the remainder of 2020, with estimates that it may remain below $60 a barrel through 2029 (Alaska Department of Revenue, 2020). These projected oil prices make Alaska oil development far less attractive than it has been in the past, and it reduces the likelihood of significant new Arctic oil development over the next decade. While the profitability of Arctic oil development in Alaska may be the strongest predictor of future activity, other considerations which can limit or encourage Arctic oil and gas development in the future are also briefly explored. Based on the changing policies affecting access to undeveloped areas for Arctic oil and gas development, it is evident that the U.S. does not have stable, long-term support for new Arctic oil and gas development throughout the US Arctic.

Shared risk through diversity in corporate entities

Investment risk for large new infrastructure has always been a major factor in Arctic development. The absence of a gas transportation pipeline in Alaska is a striking example of how national support for infrastructure is often inadequate to push major infrastructure development forward without industry support. In 1978, the Natural Gas Policy Act was put in place, but it included no subsidies for the two corporations working to develop pipeline construction. Policy-makers at the time assumed that private financing would materialize (Thomas & Thomas, 1982), but none ever did. General takeaway lessons emphasized that major infrastructure investments such as financing for the gas pipeline in Alaska requires a balance of shared risk in investment between the government and private entities (Tussing & Barlow, 1979).

Renewed political support for a gas pipeline came in 2013 when the State of Alaska formed the Alaska Gasline Development Corporation with financial contributions from ExxonMobil and BP.

The focus on development was for a pipeline, and additional infrastructure to bring natural gas from Prudhoe Bay and Point Thompson to market. Progress in this major infrastructure project has been slow since state funding appropriations have not been consistent over the last few years, especially given the enormous budget constraints recently faced by the State of Alaska. Obtaining capital for infrastructure development remains challenging in the near term, and leaves open opportunities for more diverse funding sources, such as foreign investment. Unlike other Arctic states, the U.S. does not specify a minimum percent of lease ownership by a domestic U.S. entity. The ability to independently explore and develop new lease areas might make foreign corporations more willing to consider the costs of developing new supporting infrastructure in Alaska, but so far this has not been the case. In reality, the foreign corporations with interests in developing oil on the North Slope (Eni, Pantheon Resources and Oil Search) are currently concentrated in areas close to existing infrastructure, which would reduce the need for new major infrastructure development.

Corporate entities with interest in Arctic oil development are rarely focused in the Arctic alone. Hence, corporations may fall along a range of willingness to accept risk in Arctic oil development relative to investing in oil development elsewhere. This analysis falls short of assessing specific risk-sharing profiles for investing in Arctic oil development, and focuses instead on characterizing indicators that could be used to identify general risk-sharing strategies for Arctic oil development.

One indicator to look at the risk-sharing environment for future oil and gas development is the diversity of corporations that share ownership in leases. The interests in sharing the risks in Arctic oil development was recently illustrated by Conoco-Philips which is selling some of its assets in Alaska to share its future investment risk (Herz, 2019). The diversity in lease ownership is reported in different ways since the various agencies managing oil and gas leases in Alaska aggregate lease ownership information in different ways. The Bureau of Land Management (BLM) manages leases held at the National Petroleum Reserve Alaska. At present there are 307 leases awarded to 9 companies (BLM status report for April 2020). Joint ownership occurs in only 14 leases (4.5% of leases), amounting to only 3.5% of the total leased area of 2,609,632 acres. The Bureau of Ocean Energy Management reports that the Beaufort Outer Continental Shelf had 40 leases owned by 5 companies (as of October 2018), but Hilcorp and ASRC had sole ownership of more than half of those leases. Earlier his year ASRC relinquished all 21 of their leases in the region, leaving most of the remaining leases as jointly-owned. In State of Alaska lands on the North Slope, leased areas are more broadly grouped into one of 12 units with 1725 leases in the North Slope and Beaufort Sea region. Currently only three units (Nikaitchuq, Northstar, and Colville River) have a single owner interest, emphasizing the prevalence of corporate diversity and shared investment risks - even in areas with well-developed infrastructure.

While the full diversity in number of companies involved in Arctic oil development is not reported here, the trends in bidding activity for leases have shown that a greater number of independent oil companies are becoming involved in Alaska oil leases (Nebesky, 2007). Based on the limited capital available to smaller independent companies, the access to funding for oil and gas development activities could be strongly influenced by financial institutions.

Trends in corporate sustainability policies

Corporate responsibility reporting has been increasing in the oil and gas sector, and the reporting rates on corporate responsibility in the financial services sector are generally high, with over 70% of institutions surveyed providing reports (KPMG, 2017). More pertinent to Arctic investment is how corporate sustainability policies relate to Arctic oil and gas development. In 2019 and 2020 some of the largest US banks, including JPMorgan Chase, Citigroup, Wells Fargo and Morgan Stanley released statements specific to ending financial support for Arctic oil and gas development. While 19 banks have released statements prohibiting financing for Arctic oil and gas projects, many of these banks still provide other financial services for companies that are heavily involved in Arctic oil and gas development (Figure 1). Only a small number of banks (including BNP Paribas, Crédit Agricole, Société Générale, UniCredit, ING, UBS, and RBS) have taken a more stringent approach to end all financial support and services for companies that are involved in Arctic drilling, and not just financing for specific Arctic projects (Rainforest Action Network, 2020).

Figure 1. Top twenty banks with cumulative and annual financing amounts for companies involved in Arctic oil and gas development. (Source: Rainforest Action Network, 2020)

Example policy statements released by banks is provided in Table 1, and updated information on bank policies related to financing for Arctic oil and gas activities is monitored (Banktrack.org). The definition of the Arctic also varies with some policies explicitly delineating areas above the Arctic circle, and other policies providing no specific definition of the Arctic. One corporate policy specified the boundaries of sea ice coverage at its peak ice extent between February and March to define the Arctic region. This definition includes sea ice that extends far below the Arctic circle in some places. Considering the trends in corporate responsibility statements from a geographical perspective, it is apparent that the earliest efforts were made by European banks. At least one bank

prohibited Arctic oil and gas financial support as early as 2012. US-based banks have primarily focused on financing for Arctic oil and gas development projects, and in some cases have emphasized the commitment not to finance developments in the newly opened Arctic National Wildlife Refuge.

The repercussions in Alaska may not be negligible, and policy makers have made statements related to the political influences and repercussions to banks. For instance, Alaska Governor Dunleavy announced that he was reconsidering relationships between State of Alaska investments with JP Morgan Chase, as well as Goldman Sachs in response to their corporate position on financing Arctic oil development (Rosen, 2020). President Trump also expressed concern about the political influence made on banks to discourage Arctic oil development (Dluohy, 2020). The practicalities of these policies could also jeopardize the future sale of Arctic oil and gas assets to smaller companies. For example, the sale of BP assets in Alaska to independent company Hilcorp recently received publicity as unnamed financial institutions expressed doubts about financing this sale. Although the issue of financing the Hilcorp purchase of BP assets was not specifically tied to corporate sustainability policies, the number of large banks willing to finance such a purchase has declined. This issue may become more prevalent as smaller companies seek financial support to acquire new Arctic oil and gas assets.

It is important to note that the feasibility of future oil and gas development in the Arctic is also linked to access and availability of technological innovations, and limitations on government financing of Arctic oil and gas development. The relative impact of these factors compared to access to capital in an environment of corporate sustainability policies are difficult to address, particularly as smaller, privately-owned corporations that do not disclose sources of their financing become key players in Arctic hydrocarbon development.

Table 1. Financial institution policies related to Arctic oil and gas development.

	Arctic oil and gas policy	Date and source
Morgan Stanley	We will not directly finance new oil and gas exploration and development in the Arctic, including the Arctic National Wildlife Refuge (ANWR)	April 2020 https://www.morganstanley.com/about-us-governance/pdf/Environmental_Policy.pdf
Citigroup	Citi has not previously provided and will not provide project-related financing for oil and gas exploration and production in the Arctic Circle.	April 2020 www.citigroup.com/citi/sustainability/data/Environmental-and-Social-Policy-Framework.pdf
Barclays	No financing for energy projects in the Arctic Circle	April 2020 https://home.barclays/content/dam/home-barclays/documents/citizenship/ESG/Barclays-PLC-Climate-Change-2020.pdf
JP Morgan Chase	Not providing project financing or other forms of asset-specific financing where the proceeds will be used for new oil and gas development in the Arctic.	25 February 2020 https://www.jpmorganchase.com/corporate/news/pr/jpmorgan-chase-

		expands-commitment-to-low-carbon-economy-and-clean-energy.htm
Wells Fargo	Wells Fargo does not directly finance oil and gas projects in the Arctic region, including the Arctic National Wildlife Refuge (ANWR) – part of a larger 2018 risk-based decision to forego participation in any project-specific transaction in the region.	February 2020 https://www08.wellsfargomedia.com/assets/pdf/about/corporate-responsibility/sensitive-industries.pdf
Goldman Sachs	We will decline any financing transaction that directly supports new upstream Arctic oil exploration or development. This includes but is not limited to the Arctic National Wildlife Refuge	December 2019 https://www.goldmansachs.com/s/environmental-policy-framework/#guidelines
Unicredit	A new Oil and Gas (O&G) policy covers the Arctic area and other non-conventional O&G, prohibiting the financing of new projects in Arctic oil and offshore Arctic gas as well as in shale O&G and related fracking, tar sands oil and deep sea mining O&G. Corporate financing for clients active in these areas will only be allowed if their share of revenues from non-supported activities is under 25%.	November 2019 https://www.unicreditgroup.eu/en/press-media/press-releases/2019/unicredit-announces-new-esg-targets-as-part-of-a-long-term-commi.html
Société Generale	In addition, Société Generale refrains from providing banking and financial services to companies which primarily derive their revenues from the exploration or production of Arctic oil, or have a majority share of their reserves in the Arctic region. In addition, Société Generale refrains from being involved in dedicated transactions: For the exploration and production of Arctic oil; For infrastructures exclusively dedicated to the transport or storage of oil from oil sands or Arctic oil	May 2018 www.societegenerale.com/sites/default/files/2018/oil_gas_sector_policy.pdf
HSBC	HSBC will not provide project financing for new offshore oil and gas projects in the Arctic. *The Arctic is the area within the Arctic Circle which is subject to sea ice (that is, within the 1981-2010 March median sea ice extent edge as reported by the US National Snow & Ice Data Center)	April 2018 https://www.hsbc.com/-/files/hsbc/our-approach/risk-and-responsibility/pdfs/200423-hsbc-energy-policy.pdf?download=1
Crédit Agricole	The Bank will not participate in financings or investments directly related to the development, construction or expansion of any oil & gas installation if aware of the following characteristics: project located in the Arctic; infrastructure projects mainly dedicated to projects listed above, e.g. pipeline projects mainly dedicated to the transportation of oil produced from oil sands projects.	December 2017 www.credit-agricole.com/assets/ca-com-front/temp/PDF/CSR-Sector-Policy_energy_oil-and-gas_2017-12_EN.pdf 2012 Refused all financing of Arctic offshore development

	Some transactions are not directly linked to the construction or expansion of a specific oil & gas installation but nonetheless fall within the scope of application of the Policy. In particular, the Policy governs general banking services which may be provided by the Bank to clients which have extensive activities in the oil & gas sector.	
BNP Paribas	BNP Paribas will not provide financial products or services to a company that falls under one of the following activities: - Exploration and production companies for which unconventional oil and gas represent a significant part of their total reserves. *The Arctic region is defined as the offshore area featuring the widest ice coverage over a 12 months period. According to the National Snow and Ice Data Center, the February to March period is the peak period in terms of ice coverage. All the regions covered by ice during this peak period are included in the BNP Paribas's definition of the Arctic region.	2017 https://group.bnpparibas/uploads/file/csr_sector_policy_unconventional_oil_and_gas_19_12_2017_v_standardized.pdf

Alaska summary

Policies supportive of Arctic oil and gas development have not been consistent in Alaska over the last decade. Currently, most of the offshore region remains indefinitely closed to future development, and there remains strong opposition to development in the ANWR. The landscape of corporate ownership of oil leases and oil-related infrastructure is changing as major oil companies divert their focus to regions outside of Alaska. This leaves some opportunity for smaller companies to get involved in Alaska oil exploration and development. A lack of major infrastructure continues to hamper the future development of gas resources, and keeps the cost of oil development high, while favoring industry investment in areas that can be easily connected to existing infrastructure. Given the trend in reducing oil development activity in Alaska by large oil companies, the future of oil development activity led by smaller companies may be at risk from banks not willing to provide financing for Arctic oil and gas. Furthermore, the absence of a state-supported oil company with Arctic expertise and financial stability may also put future Arctic oil development at risk.

Table 2 briefly compares some of the events and policies that have affected the development of oil and gas across the Arctic, with an emphasis on more recent events from the year 2000 onwards. Table 2 is supported by the following brief discussion of relevant factors that may affect the outcome of corporate sustainability policies on oil and gas development in other Arctic countries.

Table 2. Key recent events and policies affecting oil and gas development across the Arctic, emphasizing events from 2000 onwards

Alaska, USA	**Arctic Russia**	**Arctic Canada**	**Norway**	**Greenland**
1920-1999				
1922 - First industry-sponsored exploration of the North Slope 1923 - Federal petroleum reserve (NPRA) designated on Alaska's North Slope 1959-1973 - Mandatory Oil Import Program in place that limits oil imports to 9% of domestic consumption. 1980 – Alaska ends State income tax amidst high oil revenues 1981 – Begin drilling of outer continental shelf exploration wells	1988 - Shtokman gas and condensate field is discovered 1991 - Break-up of the Soviet Union. 1992 - Private petroleum industry begins to develop	1982-1986 - Renewed oil and gas exploration in Arctic Canada. 1989-1991 – Mackenzie delta exploration stops due to low prices	1966 – North Sea Exploration wellbores drilled 1980s - exploration begins in the Norwegian Sea. 1984 - Discovery of the Snøhvit gas field in the Barents Sea. 1996 - First licenses for deep-sea drilling are issued	1984 – Nunaoil is established to allow Greenland/ Denmark participation in oil and gas exploration in Jameson land 1994 - Open-door licensing policy begins 1996 – first onshore exploration well drilled. 1990-1996 - More than 7,000km² of seismic data collected by the KANUMAS Project
2000-2006				
2001 - Oil production begins from offshore well, Northstar in the Beaufort Sea 2006 – Beginning of frequent changes to Alaska oil and gas fiscal policies.	2002 – Beginning of tanker transport from northern Russia to Europe	2000-2004 - Mackenzie Delta exploration resumes 2005 – 2006 - Exploration drilling restarts in Beaufort Sea	2005 – Reimbursement policy introduced to reduce barrier to entry for new companies involved in exploration activity. [1] 2006 - New licenses issued in Barents Sea	2003 - New policy aims to spur interest in West Greenland 2002-2006- Licensing rounds take place, includes open door procedure for Jameson Land in 2002. This allowed companies to apply for acreage on an ongoing basis, with applications

				considered, and areas awarded on a first come, first served basis.
2007-2011				
2009 - offshore oil development leases granted	2010 - Russian Government approves a Comprehensive Plan to develop LNG production on the Yamal Peninsula.		2008 – Eight exploration wells drilled in Barents sea (highest number recorded since 1966)	2009 -Danish Parliament establishes Greenland Self-Government (Act no. 473) 2011- Nunaoil has partnerships in 20 licenses.
2012-2015				
2012 – Arctic sea ice reaches a record low summer minimum extent.				
2012 – Arctic sea ice extent reaches a record low summer minimum. 2015 – US ends ban on crude oil exports.	2012 - Shtokman gas field project put on hold. Foreign partners (Statoil & Total) face State financial burdens that make investment unappealing.[2] 2013 – Yamal LNG receives full LNG project sanction, including environmental approval and construction permits for the liquefaction plant on the Yamal Peninsula. 2013- Prirazlomnoye begins production of offshore oil. 2014- US and EU introduce sanctions on Russia energy sector.			2014 - Oil and mineral Strategy changed to include 2.5% sales royalty in addition to surplus royalty but decreases the state participation via Nunaoil (from 12.5% to 6.25%).
2016-2020				
2016 - Obama Administration permanently excludes all of the Chukchi Sea planning area and the majority of the Beaufort	2017- Yamal LNG shipping begins 2020- Major tax incentives for developing Arctic oil and gas in areas with	2016- Start of five-year moratorium on Arctic oil development.	2017 – Total of 17 exploration wells in the Barents Sea (highest number on	2016 - all licenses offshore West Greenland are relinquished. 2018 - All offshore

Sea planning area from future leasing. 2020 – Trump Administration facilitates future leasing in the Arctic National Wildlife Reserve	little existing development.		record for the region) 2020 – Norway sets northern limit for drilling at 15% ice concentration (within marginal ice zone) which allows activity on licenses already granted in the northern Barents Sea	licenses relinquished for Northeast Greenland. Nunaoil begins a major resource assessment project.

[1] (Norwegian Petroleum, 2020)
[2](Digges, 2012)

Oil and gas development conditions in other Arctic states

Russia

The focus in the Russian Arctic has been to develop its rich gas reserves. Russia has also been more consistent than the U.S. in promoting areas open for leasing, with large incentives for Arctic oil and gas development. In the eastern Arctic where no major Arctic offshore developments are currently pursued, the incentives include a zero percent tax on extraction for the first twelve years of new projects (Digges, 2020). The new legislation also provides large tax incentives for the development of infrastructure such as ports to support LNG transportation.

The inclusion of foreign partnerships for oil and gas development is tightly controlled and all lease owners for subsoil development on the continental shelf must have at least 50% ownership by the state of Russia (Shapovalova & Stephen, 2019). The Yamal LNG development is a significant project that attracted Chinese and French investment (Mitrova, 2016), but other foreign investments and partnerships with India and Vietnam are proving the importance of non-western partners for future developments of Arctic gas reserves in Russia. The financial strength of state-supported companies, Rosneft and Gazprom, is also critical for developing large infrastructure projects. For example, the two gas pipelines linking the Yamal Peninsula cost Gazprom more than US $40 billion (Mitrova, 2019). Current conditions show that access to capital from China and Russian investments influence the short-term development for Russian LNG, and current sanctions limit the availability of investments from banks in the US and Europe (Mitrova, 2016).

Despite the emphasis on gas production, offshore Arctic oil production is also a reality in Russia with the Prirazlomnoye facility in the Pechora Sea. This site is in the southern Barents Sea region, in relatively shallow water. It took over 20 years from the time of discovery to the start of production in 2013. Prirazlomnoye faced large increases in the capital required to continue its development, and throughout the process Gazprom acquired and lost several international partners (Henderson & Loe, 2014). Future offshore oil development plans are currently hampered by US and EU sanctions that have severely restricted access to the technical expertise needed to develop

offshore oil resources. However, the potential to develop new technology domestically, or the lifting of sanctions in the future, have the potential to ramp up Arctic oil development, particularly if such scenarios were combined with higher oil prices.

Greenland

Initial foreign investment for hydrocarbon development in Greenland have focused on exploration interests in western Greenland where waters generally remain ice-free in the summer and fall (National Petroleum Council, 2015). However, results indicating poor commercial feasibility and the trends in the price of oil have hampered decisions to begin commercial extraction of oil or gas. The Kanumas Group, a consortium of corporations working with state owned oil company Nunaoil were granted prospecting licenses in 1989. This consortium included corporations with proven experience in developing Arctic and sub-Arctic resources, such as: ExxonMobil, Shell, and Statoil. Additional foreign investment came from Japan in later years. In 2013, ExxonMobil did not renew their license, but the Kanumas Group moved on to explore sites in northeastern Greenland in 2014 (Casey, 2014). Exploration activity in this region indicated some optimism for operating in northeast Greenland despite the challenges of a short operating season due to the high ice cover. Realistically, the near-term access to lease sites is likely to be hampered by ice drift in the western Fram Strait especially in the summer (Zamani et al., 2019). The cost of exploration activities remains steep in Greenland, and large losses are known for exploration costs that did not result in follow up development activity. For instance, Cairn Energy spent over $1 billion in exploration activities in 2010-2011 before deciding that future activity in the region could only be resumed with additional partnerships (Cairn Energy, 2011; 2012). All offshore leases in northeast Greenland were eventually withdrawn in 2018. At the moment Greenland has only 1 active hydrocarbon license in offshore southwest Greenland held by PanOceanic Energy with the mandated 6.7% lease ownership from state-owned company Nunaoil (Greenland Mineral Resources Authority). The absence of technical expertise domestically in Greenland emphasizes the importance of foreign partnerships as Greenland continues to pursue potential oil and gas development in the future.

Canada

Canada has had a moratorium on Arctic oil and gas development since 2016 with plans to review the moratorium in 2021. However there has been very limited exploration in the region since the 1970s and 1980s when most of the offshore drilling activity occurred. Development of areas explored in the past remains a possibility, especially since companies have no time limit to develop a reserve after filing for a significant discovery finding. There are presently 69 significant discovery licenses in northern Canada on file but no drilling on record in the Beaufort Sea for 20 years. Given that Canada no longer has a Crown Corporation related to oil and gas development (former crown corporation Petro Canada became fully privatized in 2004), there is a lack of state pressure to obtain or keep a level of technical expertise in Arctic oil and gas development as a domestic resource.

Norway

The Norwegian oil and gas industry experienced more stable production compared to the US Arctic, but most activity occurs in ice free waters of the Norwegian Sea and North Sea. Of the 13 production licenses awarded for the Barents Sea region in 2020, all licenses were awarded to joint licensees, and no single-company licenses were granted. There were no exceptions to these leased

areas in the North Sea and Norwegian Sea (Norwegian Petroleum Directorate). Similar to Russia, there is a dominant presence of state-backed companies (Equinor and Petoro) in oil and gas development activity, however, there is no requirement for a minimum co-ownership with a state entity for individual leases. Norway has applauded the diversity of industry participation in their oil and gas development which they describe as an important driver for innovation in new technology while also helping to promote competition and efficiency (Norwegian Petroleum, n.d.). The only oil production present in the Barents Sea comes from the Snøhvit and Goliat fields that began production in 2007 and 2016 respectively. The gas producing Snøhvit field has majority ownership by Equinor and Petoro, while the oil-producing Goliat field is currently operated by Var Energy (with majority ownership from Italy-based Eni) and Equinor. The underlying state support, diversity of lease ownership, and access to domestic technical expertise provides a more stable backdrop for future oil and gas development, where the corporations involved in developing oil and gas may not be particularly vulnerable to the changing bank policies on financing Arctic hydrocarbon development.

Conclusion

As financial institutions set the stage for future funding for Arctic oil and gas development, the long-term commitments of major oil and gas companies may become increasingly important in the future outlook for Arctic oil and gas. Norway and Russia have established state-backed oil and gas companies which may help to better position them to pursue Arctic hydrocarbon development. However, the diversity in corporate lease ownership, as well as strong partnerships with foreign entities for capital, and technological expertise can still limit future Arctic oil and gas development. Greenland has invested in building capacity for state-backed Nunaoil but it has not yet achieved the financial capacity and technical expertise to pursue oil and gas development on its own. The complete absence of state-backed oil and gas companies in the U.S. and Canada puts them at risk of losing private investments for Arctic oil and gas development. Historical evidence demonstrates that political support and tax incentives for hydrocarbon development in Alaska have not been enough to overcome the impacts of market forces on Arctic oil development. The recent trend in U.S. bank policies that prohibit financing for Arctic oil and gas activities could also discourage smaller, private companies from getting involved in new Arctic oil and gas development. As opportunities for U.S. domestic financing for Arctic oil and gas shrink, the future of oil and gas development in Alaska may become an increasingly global-venture as new foreign partnerships and investments may become more a more attractive path to pursue moving forward.

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Fish, Not Oil, at the Heart of (Future) Arctic Resource Conflicts

Andreas Østhagen

As sea ice diminishes in the Arctic, writings about the region have directed focus to accessing and potentially claiming undiscovered offshore oil and gas resources. However, as has been extensively proven, oil and gas resources in the North have not generated conflict or aggression. Instead, another ocean-based resource is emerging as the primary rationale for disputes in the Arctic: marine living resources. Despite a pro-active moratorium on High Arctic fisheries, issues such as quota distributions for mackerel, snow crab, and access to the maritime zone/shelf around Svalbard have proven particularly conflictual in northern waters. Several Arctic states – or their respective Arctic regions – are heavily dependent on fisheries as a source of economic wealth and food security. States are thus willing to go to great lengths to protect their sovereign rights in their economic zones. This article examines three cases of conflict related to fisheries management impacted by global warming in the Barents Sea and the North Atlantic in order to tease out lessons, dynamics and general relevance to the Arctic region.

Introduction

The Arctic resources that have attracted the most attention and speculation, even leading to claims about imminent land-grabs and conflict, are oil and gas (Borgerson, 2008; Dadwal, 2014). However, the prospect of northern resource wars over hydrocarbons has now been debunked. Oil and gas resources – both onshore and offshore – are located in the exclusive economic zones (EEZ) or continental shelves of the Arctic littoral states, which seek stable operating environments within which to extract costly resources far away from their prospective markets (Claes & Moe, 2018; Dodds & Nuttall, 2016; Konyshev & Sergunin, 2014).

This does not mean, however, that resource disputes in the Arctic do not exist. Beyond strategic concerns in the "East–West axis," the North faces issues linked to the delineation and utilisation of maritime space and resources, over which states engage in disputes. The actors in such disputes may hold diverging opinions on international law, resource management and distributional

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principles. From the range of related issues,[1] the one that has caused the most friction between Arctic states has been access and rights to marine living resources.

Global per capita fish consumption increased from an average of 9 kg per year in the 1960s to 14.4 kg in the 1990s and 20.2 kg in 2015, with preliminary estimates indicating further growth beyond 20 kg (FAO, 2018). In countries like Malaysia, Portugal and South Korea, the average person consumes more than 50 kg of fish per year. Wild fisheries are increasingly exploited, decreasing the total available biomass of marine resources. At the same time, stocks are changing their migratory patterns because of changes in the geophysical marine environment (Allison et al., 2009). Those changed conditions are particularly troubling for international management of transboundary fish stocks that move between and across neighbouring EEZs and high seas. Scholars foresee an increase in the failure of global cooperation as the impact of climate change on fish stocks becomes increasingly apparent (Cheung et al., 2017; Pinsky et al., 2018).

In the Arctic, retreating sea ice and climate change are altering the distribution of marine living resources, while demand for these resources has risen. This, in turn, is challenging established management regimes for transboundary resources and demanding new forms of cooperation. Consequently, over the last decade several disputes have emerged over Arctic fisheries, at times even escalating into outright conflict.[2] What, in essence, are the disputes about, and how do states go about attempting to manage, or resolve, them? And what might this in turn mean for the political dynamics in the Arctic more broadly?

To begin answering these questions, this article examines – rather briefly – three specific disputes between Arctic states (and, in two instances, including the EU) that have emerged or been accentuated over the last decade: the mackerel conflict in the Northeast Atlantic; the snow crab conflict in the Barents Sea; and the dispute over the status of the Svalbard Fisheries Protection Zone (FPZ) in the Barents Sea.[3] Although these cases predominantly concern the European and North-Atlantic parts of the Arctic, by comparing the dynamics of each dispute it is possible to tease out lessons of wider relevance for Arctic resource and conflict management – as it is reasonable to expect similar trends emerging as other parts of the Arctic experience changes in the distribution of marine living resources.

The central proposition in this article is therefore that if we want to understand how Arctic resource disputes might evolve in the future, we must examine how the Arctic states have managed contemporary disputes over marine *living* resources in specific parts of the Arctic. Not only are these highly profitable, they are also heavily impacted by the changes underway in the North. This article further starts from the assumption that international regimes have the potential to diffuse tension, hamper conflict and prevent states from only focusing on self-interests (Hasenclever et al., 2000; Young, 1999: 249). Levy and his colleagues developed "three Cs" to understand what regimes do: enhance governmental *concern* over an issue to the extent they are willing to act on it; improve the *contractual* milieu to the extent that mutually profitable agreements are made possible; and enable national *capacities* in implementing and adhering to international regimes (Levy et al., 1995).

Based on this, some elements are central here: the state and use of scientific/external advice when agreeing on quotas for marine living resources (e.g. Polacheck, 2012); the depth of institutionalisation between the states in question (e.g. Young, 1989); and the (un)willingness by states to forgo access to fisheries seen in conjunction with domestic interests and symbolism (e.g.

Ásgeirsdóttir, 2008; Vaquer i Fanés, 2003). These issues are further examined in the three following sections covering the three mentioned disputes, before the final part of this article turns to drawing key lessons from the cases as well as considerations of how Arctic marine living resource disputes might evolve in the near future.

The Mackerel conflict

On its own, mackerel constitutes one of most profitable fish stocks in the North Atlantic, worth around £500 million annually (Findlay, 2014). The coastal states convene annually to agree on quotas for the various fish stocks in the Northeast Atlantic, based on recommendations from the International Council for the Exploration of the Sea (ICES). Since reaching an agreement on quotas in 1999, the Northeast Atlantic mackerel stock has predominantly been divided between the EU, Norway and the Faroe Islands.[4]

In 2006, the mackerel shifted northwards, in tandem with a rise in the sea temperature in the North Sea and North Atlantic. Mackerel is found in waters between 6 and 15 degrees Celsius, and as the waters around Iceland increased in temperature, Iceland found itself with a new fishery (Spijkers & Boonstra, 2017). More northern areas, including the area around Iceland, have become the mackerel's summer feeding ground during the last decade; during the autumn and early winter, they aggregate along the continental shelf edge (for more on this, see Østhagen et al., 2020).

Previously, the stock had barely entered Icelandic waters during summer, but it is currently present throughout the year. The Icelandic government argues that while in Icelandic waters, the mackerel increased by between 43 and 55 percent in weight (Icelandic Ministry of Industries and Innovation, 2012). The country grasped this economic opportunity and started expansive mackerel fisheries in 2007, unilaterally setting its quota on the claim that mackerel fisheries have historically been important for the country (Fontaine, 2015). From virtually no catches prior to the stock's arrival in 2006, Icelandic fishermen caught more than 100,000 tonnes in 2008–2009 (ICES, 2017), constituting approximately 20–25 percent of the total catch of mackerel in the Northeast Atlantic.

Once Iceland was finally recognised by the EU and Norway as a coastal state with rights to mackerel quotas, the annual negotiations granted Iceland a quota of less than 2,000 tons, about 0.31 percent of the total allowable catch (TAC), and the negotiations broke down as the countries disagreed on appropriate quota allocations. The Norwegians especially refused to accept the historic claim, arguing that Iceland's "history-based claim" was "one of the most unfounded claims" ever seen (Hotvedt, 2010: 47). The dispute continued in subsequent years due to a wide discrepancy between expectations and concessions.

In parallel, the Faroe Islands also set unilateral quotas, which were met with indignation from the EU and Norway (Østhagen et al., 2020: 159). That dispute reached its climax when the EU prohibited the import of both Atlanto-Scandian herring and mackerel caught under the control of the Faroe Islands in 2013. In March 2014, the EU, Norway and the Faroe Islands did manage to agree on a long-term management strategy for the stock (European Commission, 2016). The Faroe Islands' demand for a bigger share of the stock was initially rejected by the EU and Norway, but they were included as part of the new long-term management plan as their catch increase was regarded as somewhat legitimate due to their long-time cooperation within the coastal state management regime.

To date, however, Iceland remains outside of the total quota-setting scheme. Over time, the coastal states' combined increase in fishing pressure resulted in ever-growing overfishing of the stock. From 1998 to 2013, the total mackerel quota recommendations issued by ICES have ranged between 300,000 to 700,000 tons. The coastal states, on the other hand, have on average exceeded the quota by at least 100,000 tons annually, prompting questions about the health and longevity of the stock itself (Cendrowicz, 2010; Henley, 2019; Norwegian Ministry of Trade Industry and Fisheries, 2014a). No management agreement involving all coastal states has been reached at the time of writing, and by 2019 the fish stock had lost its "sustainable" certification through the Marine Stewardship Council (MSC, 2019). In late 2019, Icelandic officials stated they would not back down on the issue, while the remaining states criticised its unilateral quota setting for endangering the health of the fish stock (Henley, 2019).

A central point in the dispute is the disagreement over how to interpret the shift of the mackerel stock in and of itself. Two concerns in particular are relevant: What are the drivers behind the change in geographical stock distribution, and how long will it last (Hannesson, 2013: 3)? Norway and the EU consider the fluctuations an irregularity, whereas Iceland has argued that the change is part of a larger ongoing climatic shift (Gänsbauer et al., 2016: 101). Furthermore, there is disagreement over how to calculate zonal attachment, a core concern when setting quotas for a transboundary fish stock (Pinsky & Fogarty, 2012: 890).

Snow crab conflict

Snow crab was first recorded in the eastern Barents Sea in 1996. According to the Norwegian Institute of Marine Research, the current total biomass of snow crab in these waters is considerable: "Rough estimates by Russian scientists indicate that snow crab biomass is approximately ten times higher than that of red king crab, and about half the biomass of shrimp" (McBride et al., 2016). In Canada and the United States, the snow crab fishery ranks among the most valuable fisheries. Thus, expectations in Norway have been high concerning the economic potential of this new species, with some anticipating that it might even surpass cod, the most valuable fishery in the Norwegian EEZ (Fiskeribladet, 2014).

Starting in 2015, however, Norway introduced a ban on the catching of snow crab on the Norwegian continental shelf, which includes the shelf around Svalbard. The regulation was introduced to allow the government to gain control of the activity and acquire greater knowledge and data on the spread of the stock (Norwegian Parliament, 2017). In practice, however, in the regulation implementing the ban the Norwegian government permitted a limited number of licences to be issued to Norwegian fishermen exclusively, through special requests (Østhagen & Raspotnik, 2018a).

Several vessels from EU member states, predominantly Latvia, Poland and Spain, had already engaged in snow crab fisheries on the continental shelf beginning in 2013 (Staalesen, 2017). However, Norway notified the EU that these vessels would be evicted from both the Loophole (the small area of international waters between Norway and Russia) and the waters around Svalbard (Norwegian Parliament, 2017). This irked the EU, or more specifically, some EU fishers. To understand why, we must briefly examine the history of Svalbard's maritime zones.

The Svalbard archipelago, located between the Norwegian mainland and the North Pole, occupies a special position in international relations. Only in the early 20th century, when promising

discoveries of coal were made and mines opened, were specific steps taken to establish an administration: post-war negotiations resulted in a treaty that gave sovereignty over Svalbard to Norway (Svalbard Treaty, 1920). The treaty also aimed to secure the economic interests of nationals from other countries. This was done by including provisions on equal rights and non-discrimination in the most relevant economic activities: Norway could not treat other nationals less favourably than its own citizens, and taxes levied on Svalbard could be used solely for local purposes.

As coastal state rights expanded with the development of the Law of the Sea in the 1960s and 1970s, Norway – like most other states – declared an EEZ of 200 nm off its coast in 1976 (Lov om Norges økonomiske sone [økonomiske soneloven] [Law on Norway's economic zone], 1976). According to the Norwegian government, Norway, as the coastal state of Svalbard, was entitled to establish an EEZ around the archipelago, as the non-discriminatory provision in the treaty referred only, and explicitly, to the islands themselves and their territorial waters (Art. 2). Norway also considers the continental shelf under exclusive Norwegian jurisdiction.

However, this view was disputed by other states. To avoid recourse to legal proceedings, Norway established an FPZ in 1977 (Norwegian Ministry of Trade Industry and Fisheries, 2014b). Management of the FPZ would be on a non-discriminatory basis: Fishers from Norway and other nations would be treated equally, although access to the zone would be granted only to vessels from nations traditionally active in the area. The continental shelf, however, has remained closed for economic activity—until the snow crab came walking in from the east.

The EU accepts neither Norway's claims of unrestricted sovereign rights in the FPZ and on the shelf, nor conservation measures that amount to access restrictions for the European Community. However, as long as these measures are applied in a non-discriminatory manner and are scientifically based, the EU will abide by them (Official Journal of the European Union, 2006; 2011b; 2011a). Thus, the EU neither officially recognises nor rejects the Norwegian position in practice, preferring to keep the peace in lieu of limited potential gains to be had from upsetting the status quo (Østhagen & Raspotnik, 2019; Pedersen & Henriksen, 2009).

However, with the eviction of EU vessels from snow crab fisheries, the dispute has been brought forward. By December 2016, as no agreement had been reached, the Commission proposed to the Council of the European Union (hereafter 'Council') to authorise – albeit with no authority to do so – up to 20 vessels to catch snow crab on the continental shelf around Svalbard. In January 2017, the Council adopted this proposal and accorded five EU member states – Estonia, Latvia, Lithuania, Poland and Spain – the right to issue 20 licences (Østhagen & Raspotnik, 2019). Subsequently, the Norwegian Coast Guard arrested the EU-registered vessel *Senator* (from Latvia, with a licence from Latvia) in the waters around Svalbard in January 2017. This arrest irritated EU actors and drew attention to the issue of snow crab fisheries (Millán Mon et al., 2017). In order to uphold its position, in December 2017, the Council again awarded licences for 20 vessels to catch snow crab in waters around Svalbard, divided amongst the same five member states (Council of the European Union, 2017).

Although Norwegian fishers caught little of this resource, Norway's Minister of Fisheries Per Sandberg vowed never to "give away a single crab!" (Haugan, 2017). In response to this second round of licensing by the EU, the minister announced that Norway would not negotiate the issue further with the Commission, thus ending official talks aimed at finding a solution (Johannesborg,

2017). Around the same time, the snow crab became the subject of debate in the European Parliament plenary session on 18 January 2018, where one MEP characterised the Norwegians as "pirates" in the Arctic (European Parliament, 2018).

Both the EU and Norway define the snow crab as belonging to the continental shelf regime. Therefore, the broader legal ramifications of this dispute concern go beyond the right to catch snow crab on the continental shelf around Svalbard, with potential applications to sedentary resources, such as oil and gas and seabed minerals. Although there has been no oil and gas drilling on the continental shelf around Svalbard, the outcome of the dispute over snow crab might set a precedent for future industrial activity (Tiller & Nyman, 2015; 2017).

Svalbard's Maritime Zone

The arrangement in the FPZ outlined in the previous section satisfied several states that had voiced opposition to Norway's insistence on exclusive resource rights, notably the United Kingdom, the Netherlands and Denmark (Pedersen & Henriksen, 2009: 146). However, other states with extensive fishing rights remained critical, primarily Iceland, Spain and Russia, although their positions have not been identical. Disagreement over how best to allocate and manage marine living resources has the potential to be a source of conflict.

The potential for conflict is especially acute in Norway-Russia relations, given Russian fishing interests in the FPZ and the wider security relations between the two countries. The importance of the FPZ for the Russian fishing fleet must be seen in light of the fact that Russia takes a relatively small share of its catches in the Russian economic zone (REZ), where fish are predominantly young and small, and weather and ice conditions are complicated (Østhagen, Jørgensen, et al., 2020; Zilanov, 2013). Access to both the Norwegian economic zone (NEZ) and the FPZ is vital to the Russian fishing fleet.

Moreover, Russian fishers and commentators are concerned with historical fishing rights in the zone. Reference is made both to fishing history and to the fact that early Russian marine scientists made the greatest contributions to exploration and the mapping of the stocks around Svalbard (Vylegzhanin & Zilanov, 2007; Zilanov, 2016). The fact that Russia, because of its weakened position in 1920, was barred from participating in negotiating the Svalbard Treaty has retrospectively shaped Russian perceptions of Svalbard issues (Jørgensen, 2010; Vylegzhanin & Zilanov, 2007). The Russian position, expressed in diplomatic notes, has been that Norway had no right to unilaterally establish an FPZ and that fisheries in the waters around Svalbard should have been the subject of bilateral negotiations between Norway and Russia.[5] The waters are international, and regulations – which can be set only by international fisheries organisations – can be enforced by the flag state alone, in this case Russia (Pedersen, 2009: 34).

Nevertheless, Norway and Russia, and earlier the Soviet Union, have a long history of cooperation in Arctic fisheries management. When 200 nm EEZs were introduced, the two countries established the Joint Norwegian-Russian Fisheries Commission for cooperation on the management of fish stocks in the whole Barents Sea, which comprises the Russian EEZ, the Norwegian EEZ *and* the waters around Svalbard. The two countries decided to treat the most important stocks (cod, haddock, capelin) as shared stocks, across the whole Barents Sea maritime domain.[6]

Albeit well managed, incidents have occurred in the Barents Sea, with tensions arising between Norway and Russia in connection with Norwegian arrests of Russian fishing vessels in the FPZ, and the potential exists for escalation from this type of fisheries incident to a state-state incident (Kosmo, 2010). The first arrest that marked a more stringent enforcement regime by the Norwegian Coast Guard in the FPZ came in 1998, with the attempted arrest of the vessel *Novokuybyshevsk*. As it was towed by the Norwegian Coast Guard towards Tromsø, there were reports of a Russian Navy vessel leaving the Kola Peninsula headed west, and Russian airplanes were seen passing over the Norwegian Coast Guard vessel. The issue was settled "diplomatically," and the vessel was in the end released before reaching Tromsø (Skram, 2017: 156–157).

Three years later, in 2001, the arrest of the Russian trawler *Chernigov* – the first Russian vessel from the FPZ to be brought all the way to the harbour in Tromsø – led to diplomatic protests from Russia, as well as to the presence of a Russian Navy vessel – *Severomorsk* – in the FPZ the following year, presumably to inspect and safeguard Russian fishing vessels (Østhagen, 2018). As Åtland and Ven Bruusgaard (2009: 335) write, "this rare Russian show of force was apparently meant to send a signal to political decisionmakers in Norway." And in 2005, *Elektron* attempted to flee the Norwegian Coast Guard – with two inspectors onboard – heading for Russian waters. Again, the situation solved through Norway-Russia diplomacy (Åtland & Ven Bruusgaard, 2009; Fermann & Inderberg, 2015; Skram, 2017).

After a few years without incidents, the arrests of five Russian fishing vessels in 2011 – the first year after the maritime boundary was agreed between Norway and Russia – led to an uproar amongst Russian fishers in the Murmansk region (Hønneland, 2013; Østhagen, Jørgensen, et al., 2020). In the Russian media, there were strong reactions against what was described as aggressive and discriminatory behaviour by the Norwegian Coast Guard toward Russian vessels (Jørgensen & Østhagen, 2020). Russia also delivered a protest to the Norwegian Embassy in Moscow. This in turn influenced the Joint Fisheries Commission in 2011 and 2012, hampering negotiations on quotas and access.

With the strained Norway-Russia relations post-2014, further attention has been paid to the potential for conflict in the FPZ over fisheries (for more on this, see Østhagen, 2016). Both countries deem this to be a region of significance, as highlighted by a report by the Russian Defence Ministry in 2017, which listed Svalbard and its maritime zone as potential areas for confrontation between Russia and the North Atlantic Treaty Organisation (NATO) (Nilsen, 2017). In February 2020, in connection with the centenary of the Svalbard Treaty, Russian Foreign Minister Lavrov sent a letter to his Norwegian counterpart listing Russia's complaints, including "the unlawfulness of Norway's fisheries protection zone" (Ministry of Foreign Affairs of the Russian Federation, 2020).

In contrast to the other two cases described above (mackerel and snow crab), the Svalbard FPZ issue does not concern a single stock where allocations and access are the main concern. Instead, it is an example of a maritime dispute where fishing interests (by Russian fishers) at times clash with the Norwegian enforcement regime for marine living resources, with concerns about the potential escalation (Østhagen, 2018: 116). Complicating matters is the fact that the fish stocks in the region are shifting – due to climate change – northwards into the FPZ. With increased fishing by Russian trawlers in the area, the chance of small-scale incidents taking place, and potentially escalating, is a serious concern.

The Future of Arctic Resource Conflicts?

Fisheries disputes are compartmentalised, but increasingly engage the domestic audience

As shown in the cases here, although the potential for conflict over fisheries (access to or distribution of) is relatively high, states have generally preferred to keep disputes – and at times outright conflict – separate from other issues (e.g. Nemeth et al., 2014; Nyman, 2013; Raspotnik & Østhagen, 2020). The mackerel dispute has not hampered quota negotiations on other fish stocks amongst the Northeast Atlantic coastal states (although there have been issues concerning herring), nor has it affected their regional and bilateral foreign relations. Similarly, in the EU-Norway case, politicians and diplomats actively worked to keep the issue separate from larger Arctic-governance questions, preferring to treat it as a fisheries concern instead of linking it to the EU's continuous quest for a role in the Arctic (e.g. Raspotnik, 2018; Raspotnik & Østhagen, 2020).

In the case of Norway and Russia in the FPZ, on the other hand, we see that relatively positive relations in co-management of shared fish stocks play into a larger bilateral security relationship where the two countries are on opposite sides of an "East-West" divide, dynamics which have become more prominent since 2014. Here, bilateral cooperation on fisheries is sometimes a gauge of the larger bilateral relationship, perhaps even with the ability to influence those relations from the bottom-up, as argued by Hønneland and Jørgensen (2015). Still, because of two trends it is unlikely that relations in the FPZ, or fisheries relations more generally, will become less sensitive in the near future. First, an increasing number of fisheries (both Norwegian and Russian) are expected to venture northwards and begin operating in the FPZ around Svalbard, in turn prompting the Norwegian Coast Guard to be progressively present and active. Second, the Barents Sea is playing an increasing role in strategic posturing and military exercises, as NATO countries and Russia showcase their Arctic capabilities.

Although fisheries disputes are, to some extent, compartmentalised, they are also increasingly entangled in domestic politics. This, in turn, changes conflict dynamics at sea. Vasquez and Valeriano (2009: 194) describe a conflict as spiralling when it becomes infused with symbolic qualities. It might be assumed that maritime disputes – whether concerned with fishing rights or boundaries – would be a simple matter of delineating rights and ownership, given the tangible character of such disputes. Huth (1998: 26), for example, has argued that "the political salience of the [maritime] dispute is generally limited, in contrast with the importance and attention often given to land-based disputes."

However, when a maritime dispute reaches the political agenda, domestic actors sometimes seek to benefit from infusing it with intangible dimensions such as "national pride" or "being cheated out of what is ours" (e.g. Hønneland, 2013; Kleinsteiber, 2013; Roszko, 2015).[7] These dimensions could be evidenced here by MEPs' statements over the snow crab dispute; by the arguments of Norwegian and Icelandic fisheries organisations when disagreeing on mackerel quotas; and by the protests of the fishing community in Northwest Russia when arrests of Russian trawlers in the FPZ steadily increased from 1998 onwards.

To a greater extent than before, events at sea trigger domestic response and attention. Kleinsteiber (2013: 15) argues that "the fundamental drivers behind the disputes in the East and South China Seas are not potential or claimed natural resources, but rather domestic politics, rising nationalism, and irredentism." Such outcomes have also been showcased in the Arctic context: When in 2005

the Russian trawler *Elektron* "kidnapped" two Norwegian Coast Guard officers and fled towards Russian waters after fishing with too small mesh nets in waters around Svalbard, the Norwegian media were quick to broadcast the event live on national television. This helped spur politicians into action (Fermann & Inderberg, 2015), although in this instance cooler heads prevailed.

The potential for conflict escalation in maritime disputes stems not only from the economic interests of the actors involved, but also from wider ideas of symbolism and identity. States (and their inhabitants) *do* care about their maritime disputes, even those of limited economic value such as the snow crab, and increasingly so. That might limit the room for manoeuvre of politicians in Arctic coastal states, as they attempt to solve fisheries conflicts that – on the face of it – should be relatively easy to settle, or at least manage.

Climate change causes disruption, but international cooperation can alleviate pressures

When states exploit stocks independently of each other to maximise their own short-term benefits, a so-called "tragedy of the commons" takes place and the stocks become subject to depletion. Therefore, disputes and conflicts between states over fisheries have been commonplace throughout history.[8] Moreover, climate variation and change, ultimately leading to ocean warming and a more variable environment, is altering the foundations of marine life. For example, a study on marine species on the east coast of the United States found that as the oceans warm, fish are moving to colder areas, with significant effects on fishermen's catch and revenues (Pinsky et al., 2013). This has consequences for the management of marine areas and resources.

In the Arctic, temperatures have risen more rapidly than expected, and will probably increase by 3–8° C before 2080 (Norwegian Polar Institute, 2020). The circumpolar region includes not only the Arctic Ocean, but also parts of the North Atlantic and the North Pacific, as well as multiple maritime domains, such as the Barents Sea, the Beaufort Sea, the Chukchi Sea, the Kara Sea and the Norwegian Sea. Some of these domains are home to some of the world's largest fish stocks, which are extremely valuable for Arctic coastal states.

The interests states hold in marine living resources as showcased in the cases highlighted here—the Icelandic and Norwegian interests in mackerel fisheries, Russian fisheries interests in the waters around Svalbard, and the interests of the EU and EU member states in snow crab fisheries—should not be underestimated. Although the monetary value of these fisheries might not dwarf that of other Arctic industrial or economic ventures, neither is it insignificant from a financial viewpoint. Furthermore, as is discussed, the symbolic dimension of local and regional fisheries should not be ignored. Arctic states (driven by their fishers and fisheries) are not likely to forgo access to fish stocks or yield quotas simply because the fish stocks themselves have altered their distributional patterns.

Here, the role of scientific advice in preventing future conflict stands out as a particularly relevant dimension, especially in the mackerel dispute. The use of an assumedly neutral source of reliable information is crucial for trust in the relevant regime, especially when dealing with issues linked to climate change (Sarewitz, 2004: 386). If, however, there is too much uncertainty surrounding reliable information, actors sometimes opt to ignore, select or even hide relevant information (Polasky et al., 2011: 402).

One solution that states in the Arctic and beyond have used to alleviate such pressures is regional issue-specific multilateral cooperation. For example, the Barents Sea management regime –

through the Joint Norwegian-Russian Fisheries Commission – has often been heralded as best practice with regards to marine resource co-management mechanisms (Hønneland, 2014; Stokke, 2000). Similarly, in the Bering Sea, as the pollock stock collapsed in the early 1990s after a decade of overfishing in the so-called "Donut Hole," a regime came into existence to manage the stock (Bailey, 2011: 1–3). In 1994, an agreement on a temporary moratorium on pollock was reached by the various national stakeholders, including Japan, China, Poland and South Korea, with stringent enforcement measures (Dunlap, 1994: 47).

More recently, in 2018, the five Arctic states with direct access to the Arctic Ocean, together with China, Japan, Iceland, South Korea and the EU, agreed to prevent unregulated commercial fishing in the high seas of the central Arctic Ocean (Agreement to prevent unregulated high seas fisheries in the Central Arctic Ocean, 2018). This was heralded as a "proactive rather than reactive approach, showcasing the Arctic states' commitment in dealing with climate change" (Sumaila, 2015). There are similar bans on fishing within the EEZ in the Chukchi Sea (where the United States imposes the ban unilaterally) and the Beaufort Sea (with the United States and Canada imposing the ban bilaterally), which are in place pending further research on the potential fish stocks migrating to these areas.

These are examples of how states, either bilaterally or multilaterally, have managed to agree on guidelines or rules for how best to manage shared fish stocks in or close to Arctic waters. If we return to Levy et al. (1995), it is apparent that concern regarding the issues (how to manage shared marine resource) is already present amongst Arctic costal states. What these governance mechanisms enable is a milieu where a common goal (the sustainable yield of a fish stock) and shared scientific data trump self-interested state action (most of the time).

In other words, although conflict potential exists concerning marine living resources in the Arctic – and not in oil and gas, as the title of this article states – disputes over such issues are not bound to escalate and/or become protracted. However, taking proactive measures or diffusing an ongoing dispute requires both political engagement *and* concern over the long-term effects of a protracted dispute. Here, the mackerel dispute can serve as a staunch lesson, as the stock lost its rather valuable MSC-certification in 2019 (MSC, 2019).

The future is blue

In the Arctic and beyond, we can observe rapid changes in the maritime domain over the last few decades. Changes deriving from resource pressures, international commodity prices and new technologies are external to the ocean. Rising sea levels and other oceanic changes resulting from climate change, as well as changing resource distributions, are happening in the maritime domain, and are to varying degrees the consequences of human behaviour. As these changes occur, attention is increasingly directed towards the question of "who has what rights" at sea.

It is no secret that humanity is experiencing a widespread reduction in the total biomass of marine resources, closely linked to human exploitative activities (FAO, 2018). At the same time, stocks are changing their migratory patterns because of changes in the geophysical marine environment (Brander, 2010). Maritime domains hold great economic potential in terms of marine living resources, and climatic and environmental changes are impacting the distribution and characteristics of these resources, making the situation particularly ripe for conflict. This risk is also acute in the Arctic.

It would be simple to conclude that the conflict potential between states over how best to manage marine living resources in the Arctic is likely to rise, as a consequence of these factors. However, the Arctic states have a history of developing co-management mechanisms to solve problems with overfishing in northern waters. International cooperative mechanisms have grown in all oceans bordering the Arctic, as well as in the Arctic basin itself. They have grown out of a realisation that continued over-exploitation would lead to a lose-lose situation for all states concerned. As the Arctic is particularly prone to environmental changes, states will continue to navigate emerging issues with marine resource management and distribution. Fish, not oil, is indeed at the heart of future Arctic resource conflicts, but that does not mean these conflicts cannot be managed, or even resolved.

Notes

1. Examples include the disputes over the status in international law of the Northwest and Northeast Passages, the processes for determining the limits of continental shelves on the Arctic seabed beyond 200 nautical miles, the status of the continental shelf and/or maritime zone around Svalbard and efforts concerning marine protected areas and access to genetic resources/bioprospecting in northern waters.
2. I distinguish between *dispute* and *conflict*. The former entails tension and/or incompatibility between actors' positions on an issue; with conflict, those positions have hardened and come to a head, and action is undertaken by one or more parties, imposing significant costs on the others (Galtung, 1969). Despite common usage, "conflict" does not necessarily entail military hostilities or war.
3. Each of these case studies builds on previously published articles that have examined them in depth. See (Østhagen, 2016, 2018; Østhagen, Jørgensen, et al., 2020; Østhagen, Spijkers, et al., 2020; Østhagen & Raspotnik, 2018b, 2019; Spijkers & Boonstra, 2017)
4. In the North Atlantic, Denmark (on behalf of Greenland and the Faroe Islands), Norway, Iceland, the Russian Federation and the EU signed the Convention on Future Multilateral Cooperation in North East Atlantic Fisheries in 1982. This led to the creation of a specific regional fisheries management organisation (RFMO) for the region: the North East Atlantic Fisheries Commission (NEAFC), tasked with recommending measures to ensure a sustainable harvest of fish stocks in the Northeast Atlantic. NEAFC only has jurisdiction in waters outside of the 200 nautical mile EEZs, but it also makes recommendations applicable to the national economic zones.
5. Note from Russia to Norway, 18 August 1998, cited in Pedersen and Henriksen (2009), p. 146.
6. The cooperation has been analysed by Geir Hønneland in several publications, see e.g. Hønneland, 1999, 2014.
7. Interestingly, this was a prominent part of the campaign to leave the EU during the United Kingdom's 2016 Brexit referendum, despite fisheries only accounting for 0.05% of the country's GDP (Lichfield, 2018).
8. Relevant historical examples include the UK/Iceland Cod Wars in the 1960s and 1970s, and the Canada/Spain Turbot War in the 1990s (Børresen, 2011; Kristensen, 2005; Missios & Plourde, 1996).

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Maritime Militarization in the Arctic: Identifying Civil-Military Dependencies

Timothy Choi

This paper reconsiders extant discourses on Arctic security within the wider body of militarization literature and suggests that the enduring peacetime roles of Arctic maritime forces has resulted in a limited, but recognizable, militarism. However, this militarism is not to be confused with alarmist interpretations of potential interstate conflict or a predilection towards violence. Rather, in focusing on the blurred responsibilities between regional naval, coast guard, and civilian organizations, I highlight the social-economic and material dependencies between Arctic civil societies and their governments' security providers. Specifically, this paper compares Norwegian, Danish, and Canadian approaches to their respective regional maritime security interests, emphasizing how the process of militarization has developed in the relationships between their Arctic civil societies and those countries' Arctic maritime security infrastructures. It argues that Arctic literature would do well to move beyond binary debates over whether the Arctic is or is not militarized, and instead recognize that certain sectors of regional societies have long been dependent on the continued sustainment and modernization of maritime and, occasionally, naval power, which continuously provides support for peacetime civilian ways of life. Only with this understanding can the material developments of Arctic military and paramilitary power be properly contextualized.

Introduction

Discourses of current and future prospects of Arctic interstate relations have tended to fall into two primary frames: that the Arctic region has been and will remain a zone of cooperation and non-violence, or that the Arctic has seen a lesser or greater degree of "militarization" that will lead to increased acrimony and conflict (Pincus & Zebich-Knos, 2016). On the one hand, numerous international agreements between erstwhile rivals on the international stage – specifically Russia and the Western powers – appear to point to an "Arctic exceptionalism" denoting a successful separation of the region from the conflicts and differences that mark those actors' relations elsewhere on the globe (Special Senate Committee on the Arctic, 2019: 90; Exner-Pirot & Murray, 2017) On the other hand, Arctic-dedicated military exercises have increased in scale and frequency

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alongside expensive recapitalization of Arctic-capable military equipment (Special Senate Committee on the Arctic, 2019: 105). And so, while clear examples of Arctic cooperation can be seen in the 2010 resolution of the Barents Sea disagreement between Norway and Russia or the 2011 Arctic Search and Rescue Agreement, equally clear signs of potential conflict can be seen in the resumption of Russian bomber flights near NATO member airspaces and NATO's 2018 Trident Juncture exercise in Norway (Jensen, 2011; Arctic Council, 2011; Haynes, 2019; NATO, 2018). These contradictory developments have led to arguably unproductive stalemates in the literature regarding the extent to which each "camp" is correct about the state of Arctic militarization and prospects for future conflict versus cooperation (Huebert, 2019: 10-15; Lajeunesse, 2016: 298; Käpylä & Mikkola, 2015: 7; Exner-Pirot & Murray, 2017: 59-61).

Assumed within this set of discourses is a binary approach to the idea of "militarization": the Arctic either is or is not being militarized. In understanding militarization, the default association has been with physical military equipment or events, such as new military bases or training exercises. Within the broader literature on militarization, however, is the understanding that militarization is a process that is done not just to spaces and places, but to and by people and societies. Specifically, militarization has been defined by German historian Michael Geyer as the "contradictory and tense social process by which civil society organizes itself for the production of violence" (Geyer, 1989: 79). Under this definition, militarization is not simply the obvious increase in the numbers of military equipment or occurrences of exercises, but a broader acceptance and effort by society's non-military sectors aimed towards the ability to do violence. Hand-in-hand with the process of militarization is its manifestations as militarism, which is understood most commonly to be "the prevalence of martial values in civil society", but which Geyer introduces as the dependency of civil society sectors on the preparation for and production of violence.

It is with this latter understanding of militarism that I analyze the debate over Arctic "militarization" and propose that the discussion can be more productive if we recognize that sectors of Arctic societies have already become militarized in their reliance upon their respective state's (para)military institutions and capabilities. Specifically, this article explores the ways in which Norwegian, Danish, and Canadian civilian sectors have become socio-economically and materially dependent on their countries' maintenance of maritime (para)military assets on land and sea. These three countries are chosen for their shared relatively small sizes compared to their Russian and American neighbours, and relatively less attention regarding the history and development of their (para)military forces. The article begins with an overview of how militarization has been discussed within Arctic literature, which is followed by a deeper discussion on the concepts of militarization and militarism. It then employs these conceptual understandings to recontextualize the capabilities and roles of the three countries' current maritime forces and infrastructures within their respective populations' everyday lives.

Arctic conflict and cooperation: parallel views

Central to the recent discussions on Arctic interstate conflict versus cooperation is the observation that all eight Arctic states have been procuring Arctic-capable (para)military equipment, building new military infrastructure along Arctic coastlines (where applicable), and engaged in repeated military exercises throughout the region. Collectively referred to as the "militarization" of the Arctic, these observations focus on the physical elements of traditional "national" security – as opposed to non-traditional "human" or "environmental" security, and non-material security

relationships. But interstate relations are not characterized solely by military activities, and much of the literature have also highlighted the enduring cooperative atmosphere between the Arctic states in matters that are not, on the face of it, traditional military and national security issues. This section will outline in further detail both sides of this discussion in order to characterize the extent and limits of the debate.

Within popular media, the predominant discursive frame for Arctic politics is one that focuses on the aforementioned physical military elements, especially as tools for pursuing regional economic resources. With headlines such as "Military drills in Arctic aim to counter Russia, but the first mission is to battle the cold," (Cooper, 2019) or "Climate change opening up new resources in the Arctic, and a new fight to claim them," (Moran, 2019), a casual or even interested reader would be hard-pressed not to assume there is a massive military role in the search for and exploitation of the Arctic's natural resources. Canadian politicians, including Northwest Territories premier Bob McLeod, have expressed concerns about sovereignty that could be lost to unnamed others (Moran, 2019; Edwards, 2019), and modernized Russian Arctic military bases defended by Bastion anti-ship and Pantsir anti-air missiles have received significant public attention (Isachenkov, 2019). In the United States, Alice Hill, senior director of the Obama Administration's National Security Council, recently called for increased US Arctic military preparation to avoid "falling behind in the race to capture new economic opportunities" (Hill, 2019). Such articles are not limited to the recent years of increased Russian-Western antagonism following the former's invasion of Crimea, however: the previous decade saw similar articles, such as *The Guardian*'s "A very cold war indeed" with the lead explicitly referencing "major military build-ups beginning in the area" (2008). The dual constants of Arctic resources and military build-ups have continually and consistently been framed in relation to each other, with the general claim that those military investments would be used to secure the extraction of those natural resources. Why military force is necessary to secure these resources, of which 95% is within recognized Exclusive Economic Zones of their respective countries, and how, exactly, those military forces might be used for such an objective is generally left to the reader's imagination (Brosnan, Leschine, & Miles, 2011: 180; Østerud & Hønneland, 2013: 168; Breum, 2018: 43).

In contrast, Arctic scholars and governmental experts have generally taken great pains to emphasize an atmosphere of international cooperation and legally-constrained behavior between the Arctic states, especially as it pertains to the relationship between economic resources and military means (Grant, 2010: 429-43; Coates, Lackenbauer, Morrison, & Poelzer, 2008: 163-165; Exner-Pirot, 2018; Breum, 2018: 43). The core of this rests upon the 2008 Illulisat Agreement, in which the Arctic Ocean coastal states affirmed their intentions to adhere to the United Nations Convention on the Law of the Sea as the legal mechanism for resolving any maritime disputes. Certainly, the history of the past eleven years bears this out: none of the Arctic states have employed military forces to assert ownership of any disputed natural resources or geographic space. Despite popular articles claiming states are engaged in a "scramble for resources", scholars like Klaus Dodds (2016: 174) have noted that "interested parties will need to negotiate on the matter of sovereign rights in the central Arctic Ocean"; such a peaceful prospect is buoyed by cooperative examples such as the September 2010 agreement between Norway and Russia on delimiting their boundary in the Barents Sea (Jensen, 2011). Even the most pessimistic of Arctic scholars do not foresee an Arctic conflict erupting over the hydrocarbons and minerals resting under the seabed. Rob Huebert, for example, suggests that if there were to be interstate military conflict in the Arctic, then it would

stem from global geopolitical competition between the United States, Russia, and China rather than for solely securing Arctic economic resources (Huebert, 2019: 10-15). Meanwhile, Marc Lanteigne at the University of Tromsø highlights how geopolitical competition between the global great powers is moving the Arctic region "from the strategic periphery and towards an uncertain mainstream in emerging global strategic discourses" (Lanteigne, 2019). Such acknowledgements of the Arctic's national security role often cite Russia's invasion of Crimea as a sign of the country's willingness to use military force as a regular instrument of national policy in violation of international norms and laws, with implications for similar future behavior in the Arctic.

At the other end of the spectrum, some scholars continue to downplay the significance of military assets in the Arctic Circle. Michael Byers, for example, goes so far as to claim the Soviet (and current Russian) nuclear-powered ballistic missile submarine (SSBN) fleet was based out of the Kola Peninsula not "because it is in the Arctic [but rather] because the Barents Sea is ice-free throughout the year, providing assured access to the Atlantic Ocean" (Byers, 2019: 6). This, however, ignores the 1980s turn in Soviet naval strategy that focused on establishing "bastions" under the Arctic ice cap for their SSBNs, the missiles on which had acquired the range to strike North America without needing to go past NATO anti-submarine lines and into the Atlantic. Simultaneously, the United States and NATO began planning and practicing an offensive naval strategy aimed at stopping the Soviet SSBN fleet before they could reach relative safety under the Arctic ice cap (Grove, 1991: 21, 29-30; Lehman, 2018: 58, 182-183; Wood, 1989: 340; Dodds, 2016: 157; Tamnes and Holtsmark, 2014: 27). This bastion strategy continued into the post-Soviet era, cementing the Kola Peninsula and its Arctic Ocean access as a fundamental part of Russian national security (Boulègue, 2019: 6-8). Furthermore, Russian submarines have continued to exercise the practice of "pierside launch", whereby they fire their missiles from their Kola bases without setting sail (Pry, 1999: 169; Nilsen, 2019). Thus, contrary to Byers' claim that the Kola Peninsula has not been "weaponized", the opposite has, in fact, long been and continues to be the case. He is, however, to be commended for distinguishing between "militarization" (supporting infrastructure) and "weaponization" (actual weapons emplacement), though both terms remain firmly defined by military materiel and, by their own definitions, apply to the Kola Peninsula's many military bases (Byers 2019: 5). In material and strategic terms, parts of the Arctic have long been, and continue to be, heavily "militarized", playing host to some of the world's most expensive military equipment (e.g. SSBNs and anti-ballistic missile systems) as well as being a weapons launch zone and transit area in the event of major superpower conflict (Tamnes and Holtsmark, 2014: 31-32).

Militarization and militarism: bringing in the rest of society

In the above characterizations of militarization in the Arctic, the Arctic is treated as a primarily physical, geographic, space. From "remote" military bases standing alone amidst polar bears and endless ice, to oilrig platforms and icebreakers surrounded by frigid oceans without any other humans in sight, there is an implicit assumption that man-made instruments of power are disconnected from the human societies of which they are a part. However, these materiel do not exist for their own sake: they serve functions, both intended and incidental, that cannot be separated from the rest of their respective national societies. It is this societal, human, element of militarization that this section will now elucidate.

In recognizing militarization as a social phenomenon rather than merely a material one, German historian Michael Geyer highlights the distinction between militarization and militarism. While the

former is the "*process* in which *civil* society organizes itself for the production of violence" (emphases added; Geyer, 1989: 79), militarism manifests in two ways. The older, more conventional militarism was the "predominance" of martial values in civil society, where the state's military "was presumed to have an extraordinary influence…capable of affecting society at large." Geyer (1989: 67-68) termed this "nineteenth-century" militarism, modeling it off of the Prussian-German experience, where societies' "genuine interests and outlooks were presumed to be peaceful [but] could succumb to militarism by taking on the *Gessinnung* (spirit), language, and behavior of military castes." In this sense, martial values were transferred unidirectionally from the military to civilian society.

Geyer, highlights, however, that the mass mobilizations that occurred during the World Wars resulted in a dramatically different and more deeply entrenched type of militarism. This "twentieth century" militarism could be described as the dependency of civil societies on the preparation and/or conduct of war – whereby, borrowing Clausewitz's famed statement, "war is not just the continuation of social organization by other means, but [rather] war becomes the very basis of social organization; that is, if societies live off war or its preparation and propagation either economically, politically, or culturally" (Geyer, 1989: 80). Within popular consciousness, the idea that "peaceful" and democratic societies can become held enthralled by war-preparation or war-making requirements is perhaps best encapsulated by US President Eisenhower's simultaneous defense and critique of the American military-industrial complex, especially in the prioritization of the critical perspective in popular readings of Eisenhower speech (Janiewski, 2011: 684-686). However, while the idea of profit-seeking industrial elites dictating the terms of government policy may be attractive in its simplicity, Geyer's observation runs at a much deeper, more nuanced level.

As an example of Geyer's definitions as a framework in action, American anthropologist Catherine Lutz highlighted the militarized economic and social dependencies of civil relations in Fayetteville, North Carolina. Chosen for its proximity to Fort Bragg, "one of the largest military complexes in the world" (US Army, 2019), Fayetteville has become one of several cities in the United States in which civilian lives are inextricably tied to the development and existence of a nearby military base. As part of the city's militarization, "labour and resources allocated to military purposes" became intensified (Lutz, 2002: 723). For example, in order to serve the thousands of soldiers and their families at Fort Bragg, an outsized proportion of Fayetteville's labor force became dedicated to service and retail industries. These low-paying jobs suppressed the economic development of the city, rendering it continually one of the poorest in the state. This is further aggravated by the fact that military bases are federal property and therefore cannot be taxed by the municipality despite making up nearly a quarter of the city's geographic area (Lutz, 2002: 726-727). Paradoxically, Fayetteville and other cities can use their close ties to local military infrastructure as leverage for federal funding and investment. The latter includes vital infrastructure such as interstate highways, which the federal government implements in return for the city's continued acceptance of the economic and social conditions required to sustain the base (Lutz, 2002: 726). As a result, such cities are militarized in the sense that their civilian populations and economy have become dependent on the continued existence of military bases. So long as such bases exist, the cities are severely limited in what economic activities can take place; at the same time, should those same bases be downsized or altogether decommissioned, these cities might well collapse due to the sudden lack of income from military personnel and families who buy groceries, go to movie theatres, and frequent restaurants, as well as reduced federal interest.

Thus, unlike the discussions on the Arctic, dedicated literature on militarized societies highlights not only military equipment and bases themselves, but especially the institutionalized dependencies of civilian lives and sectors on the continued maintenance of the means required for war. This militarism that closely integrates the military and the civil results from the continuous process of militarization – ergo, if we can identify instances of militarism in the Arctic, then it can also be safely said that militarization has long and already been underway in the region.

Militarized dependencies in the civilian North

Recognizing the societal aspect of militarization and militarism allows us to examine the Arctic beyond the typical debate about inter-state conflict and cooperation. That being said, the physical environment can play, as will be argued in this section, a significant role in determining the extent to which civil societies become reliant on militarized institutions. Justified by their primary mission of defending the state against external human enemies, militaries often possess expensive self-sufficient abilities to operate at the full extent of extreme conditions. This allows them to provide vital services to civil society, such as all-weather search and rescue capabilities, that would be financially difficult to duplicate in non-militarized forms due to the relatively rare occurrence of events requiring such capabilities. And because the geographies of states can result in proximity to adversaries in regions that are sparsely populated, there is a further rationale in terms of deterrence and military response time to establish military presence in those regions away from population centres – a situation that is exacerbated in the Arctic. This presence can take the form of military bases, which in turn create a source of income and jobs for local civilians. Similar to Lutz's observations of Fayetteville, a dependency by civilians on continued military presence is formed. However, this dependency is not always met with resentment, or indeed acknowledged as problematic.

Perhaps one of the most poignant examples of this was the objection from local civilians when the Norwegian government announced the closure of the Andøya Airbase by 2022, located near the village of Andenes in the country's north. The airbase is operated by the Royal Norwegian Air Force and hosts P-3C Orion anti-submarine maritime patrol aircraft. It is also the municipality's single largest employer, providing some 700 jobs. Given Andenes' population of 2,694, it is easy to understand why the base's closure was decried as Andenes' "kiss of death" – the sudden unemployment would be further exacerbated by the loss of income from base personnel who would otherwise frequent local businesses (Statistics Norway, 2019; Eilertsen, 2018; Staalesen, 2018). For instance, Andenes coffee shop owners Robert Svendsen and Gina Wold told NRK reporters that the closure "is a tragedy" and "a great disappointment" (Skeie & Bjelland, 2018). When the closure was announced in 2016, Andenes' mayor expected it to result in "at least 1,000" residents leaving the region (Berglund, 2016). Although 2022 remains a few years away, the impact of the announcement is already being seen: technicians working at the air base and living in the area have already begun leaving, resulting in a "critical" lack of personnel required to service the aircraft still stationed at the base (Skeie & Steinholt, 2018; Olsen, 2018). Similar to the federal-municipal relationship experienced by Fayetteville, Andenes has also become beholden to the decisions of Oslo. The decision to close Andenes, put forth by the federal Labour party, faced disagreement and opposition from its own representative in Andenes, Kjell Are Johansen, who claimed that his party "[did] not choose to listen to the economic, military and environmental arguments for preserving Andøya air station" (Skeie & Bjelland, 2018).

At the same time that the Andøya base is being closed, the aircraft currently based there are being replaced with new P-8 Poseidon aircraft, which will be based out of a new air base at Evenes. This transition to Evenes has been justified in terms of consolidating limited numbers of expensive long-range surface-to-air defences with air force aircraft to ensure the latter's safety on the ground in the event of war. The 1400 citizens at Evenes are reportedly "very happy" about the move, which expects to bring four hundred new jobs to the even smaller village (Mehren & Eriksen, 2018). It is important to note that this militarized dependency manifests not in a rejection or resistance by the civilians to military presence, but a *desire* to acquire and maintain that presence. Within the context of limited economic opportunities in the sparsely-distributed population of the north, it appears that having such a large proportion of the civilian population economically beholden to the continued existence of a local military base is worth the risk of potentially facing the same future mass unemployment as Andenes. The cost of this militarism is not limited to the civilian population, however: from an operational perspective and as argued by Andenes union representatives, Evenes is further inland than Andenes, which reduces the aircraft's ability to loiter and monitor the ocean space in support of, for example, fisheries protection (Mehren & Eriksen, 2018). The wartime martial requirement for protecting military forces is thus in contradiction with those forces' peacetime objectives of surveillance.

Norway's Arctic maritime capability

At sea, Norway's Coast Guard (Kystvakt), operating under its Navy, illustrates the prioritization of day-to-day civilian-support missions, institutionalized in its material force structure and activities. In the aftermath of the Cold War, the Kystvakt has greatly modernized its fleet of both offshore and inshore vessels (Saunders, 2011: 578-579). Whereas the Cold War era fleet of offshore patrol ships were built to support both the daily mission of fisheries patrol as well as to be able to fit missile and torpedo armament for wartime contingencies, the new vessels were built to prioritize environmental protection with only a single gun on the bow for enforcement purposes. Equipped with a low, flat stern deck for equipment such as tow ropes and oil containment booms, these ships have formed the backbone of Norway's maritime federal presence – not just far away from shore to ensure fisheries regulations are adhered to, but within the country's territorial waters as well. The Coast Guard Act of 1997 invested the Kystvakt with the legal responsibilities and rights to support other Norwegian governmental agencies, such as customs and the police, as required (Forsvarsdepartmentet, 2017; Forsvarsdepartmentet, n.d.). Kystvakt members are invested with the authorities of those agencies, acting in their stead where unique seagoing capabilities are required. This effectively has meant that a military agency has become responsible for duties as varied as the following: ensuring cruise ship exhausts meet sulfur pollution restrictions through the use of aerial drones (Stensvold, 2018); ensuring tourist fishermen stay well back from fish farms in Norwegian fjords (Robak & Haukenes, 2018); and checking the papers of foreign merchant ships to ensure compliance with Schengen Zone regulations (Skram, 2007). Offshore in the EEZ, the larger Kystvakt ships also serve as floating hospitals and firehalls, providing vital medical and firefighting services for the civilian fishing fleets that are so central to the Norwegian coastal economy (Skram, 2007; Pedersen, 2012: 10).

Denmark's Greenlandic and Arctic maritime capability

In the Danish Realm, the impact of remote military bases and their closure or opening has a much smaller effect on civilians. Whereas many Norwegian military sites are situated throughout a long

and narrow strip of territory away from large civilian population clusters, the bulk of Denmark's military is concentrated on the continental homeland of Jutland and islands spanning the Danish Straits between the North and Baltic Seas, which minimizes the proportional economic impact of Danish military bases (Forsvarkommandoen, 2019b). Meanwhile, Denmark's interest in the Arctic lies with its self-governing offshore territories, the Faroe Islands and Greenland. For the former, no large military facilities exist, while the latter currently plays host to only three major military installations: Thule Air Base operated by the United States Air Force; Grønnedal, a naval base that served as the primary port for Danish warships during the Cold War but is now little more than a refueling depot; and Kangerlussuaq, the only international airport in Greenland used for regular commercial jet aircraft and home to the Danish Air Force's Challenger aircraft, used for surveillance and search and rescue (Forsvarskommandoen, 2019a). Additionally, Kangerlussuaq, as well as Narsarsuaq and Kulusuk airports, were built by the US military during World War II and the early Cold War as airbases, which now serve as major hubs on which many local communities depend for domestic and international travel (Air Greenland, 2020; Visit Greenland, 2019). Otherwise, the Royal Danish Navy's patrol ships of the *Thetis* and *Knud Rasmussen* classes operate out of the civilian harbour at Nuuk, as well as through Reykjavik in Iceland, which serves as the closest resupply and crew change port to eastern Greenland (Jensen, 2011: 321; Stockmann & Sturkell, 2018; Breum, 2018: 40-42). As a result, there are comparatively minimal direct dependencies between military facilities in Greenland and nearby civilian populations. Grønnedal, for example, used to be its own small town with some 140 occupants as late as 2009, but which had been closed down in 2012 and major functions consolidated at Joint Arctic Command in Nuuk (Scheelsbeck, 2009: 4; Søndergaard, 2014). The base did, however, provide scheduled medical and air transportation services for the 150 civilians living in Arsuk, twelve nautical miles away (Forsvaret, n.d.: 4; Forsvarsministeriet, 2011). Grønnedal became the centre of a minor international drama when Chinese investors indicated an interest in purchasing it, upon which Danish authorities abruptly cancelled the port's sale and returned it to operational status in 2017, albeit at a much reduced state of activity with only a three watchkeepers and a slow cleanup underway (Krog, 2017; Matzen, 2017; Fischer, 2018).

Nonetheless, the role of the Danish military in the lives of Greenlandic citizens is not inconsiderable. While the primary mission of the Danish military in Greenland is to ensure the territory's sovereignty through constant presence and surveillance, its day to day missions focus on ensuring Greenlandic and Danish civilians' ability to work on and around the oceans through fisheries inspections, search and rescue, and environmental protection (Forsvaret, n.d.: 3; Scheelsbeck, 2009: 4; Breum, 2018: 48-49; Danish Ministry of Defence, 2019). Although such roles are often delegated to dedicated coast guards, long-standing concerns over Greenlandic territorial integrity has meant Denmark continues to use its navy for these peacetime roles.

When they were first built at the end of the Cold War, the four Thetis "inspection ships" were designed for both peacetime and wartime functions in offshore areas, built with the "STANFLEX" system allowing weapons, such as torpedoes and anti-ship missiles, to be fitted in standardized slots. Since then, however, two of the ship's three STANFLEX slots have been repurposed to better reflect their primary peacetime missions: new enclosed hangars for small boats have been built on top of the spaces formerly reserved for STANFLEX, and the crane module that used to occupy the STANFLEX slots are now permanent additions on the ships. Nonetheless, the ships retain an ability to employ limited violent force if necessary, with a 76mm rapid firing gun on the

bow a constant presence in addition to .50 calibre machine guns that can be mounted throughout the ship's decks if necessary. These ships' newer, smaller cousins of the *Knud Rasmussen* class are similarly fitted with STANFLEX capability, but face logistical challenges should advanced weaponry be equipped (Breum, 2018: 55). These violent means are a reminder that although the Danish navy's 1st Squadron, under which these patrol ships fall, functions to ensure the safety of civilians and to enforce environmental regulations, it is nonetheless prepared to use military force to defend the territorial integrity of the Greenlandic and Faroe maritime spaces. That said, sovereignty assertion can be enhanced in more ways than through the demonstration of brute force. As Danish journalist Martin Breum details, the Danish patrol ship *Ejnar Mikkelsen* rendezvoused with the cruise ship *Expedition* in September 2010 in northeastern Greenland. The purpose of this was not just to be present in case of a rescue emergency or to enforce hunting regulations, but to also, literally, show the flag: "…the naval officers [on *Ejnar Mikkelsen*] also calculate…that photos of the *Ejnar Mikkelsen* and a swaying Danish flag will be uploaded to Facebook and the rest of the internet. The whole world will learn that Danish naval ships are in attendance here" (Breum, 2018: 61). The dual nature of the Danish military in the Arctic, then, is clearly illustrated: the "continuous process", in the words of Danish admiral Nils Wang (Breum, 2018: 63), of sovereignty assertion that is manifested through the military's ability to provide regulatory and emergency services – activities that are, in more populous regions, usually conducted via strictly civilian institutions.

These Arctic states' reliance on military institutions for civilian functions are also characterized by the unique nature of their regional maritime environment. Because Denmark's patrol ships in Greenland were built to operate in remote ice-covered waters, they have also proven to be opportune vessels for civilian objectives that involve in-ice operations, such as updating navigational charts that require clear readings of the seabed or taking salinity readings of the water column. Civilian scientific research organizations have entered into agreements with the Royal Danish Navy to make use of these patrol ships where research objectives and patrol areas align; indeed, such civil-military cooperation is so close that one such organization, the Danish Centre for Marine Research (Dansk Center for Havforskning, or DCH), worked with the RDN on the design of the third *Knud Rasmussen* class patrol ship, HDMS *Lauge Koch*, to make it more suitable for oceanographic research. The DCH even funded some of the key equipment that is used on board *Lauge Koch*, such as a permanently-installed Teledyne Reson 7160 multibeam sonar and various modular hydraulic winches to lower and retrieve scientific instruments (Dansk Center for Havforskning, 2018). Similarly, the Kystvakt icebreaker KV *Svalbard* became the first Norwegian ship to reach the North Pole on August 21, 2019, while supporting civilian scientists from the Nansen Center (Bentzrød, 2019). All of this, of course, on board vessels armed with at least one rapid-firing cannon on the bow. The fact that military forces, particularly maritime ones, routinely operate in remote Arctic spaces that are prohibitively expensive to access and of minimal direct importance to most civilians means that civilian researchers interested in such regions are often dependent upon the state's military or paramilitary infrastructure to support their work.

Canada's Arctic maritime capability

In Canada, while civilians occasionally remain reliant on military assets for search and rescue, much of the responsibility and capability have devolved into civilian hands. Whereas Norway's Coast Guard is a part of their navy and has its own armed capability and the Royal Danish Navy's 1st

Squadron is responsible for both traditional defence and coast guard duties, the Canadian Coast Guard (CCG) is a wholly separate civilian organization from the Royal Canadian Navy (RCN). Because Canada's ice-capable federal vessels are currently all Coast Guard vessels, this means the Canadian maritime presence in the Arctic is predominantly a civilian, rather than military, one. When civilian scientists wish to conduct research in Canadian Arctic waters, they travel on board the CCG's unarmed icebreakers (Amundsen Science, 2019; Romaine, 2019). If a major oil spill were to occur, it would not be an RCN frigate that arrives with pollution control equipment stored ad-hoc on the helicopter deck, but a CCG vessel with dedicated space and storage for containment and recovery – perhaps even a pre-positioned container loaded onto the CCG ship using its own heavy-duty crane or a contracted civilian ship (Canadian Coast Guard, 2008: [sic] 4-15, 5-12 – 5-13). In the event of a search and rescue (SAR) incident, however, all agencies are expected to play a role as and when available. Local civilian volunteers, such as those organized into federally-supported Canadian Coast Guard Auxiliary (CCGA) units, will likely be the first responders given the potential remoteness of the location from major federal rescue assets (Canadian Coast Guard, 2018). While CCG icebreakers often carry their own helicopters for ice reconnaissance and general transport, these are not purpose-built for SAR and lack infrared and night vision sensors and hoists that can lift injured persons into the cabin (Johnson, 2018). Rather, aerial SAR in Canada is the domain of the Royal Canadian Air Force (RCAF), whose unarmed bright yellow CH-149 Cormorant helicopters and CC-115 Buffalo fixed-wing airplanes are dedicated to SAR missions and accordingly equipped (Royal Canadian Air Force, 2015). In the event of emergencies, Joint Rescue Coordination Centres (JRCC), such as the ones in Trenton and Halifax, coordinate federal and local military and civilian assets. This multi-level approach is necessary especially for the Canadian Arctic due to the vast distances involved. The aforementioned RCAF aircraft are based in the southern part of Canada and can take many hours, if not days, to arrive at a distress location (Royal Canadian Air Force, 2015). This makes it imperative that local, often civilian, responders are ready to play a role in locating and saving lives.

Canada's current reliance on unarmed assets to carry out SAR and environmental protection duties in its maritime Arctic therefore stands in contrast with its Scandinavian neighbours. While all three involve civilian entities as part of potential responders, only Canada has a dedicated offshore response capability that does not play an armed military role. For Norway and the Danish Realm, offshore and remote SAR and environmental duties have been militarized in their heavy dependence upon armed naval forces.

In the coming years, however, this situation may begin to homogenize. The first of Canada's eight *Harry DeWolf* class Arctic and Offshore Patrol Vessels (AOPVs) is nearing entry into service. Six of these 6300-ton ice-capable ships will be operated by the Royal Canadian Navy while two will be for the Canadian Coast Guard in an offshore patrol role (Gunn, 2019). Lightly armed with a weather-protected 25mm gun on the bow and a pair of .50 calibre machine guns (it is uncertain whether the CCG variants will be similarly equipped), these vessels will provide Canada with an armed naval capability in ice-covered waters during the summer season for the first time since the 1950s. Much like their current Scandinavian counterparts, the *DeWolf* class are expected to play a primarily non-military role, being focused on supporting SAR, scientific, and environmental protection activities in the Arctic and offshore areas, while bringing with them a basic armed capability to assist in sovereignty operations and law enforcement activities taken under the legal

authority of other agencies such as the Royal Canadian Mounted Police or Fisheries and Oceans Canada's Fisheries Officers (Royal Canadian Navy, 2019).

At the same time that the RCN is growing to introduce a more constant Arctic presence, the CCG, which has traditionally taken the federal maritime lead in the Arctic, is slated to only remain at its current size – if not decrease. It was only as recently as August 2, 2019, that the Government of Canada announced its decision to procure, in addition to the *Diefenbaker* polar icebreaker, six new medium and heavy icebreakers for the CCG to replace its existing fleet of the same number (Public Services and Procurement Canada, 2019). By the mid-2020s, when all of the *DeWolf* class vessels are expected to enter service, six out of fifteen Canadian government vessels capable of summer Arctic operations will therefore be a military vessel. Of course, maintenance and training schedules mean not all fifteen ships will be operating at the same time, but nevertheless we can expect to see nearly half the summer federal maritime presence be of a militarized character in contrast to the current primarily civilian architecture. The exception to this has been the sporadic Canadian Armed Forces exercises in the Arctic for brief periods as part of Operation Nanook, which usually take place in ice-free areas or on land (Government of Canada, 2019).

Conclusion

While academic debate over the extent to which the Arctic is militarized tends to focus on the procurement, emplacement, and exercise of military hardware, much of the discussion tends to ignore the civil population occupying it. The centrality of military forces in the Arctic during the Cold War did not disappear overnight with the collapse of the Berlin Wall and rise of the unipolar moment. The extensive and intensive physical and social infrastructures that had developed to support sovereign claims and a prospective transpolar war were not so quickly or easily dismantled. At the same time, this need for military presence in the remote northern regions provided opportunities to support civilian objectives, ranging from scientific expeditions to simply assuring a country's citizenry could use the land and seas to their full extent, secure in the thought that rescue services would be available.

Militarization in the Arctic is not, in itself, subject to debate: the presence and use of military forces in the region have and continue to be well-established. Therefore, what much of the Arctic militarization literature *should* be concerned about is not so much *whether* militaries are in the Arctic, but rather *what* their roles are. However, the two have often been conflated, where militarization is in itself seen and framed by popular media and a minority of scholars in an alarmist manner, where military presence is assumed to be for interstate confrontation over access and resources (Pincus & Zebich-Knos, 2016: 126-127). At the same time, scholars arguing for and highlighting a cooperative atmosphere in the Arctic region should not ignore the very real and enduring militarism embedded in the societies of Arctic states: a militarism characterized by the dependence of civil sectors on the maintenance of military forces and their unique capabilities, rather than a predilection towards the use of violence or other martial traits.

It is important to recognize that although militarized dependencies are clearly prevalent to differing degrees across the Arctic, it would be difficult to argue that this is to the absolute detriment of the peoples living in the region. Military equipment can often provide enhanced abilities that make them more suitable than civilian alternatives. On August 13, 2019, two tourists and their guide requested assistance from Greenlandic authorities when they found themselves disoriented in the midst of wildfire smoke between Sisimiut and Kangerlussuaq. While local police diverted Air

Greenland's SAR-dedicated S-61 helicopter to try to find the trio (Air Greenland, 2019), it was unsuccessful. Fortunately, the Royal Danish Navy support ship HDMS *Absalon* was in the area supporting the firefighting efforts, and the ship's SH-60 Seahawk helicopter, equipped with more advanced sensors required for traditional military missions, was sent to assist. The Seahawk succeeded where the civilian S-61 did not, safely bringing the three persons to the Sisimiut hospital (Vinther, 2019). Such uses of military forces for peacetime missions in support of civilians has tended to be ignored in literature concerning Arctic military developments, often focusing on wartime or high-tension scenarios. In taking seriously the peacetime role of military forces and the specific physical capabilities that requires, Arctic militarization can be analyzed with greater nuance without defaulting to a security dilemma-driven framing of spiraling confrontation.

Table 1: Armed Offshore Patrol Ships of Norway, Denmark, and Canada (August 2020)

Country and Ship Class	**Number in Class**	**First of Class in Service**	**Full Load Displacement (t)**	**Armament (current, excluding small arms)**	**Ice Rating (theoretical in 1st year pack ice, unless otherwise stated)**
Norway					
KV *Svalbard*	1	2002	6375	1x57mm cannon	1 m
KV *Nordkapp*	3	1981	3200	1x57mm cannon	1 m as built (since deprecated)
KV *Barentshav*	3	2008	4000	1x40mm cannon (not always equipped)	n/a
KV *Harstad*	1	2005	3132	1x40mm cannon	n/a
Denmark					
HDMS *Thetis*	4	1991	3500	1x76mm cannon	80 cm / DNV ICE 1A
HDMS *Knud Rasmussen*	3	2008	2050	1x76mm cannon	85 cm (empirical)
Canada					
HMCS *Harry DeWolf*	1 (+5 more for RCN and 2 more for Canadian Coast Guard, totaling 8)	2020	6440	1x25mm cannon, 2x0.50 calibre heavy machine guns	1.2 m

Notes

1. Data collated from the following: Arild-Inge Skram (2017). *Alltid til Stede: Kystvakten 1997-2017*. Bergen: Fagbokforlaget. 104-105; Harald Danielsen and Martin Lund Tverå (May 2019). *Kriseberedskap i Arktis* [Bachelor's Thesis]. Sjøkrigsskolen [Norwegian Naval Academy]. https://fhs.brage.unit.no/fhs-xmlui/handle/11250/2608109. 27; Jan P. Jansen and Per Christian Blichfeldt (1998). *Havets Voktere: Historien om Kystvakten*. Oslo: Schibsted. 144; Per Herholdt Jensen (2005). *Atlantsejlerne: Flådens inspektionsskibe i 100 år*. Copenhagen: Aschehoug. 245; Per Herholdt Jensen (2010). *Grønlandssejlerne Flådens: inspektionskuttere og inspektionsfartøjer*. Frederiksværk: Nautilus Forlag. 303-304.; Per Herholdt Jensen (2011). *Støt Kurs: Flåden ved Grønland i 275 år – Grønlands Kommando i 60 år*. Frederiksværk: Nautilus Forlag. 201; Naval Material Command (u.d.). *THETIS Class Patrol Frigate* [Official Pamphlet]. Royal Danish Navy. 4, 10; Royal Canadian Navy (2019, November 15). Arctic and Offshore Patrol Ship Project. Government of Canada. http://www.navy-marine.forces.gc.ca/en/fleet-units/aops-multimedia.page?.

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Climate Resilience of Arctic Tourism: A Finnish Perspective on the Post-Paris Agreement Era

Juho Kähkönen

The Arctic is more globalised than ever and, in the Anthropocene, the Arctic region should be recognised as the laboratory of the future of industrial civilization (GlobalArctic, 2020). The actions taking place in the Global Arctic today may indicate how climate change impacts our future (see Finger & Heininen, 2019). Therefore, an analysis of the Arctic can provide a 'road map' for the post-Paris Agreement era (see Wu et al., 2018). In the Arctic, where the effects of climate change are the strongest, we see the importance of climate resilience, a concept highlighted in the Paris Climate Agreement. Arctic tourism in Finland is an illustrative example of climate resilience, as the industry has to respond to many different changes at the same time. Finland's government has set the goal of achieving carbon neutrality as the first industrialised society in the world by 2035. Global warming and the changing business environment is increasing the vulnerability of the tourism industry. Simultaneously, dramatic impacts following COVID-19 restrictions may halt the first-rate success of this locally essential livelihood. Unless we are able to effectively coordinate efforts to develop climate resiliency, the implementation of necessary measures will be delayed.

Introduction

In the Arctic region, tourism has a close relationship with the surrounding nature (Saarinen & Varnajot, 2019: 1) which is why climate change, with its diverse effects, is a key challenge for Arctic tourism (Kaján, 2014). Arctic tourism in Finland after the Paris Agreement is an illustrative topic for climate resilience research, as the Finnish government has outlined that by 2035 the country will be the first industrialized carbon-neutral society in the world (see Finnish Government, 2019). Globally, tourism grew strongly in the years leading up to the COVID-19 crisis and accounted for 5–8% of the greenhouse gas emissions in the world. This article engages with the following research question: what do the local perspectives of climate change on Arctic tourism tell us about their climate resilience in the post-Paris Agreement era? The material of the study consists of 20 semi-

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structured interviews conducted in Lapland, northern Finland, and the theoretical framework consists of the theory of climate resilience and theory-guided content analysis. The interviews for this study were conducted before the COVID-19 pandemic.

Regardless of the scenarios, the ongoing environmental changes are causing significant socio-ecological changes in the Arctic region (AMAP, 2017b: ix). However, the implementation of the Paris Agreement may reduce changes in the Arctic after 2050 (AMAP, 2019: 3). This study highlights four key findings on the climate resilience of Arctic tourism: 1) climate resilience is linked to the vitality of the region; 2) growing uncertainty challenges and renews climate resilience; 3) the capacity to bounce back acts as an indicator of climate resilience; and 4) in Finland, climate resilience in Arctic tourism is currently at a sufficient level, but there is a growing need to develop it. The study also highlights the need for more systematic coordination in carrying out the necessary actions to both mitigate the emissions and to adapt to climate change. This finding is in line with international comparisons, where the voluntary emission-control measures taken by the tourism industry have often proved ineffective (see e.g. Lenzen et al., 2018: 526–527; Scott et al., 2012: 11; WTTC, 2009). Balance is needed to fulfil local needs and global responsibilities.

The next section describes the relationship between climate change and Arctic tourism. This is followed by a section describing the theory of climate resilience. The methodology is then described before the local analysis figures. The end of the article summarises the study results before providing conclusions.

Climate change and Arctic tourism in Finland

In Finland, Arctic tourism is an important and strongly growing industry (Rantala et al., 2019: 20–21). The national goal is to make Arctic tourism a 'spearhead' of national tourism marketing (Prime Minister's Office, 2017: 1–2). In the municipality of Lapland, the tourism sector, which is heavily focused on the winter season, directly employs more than 10 percent of the local work force and attracts more than 3 million annual visitors (House of Lapland, 2019; Lapland Tourism Strategy, 2019: 12–14).

Arctic tourism is on the frontline facing multiple climate risks. After the dramatic results of the IPCC Special Report, Global Warming of 1.5 °C, and the Arctic Monitoring and Assessment Program, it is clear that with climate change there are no winners (see e.g. AMAP, 2017a; AMAP, 2017b; AMAP, 2019). Meanwhile, it is challenging to measure the capability to adapt, which is affected by the diversity of the Arctic tourism in Finland, its varying locations, and its cultural factors. For example, while a shortening winter increases vulnerability, it can simultaneously increase the experience of certainty of snow compared to competing travel destinations (Kaján, 2014: 6 & 48–50). According to Tervo-Kankare et al. (2018: 14 & 20), despite identified risks, Arctic tourism benefits from the environmental changes in the short run. Rantala et al. (2019: 54–57) are more cautious about possible benefits of climate change and outlines how the future of nature tourism, local infrastructure, invasive species, changes in customer behaviour, changing tourist profiles and the general increase in weather uncertainty are significant threats to livelihood.

With regards to global analysis, the tourism industry has so far been unable to take necessary action on its own initiative to mitigate or to adapt to climate change (Lenzen et al., 2018: 526–527; Scott et al., 2012: 11). This confirms the assessment that the role of public administration in ensuring local adaptability is significant. In Finland, the key problem for the tourism industry to adapt to

climate change is the lack of adaptation strategies. Strategies that guide the development of industry, such as Finland's Tourism Strategy 2019–2028 and the Lapland Tourism Strategy 2020–2023, comprehensively address economic growth and many dimensions of sustainability, but do not provide tools for preparing for climate change. In the assessment of Finland's National Climate Change Adaptation Plan (2019), the tourism industry received the weakest results among other industries (Mäkinen et al., 2019: 30). There were, for example, the least measures taken in tourism, and none of the respondents had an adaptation strategy in place (Berninger et al., 2018: 14 & 24).

According to Lenzen et al. (2018: 526–527) and Scott et al. (2012: 11), the poor success of the tourism industry in voluntary emission control means that the public administration must ensure that emissions from tourism are reduced. Climate change mitigation is inevitably in the interest of the tourism industry (Scott et al., 2015: 18–19) and within the European Union tourism has long been under increasing pressure because of its greenhouse gas emissions (Gössling, 2009: 17). For example, carbon tax and emissions trading are seen as ways of limiting emissions from tourism (Lenzen et al., 2018: 526–527).

Lenzen et al. (2018: 522) estimate that global tourism generates 8 percent of all greenhouse gas emissions. According to the World Tourism Organization, the tourism industry currently produces about 5 percent of all energy-related CO2 emissions and this is projected to continue growing steadily (World Tourism Organization and International Transport Forum, 2019: 11). For the time being, there are no reliable estimates of emissions from Arctic tourism in Finland. One indication is the fact that only one of Lapland's 21 municipalities has committed to the objective of carbon neutrality (Finnish Environment Institute, 2020). However, projects on low-carbon tourism have been launched and it is expected that more detailed information on emissions will be available in the future (see Regional Council of Lapland, 2020). In order to become a carbon-neutral country during the next 15 years, Finland will have a lot of work to do, but the trend is optimistic. National greenhouse gas emissions have fallen by 26 per cent since 1990. Prior to the pandemic, during the year 2019 alone emissions fell by 6 percent (Official Statistics of Finland, 2020: 5.) The Finnish Government stands firmly behind its aim to make Finland climate neutral by 2035, a view which the ongoing pandemic has only reinforced (United Nations, 2020).

Paris Agreement and climate resilience

Tourism is one of the main contributors of anthropogenic climate change which is why there is a discrepancy when examining the various positive effects of local climate resilience on transformative changes (see e.g. Arctic Council, 2016, 110; Einarsson, 2009; Einarsson, 2011) and the effects on the global level. The situation can be described by the term "super wicked problem" associated with anthropogenic climate change, where those who solve problems also create them, where each attempt at a solution leads to a new problem, and in addition, solutions must be global (Sun & Yang, 2016: 2–3).

As a legally binding solution for mitigating climate change, the Paris Agreement set three key objectives: to curb rising average temperatures, strengthen adaptive capacity and climate resilience, and redirect financial flows towards low-carbon development (Paris Agreement, 2015). Irrespective of the actual emission scenario that will be realised, the strong changes in line with the current climate change trends will continue for at least the next 20 years (Finnish Meteorological Institute and Ministry of the Environment, 2018). As a result, in addition to mitigating climate change,

societies will have to address the inevitable need to adapt to climate change. This requires climate resilience (Paris Agreement, 2015).

Resilience is a characteristic that describes the ability to act, recover, and thrive during and after various disturbances and shocks (ARAF, 2017: 2; Lentzos & Rose, 2009: 243). Transformative changes are central to climate resilience, because alongside a changing climate, climate change causes fundamental systemic changes in societies. These are often the result of not only disruptive events but also of preparedness for and response to them (IPCC, 2014: 1107). Inadequate consideration of transformative changes increases local vulnerabilities and risks (Bahadyr & Tanner, 2014: 9–12).

In Finland, climate change increases the average temperatures twice as fast as the world average. The warming is strongest in the northern parts of the country. (Ruosteenoja et al., 2016a: 3–15.) This is problematic for Arctic tourism, as the length of winter and certainty of snow are essential to income generation (Rantala et al., 2019; Hall, 2014). However, climate change poses challenges throughout the year, such as an increasing number of extreme weather events and increasing rainfall (Ruosteenoja et al., 2016b; Finnish Meteorological Institute and Finnish Environment Institute, 2018.)

Tourism is one of the industries that is most vulnerable to climate change, and the climate resilience of tourism is essentially determined by the surrounding society, state finances, political stability, and the economic environment. In practice, these affect the ability to make the necessary decisions, invest and further implement strategies for climate change adaptation and mitigation. (Dogru et al., 2019: 292–298.) This is also the case in Finland, where the capacity of Arctic tourism to adapt to climate change is strongly linked to the surrounding society (Kaján, 2014: 48–50). Since the Paris Agreement, the role and responsibilities of the corporate sector have been increasingly emphasized in climate policy (Chatham House, 2018: 6–8; Nasiritousi & Bäckstrand, 2018: 21–23), but the importance of public administration coordination is emphasized with regard to the diversity of the tourism industry.

Weaknesses in the study of climate resilience are often related to the lack of consideration of non-climate variables and societal dimensions (Adger, 2000; Adger, 2010). In tourism ecosystems, the fact that customers are the fastest adapters for climate change poses challenges to the others, dependent on these tourists (see e.g. Becken & Hay, 2012: 40–41). For this reason, tourism resilience emphasizes the agency of travel destinations and local communities in responding to climate change (Lew & Cheer, 2018: 3–12). The basis for tourism resilience is the well-being of the community, the infrastructure provided by the society, and the social, economic, and political capacity and resources (Dogru, 2019: 300; Gómez Martín, 2005: 574–576). In practice, the climate resilience of tourism requires climate change adaptation and mitigation measures that cut across societies.

This study follows the tradition of Arctic resilience, which has arisen from the need to respond to intense climate change in the Arctic (ARAF, 2017). Arctic resilience is built on the empowerment of individuals and networks, and public administration has a significant role to play in developing it (Arctic Council, 2016: 5–8). The theory is applied in practice, for example, in the analysis of climate resilience (Koivurova & Kähkönen, 2018: 5). The Arctic Resilience Report (2016) determines Arctic resilience as follows (Arctic Council, 2016: 8):

> The capacity of people to learn, share and make use of their knowledge of social and ecological interactions and feedbacks, to deliberately and effectively engage in shaping adaptive or transformative social-ecological change.

In this study, Arctic resilience is complemented with Grove's (2018) theory of resilience applied to the anthropogenic world which expresses two things in particular: 1) an attempt to understand a changing world despite the limited amount of information available, and 2) a willingness to design existing structures so that they would be better suited to the new environment. The premise of the theory is to improve the existing situation rather than de-stabilize it, and thus the theory supports institutions in order to better respond to vulnerabilities caused by permanent change (Grove, 2018: 5 & 274–275). The usefulness of Grove's theory is emphasized as a result of the increased uncertainty and unpredictability of international politics (Lindroth & Sinevaara-Niskanen, 2019: 192).

Methodology

In the study of climate resilience in tourism, it is important to involve local stakeholders (Dogru et al., 2019, 300). Methodological choices of this research are driven by this tradition to reveal local approaches to global phenomena. As an output of this, research reveals local perspectives to climate change and climate risks. Twenty anonymous semi-structured interviews were conducted for this study. The study looks at how climate resilience appears on the local level, hence all interviewees are local people from Finnish Lapland. Mainly they represent entrepreneurs, tourism specialists, workers, and politicians. The persons interviewed were selected using a purposive sampling method typical of a case study that allows for the study of a little-studied phenomenon (Robson, 1993: 141–142). As there are limited numbers of people familiar with the topic, several name lists were collected to fulfil a broad spectrum of stakeholders. The interviews were conducted in Finnish and the quotes used in this article are translated to English.

Content analysis makes it possible to carry out a systematic and objective analysis aimed at obtaining a generalizable and relatively concise description of the phenomenon studied. The approach chosen for this study is theory-guided approach to qualitative content analysis, where the starting point for the study is the data, but the empirical analysis of the materials will be further connected to theoretical concepts. This study commits to the interpretative tradition of content analysis, where the central idea is to describe the state of things on a general level (Tuomi & Sarajärvi, 2018: 113, 117–118 & 133).

Climate resilience is linked to the vitality of the region

According to previous research, the climate resilience of travel destinations is highest in the travel destinations with the greatest social, economic, and political capacities, as well as the highest level of infrastructure provided by society (Dogru et al., 2019: 300). The well-being of the local community is also essential to the climate resilience of the tourism industry (Gómez Martín, 2005: 574–576). These points of view also emerge strongly from the material of this study. Stakeholder interviews highlight how the climate resilience of tourism is linked to the vitality of the region and to national decision-making. In practice, the estimated impacts of climate change are closely linked to everyday political issues and the vitality of the region creates the basis for its climate resilience. Thus, local action is based on local vitality.

This is highlighted in nearly all interviews, for instance, by references to national policies that define the infrastructure provided by the society in northern Finland, which to some extent is perceived as peripheral. For example, adaptation to climate change culminates in everyday issues of basic infrastructure, such as public services that are perceived as limited, and they are not thought to take into account the specific features of the Arctic region, such as long distances. The fact that many decisions are made far away in the capital city is also felt as part of the problem.

> The development of tourism in Lapland would have been even stronger if the decisions were not made in Helsinki. If Rovaniemi were making the decision, we would have had better results with all the indicators. […] One rule for the whole country, that just does not work. I mean, if the basic conditions for living here are taken away, meaning police or hospitals, post offices and shops.

The dependence of tourism on public infrastructure concretizes the relationship with the decision-making in the capital, highlighting the limits of local agency. The general experience is that with the limited resources available, it is challenging to carry out new tasks. In practice climate adaptation and mitigation has to be linked to other ongoing development work.

> When setting the goals for the government program, we pointed out that tourism is connected to so many things in a way. That it is such a diverse field.

According to Botterill et al. (2000: 9–10), important decision-making for the tourism industry often takes place in the "cores", with the result that in the periphery, where many tourist areas are located, power is also perceived as weak in local issues. These power structures become concretely visible when comparing the infrastructures of the core and the periphery (ibid). In Lapland, this often materializes in the north-south dichotomy (Suopajärvi, 2001: 121–123). Koivumaa (2008), for his part, examines the structures that form peripherality in Lapland. His central observation is the actual capacity of Lapland to dismantle peripherality through the international system, of which the success of international tourism in Lapland is a key example.

Although Lapland and the region's tourism industry are in fact subordinate to decision-making in the capital city, they have notable autonomous agency to develop the climate resilience of the industry. Indeed, the data shows general optimism regarding adaptation to and mitigation of climate change.

> Without flights, there will be no such tourism business here that would make it possible for people to live in this province. That's definitely a big question there. If we talk about climate policy, then similar things will probably happen all over Europe.

The main concerns are the potential impact of climate policy on mobility. Air transport is a particular worry, as there are not yet enough alternatives.

> Our travel destinations should become carbon neutral pretty quickly, at the minimum. The ski resort Pyhä is at the moment carbon neutral […] What is certain is that flying will become more expensive and day charters are probably something we will say goodbye to in the near future.

The industry exerts fate control over climate policies, as long as the perceived vital conditions are not compromised. Climate policy following the Paris Agreement also brings opportunities, because Arctic tourism in Finland is, in principle, well placed to implement the necessary changes. The high

national standards and the stable operating environment are believed to be variables that have already made pioneering initiatives, such as a low-carbon ski resort, possible.

In summary, the climate resilience of tourism is strongly linked to the surrounding society. Currently, climate resilience is being actively developed, but slowly alongside other interests in the region. As a result of limited resources, the active agency that is essential for climate resilience is limited by national decision-making, but at the same time, the industry has the will to increase its climate resilience. Pioneering companies with low carbon footprints are concrete examples of the capacity for independent action through the international system.

Growing uncertainty challenges and renews climate resilience

The material highlights the growing uncertainty linked to weather and social change, which simultaneously challenges and renews climate resilience. The ways weather and climate affect tourism are a widely studied topic (see e.g., Smith, 1990: 176; Hall, 2014; Njoroge, 2015: 96; Fang et al., 2017) and local observations do not contradict the research.

> It is the variations, that make it difficult. The fact that you cannot know it anymore. Before, the limit of winter was in mid-November. […] Last summer, June, August and September were really good. We had a 10–15% increase in sales and visitor numbers, but July was a little behind the previous year. Inevitably [the weather] had effect. And I'm pretty sure that it was due to the crazy heat wave that was not good for us, as people probably sought relief by the rivers.

Weather uncertainty is observed in the data in many ways, but entrepreneurs in particular provide accurate estimates based on actual sales. Some of them have gathered reference material for decades. Weather uncertainty makes business planning difficult, as a result of which many have changed some of their practices. For example, safari routes have been redesigned so that program services can be implemented safely even in years when there is less snow or when bodies of water do not freeze as desired. This literally describes resilience as the willingness to redesign.

In addition to the weather, uncertainty is caused by a multitude of indirect effects that indicate a wider social shift. Often, these effects appear in surprising and unexpected ways, making them challenging from the point of view of climate resilience.

> It is clear that these uncertain circumstances will be reflected in things like insurance, security issues, training needs and the need for audits. No matter what force majeure clauses there are, there may still be claims for compensation and repayment.

As a result of the uncertainty, the tourism industry has reviewed the potential benefits as well as the disadvantages of climate change. This is in line with earlier research (e.g. Tervo-Kankare, Kaján & Saarinen, 2017) but the less researched perspective is, that in some cases, this leads to zero-sum game thinking, where the benefit experienced by one is a loss to another, and vice versa. Such thinking is common, although in reality such situations are rare (Davidai & Ongis, 2019: 1–2). Such observations often lead to an erroneous assessment of the neutrality of perceived risks (Binmore, 2007: 216–217). In the data, this is reflected in the view that climate change is a locally manageable risk. Recent research, however, challenges this assessment (see AMAP, 2019; Rantala et al., 2019: 51–57) which is why this view should be problematized.

From the point of view of climate resilience, a zero-sum game is problematic because underestimating the risks will delay the launching of the necessary measures. A recurring observation in the data is that one's own risks related to climate change are tolerable, because the activities of others are more strongly affected by climate change. Often this conclusion is reached with careful consideration and preparation, which is reflected in the comprehensive reasoning.

> In an activity like ours, based on making use of nature at all times and on this environment, then climate change is not so strongly reflected here because we can flexibly produce new programs and products. And we are prepared for changes.

Fate control is one of the most important starting points for climate resilience and it shows faith in the capacity to influence one's own future (see ASI, 2010: 127–146). Conversely, fate control may cause vulnerability to climate resilience if the risks are underestimated as a result. At its most concrete, the assessment of risks as 'manageable' is reflected in the fact that no significant action has been taken at the system level to develop climate resilience, even if the need has been identified. Even though some pioneers are already making headway, coordination and resources are still expected from the outside. This is an understandable approach, as public administration and strategical coordination usually play an important role in Arctic tourism. However, in terms of climate resilience, this is not the case, as can also be seen in the actions of those bodies who normally enforce coordination.

> We hope that there will be clear guidelines and more direction for the work for environmental change and for responsible nature tourism in general from the public authorities. This way we could have the cards to take things forward, and adequate.

According to the materials, Arctic tourism benefits from a strict national climate policy and national carbon neutrality, which can be linked to the image of the tourism region. At the same time, this can be potentially damaging if the measures threaten the living conditions of the industry, such as air transport. On the other hand, no matter what happens on the local or on the national level, customer preferences will change.

> Inevitably, they [customers] will make informed decisions on what they will consume. If there were some…exemptions to let people continue living as they have done before, that would not be a selling point in the future.
>
> I believe that if consumer awareness continues to strengthen in this sector [climate change], as it so far seems to do, then the customers will start making tough choices. And this will certainly regulate the market and the competition to the extent that those who genuinely take responsibility will thrive.

Therefore, it would appear to be an advantage to climate resilience to have high national standards of responsibility. The vulnerability only emerges from the material if customer expectations are higher than the local standards. Instead, high standards of responsibility are an attraction.

In summary, the locals have perceived increased uncertainty, affecting both the weather and the business environment. Often the uncertainties are interlinked. The most exacting challenges for climate resilience are the rapidly emerging challenges, but the key is that the industry is able to operate even in exceptional circumstances and to renew its practices. So far, however, there is a vacuum in the coordination of climate resilience, and national solutions are expected in order to develop climate resilience. A key threat to climate resilience appears to be the lack of coordination

for making the necessary preparations. The main identified risk caused by the uncertainty are lost sales, but uncertainties also have broader implications, as outlined in the next chapter.

Worst case scenarios as climate change shock treatment

In data there are worst case scenarios related to climate change that, if materialised, would challenge climate resiliency. In practice, the worst case scenarios act as a "shock treatment" for societies in a way that causes different levels of society to respond to climate risks and can lead to rapid local reorganization (Urry, 2011: 162–165). This chapter examines the most concrete worst case scenario presented in interviews, in which the Finnish National Emergency Supply Agency simulates the resilience of a travel destination during fictitious winter weather conditions.

According to the simulation, an atypical weather condition can cause extensive local disturbance (National Emergency Supply Agency, 2018). The simulation simulates the weather, but it does not conflict with the estimated climate risks.

> We have been thinking that for us, extreme weather events, storms, and freezing rains and the like are a big threat. Last winter, we had a virtual catastrophe exercise, with an icy rain that froze everything. And after that there was a massive frost, so people just got entrapped. That is, there was so much snow and water that the roads were blocked, and all connections and electricity were cut off, and we were practicing virtually what we should do.

The results of the simulation reveal vulnerabilities, in which public infrastructure such as transport routes, power lines and heat production in particular are disrupted. The National Climate Change Adaptation Plan (2019) identifies similar vulnerabilities, highlighting that most municipalities in Finland are not prepared for climate risks and that small municipalities in particular lack the necessary capacity (Mäkinen et al., 2019: 24 & 41).

It is noteworthy for the simulation setup that due to the strong growth of tourism, the capacity of the tourism industry is limited during its peak season. Many tourist destinations are also located tens of kilometres from regional centres, making it difficult to address vulnerabilities. The National Emergency Supply Agency's report also highlights how, despite the strong growth in tourism, the number of employees in companies has not increased in the same proportion, which is reflected in security in conditions such as in the simulation (National Emergency Supply Agency, 2018: 11).

> If you calculate the odds then at the peak time there will probably be 10–30 percent more people than beds, most likely…If the distribution of water, heat or electricity is then interrupted, then how is it intended to guarantee the well-being of the people? No way, that's not possible.

The National Emergency Supply Agency recommends paying attention to the local level of preparedness and maintaining security in the priorities of tourism strategies also in the future. A key recommendation is to develop public-private partnerships to increase security. (National Emergency Supply Agency, 2018: 11.) The report considers infrastructural issues but does not take a position on the adequacy of public resources.

Increasing the capacity under exceptional circumstances may require a new way of thinking, where the tourist destinations are considered from the point of view of peak season needs. This will be accentuated if the national goal of doubling tourism revenues in a decade materializes (see Ministry

of Economic Affairs an Employment of Finland 2019). Many tourist villages have already practically grown into small towns.

> We should consider these as larger infrastructure entities. Therefore, they should perhaps be referred to as Arctic cities, as they require as large of infrastructure systems as any city of similar size.

The ongoing expansion of tourist seasons into year-round tourism can help to solve both infrastructural challenges and preparedness challenges. This observation is most concretely made by a seasonal worker, who says that the industry is already operating at its limits.

> Perhaps year-round tourism would better allow for the construction of new facilities, which would help with these shortcomings. Because, just as I said earlier, this industry is working beyond its limits.

Year-round tourism would stabilize economic growth, diversify the infrastructure, and increase the number of permanent staff with a higher degree of preparedness. This also highlights how, as a result of limited local resources, actions to develop climate resilience need to be tied to and coordinated with other interests. Under the prevailing conditions, the success of year-round tourism would develop tourism resilience in a resource-efficient way (see Lew & Cheer, 2018: 3–12).

In summary, the simulated worst case scenario involves concrete risks that would go beyond local climate resilience. The National Emergency Supply Agency emphasizes the importance of local preparedness and reveals the limitations of the infrastructure (National Emergency Supply Agency, 2018: 11). In practice, the promotion of year-round tourism, which is already taking place, is a concrete way to respond to vulnerabilities posed by climate risks. At present, in the simulation, climate resilience has been found insufficient in certain cases, which shows that there is a need to effectively coordinate climate resilience development.

The industry expects effective coordination

Globally, tourism as an industry is exceptionally dependent on the prevailing climate. However, tourism as an industry has more than average climate resilience, which is why it bounces back quickly after shocks. The starting point for climate resilience is determined by the surrounding society, such as state finances, political stability, social conditions, and the economic environment. In the richest countries like Finland, tourism is reasonably well protected from the most common vulnerabilities and, as a rule, has a lot of resilience. The poorest countries, on the other hand, often have the least resilience and tend to have the most vulnerabilities (Dogru et al., 2019: 292–298.)

In Finland, however, Arctic tourism is a kind of exception, as it is exceptionally vulnerable to climate change and also has vulnerabilities typical to peripheral regions. The most extreme example of vulnerability is the economically and image-wise significant Christmas tourism, which has been assessed as the most vulnerable tourist season in the world because a white Christmas cannot be postponed to another month (Tervo-Kankare et al., 2013: 20–22; Hall 2014). In Finnish Arctic tourism, the local ability to adapt to climate change is strongly linked to the surrounding society and economic development (Kaján, 2014: 48–50), which increases the climate resilience of the economy in a prosperous society. For this reason, the climate resilience of Finnish Arctic tourism is a national issue, in addition to the local dimension. One fact we must remember is that the Arctic is exceptionally global (Finger & Heininen, 2019).

The research question of the article is what does the local perspectives of climate change on Arctic tourism tell us about the climate resilience in the post-Paris Agreement era? The study has highlighted three key dimensions: 1) climate resilience is tied to the vitality of the region, 2) growing uncertainty challenges and renews climate resilience, and 3) the capacity to bounce back serves as a measure of climate resilience. In these respects, the industry has shown two crucial characteristics of climate resilience in the anthropogenic era: 1) an attempt to understand a changing world despite the limited amount of information available, and 2) a willingness to design existing structures to better suit the new environment.

Resilience as a willingness to redesign is thus strong in climate adaptation, although the capacity of the industry to independently improve the situation is limited. This demonstrates the strong local will to adapt to lasting change and the willingness to curb climate change, which is imperative for climate resilience. Local commitment is essential because in the tourism sector, effective adaptation to climate change can only be concretely implemented at the local level, although the role of the national level is significant (Dogru et al., 2019: 294). Meanwhile, climate change mitigation has not yet progressed much.

Local tourism actors are motivated to develop climate resilience and they expect adequate coordination from the public administration. It is noteworthy that locals often consider their resources to be insufficient to carry out the necessary actions, which underlines the importance of the public sector. A key finding is that so far, the development of climate resilience is not systematically coordinated, making it difficult to build local capacity based on local expertise. This further undermines the development of climate resilience against transformative changes.

Local expectations and hopes for effective coordination are justified, as the industry received the weakest results among the sectors examined in the assessment of the National Climate Change Adaptation Plan (Mäkinen et al., 2019: 30). The need for coordination is clear, but its implementation is not straightforward. In practice, in the tourism sector, climate change adaptation and mitigation strategies are poorly generalizable, which is why in most cases they must be identified and implemented, one destination at a time. (Dogru et al., 2019: 294; Kaján, 2014.)

This study has shown that Arctic tourism is undergoing a transformation as a result of climate change in the post-Paris Agreement era. This is likely to increase the need for adaptation to and mitigation of climate change at the local level. Adaptation is needed because both the climate and the surrounding society are undergoing a transition. Mitigation, in turn, is important in addition to the global climate resilience and the responsibilities arising from the Paris Agreement, also because of the credibility that is essential for the tourism industry. Without mitigation, the inevitably necessary decoupling between economic development and the environmental impacts will not take place (see Heikkilä & Lettenmeier, 2014: 7–9). In this way, the set-up challenges the future development of the industry. The material indicates that the growing need for both adaptation and mitigation may emerge faster than expected, which may pose challenges to the future climate resilience of tourism.

In response to the research question, this study shows that the effects of climate change on Arctic tourism indicate that in the post-Paris Agreement era, the climate resilience of Arctic tourism in Finland is sufficient for the time being, but its key vulnerability is the lack of efficient coordination to develop climate resilience. As a result, tackling the challenges has been delayed, and the lack of coordination and resources limits the local capacity to develop livelihoods sustainably for

transformative changes. Effective coordination would also contribute to the national goal of carbon neutrality, which is why the current situation calls into question the role of public administration in the post-Paris Agreement era. Arctic tourism itself may not ever become climate neutral per se, but it may set the new standards for sustainable tourism. This could lead to a path of stronger credibility of tourism in the post-Paris Agreement era. However, the main reason for fostering the necessary action is game-theoretical: if climate change mitigation fails, everyone loses.

Conclusions

In practice, the climate resilience of tourism requires climate change adaptation and mitigation measures that cut across societies. The study highlights four essential dimensions of climate resilience in tourism in the post-Paris Agreement era: 1) climate resilience is linked to the vitality of the region; 2) growing uncertainty challenges and renews climate resilience; 3) the capacity to bounce back acts as a measure of climate resilience; and 4) in Finland, climate resilience in Arctic tourism is currently at a sufficient level, but there is a growing need for efficient coordination. For the time being, the lack of coordination and resources contribute to delaying the implementation of the necessary measures to develop climate resilience. This finding is in line with international comparisons, where voluntary system-level measures by the tourism industry to adapt to and mitigate climate change have often proved ineffective.

From the point of view of international policies, it is noteworthy that the contribution of a fast-growing tourism industry is essential for the implementation of the Paris Agreement and global climate sensitivity. In the period before the COVID-19 crisis, tourism already accounted for 5–8 percent of all greenhouse gas emissions, and Finland's increasing Arctic tourism, which is growing especially among international tourists, has repeatedly broken growth records. If there are no permanent restrictions to international mobility following the pandemic, then Finnish Arctic tourism will have to face the inevitable need to adjust its activities to adapt to a rapidly changing climate and a carbon-neutral society simultaneously. In order to be a sustainable industry in the post-Paris Agreement era, Arctic tourism must be able to solve the challenges related to climate change mitigation and adaptation. At the time of writing, Finland has 15 years to accomplish this.

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Climate Change, Security and the Role of Transnational Corporations

Salla Kalliojärvi

Climate change has become a prominent part of the global security discussion. At the same time private organizations have been increasingly providing a substantial contribution to the implementation of climate adaptation and mitigation. Traditionally, security has been understood in state-centric terms, while global issues such as climate change have belonged under the terrain of international negotiations. With climate change, however, the governance mechanisms used today, are taking on a variety of forms beyond multilateral agreements. By providing significant expertise in technology and service delivery, and committing to even more ambitious greenhouse gas emission reductions than agreed by their governments, private organizations have become active players in the climate change policy arena. Together with the securitization of climate change, the growing significance of private organizations in climate policy and action is raising questions about their role as security providers. This article focuses on the role of transnational corporations (TNCs) in climate governance and discusses the ways in which the increasing significance of TNCs impact on the structure and governance of global security. The Arctic region, while increasingly becoming a prominent part of economic globalization — largely due to global climate change — is anything but isolated from the structural changes occurring in global governance. The growing role of the region in the globalizing economy and the region's accelerated pace of warming connects it inextricably to the global security.

Introduction

The global atmospheric concentration of greenhouse gases leading to the warming of the planet is primarily caused by the massive use of energy in the processes of material transformation. As the global economic system has been driven by fossil fuels for over 200 years, shifting away from its use requires fundamentally transforming the prevailing production and consumption patterns. If unmitigated, climate change is likely to trigger a number of tipping points that further accelerate the irreversible changes, posing risks to the basic needs of people and core values of societies. Climate change, in this way, both triggers and necessitates fundamental structural changes in the economies and societies, posing a great challenge to the current political systems.

For over three decades, international climate action has been an intergovernmental process with little scope for business involvement. Business has been viewed primarily as the source of the critical environmental challenges that we are facing today, not as the solution to them. However,

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in recent years, the attitudes toward the role of private business organizations in climate action have been changing, and their involvement in climate governance has risen significantly. Major businesses are now involved in multilateral initiatives and the number of corporations committed to self-regulation and climate investments has grown steadily. Today, already over half of the annual climate finance flows are coming from the private sector, where transnational corporations (TNCs) account for the majority of investments (CPI, 2019). Subsequently, climate change is now an area of increasingly complex multi-level governance characterized with, what some scholars call, the technologies of advanced liberal government that include mechanisms such as marketization, public-private partnership and stakeholder dialogue (Stripple & Bulkeley, 2014: 34–35; Methmann, 2013; Oels, 2005).

Simultaneously, with business actors coming to be embraced as crucial partners in climate governance, the problem of climate change itself has been increasingly viewed through the lens of security. Continuing with 'business as usual' is increasingly understood to have catastrophic consequences on societies and global security. Without appropriate action to decarbonize economies, the risk of disruptions of economies and societies is seen to be mounting in a dangerous manner, leading to the formation of various kinds of security threats. But as noted by Simon Dalby (2013b), a leading security scholar, the difficulty in decarbonization lays on the fact that climate change is very much a product of the success of states in building and securing the fossil fueled economies — the main source of today's carbon emissions.

This article discusses how climate change with its inextricable relation with the world economy, which forms the backbone of today's security thinking, is producing Transnational Corporations (TNCs) as security actors. At the same time as state leaders are welcoming the participation of business actors in climate action in the name of security, investors and corporate leaders have gained more awareness of the impact of climate change on business operations and the associated risks that affect their investment returns. For business, climate risk equals very much a financial risk. This article looks at the role of TNCs in climate action from the point of view of security, while aiming to shed light on the transformations that are occurring in the nature of global security governance.

The article starts with a brief overview of security-thinking, where it focuses on demonstrating how security-thinking has evolved in recent years. It then moves to scrutinize the transformation in the world economy and the growing significance of TNCs, after which it takes a brief look to the current climate politics and the corporate response to climate change. After setting the scene, the article moves to discuss the processes, impacts and potential of the growing role of the TNCs in climate governance from the viewpoint of security. Before concluding, the article takes a look at the issue in an Arctic context, where it focuses on the oil and gas sector in particular. The Arctic region is central from the point of view of security for several reasons. The region suffers from an accelerated pace of warming, that not only brings environmental challenges but also economic possibilities. At the same time the region plays a crucial role in the global climate system that increases its importance from the point of view of climate security.

Security: Between geopolitics and geoeconomics

The threats to security today, rarely respect national or sectoral boundaries. While war and the threat of the use of force still remains as the main drivers of security policies of many states and

institutions, especially after the end of the Cold War, new threats characterized with a new kind of interconnectedness and complexity, have emerged to the security agenda (Kaldor, 2007; Gyarmati, 2004: 28–30). Whereas thirty years ago, state leaders and security scholars were mostly concerned with nuclear Armageddon and mutually assured destruction, today the disruption of the elements in the global economic system is widely filling the security agenda. National infrastructures have become increasingly globalized, as the level of trade and economic interdependencies between countries has increased. This has brought forth new uncertainties and vulnerabilities for individual states toward the impact of events occurring beyond their national borders and government control. Some scholars have suggested that this transformation is best understood as a shift in security relations from geopolitics towards geoeconomics[1] (Luttwak, 1990; Brooks, 2005; Hameiri & Jonas, 2015: 371–388; Dent, 2010: 240).

While this may be an oversimplification in many ways, as the intrinsic relationship between economy and security has always been there, the economy-based thinking has certainly gained weight in the security field with the expansion of free markets and transboundary production networks (Bell, 2011). As an outcome of the increased internationalization of supply chains, the focus of many states over the protection of their economic supplies and markets has heightened significantly. The emphasis on 'human security' that arose in the late 1990s, has added the promotion of the market and economic-based provisions of security in national security strategies. (Bell, 2011; see Dalby, 2013a; Krahman, 2008). As the concept of human security has become closely tied into the discussions of humanitarian intervention and the responsibility to protect, the so-called 'weak' or 'failing' states have become to be defined as threats (Dalby, 2013a: 9; Duffield & Waddell, 2006: 10). In the process, in a globalized world, both human and national security are increasingly seen to necessitate the undisrupted functioning of trade and global production networks — as it is what is required for societies and economies to function. This point is well exemplified in the 2017 US National Security Strategy where it is stated that 'economic security is national security' (Scholvin & Wigell, 2018: 4).

As the ways in which states use economic power to pursue strategic aims have become an increasingly important aspect of international relations, both national and international policies are more and more shaped by non-state trans- and multinational groups. From the viewpoint of climate change, as it is argued later in this article, Transnational Corporations (TNCs) form the most significant group. The next section briefly discusses the rise of TNCs and the changing contours of the world economy in order to enlighten the background against which to better understand the changes occurring in the security structures.

Understanding the changing underlaying of security: the shift to a global economy

The world has witnessed a dramatic rise of transnational production since the Second World War, due to the significant expansion of Transnational Corporation (TNC) activity. TNCs are "firms that have the power to coordinate and control operations in more than one country, even if they do not own them" (Dicken, 2011: 60). The rapid and exponential growth of TNCs is one of the most significant developments of the past decades. Today, TNCs are among the world's biggest economic institutions, and account for around two-thirds of world exports of goods and services, and nearly a third of world GDP (Dicken, 2011; OECD, 2018). Much of international trade, thus

represents the movement of goods within the production apparatus of TNCs. TNCs play a key role in coordinating global production networks, and the geography of the global economy is largely shaped by TNCs' decisions of where to invest, or not to invest, and how to reconfigure their operations across the borders.

It is important to note that while TNCs play a key role in shaping the geoeconomy, they still operate within multiscalar regulatory system. States, in other words, are actively constituting the markets that TNCs are operating in (Dicken, 2011: 179; Hudson, 2001: 48–49). As described by Peter Dicken (2011: 63):

> On the one hand, TNCs attempt to take advantage of national differences in regulatory regimes whilst, on the other hand, states attempt to minimize such 'regulatory arbitrage'. The result is a very complex situation in which firms and states are engaged in various kinds of power play: a triangular nexus of interactions comprising firm–firm, state–state, and firm–state relationships.

Historically, researchers have often argued that weak legislation in developing countries is being exploited by TNCs in profit-making. Developing countries have been seen as a way for TNCs to circumvent the health and environmental standards set by governments. However, today there is a significant and growing trend of TNCs defining and adopting even more ambitious targets for driving down their greenhouse gas emissions than demanded by their host governments. This has raised the question of the TNCs role in mitigating climate change. Even if the TNCs are not the key to escape the political gridlock hampering climate action in international level, the possibilities and implications of corporate action on climate change are an increasingly important subject of study.

Climate politics

For 30 years, national governments have sought to find a political solution to slow the heating of the planet. The crowning achievement in international climate politics is the United Nations Framework Convention on Climate Change (UNFCCC), established at the Rio Earth Summit in 1992, and ratified by 197 countries. The first legally-binding global climate change agreement was adopted at the 21st Conference of the Parties of the UNFCCC held at Paris in 2015. The agreement (commonly referred to as the Paris agreement) sets a "global ambition" goal of "holding the increase in global average temperature to well below 2°C above preindustrial levels" and "pursuing efforts" to limit it to 1.5°C, and establishes common binding procedural commitments for all signatory parties (UNFCCC, 2015). Despite the adopted 1.5–2°C goal, the world is still on a path toward temperature rise more than 3°C above pre-industrial level (Rogelj et al., 2016; UNEP, 2015; UNEP, 2019). To achieve the 2°C goal, global emission levels would need to be 25 per cent lower in 2030 than in 2018, when they reached a record high of 55.3 GtCO2e. Despite the progress in international climate politics, the global GHG emissions have grown every year since the global financial crisis in 2009 (UNEP, 2019). The rate of growth of emissions has not, however, been geoeconomically evenly distributed. According to a United Nations Environmental Programme's (UNEP) recent study, the CO^2 emissions of OECD economies have declined by 0.4 per cent per year in the last decade, while the emissions of non-OECD economies have been growing at nearly 3 per cent a year. However, consumption-based emission estimates that provide a deeper insight into the role of consumption and trade, and the interconnectedness of countries,

have shown that the net flow of embodied carbon is from developing to developed countries, which means that as OECD countries reduce their territorial emissions this effect is being partially offset by importing embodied carbon (UNEP, 2019).

In economic terms, estimates of the investment required to achieve the low-carbon transition under the 1.5 degrees Celsius range from USD 1.6 trillion to USD 3.8 trillion annually between 2016 and 2050 (CPI, 2019). Meanwhile the combined negative effect of climate change on global annual GDP, without further climate action, is estimated to be between 1.0-3.3 per cent by 2060. Changes in crop yields and labor productivity due to higher temperatures, sea level rise, extreme weather events and other climatic changes are estimated to cause the largest negative impact on global GDP, while simultaneously fostering sectoral and regional capital imbalances (OECD, 2015). The scale of regional damages depends in part on the ability of economies to anticipate and adapt to climate impacts. To balance and improve the adaptative capacities, the provision of climate finance from developed to developing countries has been a central issue in international climate politics from the very beginning.

Enabling clean investment has played an important role especially in developed states' strategies on a low-carbon transition that most often seek to align economic and climate protection objectives (Wolf, 2013). These strategies are guided by the increasing awareness of the economic risks and opportunities related to climate change, that is also prevailing in the Paris Agreement, where driving action to mobilize and shift finance by enhancing the contribution of the private sector is set as one of the three long-term goals of the Agreement. This willingness of state leaders to mobilize the private sector is increasingly met by investors' and CEOs' grown interest toward climate action. According to Climate Policy Initiative's (CPI) Global Landscape of Climate Finance report, over half of the USD 546 billion that was spent to climate related investment in 2018, came from the private sector (CDP, 2019). Corporations account for the majority of the private investments, whereas renewable energy is the primary sectoral destination for global climate finance (ibid). Wind and solar power are the most financed forms in the renewable energy sector, and the growing investment has increased global cumulative installed capacity of each technologies to well over 500 GW (CPD, 2019; IEA PVPS, 2019; GWEC, 2019).

However, while private-led investment in renewables, energy efficiency and electricity infrastructure has risen notably during the past decade, the share of fossil fuels, including thermal power generation, in total energy supply investment still accounts the major part. Public ownership is prevalent in the fossil fuels sector, with state-owned enterprises owning about 86 per cent of known global reserves and accounting for around 55 per cent of the production (Mitchell et. al., 2012: 18). Yet, for the first time in history, wind and solar assets are outperforming oil assets for some of the oil and gas companies, which is why the fossil fuel investment is increasingly dominated by state-owned enterprises and national oil companies (IEA, 2018; CPI, 2019).

Corporate responses to climate change

The corporate responses to climate change are arising from the realization that climate change is not a distant, potential threat, but a problem that is already shaping the operating field of corporations in many ways. In the past decade, corporations have launched over 650 GHG emission reducing initiatives (Vandenbergh & Gilligan, 2017: 205). One of these corporations is Walmart Inc., the world's largest retailer, which has announced a target of reducing its greenhouse

gases by one million metric tons between 2015 and 2030 (Walmart, 2017). According to Michael Vandenbergh and Jonathan Gilligan (2017: 27) Walmart's reduction target is roughly the same reduction that could be gained if the U.S. government required the national iron and steel industry to cut its emissions to zero. Another significant example is Microsoft Corp., who just this year announced a target of carbon neutrality by 2030, and by 2050 removal of all the carbon the company has emitted since its foundation in 1975 (Microsoft, 2020).

Many of the TNCs see both the opportunities and risks presented by climate change that are constructing profit-driven motivations for climate action. These motivations, such as resource and energy efficiency; customer, investor and lender pressure; regulatory avoidance; and reputational gain, are aimed at minimizing disruption to company's production and services, and to increasing profitability and the ability to do business. While corporations vary in their awareness of climate change, their climate strategies and the motivations guiding them, in the very end, the basic goal of a corporation is to maximize profits and 'shareholder value' (Pulver, 2011; Cogan, 2006; Vandenbergh & Gilligan, 2017.) To that end, taking action to address climate change is increasingly understood as in companies' own business interest. By reducing agricultural productivity, disrupting logistics and supply chains, and causing damage to buildings and infrastructure, climate change risks affordable and reliable supplies of energy and natural resources and their distribution, which are critical for the functioning of business.

It is often critically questioned to what extent environmental standards can be incorporated into trade and production regulations under the capitalist system, but the possibilities and effects that are arising from the impact of climate change on value creation under the current economic system, are easily dismissed in these critics. TNCs are often seen purely as "profit-seeking machines that have little incentive to curb their contributions to climate change" (Reyes, 2015: 71), while the emission reductions achieved through economically beneficial means are, at the best, seen as minor by their relevance. Nonetheless, this is not necessarily the case. Vandenbergh and Gilligan (2017: 206) in their study on corporate climate action estimated that "opportunities exist to achieve several hundred million tons of emissions reductions, even if firms only take economically beneficial steps to improve efficiency and reduce emissions". While CDP (2019), an international non-governmental organization providing a global environmental disclosure system, reported that collectively 4,800 companies, that responded to their questionnaires, disclosed emissions reductions in the order of 551 million metric tonnes of carbon dioxide equivalent (CO^2 e) and realized monetary savings amounting to USD 14 billion only in 2017. 76 per cent of the responders identified inherent climate change risks, and 70 per cent saw opportunities that have the potential to generate a substantive change in their businesses (ibid.). Accordingly, investors holding more than USD 100 trillion in assets pressured large corporations to reduce their carbon footprint and disclose through CDP, achieving emission reductions by an amount equal to the total annual emissions of Italy (Vandenbergh & Gilligan, 2017: 202). Also, in 2018 a consortium of 288 institutional investors with USD 26 trillion in assets appealed to the governments of G7 countries to rapidly phase out the use of coal and fossil fuel subsidies, and impose a significant price on carbon and other greenhouse gas emissions (Gilligan, 2018: 181).

Critics have also questioned the transparency of disclosure initiatives claiming that few corporations are willing to open their operations to outsiders sufficiently enough to verify the disclosures, which makes the reports unreliable (Foster, 2000; Reyes, 2015). Even as these critics

are convincing, taking into consideration that global emissions are still rising and the global economy is strongly built on the expansion of consumption, they are also becoming increasingly questioned as climate change is being understood not exclusively as financial risks but also as a force that transforms the whole playing field. The risks do not come only from the direct impact of climate change on business operations and supply chains, but also from the greater demand for action from increasingly concerned stakeholders from clients to employees and from governments to investors. As such, in business, climate change is turning from a distant threat that can be disregarded in favor of short-term economic gain, into an already occurring reality that needs to be taken into account in all operations.

TNCs and security in the frame of climate change

Fossil-fuel-based infrastructure and the global resource flows that provide the essentials for human living today, are increasingly in the hands of TNCs. These resource flows are vulnerable to both weather and economic disruption, as well as to political and social instabilities. Climate change risks to TNCs can entail physical risk such as extreme weather events or transitional and regulatory risk such as reputational or policy related drivers. While companies have long sought to optimize their production processes by locating different stages to different locations according to the production costs that are largely — but not exclusively—dependent on governmental regulations, climate change by increasing the frequency and severity of physical risks, is transforming the calculation standards of this optimization. Some TNCs have already concluded that inaction will be much more expensive in the long run than the actions taken now. In its recent study, CDP found out that nearly all of the responding CDP supply chain members found suppliers showing environmental leadership more competitive in the long run, and only 5 per cent said that in their experience those suppliers were more costly (CDP, 2019). Sustainable and transparent supply chains are increasingly recognized as a crucial part of a successful overall business strategy, instead of just a part of a company's environmental strategy. Taking into consideration the globality of the production networks of TNCs, stricter environmental and climate demands of TNCs to their suppliers can have enormous emission reduction potential.

As highlighted by the IPCC's latest report, the cost of exceeding a temperature rise of 1.5 degrees Celsius could be catastrophic. It would threaten water and food security, human health, living standards and the economy (IPCC, 2018). The estimated difference in the cost between 1.5 and 2 degrees, in economic terms, is USD 15 trillion, and the action to reduce emissions must be immediate if warming is to be limited to 1.5 degrees Celsius. As the scientific evidence on the need of urgent action on climate change has grown, the faith of future solutions has been laid on the development and use of renewable energy technologies and energy efficiency. Technological development is hoped to make reductions easier and cheaper in the future, simultaneously reducing the security risks faced by states and societies due to climate change. Historically, technological change and innovation have long been central to economic thinking, as they are seen to form the very heart of the processes of economic growth and development (Dicken, 2011: 76).

TNCs often possess greater technical, financial, and organizational resources to produce the necessary innovations. Besides being major technology innovators, TNCs also possess skills in the development of pollution abatement technologies (Morimoto, 2005), and enjoy great potential in technology transfer through their suppliers and partners in other countries. From TNCs' point of

view, technological innovation has the potential to reshape the competitive positions of different energy sources, creating huge business opportunities. An early adoption of 'green' products can also bring a competitive advantage and reduce the market risk in some sectors (Wright & Nyberg, 2015). In this light, it is no surprise that in previous years more than three-quarters of the total annual spending on energy research and development (R&D) have been coming from the private sector (IEA, 2018: 196).

By working as regulators of their emissions and supply chains, TNCs can produce fast and large-scale effects in the global production network. While both national and international arenas contain multitude of competing voices and interests, which complicates the efforts to find and execute effective climate policies, corporations can channel significant levels of technical and financial resources quickly on specific problems and missions. Through the global production networks, the requirements of TNCs can also cross international borders, which can be very difficult for national governments to do.

The growing centralized integration of global production networks resulting from TNC activity, while owning great potential for emissions reductions, can also produce notable risks for some states and societies. The future decisions of central TNCs about where to operate can have significant impact on national economies. States suffering from high exposure to climate impacts can increasingly be avoided by TNCs. Extreme weather events, a decrease in agricultural productivity, weakening markets and instable political environments, that all form security risks to states, can also affect TNCs operations and their willingness to operate, amplifying their negative impact. From the point of view of states, the growing role of TNCs in climate action can also produce risks and benefits in the form of shifting power relations. The global energy transformation toward renewable energy sources can have significant geopolitical implications as the supply of energy will no longer be the domain of only a small number of states. The states whose economy is highly dependent on the export of fossil fuels may face enormous financial losses that can have significant consequences for the economy, workers and communities.

On the other hand, the energy transformation can also strengthen states' energy security and promote greater energy independence as renewable energy sources are more easily available. States' energy security can also be enhanced through TNCs' energy efficiency targets. Besides increasing the share of renewable energy in their energy consumption, one central way to reduce emissions in corporate strategies has been the pursuit toward greater energy efficiency. Energy efficiency is most often seen as an economically efficient way to reduce the overall emissions by reducing overall energy demand and consumption, by which corporations can also achieve significant cost savings. On a global scale, improved energy efficiency owns the potential to reduce global electricity demand by more than 20 per cent, and represents the single largest potential contributor to global emissions reduction according to the International Energy Agency (2017). By reducing the amount and cost of energy imports, energy efficiency can also reduce the likelihood of supply interruptions, which often form a central part of states' energy security strategies.

The growing impact of TNCs in climate politics can also weaken the economic and political leverage of states relying strongly on carbon intensive industries. As shown in previous studies, the business sector can have significant power in shaping climate politics (Wright & Nyberg, 2015; Cave & Rowell, 2014; Reyes, 2015). These studies have often focused on the role of the fossil fuel industry in lobbying against carbon pollution regulations, but as Delmas et. al. (2015) argue based

on their study on corporate environmental performance and lobbying, there is a growing trend of sectors-wide lobbying in favor of stricter governmental regulations. According to InfluenceMap (2017), a UK-based think tank focusing on corporate influence over climate policy, the number of active and pro-climate companies has expanded noticeably since 2016. This trend is likely to continue as investors increasingly incorporate the climate risk exposure of their portfolio into their decision making (Flammer et al., 2019). Further research is needed to better understand the trends and impacts of climate lobbying today, but it is clear that the increasingly emphasized role of the business sector in climate action enhances their possibility for direct influence in climate politics.

Transforming Security Measures

By reducing climate impacts to isolated categories of 'risk', the corporate take on climate change is transforming the way climate change is dealt with as a security issue. Together with shifting economy–state relations, TNCs' risk management framework normalizes climate change into a matter of everyday technocratic fixes. Even as climate change is most often understood as a multiplier of threats, which necessitates mitigation efforts, the way climate impacts are translated into security practices emphasize the need for mundane, participatory and comprehensive means, instead of targeted and exceptional measures we are used to when we talk about security. In this way, security is much more threatened by not-doing than doing.

The idea of the centrality of the functioning economy in the maintenance of security is evident in climate politics. This constructs economic prosperity as a necessity for social stability and global security, and puts big businesses to the front in the fight against climate change. Although, adapting to climate change is already a part of military planning for many states (Brzoska, 2015), security against climate impacts is primarily pursued through market-led measures. From the point of view of climate mitigation, this is not necessarily a bad thing, taking into consideration that in the national security framework, governmental policy is largely emphasizing the need for adaptation measures, while failing to acknowledge the importance of significant emission reductions (Kalliojärvi, 2019).

The increased importance of the private sector, and especially TNCs, is also fostering the privatization of security. With the increased focus of governments on managing and organizing devolved centers and resources, the use of privatized security organizations has been growing substantially in the 21st century (Abrahamsen & Williams, 2009: 4; Bailes & Frommelt, 2004). While states increasingly rely upon public-private partnership to provide for their security, climate change is likely to increase, not only the public-private partnership, but the use of private security organizations by private market-led corporations. This is exemplified in the case of Shell, who according to internal documents leaked to an activist organization called Platform, spent at least USD 1 billion on security between the years 2007 and 2009 (Amunwa, 2012). How the increase of private authority in the security domain affects societies on a broader scale, is a crucial question for researchers in the coming years.

The Arctic

In the Arctic, climate change forms one of the most pervasive and powerful drivers of changes. The Arctic region is warming at least at twice the rate of the global average, primarily due to the ocean ice-albedo feedback (Kashiwase et al., 2017). The retreating ice-cover offers new economic opportunities as natural resources, such as oil and gas, are becoming more accessible and new sea

routes become navigable. The Northern Sea Route, that is already in use, has experienced substantial increases in traffic during the last years. Only in 2018, over 18 million tons of goods were transported on the route, which was almost 70 per cent more than during the previous year. (Zandee et al., 2020: 8). Major technology firms have also shown interest toward the new economic opportunities found in the Arctic by launching initiatives to install fiber optic cables across the Arctic Ocean and building new data centers that benefit from the cold climate (Cinia, 2019). In the Arctic's extractive sector, where government-business relationships have been the most prevalent feature during the last decades, the growing geoeconomic and strategic importance of the region is increasingly turning the relationship into what Arctic researcher Matthias Finger (2013) calls a "Siamese-type partnership".

While Arctic states are increasingly approaching the region through the lens of strategic economic development, the transformation of the Arctic into a globally important geoeconomic space is nothing but a self-evident process. Notwithstanding that the region is estimated to maintain up to 13 per cent of the world's undiscovered petroleum resources, of which most is located offshore (Gautier et al., 2009), and that oil drilling in the region is often seen to contain less political risk than in other parts of the world, the production volumes from offshore Arctic drilling are calculated to be less than 1% of the total world production (Morgunova, 2015). As pointed out by Käpylä and Mikkola (2015), there are severe practical challenges undermining the materialization of the great expectations concerning the geoeconomic Arctic. These challenges, ranging from difficult ice and weather conditions to global economic dynamics, are making the economic development of the region challenging and costly. Due to long distances, harsh weather conditions and often quite poor infrastructures, the Arctic is logistically and technologically a very difficult operating environment.

While the region is often defined as politically stable, external dynamics also affect the region as a favorable investment environment. The most evident of these dynamics include the US and EU sanctions on Russia for its annexation of Crimea in 2014, and the relatively cheap price of oil in the global market. Remoteness and difficult operating conditions in the Arctic make drilling in the region relatively costly and, thus, economically unbeneficial in the current situation where oil prices are low (Käpylä & Mikkola, 2015; Brutschin & Schubert, 2015). The sanctions on Russia are affecting the region significantly by prohibiting the export of western goods, services and technology in support of exploration or production for deepwater, Arctic offshore, or shale projects in Russia (CRS 2020). This has created a shortcoming of technological and financial resources for state-owned energy companies Gazprom and Rosneft, as it has put the joint ventures between Russian and western energy companies and their subcontractors on hold (Käpylä & Mikkola, 2016: 216). However, as indicated by Rosneft's recent resuming of drilling in the high-cost Arctic Kara Sea after six-years (Petroleum Economist, 2020), the geoeconomic aspirations of Russia are far from halted.

As the oil price needs to exceed a relatively high threshold for Arctic oil and gas extraction to be profitable, the current situation with low oil prices and ongoing development and exploration projects, is indicating that when it comes to Arctic hydrocarbon extraction, geoeconomic rather than purely economic reasoning is increasingly the primary explanation for action. Respectively, while TNCs have been replacing the state as core economic, technological and scientific drivers in many domains, the Arctic hydrocarbon production business seems to occupy the reverse logic.

Only this year, six major investment banks, with strong involvement in fossil fuel financing, as a part of their new climate strategies have announced that they will no longer finance new offshore oil projects in the Arctic, while the governmental administrations have gone the opposite way by repealing and weakening laws aimed at protecting the environment and promoting sustainability, and by announcing big state investments for new Arctic oil and gas projects (Bloomberg, 2020; International Investment, 2020; Offshore Technology, 2020). It is too early to judge whether the trend will have a significant impact on the future of Arctic offshore drilling, or even less so, to the global greenhouse emission levels, but it gives an encouraging hint that the growing climate awareness among business leaders is decreasing the interest toward Arctic hydrocarbon extraction. Furthermore, the trend also follows the general logic in the global energy sector, where according to the International Energy Agency, the investment strategies of privately owned international oil companies appear to be built on future energy transitions, whereas most state oil companies "are locked into a more traditional hydrocarbon paradigm" (IEA, 2020).

As we know, the Arctic is crucially important from the view point of climate effects, because the changes occurring in the Arctic region will also have a significant impact on a global scale. Greenland's ice sheet is estimated to disappear by the year 3000, resulting in an increase in the world's water levels of around seven meters (Aschwanden et al., 2019; Merzdorf, 2019). This would greatly affect societies and infrastructure on coastal areas and inland basins, leading to the relocation of millions of people around the globe. Studies have also indicated that Arctic climate change is already greatly correlated to extreme weather events elsewhere (Cohen et al., 2018), causing ice shelf collapse and the further acceleration of global warming (Yumashev et al., 2019). For most major TNCs these impacts mean faster growing risks in the form of economic loss, supply chain disruptions and damaged infrastructure.

Conclusions

As discussed above, leading businesses are starting to identify how climate change is impacting on their operations. The number of private climate initiatives has rocketed during the past few years and big transnational corporations have been increasingly engaged with self-regulation. Sustainability is being transformed from a choice to a matter of necessity, as it is becoming clear how climate change is contributing to a range of biophysical and economic impacts that are already affecting the economy, with the effect of amplifying other already existing threats. At the same time, the magnitude of climate change — and the political gridlock in solving it — has led to a growing recognition at national and international levels of the need to engage the private sector in climate politics. Consequently, governments are increasingly relying upon market mechanisms in both climate and security governance.

These phenomena are profoundly growing the role of private sector in a domain we used to understand as public. Taking into consideration that the Paris agreement, even if all current commitments are fulfilled, will not keep the globe on track to achieve the 2°C target, and given the scientific evidence of the severity of the implications if exceeding the target, this is not necessarily a bad thing. This article has aimed to elucidate how the prevailing belief that TNCs must always choose between higher profits or environmental protection is being challenged in a climate constrained world. The 'do nothing' option is increasingly seen to only delay the inevitable,

as more profound market, social and institutional pressures are expected to be emerging in the near future.

While much more research is needed on the overall impacts of the dramatic increase of global production networks and the growing power of corporations in climate governance, there are signs that private climate initiatives can harness market forces to enable significant responses to the need of emission reductions and the transition to a low-carbon economy. Transnational corporations, that we have used to see as environmental villains, are at the frontline of this action with their significant financial clout and technical expertise. As transnational corporations largely dominate markets, trade, investment, research and development, and the spread of technology today, they are increasingly crucial actors in the new model of security governance that is emerging under the era of human-induced climate change.

Notes

1. Geoeconomics in the article is defined as a securitizing discourse that legitimizes the use of economic means to achieve geopolitical ends. For more detailed discussion of the concept see e.g. Scholvin & Wigell, 2018.

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Commentary

Adaptation to Climate Change in Repressive Regimes: Authoritarian Environmentalism in Russia

Agne Cepinskyte

At the beginning of the year, the Russian government published the 'National Action Plan for the First Phase of Adaptation to Climate Change for the Period up to 2022'. It recognised that climate change has a growing impact on the state's socio-economic development, living conditions, and human health. The Action Plan declares the Russian government's intentions to mitigate the effects of climate change on the population, environment, and economy, and introduces 'a state system of measures' to be implemented by the federal and regional authorities. Some media has hailed the Kremlin's new policy as a milestone in joining the international community in recognising the threats of climate change. However, the Action Plan should primarily be seen as an example of authoritarian environmentalism: the government reserves itself an exclusive right to implement climate policy, neglecting the role of civil society. It thereby aims to bolster the state's geo-economic interests and suppress environmentalist organisations and activists, while flaunting international climate change agreements.

Geo-economic interests over the environment

Countering the effects of climate change fundamentally entails reducing greenhouse gas (GHG) emissions, but the extraction of natural resources, notably oil, coal, and gas, is crucial to the Russian economy. While the Action Plan recognises that Russia's global warming rate is 2.5 times higher than the world average, acknowledges the threats associated with that and pledges to introduce policy changes, there have been few indications of the government's intentions to reduce its reliance on fossil fuels. On the contrary, President Vladimir Putin has expressed doubts about the argument that climate change is caused by human activity and has been openly critical of renewable energy sources. According to Energy Minister Alexander Novak, the share of renewable energy in the state's energy balance would only rise to 4% by 2035.

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Russia is the world's fourth-largest emitter of greenhouse gas (after China, the US, and India), which owes much to the increased coal production by 35% since 2008. In the Arctic region, Russia has continued to build coal ports. For instance, the Lavna terminal in Kola Bay, which is to be completed in 2022, is expected to have the capacity of handling 18 million tons of coal annually. Even though Russia joined the Paris Agreement in September 2019, the energy sector's decarbonisation is not part of its latest policy. In the 2020 'Russian Energy Strategy for the Period up to 2035', the Paris Agreement is only mentioned once in passing, while the country's coal production is set to continue to grow, aiming to increase Russia's share in the global coal market.

Not least importantly, the Action Plan is quite candid about the link between climate change and Russia's geo-economic interests. It explicitly emphasises the positive outcomes of climate change, namely that it 'creates new opportunities for the state's economy', and indicates the Kremlin's intentions to use those advantages. A warming climate provides major new possibilities to boost the Russian economy by facilitating conditions for the use of the Arctic seas and by enabling better access to the continental shelf. In March, President Putin signed a decree 'On the Basics of State Policy of the Russian Federation in the Arctic for the Period until 2035', revealing an ambitious plan for the region. It includes constructing railways, seaports, upgrading airports, and building Arctic vessels in order to facilitate the exploitation of natural resources and increase the production of oil, gas, liquified natural gas, and chemical products.

Suppression of environmentalists

Significantly, the Action Plan exhibits a top-down policy approach and fails to acknowledge the role of civil society in addressing the issues arising from climate change. Russia's 'state system of measures' includes the suppression of environmentalist organisations and activists. This is consistent with the government's policy of restricting civil society's activities by enforcement of the 2012 federal law 'On Amendments to Certain Legislative Acts of the Russian Federation Regarding the Regulation of the Activities of Non-Commercial Organisations Performing the Functions of a Foreign Agent', otherwise known as the 'foreign agent' law. The law enables the government to declare nongovernmental organisations (NGOs) and, as of December 2019, also individuals that receive funding from abroad and engage in political activities as 'foreign agents', forcing them to suspend or cease their work.

Since the enactment of the law, Russian authorities have used it to suppress dozens of environmental organisations, such as Baikal Environmental Wave, Planet of Hopes, Northern Nature Conservation Coalition, Dront Environmental Centre, and Gebler Ecological Society, for their attempts to influence the state's environmental policy. Environmental activists have also faced harassment, threats, and physical attacks, as a result of which some have been forced to flee the country and seek asylum abroad. Numerous international institutions and organisations, including the European Union, the OSCE, Amnesty International, Human Rights Watch, and Bellona, have repeatedly expressed their concerns about the 'foreign agent' law's severe repercussions for environmental activism and urged the Russian government to abolish it.

Suppression of civil society not only violates human rights treaties, such as the European Convention on Human Rights (ECHR) and the International Covenant on Civil and Political Rights (ICCPR), but also refutes international climate change agreements. Failure to acknowledge civil society as an actor in the process of adaptation to climate change contradicts the Paris

Agreement, which explicitly '[w]elcomes the efforts of all non-Party stakeholders to address and respond to climate change, including those of civil society (...)' (art. 133). Civil society, including environmental NGOs, played a key role in crafting the Paris Agreement itself and then compelled governments to sign it. The United Nations has stated on multiple occasions that partnerships between the governments and civil society are essential to achieving the goals of the climate change agreements.

Conclusion

Vast oil and gas reserves hidden in the melting Arctic will continue to drive Russia's rapid development of the extractive industry in the North in the pursuit of national economic interests. It goes without saying that Russia is not the only state placing geo-economic interests above environmental concerns. China, the world's largest producer of coal, increased both production and consumption of coal in 2019. Prioritising national interests, the US has exited the Paris Agreement altogether, and due to US resistance on climate-related commitments, the Arctic Council ministerial meeting held in Rovaniemi in May 2019 failed to agree on a joint declaration. Even in Canada, where total GHG emissions have not gone up over the last two decades, the development of oil sands industry contributed significantly to a 23% increase of GHG emission levels from gas and oil production between 2000 and 2018. However, it remains essential that civil society in general and environmental NGOs and activists in particular are allowed to contribute to a system of checks and balances, ensuring state accountability in environmental governance.

The increasing expansion of oil, gas, and coal infrastructure in the Russian Arctic will likely result in a clampdown on more environmental organisations and activists. Such policy, rooted in what can be labelled as authoritarian environmentalism, grossly undermines the role of civil society in addressing environmental and climate change issues, and it contradicts Russia's international commitments.

Briefing Note

NATO and The Geopolitical Future of the Arctic

Andrea Charron

The future of the Arctic and NATO's role is likely to remain status quo for the next 5 years mainly because of Arctic governance institutions and agreements among the Arctic coastal states with few major challenges by others to date. However, four stressors, increasing in intensity, could undermine the Arctic governance architecture and brook opposition to the coastal states, increasing the risk of conflicts and miscalculation of intentions of other actors to NATO and by NATO toward others. By 2030, these stressors could upset the stability of the Arctic region.

Governance - Continued cooperation is vital

A common assumption is that a warming climate in the Arctic will necessarily engender geopolitical conflict in the region. This is not a fait accompli. The greatest defence against conflict in and about the Arctic are the existing governance structures driven by the Arctic coastal states. Precipitous or provocative actions by any actors, including the North Atlantic Treaty Organization (NATO), however, could upset the cooperative and productive governance structure that has been forged since the end of the Cold War. The Arctic Council remains the most important international forum for the discussion of Arctic issues. Its lack of hard power and refrain from tackling security issues directly has been a great strength rather than a weakness. Consensus decision-making, continued respect for the rules of the UN Convention on the Law of the Sea (UNCLOS)[1] and the focus on scientific problem-solving have been the secrets to the Arctic Council's success in fostering cooperation and helping negotiate a number of agreements binding on the eight Arctic states and others.[2] Other important organizations with a NATO nexus include the Arctic Coast Guard Forum[3] and the Arctic Security Forces' Roundtable (ASFR),[4] although Russia has been excluded from the latter since 2014. Regular communication, contact and table top exercises among the Arctic states, both via the Arctic Council and these other fora, have maintained low tensions. They must continue and thought should be given to re-inviting Russia to the ASFR and beginning discussions with China via the civilian side of NATO.

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Despite the cooperative governance environment to date, there are new stressors that are growing in intensity that could upend this cooperation and wrestle decision-making from the coastal and Arctic states. They include: 1) the growing nationalist/globalist divide in world politics; 2) emboldened states; 3) political churn; and 4) the growing requirement for deterrence. These stressors could accentuate, distort or unravel the current Arctic cooperation consensus that has persisted since the end of the Cold War.

1) Nationalist/globalist divide

The nationalist/globalist divide in world politics is separating states into two groups: those that want national interests to prevail and those that want global, international solutions to problems. This divide is present in the Arctic and manifests itself in the main question of the Arctic: who is in charge? Should it be just Arctic states or should it be many given the transnational issues facing it, such as climate change, increased likelihood of a shipping disaster, exploitation of resources or even which states can belong to Arctic-related fora? While the Arctic states, and especially the five coastal states, have desired to remain the lead decision-makers, other actors have insisted on playing a role. Now, with more and more actors, the compromises are becoming difficult. Nine of the 13 Arctic Observer states, which currently belong to the Arctic Council, are European and all but Switzerland are also NATO members (see Table 1). Europe, in general, has supported a globalist approach to the Arctic (indeed the EU has sought membership on the Arctic Council, but unsuccessfully). More institutions, rules, multilateral agreements and moratoria are a globalist's preferred course of action. The globalist view tends to promote a monolithic view of the Arctic (akin to treating the Arctic as a "park" to be preserved), negating stark differences in issues, concerns and culture across the Arctic. The globalist view can represent an affront to the Arctic states and especially Arctic coastal states' more heterogeneous view of the Arctic and nationalist ideas. Paramount for the coastal states is their continued lead on decision making. Four of the five coastal states are NATO members and the other is the most powerful Arctic actor (Russia) in this "A5" group (Charron et al., 2016).[5] This sets up a potential divide between Arctic and non-Arctic states and also between Arctic NATO and non-Arctic NATO states on approaches to problems. While minor to date, it is a source of irritation. It is seen most starkly, for example, in NATO's lack of consensus on the extent and scope of NATO activity in the Arctic.

The remaining five Observer states are all Asian and include: China, India, Japan, the Republic of Korea (ROK), and Singapore. They represent the majority of the world's population. Indeed, the future of the Arctic could be entirely determined by Asian states. They are either very nationally inclined (read China), or have yet to fully articulate their preferences in Arctic policies. Differences in approaches on how to solve Arctic problems create potential political cleavages. China, for example, is always looking to have more influence in decision-making on the Arctic Council and is not always sensitive to the rights of the six Indigenous Permanent Participants (PP)[6] who have a globalist perspective. Indeed, the PPs' notion of sovereignty in the Arctic transcends state boundaries. The PPs could lose patience should they be excluded from meaningful consultation. Russia too can be insensitive to the PPs on the Arctic Council, including barring the Russian Association of Indigenous Peoples of the North (RAIPON) from attending Arctic Council meetings for 6 months in 2012. If the PPs were to walk away from the Arctic Council (especially given growing recognition of UNDRIP[7] and Indigenous rights and their younger and growing population), it is expected that Canada, Norway and Demark would have to follow suit for political

reasons. Should the PPs leave or be marginalized, or should several Arctic states walk away, or should Russia choose to leave (perhaps because a new Russian-aligned state applies for membership and is refused?) or is kicked out (as was contemplated in 2014), this would damage the Arctic Council, perhaps irreconcilably, damaging a very important temper to these myriad political differences.

Russia is set to assume the two-year rotating chair of the Arctic Council from Iceland in 2021. Russia is not expected to deviate wildly from the usual chair agendas which focus on environmental protection and sustainable development but the question of new members and budget allocations to particular Arctic Council projects against a background of increasing global power competition could make for a contentious chairship.

2) Emboldened states and the further erosion of a liberal world order (such as it was)

Related to the nationalism/globalism debate, is the growing frustration with the liberal world order that is lamented by many, exploited by others. China, for example, interprets the tenents of UNCLOS very differently from much of the world, especially in the South and East China seas. China's alternate interpretations of UNCLOS, especially as its Polar Silk route initiative expands into the Arctic, may be applied to the region creating divisions among states keen to use and benefit from China's infrastructure, economic might and markets and those who want the sea lines of communication to remain strictly internationally-controlled and enforced. Continued negotiations and reactions to final outcomes on the Commission on the Limits of the Continental Shelf (CLCS)[8] process will be an important indicator of the governance health of the region. To date, parties have respected the final, negotiated announcements of the CLCS but what if non-Arctic states disagree with the process or outcomes? Or what if NATO allies disagree and fail to reach a compromise on overlapping claims? Or what if several NATO allies are pitted against Russia in a final outcome?

Additionally, emboldened states may court Arctic coastal states, especially if awarded favourable decisions by the CLCS, to curry favour with them and gain influence. China's financial and infrastructure projects in many parts of the world, including Greenland, and Iceland, have not gone unnoticed. At what point do economic necessities and promises of help by potential peer competitors to the United States create serious divisions within NATO? And given China's improving relationship with Russia, Beijing's growing interest in the Arctic should be monitored closely, particularly in the context of heightened tensions between Russia and the NATO alliance.

The other concern raised by emboldened states is their use of gray zone tactics. Violations to territorial integrity, for example, are often not flagrant – it can come in the form of territory 'infringement'. Intelligence is collected from research vessels, or badly needed 5G networks are provided as development. Rarely are there consequences which undermines Arctic governance norms established to date. In addition, military buildups by these states increase their ability to limit or deny access and control various parts of the region. Safeguarding the sea lines of communication, which now include greater portions of the Arctic, especially during a crisis or conflict, is vital for the security of the alliance.

3) Political churn

NATO may experience a lot of political churn in the next five years because of election cycles. Related to the nationalist/globalist argument, states around the world have very heated

disagreements about how to respond to migrants or how to respond to climate change; they are becoming very incendiary wedge issues. Only two NATO countries are not scheduled to have a major election between now and 2025.[9] This means that all of the Arctic states except Russia (which has given up any pretense of democracy) will have new governments or mandates. On the one hand, few Arctic states are expected to move too far to the right or left from their current postures. On the other hand, some NATO member states are expected to continue to slide to the right, ideologically-speaking, making consensus on issues difficult and further fueling nationalist tensions making it harder for NATO to reach consensus on future courses of actions or priorities. For example, difficult decisions may need to be made in the future by NATO members vis-à-vis new memberships including about Finland and Sweden. Longer-term, an independent or quasi-independent Greenland's role in NATO (or perhaps it may join the North American Aerospace Defense Command (NORAD) or prefer to be nonaligned) will need to be discussed with sober consideration for the ramifications of any and all future NATO memberships.

Table 1: Arctic Actors

Arctic Coastal States (A5)	Decision making members of the Arctic Council	Arctic Observers (non- Arctic States)
Russia	Russia	**United Kingdom (UK)**
Canada	**Canada**	**France**
United States	**United States**	**Germany**
Denmark	**Denmark**	**Italy**
Norway	**Norway**	**Poland**
	Sweden	**Spain**
States in blue= NATO members	Finland	**The Netherlands (NL)**
	Iceland	Switzerland
	6 PPs – must be consulted	China
		India
		Singapore
		South Korea
		Japan

4) Achieving the "right" deterrence and all domain awareness

It is important to recognize that the Arctic, in and of itself, is a highly unlikely place for the beginnings of a major conflict with Russia (as well as China). In this regard, the Arctic is one component of an integrated NATO deterrence posture, in conjunction with NORAD and USNORTHCOM. With the likelihood that a future major conflict with Russia would originate on the central front in Eastern Europe, the seam between NATO (the North Atlantic) and North America (NORAD/USNORTHCOM) and the emerging capability gap relative to the new generation of advanced Russian delivery systems present a potential credibility problem that could be exploited politically by Russia. As such, closing these seams and gaps, and thereby communicating to Russia that the Arctic cannot be threatened and exploited relative to a conflict elsewhere, is vital.

At the same time, the process and manner in which seams and gaps are closed must be carefully managed in order to not appear to threaten vital Russian interests in its Arctic in a provocative manner. If this were to occur, Russia might walk away from the Arctic Council, other Arctic fora and/or defect from other areas of Arctic cooperation, such as the Search and Rescue Agreement, undermining the status quo. NATO's deterrence posture must be carefully balanced with its interest in maintaining the political status quo, which in turn, could create the conditions for deeper and broader Arctic cooperation.

A major weakness for NATO, however, is that all Arctic states (and indeed NATO) desire but are challenged to achieve all domain situational awareness ideally with full access to the Arctic. The NATO trend toward domain specific component commanders tends to stove pipe resources, training and exercises. NATO exercises and scenarios have also been traditionally land focused[10] which means that maritime, air, space and cyber domains, which are vital for the Arctic, require more attention. Russia is closest to achieving both all domain awareness and access faster than any of the other NATO state and China is reportedly training with all domain awareness fore of mind. Furthermore, the ability to plan, prepare and secure funds for very expensive deterrence infrastructure is proving uneven across NATO, which is related to the political churn and slides to the right and left and, not to mention, the world-wide recession as a result of the global pandemic. Russia and China are expected to exploit this advantage, which raises the possibility of miscalculating intentions because of a lack of situational awareness, over or under reaction to events in the Arctic and a disjointed NATO plan and coordination with North America.

Avenues of attack. The green line is approximate UCP boundaries between EUCOM and USNORTHCOM.

The future for NATO and the Arctic is fraught with potential fault lines both within and between NATO and non-NATO countries and Arctic and non-Arctic states that could undermine the cooperation forged to date in the Arctic. Cooperation has been a function of a governance structure orchestrated by particular actors, especially the coastal states, but there are signs that non-Arctic states seek more input and decision-making rights. The Arctic remains a vital strategic region for Euro-Atlantic security. Now is the time for NATO to consider its approach to the region while tensions still remain low.

Notes

1. United Nations Convention on the Law of the Sea (signed 1982).
2. Including the Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic (signed 2011); Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic (signed 2013); Agreement on Enhancing International Arctic Scientific Cooperation (signed 2017) and Central Arctic Ocean Fishing Moratorium (signed 2018) with the A5 + Iceland, Japan, South Korea, China and the European Union.
3. "The ACGF is an independent, informal, operationally-driven organization, not bound by treaty, to foster safe, secure, and environmentally responsible maritime activity in the Arctic." Retrieved from https://www.arcticcoastguardforum.com
4. "The Arctic Security Forces Roundtable (ASFR) is a semi-annual gathering usually attended by twelve nations focused on improving communications and maritime domain awareness in the Arctic Circle. The twelve nations include: Canada, Denmark, Finland, France, Germany, Iceland, the Netherlands, Norway, Russia, Sweden, the United Kingdom and the United States." Retrieved from https://www.apan.org/pages/case-study-asfr
5. Measured by Arctic capabilities, reach, Arctic territory, population, or Arctic GDP, Russia is the regional hegemon.
6. Indigenous peoples' organizations have been granted Permanent Participants status in the Arctic Council. The Permanent Participants have full consultation rights in connection with the Council's negotiations and decisions. The Permanent Participants include: Aleut International Association (AIA) Arctic Athabaskan Council (AAC); Gwich'in Council International (GCI); Inuit Circumpolar Council (ICC) ; Russian Association of Indigenous Peoples of the North (RAIPON); Saami Council (SC). This category is open equally to Arctic organizations of Indigenous peoples with a majority of Arctic Indigenous constituency representing: a single Indigenous people resident in more than one Arctic State; or more than one Arctic Indigenous people resident in a single Arctic State.
7. United Nations Declaration on the Rights of Indigenous Peoples (2007).
8. Commission on the Limits of the Continental Shelf (1997).

9. Greece and Poland will have executive branch elections in 2025. All of the other NATO states have elections scheduled for 2021, 2022, 2023 and 2024.
10. 9 NATO states have non-Army/land domain CDS at present. (Denmark and Spain – Air Force and Belgium, Bulgaria, Croatia, France, NL and Portugal - Navy). Iceland has a civilian female representative (Director General, Directorate of Security and Defence Ministry for Foreign Affairs)
11. as Iceland does not have a military.She is the only female representative among the 29 other Chiefs of Defence.. More diversity measured in many ways, including gender, and specialities (such as cyber and space) would help NATO to think in new and innovative ways. Albania's CDS, for example, is a physician.

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Briefing Note

On the Implementation of the Russian National Plan for Adaptation to Climate Change in the Arctic

Dmitry Sergeev & Irina Chesnokova

The process of adaptation to climate change is extremely relevant for the Arctic: warming here occurs twice as fast as in other regions of the planet. The results of many assessments show that this trend will continue in the long run. Extreme natural phenomena become a threat to the security, health and well-being of the Arctic regions and are associated with risks for economic activity in the polar regions, affecting the development of natural resources, sea and land transport, serving infrastructure, buildings and structures, housing and communal services and agriculture. Adaptation is becoming not only one of the new priorities of the Arctic agenda for sustainable development at the national and international levels, but also an everyday challenge for the northern regions.

Introduction

A large part of the territory of Russia is experiencing climate changes, and the consequences of these changes have a significant impact on the socio-economic development of the country, living conditions and human health, as well as on the state of the economy.

According to many years of observations by the Federal Service of Russia for Hydrometeorology and Monitoring of the Environment, the average annual air temperature at the Earth's surface in the Russian Federation since the mid-1970s has been increasing by an average of 0.47°C over 10 years. This exceeds the growth rate of average global air temperature by 2.5 times, which is 0.18 °C for 10 years.

According to various estimates, 60% to 65% (about 11 million km2) of the territory of Russia is permafrost. The boundaries of the Arctic zone and the permafrost zone of the Russian Federation are shown in Figure 1. It is most widespread in Eastern Siberia and Transbaikalia. The deepest limit of permafrost is observed in the upper reaches of the Vilyui River in Yakutia. The maximum occurrence depth is 1,370 meters (recorded in February 1982). The permafrost temperature is not constant, it changes with depth. In the north of Yamal, the thickness of the permafrost layer

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reaches 400 meters, and its temperature drops below minus eight degrees. With such a huge area of permafrost in Russia, global warming of the climate can lead to significant adverse consequences, economic and environmental disasters.

Figure 1. Arctic zone and zone of distribution of permafrost rocks of the Russian Federation

The effects of climate change in the Arctic are already evident. There is an increase in the frequency and intensity of dangerous natural processes: floods, ice jams, tundra fires, etc. They become a threat to the safety, health and well-being of the population and are associated with risks for economic activity (development of natural resources, sea and land transport, buildings and structures, housing and utilities and agriculture) (Nikitina, 2019).

In such circumstances, action to adapt to climate change is simply necessary. The changes occurring in permafrost lead to the vulnerability of all facilities located on it and to enormous economic and environmental damage. For example, on May 29 this year in Norilsk, due to thawing of frozen rocks, fuel storage piles at thermal power plants dropped, and an accident resulted in a fuel spill. Environmental damage to water bodies alone is estimated at over $86 million (Fig. 2&3). What is adaptation? Adaptation of society refers to the process of adapting to the actual and future consequences of climate change to prevent related damage and reduce risks, as well as to take advantage of the opportunities for sustainable development (Climate Change, 2014). Adaptation to global climate change is relevant for the Arctic: warming here occurs two times faster than in other regions. The results of expert assessments show that this trend will continue in the long term.

On December 25, 2019, a national action plan for Russia's adaptation to climate change for the period until 2022 was signed (National Plan, 2019). What does this mean? This means that economic and social measures have been identified that will be implemented by federal and regional authorities in order to reduce the vulnerability of the Russian population, the economy

and natural objects to the effects of climate change, as well as to take advantage of the opportunities arising from such changes.

Figure 2. Top view of the pollution of the Ambarnaya and Daldykanrivers (PhotoRoskosmos, June 2020)

Figure 3. Rescue work on the Ambarnaya river (Photo Rosmorrechflot Maritime Rescue Service, June 2020)

This plan was developed for two years. The plan was prepared in accordance with a plan of measures to improve state regulation of greenhouse gas emissions and prepare for the ratification of the Paris Agreement (Russia joined it in September 2019).

The plan consists of four blocks:

- risks from climate change for the Russian economy;
- a list of federal events for three years;
- measures to prepare departmental adaptation plans by industry; and
- efforts to prepare regional plans.

The national action plan of the first stage of adaptation of the country to climate change was approved by a special Order of the Government of the Russian Federation and was calculated until 2022. Its structure is presented in the following sections. The first part is devoted to the statement of climate change in Russia and the consequences associated with it. The second part describes the planning of adaptation measures at different levels of management. The third part reveals the content of organizational, regulatory, methodological, informational and scientific support for the implementation of the national plan.

An analysis of the structure and content of the National Plan shows the following features of the Russian vision of the adaptation of various aspects of economic, economic and social life to ongoing and predicted climate changes. Highlighting the first stage of adaptation indicates an understanding of the high degree of uncertainty associated with the pressure of climate change, as well as the correct assessment of the priorities of adaptation measures. The structure of adaptation measures is tied to industries, which should ensure that the specifics of damage associated with climate change are taken into account.

It should be noted that in parallel with sectoral adaptation plans, regional adaptation plans should be developed. The development and monitoring of the implementation of such plans will be entrusted to the highest executive bodies of state power of the constituent entities of the Russian Federation. Reporting on the implementation of the plan should be generated annually, which is indirectly related to the nature of the variability of climate-related environmental characteristics.

In most regions of the Russian Federation, systematic work is not yet carried out in the field of studying the consequences of climate change for specific territories, developing adaptation measures for various fields of activity. To date, only a few regions are engaged in the development of regional climate strategies (Murmansk Oblast, St. Petersburg, Arkhangelsk Oblast, Moscow, Yamalo-Nenets Autonomous Okrug. Komi Republic, etc.). For various reasons, there is no possibility of transition from the stage of research and planning to the stage of effective implementation of adaptation measures. It is necessary to develop and include in the development strategies of the region's sections with regional climate programs, ending with a list of measures to adapt the regional economy to expected climate changes.

As for the Republic of Sakha (Yakutia), the Government of the Republic proposes the following tasks to prepare adaptation measures to the manifestations of climate change (Kirillina, 2017):

- carrying out fundamental research to identify the main climate-forming factors for the development of real scenarios of climate change in the republic; organization of complex

geocryological monitoring to assess the response of permafrost to climate fluctuations in different natural landscape conditions;
- development of new types of foundations of buildings and structures that could reliably function when temperature conditions and other parameters of frozen soils change;
- organization of monitoring bioecological studies to assess the degree of change in biodiversity under climate fluctuations;
- identification of regularities of changes in the water balance of the northern territories and during climate warming; and
- study of the consequences of the impact of climate change on the health and well-being of the Indigenous peoples of the North of Yakutia.

Russia is one of the few countries in which the consequences of climate change can be both positive and negative. As a positive consequence, we first of all consider the use of the Northern Sea Route for a longer time, and, perhaps, throughout the entire winter, as well as the expansion of the land use zone and its advance to the North, an increase in the productivity of forest ecosystems. The possible positive consequences of climate change are expected:

- reduction of energy consumption during the heating period;
- improving the ice situation and, accordingly, the conditions for the transportation of goods in the Arctic seas, facilitating access to the continental shelf of the Russian Federation in the Arctic Ocean;
- improving the structure and expansion of the plant growing zone, as well as increasing the efficiency of animal husbandry;
- increasing the productivity of boreal forests.

The negative effects of expected climate change for the Russian Federation include:

- increasing the risk of morbidity, including infectious and parasitic diseases;
- an increase in the frequency, intensity and duration of droughts in some regions, and in others, an increase in extreme precipitation, floods and water logging of soil dangerous for agriculture;
- increasing the frequency and scale of forest fires;
- Permafrost degradation in the northern regions with damage to buildings and communications;
- violation of ecological balance, including the displacement of some biological species by others;
- increase in electricity consumption in cities for air conditioning in the warm season.

It should be noted that "... losses and negative consequences come to us themselves, and gaining benefits is possible only if a number of additional conditions are met and certain measures are taken" (Kattsov, 2017: 104).

The National Adaptation Plan is a state system of measures of a political, legislative, regulatory, economic, and social nature, which are aimed at reducing the vulnerability of the system of ensuring national security of the country, economic entities, and citizens. Such a wide range of adaptation measures significantly complicates the planning tasks.

In particular, planning tasks include more economical use of water resources, changing existing building codes with the expectation of the resistance of buildings to the effects of future climatic

conditions and extreme weather events, construction of protective dams against floods, raising the level of existing dams to protect against sea level rise, and others. The establishment of advance planning can generate measurable economic benefits and minimize impacts on ecosystems, human health, economic development, property and infrastructure.

According to some experts, it should be admitted that many tasks in the National Plan are spelled out declaratively and are not very convincing. Among them, we believe, is a very important task of scientific support of the adaptation process, which is practically not feasible due to the lack of practice and procedures for attracting research teams to the processes of making managerial decisions.

Also, one of the objectives of the National Plan is to reduce losses and damage to the country's economy from dangerous natural processes and phenomena. In the context of a reduction in allocations to the environmental monitoring system and other specialized monitoring systems, this task seems to be informationally unsecured. In the same position is the problem of "... obtaining additional benefits in weather-dependent and climate-dependent sectors of the economy. Is it supposed to be solved "by identifying and implementing optimal economic decisions based on information about the current and forecasted state of the environment?" (National plan, 2019: 5).

There is also the task of "...updating strategies for the development of economic activities and sectors of the economy, taking into account the impact of climate change on them. Ensuring their implementation in the framework of state programs and investment projects, as well as projects and programs of public-private partnership" (National Plan, 2019: 5). This task is being realized most clearly in the Arctic zone (through the efforts of the new Ministry for the Development of the Far East and the Arctic). This seems quite justified, since it was in the Arctic that climate change manifested itself especially strongly. Separately, it is necessary to emphasize the importance of the task of ensuring the fulfillment of the international obligations of the Russian Federation under the UN Framework Convention on Climate Change.

The National Plan of Adaptation is quite complete, although again declaratively, the complexity of planning is prescribed, which involves:

1) preventive and post-crisis adaptation;
2) adaptation to the direct (real and expected) and indirect effects of climate change;
3) harmonization and integration of adaptation plans at the federal and regional levels;
4) planning hierarchy;
5) monitoring the effectiveness of adaptation measures and their adjustment.

Organizational, regulatory, methodological, informational and scientific support for the implementation of the national plan is formulated in the form of a list of activities (table 1), the contents of which raise numerous questions from the scientific community. The main problem of the National Plan is the lack of attention to feedbacks in management and assessment of the effectiveness of adaptation measures. Obviously, the main content of adaptation is the generation of secondary regulations that cannot become meaningful without effective targeted scientific support. In fact, out of 29 activities of the National Plan, only seven are substantive in terms of improving the quality of information support for managerial decision-making:

- Definition of a system of targets for achieving the goals of adaptation to climate change (federal, sectoral, regional);
- Development of statistical indicators that characterize the protection of the population, natural, and man-made and anthropogenic objects from the adverse effects of climate change;
- Development of guidelines for assessing climate risks and ranking adaptation measures according to their priority;
- Preparation of proposals for the creation of new and existing economic, financial instruments and insurance mechanisms, taking into account public and private financing;
- Monitoring the effectiveness of implemented adaptation measures to climate changes in the population, economy and natural objects;
- Re-equipment and modernization of the state observational network for climate monitoring;
- Preparation of the third assessment report on climate change and its consequences in the Russian Federation, including vulnerability assessments and adaptation scenarios.

Table 1. Structure of national Russian climate adaptation planning process

Hierarchic Level of Plans	National (Federal)	National (State Control on the Industrial and Social Branches)	Corporative	Regional
National (Federal)	Development of the documentary and of the system of lows with taking into account various aspects of the national security: - Political - Codes - Economical - Social	- Transport - Fuel and Energy - Industry and Trading - Building and Supply - Agriculture and Fishing - Resources - Health - Sanitary and Epidemiology - Emergency - Arctic and Far East territories	- Gazprom Company - Rosneft Company - Energy Holding - Alrosa Company - <other huge companies>	Strategy of regional development in climate change pressing
Regional (including the level of the Federation Subjects)	Development of the documentary and of the system of lows with taking into account various aspects of the regional development: - Economical - Social	–	Corporative plans of adaptation	Regional plans of adaptation
Municipal	Development of the documentary and of the system of lows with taking into account various aspects of the municipal development: - Economical - Social	–	–	To be developed after 2022
Individual and corporative units and objects	To be developed after 2022	To be developed after 2022	To be developed after 2022	To be developed after 2022

Conclusions

The Arctic, as is well known, is increasingly being integrated into global processes. This region is simultaneously experiencing growing anthropogenic impacts including climate change and pollution. The Arctic regions experience climate change twice as fast as the rest of the territory. Based on this, there is a paradox in the development of the Arctic, on the one hand, the protection and mitigation of the effects of climate change, and on the other, the desire to increase economic activity.

Under these conditions, the adoption of measures to adapt to climate change is simply necessary. The ongoing climate change in Russia creates new opportunities for the country's economy, the use of which also relates to the field of adaptation.

In Russia, there are significant opportunities for adaptation of the economy and social sphere, which will reduce the negative consequences and increase the possibilities of using the positive consequences.

Adaptive capacity is closely related to social and economic development. The economic costs of adapting to climate change are likely to be worth billions of dollars annually over the next several decades, although the exact amount of money required is not known.

On the territory of Russia, the implementation of the National Adaptation Plan will encounter additional difficulties associated with a vast and naturally diverse territory, which, moreover, has been developed very unevenly (Fauzer, 2017).

Two large groups of tasks are identified that need to be addressed in the process of adaptation. First, it is necessary to highlight those areas and aspects that need special attention in the formation of adaptation programs. One way or another, all these aspects are related to the economic well-being of risk recipients associated with climate change (Porfiriev, 2017). Second, it is necessary to formulate a list of key indicators of the state of natural-technical and socio-economic systems by which it will be possible to judge the effectiveness of adaptation procedures. There is no single point of view on this issue. It is proposed to use indicators of sustainable regional development as a basis for organizing adaptation measures.

Russia, like many countries, is taking into account the importance of adaptation measures, pursuing an active state policy, and developing adaptation strategies both at the sectoral (in the sectors of the economy) and at the regional levels (taking into account the geographical and climatic characteristics of the region).

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Commentary

Marginal Ice Zone: Profit vs. Protection

Ilker K. Basaran & Hayat Cemre Cakıoglu

Introduction

On June 18th, 2020, the Norwegian Parliament disregarded calls made through the World Wildlife Funds' (WWF) MIZ (#SaveTheIceEdge) campaign and voted against a multidisciplinary scientific report provided by a group of Norwegian research institutions and state agencies regarding updated (advised) boundaries of the Arctic Marginal Ice Zone (MIZ), a transitional area between an open ocean and solid sea ice, and opened the area in the Barents Sea for oil and gas explorations.

The significance of this decision comes from the fact that the MIZ is considered one of the world's most important biological hot spots with high biological productivity and rich biodiversity. It also has a unique ecosystem that supports some Indigenous peoples' traditional way of life. In other words, it is a key zone for food security.

The MIZ is a very dynamic zone; the extent and width of it change depending on the season, wind, and the currents. It follows an annual cycle, and reaches maximum extent in spring, usually in April, before moving back towards the north (central Arctic) during the summer; reaching minimum extent in September. During this northward retreat, conditions are ideal for the growth

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Figure 1 Photo of MIZ by Haakon Hop

of primary producers, such as ice algae and phytoplankton. The MIZ food web built on this foundation nurtures many species from different trophic levels. It is also a very important habitat for a number of ice-dependent mammals and seabirds that live partly in the MIZ. These are dependent on breeding areas on ice and on the food supplies available on the seabed in the shallow bank areas. Thus, the sea ice plays a key role in maintaining productivity and diversity in the Arctic ecosystem.

Content of the Scientific Data

The recommendation of the scientific community was to define and draw the southern limit of the MIZ where the sea ice appeared at least 0.5% of the time in April – the annual maximum extent – which would move the line southward since the previous line was drawn where the sea ice probability was 30% according to 1967-1989 data, which was considered to be outdated.

However, the opposing view in Parliament, despite environmental concerns and scientific advice, supported the idea of keeping the line at 30% probability, which would move the line northward when calculated using the new data due to the decline and movement of the Arctic sea ice towards the north.

In Norway, oil and gas activities are prohibited on the north of the MIZ line. If drawn at 0.5% probability, this meant that the MIZ not only would cover a part of the aforementioned promising area for the future discoveries and drillings but also would affect some of the licenses that have been already awarded to companies by the government. This at the very least would bring troublesome relations and legal complications with some of the biggest companies that are operating in the Norwegian Continental Shelf, undoubtedly affecting Norwegian economy.

Figure 2 Map indicating MIZ and oil licenses before the voting of the parliament.

Non-governmental organizations (NGOs), such as WWF, carefully monitored the process and campaigned to defend the integrity of the Arctic marine environment over the profit of oil and gas companies. The efforts were accelerated furthermore after the Norwegian government, upon reviewing the previous perspectives, announced its proposal to the parliament which instead of listening to the scientific advice drew the line at where the sea ice probability was 15%.

Government suggested that they've gone for the middle ground but in reality, this new proposal nearly corresponded to the same area of the old data's 30% line and did not affect any of the existing oil licenses or limited future exploration areas.

The Decision

The rationale behind the Norwegian Parliaments' decision can be traced back to Norwegian oil and gas sector. Norway is an oil dependent country. Its earnings from the sale of oil and gas have constituted one third of government revenue, as well as providing jobs for nearly a quarter of a million people who were employed not just in the energy industry but in providing the vital infrastructure - ships, buildings and essential services - that is needed to support it.

The oil production of the North Sea wells, after enjoying almost 40 years of virtually uninterrupted increase, reached its highest level in 1996 and has been gradually declining ever since. In 2019 combined oil output of Norway's all fields has been 55.1% lower than it has been in early 2000s. This year, the fluctuation of global oil prices and inconvenient conditions caused by COVID-19 pandemic additionally damaged the Norwegian industry, combined annual production of oil and gas sector has been 37.7% less than in 2019.

Therefore, Norwegians need to find new drilling fields and keep the production level high in order to compensate for the decline. In this perspective, the Arctic holds the greatest promise. Norwegian government has taken numerous actions towards moving the production activity northward, to new fields located above the Arctic Circle. It is also important to note that Norwegian tax rules allow private companies to deduct exploration costs from income generated elsewhere in Norway. This means that the state effectively covers 80 percent of the costs, a major incentive for exploration.

The recent actions of the government demonstrate the dedication to continue moving northwards. With the new line set, the Norwegian Ministry of Petroleum and Energy in June 2020 announced plans to open up eight new regions in the Barents Sea which would include 125 new exploration blocks for the 25th licensing round. About half of these would be in the High North, between 73°N and 74°N parallels. The proposal is now submitted for public consultation and the deadline for consultation comments has been set at 26 August 2020. After the assessment of comments, the 25th licensing round will be announced during the course of autumn 2020 and estimated to finish in the second half of 2021.

According to the Norwegian Petroleum Directorate (NPD), Norway's oil output will grow by 43% from 2019 to 2024 as new fields come on stream and older production facilities are upgraded. By 2023, combined output of oil and gas is expected to reach close to the record level seen in 2004, the agency said, although gas would have a greater share than before.

Threat to Ecosystem

The MIZ ecosystem is particularly vulnerable to the activities of the oil and gas industry. Substrate loss and smothering, underwater noise and abrasion can be given as examples for the pressures put on the ecosystem. The establishment of offshore oil rigs in the area would lead to an increasing number of maritime transportations, which would also put a huge pressure on the ecosystem by increasing the number of collision on marine mammals, marine littering, introduction of contaminating compounds, and consequently, disturbing the habitat and the food webs.

Furthermore, while offshore rigs' normal operational emissions and discharges to air and sea are also concerning, the obvious problem remains as the risk of an oil spill. The increasing activity combined with difficult conditions of the Arctic raises the risk of oil spill. Latest data available through the research of Nordea 'Analyses of Key Companies having Business Operations in The Arctic' clearly displays that errors leading to accidents and spills are already happening in the Arctic. Though Norway is constantly researching prevention and mitigation methods as well as preparing extensive response plans, the questions remain about the potential success of the spill response methods in MIZ's broken ice environment and the damage the vulnerable ecosystem will face. The Arctic Council previously argued that oil and gas activities in the Arctic should not be developed until proven response methods are available.

Legal Gap

Norway's decision, which will inevitably lead to more pressure on the vulnerable MIZ ecosystem, is a prime example for why a more extensive legal framework is needed to protect this area.

As a dynamic area, the MIZ is constantly changing the size and location which means it is a very difficult area to legally define and govern. The level of protection that can be provided for the MIZ would depend on whether MIZ falls within the coastal state's maritime jurisdiction or the high seas. If the MIZ fall within the coastal state's jurisdiction, then the United Nations Convention on the Law of the Sea (UNCLOS) would be the primary source that we have to turn to in order to legally protect the area. Under UNCLOS (clauses 3, 33, 55, 56, 210, 211) coastal states have jurisdiction until 200 nautical miles (nm), borderline for the Exclusive Economic Zone (EEZ), to regulate the marine activities and protect the marine environment. Beyond the EEZ is considered as high seas where the coastal states have no jurisdiction to regulate the MIZ under UNCLOS and customary international law. Thus, if the MIZ falls beyond the coastal state's jurisdiction, then there is no international legal instrument to protect the MIZ and the ecosystem services provided by this unique area.

Considering the gradual northward trend, protection the MIZ is becoming more prominent. The question is: what are the prospective regulatory frameworks in international law that we can use to protect MIZ?

Potential Pathways to Legal Protection

The current legal approach is largely sector-based and fragmented. Yet, the protection of the MIZ requires integrated transboundary ecosystem-based management that coordinates the competing ocean uses of stakeholders, such as the Integrated Coastal Zone Management. In addition to the hydrocarbon developments, the MIZ ecosystem is subject to threats from, for example, increased shipping, eco-tourism, and over-fishing in the Arctic.

As indicated earlier, developing an appropriate legal response will be challenging given the rapidly changing nature of the Arctic environment and MIZ in particular. The International Maritime Organization (IMO), the only United Nations (UN) agency with the mandate to regulate international shipping, has in 2017 adopted the IMO-Polar Code. But the Code in current form does not provide protection for the MIZ. However, there is an ongoing process to amend the Code, and this might present a great opportunity to introduce the MIZ concept and seek protection through the Agency.

The Arctic Council has evolved throughout the years as an intergovernmental forum and proved itself to be instrumental in shaping the governing structure of the Arctic. Under the Council's auspices and through the contribution of its working groups, the Arctic states have adopted a number of non-binding and regional legal instruments, such as the Agreement on Cooperation on Marine Oil Pollution Preparedness and Response. The Arctic Council can be a viable option in creating a legal instrument to protect and regulate the MIZ. As a matter of fact, the Protection of the Arctic Marine Environment (PAME) working group has been developing an area-based management system under the marine protected areas network. It is possible to include MIZ as a sensitive area that requires recognition and protection and create a regional agreement to protect it.

It is also possible to designate MIZ as a Particularly Sensitive Sea Area (PSSA) under IMO. The designation of a PSSA provides special protection to ecologically important and vulnerable areas. The MIZ can be designated as a PSSA if the Arctic states mutually agree on this. However, since PSSA scheme only serves as a guideline it depends on the voluntary compliance of its signatory states. It is also important to note that, to date, IMO has not designated any PSSAs in areas beyond national jurisdiction, namely in high seas. Therefore, if offered and accepted, such a PSSA would be the first of its kind.

Lastly, the ongoing UN negotiations on an international legally binding instrument on the conservation and sustainable use of marine biological diversity in Areas Beyond National Jurisdiction (BBNJ process) would be a critically important tool to use in protecting the MIZ as well.

Conclusion

Norway's decision to allow oil and gas companies to conduct commercial marine activities beyond the advised borders of the MIZ opened the Pandora's box as it exposed one of the world's most important biological hotspots with rich biodiversity and ecosystem services to the potential serious marine pollution, such as oil spills in Arctic.

The industry is always swift to act upon financial opportunities and governments are sometimes prone to prioritize profit over protection. Therefore, legal protection of the environment is vital to ensure sustainable development. The most important aspect of this legalization process is to be proactive in our approach to environmental protection. We should not wait for a disaster to happen in the Arctic to regulate the MIZ.

There is a legal gap in international law to protect the MIZ and this gap should be immediately addressed. The international community should put this issue into their agenda and start discussing the most feasible way to regulate this productive and ecologically vulnerable zone.

Section II: Indigenous, Northern and Gender Creativities and Perspectives

Understanding Climate Change from an Indigenous Paradigm: Identity, Spirituality and Hydrosocial Relations in the Arctic

Daria Burnasheva

This paper reflects on ways of understanding climate change from an Indigenous paradigm. Through the lens of Indigenous water concept (Griffith, 2018), it will look at the contemporary processes shaping the identity, spirituality and hydrosocial relations in Sakha (Yakutia). It will look at how these processes are influenced by climate change. Traditionally, the relations between societies and water in permafrost areas have been understood in strict economic terms as cost-ineffective and unprofitable. Previously, research has pointed out the "cost of the cold" (Hill & Gaddy, 2003). However, what was often omitted was the actual efficiency of cold and ice. In fact, Indigenous communities in Sakha (Yakutia) have succeeded in building a partnership with the ice and learned to benefit from it in conditions of scarce economic resources and lack of infrastructure. However, climate change and rapid transformations of the permafrost environment are not only causing additional costs but also cultural loss. Focused on this connection, this paper reflects on the following questions: how has the ice shaped the identity, spirituality and traditional hydrosocial relations of Indigenous communities in Sakha (Yakutia)? How do their identity and spirituality change under climate change and current transformations in the cryosphere? And finally, how is climate change transforming the traditional hydrosocial relations in the Arctic?

Introduction: why cold matters

My parents recall the elders saying twenty years ago: *"People nowadays rush through the skies [by planes] tearing it through, the Nature is changing."* It is a handy metaphor for growing technological pressure on the world's ecosystems. Climate change is happening faster in the Arctic than anywhere in the world. Earlier, a lack of intensive human development, an extreme climate and long distances from major population and economic centres resulted in the relative well-being of many Arctic ecosystems (Arctic Biodiversity Assessment Report, 2013). However, in light of recent events in Russia's Arctic, including devastating outcomes of the diesel oil spill in Norilsk and wildfires in Sakha (Yakutia), we see that the situation has changed dramatically in less than a decade.

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The Republic of Sakha (Yakutia) is one of the northernmost, remotest and coldest regions of Russia. Its territory is about 3 million square kilometers, almost one-fifth of the total Russian land area. In the late 1980s and early 1990s, the population was reported to be slightly more than a million people. However, the economic turmoil of the early 1990s caused an intensive outflow of population (Cruickshank & Argounova, 2000) which had arrived earlier in the frameworks of the Soviet project of "mastery" (osvoyenie) of the North (Vitebsky, 2006). Since 1997, the population has never reached a million people but the demography has changed. Today, unlike during the Soviet period, the majority of the population is Indigenous. The Sakha (Yakut), according to the latest data provided by the territorial branch of Federal State Statistics Service, have a population of 466,400 and are the most numerous of them (Statistical Handbook, 2020: 6).

The increasing worries about environmental changes in Sakha (Yakutia) have been proliferated in media and social consciousness following the massive drought in summer 2019. During those summer months, the Lena river, the main artery of Sakha (Yakutia) that connects people and is one of the primary means of transporting produce supplies, had the lowest water level in recent history, putting the short northern navigable season under threat. At the same time, the region suffered from severe wildfires. These factors reflect the water-related issues experienced by local communities, such as its accessibility and quality. In summer 2020, the wildfire season started earlier in Sakha (Yakutia) and lasted up until October, generating societal debates and raising serious concerns not only locally but also from the international media, such as the New York Times (Sengupta, 2020) and National Geographic (Stone, 2020), among many others. With the ongoing impact of COVID-19 and the effects of wildfires, the past summer posed a great challenge to the resilience of local communities.

While the topic of social aspects of climate change in Russia's Arctic is not very widely studied itself, even less research appears to have been done on the social aspects of water and Indigenous relations to it, and how it is affected by climate change. In general, there is a certain imbalance in research on Indigenous relations to land and water, the latter being represented comparatively less in academic research. In particular, there is still a knowledge gap on human-water relations in the Republic of Sakha (Yakutia). Little research is done through the water lens.

Major contributions have been made on understanding the social aspect of flooding and risk mitigation (Boyakova et al., 2011; Stammler-Gossmann, 2012; Vinokurova L. et al., 2016). Some analyses have been conducted on the dramatic consequences of permafrost degradation and their societal impact (Gotovtsev, 2016; Vinokurova U. et al., 2019). Important research has been done on water in a context of political ecology (Crate, 2011) and ice roads as part of transport infrastructure system (Argounova-Low, 2012; Kuklina & Osipova, 2018). Some research has been done on the spiritual aspect of water ecosystems (Danilova, 2015) and river symbolism (Varavina, 2019). The Indigenous paradigmatic approach has been used in some permafrost analyses from ecosophy and Indigenous axiological perspectives (Vinokurova, 2010; 2014; 2019) and on traditional perceptions of permafrost in relation to human health (Sleptsov, 2014). However, despite contributions of local scholars to understanding human-water relations, there is still a lack of research done from an Indigenous paradigm.

The paradigm depicting the cold as a threat to a human preventing their development and life in the Arctic has long prevailed in academia, including with Toynbee's "arrested civilisations" analysis (Toynbee, 1989). However, Indigenous activists point out the special role of the cold for

Indigenous cultures and identities, known as their "right to be cold" (Watt-Cloutier, 2015). They argue that the cold required maximum human capacity to survive, leaving them nothing but the bare minimum for sustenance, warmth, food and light, thus shaping Arctic civilization (Vinokurova, 2011). In this regard, Indigenous people regard the cold Arctic environment not as something to fight against, but as something to work with (Vitebsky, 2006).

However, climate change and rapid transformations of the permafrost environment cause not only additional costs but also cultural losses. Losses threaten the conditions that support Indigenous languages, prayers, and beliefs (Balzer, 2010). Despite the considerable amount of academic research on climate change and human adaptation in the Arctic, not much research has been conducted on how the relationship between humans and frozen water in the Arctic appears from a social and cultural viewpoint. Meanwhile, the frozen water, or ice, plays a significant role in traditional cultures in the Arctic.

By doing so, we can employ the concept of *Indigenous water* as a methodological approach through which we can better understand these relations. It is inspired by the concept of "Indigenous water" (Griffith, 2018) which I found highly relevant when studying human-water relations in my native area, central Sakha (Yakutia). The paper is further motivated by talks with my parents and relatives living in rural areas. The pictures I used in the paper are made by my relatives in their settlement.

There is no denying that water is life. For the Arctic communities relying on natural resources in their daily lives, not only is water life, but ice too. To demonstrate this, the analysis will focus on how we can understand current climate trends from an Indigenous paradigm in the context of human-frozen water relations in rural settlements in central Sakha (Yakutia). In order to understand climate change from an Indigenous paradigm, it is necessary to understand, *what* we are losing due to these changes, rather than *how* we are losing it. With this in mind, I choose to concentrate on telling about our way of Being in relation to frozen water, on and underneath the ground. This holistic concept includes also what we usually call identity, spirituality and hydrosocial relations.

Human "water protectors" activated a profound and powerful human/water relationality when they decided to protect and defend their water relatives from destruction by the Dakota Access Pipeline (Yazzie & Baldy, 2018). This paper will not bring novelty in theories of relationality being developed by Indigenous feminist scholars (e.g. Kim TallBear, Melanie K. Yazzie, Cutcha Risling Baldy, and others). However, this is an attempt to bring my humble contribution to the Indigenous voices from my part of the world.

Indigenous paradigm

As Wilson (2001) suggests, we need to move beyond an "Indigenous perspective in research" to "researching from an Indigenous paradigm." It sounds challenging. How do we understand the Indigenous paradigm? How does it differ from other paradigms? Is a "clash of paradigms" even more articulated than a "clash of civilizations" (Huntington, 1996) or a "clash of worldviews" (Little Bear, 2000)? Wilson (2001) explains that it is moving beyond an Indigenous perspective to a full Indigenous paradigm employing Indigenous ontology, epistemology, axiology and methodology that, as he argues, are fundamentally different from dominant Eurocentric paradigms. The fundamental difference of the Indigenous paradigm is that knowledge is shared with all of creation. It is not individual, but relational.

To me, it was easier to understand an Indigenous paradigm when I realized the complicatedness of relations between Indigenous people and academia. Sometimes, the academy still divides scholarship and Indigeneity. The conferences often gather the "scholars, experts and Indigenous people," although probably Indigeneity should not be defined along with professional domains since there are more and more Indigenous people as scholars and experts in various fields.

However, as we "were faced with leaving our Indigeneity at the door when we entered the academic world" (Hart, 2010), we do not always question ourselves about why and how we do the research we do. We succeeded in becoming scholars but very often we do research about ourselves from Eurocentric paradigms. It allowed us to enter the academy and build our academic identity. However, even recognizing this, we have not sufficiently acknowledged the relevance and legitimacy of our own knowledges and cosmologies which were represented as inferior to others (Chambers & Buzinde, 2015).

In Eurocentric paradigms, the Indigenous people have long been a research object, a problem, or societies with problems (Smith, 1999; Coates, 2004). Meanwhile, the scientific approach requires problems to be solved. When research problematises Indigenous, it does not answer our needs, it does not benefit our communities and it does not offer solutions to the problems that we face in our societies. It puts Indigenous peoples and cultures in a post-colonial context, which does not encourage epistemic de-linking from Western ways of thinking (Mignolo, 2009). Such an approach does not focus on Indigenous agency, instead, as suggested by Heiss (2003: 43), it is largely meaningless to them, "bearing in mind the political, social and economic status they currently occupy." The "post-colonial" suggests the state, while the notions of the process doing change are attributes of decolonizing approach (Tlostanova, 2012).

In the Indigenous paradigm, we use alternative epistemologies and methodologies shaped by the Indigenous agenda (Smith, 1999; Porsanger, 2004). The paradigm determines the object of study. In the Indigenous paradigm, the research focuses on problems to be addressed, not the people and their cultures. By doing so, it allows making visible "what is special and needed, what is meaningful and logical in respect of Indigenous people's own understanding of themselves and the world" (Porsanger, 2004: 107). It creates "space for critical analysis and encourages essential dialogue that challenges the influences of the colonialism" (Linklater, 2011: 73). Such a decolonizing approach "leads any investigation through the scholar, intellectual or researcher, *into the world,* rather than keeping him or her *within the discipline"* (Tlostanova & Mignolo, 2009: 131).

Doing research from an Indigenous paradigm requires locating ourselves in our study. In this connection, the personal subjectivities are vital to research. We "write our own stories and share our position in the world before we write about the world. This is a big task because we have to come to terms with *who we are* and *how we come to do the work that we do*" (Linklater, 2011: 1). It is more than accepting our Indigenous identity. It is taking our Indigeneity with us to the academy. While shifting our own identity to re-position ourselves from objects of research into "questioners, critics, theorists, knowers, and communicators" is necessary (Ndlovu-Gatsheni, 2017), it is not enough since it does not apply to Indigenous scholars who support the Eurocentric, post-colonial discourses.

Being an Indigenous scholar does not automatically translate to the research being done from an Indigenous paradigm. The understanding of paradigms, post-colonialism and decolonisation is lacking among Indigenous scholars ourselves (Chambers & Buzinde, 2015; Trees & Mudrooroo,

1993). As Linda Tuhiwai Smith (1999) argues, it is a devastating effect of colonialism that not only imposed control over Indigenous lands and resources but most importantly, dominated the Indigenous mentality. In doing so, it created a jagged worldview with "overlapping, contentious, fragmented, competing desires and values" (Little Bear, 2000: 8). However, the Indigenous paradigm does not compete with or replace others (Porsanger, 2004). It is about developing a holistic approach by combining different paradigms in Indigenous scholarship in order for our research to be beneficial for our people. Indigenous research should serve Indigenous interests. In this connection, the research from the Indigenous paradigm can be seen as "a scientific service to our people" (Vinokurova, 2017: 14).

The quest for the Indigenous paradigm is thus a challenge to Indigenous researchers ourselves to strive to reach an intellectual independence. As Linda Smith reminds us, "what is more important than what alternatives Indigenous peoples offer the world is what alternatives Indigenous peoples offer each other" (Smith, 1999: 105). In this regard, it is important to build partnerships with other researchers in our common mission to contribute to our well-being, facilitate healing and help building stronger resilience.

"Indigenous water": relation, not possession

In Eurocentric paradigms, the water is mainly understood in discourses of entitlement and commodification, while hydrosocial relations are largely apprehended within modes of management and governance (Stevenson, 2018: 99-108). In this connection, Indigenous relations to water are traditionally seen in the context of land rights, risk management and disaster mitigation discourses. However, such discourses limit the ways we understand our relations to water to a mere natural resource and potential disaster. They limit Indigenous aspirations regarding the water to political struggles in the same way that Indigenous methodologies have often been interpreted by the academic world as a political gesture in an Indigenous struggle for self-determination (Porsanger, 2004). In such a paradigmatic approach, the assumptions about what Indigenous peoples want are often limited by the discourse of land rights. These limits do not allow for an understanding of Indigenous ways of knowing and thinking about the water. What defines the concept of "Indigenous water" is the Indigenous epistemologies and spiritual relationships to water. For Indigenous peoples, all that exists in nature is imbued with awareness and power (Nelson, 1983: 31).

While hydrosocial relations focus on human-water relations from Eurocentric paradigms, cryosocial relations as human-frozen water relations offer new perspective on the relations shaped in the cryosphere. Cryosocial relations are not only relations to the frozen water on and underneath the ground. From an Indigenous paradigm, the cryosocial relations are one of the numerous ways we understand our Being in the world. It is about being respectful towards the ice underneath – *do not destroy the land surface and dig the ground without great need*, and also being aware of its potential dangers to human health – *do not sit on the ground without something on it*. We learned these two rules from our ancestors' support of our relations with permafrost. I consciously avoid the analysis of Indigenous water as an agent of decolonization as this is not the aim of this paper. Instead, I shall attempt to discuss the human-frozen water relations as seen from an Indigenous paradigm.

In Indigenous ontologies, the water is a relative

The ontology is a belief in the nature of reality, a "way of being, what you believe is real in the world" (Wilson 2001: 175). The use of Indigenous ontologies opens "new perspectives which may differ from those that are familiar and "scientifically accepted" in Western research" (Porsanger, 2004). Though the relation to water as a basis for human existence is universal, Indigenous peoples believe that we as individuals and communities are spiritually related to water. As Indigenous researchers note, *water is seen as an ancestor and as a relative* with agency within this network of life, one who deserves respect, care, and protection. Water is a relative with whom we engage in social (and political) relations premised on interdependency and respect (Stevenson, 2018; Yazzie & Baldy, 2018).

LaDonna Brave Bull Allard, a founding member of the Standing Rock protest movement against the Dakota Access Pipeline, notes: "Water is life. Water is the center of everything. Water is female. As females, we must stand up for the water. We have no choice. Without water, we all die. It's common sense to me. We must save the water" (2016). Kim TallBear (2017) offers a similar framework she calls "caretaking," an expression of "obligations of human kin with our other kin." She argues that scholarly theories of relationality are simply inadequate for capturing the "vibrancy" and "spirit" of "Indigenous relationships with our non-human relations in these lands," largely because they sever materiality from spirit (Yazzie & Baldy, 2018: 3).

Similarly, Sakha refer to the water bodies as lakes, rivers and seas as *ebe* – "grandmother," often using *khotun* with its name, meaning the lady, or mistress (Danilova, 2015; Prokopeva, 2015; Varavina, 2019). In Sakha culture, the water has anthropomorphic features as a female (though the water spirit is imagined as an older man). The lake *ebe*, grandmother, is a guardian and provider for a family who lived nearby. Therefore, *ebe* should be treated with a great respect. There are special norms which have to be followed: it is not allowed to treat her disrespectfully by talking out loud, calling her by name, crowding in her premises. A person who returned from a long journey should greet *ebe* by feeding her some dairy food. Our ancestors avoided inhabiting the shores of the big lakes, called *uluu ebe* "Great grandmother." They believed that the lake could destroy one's life (Danilova, 2015).

In relation to the water in particular, and Nature in general, there emerges the notion of responsibility. Human-water relations in the Indigenous paradigm is about responsibility. We are responsible for the external threats to the well-being of our water relatives with whom we are interdependent. As Sakha scholar Uliana Vinokurova (2014) reminds us, the responsibility is the attribute of the Arctic human. She and her colleagues (2019) note that the permafrost is degrading not only as the result of climate change, but also anthropogenic factors – the irresponsible actions towards the environment. The rural residents in affected areas understand that without their care about the environment, the rural landscape will become non-suitable for living: *"people express their readiness to help the nature to heal her wounds"* (Vinokurova et al., 2019: 14).

In Indigenous epistemologies, the water stories are our stories

Epistemology is how you think about reality (Wilson 2001: 175). It deals with ways of knowing, especially with reference to the limits and validity of knowledge (Porsanger, 2004). Indigenous people think in the ways that connect them with their living environment. We think about ourselves through the stories that connect us to the world, and stories about the world that

connects it to us. In Indigenous epistemologies, we think in a way that our stories are weaved in the greater stories of our water relatives – the lakes, the rivers, the seas. In other words, we observe ourselves in the processes of a greater, cosmic scale (Vinokurova, 2014).

Though storytelling through the prism of water is not exclusively Indigenous, the Indigenous stories are inseparable from the ones of the water. They are interweaved in the way that one cannot separate them. As Christian and Wong (2017: 7) write, "when we tell the stories of ourselves, we are also telling the story of the specific waters that move through us at a particular moment… When we tell a story of water, we are also telling stories of ourselves, or our societies." Indicating the connection with nature as defining feature of our identity (Larsen & Schweitzer, 2010), and being directly dependant on our water relatives, we are more sensitive to the changes occurring with them than other societies.

The water, as a living being, tells us stories that we ought to understand. The water relatives give us life, nurture us, warn us, and even punish us if we are disrespectful and disobedient. As Hansen (2016: 52) put it, "we feel need, love and fear of Arctic nature all at the same time." This is how things work in our world; this is the way we think about reality. In telling stories and locating ourselves in relation to water bodies, we do not just express our place identity or sense of belonging, we express our very way of *being related to* a certain water, be it a lake or a river. In this sense, we form the "imagined community" (Anderson, 1991) with our water relatives.

In Indigenous axiologies, the water is a teacher

Axiology is a set of morals or a set of ethics. It is how your research has to do something beneficial in this world (Wilson, 2001). As Porsanger (2004) notes, the Indigenous axiologies deal with the nature, types and criteria of values and value judgments. She also mentions, however, that the great majority of contemporary Indigenous academic publications are contained within the field of education. Indeed, the field of education is the most popular among Sakha scholars, too.

Stevenson (2018: 96) quotes Leanne Simpson, who articulates water's qualities and how it quite literally acts as a teacher: "The water, Nibi, teaches us about relationships, interconnection, interdependence and renewal." In this regard, Cutcha Risling Baldy writes, "many of our ceremonies give us an intimate connection to the river, they remind us that we are responsible for our river, our environment. These ceremonies teach us that our well-being is tied to our environment and our community. They teach us that we are intertwined with our world, not separate, not dominant" (Yazzie & Baldy, 2018: 8).

The Nature is a subject of pedagogy, writes Uliana Vinokurova (2014: 62): "the Nature has a great range of pedagogical influences, from punishment by death to rewarding with long life. Her main pedagogical principle is the interrelatedness of All Being." She claims that when life is supported only by information gathered from natural sources, own reflections, and abilities to foresee, it develops the delicate energy-informational connection to Nature. The big floods and droughts in Sakha (Yakutia) were the signals, they are our grandmother's warnings to people to help, to take care of her.

In Indigenous methodologies, we converse with our human and water relatives

The methodology is how you are going to use your ways of thinking (your epistemology) to gain more knowledge about your reality (Wilson, 2001). As Margaret Kovach suggests, the

conversational method aligns with an Indigenous worldview based on orality as a means of transmitting knowledge. She conceptualises the conversational method as an Indigenous research method, justifying storytelling as a traditional way to collect and disseminate the knowledge (Kovach, 2010: 40-48).

It is an understanding of ongoing changes in our traditional relations with water. In research of human-water relations from an Indigenous paradigm, we use the conversational method with our relatives, both human and water. It is talking to people around you, to your family, or your wider community. First and foremost, it aims to understand their motivations and needs. It teaches us to be respectful towards them, and listen to the stories they tell us, since everybody has something to tell.

When researching human-water relations from an Indigenous paradigm, we should try to understand our water relative, our grandmother. It is crucial to understand her needs, acknowledge and respect her rights by observing closer and by consulting with people who know her longer and better. In this regard, the sources usually considered as alternative become important. It engages not only sources of various genealogy but a transdisciplinary approach since we understand the knowledge as whole and relational. We need to observe, listen and feel better in order to understand what she is telling to us, whether she is happy, whether she warns us, needs our help or punishes us for being disobedient and disrespectful.

Human-frozen water relations in central Sakha (Yakutia)

Water has been a powerful metaphor for describing various social situations in many cultural contexts. Sakha use the expression *uu saha*, literal translation – "water Sakha," if they want to describe themselves as being "true" Sakha, mainly, speaking fluent Sakha language. As in many world cultures, clean water is considered by Sakha as one of the fundamentals of Being (Vinokurova, 2011). The water has indeed become central in climate change discourse, as one of its most prevalent effects is the altered water regimes (Crate, 2001). However, as previously mentioned, research tends to focus on water in its liquid state, while the frozen water is in fact a highly significant factor. The degrading permafrost landscapes challenge traditional living arrangements influencing the view of the world. Those who until recently felt belonging to land, now do not see prospects for living in rural areas. The emerged insecurity and constant externally imbued challenges along with sudden changes in environment cause severe anxiety among rural residents (Vinokurova et al., 2019).

I share the stories from *Uus-Aldan* district, namely the villages of *Suottu* and *Kurbuḥah* on the right bank of the Lena river east of Yakutsk. It is an area where I come from and my family lives. Though the geography suggests close proximity to the capital Yakutsk, Uus-Aldan is marginalized in infrastructural terms. Some of its communities severely lack roads and remain remote despite comparatively small distances. Lately, the longer and warmer autumns pose even more challenges. The ground cannot support the transport in the rainy season, thus rural roads are being destroyed. It is possible to drive on the majority of roads in Uus-Aldan in autumn and spring only when on four-wheel drive, and even all-terrain vehicles.

My native area has not yet faced the permafrost degradation at such a dramatic scale as in other locations (Gotovtsev, 2014; 2016). Previously, it suffered from a number of destructive floods. As a result, many affected households were moved to the areas on the hills. Living in close proximity

to the Lena river, our lives are dictated by its seasonal changes, namely, *suol turuuta*, literally, road standing. It is the ice roads season that enables locals to travel across the river to the capital Yakutsk. Moving on the frozen ground is a key element of ways of Being in the world for Sakha people:

> there is a concept of *uluu dobdurğa,* now forgotten; *uluu* – great, *dobdurğa* describes the sound made by horses on a frozen ground. It is an ancient concept of Sakha, describing a period of the first autumn frosts that enable travelling; in ancestral times, every significant event took place during this period, including wedding negotiations, military conflicts, relocations, because it was easier to travel on the frozen ground. Today, we no longer use this concept, but we still wait for this frozen ground period to be able to travel like hundreds of years ago…(from family conversations).

I will present some examples associated with the frozen water in the beginning and end of winter. This is a natural cycle we follow in my native area, and is also how we perceive and count the time (might be also an illustration of Indigenous perception of a non-linear time). Rural areas in central Sakha (Yakutia) have been experiencing drinking water-related issues long before the climate change discourse appeared.

In the second half of October, when the ice on the river gets thick, ice extraction for drinking water happens. The whole process is organized according to proper technology. The ice is not extracted from any lake, the choice is made accordingly as people assess its quality. Usually families extract ice from particular places on river or lakes for years. Sometimes due to warm autumns the thickness of ice is not enough, so people clean the snow on the ice to accelerate the process of freezing. The ice slabs extracted on a river or lake are then cut into cubes and used for drinking water throughout the year. It is a traditional event symbolizing the beginning of winter. Sometimes it has a communal character as people get together with their extended families to facilitate the process and also, they do it for the needs of the local school or hospital. The process of ice extraction is accompanied by observations, recollections of past extractions, analysis of conditions of ice and roads, and commenting on changes happening in the environment:

> they now use new technologies, new ways; when we were children we did not have anything, we drank icy cold water directly from the lake where we extracted ice, nobody got ill after that, surprisingly; now it is comfortable, we sit in warm cars, we have hot tea in thermoses, but the way we get our drinking water is not changing as time passes by… The lake and river ice are still free of charge though, however, maybe soon we will have to pay taxes for usage of ice as other water resources (from family conversations).

Though we do not ascribe the spiritual aspect to the process of ice extraction, this event is nevertheless associated with gratefulness. We are grateful to our *ebe* from whom we get the ice, for having access to clean drinking water. Without a doubt, the clean drinking water is of great universal value. Though there is some research done on its poor quality in some areas of Sakha (Yakutia), people in the rural settlements simply do not have any alternatives. In warmer periods, the ice cubes are stored in underground storage cellars called *buluus*.

Figure 1. The two types of *buluus*: with storage house and shed. It is done to protect the permafrost. A good example of Sakha cooperating with and conserving the permafrost. Credit: Maria Burnasheva, Vasilii Burnashev.

Buluus is a cellar almost two meters deep in the permafrost ground, used for storing deep-frozen food such as meat and fish, and also ice cubes for drinking water. In summer, it is crucial for a person going down to buluus to put on a thick coat and hat to avoid thermal fluctuations which are traditionally perceived as dangerous for health. Also, my relatives did not allow us as children to enter buluus. Even today with various freezers available on the market, the underground natural cold storage is still the most preferred way to store food and ice. Our relations with cold and frozen water teach us to care for the ground as we literally live on it. Our ancestors learned how to understand the frozen water underneath and successfully cooperated with it. Today, the permafrost degradation is challenging this partnership. Both local residents and researchers have been observing longer autumns in central Sakha (Yakutia) (Gotovtsev, 2014; 2016). Until recently, the cold has been a stable and free resource that helped maintain our households. The climate was even colder centuries ago, and the life of our ancestors was well-arranged in accordance with the climate, locality and their needs (Nogovitsyn et al., 2015). Now, we no longer rely on it as much as our ancestors used to.

At the beginning of November it is time for *muṅkha*, traditional ice fishing of Sakha. It is probably the second most significant event after the summer festival *Yḥyah*. The process is usually led by elders who coordinate all activities since it requires synchronized, coordinated actions from its participants. Importantly, it involves the ceremony of the blessing, feeding the lake – *ebe*, grandmother, asking for good luck from *Baaj Bajanaj*, spirit of hunting and fishing. The catch is then allocated to everyone who participated. It has also been the form of supporting the elders and big families who get their shares even if they could not contribute to the work as much as others. It was not only about food and subsistence but also about a community get-together. These traditions of mutual aid and support have been a foundation for human survival in the conditions of the North (Vinokurova, 2011; 2014). However, today *muṅkha* is losing its significance in community life. My relatives, who always take part in their community *muṅkha,* report that fewer people become involved each year.

> People do it differently today, in much smaller scale. Earlier it used to be collective, people shared fish and ate together, now they do not do it anymore. Now food is

> available everywhere in the grocery stores, there is no its shortage as it was before. *Sobo* was significant part of our diet back then, now it is less popular, especially among city people. People say they cannot find volunteers to work, and *muṅkha* is much work indeed, it requires a lot of effort; but then it is about enjoying the process and then sharing the catch. *Sobo* helped our ancestors to survive long winters and starvation (from family conversations).

People know exactly which *ebe* has the best fish. These relations were coordinated by knowledgeable people who, for example, decided when to let the lake rest when it gave less and smaller fish, or in contrast, too much, then it meant that *ebe* was exhausted. Though these aspects of *muṅkha* is a good example of what is usually referred to as TEK (traditional ecological knowledge), however, in an Indigenous paradigm, it is our relations with our grandmother. Our people have always been grateful for saving their lives by providing them with *sobo*, carp (crucian) fish, during hard times, especially when they faced severe starvation in the 1940s. To celebrate this, the Sakha people made a monument honoring *sobo* in Yakutsk. The *muṅkha* teaches us to be thankful, to enjoy meaningful work and good relations in our community, enjoy ourselves and the time well spent.

Early November is a period of *ôrùhù satyy tuoraaḥyn*, crossing the river; in my native area, it is the Lena river herself. Traveling and driving on the ice roads in Sakha (Yakutia) is well studied (see Argounova-Low, 2012), whilst walking and crossing rivers undeservedly received little attention. Until recently, crossing the river was a necessity for those living in Yakutsk and maintaining strong connections to the villages across the river. It was especially popular among students from the villages. We used to embark on the suburban bus that took us to the town located several kilometers from the river. There, we would tip the bus driver to get us directly to the river. We would walk for an hour or so, depending on ice conditions. The river navigation would be still ongoing, we would see the barges not far away and see our *ebe* "breathing," as she was freezing inconsistently with visible clear surfaces of open water. We would pave our route considering the condition of river ice choosing the areas where it was thicker and layered. We would avoid the open and clean areas where the ice was thin. After some time, hundreds of people would transform it to a very winding road that took into account all possible ice factors.

> Nowadays, people almost stopped crossing the river because of various reasons. First, in the 1990s and 2000s students used to do it to restore their food supplies as November is usual time for slaughter. But now the situation has changed, various food, including local meat and fish products made their way to city markets, people's income increased, they no longer rely on their connections to the rural areas and their relatives as before, they no longer keep frozen food supplies on their balconies as they used to during "hungry" 1990s and early 2000s. Second, there are now boats on the river that can drive on thin ice, so no need to walk unless you need to save money (from family conversations).

As some still walk through the river, the authorities try to regulate the cross-river movement, preventing "life-threatening situations". As Stammler-Gossmann (2010) noted, avoidance of risky situations and knowledge of ice serves Indigenous people well. Whilst traveling on river ice we indeed rely more on local experts' ice knowledge, and locally produced forecasts, than on institutionally produced knowledge. The example of Nenets reindeer herders demonstrates that

the use-value of non-locally introduced knowledge on safety requirements, in contrast to many other forms of scientific discourse, seems to be quite low (ibid: 152). Similarly, in case of river crossing, what an outsider may perceive as dangerous, for us, as locals, it is the usual order of things. As my relatives confirm, indeed, they see driving in a city as a more dangerous and risky business than moving in taiga or walking on the ice. It is in line with the Indigenous axiology, when we learn to read and understand the river ice. While walking across the river, our *ebe* teaches us to be respectful and aware of the natural powers, not overestimate our abilities, be humble in the face of Nature and the Cold, and exercise our moral and physical strength. As Sakha scholar Vinokurova (2010; 2014; 2019) reminds us, these are the foundations of our very Being in the world.

In May, the season of floods start in central Sakha (Yakutia). Each spring we guess how our *ebe*, grandmother, will behave this year. Will she bring much water to pose danger to houses (not wanted), high enough to nurture the pastures and crop fields (the ideal situation), or too low it will not even fill its usual river bed (not wanted)? People spend weeks before the floods discussing forecasts made by locals and hydrological services, and even *bilgeḥitter*, the traditional forecasters. However, despite all the research and made forecasts, our *ebe*, grandmother knows its ways better, everything is up to her own will. I remember the way our community handled the seasonal floods in springtime when our grandmother leaves its river bed and floods the valley, including the houses on its shores.

> It was when the big flood hit our village, *ulahan uu*, the "big water" in 2013, which already caused disasters on its way and now was coming inevitably. There was a lot of ice. The big ice pieces were rushing down the river destroying everything on their way. A colleague's husband stood in front of their house with a long stick and pushed every floating ice chunk away so that it would not crush the wooden house. After floods, without much complaining and lamenting about their property and animals, the villagers immediately rushed to work to get their lives together, building, restoring, cleaning, trying to get the works done before the autumn cold hits (from family conversations).

I remember how people handled the numerous floods also in other villages in central Sakha (Yakutia) accepting our grandmother's will as *"the Nature always knows its ways better."* Accepting the challenges of the Nature is a foundation of our view of the world (Vinokurova, 2010; 2014; 2019). These are just some examples of our relations with frozen water in central Sakha (Yakutia) as we learned to respect, understand and protect it.

Conclusion

This paper offers a limited account of a way climate change can be understood from an Indigenous paradigm. I focused on human-frozen water relations in the context of central Sakha (Yakutia). As Sakha poet, philosopher, and one of founders of Sakha literature Aleksey Kulakovskiy – *Ôksôkùleeh Ôlôksôj* reminds us (1909), our nation is shaped by the cold. Less cold and ice means less connections to ourselves, as we were shaped by the great Cold. Throughout the year we deal with water in its frozen state. We maintain sustainable relations with frozen water on ground and underneath it. The other paradigms would suggest that people in Sakha (Yakutia) "domesticated"

the cold. From the Indigenous paradigm, however, we would say that we built a partnership with it.

When we speak about protecting the waters, including frozen water on the surface and underneath the ground, we protect the rights of our relative, our *ebe*, our grandmother. As a living being, the water has got rights. The Indigenous movements for water protection demonstrate our relation to water as not something to claim rights for but a living being with her own rights. We should strive to protect the rights of our water relative as we can understand her needs and try to address them. Sakha scholars, permafrost scientists and sociologists, pledge for the actions for her protection. With their support, in 2018, the local government adopted a regional Law on permafrost protection and submitted a project of the federal law on sustainable use and protection of permafrost. The academic community proposes to consider the loss of dwellings due to degrading permafrost as equal to the loss due to other natural disasters, for example, the floods. In this connection, the federal law on emergency situations needs to be updated to include the permafrost degradation (Vinokurova et al., 2019).

Climate change is a disruption to our cryosocial relations. As we are forced to leave our native places and relocate due to degrading permafrost, we face a dramatic challenge for our relations with our water and human relatives. In the very beginning of this paper, I stated that we first ought to understand *what* we are losing due to climate change, rather than *how* we are losing it. So, this is what we are losing as people living in the coldest area of the world – our very way of Being in this world.

Certainly, working on this paper I had fears of falling into what Kim TallBear described "as scholars furiously producing theories to capture the turn of relationality in the context of climate change" (Yazzie & Baldy, 2018). However, as a Sakha scholar, I would like to contribute to Indigenous voices heard from my native area. It is thus a proposal of how we can understand climate change in Sakha (Yakutia) from an Indigenous paradigm. My intent is to open up opportunities for future discussion.

Notes

1. ISO-9 (1995) is used for transliteration of Sakha words.
2. Although Russia's federal law N104-FZ limits the "Indigenous small-numbered people of the North" by 50,000 representatives, here, I am using the United Nations definitions of "Indigenous peoples".
3. Much of what I wrote in this paper, I already knew growing up as an Indigenous Sakha in a small rural community. However, as Shawn Wilson suggests, it was important for me to check in with others (my parents and relatives).

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Developing a Framework for the Analysis of Arctic Indigenous Institutions in a Rapidly Transforming Region

Jacqueline Götze

Over the past decades, the Arctic has gone through a period of transformation. These changes particularly impact the everyday life of its Indigenous inhabitants due to their location in high-risk environments, vulnerability and dependency on environmental conditions. Although these communities are used to adapt to changing circumstances, the governance in times of transformative changes differs because of the complexity of change. Furthermore, the Arctic is affected by (post-) colonial and global dynamics through international agreements addressing Indigenous rights, sustainable development and climate change framed as international norms. However, global arrangements have to be rooted in regional contexts, which puts political institutions at these levels in a central position. Sustainable development studies consider inclusive institutions as key for achieving global commons. In order to overcome gaps in our understanding of policy approaches regarding sustainable development in the Arctic, this paper addresses the key role of Indigenous institutions. Against this backdrop, the paper proposes a framework on the nexus of Indigenous peoples and sustainable development by focusing on the governance of transnational political Indigenous institutions. Following sustainable development studies, this framework adds to the field of inclusive governance the relevance of political identity and Indigenous knowledges as complementing factors for the analysis of Arctic Indigenous institutions. The developed framework is exemplarily applied to two institutions, the Inuit Circumpolar Council and the Saami Council, to allow initial insights into its applicability. The framework could further act as a theoretical basis for in-depth analyses and support the derivation of testable hypotheses on the (inter)relation of transformative changes and the governance of Indigenous institutions.

Translating global dynamics to regional circumstances

The Arctic region displays certain unique characteristics and circumstances: Although the Arctic is part of different industrialised countries, the region can be categorised as a developing area based on its socio-economic data and overarching challenges.[3,4] The region is characterised by a great cultural diversity, differing socio-economic conditions, varying degrees of remoteness and

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vulnerability to climate change (SDWG, 2017). Framed as one circumpolar/transnational region, the Arctic can be differentiated into different sub-regions: the European Arctic (Iceland, Norway, Denmark, Sweden and Finland), the North American Arctic (Alaska (US), Canada) and the Asian Arctic (Russia). Indigenous peoples[3] used to live in the Arctic before their territories were divided by nation-states through (internal) colonisation processes, which led to power asymmetries between colonisers and Indigenous peoples. Today, 500,000 people of the four million inhabitants who are living in the Arctic identify as Indigenous peoples (Arctic Council Secretariat, 2020).[5] Over the past decades, the region has gone through a period of transformative changes in the ecological, economic, geopolitical, social and political dimensions. Shaping phenomena of these changes are primarily environmental and climate change, intensified resource extraction, (post-) colonialism[6] as well as processes of region-building and political re-empowerment. These aspects of transformative changes in particular impact the everyday life of its Indigenous inhabitants due to their location in high-risk environments, vulnerability, and dependency on environmental conditions.[7] Their livelihoods are jeopardised due to rapid weather changes, thin ice conditions, and an overall disappearing sea ice. These phenomena affect their traditional way of life, which includes activities such as hunting, fishing, and herding (Figueroa, 2011: 232ff.). Those changes have implications for the economic, social, and cultural situation as well as for the well-being and health of the Arctic population (Rautio et al., 2014). Consequently, Arctic Indigenous peoples are especially vulnerable to these external changes and threats. Although those communities had to adapt to changing circumstances in the Arctic since time immemorial, the governance today differs because of the intensity, rapidity and complexity of change.

At the same time, the Indigenous population is going through a period of legal re-empowerment in the Arctic context, which shaped the governance structures in the region and strengthened their self-determination (Poelzer & Wilson, 2014: 185ff.; Wilson, 2020: 27). Indigenous communities are part of processes of institutional devolution and re-empowerment that have led to the emergence of new Indigenous institutions and power shifts to other governance levels. In comparison to other regions, the governance of the Arctic displays a long tradition of transnationality, policies addressing sustainable development as well as of including local and Indigenous stakeholders (Wehrmann, 2020).

In regard to the international level, the Arctic became part of global dynamics through new awareness and agreements addressing Indigenous rights, sustainable development and climate change as international norms voiced by the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), the 2030 Agenda for Sustainable Development, and the Paris Climate Agreement. The challenges, which are addressed by these accords, are highly relevant for Indigenous peoples (Magni, 2017) and for Arctic peoples specifically (SDWG, 2017: 3). These global arrangements, however, have to be rooted in regional contexts, which puts institutions at these levels in a central position. In general, sustainable development studies consider inclusive institutions as key for achieving global commons (TWI 2050, 2018). Indigenous peoples belong to non-dominant groups and still need to advocate for their rights at different policy levels. One of these rights is, for instance, to establish and lead Indigenous institutions further promoting their rights and unifying Indigenous voices.

Our understanding of the governance and policy approaches regarding sustainable development of Indigenous institutions remains empirically and theoretically underdeveloped (Shadian, 2010).

To overcome these gaps and to integrate[8] Indigenous approaches into the sustainable development discourse, this paper addresses the key role of transnational political Indigenous institutions in the region. Against this backdrop, the paper proposes a framework on the nexus of Indigenous peoples and sustainable development in the Arctic by focusing on transnational political Indigenous institutions.[9] This framework includes elements of the concepts of inclusive governance, political identity and Indigenous knowledges. Hence, the paper aims at contributing to research on transnational political Indigenous institutions as key actors for governing in times of transformative changes and for achieving global commons. The research design envisages a deductive approach that frames transformative changes as the *independent variable* and the governance of transnational Arctic Indigenous institutions as the *dependent variable*. The developed framework will exemplarily be applied to two transnational institutions, the Inuit Circumpolar Council (ICC) and the Saami Council.[9] Thus, the paper allows first conclusions on the applicability of the framework. The framework should further act as a theoretical basis for future in-depth analyses and support deriving testable hypotheses on the (inter)relation of transformative change and governance.

In order to gain new insights into the governance and policy approaches of Arctic Indigenous institutions in times of transformative changes, the paper takes on a governance lens. This governance perspective allows for shifting from central steering to interaction. Due to different changes and issues in various areas, the governance in times of transformative changes is challenging: On the one hand, governance needs to address long-term effects and uncertainties of change; on the other hand, political actions have to be flexible and adaptable to new emerging circumstances.

By focusing on transnational political Arctic Indigenous institutions as non-state actors "our understanding of transnational interactions in a region that is increasingly cooperatively governed" can be deepened (Parente, 2013: 451). To operationalise Indigenous governance in the Arctic context, the paper aims at contextualising how transnational political Indigenous institutions are governing in times of transformative changes. These new insights are relevant because they can contribute to a more profound understanding of how Indigenous institutions develop policies towards sustainable development in a rapidly transforming region. Moreover, the findings can be referred to other regional contexts and the sustainable development discourse in general by addressing Indigeneity and critically reflecting on existing frameworks, narratives as well as paradigms. Furthermore, this approach allows applying global insights to the Arctic region and integrating Arctic research into a broader social sciences' context.

The paper begins with the development of the framework through elaborating how the different dimensions of transformative changes affect Indigenous people and political institutions in the Arctic. This subchapter is guiding to the role of inclusive institutions for the achievement of sustainable development. The framework further adds political identity and Indigenous knowledges as complementing elements for the governance of Indigenous institutions. Further, the applicability of the framework is tested. Finally, the paper closes with the conclusion.

Framework

The paper develops a framework for analysing the nexus of Indigenous institutions and sustainable development in the Arctic framed as a rapidly transforming region. Focusing on transnational

political Indigenous institutions in the Arctic, the framework aims at supporting the analysis of the institutions' policy-making and governance towards sustainable development at different policy levels. In the Arctic, transformative changes (*independent variable*) in all their different dimensions are impacting Indigenous institutions, their governance and policy approaches towards sustainable development (*dependent variable*).

Transformative changes in the Arctic

By analysing transformative changes in the Arctic more specifically, this paper identifies ecological, economic, geopolitical, social and political dimensions (see figure 1). Within these various dimensions of change, different impacts on Indigenous peoples and political institutions can be examined. Moreover, all dimensions are interlinked, which is underlined by the different arrows and connections (figure 1). Transformative changes in the Arctic in all their dimensions affect Indigenous peoples, their way of life as well as their vulnerability to external threats and influences. Policy approaches aiming at achieving sustainable development are considered to reduce these vulnerabilities, which highlights the relevance of political institutions in the context of the implementation of policies towards sustainable development.

Figure 1. Dimensions of transformative changes in the Arctic and their impact on Indigenous institutions

Source: Author

Considering the ecological dimension, the Arctic and its inhabitants are especially vulnerable to climate change impacts (IPCC, 2014: 2018). In the Arctic, the average temperatures are increasing twice as fast as elsewhere in the world. Phenomena such as disappearing sea ice, the thawing of permafrost, the release of pollutants and the effects of rising sea levels thus occur intensively (ibid). At the same time, the warming Arctic functions as an accelerator to global warming itself. Those changes in the ecological dimension are severe and affect the everyday life in the Arctic. For instance, the disappearing sea ice, the coastal erosion and the thawing of permafrost can cause infrastructure problems by impairing ice roads, bridges and housing. Moreover, Arctic animals change their migratory routes due to warmer temperatures, which is challenging traditional hunting, fishing and trapping activities. Besides the availability of traditional wildlife and fish, also

the health condition of animals worsens due to environmental change (Andrachuk & Pearce, 2010: 68). Hence, the mobility, traditional food and physical safety of Indigenous peoples in the Arctic are at risk. Indigenous institutions can raise awareness to the specific vulnerability of Indigenous peoples in the Arctic to climate and environmental change. Furthermore, they can showcase Indigenous solutions on adaptation and mitigation at different policy levels to strengthen the acceptance of Indigenous knowledges and practices in the field of sustainable development.

The economic dimension shows strong intersections with the ecological one. Record ice retreats and the changing climate facilitate the exploitation of natural resources, the emergence of new shipping routes, increasing industrialised fishing and the establishment of (mass) tourism in the Arctic. Economic development in the Arctic changes at a great scale due to complex effects. These changes also influence the life of Indigenous peoples because of new labour possibilities, external labour migration to their communities and environmental damage (Heleniak, 2016). Rising industrial activity and migration to new urban centres further describe the trend of urbanisation in the Arctic (Kenny, 2017). The economic dimension also demonstrates interlinkages with the geopolitical dimension of change in the Arctic. In the region, unclear sea borders meet with increasing economic opportunities. Because of newly evolving economic possibilities, many actors became interested in Arctic issues. For instance, many states – Arctic and non-Arctic – have developed Arctic strategies, in which they define their priorities in the region. Two main events regarding the geopolitical significance of the Arctic exemplify the argument of global effects shaping the Arctic. The Russian flag planting beneath the North Pole in 2007 and the illegal annexation of Crimea in 2014 have had far-reaching geopolitical consequences for the Arctic region in particular (Bergh & Klimenko, 2016). As Russia is one main Arctic player, its political actions could directly relate to the Arctic region. Many actors are increasingly interested in the Arctic and want to be part of decision-making processes, which can undermine the political voice and self-determination of Indigenous communities. As Indigenous peoples, some communities are already lacking in strong political representation and the free possibility to decide about their development based on their own systems due to, inter alia, long lasting effects of colonisation (Greaves, 2016; Kosko, 2013). Other Indigenous groups and communities, however, display strong political representation, which underlines the diversity in terms of political standing, resources and re-empowerment. The rising number of actors interested in the Arctic can challenge their already fragile (political) status even more (Wilson, 2020: 37). However, this awareness raising might also have positive effects for Indigenous peoples, because Indigenous' issues in the Arctic attract more international attention. Indigenous institutions can address these new economic opportunities and at the same time align them with traditional economic activities. Further, Indigenous institutions can utilise the increased attention for Arctic issues to mainstream Indigenous concerns and issues at different levels of governance, for instance against the background of competing interests of environmental protection vs. economic development.

Concerning transnational and regional cooperation, the Arctic displays increasing collaboration since the end of the Cold War, which also separated Indigenous peoples in the East and the West. Two prominent examples are the Barents Euro-Arctic Council (BEAC) and the Arctic Council. The BAEC was established in 1993 and represents Europe's largest area for interregional cooperation, including territories of northern Russia, Norway, Finland, and Sweden. The Arctic Council was founded in 1996 to foster circumpolar transnational cooperation in the areas of environment, biodiversity, ocean and Arctic peoples. In this intergovernmental forum,

transnational Indigenous institutions are represented as Permanent Participants alongside states. Being part of the Arctic Council, and negotiating and drafting declarations, strengthened the overall political voice of and unity between Arctic Indigenous peoples.[10]

With regard to the broader Indigenous rights' discourse, the adoption of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP) (United Nations General Assembly, 2008) by the General Assembly represents a significant momentum of the Indigenous rights movement. It represents over 25 years of negotiations and lobbying of Indigenous groups (Morgan, 2016: 1). The UNDRIP-process was also one of Indigenous political re-empowerment due to the shared experience of encounters with colonising powers and national governments (Coates & Holyroyd, 2014: 6). Therefore, UNDRIP became a relevant point of reference for the global Indigenous community in its fight for equal rights and self-determination in the nation-state context.[11] Overall, the declaration also played an important role in reinforcing the general negotiation position of Indigenous peoples in the Arctic at different policy levels (ibid; Rodon, 2014). Together with region-building processes in the Arctic and the regaining of self-determination, the achievements on the global level positively affected Arctic Indigenous peoples and empowered their political institutions. With UNDRIP, Indigenous people can now refer to an official declaration of the UN aiming at strengthening Indigenous rights globally.[12]

Furthermore, concepts of sustainable development and climate change action became part of global processes. The 2030 Agenda for Sustainable Development with its seventeen Sustainable Development Goals (SDGs) and the Paris Climate Agreement are two central events of 2015 that symbolise a new era of international, national and regional initiatives on sustainable development and climate action. Since the Arctic is one of the most affected geographic areas by climate change, the 2030 Agenda and the Paris Climate Agreement are of special interest to the region, too. The year 2015 has raised the general awareness of climate and environmental challenges all over the world and also in the Arctic, in particular due to its significance for the global climate (SDWG, 2017: 3). In addition, by focusing on Indigenous peoples, the SDGs provide a global framework for leaving no one behind and by that also an improved tool to work on Indigenous and minority issues. Especially due to the commitment made by the 2030 Agenda to reduce inequalities and marginalisation, Indigenous peoples' issues gained more political attention (United Nations, 2020b).[13] These dynamics also impact Arctic Indigenous institutions and their governance, because they can use the *Leave No One Behind* (LNOB) paradigm by linking the global and the regional level to address Indigenous issues.

On the social level, Indigenous peoples are facing effects of globalisation, (post-) colonisation and modernisation that are impacting their traditional way of life, the sharing and transferring of culture, traditional knowledges and land skills, as well as their languages (Andrachuk & Pearce, 2010: 68). Colonisation and modernisation interfered with the transfer of knowledges, led to power asymmetries and undermined Indigenous agency. Additionally, Arctic Indigenous peoples are confronted with drastic changes in their everyday life, for instance, the transition from a (semi) nomadic lifestyle to permanent housing, new technologies such as snowmobiles, and resource development (ibid: 64). Another relevant trend on the social level is urbanisation in the Arctic, which created new urban centres, urban Indigenous identities and lifestyles (Kenny, 2017; Nyseth & Pedersen, 2014; Patrick & Budach, 2014). Concerning the field of health and well-being, in many Arctic regions Indigenous peoples cannot benefit from the same standard of health care compared

to the majority populations (Rautio et al., 2014). Moreover, effects of global warming affect the health and well-being of Arctic Indigenous peoples. For instance, the Inuit have a relatively high incidence of lung cancer due to, inter alia, high concentrations of toxic substances coming from the transmission of black carbon, trans-boundary pollutants and persistent organic pollutants to the Arctic (ibid: 306f.; Koivurova et al., 2012: 364). Another social phenomenon are the high rates of suicide among young Inuit, e.g. in the territory of Nunavut, Canada (Rautio et al., 2014: 309f.). The health and social well-being of Indigenous people stand for complex chains of effects in the area of economic, social, cultural, political and environmental factors (ibid: 310), which reinforce the interwoven relations between the different dimensions of transformative changes. Indigenous institutions can support addressing these interrelations through a deeper understanding of the regional context and Indigenous issues framed in a broader setting.

Politically, devolution and decentralisation processes and those of political re-empowerment in recent decades have broadened the participatory power of Indigenous people in the Arctic (Poelzer & Wilson, 2014; Wilson, 2019). Many communities regained self-governance structures, autonomy and/or self-determination about key aspects of their life. In addition, they negotiated land settlement agreements that are managing land use and Indigenous ownership (Andrachuk & Pearce, 2010: 64). These processes are part of a greater region-building process that are about (re)strengthening an Indigenous identity. By stressing the east-west axis of an Arctic identity, which used to be challenged by the north-south axis established through colonisation and dynamics of nation-states (Rodon, 2014: 18), Arctic Indigenous people are referring to a circumpolar/transnational space.[14] On the regional level, the establishment of the Saami Council in 1956 and the ICC in 1977 are relevant in terms of region-building processes and transnational institutions (ibid). The Saami Council and the ICC are not only non-governmental organisations (NGOs) but they refer to a transnational identity. Castree (2004: 156) defines this element of Indigeneity as "both a reaction to and an embrace of translocal connectivity." These processes of collective political identity and institutional construction can be framed as a relocation of sovereignty in the Arctic context (Shadian, 2010). Indigenous institutions can build upon these region-building processes and integrate procedures and norms into their organisation that stress an Indigenous identity. Hence, they can further support self-determination of Indigenous communities.

The different dimensions of transformative changes in the Arctic display certain common features and interdependencies. Climate change as well as (post-) colonial dynamics seem to be a trigger or at least an accelerator of many of those changes (Ford et al., 2017; Greaves, 2016; Laruelle, 2019). The effects on Arctic Indigenous peoples and their institutions are complex and determine their vulnerability/adaptive capacity. As further elaborated in the next section, transnational political Indigenous institutions play a relevant role for governing in times of transformative changes and developing policy approaches towards sustainable development.

Indigenous institutions

To further elaborate the framework, a definition of the concept of Indigenous institutions is needed. In order to approach such a definition, it is necessary to firstly look at the term of governance as institutions are embedded in a greater framework of actors, logics and systems. Governance is described as the "entirety of regulations – that is, the processes by which norms, rules and programs are monitored, enforced and adapted, as well as the structures in which they

work [to solve] a specific problem or [to provide] a common good" (Zürn, 2010: 80). Keohane (1988: 383) describes institutions as "related complexes of rules and norms, identifiable in space and time." By adding the transnational element, which plays a certain role in the Arctic framing, different types of actors (besides states) as well as different types of linkages between actors, across diverse national contexts become visible. Transnational institutions stand for common rules of action, shared cognitive frameworks and normative commitments (Morgan, 2005).

An Indigenous institution is established and led by Indigenous people who include Indigenous principles, norms, rules and procedures into their organisation, work and programmes. These institutions can be active in different areas of life, such as in the political, social, economic and/or ecologic sphere, as well as at different policy levels: local, regional, (trans) national and/or international. This paper aims at gaining new insights into the applicability of the developed framework by showcasing two transnational political institutions, the ICC and the Saami Council, and their activities framed as a governance measures to react to transformative changes. Technically, they are non-governmental organisations, which can be "analysed as part of civil society, yet many of them take on governance functions" (Blaser et al., 2004: 15). Moreover, their administrative structures can be linked to state structures as they depend on resources and in some cases also legal legitimacy (ibid).

Following the sustainable development discourse on the role of political institutions (Sachs et al, 2018), this paper stresses their key relevance for governing sustainable development. Although Indigenous peoples are used to adapt to changing circumstances and developed knowledge systems to respond to emerging challenges (Magni, 2017), the new quality, intensity and rapidity of changes in the Arctic today have widely influenced traditional adaptive capacities. The role of transnational political Indigenous institutions is thus noteworthy in this context, because they act as focal points through negotiating at different policy levels, governing changes and by that, linking the global and regional level. By focusing on transnational political Indigenous institutions at different governance levels, those institutions are framed as non-state actors "whose activities and identities often straddle and obfuscate national boundaries and public and private sphere" (Parente, 2013: 451). Hence, new forms of governance besides the traditional governance of states can be analysed.

Further, global arrangements are contextual factors influencing transnational political Indigenous institutions. Moreover, the global sustainable development discourse forms a decisive meta discourse for the Arctic region and the governance of change. In general, sustainable development studies consider inclusive institutions as key for achieving global commons, which is concretely addressed by SDG 10 (*Reduced Inequalities*) and SDG 16 (*Peace, Justice and Strong Institutions*). In addition, sustainable transformation literature stresses the overall relevance of inclusive governance for the achievement of all other SDGs and global common goods (Messner & Scholz, 2018; TWI 2050, 2018: 6). More specifically, inclusive governance is considered as a condition to achieve the universal ambition of sustainable development to LNOB. The LNOB-paradigm is particularly relevant in the context of Indigenous peoples, because it provides a (political) framework that considers notably marginalised, vulnerable groups (United Nations, 2020b). Overall, SDG 10 and SDG 16 are comprehended as enablers for achieving all other SDGs (Sachs, 2015). Thus, inclusive institutions are framed as a "precondition and aligning vision of local, national, and global common welfare" (Sachs et al., 2018: 8).

To define inclusive governance in more detail, the shift of discourse in international development studies from *good* to *inclusive* governance has to be taken into account. The concept of good governance can be framed as a high-quality process (Taylor, 2016: 2). It defines the quality of (political) decision-making and implementation that contains three determinants: (1) formal rules (laws, regulations, code of conduct, performance standards), (2) societal and organisational norms (social capital); and (3) institutional capacity (detection and anticipation of problems, mobilisation of knowledge, articulation of goals, making timely and coherent decisions) (ibid: 6ff.; Howlett & Mukherjee, 2014). Since political institutions are embedded in a broader (national, regional, international) institutional context, the theoretical understanding of good governance is more oriented towards outputs and processes rather than outcomes. While *good* governance is associated with terms such as accountability, transparency, efficiency, government responsiveness and effectiveness, *inclusive* governance also considers the distribution of policy outcomes (Leininger et al., 2018: 108). Inclusive institutions are thus supposed to be able to redistribute public goods and strengthen equality. Moreover, this distribution of political power is framed as a driver for institution-building and, ultimately for the distribution of policy outcomes (cf. World Bank, 2017). Since Indigenous institutions represent Indigenous peoples and lobby for their rights, they take an important role in the broader inclusive governance context.

By further following the sustainable development discourse on the role of inclusive institutions, the framework defines inclusive institutions as key to govern in times of transformative changes in the Arctic. In accordance with the principles of inclusive governance, institutions can distribute policy outcomes more equitably. This paper assumes that transnational political Indigenous institutions particularly play a key role for achieving global commons because they link the global and regional level of Arctic (Indigenous) governance and by that, complementing non-Indigenous governance structures. Additionally, political identity, Indigenous practices and knowledge systems are supposed to influence Indigenous institutions, their structure, logics and governance. Thus, besides the concept of inclusive governance, the framework on the governance of Indigenous institutions in the Arctic is complemented by elements of political identity and Indigenous knowledges.

The proposed framework aims at defining criteria for the analysis of transnational political Indigenous institutions and their governance in times of transformative changes. As institutional logics are "socially constructed, [and follow] historical patterns of cultural symbols and material practices, assumptions, values and beliefs" (Thornton et al., 2012: 51), the analysis of Indigenous institutions and their governance seem relevant as they might differ to non-Indigenous forms of governance and by that, could allow mutual learning. Different institutional logics can lead to varying outputs as well as include and shape alternative paths to development (Calvo & Syrett, 2020). In the Indigenous context, customary systems of governance and traditional knowledges form the basis for sustainable production, consumption practices and resource conservation and management (Magni, 2017: 440). Thus, an analysis of transnational political Indigenous institutions should address questions on the organisation (formal rules, societal and organisational norms, institutional capacity, distribution of outcomes), the sharing and coproduction of knowledge (concepts of reciprocity and collectivity), their involvement in international fora (e.g. Arctic Council and United Nations Economic and Social Council, ECOSOC) as well as their creation and implementation of sustainable development measures. The framework aims at acting as a theoretical basis for in-depth analyses and the generating of hypotheses on the (inter)relation

between transformative changes (*independent variable*) and the governance of transnational Indigenous institutions (*dependent variable*).

By referring to the Arctic as a circumpolar region, transnational Indigenous institutions in the Arctic build upon transnational political identities. Thus, the framework proposes a strong focus on transnational, identical elements. Sharing experiences and the understanding of challenges is seen as an important basis for transnational cooperation (Wehrmann, 2020: 22). In the case of Indigenous peoples in the Arctic, they also share processes of re-empowerment and political identity building. The role of political empowerment is "to support poor and marginalised people to build resources, assets and capabilities they need to exercise greater choice and control over their own development, and to hold decision-makers in account" (Combaz & McLoughlin, 2014: 1). These elements of political empowerment particularly refer to Indigenous peoples as one of the most vulnerable peoples. Referring to Indigenous peoples in the Arctic, processes of re-empowerment and political identity building are interwoven as political identity building is an inherent part of political empowerment. Moreover, "identity is constructed and performed through the different discourse an individual relates to" (Nyseth & Pedersen, 2014: 132) and identity and group identities are interdependent (Kosko, 2013: 294). Following Tilly (2003: 608), one owns a political identity if an individual or a group considers oneself a political actor. Thus, political identities also express social arrangements. Nyseth and Pedersen (2014: 132) further frame Indigenous institutions as a "permanent, materialized and visualized expression" of Indigeneity and Indigenous identity. The structural dimension of these institutions specifically creates new "frames of reference for […] identity construction" (ibid).[15] With regard to transnational Indigenous institutions, political identities have led to the establishment of political institutions and are considered to shape them constantly. Thus, the framework addresses elements of political identity to further contextualise Indigenous institutions in the Arctic and their governance in times of transformative changes.

In the wider context of political identities and re-empowerment of Indigenous peoples, the concepts of self-determination and self-government are relevant, too. The term of self-determination has to be understood against the backdrop of development. Framed as a process of social and economic change (Kosko, 2013: 293f.), development can lead to freedom or vulnerability depending on how an individual or a group can control their development. Self-determination ensures participation and substantive freedom to (re)gain this control and reduce vulnerabilities. Ensuing from this, self-government is described as "the ability of a people to make decisions on its own affairs without the interference or direction of external forces" (Heininen & Southcott, 2010: 16). Indigenous peoples have lacked and are often still lacking this ability due to colonial dynamics and discriminating legislation, which resulted in higher vulnerabilities (Kosko, 2013: 294). The shared experiences of Indigenous peoples in the Arctic voiced by similar histories of (internal) colonisation and post-colonisation led to the establishment of political Indigenous institutions. These institutions can support overcoming these lacks by reframing the dominant discourse of development and globalisation (Tom et al., 2019: 14). Thus, a strong relation between political identity and Indigenous institutions is identified, which is why elements of political identity are included into the framework.

Due to effects of colonialism, Indigenous knowledges[16] and languages were under pressure and threatened intergenerational transmission/sharing of knowledge. Indigenous, traditional or local

"knowledge and know-how [are] […] unique to a given society and culture" (Magni, 2017: 438) inseparable from the knowledge holders and the land including the physical, biological and spiritual dimension (McGregor, 2004: 78). Indigenous knowledges stand for a way of life rather than only the knowledge of how to live, hence it is not only about understanding but about practising (ibid: 82). Concerning the role of Indigenous knowledges, Indigenous peoples are experiencing today that their knowledge systems and competences are valued to a different extent than before (Gearheard et al., 2010; UNESCO, 2017). For instance, the inclusion of Indigenous knowledges plays a more important role in studies on transformations towards sustainability (Pearce et al., 2013; Makate, 2019; Briggs, 2005; Wohling, 2009; Nordic Council of Ministers, 2015). This is also reflected in a rising awareness in research on adaptation and mitigation as well as on sustainable ways of living and use of resources of an importance about connecting scientific, Indigenous, local and traditional knowledge systems.[17,18] This new relevance ascribed to Indigenous knowledges can have empowering qualities (Briggs, 2005: 107; Magni, 2017), which draws a link between Indigenous knowledges and political identity and their influence on Indigenous institutions. However, this awareness is not always or automatically transferred to the inclusion of Indigenous stakeholders into policy and decision-making (Magni, 2017, 442f.).

As requirements for a methodology to integrate Indigenous knowledges, Lindblad et al. (2016) name legitimacy, credibility and usefulness, full and active participation, reciprocity and free, prior informed consent (FPIC). In the Arctic context, Indigenous knowledge holders share knowledges and values in relation to their environment as well as challenges in the recognition of their knowledge (ibid: 114). Indigenous knowledges are based on observations and experiences as many communities are continuously observing the state of their environment, biodiversity and weather conditions (ibid: 116). Additionally, Indigenous peoples practised a long-term/sustainable use of biological resources, which again strengthen the link between sustainability and Indigeneity (Tom et al., 2019: 2; UNGA, 2008). This link puts Indigenous knowledges in a key position for achieving sustainable development. The sustainable development paradigm does not only address Indigenous peoples but also calls for their input. Thus, the framework integrates Indigenous knowledges due to its relevance for Indigenous institutions and their governance in times of transformative change. These knowledge systems and practices are supposed to influence how Indigenous institutions are organised, shaped and governed as well as their policy measures.

Following sustainable development studies, the developed framework in this paper aims at contextualising Indigenous institutions and their governance in times of transformative changes. In order to analyse transnational political Indigenous institutions and their governance in the different dimensions of transformative changes as well as to generate hypotheses about interrelationships, the concepts of inclusive governance, political identity and Indigenous knowledges will be considered on the basis of the theoretical framework (see figure 2). To implement policies towards sustainable development inclusively, institutions needs to distribute policy outcomes equitably. Additionally, the framework stresses the role of political identity for the establishment, organisation, shifts and policy outcomes of Indigenous institutions. Those institutions create structures and points of reference for constructing and shaping political identities. For analysing Indigenous institutions, the framework further proposes to include Indigenous practices and knowledges to address alternative ways to development and the link between Indigeneity and sustainability. Thus, this approach can also contribute to the broader

discourse of sustainable development studies by highlighting the relation of Indigeneity and sustainability.

Figure 2: Criteria for the analysis of the governance of Indigenous institutions in the Arctic

Source: Author

Applicability

The developed framework of transformative changes and Indigenous governance is exemplarily applied to the ICC and the Saami Council to illustrate its applicability. Thus, the *independent variable* (transformative changes) and the *dependent* (governance of Indigenous institutions) are outlined. The governance of Indigenous institutions in times of transformative changes shall be sketched out along the different elements of the framework, *inclusive governance*, *political identity* and *Indigenous knowledges*.

Transformative changes in the Arctic, here defined as the *independent variable*, consists of different, interwoven dimensions, the ecological, economic, geopolitical, social and political. These different dimensions impact institutions, their establishment, activities and evolution in the region (see figure 1). They also shape the circumstances of the work of Indigenous institutions at different levels of governance. For instance, climate and environmental change strongly influence their policy approaches and overall priorities of their activities. As transformative changes form a dynamic environment for institutions, which are coined by long term processes that are not easily depictable, an analysis could identify events/moments where changes become visible – framed as critical junctures. Thus, the policies of institutions could be specified and analysed along the elements of the developed framework (see figure 1 & 2). These in-depth analyses should acquire new insights into the governance of Indigenous institutions (*dependent variable*) in times of transformative changes (*independent variable*).

The *dependent variable*, the governance of Indigenous institutions, shall be exemplarily classified by outlining two transnational political institutions, the ICC and the Saami Council. The ICC was established in 1977 and comprises different sub-institutions, namely ICC Alaska, ICC Canada, ICC Greenland and ICC Chukotka (Russia). It represents an Indigenous population of 180,000 people. Its first and principal goals are to strengthen unity among Inuit, promote Inuit rights at the

international level and seek full and active participation of the developments in Inuit homelands. The Saami Council was already established in 1956 and represents 50,000 to 80,000 Indigenous peoples in Finland, Russia, Norway and Sweden. As with the ICC, the Saami Council's primary aim is to promote Saami rights and interests. At the same time, the Council wants to attain recognition for the Saami as a nation. The work of the Saami Council is guided by the decisions and strategies developed by the Saami Conference, which is the highest body of the Saami Council and arranged every four years.

Applying the framework to the ICC and the Saami Council seems fruitful, because they are both engaged on different governance levels, for instance, in international negotiations and fora promoting Indigenous rights and interests at the Arctic Council as Permanent Participants (two out of six Permanent Participants) and ECOSOC holding Consultative Status II at the United Nations. They developed a "complex and sophisticated set of governance bodies" (Wilson, 2020: 29) and took over leadership roles in the Arctic governance system (ibid: 27). The ICC and the Saami Council are *transnational political institutions* that represent transnational Indigenous peoples in different nation-states resulting in varying circumstances, resources, rights and capacities. Those different political realities shaped by the nation-states also influence Indigenous governance. For instance, different self-government arrangements are in place, such as comprehensive land claims, self-government agreements, public governments or even Indigenous autonomy like in Greenland. These institutions are representing two different sub-regions in the Arctic with a comparable but still different vulnerability to transformative changes influencing their governance. Moreover, the institutions are both considered as NGOs, which represents a different category in the governance system beyond states. The two organisations also work together on an institutional level and support initiatives from one another, which was, for instance, important in the context of drafting UNDRIP (Plaut, 2012: 198ff.).

An analysis of the Saami Council and the ICC is further considered to be relevant because their "ultimate vision of self-determination and exercising self-government is similar" (Kuokkanen, 2019: 9). This right to self-determination includes the right to live as Indigenous peoples with their own institutions. Moreover, the creation and exercise of these formal institutions following elements of *inclusive governance* demonstrate certain similarities such as strategies of adaptation, processes of cooperation and collaboration as well as the incorporation of *Indigenous knowledges* (Plaut, 2012: 193ff.). Both institutions are referring to a transnational *political identity* by initiating processes of collective political identity and institutions construction, which can be considered as a relocation of sovereignty (Shadian, 2010). By exemplarily looking at two Indigenous institutions in the Arctic, the elements of the developed framework can be identified as highly relevant (see figure 2). *Inclusive governance*, *Indigenous knowledges* and *political identity* play a significant role for the establishment, development and governance of these institutions.

Prospective in-depth analyses should include strategies, policy papers, and the activities at international fora as well as conduct qualitative interviews with representatives of the institutions to gain new insights into Indigenous governance in times of transformative changes. The analyses could be further strengthened by collecting quantitative data through surveys and by additionally integrating relevant secondary data. Hence, different types of (inter)relation between the *independent* and *dependent variable* could be analysed, which allows conclusions on how Indigenous institutions govern in times of transformative changes (see figure 1 & 2).

Conclusion

The developed elements propose a framework for the analysis of Indigenous institutions in the Arctic and their governance in times of transformative change. The framework about this (inter)relation between transformative changes and the governance of Indigenous institutions needs to address in particular concepts of *inclusive governance*, *political identity* and *Indigenous knowledges*. By applying this framework as a theoretical basis to other cases or regions, existing theoretical and empirical gaps can be addressed by deriving hypotheses on policy approaches regarding sustainable development issued by Indigenous institutions in transforming regions. These analyses want to find out more about the governance of Indigenous institutions in times of transformative change with a specific focus on inclusive governance, political identity and Indigenous knowledges. Nevertheless, the framework stresses the great diversity of Indigenous political institutions and the local/regional context they are embedded in, which requires contextualisation. Through focusing on transnational political Indigenous institutions framed as non-state actors, the framework addresses the broadening of the Arctic governance paradigm beyond states. Moreover, the concept of transnationality enables linking the regional with the global level of governance, which is considered to be key for achieving sustainable development.

Transformative changes in the Arctic impact Indigenous institutions and their governance as these changes determine the circumstances in which they operate (see figure 1 & 2). After applying the framework exemplarily to the ICC and the Saami Council, the first implementation displayed that the inclusion of *Indigenous knowledges* plays a significant role for their governance. Moreover, by referring to a transnational, *political identity* and uniting Indigenous communities of the Arctic, the first transfer showed that for the ICC and the Saami Council this concept is highly relevant as well. *Inclusive governance* plays a significant role for the organisation and work of these institutions, too, as it is supposed to be a guiding principle.

Through allowing an analysis focusing on Indigenous policy approaches towards sustainable development, the framework also contributes to broadening our understandings of sustainable development. Hence, the framework can also be applied and adapted to other contexts and regions, where Indigenous peoples have developed Indigenous institutions.[19] This underlines the necessity to strengthen the nexus of Indigeneity and sustainable development in current discourses on sustainable development by analysing Indigenous institutions in transforming areas and their policy approaches framed as contributions to achieve global commons.

Notes

1. Please note, that I am a non-Indigenous researcher who has been socialised in a European context. Therefore, I can only take an outsider's perspective on Indigenous governance.
2. The development paradigm is changing through the 2030 Agenda for Sustainable Development because of its understanding of sustainable development as a universal challenge for all countries, although the Agenda still differentiates between 'developed' and 'developing' countries (Ziai, 2016: 197f.). Concerning development studies, Wehrmann (2020: 22) stresses that also looking north can support this field of study.
3. Cf. also the Arctic Human Development Report (Larsen & Fondahl, 2014).
4. Following the definition of José Martínez Cobo of 1986, Special Rapporteur of the Sub-Commission on Prevention of Discrimination and Protection of Minorities "on an

individual basis, an [I]ndigenous person is one who belongs to these indigenous populations through self-identification as [I]ndigenous (group consciousness) and is recognized and accepted by these populations as one its members (acceptance by the group)." Martínez Cobo embedded the idea of empowerment into this definition by highlighting the sovereign right and power to decide (Magni, 2017, 438). The term Indigenous needs to be contextualised within the colonial and post-colonial setting.

5. Indigenous peoples used to live in the Arctic for over a thousand years (cf. Arctic Centre of the University of Lapland, 2018). Today, Indigenous peoples present a minority of the population in the region, although there are great differences in the various states. In Canada, Indigenous peoples represent about 50 per cent of the Arctic population and in Greenland they form the majority on the island. In the whole Arctic, Indigenous peoples include over 40 different ethnic groups, amongst others, Saami people, Inuit, and Chukchi (ibid).
6. Laruelle (2019: 149) describes colonialism as "an often-understudied aspect of Arctic development today".
7. Indigenous peoples are recognised "to be the most vulnerable and at-risk human communities in the world" (Morgan, 2016: 1). Moreover, they "live in the most vulnerable ecosystems" (Magni, 2017, 441). Lifestyles of Indigenous peoples and other non-dominant communities are under threat in the Global South and Global North (Tom et al., 2019). In the Arctic context, vulnerabilities differ amongst Indigenous peoples.
8. This article does not want to strengthen a hierarchical relation or duality between non-Indigenous and Indigenous approaches. However, it acknowledges power asymmetries that led to dominant and non-dominant discourses. Indigenous knowledges are not 'only' contributing to sustainable development, but are "inherently sustainable" (McGregor, 2004: 79).
9. Indigenous peoples and their institutions are understood as active, not passive agents of change acknowledging their knowledges in sustainable practices, land use, resource management, climate change adaptation and disaster risk reduction (Magni, 2017, 438).
10. Sustainable development and environmental policies are at the core of the Arctic Council since its establishment.
11. The declaration affirms that "[I]ndigenous peoples are equal to all other peoples, while recognizing the right of all peoples to be different, to consider themselves different, and to be respected as such" (UNGA, 2008: 1). Self-determination is framed as a human right.
12. The non-binding declaration was approved although countries with settler history, Canada, the U.S., Australia and New Zealand protested and voted against UNDRIP. Since 2016 however, Canada belongs to the full supporters of the declaration.
13. The 2030 Agenda directly "refers to [I]ndigenous peoples 6 times, three times in the political declaration; two in the targets under Goal 2 on Zero Hunger (target 2.3) and Goal 4 on education (target 4.5) – and one in the section on follow up and review that calls for [I]ndigenous peoples' participation" (United Nations, 2020a).
14. The capitals and economic centres of the Arctic states are located in the South of the nation-states.
15. For the urban context in the Arctic, Nyseth and Pedersen (2014) analyse Saami identities in three cities in northern Scandinavia and found out that institutions at the local level play a key role for defining an urban identity appreciating Saami culture and building social

networks. Social networks in Arctic cities in turn shape "knowledge flows, and also influence local identity" (Zamyatina, 2013: 443).

16. There is an ongoing debate on how to name/frame Indigenous knowledge(s). Tom et al. (2019) are speaking of 'knowledges' in order to address the differences in Indigenous systems and cultures. Wohling (2009: 3) lists various possible terms such as "Aboriginal science, ethnoscience, traditional ecological knowledge, indigenous ecological knowledge, indigenous knowledge systems, folk ecology, ethnoecology, indigenous intellectual and cultural property, cultural knowledge, and local knowledge". Many articles prefer the term "local knowledge" since it implies the existing issue of scale and transferability (ibid: 5 & Briggs, 2005: 105). Thus, it could express the localness, boundedness and fine-scale focus of local knowledge systems (cf. UNESCO, 2017). Berkes (1993) defines traditional ecological knowledge as "[a] cumulative body of knowledge, practice and beliefs, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment."
17. Many authors criticise the binary tension between Western science and Indigenous knowledge systems (Escobar, 1995; Briggs, 2005 & Gupta, 1998). They emphasise that the discourse on Indigenous knowledges is shaped by post-colonial frameworks, which needs particular attention in terms of power relations as well as social and cultural contextualisation (McGregor 2004).
18. *Inter alia* pushed forward by the Intergovernmental Panel on Climate Change (IPCC, 2014) and the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES, 2019). In Aichi Target 18 in the Convention on Biodiversity, it is formulated that by 2020, traditional knowledges should be integrated in the implementation of the convention (cf. Nordic Council of Ministers, 2015). Also, the Brundtland Report (1987) already acknowledged Indigenous knowledges in the context of sustainable development.
19. Studies from Indigenous communities in Ecuador for instance show that Indigenous practices produce new institutional forms, which can co-exist, accommodate or being in conflict with non-Indigenous forms, and follow alternative paths to development, e.g. the *Buen Vivir* paradigm (Calvo & Syrett, 2020: 272). This paradigm was developed in reaction of Latin and Central American Indigenous communities to negative impacts of development. It stands for a "set of values and norms that is shared by different indigenous communities worldwide and represents a new conceptualisation of development" by highlighting values such as community and communitarianism, human-nature-universe relationship, equality and complementarity (Magni, 2017, 438f.).

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Intersectional Gender-Responsibility in STEM: Co-Creating Sustainable Arctic Knowledge Production

Mervi Heikkinen, Suvi Pihkala, Leena Pääsky & Sari Harmoinen

In this article, insights about a global gender equality promotion instruments in science, technology, engineering and mathematics (STEM) are considered in the Arctic context to provide a gender-responsible view for the Arctic Yearbook 2020's Climate Change and the Arctic: Global Origins, Regional Responsibilities *theme. The paper's intersectional and gender-responsible approach addresses the diversity of people living in the Arctic in consideration of co-creating sustainable and responsible futures. Currently, gender perspectives are hardly integrated into the research processes, and horizontal and vertical gender segregation as well as diverse exclusions persist in science and technology in addition to disciplinary silos. In relation to this challenge, this article introduces one of the most recent global actions and policies to improve gender-responsibility in science and technology, namely the SAGA (STEM and Gender Advancement) tools, and elaborates their affordances in the context of Arctic knowledge production. Responsibility and sustainability demands that we rethink our interrelatedness and interdependency with the world in relation to knowledge production processes, as global and local citizens, with the capabilities for problem-defining and problem-solving. Thus we frame the main challenge as to advance multidisciplinary research affordances, co-creating the understanding and cultivation of our imagination in an aim to relate with care to sustainability and responsibility in and about the Arctic through knowledge production.*

Introduction

It has long been acknowledged that gender equality is a key driver for social and environmental development, as well as for health and well-being. Gendered innovations and a gender-responsible approach in scientific knowledge production, and especially in Science, Technology, Engineering and Mathematics (STEM) fields, contributes to scientific excellence and quality in outcomes, enhances sustainability, makes research more responsive to social needs and promotes the development of new ideas, patents and technology (Schiebinger et al., 2011-2018). Gender-responsible scientific approaches have become imperative in relation to scientific knowledge production and education for sustainability as men and women are not affected equally by climate change and globalisation, and their impacts on traditional and non-traditional economic activities in the Arctic (AHDR-II, 2015). Furthermore, within today's technology-driven knowledge society,

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the need to receive researched knowledge instantly to support decision-making has grown, while open science and open access publishing have made scientific knowledge more accessible to every citizen. Holt (2019: 107) states that "There are also the twin issues of increasing the inclusion of local knowledge and of moving debates about how to address climate change away from the exclusive control of 'experts' and into the public sphere." Citizens' science now encourages people to participate in the production of scientific knowledge by, for example, sharing their observations of nature (Heigl et al., 2019). Finland is currently preparing recommendations for science education that covers all human life. Also, the Right for Science, as part of the United Nations (UN) Declaration for Universal Human Rights, has become a significant global debate. Knowledge society is about reality with the means offered by digitalisation. Furthermore, the rationale, need and opportunities for the production of science-based decisions are better than ever. Recent emphasis on citizen science and the access allowed by digital technologies highlights that the Arctic region and related decisions, strategies and futures should also be accessible to the people of the region. Achieving this access requires cross-border, multidisciplinary and cross-sectoral inter- and intra-action (Barad, 2007) in the Arctic. Therefore we need to pay attention to how gender, Arctic localities, including Indigenous knowledges, access and science could afford to co-creating sustainable Arctic knowledge production.

We approach this challenge by asking how intersectional gender responsibility in STEM could operate towards sustainable knowledge production in the Arctic. We understand the Arctic as many, consisting of multiple Arctic realities as well as multiple Arctic sustainabilities (Tennberg et al., 2019). Situating also ourselves in the Arctic, we draw on our experiences of two ongoing education development and research projects that we are involved in at the University of Oulu. The projects are about studying readiness for climate actions among Higher Education (HE) students (Harmoinen et al., 2020) and improving policies for gender advancement in STEM fields (W-STEM, 2020). At the same time the perspectives from these cases pave the way for opening considerations whether the existing policy frameworks and epistemological and ontological parameters for gendering knowledge production in STEM and for accounting for entangled nature-cultural realities are sufficient. To respond to this challenge, we maintain it is crucial to contemplate voices that may be missing or ignored, considering gendered as well as Indigenous knowledges (IK), and take inspiration from emerging feminist new materialist and posthuman scholarship to enrich our discussion.

The gender perspective has been discussed and scrutinised in science in various ways ranging from feminist critique of the dominant and invisible male standard in science (e.g. Haraway, 1988) to a call for increased participation and more diverse roles for women and girls in STEM fields (e.g. United Nations Educational, Scientific and Cultural Organization [UNESCO], 2017a). Gender considerations have been found to be significant for improving the reliability of scientific knowledge production and improving individual research projects. Nielsen et al. (2018) argue that gender has an impact on three interrelated levels of research: 1) the composition of research groups; 2) the research questions presented within research projects; and 3) the research methods used. This approach can be summarised as *fix the numbers, fix the institutions and fix the knowledge*. It further concerns how science and research in general are managed in a gender-responsible way to strengthen high-quality research and societal empowerment (Nielsen et al., 2018).

Despite its apparent meaningfulness and impact for science and scientific knowledge production, the gender perspective has not been fully integrated into research processes in the Arctic (AHDR-II, 2015). The role and position of women was explored in a 'Women in Arctic Science and Exploration' panel as part of UArctic Congress 2018—especially how policy, education, international collaboration and mentoring can support women's scientific careers and promote greater diversity in polar science. There has been a visible shift in the management structures of many polar organisations over the last 20 years, with more women hired in management positions, but still with little advancement in their roles. Thus, diversity should be taken on as a full package beyond the gender binary to include the race, age and sexual orientation of Arctic researchers, educators and managers. (Smieszek et al., 2018). Accordingly Sinevaara-Niskanen (2019) writes that endeavours towards greater equality and sustainability in the Arctic should reach beyond 'mere' matters of gender. This is also the focus of the University of Arctic (UArctic) an umbrella organisation, that has a collective aim to contribute to a sustainable North in an interdependent world (AHDR-II, 2015).

We contribute to this challenge of moving beyond gender binaries to consider 'intersectionality', as coined by Kimberlé Crenshaw (1995), and gender-responsibility, as used by Londa Schiebinger et al. (2011-2018). The combination of these two terms creates our departure point for this article *intersectional gender-responsibility in STEM,* which works towards two aims. First, it promotes sensitivity through the recognition of other simultaneous, intersecting socio-cultural categorisations in addition to gender. Second, it promotes scientific rigour and responsibility that recognises and accounts for the influence of gender and simultaneous socio-cultural categorisations in scientific research settings and reasoning.

In this article, our joint effort is to understand how failing to consider gender and other intersecting social categories in the Arctic scientific knowledge production related to STEM results in gaps in understanding and shortcomings in sustainability with limitations for a realization of the knowledge society and to implications for the entire planet. The authors of this paper come from diverse academic backgrounds, consisting of biology, geography, mathematics, physics, cultural anthropology, education and gender studies. This diversity is performed in the construction of this paper, as, in the following sections, we first establish why a STEM education itself is crucial for all citizens, drawing on experiences from current Finnish approaches to teaching STEM, and then elaborate on how the global SAGA tools may offer remedies for addressing gender equality in STEM fields. At the same time our expansive vision of intersectional gender-responsibility in STEM includes consideration of the diversity of people living in the Arctic, including Indigenous people and their knowledges, and discussions from feminist technoscience, particularly the intricate entanglements of human, nature, culture, climate and technology, built through following sections and elaborated more in the fourth section. With these considerations, we call for intersectional, gender-responsible and sustainable collectives for co-creating knowledge, which we see as a crucial step towards sustainability. We maintain that interdisciplinary 'cross-pollination' (Braidotti, 2019), and commitment to local realities and global policies are imperative to be responsive to sustainable human and 'more than' human Arctic futures and knowledge society.

Climate actions, scientific knowledge and education

Climate change is a severe problem and a complex, systemic challenge that requires knowledge, understanding and actions, especially from humans (Incropera, 2015). Transforming attitudes and actions to a more climate-friendly outlook is difficult in terms of individual perceptions (Harmoinen et al., 2020). Harmoinen et al. (2020) studied Finnish university students' reflections on their ability to affect climate matters through social activity and found that students ranked readiness for climate actions in social activity moderately low and lower than other climate actions considered in the survey. The data consisted of 1585 participants (65% women, 33.5% men, 1.5% other). Many respondents stressed the importance of factual knowledge and researched knowledge in building their own understanding. However, for human beings to arrive at sustainable solutions, in addition to acquired appropriate knowledge it is important to understand the individual, social and societal decision-making process and possible achievements at stake. Additionally we can reconsider the purpose of the entire 'scientific knowledge production'. Traditionally scientific knowledge has been understood as involving the production of knowledge (primarily) for human well-being and as an informant in decision-making processes (Holsman, 2001). Even today, we should ask ourselves whether science and knowledge production reaches all people and societies sufficiently? Is it as available for everybody as the Universal Declaration for Human Rights proclaims, giving an individual the right to science and to share in scientific advancement and its benefits? Wyndham and Vitullo (2018) posit that "[e]ssential tools for ensuring access include science education for all, adequate funding, and an information technology infrastructure that serves as a tool of science and a conduit for the diffusion of scientific knowledge" (975).

Climate change in the Arctic amplifies the consequences, for example the melting of permafrost releases methane, which in turn exacerbates climate change. The climate has always changed, both locally and globally. However, while the background to past climate change is natural, such as asteroid collisions and volcanic eruptions, the current climate change results from the increase in the amount of carbon dioxide in the atmosphere which is most likely the result of human activity. The current warming trend since the mid-twentieth century is proceeding at a rate that is unprecedented over decades to millennia. In August 2016, at the International Geological Congress 35IGC (http://www.35igc.org/) a group of experts declared a new geological epoch—Anthropocene—based on the effects of humans on Earth since the Industrial Revolution c. 1800 CE that began with the spread of agriculture and deforestation followed by the 'Great Acceleration' of population growth and industrialisation. The Anthropocene, a term proposed originally by atmospheric researcher Paul J. Crutzen (2002), began with the large-scale execution of nuclei visible in glacier drilling in 1950. The human effects of the beginning of this epoch are visible also for example the large-scale appearance of plastic debris, concrete and chicken bones, on Earth (Trischler, 2016). The Anthropocene is associated with the new, ongoing sixth wave of mass extinction, an increase in the amount of carbon dioxide in the atmosphere, sea-level rise and deforestation that threaten all species' survival and crucially influence human activities.

Climate change is a multidimensional, multifaceted phenomenon, which involves ethical and emotional nuances that are not simple to discuss (e.g. Harmoinen et al., 2020). For example, because water on Earth has circulated here throughout its existence, if there is drought and famine somewhere, the missing water must be somewhere else, in a place experiencing heavy rainfall and floods. Accordingly, climate change and its manifestation, look very different depending on the

area. The interconnectedness of these phenomena is basic knowledge, which is studied in schools from primary school onwards. If we know how and why rainfall occurs and how to look at the uneven distribution of rainfall in different regions, we will be able to understand more about climate change. All these dynamics can be taught to all schoolchildren, but a stronger understanding and connection to everyday phenomena will help them to learn to make sustainable solutions and choices from a future perspective as well.

In Finnish education, every child and young person acquires fundamental knowledge and skills during basic education, such as civic skills for their lives and future tenure. The foundations of local curriculum in Inari strongly emphasize the importance of building one's own cultural identity and positive environmental relations, especially from a Sámi perspective (Inari, 2016). Education has long been subject-oriented, without making strong connections between different points of view. For example, aspects of the rain example presented earlier would be studied in physics in the context of thermal phenomena and humidity. In chemistry, the phenomenon would be examined in terms of the motion of molecules and the states and changes of substances, such as the water. Geography would consider the wind and air pressure, and biology would study the growth conditions and water cycle. That is, while a student covers all the key phenomena, the connections and significance between them in discipline-based shared education may remain thin. Since 2014, the national core curriculum of basic education has strongly highlighted multidisciplinary learning to help students practicing understanding of complexities and skills. In everyday and everyday situations, this information integration and information processing skill is central and important to citizenship knowledge (Finnish National Board of Education, 2016). In Finnish education, there is not a single subject encompassing STEM, but is there a need for that in the future? The concept of STEM is not used in Finnish education, but the concept of LUMA (https://www.luma.fi/en) has a very similar meaning that covers natural sciences, mathematics and technological examination.

Regarding the UN (2012) Framework Convention on Climate Change, the Doha work programme on Article 6 of the Convention recognises that education aims to advance sustainable development by promoting lifestyle changes and preparing both individuals and communities for the effects of climate change. As indicated by UN institutions, decisions concerning development need to be made on a societal level and not left only to individuals. This concerns advancement of gender equality as well. Since the 2015 United Nations General Assembly, education and gender equality are integral to the 2030 Agenda for Sustainable Development and distinct Sustainable Development Goals (SDGs). According to Cracking the Code report (UNESCO, 2017a) 28% of the world's researchers are women today. In 2016, member states adopted a decision on the role of UNESCO in encouraging girls and women to be leaders in STEM. Therefore, it is a global and societal responsibility to ensure that STEM fields are equally available and acceptable education and career choices for women and girls. It is important that also they can find possibilities and support to nourish their interest in scientific knowledge also within and about the Arctic.

Tools for STEM and Gender Advancement (SAGA) – also in the Arctic?

A recent development in gender policies and statistics has been the global SAGA initiative (UNESCO, 2019b) that promotes gender equality in Science, Technology, and Innovation (STI). The aim of the initiative is to assist in the improvement of the measurement and assessment of

women's situation in STI, advancing the participation of women in STEM and increasing the recognition of women's achievements globally (UNESCO, 2018a, 2019b). It is a project launched by UNESCO in 2015 with support from the government of Sweden (UNESCO, 2019b). SAGA methodology, published in a multi-volume work (see UNESCO, 2018a, 2019b), includes tools designed to be used by policy-makers in reviewing national STI policies in particular to identify deficiencies in their current composition from a gender equality perspective, but it also contains tools that enhance the collection of gender-related data, which is expected to further gender equality advancement in STEM at different educational and research institutions.

The 'Science, Technology and Innovation Gender Objectives List' (STI GOL), the backbone of SAGA, is used as the common element in all the main tools, linking indicators with policy instruments (UNESCO, 2016, 2017b). STI GOL enables the classification of policies and indicators according to seven areas of gender objectives that are further divided into more specific goals (UNESCO, 2016). Regarding policies, the actual classification task is conducted using the 'STI Policy Survey' (collects information using a question set) and the 'SAGA Policy Matrix' (categorises the information based on the STI GOL) (UNESCO, 2017b, 2018a). The 'SAGA Indicator Matrix' guides the review of statistical information relevant to the evaluation of gender equality, offering an indicator list consistent with the objectives of the STI GOL (UNESCO, 2017b). UNESCO aspires to see the designed SAGA methodology applied as a global standard, recognizing however that adjustments may be required due to differing national or institutional structures and approaches (UNESCO, 2017b, 2018a).

The University of Oulu in Finland participated in the collection of institutional data on gender equality in STEM fields along with 15 Higher Education Institutions (HEIs) taking part in W-STEM, an Erasmus^{+} project that seeks to engage women in STEM (W-STEM, 2020). Drawing on our situatedness in the Arctic, experiences gained from the deployment of the data collection matrix—an applied SAGA Indicator Matrix—enable us to consider the affordances of the SAGA tools from the specific perspective of Arctic knowledge production taking into consideration the diversity of inhabitants in the Arctic, especially Indigenous knowledges and the diversity of gender.

Indigenous knowledges (IK), or Indigenous knowledge systems, are special capacities 'tailored to particular places and peoples and are trustworthy from a community standpoint' (Whyte, 2018: 75). The STI GOL does not mention Indigenous people or IK (see UNESCO, 2016), but the SAGA Policy Survey and Policy Matrix acknowledge them. The Policy Survey recommends considering whether the ministry's and high authority's examined policy instrument promotes indigenous knowledge systems and whether 'the Indigenous peoples and local communities' are among the beneficiaries or targeted groups (UNESCO, 2018b: 35). Also, a data collection section regarding measures and activities that universities and research institutions implement recommends identifying beneficiaries, including Indigenous peoples. Accordingly, the Policy Matrix describes Indigenous peoples and local communities as possible target groups of policy instruments (UNESCO, 2017b). However, the SAGA Indicator Matrix does not refer to Indigenous people or IK (see UNESCO, 2017b). We find this to be a limitation that should be taken into consideration when the matrix is practically implemented in the Arctic and appropriate alterations should be taken into account.

Regarding STEM, the SAGA project aims to include all people connected to the field (UNESCO, 2017b). Besides certified professionals pursuing a career in STEM, it comprises individuals who

work in science and engineering (S&E) without a formal education, and who have this education but do not currently work in the sector. However, SAGA's S&E workforce division that uses the International Standard Classification of Occupations excludes a group 'skilled agricultural, forestry and fishery workers' (see UNESCO, 2017b: 36–38). Also, SAGA's definition of researcher that is from the Frascati Manual of the Organisation for Economic Co-operation and Development (OECD) (UNESCO, 2017b) is rather centred on theoretical knowledge: 'Researchers are professionals engaged in the conception or creation of new knowledge. They conduct research and improve or develop concepts, theories, models, techniques instrumentation, software or operational methods' (OECD, 2015: 162). Therefore, the traditional ecological knowledge (TEK) and occupation of a Sámi fisher may be considered as outside STEM, although traditional knowledge can be more complete than scientific knowledge especially at local level (see e.g. Joks & Law, 2017).

The above examples of choices and standards in SAGA make visible some of the tensions that can emerge when considering global tools in a local context. Yet, the integration of different outlooks is a valuable aim. For example, Leduc (2010: 227) suggests in *Climate, culture, change: Inuit and Western dialogues with a warming North* to ask 'how we understand and live with this complex reality in a more inclusive way'. Cajete (2018: 15, 22) views 'Native Science' as 'a people's science', and according to him, the often elaborate Native technologies have emerged to handle place-specific issues. Instead of aiming to create a global market where local knowledges are coded into 'the terms of a universal discourse', Gough (2013: 33) suggests creating conditions under which different knowledge traditions 'can be performed together'. The similarities and distinctions between Indigenous and Western Science need to be honoured (Lowan-Trudeau, 2015). Gillis et al. (2017: 203) use the term 'knowledge builder' to include diverse research systems 'available to discipline building beyond the Western science paradigm'. In the Sevettijärvi region, traditional Skolt Sámi knowledge served as the basis of guidelines for how to return the spawning areas of trout and grayling to their natural state in summer 2017 (Fotonoff, 2017). Local Skolt Sámi and officials cooperated in all aspects, and the project was the first of its kind in Finland (Fotonoff, 2017). Kimmerer (2018) has pointed to prioritising the cultivation of conditions for both knowledge systems' coexistence and their adaptive solutions, which is a necessary and sustainability-enhancing proposition.

Challenges regarding the advancement of diversity in Arctic knowledge production in connection to SAGA do not relate only to indigenous people but also to the questions of gender. The gender equality that the SAGA project promotes considers women and men (see UNESCO, 2017b), but no other gender positioning. This choice of a binary may be for practical reasons, but it is also reflective of the wider discursive practices of gender in gender equality policies, which do not necessarily align with the ways people experience their gendered subjectivities, as became visible during the use of the data collection matrix. The radical transformation, enabled by the full dissolution of female and male categories, that Heybach and Pickup (2017: 624) describe as lying 'dormant in STEM' is, at least to some university students in Oulu (in STEM or in other fields), an aim that is acted out: There are students who do not want to identify themselves by gender in forms such as questionnaires. This may, however, complicate the determination of the state of gender equality.

SAGA advances the gender equality in STI in the STEM sector instead of STEAM (Science, Technology, Engineering, Arts and Mathematics) due to a choice of focus as well as the challenges of collecting and analysing data about the arts (UNESCO, 2017b)—The SAGA initiative involves a burden of measurability. The politically valuable aims of SAGA towards acquiring data on women in STEM also engenders inadvertent exclusions particularly as the SAGA tool is rooted prominently on established Western standards and norms. Despite its intentions to promote gender equality, when brought to bear within the Arctic contexts, perspectives emerge that challenge acknowledging the diversity of people, experiences and knowledge systems in a more nuanced manner. Furthermore, instead of disciplinary silos, gender binaries and exclusive Western epistemologies and definitions, it is important to reflect upon and re-imagine the definitions of knowledges and sciences and the responsibilities that situated knowledge producers have.

Re-imagination for sustainable knowledge production

In various ways, the pressing questions of unsustainability, and particularly of the climate crisis as one of its urgent manifestations, have propelled scholars and educators to re-imagine sustainability, knowledge productions and education. As Malone and Truong (2017) have observed, '[w]hile the terminology might shift between countries, fields, and genres [...] it is certain we are all speaking about the same imperative—the desire to find new ways of theorising and educating about being with, and in relation to, the planet' (5). One of the theoretical and conceptual lenses for this re-imagination in Western academic discussion has emerged from post-anthropocentric theorisations. This thinking in recent social theory, including feminist scholarship (e.g. Barad, 2007; Braidotti, 2013; Haraway, 2016) recapitulates in many ways many earlier non-Western and Indigenous ontologies underscored by attention to the inseparability of nature and culture and the agency of non-human others, such as other animals, plants and spirits (Fox & Alldred, 2019; Rosiek, Snyder & Pratt, 2020).

We find this thinking generative for the discussion of responsible and accountable knowledge production in this paper. Firstly, the dissolution of humanist nature-culture and mind-matter dualisms offers ways forward from a conception of sustainability that can be considered to prioritize human interests (e.g. Alaimo, 2016). Instead, Fox and Alldred (2019: 124) summarise this new version of sustainability as one "no longer to be considered as a state to be achieved, but rather as a flow of multiple affects that produces capacities and potential in (post) human and non-human matter (Braidotti, 2011: 312-3; Parr, 2009: 161)." Furthermore, the focus on entanglements, intra-action and reconfiguring (Barad, 2007), rather than distinct entities, enables attention to phenomena of our socio-material reality not for what they are but what they *do*. This approach applies as much to policies like SAGA and sustainability as to practices of knowledge production; different epistemological, historical and material reconfigurations not only engender different knowledge about the world but also different realities, possibilities and capacities (e.g. Barad, 2007). In this sense, the practices of knowledge production (such as STEM) and the policies for its advancement (such as SAGA) are always non-innocent and implicated, making us responsible for a world "we have a role in shaping and through which we are shaped" (Barad, 2007: 390). Hence, the different ways we measure, define and categorise our nature-cultural realities, is not only a matter of understanding but of shaping particular realities.

In their introduction to *A Feminist Companion to the Posthumanities* (2018), Åsberg and Braidotti underline the imperative for a 'critical and creative framework for performative and generative accounts of technoscientific or other nature-cultural practices across disciplines and categories' (p. 18). We understand this call for creative and critical frameworks as useful to thinking about the co-compositions of intersectional, gender-responsible STEM in the Arctic. There is a widespread understanding that inclusion and access to knowledge production is a human right in and of itself (UNESCO 2019a). It is equally understood that open, inclusive, intersectional, gender-responsible practices of knowledge production are essential to address today's challenges (UNESCO, 2017a), such as human-induced climate change. In a sense, these two facets of inclusion also underscore the SAGA tool, which aims specifically to advance gender in STEM fields. However, we understand Åsberg and Braidotti (2018) to allude to an orientation that not only includes or grants access within the frames of existing structures and categories but troubles their very distinctions, their epistemological contingencies and performative exclusions and inclusions. This approach in which different epistemological, material, social and historical constellations co-create different worlds can also inform practices for capacitating sustainable knowledge production. As an academic endeavour, this might entail, as Reardon (2013: 192) argues,

> imagining other routes to knowledge and justice [...] that derive not from codified reactions but from responses to the specific conditions and consequences of knowledge production. Within universities, these spaces must not be seen as 'interdisciplinary' add-ons but as fundamental to what it means to discipline ourselves in a manner that allows us to know, respond, and care for a diverse range of liveable and desirable lives.

In line with the critical posthumanist project of Braidotti (2019), this could be understood as a challenge for capacitating and constructing conditions for "nomadic lines of flight" that cut across and recompose "the dominant knowledge production systems precisely through creating multiple missing links, opening generative cracks and inhabiting liminal spaces" (49). As we understand it here, this underlines the need to account for the conditions that influence our capabilities to make an epistemic contribution (Fricker, 2015) and highlights the transformative value and ethico-political significance of recomposing missing, ignored and marginalised epistemic openings. These are crucial connections within academia. For example, Koskinen and Rolin (2019) highlight the epistemic importance of Indigenous studies for scientific/intellectual knowledge. However, these new re-compositions of knowledge production may also trouble the established barricades of scientific knowledge, such as those of Indigenous ways of including, for example, spirituality, community and creativity in their knowledge systems/Native science (Cajete, 2018) or by fostering connections with creative, art and activist assemblages with the natural world (see e.g. Subzero collective, https://sub-zero.org/). When locating ourselves in the Arctic, and when acknowledging both the importance of gender policies in STEM and taking on to find missing links and liminal spaces, we find relevance in expanding from merely 'adding' gendered or Indigenous perspectives or voices into STEM. Instead, we make a proposition of imagining and taking responsibility for cultivating a situated STEM that is responsible and accountable for its social, material, historical and discursive contingencies, constitutive exclusions and materialising effects, and committed to stemming from and for the Arctic.

Stemming conclusions

Arctic situatedness is multiplicitous. It is sometimes defined as consisting of eight states of sparsely populated areas but also including urban hubs that are all undergoing constant transformation due to the global challenges posed by climate change, globalization and digitalization. Intersectional gender responsibility productively resonates with this multiplicity by bringing in diverse people with a variety of situatedness, standpoints and rich knowledge, skills, values and views. Furthermore, the Arctic is well known for its vulnerable non-human others, such as climate, glaciers, polar bears, oil, gas, minerals and Arctic sea routes, that are of major interest to researchers but also corporations. Responsibility and sustainability demand that we rethink our interrelatedness and interdependency with the Arctic in relation to equitable knowledge production processes and related policies.

In this paper, we have touched upon the issue of whether the global SAGA policy could be further co-designed for local applications in the Arctic to improve access and resulting affordances for situated STEM. Both gender equality policies and science policies are developed to improve equality, equity and excellence, as well as sustainability. These intertwined policies aim to define and enable sustainable knowledge production. The question is profoundly about an epistemic contribution, which is considered a human capability fundamental to ensuring human wellbeing and—we propose—quality of knowledge.

One of the main challenges is to advance multidisciplinary research affordances to co-create a multifaceted understanding and cultivate our imagination to relate with care to the Arctic through knowledge production. The definition of STEM/STEAM is part of that discussion. For instance, due to practical measurability-related challenges, the A for arts was excluded from the SAGA approach, resulting in other epistemology-related consequences. Co-creation requires the participation of a diverse group of people, but it also involves and benefits from a diverse set of methods, which we will learn to apply in collaboration with Indigenous knowledge holders and artists, such as those in the SubZero project. Additionally, the gender divide between the disciplines in the categories of 'natural sciences' and 'social sciences and humanities' is persistent and requires the consideration of institutional remedies that challenge organizations conducting research (including UArctic organizations) to implement situated and intersectional gender equality plans. Finally, what is ultimately at stake is learning to understand interrelated and interdependent human and other than human complexities and make connections collectively and co-creatively—being with and in relation to the planet.

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Gender and Climate Change Research: Moving Beyond Transformative Adaptation

Pablo Romero-Nieva Santos, Nikolai Holm, Julia Olsen & Grete K. Hovelsrud

Research on how communities in the Arctic can overcome the challenge of climate change have traditionally employed adaptation frameworks. The ability of these groups to continue thriving in the Arctic is complicated by historical, social, economic, and political complexities - issues thoroughly addressed through the postcolonial feminist concept of transformation. This article critically examines contemporary research on climate and gender, and the extent to which feminist transformative concerns are addressed, thereby challenging systems and promoting power structures that recognize or benefit all segments of society. The article adopts an analytical strategy which combines two parallel instances of critical reflection on climate research, specifically, a systematic literature review of climate and gender studies in the Canadian Arctic, and the results of a round-table workshop of international climate experts and researchers on the state of climate change, adaptation and gender research in the Arctic. The article explores the results of these analyses and distinguishes those strategies that represent a continuation of status-quo power relations and climate adaptation processes from those that account for current economic and socio-political factors.

Introduction

Climate change is documented to have demonstrable negative impacts on communities' well-being in terms of health, economic stability, and physical security. These impacts are exacerbated by socioeconomic, cultural and political factors, but also gender, ethnicity, or social class. Moreover, the economic, cultural and social systems that contribute to insecurity and the impacts of climate change are deeply rooted in patriarchal and/or colonial histories. In other words, when it comes to vulnerability and adaptation in the face of climate change, intersectionality matters.

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However, it is unclear to what extent these systems are reproduced within social climate change research itself. Hence, it is essential to examine whether such research effectively incorporates strategies that recognize the knowledge and values of marginalized groups to identify local vulnerability, and if this research promotes a reformulation of colonial and patriarchal power structures and societal roles. This study provides a critical examination of contemporary research's ability to recognize and account for these complexities in relation to the impact of climate change in Arctic communities.

Combining the post-colonial feminist theory with the concept of transformation, the article argues that society must recognize and accommodate the differences and particularities of individuals and groups in the subaltern in order to develop effective strategies and produce knowledge around climate change. This perspective challenges the dominance of neo-liberal and neo-colonialist processes, arguing that they do not leave space for the most marginalized positions to narrate and define new strategies. In order to face global issues, it is critical to reformulate the socio-economic basis for ethnic, class, and gender divisions. The article is an attempt to bring this critical normative and evaluative perspective to analyze contemporary Arctic research. Are there evidence or support in the research community to argue that society must recognize and accommodate the differences and particularities of individuals and groups in the subaltern in order to develop effective strategies and produce knowledge around climate change?

The study adopts a novel research approach, combining analysis of both a qualitative critical self-reflection report by climate researchers, and the results on a systematic literature review on arctic research. In doing so, the study presents a normative self-critique from within the research community, then evaluates the extent to which climate change research in the Arctic has moved towards this goal, using intersectionality and post-colonial feminist transformation approaches as a normative yardstick. Moreover, the article discusses those strategies that represent a continuation of status-quo power relations and analyzes climate adaptation as processes that are shaped by current economic and socio-political factors (Pelling, 2010). It begins by presenting the theoretical distinction between adaptive and transformative approaches, followed by an overview of the workshop and review methods. The article then discusses the results of the analysis, and concludes, presenting a summary and normative recommendations for future research.

Theoretical transformation: Moving from Adaptation to transformation

The decreasing window for climate action results in a growing urgency to address those dimensions of climate change that impact marginalized groups. Policies, strategies, and programs may be impacted or reinforced by gendered roles, agency, and human well-being (Williams, 2018: 269). The impacts of climate and policy on society are influenced by structural and social inequalities and socially constructed roles (MacGregor, 2010: 235-236). As climate change can be conceptualized as not merely a *cause* but as a *context* of vulnerability, it is important to recognize the social constructivist components of vulnerability and the possibilities for adaptation. It is here where we can see the distinction between adaptation and transformation approaches, and why it is necessary to move towards the latter.

According to authors such as Mark Pelling (Pelling, 2010), Karen O'Brien (O'Brien, 2012) and R. Miller (Miller, 2007), addressing the social challenges of climate change requires addressing the socio-political marginalization of groups in the context of adaptation, while ensuring that strategies

and policy outcomes do not buttress interests and paradigms derived from a global hegemonic system. This idea, referred to as t*ransformational* adaptation*,* implies a reformulation of both the policies designed to face climate change, but also the perspectives used to define the concepts at the very heart of research and policy discussion: vulnerability, adaptive capacity, adaptation, and transformation.

Most contemporary definitions of adaptation, according to Pelling, refer primarily to making adjustments in response to challenging conditions, rather than overcoming them by reformulating practices and the underlying institutions that generate root and proximate causes of risk (Pelling, 2010 cited in O'Brien, 2012: 670). He argues that these structures and paradigms are accepted as a given and, in some occasions, modified but scarcely ever critically questioned. Miller argues that these changes are necessary to ensure the emergence of desirable futures (Miller, 2007) which according to Feola (Feola, 2015) are connected to the prescriptive concept of transformation.

Transformational adaptation, by contrast to traditional adaptation approaches, aims to challenge status-quo paradigms centered on economic growth and consumption (Pelling, 2010 cited in O'Brien, 2012). The concept identifies and ascribes value to the patterns that are the result of transformative processes - it defines the process of change not only as a structural change but also focused on a desirable direction. Transformative strategies focus on achieving benefits rooted in the empowerment of those with fewer resources to apply to achieving systemic change (Feola, 2015). It is thus that it addresses not only socio-economic challenges like consumption, but also socio-political power disparities. O'Brien emphasizes that this is difficult as it involves challenging deeply rooted systems and social paradigms that are protected by powerful interests. There are enormous barriers to transformation which are rooted in culture and manifest in economic and social policies (O'Brien, 2012: 669).

Vulnerability, as noted, is exacerbated by underlying social dynamics. Adger and Kelly (1999) argue that vulnerability is socially constructed and determined by contextual variables. Constructivist approaches emphasize strategies that focus on describing vulnerabilities and proposing measures that account for intersectional factors like gender and other social roles/signifiers, like race or social class. As such, vulnerability is influenced by access to and control of material and social resources (West & Hovelsrud, 2010: 343). These resources shape one's adaptive capacity, defined as "the ability to manage current and past stresses, anticipate and plan for future changes, and be resilient to shocks and perturbations" (Smit, Hovelsrud & Wandel, 2008).

To account for these complexities, one must consider the complex historical connection between society and nature, as well as the political dimensions of adaptation emerging from the dominant capitalist and colonial systems. The importance of this historicity stems from Marxist reflections on the absence of a natural ahistorical state of social relationships. Siri Eriksen and Jeremy Lind argue that adaptation processes are conflicting political processes of negotiation, historically anchored and structured by different power theories. Power relations and inequalities should be considered when designing appropriate policies to face climate change (Dietz, 2013: 27-28). If the materiality of nature is socially produced, it is necessary to consider that social production implies that the social relations of power, which structure society, and cultural identities are connected to nature through differences in access, control, forms of appropriation and representations of the environment (ibid).

In this context, power is interpreted as the ability of the actors to control and determine the use of nature. For this reason, strategies should question the prevailing imbalances of power, which constitute the root of the risk, and reformulate processes in order to reduce vulnerability to climate change. For example, while studies may document disparities that environmental changes have on men and women, McGregor argues they may contribute little to identify the processes which create vulnerability - or rather, social susceptibility to changing conditions (MacGregor, 2010: 235-236). Critiques like this highlight key differences in how climate change differentially impacts social groups, yet fail to elaborate processes which heighten vulnerability or diminish inequalities.

For example, consider when climate is analyzed as a security threat. This approach entails a critical vision about the masculine dominance over concepts such as security and peace. Masculine dominance is hidden behind an objective perception which excludes certain social groups from decision-making processes (Stuvøy, 2013). For this reason, climate change is not a gender-objective phenomenon. Its effects can reinforce structural and social inequalities as well as constructed social roles, thus, distinguishing gender vulnerability (MacGregor, 2010: 236). These imbalances can be extended to other economic, social, and political disparities as well. Recognizing these critiques, a postcolonial feminist framework can be applied to reflect on how gender, race or social class intersect and interact with climate change.

To deconstruct and challenge the status quo of power relationships, postcolonial feminism urges critical reflection on socio-political processes - such as colonialism and globalization. It challenges center-periphery relationships, not by exchanging the margin for the center, but by displacing this distinction (Landry & Maclean, 1996 cited in Oliva Portolés, 2016: 77). It is through critically questioning these structures that the nexus between feminist theory and transformative strategies emerges. Even the production of research must be critiqued as imposing paradigms generated in the center, as researchers may replicate their internalized perspectives, and subsequent norms and values (Zirion Landaluze & Idagarra Espel, 2014) (Crowley, 2011).

Oliva Portolés (2016) argues that confronting problems in a world dominated by patriarchal and neocolonial structures requires comprehensive strategies by marginalized people to reform structures. Not only is it critical to transform the basis of the socio-economic and political systems, but the ways in which knowledge is produced as well - something difficult to achieve from a position of disempowerment (ibid). Gayatri Chakravorty Spivak argues that without a questioning of the basis of the system and deconstructing periphery-center relationships, the most oppressed or the subaltern will not have capacity for development, acts of insurgency, or ability to reach accommodations with those in power (Spivak, 1999: 119). Research must be both cognizant of this disparity of voice, and also attempt to redress the historical, social, and economic factors which contribute to it. In short, research must adopt transformative approaches.

As such, this article applies a normative evaluative framework rooted in transformational adaptation and postcolonial feminist perspectives to analyze the contemporary state of Arctic climate research. It seeks to examine the extent to which Arctic research has been able to move beyond conceptual generalizations generated by liberal and individualist traditions (Zirion Landaluze & Idagarra Espel, 2014) and recognize - and accommodate - the differences and particularities of marginalized communities in order to develop effective policies and leave space for the most marginalized positions to narrate and create knowledge on climate adaptation. (Landry & Maclean, 1996 cited in Oliva Portolés, 2016: 77)

Methodology

The article adopts an analytical strategy which draws together two parallel instances of critical reflection on climate research: firstly, a round-table workshop on climate adaptation and gender in the Arctic with a panel of international climate experts and researchers (n=17); secondly, a systematic review of literature on climate and gender on a specific case and context – namely, the Canadian Arctic.

Method one: Analysis of a self-reflective workshop report

A workshop methodology is broadly used in academia as it enables an investigation into a research problem through a dialogue with involved actors (in this study the workshop included different researchers and experts on studies of gender) and has a purpose to produce reliable data on the research topic including the participants' understanding of the topic (Farner, 2013: 19-21). The same author underlines that a workshop does not necessarily result in final results but rather outline a direction for research and agreements and/or disagreements about its elements (ibid).

An interdisciplinary workshop "Climate Change Adaptation and Gender in the Arctic" (2013) was a part of the research project Critical Aspects of Adaptive Capacity to Climate Change in the Northern Regions (CAVIAR II). Participants included international experts who have applied a gender focus or tangent in their Arctic and Global South research, and who have applied an Arctic or Global South tangent in their gender research. Studies of climate adaptation and gender in the Global South have a longer history than in the Arctic, and the experts provided valuable lessons from their research. The participants included three contributors to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). Participant specializations covered anthropology, human geography, political science, sociology, and economics. The aim of the roundtable was to critically examine the status of knowledge production in relation to issues of gender intersectionality and climate change adaptation.

The discussion was framed by a set of predefined topics developed from a review of literature and media: methodological challenges in gender research, theoretical operationalization of gender, relationship of gender to other concepts in adaptation literature (e.g. vulnerability, adaptive capacity), and other variables (e.g. race, class, ethnicity, age). Detailed notes were taken during the workshop and were synthesized shortly after the event and shared with the workshop participants to secure the quality of the report. The report was initially developed for the Research Council of Norway and later shared with the participants and the research group of the CAVIAR II project. The report highlighted methodological and theoretical perspectives for gender research and relational challenges; these results are reported here (Hovelsrud et al., 2013).

In the workshop, a main focus was on the identification of gendered aspects of adaptation and adaptive capacity and discussion on the use of an intersectionality approach to analyze those aspects as well as the understanding of the consequences for the theoretical perspectives. Given the relevance of the workshop discussions to the objective of this article, the workshop report has been re-analyzed in order to extract the information on gender perspectives in Arctic climate adaptation research. This re-analysis has not been shared with the workshop participants.

Method two: Systematic literature review of Arctic research on climate and gender in the Canadian Arctic

The second component of this analysis is a literature review aimed at examining how transformation has emerged in explorations of the gender dimensions of climate research in the Canadian Arctic. The review analyzed the extent to which the captured literature reflects the concept of transformation to create knowledge and propose policies to face climate change. The process considered the presence or absence of elements that verify/conform the concept of transformation which is connected to social change. Following Piotr Sztompka and his study *the sociology of social change* the conceptual model being applied in this work, utilizes four general elements to classify processes of social change (Sztompka, 1993, cited in Feola, 2015: 378): System of model, Temporal Range, Social Consciousness and Outcome (Feola, 2015: 377). These criteria entail a description of social change that will be used in the methodology to systematically characterize the concept of transformation.

A number of inclusion and exclusion criteria for article capture were developed based on the theoretical and geographic space for the article, and these were applied within ProQuest Central collection. The first criteria were selected to account for the theoretical mainstreaming of gender within mainstream international relations and security processes. That is, the 1325 UN Resolution on women, peace and security - adopted 31 October 2000 - which calls for the inclusion of the gender perspective in all levels of peace processes and security efforts (Villelas Ariño, 2015), establishing a temporal limit from January 1st, 2000. A second criteria was established in relation to climate change strategies from a human perspective. Thus, papers that had a non-human focus were excluded. A third inclusion/exclusion criteria was the specific inclusion of gender as the key focus of the study. Gender OR Women OR Woman were the search terms. Finally, socio-geographic limitations were applied to limit the scope towards a focus regarding primarily Indigenous communities in the Canadian Arctic. The resulting search term was, "*(Gender OR Woman OR Women) AND ("Climate change") AND (Inuit OR Nunavut)"*

The initial return for this search revealed 186 articles which were examined using the inclusion and exclusion criteria as well as reading of the title and abstract. After a secondary review of abstracts, 24 relevant papers were identified and subjected to a full text review and analysis.

Data extraction and conceptual model

An evaluation matrix was applied to the collected literature, enabling the examination of transformative strategies within the literature about gender and climate change. The articles were coded and graded using a point system tied to the significance of transformation in the gendered analysis of climate change. The grade was calculated based on indicators derived from the components of the concept of transformation and operationalized via a summation question. These components included:

1. System Model (1pt): Change via complex processes that involve all segments of society and spheres of action (Feola, 2015: 382). Includes systems level change, addressing questions of values, beliefs and assumptions about human environmental relationships (O'Brien, 2012: 672).

   Question: *Does the analysis imply a* ***structural change*** *of the system?*

2. Historical Change (1pt): Recognizes historical processes with thresholds and ruptures (Geels & Schot cited in Feola, 2015: 382). Historicity requires a rejection of a natural and a historical state of social relationships (Dietz, 2013: 37). Understands relationship between society and nature as influenced by cultural and political determinants, and includes a non-linear transformative strategy (Feola, 2015: 382).

   Question: *Does the analysis show a* ***historical system*** *subdued by changes and phases?*

3. Social Consciousness (1pt): Recognizes that transformation may emerge through endogenous and exogenous processes. Understands that transformation involves deliberate consequences, going beyond the deterministic notions of the environment in which individuals are adjusted to their environment (Geels & Schot cited in Feola, 2015: 383). Article analyzes vulnerability and climate strategies as a function of the wider political and economic environment determined not only by climatic factors but also by social, cultural and political factors (Skinner, 2011: 14-15).

   Question: *Does the analysis emphasize a* ***deliberate*** *process of change?*

4. Outcome (1pt): Recognizes importance of revising political relationships, power structures, social networks, and ecosystems. Transformation can be understood as a deliberate change in various areas of society (Geels & Schot cited in Feola, 2015: 384). Rejects conceptual generalizations through a deconstruction process in which other parameters are considered in producing knowledge and adaptation strategies. Accounts for geographical and cultural particularities within social groups (Oliva Portolés, 2016: 74-75).

   Question: *Is the analysis focused on change based on modifying the patterns and relationships that* ***create knowledge and design the strategies****?*

Each article was graded according to the criteria above and assigned up to 4 points. Articles were categorized as having low (one point), low- medium (two points), moderate (three points) or high presence (four points) of transformative strategies in their analysis of climate change and gender.

Discussion of results

The following sections present the results of the analysis of the self-reflective workshop and systematic literature review. In general, the literature captured in the review mainly focused on the climate change impacts on lifestyle of Inuit communities in the Canadian Arctic specially in Nunavut. The main findings reflect the importance of social roles, resource access, traditional knowledge, social networks, and collaboration among households within Inuit communities in analyzing how vulnerabilities are shaped by socio-economic, political and demographic processes (Archer, et al., 2017).

Results from the analysis of a self-reflective workshop report

During the workshop the impacts of climate change on communities in the circumpolar Arctic and their relations to gender dimension were examined. The discussions acknowledged that linkages between climate change, adaptation and gender were well-documented in the Global South, and similar gendered disparities would likely exist in the circumpolar North - as is confirmed by the preliminary literature review. One of the main conclusions was that approaches recognizing

intersectionality might improve our understanding of gendered impacts from climate change. Second, the focus on gender should not be separated from other societal and environmental aspects. Moreover, research on adaptation and gender could be important for understanding the socioeconomic interplay between men and women, the effects of climate change, and the linkages to social phenomena of migration, education, employment, economic development, subsistence practices, and mental and physical well-being.

Furthermore, the workshop discussed the needs for future research on gender and adaptation in the Arctic. The workshop report summarized several methodological challenges and theoretical perspectives in gender and climate change studies (Hovelsrud et al., 2013). For the methodology it was suggested that a research design should identify the unit of analysis (i.e. societal level) and what change we should adapt to, in order to facilitate the examination of how the climate change impacts differs from social or other changes. The goals of research should be both acceptable to policymakers, reflexive to community needs, and meaningful for communities who participate in the research. The importance of interdisciplinary approach was underlined.

For many such studies, this approach is grounded in intersectionality. The report suggested moving from gender-centered approaches toward broader integration of other social aspects like age, class, or ethnicity to understand climatic, socio-economic and political conditions. Nevertheless, a research focus on gender is useful. But the research designs would benefit from adopting intersectionality as a backdrop and aim to integrate other relevant aspects.

Other categories not commonly integrated into intersectionality approaches could be relevant in the analysis. In particular, the workshop noted that the intersectionality theory does not include local knowledge, and no attempts to expand on the list of existing categories of intersectionality were identified in the literature (Hovelsrud et al., 2013). It was argued that local knowledge can be gendered by traditions in the Arctic (e.g. whaling responsibilities, land practices). The workshop experts emphasized that gender roles may also have implications for adaptation strategies and hence present another novel category of intersectionality. That means that in further research on gender and climate change adaptation "*It is not feasible to separate the focus on gender from other societal and environmental aspects, but rather integrate such aspects in research on change*" (ibid). It was recommended that a research focus on gender and climate adaptation should intersect with other aspects that impact society in and outside the Arctic.

The next section will examine how intersectionality emerges throughout literature on gender in Arctic studies using transformation as a vehicle for measuring the recognition of key aspects of intersectionality.

Results from the systematic literature review of Arctic research on climate and gender in the Canadian Arctic

Twenty-four articles were subjected to a complete review and analyzed in regard to the presence of transformation approaches in the context of gender and climate change research. Of the 24 studies, 3 studies [19,22,23] had no presence of transformative elements in their analysis; 2 studies [18,20] had a low presence (1 point out of 4); 10 articles [5-7,9,10,13,14,16,17,21] had a low-medium presence (2 out of 4 points); 6 studies [1,3,11,12,15,24] had a moderate presence (3 points out of 4); and 3 studies [2,4,8] were classified as having a high presence of transformative elements in their analysis scoring 4 out of 4 points. The average presence score was 2.17 showing a low-moderate presence of transformative strategies across the captured literature. While the majority

of the studies had a low-moderate transformation score, there were a few papers focused exclusively on structural changes. It is not clear if there was a significant trend or movement within the literature to move away from the established norms and towards a transformative strategy based on a reformulation of socio-political and economic processes.

An important finding that was identified within the articles (this is similar to those in the workshop report), specifically, was recognition of the differing impacts climate change has on gender groups in relation to societal roles. The literature analyzed climate change from a framework in which social, political, cultural, and economic factors determined the impacts of environmental changes on the population. This means recognizing that issues such as living costs, societal activities, and employment opportunities can be exacerbating factors for vulnerabilities associated with climatic change (Archer, et al., 2017: 17). Moreover, many studies adopted strategies rooted in multidisciplinary approaches where community knowledge played an essential role. However, these two findings are not critically analyzing underlying social and economic structures and paradigms.

Despite the general awareness of the different life experiences mediated by factors like gender, much of the literature failed to propose measures or strategies that challenge the paradigms which exacerbate the disparate life experience that climate change entails. Some studies advocated for analyzing situational and political realities with disciplinary and institutional lenses derived from communities in order to design strategies that take into consideration their values, needs and perspectives. Different from the majority of the studies, they have considered how individuals from the communities play the role of intellectual partners as the result of a process of decolonization in the research throughout the reformulation and contextualization of the historical and current forces that influence Indigenous communities (Huntington, et al., 2019: 1220).

The following section analyses and combines insights from the literature review and the workshop results as they relate to the theoretical framework. The reviewed literature is analyzed in terms of three areas, each of them involving a distinct element of the transformation concept. Therefore, this section highlights why research on gender and climate change should consider an intersectionality and transformative lens as a means of augmenting adaptation research.

Climate change as a complex historical and systemic issue

Future outcomes of climate change impacts are inseparable from historical and systemic complexities. In terms of intersectionality, this can be understood by reflecting on issues of colonial legacies, social relationships, and other complicating factors that determine the societal roles and power structures.

Recognition of the historical or systemic factors which complicate climate change were evident in 21 articles {1-18, 20,21,24}. Of these, 9 articles {1-4,8,11,12,15,24} also received an overall moderate-to-high or high level of transformation, with the remaining 12 receiving a low-to-moderate level. These studies analyzed climate change in the context of multiple risks, with examples such as high rates of poverty, suicide, substance abuse and limited medical access. Those factors, together with unemployment rates, were also noted at the workshop (Hovelsrud et al., 2013). This highlights the need to consider political and historical processes, such as colonization, which have generated inequality and power disparity within the Inuit communities. For example, several studies examined food insecurity among women, addressing the importance of cultural

practices, such as food sharing, and social and family networks that allow women to improve food security for themselves and their families. Moreover, these analyses included other factors such as type of employment and purchasing power as factors that render adaptation strategies unequal. These findings are similar to discussions in the workshop report where the participants, referring to own studies, suggest women and men can develop different behavior practices and get involved in different types of activities in response to change, including climate change (Hovelsrud et al., 2013).

On the other hand, there were some studies which did not analyze climate change in the context of multiple factors {19,22,23}, and received no points for transformative elements. These studies focused exclusively on reporting climate change's impacts on Inuit life but did not reflect on the processes that exacerbate these impacts and how they generate different vulnerabilities within communities. There was a lack of interaction between the social, biophysical and technological factors (among others) in the analysis, or as described here, the System Model. As an example, the article *Towards a sustainable future for Nunavik* [22] proposes the necessity to develop economic systems which gives sustainable opportunities to Inuit in Nunavik, strengthening local governance (Rodon & Schott, 2014). However, despite the article showing the traditional activities and jobs of Inuit women and men, it did not analyze the processes that generate different vulnerabilities and the influence that socially constructed roles have on the capacity to face climate change. There was little explanation on how relationships between society and nature are influenced by cultural, socio-political and economic determinants that the transformative element of historical change entails.

These results show that there is room for improvement for contemporary research to incorporate historical contextualization and critical reflection of social, political, and economic systems into their research. Overall, the 21 articles received a point for incorporation of a transformative systems model, and 19 of them {1-17,21,24} for acknowledging historical complexities.

Transformative Social Consciousness in Adaptation Research

Mainstream adaptation research often examines attempts to adjust existing systems to change, instead of focusing on the potential for the reformulation of practices and institutions that generate root and proximate causes of risk (O'Brien, 2012: 672). This process of adjustment implies a deterministic approach, where humans functionally adapt to an environment formulated in terms developed by the current system (Head, 2010: 236-238). Researchers who propose recommendations should be aware that research may inspire future policies, and therefore ought to consider deliberate processes which challenge entrenched systems and are effective at eliminating people's vulnerabilities and reformulating processes and power relationships. In this sense, deliberate processes are connected with the transformative element of social consciousness. The review process highlighted an interesting distinction between those articles which focused on adaptive approaches, and those which rejected them.

Within the collected literature, 19 studies applied adaptation approaches. Of these, 15 articles [5-7,9,10,13,14,16-23] had 2 or less transformative components in their analysis and 4 studies [11,12,15,24] received a 3; however, not one adaptation study included a significant element of transformative social consciousness. This was largely because the studies lacked a deliberate focus on processes of change rooted in culture and cognition and that in turn are shaped by economic, social and institutional practices.

For example, several studies on food insecurity noted that vulnerability was higher for women. These concluded that Inuit women's food security status is influenced by socioeconomic and political factors. While these addressed important socio-economic issues for a marginalized group, the measures proposed in the article to moderate food insecurity were mostly short-term and reactive: policies based on income support and facilitating inter-community sharing. Vulnerability of women was framed as an intrinsic problem of being a woman - and proposed *symptomatic* treatment, rather than *systemic*. This avoids revealing and questioning the social processes and institutions that create obstacles and exacerbate vulnerabilities. It conceals the drivers that put women in this vulnerable position in the first place, ignoring the reasons that explain it (Bradshaw cited in Tschakert & Machado, 2012: 277-278). The workshop also acknowledged that the adaptation responses are related to social roles in the communities and should be in focus when studying climate adaptation (Hovelsrud et al., 2013).

Interestingly, 5 articles [1-4,8] rejected the dominant discourse about adaptation to climate change, arguing said discourse can imply a technocratic notion, one in which there is a "correct" adaptive strategy that is readily available and possible. The concern being that adaptive strategies do not sufficiently frame the social elements of climate change or the complex behavioral aspects, but instead portray a technical problem with functional solutions (Beaumier, Ford & Tagalik, 2015: 552-553). These 5 articles contend that adaptive strategies are akin to bandaging a wound yet failing to correct the problem and prevent future damages. As such, they consider deliberate strategies that not only recognize the social, political and cultural roots that frame vulnerability, but also promote change through examining socially constructed roles and distinctions in order to identify the disparities within communities and eliminate the differential vulnerabilities to climate change. These studies have performed an average of 3.6/4 showing a high presence of transformative potential in their analysis.

For example, *Gender Justice and Rights in Climate Change Adaptation. Opportunities and Pitfalls* [4] considers that adaptive strategies imply a notion of objectivity that is predominant in the technological perspective of vulnerability and climatic strategies. It argues this perspective hides explicit language of harm and danger "but also purposefully obscure[s] underlying uncertainties" (Alaimo, 2009 cited in Tschakert & Machado, 2012: 277). The non-critical perspective articulated by adaptive strategies does not provide sufficient space to marginalized groups to articulate their needs, rights and responsibilities. They are silenced in the debates concerning their vulnerable position, and in research. In this regard, the description of women as victims and caretakers is a discourse in which women act as a crucial agent in adaptive programs; however, this noncritical approach to women's roles, responsibilities and knowledge, without an explicit consideration of the power analysis, will exacerbate the "feminization of responsibility" (Tschakert & Machado, 2010: 278).

Outcomes and intersectionality: Gender, class and ethnicity as drivers of inequality

The final key component of transformative approaches is connected to the recognition of outcomes as a result of relationships, structures, social networks, and ecosystems. This article argues that the recognition of inequalities in climate impacts are the result of the intersections of multiple social determinants - such as age, race, social class, social role and access to knowledge. This implies the necessity to deconstruct and reformulate the paradigms that dominate the relationship between society and the environment. For this reason, it is important to focus on the

result of the strategies and see if they have incorporated the knowledge, needs and values of the receptors of these policies. This connects with the transformative element of Outcome, or the focus on the desirable result of a transformative process.

Seventeen of the captured studies included a transformative outcome element as a result of applying interdisciplinary approaches, and nine of these received an overall score of 3 or higher {1-4,8,11,12,15,24} in the overall presence of transformative components. These studies worked to highlight how the consideration of gender as a sectorial category implies the rejection of its connotations of power imbalances between women and men and consequently their differences between their roles and social positions. Moreover, the analyses include gender as a transversal category, since climate change impacts have a repercussion on different social aspects such as health, security, and wellbeing. This is exemplified by the fact that being Indigenous women translates into lower incomes, greater food insecurity, and potentially higher unemployment rates. These articles also show that environmental degradation entails a risk for the physical well-being but also for the cultural survival of Inuit culture and identity. Similar to the workshop report, the literature review shows that the higher level of depression, domestic violence, substance abuse and suicide within Inuit communities is associated with the expectations that young generations (men especially) have of their future. They do not see a future as hunters and consequently contributors to their community for themselves, and at the same time they feel that they do not fit into the cash employment structures that are becoming the dominant lifestyle (Greaves, 2016: 667). These kinds of results suggest a complex, robust, and detailed interdisciplinary analysis.

The use of a critical approach that addresses gender, race and social class in order to determine the security threats is also a characteristic of interdisciplinary studies. A critical approach rejects the division of the concept of security in different sectors such as military, political, social and environmental, suggesting that security has to incorporate all the factors that influence the population's security. This approach will entail an opportunity to promote economic activities that support the priorities and traditions of Inuit communities. An example to illustrate the critical approach is the one included in the article *Securing sustainability: the case for critical environmental security in the Arctic* {5} regarding the "energy security" in the communities of the Arctic. Inuit communities are considered energy insecure because they rely on expensive imported diesel and they suffer periodical fuel shortage that is essential for transportation and heating. However, these problems are omitted in the policies framework focused on the state security that prioritizes the intensive extractions of fossils fuels. Despite this, extraction activities can imply economic benefits, but it also entails pollution threats and a greater dependency of these communities on the fossil fuels that cause climate change (Greaves, 2016: 667-668).

However, dominant analyses maintain that a functioning environment is an essential condition for providing security in the Arctic but implies a compromise with a development strategy shaped by hegemonic processes. This compromise strategy may exacerbate climate change impacts on Inuit populations. This again connects with the transformative component Outcome, when strategies developed can entail potentially undesirable consequences for vulnerable groups. A critical and interdisciplinary approach is coherent with a transformative conception based on the rejection of any process that presupposes that climate change will entirely reorganize societies and ecologies of Inuit communities. Transformative strategies reject the continuity of consumption and industrial processes that promote climate change, which represent a pathological approach to

security rooted in the tension between catastrophic climate change and the perpetuation of activities that are causing this threat (ibid).

Of the articles which did not take an outcome approach {16-20,22,23}, only articles number 16 and number 17 scored more than 1 (0.86). These articles did recognize the social, economic and cultural components in their analysis of climate impacts, and how the traditional policies and strategies exacerbate the social, gender and race inequalities; however, their proposed solutions focused on models in which established growth paradigms, such as extractive activities developed in some communities of Nunavut, should coexist with the promotion of other subsistence activities which are essential for the culture and identity of Inuit. For example, they presented discussions on the necessity of incorporating the needs, and knowledge of Inuit communities through the creation of advisory boards that consists of elders, youth representatives, representatives from the local institutions and what the study calls "selected outside experts" (Rodon & Schott, 2014: 275). However, the consideration of people from outside as experts who are going to "guide" and "assist" the Indigenous communities towards a sustainable future implies the acceptance of the principles and paradigms from outside of the Arctic playing for the Arctic inhabitants the role of advisors. This approach involves local experts as intellectual partners, not merely as information sources to be analyzed by other persons in other places (Huntington et al, 2019: 1220). It connects with the theoretical aspect of rejecting generalizations and deconstructing western paradigms that are imposed to analyze different contexts and at the same time to cause perpetuation of the colonial relationships. The workshop experts also expressed a need for research to be inclusive and meaningful for communities. They also noted that the concept of gender and gender theory are applied differently in different contexts and research traditions (Hovelsrud et al., 2013). This creates a conundrum for analysts when disentangling whether climate adaptation and transformation are gendered.

Concluding remarks

Transformation supports not only a change of beliefs and loyalties, but also a questioning of certain general assumptions about the relationship between people and environment. It is here where the concept of transformation connects with the nature of postcolonial feminism including the option of challenging the growth and economic consumption paradigms. In this way, this article has explored the extent to which elements of transformation are found in research exploring social change.

Therefore, this article identified the number of ways the concept of transformation represents an approach to systemic change, specifically that transformation entails:

- Change that involves socio-technical and socio-ecological systems (System Model) considering climatic strategies as a function of the wider political and economic environment, shaped by socio-political, economic and cultural factors in order to deal with a complex issue such as climate change.
- Change that is defined by historical processes which explain the factors that are behind the current power structure (historical change) and the importance of considering that the materiality of nature is socially produced and consequently the social relations of power are connected to nature through differences in access, control, forms of appropriation and representations of the environment.

- Change which has a deliberate intention of eradicating barriers rooted in culture and cognition, and expressed through economic, social policies, and institutional practices (social consciousness). As such, it is critical to develop strategies that go beyond incremental adjustments to deliberate processes which challenge entrenched systems maintained and shaped by power relationship.
- Change that implies achieving benefits through the empowerment and inclusion of all types of knowledge, values and concerns (outcomes). This implies the deconstruction and reformulation of the hegemonic paradigms and the inclusion of gender, race and social class in the analysis, in order to eliminate the limitations that subalterns have to promote any change in a globalized system which margins are designed from the center.

However, in a globalized world where unified strategies are more effective in combating global issues such as climate change, the debate about the analytical pertinence of postcolonial feminism has emerged (Oliva Portolés, 2016: 93-95). The approaches that encourage reflection on diversity, intersectionality, individuality, and contextual responses have a place in addressing issues which require unified and coordinated global responses. These variants on feminist theory are focused on the particularities and differences among feminism through the rejection of conceptual generalization and the confrontation to the dominant analyses that marginalizes other realities that women experience around the world (Zirion Landaluze & Idagarra Espel, 2014: 36). However, as it is said throughout the article, women from different geographical areas does not always have the capacity to challenge the current system.

Applying interdisciplinary strategies would entail a reformulation of the concepts developed by the complicity between the capitalist exploitation and the colonial values. The complicity relationship is designed on the basis of the neoliberal world economic system. As such, globalization entails a recognition of the superiority of certain postulates generalizing them as proper solutions for all types of communities. The reformulation of the hegemonic processes is indispensable to combat class, race and gender divisions and consequently creating the conditions for the most vulnerable groups to allow them to create knowledge and design strategies that promote change. For this reason, the postcolonial feminist framework is analytically pertinent in a globalized world only if it gives certain unity for a subject who needs to be defined as a collective actor in a globalized context, but at the same time recognizes the subjects' unique cultural and geographical realities.

As shown by the self-reflective report and the literature review, there is support or evidence for the importance of transformative adaptation approaches to better address complex issues relating to intersectionality and social structures when examining climate change impacts. This study supports a recommendation to the research community to further consider applying transformative adaptation approaches. While a focus on adaptive strategies was sufficient in the past, postcolonial feminist perspectives have illuminated that addressing these complications requires more than simple recognition of intersectional realities. Transformative approaches have the potential to challenge established systems in such a way that such issues are addressed through more complex systemic change. As shown by the review, evidence for this is born from the evolving nature of Arctic research, and the increasing recognition of strategies that don't merely attempt to adjust to the system but also refute it to deal with a global security threat such as climate change.

In concluding, we point out that there is a conflict between the theoretical feminist framework and transformative approaches. Theories such as postcolonial feminism offer solutions based on the recognition of cultural and social diversity among women in different realities, cultures, and regions around the world. However, this theoretical framework struggles to find strategies that could move different people towards a common goal in order to achieve practical transformative approaches. The current system implies the replacement of the concept of diversity into atomization creating a market where different individuals compete against each other. Assuming that we are all a mixture of many factors and that these factors affect each other. This is reflected in intersectionality where we are all affected by social class, our position in the productive system and everything that derives from it. Therefore, it is essential to highlight diversity connected from the material conditions, and in this way post colonialism needs to develop strategies to reach unity of action, not as an opposition to diversity but as a solution to reduce atomization. This in turn would likely promote transformative strategies to face global problems such as climate change.

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Appendix

Table: Summary and Scoring of Articles

Article	Summary	Evidence of Transformation Approaches	Score
1. Natalia, K. (2011). Climate change effects on human health in a gender perspective: some trends in Arctic research. *Global health action*, *4*(1), 7913.	Examines age and gender in current arctic research. Highlights gaps in knowledge/challenges in research trends on climate change, health, and gender. Explores how multidisciplinary approaches are effective in Arctic gender research, and represent a challenge to academic homogeneity by including all types of knowledge.	**System Model:** Promotes structural change through recognition of the influence of socio-political factors in environmental changes' impacts. **Social consciousness:** Takes into consideration the widest context in which climate change occurs - uses gender perspective to analyze its impacts. **Outcome:** Includes particularities of different geographic and social realities to design climatic strategies.	**3 / 4** **Moderate**

2. Williams, L. (2018). Climate change, colonialism, and women's well-being in Canada: what is to be done? *Canadian Journal of Public Health*, *109*(2), 268-271.	Examines evidence for how climate change and resulting policies/strategies may worsen gendered social and economic inequalities. Article rejects evaluations of vulnerability as a descriptor, seeking to identify causes of inequality between genders. Study promotes agency throughout the participation process.	**System Model:** Recognizes how capacities to face climate change differ between gender positions, resulting from socio-political, economic, and cultural processes. **Historicity: A**nalyzes situational impact on women's well-being in the context of the historical marginalization of Indigenous women. **Social consciousness: P**roposes strategies to question acritical scientific frameworks used in analyzing climate change's long-term impacts and adaptive strategies. **Outcome:** Focuses on necessity to both consider gender perspectives/participation in decision-making, and also promote critical changes to neocolonial conceptualizations of economic growth and anthropocentric world views.	**4 / 4** **High**

3. Bunce, A., Ford, J., Harper, S., Edge, V., & IHACC Research Team. (2016). Vulnerability and adaptive capacity of Inuit women to climate change: a case study from Iqaluit, Nunavut. *Natural Hazards*, *83*(3), 1419-1441.	Presents a community case in Iqaluit (Nunavut) connecting vulnerability and adaptive capacity of Inuit women to environmental conditions. Analyses impacts of climate change on women's traditional activities and well-being. Findings suggest climate change is not gender-neutral, that culturally shaped gender roles influence human/environment interactions, and therefore livelihoods and well-being. Suggests climate change will exacerbate gender differentiated vulnerabilities.	**Historicity:** Recognizes that different vulnerabilities of Inuit women are shaped by socially construed roles that reflect disparities of power as a result of a changing process. In this way, the social relations of power in te community that structures society, determined the differences in access, forms of appropriation and representation of the environment. **Social consciousness:** Focuses on factors which influence women's capacity to face climate change, such as access to financial resources, substance abuse, mental and physical health, food insecurity, social network, and the necessity to adopt strategies that go beyond small adjustments. **Outcome:** Argues for necessity to include discussion about traditional women's activities not previously or typically discussed in another research.	**3 / 4** **Moderate**

4. Tschakert, P., & Machado, M. (2012). Gender justice and rights in climate change adaptation: Opportunities and pitfalls. *Ethics and Social Welfare*, *6*(3), 275-289.	Examines research indicating that gender, social class, and ethnic inequalities undermine the potential of communities, societies, and individuals to be have significant roles in transformative processes. Aims to adopt transformative strategies based on a human security, challenging neoliberal thought in order to identify causes of material, political, and power inequalities.	**System Model and Historicity:** Argues that social gender roles shape by cultural and historical norms result in women and men experiencing environmental changes in different ways. **Social consciousness:** Establishes that vulnerability and capacities to face climate change are determined by work gender division, labor mobility, and structures in decision-making processes. **Outcome:** Questions acritical acceptance of scientific frameworks of climate change through the inclusion of women's knowledge and concerns.	**4 / 4** **High**
5. Greaves, W. (2016). Securing sustainability: the case for critical environmental security in the Arctic. *Polar Record*, *52*(6), 660-671.	Article argues achieving sustainability requires that, "Arctic security must me based on a critical understanding of human-caused environmental change." Research aimed to develop a critical approach of security that allows insecurity to be conceptually linked to global processes of production, consumption, militarization, and fossil fuel extraction.	**System Model:** Analyses environmental change as caused by human action and the socio-political impacts across the region. Argues that no conception of security which fails to address the relationship between human well-being and anthropogenic environmental change can be sustainable. **Outcome:** Alternative futures require questioning existing structures and envisioning how they might change or be changed.	**2 / 4** **Low - Medium**

6. Blangy, S., Bernier, M., Bhiry, N., Jean-Pierre, D., Aenishaenslin, C., Bastian, S., ... & Gibout, S. (2018). OHMi-Nunavik: a multi-thematic and cross-cultural research program studying the cumulative effects of climate and socio-economic changes on Inuit communities. *Éco science,* 25(4), 311-324.	Uses participatory-action research to identify priorities of the Observatory of Human–Environment Interactions (OHMi) in Nunavik. Priorities included elder-youth knowledge transmission, northern agriculture, preserving Inuit culture, language and identity, protected areas, mining employment, natural hazards and risks, and wildlife vulnerability. Aimed to develop a program that integrates local and scientific knowledge between sectorial teams, supporting interdisciplinary synergy enabling researchers to respond to the diverse challenges of environmental change.	**System of Model:** Research aimed to study the accumulative impacts that environmental changes have on the socio-ecosystem. **Outcome:** Research is based on systemic, holistic, cross-disciplinary, participatory research oriented toward local and sustainable solutions with gender and social equality.	**2 - 4** **Low-Medium**
7. Healey, G. K., Magner, K. M., Ritter, R., Kamookak, R., Aningmiuq, A., Issaluk, B., ... & Moffit, P. (2011). Community perspectives on the impact of climate change on health in Nunavut, Canada. *Arctic*, 89-97.	Research contributes to literature on perceived health effects of climate change in Inuit communities by identifying community priorities surrounding this issue. Highlights importance of participatory research to obtain community perspective and promote social action from individual to national levels.	**System Model:** Argues that climatic impacts affect economy, culture, and life-style of Inuit communities, and effects are exacerbated by the current system processes. **Outcome:** Promoting community participation and social capacity, thereby empowering communities to gain a sense of control, is essential to managing the health effects of climate change.	**2 / 4** **Low-Medium**

8. Huntington, H. P., Carey, M., Apok, C., Forbes, B. C., Fox, S., Holm, L. K., ... & Stammler, F. (2019). Climate change in context: putting people first in the Arctic. *Regional Environmental Change*, *19*(4), 1217-1223.	Article promotes a reformulation of climate change treatment in policies and research, developing an approach based on decolonization, emphasizing importance of indigenous voices in climatic strategies. Research aimed to develop contextual approach that insists climate change, strategies, and policies can only be designed effectively if climate is analyzed from both historical and contemporary contexts, in which the many forces and issues affecting people are recognized.	**System Model:** Aims to identify climate change in the context of multiple risks such as poverty, substance abuse, and limited medical access amongst others. **Historical change:** Adopts decolonized framework, implying a deep research contextualization within historical and contemporary issues affecting indigenous communities. **Social consciousness:** Aims to develop strategies to reframe processes dominated by colonization processes which exacerbates social inequalities. **Outcome:** Demonstrates how reports/policies by official institutions privilege certain actors and countries instead of developing strategies recognizing the local context.	**4 / 4** **High**
9. McClymont Peace, D., & Myers, E. (2012). Community-based participatory process–climate change and health adaptation program for Northern First Nations and Inuit in Canada. *International journal of circumpolar health*, *71*(1), 18412.	Study identifies elements of participatory research which should be normatively included to study impacts of climate change on health. Study seeks to develop suitable tools for the local context in which these strategies will be applied. Research aimed to promote community action as well as strategies and policies that include indigenous knowledge to combat the impacts that climate change has on the health of Inuit communities.	**System Model:** Focuses on perceptions of Nunavut inhabitants about impacts that climate change has on their subsistence activities, culture, and well-being. **Outcome:** Promotes a multidisciplinary methodological approach to describe the social and environmental conditions of Inuit communities. Focuses not only on climate change and health, but on taking community approaches into consideration.	**2 / 4** **Low-Medium**

10. Archer, L., Ford, J. D., Pearce, T., Kowal, S., Gough, W. A., & Allurut, M. (2017). Longitudinal assessment of climate vulnerability: a case study from the Canadian Arctic. *Sustainability Science*, *12*(1), 15-29.	Presents a longitudinal assessment of climate change vulnerability, examining a case population in Ikpiarjuk, Canada. Focuses on risks of subsistence activities in indigenous communities. Research adopts a vulnerability approach, characterizing climate change in the context of socioeconomic drivers, such as marginalization, inequality, exploitation, and exclusion	**System Model:** Argues that changes in both environment and socioeconomic context have exacerbated risks in the subsistence activities of indigenous communities. **Outcome:** Adopts a new approach to go beyond traditional knowledge transmission, allowing a broad characterization of key trends and factors affecting exposure and adaptive capacity to changing climatic conditions.	**2 / 4** **Low-Medium**
11. Beaumier, M. C., Ford, J. D., & Tagalik, S. (2015). The food security of Inuit women in Arviat, Nunavut: the role of socio-economic factors and climate change. *Polar Record*, *51*(5), 550-559.	Explores how food insecurity has become a critical element of the human dimension of climate change, examining how socio-economic and cultural factors shape food security in the Arctic. Examines how food insecurity is connected to women's purchasing power and an emerging trend of hunters selling harvests to community instead of sharing.	**System Model and Historicity:** Analysis demonstrates that food insecurity is connected to numerous issues: poverty, inequality, addiction, and the high costs of hunting. **Outcome:** Focuses on importance of analysis in which gender is not considered a sectoral category, and that being an indigenous woman entails unique security threats and climatic impacts.	**3 / 4** **Moderate**

12. Pearce, T. D., Ford, J. D., Laidler, G. J., Smit, B., Duerden, F., Allarut, M., ... & Goose, A. (2009). Community collaboration and climate change research in the Canadian Arctic. *Polar Research*, *28*(1), 10-27.	Presents research derived from a collaboration between researchers, northern research institutes, and community partners. Community-research analyzes experiences and adaptive practices of northern communities to environmental and socio-cultural changes. Focuses on need to incorporate experiences of communities, as well as the social, economic, political and cultural environment in research to expand knowledge of climatic impacts on and in Inuit communities.	**System Model and Historicity:** Reports how experience of and capacity to face climate change varies within and between regions and communities with differing social, political, economic, and historical contexts. **Outcome:** Demands active collaboration with community members. Argues that developing a research project with an Arctic community is a shared process, evolving from mutual trust and understanding of the cultural context in which the research is being conducted.	**3 / 4** **Moderate**
13. Andrachuk, M., & Smit, B. (2012). Community-based vulnerability assessment of Tuktoyaktuk, NWT, Canada to environmental and socio-economic changes. *Regional Environmental Change*, *12*(4), 867-885.	Study characterizes vulnerability in the western Canadian Arctic (Tuktoyaktuk) in the context of ongoing socio-economic and environmental changes. Describes multiple impacts of climate change on Canadian arctic communities, specifically, how environmental changes have affected employment, municipal services, infrastructure, and the loss of traditional knowledge and practices.	**System Model:** Climate change is analyzed as a complex issue which impacts the economy, general well-being, culture, and social areas. **Outcome:** Research focuses on the participation of the local institutions and organizations in the design of the climatic policies.	**2 / 4** **Low-Medium**

14. Collings, P., Marten, M. G., Pearce, T., & Young, A. G. (2016). Country food sharing networks, household structure, and implications for understanding food insecurity in Arctic Canada. *Ecology of food and nutrition*, *55*(1), 30-49.	Examines the cultural context of food insecurity among Inuit in the Northwest territories. Focuses on how food access and is connected to household contexts. Article establishes that single woman households are more likely to experience food insecurity due to socially constructed gender roles. Presence of a male hunter in households is linked to greater access to country food, which is important to Inuit food security and cultural need.	**System Model:** Establishes that issues such as food insecurity, linked to environmental changes, are exacerbated by social constructed roles. **Outcome:** Research aims to construct a concept of security derived from correlations between social issues and cultural and environmental changes	**2 / 4** **Low-Medium**
15. Beaumier, M. C., & Ford, J. D. (2010). Food insecurity among Inuit women exacerbated by socio-economic stresses and climate change. *Canadian Journal of Public Health*, *101*(3), 196-201.	Study identifies and characterizes determinants of food insecurity among Inuit women via an in-depth case study from the community of Igloolik, Nunavut, focusing on how multiple stressors affect access, availability, and quality of food. Research connects food insecurity to social problems such as poverty and addiction, which contribute not only to food insecurity but to poor health.	**System Model and Historicity:** Shows how food security and status of Inuit is influenced by social, economic, political and environmental conditions and processes which interact over multiple spatial and historical scales. **Outcome:** Focuses on consideration of gender as a transversal category. Recognizes that being women and indigenous entails greater likelihood of food insecurity.	**3 / 4** **Moderate**

16. Pearce, T., Smit, B., Duerden, F., Ford, J. D., Goose, A., & Kataoyak, F. (2010). Inuit vulnerability and adaptive capacity to climate change in Ulukhaktok, Northwest Territories, Canada. *Polar Record*, *46*(2), 157-177.	Article documents and describes exposure sensitivity to climate change and the adaptive strategies employed in the community of Ulukhaktok, Northwest Territories. Highlights need to include experiences of local communities in research to ensure relevance for Arctic communities adapting to environmental changes.	**System Model:** Demonstrates that socio-economic factors, such as financial access, time limitations, and changes in traditional knowledge among young people are affecting the capacity to face environmental changes. **Historicity:** Argues that assessments of community vulnerability to climate change require knowledge of and past experiences with climate conditions.	**2 / 4** **Low-Medium**
17. Laidler, G. J., Ford, J. D., Gough, W. A., Ikummaq, T., Gagnon, A. S., Kowal, S., ... & Irngaut, C. (2009). Travelling and hunting in a changing Arctic: assessing Inuit vulnerability to sea ice change in Igloolik, Nunavut. *Climatic change*, *94*(3-4), 363-397.	Connects local vulnerability to environmental changes experienced in the Inuit community of Igloolik, Nunavut. Attempts to identify who is vulnerable, to what stressors, and reasons that explain this vulnerability. Research includes a vulnerability perspective that explores climate change in the context of socio-economic drivers such as marginalization, inequality and exclusion	**System Model:** Argues that capacity to face climate change in Nunavut is both enabled and constrained by social, economic, and cultural factors. **Historicity:** Said factors emerge from the erosion of traditional and historical knowledge, and abilities/skills that have been passed down through generations of Inuit.	**2 / 4** **Low-Medium**

18. Crowley, P. (2011). Interpreting 'dangerous' in the United Nations framework convention on climate change and the human rights of Inuit. *Regional Environmental Change*, *11*(1), 265-274.	Argues environmental changes have fundamentally altered the Inuit way of life, and that changes to means of subsistence, property, and cultural heritage could constitute human rights violations. Research uses targets set by the United Nations Framework as a tool to analyze vulnerability and proposing strategies to face climate change and to consider the impacts of climate change on Inuit communities as a human right violation.	**System Model:** The mentioned targets have a global nature and do not take into consideration the particularities, and geographical context of Inuit communities, imposing responsibilities in a general way without considering gender, class or race as factors that imply differences in capacity to face climate change. However, despite the article not taking into consideration these particularities, it focuses on the impacts that climate change has in particular on Innuit human rights focusing on the concept of human security in which climate change threats are exacerbated by socio-economic processes.	**1 / 4** **Low**
19. Rapinski, M., Payette, F., Sonnentag, O., Herrmann, T. M., Royer, M. J. S., Cuerrier, A., ... & Guanish, G. (2018). Listening to Inuit and Naskapi peoples in the eastern Canadian Subarctic: a quantitative comparison of local observations with gridded climate data. *Regional environmental change*, *18*(1), 189-203.	Focuses on how environmental changes affect subsistence activities in Inuit communities in the eastern Canadian Subarctic. Employs a quantitative approach to compare the observations made by Inuit in the northern communities of Canada and to see the level of agreement between them. However, the article does not reflect on the multiple processes that exacerbate the impacts of climate change on Inuit communities and the reasons why they generate different impacts within communities. There is a lack of interaction between the social, biophysical and technological factors (among others) in the analysis, or as described in this article, the System Model.	**Non-presence.**	**0 / 4** **No Presence**

20. Ford, J. D., Bolton, K., Shirley, J., Pearce, T., Tremblay, M., & Westlake, M. (2012). Mapping human dimensions of climate change research in the Canadian Arctic. *Ambio*, *41*(8), 808-822.	Presents systematic review of mapping current research trends on human dimensions of climate change in the eastern and central Canadian Arctic. Scope is in analyzing the impacts of climate change on communities and understand how impacts might play out elsewhere. Results suggest there is a lack of analysis on socio-economic and ecological implications of adaptive strategies and their long-term viability and cost, given multiple stressors and competing policy priorities.	**System Model:** Highlights necessity for research to address how processes operating on multiple scales affect vulnerability and constrain or enable adaptation.	**1 / 4** **Low**
21. Ford, J. D., Bolton, K. C., Shirley, J., Pearce, T., Tremblay, M., & Westlake, M. (2012). Research on the human dimensions of climate change in Nunavut, Nunavik, and Nunatsiavut: a literature review and gap analysis. *Arctic*, 289-304.	Analyzes interaction of future environmental and socioeconomic changes, and how they affect experiences of and responses to climate change. Focuses on discussing the widest determinants of vulnerability and adaptation of the communities of Nunavut, Nunavik, and Nunatsiavut.	**System Model:** Reports gap in literature in identifying socioeconomic determinants that shape vulnerability and capacity to face environmental changes. **Outcome:** Focuses on developing more comprehensive knowledge based on local studies in which local inhabitants could lead future research.	**2 / 4** **Low-Medium**

22. Rodon, T., & Schott, S. (2014). Towards a sustainable future for Nunavik. *Polar Record*, *50*(3), 260-276.	Assesses existing socio-economic and living condition data to evaluate social well-being in Nunavik. Scope of research is to discuss possible sustainable development directions for Nunavik. Focuses on proposals to develop a transitional period in which extractive activities can coexist with subsistence activities which are essential for the Inuit culture and identity.	**Non-presence.**	**0 / 4** **No Presence**
23. Lambden, J., Receveur, O., & Kuhnlein, H. V. (2007). Traditional food attributes must be included in studies of food security in the Canadian Arctic. *International Journal of Circumpolar Health*, *66*(4), 308-319.	Focuses on how food insecurity is contingent upon access to certain foods. Results show how traditional food has many meaningful attributes that contribute to the health and cultural life of Arctic indigenous people.	**Non-presence.**	**0 / 4** **No Presence**

24. Pearce, T., Ford, J., Willox, A. C., & Smit, B. (2015). Inuit traditional ecological knowledge (TEK), subsistence hunting and adaptation to climate change in the Canadian Arctic. *Arctic*, 233-245.	Focuses on necessity for approaches where Inuit communities can exercise leadership in research. Addresses importance of adopting traditional ecological knowledge (TEK) and designing climate strategies for and by Inuit.	**System Model:** Physical and socio-economic changes are exacerbating challenges in the capacity of Inuit to practice cultural and economic activities. **Historicity:** Historical and colonial legacies influence relationships between communities and the government, and shape Inuit capacity to face environmental changes. **Outcome:** Argues that the role of TEK is not recognized in most adaptation policy processes. Argues for the necessity to stop using western paradigms to analyze the climate change's impacts on Inuit communities.	**3 / 4** **Moderate**

Enhancing Arctic Creative Business and Learning through Cross-border Collaboration—Designing the Creative Steps 2.0 Authentic Learning Environment

Anitra Arkko-Saukkonen, Anzelika Krastina & Satu Miettinen

Arctic companies are located in rural and sparsely populated areas where long distances are a common feature. Innovations and development collaboration could offer Arctic companies the possibility to widen their potential business. Digitalisation can enable companies to expand their operations and collaborations in a sustainable way. The University of Applied Sciences should take responsibility for the mutual research, development and innovation activities of companies and students, where integration of collaborative work can benefit development of companies and simultaneously provide learning opportunities for students. Such integration responds to changes in society in terms of education and regional development.

In the area of design research, we present how Creative Steps 2.0 has been redeveloped into an authentic learning environment where Arctic creative business is matched with another business and where students provide innovation and development assistance for companies in cross-border collaboration. We looked at the functionality of an authentic learning environment and the benefits for companies. Authentic learning is the framework for the study and has a strong impact on strengthening working life skills. In the development phase, companies brought perspectives to support the development of the authentic learning environment through co-design. The data were collected with a mixed methods approach and analysed with a formative and content analysis.

Participation brought the benefits from perspectives, creating a network and ideas that could later be used. However, the final concept was not notable, and companies were critical of the outcomes. The importance of the international network was the most significant factor among the companies.

Introduction

The Arctic region has many notable features: its fragile environment, cold climate, sparsely populated areas, isolated communities, long distances, and limited infrastructure. It also experiences the direct effects of climate change, so there is a pressing need to create sustainable change that can meet the challenges of the region (Arctic Center, 2020). The Arctic region requirements are reflected in the operating environment for businesses and also in the development of education, which must respond to changes in the region.

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The Lapland University Consortium (LUC) relies on Arctic global responsibility in its operations in an effort to support and develop the region's operating conditions and expertise. Lapland University of Applied Sciences (LaplandUAS), as a part of LUC, contributes to working life and regional development (Lapland UAS, 2020) through R&D activities while also playing a key role in providing professional higher education in Lapland. The development of education encourages global responsibility and, at the same time, distance management, not only regionally but also internationally. According to Heikkinen and Kukkonen (2019: 272), the University of Applied Sciences (UAS) produces an 'understanding of working life, society, at the same time one should and desire to make things better' and does not leave regional development activities too narrow a sector but instead engages responsible solutions. Although economically dominated by extracting and heavy industries, there is increasing interest in economic diversification in the Arctic. To change the economic activity structure into one that is more resilient to current climate changes in the Arctic and ensure sustainable development in the region, one solution may be an increased capacity for innovation, entrepreneurship, and creative thinking.

Digitalisation has brought opportunities for Arctic actors to operate in the global world. Through communication and interaction, the operating environment has expanded across national borders (Fidler, 2016: 7). Indeed, globalisation has been redefined through digital infrastructure (Raspotnik & Steinicke, 2017). Here, the activities of higher education institutions, along with companies and the online interactions of companies, can enable the development of products and services when the common space of activities is organised online. Education must formulate forms of action to support innovation and development work through online interaction.

Authentic learning (AL) can create a link between the development of working life skills and the challenges arising from working life, where learning and collaboration are at the centre. Lombardi (2007: 10) has noted, 'Authentic learning may be more important than ever in a rapidly changing world, where the half-life of information is short and individuals can expect to progress through multiple careers.' The nature of changing work and changes in society requires training to develop learning and collaboration solutions and thus competences for lifelong learning in relation to needs (D2L, 2018). Hussin (2018) shows that through Education 4.0, education can be involved in changing the environment by building new creative learning solutions that help meet the needs of society and the Industrial Revolution 4.0 (Fisk, 2017). In addition to personal flexibility, the skills required for teamwork and increasing internationality are made possible through collaborative networking, which can be practised through joint projects and complex world situations that require problem solving and 'transversal skills' (Fidler, 2016: 4-14; World Economic Forum, 2016: 10).

The practical development work related to our research and education in general is based on this framework of the operating environment of the Arctic region, its changing society, and the related development needs. Here, the background is the EU-funded Creative Momentum project (2015-2018), which has supported creative companies through internationalisation, networking, and competence development (MyCreativeEdge, 2020). The Creative Momentum project targeted creative entrepreneurs in the Arctic and northern periphery, for whom the project aimed to support internationalisation and business opportunities.

The current study is based on design research (DR), and we follow the iterative nature typical of design research (McKenney & Reeves, 2019; Plomp, 2010; Nieveen, 2010). In fact, DR is often

used as a method for developing complex problems in education. Therefore, it is a natural way to approach our subject, and the various phases of development work play a significant role. The phases are elaborated in detail in the study, which helps to create a picture of the entire development process. This study is part of a broader design research that iteratively develops an authentic learning environment. The first Creative Steps (CS) pilot has been reported previously, and its results serve as a starting point for this development work (Arkko-Saukkonen, 2017; Arkko-Saukkonen & Merivirta, 2013). In the present article, the development work focuses on the second iteration of DR. In the current study, an authentic learning environment (AuLE) is designed as a Creative Steps 2.0 (CS2.0) model. We test it among Arctic creative entrepreneurs and students during innovative development work, in which companies develop a common product or service. Finally, we map out the benefits for entrepreneurs during cross-border collaboration and highlight the identified areas for development through the companies' experiences.

The theoretical basis for the current study has been built in previous research (Arkko-Saukkonen, 2017); here, we focus on the framework for authentic learning (AL) (Herrington, Oliver & Reeves, 2010). The identifiable features of AL are based on real-life complex tasks that can be solved collaboratively, multi-disciplinarily, and multiculturally (Herrington et al., 2010; Leppisaari et al., 2011; Teräs & Herrington, 2014) and in which the importance of 'high-level thinking' and 'analysis' is emphasised (Lombardi, 2007). Real-life conditions offer good opportunities to transfer skills to working life smoothly (Kartoglu et al., 2017). An online solution built through authenticity also produces an effective way of learning (Parker, Maor & Herrington, 2013).

It seems that DR provides a good approach, especially for the development of innovative technology-based educational solutions (Herrington et al., 2010; Parker 2011; Korhonen, Ruhalahti, & Veermans, 2019). The focus of the current study is on companies because the benefits for companies often receive less attention in work-based learning when designing solutions. Indeed, our research fills that gap by designing an AuLE, in which, in addition to students, companies play an active role. This is done by utilising co-design in development work (Sanders & Stappers, 2008), which involves companies bringing perspectives to AuLE development.

The research is based on a socio-constructivist conception of learning, with an emphasis on social interaction among community members. The observation of an individual's reality takes place holistically through a sociocultural frame of reference, in which knowledge and skills are shaped according to the picture of the times (Siljander, 2014: 232). When considering the development of AuLE, collaborative interaction plays an important role in the joint activities of various participants including companies, students, and external experts. Lave and Wenger (1991) present the idea of a 'community of practice', in which learning takes place between the individual and the community and the individual takes on an active role in the community as his or her competence grows.

In the current article, the following research questions guided the review and analysis of content according to the phases of DR:

1. Which design points could be identified from the companies, through co-design, that can be used to develop the CS2.0 authentic learning environment?
2. How can the developed CS2.0 be further developed and refined to support Arctic companies?
3. What benefits do the companies receive during implementation, and what are the identified challenges?

Exploration of theoretical framework

Authentic learning environment

A learning environment (LE) can be broadly understood as any resource that includes physical or virtual spaces, functions, or interactive processes that contribute to learning. An LE offers an alternative to traditional teacher-led learning (Helakorpi, 2017). The LE of the UAS, which is implemented in the context of RDI activities by integrating teaching into working life cooperation, is called an integrative LE, which is characterised by exploratory and developmental learning, 'learning by developing' (Komonen, 2007; Poikela, 2009; Fränti & Pirinen, 2005). During creative development activities, doing becomes the core of collaboration. In the case of an LE that supports creative activity, it is necessary to decide on the key features that will move the joint work and learning in the RDI activities forward, especially when working internationally on a development task, as is the case with our research. Huang (2020: 10) points out that 'a positive, attractive and supportive environment' should be created to inspire creativity.

Online solutions provide an alternative way to conduct interactive learning. It should be noted that interaction is an essential component of any LE (Woo & Reeves, 2007). Web 2.0 and social media platforms have also been used as LEs (El Mhouti et al., 2016). Engeström (2009) focuses on 'learning activities', which are 'socio-cognitive processes and states', pointing out that for community learning, action can be conveyed through new tools and brands, in which digital technology can play a significant role. Mäkelä et al. (2014) see the LE as a psychosocial and physical environment whose characteristics are divided into three dimensions, including 'general well-being, learning situation and learning tools and spaces'. An earlier study found that network collaboration requires flexibility and patience because technical challenges often make joint operations more difficult (Arkko-Saukkonen, 2017).

In the current research, the AuLE is built on a multilevel model, at the core of which is an action-guiding method through which new creative thinking is pursued through collaborative online interaction. In this case, the LE is understood as a process-like AuLE and named the Creative Steps 2.0 model (CS2.0). It relies on the AL framework. The companies are provided a development environment during the collaboration. The aim is to innovatively develop new product and service concepts common to the two companies through innovation activities while the participants practice their working life skills using a step-by-step method that supports creative activities. Helakorpi (2017) sees an LE's network solutions in two directions, product-centric and process-centric, where the construction of community and interactive knowledge takes place during learning-supporting processes. A process focus resonates with the model that is being developed in the present study.

The elements of authentic learning presented by Herrington et al. (2010) are suggested as a basis for planning, focusing here on targeting the shape of the LE as a place to support AL for students. Herrington et al. (2010) emphasise that true AL is possible by considering all nine AL elements:

1. *Authentic context*
2. *Authentic tasks*
3. *Access to experts and the modeling of the process*
4. *Multiple roles and perspectives*

5. Collaborative construction of knowledge

6. Reflection

7. Articulation

8. Coaching and scaffolding

9. Authentic assessment

Our research in AuLE design relies on all key elements of AL in the context of development. From the perspective of the involvement of entrepreneurs, special attention is paid to the context of learning and the tasks that guide what is done during the process. In addition, collaborative work, which takes place through reflection and social interaction, becomes a key driving factor in terms of leading an activity toward a goal-oriented outcome and its evaluation. According to Kartoglu et al. (2017: 2250), 'decision-making, improved contingency planning, increased self-confidence and trust in one's ability to perform new tasks, as well as a strengthened professional identity' were strengthened through authentic action. Hence, AL clearly supports general working life skills.

It is hoped that learning will take place not only for students but also for entrepreneurs by adopting learning into the practical everyday life of their own business. For creative entrepreneurs, social capital can increase through 'learning by doing', in addition to 'learning from others', which Murtagh and Collins (2017) have observed by interviewing creative entrepreneurs; they highlight the fact that 'social capital' cannot be forgotten if efforts are made 'to facilitate the growth of creative capital in support of creative entrepreneurship' (Murtagh & Collins, 2017). The context and authentic tasks of the activity, general opportunities for action and potential challenges or obstacles should be mapped out in collaborative work based on the needs of the employees' working life to prepare to overcome difficult situations.

Collaborative act of creativity by co-design

A collaborative approach in design has become mainstream in recent decades. The idea of collaboration is tied to the notion of working together for a joint or common goal and achieving more together than on one's own. This may be a co-creative activity, which can refer to any collaborative act of creativity. When cocreation is discussed in the context of business, marketing, and the creation of experiences, Prahalad and Ramaswamy (2002, 2004) are usually mentioned. They discuss the fact that the inclusion of people can help in discovering and identifying unique value offerings. Designers and any user or stakeholder can also collaborate to promote design work. Sanders and Stappers (2008) present a classical image, 'new landscapes of design', which positions various design approaches in relation to users as design partners and users as objects. The trend has been to share power with the users and collaborate with them during the design process to better identify their needs in an everyday use context.

Service design builds on this collaboration with users and stakeholders and the interactions among them; it embeds the human-centred approach, focusing on institutional structures and how service offerings are organised through service journeys. This is called the outside–in approach, in which the organisation is forced to consider how their services appear from the user's point of view. Service design can be used in the context of education in various ways: it can help in curriculum

development (Kuzmina et al., 2012) and the development of learning networks (Carvalho & Goodyear, 2018).

In our study, we identified a large number of design challenges in which the development of an LE must take into account not only learning but also the companies and joint product and service development. Herrington et al. (2010) recommend DR as a strategic choice for the development of AL, specifically in support of AL key research problems arising from a complex field of education, through step-by-step progression.

Analysis of a practical problem and previous model

Background of the Arctic region and education needs

Educational institutions must play a central role in boosting innovation and entrepreneurship competence to ensure prosperous, sustainable Arctic community development. According to Drucker (2015: 25), 'innovation is a specific tool of entrepreneurs and is the means by which they exploit change as an opportunity for value creation'. To diversify the economic structure and create a sustainable future, there is a need to create incentives for more systematic entrepreneurship. An educational institution that plays the role of an enabler of innovative mindsets must also approach the problem from an angle that is different from that of the traditional method of academic training. The most important factor is to provide a form of training that meets the specific needs of a region, such as the Arctic region.

The AuLE creation of CS2.0 at Lapland UAS was a response to a described need to boost existing and emerging entrepreneurship through more efficient innovation training that would serve multiple goals, including the integration of real-life situations in the classroom by connecting students and entrepreneurs. Further, this training would help entrepreneurs, especially small businesses, innovate their businesses through a systematic step-by-step approach and input from the students involved and bring the collaboration into a digital mode that would enable collaboration across the borders in a sustainable manner.

The first prototype of the Creative Steps (CS) model was developed and iterated in the context of the Creative Edge project (2013). The first prototype of the CS model was designed to support companies' innovative development work, focusing on students' ability to develop skills and help them network with international actors as future experts. The focus was on students and strengthening their competence (Arkko-Saukkonen & Merivirta, 2013; Creative Edge, 2013). Previous research results show that the CS model is a functional environment that supports joint innovation, enabling the transfer of knowledge and technology between participants through online interactive collaboration. The results of the first iteration of CS highlighted the need to focus on improving online interaction and allowing freer choices in the use of online tools; the role of the companies should be further strengthened (Arkko-Saukkonen, 2017).

In the second iteration, the focus of the CS2.0 model shifted to supporting businesses and, at the same time, strengthening student learning through authenticity. McKenney and Reeves (2019: 99) point out that in educational development work, the research orientation phase and planning take into account what do we want to know about the problem, the context, and stakeholder needs. Because the focus and objectives clearly changed, a new prototype had to be designed, the development phases of which, from the co-design to a new prototype, will be presented below.

Design research as an approach to designing an authentic learning environment

The current study was carried out in accordance with the operating principles of DR (McKenney & Reeves, 2019; Plomp, 2010; Nieveen, 2010). The data consist of qualitative and quantitative data, but the emphasis is on the qualitative data, which was supplemented by the quantitative data. The study follows the structure of DR: analysis/exploration, design/construction, evaluation/reflection, and finally, intervention/theoretical understanding (McKenney & Reeves, 2019: 83). The last phase usually takes place after an understanding can be produced by all the iterations. Oliver, Herrington, Herrington, and Reeves (2007: 18) point out that high-level research can be seen in learning design when the process description is performed by accurately pointing out the parts of the activity, and Falconer et al. (2007: 4) use the phrase 'in the form of a runnable description'. Therefore, the development of the AuLE presented in the current article is described in phases.

Design research is iterative in nature and known by several names, such as design-based research, development research, and design experiments (van den Akker, 1999), and the DR family includes educational DR (McKenney & Reeves, 2019), which describes the approach to education in more detail. In our research, we adhere to the concept of DR. This approach is characterised by the development of a practical object in a collaboration between researchers and participants. It is known as 'a twofold yield' because its central feature promotes practical development, along with the development of theory (McKenney & Reeves, 2019; Plomp & Nieveen, 2013).

This DR strategy was considered appropriate to guide this particular research context primarily because there was 'a complex educational problem' that had to be addressed in a way that would have potential for high-level 'practical impact and relevance' (Plomp, 2010; Anderson & Shattuck, 2012). Similarly, Kelly (2010) points out that this type of research method is appropriate when 'open, or more appropriately, wicked problems' are at hand. In our study, we identified a large number of design challenges in that the development of an LE must take into account not only learning but companies that encounter joint product and service development (Figure 1).

Figure 1. Conducting the second iteration of the development of the Creative Steps 2.0 by design research

Conducting the study

As with DR, the development and testing phase is presented in the order in which the development work progressed, describing the context, participants, and data collected, as well as the results in connection with the various phases. Research questions are raised in connection with the development phase. The first two authors of the article acted as developers and, during the implementations, as coaches. The third author brought expertise to underpin the co-design experience. The first author was responsible for collecting and analysing the material. The second author went through the analysed material and made observations to correct the analysis. In connection with the collection of data, the participants were asked for permission to develop and research the method in accordance with ethical principles.

Co-designing with Arctic companies

Analysis and findings from co-designing phase

By answering the research question – *Which design points could be identified from the companies through co-design, and which are used to develop the Creative Steps 2.0 authentic learning environment?* According to Plomp (2010: 26), a formative analysis should analyse the various phases of DR and state the functionality of the planned content in its context, thus evaluating the whole from the perspective of the target group.

In the co-design phase, entrepreneurs were considered one of the target groups, and companies in the creative field were invited to the co-design workshop in Lapland, Finland. Fourteen (n=14) participants from different sectors of the creative industry were involved in the workshop taking place at the Lapland UAS Rovaniemi campus in Spring 2016. Images and visual material from the work of the co-design workshop were collected during the joint work. A formative analysis was used. Design action points were identified for development work, through which a model of an AuLE was developed. This material reflects the needs and perspectives of companies.

The 'FiveStars' tool, developed for the co-design workshop, sought the views of companies on key issues for development (Table 1) (Arkko-Saukkonen & Krastina, 2016: 16-21). In addition, a 'journey map' was sketched to describe the step-by-step model that guided the activity; entrepreneurs had the opportunity to bring visual perspectives to areas that disappeared as important steps in the company's creative development activities.

Table 1. Business perspectives were discovered from the 'FiveStars' themes.

The co-design workshop provided an understanding of companies' attitudes and perspectives for interactive collaboration and action aimed at an AuLE (Image 1). All five aspects of the 'FiveStars' tool were important. As a result and as a guide for further development, the most important observation was that the challenges of creative entrepreneurs vary greatly, depending on the type of company in question, because there were several types of creative companies involved.

Image 1. An example of the collected material to be analysed.

The opportunity for interaction and co-design must be created through versatile methods and easy-to-use online tools that support the work (Figure 2). It is important for companies to be involved in interaction and joint work because the results showed that entrepreneurs were interested in participating in several steps of the creative process, which they marked on the 'journey map' that described the process.

Figure 2. Design action points show the results of the co-design workshop.

Designing and constructing the prototype of the Creative Steps 2.0 model

Analysis and findings from developing the authentic learning environment model

By answering the research question - *How can the developed CS2.0 be further developed and refined to support Arctic companies?* - the AuLE was designed by relying on authenticity at each level of activity, as

presented by Reeves et al. (2002). Through a step-by-step method, the process activity was guided (Figure 3) by taking the task that requires creative work and developing it step-by-step toward the end result (Arkko-Saukkonen & Krastina, 2018).

Figure 3. Step-by-step methodology in the Creative Steps 2.0

In the redesigned AuLE of CS2.0, all the elements attached to it adhere to authenticity and assimilate to real-life complex tasks, and collaborative interaction takes place internationally between students and companies, here based on the support of external experts. Interaction with working life and the promotion of the creative process are made possible with the support of coaches. The reformulated CS2.0 model of the AuLE can be seen as clearly aligning with the elements of AL presented by Herrington et al. (2010) (Table 2).

Creative Steps 2.0 authentic learning environments' action steps in relation to authentic learning elements		
	Step-by-step methodology in the Creative Steps 2.0 *(Arkko-Saukkonen & Krastina, 2018)* **Step 0:** Framework of a business case **Step 1:** Identifying the business case **Step 2:** Enabling online tools **Step 3:** Understanding the business case **Step 4:** Formulating a potential business idea **Step 5:** Idea evaluation checkpoint **Step 6:** Enhancing business expertise **Step 7:** Creative clinc **Step 8:** Business idea prototyping **Step 9:** Proving market demand **Steps 10:** Pitching	**Authentic learning elements** *(Herrington et al., 2010)* 1. Authentic context 2. Authentic tasks 3. Access to expert and the modeling of the process 4. Multiple roles and perspectives 5. Collaborative construction of knowledge 6. Reflection 7. Articulation 8. Coaching and scaffolding 9. Authentic assessment
STEP 0	Authenticity is taking place immediately upon starting work. The assignment is ill-defined and is built at the beginning of the work from a framework that comes from the interaction between companies and students using a 10-question method. This is created together with the first step of the step-by-step method (step 0), where the first encounter between students and entrepreneurs takes place. • Creative teams are formed with two companies and students. • Interactive activities are needed to start work, creating a basis for all the work, • The joint mandate is built through interaction and dialogue as a framework. • The development needs and field of activity of both companies are taken into account in the framework.	⇒ in relation to authentic learning elements 1-5
STEPS 1-10	Based on the information received, the students can structure a joint assignment (step 1) for the two businesses, which is accepted by the businesses. Online work is made possible by guiding collaborative tools and online working principles to the participants (step 3). The subtasks placed in the different steps (steps 2–7) guide the process towards the prototype to be built from the creative activity (step 8), moving towards validation (step 9) and the final concept (step 10). • The whole process requires interaction, collaborative action via the web and the use of online tools, but at the same time, it also requires independent information retrieval and structuring. • Learning is made possible in interaction situations. • Learning is also taken to other spaces and expanded thinking in alternative ways (step 6), for example, events, seminars, content from the Internet, through various sources and videos, or through other self-selected sources of information. • The 'Creative Clinic' is one learning space (step 7) where external experts can spar and comment on the intermediate stage of the work.	⇒ in relation to authentic learning elements 1, 2, 3, 5

STEPS 0-10	Students practice their professional skills by taking on an expert role in a multidisciplinary team and bring their own strengths to the group while learning from others. • The stages of the work follow the process of developing working life, including the ideation tools and methods used in working life to promote the creative process. • Participants are offered the opportunity to take over the methods and online tools of the creative process. • Participants gain experience in collaborative work, managing online work and international activities.	⇒ in relation to authentic learning elements 1-7
STEPS 0-10	Working with companies opens up a view of the business world and helps the participants practice not only interaction skills, but also entrepreneurial skills, helping them understand the requirements of entrepreneurship. • Working with companies also enables the students' knowledge to be brought to the fore and the opportunity to network. • Through participation, companies are given the opportunity to learn and receive support from coaches, as well as perspectives from students and the various experts involved. • Companies are offered the opportunity to network with companies in the international creative industry and with students.	⇒ in relation to authentic learning elements 1-5, 8-9

Table 2. Authentic learning environments' action steps in relation to authentic learning elements (Herrington et al., 2010).

The AuLE structure appears as a process-centered LE, as described by Helakorpi (2017). Its elements form a combination of a process that includes participants (students, entrepreneurs, and experts), online interaction, creative and innovative methods and tools, internationality, learning spaces, a creative clinic, and a core that is a step-by-step method supporting and guiding creative learning, leading to a finished concept through collaborative work (Figure 4). The virtual work was taken into account by placing it into its own step (3), which ensures that online tools can be trained, guided, and networked to enable international interaction with the team.

Figure 4. Creative Steps 2.0 model development and levels of the authentic learning environment.

The LE that was shaped through the theoretical framework, development needs, and co-design focused on the desired benefits for the participants (Figure 5), which were identified and analysed through the results from the entrepreneurs' perspective. The aim was to provide entrepreneurs with an international development environment and collaborative work with an international company, through which the possibility for networking was created. A group of students devised a new product or service with companies. Because of international activities, the work was organised in online interaction, and the process was guided by coaches. In addition, external experts from various sectors aided in the work.

Figure 5. The desired benefits for the companies.

Result—Benefits for companies

Creative Steps 2.0 workshop context and participants

The AuLE was used during a 10-day innovation workshop called Creative Steps 2.0, and the implementation took place in 2016. The implementation was organised by Lapland UAS. The companies participated in the process only online. The students also worked part of the time in the same space. The nature of the online work was blended learning[1] based on online interaction. Students were given the opportunity to develop their skills in a creative process during the development of companies' innovative products and services. The idea was to train students' entrepreneurial thinking and innovation skills using a future development task from companies in international, multidisciplinary cooperation with entrepreneurs.

From the Arctic region, four creative companies from Lapland, Finland, were selected from the target group of the CM project, for which international business pairs were matched from the project partner countries: Sweden, Ireland, and Northern Ireland. A total of eight companies were selected for implementation. The creative companies involved were small companies, mainly one-person-enterprises, and the participants in the study and, thus, the respondents were entrepreneurs. Fifteen students participated in the implementation, so the entrepreneurs and students formed a total of four creative teams. In the current article, attention is focused on the companies in the analysis of the material.

Data

In addition to qualitative data, we utilised quantitative data in our research, especially when the entrepreneurs evaluated the final concept as the end result of the workshop. The emphasis was placed on a qualitative analysis. At the end of the implementation, the benefits for the entrepreneurs were collected with a pre-themed online survey tool (Google Forms), which consisted mainly of semi-structured or closed questions. The total number of responses was n = 6/8. The material was read several times to see if new categories were formed, after which the material was systematically analysed using content analysis and coded into new categories. The main aspect of the development of the LE was to understand the companies' experiences, what benefits they have experienced through participation, and what challenges emerged that can be identified as targets for further development. The aim of the survey was to understand the success of the implementation, which Herrington et al. (2010) define, from the perspective of DR, as important for the development of practical implementation. The study did not pay attention to differences in the responses of different countries but to the experiences of the participants in general. The questions were targeted in such a way that the benefits could be interpreted from different points of view through a content analysis, such as: *how important…, how did the company benefit…, the success of…, relevant/beneficial…, be interested to continue…, How innovative was the idea?*

Companies were asked to evaluate the outcome and its effectiveness by using the evaluation criteria and, thus, how innovative the idea and outcome were, rating this poor, fair, good, very good, or excellent (1–5). Evaluation criteria was derived from Innomaratos's concept and utilised in the previous CS iteration (Arkko-Saukkonen, 2017; Valli, 2007).

Analysis of companies' experiences and findings regarding benefits for companies

By answering the research question - *What benefits did the companies receive during implementation, and what are the identified challenges?* Through creative work, the benefits experienced by the companies were compiled into the map (Figure 6), which shows the perspectives based on the responses and will be discussed in more detail below.

Figure 6. Companies' benefits described in the categories.

At the level of continuity:

Continuity was divided into the continuation of the cooperation between the companies, potential cooperation with the students, the further development of the concept, and the possibilities for implementation that emerged from the material.

With the pairs of companies:

One pair of companies built a collaboration, expanded their networks, and created a team-designed concept that modelled a concrete service. It was taken for practical testing. As a result, collaboration continues between these two companies and also through a concept produced in an AuLE. The remainder of the participating companies were wary of opportunities for cooperation, and several mentioned that it was too early to say whether cooperation would continue.

> *B4: "We have 2-3 ideas we will discuss further. In order to benefit from each other in terms of marketing"*

With the students:

The two entrepreneurs increased the odds of continuing the collaboration if there was some suitable, concrete way of doing so. One of the companies gave no answer. However, the collaboration of one team was fruitful and created a further opportunity to for a student to work as an assistant. In addition, through one answer, the entrepreneur highlighted how impressed she was with the student's work and the time students invest in the work, but she also wondered whether the entrepreneur's needs matched the student's future goals.

> *B1: "It was innovative, however I think of the result as something that could work theoretically, but to make it work in reality, a lot more needed to be invested (time, energy, money)."*

With the concept:

The concepts implemented during the creative innovation process were critically examined by the companies, and the results were viewed with scepticism by each company, with a view to the future. The average of the evaluations was between fair and good (Figure 7).

Figure 7.

The companies' evaluation of the outcome.

Opportunities were found in the concepts, but the entrepreneurs said they needed to consider realistic perspectives. It takes time, money, and resources for small entrepreneurs to further develop the concept and take it to implementation.

For the personal level:

One entrepreneur was enthusiastic about the experience of participating and felt that her business had added value because new opportunities opened up with the help of another entrepreneur. Companies in the creative sector are mainly small businesses and often run by one person, which is why there was no time to develop or build networks because daily routines filled the everyday life of the companies. One entrepreneur summarised as follows:

> *B6: "It's hugely beneficial. For me as a sole trader, it is easy to get bogged down in the day-to-day running of the business. This process made me stop, think and look at my business in a whole new way - through the eyes of the students and the other businesses. I found that following the presentations I was really buoyed up and enthusiastic about my business again - it reinvigorated me." – "It was fantastic. I have been raving about the process ever since, recommending it to fellow craft businesses. It has also given me a personal boost and inspired me to really grasp the opportunities presented in the coming months"*

For the company level:

Each company mentioned that it had benefited from the experience, at least to some extent, although the concept was evaluated very critically from the point of view of further development. Through the results, collaboration on this issue brought new ideas and future directions. Similarly, the two companies felt that the collaboration broadened their perspective on how they saw their own company as part of the creative industry.

One entrepreneur pointed out that at this stage, he could not yet name the benefits of participation, but ideas arose that could be followed up on at a later stage. During the creative process in an AuLE, one real concrete benefit emerged for a creative team. The students, together with their entrepreneurial couple, were able to develop a concrete service that was later implemented and was also attended by one student of the team as an assistant. However, in assessing the benefits of implementation-style collaboration, one entrepreneur highlighted the fact that in terms of design, it is appropriate to process the lessons learned, analyse, and rethink to determine the real requirements of the market.

> *B4: "But maybe a little more down to earth and cost analytical elements should be included. And the market's need and desire for the new product, it is in real life?"*

There was also the idea that the entrepreneur himself did not experience learning something new but saw an implementation like this as benefitting the students more than the companies.

> *B5: "it was perhaps more so for the students, however it did lead to some concrete stuff to work with."*

For the network and collaboration level:

The feedback survey examined the importance of the international network. Based on the results, one company felt that the international network was secondary and not a topical issue for his company, mentioning that certainly, all national and international connections bring new opportunities for the company. The remainder of the entrepreneurs described the international network as important or very important. The two companies expressed their willingness to expand their international customer base. One mentioned that operating via the Internet is not location dependent, especially when the company is a digital company. One entrepreneur saw the interaction created in the collaboration as bringing a wider network through opening up new opportunities, as well as inspiration and ideas that open up a cultural perspective.

> *B6: "It is a source of inspiration, encouragement and new ideas. Cross pollination of creativity. ---- It makes you realise that although you're from different cultures and different countries, the common thread is the love of what we are making, the creative process. Building on this link now --- Without this international network I could not have done this."*

The challenges in online interaction were technical problems and difficulties in logging onto a platform, as well as the need for guidance for companies. However, one of the participants mentioned finding an alternative solution. She drew attention to basic teamwork practices that would take into account the presence of other participants and would be important to show who is talking in the online interaction. Time was limited for some entrepreneurs, so they had to be away from appointments, or they were in a place where the network connection did not work smoothly.

Through the collaboration, new acquaintances emerged, via which cooperation could occur in the future. The implementation process was said to be a new way of working. Another entrepreneur appreciated the students' time commitment to brainstorming. The creative process appeared in a form in which one could learn, analyse and rethink the issue at hand.

Discussion and conclusion

The purpose of the current study was to further develop the CS model with the help of an authentic learning approach that could serve the new CS2.0 AuLE. The new developed model of CS2.0 supports creative learning and innovative development work, as well as cross-border collaboration. Particular attention was paid to companies that met internationally with another entrepreneur and, with the help of students, built a common product or service through virtual collaboration. By considering the benefits and challenges expressed by the experiences of entrepreneurs, it is possible to interpret the practice of an AuLE and the possibilities of supporting learning and the development of companies in order to understand what enhanced the international collaboration of the participating companies.

The AL framework provided a good basis for building the CS2.0 model. The close connection between real life and the activities organised in an AuLE, along with the experience gained from it, helps to take what is learned and place it into practical concrete situations, even for entrepreneurs. According to Jäminki (2017), data transfer not only takes place unilaterally from

companies to students but companies also have the opportunity to obtain new information through students. Previous research has shown that bridging the gap between companies and universities, especially in terms of innovation capacity, benefits companies because creative activity can be fostered through 'creative spaces', enabling knowledge transfer (Geoghegan, 2017). Here, based on the results, value of the final concept was limited in terms of the concrete concept, but other general benefits, experiences, and perspectives appeared for the entrepreneurs through creative activity.

Six out of eight participating companies responded to our online survey. We have no information about the reasons why the two companies declined our invitation. However, the missing responses reflect a level of participation activity in the CS2.0 workshop that was lower for these two firms than for the other participants. This may explain their missing responses. Attention was drawn to the fact that respondents who were actively involved highlighted the positive aspects of co-operation. Their participation and joint activities produced a feasible outcome with the student team or opened up opportunities to be considered in the future through development work.

The joint interactive work of companies and educational institutions, especially via the network, can close distances, making operations possible internationally (Fiedler, 2016). This study shows that interaction through online work enables cross-border collaboration between companies; this requires careful and timely guidance, clear instructions, and guidance on the use of tools. The results of the current study confirm what was observed in the previous study: how important it is to build close interaction for valuable data transfer and provide timely scaffolding in joint online interactive activities (Jäminki, 2017). Davies et al. (2012) see the contribution as promoting creative activity with the creation of interactive situations and the use of ICT. By utilising online tools, international community action is possible, and from the point of view of accessibility, interaction through online plays a key role in the Arctic (Lipatov, 2014: 14). For this reason, a clear structure is needed for a model of CS2.0 that can support online collaboration. Working online also creates a more ecological and sustainable way of doing things, without requiring travel between countries.

Based on our research, co-design provides added value to implementation design by enabling a prior understanding of the business perspectives that influenced the development of CS2.0. On the other hand, co-design highlighted how complex the field of activity entrepreneurship itself is, as well as the varying field of entrepreneurs in the creative sector. Steen et al. (2011) emphasise that before co-designing, there must be a clear awareness of what goals are to be pursued through co-design and the content that will match what is needed. From the perspective of Sanders and Stappers (2008), co-design is one field of community-produced creativity that can be used to promote more sustainable solutions for the future. Service design provides tools (see Design Council, 2020; Chasanidou et al., 2015) with which to develop more sustainable solutions and thus address the needs of society and support DR by providing useful tools for the design of education are required. The UAS must be able to meet the needs of society through the development of education and RDI activities that have been integrated into education so that they can meet the needs of the Arctic region and international activities. Contextual thinking and service-centred solutions can lead to change (Manzini, 2009). AuLE CS2.0 has been developed in relation to the requirements of working life.

The study has certain limitations. In addition to using an online survey, interviewing the respondents could have produced more in-depth knowledge about their views and experiences.

The students' experiences were gathered from the implementation, but they are presented separately in another article, which introduces several iterations of the development process. The following research article discusses the role of students as part of creative work. This article was intended to focus on content related to the development of entrepreneurs in the Arctic region. However, from the perspective of AuLE development, the development phases are described in detail; thus, they are presented according to the design of the study. The current research provides one model of an AuLE that supports the creative process, innovation and entrepreneurship learning, and collaboration with companies.

Notes

1. Blended learning is a combination of face-to-face and online learning (Güzer & Caner, 2014).

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Arctic Art and Material Culture: Northern Knowledge and Cultural Resilience in Northernmost Europe

Maria Huhmarniemi & Timo Jokela

'Handmade', place-making, revitalisation and regional development are topical themes in the research of art and culture in the Arctic. The revitalisation of traditions through contemporary crafting has become a featuring approach in the Arctic, corresponding to global interest in materiality. The concept of Arctic art is used in this article to describe art, crafts, design and cultural productions that transmit the material and cultural heritage of Arctic nature and the northern knowledge system related to tactile situated knowing in northernmost Europe. Long-term art-based action research has been carried out in collaboration with the Arctic Sustainable Art and Design (ASAD) network of the University of the Arctic to promote art, culture and education for Arctic sustainability. A few case studies presented in this article were art exhibitions, and the art productions that were shown in the 2019 Arctic Arts Summit (AAS) in Rovaniemi, Finland. In the present work, we discuss the knowledge studied, illustrated and debated in contemporary art productions in the AAS 2019. We conclude that the northern knowledge system is formed in situated learning in relation to local ecocultures, traditions and diverse Indigenous and non-Indigenous cultures. Northern knowledge can be adopted by newcomers and even guests when participating in ecocultures. Artists inform, educate and transform their global audiences by sharing and presenting northern knowledge and different ways of knowing. Research on the 'handmade', place-making, revitalisation and knowledge themes has relevance for policy making, contemporary art, arts research and art education on many levels.

Introduction

Since the early 2000s, there has been growing interest in the material culture of the Arctic. This trend is in line with new materialism, which has been described as one of the most important emerging trends in the humanities and social sciences (Gamble & Hanan, 2019). New materialism means focusing on material elements of cultures; for example, senses, bodies and tactile experience. New materialism can be seen as a cross-disciplinary effort to change assumptions about humans and the non-human material world, as well as a paradigm shift that has moved the focus from texts to makers, spaces, places and materiality (see e.g. Fox & Alldred, 2019). For people in the Arctic, this means increasing global interest in Arctic cultures and Arctic cultural heritage, such as handcrafts and arts that are strong material expressions. In contemporary art in the Arctic, crafting,

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the revitalisation of traditions and a focus on human–nature relations have become featuring approaches (Huhmarniemi & Jokela, 2020).

In this article, we refer to Arctic art when discussing contemporary art that transmits Arctic culture and heritage and aims to contribute to Arctic sustainability and policy. The concept of crafting sustainability describes art, crafts, design and cultural productions that transmit the heritage of Arctic nature and culture across generations and cultures (Härkönen et al., 2018). Arctic art and crafting sustainability are not limited to Indigenous art; instead, they also cover non-Indigenous art and co-creation by Indigenous and other artists. The dimensions of sustainability in this context focus on cultural sustainability (Soini & Birkeland, 2014).

This article is derived from discourse analyses of the themes in the 2019 Arctic Arts Summit (AAS) in Rovaniemi, Finland. We studied the discourse in the AAS 2019 by analysing abstracts, conclusions, blogs and newspaper articles reflecting the presentations, art events, exhibitions and dialogues of the summit (Huhmarniemi & Jokela, 2020). Analyses showed that the discourse on sustainability is organised around five themes: (1) global politics and ecological crises, (2) relations of Indigenous and non-Indigenous art, (3) 'handmade', (4) place-making, revitalisation and regional development, and (5) economy and sustainability (Huhmarniemi & Jokela, 2020). Global politics and ecological crises impact the cultural politics of the Arctic, which became evident when some of the art performances and presentations in the AAS 2019 addressed Arctic geopolitics and the battle over natural resources and nature protection. While artists and designers tackle difficult social, cultural and environmental issues, the strength of art as a means of expression is seen as both communicating and visualising political themes as well as empowering interventions in communities, thereby leading to a transformation of values. These aims and themes are shared by Indigenous and non-Indigenous artists, and the AAS 2019 highlighted the need for collaborations to achieve cultural vitality and resilience. Both Indigenous and non-Indigenous cultures have a need to revitalise traditions and to support artists' and educational institutions' capacities to have a voice in Arctic politics. Potential is also seen in the creative economy fostered by vivid contemporary art, makers' cultures and Arctic design tackling local needs and opportunities (Jokela et al., 2020; Jokela et al., forthcoming).

The methodological choice for this study was art-based action research (ABAR). More a research strategy than a complete method, ABAR has been developed at the University of Lapland to combine artistic practices with regional development and community empowerment (Jokela, 2019; Jokela et al., 2015; Jokela et al., 2019). ABAR aims to develop the professional methods and working approaches of the artist–teacher–researcher and the artist–researcher. The strategy shares some common features with international arts-based research, artistic research and action research. In all of these research approaches, practical and theoretical research is conducted simultaneously, and research topics are situated in the middle ground of art and other fields of research, such as social sciences, studies on education and regional development. ABAR is especially rooted in process-oriented dialogical and place-specific art forms, such as environmental and community art and community-based art education.

Various aspects and examples of Arctic art have been studied in the research projects conducted by the Arctic Sustainable Arts and Design (ASAD) network at the University of the Arctic (Jokela & Coutts, 2018b). Two exhibitions by the ASAD network have focused on the theme 'handmade' (Huhmarniemi et al., 2017; Huhmarniemi et al., 2019). In the research on crafting sustainability,

cultural resilience and intergenerational dialogues, the authors of this article have studied the use of traditional handcrafting skills, methods, materials, tools, patterns and visual languages.

As part of the research cycles, exhibitions and catalogues were produced to present, study and transform the variety of handcraft-based methods and materials used in Arctic art and contemporary Sámi *duodji* [craft]. The main focus of these projects has been on promoting innovative research on contemporary art and art education. Funding of the projects was received from the Nordic Culture Fund, from their thematic call for applications that aimed to support crafting in contemporary Nordic art and design. Thus, the focus is on the northernmost parts of Nordic countries, while similar issues are also relevant elsewhere in the Arctic.

Contemporary Arctic art addresses the post-colonial situation of the region (see Horsberg Hansen, 2019; Igloliorte, 2019) and is related to attempts to achieve decolonialisation (Smith, 1999). A research professor of Arctic Indigenous studies, Rauna Kuokkanen (2000) presented the idea of an 'Indigenous paradigm', one that would be based on concerns, worldviews and cultural practices at the core of Indigenous perspectives. The essential objective would be to challenge the Western Eurocentric mindset as well as Western ways of knowing and researching (Smith, 1999). Thus, we discuss what kind of knowledge Arctic material culture carries and how this knowledge is embodied through crafting and other artistic activities. Arctic art includes a dimension of cultural politics, since it is used to highlight specificities of art and design in the Arctic and to promote cultural sustainability, diversity, ecological awareness, the revitalisation of traditions and cultural diversity (Huhmarniemi & Jokela, 2020). Issues of changing traditions, sustainability and political aspiration are essential to Arctic art. The focus of our interest is on making art that studies, represents and reforms local traditions, creates new meanings with them, and implements local knowledge in the generation of new forms of expression and innovation.

Northern knowledge systems revitalised to enhance cultural resilience

In the Arctic, the interconnection of the ecological and the cultural is intense, and this nexus can be described as 'ecocultures'. This concept highlights the specificities of coined communities and places, for example a village is its location and residents; the environment and community sharing and living in it together. A great number of local and regional traditions and beliefs are held and passed on as part of the ecoculture. Ecocultural knowledge is conceptualised in research as traditional knowledge, traditional ecological knowledge, Indigenous knowledge, tacit knowledge and local knowledge (see e.g., Helander-Renvall & Markkula, 2017; Porsanger & Guttorm, 2011; Valkonen & Valkonen, 2018). The debate about the existence of specific Indigenous knowledge versus a more inclusive local knowledge is by now an old one but still unresolved. The term 'northern knowledge system' (Huhmarniemi & Jokela, 2020) is used in this article to refer to interlinked ecological and cultural systems. It incorporates cultural heritage and the tacit knowledge of material culture in the making and wearing of arts and crafts as well as in visual symbols of arts and crafts as a language. We refer to 'northern knowledge system' rather than Arctic knowledge while this article is based on artistic work, research and living in ecocultures in the northernmost parts of Nordic countries.

Dualistic Western culture has separated art, design and crafts into distinct disciplines, while concepts represented in Arctic arts underline how art, design and crafts are both interwoven and integrated with ecoculture. The materialist turn in Western philosophy has significant

consequences for social theory, since it cuts across dichotomies that were once fundamental in the humanities and social sciences. Efforts to problematise anthropocentric binaries, such as 'meaning and matter' and 'culture and nature', have been made (Gamble & Hanan, 2019). The focus on materiality challenges differentiations between 'natural and social worlds', 'human and non-human', and 'animate and inanimate' (Fox & Alldred, 2019). Sámi researchers Jarno Valkonen and Sanna Valkonen (2018) added the categorical distinctions 'traditional and modern', 'local and supralocal' and 'knowledge and beliefs' and noted that these distinctions are present in Indigenous research because Indigenous people are generally considered to be representative of traditional, strictly local communities which are intrinsically tied to the land and to nature. They also pointed out that a focus on traditionality, locality and land relations carry political meanings and overtones. Regardless, in research on Sámi *duodji* [craft] many of the dichotomies are transcended, when *duodji* is discussed in between art, craft, design, tradition and modernity (see Guttorm, 2015). At the same time, Indigenous contemporary artists and designers are transforming traditions with the help of modern technologies and are showing their work in international art exhibitions and design expositions.

Sámi artist and scholar Elina Helander-Renvall (2016) has described how local knowledge grows in between the dichotomies when people conceptualise their experiences to better understand the world in which they live. With the concept of the northern knowledge system, we highlight that knowledge is not always conceptualised verbally (orally or in written form) but is also conveyed in visual signs, symbols, patterns, colour codes and choice of material. This visually crafted language has communicative significance both inside and outside of the communities. The language of crafts is important to the continuation of cultures and even to the sharing of worldviews (see e.g. Joy, 2019; Kramvig & Flemmen, 2019; Minnakhmetova et al., 2019; Schilar & Keskitalo, 2018). The material culture of the Arctic carries spiritual and religious dimensions and represents relations to nature (Helander-Renval, 2009; Joy, 2018). Because of the importance of material culture for members of Indigenous cultures, intense and often emotional discussions are provoked whenever cultural appropriation and exploitation take place through the misuse of symbols, crafts and other elements of material culture. A need to adjust and articulate the ethical principles underlying design activities with regard to traditional heritage and existing, locally established ways and rules of visual communication has been noted (Minnakhmetova et al., 2019).

Climate change impacts ecosystems and local ecocultures. As Kathrin Stephen (2018), a senior fellow at The Arctic Institute, described altered harvesting, hunting and fishing patterns have affected cultures, identifications and the value and usability of traditional knowledge. Residents of the Arctic face a challenging situation, when the base of their cultural identity is shaken. Resilience is demanded to face rapid environmental changes and following cultural shifts. The concept of resilience refers to the capacity of an individual, community and natural entities to cope with changes, adapt to them and even transform them into new possibilities. Resilience thinking has attained prominence in a number of research disciplines as well as in policy making for sustainable development. In this article, we use the concept of ecocultural resilience to follow professor of rural development Seema Arora-Jonsson (2016), who argued that we need to 'situate' rather than 'integrate' our knowledge production and demand recognition of the value of place-based knowledge and different ways of knowing. By the concept of northern knowledge system, we also refer to the situated knowing with nature, as it is discussed in new materialistic and post-humanistic research paradigms (Rantala et al., 2019). The idea of situated knowledge as part of ecocultures

also challenges art education. What kinds of traditions should we aim to pass on to new generations through art education, and what should artists learn in art universities in the Arctic?

Indigenous and non-Indigenous cultures affect each other in the Nordic countries, and are bound to nature in the same locations, to the extent that it may be difficult to determine the degree to which local Indigenous and non-Indigenous knowledge of nature differ from each other. As Jules Pretty (2011), a professor of environment and society, explained, ecocultures need to regain their connections with the environment to improve their own resilience (Pretty, 2011). Pretty underscored the need for ways to connect knowledge with action to produce optimal outcomes for both nature and culture, especially in times of change, and suggested that ecocultural systems can be redesigned by emphasising the incorporation of local and traditional knowledge (Pretty, 2011). We are interested in pondering how Arctic art can possess the agency to hold and revitalise Indigenous, local and situated knowledge as well as to foster cultural resilience.

Revitalisation is described as a practice that renews and remakes cultural traditions (Auclair & Fairclough, 2015). Revitalisation is often understood as the creation of cultural continuation from one generation to the next, as the reconstruction of forgotten skills, and as the promotion of cultural identities rooted in villages, towns and wider regions. New meaning can be given to elements of traditions (such as crafts) in contemporary art (Guttorm, 2015; Horsberg Hansen, 2016; Härkönen et al., 2018; Igloliorte, 2019; Jokela, 2008a; Stöckell, 2018), community-based art education (Gårdvik et al., 2014; Hiltunen, 2008, 2010; Hiltunen & Zemtsova, 2014) and art-based tourism services, such as crafting workshops (Huhmarniemi et al., 2020).

Contemporary and participatory crafting is one way to cultivate revitalisation. The concept of crafted sustainability is used to describe the (verbal and non-verbal) dialogue formed through making handcrafts and the method of contemporary art as a shared cultural heritage between Indigenous and non-Indigenous people (Härkönen et al., 2018). This approach is not limited to the Arctic: crafting is applied to intergenerational and intercultural dialogue with people worldwide and offers possibilities to integrate newcomers and guests into local cultures. Many people, especially from rural regions, may have experiences or memories of crafting, and these shared experiences are valuable when enhancing dialogue and a sense of belonging to community and place (Härkönen et al., 2018). Researchers have shown how art and art-based activities empower local communities (Hiltunen, 2008, 2010), as well as how strong cultural identity and a vivid local culture can help people and even entire communities in the Arctic to be more resilient to any type of change (Cunsolo et al., 2017). Material cultures based on northern knowledge form an important element of the ecoculture and create a strong part for local identity. In this article, we discuss how different ways of knowing and elements of knowledge are presented in art to enhance place-bound cultural identity and thus also cultural resilience.

Art-based action research and collaboration with members of the ASAD network

The objectives of ABAR are to identify and distinguish problems at the local level and to create solutions through artistic work that often involve various means of collaboration with community members, artists and researcher peers. For example, some objectives address community empowerment, social change, increased environmental responsibility and sense of community. Revitalisation through artistic interventions that enhance the vitality of traditional skills and focus

on northern knowledge have been developed in the ABAR conducted in Lapland (Hiltunen, 2009; Härkönen et al., 2018; Jokela, 2018; Stöckell, 2018).

Since 2012, when the ASAD network was established (as part of the UArctic organisation), Arctic educational institutions in fields of art and design have collaborated to foster cultural life in the Arctic and to strengthen vitality and regional development through art and culture (Jokela & Coutts, 2018b). ABAR and place-based art implemented in the ASAD collaborations have been promoted as a way to integrate artistic work, education, research and regional development. Building on existing ecocultures in Arctic towns and villages and on the skills and strengths of locals, as well as on contemporary art and international collaboration, this approach represents a viable alternative to conventional top-down and nationally coordinated development projects. Members of the ASAD network have set the development aims and shared their results in joint exhibitions and publications that have a particular, annual thematic focus (see Jokela & Coutts, 2014, 2015, 2016, 2017, 2018a, 2019) (Table 1).

Table 1: The development of sustainable Arctic art and design education. The research cycles, such as the *Shared Woollen Patterns* project, is part of this development, as illustrated in the top-right corner of the table.

Studies with respect to the 'handmade' theme were presented in the 2017 *Interwoven* exhibition, which was curated by Ásthildur Jónsdóttir and shown in the Nordic House in Reykjavik, in addition to art galleries in Rovaniemi and in the exhibition catalogue (Huhmarniemi et al., 2017). The analyses of the art practice shown in the *Interwoven* were described with the 'crafting sustainability' concept (Härkönen et al., 2018). The second cycle of the joint study on the 'handmade' theme was aimed at creating multi-level dialogues through crafted contemporary art and was presented as part of the AAS 2019 as the *Fringe* exhibition and catalogue, co-curated by Maria Huhmarniemi, Ásthildur Jónsdóttir and Ekaterina Sharova (2019). In addition, the material culture of the Arctic has been studied in many other joint exhibitions by the ASAD network, as well as in the *Transactions and Impulsions* exhibition shown in the AAS 2019, curated by professors Mirja Hiltunen and Timo Haanpää (Hiltunen, 2019).

The development of Arctic art and sustainable art education in the Arctic is a joint effort by ASAD members that follows the principles of ABAR as a way to set aims, conduct artistic and art-based interventions, and analyse and present results in research publications and exhibitions, such as the *Relate North* series of publications and exhibitions. As part of the international collaboration, the authors of this article have been conducting a number of research cycles on the use of traditional handcraft methods and materials in Arctic art (see Härkönen et al., 2018). The authors have learned traditional crafts from their parents and used these skills in their art installations and socially engaged art project in villages in Lapland and elsewhere in the Arctic. Some of the artistic work has been dialogical and community-oriented, while other work has constituted individual artistic productions as part of joint exhibitions aimed at highlighting Arctic art and northern knowledge systems as embedded in arts and crafts.

A case study of the ABAR approach usually starts with a place and a community mapping, in which the researcher-artist becomes familiar with the place and associated community. The process of ABAR is structured according to the cyclical progress of mapping, setting aims, planning, practical artistic action, reflection, evaluation and theorising (Jokela, 2019). Various research methods can be implemented to supplement the analytical process of the research, and documentation of the artistic process and results is commonly utilised. In contrast to many other artistic research approaches, the focus of ABAR is not on the development of one's personal artistic expression but instead on interactions among co-artists, co-researchers and participants – in this case, especially among ASAD network members and Arctic peoples.

Fringe highlighting the handmade theme – Transactions and impulsions analysing Arctic ecocultures

The title of the exhibition, *Fringe*, refers to the outer edge, the margin. The curators, Huhmarniemi, Jónsdóttir and Sharova (2019), have stated that when something is regarded as peripheral, marginal or extreme, it often must be respected and protected. The curators intended to make connections through arts and crafts and to show works by artists who have studied the dialogical themes and methods from various perspectives with handmade techniques. The theme of 'handmade dialogue' included intercultural dialogue as well as dialogue with nature, other generations and traditions. The curators stated that they were aiming to increase appreciation and understanding of the diverse

use of handicrafts in reflecting the North and in fostering resilience among exhibition visitors (Huhmarniemi, et al., 2019).

The *Fringe* exhibition presented a number of works by artists from Finland, Iceland, Norway, Russia and the United States. In this article, we have chosen to present three of them. First was the work titled *My Way to Ieśvuođat & Ieśdovddut II* by Sámi artist Gunvor Guttorm (Photo series 1). In the exhibition catalogue (Huhmarniemi et al., 2019: 14), Guttorm described the following:

> My background is in *duodji* (Sámi craft), and I use *duodji* as a basis for my ideas. For many people, *duodji* is one aspect of a person's whole life. *Duodji* has its origins in everyday Sámi life. In my work, I have been interested in exploring how our mothers and grandmothers created an existence in which they were able to exist in the centre of life while at the same time being able to find the peace and quiet to create things, often to cover a necessity. I have chosen knitting as a technique in my own work. I have combined knitting with pre-fabricated elements, such as bottles that I have been given or that I have found or purchased at jumble sales. These bottles are pre-defined, but I have wanted to give them a new identity, a transition from being a bottle to being something else.

Photo series 1: Gunvor Guttorm, *My Way to Ieśvuođat & Ieśdovddut II,* 2014. Carafes with knitted covers and reindeer horn lids. Photo on left by Gunvor Guttorm; photo on right by Janne Jakola.

The second artwork from the *Fringe* exhibition presented here is the installation *Shared Woollen Patterns* by Elina Härkönen, Maria Huhmarniemi, Miia Mäkinen and Jari Rinne. The installation consists of knitted pieces that artists have asked to receive from many places in the Arctic (photo 1 and photos 2). In other words, the installation is based on the participatory art project of inviting crafters to represent their cultural identity and heritage through colours and patterns in the knitted pieces. The installation includes fragments of soundscape with actual knitting sounds and the told stories, explaining knitters relation to patterns. The artists stated that the installation aims to make handcraft traditions visible and to demonstrate their dimension as a shared tradition of knitting that brings people together. Alluring audio cues open the listener to hearing the 'knitting state of mind': slowing down, having cosy feelings, and experiencing a safe space for sharing (Huhmarniemi et al., 2019: 26).

Photo 1: Elina Härkönen, Maria Huhmarniemi, Miia Mäkinen and Jari Rinne. *Shared Woollen Patterns*, 2019. Photo by Kaisa-Reetta Seppänen.

Photo 2: Elina Härkönen, Maria Huhmarniemi, Miia Mäkinen and Jari Rinne. *Shared Woollen Patterns,* 2019. Documentation of the process. Photo by Miia Mäkinen.

The third artwork from the *Fringe* exhibition presented here was made by Alison Aune, a painter and professor of art education at the University of Duluth, in the US state of Minnesota. Aune can trace her ancestry to northern parts of Nordic countries, and her paintings thus incorporate decorative-symbolic motifs found in Swedish, Norwegian and Sámi textiles (photo series 2). Through an inquiry of these patterns, Aune discovered some symbolic meanings as well as the cultural significance of the designs:

> I am not only exploring my cultural roots, but I am keeping the imagery alive by re-contextualising these ancient forms into a new artistic form that explores the intersection of women's material culture, craft and heritage (Huhmarniemi et al., 2019: 8).

Photo series 2: Alison Aune, *Sky*, 2016, acrylic and paper on canvas, 91 cm x 121 cm. Photo on left by Alison Aune; photo on right by Kaisa-Reetta Seppänen.

The *Transactions and Impulsions* exhibition presented art mostly from contexts of art-based research and art-based educational research by selected ASAD members. A wide range of artistic media were implemented: the exhibition covered installations, media art, photographs, video art, textile art and posters. The curators Hiltunen and Haanpää stated that the artworks reflect the ecocultural shift following climate change and other Arctic megatrends as well as the roles of artists, designers and art educators in supporting people in the Arctic:

> Some of the artists use traditional materials, techniques and colours and ancient symbols in a contemporary context. The artworks raise questions about and offer fresh perspectives on crucial Arctic issues such as climate change, plastic pollution, advocacy for consideration of land-based knowledge and environmental responsibility. At the same time, the exhibition shows how artists, designers and art educators can become co-authors of local makers by commenting on and redefining the living culture and the visual appearance of the North (Hiltunen & Haanpää, 2019: 4).

The installation by Timo Jokela was shown in the *Transactions and Impulsions* exhibition. The artwork presents an experience of a seashore and a change in the material culture of the Arctic (photo series 3). Jokela presented the background of his work in the following way:

> In the 80s and 90s, I used to walk on the shorelines of the Varangerfjord villages in northern Norway. In those days, the local fishing industry was experiencing a rapid change. Fishermen said that 'See sea is black, empty of fish'. The boat sheds

> were abandoned, and hard winds had scattered the old-style fishing gear around the seashore. I picked up cork fishing net floats one by one – each of them like a story of a changed life at sea. I used them as notebooks and marked down my landscape observations, the lights and colours of the sea and the sky, and the shadows of the abandoned stock fish-drying contraptions. About 20 years later, when I returned to Varangerfjord, the old boat sheds were gone, and the cork floats on the shore had become broken, colourful plastic pieces and messy ropes (Hiltunen, 2019: 17).

Photo series 3: Timo Jokela, *30 Years' Walk at Varangerfjord*, 2018, installation: found objects, cork and plastic (600 × 60 × 30 cm). Photo on the top by Kaisa-Reetta Seppänen, photos below by Timo Jokela

Discussion

Crafting and traditional skills were strongly present at the exhibitions and talks in the AAS 2019. Features of tradition and elements of ecoculture analysed and presented in the artworks were expressed through handmade art. The ways in which Arctic art was related to contemporary new materialism were noticed and emphasised by cultural policy researcher Maria Hirvi-Ijäs in her reflection on the artistic programme and presentations of AAS 2019:

> What is now theorised as new materialism is perceived here as a basis. Art is not separated from craft, the cultural heritage is reflected from the perspective of practice. The inclusive research field brings together contemporary art, all types of design, crafts, technology and media. The concept of art history may give way to the anthropological and political (Hirvi-Ijäs, 2019) (Translated from Swedish by the authors).

Artworks presented in this article evoke at least three different levels of material and cultural heritage and ways of knowing: (1) traditional worldviews and stories (which can be understood as indigenous knowledge embedded in crafts and represented in contemporary art); (2) situated knowing as part of an ecoculture that is in constant change; (3) political positions of Indigenous and non-Indigenous people as well as statements that either underline how traditions are bound to place or identify the ways in which they can be shared to unite people from various locations or from one generation to another.

Aune described the background of her painting by explaining that she is connected to the history of her relatives and to bringing their traditions into a new context of contemporary society. The material culture of the Arctic was seen as a kind of cultural knowledge pool from which new generations can extract Indigenous peoples' traditional knowledge without actually living in the land where that knowledge is based. Instead of situated knowing, the blood relations to ancient knowledge holders was underlined to ensure that members of newer generations are entitled to carry the knowledge and implement it for their own needs. Aune described the background of her painting in relation to her relatives in the following way:

> In my painting, *Sky*, I have painted my nephew in a Sámi Gákti surrounded by repeating textile patterns of the Norwegian eight-petaled rose (or star), symbolic of good luck and protection, to honour our Arctic Norwegian-Sámi ancestry. Sky wears the Gákti to honour my father's grandmother, Margarethe, who was a midwife, healer and Sámi; and his grandfather, Bernt, who was the 7th son of the 7th son and a healer who immigrated to Hazel Run, Minnesota, a Norwegian settlement, at the turn of the century (Huhmarniemi et al., 2019: 8).

While the *Sky* painting by Aune evoked how traditional imagery is kept alive by re-contextualising traditional patterns in an artistic form, the *Shared Woollen Patterns* installation drew attention to intentional sharing and to common ground between local and regional identity symbols. This was achieved by demonstrating similarities of knitted patterns. Although some of the models and colours of these knitted patterns are typical of a specific region, many of the patterns are common to many regions. The installation makes a political statement by showing that cultures are connected. The installation does not differentiate between Indigenous and non-Indigenous patterns. Instead, it combines patterns into a joint collage in the symbolic form of a cloak in order to symbolise the living traditions and express cultural identity as a type of protection. The soundscape of the installation recalls memories of knitting and also shared experiences across cultures.

Risks associated with cultural appropriation can be seen in an approach like that taken for *Shared Woollen Patterns* if such patterns carry cultural knowledge that can disappear or change when the patterns are adopted to new regions and communities. Similar issues have been mapped in ornamental objects in modern design and architecture in northern Russia. Design researchers Ramilya Minnakhmetova, Svetlana Usenyuk-Kravchuk and Yulia Konkova (2019) analysed these objects and raised a number of concerns related to intercultural encounters between 'outsider' designers and local/Indigenous systems of communication and identity. They revealed that ornamental borrowings often follow formalistic attributes but result in the loss of the ornament's sacral semantic aspect, which can be seen as a tacit violation of cultural norms and values.

Valkonen and Valkonen (2018) explained that if traditional Indigenous knowledge is understood as a kind of cultural heritage that is passed on from one generation to another, then this means that the knowing subject and knowledge are separated from each other and that essential, knowledge-specific, localised dynamism does not exist. To sharpen their argument, Valkonen and Valkonen (2018: 16) explained: 'Local knowledge is not a capsule nor is a knowing subject a time traveller who draws immemorial knowledge from the knowledge pool for his or her needs'. Nonetheless, in the AAS 2019, the material culture of the Arctic as a form of knowledge storage and inspiration for contemporary expression was appreciated and celebrated. A similar trend can be seen in Sámi art in general. For example, Sámi artist Outi Pieski in Finland made contemporary art by studying ancient forms of headgear.

What is discussed as a northern knowledge system differs from Indigenous knowledge because situated knowledge, integrated with the ecoculture and living traditions, is formed and carried by non-Indigenous residents in the Nordic countries as well. In addition, it is shared in situated learning in a place-specific manner. Northern knowledge as part of place-specific art has been described in earlier research (Jokela, 2008; 2013).

Changing ecosystems in the Arctic is impacting local ecocultures and identities (Stephen, 2018), as presented in Jokela's work, *30 Years' Walk at Varangerfjord*, which visualised rapid changes in ecoculture based on fishing. This work reflects situated knowing as part of an ecoculture that is undergoing constant change. Ways to deal with loss and changes in ecosystems are considered necessary for the continuation of culture and associated human capacities in the Arctic. Professor of archaeology Cornelius Holtorf (2018) has studied how cultural resilience is increased through cultural heritage. He explained that people must learn to accept loss and the transformation of heritage to enhance post-disaster recovery. According to Holtorf, the evident changes in heritage over time can inspire people to accept uncertainty and distress in times of change, which can in turn increase their cultural resilience. Panu Pihkala (2018), an ecotheologist who has familiarised in eco-anxiety, explained that space for processing grief, loss and threats must be allowed, while hope and action should continue to be emphasised. Pihkala values the strength of art as relief from eco-anxiety via deep, existential and spiritual art-based experiences that touch both body and mind (Pihkala, 2017). Several researchers have also provided evidence for the impact of a strong cultural identity on resilience (Cunsolo et al., 2017; Wexler & Burke, 2011; Wilkie, 2020). Their studies have concentrated on youth and university students who 'walk in two worlds' as they face sociocultural differences between Western and Indigenous cultures.

Sharova (2019) reflected on the *Fringe* exhibition by referring to the embodied knowledge that the artworks represent and by stating that these artworks evoke the themes of identity, connectedness and intersections in a number of ways:

> What seems very important here is namely the method, the holistic approach where relations between a human and nature are central, where culture and nature can co-exist, where various flowers can grow. The artists in the exhibitions represent not only themselves as individuals, but also the culture of the place, several generations or a family which revolves around the Arctic. The stories of the place are reflected in a form (Sharova, 2019).

All of the artworks presented in this article transform traditions in their own way. They enhance cultural continuation by fostering the presence of tradition in contemporary culture. We argue that

Arctic art strengthens regional cultural identities and thus also cultural resilience. Rapid environmental changes in the Arctic demand cultural resilience built on empowerment, cultural pride and strong regional identity. Cultural resilience supports both individuals and communities in facing, mitigating and even overcoming such rapid changes by conferring on them the capacity to transform traditions.

Both exhibitions presented here showed Arctic Indigenous and non-Indigenous artists side by side, reflecting the political sense of the Arctic art concept: using art to foster bridges between Indigenous and non-Indigenous Arctic peoples. Curatorial choices underscored the importance of such art-based bridges, whereas national strategies in Arctic countries mainly deal with cultures in the context of regional Indigenous populations (Lempinen, 2019). The revitalisation of various local cultures and traditions, the encouragement of cultural identities and the celebration of cultural diversity are all needed to enhance cultural resilience. Revitalisation can be both intergenerational and intercultural, aiming to transmit northern knowledge, artistry and cultural practices to new generations and to new community members *in situ*. Contemporary craft can be considered as a method of expression that reflects, reforms and presents northern knowledge (Huhmarniemi & Jokela, 2020). The artworks in the exhibitions expressed political statements that underlined how indigenous knowledge can be adopted in other locations, how northern knowledge is bound to place, and the ways in which traditions can be shared to unite people in various locations.

To what extent is northern knowledge expressed in tactical crafting skills compatible with artistic thinking and knowing as discussed in arts-based research methods (Leavy, 2009; 2017)? Artistic thinking refers to the knowing that is visible in artistic productions, often in forms other than verbal. This function is similar to northern knowledge as defined in this article. On the other hand, artistic research and artistic thinking often refer to the universal essence of art as, for example, a modernistic aesthetic that is not place-bound. In this sense, situated northern knowledge is very different from artistic knowing. Alternatively, the presence of a northern knowledge system can be compared to 'knowing with nature' (Haraway, 2008: 4).

The debate over the ways in which Arctic artists participate in political conversations was an essential result of the AAS 2019 that made the political nature of Arctic art more understandable. The AAS 2019 empowered artists and other participants in their efforts to impact society and participate in (global and local) environmental and cultural politics (Huhmarniemi & Jokela, 2020). To further support artists' capacities to involve themselves in Arctic politics, it is important that education and networking events for artists are organised in regions where northern knowledge exists and conflicts are actualised. In addition, as a conclusion drawn from the AAS 2019, we propose that to achieve and maintain Arctic sustainability, the importance of the 'handmade', revitalisation and northern knowledge conceptions should be emphasised in art education and among artists training in the Arctic.

Conclusion

Material cultures based on northern knowledge form an important element of the ecoculture and create a strong base for local identity. In this article, we discussed how different ways of knowing, and elements of traditions, are presented in contemporary art to enhance place-bound cultural identity and thus also cultural resilience. The northern knowledge system is formed in situated learning in relation to local ecocultures, traditions and diverse cultures in northern parts of Nordic

countries Northern knowledge can be adopted by participating in ecocultures, and thus northern knowledge can be shared with newcomers and even guests. In addition, Arctic artists inform and educate their global audiences, share traditions and pass on the material culture of the Arctic to new generations, even those outside the northern region. Cultural resilience is enhanced by cultural empowerment, cultural pride and strong regional identity. This resilience supports individuals and communities in facing rapid changes in the Arctic by helping them to transform their traditions into a contemporary culture and in response to contemporary needs. Studies on the 'handmade', place-making and revitalisation themes have relevance for policy making, and for artistic practice and research on the Arctic. Ultimately, this study informs art education and artistic training in the Arctic. Our conclusion is that themes of 'handmade', revitalisation and situated northern knowledge are critically important for art education and artistic training in the Arctic. Anyhow cultural sensitivity is needed to avoid cultural appropriation and exploitation of Indigenous cultures.

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Climate Justice in the Arctic: A Critical and Interdisciplinary Climate Research Agenda

Sennan D. Mattar, Michael Mikulewicz & Darren McCauley

Apart from rapidly affecting the Arctic environment, climate change poses significant societal challenges in the region, as well. However, compared to the impacts of rising temperatures on local ecosystems, our understanding of the social dimensions of climate change in the Arctic appears limited. In this article, we respond to this knowledge gap and to the recent calls for reorienting climate research in the region towards people and ethics. We do so by charting a climate research agenda for the Arctic guided by climate justice – a framework we use to examine the unevenness of climate impacts and the responses to them in the region.

We begin by providing an overview of current climate-related social science research in the Arctic with a focus on adaptation, mitigation, health, Indigenous studies, security, and governance. We note the scarcity of works focused explicitly on equity or justice in this context. After briefly outlining key relevant climate justice approaches, we propose a critical and interdisciplinary manifesto for climate scholarship in the Arctic centred on research focus and scale, knowledge decolonisation and co-production, new methodologies and solutions. We also discuss its practical implications for researchers and policymakers centred around non-Western frameworks of climate justice, communities' own stories of climate injustice, and using climate justice as a bridge to interdisciplinarity. We conclude by arguing that climate justice offers to align research in humanities, social sciences and natural sciences to successfully inform policymakers on the true costs of and the 'real' solutions for climate change issues in the Arctic.

Introduction: Reorienting climate research in the Arctic

The well-documented impacts of climate change on the Arctic's physical environment are not only disrupting the local ecosystems but pose significant *societal* challenges in the region, as well (Jafry, Mikulewicz, et al., 2019; WMO, 2019). Despite the severity of these societal challenges, however, social science research in the Arctic has yet to match the regional influence of natural sciences (Hua et al., 2012). This disciplinary imbalance was recognized as early as 1989 and has over the years continued to be reiterated as a critical gap in knowledge for Arctic research, policy and governance (Adger et al., 2011; Ford & Smit, 2004; Long, 2018; National Research Council, 1989; Petrov et al., 2016). While some progress has been made to address this imbalance, conceptual and

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funding challenges for promoting interdisciplinary or even multidisciplinary research in the region remain (Ford et al., 2013).

Nonetheless, social science research on climate change in the Arctic has grown in recent years (Huntington et al., 2019; Stephen, 2018), particularly within the fields of climate change adaptation and vulnerability, which began shifting from largely observational studies of physical environments towards co-productive and participatory research with those affected (Champalle et al., 2015; Petrov et al., 2016). A critical observation is that, regardless of disciplinary origin, studies on the region can frequently take an overly descriptive or even essentialist approach towards the Arctic and those who inhabit it, particularly in relation to Indigenous people (Stephen, 2018). Additionally, it has been suggested that social science research should look to situate the challenges of climate change in the Arctic within a broader historical and geopolitical context because many climatic challenges faced by Arctic communities have roots beyond the Arctic itself, such as the legacy of settler colonialism in undermining Indigenous adaptative capacity (Whyte, 2018), as well as the growing influence of global politics in shaping Arctic governance (Greaves, 2019). In this article, we respond to these critiques and the recent calls to reorient climate action and research in the Arctic towards people and ethics (Jourdan & Wertin, 2020; Palosaari, 2020; Whyte, 2020). In doing so, we chart an Arctic research agenda guided by the principles of climate justice.

Researchers use climate justice as a framework to identify and help address the unevenness of human experiences of, and responses to, climate change. Climate justice research frequently combines climate science with insights from social justice, arguing that climate change is a social rather than a natural issue that both breeds new social equalities (e.g. uneven adaptation outcomes) and exacerbates long-standing ones (e.g. coloniality) (Bond, 2012; Foran et al., 2019; Forsyth, 2014). We propose that a climate justice-oriented research agenda can successfully bridge different scientific and traditional Indigenous knowledge traditions, as well as foreground the needs, perspectives, knowledges of those affected by climate change impacts, and ultimately lead to 'real' solutions to climate-related challenges in the Arctic that address social injustices.

The rest of the article comprises four sections. First, we provide an overview of social science research in the Arctic from an equity and justice perspective by focusing on academic work related to adaptation, mitigation, Indigenous studies, health, security, and governance. Second, we outline the key perspectives within climate justice research and their applicability to the Arctic context. Third, we propose a manifesto for climate change studies in the region pertaining to research focus and scale, knowledge base, methodologies and solutions. In the fourth and final section, we make some practical recommendations for pursuing interdisciplinary, climate justice-oriented research in the Arctic based on this manifesto which focuses on embracing non-Western justice frameworks, foregrounding the lived experiences of climate change in the region, and using climate justice to address the interdisciplinarity gap.

Social science research on climate change in the Arctic: An equity and justice perspective

The following section is a summary of social science research on climate change in the Arctic which focuses on studies concerned with equity and social justice issues.

Adaptation

Adaptation has long been viewed as a detractor to mitigation in the debate on climate action – but Ford (2009) argues adaptation planning is necessary for Arctic residents, particularly in remote and Indigenous communities. Despite this, there are doubts on whether current research methodologies, employed by social scientists, are able to properly identify and characterise vulnerability and adaptive capacity of Indigenous communities (Ford et al., 2013).

Studies on forced migration in the Arctic illustrate the importance of social science research in the region for informing adaptation policy. Marino (2012) and Knodel (2014) found how the relocation of Arctic communities due to climate change is an injustice borne from an unequal distribution of climate burdens – and the authors argue this must be accounted for in resource allocation and community participation in decision-making. The lack of preparedness and understanding by governments to the plight of relocated communities is emphasised here (Knodel, 2014; Marino, 2012). Yet, rather than a recent development, the forced relocation of Indigenous communities, such as through reservations and boarding schools in USA from the 19th century onwards, and the destruction indigenous institutions and cultural practices, notably the maintaining of interdependence between communities and their ecosystems, is a legacy of settler colonialism and an underlying cause of vulnerability in Indigenous communities to climate change (Whyte, 2018).

Adaptation studies in the Arctic have increasingly advocated for community-engagement and participation in research design and knowledge production (Cochran et al., 2013). Berkes and Jolly (2002: 1) were an early adopter of co-producing knowledge in adaptations studies with the concept of "social-ecological resilience" that was informed by an Inuvialuit community. Adger et al. (2011) call for Arctic policymakers to use approaches that incorporate local social and cultural factors into the analysis of climate change impacts, because awareness of climate change will happen through peoples' lived experiences. Ford et al. (2010) exemplified this emerging approach when concluding climate change will negatively impact housing and roads of an Inuit community based on interviews, as well as geomorphological observations. A central point highlighted by Ford et al (2013) is that vulnerability and adaptative capacity are closely tied to socio-economic conditions, for example, the level of marginalisation, social networks and resource management. Arguably, the aforementioned studies yielded insights that more accurately depicted specific vulnerabilities of Arctic communities and illustrated the need for similar approaches in future research.

Mitigation

More studies have emerged in recent years on the topic of mitigation in the Arctic as the concept of sustainable development has found itself at odds with those Arctic communities dependent on natural resources and tourism (Chen, 2015; Kaján, 2014). The 'opening' of the Arctic has sparked debate on climate action in the context of exploitation of natural resources and new freight shipping routes (Dobson & Trevisanut, 2018; Lindstad et al., 2016). There is also a growing focus on equity issues that arise from development of infrastructure in regions with marginalised communities (Everett & Nicol, 2014; Loring, 2013; McCauley et al., 2016). For example, the encroachment of wind farms on Saami grazing land in the name of sustainable development is problematic (Vars, 2019), namely because the ability to migrate reindeer is considered one of the key adaptation strategies of Saami herders to climate change (Tyler et al., 2007).

The debate on natural resource exploitation in the Arctic has largely focused on the challenges of environmental protection (e.g. Dobson & Trevisanut, 2018; Trump et al., 2018; Turati et al., 2014). However, there is concern that development driven by fossil fuel industries will not achieve energy self-sufficiency for Arctic communities (Dalessandri, 2018). Further, benefit sharing agreements in the Arctic have rarely produced benefits for Indigenous communities or prevented conflict between communities and extractive industries, and even caused conflict within communities (Petrov & Tysiachniouk, 2019; Tysiachniouk & Petrov, 2018). For example, the Gállok mining project has largely ignored Indigenous land rights and is located on traditional grazing land (Berger, 2019).

Against this background, McCauley et al. (2016) pose energy justice as a framework for infrastructure development in the Arctic to address the injustices often suffered by underrepresented communities. More studies are emerging on the social injustices experienced by Indigenous communities in the Arctic as infrastructure is developed (Berger, 2019), though these accounts likely represent the tip of the iceberg.

Indigenous studies

The early and mid-2000s saw an emerging narrative among researchers that Indigenous communities in the Arctic would be disproportionately impacted by climate change and this would undermine any claims to and for sustainable development in the region (Craig, 2009). For instance, Trainor et al. (2007) found Indigenous communities in Canada and northern USA faced an environmental injustice due to historical discrimination and were disproportionately impacted by climate change. At the same time, it has been suggested that Indigenous communities are least able to cope with such impacts (Crate, 2008; PFII, 2008).

This narrative corresponded with calls for greater political representation of Arctic communities vulnerable to climate change in international forums (Brigham, 2007; Crump, 2008). The participation of Indigenous organisations through international governance bodies, such as the Arctic Council, has influenced research projects and governance in the region (Koivurova & Heinämäki, 2006). Notably, an outcome of closer engagement between researchers and Indigenous communities is the recent acknowledgement 'traditional knowledge' in natural science studies (Alexander et al., 2019; Huntington et al., 2011). For example, Parrotta and Agnoletti (2012: 525) describe how insight from Indigenous communities on good practice in forest management can be useful to *"complement formal science"*. However, researchers have increasingly focused on wider political and historical contexts underpinning climate change impacts in the Arctic (Cameron, 2012; Huntington et al., 2019). For example, Wilson (2014) argues an Indigenous community in Alaska was made vulnerable to climate change due to a legacy of colonialism undermining the agency of Indigenous people – and this legacy impeded their adaptive capacity to environmental changes by disrupting their ability to choose the manner in which they adapt, namely through constraints on subsistence livelihoods.

Health

Climate change threatens the health of Arctic communities both directly (e.g. via increased injury and mortality rates from extreme weather and unpredictable ice conditions) and indirectly (e.g. via increased mental and social stress caused by disruption of traditional lifestyles and loss of culture) (Parkinson & Berner, 2009). However, Ford (2012) argues that in order to truly understand and

address the health impacts of climate change, analyses must consider both climatic and non-climatic factors and involve the affected communities in the shaping of research and policy. For example, Ford et al. (2010) found climate change and socio-economic inequality were linked with poorer health outcomes for Indigenous Canadians. The coronavirus pandemic is particularly dangerous to Indigenous communities as lockdowns threaten to cause food insecurity and malnutrition, for example, by disrupting supply networks and delivery of food to remote Inuit communities (Zavaleta-Cortijo et al., 2020).

A consideration of socio-economic factors and community participation in research has long been recommended as a necessary step to understand the impacts of climate change on health in the Arctic (Harper et al., 2012). Ebi and Semenza (2008) argue public health programmes require a greater focus on improving community adaptive capacity to tackle climate-sensitive health issues. Relatedly, Parkinson and Berner (2009) strongly recommend the community-based monitoring of groups vulnerable to climate change. The aforementioned studies represent early examples of the increasingly recognised need among health researchers to involve communities in building a meaningful evidence-base of the climate-related public health risks, vulnerabilities and adaptabilities of Arctic communities (Ford et al., 2018; Akearok et al., 2019; Ruscio et al., 2015).

Additionally, there is a growing consensus that climate change can impact mental health. For example, Bell et al. (2010) postulate rapid environmental change affects the traditional culture of Alaskan Natives, and this may cause trauma through forced adaptation. In another example, Willox et al. (2013) found an Inuit community in Canada reported their mental health and wellbeing was impacted by environmental changes – and this manifested through stress, increased drug and alcohol use, enhancement of previous trauma, and the potential for suicide. However, there are few studies exploring climate change and mental health in the Arctic, demonstrating more research is needed on this link.

Security studies

Security studies in the Arctic have evolved beyond the traditional focus on defence and borders, and towards concepts of socio-economic crisis management and environmental protection (Heininen & Exner-Pirot, 2020; Lukovich & McBean, 2009). This broadened dialogue on security reflects the largely positive view of international cooperation in Arctic governance held by researchers during the 2000s and 2010s, particularly thanks to governments having deferred to research-led decision-making processes (Palosaari, 2012). For example, coastal Arctic nations are collecting scientific evidence on their geographical placement within the continental shelf as part of the United Nation's process for determining maritime boundaries – in spite of widely reported concerns that interstate security objectives would dominate the process (Palosaari, 2020). However, it should be noted that military concerns have re-emerged in the Arctic following the annexation of Crimea in 2014 by Russia, shifts in China's Arctic policy, and subsequent reactions by USA and NATO countries, and the American government, in particular, has purposely omitted climate change from any security debate (Lanteigne, 2019).

That said, some researchers suggest the autonomy of small actors could be affected by the growing interest in the Arctic (Shadian, 2010). Climate change is increasing the accessibility of a region with natural resources that has been historically difficult to navigate, as well as largely disconnected from the strategic concerns of Arctic and non-Arctic states (Lanteigne, 2019). Small actors will likely review their security policies in response to the 'opening' of the Arctic (Bailes, 2014).

However, international commitments to peaceful governance in the region mean interstate conflict over natural resource extraction is unlikely because most reserves are found in undisputed sovereign territory (Heininen, 2012; Keil, 2014).

Regardless, climate change has catalysed the Arctic to become geopolitically integrated with neighbouring regions and marked the end of the "Arctic exceptionalism" i.e. the conceptualisation of the Arctic as geopolitically distinct from the neighbouring regions and largely detached from interstate competition (Greaves, 2019: 11). Ultimately, new security discourses have emerged because of climate change, highlighting the need for a paradigm shift in how we understand security in the region (Heininen & Exner-Pirot, 2020).

Arctic governance

Inclusivity is increasingly considered vital for governance in the Arctic in response to climate change (Adger et al., 2011; Champalle et al., 2015). However, there is concern methodologies and conceptual frameworks used in Arctic research are still unable to effectively inform regional governance on the social impacts of climate change. Forbes (2007) argues resource management in the Arctic has historically been dominated by natural scientists within governing bodies which, in turn, have been resistant, or perceived little reason, to engage with participatory approaches. Forbes (2007) concluded top-down approaches have undermined resilience-building by not effectively understanding community needs and vulnerabilities.

Further, O'Brien et al. (2009) argue historical power structures have made some disenfranchised communities' security and wellbeing vulnerable to the impacts of climate change. They emphasise that the socio-political factors between different social actors must be understood to detect barriers to resilience-building among certain groups. This raises important questions on the social contract where the debate on rights and responsibilities between the State and its citizens have resulted in new discourses on litigation and human rights, as in the case of Indigenous organisations in the Arctic taking legal action on the basis of concepts such as environmental and climate justice (Warner & Abate, 2014). Ristroph (2019) found Alaskan Indigenous communities expected federal and local governments to hold some responsibility for assisting them with adaptation. Relatedly, Indigenous activists protesting against oil drilling in the Arctic because it was considered to infringe on their human rights and customs is an example where the concept of inherent legal protections from climate change has been pursued (Norman, 2017).

A common theme of governance studies and social science research on climate change in the Arctic is the growing emphasis on new methodologies and ways to produce knowledge to achieve insights on equity issues. Yet, there are few examples of climate change research using participatory research methods and/or equity-centred approaches. Against this background, there is a pressing need for a climate justice research agenda to understand the social impacts of climate change in the Arctic.

Climate justice and Arctic issues: An overview

Over the years, researchers in the field developed a number of analytical frameworks highlighting different aspects of climate-related injustices. While a comprehensive review of these is beyond the scope of this article, here we provide a selection of the most salient approaches to studying climate justice and the ways they may apply to the Arctic context. It should be underscored that most of these are of an explicitly Western origin.

One of the dominant frameworks of climate justice is based on its deconstruction into different 'aspects' or 'components', including recognition, procedural justice and distributive justice, all of which need to be satisfied to ensure justice can be achieved (Adger, 2006; Bulkeley et al., 2014; Gardiner, 2011; Schlosberg & Collins, 2014). First, the need for *recognition* stems from the persistent inability of societal structures to identify and adequately include historically marginalised groups or individuals in decision-making processes (Jenkins et al., 2016; Ryder, 2018; Tomlinson, 2015). This can take the form of disregarding local knowledge or underappreciating the ability of certain communities or individuals to participate in high-level decision-making due to their perceived low level of education or expertise (Medby, 2019). For example, Johnsen et al. (2015) found that the dominant narrative of Norwegian media and governance bodies present the viewpoints of Saami reindeer herders as irrational and ignorant, while lending legitimacy to scientific measurements considered apolitical and objective.

Second, *procedural justice* aims to ensure "fairness in access to democratic decision-making by individuals, groups and nations" (Adger, 2006: 14) and is concerned with including all parties affected by or involved in a given issue, such as marginalised groups, non-humans, or future generations (Gardiner, 2011). Emphasis is placed on the quality of participation, which should be deliberative (reached through discussions that address power imbalances and divergent interests) rather than simply aggregative (e.g. reached by voting) (Hilde, 2012). Building on this argument, Sovacool (2016) underscores the importance of giving communities the ability to say 'No' if they feel that their interests are not addressed. In general, procedural justice is essential for securing legitimacy of the decisions taken. As an example, political efforts to reform decision-making processes within Arctic intergovernmental bodies have sought to boost representation of vulnerable groups and Indigenous populations (Arruda & Krutkowski, 2017; Atapattu, 2013; Berkes & Armitage, 2011; Martello, 2008).

Finally, *distributive justice* is most commonly concerned with the material implications in the aftermath of the deliberations among the parties. That is, what is to be distributed, among whom and how (Grasso, 2010). In practical terms, this means ensuring that both the costs and the benefits (more than just financial ones) related to climate change impacts, adaptation and mitigation are shared in a fair manner and do not place a disproportionate burden on certain individuals, communities and nations. An example of distributive injustice in the context of mitigation is wind power development in the Saami traditional grazing lands in Scandinavia, as in the case of the Storheia wind park in Fosen, Norway (Vars, 2019).

Recognition, procedural justice and distributive justice are sometimes complemented with *compensatory justice* (also referred to as restorative or transitional justice), which aims to redress the injustices experienced as a result of past decisions and processes. In this context, climate justice activists and scholars frequently invoke arguments on historical responsibility for causing climate change (Gardiner, 2011; Klinsky & Brankovic, 2018; Vanderheiden, 2008). Initially, this was often debated at the international level with various degrees of responsibility assigned to entire nation states, but critical research has suggested that responsibilities for climate change within countries can vary greatly. An example of this is to consider the Indigenous peoples in the Arctic as co-responsible for causing climate change by virtue of them living in states historically responsible for high greenhouse gas emissions (e.g. Norway, Canada, United States), which fails to recognize their minuscule role in the process.

Rather than deconstructing its different components, other climate justice-centred approaches are based on the aggrieved parties or actors. For instance, *intergenerational climate justice* is concerned with ensuring that young or future generations can live lives free from climate change and its negative impacts (Gibbons, 2014; McKinnon, 2012; Roser & Seidel, 2017). The Arctic's young (and not to mention yet unborn) residents, for instance, are likely to witness life and livelihood changes that are more rapid and severe compared to the experience of their parents. Relatedly, *interspecies justice*, or justice for non-humans, considers the ethical and material implications of climate change impacts on non-human animals (Palmer, 2011). This is of particular significance to Arctic biodiversity and the region's relatively fragile ecosystems (Pörtner et al., 2014). It is also relevant for the crucial importance of kinship and reciprocity relationships with non-humans for many Indigenous peoples in the region (Whyte, 2020).

Another widely-used approach in climate justice scholarship is climate litigation (or jurisprudence), wherein the effects of climate change are seen as violating certain rights that people possess. Here, legal scholars and practitioners mobilize arguments rooted in both international and national law (Chamberlain, 2012; Craig, 2009; Jodoin et al., 2020; Knodel, 2014; Kronk Warner & Abate, 2014; Nilssen, 2019). With regards to the former, human rights are often used as a basis for seeking redress for climate injustice (Craig, 2009). A prominent example of this is the petition of the Inuit Circumpolar Conference filed against the United States to the Inter-American Commission on Human Rights (Kronk Warner & Abate, 2014), which argued that climate change violates petitioners' human rights, and more specifically their climate rights or their "right to be cold" (Jodoin et al., 2020: 1). At the national level, two of the most well-known instances of climate litigation are the Kivulina case brought forth by an Alaskan village against coal, oil and power companies (Knodel, 2014) and the Saami legal argument against a wind farm development sited on their grazing lands in Norway (Nilssen, 2019). However, none of these cases were decided in the plaintiffs' favour, demonstrating litigation channels' limited effectiveness in redressing climate injustice in the Arctic, particularly concerning legal action by Indigenous groups against historical colonial states.

A manifesto for climate change research in the Arctic

It is evident that social science research in the Arctic has to some extent appreciated the inherent inequalities of global climate change. At the same time, however, the field is highly fragmented, with studies frequently eschewing an explicitly equity- or justice-centred approach. We consider this a central barrier to long-term social and environmental sustainability in the region. With this in mind, below we propose a number of benchmarks which social scientific scholarship on climate change in the Arctic (and elsewhere) should meet based on the insights of currently available climate justice literature.[1]

Research focus and scales

The most commonly invoked argument for applying a climate justice-focused framework is the need to reorient climate research towards people, and specifically towards those who are disproportionately affected by its impacts while bearing little historical responsibility for causing it (Jafry, Helwig, & Mikulewicz, 2019). In this context, narrowing the research focus to groups such as Indigenous people, women, the elderly, young people, persons with disabilities or the poor is suggested as a remedy for this historical marginalisation in research and practice (Rochette, 2016;

Sellers, 2018). More contemporary approaches apply the concept of intersectionality to investigate how various axes of social difference determine people's experiences of climate change (Kaijser & Kronsell, 2014; Ryder, 2017).

At the same time, however, these calls run the risk of portraying Arctic people and the Arctic itself (Stephen, 2018) as extremely vulnerable – a problematic framing for emancipatory research. Climate justice scholarship must be conscious of this risk, and build from the bottom-up by following in the footsteps of the climate justice movement which has sought to empower, rather than stereotype, those who are often described as 'the victims of climate change'. Ecofeminist and post-colonial research, for instance, has demonstrated how women and people in former colonies can easily be subject to this kind of discursive violence (or violence that occurs in written, spoken or representational form) (Gaard, 2015; Mikulewicz, 2020a). The Arctic's widespread portrayal as fighting on the frontlines of climate change amplifies the need for this awareness even further (Jafry, Mikulewicz, et al., 2019). Therefore, climate justice research should stand for a representational reorienting of the Arctic and its residents, and seek to convey their agency and resourcefulness in the context of climate change adaptation and mitigation.

Moreover, there are evident tensions when it comes to the appropriate scale of analysis. Early climate justice research was largely entrenched at the international level, making little sense of the 'smaller' injustices happening locally (Fisher, 2015). However, the last few years have seen a proliferation of local analyses of climate injustice, including in the Arctic (Berger, 2019; Knodel, 2014), reflecting the widely recognized need to counterbalance the quantitative studies on climate change by putting a 'human face' on the issue – and foregrounding local people's lived experiences. There is still much to achieve here. For example, Stoddart and Smith (2016) demonstrate how Canadian media portray climate change in the Arctic as a national rather than a local matter, therefore ignoring the subnational aspects of the problem.

In addition, we argue, somewhat counterintuitively, that climate justice research in the Arctic and elsewhere should not limit its focus to climate change alone. Effective climate justice analyses will extend their scope to other societal issues such as poverty, health, education and political inclusion that determine people's experiences of climate impacts, adaptation and mitigation (Huntington et al., 2019). This includes broadening not just the spatial but also temporal scales to investigate the historical and systemic causes of certain groups' vulnerabilities (Huntington et al., 2019). For example, the current high level of vulnerability of many Indigenous communities in Canada to environmental change in the Arctic stems from centuries-long political, social and economic marginalisation of Indigenous Canadians (Cameron, 2012). Conversely, analyses that foreground climate change in an excessive manner can inadvertently result in obscuring these fundamental determinants of vulnerability which frequently precede the era of industrialisation and greenhouse gas emissions.

New knowledges

There are important ontological implications for emancipatory climate change research in the Arctic and elsewhere. Notably, climate justice research must strive to decolonize the current knowledge base on climate change in the Arctic. Here, lessons can be learnt from the climate justice movement which often, though by no means exclusively, draws from non-Western philosophies (Nuñez, 2019). This is to counterbalance ethnocentric ontologies (which view Western approaches to knowledge production as superior) currently dominating research on

climate change in the Arctic (Cochran et al., 2013; Knodel, 2014; Whyte, 2013). For instance, Indigenous scholars have written on the need to reorient environmental justice research away from the focus on the ecological and towards the relational, stressing the importance of relationships of kinship with both humans and non-humans (Whyte, 2020).

Moreover, the issues of who 'studies' the Arctic versus who is 'studied' and the problematic framing of Indigenous knowledge as 'local knowledge' (Cameron, 2012) should also be scrutinized. For instance, there are relatively few studies exploring the legacy of colonialism on the adaptive capacity of Indigenous populations in the Arctic, despite extensive scholarly research on similar topics in other parts of the world (e.g. Mikulewicz, 2020b; Reo & Parker, 2013). In general, the relegation of input from Indigenous communities to 'traditional knowledge' as opposed to 'formal' science (e.g. Parrotta & Agnoletti, 2012) risks perpetuating colonial relations by putting the responsibility for the lives of Indigenous communities exclusively in the hands of external actors. Meanwhile, beyond the ethical implications of foregrounding ethnocentric ontologies to studying climate change in the Arctic, climate research and policy can, and does, benefit from Indigenous knowledge (e.g. Huggel et al., 2015).

New methodologies

The calls for participatory research and a focus on equity issues in the Arctic have grown louder in recent years (Stephen, 2018). Petrov et al. (2016: 176) point out that more studies are needed on *"*equity, agency, power and justice*"* in the region. Yet, a review on methodologies for adaptation planning in the Canadian Arctic found that common methods included assessment of current and future vulnerabilities, potential adaptation pathways and monitoring, but did not always incorporate a participatory element in data collection (Champalle et al., 2015). This is considered a shortcoming in current research on adaptation in the Arctic and elsewhere, which has stressed the need to involve those affected by climate change in the selection of adaptive strategies, for instance by the use of community-based adaptation (CBA) approaches (Ensor et al., 2018). Moreover, Stephen (2018) observes that social scientific studies in the Arctic are often tailored for policymakers (a symptom of the push for research relevance beyond academia) which may end up producing research that frequently is less *"*curiosity-driven, independent, and theoretically and methodologically aware*"* (230).

These critiques provide cues for what a climate-justice-oriented research in the Arctic should look like from a methodological point of view. This includes developing proven frameworks with a more explicit participatory approach to data collection and featuring equity as a criterion for assessing priorities in adaptation planning, allowing a greater focus on vulnerable groups (Champalle et al., 2015). There is also a clear need for collaborative and co-productive approaches between Indigenous communities and researchers to allow participants-turned-researchers to play an active part in contextualizing the wider societal issues and decolonise current research methods (Huntington et al., 2019). What we would add to this is the need to open up our knowledge horizons (as discussed above) and to involve local and Indigenous people in the Arctic in research design, data collection and analysis, monitoring and evaluation, the selection of recommendations and research dissemination. Ethnographic and participatory action research (PAR) of this kind – while certainly more involved in terms of time and financial resources – holds promise for the pursuit of the difficult goal of decolonizing our knowledge on climate change in the Arctic and the associated knowledge production processes (Crang & Cook, 2007; Henderson et al., 2017;

Johnston-Goodstar, 2013; Reitan & Gibson, 2012; Ryder, 2018; Stoudt et al., 2012). Ultimately, this pursuit of new methodologies is to generate new thinking and narratives on what climate justice means for different Arctic communities.

Focus on 'real' solutions to climate change and climate injustice

Finally, we stress the need for Arctic climate scholars to be wary of 'false' solutions often touted as panacea for the Arctic's climate ills. These frequently come from ecological modernization proponents who advocate for a sustainable stewardship of the Arctic to ensure its socio-environmental integrity, as in the case of oil and gas development in the region which is to be managed in an environmentally-friendly way (Palosaari, 2020). However, these arguments miss the 'big picture'. There are important ethical implications of continuing fossil fuel extraction in the Arctic, with not just local but global consequences (Palosaari, 2020). Preventing oil spills and protecting Arctic biodiversity, while certainly important, will not solve these ethical quandaries. Therefore, climate justice research needs to ensure that the solutions it proposes do not fall into the trap of giving false hopes, as in the case of carbon markets and integrated natural resource management (Gardiner, 2011; Taylor, 2018). Instead, and drawing from political ecology, for instance, recommendations should always be situated within the context of the global system of production and consumption, and therefore stretch beyond the analytical constraints of the 'Arctic bubble'. Research on transformational adaptation – highly sceptical of resilience-focused approaches considered as inherently lacking in ambition (Gillard et al., 2016; Nightingale et al., 2019) – can signpost the way for 'real' solutions for climate change and climate injustice that fully embrace the socio-political nature of climate change and its impacts.

Conclusion and priorities for future research

We move to the concluding section of our paper where we detail three key implications for future research on climate change and climate justice in the Arctic.

Embracing non-Western frameworks of climate justice

The North American origins of climate justice (see Schlosberg & Collins, 2014) mean that the frameworks are inherently constructed for a Western audience. The justice conceptualisations that have developed throughout the past 50 years have been by Western, or European and American thinkers (Meyer & Sanklecha, 2017; Routledge et al., 2018). One common feature is the focus on Western forms of justice on human dimensions (Kortetmäki, 2016). A brief overview of competing non-Western philosophies (see Table 1 below) reveals that non-human life takes a more prominent role. There have been calls to catalogue, or even summarise, alternative approaches to conceptual frameworks that can allow us to unearth bottom-up non-Western understandings of justice (McCauley et al., 2019; Sovacool et al., 2017). A starting point for Arctic research are the non-anthropocentric concepts of justice, especially animism (Loukacheva, 2012).

Table 1: Summary of non-Western and non-anthropocentric philosophies and applications for climate justice research in the Arctic. Adapted from McCauley et al. (2019) and Sovacool et al. (2017).

Concept	**Definition**	**Application to climate justice**
Ubuntu	The act of building community, friendship and oneness with the larger humanity	Neighbourhood efforts to promote efficiency, decisions about energy resources within a community
Taoism and Confucianism	The Tao or Dao emphasizes the virtuous path that leads to greater harmony amongst humanity. It assumes a universal nature and the Means to an end is more important than the end itself	Respecting due process in decisions, adhering to human rights protections when implementing climate related projects
Hinduism and Dharma	Dharma carries the notion of righteousness and moral duty and is always intended to achieve order, longevity and collective well-being. It is context specific and does not render itself to universalization. Gandhi is a prominent example that espoused and practiced Dharma	Seeking to minimize the extent and distribution of externalities, offering access to help address poverty
Buddhism	Expounds the notion of selflessness and compassion, the pursuit of individual salvation or nirvana. Often criticized for its inability to deal with real social issues	Respecting present and future generations with climate related decisions, minimizing harm to the environment and society
Indigenous Perspectives of the Americas	Cultivation of a cultural mindset that recognizes interdependence of all life and enables good living through responsibility and respect for oneself and the natural world, including other people	Systems developed cautiously through long-term experience and sovereign cultural protocols, avoiding dramatic transformation of ecosystems, requiring restoration
Animal-centrism / animism	Difference in degree but not in kind between humans and all other animals. Valuing and recognizing rights of all sentient life	Development avoids harm and provides benefits to all sentient animals

Biocentrism	Valuing all living beings based on a reverence for life that stems from recognition of the will to live and the basic interest to survive and flourish	Decisions guiding by consideration of competing claims to a fair share of environmental resources among all living beings, where basic welfare interests outweigh non-basic welfare interests
Ecocentrism	Moral consideration for human and nonhuman communities and the basic functioning and interdependence of the ecological community as a whole	A system is just when it tends to preserve the integrity, diversity, resilience, and flourishing of the whole community, involving direct caring relationships and formal rights of nature

This difference in justice conceptualisations can be easily seen when exploring the Arctic strategies of the Inuit Circumpolar Council (ICC). In a recent report, the ICC observed that *"*for Inuit, the Arctic defines who we are" (2018: 7), while the Utqiaġvik Declaration states that "Our culture is dependent on the land and sea*"* (ICC, 2018: 8). These quotes directly underscore why demands for justice are culturally embedded within the Arctic environment. A previous report by ICC (2015: 14) notes that *"*for over fifty years, Arctic regions have been depositories, analogous to sinks for many pollutants emanating from around the world*"*. This sense of injustice is driven by a connection to nature, but further systematic work is needed to begin to untangle the implications of non-Western understandings of justice for the Arctic.

Inspire, reveal and share experiences of climate injustice in the Arctic

In referring to Indigenous storytelling, Reed and George (2011) remind us that readers need to adopt new ways of listening in order to understand not only senses of justice but also injustice. This paper challenges academics to similarly adopt, or as in several instances continue, an approach predicated on 'listening' to how injustices are experienced. Houston (2013) calls on scholars to explore the imaginative practices of how stories are performed in justice struggles in shaping alternative imaginations of place. Storytelling can be a powerful tool. It produces different environmental imaginaries about the kinds of worlds people want (or not) to live in. In so doing, such stories can act as a sort of mobile repertoire for combating injustices in other places. They can effectively inspire the construction of justice frames based on success elsewhere. Walker (2009: 622) comments, for example, that *"*as we move from concern to concern and from context to context, we can expect shifts in both the spatial relations that are seen to be significant and in the nature of justice claims being made*"*. Therefore, it is important that climate justice research in the Arctic examine multiple reasons for the "construction of *injustice*" (Schlosberg, 2013: 37, emphasis in original). In this paper, we call for an exploration of the construction of multiple injustices through activism-based research for Arctic regions

Climate justice as a bridge to interdisciplinarity

Sustainable development has been a central focal point for both social science and natural science researchers in the Arctic (Afenyo et al., 2019; Andreassen, 2016; Hilbert & Werner, 2016; Tysiachniouk & Petrov, 2018). It has been a common discourse that has allowed the humanities

to engage in a meaningful manner in Arctic related research (Aporta, 2009). So, what does this mean for climate justice? As a recent study by Overland and Sovacool (2020) detailed, climate change research is still heavily dominated by natural science interests. A wider rebalancing is urgently needed, but in the interim period, there is an opportunity for climate justice to offer a much needed normative framework for interdisciplinary research (Heffron & McCauley, 2017). The cornerstone of interdisciplinary research is when disciplines work in an integrated way (Boylan et al., 2019). As such, we advocate that climate justice scholars are at the forefront of not just problem definition, but also crucially, their solution.

This has real practical implications. Let us consider the problem of redistributing the burdens of climate action. Scholars would normally reflect on problem definition. This is a necessary process to allow cross-disciplinary scholars to develop tools, mechanisms and outputs that lead to meaningful solutions. Three mechanisms immediately emerge in relation to justice research. The use of a "justice matrix" can allow for the input of natural and social science research to demonstrate the trade-offs involved in making a policy decision, for instance helping to identify particular regions that should be targeted for redistribution of resources (Heffron et al., 2015, 2018). Similarly, a "justice-based economic valuation" can reveal the true costs of decisions (Sayegh, 2019). A justice-based approach to mapping decisions through GIS, for instance, can force policy-makers to consider the physical, cultural and social implications of their policy (Chang et al., 2015; Eisner et al., 2012). These examples of shared tools are the real delivery mechanisms of an interdisciplinary project.

In conclusion, approaches rooted in climate justice can push the boundaries of current research on climate change in the Arctic. Climate justice strongly aligns with the pursuit of sustainable development as the impacts of climate change in the region pose challenges to Arctic ecosystems, biodiversity, human development, and livelihoods, most notably in remote and Indigenous communities (Jafry, Mikulewicz, et al., 2019; Jourdan & Wertin, 2020). This new research direction comes with the recognition of the uneven distribution of climate change impacts and the damaging legacy of colonialism on Indigenous and remote communities' ability to mitigate and adapt to its impacts (Huntington et al., 2019; Whyte, 2020), and advocates a critical reflection on the role of these communities in knowledge production processes (Cameron, 2012). In addition, the equitable application of climate-related policy and the involvement of the most affected communities in the decision-making process and co-producing solutions is a procedural step towards reaching transformative solutions to societal inequalities (Jafry & Platje, 2016; Verbitsky, 2014; P. Wilson, 2016). There are parallels to be drawn here with the Arctic Circle's mission to facilitate dialogue and strengthen decision-making processes in Arctic governance (Arctic Portal, 2013), and the unique status given to Indigenous representatives in the Arctic Council (Koivurova & Stępień, 2011). In sum, climate justice-centred frameworks provide an opportunity to incorporate humanities, social and natural sciences through strongly aligned interdisciplinary research capable of informing policymakers on the true cost of and the 'real' solutions for climate change and our response to it.

Notes

1. This review was complemented by feedback obtained as part of a webinar on integrating climate justice into Arctic research and policy. The event took place on June 10, 2020 and was hosted by

the Centre for Climate Justice at Glasgow Caledonian University. It included an audience of over 95 academics, practitioners, decision-makers and members of the public who were asked to provide feedback on promoting climate justice within the fields of Arctic research and policy.

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Section III: Arctic Climate Change, From Science to Policy

Climate Change Accountability, Including TCFD in the Nordic Arctic Countries

Alexandra Middleton

Collectively, Finland, Norway and Sweden have some of the most ambitious commitments for combatting climate change, with Finland's goal to be carbon neutral by 2035, Norway's goal to reduce greenhouse gas emissions by 40% by 2030 and Sweden's goal to have zero net greenhouse gas emissions by 2045 at the latest. Recent attempts on the international level to address climate change have resulted in setting up in 2015 the FSB (Financial Stability Board) Task Force on Climate-related Financial Disclosures (TCFD). In 2017 TCFD introduced recommendations on voluntary, consistent climate-related financial risk disclosures for companies to provide information to investors and other stakeholders about risks and opportunities related to the transition to a lower-carbon economy. The article addresses climate change accountability by states and by companies in the Nordic Arctic countries. Climate change accountability or willingness to take responsibility is proxied by companies' reporting in compliance with TCFD. First, I investigate institutional mechanisms of TCFD adoption in the Nordic Arctic, including Finland, Norway and Sweden. To achieve that, I study Finnish, Norwegian, and Swedish institutions that endorse or provide practical guidelines for implementing TCFD, e.g., stock market regulators. The study results provide an overview of governance structures and practical implementation of TCFD in the Nordic Arctic (Finland, Norway and Sweden). Furthermore, the study contributes to the discussion on how to balance ambitious climate change targets with sustainable economic development in the Arctic regions.

Introduction

Human security is a people-centered concept that includes protection from threats in the areas of economic, food, health, environmental, personal, community and political security (Berghof-Foundation, 2020). It is endorsed by more than 170 states and received a new boost after the launch of the UN Agenda 2030 in 2015 (Middleton, 2019). The Nordic countries of Sweden, Norway and Finland perform exceptionally well in international assessments such as quality of life, happiness index, etc. At the same time, northern, Arctic regions of these countries experience negative population dynamics with decreasing populations of youth and young adults and disparities in tertiary education attainment (Business Index North, 2019; Business Index North, 2020). Focusing

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on the environmental pillar of human security, the goal of this article is to study climate change accountability in the Nordic Arctic, including Finland, Sweden and Norway. First, I introduce the role of the state and corporations in mitigating climate change. Then, I discuss mechanisms available for accountability, such as the Task Force on Climate-Related Reporting (TCFD) guidelines. Finally, I investigate institutional factors for achieving the accountability and implementation of TCFD.

The article proceeds as follows. Section 1 discusses accountability, climate change, and the role of companies. Section 2 provides an overview of the TCFD as an accountability tool. Section 3 presents methods and data. Section 4 describes results on the institutional environment and climate change accountability in the Nordic Arctic countries. Finally, Section 5 concludes the article.

Accountability, climate change, and the role of the state and companies

In 2015, the Paris Agreement marked an important landmark in human history when world nations agreed to commit and unite efforts in combating climate change. According to the Paris Agreement, parties should limit their emission and secure a global temperature rise this century well below 2 °C (UN). The Paris Agreement replaced the Kyoto Protocol, an earlier international treaty designed to curb the release of greenhouse gases. The Paris Agreement entered into force in 2016 and has been signed by 197 countries and ratified by 187 as of November 2019 (UN, 2020).

The Paris Agreement is realized via nationally determined contributions (NDCs). This includes requirements that all Parties regularly report on their emissions and their implementation efforts (UN, 2020). Hence, the states are each individually responsible for NDCs that represent the country's efforts to reduce national emissions and adapt to the impacts of climate change. The Paris Agreement (Article 4, paragraph 2) requires each Party to prepare, communicate and maintain successive nationally determined contributions (NDCs) that it intends to achieve (UN, 2020). Accountability mechanisms are needed due to the urgency of the actions required. According to the IPCC Special Report *Global Warming of 1.5°C* from 2018, there is just over a decade left to limit climate change and make the changes in behaviours, policies and practices needed to limit global warming to 1.5°C (IPCC, 2018).

As seen from the mechanisms of the Paris Agreement, it includes elements of "accountability," signees are required to state the targets, document them, communicate and follow-up. The meaning of the term "accountability" used in this article is more broad. It includes two notions: *answerability*, an obligation of public officials to inform and explain what they are doing and; *enforcement* the capacity of the agencies to enforce sanctions on powerholders if they violate their public duties (Schedler et al., 1999: 14). Accountability is viewed as a right to receive information and the obligation to release information, leading to a possibility of dialogue between parties (Shedler, 1999). Accountability sets the normative concept as a set of standards for the evaluation of the behavior of public actors and can be viewed as a mechanism in which an actor can be held accountable by a forum (Bovens, 2010).

Apart from state accountability, corporations play a significant role in the implementation of the Paris Agreement. In 2019, the Climate Accountability Institute released an analysis of global fossil fuel and cement emissions of CO^2 since 1751, calculating the proportion emitted since 1988. According to estimates, half of all global industrial CO^2 emissions since 1751 were emitted from

1988 through 2014. Nearly 70% of carbon dioxide emitted since the 1750s can be traced to the 90 largest fossil fuel and cement producers, most of which still operate today (see Figure 1).

Figure 1. Global CO^2 by major global corporations

Source: Climate Accountability Institute, 2019

The Carbon Majors Report by the Climate Accountability Institute attributes (GHG) emissions to companies. Direct operational emissions and emissions from the use of sold products (Scope 3) are attributed to the extraction and production of oil, gas, and coal. Scope 1 emissions arise from the self-consumption of fuel, flaring, and venting or fugitive releases of methane. Scope 3 emissions account for 90% of total company emissions and result from the downstream combustion of coal, oil, and gas for energy purposes (The Climate Accountability Institute, 2019).

Climate change accountability of corporations has been limited, and there have not been many mechanisms available. In most countries, GHG emissions reporting for companies has been and still is voluntary, even though that reporting has been recognized as an essential factor in shifting to a more sustainable economic model worldwide (Baboukardos, 2017). Investors factor GHG emissions into their valuation models and use GHG emissions as a proxy for assessing firms' unaccounted future environmental liabilities, resulting in a negative association between GHG emissions and market stock valuation (Baboukardos, 2017). Some countries, such as the UK in 2013, introduced compulsory GHG emissions disclosures for the listed companies traded on the London stock exchange. However, still, the scale and scope of climate change accountability by the companies have remained very narrow.

In 2015, Financial Stability Boards established the Task Force on Climate-related Financial Disclosures (TCFD) to develop a set of voluntary, consistent disclosure recommendations for use

by companies. The next section addresses the main components of TCFD and discusses how disclosures can serve as an element of accountability.

Task-Force on Climate-Related Reporting

The Financial Stability Board (FSB) is an international body that monitors and makes recommendations about the global financial system. It was established in April 2009 as the successor to the Financial Stability Forum (FSF). The FSB is endorsed by the Heads of State and Governments of the G20. The FSB has a key role in promoting the reform of international financial regulation and supervision.

In 2015 the FSB directed the Task Force on Climate-related Financial Disclosures (TCFD) to deliver a set of recommendations for voluntary company financial disclosures of climate-related risks. The aim of the disclosures, once adopted by the companies, is to provide information to investors, lenders and insurance companies about their climate-related financial risks. The motivation to disclose risks lies in the understanding that investors who keep their stakes in companies dedicated to fossil fuels may find their investment becoming riskier with time. Market demand for decision-useful climate-related information by various participants in the financial markets has continued to grow over the last decade. Evidence suggests that the lack of consistent information hinders investors and other stakeholders from considering climate-related issues in their asset valuation, allocation and decision-making processes, which is believed to be alleviated with the introduction of comprehensive reporting standards (FSB).

The Task Force published its recommendations in June 2017 after extensive public engagement and consultation. The TCFD developed 11 recommendations on climate-related financial disclosures that apply to organizations across sectors and jurisdictions. The TCFD includes four major blocks on which reporting is expected: governance, strategy, risk management, metrics and targets (TCFD, 2017). Recommendations link financial and non-financial information, so the company could report on risks and opportunities, time horizons, and introduce scenario analysis.

Unlike previous reporting standards, introduced as a reaction to, for example, accounting scandals such as Enron, the TCFD is proactive and seeks to address the issues of financial stability before a crisis happens and supports the transition to a low carbon economy (TCFD, 2017). Schematically TCFD can be summarized as follows (see Figure 2). Climate change impact on financial performance (the lower blocks, including income statement, cash flow, and balance sheet) should encompass an assessment of risks and opportunities pertaining to climate change. Risks are grouped into two categories: transition and physical risks. *Transition risks* are linked to the transformation towards a low-carbon economy, such as regulatory changes limiting GHG and technological changes. *Physical risks* stem directly from climate change, such as more frequent and extreme weather events and changes in the balance of the ecosystem.

Therefore, to provide a TCFD compliant reporting, a company should evaluate climate-related risks (both transition and physical) and opportunities and provide estimates of how these risks and opportunities would financially affect the company. Consistent TCFD reporting can serve as a useful tool to enhance climate change accountability by companies and provide information about climate-related risks and opportunities to investors. Empirical analysis, however, demonstrates that in practice, few companies report on climate change risks and risk-management strategies through

mainstream financial filings despite the physical consequences of climate change being of high value to investors (Goldstein et al., 2019).

Figure 2. Climate-related risks, opportunities, and financial impact

Source: TCFD Recommendations, 2017: 8.

Methods and data

First, I apply the concept of accountability (Shedler, 1999; Bovens, 2010) in relation to climate change, by asking questions about the mechanisms of climate change accountability in the Nordic Arctic countries. What is the role of corporations in climate change accountability in the Nordic Arctic countries?

Second, I apply institutional theory dealing with regulatory processes that establish rules for firms' behavior and sanctions for violating it (Lawrence & Morell, 1995; Scott, 1995). While initially institutional theory viewed the institutional environment and its elements (regulations, norms and associative forces) as top-down forces on the organization (Scott, 1995), later bottom-up models of influence emerged, where organizations themselves can be active players in setting the rules and norms and reflect their institutional environment through creative processes (DiMaggio, 1988). Hence, in my analysis, I evaluate the actors and the processes that pertain to the state and corporations in climate change accountability.

I used publicly available data from the UN Climate Change platforms, European Commission's in-house Emissions Database for Global Atmospheric Research (EDGAR), data from the Business Index North Reports (2018-2020) and national websites on progress to Paris Agreement. Furthermore, I collected publicly available data from stock exchanges in Norway, Sweden, and Finland, the TCFD hub database, and data from state pension companies.

Results and discussion

In order to understand where the Arctic countries stand in terms of global levels of CO^2 emissions and their progress in reducing CO^2 emissions, I collected data from the European Commission's in-house Emissions Database for Global Atmospheric Research (EDGAR) (see Figure 3). The data

points are available for indicating ton CO^2 per capita in the Arctic states from 2010 and 2017, making it possible to evaluate the progress.

Figure 3. Ton CO^2 per capita in the Arctic states, in 2010 and 2017

Source: European Commission's in-house Emissions Database for Global Atmospheric Research (EDGAR), collected by the author.

Figure 3 illustrates that among the Arctic countries, Canada and the USA are the top contributors in terms of CO^2 emissions when compared to the EU-28 average. The graph demonstrates that the Arctic countries, being developed ones, are contributing much more in terms of CO^2 emissions as the Global Total. Best performing out of Arctic countries are Sweden and Denmark with the lowest ton CO^2 per capita in the Arctic states and well below the EU-28 average of 7 ton CO^2 per capita in 2017. In terms of progress in CO^2 reductions, Denmark, Finland, and the USA have considerably reduced their CO^2 emissions per capita from 2010 to 2017.

Factors that contribute to the levels of CO^2 emissions per capita include (Pettinger, 2019): GDP level (countries with higher GDP levels tend to be more industrialized and use hydrocarbons in industrial production), economy focus (e.g. oil production), transport policy (levels of petrol tax and car usage), and policies to reduce CO^2 emissions and modes of power generation. In the case of Arctic states, the levels of CO^2 emissions are influenced by climatic factors (cold winters), a high percentage of population living in off-grid settlements (McDowall, 2018) and a different scale of technological development in terms of renewable energy in the total energy mix (Business Index North, 2019).

In this article, I focus on the polices that Nordic Arctic countries use to address climate change by reducing their CO^2 emissions.

Regional level CO^2 emissions in the Nordic Arctic states

When investigating CO^2 emissions in the Nordic Arctic states, I focus on the northern regions of Finland (Lapland, Kainuu, North Ostrobothnia), Norway (Troms, Finnmark, Nordland) and Sweden (Västerbotten, Norrbotten) (see Figure 4).

Figure 4. Regions in the Nordic Arctic states (The Nomenclature of territorial units for statistics (NUTS) level 3).

Source: Business Index North, 2018.

At the state level, all three countries (Finland, Norway and Sweden) have made progress on reducing their CO^2 emissions (see Figure 3). The situation on the regional level presented in Figure 5 is different. For example, regions of Lapland and North Ostrobothnia have reasonably high CO^2 equivalent emissions per capita than Finland as a whole due to developed industrial clusters of metallurgical and other carbon-intensive industries; the same holds for Finnmark and Nordland in Norway and Norrbotten in Sweden (Business Index North, 2019). These Arctic regions with large industrial and manufacturing bases are very sparsely populated. Hence the industrial emissions per capita are high.

Figure 5. Ton CO^2 equivalent emissions per capita, 2017

Source: Business Index North, 2019

On the regional level, the same industry-driven regions of Norrbotten, Finnmark, and Nordland had growth of ton CO^2 eq emissions per capita from 2013 to 2017 in the range of 7-10% (see Figure 6). Figure 6 highlights challenges on the regional level for national climate change targets. The growth of industrial activity coupled with challenging demographic trends (e.g., decline in youth and young adult population and growing elderly population)(Business Index North, 2019) demonstrates the vulnerability of the Arctic regions and the need for targeted climate-change mitigation plans.

Figure 6. Change in ton CO^2 equivalent per capita, %, 2013-2017

Source: Business Index North, 2019.

Climate change institutional setting in the Nordic Arctic countries

Analysis of climate change policies yields results that all three countries have a comprehensive set of climate change policies with very ambitious goals. Next, I address the specifics of each country's climate change policies individually.

Finland

Finland introduced the Climate Change Act (609/2015) in 2015. It is the first national statute defining general long-term guidelines for Finland's climate change policy and laying down provisions on a planning system for climate change policy.

The purpose of this Act is: 1) to establish a framework for the planning of climate change policy in Finland and the monitoring of its implementation; 2) to enhance and coordinate the activities of state authorities in planning measures that are aimed at mitigation of climate change and adaptation to it, and the monitoring of the implementation of these measures; and 3) to strengthen the opportunities of Parliament and the public to participate in and affect the planning of climate change policy in Finland. According to the Act, the Finnish Government submits a report to Parliament on the climate change policy plans that it has prepared. Parliament also receives information about the achievement of targets and objectives concerning climate change and on the

effectiveness of the measures as part of the annual climate change report included in the Government's annual report. Additionally, the Climate Change Act contains provisions on appointing a multidisciplinary expert body called the Finnish Climate Panel (Ministry of the Environment).

Initially, the 2050 target was to "*ensure that the total anthropogenic emissions of greenhouse gases into the atmosphere is reduced in Finland by at least 80 per cent by 2050 compared to 1990 levels*". However, with a newly elected government, the target has been changed to a more ambitious one. The objectives of the Programme of Prime Minister Sanna Marin's Government include a carbon-neutral Finland by 2035.

Hence, for Finland the targets are:

> Finland becoming a carbon-neutral by 2035, carbon neutrality means that emissions and the sinks that sequester carbon are of the same size.
>
> To reduce greenhouse gas emissions from the non-emissions trading sectors by at least 16% by 2020 and 39% by 2030 from the levels in 2005 (Valtioneuvosto, 2020).

Norway

Norway introduced the Climate Change Act (2017) to promote the implementation of Norway's climate targets as part of its process of transformation to a low-emission society by 2050. The purpose of the Act is to: 1) promote the implementation of Norway's climate targets as part of its process of transformation to a low-emission society by 2050; and 2) promote transparency and public debate on the status, direction and progress of this work. The Act specifies climate targets for 2030 and 2050:

> The target is for greenhouse gas emissions to be reduced by at least 40% by 2030 compared with the reference year 1990.
>
> Becoming low-emission society by 2050, achieving reductions of greenhouse gas emissions of the order of 80-95% from the level in the reference year 1990.

The Act includes elements of accountability, since each year, the Government shall, on the basis of scientific information, provide the Parliament with an account of changes in emissions and removals of greenhouse gases, projections of emissions and removals, and progress towards the climate targets.

Sweden

In 2017 Sweden adopted a new climate policy framework. The framework consists of a climate act, climate targets and a climate policy council. The Climate Act entered into force on the first of January 2018. The Act establishes that the government's climate policy must be based on climate targets and specifies how the implementation is to be carried out. According to the Climate Act the government shall: 1) present a climate report in its budget bill each year; 2) draw up a climate policy action plan every fourth year to describe how the climate targets are to be achieved; and 3) make sure that climate policy goals and budget policy goals work together.

Climate targets for Sweden are:

> The long-term target for Sweden is zero net greenhouse gas emissions by 2045 at the latest. After 2045 Sweden is to achieve negative net emissions.

Mid-term targets include emissions compared to 1990 to be 40% lower by 2020, to be 63% lower by 2030, and to be 75% lower by 2040.

Overall, all three countries have well-defined climate change policies with accountability mechanisms in terms of measurable targets. Still, much more clarity is required on the role of each industry and the role of regional climate targets. While policies provide some indication on the role of certain industries in the transition to a carbon-neutral future, none of them directly addresses the role of the companies in the process.

Institutional environment for TCFD implementation

As discussed in the review of TCFD recommendations, the guidelines related to climate-related reporting remain voluntary, and it is up to the companies themselves to decide on the timeframe of their adoption. In this section, I assess the scale of TCFD reporting in the Nordic Arctic countries. Moreover, I address the presence or absence of institutional forces that would support or suppress the transition towards climate-related reporting.

TCFD status report 2019 reviews the status of TCFD uptake worldwide and lists that governments from Belgium, Canada, France, Sweden, and the UK support climate-related reporting for companies. In 2020, the Government of New Zealand announced a planned mandatory TCFD reporting for all banks, asset managers and insurance companies with more than NZ$1 billion (CDSB 2020). In Sweden, TCFD support is concentrated among financial firms. The Swedish International Development Cooperation Agency (SIDA), a government agency, has organized TCFD workshops to bring together Swedish financial firms to work on TCFD implementation.

TCFD support at country level

The TCFD website contains data on supporters of TCFD that are available by country and by sector of economy and industry basis. To compare the prevalence of TCFD support in the Nordic Arctic region, I extract data on Finland, Norway, and Sweden summarized in Figures 7, 8 and 9.

In Finland, 16 companies and organizations are listed as TCFD supporters, with the largest proportion being the financial industry (10 organizations) (See Figure 7).

Figure 7. TCFD supporters in Finland, 2020

Source: TCFD hub database (2020).

In Norway, out of 29 TCFD supporters, 70% comes from the financial sector, and a very small number of supporters are from the energy and materials sector (6 organizations altogether) (see Figure 8).

Figure 8. TCFD supporters in Norway, 2020

Source: TCFD hub database, 2020

Similarly, in Sweden, out of 37 TCFD supporters, a large proportion originates from the financial sector (81%), while the share of carbon-intensive sectors is minimal.

Figure 9. TCFD supporters in Sweden, 2020

Source: TCFD hub database, 2020

Overall, in all three Nordic Arctic countries, TCFD support is outnumbered by the financial sector. Therefore, from the institutional perspective, the field of TCFD development and compliance is driven by the financial sector represented by banks, financial institutions, and investment firms. In Sweden, one may see the rising role of national pension funds as avid supporters of TCFD.

Role of stock exchanges

Stock exchanges provide an essential function to the economy where money can be raised by companies, and trading can be done securely. They can also offer listing and reporting requirements for stock issuers (Macey & O'Hara, 2002). Stock exchanges in Finland, Norway, and Sweden offer written guidance of environmental, social, and corporate governance (ESG), but at the same time do not require ESG reporting from listed companies. The same principle of voluntary reporting applies to TCFD. A quote from the president of Oslo stock exchange below summarizes the spirit of reporting requirements well:

> Oslo Børs encourages our listed companies to implement the voluntary recommendations of the Task Force on Climate-related Financial Disclosures. The TCFD framework provides companies and investors with valuable tools for sustainable business and investment decisions – Bente A. Landsnes, President & Chief Executive Officer, Oslo Børs ASA.

In terms of GHG reporting, a study by SITRA (2017) finds that only 34% of companies in Nasdaq Helsinki disclose their emissions, compared to 27% in the Nasdaq Stockholm. The largest contributors to the emissions of Nasdaq Helsinki are Fortum (34%), SSAB (18%), and UPMKymmene (13%), which have substantial operations in the Arctic regions. The climate risk disclosure barometer by EY (2017) found that there is a lack of company disclosures around 2^0 C scenarios of companies listed on the Oslo stock exchange.

Analysis of institutional settings for climate change accountability

Analysis of the institutional environment provides us with an understanding of climate change accountability in the Nordic Arctic. I observe both the lack of binding reporting requirements under TCFD in the Nordic Arctic countries and lack of voluntary disclosures by the firms listed on the Finnish, Norwegian, and Swedish stock exchanges. While the governments of Finland, Norway and Sweden have ambitious plans towards GHG reductions, the role of corporations and the regional complexity of transition towards a carbon-neutral future is not well operationalised. TCFD, as an element of corporate accountability, is pioneered mostly by financial institutions and not by the carbon-intensive players themselves. Therefore one may observe a phenomenon of mediated accountability (Kostogriz & Doecke, 2011) when financial institutions are expected to exert pressure on other sectors to follow TCFD in exchange for finance provision or inclusion in, for example, environmentally friendly portfolios.

The mechanisms for including TCFD as part of compulsory reporting already exist. The World Economic Forum's Global Risk Report 2019 outlines a clear role for governments worldwide to mandate legislation on climate-related disclosures and thus accelerate climate action by businesses (World Economic Forum, 2019). Moreover, in 2019 CDP and the Climate Disclosure Standards Board (CDSB) created a roadmap outlining possible avenues for embedding the TCFD recommendations into national legislation across G7 member countries (CDP, 2019).

The concept of human security plays an important role in designing a just transition to a carbon-free future. Analysis of Arctic regions in Finland, Norway and Sweden demonstrates that a high level of industrialization coupled with socio-demographic problems may present challenges for a just transition. According to Elizabeth Yeampierre, Co-Chair of the national Climate Justice Alliance, a just transition includes the following elements (Gardiner, 2020):

> A just transition is a process that moves us away from a fossil fuel economy to local liveable economies, to regenerative economies. A just transition looks at the process of how we get there, and so it looks at not just the outcomes, which is something that the environmentalists look at, but it looks at the process – workers' rights, land use, how people are treated.

Ultimately, climate change accountability should contribute to the sustainable development of Arctic communities. Therefore, the notion of human security encompassing all seven pillars (economic, food, health, environmental, personal, community and political) shall be incorporated in the strategies on climate change. Moreover, it would be beneficial to have dedicated regional strategies and action plans that account for the challenges the Arctic regions are facing. Climate change accountability on the national level should go hand in hand with human security accountability in the Arctic.

Conclusions

Climate change accountability is developed in the Nordic Arctic countries at the country level with strong climate change policies and accountability mechanisms. Analysis of regional climate change situations, however, reveals that the Arctic regions of the countries under analysis face challenges in reducing their GHG emissions.

On the institutional level, there is a substantial level of commitment from the governments of Finland, Norway, and Sweden to meet the Paris Agreement goals, but the role of corporations is not explicitly elaborated in any of the policies under analysis. TCFD reporting that can serve as a useful tool for increasing climate-change accountability by corporations remains voluntary since neither governments nor stock exchanges require TCFD compliant disclosures. The strongest driver of TCFD adoption is the financial sector in Finland, Sweden, and Norway, represented by banks, investment and financial organization, and pension funds. Yet, very little support is given to TCFD by carbon-intensive industries such as oil and gas, utilities and manufacturing.

Findings reveal that corporations need to be involved in a meaningful way in climate change accountability, and some mechanism of compulsory minimum level disclosures should be considered for implementation. Moreover, Arctic regions that face challenges in climate change mitigation strategies due to industry structure would require some tailored and targeted solutions. On the EU level, this can be achieved via the Just Energy Transition Fund linking energy transition targets with the reduction of economic inequality (Polish Economic Institute, 2019). All in all, the goal of the Just-Transition Fund is the reduction of emissions that includes social support and ensures a socially and economically just transition. In Finland, the Arctic regions of Lapland, Kainuu, and North Ostrobothnia are eligible for the fund; in Sweden, the regions of Västerbotten and Norrbotten are eligible. Norway, not being part of the EU, is not included in this mechanism. In October 2020 Finland initiated a public citizens' consultation on the Climate Change Act to include views on just transition towards a carbon-neutral society. Pertaining to the Arctic regions,

consulation collects opinions on how the rights of the Saami people should be included in the Act (Ministry of the Environment, 2020). This can be viewed as one the approaches to account for the Arctic regions specifics on the way to transition.

To conclude, the article highlights the challenges of climate change accountability and climate change mitigation strategies, with a particular focus on the institutional forces and actors involved in the Nordic Arctic. Furthermore, climate change accountability requires an understanding of regional specifics of the Arctic regions. It hence needs to be targeted to their needs, including human security and the wellbeing of Arctic communities.

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Fewer Treaties, More Soft Law:
What Does it Mean for the Arctic and Climate Change?

Hema Nadarajah

Soft law has been observed to be increasing within the global system, particularly in regions and issue-areas where scientific and technological knowledge has been substantively integrated into decision-making and governance. The often-used assumption for the prevalence of such instruments has been the uncertainty of scientific knowledge. This paper takes this oversimplified analysis further by examining the contemporary changes to the international system such as the number and diversity of state and non-state actors as well as their relative influence through a close examination of the Arctic and climate change.

This paper makes three fundamental contributions. Firstly, it proposes that soft law instruments would be best categorized as binding or non-binding. Binding soft law instruments, called "soft treaties", fall within the twilight zone of binding, yet soft instruments that contain little to no new obligations for its Parties. Secondly, it empirically establishes that soft law instruments are becoming more pervasive than previously claimed in the literature. In order to identify reasons for its prevalence, this research examines a sample of instruments using mixed methodology encompassing legal textual analysis and a review of the international relations and international law literature. Thirdly, it examines the potential consequences of this contemporary global policy paradigm that is rooted in soft law and its variants. The following implications of soft law's prevalence were identified within the cases of the Arctic and climate change: (1) written international law is increasingly adaptable and follows a non-linear evolution; (2) complacency could stem from institutional design established by soft law; (3) path dependency to cooperate within discrete areas could emerge through the iterated negotiation of soft law instruments, despite diplomatic challenges faced elsewhere; and (4) more opportunities for states to forum shop may arise due to soft law's prevalence within each regime complex.

Introduction

"In 1992 … international legal rules, procedures and organizations are more visible and arguably more effective than at any time since 1945" (Burley, 1993: 205). These rules serve to cement the relationships of states. However, similar to the natural sciences, international law is still replete with uncertainties. These uncertainties arise from its genesis, whether it is binding, and more fundamentally, what exactly international law entails. In order to explore the uncertainty of international law and its role in international relations, clear terminology and classifications are key.

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Written international law can be differentiated in several ways, one of which is by using a spectrum ranging from 'soft law', in the form of resolutions and declarations, to 'hard law' in the form of treaties. Another approach categorizes written agreements in a binary form — non-binding and binding, the former being soft and the latter hard law. However, these two widely used definitions generate extremely broad categories that fail to capture the nuances of the more specific forms of instruments that we see in the international legal system today. The terminology and classification of soft law are overly simplified and possibly outdated. For example, the Paris Agreement as well as all three agreements negotiated under the auspices of the Arctic Council[1] are binding but soft, and as such, fall within a very specific part of the soft–hard spectrum. Such instruments classified here as "soft treaties", are binding documents that are "soft" in terms of their substantive expectations. The literature, while also claiming that soft law (both binding and non-binding) is increasing within the international system, has failed to empirically substantiate this observation.

Soft law has been observed to be increasing within the global system, particularly in regions and issue-areas where scientific and technological knowledge has been substantively integrated into decision-making and governance. The often-used assumption for the prevalence of such instruments has been the uncertainty of scientific knowledge. What are the implications of states having recourse to soft law, an instrument with weaker degrees of legalization, in certain regions or issue areas? Soft law is often assumed to be characteristic of areas where decisions are based on the best available and often uncertain scientific and technological knowledge. This paper takes this analysis further by examining the implications of such an increase through a close examination of the Arctic and climate change.

By re-conceptualizing soft law to encompass both its binding and non-binding variants this article aims to address the gaps in the literature on soft law and, also, to help bridge the international relations and international law gap. Such an analysis will not only help us gain a better understanding of the international system, as it exists today, and how it has changed, but also develop our understanding of the relationship between international relations and international law, the role of negotiation, the deliberate use of legal language, and the importance of the context within which each agreement was negotiated. More broadly, it could also inform decision-makers and relevant stakeholders of the relative costs and benefits of the various forms of international instruments.

This article first introduces the conceptual framework that it uses to identify soft law instruments. Drawing on the existing international relations and international law literature on soft law, it demonstrates that soft law is indeed far more pervasive in the Arctic and Climate Change than previously thought. Using this novel form of categorization and definition of soft law, it then argues that the global public policy paradigm is shifting towards one that is steeped in soft law, as opposed to one cemented in hard law. Before concluding this article, the implications of such a shift is examined within the cases of the Arctic and Climate Change.

Re-conceptualizing soft law

This article argues that soft law instruments would be best categorized as binding or non-binding. Binding soft law instruments, called "soft treaties" – fall within the twilight zone of binding, yet soft instruments that contain little to no new obligations for its Parties. Figure 1 below illustrates the broader definitional framework of soft law that this article uses. The spectrum indicates the degree to which a written international legal instrument is binding on its parties.

Figure 1. Spectrum of written international law with the shaded segments representing soft law

Non-binding soft law

Non-binding soft law is defined, in this article, to be simply any legal instrument that is non-binding. In contrast to existing definitions of written international law, particularly those that find soft law to lie somewhere along a spectrum, non-binding soft law here is not defined to be less permissive in its language or more redundant or ambiguous than its binding counterpart (Abbott & Snidal, 2000).

Defining non-binding soft law to encompass a lower degree of precision, as Abbott and Snidal do, implies that such instruments contain vague provisions relative to binding instruments. In reality, this is not the case. There are a number of non-binding soft law instruments that are highly precise and impart a relatively greater degree of obligation on the negotiating states. The 2007 United Nations Declaration on the Rights of Indigenous Peoples and the 1992 Rio Declaration are but two examples of non-binding soft law instruments that contain precise provisions.

Such a definition may also lead one to assume that non-binding soft law instruments are benign and "residual", possibly causing states to be lenient in their negotiation (Posner & Gersen, 2008: 45). Such an assumption would be incorrect. The negotiations leading to the 2019 non-binding ministerial declaration by Arctic Council member states are a case in point. The United States was opposed to the inclusion of any reference to climate change, and the other seven countries refused to concede. This first-ever failure to adopt an Arctic Council ministerial declaration demonstrates that the language and content of some soft law instruments are hard-fought, and that states do consider them important.

Shelton's widely cited definition of soft law will be used in this article for the category of non-binding soft law (Shelton, 2008). Shelton defines soft law as non-legally binding instruments that may take the forms of "normative texts not adopted in treaty form that are addressed to the international community as a whole or to the entire membership of the adopting institution or organization" such as the ASEAN Joint Statement on Climate Change to the UNFCCC Conference of the Parties or as recommendations, resolutions, and other writings meant to "supervise state compliance with treaty obligations"(ASEAN Joint Statement, 2019; Shelton, 2009: 72).

Soft treaty

While the term soft law has conventionally been used solely for non-binding political instruments, the literature recognizing binding instruments as encompassing soft elements is growing (Abbott & Snidal, 2000; Canuel, 2015; Olsson, 2013). To this, we might add "soft treaties". Given the diversity in these instruments, one could usefully see international law as agreements along a

continuum measured by a degree of "softness" or "hardness" at either end of the spectrum. If placed along such a continuum, such instruments would fall somewhere between two ends that are either purely legal or purely political, with soft treaties falling between non-binding soft law and binding hard treaties.

This article defines "soft treaty" as a binding instrument containing some combination of permissive language, ambiguity, and redundancy that leaves it devoid of mandatory, clear, and new obligations. Identifying this new category called the "soft treaty" might then enable the expansion of the analysis of soft law and its effects, including (perhaps) challenging the assumption that soft law instruments are necessarily benign and egalitarian. These three elements make up a preliminary list of attributes of an international legal instrument that could indicate "softness" in terms of its degree of legalization.

Although a single accepted definition of "binding" is lacking, the literature generally characterizes a binding instrument as one whose provisions the parties accept as such. Bodansky explains that in some instances "final clauses addressing issues such as how states express their consent to be bound (for example, through ratification or accession) and the requirements for entry into force – provisions that would not make sense in an instrument not intended to be legal in character" help to distinguish binding from non-binding instruments (Bodansky, 2015: 157).

In the case of the Arctic Council, two out of three Agreements negotiated under its auspices explicitly identify which of their sections are binding on their parties and which are not (Agreement on Enhancing International Scientific Cooperation: Art. 14; Agreement on the Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic: Art. 20). As for the Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean, it explicitly states: "The depositary shall inform all signatories and all Parties of the deposit of all instruments of ratification, acceptance, approval or accession and perform such other functions as are provided for in the 1969 Vienna Convention on the Law of Treaties". Likewise, Article 20 of the Paris Agreement states that the Agreement "shall be open for signature and subject to ratification, acceptance or approval by States and regional economic integration organizations that are Parties to the Convention", with the "Convention" being the 1992 UN Framework Convention on Climate Change.

To identify soft treaties, we need to read international instruments carefully, for instance, maintaining an awareness of the important difference between "should" and "shall". We also need to pay close attention to context, including whether the parties are already bound to the same commitments through other, pre-existing treaties. Last but not least, we need to apply the customary international rules on treaty interpretation, as codified in the 1969 Vienna Convention on the Law of Treaties (Vienna Convention on the Law of Treaties, 1969). International relations scholars, in particular, would benefit from paying more attention to these long-accepted rules, which are designed to reduce the scope for misunderstanding and disagreement over the meaning and legal consequences of words.

Hard law

While this article is focused on soft law, there lies a need for hard law to be defined clearly in order to better situate soft law and soft treaties along the spectrum of written legal instruments. The reverse of the elements that this article uses to describe soft treaties – permissive language,

ambiguity, and redundancy – could constitute a new list of the attributes, not just of hard treaties, but of hard law generally. These attributes could be expressed as: mandatory language, clarity, and novelty.

Hard law broadly encompasses written international legal instruments, that may take the form of treaties, agreements, conventions, as well as customary international laws. This article solely focuses on written legal instruments in its enquiry of soft law. The examination of any hard law instruments serves as a point of reference when analysing non-binding soft law and soft treaty instruments.

Prevalence of soft law

This article empirically establishes that soft law instruments are becoming more pervasive than previously claimed in the literature. In order to identify reasons for its prevalence, this research examines a sample of instruments using mixed methodology encompassing legal textual analysis, review of the international relations and international law literature, and interviews with academics and practitioners. Argued elsewhere (Nadarajah, 2020), research shows that aside from shifting domestic politics, growing geopolitical tensions between the East and the West have contributed to a weaker degree of legalization.

Arctic

Aside from global treaties such as the United Nations Convention on the Law of the Sea (UNCLOS), the Arctic is governed at a regional scale by the high-level intergovernmental Arctic Council, the five coastal Arctic states (Arctic Five)[2], and the Barents-Euro Arctic Council (BEAC) (China's Arctic Policy 2018; Arctic Council 2018; UK Arctic Strategy 2013; Escudé, 2014; Hirose, 2018).

Having initiated the negotiation of three soft treaties and adopted numerous other non-binding soft law instruments, the Arctic Council has established itself as an institution for soft governance in the region.[3] The Arctic Council itself was created on the foundation of a non-binding soft law instrument – the Ottawa Declaration (Ottawa Declaration 1996).[4] This form of governance has since come to characterize the Arctic Council member states' approach to governance in the region (Smieszek, 2019: 36). It can be observed that, when the Arctic states wish to conclude a hard treaty, such as the Central Arctic Ocean Fisheries Agreement, they do it outside the Arctic Council.

Although the soft law approach facilitates norm formation, in this case, the structure and form of the Arctic Council may have been just as important. The Arctic Council includes Russia and five NATO states. A soft law approach has long enabled it to shape decisions, rather than trying to make decisions in circumstances where this might not be possible given the often-tense relationship between NATO and Russia (Hasanat, 2012). While the Arctic was categorized as a region within which tension is low, power dynamics outside of the region are spilling over into the Arctic as countries increasingly recognise the region as a key geopolitical theatre (Lanteigne, 2019). These dynamics among regional actors are compounded by China's increasing presence in the region. However, the soft nature of these instruments, coupled with the inclusion of a wide variety of regional and non-regional state and non-state actors, may strengthen social cohesion and thus facilitates cooperation – in a region where conflict has been predicted on numerous occasions (Escudé, 2014). The shift from governing purely with non-binding soft law instruments to a combination of binding and non-binding instruments perhaps indicates a move "from a policy-

shaping toward a policy-making body" lending legitimacy to the Arctic Council and, by extension, to the Arctic Council member states' role as stewards of the region (Smieszek, 2019: 41).

While several studies have been conducted on the soft law governance approach of the Arctic Council, nearly all of them have focused on non-binding instruments (Escudé, 2014; Hasanat, 2012). When examining soft law, only a few scholars have considered binding, but soft instruments negotiated and concluded within the Arctic Council and other Arctic fora. By discounting soft treaties in their categorization of soft law, these scholars fail to account for the full range of implications that such governance has on the region. It is necessary to go beyond a simplified dichotomy of written international law as binding versus non-binding to further distinguish between soft and hard treaties. For the same reason, some scholars make the mistake of applauding the Arctic Council member states for having concluded three binding treaties without considering whether those treaties are soft or hard. One needs to examine the full range of "soft" instruments, whether binding or non-binding, in order to understand the reasons and implications for such an approach to the region's governance.

Climate change

The Paris Agreement, the latest in the globalized post-Kyoto effort, is the closest instrument that resembles a treaty. Although the larger and powerful states such as the US and China had argued for a non-binding instrument, the Paris Agreement's binding nature can be attributed to strong advocacy by The Alliance of Small Island States (AOSIS) which held a strong position on the need for a legally binding instrument, thus proving the ability of smaller states to influence international law-making (Lawrence & Wong, 2017). The Paris Agreement is one of many examples of soft treaties that were reached as a compromise between entities of varying degrees of power within the international system. Such a compromise can also be observed between states and non-state actors.

The broadly cited assumption of soft law crystallizing to hard law does not hold within the climate crisis sphere. The degree of legalization, for example, has weakened and thus devolved from a hard treaty, the Kyoto Protocol, to a soft treaty, the Paris Agreement (Popovski, 2015). Moreover, the path to the soft-but-binding obligations in the Paris Agreement was not linear. It instead went from hard provisions in the Kyoto Protocol, to non-binding political concessions in the Copenhagen Accord, to soft obligations in the binding Paris Agreement (Bodansky et al, 2017: 22). It may be that the optimum design for an international instrument to reduce emissions is in fact a soft treaty – one that has taken the climate change regime decades to reach through a meandering path of trial and error. However, it remains to be seen if the combination of a hard and soft hybridized instrument is effective, at least within the climate regime.

Some of the softness in binding treaties within the climate change regime is the result of provisions pertaining to adaptation. As Hall and Persson observed, "Adaptation has low precision and low obligation" and that a number of adaptation initiatives are not "constraining on states". In analysing the Paris Agreement, Bodansky draws a similar conclusion: "Most of the provisions on adaptation and means of implementation are expressed, not as legal obligations, but rather as recommendations, expectations or understandings" (Hall & Persson, 2018: 554). The absence of precise obligations pertaining to adaptation could simply be due to challenges arising from three issues. The first is empirically accounting for adaptation. The second, the lack of clarity as to what adaptation entails (Hall & Persson, 2018: 555). And the third, the wide gap of power and global

inequality, since the impact of a changing climate is greater in developing countries and so is the cost of adaptation efforts (Khan, 2013: 9).

Soft law's prevalence: Implications for the Arctic and climate change

What does soft law's prevalence mean for governance in the Arctic and on climate change? This section examines the potential implications of this contemporary global policy paradigm that is rooted in soft law and its variants. In doing so, it offers a renewed perspective on our understanding of how the behaviour of states, and perhaps more broadly, the international system is influenced by this prevalence.

The following implications of soft law's prevalence were identified: (1) written international law is increasingly adaptable and follows a non-linear evolution; (2) complacency could stem from institutional design established by soft law; (3) path dependency to cooperate within discrete areas could emerge through the iterated negotiation of soft law instruments, despite diplomatic challenges faced elsewhere; and (4) more opportunities for states to forum shop may arise due to soft law's prevalence within each regime complex.

Non-linear evolution of written international law

Aspects of The World Charter for Nature, a non-binding soft law instrument, such as the "EIA process and participatory rights", have been argued to become customary international law, entering the hard law end of the spectrum (Atapattu, 2012: 212) With the exception of these oft-stated observations that non-binding soft law often leads to the development of hard law, the literature does little to examine these evolutions of written international law. Those that do, often examine the path that a legal regime may take as a whole, such as Harrop and Pritchard (2011) in their examination of the Convention on Biological Diversity which they observed to have, over time, devolved from a soft treaty to even softer forms of governance in the form of non-obligatory global targets.

Figure 1: A simplified version of the various stages in the decision-making process of written international legal instruments

Through the examination of the two case studies, this article reveals the non-linear evolution of written international law. Illustrated in Figure 2 above, the evolution of international law highlights the need for a dynamic approach to studying the interface of international relations and international law. Stage 1 indicates the initial phase of the negotiation process, whereby states

problematize an issue that requires a solution in the form of an international legal instrument. Whether that instrument takes the form of a binding or non-binding form is decided in Stage 2. If the former variant is chosen, the negotiation process dictates whether a hard or soft treaty is adopted. Stage 4 onwards indicates the evolution of instruments whether from non-binding soft law to soft treaty or hard law; soft treaty to hard law; or even hard law to soft treaty.

Another example of a Stage 4 process is the Montreal Protocol, a hard treaty. The Protocol is an instrument that has been amenable to changes over time, primarily because it is a protocol nested within a framework convention. This feature of flexibility in framework conventions is in contrast to the literature on the topic which argues that soft law is a preferable alternative given its flexibility. The Kigali Amendment to the Protocol was adopted in 2016 and entered into force three years later. The Amendment aims to cut back on HFCs by 80% by 2047 and may avoid up to 0.5°C increase in global temperatures.

What triggers the change from one form of written international law to another? By looking to the field of evolutionary biology, one could borrow the theoretical concept of punctuated equilibrium[5] to explain the evolution of written international law. Stephen Krasner had previously used the concept to explain institutional changes (Krasner, 1984). Krasner argues that during periods of crisis, institutions undergo rapid changes after which they are followed by "consolidation and stasis" (Krasner, 1984: 240). Binding instruments could represent these periods of rapid changes which are then followed by soft law instruments characterizing periods of stasis. Hard treaties in particular could be indicative on large scale departures from the past. These changes could be triggered by political shocks such as wars, pandemics (much like the current COVID-19), major communication leaps (such as the digitization of diplomacy and social media advocacy) and, technological disruptors.

Complacency

The Arctic Council and the UNFCCC are the principal institutions through which cooperation in the Arctic and climate change takes place. Both institutions use consensus decision-making whereby every state has to agree or at least acquiesce before any decision can be made. It would be easy to assume that consensus decision-making equalizes the power of different states within an institution, but this is not the case. After studying consensus decision-making within the GATT/WTO, Richard Steinberg concluded that the process – despite upholding the principle of sovereign equality and delivering rules that are accepted as legitimate by all the participants – nevertheless favours powerful states (Steinberg, 2002: 342). A plausible explanation for this continued role for power was advanced by Paul Reuter, writing half-a-century ago:

> Consensus may perhaps oblige the strongest to make certain sacrifices, but it sacrifices the viewpoint of another minority: the one which is not strong enough to make the consensus process fail; ... in spite of the apparent unanimity which it represents, it constitutes an instrument of coalition against those who are isolated.[6]

As Michael Byers argues "although each state in a consensus decision-making system could act as a spoiler, this fact provides an incentive for states to signal to any potential spoiler that the costs imposed for blocking consensus would be higher than any possible gains" (Byers, 2019: 8). Consensus decision-making can thus conceal and perhaps even facilitate the application of power. In contrast, the decision-making based on voting is different. While "still open to applications of

power, the very act of calling a vote legitimizes opposition by a single or small number of states" (Byers, 2019).

That being said, the prevalence of soft law examined in this article is likely to be a result of a consensus decision-making which many of the respective forums and IOs within each issue-area, or region engages in. Such a decision-making system reduces the costs and the need for tough negotiations (Byers, 2019). Because hard law "involves clear, mandatory, substantively new commitments", the stakes are higher (Byers, 2019). As outlined in the section above, soft law can crystallize into harder forms, both written and customary law. However, this only happens gradually, and "only if states demonstrate through consistent practice that they are following the norms and consider them binding" (Akehurst, 1975; Byers, 1999; Byers, 2019, 9; D'Amato, 1979).

But such a prevalence arising from consensus could have its drawbacks. If states conclude soft law instruments, simply as a means to overcome the constraints of a consensus based decision-making mechanism, or to be seen as doing something (even if the bare minimum), there could be drawbacks of soft law's prevalence. Kirton and Trebilcock surmised the problems of (non-binding) soft law:

> It may lack the legitimacy and strong surveillance and enforcement mechanism offered by hard law. With a broader array of stakeholders, soft law may promote compromise, or even compromised, standards, less stringent than those delivered by governments acting with their full authority all alone. And soft law can lead to uncertainty, as competing sets of voluntary standards struggle for dominance, and as actors remain unclear about the costs of compliance, or its absence, and about when governments might intervene to impose a potentially different, mandatory regime (Kirton & Trebilcock, 2004: 6).

While one could argue that soft treaties may help to address these challenges posed by non-binding soft law, the very ambiguity, permissiveness, and redundancies of soft treaties may add to the challenges similarly posed by ambiguous non-binding soft law instruments. The ambiguity of the Paris Agreement, or the redundancy of the Arctic Council Scientific Cooperation Agreement give Parties a great deal of independence to skirt around their obligations and perhaps fall short of reaching the desired goal of the said treaty.

Path-dependency

The ongoing activities of all the Arctic Council working groups, many of which result in soft law instruments, provide an excellent example of path dependency for future cooperation. Non-security issues in the region have generally been managed among the Arctic states on a cooperative basis since the end of the Cold War, even during and after Russia's annexation of Crimea, with a number of non-binding soft law and soft treaty instruments having been successfully negotiated. These activities never stop, because the Arctic Council is always working on the next deliverable in the forms of reports, assessments, and other soft law instruments. Diplomats and experts are therefore on a perpetual hamster wheel of international interaction. There are over a hundred cooperative projects and initiatives continuously being worked on at the Arctic Council at any given time (Arctic Council, 2020). This raises a more general question: Does a path dependency[7] to cooperate arise as a result of soft law's prevalence?

Soft instruments could provide a degree of resilience to regional cooperation among distrusting states, in circumstances where hard treaties and formal international organizations are not possible (and might suffer full breakdowns if they were). Therefore, it is not just about flexibility and sub-

optimal outcomes, but rather about creating interdependence, building and strengthening trust, cushioning cooperation against exogenous shocks. Non-binding soft law and soft treaties that encompass redundant, permissive, and/or ambiguous provisions could also be a way of filling gaps, encompassing new developments, gathering non-state parties (and non-state actors) into the normative envelope of a harder treaty.

There is perhaps a path dependency to cooperation, as is the case with the Arctic and climate change, because of this prevalence of soft law instruments. The continued negotiations within each of these regimes have yielded instruments of varying degrees of legalization, cementing cooperation on a diversity of issues. This is despite the shifts at the systemic level due to an increase in the number of states and non-state actors involved in negotiations and the advancement of science and technology. If states have an interest in and/or momentum toward increased cooperation, soft law enables them to pursue that regardless of political impediments to hard law.

Forum shopping

While there has been a growing volume of research on treaty conflict and forum shopping, little work has been done on the choices between, and the tensions arising, from the availability and interaction of hard and soft instruments, particularly in the context of the latter's prevalence. With the increase in the number of soft law instruments, including those setting out obligations that are redundant, i.e. already binding on states as a result of pre-existing hard law, states are able to strategically "use soft-law provisions [to] undermine existing hard law or creat[e] hard-law provisions to trump existing soft law" (Shaffer & Pollack, 2010). Shaffer and Pollack are among the few scholars who have written on this topic. They argue that the incentive for states to forum shop between soft and hard law depends on the ongoing "distributive conflict among states" (Shaffer & Pollack, 2010: 739). When this conflict is low, there may be a higher tendency for states to employ hard and soft law in a complementary manner; when conflict is high (and regime complexity is high) the reverse may more likely be observed (Shaffer & Pollack, 2011: 1167).

Both cases examined in this article are governed by a combination of hard and soft law instruments, the provisions of which may overlap or even contradict each other. What are the consequences that could potentially arise from this co-existence of hard treaties and soft law instruments, both binding and non-binding? Does it give parties to the former influence vis-à-vis the latter, or at least vis-à-vis matters addressed by the latter? China is a party to UNCLOS and only an observer at the Arctic Council, under the umbrella of which the Arctic Scientific Cooperation Agreement was adopted. An instance where a hard treaty can provide greater influence could possibly be foreseen with regards to China's presence in the Arctic.

While only an observer to the Arctic Council, the principal organization within which much of the regional non-binding soft law and soft treaties are negotiated by member states, China is nonetheless a party to the Central Arctic Ocean Fisheries Agreement, the UN Convention on the Law of the Sea, a permanent member of the UN Security Council (which is the only body within the UN that can "adopt binding coercive measures" in order to maintain international security), and a member of the UNFCCC. Timo Koivurova, for this reason, argues that "under the framework of international law, China is one of the Arctic's main actors" (Koivurova, 2018). While for now, legal instruments concluded within the auspices of the Arctic Council are complementary to existing international law, it remains to be seen if conflict may arise on issues pertaining to China

particularly due to deteriorating relations between it and the United States due to disputes on trade and the COVID-19 pandemic.

Conclusion

Soft law's increasing use in the international system and the gaps in the current literature examining its prevalence and implications, call for a re-examination and further theorizing of this now ubiquitous feature of the international system. Broadening the definition of soft law to include both binding and non-binding forms has not only verified that soft law is indeed increasing but also that it is far more pervasive than previously assumed to be. The literature's past exclusion of soft but binding instruments resulted in a narrow examination of soft law's influence within the international system. This article aims to deepen our understanding of the implications of states choosing to increasingly negotiate soft law instruments and by extension narrow the gap between the fields of international relations and international law, which are, despite their general lack of engagement with each other, inextricably intertwined.

Growing numbers of state and non-state actors can make it more difficult to negotiate hard treaties. Rapid political, technological, and environmental change can make it impractical to use hard treaties that are, to some degree, frozen in time. Soft treaties and other forms of soft law are more flexible and adaptable. They also allow for greater and more diverse participation. And they might avoid some of the obstacles that can prevent the adoption of hard law, such as growing tension between Western states and Russia, while leaving open and even facilitating the possibility that their commitments might later become part of hard treaties or customary international law (Abbott et al, 2000).

International law is often criticized for lacking enforcement mechanisms (Goldsmith & Posner, 2005). Although this criticism is usually overblown (think of the UN Security Council, international courts and tribunals, and national courts), it is true that international law may be more dependent on reciprocity, reputation, and other forms of "soft" enforcement than domestic law (Albright, 1995; Franck, 1998). For this reason, it is also possible that soft international law is not as much of a departure from hard international law as soft domestic law (recommendations, guidelines) might be from hard domestic law (statutes, contracts). Soft treaties might be just as effective as hard treaties, at least in some instances, precisely because neither kind of instrument relies on hard enforcement. And at times, soft law instruments can be used to test the political will for parties to take cooperation to the level of an international treaty.

Notes

1. The Arctic Council is made up of eight member states include the following: Canada, Denmark, Iceland, Finland Norway, Russia, Sweden, and United States, and permanent participants who represent the six indigenous organizations in the region. As of 2017, there are 13 non-Arctic states and 13 intergovernmental organizations that have been approved observer status within the AC. Observer states include China (which has since called itself a "near-Arctic state"), Germany, Poland, South Korea, Singapore, Switzerland, and the UK (which also calls itself "the Arctic's nearest neighbor"); China's Arctic Policy 2018; Arctic Council 2018; UK Arctic Strategy 2013.

2. Arctic Five refers to the five Arctic Ocean littoral states: Canada, Denmark, Norway, Russia, and United States. In 2008, these five states agreed to utilize the existing international law as outlined in UNCLOS on matters pertaining to the Arctic and decided against the need for a "new legal framework".
3. See, Nadarajah 2020 for an extended discussion on soft law's prevalence within the Arctic and the role that the Arctic Council plays in catalyzing these soft treaties.
4. The Declaration on the Establishment of the Arctic Council (also known as the Ottawa Declaration) established The Arctic Council in 1996 under the Canadian chairmanship (Ottawa Declaration 1996).
5. N.B. "Punctuated equilibrium" in the field of evolutionary biology is used to explain the rate of speciation. Species are thought to mostly be in a stable equilibrium which is punctuated by short bursts of rapid evolution which is in contrast to the Darwinian theory that evolution of species is a gradual process. For an extended discussion on the topic, see, Eldredge and Gould 1972.
6. Reuter 1967, Michael Byers' translation.
7. Path dependency defined by Dryzek (2014, 941) is "Path dependency means that early decisions constrain later ones, as the costs of changing course become high, actors develop material stakes in stable institutions, and institutions arrange feedback that reinforces their own necessity".

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Climate Change and Norwegian Arctic Aquaculture: Perception, Relevance, and Adaptation

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The Norwegian aquaculture sector continues to increase both spatially and in terms of production volume, but is vulnerable to changes in weather, temperature, marine environmental conditions, and other conditions. More than a third of Norway's aquaculture production takes place in Northern Norway, a region where the rate and magnitude of climate change is already twice that of the global average. In this article, we investigate representatives from the aquaculture industry and their perceptions of climate change and how it influences their current and future operations. Our findings show that climate change is generally not a central concern for aquaculture companies and climate change is translated into and understood as a gradual intensification of already existing problems. The industry aims at balancing their production targets with the management systems' environmental and sustainable development requirements and focusing on short-term challenges such as lice, diseases, and market trends. Although most adaptive measures are not justified directly as climate related, the industry is highly adaptive and responsive to climate relevant changes through continuous adaptation and innovation strategies. The only measure that is genuinely climate related is the efforts of some of the actors to localize parts of their production capacity further north. The findings are based on semi-structured interviews with representatives of eight aquaculture companies whose facilities are localized in Northern Norway.

Introduction

Food production is an important part of the climate issue and aquaculture is important for global food security. The OECD/FAO estimates that in 2022, aquaculture production will for the first time surpass wild catch fisheries in volume (OECD/FAO, 2019: 195). The bulk of the world's aquaculture production takes place in the global south, carried out by small-scale producers (Galappaththi et al., 2020). However, important, large-scale aquaculture also takes place in the High North. Norway is the world's top producer of Atlantic salmon, and aquaculture represents Norway's second largest export industry. In 2019, Norway produced 1.366 tons of salmon (*Salmo salar*) and trout[1] (*Oncorhynchus mykiss*), which again provided a first-hand value of 71.7 billion NOK

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(SSB, 2020). About 40% of this production volume takes place in Northern Norway, and the region's share is increasing. The government aims to facilitate further growth of the aquaculture industry in the northern region (White paper no. 7, 2011-2012).

Given the location of Northern Norway, stretching from 65 to 71 degree north, the region is likely to experience climate change related weather variations that may influence the future growth of the aquaculture industry. Temperatures in Northern Norway are expected to increase at a higher rate than further south (Hanssen-Bauer 2019). Changes in water temperature, sea-levels, the frequency of extreme weather incidents, ocean acidification and sea surface salinity are just some of the climate variables that may affect development trends, as these factors have bearing on which species thrive and the interactions between them (White paper 16, 2014-2015; Winter et al., 2013; Dannevig et al., 2019).

The success of salmonid farming is dependent on the complex ecology of the aquatic environment, which makes the wide-ranging impacts of climate change important to consider (Callaway et al., 2012). The consequences of climate change require attention to sustainable management, knowledge, and technological changes in operational processes. It is important to have adequate knowledge about the effects of climate change on marine ecosystems, in order to adapt aquaculture, fisheries and coastal management to the new conditions (White paper 33, 2012-2013). Attention to and knowledge about climate change adaption in aquaculture is increasing (e.g. Callaway et al., 2012; Galappaththi et al., 2020; Karlsson & Hovelsrud, in press; Rybråten et al., 2018; Dannevig et al., 2019).

With the backdrop of high targets for production growth and the projected climate change impacts, in this study we describe the aquaculture business' perceptions of and adaptation to climate change. First, we provide a brief conceptual framework and the methods applied in this research, followed by an overview of the aquaculture industry and the expected consequences of climate change. Subsequently we present our main findings from the interviews and a concluding discussion.

Conceptual framework

In this article we approach climate adaption as broadly pertaining to adjustments in coupled natural and human systems in response to actual or expected climate stimuli or their effects. The adjustments or adaptations function in moderating harm or exploiting opportunities (Smit & Pilofosova, 2001; Adger et al., 2007). Climate adaptation as a concept has developed significantly in the past two decades. As studies of climate adaptation have multiplied, they have also revealed that adaptation is not a straightforward response to a given perturbation. It has therefore passed through many iterations and applications, consequently developing into an analytically strong concept.

Adaption is increasingly referred to as a process that takes place along multiple dimensions and in the context of multiple interacting stressors and cumulative change (e.g. AMAP, 2017: 219-252; Hovelsrud & Smit, 2010; Schipper & Burton, 2009; Leichenko & O'Brien, 2008). Adaptation processes are shaped by barriers, limits, opportunities, and governance. Such processes create adaptation strategy options that emerge across scales (institutions such as municipalities and states, sectors such as aquaculture and fisheries) and actors (businesses, policy makers, government officials, individuals) (AMAP, 2017: 219-252). Adaptation is also a context-dependent process

shaped by the institutional structure of a community and the specific national climate adaptation guidelines, the range of exposure-sensitivities and cumulative change, and adaptive capacity (e.g. Hovelsrud & Smit, 2010; Smit & Wandel, 2006). Exposure-sensitivity is understood as the manner and degree to which a community - in this case, the aquaculture industry - is both exposed and sensitive to stresses given changing conditions and the situational characteristics of place and people (Smit et al., 2010: 5).

Adaptive capacity is shaped by a number of factors and processes, such as access to resources and knowledge, economic or livelihood flexibility and opportunities, enabling institutions, governance, infrastructure, and connectivity (Cinner et al., 2018; Keskitalo et al., 2011). However, adaptive capacity is not only associated with the existence of these factors, but also with the willingness and the potential of actors to translate them into adaptive responses (Bay-Larsen & Hovelsrud, 2017). Adaptation responses, whether reactive or proactive, take many forms depending on the multiple interacting effects (e.g. Smithers & Smit, 2009). There is potential for conflict between the goals and concerns of different interests or actors, because responses are not one type fits all (e.g. Westskog et al., 2017). That adaptation is a response to cumulative and interactive changes in climatic and non-climatic conditions illustrates that it is a highly complex process with multiple strategies. The perceived need to adapt to climate change can be revealed through discourses and narratives and is dependent on whether the issue of climate change is seen as salient (Dannevig & Hovelsrud, 2016). It is argued that adaptation - and the ability to adapt - to changes can be seen as a condition for sustainability (Berman, Kofinas & BurnSilver, 2017).

Methods

A combination of qualitative methods was used for this explorative study. In order to assess the climate change impacts on aquaculture industry, data collection started with a literature review of selected scientific reports and journals, governmental green and white papers, reports, and assessments. Document analysis of public business strategy documents, presentations, and media sources were used for the development of qualitative interview guides with industry stakeholders and representatives.

To examine whether and how the managerial representatives of aquaculture companies perceive and operationalize the effects of climate change, we adopted a semi-structured interview protocol (Seidman, 2019). An interview guide was developed with the intention to document the companies' perception of climatic changes. The interviewees, namely senior managers in the aquaculture companies, were recruited by suggestion from the Norwegian Seafood Federation. To secure a diversity of viewpoints, we selected representatives from local, national, and international fish farming organizations. All companies specialized in salmon farming. In total, eight representatives from eight companies were interviewed over the phone. The following topics were covered during the interviews: interviewees' background and their experience, sources for knowledge about climate change, positive and negative impacts of climate change on the industry, influences of those impacts on the choices for location, and industry cooperation with research communities and government bodies.

The interviewees were contacted prior to the interviews and received an informational letter about the project with the topics for discussion. All interviews were conducted in Norwegian, audio

recorded and later transcribed. Those parts of the interviews that are used in this study were translated into English. The interviewees have been anonymized.

Aquaculture and climate change in Northern Norway

The case area comprises the two northernmost counties in Norway – Nordland and Troms & Finnmark - that represent about 40% of the national salmon production. Salmon production is regulated through government issued licensing, whereas a production volume is defined per license and varies between counties (Winther et al., 2013). The number of issued licenses has increased in Northern Norway during the past years (*ibid.*), with 403 grow-out licenses and slightly over 3000 people directly employed in the region. As such, the industry forms a vital part of the coastal communities' employment. The regions' remoteness results in long and costly transport requirements by trailers and rail to the European markets. Fish is a perishable commodity with a short selling time frame, and is therefore reliant on fast and reliable transport. Delays due to adverse weather and climate-induced challenges, such as floods, heavy snowfall, avalanches and landslides, may occur (Hanssen & Mathisen, 2011). Rougher and more unpredictable weather patterns are expected to increase.

Climate change could lead to significant structural changes in the industry, both in terms of aquaculture species, optimal range for the production, and siting patterns. Temperature is of central importance to the aquaculture industry, as it influences growth rate, algal blooms, and infestation rates of disease and parasites. A warmer thermal regime may lead to changes in the abundance, distribution, and composition of species. This also includes jellyfish, poisonous algae, parasites, pathogens, and diseases; all potentially harmful to aquaculture, and the link between climate changes and disease risks is increasingly recognized (Callaway et al., 2012). Ocean acidification presents another emerging challenge for the aquaculture industry, especially for smolt production; however, the research on this is so far inconclusive (McCormick & Regish, 2018).

Higher temperatures are likely to lead to increased salmon lice reproduction (*Lepeophtheirus salmonis*). This chronic and increasing problem – and the following government regulations – is hampering industrial growth and represents a significant economic impact on the industry. As salmon lice causes serious problems in wild salmon stocks as well, the salmon farming industry is strictly regulated with respect to lice. Norway has more than 400 watercourses with Atlantic salmon and hold approximately 25% of the world's healthy populations (Forseth et al., 2017; Hindar et al., 2011). In 2017, the government introduced a new growth system based on 13 production areas along the coast, referred to as the 'traffic light system.[2] Using the occurrence of lice as its main indicator, the system offered a way to regulate production geographically based on a surveillance program. Additionally, escapes from the cages form a threat to wild salmon as it leads to increased competition, interbreeding, and reduced breeding success for wild salmon – which are adapted to local river systems.

These challenges with current sea-based open cage technology have led the industry and the government[3] to search for other technologies, such as closed containment systems. Closed or semi-closed production systems have physical barriers that limit interaction with the environment to avoid escapes, salmon lice infestations, and other pathogens. In Norway, most of these concepts are sea-based. Land-based recirculating grow-out facilities have the additional economic and environmental advantage that it can take place at sites closer to the consumer markets, and thus

increase profitability and reduce the environmental and carbon footprint by reducing transport distances for fresh salmon (Liu et al., 2016). However, in Norway, these systems are mainly addressing the lice and disease problems and regulations, and are not likely to have important beneficial climate effects.

Another development is the post-smolt strategy. Traditionally, the smolt have been transferred to sea at a weight of approximately 100 grams, but several companies are currently transferring the smolt to sea at an increasingly higher weight. This reduces the sea phase of the production, and thus the time in which fish is exposed to "uncontrollable" risks such as temperature changes, weather, poisonous algae blooms, salmon lice, and diseases (Callaway et al., 2012).

With increasing temperatures, the geographic point at which the Norwegian coast is at an optimum temperature for rearing salmonids will move northwards and enter the northern region and will likely lead to productivity changes (Hermansen & Heen, 2012). In the beginning of the salmon farming era, it was widely believed that the temperature was too cold for rearing salmonids in the north. Subsequently, however, the government wanted to stimulate fish farming in northern Norway, mainly to support job creation in vulnerable coastal communities, and thus the region was given earmarked and larger licenses than further south. Increasingly, the favorable conditions in the north regarding diseases and salmon lice also attracted and encouraged aquaculture companies to establish production plants in the region. Some companies acquired new licenses to establish themselves in the north, while others moved existing licenses into the region. The region still experiences fewer diseases and salmon lice than further south, but the difference is dwindling.

In the following section, we present our findings on interviewees' perception of the impacts of climate change in combination with other emerging challenges for fish farming operations and suggested adaptation measures.

Climate change: Perceptions, relevance, and impact on aquaculture

The interviewees are not uniform when it comes to observing the effects of climate change. Some note there is a slow ocean warming whereas others state that the observed temperature changes are within the range of normal temperature and weather variations. Some also state that in the northernmost region, Finnmark, the temperature has been colder than average in recent years. Some observe the northwards migration of new fish species and changes in the species composition along the coast (i.e. more mackerel). The optimal temperature range varies between sites and local fjord systems, but the farmers state that less than 4 degrees and higher than 14-16 degrees centigrade harms the production. Temperature is also seen as relevant for lice, bacterial, and viral infections.

The informants generally acknowledge the climate issue, and they were aware of all the debates and policies regarding the topic. Climate change is rarely considered in day-to-day operations or is on the agenda, except at occasional national or regional scientific or other aquaculture gatherings, or in communication with regional authorities. They see the long-term links to, and relevance for fish farming, but they do not relate operational issues in their daily work to climate change. The companies do not possess competence directly related to climate change; however, some have taken part in research projects where climate change has been one of many variables.

The informants generally state that the industry is to date not very weather sensitive, and there are few concerns relating to stronger and more frequent storms. Nevertheless, some interviewees indicate that the weather has always been harsh in the north, but that the patterns have become more unstable and unpredictable, which at times may also create problems. For example, when storms suddenly come from an uncommon direction, this poses new challenges to crews and equipment. Heavy storms and larger waves frequently lead to physical injuries and increased stresses for the fish, which leads to higher mortality and production losses. During storms, the fish are not fed, and frequent storms may lead to lower growth as well as disturbances of scheduled maintenance, logistics, and other operations.

The safety and well-being of crew on feed barges, and transport back and forth during heavy weather is another concern, and one informant stated that "the cages can take more bad weather than the boats and the crew". Thus, long, or frequent storms may negatively influence the feeding and tending of the fish. IT infrastructure is vital to run the operations, and storm related power outages[4] can cause production disturbances. The interviewees typically stated that the safety is addressed within existing standards and regulations. While a steady strengthening of the requirements has been observed[5], this is not seen as primarily related to climate induced extreme weather specifically. Instead, it is seen in connection with reducing fish escapes, and facilitating efficient operations in more open and wave exposed areas which may be environmentally optimal locations - so-called super sites. Some interviewees state that they take for granted that authorities have built in the effects of climate change in the technical and operative regulations and requirements.

Changes related to indirect operational issues are mentioned by some interviewees. In some production areas, the increased risk of climate induced landslides and avalanches blocking difficult access roads are regarded as a possible concern, as this may hamper supplies and the transport of fish and crew. The informants state, however, that they already experience and handle such problems and a future slight deterioration of the situation is manageable. Some also mention that climate change in the long run may have consequences for the worldwide availability of feed. These imports may become more unstable and with higher price volatility. If these inputs are not produced and exploited in a sustainable way, nature, as well as global regulations, may put the supplies at risk.

Nevertheless, the main impression is that – as one fish farmer puts it – "the challenges [facing the industry] is a result of fast growth", where climate change is not the primary frame of reference, but rather the biological or physical factors influencing the fish. Climate change is understood mainly in terms of a slow and incremental increase in ocean temperatures. This may lead to more parasites and more infection prone fish farms. In the southern regions the experience is that increasing temperature leads to increased infection pressure. In the north the experiences are not as clear cut, as increasing temperature is also making the production more efficient as the fish grow faster. Some companies even moved their production to more exposed sites further out on the coast to benefit from warmer temperatures.

Companies in position to carry out strategic re-localizations or establishments in new regions see a northward move of production capacity as relevant, and several report that they have already done so. These companies are in a constant search for new and better production sites and work with the relevant coastal municipalities to get access to such sites. Growth and diversification

strategies are stated as the main motivations, and climate change is merely a legitimizing and/or background factor. Climate change is not, however, cited as an explicit factor in either of these considerations, but rather as part of growth or diversification strategies. Optimization of production is often difficult, but long-term environmental considerations are always important, as this is the key to efficient and economic production.

When the winter water temperatures suddenly increase, producers may experience problems with biomass regulations. The temperature makes the fish grow faster and at times this leads to violations of given biomass restrictions. To avoid heavy fines, producers may have to transfer or slaughter fish at an inconvenient and suboptimal phase in the production cycle. The same company representative also claims that these warm periods may lead to problems with feed availability because the fish suddenly require a lot more feed.

Increased temperatures also lead to more algae growth on the nets and moorings. Some also mention that if climate change also changes the ecology around the aquaculture plants, this may negatively affect their operations. Poisonous algal blooms are dangerous for the salmon and pose a serious threat to the industry. While such incidents are less frequent in the northernmost areas, they have occurred.

The companies' focus and concerns are, beside efficient, environmental, and safe operation, related to lice treatment and avoiding fish escape. These challenges have been present in the industry for decades but are accelerating as a consequence of climate change. Warmer ocean temperatures increase lice production. Lice is therefore perceived as indirectly related to climate change. The companies' main focus is on lice, as this is the governments' environmental and sustainability indicator that regulates growth in the industry. Thus, the concept "sustainable development" has a much stronger history, standing and presence in the industry than climate change. However, some informants indicate that they include climate change concerns in the sustainable development concept. The informants report that, to their knowledge, there are no explicit references to climate in the governance-related procedures and requirements.

Most interviewees agree that the lice problem has gradually increased and moved northwards, and that temperature rise generally lead to increased propensity for lice and virus and bacterial infections. However, the number and size of farms is also seen as a cause of increased lice infections. Several interviewees also stated that the lice outbreaks occurred earlier than previously, and that the problem has generally become bigger. Some see a potential benefit in higher precipitation levels due to climate change, as this results in more freshwater supplies to the fjords which may reduce the lice problem through "natural" delousing.

It is a general observation that climate change issues are translated to other well-known, concrete, and specific operative issues. The effects of climate change are simply interpreted as a gradual worsening of known, existing problems and challenges. Beside some examples of increasing the height of the building foundations on the waterfront to compensate for future expected sea level rise, we do not find any adaption or mitigation efforts that are directly and explicitly introduced to address the climate problem.

Concluding discussion

In Norway, climate change is recognized as a major issue and problem of growing importance; the representatives of the aquaculture industry also seek to obtain knowledge about the expected changes and the impacts on their current and future operations. However, climate change is not dealt with, or handled as climate change problems by the industry or governance system, but rather translated into various ongoing and acknowledged sub-problems in the industry they already are adapting to. Being a wealthy and knowledge intensive industry, it has a large adaptive capacity to handle seasonal variation and extreme events – algal blooms, temperature changes, wave height, storm surge, etc. The aquaculture industry carries out adaptive actions all the time, and climate change does not manifest itself as a distinct and new problem, but rather as intensification of already existing and well-known environmental and operational issues. Climate change is rather interpreted more as a background variable that is understood in terms of the cumulative impact of multiple drivers. The relevant impacts from climate change are thus translated into "environmental problems", "parasite and disease problems", "invasive species problems", or "weather problems". The only measure that is genuinely climate related is some actors' efforts to localize parts of their production capacity to northern, thus colder, regions of the country.

In addition, the adaptive capacity of the industry should be assessed along these lines: the industry is generally focused on management in terms of diseases, lice, and escapes, not on climate change or climate adaptation. Sustainable operation is a vision that is far more relevant and important to the fish farmers than climate change, partly as it more directly addresses their current problems and challenges, partly as it is at the core of the management systems. Though climate actions, including the reduction of global emissions, are addressed in one of the sustainable development goals, mitigation strategies were not a focus of this inquiry. However, climate change is interpreted into these sustainability issues and seen as an influential factor. Climate change and adaptation is thus not interpreted in a hazard frame, but rather in an incremental adaptation framework. The exact nature and magnitude of the climate change effects are generally difficult to assess, and so are the consequences they will have on aquaculture. The proximate and main problems in Norwegian aquaculture – salmon lice and escapes - are according to the interviewees only loosely and indirectly related to the climate problems, and specific climate measures are so far not very developed. Several of the innovations and measures introduced to fight lice, diseases, and stormy weather will also contribute to climate adaption, as it makes the operations less vulnerable to temperature and weather variations. Climate change is, however, not the direct reason for the industry making these changes, and it would be strange to label this as climate adaption. It is thus important to acknowledge that de facto climate adaption may hide behind different activities, labels, and discourses, and a broad understanding of what adaptation is all about is required. Climate related issues should not be separated from other considerations and decision-making about future concerns over environmental conditions.

The fish farming industry sees climate change and adaptation largely as a knowledge and management issue outside their daily realm of responsibility. Comprehended as a top-down management issue, they expect the research and government institutions to handle this and translate the climate problem into technical or operational standards and regulations, and they do not see themselves as a central part in the policy-making process. The interviewees largely regard the governmental technical standards and operative regulations as the main driver in the climate

change adaptation work, as well as technology and innovations developed by research agencies and the companies themselves. Examples given are temperature adjusted feed, stronger cages, nets and mooring, and better crew training.

However, we do not see this as an indication of neither "denial" (Nordgaard 2006) nor "complacency" (Kaltenborn et.al. 2017) towards the climate change issue. Rather, the industry's confidence in their ability to adapt in general terms, leaves the climate change issue as too abstract or intangible a frame of reference for adaptive action. Moreover, when climate problems are translated into other problems such as increase in diseases and rough weather, also the climate issues are transferred to the respective management bodies that "own" these problems.

This raises the question of what can be gained through a more coherent policy coordination on climate change – through a more specific climate frame. Given the complexity of the problem, such a frame may not be easily established, but the authorities should continue to communicate the need for the industry to act in relation to climate change. Sandkjaer Hanssen et al (2012) suggest that the elected regional level (counties) has a huge potential to act as a multi-level coordinator. After recent reforms, the counties have become multi-level network nodes particularly suited for dealing with cross-cutting and comprehensive policy fields such as climate change adaptation.

Notes

1. Trout accounts for approximately 5 % of the volume.
2. According to the average lice levels in the given production area, production is allowed to grow (green), freeze (yellow) or must be reduced (red).
3. The government has issued several development licenses to facilitate different technologies to be developed, implemented and tested.
4. Most plants depend on electricity generators, but the number connected to the public power grid is increasing, using the diesel-driven generators as backup.
5. The Norwegian government is continuously developing and implementing technical regulations and standardization measures through the NYTEK and NS 9415:2009 systems.

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Decadal Predictions to Climate Services:

How Understanding Climate Change in the Arctic can Support Climate Adaptation Decision-Making across the Northern Hemisphere

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The Arctic is warming twice as fast as the rest of the world, but is intricately connected to it through oceanic and atmospheric circulation. Improved observational networks quantifying these connections and subsequent climate model development are enhancing our ability to describe, model, and predict Arctic climate change and its impact on northern hemisphere weather and climate, including their extremes. These developments have made skilful predictions from a sub-seasonal to a decadal timescale possible. Decadal prediction lies in the middle between short to medium range weather forecasts and global-scale climate change projections, and allows predictions of time-evolving regional climate conditions. These predictions are very relevant to the time period that many communities need in order to plan for the near future and beyond, where adaptation is possible and understandable for a wide range of sectors and new opportunities can be explored.

Here, we talk about climate change in the Arctic, and the mechanisms by which it can influence the northern hemisphere weather and climate. We discuss how recent scientific work on understanding these mechanisms can increase predictive skill. We present case studies demonstrating the potential for these outputs to be translated into climate services across the region, providing specific and relevant information for businesses, communities and policy-makers on evolving future conditions and allowing dynamic adaptation. Finally, we look ahead to the next developments in this area, and discuss the scientific requirements for future progression.

Introduction

The changing climate is affecting all aspects of our environment and society, including weather, food production, biodiversity loss, energy generation and freshwater availability. As many of the changes we are seeing are predicted to continue or accelerate, understanding future climate impacts are a policy priority in many sectors, including risk management, sustainable development and

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human health. For example, the EU Strategy on adaptation to climate change highlights that economic losses from weather and climate-related extremes are on average already EUR 12 billion per year, and that "Adaptation is about understanding, planning and acting to prevent the impacts in the first place, minimise their effects, and address their consequences."

At the science-policy interface, there is therefore a need for robust and reliable climate predictions that can allow for longer-term planning on policy-relevant timescales, beyond the short-term value of weather forecasts and on a more localised and societally-relevant scale than the long-term climate projections. In particular, there is demand to understand the scale and frequency of extreme events that can have devastating impacts, and how it is possible to adapt in a way that will minimise the economic and social costs of these events. The growing need for predictions on a seasonal to decadal timescale is being matched by the developing skill in this field of research, but the challenges of improving our capacity to predict future weather and climate are enormous. Here, we explain how providing policy-relevant information on future weather and climate across Europe involves exploring the huge complexities of a global interconnected system, beginning with understanding the importance of the Arctic climate.

Climate change in the Arctic

It is no surprise to communities living in the northern regions that the Arctic is warming rapidly. The Arctic region has been observed to be losing sea ice, glacial ice and snow cover in all seasons since the satellite era (Stroeve et al., 2007; Meredith et al., 2019). Sea ice is estimated to have declined by around 13% per decade since 1979, and the scale of this loss is unprecedented even in relation to reconstructions of the region over the past 1400 years (Kinniard et al., 2011). In fact, some areas including the surface layers have warmed two or three times faster than the global average since the late 20th century, a phenomenon termed "Arctic amplification" (Serreze & Francis, 2006; Davy et al., 2018).

Arctic amplification has implications for those living across the region and beyond. Over 2 million people live within the Arctic Circle, where the loss of sea ice and changes to glaciers and ice sheets profoundly alter the land- and sea-scape. Warming temperatures in such a sensitive climate lead to destructive thawing (leakages from pipes, collapse of roads and infrastructure, air pollution), and the cities can generate urban heat islands, further exacerbating the effects (Varentsov et al., 2018). Climatic changes degrade Arctic ecosystems, which affects not only endemic species but also the communities that rely on them (Bhatt et al., 2010). Increasing methane emissions from degrading permafrost and warming feedback loops can accelerate the impacts of climate change on a wider scale (Schurr et al., 2015). Indeed, the amplification observed so far is expected to become stronger in the coming years. Increasing our scientific knowledge of warming in the Arctic is therefore a fundamental component of climate science.

Our understanding of the causes and consequences of Arctic warming has grown over recent years, through integrated assessments of observations and results from climate simulations. A central part of climate research is model development and testing: creating and refining computer simulations that aim to tease apart the relative physical, chemical and biological (earth system) processes that make up the climate. Modelling the Arctic is particularly challenging, as it is hard to get long-term, sustained observations to feed into models, and ultimately compare to the outputs. It has taken international efforts to produce shared arrays of instruments that can provide

observational data in the Arctic region, such as the international collaboration of the Year of Polar Prediction (www.polarprediction.net) and the ongoing EU project INTAROS (http://www.intaros.eu).

Observations and models have suggested that the warming can be influenced by local processes in the Arctic, such as the amount of snow cover, cloud cover, sea ice melt or moisture in the air (Shindell, 2007; Stern et al., 2019). For example, periods with higher amplification are associated with larger sea ice loss, and models with larger sea ice loss produce larger amplification ("positive feedback", Kumar et al., 2010). Feedback between the increasing temperatures intensifying sea ice melting, and the darker open waters absorbing more heat radiation, accelerate the warming effect across the Arctic (Winton, 2006).

Arctic amplification has also been shown to be influenced by remote processes, including moisture and heat transport from lower latitudes by air and oceans (Årthun et al., 2019; van der Linden et al., 2019), and direct and indirect aerosol effects (Shindell, 2007). In particular, poleward transport of heat through ocean and atmosphere circulation is considered a major source of temperature increases across the Arctic (Marshall et al., 2014). To the west of Europe, the Atlantic Meridional Overturning Circulation (AMOC, which encompasses part of the Gulf Stream system) can be seen as a large "conveyor belt" system of ocean currents moving heat from the tropics to the Arctic, driven by winds and differences in temperature and salinity. This redistribution of heat across latitudes by the AMOC is an important component of the global climate system.

Although numerous studies have investigated the various processes influencing warming in the Arctic, the relative contribution of these processes is still under debate. For example, Screen & Simmonds (2010) showed that Arctic warming is strongest at the surface, and is consistent with reductions in sea ice cover. However, a model by Alexeev et al. (2005) kept the sea ice effect fixed, and found that energy transport from lower latitudes alone could result in Arctic amplification. Overall, it is now recognised to be "an inherent characteristic of the global climate system, with multiple intertwined causes operating on a spectrum of spatial and temporal scales" (Serreze & Barry, 2011).

Links between Arctic and European climate

Many people are aware of changes in the Arctic, and several of the narratives exploring the effects of climate change have centred around the dramatic transformation being observed in the Polar Regions. For those living below the Arctic Circle, changes in the highest latitudes can seem remote and less significant for day-to-day living. However, a growing body of evidence shows that variability within the Arctic system is associated with corresponding effects much farther afield (e.g., Liang et al., 2020), from weather events across the Northern hemisphere to feedback loops that influence European climate and beyond. As the potential impact of Arctic influences on economies and societies across Europe, North America and Asia are more widely acknowledged, policy-makers are increasingly focused on the Arctic, as shown by the updated EU Arctic strategy.

The idea that the Arctic can influence other regions in a global climate system is of course not new. As far back as the early 1900s, scientists hypothesized that winter conditions in Europe were related to sea ice cover in the Arctic (Hildebrandsson, 1914). However, nearly a century later, the science linking Arctic amplification to weather and climate in the mid-latitudes is still debated. While there are comprehensive underlying theories of the mechanisms by which Arctic changes

could also be a driver of this variability, untangling the relative contribution of different factors is an area of ongoing research. Large consortia of researchers are working to progress the scientific understanding in EU-funded projects such as Blue-Action (www.blue-action.eu) and APPLICATE (www.applicate.eu).

Arctic effects on mid-latitude climate

Although the theories underlying links between Arctic warming and midlatitude climate are robust, actually demonstrating they apply in the real world is much more difficult. This is partly due to the complexity of the multiple connections, which vary across time and space. When correlations are observed, it can also be difficult to determine cause and effect. An interesting example relates to the North Atlantic Oscillation (NAO), which is a "see-saw" of atmospheric pressure across the North Atlantic. "Positive" NAO years are thought to lead to high sea ice concentrations in some areas of the Arctic such as the Labrador Sea, possibly due to wind-driven heat fluxes within the ocean (Deser, 2000). However, negative NAO years have in turn been linked back by recent research to the reduction of sea ice extent in the Arctic (Caian et al., 2017). Overall, the mechanisms underlying NAO variability are not well-understood, but the frequency of negative NAO events seem to be increasing, leading to winters becoming colder and more extreme across parts of the northern hemisphere.

Equally, ocean circulation such as the AMOC brings warmer waters north to the Arctic, and changes to the circulation or temperature can increase the heat transport to the region. However, changes in the Arctic can in turn affect the water travelling south. In particular, melting sea ice causes the cold waters of the Arctic region to become warmer and less salty, and therefore less dense, reducing the sinking of cold water part of the circulation system back towards the midlatitudes and beyond (Sevellec et al., 2017). Several other factors, such as the melting of the Greenland ice sheet, the increase in precipitation, and river runoffs, might also lower the salinity and density of the upper North Atlantic, also leading to a potential weakening of the AMOC (Swingedouw et al., 2007). As the warming influence of the AMOC is fundamental to the mild climate of areas of Europe, a slowing of the circulation could have long-term profound implications for societies built around a stable and temperate environment.

Arctic effects on mid-latitude weather

More noticeably for most people, there is increasing discussion that Arctic warming could be a leading contributor to recent unusual weather patterns. Over the past few years there has been an increased frequency and intensity of extreme weather events across the mid-latitudes of the northern hemisphere, from heatwaves in Russia to severe winters in North America (Cohen et al., 2014; Francis & Vavrus, 2012). Studies have suggested that these are likely to become normal for many regions, and have begun to unravel the mechanisms that may link a changing Arctic to weather impacts further south (Walsh 2014).

Many of these mechanisms centre around the effect on atmospheric circulation. The rotation of the Earth influences wind systems that are generated by differences in temperature across space, and flow west to east in the high latitudes. This general flow is accompanied by meanders that create high or low pressure gradients, which ultimately influence the weather. The magnitude and position of these meanders can also be affected by external "forcings," non-local factors that have

an influence (Overland et al., 2016). External forcings from remote areas that influence the atmospheric patterns of the midlatitudes are known as teleconnections.

In the Arctic, the reduced sea ice cover and therefore warmer ocean creates warmer and wetter air over the region and beyond (Overland & Wang, 2010). A warming Arctic can create forcings caused by a reduced temperature differential between the Arctic and the lower latitudes. This temperature differential influences a number of atmospheric phenomena, such as the jet stream, a band of fast-flowing air in the troposphere over the North Atlantic, which causes changes in areas of high and low pressure, and therefore the weather we experience at the surface. A reduced latitudinal temperature gradient leads to a weaker jet stream, which can result in systems moving more slowly and a particular weather pattern becoming more persistent over a specific area and reaching lower latitudes (Barnes & Screen, 2015). Persistent weather can itself be the basis of an extreme event, such as drought, flood or heat or cold wave.

Equally, changing temperatures in the stratosphere can cause downward planetary waves, incursions of frigid air to the lower latitudes. These planetary waves can account for most of the recent winter cooling trends over Europe and Asia (Kretschmer et al., 2018.) Interest in these polar vortex instabilities has been heightened by the dramatic impact of sudden temperature drops across North America and Europe in recent years, and the concomitant effects on human health.

Future research

At present, many observational studies support that Arctic amplification is related to weather at lower latitudes but most models do not currently reproduce this connection, leading to a divergence between model and observational studies (Barnes & Screen, 2015; Sellevold et al., 2016). One of the problems is that observational data in the Arctic, in terms of both temporal and spatial coverage, is often insufficient to allow in-depth analysis of such long-term variability. Our climate models are built on our knowledge of the physical processes involved, but the relative contribution and interactions between them are less well understood. The more we can determine whether models are successfully reproducing observed effects, the better representations of actual climate processes in our models become, and the more skilfully we are able to predict the future. Understanding and observing Arctic warming is therefore important to understand the future of the region itself, but is also vital to prepare for the extreme impacts across the globe.

Moving towards predictions

A central purpose for climate science is not only to increase our understanding of the fascinating physical processes governing the global climate system, but to reach a sufficiently detailed representation that we can move beyond recreating the current system to predicting what it will look like in the future. The most high-profile of these predictions, climate models that simulate various scenarios to project global temperature trends up to a century into the future, are now part of our public discourse (e.g. IPCC, 2014). Simple versions of these models have been created since the 1970s, and recent evaluation found that most models were accurate in projecting future global warming (Hausfather et al., 2020).

Decadal predictions

While projections of global mean temperature may be powerful in stimulating discussions about emission scenarios, the scales are so immense that the public cannot relate average wide-ranging

changes to the potential impact on their own lives. Most people are more familiar with using weather forecasts that provide sufficient information for flexibility over a few days to weeks. With a rapidly changing climate however, there is a growing need for robust information that allows longer-term planning on a more local scale (Meehl et al., 2014). Decadal climate predictions - predictions typically up to a decade ahead - were for the first time included and discussed in the last IPCC report, and will also contribute to the sixth report from IPCC (Boer et al., 2016). As these decadal climate predictions have increased in skill, now they can begin to support meaningful adaptation for individuals, businesses and policy-makers (Smith et al., 2019).

The difficulty with making predictions longer than a few days or weeks ahead is that proving success can be a long wait. Instead, research on decadal climate prediction focuses on developing models that simulate the actual variations in climate, then testing the credibility of the results by making retrospective forecasts, known as hindcasts. By testing how well the models predict events that have been observed in the past, it is possible to assess the "skill" of the model (e.g., Goddard et al., 2013; Robson et al., 2013). Models may never perfectly predict real world outcomes because so much within the system is stochastic rather than deterministic, but with greater understanding of the mechanisms and interactions in the climate system that provide predictability, we will likely achieve more robust climate predictions (e.g., Årthun et al., 2017; Borchert et al., 2018).

A key aspect of making skilful predictions of weather and climate is understanding where the main part of the predictability comes from. For example, many researchers refer to the "memory" of the ocean, which - slow to move and slow to change - is a great source of long-term predictability (Bjerknes, 1964). In fact, a recent study showed that a cool period in the Earth's climate around 700 years ago is still detectable in the Pacific deep ocean (Gebbie & Huybers, 2019). On a decadal scale, climate predictions show promising results in predicting ocean heat content and ocean surface temperature. In some ocean regions, such as the subpolar North Atlantic, it is possible to predict ocean temperatures several years ahead (e.g., Yeager & Robson, 2017). By looking at evolving ocean temperatures in the North Atlantic it is therefore possible to make predictions about the climate in western Europe years into the future (e.g., Årthun et al., 2017; Smith et al., 2019; Borchert et al., 2019).

Decadal climate predictions are now beginning to reach the stage where the outputs are sufficiently accurate to input into decision-making, and research indicates that there is great potential to further enhance this skill (Smith et al., 2020. Still, climate variability beyond the North Atlantic region and towards the Arctic Ocean appears to be more predictable than models imply (Langehaug et al., 2017). Moreover, in decadal climate predictions, ocean skill does not translate into significant atmospheric skill over northern Europe. Understanding why requires further research into the underlying mechanisms and interactions, and development of Earth System models that can resolve these.

Predicting extremes and abrupt changes

Understanding the predictability of extreme weather systems over Europe that may be influenced by remote teleconnections with the Arctic through atmospheric pathways is much more challenging. With such uncertainty and differences between models and observations still present in understanding of these interactions, making usable predictions for many sectors may be some way off. Yet there is increasing research that shows that these predictions are possible: for example,

a recent study showed that the 2015 European heatwave could be predicted using a combination of ocean temperatures and atmospheric and sea ice initial conditions (Mecking et al., 2019).

Furthermore, our understanding of the Arctic impact on climate may allow us to make predictions of low probability but high impact events (Sutton, 2018), such as abrupt changes (or "tipping points"). When the idea of these "large-scale continuities" were brought into the IPCC report two decades ago, they were thought to be extremely low probability and only of concern at incredibly high levels of warming (>5°C). More recent work has suggested that abrupt changes related to ice in the Arctic and Antarctic could become likely at much lower levels of warming (IPCC, 2019).

Due to the huge potential impacts, it is paramount to correctly estimate any risk of rapid (<10 years) changes, such as shifts in the North Atlantic oceanic circulation that may simply reverse the trend of climate warming over Europe. The Arctic is a key region for triggering such a switch in state in the ocean circulation and considerable uncertainties remain in the complex processes at play, including ocean-sea ice interactions (IPCC, 2019). Such events, even if low-probability among the available models (Sgubin et al., 2017), would have huge impacts on water availability and agriculture across regions of Europe (Sgubin et al., 2019). Furthermore, the potential impacts might also affect remote regions like the Sahelian region (DeFrance et al., 2017), where migration towards Europe is already large and would likely increase due to the severe drought. Preparing to adapt should such catastrophic shifts occur should be a fundamental part of policy-making for the future.

Future research

The success of future research into predictions relies on both observational and computational power. Sustained, long-term observations of the ocean are required, and modellers need to work together with observational scientists to ensure the data needed is prioritised. Making the kind of large-scale yet detailed measurements needed to understand the climate system is a huge commitment of funding, resources and time. Equally, changes in computing infrastructure and how research is organised are needed to match the development of ever more complex computer models, such as larger ensembles and higher resolution. Huge teams of researchers are already working together and sharing computing power to be able to develop and analyse the next stage of climate models, and future policy initiatives such as the Digital Twin of the Ocean proposal as part of the EU Green Deal will be a step forward.

Turning predictions into climate services

Thanks to improved understanding of linkages between atmosphere and oceans in the Arctic and beyond, our scientific prediction skill is improving. For an individual however, these high-level, complex outputs provided by the scientific community are remote. Increasingly, research scientists and stakeholders are coming together to discuss how to translate these data into relevant, timely information that can assist in decision-making on multiple spatiotemporal scales. This targeted output is the essence of a "climate service", supporting businesses, communities and governments who are trying to plan for the next month, season or decade.

Climate services provide climate information in a way that assists decision-making, and so need to strike a balance between what is scientifically possible and what is useful to the end-user. They are collaborative and co-developed by nature, and require a multi-disciplinary approach to tailor and

translate applied science into products that are needed. These can range from products that improve economic viability of businesses, to those that improve resilience, safety and security of communities. The diversity and impact of such climate services are exemplified in two very different case studies below.

Case study: polar lows in the Arctic

Predicting the likelihood and severity of extreme or abrupt weather or climate events is a particularly important climate service due to the potential high impact and cost. This can be in the Arctic itself, where communities and industry across the region can be affected by dramatic weather phenomena such as polar lows. Polar lows are short-lived, intense periods of high winds and snowfall, often known as Arctic hurricanes (Kolstad & Bracegirdel, 2008). They can be very difficult to predict or detect, and have been the cause of numerous fatal shipwrecks.

While we are not yet at the stage where we can robustly predict when polar lows will occur, we have increasing capacity to predict systems that allow polar lows to form (Kolstad, 2017; Stoll et al., 2018). These are known as marine cold air outbreaks (MCAO), much larger-scale sustained transports of extremely cold air over an ice-free ocean (Kolstad, 2017). MCAOs set up a large energy imbalance, which can drive such things as polar lows and other extreme weather events. By predicting the likelihood of MCAOs forming, we can create a climate service that provides an evolving measure of risk to those involved in maritime activities in the Arctic.

The climate service being co-developed with industry stakeholders focuses on delivering consistent and accurate risk-informed decision support. Highlighting risks of extreme weather events in the area will help shipping and other maritime activities such as oil and gas platforms improve resilience towards polar lows, ultimately saving lives. Understanding and predicting these types of extreme events are fundamental to many policy frameworks such as the Sendai Framework for Disaster Risk Reduction, which has an explicit focus on climate change-induced risk management through science-based knowledge, and works in complement to the UN Framework Convention on Climate Change.

Case study: Heatwaves in middle latitudes

While there may seem to be no connection between polar lows in the Arctic and heatwaves in the middle latitudes, we are also able to use our increasing understanding of the linkages between the Arctic and midlatitudes to turn predictions of extreme events into climate services across Europe. One of the major climate change challenges faced by southern Europe in particular is the incidence of more frequent, longer and harsher summer heat waves. These heat waves can be devastating to vulnerable communities in warmer regions, such as the elderly, without preparation and adaptation.

The increase in frequency and severity of heatwaves poses a threat to societies that are widely unused to the increasing risks of climate change. Overall, about 8% of deaths across Europe are associated with the short-term health effects of environmental temperatures. In 2003, when temperatures in some parts of Europe were 13 degrees above average, some estimates suggest it was responsible for over 70,000 additional deaths (Robine et al., 2008). In 2019, the June heatwave sweeping across Europe set new all-time temperature records in France, Germany and Spain, although the death toll was significantly smaller. The danger comes not only from the continued

high absolute temperatures, but the dramatic difference from "normal" that has an impact on communities affected by heat waves.

Translating modelled predictions of heat waves into climate services that could allow governments and communities to put measures in place to mitigate the effects of climatic extremes is therefore a priority for many policy-makers. Researchers can use epidemiological models to transform the output from operational weather and climate models into predicted impacts on health: initially temperature-attributable mortality, but a seamless forecast of health outcomes exploring the whole range of forecasts is theoretically possible. Public health policies are implemented at a national and regional scale, so there is scope for these types of climate services, designed to provide information from local to national levels to directly inform societal needs. Here we hit a whole new layer of challenges however: predicting climate change is only one factor in a complicated societal and policy landscape, where gaps between rich and poor, urban and rural and the youth and elderly all play a part in how climate change will ultimately play out among our communities (Achebak, 2020; Ballester, 2019).

Conclusions

So, we can trace links from large-scale Arctic warming to local policy-making in the Mediterranean. We are still in an exciting and fast-moving phase of understanding the detailed interconnectedness of the global climate system, both in terms of the underpinning science and the societal implications, but the importance of doing so is growing.

Arctic issues have risen up on the political agenda, with the high-profile EU Arctic policy explicitly designating the region as a global responsibility. Part of the updated policy highlights that "continuously improving our knowledge of the changes happening in the Arctic region, as well as identifying sustainable responses, is essential." Scientists, policy-makers and local communities are increasingly working together to understand both the future research and adaptation actions that are required.

Beyond the Arctic, our understanding of the changing climate and capacity to predict it is a vital component in policy-making, from the Sendai Disaster Risk Framework to the European Green Deal. Meeting our ambitions on global targets such as the UN Sustainable Development Goals will involve planning with as much foresight of the future as possible. Increasing knowledge of climatic changes in the Arctic and the pathways by which it influences the world is therefore now a global challenge. As stated by Virginijus Sinkevičius, Commissioner for Environment, Oceans and Fisheries: "What happens in the Arctic, does not stay in the Arctic. It concerns us all."

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On Thin Ice: Exploring Solutions for Climate-Induced Displacement in the Face of Disappearing Permafrost

Mariel Kieval

Arctic security dialogues have increasingly featured nontraditional topics such as climate change and maritime safety. Many people around the world have only recently started seeing the effects of climate change in their own communities, however, this is not the case for many Arctic peoples, whom climate change has been affecting for decades, and on a much larger scale. As polar temperatures reach new highs, human security is becoming a larger issue. Over eighty-five percent of Alaska Native villages are experiencing increased erosion and flooding, as well as melting of the permafrost that makes up their land. The stories of Newtok and Shismaref are better known, but many villages are still grappling with decisions over relocation and dealing with government inaction. This article provides an overview of the choices at-risk Arctic communities have by looking at existing government procedures. The governments of the United States, Norway and Russia will be highlighted, and this article will analyze their existing policies. This article will also look at options that are available for villages opposed to uprooting their communities. Indigenous communities located on or near unstable permafrost have a right to decide if, when and where to move. They deserve dignity and choices, and states' actions and policies will set a precedent for how future communities facing climate migration will be treated.

Introduction

For coastal and island communities, climate change will affect more than their daily life. It is causing the destruction of the lands they have inhabited, some for centuries, leaving them to deal with possible displacement and relocation. Communities from Louisiana, United States to Vunidogoloa, Fiji, have begun moving their people and infrastructure to higher ground, and as ice melts and sea levels continue to rise, millions of people will be facing the same decisions. Those that have already made efforts to move have done so mainly as pioneers, without funding designated for relocation or strategic plans.

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Arctic Indigenous peoples comprise less than two percent of the world's Indigenous population (Ferris, 2013: 1). However, the rapid rate of environmental change in the High North is disproportionately impacting their ways of life, occasionally requiring them to relocate away from their traditional or seasonally inhabited villages. Indigenous Arctic peoples are not strangers to voluntary migration. Their traditional and customary lifestyles have long required movement. The decisions about moving many communities are not ones they will make lightly, as they are a result of the environmental changes produced by the industrialization and destruction of the natural world, largely by non-Indigenous people. They are on the front lines of climate migration and the responses of local and state governments' will set the stage for how future communities will be assisted.

This paper discusses climate-related threats and potential displacement of the Sámi people in Norway, Alaska Natives, and the Indigenous people of Russia, focusing on three key elements: 1) current climate-related threats 2) government policies and attitudes toward Indigenous populations, and 3) recommendations and possible solutions.

Background

Terminology

In order to ensure clarity and understanding, several terms will be defined ahead of the discussion of the climate-related threats to three Arctic Indigenous communities.

Outdated language

Although often referred to as "climate refugees", the Indigenous nations battling loss of their ancestral lands are not a helpless people as the label suggests. This characterization has a similar connotation as the defining of certain Indigenous groups as "vulnerable", which can evoke "outdated and racist stereotypes of Indigenous peoples needing the help of white outsiders," (Marino, 2015). This paper elects not to use these terms in order to maintain the dignity and agency of the people discussed.

Indigenous

This paper makes use of the word "Indigenous" using the definition from the "Convention concerning Indigenous and Tribal Peoples in Independent Countries" (ILO, 1989) from the International Labor Organization (ILO):

> "People are regarded Indigenous on account of their descent from the populations which inhabited the country, or a geographical region to which the country belongs, at the time of conquest or colonization or the establishment of present State boundaries and who, irrespective of their legal status, retain some or all of their own social, economic, cultural, and political institutions."

Alaska Native

Many tribes call the US state of Alaska their home, including but not limited to the Yupiit, Eyak, Iñupiat, Aleut, and Gwich'in peoples. Several of these peoples reside in both Alaska and parts of Canada, though the focus in this paper will be on those living in Alaska who are affected by US policies. As such, the general term "Alaska Native" will be used to refer to all Arctic Indigenous individuals in Alaska.

Climate change

While 2019 was the second warmest year on record with a global temperature of 1.15° Celsius higher than the pre-industrial average, the Arctic and Antarctic are experiencing an increase in temperature twice as fast as a result of the albedo effect (NOAA, 2019). As snow and ice melts at higher rates, more solar energy is absorbed into the newly exposed darker surface, which in turn leads to more melt. Sea ice is declining at a rate of 12.85% per decade, as compared to the 1981-2010 average (NASA, 2019).

Norway

Between 1838-2012, Norway has experienced an increase in annual mean temperature of 1.5° Celsius (Norwegian Polar Institute, 2019). All seasons have seen warmer weather, though winter and spring tend to have higher increases in temperature. Climate models predict that by the end of the century, parts of Norway will see a 2.5-3.5° Celsius increase in average temperature, with more drastic temperature increases occurring in the northeast (ibid). The warmer temperatures are causing snow to thaw and freeze regularly, which creates thick layers of ice. The lichen that reindeer depend upon usually resides beneath easily penetrable snow, but now is often covered by several feet of ice (Little, 2020). Heavier precipitation, mainly in the form of rain, has the potential to increase overall biological productivity, though the humidity is likely to benefit fungi and mold species rather than native plant species. Erosion and lost sea ice will lead to greater destruction of coastlines, especially when combined with larger storms. Norway's largest Arctic city, Tromsø, is expected to experience a 5-7 cm sea level rise by 2050 and a 23-36 cm rise by 2100 (Norwegian Polar Institute, 2019).

Alaska

Alaska, the US's Arctic state, has experienced a 1.6° Celsius temperature increase on average, with winter temperatures 3.33° Celsius higher above average, according to the Environmental Protection Agency (EPA) (2016). The ramifications of this greatly impact not only the wildlife and the communities that live there, but threaten the very ground that makes up the state. Rates of eroding shorelines, melting glaciers, and thawing permafrost are increasing. Drier, hotter summers are causing the drying out of wetlands, destroying habitats for migrating birds. Wildfires in the forests and tundra are expected to burn twice the amount of land by 2050 and triple by 2100. The ocean acidification that is resulting from higher levels of atmospheric carbon dioxide is harmful for shellfish and the plankton that other fish rely on. Disappearing sea ice leaves fewer habitats for larger mammals like walruses and polar bears and hunting grounds for Alaska Native communities (USGCRP, 2018).

Northern Russia

The Russian Arctic covers more than five million square kilometers, or just over thirty percent of Russia's territory (Laverov, 2009: 87). With annual regional temperatures being 6° Celsius higher on average, the permafrost that covers almost 90 percent of Russia's north is melting at an accelerated rate. This permafrost is also much of the most southern permafrost in the world, rendering it especially vulnerable to warmer temperatures. The top layer of ground that freezes and thaws with the seasons every year that used to be around three feet thick (~1m) is now ten feet (3m) deep in some places (Macfarquhar & Ducke, 2019).

Like other Arctic states, northern Russia is seeing longer summers and warmer winters, along with the extreme climate events of floods and devastating wildfires (ibid). Over 4.8 million hectares in Siberia were ravaged by wildfires between January and mid-May 2020, with 1.1 million hectares of it being high-latitude boreal forest. The Russian government has been reluctant to take action to fight the fires, citing the large expense of sending people and resources to the remote regions (Ягодина & Аллахвердов, 2020). The swamps and lakes created by the permafrost melt serve as prime breeding grounds for mosquitoes, already notoriously ferocious, and the longer summers mean they are breeding earlier and longer. The threat to Russia's trees is twofold. Half of the world's boreal forests are located in the Russian Arctic, but they are shrinking as deciduous forests move farther north. These trees are also experiencing widespread wildfires. Higher rates of Siberian silk moths and bark beetles that specialize in eating needles and boring into trunks, respectively, are causing the trees to be more susceptible to fire (Pleitgen, 2019). Underneath Russia's northern permafrost reside vast stores of methane deposits. As the permafrost melts, these will be released and will lead to intensified climate change in the region and globally.

Norway et al.

This paper will include discussion of the Sámi (or Saami) people who live mainly in Norway, Sweden and Finland, with a few thousand living in Russia. Because over half of Sámi reside in Norway, the discussion of the potential for their migration due to climate change will focus on the situation and policies in Norway. Norway is the only Scandinavian country that has a portion of its coastline above the Arctic Circle. Rossøya, Svalbard is Norway's most northern part, however, it will not be included in this discussion, as it has never been inhabited by Indigenous peoples.

The Sámi people have continuously lived in the Scandinavian Peninsula since the arrival of people following the last ice age. Traditionally a nomadic people, the Sámi practice reindeer husbandry, as well as fishing and farming. During the mid-1880s to mid-1900s, the Norwegian government engaged in fornorsking, or "Norwegianization". Sámi children were made to learn, speak, read and write in Norwegian, and the Sámi language was eventually banned in 1898. Later government policies during the 1960-70s made modern living more desirable and necessary. The county of Finnmark, now Troms og Finnmark, made houses more affordable for Sámi, while a national policy requiring children to be in school for at least nine years made constant migration throughout the year unmanageable (Riseth & Vatn, 2009).

Because of the assimilation efforts in Norway it is difficult to determine the true number of Sámi people today. The total population in Norway is thought to be around 55,000 today, though censuses often do not include those who identify ethnically as Sámi, but refer to people who speak or have ancestors who spoke Sámi. Norway also generates demographic statistics based on geographic area that has been designated for jurisdiction under the Sámi Parliament. As a result, the statistics count both Sámi and non-Sámi residents in the area (Kelman & Næss, 2013).

Traditionally, the Sámi made their livelihoods by herding reindeer, supplemented with fishing and farming. Though reindeer husbandry remains an important part of Sámi history and culture, today only around 2,800 individuals are actively practicing the customary livelihood. That being said, some Sámi have developed a semi-nomadic lifestyle. For example, Sámi may choose to jointly care for reindeer herds with multiple families in partnerships called "siidas". Others may choose to live in a larger town and make regular excursions to check on their herd (ibid). Tourism has increased

all around the Arctic, and many people are interested in seeing what traditional Arctic life looks like. Tourism generates a portion of income for some Sámi and may encourage some to maintain traditional Sámi livelihoods. However, some tourist attractions are not associated with Sámi heritage or modern Sámi life, and the absence of statistics on Sámi numbers and livelihoods makes it difficult to know the true economic impact of tourism. Sámi have lived both in and outside of the Arctic for decades, and this paper does not make the assumption that Sámi choosing to live farther south will lose touch with their identity or never return to the Arctic.

There's no question that the Sámi people are being directly affected by their changing environment, from experiencing greater difficulty finding enough food and grazing grounds for their reindeer to seeing new fish species along the coastlines. Open lands for grazing and migration for centuries are being privatized and segmented. Though the number of individuals practicing reindeer husbandry as their livelihood is shrinking, the practice remains an important part of Sámi culture. Reindeer husbandry is still taught in schools, and it is important for the transfer of traditional environmental knowledge from generation to generation. As the environment continues to grow less familiar, Sámi are relying on their traditional knowledge more than ever to adapt their customs (Little, 2020). Resource conflicts are also expected to become more common as the Arctic's climate tempers and more people are willing to live farther north. Sámi lands are highly desired for mining and logging, and Sámi are already struggling against these industries to protect their lands from extraction and pollution. Sámi in Sweden, Finland, and Norway have also been forcibly relocated to make way for mines, hydroelectric development, and the damming of the Alta-Kautokeino watercourse, respectively (Briggs 2006). The Arctic territories contain much of the world's remaining and untapped oil and natural gas reserves. As these industries grow in northern Norway, Sámi may see the economic opportunity and choose to leave their traditional lives. These resource development projects are often proposed with the good intention of harnessing renewable energy. Abstractly, the Sámi are supportive of green energy projects, but when they are put into practice, they are usually done so without regard to how they will affect Sámi migration patterns. Norwegian Sámi have vocally opposed several plans for development, though the government does not adequately address these concerns and the plans have been implemented regardless. In April 2016, the Norwegian government supported what became Europe's largest onshore wind farm in the heart of South Sámi land. The Gáldu Resource Center for the Rights of Indigenous Peoples has worked to provide Sámi and other Indigenous groups resources for handling resources conflicts.

The Sámi have access to the Norwegian government through the Sámi Parliament. The parliament works with the Department of Sámi and Minority Affairs in the Ministry of Labour and Social Inclusion. The government is supposed to consult with the Parliament if its affairs affect Sámi interests, but it is unclear to what extent Sámi concerns are truly taken into account. The Sámi Parliament has additional representatives that serve as board members on the Finnmarkeiendom, the legal body that presides over the people and resources of Finnmark. As of January 2020, Finnmark has merged with Troms, a neighboring county, forming Troms og Finnmark. Three Sámi representatives and three Finnmark county government representatives run the Finnmarkeiendom. This equal representation is significant as the Sámi make up 25 percent of the county's population (Kelman & Næss, 2013).

Norway's green development is largely supported by non-Sámi, as it is helping the country reduce its carbon footprint. Better education of Sámi culture and the effects of infrastructure development

on Sámi lands can help bring awareness to non-Sámi people (Wing, 2017). In order to manage land use conflicts, a platform should be created to bring together Sámi and industry representatives, along with local government officials. Together, they can address potential concerns Sámi may have over any proposed development, and the Sámi will be able to act in a consulting role to ensure proper environmental protections are adhered to.

Alaska

Alaska is home to over 100,000 Indigenous people, or around 15.4% of the state's population (Alaska Census, 2019). Because of the diversity of the Alaskan nations, this portion of the paper will focus less on the history and livelihoods of various tribes and more on the state and federal government's responses to climate-based migration.

The US has not set a precedent of respecting its Indigenous populations. The US purchased Alaska in 1867 without consulting the Indigenous communities already living there. From that time until 1924, Alaska Natives were not considered US citizens, and couldn't own their ancestral land or have jurisdiction over their natural resources, unless they demonstrated that they had left their Native lifestyle and identity behind. Today, Alaska's constitution lacks recognition of its Indigenous peoples right to hunt and fish in their homelands, only stipulating that they have equal access to the resources.

At least eighty-five percent of Alaska's Native communities are experiencing increased erosion and flooding, as well as melting of the permafrost that makes up their land (USGCRP, 2018). Some villages have moved homes and buildings away from the coastline, while others have elected to relocate completely. Alaska Native communities have been documenting environmental changes such as erosion for decades. A Yup'ik village relocated itself due to climate change from Kayalavik to Newtok as early as 1949 (McDermott, 2015).

The Alaska Natives that inhabit the northwestern coast of Alaska historically did not rely on built infrastructure. These communities were able to move away from areas experiencing coastal erosion or sinking ground. It was the imposition of a formal educational requirement by the United States government that forced Yup'ik and other Indigenous communities to become sedentary, a break from their nomadic past. In the case of Shishmaref, a village considering relocating from a barrier island 120 miles from Nome to Mertarvik on the mainland, the issue of education became an obstacle to receiving government funding. Ironically, in order for the Alaskan government to provide funding for a new school, there must be at least 10 children residing there, but few parents were interested in taking their children out of school in Newtok and moving them to Mertarvik where there wasn't a school (ibid).

Often, Indigenous communities are described as having a double bind, stuck between wanting independence from Western, non-Indigenous institutions and being able to use those same institutions (such as international law) to uphold their rights to land, resources and freedom. Alaska Natives could potentially benefit from collaboration with the United States government for relocation, but may risk sacrificing their complete freedom to set up a new village in a way that fits their community. This double bind is important to mention, as some communities may be reluctant to work with governmental institutions for fear of losing their autonomy or being forced to leave their homelands as in their ancestral histories. Another double bind is the relocation itself. Once the government is aware that members of a village have begun discussing the process of relocation,

they are less inclined to finance the infrastructure in a town that may be nonexistent in the next few years. For example, once the Newtok community began debating moving their village, the government divested in its infrastructure, leading to the shut down of an entire power plant. This divestment from Newtok did not mean an investment in the proposed village, Mertarvik (ibid).

Since the early 2000s, several government bodies including the US Government Accountability Office (GAO), the Alaska Sub-Cabinet on Climate Change Intermediate Action Workgroup (IAWG), and the US Army Corps of Engineers have been documenting environmental threats to Alaska Native villages. The IAWG was intended to bring together stakeholders and government officials who could work with communities experiencing the impacts of climate change and considering relocation. The IAWG was successful in creating spaces for representatives from Alaska Native communities to voice their concerns and opinions to government officials and to aid in the drafting of strategic plans for mitigating climate change-induced risks. The IAWG was the first step toward finding solutions for Alaska's native populations: it identified communities in areas already greatly affected by climate change, and it voiced concerns and recommendations for funding and community response to the Alaska State Legislature. For reasons not made public, the IAWG was not given approval to continue its work from Governor Parnell nor the Subcabinet on Climate Change in 2011 (Bronen, 2013: 18).

The IAWG was successful in getting the Alaskan Legislature to establish the Alaska Climate Change Impact Migration Program (ACCIMP) in 2008. The AACIMP mainly conducts Hazard Impact Assessments and doles out Community Planning Grants so that the recommendations from the impact assessments may be carried out. The Alaska Division of Community and Regional Affairs (DCRA) is funded by the US Fish and Wildlife Coastal Impact Assistance Program. It was under DCRA that the Newtok Planning Group was formed, which includes stakeholders from the federal, state, regional, local and tribal levels. It has been instrumental in aiding the Newtok community work through the relocation process, though it has taken over twenty years for the proposed site to become habitable. In October 2019, a third of Newtok's residents made the move to Mertarvik creating a new problem. The 2020 Census will count the two halves of the community separately. Additionally, due to climate change, some residents have moved either temporarily or permanently to live with relatives in other parts of the state. Future population-based funding, like that for housing, schools and other infrastructure, will be lower for both Newtok and Mertarvik (Wang, 2020).

The US currently does not have sufficient federal money designated for Alaska Native communities to adequately relocate their communities and adapt to climate change. The US Army Corps of Engineers has estimated that the relocation cost for one village in Alaska would cost between 100-200 million USD. Though at least thirty Alaskan towns are expected to relocate in the next ten years, only 2 million USD was promised in 2015 by President Obama to the Denali Commission, the independent federal agency mandated to manage climate-related displacement in Alaska (Herrmann, 2017). Since then, the current Trump administration has put climate change denial into practice and has worked to slash the funding of the Denali Commission and similar agencies. For the 2019 fiscal year, the Commission had just $13 million available for program activities, with only $5 million allocated to village infrastructure protection (Neimeyer, 2018). In February 2020, President Trump's budget proposal included the elimination of the Denali Commission, stating that Alaska is a wealthy enough state to pay for the rural infrastructure

projects that are usually federally funded (ibid). Alaska's congressional delegation pledged to protect the Commission as in previous years, though it remains to be seen whether they will be successful (DeMarban, 2020).

The Stafford Act serves as an outline of the federal government's main actions triggered during a natural or major disaster. It classifies these as "any natural catastrophe (including any hurricane, tornado, storm, high water, wind-driven water, tidal wave, tsunami, earthquake, volcanic eruption, landslide, mudslide, snowstorm, or drought), or, regardless of cause, any fire, flood, or explosion, in any part of the United States, which in the determination of the President causes damage of sufficient severity." The Act, and other Federal Emergency Management Agency (FEMA) disaster relief programs, have only been applied in short-term catastrophe scenarios and notably do not mention slower destructive natural processes like erosion or permafrost melt (Gómez, 2019) Additionally, any funding given out must be spent on repairs and rebuilding efforts at the site of the disaster. This has meant that Alaskan communities must rely on smaller and more specific grants to fund both their adaptive measures and relocation efforts (Herrmann, 2017). The Arctic Monitoring and Assessment Programme (AMAP) includes sustainable livelihoods as a provision of a climate resilience plan. Any relocation that creates poverty is not considered to be climate resilient (AMAP, 2017). In the case of Newtok and Mertarvik, the residents of both communities faced economic hardships after the government's divestment. This is not a case of true climate resilience, and future government actions related to climate resilience should be preceded by an assessment determining the ability of the residents to continue their sustainable livelihoods based on the effects of said actions.

Creating better climate relocation policies and funding pools is just the first step for the US. The Alaskan communities highlighted in this paper are only a portion of the US coastal populations that will face similar decisions. In 2019 the US Government Accountability Office (GAO) proposed two funding options for climate resilience: 1) "a federal financial assistance program that could provide grants, loans, or loan guarantees to nonfederal entities implementing high-priority climate resilience projects; or 2) a climate resilience infrastructure bank that could combine federal funds with funds from other sources to provide funding to nonfederal entities for implementing high-priority climate resilience projects" (Gómez, 2019). Both of these options are tenable and the time to enact these is now. With the current administration slashing funding for environmental agencies and social services, it is unlikely that these will occur without a change in the White House. As more coastal communities become threatened, competition for relief resources will also increase. This paper recommends that Congress amend the Stafford Act to include erosion and permafrost under the definition of what qualifies as a disaster, and that allows for the spending of disaster relief funding in areas not within range of the disaster.

Northern Russia

Russia is home to almost 200 different ethnic groups, with 41 of them being legally recognized as Indigenous. Russia's Indigenous groups, including those that live in Northern Russia, Siberia, and the Far East, make up less than 0.2% of its total population (Rohr, 2014). Today's numbers estimate that there are 250-300,000 individuals identifying as or falling under the classification of Indigenous (ibid). These northern communities are widely spread between the western Kola Peninsula to the eastern Bering Strait, covering around two-thirds of Russia's land (Berezhkov & Sulyandziga, 2019). In addition to the way these communities' livelihoods are threatened by climate

change, other dangers to their existence come in the forms of an absence of legal rights, and a lack of adequate and enforced environmental standards.

Many of Russia's Indigenous groups have ties to their homelands that date back to before the 17th century. Since Russia's colonization in the 17th century, they experienced forced relocation and attempts at 'Russification' (Crate, 2013). Under the rule of the Soviet Union, years of collectivization and industrialization worked to create a socialist system out of the previous feudal one. This change included displacement and forced resettlement, condensing rural populations into centralized production areas. Indigenous groups were mainly nomadic or semi-nomadic and relied on the migration of reindeer, fishing, hunting and gathering. Their traditional lifestyles built around ecology, movement, and environmental processes were put on hold as they were forced into static lives. Soviet settlement and collectivization policies were designed to boost and regulate agricultural and industrial production. Children were often separated from their families and sent to boarding schools away from their traditional lives. The fallout from the collapse of the Soviet Union has left Indigenous people poorer than ever and underserved by the Russian government.

The continual permafrost melt and subsequent flooding in much of the territory inhabited by Indigenous peoples has already caused several communities to explore options for relocation. Beryozovka, a village of around 300 residents, has experienced extreme flood events for about a decade. This village, home to the only settlement of Even people, struggled with whether to move to higher ground or risk losing their community (Macfarquhar & Ducke, 2019). Most of the Indigenous communities still reside in rural regions of northern Russia today, though their modes of survival have changed slightly. Communities like the Viliui Sakha traditionally practiced reindeer husbandry, hunting and gathering, though through the Soviet collectivization policies, several of these communities were wiped out. The increasingly unpredictable seasonal weather and extreme climate events, coupled with a documented decline in native wildlife, led the remaining Viliui Sakha to retain the cow farming lifestyle after the fall of the Soviet Union into which they had been forced. More recent trends of permafrost melt and softening ground are now putting their farming practices at risk. The Viliui Sakha have considered relocating but for now, the majority of them prefer to remain in their ancestral homeland and again adapt, rather than move in order to maintain practicing cattle and horse raising (Crate, 2013: 9).

The Indigenous peoples of Russia that still continue their customary practices of reindeer herding and migrating are running into other problems similar to the Norwegian Sámi. Reindeer are suffering from higher rates of disease and starvation as their food sources stop growing as far south and are taken over by new lichens and plants. Migration patterns of the animals are becoming more unpredictable due to the equally unpredictable climate and weather events. The traditional and experiential knowledge that Indigenous peoples have is becoming less useful and relevant, and is in danger of being lost.

In addition to the already shrinking numbers of mammals and growing number of insect pests, Indigenous peoples in Russia also have to deal with barriers to other resources like fish. According to the law, Indigenous people are allowed to fish without first obtaining a permit. However, in 2017, the Russian government began requiring Indigenous people to complete a lengthy application process in order to fish. If their application is accepted, they are limited by the amount of fish they can collect, as well as the specific dates and times they are allowed to fish (Rohr, 2014). To make matters worse, Indigenous peoples frequently get in trouble when hunting and fishing

because they must provide documentation of their status as Indigenous. However, this can be more difficult for Indigenous peoples as Russia has removed the portion of its passports that denotes nationality.

The Russian constitution and national legislation does little to protect the rights of its Indigenous populations. Many of its laws are incomplete or intentionally vague. The laws outlining basic rights of Indigenous peoples only apply to populations fewer than 50,000 individuals and do not identify who classifies as Indigenous (ibid). In 2001, the federal law on Territories of Traditional Nature Use (TTNU) was passed, which was intended to officially recognize Indigenous land ownership. Though this law sounds constructive in theory, it is not enforced. The hundreds of territories outlined by Indigenous communities along with relevant regional government bodies have not been acknowledged by the federal government. Thus these territories have no official legal status. In addition, under current legislation, Russia's Indigenous peoples are only granted usufruct rights for fishing and hunting. Their inherent right to their ancestral lands remains unrecognized. The TTNU originally defined the territories as environmentally protected territories, but the word "environment" was removed in 2013. This, in conjunction with the fact that in 2015 the portion of the law delineating the authority of the local authorities was repealed, makes Indigenous lands more susceptible than ever to resource plundering and business development (ibid).

The Russian Association of Indigenous Peoples of the North (RAIPON) was originally created to be an advocacy organization, supporting the voices of Russia's Indigenous peoples both domestically and internationally. Pavel Sulyandziga, the first vice president of RAIPON from 1997-2010, has been vocal in international conventions about the poor treatment of Indigenous peoples in Russia. A confidential Russian report states that Sulyandziga was difficult to control, just one of many cases in which the Russian government has attempted to intimidate Indigenous rights' activists. RAIPON's activities were suspended in 2012 by the Russian government over allegedly receiving foreign funding. In 2013, RAIPON was taken over by new staff with Ledkov Grigory Petrovich as president. RAIPON has since openly supported government positions that oppose what Indigenous and environmental activists are fighting for.

As countries around the world try to squeeze out the last drop of oil from their lands and extract minerals at rates higher than ever before, Russia is doing its part to keep up and stay competitive. Russia's Arctic is not only home to the majority of its Indigenous populations, but also 80 percent of its natural resources by value. Most of its oil and natural gas is produced in the North, as are most of its gold, diamonds, platinum, nickel and other minerals (Berezhkov & Sulyandziga, 2019). The large-scale mining and energy projects are heavily damaging the environment and have displaced Indigenous communities. Northern Russia has seen thousands of pipeline spills, including the largest ever on-land oil spill in 1994. Rivers, swamps and the unique ecosystem of the taiga are consistently contaminated. In May 2020, more than 6,000 tons of diesel oil from the Norilsk-Taymyr Energy Company was spilled across the Taymyr tundra. The company reported that the spill was likely due to the ground underneath its reservoir sinking and causing damage to the foundation. Permafrost melt has caused a lot of infrastructure destruction, and as the rate of melt and frequency of oil projects both increase, there are likely to be more accidents. Furthermore, these accidents are difficult to clean up because of their remote locations. Lastly, not only are Indigenous peoples required to rent out the territories theoretically set aside under the TTNU, but

also the territories are often rented out to companies wishing to extract natural resources from the land (Rohr, 2014).

Like the Sámi and Alaska Natives, the Indigenous peoples living in the Russian Arctic are struggling to adapt to the environmental changes of permafrost melt, erosion and flooding occurring in their land. The threats to their existence from their government and from the extractive industries are just as great, if not greater. The Russian government should officially recognize the inalienable rights its Indigenous peoples have as listed by the United Nations Declaration on the Rights of Indigenous Peoples (UN General Assembly, 2007). It must develop protective legislation for the ancestral lands of its Indigenous groups and give greater autonomy to the local bodies that have the power to enforce them. Russia's Indigenous peoples are some of the poorest people in the republic, and their communities may require greater assistance as their lands become increasingly inhabitable. Moscow must end the smear campaigns against Indigenous activists and allow Indigenous organizations like RAIPON and the Centre for the Support of Indigenous Peoples of the North to remain independent. International bodies such as the UN Economic and Social Council must continue to support Russian Indigenous individuals and organizations. While these actions are unlikely to be undertaken by the Russian government, human rights organizations around the world have the ability to highlight the voices of Russian Indigenous peoples and to call on Russia to better protect its citizens.

Challenges of relocation

Traditional knowledge

The changing temperatures in the Arctic threaten the threads of the fabric that make up Indigenous peoples' lives and cultures. One of the less obvious issues with relocation is the threat to traditional knowledge. Many Indigenous cultures are strongly tied to the microclimate they live in, with their history, forms of transportation, clothing and environmental knowledge being dependent on the Arctic climate. The effects of rising temperatures are already very apparent, with the increase in average Arctic temperature expected to range from 2.5 to 7.5° Celsius by the end of the 21st century (Hassol, 2004). Landfast sea ice, or ice that is attached to the coastline, is crucial to the survival of Indigenous communities, as it increases their access to open water and icebergs where the animals they hunt such as seals and polar bears reside (Aporta, 2010). In fact, some Indigenous peoples, such as the Inuit, dwell and hunt on the ice for two-thirds of the year, making it a large part of their cultural memory (Aporta, 2010). Physical characteristics of ice floes and coastlines have been utilized by the Inuit for navigational purposes and in storytelling. For communities that move farther inland, away from coastlines and permafrost, any traditional knowledge about fishing, hunting or even using permafrost for building on has the potential to be lost with the move. As the warming of the climate causes large-scale changes to centuries-old glaciers and the ecosystem, they are at risk for losing part of their knowledge and culture.

Culture and family

For some Indigenous groups, their ancestral home is located completely in areas that are at risk for becoming inhabitable due to climate change. If these communities choose to move to stable ground, this may come at the cost of leaving their spiritual sites and deceased family members behind. Elders may also choose to remain in the ancestral home, leading to greater fragmentation of the communities and loss of environmental and linguistic knowledge (Gerlach, 2017).

Choices

There are so many questions involved when a community is deciding whether to relocate. Do they move as a whole community? Will individuals and families choose to move to larger cities? Will they risk being forced into displacement camps if they can't relocate in time or choose to stay in their homeland? How can they ensure that their community receives enough support and funding for their new settlement to avoid impoverishment that may result from a lag in social services? How can they maintain their cultural identity and heritage as individuals and as a community, which is so often tied closely to the land? And how can the non-Indigenous people whose industrialization has caused climate-induced relocations support these communities?

General recommendations

The myriad of Indigenous groups in Alaska, Norway, and Russia mentioned in this paper are dealing with radically different government bodies and a range of relocation options. However, the methods they use to gain access to the resources of government agencies, non-governmental organizations (NGOs) and philanthropies may prove insightful to each other and for other communities in the future. Several Indigenous peoples' organizations are Permanent Participants to the Arctic Council including the Sámi Council, the Inuit Circumpolar Council, and RAIPON. As Permanent Participants, these organizations have influence when the Council negotiates and makes decisions. This status gives Indigenous peoples a platform for direct communication with the highest-level government officials of the countries in which they reside. The Arctic Council has the potential to be an effective platform for vocalizing concerns and drawing greater international attention to the climate change relocation they are facing.

Support network

Because a successful climate resilience and adaptation plan will have to take into account both climate change and non-environmental factors, AMAP recommends that plans include: 1) processes for learning, 2) holistic understanding, and 3) conflict resolution methods (AMAP, 2017). The people going through climate-induced relocation today will be able to serve as resources for future populations, sharing information and bringing up aspects of adaptation that might have been otherwise forgotten. As each community works through their options, it would be useful to have a space for them to document their process and avenues tried so that others may see an example of a successful or unsuccessful relocation.

A platform exists that fosters networking and the sharing of problems, ideas and innovative solutions for stakeholders across the United States, called Adaptation Clearinghouse. This organization has resources including funding options, climate modeling, current laws, and networks for local government officials, and partnerships with the Urban Sustainability Directors Network and American Society of Adaptation Professionals. Stakeholders from Alaska are able to join various networks, though the resources are to "assist policymakers, resource managers, academics, and others who are working to help communities adapt to climate change" (Adaptation Clearinghouse, 2020). The organization is aimed at engaging professionals from many sectors, but lacks a network for the Indigenous communities experiencing climate change in or outside of the Arctic.

A similar but more inclusively structured international system could be valuable for sharing information, as well as building support on an international level. The proposed organization would allow community members and leaders, government officials, NGO workers, prospective donors, and all of the stakeholders in between to communicate and better understand each other's interest and concerns. The platform can include resources by country such as available funding, current policies, case examples, and other helpful resources. There can also be resources for individuals or organizations interested in getting involved on the international level.

Conclusion

There is no doubt that the climate of the Arctic will continue to change rapidly. The region that is already known for its extreme temperatures and weather will become an increasingly difficult place to survive for the people that call it home. As the permafrost melts and the coastlines erode, it is imperative that the governments of the United States, Norway, Russia and the rest of the Arctic nations step up their efforts to support their Indigenous peoples both domestically and internationally, in addition to more generally combating climate change. The communities discussed in this paper are threatened by climate change directly and indirectly from loss of ancestral land and inability to practice customary livelihoods to pollution from resource extraction industries and government crackdowns on human rights activists. And they require varying solutions. Alaska Natives may have the greatest success in lobbying for better disaster relief and legislation, while Norwegian Sámi might find their energy is better spent advocating for better conflict resolution strategies between themselves and industries. Russian Indigenous communities may choose to continue their fight against their governments' suppressions, and all Indigenous peoples can benefit from each other's experiences and support.

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Widening the Scope of Responses to Environmental Concerns in the High North:
Arctic Countries' Policies and the Role of China

Gao Tianming & Vasilii Erokhin

With the progressing exploration of the Arctic as a resource base and trade corridor between the continents, the region is experiencing changes that fundamentally affect the environment, biodiversity, and people. The once established patterns are transforming and bringing new potential risks to the sustainable development of the region. Due to the industrialization in many northern territories, air, water, and soil pollution have been emerging as threats to ecosystems and public health. For those countries that now launch industrial projects in the Arctic, there is a challenge of how to converge the economic benefits with the urgent need for environmental protection. In this chapter, the authors review current policies and potential responses to environmental challenges contained in the national development strategies of Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden, and the USA. Among non-Arctic countries, China has emerged as one of the prominent actors in the region, including in the spheres of industrial development and shipping. Other countries also show ever-deeper environmental concerns, but progressing climate change in the High North is not an issue to be solved by any country acting alone. It is of emerging global concern with the broader community of Arctic and non-Arctic countries having a mutual interest in cooperation to ensure the protection of fragile ecosystems and sustainable development of the region. Using China as an example, the authors discuss how non-Arctic states may contribute to the solution of environmental problems in the High North. The study analyses existing international and national approaches to environmental protection and climate change issues in the Arctic. It discusses how varying interests of Arctic states, from one side, and China, from the other, could be translated into effective international policies for the benefit of sustainable development of the region.

Introduction

The Arctic is changing in many ways with the climate being one of the most dramatic transformations in the past years. According to the Arctic Monitoring and Assessment Programme [AMAP] (2019), the annual average Arctic surface air temperature has increased by 2.7°C since

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1971 (AMAP, 2019: 3), while the September average volume of sea ice has declined by 75% since 1979 (AMAP, 2019: 4). Climate change in the Arctic is largely related to global warming, the latter being triggered by air pollution (Norkina & Van Canegem, 2020). In terms of various anthropogenic emissions, the world's biggest contributor to climate change is China with 27% of global emissions of greenhouse gas (Olivier & Peters, 2018) and about 20-24% of global emissions of black carbon (United Nations Environment Programme [UNEP], 2015).

Although it is difficult to assess the amount of pollution coming to the Arctic specifically from China (Kopra et al., 2020), it is clear that progressing warming may result in a reduction in the area and thickness of sea ice, melting of permafrost, shifting boundaries of the forest zone, transformation of ecosystems, and degradation of landscapes. Due to excessive air pollution, chemicals accumulate intensively in the trophic chains of terrestrial and aquatic Arctic ecosystems and are concentrated in the bodies of long-lived carnivorous mammals, birds, and fish. This creates prerequisites for the long-term effects of chemical pollution in Arctic ecosystems, including the death of offspring, the reduction or extinction of populations, and the depletion of fauna. Currently, the critical pollutants in the trophic chains of the Arctic ecosystems are organochlorine hydrocarbons. They are herbicides, insecticides, fungicides, and industrial chemicals (carbon, chlorine, and other products of transformations occurring in technological processes and side reactions in the environment) that disrupt the hormone balance of animals, birds, and aquatic organisms (Rosińska, 2019; Macías-Zamora, 2011). Bioaccumulation of such contaminants is associated with ocean pollution, long-range transboundary air pollution, aerosol deposition, as well as bird migrations. Arctic ecosystems are highly susceptible to global and regional transport of substances. Global pollution is primarily associated with the Gulf Stream, river flow, and atmospheric transport. Regional ones have their specifics in each country, but in general, they are the consequences of toxicant emissions by industrial enterprises, shipping, military and industrial waste, oil and gas production in coastal areas, as well as the exploration and development of oil and gas fields.

For over a decade by now, China has been actively implementing various domestic policies to reduce the growth of emissions of greenhouse gases and other pollutants. The Greenhouse Gas Emission Reduction Plan (China Briefing, 2012) aimed to reduce the amount of carbon emitted per unit of GDP by 17% by 2015 compared with 2010. China has taken part in a variety of international negotiations and partnerships on climate change, including the United Nations Framework Convention on Climate Change, the Kyoto Protocol, and the Paris Agreement (Koivurova et al., 2019). In 2016, China ratified the Kigali Amendment to the Montreal Protocol aiming to reduce the climate impact of hydrofluorocarbon gases (Science Daily, 2020). In 2018, China introduced an action plan to meet "ultra-low emission" standards in steel production (China Power, 2020). The power grid system has been actively transitioning to the use of natural gas instead of coal. Furthermore, China has made serious efforts to develop its renewable energy sector. As a result of these actions, by 2018, China had managed to reduce carbon intensity by 45% and raise the share of non-fossil fuel energy sources to 15% compared to 2005 levels (China Power, 2020).

Despite the efforts on reducing emissions of greenhouse gases, persistent organic pollutants, and other climate change forcers, Chinese companies have been blamed for negatively affecting Arctic habitats, including in Greenland, Russia, northern Europe, and Canada (Sidorov, 2018; Lajeunesse,

2018; Erokhin et al., 2019; Kopra et al., 2020). The increasing shipping activities of Chinese operators in the Arctic Ocean are also viewed as a threat to marine ecosystems and air quality in the Arctic (Kopra et al., 2020). Among the risks are oil spills, emissions of pollutants into the air and water, oil spills during loading, unloading, bunkering, or as a result of emergencies. In its Arctic policy, China advocates stronger international cooperation in environmental protection, energy conservation, emissions reduction, low-carbon development, and tackling climate change in the Arctic (State Council of the People's Republic of China, 2018: article IV.4). However, the development and implementation of such cooperation should take into account both the global challenges of controlling climate change in the Arctic and individual priorities of Arctic countries (as well as China itself) in concentrating their efforts and resources in certain areas of the environmental agenda. This chapter aims to address major environmental problems in the Arctic across the spheres of climate change, industrial pollution, shipping, living resources, and habitats and populations of various species of flora and fauna. The authors explore how the international community in general and Arctic countries in particular approach to responding to the above-mentioned environmental problems in their strategies, policies, and regulations. The article concludes with an analysis of intersections between China's and Arctic countries' priorities in environmental protection and climate change responses in the Arctic.

Major environmental challenges in the Arctic

According to the United Nations Environment Program (UNEP) (n.d.), the environmental problems of the Arctic are grouped into several main areas: oil pollution of the Arctic seas; climate change leading to ice melting; extensive fishing and seafood production; changes in the habitat of flora and fauna and reduction of animals' populations; and intensive shipping. These five points are detailed in the following sections.

Oil spills and industrial pollution

Arctic territories and offshore waters of the Arctic Ocean seas are increasingly being developed by oil-and-gas and other resource companies (Blaauw, 2013; Batin et al., 2015). In many regions, especially in the Russian sector of the Arctic as the most developed in industrial terms, negative environmental processes lead to the transformation of the natural geochemical background, atmospheric pollution, degradation of vegetation, soil pollution, and introduction of harmful substances in food chains. Industrial pollution in the Arctic affects the safety of the river and marine ecosystems, as well as the health of Indigenous populations. Only with river runoff, several hundred thousand tons of oil products are taken out to the Arctic Ocean annually. This problem is particularly critical in Russia, where intensive resource development projects are being carried out. Air masses from the continent are transported to the High North, bringing nitrogen and sulfur oxides. Acid rains negatively affect the health of people and animals.

In a cold climate, the risk of accidents increases significantly whereas the possibilities for the elimination of consequences decrease (Fadeev, 2012). On the Arctic Ocean shelf, even a small leak of hydrocarbons into ice-covered water areas can lead to significant environmental damage. On May 29, 2020, in Norilsk, Russia, there occurred a spill of over 20,000 tons of diesel fuel, with part of it flowing into the Ambarnaya and Daldykan rivers. According to Greenpeace (2020), this is one of the most massive environmental disasters in the Arctic in the past few decades. It is comparable in scale and consequences with the accident that occurred in 1989 off the coast of

Alaska when the wreck of the Exxon Valdez tanker spilled 37,000 tons of fuel into the ocean. In Norilsk, the pollution covered the total area of 180,000 square meters. The damage is estimated at $86 million, while it is still difficult to assess the long-term impact caused to the soil and air. Diesel fuel is more toxic than oil and contains chemical compounds that are not captured by treatment facilities. According to Knizhnikov (RBC, 2020), Blokov (Greenpeace, 2020), and some Russian environmental experts working at the site of the accident, the diesel will dissolve in the water, remaining there for a long time. In a cold climate, where nature is slower to respond to oil spills, the effects of the latter on the environment may be observed for years, causing permanent losses of fish and other aquatic organisms and thus degrading traditional sources of the food supply in Indigenous communities in the long run.

There is growing evidence of contamination from industrial pollution in the Arctic (Davis, 1996; Macdonald et al., 2000; Kurgankina et al., 2020). The ecosystems are affected by the emissions and effluents from industrial enterprises and public utilities (Arnold et al., 2016; Law et al., 2017; Recio-Garrido et al., 2018), products of hydrocarbon processing (Fang et al., 2018), heavy metals and other wastes from metallurgical production (Caputo et al., 2019; Khan et al., 2019), microplastics and marine litter (Abate et al., 2020; Martinez et al., 2020), certain toxic substances (phenol, ammonia, and others) (Lee et al., 2019; Skaar et al., 2019), numerous pollutants from military sites (Koch et al., 2005; Brown et al., 2014; Hird, 2016), and waste from nuclear-powered vessels (Sarkisov, 2019; Karcher et al., 2017; Huang et al., 2020). In conditions of ultra-low temperatures and the shielding effect of permafrost, pollutants can have a long-term negative impact on peoples, fauna, and flora.

Ice Melting

Climate changes observed in the Arctic in recent decades may lead to the reduction of the ice cover and the expansion of the navigation window. According to the Intergovernmental Panel on Climate Change (IPCC) (2013), the global average temperature increased by 0.85°C during 1880-2012. In the polar regions, however, the increase has been much more noticeable, especially in recent decades, reflecting new prospects for commercial cargo shipping and research due to climate change (Cavalieri & Parkinson, 2012; Stroeve & Notz, 2015; Ng et al., 2018). Observations show significant fluctuations in the ice cover across the Arctic Ocean (Landy et al., 2016; Tschudi et al., 2016). In 1979-2019, the September minimum ice spread decreased significantly – by 87.2 km^2 or 13.3% every decade (National Snow and Ice Data Center [NSIDC], 2016). The record low in September 2012 was 3.41 million km^2, or just 54% of the average low in 1981-2010 (Liu et al., 2016). In addition to the reduction of the spread of ice, Lindsay and Schweiger (2015) report an increase in the proportion of thinner and younger ice in the overall structure of the Arctic Ocean ice cover (Figure 1).

The average annual temperature in the Arctic is increasing, which affects the processes of ice formation, growth, constancy, and movement throughout the year. Side processes are also triggered, which have an equally noticeable and non-linear growing influence on the ice cover. For example, melting ice increases the area of open water, which has a lower coefficient of reflection of sunlight compared to ice. As a result, the absorption of solar heat in open water zones increases, the surface water temperature increases, which causes a cyclical process of ice melting (Parkinson, 2014). This effect of global warming works both in seasonal and long-term perspectives: warming of surface water layers postpones autumn freezing, thereby reducing the period of ice growth. As

a result, the next year, the ice layer is thinner and more prone to early splitting (Serreze & Barry, 2011). However, despite the apparent relief of the ice situation occurring in the Arctic, it should not be unambiguously identified with the improvement of conditions for shipping.

Figure 1. Ice distribution in the central part of the Arctic Ocean during peak periods (March) in 2009-2019
Note: light blue – open water, blue – nilas ice (0-10 cm), purple – newly-formed ice (10-30 cm), green – first-year ice (30-200 cm), brown – multi-year ice, gray – fast ice.
Source: Authors' development based on the Arctic and Antarctic Research Institute [AARI] (n.d.)

Dynamic forces affecting the ice or icebergs breaking off from glaciers pose serious risks to the establishment of stable and secure shipping routes. In some zones of the Arctic Ocean,

dynamically deformed annual ice can reach 5-7 meters in thickness (Landy et al., 2016). This complicates or completely blocks the passage of vessels, especially in narrow straits. To the north of Greenland and in the waters of the Canadian Arctic Archipelago, currents press ice, and the thickness of the ice cover reaches the world's maximums (Melling, 2002). Drifting ice is also a danger. Due to the decrease in the thickness of the ice cover and its area, the ice becomes more mobile, the speed of drift increases, and the behavior of the ice becomes more dynamic and less predictable (Rampal et al., 2009).

Increase in marine fisheries

Ice melting frees up a significant part of the Arctic Ocean for fishing. During warmer seasons, fish and other marine populations increase in the Barents, Norwegian, and Greenland seas. This applies primarily to cod, haddock, perch, halibut, herring, whiting, and other species. At the same time, their range is expanding in eastern and northern directions (Zilanov, 2015). Rayfuse (2019) warns that an expansion of unregulated fishing may wipe out particular fish species or entire fish stock. The extensive removal of fish from food chains may harm many species, including marine mammals and birds. Improper monitoring and lack of international research may result in overfishing of harvested species and may undermine the economic integrity of the ecosystem. Diminishing fish stock in the Arctic seas may have a negative consequence for Indigenous peoples, for whom fish and marine mammals are subjects of subsistence harvesting (Muir, 2010).

Regularly, fishing is carried out by Norway, Russia, Iceland, the Faroe Islands, Greenland, and some of the EU countries. The central part of the Arctic Ocean is located outside the exclusive economic zones of the five Arctic states (Canada, Denmark, Norway, Russia, and the USA) and is thus considered as an open sea where any country can fish. In 2015, Canada, Denmark, Norway, Russia, and the USA signed the Agreement to Prevent Unregulated High Seas Fisheries in the Central Arctic Ocean (CAOFA). In 2018, the agreement was extended to include China, Japan, South Korea, Iceland, and EU countries (EUR-Lex, 2018). According to the CAOFA, each signing party allows vessels under its flag to conduct commercial fishing in the Central Arctic only in accordance with measures for sustainable management of fish stocks taken by regional or sub-regional fisheries management organizations. Taking into account the current lack of commercial fishing in the central part of the Arctic Ocean (Schatz et al., 2019), there is no clear indication yet as to the immediate success of the agreement. Moreover, the likelihood of the rapid growth of commercial fisheries in the Central Arctic is low even in 2034 until when the CAOFA is valid. Vylegzhanin et al. (2020) underline the reliance of the CAOFA on a precautionary approach, while Rayfuse (2019) considers the agreement as "an initial framework for environmentally sound decision making regarding the potential for future fisheries". In a few years, it remains to be seen whether the CAOFA is applied correctly by all signing parties and allowed to ensure the conservation and sustainable use of fish stocks.

Habitat change and population decline

Rising sea level as a result of climate warming and ice melting leads to the desalination of surface water and an increase in primary productivity of the Arctic seas. Besides, global warming triggers the invasion of alien species into the northern ecosystems. As a result, the characteristics of the habitats of both marine and land animals change. According to the Organization for Economic

Cooperation and Development (OECD) (2016), there are seven critical environmental threats to marine ecosystems in the Arctic (Table 1).

Table 1. Main environmental threats to Arctic marine ecosystems until 2050

Environmental threat	**Impacts on ecosystems and potential economic losses**
Sea level rise as a result of climate change and ice melting	Flooding of low-lying coastal areas and wetlands, erosion of coastal areas, increased flooding in other areas, increased salinity of rivers, bays, and aquifers. The threat of damage to harbors and ports due to rising sea levels. According to the OECD (2016), total economic losses could reach $111.6 billion by 2050 and $367.2 billion by 2100.
Increase in temperature and freshening of surface waters due to glaciers melting	Significant changes in the lower/middle trophic chains and fluctuations of the quantity and quality of food resources at higher trophic levels.
Increase in primary productivity of the Arctic Ocean and the North Atlantic seas	Reduced proportion of stocks of valuable commercial species in the structure of biodiversity, significant modification of technologies for extraction of biological resources.
Invasion of alien species	
Loss of marine biodiversity	Currently, 550 species of fish are endangered. The rate of biodiversity loss will continue to increase.
Marine pollution	Marine ecosystems are under pressure from more than 300 chemicals classified as the most dangerous, as well as plastics and microplastics. They cause changes in the physical, chemical, and biological characteristics of marine and coastal zones that affect the quality, productivity, and sustainability of marine ecosystems. Pollutants can undermine the immune system and reproduction capacity of marine species, their resistance to other anthropogenic stressors, and contribute to the shifts in the ecosystems.
Acidification of the world's ocean waters	The increase in carbon dioxide emissions and climate warming causes an increase in the acidity of ocean waters, a gradual increase in the concentration of inorganic carbon, a decrease in the pH of waters, and their saturation with calcium carbonate.

Source: Authors' development based on OECD (2016)

With the current rates of pollution and climate change remaining constant, the OECD (2016) predicts the increased pressure on Arctic ecosystems from chemical pollution, affecting their health, productivity, and sustainability. Pollution undermines the immune system and reproduction of all Arctic animal species. There are changes in the functioning of ecosystems, the consequences of which are global and long-term (Titova, 2016). One of the major threats is the expected increase in acidification of marine waters, a factor of physical and biological changes in ecosystems. The extinction of entire populations of animals, birds, and fish is also a significant environmental problem. To a certain extent, this is due to a sharp change in climate and habitat conditions. According to the Conservation of Arctic Flora and Fauna (CAFF) (n.d.), mammals, birds, and fish living in the High Arctic experienced an average 26% drop in their populations between 1970 and 2004 due to the loss of sea ice. Arctic grazing species have declined by 20% between 1985 and 2004 (CAFF, n.d.). For many bird species, widespread and accelerating declines in population have been observed by Smith et al. (2020), Fuglei et al. (2020), Goyert et al. (2018), and Amundson et

al. (2019). According to Taylor et al. (2020), 57% of bird species in the Arctic had at least one population in decline, while for 21% of species, all populations were declining. In the case of mammals, Cuyler et al. (2020) found that six muskoxen populations had been declining since the 2000s. The two of six with steepest declines used to be the largest endemic populations in the world as recently as two decades ago (Taylor et al., 2020). Lemming populations declined in Russia and outside Fennoscandia at the southern edge of their distribution (Loarie et al., 2009; Ehrich et al., 2020) due to more frequent melt and freeze events in winter caused by climate change (Kausrud et al., 2008; Berteaux et al., 2017). The occurrence of irregular winter conditions is recognized as one of the major reasons for the Peary caribou population decline (Langlois et al., 2017; Kaluskar et al., 2019), as well as habitat shifts in polar bears populations (Watson et al., 2019). Other important factors of habitat change and biodiversity loss in the Arctic are poaching, industrial development, urbanization, and increased shipping (Peck et al., 2018; Yurkowski et al., 2019).

Intensification of shipping

Currently, most ships operating in the Arctic use heavy fuel (up to 75% of all fuel), which is dangerous for the environment (Cariou & Faury, 2015). As a result of its combustion, soot gets into the air and then condensates on ice and snow thus contributing to greater absorption of solar energy and ice melting. As the reflectivity of water and ice surfaces decreases, they absorb more and more energy, which contributes to the strengthening of the greenhouse effect and progressing warming. In the case of Norilsk and other catastrophes, we see that fuel spills cause serious damage to the entire ecosystem, including people. Because of its viscous consistency, fuel oil is practically insoluble in water and has a detrimental effect on birds and marine mammals.

Since the 2010s, there has been a search for ways to restrict and ban the use of heavy fuel in Arctic shipping. The Arctic Council's Working Group on the Protection of Arctic Marine Environment (PAME) conducted a comprehensive assessment of the impact of shipping on Arctic ecosystems and the threat of accidental oil spills in 2009 (Arctic Council, 2009). Further, the comprehensive three-staged PAME study on the use and carriage of heavy fuel in Arctic shipping in 2011-2016 (PAME, 2011, 2013a, 2013b, 2016a, 2016b), has resulted in the IMO's proposal to ban the use of heavy fuel in the Arctic. According to the IMO's Sub-Committee on Pollution Prevention and Response, the ban is expected to be adopted in 2020 and will come into force on July 1, 2024. However, some vessels, especially those with a double hull, will be able to continue using heavy fuel until 2029. Also, for the Arctic littoral states, it will be possible to issue special permits for individual vessels using heavy fuel also until 2029.

Responses to environmental problems in the Arctic

To unify approaches to solving the above-mentioned environmental problems, the issues of conservation and protection of the Arctic ecosystems are addressed at the international, bilateral, and national levels (Khludeneva, 2016).

International legislation in the sphere of environmental protection

At the international level, environmental challenges in the Arctic have been addressed since the 1960s. Since then, a comprehensive framework of multilateral agreements has been established, including:

- International Convention on Civil Liability for Oil Pollution Damage 1969 (International Maritime Organization [IMO], 1969).
- Convention on Wetlands of International Importance Especially as Waterfowl Habitat 1971 (International Union for Conservation of Nature [IUCN], 1971).
- Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 (IMO, 1972).
- Declaration of the United Nations Conference on the Human Environment 1972 (United Nations [UN], 1972).
- Convention on Long-Range Transboundary Air Pollution 1979 (United Nations Economic Commission for Europe, 1979).
- United Nations Convention on the Law of the Sea 1982 (UN, 1982).
- Convention on Biological Diversity 1992 (UN, 1992a).
- United Nations Framework Convention on Climate Change 1992 (UN, 1992c).
- The Rio Declaration on Environment and Development 1992 (UN, 1992b).
- Kyoto Protocol to the United Nations Framework Convention on Climate Change 1992 (UN, 1997).
- Stockholm Convention on Persistent Organic Pollutants 2001 (UN, 2001).

International conventions set out the general requirements applicable to the protection of Arctic ecosystems. These are, in particular, the measures for the protection of wetlands established by the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (IUCN, 1971), the measures to combat pollution of the marine environment from waste discharges, as set out in the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (IMO, 1972), and the measures for the conservation and sustainable use of biological diversity envisaged by the Convention on Biological Diversity (UN 1992a).

The international framework for the protection of the Arctic environment is supplemented by the measures stipulated in legal acts and agreements concluded between the Arctic states, for example:

- The 1973 Agreement on the Conservation of Polar Bears between Canada, Denmark, Norway, the USSR, and the USA (Polar Bear Range States, 1973).
- Arctic Environmental Protection Strategy 1991 (Arctic Council, 1991).
- Declaration on Environment and Development in the Arctic between Arctic Council member countries (Arctic Portal, 1993).
- Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic between Arctic Council member countries (Government of Canada, 2013).

These agreements develop and specify the provisions of universal international treaties to ensure that the natural and other features of the Arctic region are taken into account. As a rule, they are concluded within the framework of the Arctic Council between all member countries, and then

implemented under the supervision of the relevant working groups. During its existence, working groups of the Arctic Council have prepared many guidelines and reports on such areas as biodiversity, development of offshore oil and gas fields, safe transportation of oil in Arctic waters, and spills of oil and other dangerous and toxic substances.

Environment-related policies and strategies of Arctic states

The recommendations made by the Arctic Council are not binding. Therefore, the key role in shaping responses to environmental concerns in the Arctic is played by national environmental policies. They address various aspects of both international and country-specific activities, including prevention of pollution of the Arctic marine environment from various sources, creation of Arctic marine and coastal specially protected natural territories, prevention of negative impact on Arctic natural resources, and promotion of effective participation of indigenous people in the rational use and protection of the Arctic environment. Given the above outlined five major environmental concerns, the following sections discuss policies and responses to current environmental challenges contained in the Arctic-related development strategies and documents of eight Arctic Council states.

Canada

Canada's Arctic legislation has changed significantly over the past decades. In 1985, the approval of the Arctic Water Pollution Prevention Act (Government of Canada, 1985) meant to create a legal framework for regulating shipping, economic activities, and marine pollution and for protecting the Arctic marine environment. The Act provides for administrative and civil liability, and economic sanctions against entities that pollute the marine environment. The Act also contains a clause that regulates and controls activities in all Arctic territories of the country. Canada's Arctic strategy has been updated since the early 2000s. In 2019, Canada's Arctic and Northern Policy Framework (ANPF) (Government of Canada, 2019) was approved. Similar to previous Arctic-related documents, it emphasizes the importance of climate change responses, environmental protection, environmental management, and biodiversity conservation in the vast northern territories of the country. In the Canadian Arctic, the annual temperature is rising 2-3 times faster compared to the global average (Bush & Lemmen, 2019), which poses a significant threat to the population, infrastructure, and ecosystems (Government of Canada, 2019). Najafi et al. (2015) and Zhang et al. (2019b) attribute at least half of the observed warming to the anthropogenic activity, particularly, to human-caused emissions of greenhouse gases. Climate change is projected to affect northern parts of Canada more than southern ones, thus increasing the likelihood of extreme events in the Canadian Arctic such as wildfires, droughts, and floods (Zhang et al., 2019b). Future warming may have adverse effects on terrestrial and marine ecosystems, as well as on the economy. These include risks to freshwater supply (Sturm et al., 2017), unpredictable seasonal and spatial variations in ice situation for marine shipping (Laliberté et al., 2016; Pizzolato et al., 2016), interruption of overland transportation due to the unstable lake and river ice conditions (Furgal & Prowse, 2008), and the impacts of thawing permafrost on greenhouse gases release (Olefeldt et al., 2016) and degradation of northern infrastructure (Prowse et al., 2009).

Increasing the resilience and ensuring a healthy state of the northern ecosystems are among the strategic goals of Canada. To achieve this goal, the following tasks are provided (Government of Canada, 2019):

- "accelerate and intensify national and international reductions of greenhouse gas emissions and short-lived climate pollutants;
- ensure the conservation, restoration, and sustainable use of ecosystems and species;
- support sustainable use of species by Indigenous peoples;
- approach the planning, management, and development of Arctic and northern environments in a holistic and integrated manner;
- partner with territories, provinces, and Indigenous peoples to recognize, manage and conserve culturally and environmentally significant areas;
- facilitate greater understanding of climate change impacts and adaptation options through monitoring and research, including Indigenous-led and community-based approaches;
- enhance support for climate adaptation and resilience efforts;
- enhance understanding of the vulnerabilities of ecosystems and biodiversity and the effects of environmental change;
- ensure safe and environmentally-responsible shipping;
- decommission or remediate all contaminated sites;
- strengthen pollution prevention and mitigation regionally, nationally and internationally".

The ANPF specifies no tools adjusted individually to the achievement of the environmental tasks, but it outlines government mechanisms that will be developed to accomplish Canada's overall goals in the Arctic. These include renewed federal-provincial-territorial-Indigenous relationships, involvement of the Inuit Crown Partnership Committee, the Yukon Forum, and the Intergovernmental Council of the Northwest Territories, investment plan to define and attract new investments to the region, and economic and regulatory levers to align funding initiatives with the objectives of the Framework (Government of Canada, 2019). The ANPF declares Canada's commitment to international efforts to reduce the negative impact of environmental issues on the population and Arctic ecosystems. Again, no specific environment-related agreements are mentioned, but among the institutions and international formats, the ANPF underscores the Arctic Council, the Arctic Coast Guard Forum, the Arctic Economic Council, the International Maritime Organization (IMO), and the United Nations Convention on the Law of the Sea (UNCLOS) (Government of Canada, 2019).

Denmark (Greenland and the Faroe Islands)

Denmark has a common strategy for the development of its circumpolar territories taking into account the interests of Greenland and the Faroe Islands (Government of Denmark, Government of the Faroes, & Government of Greenland [Kingdom of Denmark Strategy], 2011). The 2011 Arctic strategy is expected to be revised before it expires at the end of 2020 (McGwin, 2020). Since the new text was unavailable at the time of writing, we analyze the 2011 version.

Both Greenland and the Faroe Islands are important migration routes for birds, whales, polar bears, and other polar animals, as well as the conventional habitats of various species of flora and fauna (Lyngs, 2003; Boertmann et al., 2006; Merkel et al., 2019). Over the past years, the evidence that migratory species have declined in the North Atlantic has accumulated (Ganter & Gaston, 2013; CAFF, 2017). Adverse effects of climate change on the terrestrial and marine ecosystems across Arctic territories of Denmark were found by many scholars, including Irons et al. (2008), Canini et al. (2019), Fortune et al. (2020), and Burgos et al. (2020). The 2011 Strategy recognizes that a negative impact on the environment is caused by economic activities in Denmark, Greenland, and the Faroe Islands, including the extractive and energy industries (Kingdom of Denmark Strategy, 2011: 26). Intensive shipping is attributed to becoming a threat to marine ecosystems as a source of pollution and a potential transfer route for invasive alien species (Kingdom of Denmark Strategy, 2011: 45). In light of the increased maritime activities, oil exploration, marine studies, fishing, and passenger transport, both Greenland and the Faroe Islands "have entirely or in part been responsible for the monitoring of the marine environment and pollution control in territorial waters" (Kingdom of Denmark Strategy, 2011: 18). Denmark supports the surveying of territorial waters and promotes maritime safety and marine protection. The Strategy claims that although a certain amount of pollutants is generated domestically, the majority of greenhouse gases, heavy metals, persistent organic pollutants, petroleum products, and mercury still comes from outside (Kingdom of Denmark Strategy, 2011: 45). Such influx of transboundary pollutants negatively affects the health of the population and food chains (Snodgrass, 2020; Foguth et al., 2020), as well as triggers Greenland Ice Sheet melt (Lamarche-Gagnon et al., 2018; Williamson et al., 2020).

Due to the impacts of rapid global warming and greater pressure of anthropogenic activities on fragile biodiversity, Danish Arctic policy expresses particular concern for protecting the environment through improved understanding of climate change in the Arctic (Kingdom of Denmark Strategy, 2011: 43), monitoring of the Greenland ice sheet (Kingdom of Denmark Strategy, 2011: 45), monitoring and study of migratory species and migration routes, and tracking of transboundary pollutants and understanding of their effects on the health of the people and the biodiversity loss (Kingdom of Denmark Strategy, 2011: 46). The country plans to reduce greenhouse gas emissions by 50% by 2050 in accordance with the EU guideline, increase the share of renewable energy sources to 30% by 2020, and achieve full independence from hydrocarbon fuels by 2050 (Kingdom of Denmark Strategy, 2011: 46).

Environmental protection efforts are focused on the national implementation of international agreements (Kingdom of Denmark Strategy, 2011: 46) and are made in accordance with international obligations based on the best international experience and scientific knowledge to ensure the health, productivity, and sustainability of northern communities (Kingdom of Denmark Strategy, 2011: 10). The two treaties that Denmark focuses on in its environmental policy in the Arctic are the Convention on Wetlands of International Importance Especially as Waterfowl Habitat (IUCN, 1971) and the Convention on Biological Diversity (UN, 1992a). In the sphere of pollutants control, Denmark calls for a proactive application of the UNEP's global mercury convention (today, it is the Minamata Convention on Mercury signed in 2013 (UNEP, 2013)) and the Stockholm Convention on Persistent Organic Pollutants (UN, 2001) (Kingdom of Denmark Strategy, 2011: 46). In the sphere of marine environment protection, Denmark participates in the International Convention on Liability and Compensation for Damage in Connection with the

Carriage of Hazardous and Noxious Substances by Sea (IMO, 2010) and the International Convention for the Control and Management of Ships' Ballast Water and Sediments (IMO, 2004) (Kingdom of Denmark Strategy, 2011: 46). Under a bilateral agreement with Canada, Denmark and Greenland share information on oil spills and other marine pollution. Denmark also collaborates with the IMO in the field of environmental regulation of shipping and oil spills.

Finland

Finland's Strategy for the Arctic Region 2013 (Government of Finland, 2013) is largely focused on environmental protection and climate issues. It states that the efforts are focused on the following areas (Government of Finland, 2013: 38):

- developing an understanding of the impact of climate change and transboundary transport of pollutants;
- sustainable use of natural resources in the Arctic;
- identification of environmental limitations of Arctic development;
- implementation of environmental protection measures in all spheres of activity in the Arctic.

To some extent, this vision conflicts with the economic interests in the northern territories of the country. Finnish legislation, particularly, the Environmental Protection Act (Ministry of the Environment of Finland, 2014), the Waste Act (Finlex, 2011a), and the Water Act (Finlex, 2011b) require the use of best available sustainable economic practices to reduce harmful impacts of exploration of natural and mineral resources. The 2013 Strategy emphasizes that an environmentally-oriented approach allows taking into account the impact of the use of natural resources in a broad perspective. Environmental objectives are "the key considerations in the efforts to promote economic activity and cooperation, while at the same time ensuring sustainable use of natural resources" (Government of Finland, 2013: 7).

The fundamental parts of Finland's environmental program in the Arctic are the creation of conservation zones and the conservation of biodiversity (Heininen et al., 2020). One of the Strategy's objectives related to the Arctic environment is "the development of the network of nature conservation areas … in order to improve the standard of environmental protection and clarify the framework for economic activity" (Government of Finland, 2013: 57). The expansion of a network of nature reserves and protected areas in the north of Finland is seen as a pragmatic way to improve environmental protection and to facilitate economic activity. In terms of biodiversity, the main focus is on the conservation of various species of flora and fauna, especially migrating birds. Since the development of economic development can negatively affect the conservation of biodiversity, there is a need for careful planning of those activities that involve the use of resources or land.

Finland recognizes pollution from various types of domestic and outer sources as one of the main environmental threats (Government of Finland, 2013: 39). The main pollutants are greenhouse gases, black carbon, methane, carbon dioxide, oil, waste from military production and military bases, radioactive waste, waste from the mining industry, household garbage from settlements, as well as pollution from the shipbuilding industry and shipping. To address the existing pollution problems, Finland relies on the Arctic Council countries' compliance with the regulations of the

Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic (Government of Finland, 2013: 58). Finland also calls on all Arctic states to responsibly reduce emissions of greenhouse gases and non-persistent pollutants (Government of Finland, 2013: 13, 39).

Iceland

Iceland has long been known to be one of the critical regions in the Arctic for preserving biodiversity (primarily, in marine ecosystems) and global circulation of air and water masses (Meissner et al., 2018). An increasing number of studies have been reporting a human-driven climate change in Iceland in recent decades due to deep-sea resource extraction, mining operations, fishing, shipping, and other anthropogenic activities (Halfar & Fujita 2007; Mengerink et al., 2014; Van Jochumsen et al., 2016). Many of these concerns are addressed in the Parliamentary Resolution on Iceland's Arctic Policy (Ministry for Foreign Affairs of Iceland, 2011), which, as noted by Heininen et al. (2020), has the most pronounced focus on climate change and environment among the policies of other Arctic countries. The Resolution states that "Iceland will concentrate its efforts fully on ensuring that increased economic activity in the Arctic region will contribute to sustainable utilisation of resources and observe responsible handling of the fragile ecosystem and the conservation of biota" (Ministry for Foreign Affairs of Iceland, 2011: 2).

An intensification of shipping activities in the waters around Iceland is considered to be one of the major sources of increased greenhouse gases emission. Heininen et al. (2020) note that although the Resolution hardly identifies other sources and types of pollution, it nevertheless suggests measures to reduce the negative impact of pollutants on the environment. First, it calls for the compliance with the provisions of such international agreements as the United Nations Convention on the Law of the Sea (UN, 1982) and the United Nations Framework Convention on Climate Change (UN, 1992c), as well as with the regulations established by the IMO. Second, environmental pollution is considered a national security issue in terms of the establishment of adequate capacity for response to "environmental accidents, accidents at sea and maritime activity in connection with oil extraction and other resource utilization" (Ministry for Foreign Affairs of Iceland, 2011: 10).

Various approaches are being implemented concerning climate change adaptation, including research activities. Many states and their associations, including China, Japan, and the EU, are invited to participate in the activities related to inter-state aspects of climate change. Iceland also proclaims its collaboration with the UN in implementing the provisions of the Framework Convention on Climate Change (UN, 1992c) and its commitment to the principles of sustainable development, including reducing greenhouse gas emissions and developing renewable energy opportunities.

Norway

The updated version of Norway's Arctic Strategy has been in effect since 2017 (Norwegian Ministries, 2017). It names environmental protection and preparedness for natural and man-made emergencies among priority areas of the country in the Arctic, along with international cooperation, business development, knowledge, and infrastructure development (Norwegian Ministries, 2017: 15). In the sphere of environmental protection, Norway aims to "safeguard threatened and valuable species and habitats and achieve good ecological status in ecosystems;

ensure sustainable use and the conservation of a representative selection of Norwegian nature covering the whole range of habitats and ecosystems; reduce greenhouse gas emissions and pollution in line with national targets and international commitments; and strengthen emergency preparedness and response related to increased activity in the north" (Norwegian Ministries, 2017: 35).

As pointed by Heininen et al. (2020), the Norwegian Arctic Strategy is particularly focused on establishing a balance between environmental and economic activities. The Strategy underscores that "all business activity in the Arctic is to be economically, environmentally and socially sustainable" (Norwegian Ministries, 2017: 23), while main industries (fishing, mining, marine biotechnology, energy, shipping, and tourism) have to be based on "even better utilisation of the region's natural and human resources" (Norwegian Ministries, 2017: 23-24).

Among the main pollutants in the Norwegian Arctic, the Strategy recognizes greenhouse gases emissions, primarily, from the transport sector (Norwegian Ministries, 2017: 10, 32) and articulates a goal to reduce the emissions by at least 40% by 2030 and to becoming a low-carbon society by 2050 (Norwegian Ministries, 2017: 12). Apart from road transport, other sources of pollution include shipping and infrastructure development. The Government aims "to reduce the environmental and climate impacts of ferry traffic and domestic shipping", as well as "to ensure that adequate attention continues to be given to climate change and environmental considerations in connection with land-use decisions concerning infrastructure development" (Norwegian Ministries, 2017: 33).

In the sphere of environmental protection, Norway announced several ambitious projects. The Strategy mentions the creation of a center for oil spill preparedness and response, as well as the collection of plastic debris (Norwegian Ministries, 2017: 37). Norway has high hopes for the contribution of the Arctic Council states to the development of the seed storage facility in Svalbard to preserve genetic diversity and promote global food security. The Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic is seen as one of the principal tools for combating pollution (Norwegian Ministries, 2017: 36).

Climate change impacts on the environment are one of the greatest challenges for the Norwegian Arctic recognized by the 2017 Strategy (Norwegian Ministries, 2017: 3), ministerial reports (Norwegian Ministry of Climate and Environment, 2015; The Research Council of Norway, 2012), and individual scholars (Benestad & Haugen, 2007; Pall et al., 2019; Poschlod et al., 2020; Ward, 2020). The climate in Norway has become warmer and precipitation has increased by about 20% since 1900. The Norwegian Ministry of Climate and Environment (2015) forecasts the annual mean temperature in Norway to rise by between 2.3°C and 4.6°C by 2100. According to Heininen et al. (2020), the Norwegian Arctic Strategy views global warming from two sides. Norway expects that ice melting may soon have a positive impact on the development of economic activity in the Arctic in terms of the emergence of new opportunities for shipping and resource extraction (Norwegian Ministries, 2017: 3). On the other side, climate change is considered as a threat to Arctic species and ecosystems (Norwegian Ministries, 2017: 35). For instance, rising temperatures can lead to a northward shift in the distribution of habitats of terrestrial animals and plants, while changing ocean currents along with the retreat of the sea ice can allow more southerly fish species to move into Arctic sea areas. When such shifts happen, purely Arctic species of flora and fauna will meet growing competition, greater predation pressure, and a higher risk of an influx of diseases

and parasites into the region (Norwegian Ministry of Climate and Environment, 2015). Establishing a balance between economic opportunities and environmental considerations could be a challenging task for the Norwegian Government. Among the prospective tools to achieve a balance, the Strategy outlines integrated management that pulls local, regional, and international policies in the same direction.

Russia

In Russian legislation, the issues of environmental protection and rational use of natural resources are covered at various levels. In the Foundations of the State Policy of the Russian Federation in the Arctic till 2035 (President of the Russian Federation, 2020), environmental protection and environmental security are mentioned among the main directions of the national policy in the region. The lack of preparedness of the environmental monitoring system to contemporary ecological challenges is recognized among the threats to national security in the Arctic. Following this vision, the 2020 Policy identifies the tasks in the field of environmental protection and environmental safety (President of the Russian Federation, 2020: article 15):

- development of a network of specially protected natural territories and water areas to preserve ecosystems and to adapt them to climate change;
- ensurance of conservation of Arctic fauna and flora, protection of rare and endangered plants, animals, and other organisms;
- permanent work on the elimination of accumulated environmental damage;
- improvement of the environmental monitoring system, usage of modern information and communication technologies and communication systems for satellite monitoring, development of sea and ice platforms, research vessels, and observatories;
- introduction of the best available technologies, ensuring minimization of air emissions, discharges of pollutants into water bodies, and reduction of other types of negative impact on the environment in the course of economic and other activities;
- ensurance of the rational use of natural resources, including in locations of traditional residence and economic activities of indigenous peoples;
- development of a comprehensive waste management system of all hazard classes, construction of modern environmentally friendly waste processing complexes;
- implementation of a set of measures to prevent toxic substances, infectious agents, and radioactive substances from entering Russia's Arctic zone.

The 2020 Policy's vision of environmental protection tasks in the Russian Arctic is detailed in the Strategy of Development of the Arctic Zone of the Russian Federation and Ensurance of National Security till 2020 (Government of the Russian Federation, 2013). The update of the 2013 Strategy is expected by the end of 2020 until when it is currently valid. The 2013 Strategy points out the increase of technological and man-made burdens on the environment in some of Russia's northern coastal territories (Government of the Russian Federation, 2013: 3). It also emphasizes risks of radioactive contamination along with a high level of accumulated environmental damage in many inland areas of the Arctic zone (Government of the Russian Federation, 2013: 3). Therefore, the

2013 Strategy prioritizes the improvement of environmental security as a means of development of the Arctic and the ensurance of national security (Government of the Russian Federation, 2013: 3). Rational use of natural resources is recognized as a key to improving the quality of life of the population in the Arctic, as well as ensuring positive demographic processes and socioeconomic conditions in the region (Government of the Russian Federation, 2013: 7, 11, 13, 19).

To protect the environment and ensure environmental safety in the Arctic zone of Russia, the 2013 Strategy provides for (Government of the Russian Federation, 2013: 12-13).

- ensuring the conservation of the biological diversity of Arctic flora and fauna in the context of expanding economic activity and global climate change;
- development and expansion of the network of specially protected natural territories and water areas at both federal and regional levels;
- elimination of environmental damage caused as a result of past economic, military, and other activities, including assessment of the environmental damage and implementation of measures to clean up land and water areas from pollution;
- development, justification, and implementation of measures to reduce environmental threats caused by the expansion of economic activity in the Arctic, including on the continental shelf;
- increasing the responsibility of enterprises for environmental pollution, encouraging the development and implementation of new technologies that reduce a negative impact on the environment, reduce the risks of occurrence and minimize the consequences of man-made emergencies;
- improving the system of state environmental monitoring to assess environmental parameters, the establishment of a system to monitor environmental pollution, air, and space-based observations of ecosystems and climate;
- development and implementation of economic mechanisms that stimulate the reproduction and rational use of mineral and biological resources, energy and resource conservation, and utilization of fossil gas in oil production areas.

Along with the fundamental principles set out in the strategic documents, environmental protection activities are regulated by industry-specific legislation. Within the Arctic zone of Russia, continental shelf, and exclusive economic zone, it covers environmental requirements for any activity that has or may harm the environment. The 2013 Strategy also defines the tools of environmental regulation, environmental expertise, environmental impact assessment, payment for negative impact on the environment, environmental insurance, state environmental monitoring, state environmental supervision, industrial and public control in the field of environmental protection (Government of the Russian Federation, 2013: 12-13).

Sweden

Among Arctic Council countries, Sweden was the first to elaborate comprehensive environmental legislation by adopting the Environmental Protection Act in 1969 (Lidskog & Elander, 2000). Since that time, environmental issues have always stood high in the national political agenda (Granberg & Elander, 2007). Sweden's Strategy for the Arctic Region addresses climate change and the

environment among major concerns of the country in the Arctic (Government Offices of Sweden, 2011: 23). There is also the Environmental Policy for the Arctic (Government Offices of Sweden, 2016) which particularly emphasizes the focus on environmental and ecological activities in the High North. As the 2016 Policy directly addresses Sweden's priorities in the sphere of the Arctic environment, we consider this document in our study.

The 2016 Policy declares three priorities for protecting the environment in its northern territories: strengthening measures to prevent the negative effects of climate change, improving the protection of biodiversity and ecosystems, and sustainable use of resources (Government Offices of Sweden, 2016: 2).

According to the first priority, international cooperation to prevent global warming above 2°C is considered a fundamental element of curbing climate change in the Arctic (Government Offices of Sweden, 2016: 2). Sweden's approach to this task is expressed in the climate strategy developed in the run-up to the Paris agreement in 2015. Sweden aims "to strengthen the Arctic Council's climate and renewable energy measures" (Government Offices of Sweden, 2016: 2). One of the main goals is to reduce "emissions of emissions of short-lived climate forcers such as soot and methane" (Government Offices of Sweden, 2016: 2). In this area, Sweden operates within the framework of the agreement on reducing harmful emissions concluded in 2015 between Arctic countries, which involves improving national measures and joint actions to reduce soot and methane emissions (Government Offices of Sweden, 2016: 2).

The second priority also highlights the need for international efforts to protect valuable natural habitats of animals and plants. In its 2016 Policy, Sweden "supports the process under way in the Arctic Council to implement the recommendations of the Arctic Biodiversity Assessment, including efforts to establish networks of protected areas" (Government Offices of Sweden, 2016: 3). Protection of habitats in the Arctic meets the guidelines of the Convention on Biological Diversity (UN, 1992a) on the conservation of at least 10% of inland territories and water areas and up to 17% of inland water reservoirs by 2020 (Government Offices of Sweden, 2016: 3). The UNCLOS (UN, 1982) is considered as an instrument for the protection and conservation of marine biodiversity in the areas beyond national jurisdiction (Government Offices of Sweden, 2016: 3). However, Sweden recognizes that it takes "many years before such an implementing agreement can enter into force" (Government Offices of Sweden, 2016: 3). In the meantime, operational environmental measures can be implemented based on the Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Commission, 1992).

Concerning the sustainable use of resources, the 2016 Policy recognizes the role of the UNCLOS (United Nations, 1982) as the main international instrument for regulating the rights of littoral states to explore mineral and other resources on the continental shelf (Government Offices of Sweden, 2016: 4). At the same time, the extraction of oil and gas from the subsurface for combustion and energy production must be limited to achieve the internationally approved target of containing global warming within 2°C (Government Offices of Sweden, 2016: 4). Sweden is committed to strict regulatory measures, particularly, in the areas with permanent or seasonal ice cover, where the risks of oil spills and other pollutions to fragile Arctic ecosystems are higher (Government Offices of Sweden, 2016: 4). Among the major sources of environmental risk, the 2016 Policy recognizes increased shipping activities (Government Offices of Sweden, 2016: 4). To mitigate potential risks, Sweden follows the provisions of the Polar Code, which includes both

environmental regulations and technical requirements for marine and river vessels used in the Arctic (Government Offices of Sweden, 2016: 4).

USA

Similar to those in other Arctic territories, adverse impacts of climate change and environmental disruptions on terrestrial and marine ecosystems in Alaska have been increasing in the previous decades. The average temperature in Alaska has risen at twice the rate of the global average (Allen, 2020), while the Gulf of Alaska experienced extreme temperatures during 2014-2019, including the four warmest years ever observed (Litzow et al., 2020). In response to warming and sea ice reduction, Alaskan ecosystems are reacting by a decline and lower productivity in fish populations (Jones et al., 2020), change of habitats of Arctic animals and birds (CAFF, 2017; Larson et al., 2020), and decomposition of previously frozen carbon from tundra soils (Tao et al., 2020).

Many studies suggest that increasing and more fluctuant variabilities in the Alaskan climate, as well as environmental pollution in the region, could be associated with more intensive anthropogenic activities, including exploration of natural resources and development of industrial infrastructure (Skjærseth & Skodvin, 2003; Jezierski et al., 2010a, 2010b; Litzow et al., 2020). An emerging environmental problem in Alaska is the metal contamination of food and water resources due to the emergence of mining and drilling activities (Perryman et al., 2020). The United States has significantly developed its legislation related to the exploration of the continental shelf and territorial waters. Outer Continental Shelf Lands Act (Cornell Law School, n.d.) is one of the principal documents to regulate the activities of oil and gas companies on the Alaska shelf. The Act states that the operations on the outer continental shelf should be concluded in a safe manner to prevent or minimize the occurrence of damage to the environment (Cornell Law School, n.d.: §1332). It also establishes liability for all types of environmental and economic damage is established. There is a multi-stage system for planning of subsurface use, issuing licenses for exploration, development of deposits, and production of minerals (Gladun, 2015).

The National Strategy for the Arctic Region states that the USA "will continue to protect the Arctic environment and conserve its resources" (President of the United States, 2013: 2). Specific objectives of the U.S. environmental efforts in the Arctic include conservation of natural resources, assessment and monitoring of ecosystems and the risks of climate change, implementation of integrated management practices to balance economic development and environmental protection, studies on environment changes, and charting and mapping the ocean and waterways (President of the United States, 2013: 9-10). Among critical concerns, the 2013 Strategy underscores "land ice and its role in changing sea level; sea-ice and its role in global climate, fostering biodiversity, and supporting Arctic peoples; and, the warming permafrost and its effects on infrastructure and climate" (President of the United States, 2013: 9-10).

While the 2013 Strategy calls for a strengthening of international cooperation for "collaborative efforts by nations seeking to explore emerging opportunities while emphasizing ecological awareness and preservation" (President of the United States, 2013: 8), in recent years, the Arctic has been turning into "an arena of global power and competition" (Pompeo, 2019). Two documents released in 2019 articulate this new vision of the Arctic by the U.S. Coast Guard and the U.S. Department of Defence. While the latter one, the DoD's Arctic Strategy views environmental changes in the High North as "specific operational challenges that limit communications, including the harsh climate, vast distances, and atmospheric phenomena"

(United States Department of Defence, 2019: 10), the Coast Guard Arctic Strategic Outlook calls for a deeper understanding of environmental processes through the development of pollution detection and tracking capabilities, weather and environmental observations, and assessment of living marine resources activity (United States Coast Guard, 2019: 27).

Environmental focus of China's Arctic policy

Since the contemporary environmental challenges faced by the Arctic countries are rapidly becoming global, a broader international community has been attempting to contribute to their solution. Among the non-Arctic states, China has become one of the most prominent and important actors in the Arctic in recent years.

China's active involvement in environmental studies in the Arctic dates back to 1996 when the country entered the International Arctic Science Committee (IASC). In 1999, China organized its first scientific expedition to the Arctic to study climate change and its impact on the country. Since then, Chinese researchers have carried out eleven expeditions to various parts of the Arctic Ocean to study the biological diversity of Arctic ecosystems and atmospheric, marine, and oceanic processes associated with ice melt (Chistyakova, 2018; Filippova, 2019; Staalesen, 2020). Having analyzed the results of China's expeditions to the Arctic, Wang (2015) and Wei et al. (2020) identified priority spheres in Arctic studies for China, i.e. environment, climate change, water and ice, maritime routes, and sustainable development. Pan and Zhou (2010), Wu et al. (2013), and Zhang et al. (2019a) emphasized environmental security and the need for scientific knowledge on climate change as the premier interests explaining China's research activities in the High North.

In 2017, China's President Xi Jinping underscored the commitment of the country to "the principles of prioritizing resource conservation and environmental protection" (Xi, 2017: 45) by promoting low-carbon development, preventing and controlling pollution of air, water, and soils, restoring ecosystems, and developing biodiversity protection networks (Xi, 2017: 45-46). Such a vision of China's role in building an "ecological civilization" (Xi, 2017: 47) is very much enshrined in China's Arctic Policy 2018 which states that "the Arctic situation now goes beyond its … regional nature, having a vital bearing on … the survival, the development, and the shared future for mankind" (State Council of the People's Republic of China, 2018: Foreword).

The 2018 Policy emphasizes that ice melting is associated with significant climate changes throughout the planet and alerts the fact that progressing climate change in the Arctic can cause a rise in the level of the Arctic Ocean and trigger natural disasters (State Council of the People's Republic of China, 2018: article I). Despite such threats to polar ecosystems, China acknowledges the opportunities climate change could bring for the research and development of the Arctic, for commercial use of maritime routes, and the exploration of natural and other resources in the region (State Council of the People's Republic of China, 2018: article I). A balance between economic opportunities and environmental concerns may be established by integrating environmental protection efforts and rational utilization of all kinds of natural resources – the key areas of China's activities in the Arctic both prioritized in the 2018 Policy (State Council of the People's Republic of China, 2018: article IV). China recognizes the direct impact of the natural conditions of the Arctic on China's climate system (State Council of the People's Republic of China, 2018: article II) and calls for the enhancement of the environmental background investigation of Arctic activities, evaluation of the interaction between the Arctic and global climate change, and

forecasting of potential risks posed by future climate change to the Arctic's natural resources and ecological environment (State Council of the People's Republic of China, 2018: article IV.2). The 2018 Policy states that "to protect the Arctic, China will actively respond to climate change in the Arctic, protect its unique natural environment and ecological system, promote its own climatic, environmental and ecological resilience" (State Council of the People's Republic of China, 2018: article III).

China's role in shaping the common response to future environmental challenges in the Arctic

Being a non-regional actor, China is particularly concerned with global implications and international impacts of environmental management in the Arctic. To contribute to the protection of the natural environment and Arctic ecosystems, China follows international law (the UN Framework Convention on Climate Change, the Kyoto Protocol, the Paris Agreement, the Agreement on Cooperation on Marine Oil Pollution Preparedness and Response in the Arctic, and the IMO's regulations) and participates in Arctic governance and international cooperation in the sphere of environmental protection (Arctic Council, Arctic Science Ministerial Meeting, China-US and China-Russia dialogues on polar issues, China-Iceland Framework Agreement on Arctic Cooperation) (State Council of the People's Republic of China, 2018: article IV.4). The country takes an active part in addressing the challenges of environmental and climate change in several ways, including environment protection, sustainable development and biodiversity protection, emission reduction, utilization of Arctic resources in a rational manner, conservation and utilization of living resources (State Council of the People's Republic of China, 2018: article IV.3).

Such involvement of China in the Arctic environmental agenda provides a number of opportunities for reshaping the existing approaches to addressing climate change and other global ecological challenges in the region. To find potential areas for China and Arctic countries to collaborate in the sphere of environmental protection in the High North, we viewed previously discussed five environmental challenges through the lens of China's priorities outlined in the 2018 Policy (State Council of the People's Republic of China, 2018: articles IV.2, IV.3). These priorities (namely, more efficient environmental protection, more resilient ecosystems, addressing climate change, and conservation and utilization of fisheries and other living resources) were detailed in 24 activities derived from the text of articles IV.2 and IV.3 of the 2018 Policy. The activities were then attributed to specific environmental challenges thus establishing five groups. For each activity, we scanned the Arctic-related documents previously discussed in the Environment-Related Policies section of the paper to identify intersections between China's priorities and those of Arctic countries.

As regards industrial pollution, oil spills, and intensification of shipping in the Arctic, China's interests correspond with those of Arctic countries in many areas, particularly, an assessment of the environmental impact of Arctic activities, reduction of pollutants in the Arctic waters from land-based sources, and control of the sources of marine pollution, including ship discharge, offshore dumping, and air pollution (Table 2). China requires its enterprises to conduct comprehensive risk assessments for resource exploration and encourages them to participate in the exploitation of resources in the Arctic on the condition of properly protecting the environment (State Council of the People's Republic of China, 2018). To establish the foundations of stronger

cooperation, Chinese research institutions could also be engaged in enhancing the environmental background investigation of economic, transport, resource extraction, and other activities.

Table 2. Intersections between China's and Arctic countries' priorities in environmental protection and climate change responses in the Arctic (challenges 1-3)

Activity	CAN	DEN	FIN	ICE	NOR	RUS1	RUS2	SWE1	SWE2	US1	US2
Challenge 1: Industrial pollution and oil spills											
Environmental background investigation of Arctic activities	–	+	–	–	–	+	–	–	–	–	+
Assessment of the environmental impact of Arctic activities	+	+	+	+	+	+	+	+	+	+	+
Reduction of pollutants in the Arctic waters from land-based sources	–	+	+	–	+	+	+	+	–	–	–
Environmental responsibility awareness of citizens and enterprises	+	–	+	+	+	–	–	–	–	+	+
Challenge 2: Intensification of shipping											
Control of ship discharge, offshore dumping, air pollution	+	+	+	+	+	+	+	+	+	+	+
Challenge 3: Ice melting											
Energy exchange processes in the Arctic	–	+	+	–	–	+	–	+	+	+	–
Evaluation of the impact on ecosystems caused by climate and human activities	+	+	+	+	+	+	–	+	–	+	–
Interaction between the Arctic and global climate change	+	+	+	–	+	+	–	+	+	+	–
Risks posed by climate change to natural resources and ecosystems	+	+	+	+	+	+	+	+	+	+	+
Arctic cryospheric sciences	–	+	+	–	–	–	–	+	–	+	–
Public awareness of climate change	+	+	+	+	–	–	–	+	–	–	–
International projects to address climate change	+	+	+	+	+	+	+	+	+	+	+

Note: CAN = Canada's Arctic and Northern Policy Framework (Government of Canada, 2019); DEN = Denmark, Greenland, and the Faroe Islands: Kingdom of Denmark Strategy for the Arctic 2011-2020 (Kingdom of Denmark Strategy, 2011); FIN = Finland's Strategy for the Arctic Region 2013 (Government of Finland, 2013); ICE = A Parliamentary Resolution on Iceland's Arctic Policy (Ministry for Foreign Affairs of Iceland, 2011); NOR = Norway's Arctic Strategy – between Geopolitics and Social Development (Norwegian Ministries, 2017); RUS1 = Strategy of Development of the Arctic Zone of the Russian Federation and Ensurance of National Security till 2020 (Government of the Russian Federation, 2013); RUS2 = Foundations of the State Policy of the Russian Federation in the Arctic till 2035 (President of the Russian Federation, 2020); SWE1 = Sweden's Strategy for the Arctic Region (Government Offices of Sweden, 2011); SWE2 = New Swedish Environmental Policy for the Arctic (Government Offices of Sweden, 2016); US1 = National Strategy for the Arctic Region (President of the United States, 2013); US2 = Arctic Strategic Outlook (United States Coast Guard, 2019); "+" = intersection with China's Arctic Policy; "-" = no intersection with China's Arctic Policy.

Source: Authors' development

Water areas out of the national jurisdiction, where Chinese expeditions may carry out their research activities without permission of the Arctic states, are considered as key areas for Arctic environmental protection (Pilyasov, 2018). China proclaims the principle of unrestricted navigation in the Arctic Ocean for all countries and recognizes the Polar Code to a greater extent than national regulations of the Arctic countries (Erokhin et al., 2018). Nevertheless, China is committed to collaborating with other countries in the Arctic to enhance control of the sources of marine pollution such as ship discharge. Many Arctic states recognize shipping as one of the sources of pollution. Because of the increasing activity of Chinese research and cargo vessels in the Arctic Ocean, the reduction of ship discharge is one of the critical areas to collaborate. Due to the ban on the use of heavy fuel in the Arctic, it will be necessary to ensure the transition to the use of other types of fuel for cargo ships and tankers after 2024 and in some cases after 2029 (due to the IMO's ban of heavy fuel which will come into force in 2024 with specific extensions until 2029). It may have a major impact not only on Chinese vessels but also on resource-extraction projects. China is one of the major consumers of liquefied natural gas (LNG) from Yamal LNG and other facilities located in Russia's Arctic sector. Knizhnikov and Klimentyev (2019) expect that the use of LNG as an alternative to heavy fuel could become a solution for Chinese and other vessels used in the Arctic. For Finnish and Norwegian companies, there is an opportunity to work with China on the development of LNG technologies (Gao & Erokhin, 2019). In cooperation with Russian oil-and-gas companies, Chinese research institutes and enterprises could be engaged in the hydrographic surveys in the Northern Sea Route to improve the security of navigation and reduce ship accidents (Erokhin & Gao, 2018; Gao & Erokhin, 2020b). The transition to the use of LNG instead of heavy fuel can reduce air pollution, including carbon dioxide emissions.

The 2018 Policy underscores China's commitment to "studying the substance and energy exchange process and mechanisms of the Arctic" in relation to climate change (State Council of the People's Republic of China, 2018: article IV.2). Although none of the eleven documents contains this exact term "energy exchange", a need to study the impacts of melting ice sheet mass and permafrost on elevated carbon dioxide levels in the atmosphere is prioritized by Denmark, Finland, Russia, Sweden, and the USA. Denmark calls for the development of a model system "to study the inland ice and its interaction with the surrounding seas, … the knowledge of permafrost conditions, and the interplay between weather, sea and ice more generally" (Kingdom of Denmark Strategy, 2011: 45). Finland stands for deeper cooperation between countries which "must shoulder their responsibility for reducing emissions of greenhouse gases and short-lived climate pollutants" (Government of Finland, 2013: 41) in view that "the melting of the polar ice cover and permafrost will further accelerate global warming" (Government of Finland, 2013: 15). Russia directly links energy and climate and advocates the development of an international dialogue "for the exchange of experience in the development of climate and energy policies" (Government of the Russian Federation, 2013: article 15).

There are several areas for collaboration in the sphere of protection of Arctic ecosystems, including habitat changes, declines of populations of mammals, fish, and birds, and rational use of fishery resources (challenges 4 and 5). Such activities as biodiversity protection, ensurance of adaptability and resilience of ecosystems, international cooperation in the sphere of protection of Arctic flora

and fauna, and environmental and ecosystem-based management are prioritized by most Arctic countries (Table 3).

Table 3. Intersections between China's and Arctic countries' priorities in environmental protection and climate change responses in the Arctic (challenges 4 and 5)

Activity	CAN	DEN	FIN	ICE	NOR	RUS1	RUS2	SWE1	SWE2	US1	US2
Challenge 4: Increase in fisheries											
Conservation and rational use of fishery resources	–	+	+	+	+	+	–	+	+	–	–
Survey on the fishery resources and exploratory fishing	+	+	–	–	+	–	–	–	+	–	+
International management of fisheries	–	+	–	+	+	–	–	+	+	–	+
Cooperation on conservation and utilization of fishery resources	–	+	–	+	+	–	–	+	+	–	–
Challenge 5: Habitat change and population decline											
Biodiversity protection	+	+	+	+	+	+	+	+	+	+	–
Protection of migratory birds and their habitats	–	–	+	–	–	–	–	–	–	–	+
Study of migration patterns of Arctic migratory birds	–	+	+	–	–	–	–	–	–	–	–
Adaptability and resilience of ecosystems	+	+	+	–	–	+	–	+	+	+	–
International projects to protect flora and fauna	+	+	+	+	+	+	+	+	+	+	–
Transparent exploration and utilization of Arctic genetic resources	–	+	–	–	+	–	–	–	–	–	–
Equitable sharing and use of the benefits generated by the exploitation of living resources	–	+	–	–	–	–	–	–	–	–	–
Environmental and ecosystem-based management	+	+	+	–	+	–	–	+	+	+	–

Note: CAN = Canada's Arctic and Northern Policy Framework (Government of Canada, 2019); DEN = Denmark, Greenland, and the Faroe Islands: Kingdom of Denmark Strategy for the Arctic 2011-2020 (Kingdom of Denmark Strategy, 2011); FIN = Finland's Strategy for the Arctic Region 2013 (Government of Finland, 2013); ICE = A Parliamentary Resolution on Iceland's Arctic Policy (Ministry for Foreign Affairs of Iceland, 2011); NOR = Norway's Arctic Strategy – between Geopolitics and Social Development (Norwegian Ministries, 2017); RUS1 = Strategy of Development of the Arctic Zone of the Russian Federation and Ensurance of National Security till 2020 (Government of the Russian Federation, 2013); RUS2 = Foundations of the State Policy of the Russian Federation in the Arctic till 2035 (President of the Russian Federation, 2020); SWE1 = Sweden's Strategy for the Arctic Region (Government Offices of Sweden, 2011); SWE2 = New Swedish Environmental Policy for the Arctic (Government Offices of Sweden, 2016); US1 = National Strategy for the Arctic Region (President of the United States, 2013);

US2 = Arctic Strategic Outlook (United States Coast Guard, 2019); "+" = intersection with China's Arctic Policy; "-" = no intersection with China's Arctic Policy.

Source: Authors' development

In its Arctic Policy, China underlines the importance of sustainable development and protection of biodiversity in the Arctic (State Council of the People's Republic of China, 2018: article IV.2). In the coming years, the international collaboration agenda in the Arctic will be dominated by the establishment of a special regime for the use of natural resources, monitoring the state of ecosystem pollution, landscape restoration, creation of natural reserves, waste management, conservation measures, increasing animal and bird populations, control of industrial fishing, and fighting against poaching (Pilyasov, 2018; Heininen et al., 2020; Gao & Erokhin, 2020a; Titova, 2016). In contrast to China, few Arctic countries specify the protection of migratory birds and the study of their flyways. In these areas, Chinese scholars could contribute to the Arctic research agenda with their studies on the migration patterns of birds (for instance, in Finland and Greenland which both prioritize studies of migratory birds), evaluation of the impact on the ecosystem caused by the resource-extraction and other projects where Chinese companies participate (Russia, Nordic countries), as well as with research on the adaptability and resilience of the ecosystems across the Arctic. Most relevant topics: how to avoid a situation where ecosystem approaches and ecosystem management do not create ecological borders in the Arctic in addition to the existing borders of national jurisdiction; how to gradually transform the convention regime and adapt it to the new international political and economic conditions; how to integrate the responses to these problems in the national policies of the Arctic Council, China, and other observer states.

Conclusion

Taking into account progressing climatic and environmental changes in the Arctic along with the growing influence of anthropogenic factors, risks to Arctic ecosystems are emerging due to industrial pollution from land-based and offshore facilities, intensive shipping, and exploratory use of living resources. In Arctic countries, the environmental component has long been an extremely important part of development strategies. With the entry of non-Arctic actors into economic, transport, and research activities in the High North, certain adjustments in the environmental protection agenda are needed to efficiently integrate global responses to climate change with individual priorities of the Arctic and non-Arctic countries in the region. The responses to the existing environmental challenges with stronger involvement of China in international formats like Arctic Council, Arctic Science Ministerial Meeting, and bilateral dialogue frameworks with Arctic countries will depend on the integration of the environmental agenda in the international legal framework. China is exactly committed to the existing framework of international law including the UN Charter, UNCLOS, rules of the IMO, the Spitsbergen Treaty, and other treaties on climate change and the environment that govern Arctic affairs (State Council of the People's Republic of China, 2018). Arguably, a comprehensive international treaty is needed to stress the importance of environmental protection in the Arctic in the international legal context. The elaboration of an umbrella environmentally-oriented agreement between the Arctic Council members, China, and other non-Arctic countries is hardly likely shortly, especially when it comes to the exploration of resources, exploitation of shipping routes, and benefiting from other economic opportunities in the region. Nevertheless, the intersections of China's and Arctic countries' priorities demonstrate the potential for establishing workable multilateral and bilateral cooperation frameworks in the

spheres of climate change, conservation and utilization of living resources, clean energy solutions, and environmentally-friendly operation of the Arctic routes.

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Briefing Note

Low-carbon in the High North: Achieving Carbon Neutrality in the Nordic Arctic

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Introduction

The pace of temperature and environmental change in the Arctic, and the implications for the stability of the global climate system, are driving a growing urgency to decarbonise every aspect of our lives. While it is often repeated that the Arctic is ground zero for the impacts of the climate crisis, it does not abdicate the region from taking the necessary action to tackle the root of the problem: the carbon economy.

Achieving carbon neutrality, or net-zero emissions, is increasingly becoming the ultimate climate goal being adopted by an ever-growing number of public and private actors to end their contributions to global climate change. The Nordic region stands out in this regard, having committed in the Helsinki Declaration of January 2019 to the goal of becoming a carbon neutral region, in line with their vision to become the most sustainable region in the world by 2030 (Nordic Council of Ministers, 2019). This aim ties together national legislation and policy positions that mandate carbon neutrality by between 2030 and 2050.

While the Nordics' national governments have busied themselves in assessing the implications of carbon neutrality on different sectors of the economy, little consideration has been given to how to achieve carbon neutrality specifically in the Nordic Arctic region, where a unique geography, demography, and economy means that the challenges of decarbonising look markedly different from elsewhere.

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The views presented in this briefing note are of the authors, and do not represent those of their employers or affiliate institutions.

This briefing note aims to give an overview to the unique characteristics of the Nordic Arctic that may set it apart when designing policies to deliver carbon neutrality. It will discuss some key challenges and opportunities in reaching this goal in the region, identifying areas of potential conflict with other policy goals. This note does not claim to hold all the answers, but aims to begin a conversation on where sweeping national policies are less appropriate and a more nuanced Arctic approach is needed, pointing to some areas where policy development, innovation and further research are needed.

Carbon neutrality - definitions and targets

Carbon neutrality, or *climate* neutrality, is a widely used, though not always clearly defined term (Murray & Dey, 2009; Tozer & Klenk, 2018). According to IPCC (2018: 545), *climate neutrality* refers to a concept of a state in which human activities result in no net effect on the climate system. Achieving such a state would require balancing of residual emissions with carbon dioxide removal, as well as accounting for regional or local biogeophysical effects of human activities, for example, that affect surface albedo or local climate. *Carbon neutrality* (also referred to as *net zero CO_2 emissions*) is achieved when anthropogenic CO_2 emissions are balanced globally by anthropogenic CO_2 removals over a specified period (IPCC, 2018: 555). In order to achieve carbon neutrality, there needs to be a balance between emitting carbon and absorbing carbon from the atmosphere in carbon sinks (European Parliament, 2019). The above terms are often used interchangeably, so carbon or climate neutrality should always be defined in the used context to avoid misunderstanding.

This briefing note is based on climate neutrality defined as achieving net zero emissions through reduction and compensation. As a target to commit to, it dictates that some carbon emissions can still take place, if they are offset through compensation and other flexible mechanisms. A lack of a common definition, especially around compensation, means that when agreeing to a target it is not known with absolute clarity what is being committed to. This is also particularly problematic when it comes to production versus consumption based carbon accounting, which can allow the passing of responsibility for emissions (Franzen & Mader, 2018).

Furthermore, there is a growing consensus that offsets must not be used as a get-out-of-jail-free-card, and there are significant questions around their effectiveness and verifiability (UNEP, 2019). It is therefore important to approach achieving carbon neutrality by focusing on reducing emissions as much as possible, and compensating *only* as a final resort.

The Helsinki Declaration only loosely commits the five Nordic states[1] to "working towards carbon neutrality" (Nordic Council of Ministers, 2019: 1), without any further expansion on the technicalities of doing so. However, as shown in table 1, this ties together targets already set (mostly into law) at a national level.

Table 1 - Carbon neutrality and other relevant targets in the Nordic countries and autonomies.

	Norway	Finland	Iceland	Sweden	Denmark	Greenland	Faroe Islands
Carbon Neutral Target Date	2030	2035	2040	2045	2050	N.A.	N.A.
Other relevant targets	Low emission society by 2050 (80-95% GHG reduction compared to 1990)	Fossil fuel free by 2035 & 80% reduction by 2050	50-75% emission reduction by 2050	Fossil fuel free by 2045	70% emission reduction by 2030 (compared to 1990)	As close to 100% as possible renewable energy by 2030	100% renewable power and electrification on land by 2030

Geography, demography and economy

The Nordic Arctic is defined here as Greenland, Iceland, the Faroe Islands, and the Northern regions of Norway, Sweden, and Finland, as shown below in Map 1. Whilst the Nordic Arctic shares many characteristics, it is also an incredibly multifaceted region, with vast disparities between its constituent parts – from the remote villages of Eastern Greenland and Norway's only coal mine in Svalbard, to the highly connected cities of Rovaniemi and Tromsø.

Importantly, the Nordic Arctic varies significantly from the wider Nordic region, in particular the capital belt of Oslo, Copenhagen, Stockholm and Helsinki, where national policymakers sit. It is therefore relevant to consider the nuances of the Nordic Arctic region when it comes to the task of translating sweeping policy aims such as carbon neutrality into meaningful policies and actions.

Map 1 - The Nordic Arctic (NordRegio, 2017)

There are several geographic characteristics that pose particular challenges in delivering the low-carbon transition in the Nordic Arctic. Firstly and perhaps most obviously, is a cold climate with wide variability in sunlight hours through the year leading to a greater energy demand, particularly for heat, but also light and transport, which also often operates less efficiently in colder conditions.

Much of this energy today still comes from fossil fuels, making it one of the region's main contributions to carbon emissions. The severity of the region's climate also means that renewable solutions that are easily adopted elsewhere, such as energy storage and solar energy, are less cost-effective (although as these technologies develop, this is changing). Additionally, such conditions make low-carbon infrastructure more difficult and costly to build and more carbon intensive to operate (Marsik & Wiltse, 2019). Forest resources that can support a renewable, bio-based local economy exist in abundance in northern Norway, Sweden and Finland, but are not present elsewhere.

A second key characteristic to be considered is the large number of small, remote communities separated by significant distances. While the Nordic Arctic, particularly on the continent, is relatively well-connected and densely populated compared to the Russian and North American Arctic, it still remains a challenge. This is primarily because there lacks a compelling case for solutions that rely on economies of scale, such as connection to national power grids, which can better utilise renewable power. With such great distances to cover, many parts of the region, especially northern Norway and Greenland are reliant on aviation – a very carbon intensive method of transport – to move people and goods. The transportation of fossil fuels to remote communities that are still reliant on them for heat and power further increases the carbon footprint of these energy sources. Marsik and Wiltse (2019) find that often these factors combine to create further problems for security of supply and cost of energy, which can in turn lessen the ability to shift to zero carbon solutions.

Whilst the population is forecast to continue growing across the Nordic region, adding further pressure on efforts to achieve carbon neutrality, population growth in the Nordic Arctic is more modest (NordRegio, 2019). However, urbanisation is set to continue with more people moving into the region's larger towns and cities, shifting demand for energy, transport, construction, and other resources and services. Employment in the Nordic Arctic is lower than the region as a whole, but is well balanced across different sectors, with a slight over-representation of public administration.

Economic development and sustainable resource management are key threads of most of the Nordic states' Arctic strategies, but there is little acknowledgement of how this may be in conflict to goals of carbon neutrality. The economy of the Nordic Arctic is varied, but heavily focused on natural resources, much of which (mining, hydrocarbon extraction, tourism etc.) is highly emitting in its nature (Duhaime & Caron, 2006). A lack of economic diversity in parts of the region is a major underlying factor when considering how to transition to a zero carbon economy. As the Nordic Arctic has every right to develop in the same way that the rest of the Nordics has, it is important to open more dialogue on the responsibilities and expectations when it comes to reducing carbon emissions.

The road to zero in the Nordic Arctic

Despite some of the factors discussed that make the Nordic Arctic a difficult place to achieve carbon neutrality, there has already been some excellent progress in the region. This has mostly been within power and heat, where efficiency gains, electrification and renewable power are rapidly reducing demand for fossil fuels (Rud et al., 2018). High standards of building insulation, even if driven mostly by economic and practical factors, means that the region is home to some of the

most heat efficient buildings in the world. Renewable power is also taking hold in the region at a strong pace, with hydropower playing a critical role, even in areas of permafrost, although Svalbard is yet to make this transition as it still relies heavily on Norway's only coal-fired power station (Verkis, 2018; Rud et al., 2018).

As renewable power sources increase, electrification of the heating sector through mature, cost-effective solutions such as electric boilers, district heating and heat pumps have the potential to greatly reduce the carbon intensity of heating in the region. In Greenland, for example, 67% of heat and power is renewable, while in Iceland that number is 99% (Nukissiorfiit, 2020; Craig, 2016).

Notwithstanding a small number of remote communities where fossil fuels still dominate for heat and power, it is foreseeable that renewables and electrification will be able to reduce the Nordic Arctic's carbon emissions in this sector to a negligible amount in time. The Faroe Islands have set the goal of all such energy being supplied through renewable electricity by 2030, and it seems plausible that it will be achieved given the current trajectory of investments and policies, a pattern that is also reflected more widely in the region (Nolsøe, 2016).

It should be noted that bioenergy produced in the Nordic Arctic (typically forest-based) is used widely for both heat and power, and is often seen as a renewable solution. However, bioenergy still releases greenhouse gases (notably including black carbon as further discussed below) into the atmosphere, which is only recaptured when the biomass regrows. As such, the true carbon footprint of forest-based biomass is reliant on ongoing improvements to sustainable forest management, which should be accounted for when considering the contribution of bioenergy to carbon neutrality goals (Koponen et al, 2018; Soimakallio et al, 2016).

While decarbonisation of heat and power seems within reach, the primary energy supply which includes other uses such as transportation and industry is a different story, with less than 15% being sourced from renewables in Greenland, the Faroe Islands, and Svalbard (Rud et al., 2018). As discussed further below, some of these areas may prove challenging in decarbonising the Nordic Arctic.

In addition to CO_2, short-lived climate pollutants (SLCPs), such as black carbon are of particular significance in the Arctic due to the impact on local climate forcing and albedo (Ting-Feng & Cun-De, 2016). In recent years the Arctic Council has paid more attention to this area, establishing the Expert Group on Black Carbon and Methane in 2015, which finds that regulations are helping to bring down such emissions in many sectors (Arctic Council, 2019). The use of heavy fuel oil (HFO) – which causes especially high levels of black carbon pollution – by ships in the region is one area that requires international cooperation. As such, the Nordic countries are leading the advocacy efforts towards a ban on HFO use in Arctic waters within the slow-moving frameworks of the International Maritime Organisation (IMO) (Lehtomäki, 2019).

Other areas pose more significant challenges for achieving carbon neutrality in the Nordic Arctic, forming bumps on the road to net zero emissions. Below we examine some of the most important sectors for consideration, concentrating on extraction activities, transport and construction.

Hydrocarbons and minerals

Oil and gas extraction often remains the elephant in the room when it comes to the sustainable development of the Nordic Arctic, given the resource potential of the region shown in map 2. Norway's approach is of particular interest, where extensive petroleum activity takes place in the Barents and Norwegian Sea, areas that are considered Arctic by the Arctic Monitoring and Assessment Programme (AMAP, 2009). Despite being the hydrocarbon pusher of the Nordics, consumption based accounting means that Norway's 2030 carbon neutrality goal does not account for emissions from the burning of the fossil fuels it produces and exports.

Map 2 - Hydrocarbon and mineral resources in the Nordic Arctic in 2019 (Turunen, 2019).

A report from the Norwegian Petroleum Directorate (2019: 5) states that over half of the undiscovered petroleum resources are located in the Barents Sea, and that therefore, these northern areas can play an important role when it comes to maintaining the Norwegian petroleum production in the long term. While efforts are underway to reduce emissions from the operations of hydrocarbon extraction in Norway, for example through electrification of platforms, this has so far had limited success, fails to address the underlying problem, and may be seen as oil companies trying to gain social licence to continue with business as usual (Elset, 2018).

Although there will be a continuing need for hydrocarbon extraction in a carbon neutral economy for non-combustion uses such as in producing petrochemicals and plastics, this will be modest

and should not require further development of resources in the Nordic Arctic. Whilst it can be argued that the wealth accumulated from hydrocarbon development in Norway has funded their ability to grow a world-leading low-carbon economy in many respects, it is ultimately incompatible with the goal of carbon neutrality, and should be phased out in an economically responsible way over the coming years.

Mineral extraction on the other hand – currently also a highly carbon intensive industry – will certainly be needed to provide critical resources in a carbon neutral economy. Greenland's desire to expand mining operations is often cited as a reason why their emissions are forecast to increase over the coming decades. The mining sector has been slow to adopt any serious initiatives to reduce emissions, despite the fact that the readiness of the technology is at such a level where many operations could vastly reduce on-site emissions through electrification (Azadi et al., 2020). A greater level of external pressure, likely through regulation, will be needed for the sector to not become problematic in the region's goals of carbon neutrality.

Transport

Decarbonising road transport – primarily through electrification – is a well covered policy area, with bans in place on the sale of combustion engine cars on the horizon in Iceland, Sweden and Norway, and the technology developing at the required pace to meet such targets (Rud et al., 2018). As noted however, distance and lack of access in the Nordic Arctic means a heavy reliance on aviation for transport of goods and people. These are often lifeline services which should be supported, but airport expansion to meet goals of economic development through tourism and trade should also be levelled against climate priorities, until we have commercially available zero emission aircraft. While the aviation sector has to date shown only incremental signs of decarbonisation, for example through small additions of biofuels, there are promising developments for electric planes for short-haul routes in small aircraft. Indeed, the Norwegian carrier Widerøe is aiming to shift their entire fleet of Dash 8s to electric planes by 2030 (Widerøe, 2020). If the sector proves difficult to decarbonise within the required timeframe, emissions may have to be offset in other ways, but it does not mean that one should not question the necessity of the scale of planned aviation expansion in the region.

As well as aviation, the region relies heavily on maritime transport, where traffic is increasing due to a growth in trade and tourism, however, this is a sector that is also proving difficult to reduce emissions in. Norway has led the way in investing in low-carbon solutions for near-shore shipping, shifting ferry and feeder routes to electric and hybrid solutions, but meaningful scale is still some way off (DNV GL, 2018). Globally, the shipping industry is incrementally setting targets (such as the IMO's rather unambitious 2050 50% emission reduction target) and implementing new low-carbon initiatives, but greater commitment from the large shipping firms operating in the Nordic Arctic is needed. Pressure from the legislator may be needed to achieve this, although the shipping sector is especially complicated due to its international nature.

Aside from important steps such as the aforementioned HFO ban in the Arctic, hydrogen fuel cells are also a potential solution in the shipping sector where electrification is unfeasible. However, as Rud et al. (2018) note, there remains uncertainty and disagreement on the future of hydrogen, and the region currently lacks the requisite infrastructure to support the technology. If successful however, such developments will also help the fishing industry – of huge economic importance in the Nordic Arctic – to reduce its reliance on fossil fuels. Efficiency offers good potential here, too,

such as in Iceland where the sector has managed to almost halve its carbon emissions since 1990 (Fisheries Iceland, 2017).

Construction

Energy efficiency of buildings in the Nordic Arctic is some of the highest in the world, but less attention has been paid to the embedded carbon emissions of the buildings themselves (Rud et al, 2018). Conventional concrete and steel production is associated with high emissions, and such materials must often be transported into the Nordic Arctic, furthering their carbon footprint. At a national level in the Nordics, regulation is forthcoming to better measure and eventually limit the full lifecycle emissions of buildings, and the Nordic Arctic too must be ready for this.

As well as innovative developments in the concrete industry, increasing the share of bio-based building materials should be seen as an attractive way in which to reduce carbon emissions from construction. Given the high availability of sustainably managed forest resources in the region, mass timber is a solution that can not only boost local rural economies, but also lock carbon away into buildings, and reduce transport emissions thanks to its light weight. Local strategies, such as in Skellefteå in Sweden, have proven an excellent lever in reducing lifecycle emissions from construction (Vestergaard Jensen & Craig, 2019). Additionally, circular principals should be better embraced to better utilise waste streams and ensure that resources remain in the value chain for longer.

Negative Nordic

Achieving carbon neutrality in the Nordic Arctic, as discussed, is not without its challenges. However it is also worth considering where the region can contribute to compensations, as well as taking opportunities to help other areas with reductions. While carbon capture and storage technologies and initiatives could prove to be of support, it would require substantial progress within the next few years in order to be of real use in achieving reduction targets. Further research and innovation is necessary and important, but should not be relied upon as the sole solution. Thus, the Nordic Arctic should focus on initiatives and legislation that can reduce emissions and transition to a zero emission economy.

Natural solutions also have a key role to play, as the greening of the Nordic Arctic means that the region can potentially lock more carbon into vegetation and soil stores. In Northern Finland, peat restoration projects are sequestering and locking in carbon, and work is underway to find a mechanism that can register this as verifiable offsets (Gatehouse, 2020). On the other hand, warmer temperatures can also lead to the release of already stored carbon from the thawing permafrost, as well as an increase in wildfire occurrence.

Where there is an abundance of renewable energy, the Nordic Arctic is also well positioned to help support growing green industries, from zero emission data centres – where the cold climate also can come in handy – and aluminium smelting in Iceland to battery production for electric vehicles in Northern Sweden. This represents just a small snapshot of some of the opportunities that can be taken in the region to positively contribute to the decarbonisation of the wider economy.

Conclusion and recommendations

If the Nordic region is to achieve carbon neutrality in the coming decades, a more nuanced approach that accounts for the particular circumstances in the Nordic Arctic must be adopted.

The Nordic Arctic's extreme climate, small and remote settlements, and fast-developing economy are characteristics that present unique challenges in decarbonisation efforts. The choice to pursue economic development in the region through the extraction of natural resources and tourism is hard to level with carbon neutrality targets, and more open dialogue should be had on this trade-off in policy aims.

Some sectors such as heat and power sectors are making significant progress in cutting carbon emissions, and recent attention from the Arctic Council on short-lived climate pollutants has resulted in reductions in hard-to-abate areas. However, the three sectors discussed in this paper – hydrocarbon & mineral extraction, transport, and construction – form bumps on the road to net zero emissions in the Nordic Arctic. Plans to be fossil fuel free across much of the Nordics are at odds with being a hydrocarbon producing region, and as such greater commitment is needed to phase out the industry in an economically responsible way over the coming years – without leaving people behind and ensuring that livelihoods are supported throughout the carbon-neutral transition. Greater pressure from the legislator, combined with commitment from larger shipping firms is needed to tackle emissions in the maritime transport and fisheries sector, while the necessity of the scale of planned aviation expansion in the region should also be brought into question. As urbanisation in the region continues, emissions from construction materials present a growing issue, which can be tackled through for instance improved strategies to utilise local bio-based resources and make better use of waste streams in the circular economy.

In addition to the key challenges described in this briefing note, there are also many ways in which the Nordic Arctic can positively contribute and even lead in the transition to a zero carbon economy through green industries, carbon capture and storage and the harnessing of natural solutions to carbon sequestration. Furthermore, this has the potential for a double dividend of new economic and employment opportunities in the North. At a Nordic level, there is a need to develop a common understanding of the precise definitions and accounting methods of carbon neutrality in order to better integrate efforts across national boundaries.

Despite some of the challenges laid out in this note, the Nordic Arctic remains well placed to achieve the goal of becoming carbon neutral. It is a realisable goal, but it will not be reached without a more nuanced Arctic approach being taken at a national and Nordic level. Moreover, greater ownership of the carbon neutral aim is needed locally from policymakers and corporations to maximise the benefits from building a zero carbon economy in the Nordic Arctic.

Notes

1. The Helsinki Declaration is signed by the five Nordic States of Norway, Finland, Iceland, Sweden and Denmark. However the Nordic cooperation also includes the three autonomies Greenland, Faroe Islands and the Åland Islands (the latter of which has been omitted from table 1 as it is not geographically in the Arctic). While Greenland and the Faroe Islands are a part of the Kingdom of Denmark, they have autonomy on climate policy.

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Briefing Note

An Arctic Boom of Policies & Strategies: 32 and Counting

Lassi Heininen

Traditions are neither mandatory *per se,* nor do they commit you. However, they easily remind and engage you about something to be interested in and follow. As the theme of the first Arctic Yearbook, in 2012, was "Arctic Policies and Strategies" – including a summary of the existing policies of the Arctic states, the first articles on interests and emerging policies of the Asian and European non-Arctic states (China, France, Japan, Poland, Scotland, Singapore, UK), as well as Inuit engagement in regional Arctic politics – the Yearbook has since then followed the theme (e.g. Lackenbauer 2013 on India; Olsen & Shadian 2016 on Greenland; Rahbek-Clemmensen 2016 on Denmark; Lim 2018 on China; Basse 2019 on Germany, and several analyses on the EU).

Indeed, there has been, and continues to be, a clear tendency and progressive process, almost like a race, to update existing policies by the Arctic states – as Canada, Russia and Sweden recently did, and as Finland is in progress – and by the first non-Arctic states – as Germany did – to adopt/approve, or aim to release, the first Arctic policy by non-Arctic states – as Scotland recently did, and a few others are in process and progress. For example, as the newest Observer State of the Arctic Council Switzerland, representing a 'vertical Arctic' due to its high altitudes, is working on a Swiss Polar White Paper aiming to acknowledge the activities and initiatives of Swiss research institutes in the Arctic (Arctic Council, 2020) and introduce the country's long and extensive experiences in polar and glaciological research. There is also discussion and proposals for Poland's engagement in the Arctic, due to a "long-established tradition of Polish research in the area" (in Svalbard), and to adopt Arctic policy, as well as recommendations for the formulation and substance of such policy (e.g. Łuszczuk et al., 2015). As well as, there is a devoted article to the Indian Arctic policy (Pronina et al., 2020), though India has not, yet, adopted an official Arctic policy. Finally, the first comprehensive, systematic analysis of existing policy documents of the Arctic and non-Arctic states, Indigenous peoples' organizations and the Arctic Council was released in early 2020 (Heininen et al., 2019).

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Following from this tendency, there are, again, good reasons for the Arctic Yearbook to write about the theme. This briefing note first, presents an overview/summary of the comprehensive analysis, and second briefly describes the recently updated and new policies and discusses them in the context of the analysis.

Before that as a personal observation I have a strange feeling (some others might have experienced the same) that though having broad research interests in IR, studies on Arctic policies was not my choice, but more the topic chose me. As a young researcher at the TAPRI international research project (on alternative development and security) my task was to focus on national approaches and interests of the smaller Arctic states (Canada, Denmark including Greenland, Finland, Iceland, Norway, Sweden), when senior researchers concentrated on the great powers (Soviet Union, USA). As an outcome, there was one of the first articles (Heininen, 1992) on national interests and agendas, but no explicit policies yet, of these Arctic states. This was updated and expanded to include the Russian Federation and the USA for the Barents Region's international conference where the Finnish initiative for the European Union's Northern Dimension was launched (Heininen, 1997). The next phase was the first comparative study and analysis of the policies/strategies of the eight Arctic states (after Sweden had approved its national Arctic strategy in May 2011) and that of the EU (Heininen, 2011) to be used as a handbook for policy-shaping/making. It was followed by a developed version (Bailes & Heininen 2012), a detailed inventory of the Arctic states' policies (with Hanna Lempinen) ordered by the Swedish foreign ministry as background material (not published) for the Kiruna Vision (2013) at Sweden's Arctic Council chairmanship, and the above-mentioned summary for Arctic Yearbook 2012. As if this would not be enough, I was also leading the 2019 comprehensive study at IIASA.

Comprehensive study and analysis on Arctic policies

In spite of these articles and publications on intergovernmental cooperation, governance and institutions, geopolitics and Arctic policies, and the resource potential[1], there were only a couple of studies/overviews on the priorities of the Arctic states' national interests in addition of the classic book, *The Circumpolar North* by Armstrong et al. (1978) in the late 1970s. Among others, the article by Brosnan et al. (2011) on (how cooperation and conflict appear in) the Arctic strategies of the five Arctic Ocean littoral states, and the articles of Arctic Yearbook 2012 on the Arctic Council Observer states (e.g. Plouffe, 2012 on France; Alexeeva & Lasserre, 2012 on China; Tonami & Watters, 2012 on Japan; Depledge, 2012 on UK). There was no in-depth analysis on the national policies of the Arctic Council Observer States (as non-Arctic countries), policies of Arctic Indigenous peoples' organizations (as Arctic Council Permanent Participants), or the Council's Ministerial meeting declarations.

These gaps in research related to Arctic governance and politics, as well as a lack of comprehensive study and analysis of all state and non-state policies, and Arctic Council declarations, were seen as an opportunity for the Arctic Futures Initiative (AFI). As a new-generation research project at the International Institute for Applied Systems Analysis (IIASA), the aim was to provide a holistic and systematic analysis of policies and practices, and deliver decision support with options that balance environmental protection, economic prosperity and societal well-being for the rapidly changing Arctic. However, the AFI was terminated by the IIASA Directorate in summer 2019, and therefore only its flagship project, *Arctic Policies & Strategies – Analysis, Synthesis and Trends* (by Heininen,

Everett, Padrtova and Reissell) was managed to be completed.[2] It is a comparative, deep, systematic study and analysis of existing policies and priorities of the Arctic states, Permanent Participants of the Arctic Council, Arctic Council Observer states, and AC Chairmanship programs & ministerial declarations.[3]

Altogether 56 policy documents as the primary references – national policies/strategies, chairmanship programs, and declarations covering the years 1998-2019 – were coded and analyzed. This large number of different source materials of Arctic policy documents have not been analyzed before. Relevant variables were selected as indicators (and sub-indicators), with altogether 14 indicators – (re)defining & (re)mapping, human dimension, governance, international cooperation & treaties, environmental protection, pollution, climate change (these three together also consisted of a super-indicator), security, safety & SAR, economy, tourism, infrastructure, science & education, and implementation. The texts of the documents were coded according to the indicators (except (re)defining & (re)mapping and implementation) as a quantitative method. Each policy document was analyzed (using applied system analysis), compared and searched for similarities & differences (striking, relevant, fragmentation), and priorities based on explicit, as a qualitative method. Then policies with priorities in each category were compared and discussed with each other. Finally, based on all this, and combining quantitative and qualitative methods, new/emerging trends were identified and briefly discussed in the context of existing Arctic narratives, perceptions and discourses.

Interesting findings of the policy documents

There are several relevant and interesting findings of these policy documents which I briefly summarize here according to the five categories of the study: Arctic states, Indigenous peoples' organizations, Arctic Council (AC) Observer states, and AC chairmanship programs and ministerial declarations.

The most-quoted indicators of the **Arctic states'** policies (adopted in 2009-2013) are governance, environmental protection including pollution and climate change, economy, international cooperation, and the human dimension. This is more or less according to the official priorities of these states' policies: economy/economic development, environmental protection, international cooperation, security/stability. The fact that governance and international Arctic cooperation, as well as international treaties (for example for maritime safety), are emphasized by all can be interpreted to mean political support for current geopolitical stability and Arctic Council work. At the same time, security *per se* is fragmented, as 'hard security' is emphasized by Canada, Iceland and USA, and 'comprehensive security' by Canada and Finland.

Economic activities and trade are explicitly emphasized, although fields are fragmented, and transportation & shipping, mining and tourism as priorities are striking. The private sector is explicitly mentioned by all, while the government and public sector are depicted as the most important. The human dimension is referenced with a good number of quotes, though not among official priorities. A striking similarity is that climate change is defined as the major research driver, when pollution is rarely mentioned. Although research is emphasized, education is neglected and mostly framed as attainment for economic reasons. Implementation is explicitly mentioned and planned by all, except Canada.

Finally, the term 'Arctic' is used in all policy-documents (also 'North', 'circumpolar'), though there is fragmentation in describing the region (e.g. strategic, fragile, vulnerable, unique, remote), and a global perspective is explicitly mentioned in half of them.

The policy documents of Arctic **Indigenous peoples' organizations**, as Permanent Participants of the Arctic Council, are fragmented, as they come from different directions and do not necessarily cover all the indicator fields in full detail. *Arctic Athabaskan Council's Arctic Policy* (2017) sets out nine principles of partnership of a new Shared Arctic Leadership Model to provide advice on new ambitious sustainable conservation goals for the Arctic, and social and economic priorities of Indigenous peoples living in remote Arctic communities. The policy priorities of *Inuit Arctic Policy* (2010), supported by the Inuit Circumpolar Council 2018 Declaration, are health & well-being of the Inuit (especially children), environmental protection, governance of their homeland, *Inuit Nunaat* i.e. the rights of Inuit to their self-government, and being active in international cooperation and supported by international agreements & organizations (UN, AC). Those of the *Sami Arctic Strategy (*2019) are to act as a robust and reliable partner in policy- and decision-making on Arctic issues, to ensure the right to choose, to address climate change and environmental protection, and to deploy Sami Indigenous knowledge and science.

There is a striking similarity that all policy documents explicitly address issues broadly surrounding Indigenous – individual and collective – rights, although in different contexts, both as a part of the human dimension, and also related to governance, both broadly and in detail. The importance of the international cooperation (and treaties) is much highlighted for Indigenous rights and self-governing. Unsurprisingly, all the documents emphasize the rights of Arctic Indigenous peoples to use and utilize the resources of their homelands, as well as the importance of 'traditional knowledge'. Unlike, the indicators of environmental protection, pollution and climate change are not explicitly covered by all documents; instead the Sami Strategy has critical comments on *green colonialism*. Scientific findings are seen to be produced and developed further in partnership, as the Gwich'in report states.

All in all, there is an impression that these are nations, who are proud, conscious, and know what they want and how to accomplish that.

Among the **Observer states** of the Arctic Council, France, Germany, Italy, Japan, Netherlands, PRC (China), ROK (South Korea), Spain and UK had all adopted (in 2013-2018) an Arctic policy/strategy by summer 2019. As the European Union, though it has adopted a couple of Arctic policies, is not a permanent observer, it was excluded in the analysis.

The most-quoted indicators are science & education, environmental protection including pollution and climate change, international cooperation & treaties, and economy, more or less according to the official priorities/policy goals of these states' policies. Science & education, including research infrastructure (stations & vessels), formal networks (IASC, UArctic) and knowledge-creation (e.g. the Italian *Tavolo Artico* group), is emphasized by Netherlands, ROK and Spain; environmental protection, including pollution and climate change, by France, Germany, Italy, PRC and UK; international cooperation by all, except Netherlands, in particular by Germany, Japan; and economy by France, PRC, ROK and UK (e.g. France's Roadmap includes economic opportunities for French companies). Correspondingly, the human dimension, security, including sovereignty and defense, and tourism are among the least-quoted issues.

Finally, an interesting finding of the nine policy documents, which are more current than those of the Arctic States, is that they also use the term 'Arctic' indicating a wish to become Arctic 'stakeholders'. There is fragmentation to either include self-identification toward the Arctic, as France, PRC, UK do, or exclude it.

Concerning the **Arctic Council chairmanship programs** (in 1996-2019) a relevant finding is that the official priorities in the programs are focusing on the environment, climate, and the Arctic Council main functions, environmental protection and sustainable development. Correspondingly, based on the coding the programs' focus are on governance, international cooperation and the human dimension (e.g. health, culture). A bit surprisingly, there are no formal or public evaluation processes explicitly mentioned.

When it comes to the **declarations of the Arctic Council ministerial** meetings, they do not include explicit priority statements, and therefore can be analyzed based on section headings. In general, the prioritized issues are around the main functions of the Council, environmental protection and sustainable development. These include biodiversity and balance between environmental protection and economic activities, as the scientific community is heard in climate action. Also health, governance & international cooperation are explicitly mentioned.

As a summary according to the coding of the 56 policy documents, the overall lists of priorities of the three main categories of stakeholders are the following:

Arctic states: governance, environmental protection included pollution and climate change, economy, international cooperation, human dimension;

Indigenous peoples' organizations: Indigenous rights, reflecting human dimension and governance, international cooperation, right to use resources, traditional/Indigenous knowledge;

Observer States: science & education, international cooperation, environmental protection included pollution and climate change, economy.

New and emerging trends

Based on the analysis of these policy documents and their priorities it was possible to identify, formulate and analyze what might be new and emerging trends of Arctic governance and geopolitics in each category (five lists of trends), as well as what might be new overall trends (see, Heininen et al., 2019: 249-253). It is necessary to note here that the task was what are new and/or emerging trends implicitly or explicitly included the existing policies and strategies, not current and existing trends. For example, the high geopolitical stability of the Arctic is not included, as it is no new trend but the current state of the region (e.g. Heininen, 2018) and explicitly mentioned by national policies and highlighted in the ministerial declarations (e.g. Rovaniemi, 2019; Fairbanks, 2017) as the first preamble.

Based on the five lists of new trends (of all categories) the new and emerging overall trends of Arctic governance and geopolitics are the following:

First, an ambivalence or paradox of Arctic development whenever a balance is been sought between environmental protection & climate change mitigation and new economic activities due to 'political inability'; second, state domination supported by geopolitical stability & sovereignty vis-à-vis globalization based on international treaties, UNCLOS & maritime law and UN

declarations regarding Indigenous rights and self-determination; third, focus on science, as to lean on scientific research & international cooperation in science, for problem-solving due to the pressure of the rapidly advanced climate change and the above-mentioned paradox; and fourth, new interrelationship between the Arctic and Space (e.g. digital security, meteorology, WMO) due to climate change, globalization and the global economy.

Recently updated policies by Arctic states

As mentioned earlier, there continues a clear tendency and progressive process by the Arctic states and a few non-Arctic states (AC Observers) to update existing Arctic policies/strategies. Among the Arctic states, Canada, Russia and Sweden have recently approved/adopted a new policy document, which I briefly describe and discuss, without systematic analysis, here in the context of the 2019 comprehensive study.

Canada

An updated Arctic and Northern Policy Framework was approved and released by the Canadian Government in September 2019 (Government of Canada 2019). This document, promised several years earlier, was delivered after a few years of cooperative work and consultations (regional and interest-based roundtables, and a public submissions process) with the Inuit, First nations, Metis, and other Northerners, as well as territorial governments and the governments of Manitoba, Quebec, and Newfoundland and Labrador. It is explicitly mentioned, even emphasized, that these have "contributed to this framework together" and that the framework "has been co-developed for the North, in partnership with the North, to reflect the needs and priorities of the North".[4] Consequently, the document is said to give a "shared vision of the future where northern and Arctic people are thriving, strong and safe… [and] a roadmap to achieve this vision".

The 2019 Arctic and Northern Policy Framework was described and analyzed, also critically, in the Arctic Yearbook 2019 (Kikkert & Lackenbauer, 2019) soon after the launch. In addition to the well-grounded note, I have a few observations. Structurally the Arctic and Northern Policy Framework differs from most national Arctic policy documents: The foreword and a shared vision "Our vision" are followed by substantial discussion on "Our past", including impacts of colonialism, history of the modern self-determination; "Our present", including impacts of climate change and global warming, existing robust rules, norms and institutions, Canada's long-standing sovereignty over, the global consciousness of and growing global interest towards the Arctic, as well as multi-dimensional description of the state of the "strong" people & communities, "comprehensive" infrastructure, "strong, sustainable and diversified" economies, science & Indigenous knowledge, environmental protection, global context, safety & security & defence, Indigenous youth of Canadian Arctic & North); and "Our future", including reconciliation with Indigenous peoples, global leadership, promotion of sustainability, safety and security of the Arctic & North. After this long introduction, there are the goals and objectives of Canada's Arctic & Northern policy, as well as next steps as conclusions.

The goals and objectives consist of, on the one hand, the long list of goals (8) from human health and security of Indigenous people and sustainable economies to knowledge-guided decision-making, resilient northern ecosystems and a rules-based international order (also Kikkert & Lackenbauer, 2019), and on the other hand, each goal has a list of objectives (from 4-6 to 12). In addition, in the beginning of the document there is another long list of matters - nurture healthy

families & communities; invest in energy, transport and communications infrastructure; create jobs, foster innovation and grow arctic economies, support science, knowledge and research; face the effects of climate change and support healthy ecosystems; ensure that Canada and our northern residents are safe; restore Canada's place as an international Arctic leader; and advance reconciliation and improve relations between Indigenous and non-Indigenous peoples – which are mentioned to be "clear priorities and action sets out by the federal government and its partners".

It is a bit unclear first how these two long lists of eight matters – "clear priorities" and "goals" – relate to each other, then after a more careful study it is possible to find out that the eight points (of the both lists) match with each other, though the wording and order differ. More importantly, it is neither clear which are real priorities, nor it is explicitly mentioned or discussed how to implement those objectives, only promised that "[t]he next phase of framework co-development will focus on implementation, invest strategies and governance".

Following from this, when comparing the 2019 priorities/goals to the four priority areas of the 2009 Canada's Arctic policy there are a few clear differences: first, human dimension, in particular "reconciliation with Indigenous peoples", is more in focus in the 2019 framework document than that of 2009; second, unlike, the 2009 document focuses more on environmental protection and climate change; third, the 2019 policy document focuses less on sovereignty than the previous one, albeit states to ensure the safety, security and defence of northern and Arctic residents, and emphasize the importance of rules based on international order in the Arctic.

In summary: comparing to the overall priorities of the Arctic States' policy documents, based on the coding of the 2019 comprehensive study and analysis, Canada's updated policy is more or less in line with them. It emphasizes more human dimension, in particular health and safety, and Indigenous peoples, and less international cooperation and economy. Following from this, it is logical that concerning the new trends state domination is not emphasized, but rather human health, Indigenous rights and reconciliation. However, the ambivalence implicitly influences the updated policy, as there are no clear priorities on environmental protection vis-à-vis economic activities.

Russian Federation

An updated "Basics of the State policy of the Russian Federation in the Arctic for the Period till 2035" was approved by the Decree of the President (No. 164) in March 2020. This is the third policy document with the same kind of structure in the series of the Russian Arctic state policies since 2008. The document (based on an unofficial translation) is rather short and reduced, and mostly consists of several lists of matters (interests, goals, directions, tasks, objectives, challenges, implementation mechanisms and indicators).

The document consists of several lists. The first one is a list of following Russia's national interests in the Arctic: ensuring sovereignty and territorial integrity; protecting peace, stability and mutual partnership in the Arctic; attainment of high quality of life; developing the Russian Arctic zone as a strategic resource base; developing the NSR as a competitive national transport & communication; and environmental protection and protection of traditional lifestyle of Indigenous peoples. That is followed by a list of the Russian state's policy goals in the Arctic: better quality of life of the Russian Arctic population; acceleration of economic development; environmental protection; implementation of (mutually beneficial) international Arctic cooperation; and

protection of the Russian national interests (in the Arctic). Among the issues of the both lists are high quality of life and well-being of the Russian Arctic population, environmental protection parallel to (economic) development (of the Russian Arctic zone) and that of the NSR, sovereignty and territorial integrity of Russia, and peace and (mutually beneficial) cooperation in the Arctic.

After these, there are lists of (main) development tasks covering social issues, infrastructure, science & technology, international cooperation, protection of the population, ensuring public security, that of military security, and border defense. Finally, implementation mechanisms and key (performance) indicators for the implementations are described with details, though without budget figures.

As the first observation, there are no explicit priorities mentioned, instead on the one hand, national interests of the Federation in the Arctic, and on the other hand, the goals of the state policy of Russia in the Arctic (see above). When trying to identify common factors of the interests and the goals, it is possible to interpret the following priorities of Russia in the Arctic: high (better) quality of life of the Russian Arctic population, including Indigenous peoples; acceleration of (economic) development of the Russian Arctic zone, including the Northern Sea Route (NSR); environmental protection of the Arctic; peace, stability and (mutually beneficial) Arctic cooperation; and protection of Russia's national interests, sovereignty and territorial integrity in the Arctic.

Another observation is that based on the lists of "development tasks" safety and security are high on the agenda, which can be interpreted to refer to the comprehensive security concept. Unlike, the 2008 and 2013 state policies were more focused on economy and infrastructure.

In summary: comparing to the overall priorities of the Arctic States' policy documents, based on the coding of the 2019 comprehensive study, Russia's updated policy is mostly in line with them, though it emphasizes more safety & security, and less economy and infrastructure. Concerning the new trends of Arctic governance, the updated policy supports state domination based on geopolitical stability and sovereignty, unlike focus on science is emphasized.

Sweden

An updated strategy for the Arctic region, "Strategi för den arktiska regionen" was approved by the Swedish Government in September 2020 (Regeringens skrivelse 2020/21:7).

In the updated strategy, the Swedish Government recognizes six theme areas – international cooperation in the Arctic, security and stability, climate and the environment, polar research and environmental protection, sustainable economic development as swedish business interest, and security of good living conditions – as priorities.

Comparing to Sweden's first Arctic Strategy (2011) there is a striking difference that, though both documents have long lists of objectives and promises what Sweden/the Government will aim or do, the 2011 policy was minimalist with three priorities, and the 2020 one is with doubled number. From the priorities, international cooperation, security and stability, and polar research are new ones, though international cooperation and research (science) were among the most quoted indicators of the 2011 policy. Using a qualitative method a striking similarity is that the human dimension is much highlighted by the two policies.

Concerning the updated policy there are a few observations: First, Indigenous peoples' culture and reindeer herding is been discussed as part of good living conditions, and interestingly, knowledge exchange (among Indigenous peoples) is one of the highlighted aspects. Second, among international, institutional networks, in addition of the obligatory Arctic Council, Barents Region, Nordic cooperation and the EU, the Saami cooperation and cooperation with Germany (bilateral cooperation) are explicitly discussed. Third, security & stability, including a separate section of strong national defense skills, is explicitly discussed and (re)defined as a new priority. Here China is emphasized as the most important factor of the increasing interest by non-Arctic states trend, the two other security-political trends are the increased interests towards Arctic resources, and a new military dynamics in the Arctic. Fourth, Arctic (or polar) research is explicitly discussed, and thus tied, with environmental protection, which is logical. Biodiversity is highlighted, as well as nuclear safety, as a continuity Sweden's environmental politics and scientific community's interests.

Finally, if the 2011 policy document thoroughly described that there are "many ties linking Sweden to the Arctic", the 2020 one takes that as granted, as a natural fact.

In summary: comparing to the overall priorities of the Arctic States' policy documents, based on the coding of the 2019 comprehensive analysis, Sweden's updated policy is mostly in line with them, though security and defense is more emphasized, as well as biodiversity. Concerning the new trends of Arctic governance, the updated policy supports focus on science, tries to seek a better balance between environmental protection and economic activities, and explicitly mentions the Arctic and Space (satellites).

Updated and new policies by non-Arctic states

Among non-Arctic states, which have recently approved/adopted an updated policy document on the Arctic, are France and Germany, as Arctic Council Observer states. And Scotland has adopted its first Arctic policy. I will describe and discuss these three policy documents. In addition, I will briefly discuss the 2016 Arctic policy of the EU, though the Union has no permanent observer status of the AC, but is an important Arctic stakeholder and seeking to update its Arctic policy.

France

A policy document "France and the New Strategic Challenges in the Arctic" was approved in autumn 2019. This is neither a real policy document nor updated version of France's (first) Arctic policy, "The National Roadmap for the Arctic" (approved in 2016). This is more a brochure kind of publication to refresh the French vision on the Arctic region/Arctic matters, in particular from a strategical point of view, released by the Ministry for the Armed Forces.

The French brochure emphasizes the growing geostrategic importance of the Arctic for example, by stating that "it may one day become an area of confrontation". Followed from this, France's activities and the action of the French Ministry for the Armed Forces (with details and in figures) is logical in the region. Though, the 2016 National Roadmap emphasizes economy and France's economic interests in the region, as the highest priority, it also includes a chapter on defense and security issues with several recommendations, and sovereignty is explicitly mentioned. Behind is "Enhancing legitimacy of France in Arctic affairs" as one of the four main areas. In addition, the 2016 policy is also a strong statement on behalf of the EU and its legitimate involvement present

in the Arctic (Heininen et al., 2019: 194-200) Unlike, the 2019 brochure briefly mentions France contributions to an inclusive Arctic governance and French non-military activities in the region.

In summary: as the main focus of France's short 2019 document is defense and security issues, not comprehensively national interests, there is no sense to compare it to the overall priorities of the AC Observer states' policy documents.

Germany

An updated "Germany's Arctic Policy Guidelines: Assuming Responsibility, Creating Trust, Shaping the Future" was adopted in August 2019 (The Federal Government 2019).

According to the Federal Government, there are seven influential factors and fields for Germany in the Arctic: consistent climate and environmental protection, as the Arctic is a "kind of early warning system for global warming"; international cooperation, in particular in the Arctic Council context and the UNCLOS legal framework; security policy dimension aiming "to preserve the Arctic as a largely conflict free region" despite increasing "non-cooperative behaviour in view of overlapping interests" worldwide; cutting-edge research (promoting knowledge and resilience as a "prerequisite for sustainable development in the Arctic"), where Germany "with a strong profile in polar research… is an international actor in the High North", including the Arctic Ocean; safeguarding sustainable development, in particular in resource exploitation for example, "seeking to work together with the Arctic states on balanced and sustainable solutions for safe shipping" and making Arctic tourism sustainable; and involving the local and Indigenous population among others by respecting and recognizing the Indigenous peoples' "right to freedom and self-determination", and welcoming them in the Arctic Council's decision making "as an equal party".

According to the policy document "The future of the Arctic deserves our full attention", due to its vulnerability and influences of the global climate, which is said to constitute "grounds for assuming responsibility and taking action". Among others, Germany is committed "to integrating the Arctic into a diversified resource security system as well as to safe and environmentally friendly shipping", and aims "to prevent conflicts (of interest) and potential crises in the Arctic". Applicable shipping and transit rights must be protected. Further it is committed "to ensuring that NATO and the EU also devote more attention to the Arctic and its significance in terms of security policy", and "rejects any attempt to militarise the Arctic" (The Federal Government. 2019: 41-42).

As an interesting observation the updated Arctic policy is more focused than the 2013 policy document "Guidelines of the Germany Arctic Policy: Assume Responsibility, Seize Opportunities" with a list of eleven issues that the federal government seems to be interested in. According to the quantitative analysis based on coding the most discussed were International cooperation, (maritime) Governance and Economy (Heininen et al, 2019: 201, 206). A striking similarity of the two documents is that environmental protection, climate change, and international cooperation continues as priorities, if interpreted the factors & fields of the 2019 as priorities. Economy is still in a focus, though in the 2019 document it is explicitly discussed under sustainable development. Correspondingly, a difference is that security, science and Indigenous peoples are defined as new priorities.

In summary: comparing to the overall priorities of the AC Observer states' policy documents, based on the coding of the 2019 comprehensive analysis, Germany's updated policy is mostly in line with them, though emphasizes more security policy and Indigenous peoples, and less

economy. Concerning the new trends of Arctic governance, the updated policy supports focus on science, and internationalization of the Arctic, and maybe seeks prefers sustainable development pre to economic activities.

Scotland

Scotland approved its first Arctic policy, "Arctic Connections. Scotland's Arctic Policy Framework" (Scottish Government 2019), in September 2019. Scotland did this, though it is (still) officially a part of UK, and UK updated its policy towards the Arctic, including Scotland, in 2018. As both UK's Arctic interests (Depledge, 2012), and "costs and benefits in publishing a formal Arctic strategy" for Scotland (Johnstone, 2012) were discussed at Arctic Yearbook 2012, it is fair to describe and discuss Scotland's formal Arctic policy here.

The Scottish Government's plan is to take action under its Arctic policy framework in the following areas (ibid: 42-44), which could be interpreted as priority areas: first, "Scotland looks to North" based on peoples' history and cooperation between Scotland and Arctic nations dating back centuries. It states that "Our Arctic work provides further momentum to the Scotland is Now campaign, which seeks to project Scotland as a progressive and dynamic nation that does not hesitate to take the lead on key global challenges" (ibid: 9). Second, "Education, Research and Innovation" based on a long tradition of Scottish universities and research centers of "producing world-class science on the Arctic", and aiming "to be even more closely involved in multi-disciplinary research that addresses Arctic issues". Third, "Cultural Ties" based on peoples' history and using culture as a powerful vehicle "by building on the strong cultural links between Scotland and the Arctic region… [to] strengthen connections between people, empower communities through creativity and be leaders in encouraging international dialogue". Fourth, "Rural connections" as "Remoteness is a common feature of the Arctic region and many parts of Scotland" (more than 90% rural and 96 inhabited islands) with many challenges from transport to digital connectivity and the provision of medical services.

Fifth, "Climate change, Environment and Clean Energy", as the Arctic and its melting glaciers illustrates the devastating impact of global warming. "Combined with other environmental threats – such as pollution, sea level rise and erosion – climate change poses a serious threat to ecosystems and biodiversity on a global scale". An answer could be renewable energy and decarbonisation bringing economic benefits, and therefore the Government works with industries on the energy sector to "ensure that the benefits of our transition to a net-zero economy are maximized". Among successful renewable energy projects is the world's largest floating offshore wind array in Scotland. Sixth, under the title of "Sustainable Economic Development" the policy document encourages to work with Arctic countries and peoples to "devise solutions that are ecologically accountable and combine increased prosperity with greater equality" based on the UN Sustainable Development Goals. The document states that Scotland signed up the goals as one of the first countries. As well as, it states that Scotland is aiming to become "as a leading space nation… building more small satellites than any other place in Europe", much needed in the Arctic experiencing inadequate satellite coverage.

As the first observation, and the most political notion, the policy document states that "Membership of the EU has greatly benefited Scotland's cooperation with Arctic countries", and therefore, "The UK's exit from the EU poses a serious risk to Scotland's domestic and international interests, including around Scottish-Arctic relations" (ibid: 6-7). Concerning the

politicized relations with the UK interestingly, the 2018 UK policy notes that "although the UK is not an Arctic states, we are its nearest neighbor, with Lerwick in the Shetland Islands closed to the Arctic Circle than it is to London" (UK, 2018: 2; also Heininen et al., 2019: 233). Actually, the Shetland Islands belongs to Scotland as one of its council areas, and consequently, Scotland's Arctic policy also notes that its "northernmost islands are closer to the Arctic Circle than they are to London" (Scottish Government, 2019: 5).

Another observation is that young people in the Highlands and Islands region are interpreted to show a "strong sense of belonging and a desire to work in their communities", which the document finds as an idea for a Scottish-Arctic dialogue. Further, the notion of using culture as a powerful vehicle in the policy includes an interesting proposal of a Scottish-Arctic Laboratory for cultural policies, meaning that Scotland and Arctic countries "can work together to promote equality through culture and creativity". They may even try to find "solutions to remove barriers to taking part in cultural life, enabling all citizens to participate and be creative, irrespective of their background and personal circumstances". The historically and culturally close relations between Scotland and Iceland are explicitly discussed by mentioning the Wellbeing Economy Governments group with the two governments as founding members, which "seeks to apply the principles of economic wellbeing to practical and scalable policy approaches".

Finally, based on this geographical fact and Scotland's close links to the Arctic, historically, culturally and otherwise, the Scottish Government "intends to strengthen the foundations of a long-standing two-way discussion with its Arctic partners… [and] to share Scottish expertise while underlining our desire to learn from others" by building a new platform for policy and knowledge exchange.

In summary: all in all Scotland's Arctic policy is substantial and political, and shows a strong interest towards engagement with the Arctic states, as also emphasized by First Minister Sturgeon at Arctic Circle Assemblies. Interestingly, it both highlights immaterial aspects (e.g. culture) and includes several concrete examples (e.g. Scottish-Arctic dialogue). Comparing to the overall priorities of the AC Observer states' policy documents, based on the coding of the 2019 analysis, Scotland's policy is mostly in line with them. Scotland however emphasizes more clearly culture and sustainable economies, and brings in rural connections and remoteness as common features of the world's northernmost regions. The policy also includes self-identification toward the Arctic region, as the UK also does. Concerning the new trends of Arctic governance, the Scottish policy supports a focus on science, tries to seek a better balance between environmental protection and economic activities, and explicitly mentions the Arctic and Space (satellites).

European Union (EU)

As the first EU policy (Communication) on the Arctic stated that the European Union "is inextricably connected to the Arctic region" (EU, 2008), there was "a perceived need for strengthening the Union's position and presence in the High North, and the EU aims to become a real Arctic player" (Heininen, 2011: 65). Followed from this, A Global Strategy for the EU's Foreign and Security Policy (EU, 2016a: 38-39) states, as a part of the priority on cooperative regional orders, that "the EU has a strategic interest in the Arctic remaining a low-tension area". This is echoed by the statement of the latest EU's 2016 Arctic policy that the Union "has a strategic interest in playing a key role in the Arctic" (EU, 2016b). In summer 2020, the EU was seeking to update its Arctic policy and asked inputs in that from the members states and their decision-

makers. In October 2020, the EU Commission announced that a new policy was decided to aim for 2021.

According to the 2016 integrated Arctic policy "the EU should engage with the region" on three priority areas: climate change and safeguarding the Arctic environment, promoting sustainable development in the Arctic, and supporting international cooperation on Arctic issues. These are in line with the 2008 policy's priorities (protecting and preserving the Arctic environment and its population; promoting sustainable use of resources; and contributing to enhanced Arctic multilateral governance). This shows on the one hand, a continuity of the EU policy in the Arctic region and Arctic affairs, and on the other hand, leans on the EU's reputation of having "always prided itself on its soft power – and it will keep doing so" (Mogherini in the EU 2016 Global Strategy).

As an interesting observation, unlike the 2008 policy's notion of an inextricable connection to the Arctic, the 2016 policy recognizes the Arctic states' contributions "to foster peace and stability through cooperation and the application of the rule of law", echoed by the EU Global Strategy to have "a strategic interest in the Arctic remaining a low-tension area" (EU, 2016a). Behind this are a few geopolitical facts: three EU member states (Denmark, Finland, Sweden) and two European Economic Area members (Iceland, Norway) are among the Arctic states, and Greenland, a part of the Kingdom of Denmark, has the status of the Overseas Countries Territories associated to the Union. Following from this, there is a paradox and obviously a weak point for the EU's self-esteem, that the Union does not have, yet, the status of a (permanent) observership of the Arctic Council.

Another observation is that the Union contributes to the goal of strengthening its soft power by enhancing "work on climate action and environmental research, sustainable development, telecommunications, and search & rescue, as well as concrete cooperation with Arctic states, institutions, Indigenous peoples and local communities" (EU, 2016b). In political rhetoric, this statement could be interpreted to represent EU's new moral language and geopolitical discourse on Arctic governance. Finally and importantly, in addition to the (above-mentioned) geopolitical facts, and despite the existing Arctic policies and the non-Observer status at Arctic Council, the European Union much affects the Arctic region being a global actor in international climate negotiations, one of the biggest funders of Arctic research, and the biggest market area for Arctic fisheries, among others (Bailes & Heininen, 2012: 84-97; also Airoldi, 2008).

In summary: if the text of the 2016 EU Joint Communication would be coded according to the 12 indicators (excluding (re)Mapping/(re)Defining, and implementation) of the 2019 analysis, the most quoted ones would be economy, climate change, and science & education. Thus, comparing to the overall priorities of the AC Observer States' policy documents, based on the coding of the 2019 analysis, the EU policy is more or less in line with them. Concerning the new trends of Arctic governance, the 2016 EU policy supports focus on science, and could be interpreted to challenge the "Ambivalence of Arctic development" trend by seeking a better balance between environmental protection and economic activities, at least in political rhetoric.

Conclusions

As critical comments to conclude the overview of the 2019 comprehensive study & analysis is that the most-quoted indicators accord more or less with the official priorities/policy goals of the

states' and Indigenous peoples organizations' policies. Climate change, as a threat multiplier, is the driver, a uniting and merging factor, as well as the main reason for focus on science, as one of the overall trends of Arctic governance and geopolitics. At the same time, there is ambivalence or paradox in Arctic development, as another trend, due to the rapidly advanced climate change (in the region). There are also relevant interrelations between the new overall trends and major narratives, such as ambivalence vis-à-vis race for resources/state domination vis-à-vis geopolitical stability & state controlled development/focus on science vis-à-vis climate ethics/Arctic & Space vis-à-vis 'Global Arctic'.

From the updated policies of the Arctic states, Canada is more or less in line with the overall priorities of the Arctic States' policy documents (based on the coding of the 2019 comprehensive study & analysis), though it emphasizes more human dimension, in particular health and safety, and Indigenous peoples, and less international cooperation and economy. Russia is also mostly in line with them, though it emphasizes more safety & security, and less economy and infrastructure. As well as Sweden is mostly in line with them, though security and defense is more emphasized, as well as biodiversity. From the updated policies of non-Arctic states, Germany is mostly in line with them, though emphasizes more security policy and Indigenous peoples, and less economy. Scotland's first policy is mostly in line with them, though emphasizes more clearly culture and sustainable economies, and brings in rural connections and remoteness as common northern features. Finally, the 2016 EU policy is more or less in line with the overall priorities of non-Arctic states, though the Union consists of three Arctic states.

In spite of the focus on science, and explicitly discussed synergy between scientific and Indigenous knowledge to tackle climate change, as well as (long) lists of priorities, goals and objectives, states' policies on the Arctic reflect hesitation, when facing and trying to solve grand environmental challenges and the wicked problem (combination of rapid climate change, pollution and declining biodiversity). They reveal the existing 'political inability' to act – to act now. In maintaining the achieved constructive cooperation and high geopolitical stability, which are, so far, surprisingly resilient, would support the tackling against climate change and pollution in the Arctic region, if only that would be put as the most important priority. This kind of a 'best practice' would be mutually and globally beneficial, and could be a foundation for 'political ability' to make a paradigm shift in mind-set in world politics, as a precondition for problem solving globally.

Notes

1. These represent first focus of existing social sciences literature on the Arctic, and another focus is covered by multidisciplinary studies on the globalized Arctic as a part of global dynamics in the environmental, societal, political and economic spheres.
2. The project was co-funded by IIASA and Ministry for Foreign Affairs of Finland, and supported by Arctic Circle and INAR at University of Helsinki.
3. The expectation was to understand how perceptions of the Arctic have changed; how different actors behave, and define, address, prioritize issues around relevant factors; identify the common/shared interests, and dynamics of the interplay, of stakeholders, and how their behaving impacts the Arctic region and the entire globe; and finally, based on that determine policy consistency, identify new/emerging trends, and discuss them with

narratives and perceptions of Arctic governance & geopolitics. In the background was the social relevance of science, and the importance to implement the interplay between science, politics and business.

4. Unfortunately, the online version does not have page numbers.

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Section IV: The Arctic Council and Climate Change Mitigation – What Role?

The Arctic Council as a Success Case for Transnational Cooperation in Times of Rapid Global Changes?

Dorothea Wehrmann

In times of rapid global changes, agreements such as the Paris Climate Agreement illustrate the growing need for transnational cooperation to solve complex and interrelated challenges that affect humanity at large. In past decades, a number of forums and institutions formed to enhance cooperation and coordinate different approaches and policies transnationally. Not all of them have been assessed to be a success. The Arctic Council is a forum that is widely perceived as facilitating transnational cooperation – also in times of rapid global changes. This article explores systematically in how far the Arctic Council can be considered an example to learn from and identifies useful "ingredients" for strengthening transnational cooperation more generally. First, by drawing on global governance research this study shows that in the literature, very different perspectives consider similar factors as strengthening transnational cooperation. Second, it outlines how the AC has adhered to various factors identified in the literature but also recognises the need to improve its process management. The concluding section argues that particularly the Arctic Council's focus on knowledge generation and expertise has encouraged the maintenance of robust transnational cooperation.[1]

Introduction

When discussing how transnational cooperation[2] can successfully contribute to the governance of far-reaching, entangled, and complex challenges such as the implementation of the 2030 Agenda and the Paris Climate Agreement, particularly in development studies "a look up north" to the Arctic region is often missing. This is surprising, given the Arctic's experience with transboundary challenges and its unique exposure to rapid global changes. Moreover, since its origin in 1996 cooperation of non-state and state actors is at the core of "the leading intergovernmental forum promoting cooperation, coordination and interaction *among Arctic States, Arctic Indigenous communities and other Arctic inhabitants*" (Arctic Council, 2018, emphasis added), and the Arctic Council (AC) has

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often been described as a very successful forum in this respect (Young, 2019). Some even explain the AC's success by emphasising the numerous distinct actor groups that are engaged in the Arctic Council (Knecht, 2017) and refer particularly to the inclusion of non-state actor groups (most notably to Indigenous peoples' organisations with Permanent Participant-status, encouraging the prominence of the concerns of Arctic Indigenous peoples in the AC (Smieszek, 2019). Others highlight that the AC has managed to increase transnational cooperation and to maintain peace in a region that is still often represented as a region prone to international conflicts (the 2015-Iqaluit Declaration, Arctic Council, 2015) that used to be a "military theatre" and an "arena of the superpowers" during the Cold War (Lackenbauer, 2010). Also due to this continuity of cooperation, the AC is widely considered the primary forum for policymaking in the Arctic (Nord, 2016), the "promoter voice of the Arctic" (Heininen, 2004: 33), and "the most important multilateral framework in the region" (Käpylä & Mikkola, 2015: 9).

This article investigates potential lessons to be learned from the AC for encouraging successful transnational cooperation in times of rapid global changes. It proceeds as follows: First, by drawing on research on global governance, this study shows that in the literature very different perspectives consider similar factors as strengthening transnational cooperation. Second, it focuses on lessons learned from the Arctic Council. This section outlines how the AC has adhered to various factors identified in the literature but also points out the need to improve its process management. The implementation of the 2030 Agenda and the Paris Climate Agreement are central for the policy field of development cooperation, which is why, third, the concluding section evaluates the relevance of this study's findings, particularly for international relations and development studies. This third section concludes that many of the premises discussed in the literature on transnational cooperation and on multi-stakeholder partnerships mirror the praise and concerns brought forward with regard to the AC. At the same time, it shows that transnational cooperation under the auspices of the AC allows these premises to be expanded –particularly its relevance ascribed to knowledge generation.

Overall, this study aims at contributing to the discussion of how transnational cooperation and the implementation of ambitious global visions, such as the 2030 Agenda and the Paris Climate Agreement, can be advanced. Despite the growing attention paid to non-state activist groups such as the Fridays for Future- and Extinction Rebellion-movements, those arguing that it is either "too late" to change anything or "too difficult" to find effective solutions often seem to dominate the discussion. Thus, more balanced, constructive contributions are needed to identify pathways for reaching the goals agreed upon, for example, through intensifying cooperation between state and non-state actors. One may argue that the complex nature of collective action problems hinders any transferability of possible solutions and best practice-examples to the global level in the first place. This study does not doubt limitations in this regard. However, complex collective action problems still have their origin in the actions "undertaken by individuals, families, firms, and actors at a much smaller scale" (Ostrom 2009: 3), and concrete examples such as those provided in this study might be helpful to encourage changes in that way.

Enhancing transnational and multilateral cooperation in times of rapid global changes

To address global challenges such as climate change, there is broad consensus that individual and collective changes are needed. However, not only in regard to social control mechanisms have

scholars repeatedly found that "most influences which transcend national borders emanate not from the globe but the neighbourhood" (Mann, 2006: 28). Scholars similarly highlighted that "individual behaviour is strongly affected by the context in which interactions take place rather than being simply a result of individual differences" (Ostrom, 2009: 431). Consequently, to implement global agreements, it is necessary to link them more strongly to individual contexts (Jakobeit et al.: 2010). In this regard, transnational interactions and networks in particular have the potential[3] to guide behaviour and to enhance cooperation because they are intermediate to both the global and the individual levels. In this way, "motivations behind the creation of transnational initiatives [have] often […] international dimensions, such as promoting a set of norms […]" (Roger, Hale, & Andonova, 2017: 11). But what factors enhance transnational cooperation in times of rapid global changes?

Like individual behaviour also transnational governance "varies enormously across countries, and is fundamentally shaped by the different domestic political contexts that actors are embedded in" (Roger, Hale, & Andonova, 2017: 2, see also Avant, Finnemore, & Sell, 2010). Recognising this as a limitation to my findings, in this section, I discuss different perspectives on how transnational multilateral cooperation can be generally encouraged. From the scholarly literature focusing on questions related to cooperation, I present research results from different strands that pertain to the transnational level and show the various perspective overlaps.

In times of rapid global changes that cause fundamental environmental, economic, and social shifts, policymaking faces various challenges as negotiations on agreements such as the Paris Climate Agreement and the 2030 Agenda have shown: Policies require to be ambitious to encourage effective decision-making at all levels; they should consider and integrate various (also conflicting) **actor** perspectives to be comprehensive; in terms of **process**, they should be negotiated in a timely manner; and they need to be adaptive if they are to adequately address urgent problems. Moreover, to implement policies and agreements, it is important to overcome **context**-related problems and factors that limit cooperation and to take advantage of the factors that enhance cooperation at the sub-national, national, and global levels. With that in mind, when investigating factors to enhance transnational cooperation in times of rapid global changes, I differentiate between actor-, process- and context-dimensions[4] and compare the respective findings from the literature accordingly.

From their investigation of transnational multi-stakeholder partnerships for sustainable development, Pattberg and Widerberg argue that an optimal mix of partners with different resources, types of knowledge and capabilities enhances "successful cooperation" in multi-stakeholder partnerships, understanding success in this way as "the use of synergies and an effective division of labor" (Pattberg & Widerberg, 2016: 46). Considering the process-dimension, Pattberg and Widerberg highlight the need to align goals with international norms. Thus, when applied to the implementation of the Paris Climate Agreement and the 2030 Agenda, they would emphasise the need to develop a "common problem-definition" and to aim for "clear and measurable goals" (Pattberg & Widerberg, 2016: 47). When acknowledging the distinct features of problems, Pattberg and Widerberg characterise them by high levels of complexity ("malign problems") or understood as "benign problems" in cases, in which "actors' interests and preferences converge, and solutions are easier to identify" (Pattberg & Widerberg, 2016: 49). Pattberg and Widerberg thus argue that, with regard to the context-dimension, it is important to reflect on different administrative challenges and institutional setups that are needed to address different kinds of problems.

Peinhardt and Sandler, among others, base their analysis on game-theoretic foundations. Where the actor dimension is concerned, they argue that collective action is "usually easier to achieve among a small number of agents" that are like-minded and possess similar means (Peinhardt & Sandler, 2015: 10), which contradicts Pattberg and Widerberg's findings who stress the differences and optimal mix of actors. They support, however, Pattberg's and Widerberg's suggestion to define clear and measurable goals as from Peinhardt and Sandler's view, collective action is "bolstered if payoffs are immediate and certain" (Peinhardt & Sandler, 2015: 11). With regard to the context dimension, they also agree with Pattberg and Widerberg when stating that "institutional rules can […] bolster collective action by offering selective incentives" and that cooperation under the auspices of institutions contributes to the development of trust and to the formation of alliances, both enhancing further cooperation also as regards other thematic areas (Peinhardt & Sandler, 2015: 11).

From the analysis of transnational movements, Bandy et al. add to Pattberg and Widerberg's and to Peinhardt and Sandler's findings by outlining the international legitimacy that large international non-governmental organisations and international governmental organisations give to specific norms. Similarly, also others have argued that particularly "agenda setting and norm development is largely the domain of non-state actors" (Haas, 2016: xxix). Thus, in connection with the context dimension, the political and institutional space provided by these organisations can be seen as encouraging the development of shared strategies and coalition-building (Bandy & Smith, 2005: 233). In line with Pattberg and Widerberg and with Peinhardt and Sandler, Bandy et al. also stress the value of established cooperation as a factor contributing to the emergence of more cooperation that is more resilient "to tensions and breakdowns elsewhere" (Byers, 2019: 43) and offers greater influence for collaborating actors (Avant & Westerwinter, 2016: 17-18). Further, cooperation that builds on other cooperation seems less time-consuming, resource-intensive, and risky (Bandy & Smith, 2005: 233). Resources, specialised knowledge and "access to centers of economic and political decision making" are also factors that Bandy et al. identify with regard to the actor dimension as beneficial for the sustaining of transnational coalitions. In this way, they emphasise advantages arising from the inclusion of actors "from the North" that are said to "have larger organizational capacity, financial power, and abilities to join IGOs, national governments, or transnational corporations" (ibid.). Also, regular contact and even conflicts may foster cooperation when generating "new sensitivities" and contributing to "conscious-raising efforts" (ibid.), thereby enhancing "the development of solidarity, trust, and shared values among participants" (Brown & Fox, 1998: 455). These behavioural conditions are also stressed by Messner and Weinlich, who emphasise the "human factor in international relations" when investigating how and under which conditions global cooperation can succeed (Messner & Weinlich, 2015). In this regard and based on the so-called "Cooperation Hexagon", Messner et al. suggest that reciprocity is "the fundamental prerequisite for cooperation to be sustained [over] time". They further identify four mechanisms (trust; communication; the ability to determine people's reputation as trustworthy partners; and the perception that the interaction is fair) as necessary to "create conditions conducive to reciprocity", which may then be expanded by "enforcement" (via punishment or rewards) and a "we-identity" (Messner, Guarín & Haun, 2013: 16).

Table 1: Factors and mechanisms to enhance and strengthen cooperation between different entities at the transnational level

	Transnational multi-stakeholder partnerships	**Transnational movements**	**Game-theory**	**Behavioural conditions**	**Constructivist approaches**
Actors	Optimal partner mix (various resources, knowledges and capabilities) encouraging the use of synergies and effective division of labour		Like-mindedness and similar means to collaborate ("We-identity")	Reciprocity as the fundamental prerequisite for cooperation	Framing of problems, construction of shared narratives and ideas
	Effective leadership	Large international organisations give legitimacy to specific norms			
Process	Stringent goal-setting		Define clear and measurable goals to ensure that payoffs are immediate and certain		
	Sustained funding		Country-specific incentives		
	Professional process management	Specialised knowledge, access to economic and political decision-making through actors with organisational capacities and financial power (often	Presence of a leader country to lead by example	Enforcement (rewards or punishments)	

		"actors from 'the North'")			
	Regular monitoring, reporting and evaluation to support organisational learning	Regular contact to develop solidarity, trust and shared values		Trust, communication, trustworthiness, fairness	
Context	Active meta-governance	Political and institutional space provided by international organisations (IOs) encourages development of shared strategies and coalition-building	Institutional rules to offer selective incentives		
	Favourable political and social context	Established cooperation enhances further cooperation (less time-consuming, resource-intensive or risky)	Cooperation under the auspices of institutions support development of trust and the formation of alliances while enhancing further cooperation	"We-identity"	
	Fit to problem-structure				
Source: Author					

While constructivist approaches are valuable in considering discourses as important for successful transnational cooperation, they do not necessarily differentiate among the actor-, process-, and context-dimensions. From the perspectives of frame analysis (Goffman, 1974) and critical geopolitics (Tuathail, 1992), for example, geopolitical imaginaries and narratives, such as the framing of China's Belt and Road Initiative as a "new Silk Road" or of the Arctic as a "military theater", contributed to the formation of alliances among different actor groups (Pincus & Ali, 2015). From that perspective, not only coalitions among actors but also framing processes shape the process of agenda-setting, or as Altheide "frames it", "[f]rames focus on what will be discussed, how it will be discussed, and above all, how it will not be discussed" (Altheide, 1997: 651). This also relates to the more recent analysis of ideas as coalition magnets that policy entrepreneurs frame and use strategically "to garner the support of a diversity of individuals and groups" (Béland & Cox, 2015; Janus & Lixia, in press).[5] Constructivist approaches thus add to all three dimensions an additional layer highlighting the representation of the purpose that is encouraging cooperation in the first place, of which the aim to implement the 2030 Agenda and the Paris Climate Agreement are just two examples.

Overall, there are various overlaps and fairly few contradictions between the different theoretical approaches, investigating factors and mechanisms encouraging cooperation between different entities at the transnational level (see Table 1). The research introduced above further supports the differentiation between the actor-, process-, and context-dimensions. This differentiation will also guide the analysis presented in the next section, which critically assesses in what regard the Arctic Council can be considered an empirical example to learn from when examining transnational cooperation in times of rapid global changes.

Lessons learned from the Arctic Council

As the relevance ascribed to the Arctic Council indicates, in Arctic studies the question of whether the Arctic Council has strengthened transnational cooperation in the Arctic is not new. Various studies have focused, for example, on the effectiveness[6] of the Arctic Council, and found amongst others that "the effectiveness of the AC has exceeded the expectations of many of those who were present during its inception" (Kankaanpää & Young, 2014: 1). As Smieszek assesses, however, these studies are mostly grounded on empirical observations and lack a systematic inquiry. The missing systematic inquiry therefore "hampers our ability to accumulate knowledge about the performance of the AC" (Smieszek, 2019: 3) and to transfer knowledge on the AC to other related studies in the field of global governance. Following the different approaches presented above, this current section examines transnational cooperation under the auspices of the Arctic Council within the context of the various factors and mechanisms that relate to the actor-, process- and context-dimensions introduced above.[7]

The Arctic Council celebrated its 20th anniversary in 2016. Since it was set up, the intergovernmental forum has evolved in many ways, particularly in relation to the actors collaborating under its auspices, its institutional structure, and thematic priorities. When assessing in how far the **mix of actors** collaborating under the auspices of the AC has enhanced transnational cooperation in the Arctic, a look at this **actor-dimension** shows that the Arctic Council has clearly "opened up". Initially, the AC representatives from the eight circumpolar countries with voting rights collaborated with three non-governmental Indigenous peoples' organisations with consultation rights, obtaining Permanent Participant-status.Within a few years, the number of non-governmental organisations (NGOs) with Permanent Participant-status grew to six; additionally,

the number of non-Arctic states, inter-governmental-, inter-parliamentary-, and other non-governmental organisations that participate as Observers in the Arctic Council tripled (during the last Ministerial Meeting in 2019, 39 states and organisations were approved as Observers to the AC.[8] Over the course of time, the number of actors contributing to the AC has thus significantly grown.

At least two reasons explain the Arctic Council's enlargement: First, the need to include the expertise, resources, and capacities of relevant actors, for example, for the preparation of the AC's "landmark" cooperative scientific publications (The Northern Forum, 2015); and second, the need to enlarge to strengthen the Arctic Council's legitimacy (Knecht, 2017; Wilson 2015). Particularly in view of the latter, Knecht shows how, at different times, the Arctic Council decided strategically to admit access to some actors and deny it to others. The enlargement of the AC can thus be seen as strengthening Pattberg and Widerberg's claim about the desire to use synergies and to divide labour as a factor enhancing transnational cooperation. At the same time though, the enlargement of the AC is also driven by the growing number of actors with geopolitical interests in the Arctic (Chater, 2016). Moreover, the strategic consideration of the Arctic states also supports Peinhardt and Sandler's argumentation, according to which an "optimal partner mix" also builds on the like-mindedness and means of actors, which is why some actors – such as the EU and Greenpeace – have still not attained Observer-status in the AC. Overall, the openness of the Arctic Council to non-state actors and the prominent status ascribed to Indigenous peoples have been reviewed as contributing to the success of circumpolar cooperation conducted under its auspices (Kankaanpää & Young, 2012: 4).

Any assessment on **the effectiveness of the AC's leadership** – another factor of relevance in regard to the actor-dimension – needs to investigate the different chairmanships of the Arctic states that obtain "the influential agenda-setting position" and rotate every two years (Smieszek & Kankaanpää, 2015). Those arguing that the AC has been a successful forum, often highlight that it "has made a difference since its establishment in 1996" (Kankaanpää & Young, 2012), particularly in the "realms of knowledge generation, issue framing and agenda setting" (ibid.). Moreover, despite the regular rotation of the AC's chairs, the AC's leadership has maintained the institutional character and purpose of the council as defined in its founding declaration. Even though the AC's thematic priorities have expanded over the past decades, they all relate to issues of sustainable development and environmental protection in the Arctic. At least partly, this can be explained with the AC operating by consensus, which limits the scope of chairs for changes. However, as I show in an analysis of the chairmanship-programmes released between 1996 and 2016, various projects and institutional transformations have been carried out under the umbrella of these founding themes, which mirror their multiple and broad meanings (Wehrmann, 2016: 100). Moreover, as a chairmanship period is usually limited to only two years, it has often been demanded that the Arctic states should align their chairmanships better to carry on projects and to ensure that initiatives have a greater impact. For the first time, the Scandinavian Arctic states did so during their consecutive chairmanships from 2006 to 2013. Also, the chairs of the AC's subsidiary bodies (working groups, task forces, expert groups) rotate biennially. In theory, this rotation supports the consideration of multiple perspectives and an integration of knowledge as is often demanded in polycentric governance. However, interviewees highlighted that in practice the hierarchical position of chairs in working groups allowed them to greatly influence the content-related directions taken and also the atmosphere of (and inclusion in) cooperation (Wehrmann, 2017).

Lastly, in respect to the actor-dimension, research has emphasised **reciprocity** as a fundamental prerequisite for transnational cooperation. In the case of the Arctic, reciprocity relates particularly to the need to cooperate in order to deal with transboundary challenges. These are caused by the remoteness of the region (for instance, in the context of search- and rescue-operations), environmental challenges (particularly climate change effects such as the melting sea-ice, coastal erosion, the release of black carbon and toxic gases), and the aim to maintain influence and to avoid territorial conflicts. More recently, it is more often climate change and its dramatic effects in and beyond the Arctic that particularly non-Arctic states and environmental organisations emphasise to justify their interests in the region (for example, China frames itself in this way a "near-Arctic"-state). Despite their different interests for cooperating, all actors collaborating under the auspices of the AC share an interest in strengthening the legitimacy of the Arctic Council, fearing that otherwise their say would be much more limited. Consequently, the Arctic Council supports the premises brought forward in the literature cited above according to which the success of transnational cooperation very much depends on reciprocity.

When examining how the AC could modify **processes** in order to be more effective, in the literature it is often argued in favour of stringent **goal-setting**. The definition of clear and measurable goals is intended to ensure that payoffs are immediate and certain. Beyond the mandate of the Arctic Council, goals are usually set biennially in the chairmanship programmes and, in the past, these have not necessarily built on each other, nor did they outline measurable goals. In this respect, the work of the Arctic Council (and particularly that of the Arctic states) could be improved. More concrete and detailed chairmanship programmes, for example, could be a start in this way, which would also put more pressure on chairmanship countries **to lead by example** and facilitate the identification of **country-specific incentives** arising from cooperating in the AC. In a similar vein, the Arctic Council does not provide any **regular monitoring, reporting and evaluation** of its work which – as discussed in the literature – would support organisational learning. The AC also does not have any mechanism to oversee in how far its work is implemented and aligned with policies at the national level. Ideally, a follow-up mechanism should also oversee "how the council's recommendations and guidelines are interpreted" (Kankaanpää & Young, 2012: 4; Smieszek, 2019: 12). Due to the lack of a follow-up mechanism, it is also almost impossible for the AC to **enforce** cooperation via **rewards and punishments**.

The establishment of a permanent Secretariat in 2013 already addressed some of the weaknesses of the AC in its process management, for example by contributing to a greater transparency of the work conducted under the auspices of the AC. However, up till now, monitoring and evaluation have still not been regularised by the AC. In addition, because of this lack of information, it is difficult to assess the AC's effectiveness in regard to the different issue areas that it addresses. It is only possible to guess that its effectiveness differs across the various issue areas, given the broad mandate and number of issue areas that it deals with (Smieszek, 2019; Wehrmann, 2016). Moreover, most of the problems that the AC works on cannot be solved by the AC on its own but require "ongoing efforts and periodic adjustments in […] governing arrangements, rather than one-time solutions to ensure that the undertaken actions account for observed changes and deeper comprehension of issues at stake" (Smieszek, 2019: 11). Given this, it comes as no surprise that reforms of the AC have been discussed in the past. Critics argued, for example, that "long overdue steps to reform the Arctic Council are on hold" (Etzold & Steinicke, 2015: 1) and have questioned whether the AC is sufficiently prepared to address the challenges in the Arctic (Käpylä & Mikkola, 2015; Stephen, 2017). Thus, as far as **professional process management** by the Arctic Council

is concerned, there is much room for improvement. The same applies to the funding of the AC, which is also largely based on the priorities identified in the chairmanship programmes. As a consequence, cooperation initiatives cannot calculate on the basis of **sustained funding**. Based on a survey with practitioners in the AC, Kankaanpää and Young highlighted that respondents identified "the lack of a reliable source of funding to cover general operating expenses" as "the greatest hindrance to the effectiveness of the council" (Kankaanpää & Young, 2012).

In general, however, the actors collaborating under the auspices of the Arctic Council have managed to develop significant outputs. Most prominently, their flagship reports (such as the Arctic Council Climate Impact Assessments) prepared by the AC's working groups have been perceived as influential and "the most effective products of the AC" (Kankaanpää & Young, 2012: 4). Also due to their scientific quality, these reports have given the AC the reputation of being a "cognitive forerunner […] for its role as a fact finder and consensus builder on Arctic environmental challenges" (Smieszek, 2019: 13). Others even argue that the AC is successful because of this focus on scientific outputs when arguing "the most important and still enduring element of the Council's work is the pragmatic, hands-on scientific cooperation in its working groups, not high politics" (Käpylä & Mikkola, 2015: 14). In this way, the AC has contributed to the formation of **specialised knowledge** – and at the same time builds on the specialised knowledge provided, amongst others, by the Indigenous peoples' organisations participating in the Council. While the literature on multi-stakeholder-partnerships presented above emphasises access to economic and political decision-making through actors with organisational capacities and financial power, the consideration of "traditional knowledge" and of community-based monitoring of environmental changes in the Arctic by "locals" have especially been considered beneficial to the work of the Arctic Council (Johnson et al., 2015). Based on this specialised and shared knowledge, successful negotiations under the umbrella of the AC resulted in the adoption of three binding agreements.[9] Regardless of the thematic relevance of these agreements globally,[10] at the regional level for a soft-law forum, the negotiation of these agreements is remarkable and can be considered an example for the growing and shared sensitivity towards some issues that has developed through the transnational exchange among various different actors. The agreements also illustrate that cooperation in the AC builds on the often-demanded **trust, communication, trustworthiness, fairness, and solidarity** as shared values supported by the AC and in **regular contacts** under its auspices. In contrast to other regional settings that have evolved "as security or trade complexes" (Heininen et al., 2015: 18), the AC's main thematic pillars are also based on the perception that "mutual trust was to be built above all through cooperation in the areas of research, environment, business and culture" (Etzold & Steinicke, 2015: 1). Consequently, the Arctic states have related their aim to enhance "cooperation, coordination and interaction among the Arctic States, with the involvement of Arctic Indigenous communities and other Arctic inhabitants on common Arctic issues" (Ottawa Declaration, 1996) almost entirely to these two pillars (Heininen et al., 2015: 18).

Turning now to the **context-dimension**, as was shown above, the **active meta-governance** and **institutional rules to offer selective incentives** promoted in the literature on transnational cooperation are areas that seem to be expandable in the Arctic Council. Whether transnational cooperation in the AC is based on a **fit to problem-structure** is difficult to assess (particularly in terms of effectiveness) given the lack of monitoring and evaluation and interconnectedness of problems addressed by the AC. However, when evaluating the work of the AC against the backdrop of the popular narrative that the Arctic is a region prone to international conflicts, the AC's inclusive structure has clearly supported a continuity of peaceful relations between all actors

cooperating in the AC. Thus, the AC has also proven that its **political and institutional space has encouraged the development of shared strategies and coalition-building**. Moreover, the AC has encouraged continuous cooperation also in times of crisis. A prominent recent example is the United States withdrawal from the Paris Climate Agreement and its subsequent new position in the AC. Even though the United States' refused to address climate change in a ministerial declaration at the Ministerial Meeting in 2019, the other Arctic states released a Ministers' statement emphasising their continuous joint efforts to deal with climate change in the Arctic. What is more, cooperation in the AC has contributed to **further cooperation** and **the formation of trust** in and also outside the Arctic Council, for example through the formation of new "Arctic institutions" that have been established to address topics explicitly excluded or given less priority in the Arctic Council (such as the Arctic Economic Council and the Arctic Coast Guard Forum). Vice versa, cooperation in the Arctic Council has also been inspired by cooperation in other settings: When comparing the declarations under the auspices of the AC since 1996 for example, references to global discourses illustrate that the negotiation of thematic priorities has not taken place detached from global contexts. Even though the Arctic region might be regarded "exceptional" in some regards, the framing and wording of declarations illustrate that – similar to other international institutions – the Arctic Council does not operate "in isolation" (Etzold & Steinicke, 2015: 1) nor in a political "vacuum" (Smieszek & Kankaanpää, 2015: 3). After the coming into force of the Kyoto Protocol, for instance, the Arctic states started to broaden the AC's Arctic-specific focus by "[r]ecognizing the significance of the Arctic environment for the global community" (Salekhard Declaration, 2006). Similarly, two years after the adoption of the Agenda 2030, the Arctic Council also "[r]eaffirm[ed] the United Nations Sustainable Development Goals and the need for their realization by 2030" (Fairbanks Declaration, 2017).

Transnational cooperation under the auspices of the Arctic Council seems to have benefitted particularly from a **favourable political and social context** and the formation of a "**we-identity**". In regard to the former, since the establishment of the AC, the countries collaborating under its auspices, have excellent governance capacities; they are not hampered by fundamental subversive challenges (such as experiencing violent inner-state conflicts, extreme poverty, and so on) limiting their capacities to engage in the AC. Instead, they all have a shared understanding that the problems in the Arctic which affect them constitute circumpolar problems that they ("We") need to address collectively.

Overall, the Arctic Council was formed as a forum in "response to practical needs" (Käpylä & Mikkola, 2015: 8). This analysis has identified mechanisms and factors that the AC could improve in order to intensify transnational cooperation under its auspices and in the Arctic. However, it has also shown that the AC is already applying many of the mechanisms and factors identified in research that also explain the widespread perception of the AC as being a successful forum (see Table 2). Moreover, the case of the Arctic Council supports constructivist approaches investigating transnational cooperation as it shows that some mechanisms and factors identified in the literature can conflict with the purpose of cooperation in the first place. For example, the lack of long-term strategic planning and the broadness of its mandate and goals limit the effectiveness of the AC, but both allow the council to adapt to the changing context in which it operates. It encouraged "locally oriented projects rather than major circumpolar initiatives" and in the context of sustainable development, for example, it allowed that "the meaning of the term has evolved over time, considering broader political and economic contexts and their changes" (Smieszek, 2019: 10).

Table 2: Assessing mechanisms and factors perceived as enhancing transnational cooperation in the AC		
	Mechanisms and factors that have proven to be successful in the AC	**Mechanisms and factors to be improved in the AC**
Actors	• Opening up of the AC strengthened its legitimacy and global relevance • Diversity of actors enhanced the use of synergies • "We-identity" particularly among Arctic states has supported the development of shared approaches also in times of crises • Reciprocity principle: all actors cooperating in the AC have access to specialised knowledge needed to address complex, transboundary challenges	• Leadership: the programmes of the rotating chairmanships are often not aligned and apply a rather vague and unspecific wording
Process	• The inclusion of non-state actors and the focus on scientific output have enhanced the sharing of specialised knowledge • Regular contact in working groups, task forces and expert groups has contributed to the development of shared values, of trust and solidarity • The possibility to contribute to and to participate in policy dialogue can be perceived as a main incentive for actors cooperating in the AC	• Stringent and measurable goal-setting in chairmanship programs • Sustained funding • Professional process management (the AC-Secretariat fills this function only partly) • (Regular) monitoring and evaluation of the work conducted under the auspices of the AC • Need to agree on enforcement-practices
Context	• The promoted bottom-up approach and new agenda every two years facilitates a "fit-to-problem"-structure • The political and institutional space of the AC has encouraged the development of shared strategies and coalition-building	• In how far the AC provides an active meta-governance very much depends on the chairmanship-countries; more orchestration is needed to develop shared strategies systematically
Source: Author		

In order to be "fit for purpose" in times of rapid global changes, however, critics question whether the Arctic Council as a fairly static entity is sufficiently prepared and "well-suited to address needs for governance under the conditions prevailing in the 2020s" (Young, 2019).[11] Perspectives also differ as to whether the AC has succeeded in addressing pertinent issues in a sufficient/effective manner (Stephen, 2017). It is also not clear whether the AC will remain the "preeminent high-level forum of the Arctic region" when considering, as Young (2019) convincingly argues, the "development of governance arrangements that are not linked to the Arctic Council".[12] In either way, this study has shown that the AC will benefit particularly from improved process management and from more orchestration in aligning its work internally to ensure more effective policymaking. At the same time, the AC will also be more likely to preserve its relevance if it cooperates more

intensively also with other fora, such as the United Nations and the Arctic Circle to harmonise agendas and, ideally, contributes to more holistic approaches.

Conclusions

This study investigated lessons that can be learned from the Arctic Council and explored to what extent this case adds to and challenges the conception of models, concepts, and success factors for transnational cooperation identified in the literature. It has shown that many of the premises discussed in the literature on transnational cooperation and multi-stakeholder partnerships mirror the praise and concerns brought forward in connection with the AC; at the same time, transnational cooperation under the auspices of the AC allows these premises to be expanded particularly in regard to the relevance ascribed to knowledge generation.

Considering the **actor-dimension**, for example, it was shown that the inclusion of actors in the AC was not solely driven by the aim to include more expertise and resources and access further capacities contributing to a better division of labour and use of synergies. The inclusion of actors in the AC was also used as a strategy to strengthen the AC's institutional legitimacy. Similarly, assessing the effectiveness of leadership is more complicated than described in the literature if leaders (as in the case of the AC) rotate, contexts (agendas) change over time, and if the problems addressed by the institution/forum/partnership under analysis cannot be solved by the entity on its own due to their interconnected character.

In view of the **process-dimension**, the case of the AC illustrates that whether or not the approaches chosen relate to each other very much depends on the definition of goals (even if the same goals are stressed over time, their meaning and relevance may differ). In the case of the AC, the broad mandate and rather general wording in chairmanship programmes gives room for different interpretations, hampering the measurement, monitoring, and evaluation of the work conducted under the auspices of the AC as well as the enforcement of cooperation via rewards and punishments. In addition to more sustained funding, these are all areas of the process management to be improved by the AC. At the same time, the broad mandate allows the AC to address and adapt to the changing context in which it operates. Moreover, the case of the AC exemplifies that, despite its expandable process management, it has succeeded in forming and accessing specialised knowledge, establishing trust, communication, trustworthiness, fairness, and solidarity among those cooperating in the AC.

This success can also (at least partly) be explained by the **context-dimension**[13] as it has been noted that most often the AC's inclusive structure and consideration of multiple (particularly "local") perspectives encourage the development of shared strategies, coalition-building, and further cooperation even in times of crisis. However, the political and social context has also contributed to coalition-building, as the collaborating Arctic states have had the capacities to form and to maintain the AC to address their needs.

With regard to the three different dimensions (actors, process, and context) that also others (such as Pattberg and Widerberg) have perceived as being of particular relevance for assessing and improving transnational cooperation, the case of the Arctic Council suggests these dimensions to be expanded and that one consider **the additional dimension of knowledge** in further research. Particularly the AC's focus on developing specialised knowledge and the publication of high-quality scientific outputs has enhanced the legitimacy and reputation of the Arctic Council externally and at the same time strengthened its inclusive approach internally. Moreover, in contrast to other

settings, the exercise of authority in the AC seems to be shaped less by moral attitudes or by power but seems to depend on expertise, which encourages the maintenance of robust cooperation over "high politics" – also in times of crisis and in an era of dramatic global change.

Overall, this study has aimed at contributing to research on transnational cooperation and also to research in the field of development studies, for which the question of how to enhance transnational cooperation to achieve the global common good as identified in the 2030 Agenda and the Paris Climate Agreement is central. A look "up North" seems of great relevance for development studies that have traditionally focused more on "the Global South," given the growing new understanding of "development" promoted in development studies (Klingebiel, 2017), the relevance ascribed to social environmental research (Scholz, 2018) and the principle of universality agreed upon in the 2030 Agenda. Similar to other regions in an interconnected world, in the Arctic also "regional development is both constrained and enabled by global forces and dynamics – be they economic, political or environmental in nature" (Käpylä & Mikkola, 2015: 18). A better understanding of how these global forces and dynamics may be shaped by transnational cooperation in one region may be of use for other regions despite their differences. Or put differently: "There is much to learn from successful efforts as well as from failures" (Ostrom et al,. 1999: 282). A transfer of the lessons learned from this analysis of transnational cooperation in a highly institutionalised forum such as the Arctic Council comes with obvious limitations for other non-institutionalised cases of transnational cooperation. However, particularly in times of rapid global changes, the case of the AC illustrates that first, efforts geared towards creating a shared understanding of challenges is an important basis for transnational cooperation, and second, that regional settings need to remain flexible particularly in regard to the actor- and process-dimensions in order to successfully adapt to changing contexts."

Notes

1. A longer version of this article was published under the title "Transnational Cooperation in Times of Rapid Global Changes: The Arctic Council as a Success Case?"
2. This is defined as interactions among actors from different actor groups (including at least one non-state actor) that occur on a regular basis, cross borders but are not global in scope (Albert, Bluhm, Helmig, Leutzsch, & Walter, 2009; Pries, 2010).
3. As Roger, Hale and Andonova (2017: 15) pointed out, however, "the influence of transnational factors […] is processed through domestic institutions".
4. Also Pattberg and Widerberg (2016) suggest differentiating between these three dimensions, which they identified as "conditions" of relevance for cooperation (Pattberg & Widerberg, 2016).
5. According to Béland and Cox, ideas can become coalition magnets if an idea is high in valence and has an ambiguous or polysemic character "that makes it attractive to groups that might otherwise have different interests" (Béland & Cox, 2015: 428).
6. As Smieszek emphasises, "there is no single, clear-cut definition of institutional effectiveness in the literature on international regimes", which is also why the analyses of the AC's effectiveness focus on different aspects. Smieszek herself defines institutional

effectiveness for the purpose of her study as "the extent to which a regime contributes to solving or mitigating the problems that led to its creation" (Smieszek, 2019: 4).

7. The mix of actors; leadership; reciprocity; goal-setting; funding; incentives; process management; knowledge; presence of a leader country; enforcement; monitoring; reporting and evaluation; regular contact; trust; communication; trustworthiness; fairness; meta-governance; institutional rules; political and institutional space; political and social context; cooperation under the auspices of institutions; "we-identity"; fit to problem-structure.
8. Similar to the actors engaged as Observers, the role ascribed to this status has also changed over time (see Knecht, 2016 for an assessment of the latest procedural reform of the AC's Observer Manual).
9. The Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic in 2011; the Agreement on Cooperation on Marine Oil Pollution, Preparedness and Response in the Arctic in 2013; and the Agreement on Enhancing International Arctic Scientific Cooperation in 2016.
10. In important issues areas such as climate politics it is often argued that "broader international institutions, often global ones, are in a better position to extract legally binding commitments from the relevant sets of players" and also in areas that "may require stronger regulation and more intrusive enforcement […] Arctic –specific institutions are not best venues for such strengthening" (Schram Stokke: 2015).
11. Particularly due to its relevance for global climate change, the Arctic is no longer considered a peripheral region, which also serves as a justification for growing interests of non-Arctic states such as China and intergovernmental organisations like the European Union in the Arctic.
12. Such as the forum of science ministers, which relates to Arctic issues and "allow[s] for the participation of non-Arctic states as members" (Young, 2019).
13. Thereby pointing to the need to likewise explore interrelationships between the different dimensions identified by Pattberg and Widerberg and the overall relevance of the differing factors and mechanisms in further research.

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Climate Change and Responsibility: Arctic States' Cooperation through the Arctic Council in Climate Change Mitigation and Adaptation Efforts

Volker Roeben & Smith I. Azubuike

The Arctic is experiencing what is understood to be the impact of climate change. As a global environmental challenge, climate change mitigation ideally requires a comprehensive solution. However, when a global agreement is difficult to realise, regional cooperation may be useful to accomplish global mitigation objectives, at least in part, and to enable individuals to adapt to changing climatic conditions. Human rights law reinforces the international law of climate action. It imposes the responsibility on states individually and collectively to respect, fulfil and protect rights concerning the impact of climate change. In carrying out this responsibility, states are to cooperate through appropriate regional fora and to use the potential of these fora to the utmost. International environmental governance underscores the benefits of shared objectives, common historical backgrounds, geographical proximity, and a smaller number of negotiating parties, which make it easier to come to an agreement and to synchronise mitigation effort; the Arctic region benefits from these views. The article first establishes the intersection between climate change and human rights and emphasises the responsibility of states to cooperate. It then identifies and discusses the suitability of the Arctic Council as a forum for their cooperation. It finally examines possible areas of collaboration which include the slowdown of hydrocarbon exploration in the region, utilising offshore off-grid initiatives, and the opening of the North-East Passage to reduce vessel travel time and cut down on CO2 emission. The article concludes that regional coalition formation is crucial for effective climate change mitigation and adaptation in the Arctic region.

Introduction

Discussions about climate change in the Arctic assume saliency because of the negative impact it has on the ecosystem and the people who depend on it. In the Arctic region, as with the rest of the world, climate change threatens the enjoyment of human rights (IPCC, 2014) due to melting ice, permafrost, alteration of the food chain and reindeer herding in the Arctic. These rights include the right to life, food, clean water, healthy living, and the right to earn a living through work (Azubuike & Songi, 2020). Climate change also threatens the housing and subsistence of

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Indigenous people, communities in the Arctic that may be disadvantaged due to poverty, geography, gender, disability, age, and ethnicity (OHCHR, 2020).

In the international arena, climate change is governed by instruments that regulate greenhouse gas emissions (GHG) such as the United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol and the Paris Agreement. These instruments are grounded in international environmental law and its general principles on responsibility, sovereignty and law-making (Bodansky, Brunnee & Rajamani, 2017). They place the burden on states to cooperate in the areas of mitigation and adaptation to climate change. Human rights law reinforces and concretises the normative impetus of the international law of climate action. This law turns global climate action into enforceable rights of individuals with a corresponding responsibility of states. This responsibility to respect, fulfil and protect affected human rights requires developing climate change mitigation and adaptation strategies.

In the discharge of this responsibility, states are to cooperate using the appropriate regional fora and to use their potential to the utmost. Although climate change arises from global emissions of GHGs, countries in various regions can take climate action through a regional coalition. This strategy has become essential as international environmental agreements (IEA), such as the Kyoto Protocol or the Paris Agreement may be difficult to achieve and to enforce, due to the absence of supranational agency to enforce compliance (Barrett, 2003; Barrett, 1994; Asheim et al., 2006), as well as political (Finus & Rundshagen, 2001) and economic reasons, conflicting interests and contending priorities of various states (Hallegatte et al., 2016).

In their analysis of the importance of regional cooperation over international cooperation, Asheim et al. (2006) note that regional coalition formation (RCF) involving a small number of negotiating parties can facilitate climate action. RCF is possible when the parties are geographically close, have a comparable political and economic system, share a common objective and tend to have cultural closeness (Carraro, 2000). The possibility of rivalry may be limited, and there is a higher chance of success because members pool their efforts (Sánchez-Pagés, 2007). These factors tend to reduce negotiation cost and uncertainty and enhance trust, making countries more likely to join and comply with regional arrangements (Asheim et al., 2006). The Arctic Council is arguably an appropriate institutional forum to achieve regional cooperation on several climate arrangements in the region.

Accordingly, this article first gives an overview of climate change concerns in the Arctic. It then examines how climate changes impact human rights and particularly the rights of the people of the Arctic region, before discussing the responsibility of states to respect, protect and fulfil these rights by synchronising mitigation and adaptation efforts for climate action. It furthermore utilises a coalition formation framework to establish the normative basis for regional cooperation and how it could facilitate climate change mitigation and adaptation given the geographical proximity and shared objectives of Arctic states. It finally discusses areas of cooperation such as the opening up of the Northeast passage to reduce vessel travel time to cut black carbon emission; a shared off-grid initiative; the slowing down of hydrocarbon exploration in the Arctic; and the development of an early warning system to foster adaptation. The article concludes that cooperation in the identified areas will limit CO_2 emissions, thus, facilitating effort towards climate change mitigation and adaptation in the Arctic region.

Climate change in the Arctic region

Apart from the overall effects of climate change on the global ecosystem and humanity, there exist specific effects on the Arctic region. Climate change severely impacts water and sanitation, housing, education, self-determination and the right to informed and meaningful participation (CIEL, 2013) in the Arctic. Research about the Arctic shows that the region's weather and climate are changing rapidly due to global warming, warming twice as fast as the worldwide average. This change is resulting in the melting of ice, snow cover, permafrost, rise in sea level (Yumashev et al., 2019), loss of fish stock, marine mammals and birds in the region. Post et al. (2019) note that "the Arctic has warmed by 0.75°C, far outpacing the global average". Referring to the work of Post et al. (2019), Pierre-Louis (2019) notes that under a high-emissions scenario, late autumn temperatures in some parts of the Arctic could reach more than 23 degrees Fahrenheit warmer than the historical average (Pierre-Louis, 2019, p.1). Arctic annual surface air temperatures in 2014, 2015, 2016, 2017, and 2018 surpassed those of any year since 1900 (AMAP, 2019).

The Arctic acts as a refrigerator for the rest of the world as it gives off more heat to space than it absorbs, thus helping to cool the planet (NSIDC, 2020). But the thawing of Arctic ice, relative to their benchmark, now negatively impacts the region and the globe in general. A recent study (The IMBIE Team, 2020) finds that the ice in Greenland is thawing seven times faster than it did in the 1990s, a rate that would add about three extra inches of the rise in sea level by the end of the century. As the ground melts, it emits sequestrated carbon into the atmosphere, increasing climate change (Pierre-Louis, 2019). Observation of CO_2 flow in Alaska reveals that more carbon is released than stored. This could result in flooding of coastal communities in the Arctic (IPCC, 2019). There is also the concern about wildfire arising from heatwave due to climatic conditions. As the heat thaws and dries up the vast tracts of the far-northern snow forest, it leaves tundra vulnerable to wildfires which devastates the land (Wood, 2019).

Climate change-induced thawing of permafrost in the Arctic is now causing roads to slump, and houses, built on permafrost, to collapse (Pierre-Louis, 2019). The infrastructure in the Arctic regions could experience a high incidence of mudslides, avalanches and floods arising from climate changes in the area. The impact will probably increase the cost of building, at least in the short term, as new designs will emerge to handle permafrost instability and modification to the existing building due to snow load and wind strength (Eskeland & Flottorp, 2006). Permafrost sequestrates twice as much heat-trapping CO_2 as is present in the atmosphere.

Since climate change affects the marine and continental parts of the Arctic differently, it impacts lifestyles within the region differently as well. Climate change is causing the region to experience a loss of hunting culture, a decline in food security and human health (Atapattu, 2013). Livelihoods connected with hunting, fishing and reindeer herding by Indigenous people are under threat as these activities depend on weather conditions. Indigenous peoples have a strong bond with nature, and the changes in harvesting activities have implications on the economy, society, culture and health (AMAP, 2019), and herding, hunting, fishing and farming, which provides the basis for traditional foods. Seasonal variation and changing ecological conditions affect these activities and the right to enjoy them (Eskeland & Flottorp, 2006). The result is that Indigenous communities in the Arctic region are affected as the warming Arctic shrinks access to food resources that provide a source of their community resilience (Pierre-Louis, 2019; Khan, 2019).

The temperature change is also shifting food seasons. An Inupiat community in Alaska have seen changes in the harvesting season of clams move from fall to summer (Pierre-Louis, 2019). These changes have an implication on the right to food in the Arctic. For instance, Athabaskan people have a cultural and spiritual link to their environment, including significant dietary intake of traditional foods. Many goods and medicines are gathered from the environment to support Athabaskan traditional lifestyles and cultures. The impacts of climate change are already altering the usual lifestyle. Changes in conventional foods and contaminants negatively impact the nutritional diets and sociocultural values and health of Athabaskan people (Keith & Dickson, 2004).

Global warming is affecting the Arctic ecosystem and its residents significantly. Climate change in this context emphasises people in relationship to the environment, not just the air, the ice and shrinking glaciers (Huntington et al., 2019). The impacts on ecosystems, freshwater resources, and human settlements undermine access to food, clean water, shelter, and other basic human needs. Thus, interfering with livelihoods and displacing people from their homes (UNEP, 2015). Even if temperature rise remains at 2° C, these effects will increase intensely in the coming years (UNEP, 2015).

The intersection between climate change and human rights: A responsibility to cooperate

The 1948 Universal Declaration of Human Rights (UDHR) affirms the rights that enable everyone to live with dignity, freedom, equality, justice, and peace. These inalienable rights underpin the commitment of the international community of states to protect the world from climate change and global warming. The intersection between climate change and human rights is visible when we understand the impacts of climate change primarily arising from the emission of greenhouses gases (GHGs) and the way climate change affects both the ecosystem and the human rights of existing and future generations. Socio-economic activities such as transportation, energy production, industry, etc. contribute to climate change, and climate change and global warming affect the means of sustenance, livelihood and life in communities which are core human rights concerns (Bodansky et al., 2017).

Addressing climate change through mitigation strategies and adapting to its challenges through states' cooperation is then crucial for the protection of these rights; it becomes a human rights-based responsibility. This section sets out this human rights approach to climate change and defines the resulting obligation of states to cooperate to prevent such effects.

A human rights approach to climate change

Climate change has physical effects on humans, and the ecosystem arising from the rise in sea level, extreme weather conditions, unexpected changes in precipitation pattern and rapid increases in the earth's temperature. The result is a reduction of agricultural soil, loss of land, contamination of water sources, damage to coastal property, the spread of disease, interruption of educational services and displacement of populations (Orellana, 2012). The impacts of climate change on human rights are extensive. The affected rights include the right to life, adequate food, clean water, healthy environment and housing, and the right to work and earn a living (Azubuike & Songi, 2020; Wewerinke & Doebbler, 2011). The impact ranges from the damage of ecosystem, water pollution, and degradation of farmland which constitutes a significant source of economic and social existence for rural communities. Climate change has severe effects on the psychological and

physical health of humans, thus impairing the enjoyment of these rights (Hayes *et al.,* 2018). The following discussion on the principal human rights impacts will necessarily be selective.

The right to life

The Universal Declaration of Human Rights (UDHR) and the International Covenant on Civil and Political Rights (ICCPR) reiterates and emphasises the inherent right to life, liberty and security of every human being (Article 3, UDHR & Article 6, ICCPR). With the commitment of states to protect and promote the right to life, there is a responsibility on governments to take measures against predictable and avoidable loss of life (OHCHR, 2015). Climate change poses an existential threat to life as it could leave paths of starvation, death and destruction in vulnerable communities. Climate change could cause people to drown, get injured, or result in the spread of disease due to flooding (UNEP, 2015) or extreme weather (World Bank, 2012), thus, denying people the right to life. According to a report, climate change is already responsible for approximately 400,000 deaths per annum, with the number likely to increase to 700,00 by 2030 (DARA & Climate Vulnerable Forum, 2012).

The right to food

Article 11 of the International Covenant on Economic Social and Cultural Rights (ICESCR) and Article 25 of UDHR recognises the right to food as a fundamental right. This means that food must be available and accessible to citizens from productive land and natural resources (Azubuike & Songi, 2020). The right to food is impacted when sea-levels rise and cause flooding in coastal communities, or when rise in temperature causes draught and affects farming activities due to anthropogenic climate change. Thus, causing damage to crop, food shortage and severe hunger (DARA & Climate Vulnerable Forum, 2012). Within the context of the right to food, governments most cooperate to protect and improve existing food sources. They should not allow the adverse effects of climate change to impact food sources, thus preventing peoples' effort to feed themselves.

To ensure food supply means that states have a responsibility to implement measures to promote mitigation and adaptation strategies that will curb the rise in sea level or reduce GHG emissions. The World Bank estimates that a 2°C increase in average worldwide temperature would put more people at risk of hunger and could result in further deaths from malnutrition. The report notes that an increase in temperature is a threat to agricultural harvests, often the sole source of food and income for most people, especially in Africa (World Bank, 2010).

The right to work and an adequate standard of living

The ICESCR provides for the right to earn a living through work, and both the ICESCR (Article 11) and the UDHR (Article 25) affirms the right to an adequate standard of living. Coastal communities exercise these rights by engaging in farming and fishing as a means of sustenance and livelihood (Azubuike & Songi, 2020). Climate change impairs the exercise of these rights and impact on livelihood when floods overtake farmland or sea level rises and make fishing impossible. Nobody can work or earn a living when the environment is in disarray. It is, therefore, the duty of governments to take all necessary measures to protect this right, including infringements through activities of non-state actors. Climate change has occasioned increased degradation of the environment; occasioned food insecurity following the death of crops and fish, and impact on farmlands and rivers for fishing activities (CIEL, 2013). In the Arctic region, fishing activities have

been affected by climate change as specific fish stock is now sensitive to changes in water temperature, making them unreachable and posing a threat to subsistence and commercial fishing (Worldwide Fund, 2020).

The right to health and a healthy environment

Both the UDHR (Article 25) and the ICESCR (Article 12) articulate the right to health by affirming that human beings have the right to the highest attainable standard of physical and mental health. This right includes the right to a healthy environment (Azubuike & Songi, 2020). The World Bank (2013) in its report notes that climate change will cause health impacts which may increase and worsen with high rates of malnutrition, including likely increases in vector-borne diseases, and that amplified levels of smog from the heat could aggravate respiratory ailments. Hayes et al. (2018) note that climate change also threatens mental health. Also, the IPCC (2014) report found that climate change is likely to result in increases in ill-health in several regions and particularly in developing countries with low income, as compared to a baseline without climate change. In fulfilling these rights, the state has to improve environmental and industrial hygiene (ICESCR, Art 12.2).

States' responsibility for cooperative mitigation and adaptation efforts

The international climate regime addresses the common concern for the climate. Its basis is the UNFCCC, the Kyoto Protocol and now the Paris Agreement. The Paris Agreement obligates state parties to take measures to mitigate climate change to achieve the agreed objective of limiting the global temperature rise to well below 2ºC. An essential obligation is for each state party to formulate and submit a document on its Nationally Determined Contribution to the collective effort. However, this does not exhaust a state's obligation to act according to the principle of common but differentiated responsibility.

Human rights law reinforces this climate change regime and adds a new normative impetus as well as a legal approach to climate action. This impetus is for states to protect each individual, rather than just a public good. This impetus means identifying specific climate threats to vulnerable individuals and groups of individuals, such as Indigenous peoples in the Arctic where the melting ice poses a severe threat to human, as well as aquatic and animal existence. Broadly, the impetus means that states become accountable for effective measures towards all individuals affected by climate change in the Arctic, rather than just other countries.

In addition to this normativity, human rights provide a stricter legal approach, not least because the expert committees established by human rights treaties are composed mainly by lawyers (Bodansky et al., 2017) and because international courts have jurisdiction over several (regional) human rights treaties. This legal approach turns on a clearer understanding of the responsibility that states have to ensure the effectiveness of human rights. As it is now widely accepted, this responsibility has three dimensions: the obligation to respect, to protect and to fulfil each substantive right. That is the state must refrain from interferences, it has to prevent interruptions by third parties, and it has to take decisive positive measures where this is necessary. The reference point of these responsibilities is persons under the jurisdiction of the state, comprising territorial and extraterritorial action of the state. What is less clear is whether this responsibility has a fourth vector, the obligation to cooperate with others. We present three arguments in support of the latter.

First, the obligation to cooperate is emphasised explicitly in the ICCESCR that sets out the rights to economic and social conditions of a life in dignity. This covenant contains rights that by their nature, require positive action. The covenant generally provides, in Article 2, that States should "take steps, individually and through international assistance and *cooperation"* (emphasis added) to realise the rights recognised in the covenant. Climate change affects these conditions.

Second, the discharge of this responsibility cannot be formal but must be effective. Effectiveness of the response is a function of the nature of the threat. Human rights law then requires cooperation between states to tackle issues such as climate change that are inherently transboundary and cannot be addressed by one country alone even if they affect rights holders under their jurisdiction (Bodansky et al., 2017). The Human Rights Committee, established under the ICCPR, has recently recognised that states will have to cooperate to meet their human rights obligations to counter threats of climate change (UN Human Rights Committee, 2019). The Committee emphasises that climate change threatens the right to life in dignity under article 6 of the Covenant, and the obligations of States parties under international environmental law informs their duty to respect and ensure the right to life. Implementation of the right to life demands measures against climate change caused by public and private actors. States parties should therefore ensure sustainable use of natural resources, develop and implement substantive environmental standards, and conduct environmental impact assessments. These measures of necessity are cooperative. Thus, states, according to the Committee "should consult with relevant States about activities likely to have a significant impact on the environment. They should also provide notification to other States concerned about natural disasters and emergencies, and cooperate with them, provide appropriate access to information on environmental hazards and pay due regard to the precautionary approach" (ibid).

Third, human rights law recognises the common concern of states for the human right situation beyond a state's borders, and it encourages states taking action, including legal action, to improve such cases. The International Court of Justice has recognised this concern, and also that this means putting the necessary legal powers in the hand of states parties. From the case of Belgium v Senegal to the recent provisional measure in The Gabon v Myanmar, these cases make clear that human rights create obligations erga omnes parties, that is international legal obligations of each party toward all other state parties. These cases are evidence of the concrete legal consequences that states have when standing before the Court, notwithstanding whether any of their nationals are concerned to legally, and indeed judicially, protect these rights in another state. It also has the consequence that the Court, as a de facto mechanism under the treaties, can use its legal powers to this effect, including by issuing provisional measures. This qualification of human rights as obligation erga omnes implies more broadly that states must be ready to exercise their responsibility for effective action cooperatively through institutional mechanisms endowed with the competence to adopt legal measures if need be.

When states cooperate to mainstream mitigation and adaptation strategies necessary to reduce GHG emission, they are preventing a threat to human rights and satisfying the obligation to respect, fulfil and protect human rights (OHRHC, 2015). Adequate cooperation to address global warming is crucial, especially as climate change poses disproportionate threats to states without resources to protect human rights and to invest in adaptation (Orellana, 2012). For instance, coastal and low-lying islands that lack the resources to adapt to severe climate change could

encounter rising sea level and natural disasters associated with global warming. They then require international cooperation, including financial, technological and capacity-building support, to realise low-carbon, climate-resilient, and sustainable development, while also rapidly reducing greenhouse gas emissions (OHCHR, 2020). But the responsibility to cooperate is not limited to these situations. It is also triggered where ecosystems are particularly vulnerable or where GHG emissions are transboundary. In all these instances, the objective is to enable human beings to realise their potential in dignity and equality in a healthy environment (United Nations, 2015).

The collaborative efforts of non-state actors such as international firms, the shipping industry and Indigenous people in the Arctic region can further mitigate the human rights impact of climate change. For instance, the active participation of Indigenous people, in existing or new initiatives similar to the New York Declaration on Forest (NYDF) (United Nations, 2014) and the Climate and Clean Air Coalition (CCAC, undated) can assist in mitigation and adaptation measures. Both ideas are driven by actors with a common goal to limit deforestation, improve air quality and reduce short-lived climate pollutants to complement the actions of state actors (Hale, 2018). The NYDF grew out of dialogue among governments, Indigenous people, companies and civil society, with Indigenous peoples pledging to protect hundreds of millions of hectares of tropical forests, and country governments committing towards reducing deforestation (United Nations, 2014).

Regional coalition formation for climate action in the Arctic

If there is a responsibility to cooperate and if the international climate regime does not exhaust this, then regional cooperation comes to the fore. The global climate change regime provides a broad if not exhaustive framework within which states may discharge their collective responsibility that they have under human rights. The UNFCCC imposes this obligation by stating that states "share a duty to prevent dangerous anthropogenic interference with the atmosphere" (Article 4). The declarations from Iqaluit in 1998 to Rovaniemi in 2019 recognise the adverse effect of climate change on the Arctic and emphasises the need for mitigation and adaptation. In this regard, the second Iqaluit declaration in 2015 encouraged members to commit to work together and partner with other actors towards a significant and lasting climate agreement in Paris in December 2015 (Heininen et al., 2019).

The responsibility of governments to cooperate under the climate regime has a substantive and procedural vector. The former relates to the obligation to provide adaptive measure and strategies such as disaster relief assistance, early warning system, emergency response plan, and improvement of infrastructure against environmental harms that result from the adverse impacts of climate change. There is also a mitigation responsibility which involves the reduction of carbon emissions, mitigation of transboundary ecological damage and investing in or developing plans for renewable energy development, according to the maximum extent of their resources (UNEP, 2015). Fulfilling this obligation requires the enactment of institutional and legal frameworks to mitigate, protect and respond to climate impacts. It also involves financing of renewable energy projects, sharing of technical expertise and capacity building. The procedural aspects include the responsibility of states to provide information about climate impacts, facilitate involvement in decision making and access to justice for environmental harm (UNEP, 2015).

The rationale for regional coalition formation for more effective climate action

While this international framework is essential, it has limitations. In the discussions about environmental and climate action, scholars (Galan-Martin et al., 2018; Asheim et al., 2006; IPCC, 2014) note that it is difficult, if not impossible, to get all countries of the world to agree on the specific and useful cooperative regimes that mainstream the reduction of GHGs and pursue adaptation measures to climate change. International environmental agreements (IEA) such as the Kyoto Protocol, which sought a top-down approach, have not been able to ensure commitment to GHG emission reduction from states. Some scholars suggest that it is because of the absence of a supranational agency to enforce compliance (Barrett, 2003; Barrett, 1994; Asheim et al., 2006), political (Finus & Rundshagen, 2001) economic reasons, and conflicting interests and contending priorities of various countries (Hallegatte et al., 2016). The 2015 Paris Agreement combines a bottom-up with a top-down approach, but its effectiveness has not been fully tested.

Thus, a regional coalition formation (RCF) in GHGs control can make a difference (Asheim et al., 2006). An RCF provides a normative basis for regional cooperation and promotes the use of regional regimes by states to address transboundary and global pollution challenges. This framework shows the benefit of such collaboration to solve a common problem in universal pollution control. Asheim et al. (2006) use a dynamic game-theoretic model to establish that regional coalition formation involving a small number of negotiating parties can facilitate climate action.

RCF is possible when the parties are geographically close, have a comparable political and economic system, share a common objective and tend to have cultural closeness (Carraro, 2000). The likelihood of rivalry is usually limited, and there is a higher chance of success because members pool their efforts (Sánchez-Pagés, 2007). These factors tend to reduce negotiation cost, uncertainty and enhance trust, thus making countries more likely to join and comply with regional arrangements (Asheim et al., 2006). The Arctic region consists of eight countries which share similar geography and climatic conditions (Vinogradov & Azubuike, 2018). Their typical challenge results from the negative impact of climate change, and their shared objective is how to mitigate and create adaptive measures to climate change. The lifestyle in the region is similar, and the culture tends to be close.

An analysis under the RCF

It has been suggested that the model of the Antarctic Treaty System (ATS), which is a symbol of openness, scientific foresight and effective collaboration for regional cooperation in that part of the world, could also apply in the Arctic (Post et al., 2019). Yet, of course, there are significant differences between the regions in both geological and legal terms. Ultimately, the Antarctic Treaty System rests on suspended sovereign rights, while the Arctic has active sovereignty claims under the Law of the Sea and on land. The ATS does not, therefore, meet the rationale of regional coalition building for climate action in the Arctic.

The Arctic Council is the regional agency that facilitates states commitment. Thus, a coalition formation approach could rely on it to promote climate action in the region. Does it meet the rationale that has been set out above?

The Arctic Council promotes cooperation among member states, monitors and assesses the evolving climate of the region and makes recommendations regarding its findings. Its aim includes the protection of the biodiversity and peoples of the Arctic region by encouraging the reduction

of emissions and pollutants and assisting with emergency preparedness and response mechanisms. The Ottawa declaration formally established the Arctic Council in 1996 and contains significant aspects of these aims (Arctic Council, 1996).

State, non-state actors and observers recognise the importance of the Arctic and the negative effect of climate change in the region. Canada's 2009 strategy and 2010 policy document highlight the importance of understanding climate-related effects, conducting scientific research, creating a regional adaptation plan and developing partnerships crucial to implementing the plan (Heininen et al., 2019). Finland's 2010 and 2013 Strategy documents recognise the negative impacts of climate change with two record lows reached in five years (Finland PMO, 2013). Its mitigation and adaptation strategy stresses the need to reduce emissions; support actions that facilitate adaptation to livelihoods based on renewable natural resources; and prioritise the use and management of water resources, including the risk arising from more frequent floods. It also emphasises the necessity to intensify dialogue between governments and the scientific community concerning several connections to different global trends (Heininen et al., 2019).

For Iceland, the strategy involves conducting climate change research, working within the UNFCCC framework and following the sustainable development principles, while 'cooperating on efforts to reduce GHG emissions, including utilisation of renewable energy sources' (Iceland, 2011). The Danish strategy recognises the impact of climate change on the region, the work of the scientific community and the need to engage in research to develop mitigation and adaptation measures. The project concerning the consequences of climate change on the fishing and hunting industry to identify opportunities for adaptation that manage the challenges while exploiting new opportunities, is a case in point. Its strategy document also focuses on addressing GHG emissions (Heininen et al., 2019).

Both the 2014 and 2017 Norwegian strategy documents imply or expressly emphasise the intention to reduce emissions through the Barents Cooperation Forum, and to carry out research on climate models. This approach entails both mitigation and adaptation measures (Norway MFA, 2017). The Russian strategy documents of 2008 and 2013 highlights the need for further research, technology to predict change and the need for cooperation in climate change issues. The Swedish strategy document identifies collaboration with Arctic countries in knowledge–building and action to strengthen the capacity for adaptation to and recovery from the effects of climate change as essential in climate action. The United States of America's strategy document made limited implied inference to mitigation and adaptation, apparently due to the non-recognition of climate change agreement.

From the Observers side of things, there are champions and sceptics regarding climate action in the Arctic. For instance, France supports climate-focused research in the region and internationally driven regulations to new uses of the Arctic ocean. Italy also supports climate change research, but Germany appears pessimistic in its guidelines, noting that previous efforts to reduce emission have not been successful. Other observers focus on one form of study or another that seek to assist the region (Heininen et al., 2019).

Collaboration to mitigate and adapt to the adverse effects of climate change runs through most of the strategy and policy documents of Arctic states and Arctic declarations. This element strengthens the argument for a RCF to forge a common agenda, especially as some of these countries are yet to realise their climate action strategies fully. State and non-state actors can also

collaborate and finance scientific investigations to find new adaptation and mitigation models suitable for the region. A RCF is now crucial given the problem of pollution and climate change as well as reconstructing their reality and going beyond traditional power and hegemony game by redefining climate action (Heininen, 2018). The Arctic Council stands as an appropriate forum to drive such cooperation.

Through a RCF in the Arctic, state and non-state actors can create partnerships to mitigate and adapt towards climate change. Indigenous people, for instance, can collaborate with the Arctic Council, and state actors to promote afforestation and clean cooking which can assist in climate action in the region. Collaboration on these issues is essential in supporting the ACAP Project on climate mitigation which targets the reduction of emission of black carbon from wood in residential homes. There can also be partnerships with international firms and state actors in the Arctic region to reduce carbon emissions as in the case of CCAC, which drives air quality improvement and reduction of short-lived climate pollutants. A recent study reveals that between 1988 and 2015, 100 companies accounted for 71 per cent of global emissions (Griffin and Heede, 2017). Some of these firms could generate enabling conditions through finance, information exchange, technical capacity-building or other measures. Carbon reduction partnerships are particularly necessary as the various features of climate change and the political dynamics around it favours collaborative frameworks.

Given that climate change is caused by, and affects almost all sectors of the economy, addressing it requires the collaboration of both state and non-state actors. State and non-state actors can collaborate to implement and deliver National Determined Contribution and mobilise technical knowledge, capacity-building or finances to address climate change in the Arctic region. Thus, creating the condition for more ambitious actions in the future and boosting the resources, confidence and political will of governments to raise their ambition and strengthen the Paris Agreement. Another advantage is that it can allow for policy innovations and agreement with the various actors regarding carbon reduction through experimentation on a country/regional level and for possible upscaling internationally. It can also increase the use of carbon-neutral sources, decarbonise energy production and facilitate renewable energy research and development between actors. These actions can stimulate mitigation and adaptation and limit the impact of climate change on human rights.

In the Arctic region, the 2018 Inuit Circumpolar Council declaration to commit towards making international organisations recognise and put resources in place to minimise the impact of climate change and stabilise emissions, can be upscaled through cooperation similar to the NYDF. Additionally, the traditional knowledge of Indigenous people can be leveraged upon and shared in research to build climate resilience, including monitoring and movement of animals arising from climate change, erosion and community relocation. This will assist AMAP in its work plan on Arctic climate issues and concerns.

Finus and Rundshagen (1998) note that environmental agreement must be designed to be self-enforcing in the absence of a global agency to enforce a binding agreement. However, they note that this approach may result in 'free riders' who may want to take advantage of the deal. In this regard, a regional body such as the Arctic Council offers an excellent opportunity to monitor compliance and discourage free riders, after states have committed to an agreement to protect, fulfil and respect human rights and preserve the ecosystem which receives the impact of climate

change. The Arctic Council, through its various working groups, have been facilitating climate change and adaptation actions in the high north. Thus, acting as the appropriate intergovernmental forum to enhance coalition efforts for the region and knowledge broker and global advocate for Arctic issues.

Cooperating through the Arctic Council

Regional efforts to mitigate climate change and foster adaptation may not immediately end global warming and its challenges to human beings. Albeit, it could contribute to slowing down the impacts of climate change. We discuss some possible areas of cooperation below.

Monitoring and Assessment

No state can unilaterally change the atmospheric, cryospheric and biospheric situation in the Arctic. Although programmes such as the US Arctic Observation Network exist, expanding these efforts will provide significant value in situation planning and policy development in expectation of ongoing impacts of global warming (Schindler & Hilborn, 2015). Post and Brodie (2015) notes that the need for cooperation and policy shift in the expectation of climatic change is crucial. These initiatives require coalition efforts by member states who must commit to a binding agreement, with coordination from the Arctic Council. Technical, financial and capacity building efforts must be synchronised to realise them.

In the Arctic, the Arctic Monitoring and Assessment Programme (AMAP) monitors and assesses pollution and climate change matters. It produces science-based assessments of the status of pollution and climate change in the Arctic to enable sound policy and decision-making by member states. AMAP, with external support, is assessing short-lived climate forces, climate-ecosystem interactions and Arctic climate trends (Tørseth et al. 2019). In the area of mitigation, there is a circumpolar capacity-building and knowledge programme - Arctic Remote Energy Networks Academy - which focuses on integrating isolated power systems. This programme has the support of the Arctic Council's Sustainable Development Working Group with partnership from Canada, Iceland and US (Arctic Council, 2020). Albeit, this is a training programme and not a binding coalition and does not involve all the member states. There is also the new Arctic Contaminants Action Program (ACAP) project on climate mitigation which targets the reduction of emission of black carbon from wood in residential homes (Arctic Council, 2015).

While this project will facilitate data collection to help in strategies that will reduce black carbon emission in residential wood combustion, it does not have the substantial cooperation of member states. It does not include black carbon from ships in the Arctic region. Again, the second phase of the project is yet to begin. There have also been assessments done by AMAP on the impact of climate change in the region (AMAP, 2019) and the Protection of the Arctic Marine Environment (PAME) is developing Factsheets which relates to the livelihood of Indigenous people in a changing globe. AMAP has also published adaptation actions for a changing climate for the Baffin Bay/Davis Strait, Barents, Bering/Chukchi/Beaufort regions (AMAP, 2017). There is a need for upscaling cooperation in monitoring and assessing climate impacts.

Opening of the Northeast Passage

The Northeast Passage (NEP) encompasses the route along the Russian and Norwegian Arctic coasts (Buixadé Farré et al., 2014). The NEP is sometimes called the Northern Sea Route (NSR),

and under the Russian law, it is defined as extending from the Novaya Zhelaniya straits to Cape Dezhnev by the Bering Strait (Solski 2013). A significant distinction between the NEP and NSR is that the former includes the Barents Sea (Østreng et al. 2013) and offers access to the port of Murmansk, the major Russian Arctic port. The Russian Federation and Norway, under the 1982 UN Convention on the Law of the Sea, exercise control over the NEP that falls into their exclusive economic zone (EEZ) including passage of ships for transport, as well as fishing.

One possible area of the coalition is for Norway and Russia to work on the opening of the NEP to reduce ship travel time and thus cut down the amount of black carbon mostly from cruise vessels and cargo ships travelling from the Arctic to the Pacific. These vessels sometimes use heavy fuel oil known to emit black carbon which has been recognised by the International Maritime Organisation as having damaging effects in the Polar region (Brzozowski, 2020). Increases in natural resource extraction, tourism and shipping due to melting ice will continue to facilitate the emission of black carbon as vessels travel long routes. Since the challenge is mutual in the region, a binding agreement would allow ships to go shorter routes within the territories of member nations, thus reducing the release of black carbon. States could complement this by committing to a framework to minimise bush burning and black carbon from residential wood combustion in various countries of the region.

Shared offshore grid initiative

In the area of climate and green energy solutions, the Icelandic Chairmanship of the Arctic Council is making efforts to introduce renewable energy strategies and encouraging member states to act according to their international responsibilities and national action plans (Arctic Council, 2019). A coalition in this regard is essential to realising the idea. The development and application of practical green energy solutions in the Arctic region are necessary, and one possible way of achieving this is through offshore grid initiatives with the cooperation of member states. It will contribute towards decarbonisation and net-zero emissions in the future for climate action (Beck, 2020).

Renewable energy from the oceans provide an avenue to mitigate the impact of climate change. Its exploitation requires feeding into and distributing power via large-scale offshore infrastructure that extends through the marine jurisdictional zones of numerous countries (Roeben, 2013). Offshore grids are subsea power transmission cables which interlink land grids to feed power supplied from marine renewable sources, such as wave, wind, and tidal energy, into terrestrial networks. Offshore grids interconnectors allow for energy trading between different countries and offer an avenue for the use of renewable energy and storage options, and increases the security of electricity supply (RGI, 2020). An initiative with model character to this effect has been taken by states bordering the North Sea through the joint 'North Seas Countries Offshore Grid Initiative'. This initiative allows neighbouring countries to cooperatively establish and share large-scale electricity infrastructure to exploit their offshore wind resources (European Commission, 2020).

A transboundary offshore grid initiative requires a secure allocation of competences regarding ocean use among countries as a prerequisite for such cooperation; agree to principles about such collaboration; and the establishment of a structure within which to take synchronised decisions (Roeben, 2013). The 2010 Treaty on maritime delimitation and cooperation in the Barents Sea and the Arctic Ocean between Norway and Russia provides this legal certainty (Jensen, 2011).

Elements of a coalition framework favour this initiative in the Arctic region, and it will facilitate joint financing and development of renewable energy sources to solve a common challenge.

Development of hydrocarbon in the region

The Arctic is the last frontier for conventional hydrocarbon development. The region holds about 13% of the world's unidentified oil resources and 30% of the world's undiscovered natural gas resources (Vinogradov & Azubuike, 2018). It is attracting more interest from international oil companies who seek to explore the vast untapped resources in the polar region due to melting ice. While exploiting these hydrocarbon resources will significantly benefit the economies of Arctic states, it will also have an impact on the environment of the polar region. The general calls on resource-endowed states to employ emission cutting approaches to their obligations under the Paris climate agreement and the UN Sustainable Development Goals (Gabbatiss, 2018) have significance for the Arctic region and its vulnerable ecosystem. These concerns call for bespoke regional strategies.

One such approach is to agree to postpone or limit drilling activities in the pristine polar region to cut the release of CO_2 during petroleum operations and the possibility of an oil spill. Only a coalition formation can achieve this plan. Each state exercises the right to develop its resources independently, but they could delay the issuance of licenses for exploration in the interest of the region. A powerful tool to this effect would be coherent, coordinated environmental impact assessment procedures that streamline the relevant considerations. It bears mentioning that the Norwegian constitution recognises the right of present and future generations to be protected from the effects of climate change. Whether this extends to the control of hydrocarbon exploitation is currently being tested in the courts.

Transboundary emergency response and early warning system

The AMAP (2017) report on adaptation action for the changing Arctic shows that developing shared knowledge and understanding of the increasing and continued impacts of climate change is crucial for developing actual policy responses. Shared experience and information are significant in climate change adaptation. One of the known effects of climate change is flooding which creates a disaster situation (UNEP, 2015).

Since disaster risks could be transboundary, it is necessary to promote regional cooperation between nations that are open to common hazards and threats. Transboundary early warning systems are a significant step to foster this regional cooperation on disaster risk reduction. This is especially important for the Arctic region where the possibility of a cross-border disaster exists and could displace coastal Arctic communities. It is important to note that the region has a legally binding instrument known as the Search and Rescue (SAR) agreement (Koivurova, 2012). This agreement seeks to reinforce SAR coordination and cooperation efforts in the Arctic by assigning tasks to each Arctic state in its jurisdiction and by setting up measures for countries to cooperate in cases of emergency. The agreement on marine oil pollution preparedness and response for the Arctic is also legally binding. There is a need to extend such cooperation to early warning systems by sharing information, expanding scientific investigations on adaptation models and building capacities to enhance adaptation strategies.

Governance

The Arctic Council acts as the vital governance structure for the region. It performs certain governance functions through the various working groups such as AMAP and PAME. AMAP has some responsibility of monitoring and assessing pollution and climate change issues in the Arctic for sound policy and decision-making. The Arctic Council could facilitate the proposed cooperation by designing a framework directive or strategy, with inputs from states, to govern mitigation and adaption in the region. Each state would then implement this strategy as binding national law with a stipulated date of implementation. The Arctic Council would supervise implementation by states and provide progress report through AMAP. This approach resembles that of the European Union in its Directive 2013/30/EU on safety of offshore oil and gas operations. Although the European Union is an international organisation and hence is structurally different from the Arctic Council, both the EU and Arctic Council serve the need to address issues with transboundary effects.

Arctic Council member states could also cooperatively establish a long-term approach, such as the implementation of a net-zero strategy to curb the emission of GHGs. Northern states could work together to define a quantified baseline emission scenario, select appropriate emissions mitigation measures, and estimate the possible results of applying those procedures under a binding agreement. This governance approach of bottom-up national strategies coupled with top-down scrutiny by a joint body underlies the European Energy Union (Roeben, 2018). Regulation (EU) 2018/1999 of 11 December 2018, Official Journal L 328/1, on the Governance of the Energy Union and Climate Action organises this approach.

Non-state actors such as oil majors in the region could facilitate the net-zero target strategy by implementing it as corporate social responsibility and as an obligation imposed by law.

Conclusions

The concern about climate change arises from the apparent impact on the ecosystem and on humans. The result affects the enjoyment of human rights in the Arctic region. Climate change has a global origin but states in the Arctic region can mainstream strategies to limit the emission of GHGs. States have a responsibility to respect, fulfil and protect human rights and to cooperate with other countries in limiting climate change. This responsibility arises from both human rights and climate change laws, which are mutually reinforcing. This article has focused on the responsibility of states under human rights law that adds powerful normativity as well as a legal basis to climate law. Arctic states can fulfil their human rights responsibilities through a regional coalition formation to mitigate and adapt to climate change, given their geographical proximity and the common objective of minimising the impact of climate change in their region.

Regional cooperation finds support in the fact that global operational agreements on specific or tailored climate actions may be unrealistic given heterogeneous political and economic goals of states and the absence of a supranational agency to enforce compliance of the relevant frameworks. An Arctic coalition could help to reduce black carbon from vessels by opening the Northeast Passage to reduce ship travel time. Offshore off-grid initiatives can also boost the supply of renewable energy through wind energy from the sea, and Arctic states can agree to slow down the development of hydrocarbon in the region, reducing the amount of GHGs that would have been emitted during petroleum operations. Such cooperation, possibly through a binding agreement,

could also facilitate knowledge exchange, capacity building and information sharing for an early warning system and emergency response to enable local Arctic communities to adapt to climate change in a resilient manner.

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The Amplification of Polar Diplomacy: A Textual Analysis of Arctic Council Declarations

Derek Moscato

Climate change discourses loom large over the Arctic even as the growth of energy, mining, and transportation opportunities align with growing demand for global commodities. A prominent forum for mediating these conversations to stakeholders and publics has been the Arctic Council. This article examines the emergence of Arctic Council dialogue as a global intergovernmental forum in the Arctic and a conduit for economic-ecological communication. A textual analysis of the forum's declarations over two decades analyzes the relationships between stakeholders in the Arctic and emergent discourse frameworks. As a vehicle for analysis, it helps to identify the embedded or proclaimed interests of government and markets—and the relationship between climate change with political, social, and cultural forms. Analyzing Arctic Council Declarations from annual meetings also highlights the mediatization of political action and the trajectory of the organization's environmental mandate over the past quarter-century.

The evolution of Arctic Council discourses over the past two decades provides insight into how polar nations collectively grapple with tensions between economic and environmental interests. This paper explores such intergovernmental communication through the public artifact that is the Arctic Council Declaration. A textual analysis of the forum's declarations over more than two decades analyzes the relationships between stakeholders in the Arctic and emergent discourse frameworks.

The issuance of the first-year report of Iceland's chairing of the Arctic Council in June of 2020 provided an ongoing reminder that sustainable development drives the mandate of the Arctic Council. Einar Gunnarsson, Chair of the Arctic Council's Senior Arctic Officials, noted in his editorial update that Iceland's chairmanship was focused on four pressing issues: the Arctic's people and communities; the region's marine environment; climate and energy issues; and strengthening of the Arctic Council itself (Gunnarsson, 2020). Over the past 25 years, these themes of resources, ecology, and community have permeated Arctic Council deliberations.

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In many ways this emphasis mirrors the region it serves. The Arctic has emerged as one of the planet's symbolic environmental battlegrounds and a flashpoint of global ecology, pitting proponents of resource extraction and economic growth against green activists and conservationists. This tension has helped elevate the region's prominence in the global community and has captured growing attention from world leaders. For example, at the end of his second term in office, former U.S. president Barack Obama declared the entire U.S. portion of the Chukchi Sea and the majority of the Beaufort Sea, both situated within the circumpolar Arctic Ocean, as off limits to offshore drilling—citing protections for Indigenous communities, wildlife, and natural resources (Liptak, 2016). His vow was echoed by neighboring Canada, which promised to protect its Arctic waters from oil and gas exploration. Such official pronouncements have not only elevated the role of global diplomacy and communication in shaping policy for the region. They have also placed the spotlight on the Arctic Council as the Arctic's leading facilitator in furthering this polar regional dialogue.

Established in 1996 as a result of the Ottawa Declaration, the Arctic Council is an intergovernmental forum promoting "cooperation, coordination and interaction among the Arctic states, with the involvement of the Arctic Indigenous communities and other Arctic inhabitants on common Arctic issues, in particular issues of sustainable development and environmental protection" (Arctic-Council.org, 2011). This study examines the emergence of the Arctic Council at its 25th year as the preeminent forum serving the region—examining how it grapples with environmental, economic, and social themes. This research seeks to assess what nation-state interests are communicated by the organization, and how these interests interface with the region's ecology and local communities. A textual analysis of digitally archived governance documents analyzes the relationships between national, corporate, environmental and Indigenous/community stakeholders in the Arctic, assessing the emerging discourse frameworks promoted by the council.

The growth of the Arctic Council has occurred during a transformative era for the Arctic region as a whole. The confluence of geo-political, economic, and environmental variables within the Arctic over the past three decades has intensified the global focus on the region, an area comprised of vast ocean and the most northerly land masses of the Arctic nations. Climate change has been a felt presence—not only altering ecosystems and wildlife habitat, but also opening up possibilities for new marine shipping lanes and sites for mineral and resource extraction. The emergence of these energy, mining, and transportation opportunities and subsequent corporate investments has coincided with an overall rising of market demand for major global commodities such as petroleum and precious metals. A 2012 report, referencing the Arctic's holding of 30% of global undiscovered natural gas and 13% of global undiscovered oil, estimated exploration and drilling investment to reach $100 billion (Lloyds.com, 2012). More recently, the Russian government passed legislation that would create $300 billion in financial incentives for Arctic oil infrastructure (Last, 2020). Thus, even against the backdrop of diminished returns for the petroleum industry due to a downturn in global demand and oil prices, national and corporate interests globally continue to pursue such opportunities through exploration, environmental assessments, land purchases, and diplomatic endeavors. In the realm of minerals and precious metals, the Arctic is home to reserves of diamonds, coal, gold, iron ore, phosphate, copper, bauxite, and nickel. Maritime shipping is also enjoying growth and increased interest, thanks to a combination of melting ice and global demand. The Northern Sea Route, which offers a faster route for some cargo shipments between Europe

and Asia, saw 1.35 million tons of goods pass through in 2013—with over half of the voyages involving oil products (Dawson, 2014).

At the same time, governments have requested billions of dollars of new equipment such as ice-breaking ships, satellite services, fiber-optic networks, and other facets of maritime infrastructure to facilitate the influx of interests from energy, mining and shipping sectors (Reuters, 2014). Tourism, including eco-tourism, has also been a source of interest and investment. Such a focus affirms the primacy of commodities and natural resources in the development of the Arctic to date, but also the growing confluence of national security and resource extraction.

Given the competing visions for the Arctic, the Arctic Council's importance lies not only in deploying dialogue and policy, but also in symbolically articulating the role of national and global governance in this region. This formalization of message amplification can juxtapose international cooperation against nation-specific narratives. For example, Keskitalo's (2004) exploration of Arctic discourses found North American networks of knowledge-producers playing an outsized role in facilitating communication about the region, particular Canadian networks that conceptualize the Arctic as a northern frontier.

The Arctic Council: Polar diplomacy and intergovernmental policy

Since the end of the Cold War, the Arctic has become what is described as "a locus of energetic and often innovative initiatives relating to the governance of human-environment relations"—which in turn has shifted the nature of the demand for governance in the region (Young, 2009). Since its establishment in 1996, the nature of the Arctic Council has often mirrored this description. With its eight Arctic nation-states, the Arctic Council carries out two major objectives: the promotion of environmental protection (an outgrowth of its former work with the Arctic Environmental Protection Strategy), and sustainable economic development (Bloom, 1999). The organization's origins lie with both the Arctic Environment Protection Strategy (which the council absorbed in 1996), and Russia's desire for an "Arctic zone of peace" in the late 1980s (Dodds, 2013: 4).

It is at this intersection of environmental protection, economic development, and nation-state interests where the Arctic Council has channeled its energies, but also where member nations have forged their own approaches borne of national agenda-setting. The Council's rotating two-year chairmanship gives lead nations an ability to set the agenda for the council, and therefore for the Arctic as a whole. Canada, for example, was described as having "sought to use its chair to refocus the Arctic Council on the 'other' pillar of the council: sustainable development, emphasis on development" (Exner-Pirot, 2014).

However, the 2015 federal election defeat of Canadian Prime Minister Stephen Harper, an avowed proponent of Canadian engagement with the Arctic, raised the possibility of the country recalibrating its Arctic priorities. Harper's successor, Justin Trudeau, has taken greener positions on climate change mitigation and environmental protections, and more conciliatory positions on foreign policy. That relationship between national politics and Arctic Council chairmanship also extends to the United States. The U.S. held the chair role between 2015 and 2017, having taken over from Canada. The contemporary Arctic era of the past decade has been marked in part by a growing awareness of the United States' Arctic stake. As Admiral Robert Papp, U.S. Special Representative for the Arctic, pointed out in the official White House blog, "There are only eight

countries in the world whose territory above the Arctic Circle grants them the honored title of 'Arctic Nation.' The United States is one" (Papp, 2014). This was highlighted both by Barack Obama's 2015 Alaskan Arctic visit and subsequent Arctic policy directions set by U.S. President Donald Trump. During its tenure in the chair role, U.S. focus areas were articulated as economic and living conditions for Arctic communities, ocean security and safety, and climate change.

For all member countries, the intensifying focus on both climate and site-specific environmental impacts of industrialization have added to the complexity of the Arctic Council's mandate. In order to effectively foster dialogue and advance policy implementation or agreements, senior officials from Arctic countries meet at least twice a year, while all partners convene at the ministerial meetings held usually every two years in the country holding the chairmanship. All decisions must be accepted by a consensus of all eight Arctic states, offering a check on the influence of the chair state. Partners of the forum, who do not have voting privileges, include Permanent Participants, working groups, and observers. "Permanent Participants" are Indigenous peoples from six councils or associations from across the Arctic. Observers include non-Arctic states, inter-governmental and inter-parliamentary organizations, and non-government organizations. Outside of this official governance framework, many global and regional non-governmental organizations, particularly those focused on the environmental and wildlife protection, lobby the Arctic Council and attempt to influence its policy direction through official channels and unofficial public communication activities.

As an entity for dialogue and policy facilitation, the Arctic Council has received some past criticism, however, in terms of both function and form. A previous critique of the Arctic Council is that its political leaders have lacked the necessary urgency and sense of crisis to strengthen or expedite regional legal arrangements, thus relegating it to more of a discussional rather than regulatory or decision-making entity (Koivurova & VanderZwaag, 2007). However, the past decade has seen the Arctic Council produce several legally-binding treaties: the 2011 Arctic Search and Rescue Agreement, the 2013 Oil Spill Preparedness and Response Agreement, and the 2017 Arctic Scientific Cooperation Agreement.

The Council's continued growth is historically another concern. For the Indigenous nations who have Permanent Participant status in the Arctic Council, the growing influx of observers such as the European Union is argued to have had a destabilizing effect as it reinforces outside understandings and relationships (Dodds, 2013). Another past critique was the forum's lack of formalized strategic communication to stakeholders, resulting in messaging that was either misaligned or non-existent—with public relations efforts mostly directed to branding activities such as the production of websites and brochures (Breum, 2012). Recent years, however, have seen the Arctic Council make significant investments in public relations and engagement, including communication personnel. Furthermore, the Arctic Council has become an important subject, and source, for journalists covering the region (Chater & Landriault, 2016). In some cases, however, media gravitate to what *is not* communicated by the Arctic Council. For example, the absence of a joint declaration from the 2019 ministerial meeting in Rovaniemi, Finland—due in part to U.S. opposition to climate change language (Breum, 2019)—was widely reported by international news outlets, including *Xinhua*, *Reuters*, and the *New York Times*.

What these media discussions highlight in part is the growing interest in understanding both the aims and production of Arctic Council communication, including public dialogue, press relations,

and official pronouncements. The council's official declarations—joint statements describing the outcomes of the organization's political meetings—become what are described as the *mediatization* of political action: They become "a ritualized communicative event, with the objective of projecting a united front on crucial global political issues" (Bhatia, 2006: 176). Arctic Council declarations serve an international media function, as they extend across time and geography to proclaim evolving Arctic Council priorities. This confluence of nation state interests, economic activity, and resource extraction potential—and its relationship to political dialogue—points to the importance of formal communication artifacts as vehicles for deliberation, amplification, and persuasion.

Analysis of Arctic Council declarations

This study utilizes a qualitative textual analysis to understand the governance messaging of the Arctic Council to its immediate and global stakeholders as a form of political discourse. As a vehicle for political economic analysis, it helps to identify the relationship between the economy and political, social, and cultural forms. Examining the political economy of texts also illustrates the ways in which mediated representations are related to material realities and conditions (Golding & Murdock, 1991).

As an interpretive method, textual analysis allows the researcher to digest all forms of content dissemination: "every significant stylistic, visual, linguistic, presentational and rhetorical feature" (Lester-Roushanzamir & Raman, 1999). Such a qualitative analysis of content allows for the subjective interpretation of text through the identification of themes and patterns (Hsieh & Shannon, 2005). Texts will sometimes systematically prop up dominant discourses while excluding certain kinds of representations. The producers of texts may indeed be careful to not draw attention to such absences. To this end, qualitative textual analysis allows the researcher to identify what elements of a text might be important (McKee, 2003).

Using this process, Arctic Council Declaration documents were read and reread as a singular entity. The author noted any visual or stylistic features (such as images, photos, logos) as well as physical attributes of the documents (such as length or the usage of color). Individual declarations were also examined for recurring patterns, proclamations, warnings, and omissions. Analysis of these texts may indicate a form of structured discourse defining the material more broadly (Lester-Roushanzamir & Raman, 1999). To this end, a third step involved the interpretation of the evidence acquired in the first two steps. In the discussion and conclusion, textual evidence is linked with the larger Arctic Council narrative.

In order to cast a wide net in terms of the scope of the Arctic Council's interests and objectives, the council declarations from the ministerial meetings between 1996 and 2020 were examined. This timeframe is chosen because it reflects both the duration of Arctic Council summits, and tracks closely to the prominence of global economic and environmental issues that have become manifest in the Arctic, including climate change. These digitally archived declarations, published on the Arctic Council's website, represent the agreed-upon language of the government leaders (usually comprised of ministers of foreign affairs or secretaries of state) assigned to the council and representing the eight Arctic states, joined by the representatives of the six Permanent Participant organizations of the Arctic Council. These are the Fairbanks Declaration (2017), Iqaluit Declaration (2015), Kiruna Declaration (2013), the Nuuk Declaration (2011), the Tromsø Declaration (2009), the Salekhard Declaration (2006), the Reykjavik Declaration (2004), the Inari Declaration (2002), the Barrow Declaration (2000), the Iqualuit Declaration (1998), and the Ottawa

Declaration (1996). Notably, a declaration from the 2019 ministerial meeting in Rovaniemi, Finland is not included here. This is because a joint declaration could not be achieved due to U.S. opposition to climate change language in the document (Breum, 2019).

Readings of the texts lead to the identification of three organizing strategies on the part of the Arctic Council: (1) the dichotomy of environmental sustainability versus economic growth; (2) human development programs for Indigenous communities; and (3) spatial governance. This conclusion is based on systematic readings and re-readings and provides a foundation upon which to present my findings. Here, declaration documents establish discourses that adjoin the natural world and Arctic communities to themes of economy, human development, and spatialization.

(1) The sustainability/economy paradox

Previous scholarship has situated sustainable development as an oxymoron, to the extent that underlying assumptions of such development and its social consequences are ignored by the market consensus (Redclift, 2005). This sustainability paradox is embedded in Arctic Council declaration discourses. From its inception, the Arctic Council has integrated a message of sustainable development and environmental protection for the region. The 1996 Ottawa Declaration, the first such proclamation, declares that the goal of the council is to provide a forum for interaction and cooperation in both realms, encouraging a growing role for Arctic nation-states and their governments in the future of the region. As a collective, however, declarations between 1996 and 2017 toggle between the aspirations of environmental sustainability and the pursuit of economic growth, increasingly integrating the latter into policy statements. The growing emphasis on economic growth over the period studied is facilitated by environmental projects, sustainable business initiatives and infrastructure, and large-scale resource extraction operations. Yet the urgency of climate change is also communicated: the 2017 Fairbanks document notes that the region "is warming at more than twice the rate of the global average" and reiterates "the importance of global action to reduce both greenhouse gases and short-lived climate pollutants" and the Arctic Council's further engagement with the reporting of the Intergovernmental Panel on Climate Change.

While climate change, air and water pollution, protection of the marine environment, and biodiversity conservation merit individual attention outside of the relationship between the economy and natural resources, policy statements over time champion the integration of environmental pursuits with commercial enterprise and commodity export. Acknowledging its roles in environmental protection and development, the 2000 Barrow Declaration promises an Arctic Council committed to promoting sustainable development as a first priority. This mandate continues with Iceland's chairmanship in 2019-2021.

The 2009 Tromsø Declaration provides an overarching perspective of Arctic nations' prerogatives during a critical juncture for global climate change awareness and environmentalism: "Reconfirming the commitment of the Arctic Council to promote environmental protection"—in areas such as ocean acidification and the environmental risks of major environmental projects. However, this prioritization of the Arctic Ocean co-exists with that declaration's embedded communication missives, such as the *Offshore Oil and Gas Guidelines,* providing a reminder that polar geographies must contend with industrial incursions fostered in part by the Arctic Council's economic mandate.

Two different recognitions make this tension between ecology and economy readily apparent: 1) "Environmentally sound oil and gas activities may contribute to sustainable development of the Arctic region" and 2) The council needs to "strengthen cooperation on prevention of, and response to, accidental spills of oil and hazardous substances in the Arctic" (55). This is a view that served as a precursor to the Arctic Council's 2013 Oil Spill Preparedness and Response Agreement. Short of rejecting the arrival of energy companies, the council communicates a position of management or mitigation, not elimination. The regular usage of terms such as "corporate social responsibility," "sustainable business," and "sustainable Arctic economies" indicates a commitment to the integration of commercial enterprise into the region that is cognizant of the ecological and social risks. The promise of attunement to these matters provides safe framing for the words "business," "corporate," and "economies". Even strictly economic objectives promise the end-goals of Arctic greenification and increased "cooperation and interaction with the business community to advance sustainable development in the Arctic" (71).

Climate change also warrants special attention in the 2013 Kiruna document, which communicates a deep concern for the "escalating rate of warming of the Arctic climate, which will likely also affect the rest of the world" (50). It points to a number of existing initiatives or protocols for guidance—such as the *United Nations Framework Convention on Climate Change*, the *Montreal Protocol on Substances that Deplete the Ozone Layer, the Arctic Resilience Report*, and *the Adaptation Actions for a Changing Arctic*. The enduring challenge for the Arctic Council is to implement action based on such guidance. After setting out a bold policy framework based on potentially dire environmental prospects, a decision to "continue the work on enhancing the capacity of decision-makers to manage climate risks including through an on-line information portal and through improved predictions of combined effects" (72) feels well-intentioned but bureaucratic.

(2) Indigenous and local communities: Protections and threats

The viability of longstanding Indigenous communities in the Arctic region remains a central consideration in the Arctic Council declarations—in terms of both policy recommendations for nation-states, but also for the composition of the council itself. Simultaneous threads of development, including health and social conditions, with language and culture arguments underscore a duality of remedies for Indigenous communities within Arctic Council communication. Ecological degradation is positioned as a problem to be solved through Indigenous knowledge, yet also a precursor to inevitable challenges.

Along with the ecological, a bid to improve upon a particular set of economic and social conditions for Arctic populations emerges as a key theme. The 2004 Reykjavik Declaration defines human development in the Arctic as "the need for improving living conditions, promoting economic opportunities… and measures such as capacity-building, education and research" (42). This aligns with the view that business development activities help Indigenous communities' improve socioeconomic circumstances while asserting their land rights (Anderson, Dana, & Dana, 2006). The Salekhard Declaration of 2006 retreats slightly from this position, offering a more reflective perspective by remarking upon the council's existence as "an important forum for increased mutual understanding and cooperation in the circumpolar area and (providing) a major contribution into the well-being of the inhabitants of the Arctic" (39).

This trajectory is further articulated with the recognition of urgent need for action to protect Indigenous language and culture. The 2009 Tromsø Declaration argues that "education, outreach,

scientific research, traditional knowledge and capacity building are major tools to address challenges in Arctic communities" (55). That some members of the forum—notably Indigenous communities—were encountering difficulties in affording attendance at the Arctic Council's meetings was highlighted near the end of the declaration—noting the importance of financing circumpolar cooperation. This perspective helped lead to the 2017 establishment of the Álgu Fund, a charitable foundation which aimed to raise $30 million to allow the Permanent Participant Indigenous groups to fully participate in Arctic Council activities, but is no longer active.

Impacts on local populations are acknowledged—"Arctic peoples are experiencing challenges associated with rapid socio-economic and environmental changes"—and the 2011 Declaration implores council members to improve mental wellness strategies, recognize the importance of local knowledge and traditions, and promote the traditional ways of life of Indigenous populations to their wider, global constituencies.

(3) Spatial governance

As a collective of nation-states defining objectives for a remote world region, the Arctic Council takes on the characteristics of a spatial medium. Spatialization explains how communication overcomes time and space and facilitates the logistics processes inherent in globalization (Mosco, 2014). It is these time-and-space attributes that extend the Arctic Council's declarations into a form of international mediatization. Arctic Council policies affirm the role of overseeing spatializing activities, notably transportation and communication. Indeed, the declarations along with other communication—speeches, meetings, summits—overcome vast geographies by way of media that overcome the obstacles of time and space.

The council's role as a mediator and facilitator of spatial projects—supply chain and logistics infrastructure, transportation routes, communication technologies—is woven into the fabric of declarations. The council assuages concerns about encroaching industrial activities by presenting its aspirations as adjoined to optimal environmental, social, and technological outcomes. This spatial governance role for the council is articulated through the identification of circumpolar business meetings, as well as the emphasis of transportation infrastructure that complements airports and seaports. The 2011 Agreement on Cooperation in Aeronautical and Maritime Search and Rescue in the Arctic, described as the first legally binding agreement negotiated under the auspices of the Arctic Council, is emblematic of the council's multi-faceted program to engage with the region's spatial economy. The important role of telecommunication infrastructure to communities, to science, and to navigation and emergency response is also highlighted, paving the way for networking infrastructure expertise.

In communicating these numerous developments, these declarations extend across time and geography. Their evolution as textual but also visual media reflects changing Arctic Council priorities. The cover of the initial Ottawa Declaration features an idealized depiction of the Arctic landscape. The watercolor portrait depicts wildlife and an Inuit village set against a pristine river valley wilderness and snow-capped hills in a scene free of industry or ecological degradation, suggesting a potential rift between visual treatments of Arctic Council declarations and the policy recommendations within forthcoming declaration texts. A later declaration includes the Arctic Council's logo at the beginning of the document, which features the Arctic fox, to convey its evolving brand identity. Starting in 2011, the texts of the declarations become design-heavier, featuring bright colors and photographs of political leaders interacting with the landscape and

working with each other. Such an evolution is indicative of an Arctic Council that sees its declarations serving not only policy positions, but indeed a larger role of global public relations. That council members can view their role as promotional in nature is underscored in the assertion made in 2011 "to raise the profile of the Arctic internationally." This is complemented by the adoption of a new tagline in 2013 to describe the forum's collective mission: "Vision for the Arctic" which connotes a more carefully managed trajectory for the Arctic and regional stakeholders.

Conclusion: A dialectic of ecological crisis and economic intervention

This analysis of the Arctic Council's declarations highlights the council's growing role as a producer of discourses that situate economic development—through sustainable development—as a potential solution for environmental and social issues facing the Arctic region. As an intergovernmental forum addressing the issues facing nation-states and Indigenous peoples of the Arctic (as well as NGOs and other international bodies), the Arctic Council represents a unique and noteworthy forum for discussion and policy articulation, highlighting the key priorities of its full nation-state members and to a lesser extent its stakeholders without full membership. The declaration documents from the 1996 to 2017 ministerial meetings provide an important perspective on how a country's—or countries'—priorities come to be represented, how they are communicated to multiple audiences, and how they are balanced with other interests—international, societal, and environmental. At surface level, the evolution of such declaration documents during these two decades shows that the Arctic Council has become increasingly sophisticated in its outreach and has grown its political, legal, and social mandate alongside its environmental goals.

At the same time, the inevitability of economic development—through resource commodities and their export—becomes apparent as declarations progress from 1996 to their most recent publication. Indeed, the concern for the environment—tied as it is to carbon reduction, mitigation of pollution, and crisis response—ultimately serves as a bridge to sustainable development, including economic growth. Increasingly, the desire on the part of countries for economic expansion and resource extraction is not situated as diametrically opposed to the welfare of traditional communities nor natural environments. Rather, such development is positioned as a potential remedy for socio-economic underdevelopment and ecological crisis—simultaneously serving the aims and trajectories of the Arctic nations and companies whose interests they ostensibly serve. At the same time, readers of the Arctic declarations are reminded that Indigenous cultures and languages need to be protected and respected—even as these documents advocate for industrial investment alongside interventions in environment, education, and health.

These potentially contradictory themes are emblematic of a longstanding challenge for the Arctic Council. Arctic nations have a vested interest in the extraction and transportation of commodities, including petroleum and precious metals. Climate change furthers the ability of countries to engage in both activities, as energy deposits and shipping lanes become more accessible with the gradual melting of the polar ice cap. This is a catalyst of ongoing tension within Arctic Council declarations. That the council recognizes the disruptions being imposed upon Arctic communities, including traditional communities, as a result of such economic change echoes the staples trap articulated by Harold Innis (1999): Societies eventually become an outgrowth of the market-based commodity they exist upon. Even as the Arctic Council works to curtail the impacts of climate change through local intervention and global engagement, it is simultaneously suggesting their inevitability.

Throughout these declarations, the role of economic intervention in the Arctic is paramount—from the cultivation of resource exploration, to new logistics developments emanating from aviation and shipping, to maritime emergency preparedness. This aligns with the view of Arctic economic development espoused by some political leaders, including Lisa Murkowski, U.S. Republican Senator from Alaska:

> A focus on climate change and its impact on the Arctic is certainly warranted, but it cannot be our sole focus and it should not prevent those who live in the Arctic from developing the resources that are available within their region in order to create a better standard of living (Juneau Empire, 2014).

The council offers cautious support for these economic developments. It rarely supports their eviction from the Arctic.

Key to the dissemination of these discourses is their distribution network. As a form of global communication, Arctic Council declarations travel across contemporary global media systems through a network of wire services, press releases, digital media such as blogs and websites, and finally mainstream, regional, national, and international media outlets, including influential newspapers. Such a trajectory denotes the importance of organizational public communication artifacts such as joint declarations in refining messages and intergovernmental policy aspirations for public audiences. Further studies devoted to the communication of Arctic policy are wise to investigate the production and content of designated media and public relations artifacts, but also the broader framework of public relations processes—including consultancies, publications, and wire services—that make such a trajectory possible. Additionally, these processes set the boundaries for negotiation between the narratives of economic development and ecological sustainability that play out within and between the media. Finally, further examination of such discourses might look to how they align with the notion of ecological modernism, highlighting the economic and market benefits arising from pro-environmental activities, including green technologies and clean energy production.

There continues to be much speculation about the future of the Arctic as a polar crossroads of globalization, commodity extraction, and environmental protection/degradation. This has been buoyed in part by news stories about the economic potential of the region (Chater & Landriault, 2013) even though the global economic slowdown of 2020 caused by the COVID-19 pandemic has lessened expectations for the future (McGwin, 2020). To this end, Arctic nations are publicly accounting for mineral deposits, potential energy reserves, and future navigable waterways through strategic communication and public diplomacy channels including governmental white papers (Moscato, 2018). Such narratives also travel through channels of popular culture. Reality television programs focused on the polar north such as Discovery's *Deadliest Catch* and History's *Ice Road Truckers* further articulate for mass audiences discourses of commodities acquisition and transport—oscillating between themes of resources extraction, market forces, and ecological impacts (Moscato, 2017). Furthermore, news media events make audiences aware of the region's geopolitical developments, including the growing boundary disputes that have both economic and military implications. The example of Russia planting its flag in the central Arctic Ocean to position the Arctic as a "last frontier" for investors provides a case in point (Dodds, 2013). The Arctic Council's Declarations in their own way reinforce these understandings by introducing to policymakers and publics a range of catalysts for development; from search and rescue protocols

to environmental emergency response measures to maritime infrastructure.

Given their collective intergovernmental voice, there are limitations to the Arctic Council declarations as a site for analysis. Strategic communication has been an underplayed element within the Arctic Council historically. Within these declarations "members of the Council currently share an implicit desire to communicate their own perception of the Council's stewardship of the Arctic Ocean and the Arctic environment in general" (Breum, 2012: 118). However, as snapshots of an intergovernmental organization's communicated purpose occurring throughout its existence, they provide a useful perspective of a cumulative vision and projected governance framework—and a vehicle for connecting national interests to economic enterprise. The influx of human population and capital into the Arctic will both accelerate the evolution of such governance developments and exacerbate tensions amid simultaneous discourses of political uncertainty, economic opportunity, and the ongoing climate crisis.

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Evolution of the Arctic Council Agenda: From Environmental Protection to the Effects of Climate Change

Tuuli Kuusama

Profound changes are taking place in the Arctic, and a central driver is climate change. It is rapidly occurring in the Arctic, melting sea ice and reshaping the social and political environment into a landscape of new challenges and opportunities. As a result, the Arctic Council, the region's preeminent high-level forum, is evolving and reassessing its focus.

According to an agenda-setting perspective, the hierarchy of different issues on political agendas varies over time. Agenda-setting is a political process where stakeholders compete for the attention of decision-makers and media. Agenda-setting explains how growing public awareness helps elevate issues to the top of the political agenda. The Arctic Council is an environmental regime and an international regional institution which provides added value by producing information about significant environmental challenges. The evolution of the Arctic Council can be mostly explained by its growing understanding about the state of the Arctic environment and the most salient phenomena facing the region. This development can be analyzed in Arctic Council deliverables. The primary sources for these include the Arctic Environmental Protection Strategy (AEPS) and Arctic Council ministerial meeting Declarations (1991-2019) and selected scientific reports produced by the Arctic Council Working Groups. In this article I analyze how environmental questions were adopted into Arctic politics, concentrating on how climate change was incorporated into the agenda of the Arctic Council.

Introduction

Since the beginning of institutionalized Arctic environmental protection, the understanding of the main threats to the Arctic environment has changed tremendously. Arctic environmental cooperation started with transboundary long-range pollution and stability building in the early 1990s. Scientific monitoring gradually led to a better understanding of the state of the Arctic environment. The growing awareness of climate changes has entailed implications for international environmental regimes, including the Arctic Council.

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Institutionalized Arctic environmental cooperation manifested in full in 1991 when the eight Arctic states adopted the Arctic Environmental Protection Strategy, or AEPS, in Rovaniemi, Finland (AEPS, 1991). From its inception, the cooperation focused on protecting the Arctic environment, increasing knowledge of anthropogenic pollution (in particular oil, acidification, persistent organic contaminants, radioactivity, noise and heavy metals), monitoring the state of the Arctic environment, assessing threats to the Arctic environment, and advocating on those issues in other international fora. A special feature of Arctic environmental collaboration has been the active involvement of Arctic Indigenous peoples as non-voting Permanent Participants and the recognition of their traditional knowledge.

The AEPS played a central role as a regional regime while raising national and international awareness of transboundary environmental problems. The Arctic Council has continued the work and done the same for climate issues. The AEPS was subsumed under the Arctic Council upon its creation in 1996. The Arctic Council was established by the Declaration on the Establishment of the Arctic Council, which is better known as the Ottawa Declaration (1996). It was founded to advocate for the resolution of environmental challenges, while promoting sustainable development. What is important in the context of this article, is that the Ottawa Declaration (1996) does not mention climate change. What turned out to be important for Arctic environmental cooperation, however, was that the Arctic Council reserved for itself the possibility to "regularly review the priorities" (ibid: 4).

The Arctic Council is a high level forum for promoting cooperation "on common Arctic issues, especially on sustainable development and environmental protection in the Arctic" (ibid: 2). High-level forums enhance interaction and knowledge dissemination by highlighting common standings to recognized problems. Noticeably, decisions are taken by consensus of the Arctic States (Ottawa Declaration, 1996: 3). The Arctic Council subsumed the programs of the AEPS. Substantive work of the Arctic Council is conducted in six Working Groups.[1] They cover subjects from marine protection and emergency preparedness to environmental monitoring, biodiversity, and sustainable development. There is no specific Working Group for climate issues. Widely respected scientific assessments produced by the Arctic Monitoring and Assessment Programme (AMAP) Working Group have substantially affected the understanding of major environmental threats in the Arctic.

In this article, I develop an institutional analysis of Arctic environmental cooperation and describe how the focus has changed over the years from long-range transboundary pollutants to climate change. This article examines how the Arctic Council recognized an emerging issue, climate change, and renewed itself to meet this ongoing and escalating challenge in the circumpolar north.

In describing how climate change was incorporated into the Arctic Council's agenda, I apply a Downsian issue-attention cycle analysis. My core question is about how well the Downsian issue-attention cycle model fits with the regime development of the Arctic Council's work related to climate change: Does it have any explanatory value? The development of Arctic climate policy is worth exploring, because the Arctic is warming twice as fast as the rest of the planet. I am interested in how a high-level forum becomes aware of the problem, promotes climate issues and in the meantime reacts to the fluctuating national climate stances of its member states. While trying to concentrate on how the Arctic Council responds to climate change, I will not explore political processes leading to the founding of the AEPS and the Arctic Council.

This article builds on my Master's thesis (Kuusama, 2018) published in Finnish, where I formulate a stage-model of the institutional development of Arctic environmental cooperation focusing on climate change. Drawing from my observations, I argue that the institutional development of Arctic environmental cooperation, especially climate awareness, can be divided in stages. Further building on that previous research, I add in this article a fifth stage to the analysis in order to cover the development through the latest ministerial meeting, which was held in Rovaniemi in May 2019.

Arctic environmental politics

This section introduces the concept of environmental regime and briefly seeks to contextualize how environmental questions were taken into Arctic politics. Arctic politics is characterized by several themes: highlighting environmental cooperation, Arctic governance, geopolitics, maritime access, resource potential and Indigenous peoples' involvement, to name a few. The Arctic region was originally framed around environmental security questions instead of military security or trade (Exner-Pirot, 2013: 122).

The Arctic Council is an environmental regime which produces, for example, added value by producing information of significant environmental challenges. There are several definitions for regimes, including Keohane's description: "Regimes are institutions with explicit rules, agreed upon by governments, that pertain to particular sets of issues in international relations" (Hasenclever et al., 1997: 12).

It is typical for regimes to be dynamic and get stronger over time. The Arctic Council reforms its goals depending on the best available cumulative information and informs national policy-makers. Regimes renew themselves to fulfill the requirements of their environment (Young, 1997). In the Arctic context, climate change and cumulative environmental information have been relevant challenges for environmental regimes.

Young's (1999) concept of a generative regime turns out to be useful in the Arctic setting. One of the central generative tasks is to catalyze new common practices to areas where there have not been any (ibid.). The key to the Arctic Council's success is said to lay in its generative role (Escudé, 2016: 69). It has shaped common norms and values and a framework for mutual interaction "even for the most reluctant to cooperate" (ibid: 69). This observation is especially crucial in this climate context.

The special value, or the cognitive niche of the Arctic Council, are scientific assessments produced by its Working Groups. The Arctic Council is an effective policy-shaper as a provider of new knowledge which stems from monitoring and co-producing knowledge, science and policy. The Arctic Council "serves as a knowledge broker and global advocate for Arctic topics" (Arctic Council: Climate, n.d.). The Arctic Council has been a "cognitive forerunner" in environmental policy, and especially in the case of POPs and climate change, which pose significant risks to Arctic inhabitants (Nilsson, 2012b: 191). Some of the assessments, especially the jointly produced Arctic Climate Impact Assessment (ACIA) (2004), have enabled the Arctic Council to disseminate a strong environmental and climate message to international fora.

The Arctic Council and its predecessor, the AEPS, are each products of the context in which they were founded. The thaw of East-West tensions in the early 1990s paved the way for strengthened regional cooperation. The period after the end of the Cold War was ripe for environmental awakening on a global scale, paving opportunities distinct from those only about traditional

military security issues (Brigham et al, 2016: 15; Koivurova & Graczyk, 2014). Arctic environmental protection, inspired by the Soviet leader Gorbachev's Murmansk speech, provided a common ground for functional cooperation and stability building. This was the starting point for the Arctic Environmental Protection Strategy, the AEPS, signed by the eight Arctic states in Rovaniemi in 1991.

The Arctic region is a sink of long-range transboundary air and water pollution which leads to environmental degradation. Arctic Indigenous peoples who live in close connection with nature were the first ones to be concerned about environmental changes. The Arctic environmental problems are linked with transboundary pollution from southern latitudes originating from human activities and radioactivity from the Cold War legacy and nuclear power plants. Local residents ultimately pushed the Arctic states to recognize these environmental challenges and identify solutions. At first, environmental cooperation was identified as a low political field and thus, suitable for multi-lateral cooperation. This changed when the environmental issues became interpreted politically as more significant, and environmental degradation was raised to a high political level and included in the foreign policy agendas of the Arctic states (Heininen, 2013).

The Arctic Council adopted a new salient message from the effects of climate change, when it was realized that the Arctic will warm twice as much as the rest of the planet. Resulting from the ACIA process, the image of the Arctic and dynamics of the Arctic politics changed (ACIA, 2004; Koivurova & Graczyk, 2014). The region previously framed as a vulnerable frontier transformed into a vivid, politically and economically viable area (AEPS, 1991; Koivurova & Graczyk, 2014). Much of the reassessing of the Arctic Council's focus is, thus, explained by increased understanding about the state of the Arctic environment, which is attributable to AMAP's assessments.

Methodological choices

This article mainly follows a document analysis method. I use an agenda setting perspective (see Pralle, 2009) and Downsian issue-attention cycle (Gupta & Jenkins-Smith, 2015) as a loose conceptual model for the analysis.

Document analysis gives an insight into an institution by examining documents it has produced (Bowen, 2009). This analysis is based on organizational documents such as ministerial declarations, which are official institutional deliverables. The primary sources used for this document analysis include the Arctic Environmental Protection Strategy (AEPS) and Arctic Council Ministerial Declarations (1991-2019) and some selected scientific reports produced by the Arctic Council Working Groups. Reports of Senior Arctic Officials to ministers or Working Group deliverables such as thematic scientific reports are not included.

The institutional development of the AEPS and the Arctic Council can be researched by analyzing processes at the highest ranking decision-making level, i.e. ministerial meetings. A testimony of the Arctic Council's growing climate awareness is traceable in ministerial declarations. This is the reason I concentrate on the ministerial declarations in order to trace the development of the Arctic Council's climate policy. A section in every Ministerial Declaration from Inari (2002) to Fairbanks (2017) is dedicated to climate change. (Although in the 2015 Iqaluit Declaration the subtitle did not include the exact word of climate change.) This represents the fact that the findings of the ACIA and the predicted impacts of climate change in the Arctic have served as a "game changer"

for the Arctic Council (see Friedrich, 2016: 173).

The top Arctic government officials gather biannually to a ministerial meeting to review the progress of the Arctic Council. The Arctic states are nowadays represented by foreign ministers and the tone is usually described as collegial stressing common Arctic interests (Chater, 2019). The decisions are made by consensus, and the ministerial meeting provides a joint declaration. Declarations are not legally binding, but they reflect the spirit and intent of the Arctic states supported by Permanent Participants and contain recommendations to Senior Arctic Officials.

Theoretical framework

I am interested in how different actors choose their primary focus and how it changes over time. According to the agenda-setting perspective, the hierarchy of different issues on the political agenda varies over time. Agenda-setting is a political process where issues compete for the attention of decision-makers and media. The core of agenda-setting is that growing public awareness helps elevate issues to the top of the political agenda (Pralle, 2009). This happens even in the Arctic Council and its growing climate consciousness, as I will demonstrate.

Agenda-setting and the varying prominence of policy issues can be visualized as a Downsian issue-attention cycle. It describes a cyclical process in which a policy issue gains and loses public interest over time. Public attention reflects the relative priority of a specific issue compared to other issues. Governmental attention, in turn, reflects that the issue is proportionally more discussed. The prominence of an issue grows when it shifts from a pre-problem stage to the next stage of alarmed discovery and euphoric enthusiasm. However, the attention begins to diminish when the costs of significant progress are realized, followed finally by a gradual decline of public interest into the post-problem stage (Gupta & Jenkins-Smith, 2015).

The stages are relatively predictable. In the first stage, the problem exists but is not widely recognized as a salient issue. In the second stage, the policy problem gains mass attention resulting from a big event which sparks the recognition of an urgent matter. In this stage, the policy-makers are forced to look for solutions for the problem. In the following stages, the costs of solving the societal problem cause frustration and the public loses interest. Finally, in the post-problem stage the policy issue loses its political priority. However, the political issue has already affected the institution and left open the door to potentially reawaken the issue quite easily (Gupta & Jenkins-Smith, 2015).

Next, I will explore how the Arctic Council has responded to climate change. Inspired by the Downsian issue-attention cycle, I have developed a 5-stage model of the growing climate awareness of the Arctic Council. The breaks in time periods coincide with ministerial meetings.

I: Pre-problem stage: Climate change is a global environmental problem

When Finland suggested transboundary cooperation to other Arctic States in the beginning of the 1990s, the environment was perceived as a common denominator belonging to the field of low politics (Nilsson, 2012a: 179). In the AEPS founding document (1991: 7), the Arctic states committed to international cooperation to ensure protection of the environment and sustainable development across the Arctic region. At that point the Arctic region was described as vulnerable and "highly sensitive to pollution" (ibid: 6, 12).

The focus of Arctic environmental cooperation was on transboundary human-induced long-range

contaminants (see AMAP, 1997; AEPS, 1991). The concrete action composed of activities for the "[a]ssessment of potential environmental impacts of development activities," as well as "the threats to the Arctic environment," including scientific research (AEPS, 1991: 2). The AEPS listed six specific pollution issues which required attention: persistent organic pollutants (POPs), oil, heavy metals, noise, radioactivity and acidification (ibid: 12). All of them are transboundary by nature except for noise. It is worth noting that climate change was missing from the initial priorities of the AEPS as Arctic environmental cooperation kicked off.

There were already some clear signs in the AEPS that climate change may become a significant environmental factor for the future of the Arctic and that it was important for AMAP to remain aware of international research:

> Two of the most significant threats to the present Arctic environment may come from climate change, induced by global warming and the effects of stratospheric depletion. Programs to detect and determine the causes and effects of climate change and ozone depletion are to a large extent being developed by other international groupings and in other for a.
>
> It is important for AMAP to be aware of these programs and to develop links with them from an Arctic perspective in order to encourage and facilitate an Arctic component in climate programs (AEPS: 1991: 30-31).

In the beginning of the Arctic environmental cooperation, climate change was first classified as a problem best suited for global environmental governance. The Rovaniemi Declaration (AEPS 1991: 12), the founding document of the AEPS, stated: "Other environmental problems including the depletion of the ozone layer and global warming were not addressed because they were already being considered in other fora." The first stage of Arctic environmental cooperation in the early 1990s thus aligns with the pre-problem stage of the Downsian issue-attention cycle: the existence of the problem of climate change was just beginning to be recognized.

The built-in intention and ability of the AEPS to adjust the initial priorities of the working groups proved later to be important for Arctic climate governance (AEPS, 1991: 32). It was already recognized early on that the Arctic is "influenced and in some cases threatened by factors occurring also outside" the region (ibid: 7). The Arctic ecosystems similarly affect global climate (ibid: 10).

II: Specific Arctic interest on climate monitoring (1993-1997)

The second stage of the five-stage model aligns with the period of 1993 to 1997, when the AEPS sought concrete steps for future cooperation. A central difference in the second stage compared to the first one is that climate change was now identified as salient for the Arctic region, spawning a call for more specific Arctic monitoring. This was supported by a distinguished global climate change study: The IPCC's special report on the regional impacts of climate change confirms that the Arctic is "very vulnerable to projected climate change and its impacts" (IPCC, 1997: 8).

In the Nuuk Declaration (1993: 6), one of the initial Working Groups, AMAP, was requested to "regularly review" results of global cooperation on climate change. AMAP's duty was to identify potential gaps and provide Arctic-related perspective on the global agenda. It was mutually synergistic to coordinate Arctic and global monitoring efforts in logistically difficult areas.

Climate change was included in the first Arctic Council Ministerial Declaration (Iqaluit

Declaration, 1998: 4), when the working groups CAFF and AMAP introduced their intention to prepare an overview on changes to ecosystems. In the beginning, effects of climate change were solely linked with general topics of Arctic ecosystems and biodiversity. The first comprehensive State of the Arctic Environment Report on Arctic Pollution Issues (AMAP, 1997: 169) reveals "climate change is likely to be more pronounced in the Arctic than in other areas of the world."

III: Arctic climate awakening (2000-2005)

In the third stage, the dramatic effects of climate change were realized and general awareness began to rise through the Arctic Climate Impact Assessment (ACIA) process. This aligns with the stage of the alarmed discovery of the Downsian issue-attention cycle (see Gupta & Jenkins-Smith, 2015). The third stage of the five-stage model covers the period from the Barrow Ministerial Meeting (2000) when the ACIA project was launched to the publication of the findings in Reykjavik in 2004. The ACIA process has been thoroughly analyzed by Nilsson (2007).

The ACIA (2005) is the world's most comprehensive regional climatic and ultraviolet radiation assessment to date. It describes the ongoing climate change and its consequences in the Arctic region and its global effects: inter alia global sea level rise, reduced sea ice, vegetation zones and animal species' distribution shifts, economic and cultural impacts to Indigenous communities and challenges to infrastructure (ACIA, 2004: 10-11; ACIA, 2005).

The goal of the ACIA, as defined by the Barrow Declaration (2002: 2), was to "evaluate and synthesize knowledge on climate variability and change and increased ultraviolet radiation, and support policy-making processes and the work of the Intergovernmental Panel on Climate Change." The assessment included sections on topics of general Arctic interest, such as human health, social and economic impacts with respective policy recommendations (ibid). One key finding was that "[c]limate change, together with other stressors such as ultraviolet radiation, presents a range of challenges for human health, culture and well-being of Arctic residents, including Indigenous peoples and communities, as well as risks to Arctic species and ecosystems" (ACIA Policy Document, 2004: 4).

In the Inari Declaration (2002), the main focus of the Arctic Council still centered on longstanding themes: pollutants, biodiversity conservation and human conditions in the Arctic, but this would soon change. The preliminary findings of the ACIA process had already become available, and the Inari Declaration made this clear by introducing the idea that the Arctic is an "early warning of global climate changes" (ibid: 4).

The Reykjavik Ministerial Meeting two years later served as a further turning point for the environmental and climate work of the Arctic Council. In the Reykjavik Declaration (2004: 4), the original themes of biodiversity conservation and actions against pollutants were mentioned, but they were tied in with cross-cutting climate issues to "Recognize the special features of the Arctic environment as an indicator of global environmental impacts, such as climate change and long-range transboundary pollution." In this ministerial meeting the Arctic Council welcomed with appreciation the Arctic Climate Impact Assessment (ACIA, 2004) and 'note[d] with concern' the documented climate impacts which were already felt in the Arctic region. The climate emphasis was so overpowering that the simultaneously published Arctic Human Development Report (2004) was overshadowed by the ACIA (2004) (see Brigham et al, 2016: 16).

The results of the ACIA (2004: 10-11) are comprised of ten key findings:

1. Arctic climate is now warming rapidly and much larger changes are projected.
2. Arctic warming and its consequences have worldwide implications.
3. Arctic vegetation zones are very likely to shift, causing wide-ranging impacts.
4. Animal species' diversity, ranges, and distribution will change.
5. Many coastal communities and facilities face increasing exposure to storms.
6. Reduced sea ice is very likely to increase marine transport and access to resources.
7. Thawing ground will disrupt transportation, buildings, and other infrastructure.
8. Indigenous communities are facing major economic and cultural impacts.
9. Elevated ultraviolet radiation levels will affect people, plants, and animals.
10. Multiple influences interact to cause impacts to people and ecosystems.

The "Arctic in change" metaphor was introduced by the ACIA process (Koivurova, 2010: 149). The key message of the ACIA (2004) was that the climate is inevitably changing and these changes were intensely experienced in the Arctic, presenting profound challenges to the Arctic ecosystems, inhabitants, infrastructure and livelihoods (ACIA, 2004). The ACIA argued that climate change would challenge the circumstances typical for the Arctic as we know them. Global warming is expected to accelerate over this century, contributing to severe ecological, social and economic changes; some of these are already felt in the Arctic. Whether particular changes are perceived as positive opportunities or negative challenges depends on stakeholders' interests. Impacts of climate changes addressed in the Arctic are partly caused by greenhouse gas emissions whose origins are outside of the Arctic region. In the same way, the changes in the Arctic reverberate back globally. Thus, the Arctic is of special global importance and can provide an early indication of future societal and environmental challenges (ibid: 8-10). A true wake-up call was the observation that the "Arctic average temperature has risen at almost twice the rate as the rest of the world in the past few decades" (ibid: 8).

The ACIA process is renowned for its detailed work with three-hundred scientists participating in its research processes. The results of the ACIA are compiled in different documents: a plain language 140-page synthesis report Impacts of a Warming Arctic (ACIA, 2004), a negotiated ACIA Policy Document (2004) and comprehensive 1020-page scientific Arctic Climate Impact Assessment (ACIA, 2005). In the ACIA Policy Document (2004) the Senior Arctic Officials (SAOs) presented their recommendations. They covered mitigation, adaptation, research, monitoring and outreach activities. Based on the findings of the ACIA, the need to reorganize the work of the Arctic Council was evident (ibid). Climate change, among other stressors, presented several challenges to Arctic ecosystems and communities. The ACIA's findings also linked the Arctic to the global climate system, leading to the understanding that taking effective policy measures was a common responsibility (see Reykjavik Declaration, 2004).

A direct consequence of the ACIA recommendations and growing climate awareness was increased visibility of the Arctic Council at international fora (see e.g. Reykjavik Declaration, 2004: 1; Salekhard Declaration, 2006: 1). The Arctic Council embraced a more active role in other international fora by disseminating the ACIA deliverables in order to advance cooperation and to

address environmental, social and cultural implications of climate change. The role of the Arctic as an international partner was highlighted already in the Inari Declaration (2002: 4-5). This is attributable to the preliminary results which had underlined the linkages between Arctic and global processes on climate. Politically, even institutional interplay with other fora and "intensified need for global and regional action" was addressed (ibid.). This emphasis continued in the subsequent Reykjavik (2004) and Salekhard (2006) Declarations.

IV: "Climate Change as Game Changer"[2] (2006-2017)

The fourth stage took place between 2006 and 2017, when the Arctic Council fully incorporated impacts of climate change into its work. The Downsian issue-attention cycle describes the skyrocketing prominence of an issue as euphoric enthusiasm (Gupta & Jenkins-Smith, 2015). This description corresponds with the Arctic climate buzz after the releasing of the ACIA (Steinberg et al., 2014: 4). In line with the Downsian issue-attention cycle, several prominent events drew attention to the Arctic in the beginning of the new millennium. They included, for example, the record lowest Arctic sea ice minimum (2007), a Russian flag planting on the seabed beneath the North Pole (2007), and assessments of undiscovered Arctic oil and gas reserves (2008) (ibid).

As a result of the ACIA (2004), the Arctic states became more aware of new economic opportunities and easier marine access resulting from global warming in the Arctic region. The loss of sea ice opens new opportunities for economic development, whereas several challenges are placed upon Arctic ecosystems, cultures and sustainable livelihoods. The ACIA (2004: 13) projected the nearly total loss of sea ice in summer "for late this century." It is evident that the Arctic Council was preparing for increased human activity in the Arctic in such forms as oil and gas development, commercial shipping and tourism. As a consequence, the Arctic Council identified itself as the leader "on Arctic challenges and opportunities," which became a new, repeating locution in the declarations (Tromsø Declaration, 2009: 1; Kiruna Declaration, 2013: 1). The notion is tied with "the extensive reduction of Arctic sea ice coverage and thickness," which is associated with increased marine access (Tromsø Declaration, 2009: 2).

At the same time, the need to enhance emergency preparedness increased (Chater, 2015: 83). Along with economic visions, the Arctic Council placed new emphasis on emergency prevention preparedness and response and assessment on oil and gas anticipating increasing marine activity and access to natural resources (AMAP, 2007; ACIA, 2004; see Reykjavik Declaration, 2004: 4). Even an Arctic Marine Shipping Assessment (PAME, 2009) was published. The Arctic Council "recognize[s] the development of safe and environmentally secure marine transportation and subsea pipeline development in the Arctic region as a priority issue closely linked to climate change, technological advance and resource use" (Salekhard Declaration, 2006: 7). Even the first two legally binding agreements negotiated under the auspices of the Arctic Council dealt with search and rescue and marine oil pollution preparedness and response (Arctic Council: International cooperation, n.d.).

In the Tromsø Declaration (2009: 1) the Arctic Council underlined "human induced global climate change as one of the greatest challenges facing the Arctic." However, the original priority issues, namely transboundary pollutants including heavy metals and persistent organic pollutants, "continue to be a major concern" (ibid: 2).

The Nuuk Declaration (2011) condensed the spirit of the above-mentioned metaphor of "the

Arctic in change." The Arctic Council explicitly wanted to stabilize its view on the rapidly changing circumstances and prevailing values while, at the same time, global interest in Arctic involvement was exploding. The increased attention to the Arctic Council underscored the need to strengthen its capacity to address new challenges and opportunities. The Arctic Council launched several new conceptual tools in Nuuk. The ministers decided to establish a standing secretariat and a task force to implement the strengthening of activities. New recommendations for the role and criteria of observers were adopted (ibid, 2011: 1-2). The first legally binding agreement concerning cooperation in aeronautical and maritime search and rescue in the Arctic was negotiated under the Arctic Council (SAR Agreement, 2011). The Nuuk Ministerial Meeting supported substantial global carbon dioxide reductions and urged all parties to the United Nations Convention on Climate Change (UNFCCC) to meet the goal of keeping the global average temperature rise under two degrees Celsius relative to pre-industrial times (Nuuk Declaration, 2011: 4). This is an example of institutional interplay and how the institutions support each other and share common goals. The Arctic Council welcomed the assessment of the Arctic cryosphere (AMAP, 2011) which provided evidence on accelerated changes. The Arctic Council emphasized their "leadership to minimize the human and environmental impacts of climate change" and repeated the importance of resilience and reducing short-lived climate forcers (Nuuk Declaration, 2011: 3).

The Kiruna Ministerial Meeting in 2013 marked a shift towards a more global community of Arctic-interested parties. The enlargement of Asian observer countries, including China, India, Japan, Republic of Korea and Singapore, was noticeable. The Kiruna Declaration (2013: 3) highlighted that climate change in the Arctic has "repercussions around the world." Thus, the ministers used the momentum and included a reference to major Arctic and Arctic-minded emitter countries urging them all to commit to common climate efforts (ibid).

The Arctic Council published in Kiruna the Vision for the Arctic (Arctic Council, 2013) which addresses a need to ensure that the Arctic voice is globally heard. Among other priorities, the Vision emphasizes a safe, prosperous and peaceful Arctic. The safety dimension covers environmental and civil security with growing emphasis on marine safety. Prosperity of the Arctic covers both human well-being and sustainable development with economic potential. The peaceful Arctic includes the heart of all the efforts of the Arctic Council: a stable and cooperative region is the requirement for all development.

The Iqaluit Declaration (2015: 4-5), signed in April 2015, marked a strong statement for global and national action to fight climate change, including its referring to the Paris Climate Change Conference in November-December 2015. The importance of resilience and adaptation to climate change were stressed for the sake of Arctic communities (ibid: 8). The economic emphasis strengthened as the Arctic Economic Council was established (ibid: 5). The role of the Arctic Council as an environmentally aware standard setter was strengthened; the ministerial meeting endorsed Offshore Oil and Gas Guidelines (PAME, 2014) and the Guide to Oil Spill Response in Snow and Ice Conditions in the Arctic (EPPR, 2015) in line with the anticipated increase in activity in the marine area. However, politically, the biggest achievement of the Iqaluit Ministerial Meeting was its proof that the Arctic Council could still thrive in spite of the tensions in the wake of the Ukrainian crisis.

Still, at least in one central way, not much changed in relation to the Arctic Council taking a role in addressing the major cause of climate change, i.e. greenhouse gas emissions where the Arctic

states are among major culprits. This is logical, firstly, because several Arctic states have major investments and stakes in the oil and gas sector. Secondly, and perhaps most importantly, the Arctic Council works based on consensus, and emission regulation belongs to national decision-making processes.

V: Time of uncertainty (2017-present)

If the Arctic Council has thus far acted as an active climate messenger for international environmental governance, a chilly wind of change started to approach Arctic environmental cooperation in the late 2010s. The challenges were around the corner when Donald Trump was inaugurated as the President of the United States in January 2017. President Trump has long openly undermined the Paris climate agreement and multilateral cooperation on these issues (see Koivurova, 2019). Paris agreement had been the first universal and legally binding climate change agreement (UNFCCC).

The Arctic Council celebrated its 20th anniversary in Fairbanks in 2017 and reaffirmed its "commitment to maintain peace, stability, and constructive cooperation" (Fairbanks Declaration, 2017: 1). The Fairbanks Declaration (2017) included sections of Arctic Ocean safety, security and stewardship; impacts of climate change; improving economic and living conditions and strengthening the Arctic Council. However, the first signs of what was to come were already visible in this meeting in May 2017.

There had been signs that the Trump administration was trying to weaken phrasing of the Fairbanks Declaration in advance of the meeting, particularly regarding climate change and reducing greenhouse gas emissions (Sevunts, 2019). Finally, then United States Secretary of State Rex Tillerson along with other foreign ministers of the Arctic States signed a declaration which expresses support for international institutional interplay and the objectives of the Paris Agreement. The Fairbanks Declaration (2017: 1) was endorsed including the words: "[n]oting the entry into force of the Paris Agreement on climate change and its implementation, and reiterating the need for global action to reduce both long-lived greenhouse gases and short-lived climate pollutants." The subsequent section on climate change goes further on resilience, adaptation and mitigation of climate change (ibid.: 5). The ministers even welcomed the updated assessment on Snow, Water, Ice and Permafrost in the Arctic (Fairbanks Declaration, 2017: 6; AMAP, 2017). Ultimately, the outcome of the Fairbanks Ministerial Meeting was that both the United States and Russia signaled their interest in continuing cooperation within the Arctic Council, which was, in the short term, an apparent success. However, less than three weeks later, on June 1st 2017, President Trump made the decision to withdraw the United States from the Paris Agreement because of the perceived unfair economic disadvantages to the United States (White House, 2017).

President Trump's decision to withdraw the United States from the Paris Agreement started a distinct new stage of the Arctic climate collaboration. That was a strong manifest against the core of the work of the Arctic Council from one of its founding members. However, this is understandable, if a state has significant national political interests at stake. National, in this case American, stances on climate change has shifted over the years depending on each presidential administration. Nevertheless, climate collaboration became more complicated, or even paralyzed, in the consensus-based Arctic Council.

Diverging national opinions on climate change catapulted the Arctic Council to a new phase during

the Rovaniemi Ministerial Meeting in 2019. In the Arctic context, Rovaniemi was previously known for its collaborative Arctic spirit (Rovaniemi Arctic Spirit, n.d.; Koivurova, 2019). This metaphor refers to the history of Arctic environmental cooperation and the signing of the AEPS in Rovaniemi about thirty years earlier. The latest ministerial meeting is thus far the only one without a ministerial declaration. This is the result of the fundamental disagreement over climate change between the other Arctic states and the Trump administration which denied it.

When it was clear that the United States would not accept the draft ministerial declaration mentioning climate change, it was time for a diplomatic maneuver as the decisions of the Arctic Council are taken by consensus. The Arctic states concluded the ministerial meeting with a short Rovaniemi Joint Ministerial Statement (2019) without any mention of climate. However, the spirit of the majority of the Arctic Council was innovatively delivered by the Rovaniemi Statement by the Chair (2019). This implied that the Arctic Council was not ready to completely reverse course and water down their decades-long, growing efforts to steward the discussion about climate change as a common challenge.

The one-page Rovaniemi Joint Ministerial Statement (2019) included general statements of the common set of values and the significance of Permanent Participants. Structurally, the Rovaniemi Statement by the Chair (2019) is what one used to get in ministerial declarations. There is some duplication between these two statements. However, it is evident where the shoe pinches, when one pays attention to the contents of the documents. The Chair, then Finnish Foreign Minister Timo Soini, refers to "the meeting" when speaking about the points which all ministers consensually agreed on and states "a majority of us" when referring to the more contradictory climate issues. Ultimately, the Statement by the Chair addresses climate change in several points, mentioning by name the Paris Agreement and the need "to limit the impacts of climate change in Arctic communities" (ibid: 9). The message of the Chair of the Arctic Council was that "[a] majority of us regarded climate change as a fundamental challenge facing the Arctic and acknowledged the urgent need to take mitigation and adaptation actions and to strengthen resilience" (ibid: 7). The ministerial meeting noted the interconnectedness of the planet, how faraway activities and changes may have substantial effects in the Arctic region leading to social, economic and environmental effects (ibid).

The Downsian issue-attention cycle suggests a development towards "realizing costs of significant progress," "gradual decline of public interest," and finally, the "post-problem stage" (Gupta & Jenkins-Smith, 2015). In the Arctic climate context, it is not the case of decline of public interest: Climate change is an omnipresent, cross-cutting issue. A better explanation would be extremely differing national interests, which affect international cooperation.

Analyses

The Downsian issue-attention cycle works reasonably well for developments of the Arctic Council's work related to climate change during the first four stages, but it fails to provide relevant insights in the fifth stage. This is due to the fact that climate change is an omnipresent phenomenon, and the current public interest is not gradually declining, as suggested by the Downsian cycle. Rather, here it is most obviously a case of opposing national interests, with high political stakes. Thus, the Downsian issue-attention cycle does not reflect the best possible way to analyze an issue with several parties with conflicting interests.

Another possible weakness of this Downsian issue-attention cycle may lay in the fact that it is retroactively easier to differentiate and choose relevant time periods matching each Downsian stage. The time frames for each stage are created by the author and are thus subjective. "Pre-problem stage," "alarmed discovery," and "euphoric enthusiasm" were relatively easy to identify. Still, I noted that the limits were somewhat blurred. However, milestones such as the publishing of the ACIA in 2004 and the withdrawal of the United States from the Paris Agreement were obviously clear.

The Downsian issue-attention cycle continues with "realizing costs of significant progress," "gradual decline of public interest," and finally, the "post-problem stage" (Gupta & Jenkins-Smith, 2015). Climate change has lost, for practical reasons, its top priority, and new issues are raising and taking its role on the Arctic Council's agenda. One of the trending issues is economic activities. However, the Arctic Council has never had only one priority, but more cross-cutting themes such as environmental protection and sustainable development. Climate collaboration work will be possible in the Arctic Council as part of other practical and science-based cross-cutting projects. This idea is in line with Down's issue-attention cycle, which recognizes the possibility to reawaken an issue which has once lost its priority.

Concluding note

The general consciousness of climate change as a salient issue has gradually risen. A central role in this process was the Arctic Climate Impact Assessment (2005) and its synthesis report (ACIA, 2004). This forced policymakers to understand that the future of the Arctic will fundamentally be different. After the publication of the ACIA, the Arctic was interpreted as an early warning of global climate change, and the Arctic Council realized its significant implications for its work.

Daily Arctic cooperation is currently being challenged not only by disagreement on climate issues, but also by COVID-19. The pandemic virus challenges well-established international frameworks even at the practical level: travelling, meeting colleagues face to face, and field trips to the medically and socioeconomically vulnerable Arctic region can no longer be taken for granted. When the current, most severe and acute political and public interest no longer rests on COVID-19, there will be a need to reassess the new landscape of challenges and opportunities for continued climate cooperation.

Arctic cooperation has been a story of scientific scrutiny and gradually increasing understanding. Perhaps the new common denominator lies in opening economic opportunities that are connected with dramatically changing Arctic circumstances driven by climate change. It will certainly remain challenging to foster climate stewardship in the near term. This all leaves some central questions open: how dedicated is the United States to the work of the Arctic Council in general? How can the Arctic states rebuild the confidence they need to succeed? However, the geographic proximity and the need for mutual understanding are here to stay. It might be the spark to maintain constructive Arctic cooperation, although the challenges from Rovaniemi will reverberate in the years ahead.

Notes

1. The current Arctic Council Working Groups are Arctic Contaminants Action Program

(ACAP), Arctic Monitoring and Assessment Programme (AMAP), Conservation of Arctic Flora and Fauna (CAFF), Emergency Prevention, Preparedness and Response (EPPR), Protection of the Arctic Marine Environment (PAME) and Sustainable Development Working Group (Arctic Council: Working Groups).

2. The subtitle is originally by Friedrich (2016: 173).

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Briefing Note

The Royal Circle: Swedish Monarchy and the Arctic

Robert P. Wheelersburg

> I realized from travelling to the Arctic that science has an absolutely critical role to play [in the future of the Arctic]. The Nordic countries are at the forefront of Arctic research … [and] are in an excellent position to contribute with the best of our knowledge, ideas and new solutions…Coming generations may not have a voice or a vote. At least not yet. But we owe them to make the right decisions, and to base those decisions on solid knowledge - and, above all, to act accordingly. I am quite sure that the Arctic enthusiast King Oscar would agree. And that his namesake, my 3-year-old son, Prince Oscar, expects nothing less.
>
> - HRH Crown Princess Victoria, Arctic Circle Assembly, October 10, 2019

With those words, Swedish Crown Princess Victoria became the public face of her country's recently discovered Arctic identity that tied its past to its future. Yet, her ancestor King Oscar II (r. Sweden 1872-1907; r. Norway 1872-1905) could have given her speech because it dealt with the Arctic as a place of exploration and research, the way he understood it over a century ago.

King Oscar II was arguably modern Sweden's founder through his creation of the Oscarian Age (Frykman & Löfgren, 1987), a period of industrialization and urbanization leading to the growth of the emerging middle-class value system recognized by many people today as Swedish culture (e.g. punctuality and cleanliness). As part of his modernization program, Oscar supported expeditionary-based Arctic research. Hegemony also played a role in his patronage, as the king wanted a Swedish expedition to reach the North Pole first. During Oscar's reign, Sweden still controlled Norway, and he wanted to display a strong presence in the circumpolar north.

Along with Alfred Nobel, King Oscar funded the Swedish expedition of S.A. Andrée, who attempted to reach the North Pole by hydrogen balloon. The expedition came to within 300 miles of its goal on July 14th, 1897, only to have its three members die trying to walk across the ice to

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safety three months later. Oscar funded other circumpolar expeditions including Norwegian Fridtjof Nansen's expedition to Greenland in 1888. Nansen was different than other Arctic explorers because he started as a scientist, defending his Ph.D. thesis five days before departing on his Greenland expedition. In his 1897 autobiography, Nansen referred to the Arctic as "that never-ending white line on the horizon over yonder … [where] … a new life is beginning for us" (2008: 318).

However, Sweden lost its Arctic identity during King Oscar's reign due to sovereignty processes over the past 200 years in the Swedish Arctic including border disputes, warfare, and treaties. Sweden lost part of its access to the Arctic Ocean as a result of the Finnish War (1808-09), when the country ceded Finland to Russia, after controlling it for 700 years. Then, in 1905, the Union between Sweden and Norway dissolved, resulting in the loss of Sweden's access to the Arctic Ocean through Norwegian ports. Thus, despite King Oscar's interest and support in the region, for a hundred years following his death Sweden no longer considered itself an Arctic country because it had no circumpolar territory.

A century later, the future queen prepared for her plenary speech by visiting the royal palace's Bernadotte Library, which King Oscar founded. The library's Arctic collection was orientated toward exploration and research, setting the tone for Crown Princess Victoria's portrayal of the region as a remote place that is subject to royal control by the three modern Scandinavian kingdoms. The Crown Princess, along with the Crown Princes of Denmark and Norway (all descendants of Oscar II), spent four days in 2008 aboard the Swedish icebreaker Odin, visiting Svalbard to learn about climate change. The next summer, the three future monarchs boarded a Danish patrol vessel sailing to Greenland to learn how climate change was affecting the Inuit. Emphasizing her kingdom's belief that global climate change was everyone's concern, Her Royal Highness called on the Nordic countries to ensure "sustainable and peaceful development of the Arctic region". Before concluding her speech, in order to illustrate Sweden's stake in the future Arctic, the Crown Princess noted that her son Prince Oscar, Duke of Skåne would be watching our response to those challenges.

There were some aspects of Crown Princess Victoria's speech unique to Sweden as it attempts to reestablish its Arctic identity. Despite having 15% of its landmass located above the Arctic Circle, Sweden calls its Arctic region *Övre Norrland* (Upper Norrland). Upper Norrland consists of Norrbotten Province, much of which lies within the Arctic Circle, but it also includes Västerbotten Province that contains no territory within the 66.5º arc. Other Nordic countries have also recently proclaimed large portions of their nations Arctic in policy statements, such as Finland formally designating its entire country Arctic (Katainen, 2013). Arctic identity allows countries like Sweden to exploit emerging territories containing natural resources and to use newly opened corridors like the Transpolar Sea Route from the Pacific to the Atlantic.

In his essay, *The reluctant Arctic citizen: Sweden and the North*, historian Sverker Sörlin asked the question "Is Sweden an 'Arctic nation'" (Sörlin, 2014: 149). Sörlin answered that geographically Sweden is Arctic since over half of the kingdom lies above the 60th parallel, an area containing one third of Sweden's population. Sweden's northern territory also exhibits many of the characteristics of Arctic countries, including its weather, glaciers, and a sparse population (Sörlin, 2014). Upper Norrland is also home to an Arctic Indigenous people practicing traditional activities such as reindeer herding and handicrafts.

Yet Sörlin stated that Sweden had no formal Arctic identity until 2011 when the country produced its first Arctic Strategy (Ministry for Foreign Affairs 2011) as it assumed the Arctic Council Chairmanship. After entering Arctic politics in 1996 as an Arctic Council founding member, Sweden addressed international circumpolar issues such as human rights and sustainable development within the council. Conversely, Sweden's Arctic territory was treated as a domestic policy issue involving economic activities (e.g. Baltic seal hunting, reindeer herding, mining, etc.), infrastructure building (e.g. hydroelectric dams, roads, airports, universities and colleges, etc.), and security preparedness (i.e. territorial defense) (Sörlin, 2014).

As did Crown Princess Victoria, Sörlin related Sweden's Arctic identity to its long-term circumpolar research agenda starting with its early Arctic expeditions. Swedish Arctic research continued by building institutes and observatories with a circumpolar focus, including those at Abisko in 1906, Tarfala in 1945, Stockholm in 1944, and Kiruna in 1957. Since it had no formal polar secretariat, Swedish Arctic research benefitted substantially from the efforts of scientist Hans Ahlmann (1889-1974), who made the transition from expeditionary-based discovery to scientific research projects. A glaciologist who conducted field research in the high Arctic, Ahlmann's "polar warming" hypothesis became a focus for Arctic research from the 1950s until today (Sörlin, 2011). He became president of the Geographical International Union and entered politics after being appointed as ambassador to Norway from 1956 until 1960. Using informal networks and international connections, Ahlmann became "the prime manifestation of Swedish Arctic and polar policies over a critical period, spanning five decades from the 1920s through to the early 1960s" (Sörlin, 2014: 157). Like Crown Princess Victoria, Ahlmann called on the Nordic region to cooperate on Arctic science because the Scandinavian peninsula was subject to the circumpolar and North Atlantic climate and physical processes that he documented.

Sweden's Arctic research agenda became involved in the region's geopolitical divisions following World War II. Regardless of Sweden's publicly stated policy of neutrality beginning in the 1940s, the Arctic became an important part of what in reality was its West-aligned security policy throughout the Cold War. Sweden's western alignment manifested itself through U.S. military support to the Kiruna Geophysical Observatory, which in 1973 became the Swedish Institute of Space Physics. The International Meteorological Institute in Stockholm was also funded by the U.S. Air Force (up to 50%) during the late 1950s and early 1960s (until 1967 when politics ended U.S. military support). With the American funding the Russian space program became an emphasis of Swedish meteorological and atmospheric research (Sörlin, 2014).

Despite that history of Arctic research and geopolitical activities, Sweden still did not have a formal polar policy a decade into the 21st century (Sörlin, 2014: 162-163).

> Swedish polar policies are still not as clearly articulated as that of the other Scandinavian countries and most other members of the Arctic Council…Swedish chairmanship of the Arctic Council acted as a catalyst to this process. Indeed, it was at the outset of that period that Sweden presented its first-ever Arctic strategy. The word 'Arctic' is nowadays also used in official Swedish foreign policy documents, which it has not been for almost a century.

Even with Sweden's officially stated Arctic identity and the country's chairmanship of the Arctic Council, most Swedes still did not consider themselves residents of an Arctic country as illustrated in a 2011 survey. Nearly 50% of Swedish respondents (n=1000) thought that "the Arctic should

be an international territory like Antarctica", and only 9% had heard of the Arctic Council (Ekos, 2011: 42, 48). Thus, the year that the kingdom produced its first Arctic strategy, the Swedish public thought of the Arctic as the remote circumpolar north rather than Norrland.

A personal anecdote illustrates the Swedish peoples' lack of Arctic identity a few years later. I conducted field and archival research for nearly three decades on Saami reindeer herders in Norrland. Along the way, my wife and I became friends with a Swedish family from Umeå, with whom we corresponded and visited several times. Although not academics, the family knew of my work with the Swedish Saami, much of it in Västerbotten Province where the family lived. We were excited to tell our friends that we would be attending the International Congress of Arctic Social Scientists (ICASS) to be held in Umeå during June 2017. Yet they were puzzled. The Swedish wife asked why I would be attending a conference on the Arctic since I conducted field research in Upper Norrland?

Considering that it lacks an Arctic regional identity, that it possesses no territory bordering on the Arctic Ocean, and that it was without a formal Arctic policy for over a hundred years, it is hard to envision how Sweden can be considered Arctic. In fact, at first Her Royal Highness' speech sounded archaic in its portrayal of Sweden as an Arctic country because it tied the monarchy but not the state to the circumpolar region. Yet, upon further reflection, the future queen proclaimed that her kingdom remained firmly committed to the Arctic as a place of discovery and scientific research to address problems like climate change. By referring to Umeå as an Arctic city, despite it being located 250 miles (400 kilometers) south of the Arctic Circle, she indicated her view that Upper Norrland is part of the Arctic, although it is subject to the kingdom's domestic policy and sovereignty. Crown Princess Victoria described the royal family's continued association with the Arctic, today as supporters instead of as rulers, establishing the realm's commitment to the region that represents her subjects' future as well as their past.

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Briefing Note

Future Arctic Societies: Scenarios, Innovations, Best Practices & Actors

2019 Calotte Academy

Gerald Zojer

The Idea of the Calotte Academy

The Calotte Academy (CA) is, on the one hand, an annual travelling symposium in Europe's Arctic, North Calotte region and, on the other, an international, independent, academic forum in the Arctic. It is designed first, to promote interdisciplinary discourse and second, to foster academic and policy-oriented dialogue among members of the research community, as well as a wide range of other northern stakeholders, such as policy- makers, civil servants, community leaders and planners, business representatives, and members of academia. On the other hand, it is an international summer school (and in 2019 a winter school) for early-career scientists, particularly PhD candidates and post-docs with an aim to implement the interplay between senior and young researchers, and post-graduate students.

The CA is an independent, though not established, academic forum with dozens of scientific presentations, lively discussions, and written reports. We also do interdisciplinary border studies by having several crossings of national borders (this year only the Finnish-Norwegian, while usually also Norwegian-Russian, Russian-Finnish, and sometimes Finnish-Swedish and Norwegian-Swedish), as well as crossing borders between Finland and the Sámi Area, Sápmi in Finland and Norway.

The Academy has been arranged annually since 1991 with an aim to bring together academics and other experts, policy-shapers and other stakeholders from different Arctic and European states, as well as students and scholars with different academic backgrounds and in different stages of their

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academic careers. The Academy has a participatory approach with sessions in several destinations with local audiences and expertise. Furthermore, it aims to contribute to discussions and debates over regional development through inviting local and regional stakeholders to participate in the sessions with the intention of sharing research results and insights, creating networks and fostering dialogue between the local and national actors and the international scientific community.

At the Calotte Academy we are used to combining a few things, such as research/theory and practice/action; different studies/inter-disciplinarity and different knowledges (trans-disciplinarity); research, supervision and studying/teaching; presentation, participation, interactivity; brainstorming, planning, sharing ideas, having division of work; different scales from local to global; and final, synergy between international networks (e.g. Northern Research Forum, TN on Geopolitics and Security, Arctic Yearbook).

Following from this, in each session of the Academy the annual overarching theme is discussed holistically from many angles and disciplinary approaches, and from the perspectives of past(s), present(s) and future(s), as well as from global, Arctic and local context in the European Arctic. This principle has been implemented at recent Calotte Academies and will be implemented in future events. In addition, the overarching themes of five of the previous Calotte Academies were much related to resources:

- May 28 – June 4, 2012 in Kiruna and Abisko, Sweden, Tromsø, Norway and Inari, Finland under the theme "Water – globally and in North Calotte;"
- May 16-23, 2013 in Rovaniemi and Inari, Finland, Tromsø, Norway and Kiruna, Sweden under the theme "Resource Geopolitics – Energy Security;"
- June 1-8, 2014 in Rovaniemi and Inari, Finland, Kirkenes, Norway, and Murmansk and Apatity, Russia under the theme "Resource Geopolitics – Sovereignty;"
- May 31-June 7, 2015 in Rovaniemi, Salla and Inari, Finland, in Kirkenes, Norway, and in Murmansk and Apatity, Russia under the theme "Resources and Security in the Globalized Arctic;"
- May 30 - June 5, 2016 in Rovaniemi and Inari, Finland, in Kirkenes, Norway, and in Murmansk, Russia under the theme "Resilience related to Sustainable Development in Globalization."

Then the most recent Academies started to bring in a new thematic phase emphasizing discourses, premises, paradigms and methods:

- June 1–12, 2017 in Inari, Finland, Kirkenes, Norway, Apatity, Russia, and Umea, Sweden under the theme "Perceptions of the Arctic: Rich or Scarce, Mass-scale or Traditional, Conflict or Cooperation?"
- and June 3–10, 2018 in Rovaniemi and Inari, Finland, Neiden and Kirkenes, Norway, and in Apatity and Kirovsk, Russia under the theme "Discourses on the Arctic – (inter)disciplinary theories and methods of Arctic research."

This path was continued with the 2019 Academy under the theme "Future Arctic Societies: Scenarios, Innovations, Best Practices & Actors" (for the final reports of previous Calotte

Academies visit: https://calotte-academy.com/final-reports).

Correspondingly, the CA has a few rules and principles: First, and foremost, that there is always time for open discussion – usually this means about two times more time for open discussion than for a presentation. Second, that each participant, in addition of her/his presentation, is asked to write a report on one session for the final report of the Academy, and actively participate in discussions. Finally, each participant is asked to be flexible, as are the organizers, but keep the time frame and schedule in sessions and in travelling.

Thus, the Calotte Academy implements the social relevance of science, or science diplomacy, by having the interplay between science and politics as one of the main aims. This has been there since the first Calotte Academy, which took place in May 1991 in Inari, Finland; of note is that the Arctic Environmental Protection Strategy (AEPS) was signed at the first ministerial meeting between the eight Arctic states in June 1991 in Rovaniemi, Finland, and the Arctic Council was established in September 1996 in Ottawa, Canada. During its (more than) 25 first years the Academy has built partnerships between researchers and community members, and conducted community-based research as well as developed research models for communities.

As an international platform for policy-oriented dialogue and dissemination of research with an emphasis on both expertise and dialogue the Calotte Academy is a post-modern academic stage and workshop that fosters interdisciplinary, knowledge(s), and dialogue-building, and implements the interplay between science and politics. Since 2002 the Academy has served as a sub-forum for Open Assemblies of the Northern Research Forum. Since 2010 the CA has acted an annual doctoral summer school for PhD candidates and functioned as the main annual forum for the discussions and research planning of the Thematic Network (TN) on Geopolitics and Security. The TN is a joint international, academic network between the University of the Arctic and the Northern Research Forum (see, https://arcticpolitics.com). The Network also publishes The Arctic Yearbook - the 8th volume devoted to the "Redefining Arctic Security" was launched in November 2019 – via which a state of Arctic geopolitics and security is documented, analyzed and contributed to (see, https://arcticyearbook.com). Here the Arctic Yearbook is a major forum for dissemination of the main findings and highlights of the Calotte Academy, as well as further discussion on the themes.

To conclude, the Calotte Academy is an interdisciplinary brainstorming meeting to bring researchers and other experts from different fields, regions and countries together for to discover innovations and new methods, and produce international research projects as well as plans and applications. This kind of a "school of dialogue" with serious efforts and flexibility aims to create an open academic discussion, and participatory by nature with an idea to share knowledge and experiences with communities. Behind is a need for science and the scientific community to take seriously, and literally the social relevance of science, and that science is with values, and this means more than labs - science is about people(s), societies and the environment. Briefly saying to 'take care' - instead of having corrupted norms of double standards, or the current schizophrenic approach of neoliberalism supported by specific expertise and meritocracy - is possible to interpret as a new norm with values. In these turbulent times for Academia, as it is in many European countries due to several pressures and cuts in funding, this kind of academic forum is a much needed democratic and equal space for a dialogue and brainstorming.

Theme of the 2019 Calotte Academy

The theme of the 2019 Academy was "Future Arctic Societies: Scenarios, Innovations, Best Practices, Drivers & Actors". In this year the travelling symposium discussed Arctic issues and discourses in the context of the regional and globalized Arctic theoretically and holistically from many scientific and knowledge angles and multi/inter-disciplinary approaches, from academic and policy-oriented ones, including exploitation, transportation, tourism, infrastructure and technologies, industries, film-making, as well as telecommunications and digitalisation. This was done from the perspectives of past(s), present(s) and in particular future(s), and from global, international, Arctic and local contexts in the European Arctic, as well as from points of view of different stakeholders from Indigenous peoples to business. What are their ecological and socio-economic impacts, and what kind of 'new sustainable economies' would be needed/foreseen? Finally, who are the involved actors, and what are their interests, and how do they take into consideration 'societal security', and how do they help to develop pathways to plausible sustainable futures?

The focus of the 2019 Academy was inspired by the substantial, multidimensional and multi-theoretical discussions and debates on perceptions of, and discourses on, the Arctic and Arctic politics in the previous (e.g. 2017 and 2018) Academies' sessions (see, Final Reports at https://calotte-academy.com). This was continued by having the main focus on 'societal security' and what kind of Arctic societies, as well as scenarios, innovations, best practices for them, there could/should be in the future.

Figure 1: Visit to Skolt Sámi museum. (Photo by Adam Kočí)

Figure 2: Visit to Juhls Silver gallery (Photo by Clemens Jöbstl)

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