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Science at Stake – Russia and the Arctic Council

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Abstract
The discontinuation of cooperation with Russia in the Arctic Council in response to the Russian invasion of Ukraine may severely impact Arctic climate science. Since its creation, the Arctic Council has been a symbol of diplomacy and values of scientific integrity. However, with all institutional research collaborations with Russia on hold and few windows open for researcher-to-researcher dialogue, the Arctic Council faces its most significant challenge to date. This article discusses possibilities for the maintenance and implementation of Arctic science with its Russian contributions and examines how conditions changed after February 24, 2022. The analysis is based on interviews with Russian researchers working on Arctic issues and participants in Arctic Council projects conducted after March 2022. The article maps out scientific practices in the Arctic Council and Russian Arctic science across three dimensions: knowledge translation, depoliticized scientific independence, and maintenance of researcher networks.

Keywords: *Arctic, Arctic Council, Russia, climate change, science–policy interface*

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1 Introduction

1.1 Background

The strongest effects of climate change are seen in the Arctic, which is estimated to be warming four times faster than the rest of the world.[1] The melting of ice and thawing of permafrost are contributing to extreme temperatures beyond the Arctic region.[2]

The Arctic Council (AC), an intergovernmental and consensus-based forum that promotes cooperation among the Arctic states, indigenous peoples, governmental

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and non-governmental organizations, and non-Arctic observer states, has played a crucial role in sustainable development and environmental protection in the Arctic since its establishment in 1996.[3] The AC has contributed to the strengthening of multilateral conventions on environmental protection and has fostered understanding of the fragile climate and ecosystems of the Arctic region.[4] Often described by its member states as the most influential platform to address challenges and find solutions in the Arctic region, the AC plays a unique role in the early identification of problems. Its consensus-based and non-binding deliberative procedures have allowed member states to effectively address controversies and conflicts through diplomatic methods.[5]

The Russian Federation encompasses a major portion of the Arctic, comprising 53% of the Arctic coastline and housing an Arctic population of approximately 2.5 million people.[6] Russian researchers have traditionally played a central role in Arctic issues, often through participation in the Arctic Council. However, in response to the full-scale Russian invasion of Ukraine, the seven non-Russian member states decided to discontinue work in the Council in March 2022. As of June 2022, they declared a limited resumption of work but paused all ties to Russia.[7]

What are the premises and possibilities for Arctic climate science to be created, maintained, and used, in Russia and the Arctic Council? What can be learned from cooperation prior to the war, and how have these premises changed since February 24, 2022?

Scholars have examined the role of the working groups of the AC in the production and use of scientific knowledge.[8] Additionally, there have been studies focusing on Russian participation in the Arctic Council and on the science–policy interface in Russian climate science.[9] Russian scholars have reflected upon the accomplishments and challenges of Russian membership in the AC.[10] After the pause in cooperation with Russia, there have been some publications examining its impact on the future of Arctic science and the consequences of freezing scientific work.[11] However, there has been a general lack of qualitative research examining the science–policy landscape in the Arctic Council and in Russian climate science after the pause. This article aims to address this gap in the literature and provide insights into the current state of Arctic climate science.

1.2 Structure

The next section elaborates on the ontological assumptions and methodological approaches of the paper. A key premise is that knowledge is constructed and co-produced. This is followed by a brief presentation of the functions of the Arctic Council, a historical perspective on Russian climate science from the times of the Soviet Union, and Russian participation in the Arctic Council to the present—establishing a 'baseline' for analysis of subsequent developments. The main empirical contribution is found in section 3, consisting of an analysis of interviews with

Russian scientists and participants in the Arctic Council, where three dimensions of scientific practices in Russia and the AC are displayed: knowledge translation, depoliticized scientific independence, and maintenance of researcher networks. In the conclusion, the role of the three dimensions as conditions for the creation and use of Arctic science in Russia and in the AC is reflected upon.

1.3 Methodological approaches and theoretical assumptions

In perceiving science-making as embedded in norms, discourses, and institutions, science is understood as a result of the societal structures that surround it. When addressing research questions, there is a premise that scientific knowledge is constructed and co-produced by its social frameworks.[12] This is especially relevant when it comes to discussion of depoliticized science, as knowledge creation is often incentivized by, and co-created with, political room for maneuverability.[13] Particularly notable in the AC, scientific work in working groups is intertwined with decision-making in ministerial meetings and dialogues with senior Arctic officials.[14] Therefore, the concept of depoliticization in this case should not be viewed as a complete separation of science from policy but rather as an indication of the conditions driving scientific practices in the Council.

The analysis is based on ten in-depth interviews with scientists from the Arctic Council ("AC members") and Arctic research centers in Russia and with non-Russian experts. The interview languages were Norwegian and Russian. Data processing and coding were rooted in abductive, back-and-forth patterns, from creating the research question to analyzing the finished data. During the processing and analysis of raw data through to conceptualization, the framework of an SDI model was used.[15] The SDI model is a step-by-step, inductive–deductive method that uses a circular approach at each step, from collecting raw data to processing, grouping, and concept development. This circular approach contrasts with linear models, where concept generation, data analysis, and coding take place at separate stages of the research process. Transcriptions were analyzed using NVivo software.

Snowball sampling was used to gather informants for the study. 'Snowball sampling' refers to identifying new informants through their networks, where the initial interviewees recommend individuals in their networks that fit the research criteria.[16] This allows a social scientist to access networks, communities, and individuals that are otherwise challenging to find due to their potential inaccessibility to the public. Due to data privacy concerns and the political sensitivity of the topic at the time of interviewing, the participants' names and affiliations are anonymized. All details that could reveal personal information have been removed from transcripts, including the names of working groups, research centers, and institutes. The informants were informed of the scope of the research question beforehand and were sent the interview questions before the interview.

Interviews	Russian scientists	Russian Scientist 1 (March 2022) Russian Scientist 2 (March 2022) Russian Scientist 3 (March 2022) Russian Scientist 4 (April 2022)
	Arctic Council	AC Member 1 (February 2022) AC Member 2 (May 2022)
	Expert interviews	Expert Interview 1 (March 2022) Expert Interview 2 (March 2022) Supplementary Expert Interview 1 (September 2022) Supplementary Expert Interview 2 (September 2022)

Figure 1. Table of interviews.

2 The Arctic Council

During the Cold War, the Arctic region served as a frozen front between the Soviet Union and the United States. The Soviet narrative of the Arctic region changed course when Mikhail Gorbachev proposed transforming the Arctic into a 'zone of peace' focusing on scientific cooperation and protection of the natural environment in his influential 1987 Murmansk speech.[17] By fostering the idea of the Arctic as a region of peace, the speech made room in Soviet and Russian discourse for international scientific cooperation in the region. This contributed to Finland's interest and initiative for the creation of the multilateral Arctic Environmental Protection Strategy (AEPS) in 1991.[18] Five years later, due to Finnish and Canadian initiatives, the Arctic Council (AC) was established.[19]

The AC primarily acts on shaping decisions rather than making them, with the working groups playing a pivotal role.[20] Similar to other cooperative arenas in the region, the AC operates based on principles of soft law, and non-legally binding agreements. The recommendations provided by the AC can be politically binding, but not domestically obligatory, as the AC lacks the authority to apply sanctions against its member states. However, three legally binding agreements have been negotiated between the Arctic states through the auspices of the AC.[21] Cooperation based on soft law has been recognized as having several benefits in multilateral arenas, as it incentivizes non-state actors to partake in decision-making processes.[22]

However, the Russian full-scale invasion of Ukraine has uncovered the fragility of the non-legally binding frameworks the AC is created upon, evidenced by the absence of foundational rules governing the operational dynamics of the soft law instruments.[23] In addition, the efficiency of the legal structure of the AC was already a topic for debate before February 24, 2022.[24] Despite its perceived benefits, soft-law-based cooperation in the Arctic has been pointed out as being more vulnerable to current challenges posed by deteriorating geopolitical circumstances. [25]

The Arctic Council faces an uncertain future, which in turn impacts the production of scientific knowledge on climate change and environmental protection of the region. In Norway's (AC chair as of May 11, 2023) presentation of its chairmanship plans, survival of the forum is presented as the overarching objective going forward.[26] Recent revisions of Russia's Arctic policy, removing mentions of the Arctic Council while prioritizing national Arctic interests, coupled with Finland's recent membership in the North Atlantic Treaty Organization, and Sweden's pending application, serve as an indication of the diminishing prospects for the future of pan-Arctic cooperation.[27] Debates about the future of the Arctic Council have been prominent across media outlets, discussions at Arctic conferences, and academic discussions, showing fluctuating optimism and pessimism regarding the future of the AC.[28]

3 The history of Russian climate science

3.1 Russian approaches to international climate science

Considering the historical context of Russian, and formerly Soviet climate science provides context for its current contributions to the Arctic Council, and the underlying conditions that underpin their creation, use, and implementation. When the development of climate science is discussed, contributions from Soviet science from the post-war period until the dissolution of the Soviet Union tend to be overlooked.[29] Soviet science was in the lead internationally in developing models of atmospheric circulation systems and in the fields of radiation, heat balance, and general climatology.[30] During the Cold War, Soviet scientists did not have access to the high-speed computers and infrastructure necessary to develop models to forecast long-term climatic changes.[31] Instead, climatologists often used paleoclimatic models, leaning on theories of cyclical climatic changes and history repeating itself, making the paleoclimatic approach one of the dominant traits of Soviet, and later Russian science.[32] During the early stages of the Intergovernmental Panel on Climate Change (IPCC), Soviet work on forecasting climate change was presented internationally primarily by a small group of scientists. These Soviet scientists, and later Russian research traditions were in opposition to the IPCC's focus on the irreversible man-made impact on Earth's climate.[33]

During the 1990s, the countries in the former Soviet Union faced significant economic challenges, making all scientific work less of a priority. Many young researchers and parts of the scientific elite left Russian academia, whereas older and

established scientists usually stayed in their positions, and skepticism toward man-made climate change prevailed.[34] However, in Russia scientific attitudes towards climate change shifted towards anthropogenic explanations in the early 2000s, which coincided with Russia's ratification of the Kyoto Protocol in 2004, although this was not necessarily the cause of the shift.[35] Despite the Russian Academy of Sciences' assertion that the Kyoto protocol had no scientific basis,[36] discourse on the causes of climate change began to place a stronger emphasis on the role of greenhouse gas emissions.[37] While anthropogenic explanations of climate change became increasingly prominent in Russian climate science during the 2000s, debates still persisted regarding the extent to which climate change could be associated exclusively with negative outcomes.[38]

3.2 Russian approaches to climate change

Despite Russia now being in line with international climate science, Russian approaches to climate change still differ from approaches in the West, both in terms of science, policy and negotiations of international agreements, with Russia highlighting the potential benefits resulting from global warming to a greater degree.[39] Discourses on climate risks are frequently accompanied by talk of new opportunities, especially in the Arctic region.[40] This is reflected in processes leading up to Russian ratification and implementation of various international environmental agreements, and within domestic policy.[41] Domestically the effects are seen through an extensive focus on climate adaptation in favor of mitigation, in contrast to western approaches which to a higher degree favor mitigation through a reduction of greenhouse gas emissions.[42] In addition, implementation processes of environmental agreements are frequently affected by priorities related to foreign policy, national image, or economic benefits.[43]

While the domestic discourse on climate change in Russia cooled after ratification of the Kyoto Protocol,[44] the ratification itself has been viewed as a political decision, motivated more by image-building than environmental concerns.[45] Some scholars have suggested that Russia's initial motivation for joining the Protocol was to gain admission to the World Trade Organization and that the decision to decline participation in its second phase was influenced by this relationship.[46] Despite the opposing views of Russian, and formerly Soviet and Western research traditions, there were ongoing collaborations in the fields of environmental protection and conservation before the Kyoto Protocol as well. The USSR and the USA signed a bilateral agreement on environmental protection in 1972 that incentivized the exchange of expertise on several environmental issues, including pollution, nature conservation, and prevention of environmental emergencies.[47] Additionally, the USSR together with the USA, Norway, Canada, and Denmark signed a multilateral agreement on the conservation of polar bears in 1973,[48] the first time the five Arctic nations collaborated in a conservation measure through a treaty.[49]

3.3 Russian participation in the Arctic Council

The two most prominent controversies related to Russian participation in the AC include the Russian Association of Indigenous Peoples of the North (RAIPON) dispute in 2008 and the Russian annexation of Crimea in 2014.

The Russian Arctic strategic goals announced in 2008 included recognition of several risks faced by Indigenous peoples in the Russian Arctic and the need to combat these risks.[50] Despite this formal prioritization, RAIPON questioned the Russian government's sincerity as, in practice, it was continuously violating Indigenous rights in the Arctic.[51] This led to the Russian government suspending RAIPON in 2012 and demanding changes in RAIPON leadership in order for the organization to be allowed to continue its work.[52] This conflict created tensions between the Russian delegation and other members of the AC.[53]

In March 2014, two years after the RAIPON dispute, the Russian annexation of Crimea affected diplomatic relations within the Council.[54] Practical consequences in the AC consisted of Canada and the USA boycotting several meetings in the working groups and Russian Foreign Minister Sergey Lavrov not attending the ministerial meeting in Iqaluit, Canada, in 2015.[55] Despite increased tensions in Russian–Western relations, work within the AC continued, and Russia increased its sponsorship of several AC projects.[56]

Cooperation in the Council was challenged again when Russia invaded Ukraine on February 24, 2022. The full-scale military invasion affected scientific collaborations worldwide.[57] In March 2022, the seven non-Russian AC members declared a pause in their work in the Council.[58] Russia, then chairing the AC, could only carry out its plans at a national level, which they proceeded to do.[59] With all institutional research collaborations on hold and few windows open for researcher-to-researcher dialogue, the AC is facing its most significant challenge to date.

4 Three dimensions of Arctic climate science

The consequences of the current geopolitical climate on the practices of the AC play out across three dimensions: in the maintenance of researcher networks, the translation of knowledge, and the scientific independence of the Council's working groups. These dimensions cannot be neatly separated, as they constitute the premises for each other. The scientific independence of the working groups in the AC enables cooperation through active researcher networks, which in turn facilitate for continuous translation of knowledge between science and policy. Hence, the dimensions are presented through their intertwined co-production.

Firstly, within the dimension of knowledge translation, the scientists in this study explain part of their work as mediating between scientific knowledge production and political action. They translate their findings by presenting them at conferences, talking to policy actors, and motivating them to act. Their perceived role in the interface between science and policy is active, with works of translation forming the core

of their practices. During an interview with a Russian scientist, he explained the importance of outreach to critical actors for engagement in his research area:

> Close relationships with people and with their surroundings, which means it is also essential to meet people in person, right? Conferences or events where first faces [leading politicians] participate, or other people with influence, who need you to carry information to them, you must show your position to them, and explain … to motivate them. (Russian Scientist 2, 2022)[60]

By explaining the importance of dialogue with decision-makers, Russian Scientist 2 illustrates how his role goes beyond scientific work to active engagement with policy. In this quote, an active role of translation and broadcasting of scientific knowledge becomes a condition forming his practice. However, regardless of enrollment and the spreading of interest, active researcher engagement does not guarantee the implementation of produced scientific knowledge.

> How the implementation takes place for me is another mystery. It's like a black box. Because it's hard to say. If I've held a conference and I've been listened to for a few hours, someone's heard something I've said, where does all this go? I do not know. How is this implemented? I do not know. What I do know, however, is in the form of feedback. When someone asks me, "Hello, please, show me, tell me, why does Arkhangelsk hang after Murmansk?" I understand that it is an interest. If there is a governor who asks me about this here, then I understand that this means that we are on the right track. (Russian Scientist 1, 2022)

Russian Scientist 1 compares his experiences with the perceived implementation and use of his research to a black box. The role of feedback is emphasized, both as a mechanism to show that his work is being received by policymakers and as a personal motivating factor. As there are no mechanisms or guarantees for being heard, any acknowledgment of research becomes an unexpected win.

> And I can say that when politicians start talking about this, without even referring to me, but they use my terms and the phrases I used three or four years ago, it doesn't upset me. Instead, I'm overjoyed because it means that the knowledge has reached them. It means they have read what I have written; it means they have heard it! (Russian Scientist 1, 2022)

Another essential element of perceived contributions to the use of climate knowledge is the perception of being heard by Russian policymakers. Russian Scientist 1, in this case, highlights how he has experienced his terms and phrases as being received by politicians, indicating occasional active bonds between science and policy in Russian Arctic climate science. During this interview, he explained the importance of their scientific work being in line with the sustainable development goals (SDGs) of the United Nations, as this contributes to credibility and standardization.

> In our work, we developed several indexes on sustainable development. We wanted to do something exciting; we wanted to see where we were positioned in relation to the SDGs. And we were relieved when our indicators practically matched all of these! [Laughs.]

> Of course, there is never an absolute similarity, but the differences in rating mainly depended on the inclusion of more variables. When we found this out, we breathed a sigh of relief and knew that what we use does not differ much from the data used by the World Bank or the ministries of the UN. (Russian Scientist 1, 2022)

Historically, Russian climate science has differed from the perspectives of the IPCC and Western climate science. A wish for international consensus and alignment with the SDGs reflects the discursive shift of Russian climate science toward an international consensus.

Translation between science and policy is also prominent in the Council, as reports created by its working groups must make their way to policymakers. For policymakers to understand the value of research results developed in the AC working groups, it is essential to translate scientific results into the language of policymakers.

> It's like trying to put a fish in the ocean, wishing for it to be caught by the right person at the right time. Of course, it's a gamble. You think you published your best work, and it may not even be discovered. There's a sea of articles out there, and management, neither at the bureaucratic nor the ministerial level, can understand them completely. You need someone who pulls things together and does things. Our scientific reports are heavy; they are not easy for politicians to understand, but we try to create summaries in twenty pages or so, and then we have a list with policy recommendations, which are negotiated and make it easier for us to get things through. We get a lot of praise for telling the root of what's important, why it is important, and why this will make a difference. So, it makes it much easier to release the fish into the sea. (AC Member 2, 2022)

The translation between science and policy in the Council is key for making use of the produced knowledge in the AC working groups. Russian Scientist 1 described how knowledge is translated to policymakers through dialogue, and AC Member 2 explained how the AC, in addition to publishing heavy scientific reports, includes policy recommendations and summaries. The translation of Arctic science to the field of policymakers does not go unnoticed. AC Member 1 recounted how the Arctic Climate Impact Assessment (ACIA) report in 2005 made a noticeable impression on a Bangladeshi minister at an IPCC meeting.

> We made the Arctic Climate Impact Assessment in 2004 and 2005, which is a bible, and many Russian scientists were involved in this as well. We traveled to Buenos Aires to an IPCC meeting and discussed our findings. The first person to take the floor after us was the minister of Bangladesh, and he had tears in his eyes, saying that "this is the most tragic day in my life, for you are telling us that several millions of my people will be flooded and must leave their homes," and that was right. When the Arctic melts, Bangladesh will be severely affected. (AC Member 1, 2022)

The ACIA report is one of many examples of how the knowledge produced by the Council has achieved political traction. The AC has contributed to several environmental conventions affecting national and international environmental policy. During the interviews with AC members 1 and 2, they explained the success stories of the Stockholm Convention and the Minamata Convention, which are examples

of how Arctic scientific knowledge directly impacts political action.[61] The idea of scientists as translators, suppliers, and brokers of knowledge was also prominent in the Minamata Convention, as the AMAP working group took an active part in the processes leading up to international negotiations on the convention.[62]

The second dimension of scientific cooperation in the Council is the importance of researcher networks.[63] The maintenance of researcher networks in the AC gives individual scientists a sense of belonging to the work and fields of their colleagues. As the AC is an arena that intertwines knowledge creation and decision-making, the translations that happen internally in the working groups rely on translations between science and policy, and vice versa.

Thirdly, the lack of binding obligations is partly responsible for giving the Council its political legitimacy and the opportunity to lift necessary knowledge to the level of international conventions. The non-binding principle of the Council protects scientific integrity through its partial separation from obligations in policy fields, and the working groups gain the freedom to provide precise policy recommendations:

> I think the Arctic Council is very important in the sense that it has not been politicized, that it does not come with many binding agreements because they would have been diluted, right? It would be thin soup. […] The recommendations of the working groups that are at a lower political level can be quite precise, right? Then you can do something because it is at a management level. (Expert Interview 1, 2022)

> The most important thing for us is the principle of scientific integrity. We emphasize that our reports are scientific and represent the view of the experts and not the Arctic Council nor the views of the working groups as such. It's important to act as a legitimate, scientific body. (AC Member 2, 2022)

In these interviews, two levels of importance are presented for the scientific legitimacy of the AC: the principle of scientific integrity, and the ability to provide non-diluted recommendations. Even though knowledge production in the AC working groups is incentivized by a level of disconnect between science and policy, the fields of science and policy are not entirely separated. This intertwining is visible in the relationship between the Council's three levels, as consensus is required for decisions to be made, and the mandate in the working groups is received from senior Arctic officials and ministerial meetings.[64] However, by emphasizing the separation of the scientific reports from the official views of the Council, AC Member 2 illustrates room for legitimacy through depoliticization.

Analysis of the interviews reveals that the co-production of scientific knowledge in the Council operates across three dimensions, namely: researcher networks, translation of scientific knowledge between science and policy, and scientific integrity. All aspects of the co-production and outreach of Arctic climate science affect each other, as active researcher networks enable possibilities for knowledge translation to the field of policy, and depoliticized scientific integrity contributes to the legitimacy of the translated knowledge and creates room for cooperation through international researcher networks in the AC.

5 How the Russian war against Ukraine has changed conditions in Arctic science

5.1 The weakening of dimensions in the Arctic Council

During an interview in late spring 2022, a Russian scientist expressed concern for the future of Arctic climate science.

> We are in total isolation; we are sanctioned everywhere. Who will care about the climate? Of course, there are [Russian] institutes that work on climate, but their work has become almost insignificant. There are some people that say that if we don't act now, we have a scary future ahead of us when it comes to climate change, but we are already living in a frightening future, and not because of the climate. The current prospects are alarming, and climate has nothing to do with the matter. And based on that, convincing someone to work with climate … I have worked with Arctic climate all my life; I now feel that it is entirely useless for me to talk to anyone because I become a person from a completely different planet. (Russian Scientist 4, 2022)

There are two main arguments embedded in this quotation. First, Russian Scientist 4 explains how he finds himself in a bind between translating his knowledge of climatic changes in the Arctic and understanding the risks of the current political situation. Understandably, the current political priorities and discourses that have followed the Ukraine crisis concern short-term military risks. For some, the long-term effects of climate change, no matter their danger, pale in comparison to the impacts of the war. Second, he emphasizes how Russian climate science is currently in total isolation. Both the dimensions of the translation of scientific knowledge and the value of networks appear fragile and at risk of weakening. Russian Scientists 1 and 2 mention how the translation of knowledge and communication around scientific results are of key value in the development and growth of their research, leading to a question of how Arctic science can be heard and used if it cannot be translated or communicated.

Just as Russian scientists encounter difficulties translating their knowledge inside Russia, the Council faces similar challenges due to the freeze in cooperation with their Russian colleagues. The consequences of the pause play out at material and social levels. Researcher networks are only one of the things lost in this lack of translation, as challenges mount in the gathering of data on thawing permafrost, biodiversity, and environmental monitoring from Russian territory. Russian data plays a crucial role in Arctic climate research.[65,66] Suspensions of scientific collaboration and lack of access to data after the Russian invasion of Ukraine are worrying scientific communities, and calls to resume cooperation can be heard.[67]

However, sharing standardized data across borders was challenging prior to the war in Ukraine as well. The collection of data from the Arctic region is known for its resource-intensive processes and rare accordance with international data standards, especially regarding datasets on biodiversity.[68] Still, lack of access to Russian data on biodiversity is one of the significant losses of the Council.[69] Russia has extensive databases on biodiversity; as most are not yet easily accessible digitally, access by

individuals must be relied upon.[70] Permafrost is another case that has regularly been mentioned as a significant area of data loss in the AC, and remote sensing through satellite observations has been mentioned as a possible, but not ideal, alternative.[71,72] The gathering of observational data from the circumpolar region on thawing permafrost was formerly challenging as well, partly as a result of the lack of shared data across countries and institutes due to restrictive national policies.[73] The use of remote sensing to classify permafrost and wetlands is not new to 2022, and it is one of the priorities of the working group of the Conservation of Arctic Flora and Fauna (CAFF), with the goal of developing a baseline dataset that enables long-term monitoring across the pan-Arctic region.[74]

The pause in the Council demonstrates how researcher-to-researcher dialogue is an essential condition for producing and making use of scientific knowledge both in and outside the AC. Despite researcher-to-researcher collaborations being possible "on paper," the reality of the situation is entirely different. It is in practice almost impossible to separate individual researcher contacts from institutional links, especially where the transfer of data is concerned. This throws a wrench in the work of the AC working groups.[75] Individual researchers involved in various working group programs become vulnerable as they risk losing researcher networks that have taken time to develop. The long-term risk of weakening researcher networks affects work in the Council and the future of Arctic climate science.

When asked in May 2022 about the role of science in handling climate threats, Arctic Council Member 2 reflected on the potential of scientific independence for building trust.

> If one lets science become the basis for building trust, it could be symbolic in resuming cooperation at a scientific level. It could be seen as a strength that the Arctic Council is so flexible that the scientific work could be done despite global conflicts. (AC Member 2, 2022)

The perspective of AC Member 2 on collaboration through scientific integrity confirms its importance, as the scientific independence of the working groups is one of the premises that the Council has been able to foster. The argument of "if one lets science become the basis for building trust" implies the possibility for depoliticized scientific cooperation if conditions allow for it.

5.2 Incentives and limitations in the Arctic Council after February 24, 2022

When AC Member 2 mentioned how science could become a basis for building trust for future cooperation, scientific integrity was addressed as an incentive for cooperation. Other drivers include, but are not limited to, the long-term priorities of Arctic climate science and the non-legally binding principle of the Council.

International environmental cooperation in the Arctic region has been characterized by its long-term collective prioritization to protect the northern environment. In the introduction to the Strategic Goals of the Arctic Council from 2021 to 2030, the

Arctic is envisioned as "a region where it is firmly established that healthy ecosystems and habitats are of critical importance and the uniqueness and fragility of the Arctic environment is respected by all in the region and beyond."[76] The long-term goals of conserving Arctic ecosystems and recognizing the value of Arctic environments are not only priorities of the AC but incentives for scientific cooperation between Arctic countries. In addition to the long-term perspective, the lack of legally binding obligations in the Council is an important prerequisite for the persistence of the forum.

While the dimension of scientific integrity may create incentives for the partial resumption and maintenance of the AC after the Russian war on Ukraine, the dimensions of researcher networks and translation processes will encounter limitations for future practice within the Council. As mentioned in the previous section, both the curtailment of contact with Russian researchers and limited access to Russian data on biodiversity, permafrost, and environmental monitoring frustrate AC work.

In addition to limitations emerging from within it, the current state of Russian science may affect the practices of the Council. There are similarities between the challenges that Russian academics are encountering today and the situation during and after the dissolution of the Soviet Union, with a substantial brain drain and limited access to necessary technology. Russia already struggled with the external outflow of knowledge before February 24, 2022, as the brain drain has been increasing over the past five years.[77] Many Russian scientists are reported to have fled the country after the war started because of the isolation of Russian academia, and later because of the risk of being drafted. However, there are no authoritative figures on the number of academics who have emigrated.[78] The effects of this brain drain can be a weakening of internal researcher networks in Russian climate science, thereby affecting international dialogue.

6 Conclusion

This study has examined which conditions shape the room for maneuvering in Arctic climate science through a series of interviews with Russian Arctic climate scientists and participants in research under the Arctic Council. The study has mapped out three dimensions that form the conditions for scientific practices in the AC and in Russian climate science in the Arctic: knowledge translation, researcher networks, and depoliticized scientific integrity. These and other dimensions make up the conditions under which scientific practice can continue.

Russian climate scientists and other participants in AC research emphasized the importance of translating their produced knowledge for policymakers and enrolling new participants. Russian Scientist 2 mentioned the importance of being heard by policymakers, illustrating that the interface between climate science and policy in Russia is active and that climate scientists in Russia have experienced that policymakers are receptive to their scientific practices. After the Russian invasion of Ukraine, translating international research results and emphasizing the importance

of climate research in the Arctic has been described as increasingly challenging, as security risks and political uncertainties overshadow climate issues in the Russian Arctic. Historically, there have been conflicts between practices in the Russian academic field and those of Western IPCC research. The Russian scientists in this study expressed a wish for alignment with the UN SDGs. They had completed systemic work toward alignment with international sustainable development practices, illustrating the increasing shift toward consensus within international climate science.

When it comes to cooperating with Russian climate scientists on Arctic matters and to cooperation within the Council, researcher networks were depicted as a core dimension for collaboration. The maintenance of active researcher networks in the AC allows the participating scientists to acquire both a sense of belonging to the organization's work and unique field knowledge. Despite its value, researchers have encountered obstacles in individual researcher-to-researcher collaborations because of the difficulty in separating institutional connections from individual ties. The participants in this study voiced concerns about the isolation of Russian climate science and the weakening of dialogue with their international colleagues since February 24, 2022. Challenges in network maintenance may also lead to difficulties in accessing Russian data, as several data banks on biodiversity in Russia are not digitally accessible, with access to them relying on individual researchers. The outflow of knowledge and brain drain after the Russian war on Ukraine also threatens to weaken the dimension of researcher networks, leading to challenges in Russian academia similar to those after the dissolution of the Soviet Union.

The dimension of scientific integrity was highlighted in the interviews with members of the AC, epitomized by the non-binding principle of the Council and the partial independence of its working groups. Because reports created by the working groups represent the views of scientists and not the Council, they gain political legitimacy. In addition, the non-legally binding principle of the AC allows for the provision of recommendations that are less diluted and require fewer negotiations. Scientific integrity becomes a prerequisite for trust in international cooperation in the Arctic. Apart from the non-binding principle and scientific independence from the field of policy, the long-term priorities of climate science take part in the dimension of scientific integrity.

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NOTES

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