

Editorial

Dealing with insecurities and geopolitics: science diplomacy at the poles

Global environmental crises are destabilizing the cryosphere and, as a result, the capacity of the planet's glaciated regions to absorb or even persist in the face of the current velocity of physical changes (Intergovernmental Panel on Climate Change 2019, Chown *et al.* 2022). According to the latest data, warming in the polar regions (Arctic and Antarctic) is occurring at three to four times global average rates. These regions should not be narrated through the prism of climate change alone, as the complex regional changes engendered by the environmental and climate crises also have profound effects on the rest of the world. At both poles, climate and environmental changes provide key warnings of potential global tipping points and underpin global environmental security concerns. The polar regions are vastly different in their geographies, populations and governance structures. However, in spite of these differences and ongoing crises, scientific cooperation has – at least until now – been a major contributor to regional governance at both poles.

In the south, on top of international legal norms such as the United Nations Convention on the Law of the Sea (UNCLOS), since 1961 the Antarctic continent and surrounding Southern Ocean south of 60° of latitude has been governed by a major international treaty – the Antarctic Treaty – and its component instruments and their measures, referred to as the Antarctic Treaty System (ATS). Apart from year-round but transient scientific operations, the Antarctic has never had a permanent human population. Under the Antarctic Treaty, national territorial claims in the region are held in abeyance. Seven states as well as the Russian Federation (as the successor state to the USSR) and the USA have made or 'reserved their right' to make territorial claims to parts of or the entire continent. However, Article 4 of the Antarctic Treaty places these claims on hold – meaning no state can make new or expand their own sovereign claims. The ATS also prohibits military activities, the use of nuclear technologies and the disposal of radioactive waste, and it provides the frameworks for marine ecosystem and fisheries management and for environmental protection in Antarctica. Above all, the ATS provides the infrastructural mechanisms that enable state cooperation to achieve consensus governance of the Antarctic continent and surrounding Southern Ocean collectively and peacefully through science.

Due to its contrasting geography, Arctic governance differs from that of its southern counterpart. As landmasses surrounding the Arctic Ocean, the eight Arctic states (the A8; Canada, the Kingdom of Denmark (Denmark, the Faroe Islands and Greenland), Norway, Finland, Iceland, Sweden, the Russian Federation and the USA) exercise their sovereignty over the land, with five of them having Arctic coastlines and sovereign rights over parts of the Arctic Ocean. Beyond general international law, the UNCLOS provides the regulatory framework to govern those parts of the Arctic Ocean and Southern Ocean not subject to sovereign rights. Since the 1990s, the A8 have cooperated at first through the Arctic Environmental Protection Strategy and later through the Arctic Council. Founded in 1996 under the Ottawa Declaration – a political declaration as opposed to an international treaty – the Arctic Council has served as a high-level intergovernmental forum for the A8 and six Indigenous political representations to flexibly work together on scientific research and policy recommendations relating to social and environmental issues.

Thus far, both regions, however, have somehow been able to respond to significant geopolitical and environmental challenges. Despite their structural differences, science diplomacy and scientific research have provided two pillars for both Arctic and Antarctic cooperation. Science therefore offers an avenue to think about solutions for future geopolitical polar challenges and security issues. However, can polar governance survive both the unfolding threat of a melting Earth and the latest upsurge in global geopolitical instabilities, in particular driven by Russia's illegal invasion of Ukraine? This is where polar science and the science–policy nexus become matters of regional and international security. Through a critical international relations lens, security in the Arctic and the Antarctic clearly extends beyond environmental and economic security, although this should not be only understood as military security, especially since military issues are often – deliberately – off the table in both governance settings. For instance, the 1996 Ottawa Declaration explicitly expressed the wish of the A8 to keep military matters out of the Arctic Council's mandate. However, it is notable that, as a consequence of the current conflict and the massive global geopolitical ramifications that this is leading to, the Arctic Council has currently postponed all planned meetings for an undefined period, even though Russia currently holds the Council's Presidency. While Arctic scientific collaboration and diplomacy have been on hold, the 'Arctic 7' – all of the Arctic states except the Russian

Federation – have recently issued a joint statement of their intent to resume cooperation outside the Arctic Council without the Russian Federation. At the same time, in a historical context, it should also be noted that the previous Russian chairmanship in 2004–2006 catalysed important initiatives in the realm of environmental protection, in particular the establishment of the Arctic Contaminants Action Program as a sixth working group of the Council in 2006. Russia also served as co-lead of the Task Forces responsible for the terms of the 2011 Agreement on Search and Rescue and the 2013 Agreement on Marine Oil Spill Preparedness and Response (Vylegzhanin *et al.* 2021). In the south, while the latest Antarctic Treaty Consultative Meeting has recently taken place, hosted by Germany, Russian representation was minimal, and the meeting was heavily overshadowed both by the ongoing conflict and fundamental national geopolitical differences on climate change.

In both regions, science and scientific cooperation have been central to peace and security. Polar academics have written at length about the diplomatic potential of the science–policy interface (Rowe 2018, Berkman 2020, Berkman *et al.* 2022). In the Arctic, scientific cooperation has been further cemented with the 2017 Agreement on Enhancing International Arctic Scientific Cooperation negotiated under the auspices of the Arctic Council, which has been seen as setting a new model for Arctic international law-making within the Council (Shibata 2019). Such initiatives allow for more informal approaches to diplomacy and cooperation while creating the infrastructural space to address pressing issues of Arctic governance more flexibly. Arctic science diplomacy allows states to cooperate while achieving foreign policy goals. In addition to marine and Arctic scientific cooperation, the Arctic Council has been at the forefront of knowledge coproduction – that is, the use of local and traditional knowledge and community-based management tools in the production of knowledge. Furthermore, not only has scientific knowledge influenced polar decision-making, but it has also had positive implications for multilateral interactions between states and non-state actors in the region.

A key development catalysed by the International Polar Years of 2007–2009 (Salmon *et al.* 2011) lies in the creation of young scholars' networks (Association of Polar Early Career Scientists (APECS), <https://apecs.is/>; UK–Russia early career group, <https://ukrussiaarctic.wordpress.com/>; etc.). Such networks make epistemic communities even stronger, since young researchers can use specific science communication resources and channels, more rapidly share their own innovative results and, through their direct interactions, accelerate the breaking down of long-established language and cultural barriers. There are also older examples of such network opportunities being developed. For example, the international travelling symposium called the 'Calotte Academy' is one of the longest-standing international academic institutions addressing northern circumpolar issues. Initiated in 1991 in Finnish Lapland – and since then arranged annually – it provides an excellent example of the potential for interplay between science, politics and business, as well as crossing 'Global-Local' scales (Heininen 2021), and it is a rare platform for early-career researchers to discuss Arctic science and politics simultaneously (Brodt 2022). Such direct cooperation among early-career researchers can effectively transcend the deep-seated hostility of intergovernmental politics during times of crisis and conflict. However, the exchanges, joint funding opportunities and undoubtedly positive outcomes that such initiatives bring are themselves also vulnerable to the blunt instrument of state sanctions, in a paradoxically counterproductive manner.

Scientific research in the Arctic does not stop with natural science and environmental issues. For the science–policy nexus to succeed, social and human scientists also need to be involved. Similarly, in the Antarctic, which lacks any history of human presence prior to the exploration and research era, this is now being reflected by the development of a 'human and social science' (HASS; www.scar.org/science/hass/about/) research community and direction under the auspices of the Scientific Committee for Antarctic Research (SCAR). In the Arctic, this process will engage diplomatic consideration regarding the changing climatic and socioeconomic circumstances of the polar regions, which itself is part of a growing global dialogue regarding science and technological advice for policymaking. Additionally, this particular science–policy interface has also been observed in other Arctic and Antarctic fields such as fisheries management, pollution prevention (e.g. persistent organic pollutants, mercury, plastics), biodiversity, search and rescue, ecosystem-based ocean management and marine and terrestrial protected areas. Nonetheless, science–policy interaction is not the only element of the puzzle in how the perceptions and actions of stakeholders are being shaped in relation to regional governance and management systems. This dual relationship neglects other actors relevant for sustainable regional development and thus needs to be opened up to include other key stakeholders – not least the relevant business communities, non-governmental organizations and civil society. History will be the judge of whether the separate governance mechanisms of either polar region are capable of rising to the current climatic and geopolitical challenges, unprecedented in their time of existence, and thereby over time help to reverse the vast damage being caused to international relations and security at present.

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