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SYMPOSIUM ON THE FUTURE OF A MELTING ARCTIC: CHALLENGES FOR INTERNATIONAL LAW

ARCTIC WARMING AND INTERNATIONAL LAW

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Introduction

Not all warming is created equal. Although global warming is (as its name indicates) global in scope, its magnitude and impacts vary widely between regions. Nowhere is this more apparent than in the Arctic, which by one estimate has been warming four times as fast as the global average since 1979, due to a phenomenon known as "Arctic amplification."[1] Already, with "only" about 1.3ºC of global warming (as compared to pre-industrial levels), Arctic ice and snow are melting, Arctic permafrost is thawing, and Arctic glaciers are shrinking. These effects will only increase in magnitude as global warming continues. If the globe warms by 2.7ºC, as is currently projected if states implement their emission reduction pledges under the Paris Agreement, the Arctic will warm by more than 10ºC in the winter and will be "transformed beyond contemporary recognition."[2]

Last year's Arctic Report Card[3] paints a stark picture. Among its key findings:

- "Surface air temperatures across the Arctic from October 2024 to September 2025 were the warmest recorded since 1900."
- "In March 2025, Arctic winter sea ice reached the lowest annual maximum extent in the 47-year satellite record."
- "The oldest, thickest Arctic sea ice (>4 years) has declined by more than 95% since the 1980s."
- "June snow cover extent over the Arctic today is half of what it was six decades ago."

As the saying goes, what happens in the Arctic doesn't stay in the Arctic. The melting of Arctic sea ice lowers the Arctic's reflectivity (or "albedo"), transforming white snow into blue ocean or dark land, which absorbs more incoming solar radiation and thereby exacerbates global warming. The thawing of Arctic permafrost releases stored carbon dioxide and methane, increasing concentrations of greenhouse gases in the atmosphere.

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[1] Mika Rantanen et al., *The Arctic Has Warmed Nearly Four Times Faster Than the Globe Since 1979*, 3 COMM. EARTH & ENV'T 168 (2022).

[2] Julienne C. Stroeve et al., *Disappearing Landscapes: The Arctic at +2.7ºC Global Warming*, 387 SCIENCE 616, 618 (2025).

[3] NOAA, *Arctic Report Card 2025* (M.L. Druckenmiller, R.L. Thoman & T.A. Moon eds., 2025). The Arctic Report Card has been issued yearly by the U.S. National Oceanic and Atmospheric Association since 2006.

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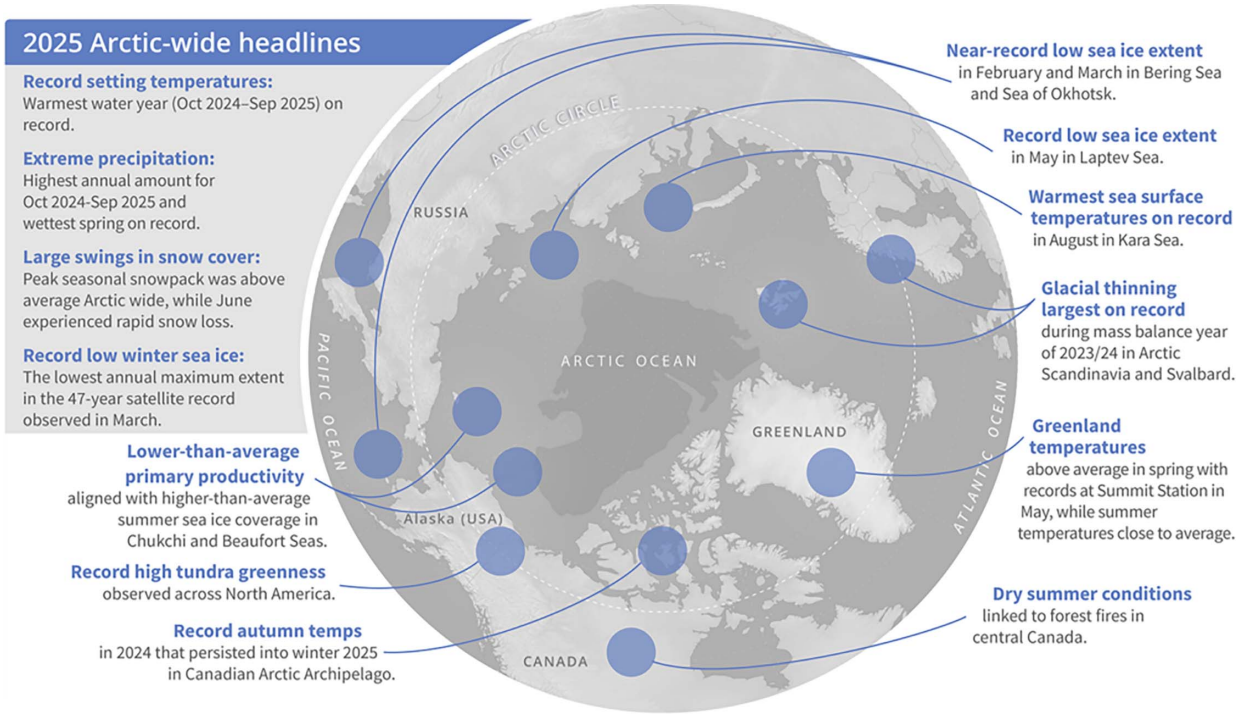


FIGURE.1
Source: Arctic Report Card 2025

The melting of Arctic glaciers contributes to global sea level rise. These effects are already happening and will only increase in magnitude as Arctic warming continues.[4]

But Arctic warming not only has global effects; it also has profound implications for the people and environment of the Arctic itself, presenting both opportunities and challenges. It is opening up the Arctic to human activities such as commercial shipping, tourism, and mineral exploitation. But it is also negatively impacting the Arctic ecosystem, Indigenous Peoples, and other local communities, as well as increasing geopolitical tensions in the Arctic.[5]

This symposium explores some of the issues for international law raised by the warming Arctic:

- How does international law allocate rights and jurisdiction over Arctic natural resources, and which states may exploit them?
- As sea routes open and traffic increases, how should the environmental impacts of Arctic shipping be regulated?
- What are the effects of Arctic warming for Indigenous rights?
- What is the future of Arctic governance?
- And what are the options, if any, for targeted interventions to protect Arctic ice, snow, and permafrost against the effects of climate change?

[4] Stroeve et al., *supra* note 2.

[5] Michael Meredith & Marin Sommerkorn et al., *Polar Regions*, *in* IPCC SPECIAL REPORT ON THE OCEAN AND CRYOSPHERE IN A CHANGING CLIMATE (Hans-Otto Pörtner et al. eds., 2019).

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In contrast to the Antarctic, which is governed by a treaty regime—the Antarctic Treaty System—the Arctic Council was established by Arctic states in 1996 through a non-binding declaration and lacks binding decision-making authority.[6] Despite this institutional limitation, the Arctic Council for many years served as an effective forum for Arctic cooperation. However, the Russian invasion of Ukraine in 2022, along with U.S. assertions of the need to acquire Greenland, have brought the era of "Arctic exceptionalism" to an end, and the future of the Arctic Council remains quite uncertain, as David Balton and Timo Koivurova discuss in their contribution. As a result, just as the need for cooperation in the Arctic has increased to address the various issues raised by a warming Arctic, the supply of Arctic cooperation is at a low ebb.

In thinking about the implications of a warming Arctic for international law, the symposium begins with a brief introduction to the science of Arctic warming by Amanda Lynch and Charles Norchi. Why are Arctic ice and permafrost so important? What is happening to them? What are their current status and what does the future portend for Arctic access? Their overview of Arctic science provides the necessary foundation for the contributions that follow.

In "Climate Change, the Arctic Threat Environment, and Legal Ramifications," Sherri Goodman and Carl Graefe explore the potential security issues raised by Arctic warming. They focus on three potential threats: conflict over navigational rights; the development of nuclear weapons by Arctic states concerned about their security; and challenges to the fundamental principle of territorial integrity, illustrated by the Trump administration's effort to make Greenland part of the United States. They suggest that Arctic states should invest in areas of potential cooperation, which serve their mutual interests, as a means of mediating conflict.

The melting Arctic is opening up the possibility of mineral exploitation, prompting a flurry of claims by coastal states to their extended continental shelves. In his contribution on "The Continental Shelf in the Arctic Ocean," Kevin Baumert analyzes these claims. As he notes, most of the Arctic Ocean is under the jurisdiction of one Arctic state or another; there is only a small doughnut hole in the middle that is part of the high seas. Determining which state has rights over which areas of the seabed depends not only on the margins of each state's extended continental shelf, but also on delimitations between their shelves where their claims overlap. This is being done primarily through negotiation between the states concerned, but could also be decided through adjudication.

Arctic warming poses a particularly dire threat for the Indigenous Peoples of the Arctic, including the Inuit, Sami, and Chukchi. The impacts are both direct and indirect. The melting of Arctic ice is directly harming Indigenous Peoples by shrinking their traditional lands and undermining their culture and way of life. But it is also indirectly threatening them by opening up the Arctic to potentially harmful human activities such as mining critical minerals. As Romain Chuffart and Aaron Cooper stress in "The Future of a Melting Arctic: Implications for Indigenous Rights," Indigenous Peoples have a right to participate in decisions about activities that may adversely affect them, and projects should not go ahead without their free prior informed consent.

The Arctic is also becoming a bucket list item for "destination tourism," as its waters become accessible to cruise ships. Arctic cruise activity has already exploded and continued growth is projected. The adverse environmental effects of the Arctic cruise industry—in particular, black carbon emissions and underwater radiated noise—are explored in the contribution by Stella Ebbersmeyer and Beatriz Martinez Romera, "Environmental Challenges of Increasing Arctic Cruise Ship Tourism." Potentially, these environmental harms could be addressed by the International Maritime Organization, but thus far only a patchwork of regional, domestic, and private measures have been adopted.

[6] Declaration on the Establishment of the Arctic Council (Ottawa Declaration), Sept. 19, 1996.

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Could anything be done to prevent Arctic warming? Reducing greenhouse gas emissions would slow global warming but would not cool the planet for some time. By then, it will likely be too late: the Arctic will already be completely transformed. Given this dilemma, some researchers are exploring technological means to cool the planet more rapidly. Most of these are global in scope. But Arctic-specific interventions have also been proposed to save Arctic ice and glaciers. These techniques raise many issues. Are they feasible? Scalable? Cost-effective? Safe? In their contribution Daniel Bodansky and Yoshifumi Tanaka explore the legal issues raised by Arctic climate interventions.

Global warming will profoundly affect all parts of the world. But, due to Arctic amplification, climate change poses a particularly urgent threat to the Arctic. It behooves the international law community to begin reckoning with the changes that Arctic warming will wreak.

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