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ARCTIC SHIPPING ON THE RISE: IS THE REGION READY?

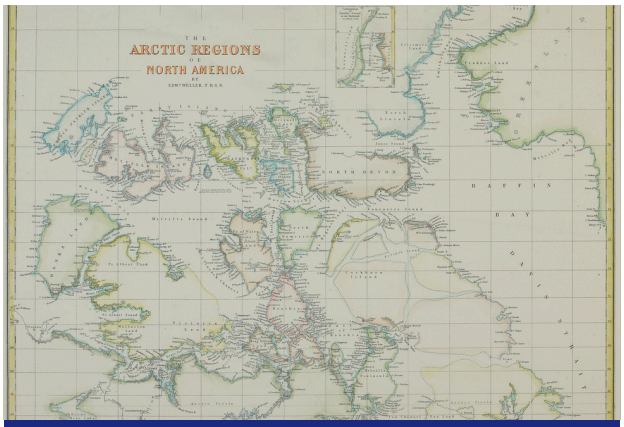
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Abstract

Climate change has opened the Arctic Ocean to a wider range of maritime activities. Receding sea ice has extended the navigation season and improved seasonal accessibility along existing and emerging Arctic sea routes, and eased access to energy sources, minerals, and fish, while also enabling tourism. Since 2013, shipping traffic in the Arctic area covered by the International Code for Ships Operating in Polar Waters (Polar Code) has increased. However, limitations in hydrographic information, navigation infrastructure, and emergency response capacity raise important questions about the region's ability to manage growing maritime activity. This policy brief analyzes the safety and security implications of the growing Arctic shipping activity and outlines recommendations for strengthening implementation capacity.

Why is shipping traffic increasing in the Arctic?

The Arctic is warming nearly four times faster than the rest of the planet (Rantanen et al., 2022). Due to this, the climate-change-induced ice melt is prolonging the navigation season for maritime transportation. The Arctic, which for years was considered inaccessible and isolated, is becoming increasingly accessible for maritime navigation as sea ice retreats. Such sea routes include the Northern Sea Route (NSR), the Northwest Passage (NWP), the Transpolar Sea Route (TSR), and the Arctic Bridge, which have great significance for the global economy in the sense that they will allow reduction in transit times and thus may drastically impact demand for chokepoints like the Suez and Panama Canals. According to the latest assessment by Arctic Council's Protection of the Arctic Marine Environment (PAME), the total number of individual vessels operating in the Polar Code Area increased to 1,812 in 2025, reflecting a 40 percent rise from 2013. Over the same period, the combined distance covered by these vessels increased by 95 percent (Arctic Council, 2026).

According to a modeling study by Bekkers et al. (2018), the NSR shortens the average transit distance and duration between Northeast Asia and Northwest Europe by approximately one-third compared to the existing Southern Sea Route. Broken down by country pairs, this reduction is approximately 37% for Japan, 31% for South Korea, 23% for China, and 17% for Taiwan. The same study estimates that about 8% of global trade passes through the Suez Canal, and that if the Arctic sea route were fully utilized, roughly two-thirds of this volume could shift to it. The potential gains for the NWP are more limited. Countryman et al. (2016) calculated that the weighted average maritime distance for U.S. trade with East Asia would decrease by approximately 9–11% compared to the route via the Panama Canal. This reduction reaches 23–28% for the route to Newark, while it remains at 5–8% for the route to Louisiana. The same study suggests that the NWP could reduce traffic through the Panama Canal by up to one-third. However, both studies represent "upper-bound" scenarios based on the assumption that these routes are navigable year-round.

Melting ice not only enables access to sea routes; it is increasing access to natural resources as well. According to the 2008 United States Geological Survey (USGS) assessment, the Arctic has an estimated 90 billion barrels of undiscovered oil, 47 trillion cubic meters of natural gas, and 44 billion barrels of natural gas liquids. These numbers constitute about 30 percent of the untapped natural gas deposits in the world and 13 percent of the untapped oil deposits (USGS, 2008). Gold, copper, iron, lead, tin, nickel, and diamonds are some other minerals that the Arctic is rich in. With ice retreating, the prospecting, extraction, processing, and energy transport activities in the region are gradually becoming easier (Baldıran, 2023).

Fishery and tourism activities have been increasing at the same time. The Arctic is inhabited by over 21,000 species of mammals, birds, fish, invertebrates, plants, and fungi (Arctic Centre, n.d.). This area has been attracting tourists ever since the early nineteenth century, and currently, tourism is the third largest activity in the Arctic after shipping. Among the popular places are Glacier Bay in Alaska, and Nunavut, Northwest Territories, and Yukon in Canada, as well as regular flights in summer to Greenland, Faroe Islands, and Iceland. Tourism is rapidly developing in the Arctic (Arctic Portal, 2009), but there are some repercussions of this trend for the indigenous population and natural environment.

The total of these developments demonstrates the presence of an evident increase in Arctic shipping volumes. The real concern, however, is whether the Arctic safety and security structure is ready to cope with these developments. The ice situation in the Arctic continues to be highly changeable, thus making the Arctic a rather unpredictable region for navigation even for a well-experienced crew. Despite the increase in traffic volumes, there are still considerable problems with navigation in the Arctic because of insufficient developed mapping (PAME, 2026).

More ships, more risks?

The increase in shipping traffic in the Arctic brings with it various challenges regarding navigational safety, emergency response, and the protection of the marine environment. Harsh weather conditions, shifting ice cover, limited navigational and communication infrastructure, and the significant distances between settlements and response capabilities make it difficult to prevent maritime accidents and respond to incidents in a timely manner. These conditions highlight, in particular, the safe navigation of vessels, the effectiveness of search and rescue operations, and the mitigation of environmental damage resulting from accidents. Therefore, to assess the risks posed by rising shipping traffic in the Arctic, it is essential to first examine the core issues within these three areas.

In this context, the primary challenges include: regarding navigational safety, the unpredictability of ice conditions, insufficient hydrographic data, and limited navigational infrastructure; regarding search and rescue, inadequate response capacity, long response times, and communication constraints; and regarding the protection of the marine environment, the technical difficulties in cleaning up oil and other pollutants, the fragility of sensitive Arctic ecosystems, and the limited options for environmental response.

Navigational safety

The harsh weather conditions, unpredictability of ice, limited communications, and considerable distance in travels from one port to another are among other challenges encountered in the Arctic area that pose a safety and security threat at sea. The safety of vessels operating in such conditions and the protection of the marine environment are key concerns addressed by the International Maritime Organization (IMO). For this reason, the organization has put in place certain requirements. The Polar Code, which entered into force on 1 January 2017, sets out standards on design, construction, equipment, operation, training, search and rescue, and environmental protection of ships sailing in polar waters (IMO, n.d.).

Search and rescue capacity

As shipping traffic increases, search and rescue (SAR) capacity has become an increasingly important component of Arctic maritime safety. On the one hand, the SAR issue is directly regulated by the Polar Code adopted by the IMO. On the other hand, the Agreement on Cooperation on Aeronautical and Maritime Search and Rescue in the Arctic, which was signed in 2011 and entered into force in 2013, defines the areas of state responsibility for cooperation in SAR issues (Arctic Council, 2011). However, the presence of IMO regulations and the agreement on cooperation does not necessarily mean that the capacity of SAR will be adequate. The increased shipping traffic in the Arctic requires reconsideration of the capacity of SAR, because the nature of the Arctic makes SAR actions much more complicated than in other regions.

Maritime accidents and environmental risk

Increased traffic can increase exposure to maritime accidents. Such incidents as shipwrecks, collisions with ice or other vessels are threats not only to human lives but also to the marine environment due to possible pollution and disturbance. In the Arctic, maritime security cannot be separated from environmental security since any risk connected with navigation involves an environmental aspect as well. It should be noted that increased shipping traffic alone does not constitute an environmental risk. The main task is to gain the ability to prevent these risks and cope with their consequences in case of accidents.

Is the Arctic ready?

The Polar Code became legally binding through amendments to the International Convention for the Safety of Life at Sea (SOLAS), notably Chapter XIV, and the International Convention for the Prevention of Pollution from Ships (MARPOL) (IMO, n.d.). Effective 1 January 2026, amendments to the Polar Code and SOLAS Chapter XIV extended navigation safety and voyage planning requirements to fishing vessels of 24 meters or more in length, pleasure yachts of 300 gross tonnage or more not engaged in trade, and cargo ships between 300 and 500 gross tonnages. Existing vessels have a transition period that ends in 2027 (IMO, 2026).

Other legally binding regional agreements developed by the Arctic states relate to SAR and response to marine pollution. However, despite the presence of such a regulatory framework, the operational capability needed to deal with the rising level of shipping traffic in the region cannot be guaranteed automatically. The increase in traffic necessitates the strengthening of capabilities in monitoring, navigational safety, SAR, and emergency response.

What should be done?

While the Arctic regulatory framework is evolving, implementation capacity should also be strengthened simultaneously. The following policy recommendations follow this analysis;

- *Build SAR capacity:* As Arctic shipping traffic increases, strengthening SAR capacity becomes increasingly important for maritime safety and security. This requires adequate SAR vessels and equipment, personnel trained to operate in harsh polar conditions, and joint exercises to prepare for cross-border emergencies. Arctic states should assess their SAR capacities within their respective areas of responsibility and strengthen regional cooperation to address any shortcomings. In this context, the availability of SAR vessels and appropriate equipment should be increased, personnel should be trained for operations in harsh polar conditions, and joint exercises should be conducted for cross-border emergency situations. Relevant cooperation mechanisms within the Arctic Council can contribute to enhancing coordination and information sharing among these states.

- *Improve accident and pollution response capacity:* Beyond SAR operations, Arctic states should strengthen their capacity to respond to oil spills and releases of hazardous substances resulting from maritime accidents, which pose significant risks to environmental security. To this end, it is necessary to keep emergency response equipment readily available at strategic locations, update response plans aimed at containing the spread of pollution, and conduct joint exercises among national response units. National authorities, coast guard services, and emergency response agencies should strengthen coordination and information sharing to facilitate the joint use of resources in the event of transboundary environmental incidents.

- *Enhance enforcement of the Polar Code:* Strengthening this capacity can improve compliance with applicable safety and environmental protection requirements for ships operating in Arctic waters. The effective implementation of the IMO Polar Code requires consistent monitoring of compliance and enforcement by the relevant authorities. Flag states should monitor the compliance of vessels flying their flag with the applicable requirements, while, within the scope of port state control, competent authorities should conduct necessary inspections in accordance with existing international regulations. Furthermore, targeted guidance and awareness-raising activities for ship operators, crews, and relevant industry stakeholders can improve understanding of the Polar Code's requirements and support compliance with applicable regulations.

- *Strengthen hydrographic mapping and navigation infrastructure:* Mapping the Central Arctic Ocean is challenging due to the presence of perennial sea ice, complex seafloor geology, thick sediment cover, and political dynamics; these factors limit data collection to the use of icebreakers, submarines, and drifting ice stations (Jakobsson et al., 2024). Arctic states should expand joint hydrographic research programs, prioritizing seabed surveys and the updating of nautical charts in areas where hydrographic data is limited and shipping traffic is increasing. National hydrographic agencies should strengthen data sharing to identify and address gaps in existing nautical charts. Regional hydrographic cooperation mechanisms can facilitate the identification of research priorities and the standardized sharing of data. Furthermore, the accessibility of navigational warnings and up-to-date hydrographic information for mariners should be improved.

Conclusion

The question surrounding Arctic maritime safety and security is no longer simply whether more ships will enter the Arctic. There is ample evidence to prove that there has been an increase in shipping activities in the area, and all signs indicate that such activities will continue in the coming years because of melting ice and increased accessibility through these routes. The important question that needs to be addressed now is whether the region is ready for such growth.

The analysis set forth herein reveals an ongoing gap between regulatory intent and readiness for implementation. The Polar Code and the Arctic SAR agreement from 2011 reveal that both Arctic and non-Arctic states are aware of the hazards posed by the increase in shipping traffic in the region. However, the existence of these frameworks does not by itself demonstrate that SAR capacity, accident response infrastructure, and hydrographic surveys are sufficient to manage increasing maritime activity. To fill this gap, there is a need for Arctic nations, the IMO, and other relevant organizations to give emphasis to implementation as well as regulation in the years ahead. The future of Arctic shipping will depend not only on the conditions of the ice but also on how quickly the region is able to match up in terms of security, governance, and response capabilities.

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