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Defining the White Water Zone

Cold Seas as a Distinct Category for the Operational Ordering of Maritime Domain

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Cold waters constitute a distinct operational space in the maritime domain¹ that remains insufficiently conceptualized. They are commonly treated as a climatic modifier of existing operational spaces rather than as a category in their own right. In American thinking, these are referred to as the blue, the green, and the brown water zone.² They broadly correspond to those defined under the United Nations Convention on the Law of the Sea, namely the high seas, the exclusive economic zone, and territorial waters.

The lack of a conceptual framework for cold waters now carries concrete consequences, shaping force posture, access, and patterns of global power competition in the maritime domain; [recent debates over the control of Greenland](#) illustrate why cold waters must be understood as a distinct operational space, continuing the colour-coded taxonomy of maritime geography: the *white water zone*. Such a category would help Western maritime forces³ to deliberately develop capabilities for regions whose importance is likely to expand further.

From Icy Flanks to Global Hotspots

As with the deep sea and outer space, cold waters and adjacent landmasses were long considered peripheral due to their inhospitable conditions. These include the areas of the Arctic and the Antarctic Ocean. While they were not entirely unaffected by global power competition, cold waters were far less impacted than other regions. Consequently, there had long been no comparably strong military presence, and became mostly forgotten flanks.

This began to change around the millennium, when Arctic littoral states increasingly started to reframe and reassert maritime and continental-shelf claims that had previously remained largely latent. This process became particularly visible in 2007, [when a Russian expedition team planted a flag on the seabed on or near the Lomonosov Ridge](#). What followed was a gradual widening of Arctic competition beyond legal and symbolic positioning towards more sustained strategic attention.

This process has since been further intensified by climate change: many actors - both states and companies - hope that melting ice will ease resource extraction and open new shipping routes. Alongside these potential advantages emerges the risk that existing legal regimes and claims may not be upheld.

Today, the Arctic is characterized by the coexistence of competing visions of order, reflecting distinct security, legal, and geoeconomic rationales:

[From a Russian point of view](#), the primary objective is the consolidation of sovereignty and control over its Arctic domain, conceived as an integrated strategic space. This is reflected in a hierarchical understanding of - as it is called in Russia - the “world ocean” that differentiates between areas according to their relative security relevance, thereby constructing a centre-periphery or near seas-far seas logic in which strategic proximity to

¹ The term “maritime domain” as used in this paper is understood in geographical terms as the area “encompassing oceans and seas - including everything on, above and below the surface, in all directions”, cf. NATO (2025): NATO’s maritime activities, online in: <https://www.nato.int/en/what-we-do/operations-and-missions/natos-maritime-activities>, 10.03.2025 (accessed: 16.04.2026), supplemented analytically by the inclusion of the littorals as the land-sea interface.

² The mentioned colour-coded taxonomy became widely known primarily through the US “Naval Operations Concept” of 2010, cf. U.S. Department of the Navy (2010). Naval Operations Concept 2010: Implementing the Maritime Strategy, online in: <https://www.marines.mil/portals/1/Publications/Naval%20Operations%20Concept%202010.pdf> (PDF file), 2010 (accessed: 16.04.2026), p. 8.

³ The term “maritime forces” as used here refers to state authorities and organizations exercising executive security functions in the maritime domain, including navies, coast guards, and other law enforcement entities.

the Russian mainland is associated with varying intensities of attention, presence, and control.

[From an American and European point of view](#), the central concern lies in preserving a rules-based maritime order that safeguards open access and constrains the militarization of Arctic spaces governed by international legal frameworks. This position is, however, not fully uniform, as some coastal states - most notably Canada in relation to the North-west Passage - also maintain more sovereignty-oriented interpretations of adjacent Arctic waters.

[From a Chinese point of view](#), the aim is to secure legitimate access to the Arctic in order to utilize its natural resources, emerging maritime routes, and scientific opportunities for Beijing's long-term economic and strategic development. This objective is primarily justified through the self-identification as a "near-Arctic state", operationalized via involvement in raw material extraction, infrastructure engagement, and scientific research activities, as well as supplemented by an expanded diplomatic presence.

The Military Reawakening of the Arctic

The Arctic's contemporary importance is underlined by Russia's growing military presence, which builds on a substantial Soviet-era legacy of Arctic militarization. Throughout the Cold War, the region was systematically transformed into a forward strategic space for naval operations, nuclear deterrence, early-warning systems, and the projection of Soviet military power. Extensive infrastructure networks - including airbases, radar stations, naval facilities, and forward military positions across the Arctic archipelagos - were established, reflecting the Arctic's central role in bipolar global power competition.

Following the collapse of the Soviet Union in 1991, much of this infrastructure entered a period of decline or partial abandonment. Since the early 2000s - after Vladimir Putin became president - and increasingly throughout the 2010s in parallel with the effects of climate change and the gradual reduction of sea ice, [Moscow has systematically reactivated, restored, and modernized its Arctic military footprint](#).

Russia's renewed engagement in the Arctic therefore represents not only a return of military competition to the region but also a challenge to established ways of conceptualizing maritime power. The rapid restoration of Arctic capabilities and infrastructure has created a strategic reality that existing maritime frameworks struggle to adequately capture, as the operational conditions of cold-water environments differ fundamentally from those of more conventional realms of the maritime domain.

Moreover, Arctic competition increasingly manifests itself in areas below the threshold of conventional military confrontation. Disputes over fishing rights, for example, demonstrate how civilian activities can become intertwined with strategic interests. In particular, the use of non-military maritime forces to enforce claims and regulate access highlights the growing importance of capabilities beyond traditional naval power in shaping control over cold-water environments.

To understand cold seas such as the Arctic, it is necessary to move beyond assessments of military presence alone and examine the geographic conditions that shape operations in cold seas. From a broader perspective, the Arctic highlights a disconnect between evolving maritime realities and existing analytical frameworks, requiring closer attention to how maritime forces can establish and sustain presence in such environments.

Maritime Geography and Fleet Design

To address these gaps, maritime forces are the primary instruments offering sustained presence, operational flexibility, and the ability to project influence beyond the sea. This includes both naval and maritime law enforcement actors.

Their employment is contingent upon the respective maritime environment; the typology of blue, green, and brown water zones provides a conceptual framework for understanding how different maritime geography impose distinct demands. Each zone can be characterized by specific criteria - including ship design, tactical and operational employment, and strategic objectives - which in turn shape fleet planning and operational concepts: High seas, or blue water, generally require long-endurance vessels capable of sustained deployments and power projection over wide areas; coastal zones, or green water, favour shallower-draft, agile platforms optimized for littoral manoeuvre and support of expeditionary operations; inland and near-shore areas, or brown water, demand small, highly manoeuvrable craft suited to local control and rapid response.

By delineating maritime geography according to these criteria, planners can systematically match capabilities to the operational and strategic challenges inherent in each environment, thereby shifting the focus from geographically bounded "[oceans of operations](#)" to functionally differentiated maritime spaces.

The Arctic includes high seas, coastal areas, and inland waters, superficially resembling the traditional blue, green, and brown water zones. In principle, this taxonomy can be applied, but it fails to account for environmental factors unique to cold regions.

The problem with this perspective is that it downplays the effects of low temperature: ice-edge zones shift annually, ice movements are unpredictable, and interactions between saltwater and meltwater produce unusual currents and tidal variations. These conditions affect both personnel and material, and ultimately influence procedures. As a result, surface operations in cold waters follow a unique modus: On the one hand, missions proceed relatively slowly and require heightened vigilance or markedly altered approaches than those used in temperate areas. On the other hand, mission success depends less on scale - such as force size or firepower - and more on environmental resilience. In order to achieve this, warships must incorporate features such as reinforced hulls, protected propulsion and rudder systems, redundant marine engineering, increased storage capacity, and life-saving equipment suited to extreme weather.

The Need for Sustainable Capabilities

Despite a small number of public papers published over the past several years on the [requirements of a “white water navy”](#), Western navies [have not increased the construction of combat icebreakers or comparable platforms](#). In practice, however, operations in cold waters appear to remain exceptional in most of them, as kind of a specific mission. When those are accounted for, they are usually confined to major surface combatants and their crews - that is, forces primarily designed for blue water operations - creating an inherent trade-off between multi-mission flexibility and environmental resilience. This reflects a broader Western preference for efficiency over actual effectiveness.

This approach will not be sustainable going forward. Even ahead of the recent debate over Greenland, [NATO had already increased its military activity in the Arctic](#) to counter Russia’s presence and preserve the strategic balance. In doing so, the Arctic has evolved from a peripheral or transitional space into a permanent and distinct operational environment. However, institutionalized expertise and specialized technologies remain little and are found primarily in Canada, Denmark, and Norway - three of the four Western countries of the five Arctic littoral states.

These nations alone cannot ensure the defence of their territories or the enforcement of national and international law. The latter is likely to become more salient as access to and competition over Arctic resources increases.

While public debate has largely focused on hydrocarbon and mineral deposits, fisheries constitute an equally significant and [often underappreciated dimension of Arctic resource governance](#). The Barents Sea, for instance, contains some of the world’s most productive fishing grounds, where Russia and Norway continue to cooperate on resource management despite broader geopolitical tensions and areas of rivalry. At the same time, the potential expansion of Chinese distant-water fishing fleets into the region - similar to [patterns already observed off the coasts of South America](#) - could introduce a predominantly non-military yet strategically salient challenge with clear geopolitical implications.

To support the Western Arctic coastal states effectively, their allies will require not only political will and strategic resolve, but also capabilities that go beyond those associated with blue-water naval forces: military presence in this context is primarily geared toward deterrence and assurance, rather than high-intensity warfare. However, the employment of such capabilities is often tied to the management of escalation risks in environments where disputes emerge well before the threshold of armed conflict is reached. At the same time, Arctic coastal states may seek to calibrate the scale and profile of external military involvement, as extensive deployments can be of limited utility when external actors lack familiarity with local environmental and operational conditions, thereby increasing the risk of misperception and miscalculation on both sides. Maritime security challenges in the Arctic are therefore frequently situated in the realm of surveillance, monitoring, and law enforcement. This does not imply a reduced demand for support, but rather a differentiated one, where emphasis may shift away from traditional naval deployments toward constabulary-type contributions, should these be requested by the coastal states. While such tasks are typically performed by coast guards in many countries, not all Western states possess adequately resourced constabulary forces, and even fewer have capabilities designed for sustained operations in extreme cold-weather maritime environments.

Making the Case for a White Water Concept

Treating cold waters as a *white water zone* facilitates the adaptation of Western maritime forces to sustained operations under such conditions, without transforming them into a full-fledged “white water navy”. Articulating such a concept would yield multiple benefits:

First, it acknowledges the unique operational challenges in these areas and addresses a conceptual gap which should be filled urgently.

Second, it supports better capability planning by showing that conventional blue water platforms are insufficient and that subject-matter expertise, long-term preparation, ice-operating capabilities, and material resilience are necessary. This enables more focused force posture, doctrine, and resource allocation.

Third, it allows for more precise operationalization, making patrols, escalation management, and logistics easier to analyse systematically. The category also emphasizes that the maritime domain is shaped not only by a horizontal centre-periphery relationship between mainland and the open sea, but also by physical access limitations, much like in a vertical sense with the deep sea (which likewise resists established colour-coded categorization and could, heuristically, be described as a “black water zone”).

Fourth, the *white water zone* assists political communication by justifying investments in capabilities and presence through clearer articulation of risks, costs, and operational demands.

Fifth, the concept is applicable beyond the Arctic, including the Antarctic, and is therefore relevant to states in the Southern Hemisphere or those operating there.

Doctrinal Standardization through US and Allied Cooperation

The introduction of a *white water zone* concept is most effectively achieved through U.S. Navy doctrine, as American regulations have historically provided guidance that is often adopted by allied naval forces. Against this background, revising the U.S. Navy’s Cold Weather Handbook for Surface Ships represents a suitable approach. [The publicly available edition](#) dates from 1988 and is therefore likely outdated. This creates a practical opportunity to standardize knowledge in this field.

The United States should, however, incorporate the experiences of its allies, with European partners such as Germany playing an active role in the revision of the document and contributing their own operational insights to support the development of a shared understanding applicable within NATO as well as in cooperation with Japan in the defence of the Arctic-North Pacific region. Given that operations in cold-water environments extend beyond the traditional scope of naval warfare and also encompass constabulary and law enforcement functions, the conceptualization of a *white water zone* should not be limited to naval forces alone.

In the same way that the blue, green, and brown water zones provide conceptual clarity, the *white water zone* would clarify operational requirements, shape capability planning, and highlight the strategic importance of cold-water operations.

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