

Hóracio Werner
Patricia Cavalcanti
Mariano Aguas
[Eds.]

Antarctica as a Model for Global Peace

A compelling contemporary
example of how nations
can thrive through collaboration

 KONRAD
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ANTARTICA

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Prologue

The Konrad Adenauer Foundation (KAS) in Argentina is deeply engaged with issues that are vital to the future of humanity. In recent years, the Foundation has turned its attention to Antarctica—a continent of critical importance for human survival, given its profound relevance to scientific advancement and climate protection. This publication, produced in collaboration with our partner Agenda Antartica, highlights the agreements governing Antarctica and the Southern Ocean as a model of international cooperation and peacebuilding in an era of global uncertainty. Born out of the geopolitical tensions of the Cold War, the Antarctic Treaty System remains a compelling framework for collaboration. Today's geopolitical landscape is no less complex. This book aims to inspire new thinking on how international cooperation can serve as a pathway to addressing the major societal challenges we face together. In Antarctica, the principle of international cooperation has been implemented as successfully as perhaps in no other region of the world. The principles of the common good and cooperation have successfully prevailed over national interests and competition.

The protection of the white continent and its scientific use for the benefit of humanity are regulated by the 1959 Antarctic Treaty, which has been an unprecedented guarantee of peace and stability since its inception. However, in times of shifting global power dynamics, the likelihood of political and economic competition in

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the southernmost region of the world is increasing. After World War II, geopolitical tensions emerged in Antarctica. Argentina, Australia, Chile, France, New Zealand, Norway, and the UK made partially overlapping territorial claims. Western countries also viewed the Soviet Union's growing presence in the South Pole with suspicion. In June 1958, negotiations began for the first arms control treaty after WWII, involving claimant countries as well as the US, USSR, Belgium, Japan, and South Africa. The signatories agreed to suspend territorial claims and refrain from military and economic activities. Instead, Antarctica—uninhabited and located between 60° and 90° south latitude—was designated for peaceful purposes, particularly scientific research for the common good.

Today, 58 countries are part of the agreement. Of these, 29 hold consultative status at the Antarctic Treaty Consultative Meetings. To obtain this status — and thus participate in decision-making — a country must demonstrate that it has conducted significant scientific research in Antarctica, either by establishing a research station or by sending a substantial scientific expedition. All decisions are reached by consensus rather than by majority vote, requiring that none of the Consultative Parties formally objects. The original treaty, along with five subsequent agreements, forms the Antarctic Treaty System. Notably, the 1980 Convention for the Conservation of Antarctic Marine Living Resources established a commission to create marine protected areas, and the 1991 Madrid Protocol explicitly prohibits commercial exploitation of raw materials.

In recent years, shortcomings of the Antarctic Treaty have become evident. In 2025, the designation of new marine protected

areas failed for the ninth consecutive time due to vetoes by China and Russia. Since marine protected areas established under the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), which is part of the Antarctic Treaty System, are not permanent, the Ross Sea MPA — the largest in the world — is set for review in 2052, 35 years after its entry into force. Decisions on extensions and the establishment of new protected areas require consensus of the 27 CCAMLR members. Additionally, the Protocol on Environmental Protection — which bans all resource extraction in Antarctica — may be subject to review in 2048 at the request of any Party. While most decisions within the Antarctic Treaty System are adopted by consensus, amendments made at a review conference would follow a different rule: they may be approved by a majority of all Parties and by at least three-quarters of the Consultative Parties. Large deposits of coal and iron ore have been confirmed in the region, and speculation about other raw materials is growing. Easier access to mineral resources due to melting ice is sparking interest. China has long recognized Antarctica's strategic importance and has intensified its polar engagement as part of its maritime strategy to bolster its global power claims. China's defensive stance on new marine protected areas is concerning to many member states. Doubts are growing about whether existing protection mechanisms are sufficient. Moreover, the use of dual-use technologies in research raises concerns about the region's exclusively peaceful use. Although consultative states have the right to inspect all areas of Antarctica, they lack the resources to effectively monitor compliance.

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Latin America is the closest continent to Antarctica. Argentina and Chile have been signatories of the Antarctic Treaty since its inception and are geographically closest via Ushuaia and Punta Arenas, respectively. Argentina established the first permanent base in Antarctica in 1904. For both countries, scientific research—especially environmental—is crucial. Maintaining scientific bases and a permanent presence in Antarctica strengthens their roles as active players in the Antarctic system and protects strategic interests. Their proximity to the Antarctic Peninsula gives them an advantage in maritime routes, especially if new trade routes open due to ice melt. Controlling logistical and maritime access to Antarctica can translate into regional influence and naval cooperation. Brazil, Ecuador, Peru, and Uruguay are consultative members. Cuba, Colombia, Venezuela, and Costa Rica are non-voting members. For them, Antarctica represents an opportunity to engage in global governance and international debates about the continent's future.

In 2021, the EU presented a new Arctic strategy, but it lacks a formal Antarctic policy. Since Russia's war of aggression against Ukraine, a comprehensive polar strategy has become essential, and Antarctica's demilitarized status can no longer be taken for granted. The return of great power rivalries increases the risk of strategic competition in the southern polar region. Twenty EU member states are signatories of the Antarctic Treaty, and France is a founding member. EU countries conduct significant research in the South Pole. The EU must clearly articulate and defend its political interests in science, marine protection, fishing, regional peace, and

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rule-based order—alongside partners who share its values, such as the UK, Norway, Argentina, Chile, Brazil, and the US.

Since its inception, the Antarctic Treaty has shown its ability to unite nations around a common goal through scientific cooperation in politically challenging times, contributing to peace. Future challenges—climate protection, conservation, and peacekeeping—require joint action. On an operational level, trust and solidarity prevail in Antarctica's harsh environment. This trust must be cultivated at the political level as well. Given the current complexity of relations with Russia, countries with shared interests in Antarctica should pursue strategic dialogue with China on marine protection. In a fragmented world with growing conflicts, shared responsibility, peaceful cooperation, and scientific solidarity in Antarctica are powerful symbols of hope and inspiration.

With this work and the debate surrounding it, we aim to encourage reflection on how the spirit of the Antarctic Treaty can be preserved in the future. We thank all the authors and Agenda Antártica for their important contributions.

SUSANNE KÄSS

Representante de la Fundación
Konrad Adenauer en Argentina

Introduction

This volume represents an unprecedented collective endeavor, uniting a select group of leading voices from across the world to reflect on Antarctica and its enduring role as a model for peace. Its contributors include scholars, diplomats, policymakers, and experts whose fields span law, science, governance, history, culture, and international relations. Together, they bring a remarkable convergence of perspectives: those deeply engaged in Antarctic affairs joined by specialists in peace studies and global cooperation. The result is a dialogue that is both rigorous and forward-looking, bridging disciplines and regions in pursuit of a shared understanding of how peace can be sustained in a complex and changing world.

In contrast to the extensive literature on geopolitics, environmental policy, or exploration, there are few works devoted to examining how Antarctica itself has become one of humanity's most extraordinary achievements in peaceful governance—and how that experience can inspire solutions in other global contexts. The need for such work has never been more urgent. Beyond contributing to academic scholarship, this book aspires to spark a broader reflection on the value of Antarctic peace: to recognize it as a milestone of human cooperation, to defend it amid rising international tensions, and to draw from it the lessons necessary to confront the divisions and conflicts of our time.

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Ultimately, this book seeks to raise awareness and foster responsibility. It invites readers to consider the broader societal and moral implications of preserving peace in Antarctica—not merely as a regional success, but as a living example of how shared purpose, restraint, and innovation can guide humanity toward a more stable, equitable, and cooperative global order.

Peace also serves as a bridge concept—a meeting point and common denominator in times when many debates have become polarized. These days, discussions around conservation have increasingly become polarized, frequently cast through a political lens — with support often associated with progressive or left-leaning views, and opposition framed as a more conservative or right-leaning position. This framing has diminished the quality of dialogue, trapping discussions in deadlock, and preventing the emergence of shared solutions. Part of the purpose of this book is to build what could be called a golden bridge of consensus. Peace, unlike many contested terms, carries a unifying power: few oppose the aspiration to live in a world that is healthy, stable, secure, and at peace. Thus, the value of discussing peace lies not only in affirming peace itself, but also in using it as a tool to construct common ground—an entry point for reconciling diverse perspectives on production, conservation, and human development.

It is also undeniable that peace carries a cost. Peace entails an opportunity cost, often reflected in the economic and strategic aspirations of nations, in the development of industries, and, not least, in the profits generated by conflict itself—whether through the arms trade, wartime economies, or post-conflict reconstruction.

To choose peace is to set aside these opportunities, a choice that may limit immediate gains, but will undoubtedly yield greater long-term benefits for all of us. It also means foregoing the use of conflict as a tool for power-building, whether within nations, across regions, or in the pursuit of global hegemony. To forgo these avenues in favor of peace is no small cost, and yet it is a cost that humanity must acknowledge if we are to preserve the possibility of a stable, cooperative, and just world.

Thus, the real discussion of how to achieve peace cannot be reduced to goodwill or moral aspiration alone. It also requires the creation of viable alternatives for development and addressing the very issues outlined above. To ignore them is insufficient; it is an excess of voluntarism. The question that emerges is: what is the currency of exchange for these costs? This is where humanity faces its true challenge—imagining possible futures in which human development and diverse aspirations, some more legitimate than others, can be reconciled through forms of exchange that sustain peace. One pathway explored in this book is innovation. Innovation offers the possibility of jointly identifying, across nations, new avenues of development—whether through technology, social models, or scientific advancement. These models can help replace the opportunity costs of peace with constructive gains that are more closely aligned with a universal vision: a world that is healthy, stable, secure, and at peace.

Equally, peace cannot be sustained without collaboration and dialogue. When dialogue is genuine and collaboration is embraced, the result is more than the sum of its parts: it is a process where one

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plus one is not two, but three. In other words, cooperation creates new value — ideas, trust, and possibilities — that would not exist if actors remained isolated. Yet for this to occur, certain conditions must be met. Dialogue requires openness and honesty; collaboration requires tolerance, patience, and a willingness to understand the other. Without these foundations, attempts at cooperation risk becoming superficial or fragile. With them, however, collaboration becomes transformative: it generates outcomes that are richer, more resilient, and more capable of advancing peace than any single effort on its own.

The moral dimension also plays a crucial role. *Laudato Si'*, Pope Francis's encyclical on the environment, introduces the concept of integral ecology—the recognition that ecological, social, human, and ethical dimensions are inseparably linked. Although Christian in origin, the principle resonates universally, echoing values such as human dignity, solidarity, and responsibility to future generations. Confucian philosophy contributes to a parallel perspective: harmony between Heaven, Earth, and humanity, guided by benevolence (*ren*) and balance, including care for nature. China's contemporary concept of ecological civilization extends this into a political ethos, placing environmental stewardship at the core of sustainable development. Likewise, Jewish tradition emphasizes *tikkun olam*—repairing the world—as a moral duty, while Islam calls humanity to act as *khalifa*, stewards of creation, entrusted with its care. Taken together, these traditions illustrate that across civilizations there exists a shared moral commons: an ethical foundation for peace grounded in responsibility, justice, and respect for life.

Although this book is primarily about peace as learned through the practice of consensus in Antarctica—and how that experience might be applied universally—it would be misleading to overlook the role that Antarctica will also play in shaping the conditions of global peace in the decades ahead. While this is not a statement measurable in strictly scientific terms, the relationship between climate change and geopolitical stability is widely recognized by institutions such as the Intergovernmental Panel on Climate Change (IPCC), the World Bank, and the United Nations Environment Programme (UNEP). The melting of the Antarctic ice sheet will affect food security, water resources, and migration flows—all with significant implications for global peace.

Scientific evidence, including the latest assessments of the Scientific Committee on Antarctic Research (SCAR), confirms that Antarctic ice sheets are melting at an accelerating pace. Projections suggest that by the end of this century, under high-emission scenarios, global sea levels could rise by up to 1.4 meters. Such an increase could put up to one billion people at risk of displacement from coastal zones. Rising seas will cause salinization, degrade agricultural lands, and destabilize many of the regions where societies have flourished for millennia.

These cascading effects will inevitably produce new geopolitical frictions, as nations and regions contend with mass migration, resource competition, and social upheaval. In this sense, Antarctica is both a paradox and a warning: while it serves as a case study and model of cooperation, it also exerts—through processes beyond its shores—an involuntary influence as a driver of future global

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peace and security challenges. Another dimension to consider is the fragility of this achievement. The Antarctic Treaty is arguably the most successful peace agreement in modern history, preventing militarization and fostering cooperation for more than six decades. Yet should it ever collapse, the setback for humanity would be profound. Human progress is marked by milestones, each one demonstrating our capacity to cooperate and build trust. The Antarctic Treaty is one such milestone. Losing it would mean not only the erosion of governance in a single region but also a regression in humanity's collective ability to sustain peace through agreements. In a world where treaties are increasingly questioned, agreements devalued, and violence glorified as a tool of power, preserving the Antarctic model is itself a global imperative.

The Treaty has also played a stabilizing role far beyond Antarctica. Argentina and Chile, once divided by territorial disputes, now cooperate in Antarctica at the highest levels, exemplified by the Combined Antarctic Naval Patrol, jointly operated for nearly three decades. South Africa, as a logistical hub and symbolic bridge to the Global South, underscores the role of Africa in Antarctic affairs. The Pacific Island nations, whose survival depends on the fate of the Southern Ocean, remind us that Antarctica's impacts are not remote but existential. These examples illustrate how Antarctic cooperation elevates relationships across regions, offering lessons in building trust and stability elsewhere.

Equally important is the dimension of narrative. For too long, the history of Antarctica has been dominated by the "heroic age" of Anglo-European exploration. Yet Antarctica is not the story of one

culture. Argentina's continuous presence since 1904, Chile's sustained engagement, the massive scientific contributions of Europe, the United States, and Asia, and the perspectives of nations across Africa and Oceania form a genuine mosaic of human endeavor. This broader narrative underscores Antarctica as a crucible of humanity—where multiple cultures converge in science, governance, and imagination.

Narratives play a crucial role in shaping how societies understand themselves, their priorities, and their responses to challenges. They provide meaning and coherence, transforming facts into stories that guide collective action and justify decisions. In this way, narratives do not simply describe reality—they construct it, influencing both what people believe and how they act. For peace, this means that the stories we tell about cooperation, conflict, and the future matter as much as the treaties or institutions we design. Narratives can inspire trust, solidarity, and shared purpose, or they can fuel suspicion, rivalry, and division.

For this reason, caution is required in both the interpretation and the creation of narratives. In our time, narratives have themselves become a contested battlefield, a space where competing versions of reality are deployed as instruments of power. The proliferation of polarized, manipulative, or exclusionary narratives underscores the need for what might be called peace in storytelling. Constructing narratives responsibly—grounded in truth, attentive to diversity, and oriented toward reconciliation—becomes a task no less important than negotiation or policy. In this sense, the Antarctic story offers an opportunity: to cultivate a narrative of cooperation that

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not only reflects what has been achieved but also resists distortion, inspiring future generations to see peace as both possible and necessary.

Finally, the Antarctic experience provides a compass for broader debates on security and defense. Peace in Antarctica shows that security can be built not only on deterrence but also on cooperation, shared responsibility, and ethical vision. In this sense, the Antarctic model enriches global security debates by integrating moral, technical, material, strategic, and economic dimensions. It is a testimony that cooperative security is possible, and a reminder to societies and policymakers that defense cannot be measured solely by military strength but must be guided by the values of stability, dignity, and peace that it seeks to protect.

This book emerges, therefore, from a conviction that peace must be understood as a dynamic, and innovative imperative. The Antarctic Treaty System provides not only an example of what humanity has achieved but also a warning of what could be lost. It offers lessons for governance, cooperation, and resilience that extend far beyond the ice. In the chapters that follow, scholars and practitioners from across the world bring forward their perspectives—historical, cultural, scientific, legal, and geopolitical—on how peace in Antarctica can continue to serve as both a model and a challenge for humanity.

The expectation of the authors is that this book will awaken—and help accelerate—a vision shared by groups, communities, and societies worldwide: that peace is indeed possible. If the neces-

sary conditions are met, and if humanity commits to the deliberate construction of peace, then it can be achieved. The hope is that this work will contribute to a global dialogue in which more people, more societies, and more stakeholders recognize their role in shaping peace, and that it will inspire participation in a movement to build a healthier, more stable, more secure, and more peaceful world.

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Introduction

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Chapter 1

Peace as a Strategy: Antarctic Lessons for Rebuilding Global Trust

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Abstract

This chapter explores the theoretical and practical dimensions of peace in relation to Antarctica, presenting the Antarctic Treaty System (ATS) as perhaps the most successful peace agreement in modern human history. Moving beyond the narrow definition of peace as the absence of conflict, it situates peace as a proactive, dynamic, and innovative construct—one that must be deliberately built, sustained, and adapted over time. Drawing on key peace theories, the chapter highlights how the ATS embodies both restraint and creativity: prohibiting militarization, “freezing” sovereignty disputes, enabling mutual inspections, and fostering consensus-based

decision-making. Beyond its iconic status as demilitarized commons, Antarctica regulates the planet's energy balance via the Southern Ocean carbon sink. The region has absorbed ~75% of anthropogenic ocean heat and ~43% of anthropogenic CO₂ since the Industrial Revolution, underscoring that Antarctic peace and environmental stewardship are inseparable from global climate stability. The analysis identifies five principles that explain the ATS's durability—demilitarization, transparency, constructive ambiguity, dialogue through consensus, and institutional flexibility—and assesses how each is being tested by contemporary pressures, including geopolitical rivalry, resource competition, climate change, tourism, and limited public awareness. Special attention is given to environmental stewardship, from the creation of Marine Protected Areas to the regulation of krill fisheries, underscoring the inseparability of peace and ecological protection. Finally, the Antarctic experience is framed as both inspiration and responsibility: a model for global governance in contested commons such as the Arctic, the high seas, and outer space, and a fragile system that must be defended through education, outreach, civil society's social awareness and renewed commitment to cooperation.

Introduction and Problem Description

Peace is one of humanity's most contested and most necessary aspirations. While often defined narrowly as the absence of armed conflict, peace theory suggests that sustainable peace must be constructed, nurtured, and actively maintained (Galtung, 1964; Lederach, 1997). This chapter sets the stage for understanding Antarctica not simply as a frozen continent, but as a living experiment in positive peace.

Antarctica as a Model for Global Peace

The Antarctic Treaty of 1959 created an unprecedented framework that has preserved the continent for peaceful purposes, scientific cooperation, and environmental stewardship (Joyner, 1998; Dodds, 2010). At a time when the Cold War divided the world, states agreed to suspend territorial disputes, prohibit military activities, and collaborate in knowledge production. Today, this treaty system represents both an endangered achievement and a source of inspiration: endangered, because it requires constant reaffirmation; inspiring, because it proves that peace can be deliberately built even in strategically sensitive contexts (Hemmings, 2017; Richmond, 2008).

Peace also serves as a bridge concept—a meeting point and common denominator in times when many debates have become polarized. Today, even the global conversation on conservation has been reduced to ideological camps, often framed as a left–right divide: conservation as a cause of the left, resistance to it as a stance of the right. This framing has diminished the quality of dialogue, trapping discussions in deadlock, and preventing the emergence of shared solutions.

Part of the purpose of this chapter, and of this book, is to build what could be called a golden bridge of consensus. Peace, unlike many contested terms, carries a unifying power: few oppose the aspiration to live in a world that is healthy, stable, secure, and at peace. Thus, the value of discussing peace lies not only in affirming peace itself, but also in using it as a tool to construct common ground—an entry point for reconciling diverse perspectives on production, conservation, and human development (Boulding, 2000; Lederach, 1997).

The core problem is twofold:

1. How can peace be understood as a proactive construct, rather than a passive absence of conflict?

2. How can the Antarctic experience serve as both a model to inspire global governance and as a system that requires protection through awareness and education?

Peace as Construct: Theoretical Foundations

To address how peace can be understood as a proactive construct rather than a passive absence of conflict, it is necessary to examine the theoretical foundations of peace and explore how these have been embodied in the Antarctic experience (Galtung, 1964; Richmond, 2008). The idea of peace occupies a fundamental place in the study of political philosophy and international relations. Rather than viewing peace as a natural or default state, or simply as the absence of war, contemporary perspectives recognize peace as a social construct. This means that peace arises from intentional decisions, carefully designed institutions, and collective practices that elevate cooperation above conflict (Boulding, 1978; Bull, 1977).

The Antarctic experience, particularly under the ATS, demonstrates the durability of such a construct when states commit to a shared vision (Lederach, 1997; Mac Ginty, 2011). Building on this conceptual foundation, key distinctions within peace theory illuminate how the ATS operates in practice:

Negative and Positive Peace

As previously stated, peace can no longer be reduced to the mere absence of war. Johan Galtung's (1964) distinction between

negative and *positive* peace shows why peace must be understood as a construct. Negative peace refers only to the absence of direct violence, a minimal threshold of order. Positive peace, however, involves the active creation of institutions, norms, and relationships that sustain justice and cooperation. In this sense, peace is not a passive state but a proactive design. Kant's *Perpetual Peace* (1795) anticipated this idea by arguing that lasting peace requires legal frameworks, republican governance, and federations of restraint. The Antarctic Treaty System (ATS) embodies this principle: peace in Antarctica has not come from isolation or chance but from a deliberate effort to build treaties, conventions, and protocols that actively nurture cooperation.

Peace as Active Construction

If peace is to be durable, it must be built and constantly maintained. John Burton (1990) argued that peace depends on satisfying fundamental human needs—recognition, participation, and identity—while Elise Boulding (2000) emphasized the cultural and educational work needed to create “peaceable societies.” This means peace is not the management of hostilities but the transformation of potential conflict into cooperation. The ATS illustrates this vividly: sovereignty disputes have not been resolved, but rather “frozen,” allowing states to collaborate despite their differences. This framework is evidence that peace is a proactive construct, requiring transparency, dialogue, and institutional creativity to remain viable over time.

The Value of Peace

Understanding peace as a construct also highlights its intrinsic and instrumental value. Intrinsically, peace allows individuals and communities to live without fear. Instrumentally, it creates the stable order necessary for science, innovation, and cooperation. Kenneth Boulding (1978) described peace as a “stable social order,” essential for long-term progress. In Antarctica, peace is the foundation for scientific research and environmental protection. Without the ATS, the continent might have been militarized or exploited; with it, Antarctica has become a shared laboratory for humanity. This shows that peace, when deliberately constructed, becomes the enabling condition for achievements that extend far beyond conflict avoidance.

Peace as Resilience and Innovation

Recent scholarships emphasize that peace must be resilient and adaptive. John Paul Lederach (1997) framed peace as “conflict transformation,” the capacity to reshape relationships so that disputes become opportunities for cooperation. Roger Mac Ginty’s (2011) notion of “hybrid peace” similarly points to the blend of international structures and local agency necessary for sustainability. In Antarctica, peace has survived Cold War rivalries, economic pressures, and contemporary resource tensions precisely because the ATS incorporates innovation: consensus decision-making, mutual inspections, and joint scientific projects. These mechanisms illustrate how peace is not static but constantly renewed through institutional creativity.

Peace as a Global Paradigm

Finally, if peace is understood as a proactive construct, the Antarctic example becomes a paradigm for global governance. Oliver Richmond (2008) emphasizes that peace is both local and international, and that successful peace systems radiate outward as global norms. Hedley Bull (1977) similarly argued that international society can, under the right conditions, establish institutions that constrain anarchy. The ATS demonstrates this possibility: even in a strategically contested region, states have chosen cooperation, inspection, and consensus over competition. This model suggests that peace can be constructed in other fragile domains such as the high seas, cyberspace, or outer space. The Antarctic experience shows that peace is possible not because conflict is absent, but because actors have proactively chosen to transform rivalry into collaboration.

From Theory to Practice: The Antarctic Treaty as a Living Construct of Peace

The theoretical perspectives outlined above invite us to look at real-world examples where peace has been deliberately constructed and sustained. Nowhere is this more evident than in Antarctica. The Antarctic Treaty, signed in 1959 and entered into force in 1961, represents a landmark achievement in the history of international cooperation. Today it includes **58 parties**, of which **29 hold consultative status with decision-making power**, and it covers nearly **10% of the Earth's surface**—an entire continent and its surrounding seas.

The Treaty's achievement is best understood against a background of real confrontation. By the 1940s, seven states had carved territorial claims across most of the continent, with some threatening war to defend them. The United States deployed thousands of troops to Antarctica in Operation Highjump (1946–47), training for extreme environments (Hemmings, 2017; Abdel-Motaal, 2016). The 1959 Treaty therefore transformed a *militarizable* theater into a zone devoted to peace and science.

Often described as the most successful peace treaty in human history, the Antarctic Treaty System (ATS) has maintained a region free of armed conflict for over six decades, despite spanning the Cold War, the rise of multipolarity, and the intensification of global resource competition (Dodds, 2010; Richmond, 2008). It achieved this by prohibiting military activity, nuclear testing, and territorial expansion, while at the same time transforming Antarctica into a space dedicated exclusively to peace and science.

The ATS is not a single treaty but a constellation of agreements, including the Convention for the Conservation of Antarctic Seals (1972), the Convention for the Conservation of Antarctic Marine Living Resources (1980), and the Protocol on Environmental Protection (1991). Together, these instruments provide a comprehensive framework for governance, environmental stewardship, and cooperative research.

The fact that the Antarctic Treaty has endured without violations of its core principles is a testament to its unique design. It has not

only suspended sovereignty disputes but also created mechanisms of inspection, consensus-based decision-making, and environmental protection. In doing so, it has given practical expression to the idea of peace as a proactive construct, proving that rival states can deliberately choose cooperation over conflict.

It is within this context that we can now turn to the principles that explain why the Antarctic Treaty has worked —principles that illuminate both the strengths of the system and the lessons it holds for global governance more broadly.

Principles Behind the Success of the Antarctic Treaty

Scholars have long examined the resilience of the Antarctic Treaty System (ATS), questioning why it has persisted where so many other international regimes have failed. As Isidora Martínez Fariña (2024) argues, the key lies not in a single provision but in a set of principles that have guided its design and practice. These principles explain why the ATS has been able to maintain peace, prevent militarization, and adapt to changing circumstances.

1. The Principle of Demilitarization

The ATS prohibits military activities, nuclear testing, and the disposal of radioactive waste, allowing only uses that serve peaceful and scientific purposes. By removing the possibility of armed competition, the Treaty ensured that Antarctica would not become a battlefield in the Cold War—or in subsequent rivalries. This principle established restraint as the first building block of peace.

2. The Principle of Transparency

Article VII introduced a system of mutual inspections, granting all consultative parties the right to verify compliance. This innovation reduced suspicion by institutionalizing verification, turning trust into an observable practice rather than a matter of goodwill. Transparency became a form of security.

3. The Principle of Constructive Ambiguity

Rather than resolving sovereignty disputes, Article IV “froze” them. States preserved their claims but agreed not to advance them during the life of the Treaty. This ambiguity, far from being a weakness, created stability by avoiding escalation while leaving space for cooperation. Peace was built not through final settlement but through managed suspension.

4. The Principle of Consensus and Dialogue

The Antarctic Treaty Consultative Meetings (ATCMs) provide a forum for states to discuss and adopt measures. Decisions are made by consensus, meaning no state is forced into a position against its will. This principle of inclusivity—effectively granting each state veto power—reinforces trust and ensures that cooperation is voluntary and legitimate. Dialogue is not only encouraged; it is institutionalized.

5. The Principle of Flexibility

Finally, the ATS has proven capable of adapting to new challenges. Additional agreements, such as the Convention on the Conser-

Antarctica as a Model for Global Peace

vention of Antarctic Marine Living Resources (1980) and the Madrid Protocol on Environmental Protection (1991), extended its scope. This flexibility has allowed the system to remain relevant in light of scientific, environmental, and political change. Peace was sustained not by rigidity but by innovation.

The Antarctic Treaty has survived because it institutionalized restraint and innovation through these five principles. But each principle now faces a test: demilitarization is strained by dual-use technologies; transparency by outdated inspections; constructive ambiguity by resource pressures; consensus by deadlock; and flexibility by an increasingly divided world.

The lesson is clear: peace in Antarctica is not self-sustaining. It requires renewed commitment, modernization of mechanisms, and broader public awareness to preserve the achievements of the ATS. Only by reinforcing these principles in today's context can Antarctica remain both a model of global governance and a system resilient enough to withstand the pressures of the twenty-first century.

Yet even these guiding principles face increasing stress tests in today's geopolitical and environmental context.

Main challenges currently threatening peace in Antarctica:

As mentioned before, although Antarctica has long stood as a symbol of peace and cooperation under the Antarctic Treaty System (ATS), this carefully constructed order now faces a range of emerging challenges that test its resilience.

1. Geopolitical Rivalries and Strategic Competition

Although the Antarctic Treaty prohibits militarization, major powers increasingly view Antarctica and the Southern Ocean as spaces of strategic interest. The rise of global competition—particularly between the United States, China, and Russia—creates pressure on the consensus-driven system. Military-style logistics, dual-use technologies, and increased national presence risk undermining the spirit of demilitarization (Brooks et al., 2025; Dodds, 2010).

2. Resource Pressures

Even though mineral exploitation is banned under the Madrid Protocol, the potential for future access to critical minerals remains a latent source of tension. Similarly, the management of Antarctic fisheries—especially krill—has become more contentious as global demand for marine resources grows. These pressures may incentivize states to test the limits of existing agreements. Yet the ATS has been slow to operationalize climate risks, particularly in fisheries and conservation (Meyer et al., 2025; Joyner, 1998).

3. Climate Change and Environmental Stress

Global warming is profoundly transforming Antarctica, accelerating ice melt and threatening biodiversity. These changes introduce uncertainty into the Treaty System: rising sea levels, altered ecosystems, and new navigable waters may create incentives for competition rather than cooperation.

Climate change also tests the Treaty's ability to adapt to challenges it was not originally designed to manage. Emerging evi-

dence shows that Antarctic ecosystems already intersect with global pollution flows. Microplastics, sometimes hundreds of particles per liter, can impair krill feeding and reproduction. Early data on nano plastics suggests even greater pervasiveness via atmospheric transport. These stressors blur ecology and security, linking governance legitimacy with the protection of Antarctic food webs.

4. Governance Strains in the Antarctic Treaty System

The consensus rule has historically ensured legitimacy, but it can also paralyze decision-making. Recent failures to agree on new Marine Protected Areas (MPAs) in the Southern Ocean illustrate how growing divisions may erode the system's effectiveness. If consensus becomes unworkable, the credibility of the ATS could weaken. MPAs have become a geopolitical proxy. Proposals often cover very large areas and intersect with claim zones, prompting accusations—from some members—that science masks politics. Even research and monitoring plans, designed to build trust, have stalled, demonstrating how consensus rules can paralyze action in a science-rich system (Dodds, 2010).

5. Tourism and Human Footprint

The rapid expansion of Antarctic tourism poses risks to fragile ecosystems and increases logistical and safety demands. It also raises questions about equitable access, liability, and the capacity of the ATS to regulate non-state actors effectively (Joyner, 1998). The International Association of Antarctica Tour Operators (IAATO) provides voluntary guidelines and reporting that complement the

ATS, yet rising visitor numbers underscore the need to align non-state practices with treaty-level safeguards.

6. Limited Public Awareness and Protection Through Education

Despite its significance, the Antarctic Treaty remains little known outside diplomatic and academic circles. This lack of awareness makes the system vulnerable: without broad societal recognition of its value, there is less political pressure to defend and update it against emerging challenges.

A telling example of this vulnerability is the widespread misconception that the Antarctic Treaty “expires” in 2048. In reality, what the Madrid Protocol on Environmental Protection establishes is the possibility of a review after that date, not an automatic termination of the Treaty itself. The confusion is revealing: it shows how limited public understanding can create myths that undermine confidence in the system. If people believe that the Antarctic governance regime has a fixed end date, they may wrongly assume its principles are temporary rather than enduring.

This highlights the central role of education, outreach, and public engagement. To safeguard Antarctica as a continent dedicated to peace and science, it is not enough for diplomats and specialists to defend the Treaty; the broader global public must also be made aware of its achievements, its durability, and its continuing relevance. Only with this foundation of understanding can the Antarctic model of peace be protected and projected into the future.

Antarctica as a Model for Global Governance and as a System Requiring Protection

The Antarctic Treaty System (ATS) is often cited as one of the most successful examples of international cooperation in modern history. After being signed in 1959, it suspended sovereignty disputes, prohibited military activity, and devoted the continent to peace and science. Despite recurring geopolitical tensions, resource competition, and climate change debates, the Antarctic Treaty System (ATS) continues to demonstrate that enduring cooperation is achievable when higher values transcend national interests (Joyner, 1998; Dodds, 2010). One distinctive feature of Antarctic governance is that the Antarctic Treaty System operates entirely outside the framework of the United Nations. While this independence has preserved a high degree of consensus within the ATS—shielding it from the geopolitical conflicts that often paralyze UN forums—it also creates a paradox. Decisions that most directly affect global peace, security, and therefore the stability of the Southern Ocean and Antarctica, are largely shaped outside the ATS, within broader security and defense arenas centered on the United Nations and other international bodies. This separation has been both a strength and a limitation: a strength because it has allowed Antarctic governance to remain uncontaminated by the rivalries of the UN system; a limitation because it erects a kind of firewall, preventing the integration of security and defense issues into Antarctic deliberations. For policymakers, this duality is crucial: understanding how global defense and security decisions reverberate into Antarctica, while recognizing that the ATS must

balance its autonomy with the need for coordination across wider international regimes.

As a governance model, the ATS shows that peace and cooperation can be deliberately constructed even in contested spaces. Mechanisms such as consensus-based decision-making, mutual inspection rights, and collective scientific programs offer valuable lessons for other global commons like the high seas, outer space, or cyberspace. In each of these arenas, geopolitical competition could easily dominate, yet the Antarctic example proves that carefully crafted regimes can transform rivalry into collaboration. Scholars such as Bull (1977) and Richmond (2008) emphasize that international society is capable of producing institutions that restrain anarchy and create durable norms. The ATS embodies precisely this potential.

At the same time, the Antarctic model is vulnerable. Its achievements rest on continued political will, compliance, and legitimacy. Unlike more visible global institutions, the ATS is relatively unknown to the wider public. This obscurity creates a paradox: while the Treaty is celebrated in academic and diplomatic circles, it lacks strong societal ownership beyond the policy community. Without awareness, there is a risk that the Treaty's principles could be neglected, eroded, or bypassed in the face of new pressures—whether mineral exploitation, geopolitical rivalry, or environmental change.

Education and the promotion of greater awareness in civil society, therefore, becomes central to protecting the Antarctic model. By integrating the Antarctic experience into curricula, public diplo-

macy, and global forums, societies can learn not only about the continent's environmental importance but also about its political significance as a living example of peace. Civil society organizations, universities, and NGOs have a key role in translating the technical language of treaties into accessible narratives for wider audiences. Public visibility is not a secondary issue: it is an essential safeguard, ensuring that governments remain accountable to the principles of peace and cooperation enshrined in the ATS.

The Dual Dimension of Inspiration and Protection

The Antarctic experience operates in two dimensions. First, it inspires global governance by showing that cooperation is possible under conditions of rivalry. This inspiration is not abstract; it can inform concrete regimes for climate governance, ocean conservation, and the management of outer space. Second, it requires active protection through education and awareness. Inspiration without protection risks becoming symbolic; protection without inspiration risks being purely defensive. Together, these dimensions highlight the broader lesson: peace is both a model to emulate and a system to defend.

Safeguarding Peace in Antarctica: Innovation, Security, and Global Lessons

Antarctica stands as one of humanity's most ambitious experiments in collective peace and governance. Within the framework of the Antarctic Treaty System (ATS), the continent embodies a deliberate alignment between science, environmental protection, and international collaboration.

This unique environment shows that innovation can serve as both a catalyst and a safeguard for peace. By linking scientific progress with ecological responsibility and transparent cooperation, the Antarctic experience demonstrates how trust can be built through openness rather than competition. The practices developed on the continent—ranging from scientific diplomacy to sustainable logistics—offer lessons that extend beyond the polar context. They suggest that peace, when rooted in knowledge-sharing and responsible stewardship, can become a replicable framework for addressing global challenges.

Innovation as a Global Public Good

One of the most remarkable aspects of peace in Antarctica is how innovation has been conceived and practiced. Unlike in many other regions, where technological or scientific progress can be monopolized for strategic advantage, in Antarctica innovation is rooted in the principle of shared benefit. The Antarctic Treaty System (ATS) has created an environment in which data, discoveries, and methods are intended to serve humanity as a whole. Renewable energy experiences, autonomous logistics for remote environments, or advances in environmental monitoring are not restricted to national use but shared through open channels of scientific collaboration. This openness has an important implication for security: by ensuring that no single state or company can monopolize Antarctic innovation, mistrust is reduced, and the risk of militarization diminishes. In this sense, transparency itself becomes a defense mechanism, strengthening the foundations of peace.

Peace as Permanent Social Innovation

Peace in Antarctica is not the passive result of isolation or luck, but rather the continuous product of social and institutional innovation. The Treaty “froze” sovereignty claims without attempting to resolve them, allowing states to channel their rivalry into cooperation rather than confrontation. This delicate balance must be re-affirmed constantly through practices of scientific diplomacy, joint inspections, and cooperative missions. For instance, multinational research expeditions or training initiatives for young scientists from diverse regions act as practical tools to sustain peace by weaving networks of trust. From the perspective of security and defense, these visible and verifiable forms of collaboration reduce suspicions about hidden agendas. Peace, therefore, is not simply the absence of war; it is a proactive system of measures that transforms potential conflict into cooperative opportunity.

Nature as a Responsible Frontier of Innovation

The Antarctic environment also serves as a testing ground for the kind of responsible innovation that respects planetary boundaries. The fragility of ecosystems in Antarctica and the Southern Ocean demands extreme caution. Here, innovation must be guided by the principle of precaution: sustainable logistics, renewable energy systems for bases, circular approaches to waste management, or the use of artificial intelligence for ecological monitoring. These efforts illustrate how exploration can be inseparable from protection. Moreover, by firmly linking innovation to environmental goals, the international community reduces the risk that scientific

infrastructure could be repurposed for military ends. In this way, conservation and security are not separate concerns but mutually reinforcing pillars of peace.

Convergence of Sectors for the Common Good

The sustainability of Antarctic peace also depends on the interaction of multiple sectors. Governments provide regulation and institutional frameworks; the private sector contributes with resources, efficiency, and scalability; civil society adds ethical guidance and legitimacy. The convergence of these actors makes cooperation the rational and dominant choice. For example, partnerships that develop renewable energy systems for research stations or telemedicine solutions for remote expeditions demonstrate how multi-sector collaboration strengthens both peace and efficiency. From a defense perspective, this reduces the incentive for states to disguise military infrastructure as scientific necessity, since the logistical needs of survival are already met through cooperative civilian projects. The interplay of actors is therefore not only an organizational strength but also a preventive security measure.

Raising the Bar Through Collaboration in Protection

Beyond preserving the continent for peace and science, the Antarctic experience also demonstrates how protection itself can become a collaborative innovation. In recent years, the debate over the creation of a network of Marine Protected Areas (MPAs) in the Southern Ocean has become a focal point for cooperation and contestation. These MPAs are intended to safeguard biodiversity,

strengthen ecosystem resilience, and reinforce the role of Antarctica as a natural reserve devoted to peace and science.

Yet progress has been uneven. While some protected areas have been successfully established—such as the South Orkney Islands Southern Shelf MPA (2009) and the Ross Sea Region MPA (2016)—others have been delayed due to lack of consensus. These slow-paced risks are undermining both ecological objectives and the credibility of the Antarctic Treaty System.

Elevating the bar for protection through accelerated collaboration on MPAs is thus not simply an environmental imperative, but also a test of the Antarctic Treaty System's capacity to respond proactively under pressure. When states agree to safeguard common resources for collective benefit, they reinforce trust and renew the legitimacy of the Treaty. By embedding protection into the core architecture of the ATS—through MPAs, sustainable quotas, and enhanced ecosystem monitoring—Antarctica can continue to serve as a strong example of peace grounded in environmental stewardship.

Antarctic Peace as a Global Inspiration

The Antarctic Treaty System (ATS) is not only a regional achievement but also one of the most powerful symbols that peace can be constructed, sustained, and projected outward. Since its entry into force in 1961, the Treaty has governed nearly ten percent of the Earth's surface, keeping the continent free of armed conflict and dedicated exclusively to peace and science. The Antarctic Treaty System's resilience—through the Cold War, decolonization, the rise of multipolarity, and today's contest for critical resources—proves

that states can opt for restraint and collaboration even in the world's most strategic spaces.

The importance of this example extends beyond Antarctica itself. In a world confronted by intensifying rivalries, environmental disruption, and social instability, the Antarctic experience functions as both an inspiration and a challenge: an inspiration because it shows that cooperation is possible; a challenge because it reminds us that peace requires continuous effort and vigilance.

THREE GLOBAL LESSONS FROM THE ANTARCTIC MODEL

1. Peace Requires Institutionalized Restraint and Trust

The Antarctic Treaty demonstrates that peace endures when mechanisms of restraint are combined with structures of trust. The prohibition of military activity, the freezing of sovereignty disputes, and the use of inspections create a system in which cooperation is safer than conflict. Applied globally, this principle suggests that contested domains such as cyberspace, outer space, and the deep sea require clear prohibitions, verification mechanisms, and forums for dialogue to prevent militarization. Without such frameworks, rivalry often dominates—as seen in the Arctic.

2. Peace Is Inseparable from Environmental Stewardship

The ATS also teaches that peace cannot be separated from environmental protection. The Madrid Protocol (1991) designated Antarctica as a “natural reserve devoted to peace and science,” linking security directly to conservation. The ongoing effort to build a network of Marine Protected Areas (MPAs) in the Southern Ocean em-

bodies this principle: expanding MPAs is not just about protecting biodiversity but about reinforcing cooperation. Globally, this lesson means that climate change mitigation, biodiversity conservation, and pollution control are not peripheral to peace—they are central pillars of it.

3. Peace Must Be Protected Through Education and Awareness

Finally, the Antarctic example shows that peace is fragile if it lacks broad societal support. The ATS is remarkably effective, but public awareness of it is limited, and misconceptions—such as the belief that the Treaty “expires” in 2048—reflect this gap. Education, outreach, and public diplomacy are essential to sustain legitimacy. Globally, peace frameworks will only survive if they are not confined to diplomats and experts but embraced by societies as part of their collective future. Awareness builds resilience by ensuring that political leaders remain accountable to shared commitments.

Box 1: Three Global Lessons from the Antarctic Model

Conclusion

Antarctic peace is more than a regional success story; it is a global message. It shows that rival states can restrain themselves, that environmental stewardship is inseparable from stability, and that peace must be defended not only through treaties but also through public consciousness. In an era defined by military tensions, ecological crises, and technological disruption, the Antarctic model

challenges the world to elevate its standards—to pursue peace not as the mere absence of war, but as an active, resilient, and collaborative system that secures both humanity and the planet.

The Antarctic Treaty has endured because it institutionalized restraint and innovation through five guiding principles: demilitarization, transparency, constructive ambiguity, consensus, and flexibility. Yet each of these principles now faces a stress test—demilitarization is strained by dual-use technologies, transparency by outdated inspections, constructive ambiguity by resource pressures, consensus by recurring deadlocks, and flexibility by an increasingly divided world. The lesson is clear: peace in Antarctica is not self-sustaining. It requires renewed commitment, modernization of mechanisms, and broader public awareness to preserve the achievements of the ATS.

These lessons extend beyond Antarctica. Just as peace was deliberately constructed at the bottom of the world, humanity can design cooperative regimes for other contested domains—the high seas, outer space, cyberspace, and beyond. Such regimes demonstrate that nations are capable of reaching foundational agreements that transform rivalry into collaboration, ensuring that shared resources are safeguarded for the collective good. The Antarctic example thus affirms not only that peace is possible, but also that it can serve as a framework for building a healthier, more stable, secure, and peaceful world for generations to come.

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Chapter 2

The resilience of the Antarctic Treaty System in the face of a changing global order

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Abstract

Often celebrated as a model of peaceful governance and international scientific collaboration, the Antarctic Treaty System (ATS) emerged during the 20th-century Cold War as a diplomatic and legal innovation that neutralized territorial rivalries and prohibited militarization in the region. However, in today's 21st-century increasingly contested geopolitical climate, the long-held exceptionalism of the ATS faces mounting challenges. This chapter explores how the ATS can continue to fulfill its foundational role in maintaining peace and promoting international cooperation in Antarctica in the face of evolving geopolitical pressures. It traces the legal and institutional evolution of the ATS, including how it has managed geopolitical events such as the Falkland/Malvinas Islands conflict, mineral exploitation debates, and tensions over maritime jurisdiction. It then turns to contemporary contests over marine protected areas, fisheries management, and diverging legal interpretations, highlighting growing tensions among Consultative Parties — especially amid the fallout from Russia's invasion of Ukraine. The emergence of new alliances, alongside growing interest in Antarctic resources, tourism, and the growth of dual-use technologies, further complicates the region's governance. The chapter offers a geopolitical and legal analysis of the ATS's resilience and identifies potential vectors of instability, including resource competition, risks of militarization, and the fragmentation of consensus-based decision-making. It concludes by reflecting on whether Antarctica can continue to serve as a beacon of peace and collaboration, or whether it will drift into patterns of geopolitical rivalry and instability that the ATS was designed to prevent.

The Antarctic Treaty System

The Antarctic Treaty System (ATS) comprises the legal instruments and measures adopted under the Antarctic Treaty framework, including the bodies and institutions established by or through those instruments, as well as the laws, decisions, and measures issued by those institutions.

It consists of the 1959 *Antarctic Treaty*; the 1972 *Convention for the Conservation of Antarctic Seals* (Seals Convention or CCAS); the 1980 *Convention on the Conservation of Antarctic Marine Living Resources* (CAMLR Convention); and the *Protocol on Environmental Protection to the Antarctic Treaty* (Environmental Protocol).

The Antarctic Treaty Consultative Parties make their decisions through the Antarctic Treaty Consultative Meeting (ATCM), which operates by consensus (see Box 2). The ATCM adopts three types of instruments: Measures (legally binding once approved by all Consultative Parties), Decisions (concerning internal arrangements), and Resolutions (non-binding recommendations). In 2003, the ATCM established the Antarctic Treaty Secretariat, which is based in Buenos Aires/ Argentina. The ATCM meets annually on a rotational basis among the Consultative Parties, with the host country responsible for chairing the meeting.

The CAMLR Convention establishes a governing body, the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR); a Scientific Committee that is charged with providing advice to CCAMLR; and a Secretariat that is based in Hobart/ Australia. CCAMLR and the Scientific Committee meet annually (in Hobart). CCAMLR adopts consensus (see Box 2) Conservation Measures to regulate the conservation and sustainable use of marine living resources in the Southern Ocean.

The resilience of the Antarctic Treaty System...

The Environmental Protocol established by the Committee for Environmental Protection (CEP), provides advice and recommendations to the ATCM in relation to the implementation of the Protocol and the protection of the Antarctic environment. The Antarctic Treaty Secretariat supports the work of the CEP.

The Seals Convention has largely fallen into disuse, as there is no commercial sealing in Antarctica. Moreover, the Environmental Protocol and the CAMLR Convention both contain provisions addressing the conservation of seals.

Box 1: The Antarctic Treaty System

Introduction

The Antarctic Treaty System (ATS) has long been regarded as a remarkable achievement in international law and diplomacy. The Antarctic Treaty, the foundational instrument of the ATS, was adopted in 1959 amid fears of Cold War tensions spilling over into Antarctica as well as unresolved territorial claims in the region (Auburn, 1982) (see Box 1).¹ The Treaty transformed Antarctica into a continent dedicated to peace, science, and cooperation.

¹ By the 1950s, seven states had made territorial claims in Antarctica: Argentina, Australia, Chile, France, New Zealand, Norway, and the United Kingdom. The United States and the Soviet Union (now Russia) did not advance formal claims but reserved the right to do so, while simultaneously rejecting the validity of existing claims.

It put on hold disruptive arguments over territorial sovereignty, prohibited military measures of any kind, and created a legal and institutional framework that has withstood decades of global political shifts (Vidas, 1996; Young, 2010). Since then, through consensus-based agreements among all states active in the region, the ATS has evolved into a comprehensive regime encompassing the conservation and management of marine living resources and environmental protection — including the prohibition of mining activities. In doing so, the ATS has helped transform Antarctica into “a natural reserve, devoted to peace and science” (Article 2, 1991 Environmental Protocol).

The ATS has largely insulated the Antarctic region from broader global geopolitical dynamics. It is frequently cited as an exceptional model of international cooperation (Portella Sampaio, 2019) — a peaceful alternative to the conflict-prone dynamics that have characterized governance and international relations in other parts of the world. However, with the emergence of an increasingly multipolar world (Peters, 2023), where strategic interest in the polar regions is intensifying (Dodds & Nuttall, 2015), the continued relevance of the ATS is being called into question (Mancilla, 2020; Yermakova, 2021). Recent tensions over fisheries management, the designation of marine protected areas, and the protection of species - exacerbated by the destabilizing impact of global events such as Russia’s invasion of Ukraine - point to a more fragile and contested consensus within the ATS framework. These developments raise important questions about the resilience of the ATS and its ability to adapt to a shifting geopolitical landscape (Latham et al., 2024).

The changing global order is also challenging traditional assumptions about geopolitical influence in the ATS. The current U.S. administration, while announcing a significant investment in Coast Guard icebreakers for the polar regions, has also signaled reductions in Antarctic research, logistics and field support (Muntean, 2025). This slowing of U.S. Antarctic efforts is matched by the rising investment of China in Antarctica, with the rapid operationalization of its Qinling station in the Ross Sea region, and the announcement of a new Chinese research facility in Marie Byrd Land (Bloom, 2025). These science and presence manifestations of status and influence in Antarctic affairs are also being reflected in ATS meetings, with China increasingly dominating some decision-making processes. These developments underscore how shifts in national investment and presence are reshaping influence and power within the ATS.

This chapter assesses the notion of Antarctic exceptionalism in light of current and anticipated geopolitical tensions affecting Antarctic governance and examines how the ATS can continue to function effectively in a changing world. Section 2 critically examines the factors that have contributed to the ATS being regarded as an exceptional legal and institutional regime within the international order. Section 3 evaluates recent developments that challenge this perception. Section 4 explores the emerging geopolitical and legal pressures the ATS may face in the near future. Finally, the chapter concludes with reflections on how the ATS may continue to function effectively.

2. The ATS as a Protective Shield Against Global Geopolitical Tension

Antarctic governance has always been influenced by the broader geopolitical landscape. The Antarctic Treaty is both a product of and a response to geopolitical tensions – most notably the Cold War rivalry between the United States and the Soviet Union – as well as disputes over overlapping Antarctic territorial claims by the United Kingdom, Argentina, and Chile in the Antarctic Peninsula region (Auburn, 1982). However, external geopolitical tensions have largely not spilled over into Antarctic governance (Haward & Jackson, 2023). Rivalries among Antarctic states were effectively set aside in favor of a shared commitment to the peaceful use of the continent and cooperation in Antarctic affairs, particularly in scientific research. This ability to insulate the region from global political dynamics has contributed to the notion of Antarctic “exceptionalism”, where what happens outside the Antarctic region has, for the most part, been deliberately bracketed. Nonetheless, the history of the ATS is not without episodes of both latent and overt geopolitical friction.

The resilience of the ATS to external geopolitical tensions has been tested at various points in its history. A notable example occurred in 1982, when two original Antarctic Treaty signatories and claimant states, the United Kingdom and Argentina, engaged in armed conflict over the Falkland/Malvinas Islands and South Georgia. While both territories lie just outside the Antarctic Treaty Area, South Georgia falls within the area regulated by the 1980 Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR) Convention (see Arpi and McGee, 2022). At the time,

the conflict raised serious concerns about the stability of Antarctic cooperation. Yet, remarkably, both states continued to engage in collaborative Antarctic activities throughout and after the war. Scientific exchanges persisted, diplomatic channels within ATS forums remained open, and neither party attempted to use their Antarctic claims to advance their positions in the conflict. Indeed, during this period, both countries participated in ongoing negotiations for a convention on Antarctic mineral resource activities, and the CAMLR Convention entered into force. This episode underscored the ATS's remarkable capacity to shield Antarctic governance from external geopolitical disputes. It also highlights the commitment among Parties to uphold Antarctica as a zone of peace and scientific cooperation, even in the face of severe bilateral tensions elsewhere.

But the 1982 Falklands/Malvinas conflict was not the only challenge for the ATS in the 1980s. Another important test arose from the tensions created by the failed entry into force of the 1988 Convention for the Regulation of Antarctic Mineral Resource Activities (CRAMRA) (Beck, 1989). Its rejection by Australia and France, after it had been agreed by all Antarctic Consultative Parties, did not result in the fracturing of the ATS, despite the strident objections of many key Antarctic states (Jackson, 2021; Press and Jackson, 2024). The Antarctic community's rapid response to this crisis was the negotiation and adoption, in less than two years, of the 1991 Protocol on Environmental Protection to the Antarctic Treaty (Environmental Protocol), which imposed an indefinite moratorium on Antarctic mining (except for scientific purposes). This significant departure from the consensus of the previous decade represented not only

international legal innovation, but also a political recalibration that preserved consensus within the system. These episodes demonstrate the ATS's ability to evolve in response to geopolitical and regulatory changes while maintaining its founding commitments to peace and cooperation.

The interaction between the ATS and broader developments in international law has occasionally exposed underlying tensions among states. A significant episode testing the resilience of the ATS occurred in 2004, when Australia submitted data to the Commission on the Limits of the Continental Shelf (CLCS) to support its claim to continental shelf areas beyond 200 nautical miles. The CLCS, established under the United Nations Convention on the Law of the Sea (UNCLOS), is tasked with evaluating the scientific and technical validity of such claims based on data submitted by states. As early as 2002, Australia had informed other Antarctic Treaty Parties that it was collecting data from the Australian Antarctic Territory that could potentially support an extended continental shelf claim. This triggered concern among some Antarctic states and commentators, who argued that any attempt to assert an extended continental shelf in Antarctica could contravene Article IV of the Antarctic Treaty (Serdy, 2005). This episode brought to the surface ongoing tensions between claimant and non-claimant states over how to reconcile obligations under UNCLOS with the need to avoid actions that might undermine the legal and political stability of the ATS.

However, despite the potential for conflict, this episode once again demonstrated the ATS's resilience and capacity to absorb pressures from external legal regimes without fracturing. In re-

sponse to the diplomatic unease (including from other claimant states) Australia maintained that its actions were consistent with the Antarctic Treaty. It argued that the submission did not constitute a new claim but merely described the right that existed because the area was appurtenant to the already existing claim; that Article IV did not preclude the collection or submission of such data; and that, under UNCLOS, Australia had a legal obligation to make its submission within ten years of ratifying the Convention (Article 4 of Annex II). Despite the controversy, Australia proceeded to collect data and engaged in sustained bilateral and multilateral diplomacy to manage the situation. Ultimately, Australia requested that the CLCS refrain from considering the Antarctic portion of its submission (Australia, 2004). By that point, careful diplomatic efforts had successfully defused what could have escalated into a significant dispute within the ATS. Seven states submitted formal responses to Australia's CLCS submission with respect to the Antarctic data, reflecting the sensitivity of the issue (CLCS *n.d.*). While no formal challenge emerged, the incident revealed the balance the ATS must maintain between preserving the continent's unique legal status and adapting to evolving international legal obligations under frameworks such as UNCLOS. It highlights the importance of continued diplomatic prudence and legal clarity to uphold the consensus at the heart of the Antarctic regime.

These historical developments demonstrate the ATS's capacity to absorb, deflect, or neutralize geopolitical tensions without veering into open conflict. However, they also reveal the system's reliance on diplomatic restraint, political will, and the continued rele-

vance of consensus-based governance. As global power dynamics shift and interest in Antarctica intensifies, the ATS must contend not only with new pressures but also with the legal and institutional precedents set by its own evolution. Whether it can continue to function as a stabilizing framework will depend on its ability to adapt while preserving the core principles that have defined it for over six decades.

3. Antarctic exceptionalism under pressure: current challenges in Antarctic governance

International order is becoming increasingly volatile. Geopolitical tensions have the potential to undermine many of the multilateral arrangements established in the aftermath of the Second World War (Ikenberry, 2018). For over six decades, the ATS has stood out as a rare example of stability, peaceful cooperation, and science-driven governance. However, this resilience is now being tested. Emerging geopolitical rivalries at the global level, growing competition for strategic resources, and the accelerating impacts of climate change are placing unprecedented strain on the regime. Recent developments in Antarctic affairs suggest that the continent may no longer remain insulated from the broader erosion of international norms and the weakening of multilateralism. In this shifting global landscape, the future of Antarctic governance may depend on the continued political will of states to uphold the cooperative spirit and legal principles that have long defined the ATS.

One of the clearest manifestations of the current trend is a growing paralysis within the Commission for the Conservation of

Antarctic Marine Living Resources (CCAMLR) regarding the establishment of marine protected areas (MPAs) in Antarctica. Although the Commission made significant early progress, most notably with the adoption in 2009 of its first MPA over the South Orkney Islands southern shelf, followed in 2016 by the Ross Sea Region MPA (still the largest MPA in the world), momentum has stalled. Over the past decade, CCAMLR has failed to reach consensus on any of the three additional MPA proposals under consideration (the East Antarctic MPA, the Weddell Sea MPA, and the Antarctic Peninsula MPA). This deadlock is largely due to opposition from both Russia and China, which have consistently blocked consensus, often citing scientific uncertainties and economic interests related to fishing. These objections, however, are widely seen as politically motivated, reflecting broader strategic and economic considerations, such as seeking increased access to marine resources and opposition to any precedent-setting that might be relevant to other areas of marine management. This persistent deadlock has deepened distrust among key parties, raising concerns among observers about the long-term viability of consensus-based decision-making within CCAMLR and the broader ATS.

Consensus in the Antarctic Treaty System

Consensus of decision-making underpins law-making in the Antarctic Treaty System. The principle of consensus is not written into the 1959 Antarctic Treaty, but it has been the adopted mode of operation since the first Antarctic Treaty Consultative Meeting held in Canberra in 1961: matters of substance and adoption of decisions are made through the consensus of represented Parties at the

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meetings. As Jackson (2018) outlines, consensus is "... the absence of formal objection". The making of a formal objection to a decision "...is to exercise a veto"

The Rules of Procedure for Antarctic Treaty Consultative Meetings (ATS, 2018) say:

"...Measures, Decisions and Resolutions... shall be adopted by the Representatives of all Consultative Parties present..."

This, in practice, means that substantive decisions will be made by consensus. The same principle applies to decisions of the Committee for Environmental Protection:

"Where decisions are necessary, decisions on matters of substance shall be taken by a consensus of the members of the Committee participating in the meeting". (ATS, 2018).

And similarly, the Rules of Procedure for Commission for the Conservation of Antarctic Marine Living Resources states:

"Decisions of the Commission on matters of substance shall be taken by consensus. The question of whether a matter is one of substance shall be treated as a matter of substance". (CCAMLR 2021)

The fact that Antarctic law is made through consensus provides two fundamental international diplomatic states. A consensus decision is strong and enjoins all members in adhering to the decision and its outcomes. It is a unifying mode of decision-making.

Consensus also provides the opportunity for a single or small number of members to veto decisions that are supported by the vast majority of members. In the current geopolitical environment, it is clear that the "veto power" of consensus is being used frequently

by a small number of countries to prosecute their own interests at the expense of the views of most members.

Consensus requires skill, flexibility, and quite often a long period of time to deliver, because failure to find consensus in one form, requires effective effort to find consensus in another form.

But as consensus is the foundation of Antarctic law-making throughout the Antarctic Treaty System, the use of a consistent veto on decisions is contrary to established international practice. It is not “law-making”, it is the undermining of accepted international law.

Box 2: Consensus in the Antarctic Treaty System

The lack of consensus over MPAs not only hampers marine conservation efforts, but it also strains the collaborative spirit that has traditionally underpinned the ATS. Tensions have also emerged around the management of Antarctic krill fisheries, a key Antarctic commercial resource (Trathan et al., 2025). Debates over precautionary catch limits, fisheries monitoring, small-scale management measures to reduce fisheries impacts on other species, and the establishment of no-take zones have become increasingly contentious, with precaution increasingly challenged by requests for expanded access to krill resources. As a result, resource management (once a domain where scientific advice held strong authority) has become another arena where broader strategic and economic ambitions collide. Here again, geopolitical interests have manifested in the guise of scientific disagreement and procedural objection.

Russia's invasion of Ukraine in 2022 marked a significant destabilizing moment for the ATS. This international conflict between two consultative parties outside the Antarctic Treaty area introduced overt geopolitical conflict into Antarctic forums. For the first time in the ATS's history, diplomatic walkouts and formal demarches occurred during Antarctic Treaty Consultative Meetings (ATCMs), disrupting the historically collegial atmosphere of these gatherings. Some scholars have publicly questioned whether a state that so flagrantly violates the fundamental principles of the UN Charter, particularly the prohibition on the use of force, should continue to enjoy the full privileges of participation in a regime founded on peaceful cooperation and respect for international law (Hemmings, 2022). These actions have not only strained bilateral relations within the ATS but have also introduced a broader challenge to the system's foundational ethos. Political grievances and expressions of solidarity have begun to surface in forums previously focused on technical, scientific, and environmental matters, complicating the work of consensus-based decision-making. This episode directly illustrates how global conflicts can spill into the Antarctic regime, challenging its capacity to remain insulated from the broader geopolitical environment and raising difficult questions about how to uphold legal and normative coherence within a multilateral system under pressure.

The COVID-19 pandemic placed additional strain on consensus-based decision-making within the ATS. The 2020 ATCM was cancelled, and during parts of the pandemic both the ATCM/CEP and CCAMLR met online, with intersessional discussions and nego-

tiations also constrained (Hughes & Convey, 2020; Frame, 2020). While virtual platforms ensured continuity of discussions on Antarctic governance, they also introduced new challenges. Meeting agendas were narrowed, excluding, for example, consideration of the adoption of new MPAs in CCAMLR. In addition, the online format curtailed long-standing practices such as “corridor diplomacy,” informal consultations, and side meetings, which have historically played a vital role in building consensus and advancing negotiations (Liggett et al., 2024; Boyce and Press, 2011). These disruptions are likely to have lasting effects on the ATS, particularly by reducing the scope for informal consensus-building.

Adding to this complex diplomatic landscape is the emergence of new alliances and informal blocs within the ATS. In recent years, coalitions of like-minded states, whether centered on environmental conservation, scientific cooperation, or strategic geopolitical interests, have become increasingly visible in ATS negotiations and decision-making processes. These alignments are not static; they evolve in response to global power shifts, regional dynamics, and emerging policy challenges. For example, some states (such as Australia, France, the EU, and the U.S.) have coalesced around ambitious proposals for the designation of large-scale MPAs, championing a precautionary approach to environmental stewardship. Others (such as China and Russia), however, have formed tacit alliances to delay or oppose such measures, citing the need for more scientific data, economic considerations, or the preservation of fishing rights. These shifting alliances reflect not only tactical shared interests, but also deeper divergences over the vision and direction of Ant-

arctic governance. While some actors advocate for strengthening the ATS's conservation mandate in light of climate change and ecosystem vulnerabilities, others appear more focused on ensuring future access to marine living resources, asserting national presence, or reinforcing strategic influence in the region. The result is a more fragmented and contested diplomatic environment, where consensus (long considered a cornerstone of the ATS) is becoming harder to achieve key issues.

These developments suggest that the ATS is becoming increasingly exposed to geopolitical forces originating beyond the Antarctic region. This trend calls into question the long-held notion of Antarctic "exceptionalism" and the idea that the continent has remained largely insulated from external political pressures. While the system continues to operate and uphold its core functions, its resilience is being tested by the broader erosion of international trust, the fraying of multilateral cooperation, and the resurgence of great power competition. These pressures are unlikely to subside, and future challenges—ranging from intensified resource interests to accelerating climate impacts, increased tourist activities, and dual-use technologies in Antarctica—are likely to amplify the strain on the regime. The next section turns to these emerging challenges and considers how they may shape the future of the ATS.

4. The future of the Antarctic region

Predicting the precise future trajectory of the ATS is not achievable, but it is possible to identify several emerging drivers that are likely to challenge its strength, cohesion, and normative stability. Unprec-

edented pressures might arise from a confluence of interrelated factors. These include growing interest in potential minerals (including rare earths); the region's fisheries and biological resources; the expansion of economic activities such as tourism and recreation; and the rapid advancement of technologies that enable greater access to and exploitation of the Antarctic environment. Compounding these challenges is the resurgence of strategic competition among major powers, which threatens to politicize Antarctic governance and undermine the consensus-based decision-making that has long characterized the ATS. Taken together, these dynamics suggest that the regime will need to adapt if it is to preserve its core principles and maintain its legitimacy in an increasingly complex and contested international landscape.

The long-standing prohibition on mineral resource activities under Article 7 of the Protocol on Environmental Protection to the Antarctic Treaty has, for now, kept resource exploitation at bay. However, this moratorium does not eliminate interest in the continent's potential mineral and hydrocarbon resources (Galushkin et al., 2020). As global demand for critical minerals intensifies, driven by the accelerating shift towards low-carbon energy technologies and the requirements of digital infrastructure, the strategic significance of Antarctica's untapped resources may re-emerge on the international agenda. In this context, some states may become more inclined to question, reinterpret, or even seek to renegotiate existing legal prohibitions, particularly if global supply chains are disrupted or if resource competition deepens.

Concerns about this possibility are not merely hypothetical. Russia, in particular, has drawn consistent criticism from environmental

NGOs and scientific observers for its ongoing geological research in areas of the Southern Ocean believed to contain hydrocarbon deposits. Reports suggest that Russian research vessels have conducted seismic surveys in the Antarctic Treaty area, which, while not constituting direct exploitation, raise suspicions about the long-term strategic intent behind such activities (Walters, 2022; Sukhankin 2024). These actions risk undermining the spirit, if not the letter, of the Environmental Protocol, and contribute to growing anxiety among some commentators about the durability of the mining prohibition in an era of shifting geopolitical and economic priorities. As competition for critical resources escalates globally, the risk that Antarctica's mineral protections may be politically tested (or legally reinterpreted under pressure) becomes more plausible. The challenge for the ATS will be to reaffirm its normative commitments while ensuring that states remain collectively invested in upholding the ban in both word and practice.

In parallel, Antarctic fisheries (particularly for krill and Patagonian and Antarctic toothfish) appear to be taking prominence as a major economic and diplomatic driver for several ATS members. These species are not only commercially valuable but also ecologically critical, serving as key components of the Southern Ocean food web. In recent years, China has pushed for increases in the total allowable catch for krill, though these proposals are still under negotiation in CCAMLR (CCAMLR, 2024). However, CCAMLR has struggled to renew key conservation measures, including those regulating krill catch limits in the Antarctic Peninsula, due to persistent disagreements among members (Goldsworthy et al., 2024).

These disputes centered on catch allocations, spatial management, and the establishment of MPAs have increasingly revealed underlying fault lines between states advocating conservation and precautionary, ecosystem-based management, and those prioritizing continued or expanded commercial exploitation. The challenges faced by CCAMLR reflect broader tensions within the ATS regarding how to reconcile environmental objectives with divergent national interests and growing pressures on marine resources.

Looking ahead, the ATS will likely face even more frequent and intense contestation as states seek to advance strategic, economic, and scientific interests within an increasingly complex and competitive global context. Disagreements over fisheries management, marine protection, and resource access are expected to become more pronounced, particularly as climate-driven ecological shifts create both new uncertainties and new opportunities. In this evolving landscape, the tension between maintaining environmental integrity amid new or growing commercial ambitions will become harder to manage and the ATS may be pressured to change or adapt its legal and institutional frameworks in the face of these emerging geopolitical realities.

The exponential growth of Antarctic tourism, particularly in the Antarctic Peninsula, presents another significant governance challenge. Although the sector is currently mainly governed through non-binding guidelines adopted under the ATS and through industry self-regulation, particularly by the International Association of Antarctica Tour Operators (IAATO), this framework is increasingly being tested by rising visitor numbers and the diversification of

tourist activities. IAATO has played an important role in promoting responsible conduct and environmental protection among its members, helping to fill regulatory gaps through voluntary codes of conduct, reporting mechanisms, and operational standards. However, as tourism volumes continue to grow and more operators enter the market (some of whom may not be IAATO members), reliance on voluntary measures appears increasingly insufficient. Tourism growth raises pressing questions about the adequacy and comprehensiveness of the ATS's existing legal instruments.

The ATCM agreed in 2025 to proceed with discussions on tourism management in Antarctica (ATS, 2025). Some Antarctic Treaty Parties have begun to call for binding standards on ship-based tourism, the introduction of caps on visitor numbers, and clearer restrictions on the types of activities permitted in Antarctica (see Netherlands 2025). Discussions on these matters have recently been placed on the agenda of upcoming ATCMs. However, given the consensus-based nature of ATS decision-making, adapting the regime to govern a fast-evolving, commercially driven industry may prove difficult. A growing number of experts and parties are now suggesting that new legally binding instruments are required (potentially in the form of measures adopted under the Antarctic Treaty or even, by some, a new international agreement) to ensure that tourism develops in a way that is consistent with the environmental and scientific values of the Antarctic regime.

Emerging dual-use technologies may blur the line between science and militarization in Antarctica. The increasing deployment of dual-use technologies in Antarctic research, and the potential

use of satellite and ground-based infrastructure that could support both civilian and military functions has been raised as concerns that Antarctica is being, or could be “militarized” (Buchanan, 2022; see also McGee et al., 2022). Article I of the Antarctic Treaty prohibits military activity in the region, but the line between peaceful scientific research and potential militarization is becoming increasingly blurred with the rapid growth of new technologies, many of which are already used for both peaceful and military purposes (e.g., remotely operated marine and aerial vehicles). Moreover, the growing interconnection between Antarctic activities and outer space, particularly through satellite and remote sensing capabilities, adds complexity to the regulatory landscape, and this may intensify strategic competition in the region. These trends raise difficult questions for the ATS about how to distinguish legitimate scientific activity from activities with potential military dimensions.

While the Treaty prohibits military activities, the reality is more nuanced. Military personnel, equipment, and logistics may be used for peaceful purposes, including scientific support, search and rescue, and environmental monitoring. However, as geopolitical rivalries deepen, concerns about creeping militarization of Antarctica are gaining prominence. Some recent developments, such as new satellite technologies in the region, the construction of new, and the refurbishment of old, stations, the expansion of some national Antarctic programs, and the dual-use potential of some infrastructure investments, have raised questions around activities “of a military nature” in Antarctica. The strategic significance of Antarctica, particularly its geographic proximity to key Southern Hemisphere trade routes, and

its putative role in space and cyber operations, makes it a potential theatre for symbolic and material power projection.

From a legal perspective, questions arise as to how the Antarctic Treaty's non-militarization provisions should be interpreted and applied in light of contemporary technological and geopolitical developments. The Treaty prohibits military activities but does not provide detailed definitions of what constitutes a military activity, leaving significant room for divergent interpretations. This ambiguity becomes more acute with the emergence of dual-use technologies—such as satellite systems; autonomous marine, terrestrial, and aerial platforms; and research infrastructure—that can serve both civilian and military purposes. Without robust verification or compliance mechanisms, and with eroding trust among key parties, there is an increased risk that states may test the limits of the Treaty or deliberately exploit its silences to advance strategic or national objectives.

These dynamics underscore the need to clarify the scope of the Treaty's non-militarization obligations and to consider whether new mechanisms may be required to preserve Antarctica as a space dedicated to peace and science. While there is little direct evidence that modern technologies have been used to militarize Antarctica, their potential dual-use character brings into sharper focus the adequacy of the ATS's existing reporting and inspection provisions. These mechanisms were originally designed six decades ago, when the range of relevant technologies and the geopolitical environment were markedly different, and they have remained largely unchanged since. As a result, questions arise as to whether they can

provide sufficient transparency in an era of satellite surveillance, remote sensing, autonomous systems, and increasingly complex logistical operations. Strengthening inspection practices and updating reporting requirements should play a crucial role in rebuilding trust and providing mutual assurances among Antarctic Treaty Parties, thereby reinforcing confidence that activities in the region remain consistent with the Treaty's non-militarization obligations.

5. Discussion and Conclusions

For much of the past six decades, the ATS has been portrayed as a unique example of international cooperation largely insulated from wider geopolitical tensions. This idea of *Antarctic exceptionalism* has been central to narratives about its success. In practice, the ATS has indeed been exceptional. Despite occasional disputes, states have generally managed to build a successful body of international law through consensus-based governance and have prevented Antarctica from becoming a theatre of conflict. The ATS has successfully navigated significant geopolitical challenges, including tensions surrounding the 1982 Falklands/Malvinas armed conflict, the rejection by Australia and France of CRAMRA, debates on the "Question of Antarctica" at the United Nations, and, more recently, claimant states' submissions to the CLCS. These episodes highlight the unique capacity of the ATS to sustain cooperation and consensus in a region otherwise shaped by competing national and geopolitical interests.

However, recent developments suggest that Antarctica is no longer insulated from the shifting tectonics of global power politics.

The resurgence of great power competition, intensifying resource interests, technological advances, and broader geopolitical rivalries are placing new pressures on consensus-based decision-making. In this context, achieving agreement on issues such as the rational use of marine resources or measures with potential international precedents is becoming increasingly difficult. Nonetheless, it remains crucial to analyze these contemporary impasses in light of the ATS's historical resilience and the potential consequences of efforts to challenge or replace existing Antarctic law and governance norms.

While external geopolitical tensions are increasingly spilling into Antarctic governance, it is important to emphasize the relevance of the ATS not only for the region but for the entire international community. This is not to suggest that the ATS is functioning perfectly, it is not, particularly given the practices of Russia and China in undermining consensus-based decision-making. However, using current global geopolitical shifts and assertions of power as a justification for calling for "...an alternative framework for the Antarctic" (Lin, 2024) would expose the region to new international law and governance regimes that lack the built-in protections and interconnections of the existing corpus of Antarctic law. In this context, two counterfactuals are particularly instructive. First, what would the Antarctic region look like if the Antarctic Treaty negotiations had not set aside Cold War ambitions and sovereignty disputes in the 1940s and 1950s? Second, what might a realistic Antarctic regime negotiated today look like, given the current global geopolitical environment? Would it include the same key provisions on militarization, inspections, marine resource management, and mining?

It seems highly unlikely that such comprehensive and protective provisions could be achieved in the current context.

The Antarctic Treaty has promoted peace and security in Antarctica for decades. It was negotiated, among other objectives, to prevent armed conflict in the region, and it has successfully maintained the non-militarization of approximately 10% of the planet. In a world increasingly experiencing the return of the use of force, this achievement remains a major benefit not only for Treaty parties but also for countries outside the ATS. These benefits are particularly direct for Southern Hemisphere countries in close proximity to Antarctica. In addition to non-militarization, which includes the prohibition of nuclear weapons testing, the Treaty establishes an open inspection regime. While some argue that aspects of the Treaty are no longer suited to this modern world, many of these remarkable provisions would be exceedingly difficult to negotiate in today's geopolitical environment if a new international legal regime were to be created.

A similar analysis applies to the CAMLR Convention. The Convention establishes a conservation-based marine management regime in Antarctica that is broader and more comprehensive than typical regional fisheries management organizations (RFMOs), covering all Antarctic marine living resources, including marine genetic resources (Press et al., 2019). Its provisions integrate scientific advice, ecosystem-based management, and precautionary approaches, making it a pioneering framework in international ocean governance. CCAMLR has successfully maintained consensus among states with diverse interests, balancing conservation objectives with the rational utilization of resources—a feat that remains challenging even

in less politically sensitive regions. Negotiating a treaty of this kind today would be exceedingly difficult given rising geopolitical competition in the Southern Ocean, intensifying resource pressures, and the complexities introduced by emerging technologies that affect monitoring, enforcement, and compliance. The achievement of CCAMLR in creating legally binding, science-based rules for such a politically and environmentally complex region highlights both its historic significance and the challenges of replicating or replacing it in the current international legal environment.

The Protocol on Environmental Protection similarly illustrates the challenges of negotiating comprehensive Antarctic governance measures in the current geopolitical context. Its provisions, including the indefinite ban on mineral resource activities in Antarctica (Article 7), the strict environmental impact assessment requirements, and the rules for waste management and protected areas, establish one of the most rigorous environmental regimes in international law. These measures were negotiated through intense and sustained consensus-building among Antarctic Treaty Parties, reflecting a shared commitment to long-term environmental stewardship. Reproducing such a framework today would be extremely challenging given the current global political climate, marked by intensifying competition among major powers, growing commercial interests in resources, and emerging technologies that could facilitate access and exploitation. The Protocol's robust, legally binding protections thus underscore both the historic achievement of the ATS and the difficulties of negotiating comparable provisions in today's international legal environment (Press, 2015).

Looking to the future of Antarctic governance, it is essential to identify the areas in which the ATS must be strengthened and adapted to meet contemporary challenges. The region faces increasing pressures from geopolitical rivalries, intensifying resource interests, accelerating technological change, and the impacts of climate change, all of which test the resilience of existing legal and institutional frameworks. Maintaining the effectiveness of the ATS requires not only preserving its core principles but also actively addressing emerging threats to consensus, transparency, and science-based decision-making. By focusing on the mechanisms that underpin cooperation, the foundational norms of the Treaty, and the primacy of precautionary approaches grounded in the best available science, Antarctic governance can continue to provide stability and protection for the region and for the global community. This analysis highlights three key areas where efforts should be concentrated to safeguard the ATS in the decades ahead.

The first priority is to rebuild the operation of consensus within the ATS. Consensus has historically been one of the ATS's most powerful and enabling tools, allowing states with diverse interests and geopolitical backgrounds to cooperate effectively in a region of shared global significance. However, the integrity of consensus can be undermined when it is treated as a veto mechanism, where one or a small number of Parties block decisions or act against the collective interests of the membership. Such practices weaken the decision-making process, slow progress on critical environmental and scientific issues, and erode the legitimacy of the ATS. Actively challenging and addressing attempts to manipulate consensus is therefore essential to preserve this

foundational element of the system. Rebuilding trust in the consensus process will require transparent negotiation practices, sustained diplomatic engagement, and a commitment by all Antarctic countries to prioritize the collective good over narrow national interests. Ensuring that consensus operates as an enabling mechanism rather than a tool for obstruction is critical for maintaining the ATS's capacity to respond effectively to contemporary and future challenges.

The second priority is a renewed focus on the fundamental principles of the ATS and the ways in which these principles are embedded throughout the governance system. Central among these are non-militarization, cooperation, and mutual assurance among Parties, principles that have allowed the ATS to function effectively for over six decades. Non-militarization ensures that Antarctica remains a zone dedicated to peace and science, while collaboration promotes joint scientific research and environmental protection, strengthening the collective understanding of the region. Mutual assurance, facilitated through transparency and confidence-building measures, underpins trust among Parties and enables the consensus-based decision-making that is vital to the system. In the context of accelerating technological developments, such as advanced satellite monitoring, unmanned vehicles, and sophisticated data-gathering tools, there is an urgent need to modernize reporting and inspection mechanisms. Improving transparency and adapting these oversight systems to new technologies will help reinforce trust, ensure compliance, and maintain mutual assurance, thereby safeguarding the foundational principles of the ATS in a rapidly evolving Antarctic environment.

The third priority is to reaffirm and strengthen the primacy of precautionary decision-making based on the best available scientific evidence. This principle should guide all aspects of Antarctic governance, including species conservation, management of protected areas, and the coordination of international scientific collaborations. Precautionary approaches are particularly important in a region where ecological systems are fragile, and human activities, ranging from research operations to tourism, can have disproportionate impacts. Climate change is rapidly altering global ecosystems, and Antarctica is both affected by and a driver of these changes, influencing ocean circulation, sea-level rise, and biodiversity worldwide. In this context, science-based decision-making provides the foundation for effective management, ensuring that policies and actions are informed by empirical evidence rather than short-term political or economic considerations. Strengthening precautionary principles in Antarctic governance will be crucial for maintaining the continent's role as a global protector of species and ecosystems, safeguarding its unique biodiversity, and supporting broader international efforts to mitigate and adapt to environmental change.

The ATS stands as one of the most remarkable examples of international cooperation, embodying the principle of Antarctic exceptionalism by maintaining peace, collaboration, and environmental protection in a region that has remained largely insulated from broader geopolitical rivalries for much of the past six decades. Its success has relied on mechanisms such as consensus decision-making, non-militarization, cooperation, and science-based, precau-

tionary management of resources. However, the system now faces unprecedented pressures that challenge its resilience. Strengthening the operation of consensus, reaffirming the core principles of the ATS, and ensuring that all decision-making remains grounded in the best available science are essential to preserving the exceptional character of Antarctic governance. Preserving and adapting the existing framework, rather than replacing it, offers the best prospect for maintaining the continent as a zone of peace, scientific collaboration, and environmental protection. In doing so, the ATS will continue to serve not only the interests of Antarctic states but also the broader international community, ensuring that Antarctica remains a global exemplar of exceptional, sustainable, and cooperative governance.

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Chapter 3

Antarctica in the 21st Century – Geopolitics and Governance: Balancing national interest with international collaboration

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Abstract

The historical character and enduring value of the Antarctic Treaty derives from the phenomenon of two hegemonic powers, at the height of bipolar tension, making their separate national interests equivalent, with a view to collaborating for the common interest.¹

¹ The term 'common interest' is used here, for the purpose of generic introduction.

What, if any, comparable moments in the eight decades of the United Nations (UN) era have occurred, and what similarities or differences might there be among them? Has the 'equivalence' of interests naturally and inevitably changed in the six decades since the Treaty?

This chapter reviews the Treaty – its history, content, and context. The analysis explores the geopolitical and governance challenges addressed in the Antarctic experience, and the evolution in conceptual and doctrinal thought reflected in subsequent comparable treaties. It then relates the mid-20th century framework to the early-21st, concluding with some aspirational initiatives that might be regarded as deriving from 1958.

1. The Antarctic Treaty

(a) History

The story of Antarctica reflects four eras: deductive thought, naval sightings, land exploration, and scientific activity. Deductive thought of classical antiquity envisaged a southern continent, *Terra Australis*, reflecting a hypothesised inter-hemispherical land balance, depicted in map form in the 5th century.

Empirical discovery took another millennium, requiring globe-spanning sailing ships from Europe. Naval sightings and first landings occurred from the 16th to 18th centuries. Continental expeditions commenced in the 1830s, but the 'heroic age of exploration', comprising 17 expeditions by nine countries and reaching the South Pole, was almost another century later (1897-1922).

(b) Content

The Treaty, which applies to all land and ice shelves beyond 60° S, has three principal concepts. Two concern political and societal action: peaceful activity, with demilitarisation and a nuclear-free zone (Arts. I, II, V); and shared scientific exploration (Art. II, III). One concerns jurisdictional sovereignty (Art. IV). In support of this are procedural provisions: accountability and transparency (Art. VII), state responsibility for nationals (Art. VIII), advancement of Treaty objectives (Art. IX), and judicial settlement (Arts. X, XI).

In historical context, the Treaty is acknowledged as insightful and progressive for its time: the primacy of an international interest through peaceful activity and shared scientific exploration, and equivalence between international and national interests through the jurisdictional arrangement. As with all major initiatives concerning geopolitics and governance, however, it contains certain vulnerabilities and has attracted its share of controversy.

(c) Context

A dual framework, temporal and geographic, is required for placing the Treaty in an analytical context.

The temporal framework

Seven broad periods can be identified through the eight decades of the UN era:

- First (1946-47): Birth of the UN multilateral era
An initial, brief period of collaboration, with the intent that collective security would work

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- Second (1948-84): The bipolar Cold War
A deep bipolar geo-strategic tension, involving regional self-defence with adversarial alliances
- Third (1985-95): Resumed multilateralism
Détente and bipolar tension reduction; a bilateral summit on the avoidance of nuclear war
Partial success with collective security through the United Nations Security Council (UNSC) enforcement measures
- Fourth (1996-2000): Deterioration of UN multilateralism
Failure of UNSC unity over crises in Southwest Asia, North Africa, and Southeast Europe
- Fifth (2001-10): Global terrorism and counter-terrorism
Global terrorism (9/11) and the 'war on terror'
Adversarial declarations of an 'axis of evil', and the invasion of Iraq
- Sixth (2011-22): Global multipolarity
Emergence of China as the third global hegemon
Creation of the BRICS, to challenge, and / or collaborate with, the West
Invasion/annexation of Crimea and Ukraine
- Seventh (2023-?): Global systemic regression
Unpredictable transactional leadership; US withdrawal from UN agencies, and bilateral tariff measures
Paralysis of the UN system; adversarial policies toward the ICJ and the ICC

Two inferences may be drawn from the above.

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- Positive legal initiatives emerged during periods of geostrategic tension, both multilateral² and bilateral³, the subsequent agreements essentially being derivatives thereof ⁴.
- The international system of the 20th century metamorphosed into a global system in the 21st century (albeit equally dysfunctional and dangerous)⁵.

The geographic framework

The differentiation between the Antarctic Treaty and other legal instruments has to do with territory and its geo-strategic implications. The Treaty concerns uninhabited land⁶, whereas all other continents are inhabited, with military conflict occurring over territorial rivalry or political antagonism.

Analysis of the above dual framework facilitates an exploration of 'substance' versus 'dynamism'. What is the evolution in geopolitics from the time of the Treaty through to the current decade? And is the substantive content of the Treaty relevant to contemporary international law, or is its value to be found as an exemplar of political leadership and procedural insight?

2 Antarctic Treaty, 1959/61, Outer Space Treaty, 1967/67, Non-Proliferation Treaty, 1967/68; Moon and Celestial Bodies Agreement, 1979/84.

3 SALT/ABM/INF, 1972 to '87.

4 START in the 1990s, SORT in the 2000s, New Start and TPNW in the 2010s.

5 It follows that, in this chapter, the 'international interest' of the 1950s (in fact, the entire 20th century.) evolves into the 'global interest' of the 21st century.

6 Both Chile and Argentina operate small villages, with postal, educational and medical facilities; but these are essentially devoted to support of the scientific collaboration. Several nationals have been born there, largely to reinforce the appearance of sovereignty through citizenship.

2. Geopolitics and Governance

The geopolitics of Antarctica, and the governance thereof, proved to be of critical influence in the mid-20th century, involving the inter-relationship between international collaboration and national interests.

(a) International collaboration

The quintessence of the Antarctic political-legal story is the effort, by both the US and USSR, during a time of high tension, to collaborate with a view to achieving equivalence between their national interests and the international interest.

In 1948, the US advanced a progressive proposal – one of the earliest examples of '*multilateral centrality*' – seeking to develop a consensus over territorial claims to the continent. The original idea was an international regime in which every state with a 'legitimate interest' would relinquish or pool its claim, under UN trusteeship. Of the seven claimant states, only one (UK) endorsed the idea. In 1956, India attempted a similar proposal for UN trusteeship, which was opposed by both the UK and the two Latin American claimant states, which themselves were in dispute (Howkins, 2008). The proposal at the UN failed – In the early 1980s through the 1990s, Malaysia advocated UN trusteeship, also without success –.

In 1958, with the Cold War generating high levels of strategic tension, the failure of the attempts at UN trusteeship, and the success of scientific research during the 1957/58 IGY, the US advanced a second, entirely different, proposal – best described as '*selective international collaboration*'. States with a legitimate interest could

agree on a treaty that established Antarctica as a peaceful, demilitarised zone for shared scientific research, with 'previously asserted rights of or claims to territorial sovereignty' placed in abeyance ('frozen'). Agreement was reached among the 'original twelve'⁷, – the seven claimant states, plus USA, USSR, Belgium, South Africa and Japan – with the Treaty negotiated on the basis of a US draft.

Along with Canada's proposal of 1956 for UN peacekeeping to complement the struggling collective enforcement measures, this was perhaps the most progressive concept of the Cold War era.

(b) National interests

Two challenges have confronted the 'Antarctica initiative' since its inception: the 'territorial issue' of historical claims over parts of the continent, and the 'zonal issue' of regional collective self-defence of the continent of America.

(i) Territorial claims

When expeditionary visits to Antarctica were undertaken in the 19th and early 20th centuries, nationalism had reached a high point. The 'heroic age' was followed by the 'mechanical age' (1922-50), involving tractors and planes, and radios. It was during the first half of the 20th c. that seven countries advanced formal claims to various parts of the continent (UK, Australia and New Zealand; France and Norway; Chile and Argentina). Despite their own achievements in exploration, neither the USA nor USSR lodged a claim.

⁷ The seven claimant states, plus USA, USSR, Belgium, South Africa and Japan.

What, then, is the basis of a state's claim? To what extent does it still assert the claim and apply jurisdictional authority? And what is its recognition status?

National claims derive from anticipated discovery or actual discovery (UK 1908, France 1924, Norway 1931) and from post-colonial inheritance or conveyance (New Zealand 1923, Australia 1933, Chile 1940, Argentina 1941). Several political-legal problems arise from the action of the claimant states, before the Treaty and after.

The two Latin American claims rest on the doctrine of discovery dating back to the 15th century and relying on papal bulls⁸ that accorded authority to Portugal and Spain, culminating in two treaties⁹ that divided Antarctica into two segments, one for each entity. The legitimacy of sovereignty through papal authority was rejected by most other European states, especially France and UK, and was eventually revoked by the Vatican in 2023 (Holy See Press Office, 2023) as “not part of the teaching of the Catholic Church”. Both Chile and Argentina also claimed sovereignty through proximity to, and settlement on, the peninsula, based primarily on the doctrine of *uti possidetis juris*.

The formalising of such claims was enacted in domestic legislation by claimant states between their signing of the Antarctic Treaty and its entry-into-force (23 June 1961), raising the question of whether such actions were in violation of the spirit of the Treaty

8 Aeterni regis (1481), Inter Caetera (1493), Praecelsae devotionis (1514).

9 Treaty of Tordesillas (1494); Treaty of Zaragoza (1529).

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(United Nations General Assembly, 1969). Two examples are shown below:

- The UK signed the Antarctic Treaty on 31 December 1959, depositing its ratification on 31 May 1960. The Treaty entered into force on 23 June 1961. The UK acknowledged in 1959-61 that it was putting its Antarctic claim in abeyance but did not 'officially establish' its claim until 1962, through statutory instrument¹⁰. To this day, it formally states that it has 'no doubt about its sovereignty' over the Territory (British Antarctic Territory, n.d).
- New Zealand signed the Treaty on 31 December 1959, depositing its ratification on 1 Nov. 1960. Just before ratification, Parliament adopted the Antarctica Act on 21 October, conferring jurisdiction on the NZ judiciary to deal with offences committed in the Ross Dependency 'and certain other parts of Antarctica', while restricting jurisdiction over acts or omissions in Antarctica of 'certain nationals of other countries'¹¹ (Antarctica Act, 1960). Amendments to its 1960 statute have been made in 1961, 1970, 1993, 2011 and 2021. The Ross Dependency is stated to be a territory of New Zealand, and the NZ Governor-General acts as its governor.

¹⁰ British Antarctic Territory Order in Council 1962/400.

¹¹ Note the NZ experience with the Rodney Marks case, when US nationals refused to cooperate with NZ police investigation over the death by poison of Australian scientist, at the US base in the Ross Dependency, in 2000.

As recently as 2015, Norway extended its claim, to the South Pole through domestic legislation, which raises the question of a violation of the Treaty Art. IV (2), through an active assertion of claim (Headland, 2015)¹².

The claims have never attracted multilateral recognition. Reciprocal recognition exists among five of the seven claimants (Australia, France, NZ, Norway, UK). There is a degree of mutual recognition between Chile and Argentina over their claims, outlined in two joint declarations – Joint Declaration on the Antarctic (Buenos Aires, 12 July 1947) and Joint Declaration on Antarctica (Santiago, 8 March 1948) –, but the collaboration is thwarted by the territorial overlap in their claims, and their failure to date to achieve the stated goal of a formal treaty on agreed boundary demarcation. Beyond this, the claims are not recognised by the other 185 UN member states. The International Standards Organizations, working in cooperation with the UN Statistics Division, does not accord geo-spatial recognition to the claims (ISO, n.d.).

The only countries that could advocate legitimacy of claim through proximity would be the two South American states, Chile and Argentina, but even they are significantly far from the northern-most point of the ice continent¹³.

The clearest historical record of internal policy deliberation, and perhaps the most striking example of national interest and interna-

12 The report defined the southern limit of *Dronning Maud Land* as extending to the South Pole.

13 Chile's most southern point is 56°32'S; Argentina's is 55°04'S.

tional collaboration, is that of the US, in developing the following policy in 1956 regarding territorial claims:

The United States has consistently refused to recognize claims to Antarctic territory made by other countries. On occasion in the past, the United States has specifically rested its refusal to recognize a claim to sovereignty on the ground that discovery alone, unaccompanied by effective occupation of the area in question, cannot support a valid claim to sovereignty (US Dept. of State, 1956).

The seven claims were no doubt of serious relevance in the 19th century and early 20th. But they became less tenable in the second half of the 20th century. and, in the 21st, they seem to the rest of the world to exist as a shared reliquary¹⁴. They come from a bygone age, yet they remain actively pursued with dogged determination.

In fact, the earliest discussion on jurisdiction over Antarctica was generated before WWI, when exploratory activity was at its zenith.

In 1910 the American jurist, T. W. Balch, argued that discovery alone was insufficient as a juridical basis for any national territorial claim (beyond an inchoate claim), and that discovery plus effective possession (the latter only by an act of state) was required. Citing recognised jurists¹⁵, Balch concluded that, 'on

14 The relevant parts of Antarctica are named after the wives of 18th and 19th c. explorers and monarchs.

15 Vattel, Ortolan, Bluntschli, Martens, von Holtzendorff, Westlake, Calvo, Gefken, and Oppenheim.

general principles', Antarctica should "*become common possessions of all the family of nations*" (Balch, 1910).

- In 1924 this was more formally endorsed by the US Secretary of State, who advanced the view that "*discovery of lands unknown to civilization, even when coupled with the formal taking of possession, does not support a valid claim to sovereignty unless the discovery is followed by actual settlement of the discovered territory*" (US Dept. of State, 1924).
- In 1929, a US climate scientist proposed that the League of Nations should be responsible for Antarctica. The League did not, however, pick up on the proposal.

The following two decades, characterised by international economic and military turmoil, constrained exploratory activity on the continent, but the issue of its political-legal future re-emerged in the late 1940s. Following the three failed attempts at UN trusteeship noted earlier, between the 1950s and '80s, some cooperation developed in 1994, with the AT Consultative Parties committing to report annually on their work to the UN Secretary-General and actively collaborating with UNEP. This was welcomed by the General Assembly which agreed to consider the item every few years and requested reports from the UNSG (A/RES/38/77, 1983). But in 2005, the Assembly decided simply to 'remain seized of the matter' (A/RES/60/47, 2005).

It is often overlooked that the Treaty does not prevent a state from renouncing its claim – it simply provides that nothing in the Treaty itself amounts to a renunciation. A state is free, independent

of the Treaty, to renounce a claim. Given that there is virtually no global recognition, such an act would in effect comprise less a renunciation than a surrender of an historical fiction.

(ii) *Security issues*

A different complication concerns regional security issues extending, perhaps inadvertently, into the continent.

The Rio Treaty (1947/48), along with the OAS Charter (1948/51) established the first regional self-defence alliance of the modern age¹⁶ (Inter-American Treaty of Reciprocal Assistance, 1947). This regional arrangement has had serious problems and weaknesses (Canada never having joined, and there being only 18 states parties) but it remains extant in international law.

The Treaty extends the military alliance beyond all national jurisdictions through an 'American Defense Zone' which extends to both poles.

- The Antarctic sector, commencing at 60°S, extended from 24°W across to 90°W, narrowing down to the South Pole. This covered the British, Argentinian, and Chilean claims. An attack against any one American state which takes place within the security zone, is thus considered, even today, to be an attack against all.

¹⁶ The Treaty legally formalised the regional self-defence principle adopted by resolution at a conference in March 1945 (before the UN Charter was finalised), known as the Act of Chapultepec. The nature and role of the Charter's self-defence article (Art. 51) was due in large part to Latin American negotiations with the US at the San Francisco Conference in May.

- Three decades later, a Protocol to the Treaty containing several amendments retained the polar extension. But instead of proceeding from the North Pole to the South Pole and returning, the Protocol does the opposite, with modest adjustments to the western longitudinal coordinates on both sides of the Zone (Protocol of Amendment to the Inter-American Treaty of Reciprocal Assistance, 1975).

This reaffirmation of military self-defence was formalised 14 years after the Antarctic Treaty, which prohibits military conflict on the continent, came into force. No post-1975 amendment has been made to the Rio Treaty. The retention of the right of collective regional self-defence of the 'American Quadrant' under the Rio Treaty (1947) is a challenge, in terms of legal theory, to the demilitarisation principle of the Antarctic Treaty (1959).

The ANZUS Treaty (1951/52) refers to the 'Pacific Area' without defining it. But insofar as Australian national territory is an integral part of the alliance, and Australia regards its Antarctic Territory as part of its national territory, a similar logical problem of collective self-defence arises (Australian Antarctic Territory Acceptance Act., 1933; Australian Antarctic Territory Act., 1954). A similar issue may possibly exist regarding the Latin American and South Pacific nuclear-free zones¹⁷.

17 Treaty of Tlatelolco (1967/68) and Treaty of Rarotonga (1985/86).

3. Comparable Regions and Treaties

(a) Outer space and the oceans

The Treaty can be analysed in five areas: universality, jurisdiction, activities, organization, and procedure. Each is briefly summarised below, with comparisons made between the Treaty and other instruments.

Universality

How many states parties are there, and are any major powers non-member?

The extent to which the international community recognises treaty law is critical. The Appendix shows the universality of the Antarctic Treaty compared with comparable treaties dealing with the global commons and major weaponry. Both the outer space and the seabed instruments have near universality, but the moon agreement has essentially failed. The multilateral nuclear arms control instrument has near universality, but the nuclear weapons prohibition treaty has some way to go, confronted by 'persistent objectors' in the form of the nuclear powers and their allies.

Jurisdiction

Is the territory a global common, or is it shared internationally, or subject to national rivalry?

The question of jurisdiction is explored in subsequent sections, but, in summary, an evolution in legal thought is evident through the four main treaties addressing the 'common interest' in sovereignty:

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- Antarctica: No activities constitute a basis for asserting, supporting, or denying a claim.
- Outer space: The province of all mankind; national appropriation by claim of sovereignty is prohibited.
- Moon: The moon and its natural resources are the common heritage of mankind.
- Seabed: The seabed and subsoil and its resources are the common heritage of mankind.

Activities

A related evolution in provisions on exploration and exploitation is evident:

- Antarctica: No military actions, nuclear explosions, or radioactive waste; freedom of scientific investigation.
- Outer space: No military bases, weapon testing, military manoeuvres, weapons of mass destruction orbiting; free inspections.
- Moon: Exploration and use of the moon or other bodies shall be conducted for the benefit of mankind.
- Seabed: Activities shall be for the development of the common heritage, and for the benefit of mankind.

Organization

How is the legal instrument implemented and administered?

Regarding treaty implementation, the organizational arrangements differ fundamentally:

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- Antarctica: A secretariat, with permanent headquarters in Argentina since 2001.
- Outer space: A UN Office for Outer Space Activities, part of the UN Secretariat.
- Moon: An undertaking to establish an international regime (never implemented).
- Seabed: An international organization, the 'International Seabed Authority' with a Secretariat in Jamaica.

Procedure

How transparent is the procedure, and what is the dispute settlement method?

- Antarctica: Resolved by negotiation, inquiry, mediation, conciliation, arbitration, or judicial settlement.
- Outer Space: No dispute settlement procedure, but collaboration, and consultation with the UNSG.
- Moon: Similar to the Outer Space Treaty.
- Seabed: Bilateral negotiation or mediation, thereafter compulsory mechanisms¹⁸. (Three mechanisms: International Tribunal for the Law of the Sea, ICJ, or arbitration under the Convention).

It is clear from the above that a commencement in global thought occurred in the 3rd and 4th periods identified in s. 1(c). But a

¹⁸ Three mechanisms: International Tribunal for the Law of the Sea, ICJ, or arbitration under the Convention.

new geo-strategic problem has arisen in the 6th period: a new bipolar stand-off between the West and the BRICS, manifested in both space and seabed exploration.

The current decade has witnessed an intensification of space rivalry, through the Artemis Accords of 2020 (adhered to by 56 countries) and the 2021 ILRS Memorandum of Understanding for the International Lunar Research Station (with 13 countries)¹⁹. There are many national space agencies and three regional agencies (African, European, Latin American, and Caribbean). But there is no global space agency, with the UN member states addressing matters through the General Assembly's COPUOS (A/RES/1472 (XIV), 1959), and the Secretariat's Office of Space Affairs. The question arises whether there is political scope for a global space agency within the next decade, or whether group rivalry will incur military activity in orbit or on celestial bodies.

Regulations to govern the exploration and extraction of rare earth minerals on the seabed of international waters are under negotiation through the ISA, despite US affirmation to proceed unilaterally. The demand for rare earth minerals is increasing. The Authority is mandated to regulate the deep seabed, which comprises over 50% of the world's underwater surface area (UN, 2025).

In what ways might the Antarctic experience of the mid-20th century be relevant to the above issues in the 2020s?

19 In June 2025, China established the International Association on Deep-Space Exploration.

(b) Significance of Antarctica

The significance of the Antarctica experience lies in the example of positive and constructive leadership, in which national interest and international collaboration were insightfully balanced. It is not the substance of the legal documentation that reflects a bygone era, but rather the human and political aspirational character that guided the leadership by one global power, during the height of the Cold War.

Two examples subsequent to the Antarctic experience that represent similar qualities of leadership were the low-key but critically effective negotiating role of the UN Secretary-General during the Cuban missile crisis in 1962, and the qualities of both American and Soviet leadership in displaying transparency, courage and a degree of mutual trust, at the Reykjavik Summit in 1986, for a genuine bipolar collaboration for the global goal of nuclear weapons disarmament.

(c) Relevance to the Arctic

The Arctic is almost the precise opposite of Antarctica, with national land belonging to eight UN member states that enjoys mutual recognition²⁰. A recent exception is the US policy indication of interest in a takeover of Greenland for geo-strategic purposes, which would constitute a direct assault on NATO's political unity and legal obligations. This may, or may not, extend to a level of serious crisis.

20 Canada, Denmark (Greenland), Iceland, Norway, Sweden, Finland, Russia, USA.

The more underlying geopolitical challenge concerns the use of Arctic waters (surface and sub-surface) plus the seabed and subsoil thereof. This has increased relevance now regarding two scenarios:

- predicted ice-melt, which is likely to result in new shipping trade-routes through the polar waters; and
- exploration and exploitation of the polar seabed (such as the Russian submersible, *Mir*, during which a Russian flag was planted on the seabed (The Guardian. 2007; The New York Times, 2007)²¹.

It may be that the International Seabed Authority will be able to handle the second issue adequately, if the US-Russian collaboration of the kind witnessed in 1959 were to be repeated.

4. A Global Peace Framework

(a) *Concepts in the UN Charter*

While the Charter's 'international security' is based on authorised enforcement measures, it also contains a long-term aspirational goal. Member States commit to take appropriate measures to strengthen 'universal peace' (UN Charter, 1945). The concept is insightfully captured below:

"The challenge of peace is complex and intractable. Much depends on the meaning of the concept and the definition of the term.

21 Russia's foreign minister pointed out that the US flag is on the lunar surface, and not associated with territorial claims.

whether a diplomatic-legal or a socio-political approach is adopted. The concept of universal peace is entirely different from that of 'international peace and security' in chapter VII. Universal peace does not encompass military force; it evokes work of a socio-political nature. Political leaders interested in the protection of cosmopolitan space and the advancement of positive trans-nationalism and globalism will need to generate a paradigm shift away from 'power over' to 'power with', from coercive to integrative power. global problems demand global solutions. So, this is the moment to transcend national sovereignties with effective capable and legitimate global institutions" (Clements , 2017).

(b) Concepts in treaty law

The Antarctic Treaty stands as the link between the Charter and subsequent international law on 'peace' and 'universality'. The Charter's preamble is in the name of 'We the Peoples' and refers to 'mankind'. The Treaty reinforces this, its preamble declaring that *"it is in the interest of all mankind that Antarctica shall continue forever to be used exclusively for peaceful purposes."*

In the following decades, the vision of human unity was developed through two related concepts: the 'common interest' and the 'common heritage':

- The Outer Space Treaty (1968) has states parties recognizing the *"common interest of all mankind in the progress of the exploration and use of outer space for peaceful purposes"*. They agree that the exploration and use of outer space, including the moon and other celestial bodies *"shall be the province of all mankind"* and

“is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means”.

- The UN General Assembly declared in 1970 that the seabed and ocean floor and subsoil beyond national jurisdiction are *‘the common heritage of mankind’* (United Nations General Assembly, 1970). This concept, subsequently enshrined in treaty law (Moon and Celestial Bodies Agreement, 1979/84; UNCLOS, 1982/94), rests on four principles: universal trusteeship in lieu of national ownership; resource management as a global public good; demilitarisation of identified territories; and inter-generational equity through ecosystem preservation (UNCLOS, 1982). The concept of the ‘common heritage’ applies primarily to ownership of the ocean seabed. But more than any UN member state, perhaps, Australia is wrestling with the apparent logical contradiction between its ratification of the Moon Treaty and membership of the Artemis Accords (Tronchetti & Liu, 2021)²². Indeed, the Moon Treaty, with only 17 states parties, is the clearest example of national interests overwhelming the global interest in the 21st century, with the onset of bipolarity in space rivalry for mineral exploitation. In fact, the debate between national and global interests has extended to the Outer Space Treaty as well.

22 *“Australia is the only state party to the Moon Agreement to have signed the Artemis Accords. Australia’s simultaneous membership of both instruments is problematic both from a diplomatic and a legal standpoint.”*

(c) Concepts in international customary law

Some related concepts are not enshrined in treaty law but are declared to be customary international law. The 'global commons' is defined as being comprised of four 'areas', being:

".... the parts of the Earth's surface beyond national jurisdiction – notably the open ocean and the living resources found there; or held in common – notably the atmosphere. The only landmass that may be regarded as part of the global commons is Antarctica" (World Conservation Strategy, 1980).

In 2021, the UN Secretary-General made it clear, based on advice from the UN Legal Counsel, that Antarctica is part of the global commons (United Nations, Secretary-General, 2021)²³. Some ATS members rebuked the Secretary-General for an 'inaccurate report'. In 2022, eight of the 29 Consultative Parties (the seven claimants plus the US) wrote to the UN Legal Counsel to 'make some observations', opposing the judgement²⁴. But the political and legal implications of such a judgement are, nonetheless, profound. Given

23 "The global commons usually refer to natural or cultural resources that are shared by and benefit us all. They include the four conventionally understood commons that are beyond national jurisdiction – the high seas, the atmosphere, Antarctica and outer space – all of which are now in crisis."

24 "Whilst the concept of the 'Global Commons' has developed in political and economic writing, it is not a universally accepted term, nor is it defined in international law. We consider that the Report's description of the Global Commons to include some areas as 'beyond national jurisdiction' is not accurate in a number of ways. From a legal perspective, there are particularities about each of these areas, which account for the different legal regimes which govern them."

the intrinsic importance of the issue, there is a compelling case for seeking an advisory opinion from the International Court of Justice.

The concept of 'Earth governance' (Bosselmann, 2015) has no formal standing, as yet, in international law, but it is directly relevant to the relationship between, and debate over, the obligation of some 200 nation-states to engage, not simply in international collaboration, but in shared global governance. Indeed, the concept of global governance (Commission on Global Governance, 1995) has itself been well-received in some areas. This rests on the reputable philosophical and jurisprudential opinion on 'global constitutionalism' (Macdonald & Johnston, 2005; Lopez-Claros, et al., 2020). Other associated concepts have been developed since the 1980s, viz. common security (Independent Commission on Disarmament and Security Issues, 1982), global sustainability (World Commission on Environment and Development, 1987), and the planetary interest (Graham, 1999).

5. Lessons for the 21st century Global Order

What lessons, then, might the Treaty carry for the global order in the 21st century? The issues of our time are no longer confined to the normative (inter-societal relationships) but now include the existential (species survival). This section identifies these issues and considers the challenge of an equivalence of interest concerning their management.

(a) An equivalence of interests

The UN Charter, as the theoretical foundation of the 20th century legal order, established seven principles: sovereign equality,

good faith, pacific settlement, lawful force, non-member obligations, member-state unity, and domestic jurisdiction. This reflects the apogee of the 'international age'. The Antarctic Treaty, only a decade after the Charter, reflects this era. In practice, however, the UN has become continually weaker over the decades, primarily through misuse of the veto and selective refusal to resort to, or accept, international jurisdictional case law and advisory opinions.

Over the intervening eight decades, three major positive developments have occurred:

- The de-legitimisation and prohibition of weapons of mass destruction.
- The strengthening of peremptory norms covering state responsibility in customary international law.
- Individual criminal liability before a new court (ICC) covering the four most egregious crimes.

With the rise, politically and militarily, of the two most populous UN member states (China and India) and some leading regional states (South Africa and Nigeria, Argentina and Brazil), a new geo-strategic framework has emerged. The global order has witnessed the emergence of the BRICS, a political alliance since 2009 regarded by some as a challenge to traditional Western hegemony; by others as a 'post-Western reshaping'.²⁵ Despite having

²⁵ "BRICS is not an anti-Western project. It is a post-Western one. It represents a collective effort to recover sovereignty, build real economies, and reconfigure global governance in line with contemporary realities." <https://infobrics.org/en/post/52029/>

no founding constitutional document, the organization is exerting greater influence on the world's political and economic order than any other phenomenon since 1945, comparable to the G7²⁶ – BRICS now has ten members states and a large number of 'partner states' –. In short, the traditional 'rules-based order' (the UN-RBO) appears to be undergoing a fragmentation process, hastened by recent US national policy.

Given the emergence of a new 21st century bipolarity ('NA-TO-plus' and the BRICS), how might a new equivalence of interests eventuate? This section explores three possibilities. In the early 21st century, three geo-strategic legal issues have perhaps been the most prominent and challenging: the invasions of Iraq (2003) and Ukraine (2014 and 2022) and the reciprocal claims of 'terrorism-genocide' between Israel and Palestine (2023-25).

The third characteristic of the emerging global age is the emergence of 'existential risk' – the possibility of severe damage being done to the planet's bio-system and consequential risk to all species, including *homo sapiens*. There are various existential risks recognised today: weapons of mass destruction (nuclear, chemical, biological, radiological); robotic weaponry; climate change, and artificial intelligence beyond human agency (University of Cambridge, n.d.).

Perhaps the most eloquent articulation of this comes from the UN Secretary-General:

26 BRICS now has ten members states and a large number of 'partner states'.

"... [T]oday's global order is not working for everyone. In fact, I would go further and say: it's not working for anyone. Our world is facing existential challenges, but the global community is more fragmented and divided than at any time during the past 75 years. Even the cold war era was, in some ways, less dangerous. The threat of nuclear war was real and existential. That's why the United States and the Soviet Union agreed on arms reductions and controls and other mechanisms to prevent mutually assured destruction. ... It is clear that our world is in deep trouble. Global governance in its present form is entrenching divisions and fuelling discontent.... There is always an opportunity to create a more inclusive, comprehensive and effective global order that works for everyone based on international law" (UN Secretary-General to the Munich Conference, 2024).

(b) Contemporary concepts for Antarctica

From the above analysis, the following four conclusions can be drawn:

1. The Antarctic Treaty is the first substantive case in the UN era, in which national interests and international collaboration attain a meaningful equivalence.
2. The Treaty's substance is not immediately relevant to the other six continents with human habitation, but the leadership qualities and procedural insight displayed by the two global hegemony are relevant to 21st century tensions.
3. The Arctic states could consider the extent to which Antarctic provisions might be applicable, but the natural differences

(inhabited land territory, internationally recognised borders) together with recent unexpected and unpredictable geo-strategic tensions (especially within NATO over Greenland) render this, at best, a long-term vision.

4. The two shortcomings of the Antarctic Treaty, understandable in the 1950s but requiring redress in the 2020s, are the following: an absence of universal trusteeship in the form of a governing international organization; and the muted retention and assertion of the seven national claims. Possible changes, later in this decade and into the next, could include the following:

- Recognition that the Treaty does not prohibit the renunciation of the seven historical claims to Antarctica; all seven claimant states could conclude a multilateral agreement, on 23 June 2026, the day the Treaty turns 65, in which each terminates its claim.
- All 58 Parties to the Treaty could, at the opening of the 48th ATCM on 11 May 2026, in Hiroshima, lodge a declaration acknowledging Antarctica as part of the global commons, thereby agreeing with the UN Secretary-General and Legal Counsel, and moving to establish UN trusteeship for jurisdictional governance of the continent.
- Amendment of the Treaty to accommodate a UN scientific agency.
- Establishment, within the UN system, of an agency responsible for the 'UN Agreed Territorial Coordinates of Member States', with preconditional recognition by the General As-

sembly on the basis of ISO information. The only additional territory beyond the UN member States and observer states would be Antarctica, recognised as global commons under UN trusteeship.

(c) Potential global initiatives

Some potential examples, involving different leaders and different goals that could conceivably be achieved through Western-BRICS collaboration, are as follows:

1. Nuclear weapons elimination, within a timeframe

A negotiated timeframe for the elimination of nuclear weapons, as a related protocol to the Treaty on the Prohibition of Nuclear Weapons (TPNW). Perhaps the Rajiv Gandhi 10-Year Plan stands ready for this.

2. Greenhouse gas mitigation, within a timeframe

A timeframe for net-zero Greenhouse gas (GHG) emissions, as a protocol to the 1992 United Nations Framework Convention on Climate Change (UNFCCC) and 2015 Paris Agreement.

3. Establishment of an Outer Space Global Agency

Agreement, further to the 1967 Outer Space Treaty (OST), for a UN Space Agency, within which the national space agencies operate, building upon the bilateral US-USSR collaboration over Apollo-Soyuz half a century ago, and the subsequent International Space Station (Mir 1986-2001; and ISS). Precedents include the Apollo-Soyuz docking (1975), and the ISS (1998; intended to last 15 years and now expected to terminate in 2028-30).

4. Control of Artificial Intelligence

In 2021, UNESCO adopted a normative framework for the ethics of AI (UNESCO, n.d.). This builds on agreement, further to UN General Assembly resolutions from 1947 to 2024 (A/RES/110, 1947; A/RES/78/265, 2024)²⁷. It remains for the General Assembly to recommend the negotiation of a multilateral treaty to promote global A.I. governance, similar to its two resolutions in 1963, which established guiding principles and called for an appropriate treaty that became the Outer Space Treaty (United Nations General Assembly, 1962–1963).

The purpose here is not to assign decadal probability levels to each of the above. To do so would be neither possible nor strategically positive. The point is to retain the vision of global aspiration, and promote the possibility of global political leadership, for the perennial goal of avoiding human catastrophe. In this respect, the Antarctic experience stands, to this day, as the parent.

²⁷ “regulatory and governance approaches and frameworks related to safe, secure and trustworthy artificial intelligence systems that create an enabling ecosystem at all levels, including for innovation, entrepreneurship and the dissemination of knowledge and technologies on mutually agreed terms...”

Appendix

Universality of relevant treaties

The global commons

	Outer Space	Celestial Bodies	United Nations Convention on the Law of the Sea (UNCLOS): Seabed/ subsoil	Artemis Accords*	International Lunar Research Station (ILRS) MoU*
1961	1967	1984	1994	2020	2021
58 All 5	116 All 5	17 0	170 4 (not USA)	56	13

Weapons of mass destruction

PartialTestBan Treaty (PTBT)	Nuclear Non-Pro-liferation Treaty (NPT)	Biological Weapons Convention (BWC)	Compre-hensive Nucle-ar-Test-Ban Treaty (CTBT) (not EIF)	Chemical Weapons Convention (CWC)	Treaty on the Prohi-bition of Nuclear Weapons (TPNW)
1963	1970	1975	1996	1997	2021
126 Excl. China, France, Isra-el, DPRK	190 Excl. 4 India, Paki-stan, Israel DPRK	189 All P-5 included	178 Excl. 9: US, China, Egypt, Iran, Israel, Rus-sia, India, Pakistan, DPRK	193 Excl. Egypt, Israel, DPRK, South Su-dan	62 Excl. all 9 NW states + NATO

* These two agreements do have formal treaty status but represent the recent bifurcation of the international community regarding space exploration and exploitation.

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Chapter 4

Antarctica as a Testing Ground for China's Community of Shared Future Narrative

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Abstract

International cooperation under the Antarctic Treaty System (ATS) faces rising challenges from global environmental change and shifting geopolitics. While China's expanding presence in Antarctica and engagement in the ATS decision-making have often been interpreted as challenges to existing international frameworks, their actual impact is still to be determined. "Building a Community of Shared Future for Humankind", the overarching discourse of China's foreign policy, may align well with the governance needs of the Antarctic region. However, such alignment is to be proven. By reviewing the governance needs in the ATS and their compatibility with the Chinese narrative, this paper identifies the policy areas as practical parameters to evaluate China's commitment to its proclaimed ideals, specifically the establishment of Marine Protected Areas and responses to climate change.

Introduction

Antarctica is a unique region of the planet, not only for its special physical features but also for the outstanding institutions that govern it. Established in 1959 during a period of intense geopolitical rivalry, the Antarctic Treaty dedicated the continent to peace and science (Bergin, 1988; Dodds, 2008). Since the entry into force of the Treaty, the consultative parties have worked continuously to introduce additional instruments for specific purposes, forming the Antarctic Treaty System (ATS), with environmental stewardship being a prevailing value (Rothwell, 2021; Triggs, 2011). While the

continent's status as a global common is disputable, the leadership in environmental protection and scientific cooperation of the ATS has been widely recognised. It is broadly seen as one of humanity's most distinguished diplomatic achievements (McGee et al., 2022; Triggs, 2011). The ATS exemplifies successful international governance, built on principles of transparency, consensus-based decision-making, and mutual respect for sovereignty (Dodds, 2010). Because the Antarctic Treaty was designed to protect issue-based cooperation from geopolitical competition, it has long exemplified international cooperation in science and conservation despite the Cold War. The ATS has been regarded as exceptionally resilient to external political pressure (Haward & Jackson, 2023; Peterson, 2023; Sampaio, 2017).

Global geopolitics in the 2020s is testing this resilience (Latham et al., 2024; Liu, 2024). Since 2010, the decision-making process at the Antarctic Treaty Consultative Meeting (ATCM) and the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) has been struggling with intensifying disputes among global powers (Hemmings, 2018). Negotiations on critical issues such as the response to climate change and the designation of large-scale marine protected areas derailed from substantive discussions into generic debate (Goldsworthy & Brennan, 2021). In addition, the shifting global landscape has raised suspicions about the objectives behind states' activities in the continent, especially when such activities expanded rapidly (Brady, 2017b). As China has played a major role in the rapid shift in the global geopolitical landscape and, at the same time, rapidly enhanced its presence in

Antarctica and its participation in Antarctic policymaking (Chen & Zhang, 2024; Liu, 2020), its participation in the ATS has become a critical topic in the debates on Antarctic governance (Liu, 2019a).

Since the 2010s, China has significantly expanded its presence in the Antarctic in terms of logistical capacity, scientific research, and policy-making participation (Harrington, 2024; Liu, 2020). China has strategically invested in its logistics infrastructure, adding three research stations, one research vessel, and one fixed-wing plane to its national Antarctic program.¹ In scientific research, China's Antarctic program emphasises research with global environmental implications, focusing on climate studies, marine ecology, geology, astronomy, and biotechnology (Liqi et al., 2017). Concurrently, China is exploring areas with strategic and potential economic significance, including geological and fisheries resources, signalling its comprehensive approach to Antarctic science (Zhang & Haward, 2022).

In terms of policy, China actively participates in the policy-making processes at the ATCM and CCAMLR by submitting more meeting documents and delivering more interventions, sometimes vetoing decisions supported by the rest of the decision-making group (de Oliveira, 2021; Liu, 2020; Wang, 2021). Despite the absence of a national strategy for Antarctica, China has developed its regulatory

1 China's logistical growth in Antarctica is exemplified by its operation of five permanent research stations (Great Wall Station 长城站, Zhongshan Station 中山站, Kunlun Station 昆仑站, Taishan Station 泰山站, and Qinling Station 秦岭站), with another under consideration. The introduction of advanced icebreakers, Xuelong 2 (雪龙二号).

system for Antarctic activities, including the publication of a policy white paper (CAA, 2017) and the Regulation on the Environmental Protection of Antarctic Activities (Hong, 2021; Wang & Wang, 2021). While China has been developing its Antarctic logistical capacity and scientific research since its first Antarctic expedition, it only started to rapidly enhance its engagement in Antarctic policy-making in the 2010s (Harrington, 2024).

The expanding footprint of China in Antarctica has been met with a complex mix of recognition, curiosity, and caution among the international community: On the one hand, many ATS members acknowledge the positive contributions China brings to Antarctic science and logistics (Zhang & Haward, 2022). Its substantial investments have not only increased the continent's research capacity but also provided new opportunities for multinational scientific collaboration, especially in previously understudied regions. Chinese scientists now participate regularly in international projects, joint expeditions, and data-sharing initiatives, which are widely viewed as beneficial for the broader goals of the ATS (Brady, 2017a; Tin et al., 2014).

On the other hand, the rapid pace and scale of China's Antarctic activities have triggered concerns, particularly among traditional ATS leaders such as Australia, the United States, and the United Kingdom (Bergin & Press, 2020; Funairole et al., 2023; Young, 2022). These concerns revolve around several recurring themes. First, there is unease about the long-term strategic intentions behind China's investments—particularly whether scientific endeavours might serve as a cover for future claims or resource exploitation, in contravention of the ATS's spirit (Brady, 2017a). Second, there are

also technical concerns about transparency, particularly regarding the dual-use potential of some of China's new infrastructure, such as icebreakers and airfields, and whether all activities are being reported in line with ATS inspection protocols (Brady, 2017a; Hong, 2021). Such uncertainties can contribute to an atmosphere of mistrust, which, if left unaddressed, risks undermining the collaborative ethos that has long defined Antarctic governance.

Besides China's physical expansion, some states are wary of China's increasing diplomatic assertiveness, especially when it comes to consensus-based processes in CCAMLR or the negotiation of new Marine Protected Areas (MPAs), where China's positions are sometimes seen as obstructive or out of alignment with conservation goals (Hemmings, 2018; Hong, 2021). Additionally, China's calls for more "equitable" governance and critiques of Western dominance in ATS decision-making have led to divided opinions (Liu, 2019c). While some developing countries welcome China's advocacy for inclusivity and see it as a potential counterbalance to traditional powers, others worry about the risks of politicisation or the emergence of new geopolitical blocs (Brady, 2017a).

In light of the criticism of China's behaviour in Antarctic governance during the 2010s and 2020s, we argue that it is too early to conclude on China's role in the ATS, as China's Antarctic strategy has not yet been clearly defined. A few national political narratives guiding China's foreign policy align with the key values of the ATS. They may inform China's Antarctic policies, enabling better alignment with the ATS's values and more effective responses to the governance needs of the Antarctic. China's commitment to the

principle of a “Community of Shared Future for Humankind (CSF-H)” —a concept articulated by President Xi Jinping and embedded deeply within Chinese foreign policy discourse—mirrors its growing engagement with Antarctic affairs.

In this chapter, we examine the alignment between the governance needs of Antarctica in the 2020s and China’s political narrative to identify priority policy areas for China to materialize its commitments further and strengthen the ATS in the context of the global environmental crisis and challenging geopolitics.

Governance needs in the ATS

Originally established during the Cold War to prevent militarisation and promote international scientific collaboration, the Antarctic Treaty (AT) has since evolved in response to changing governance needs. Based on its understanding of the vulnerability of the Antarctic ecosystem, the ATCM moved quickly on natural conservation issues by adopting the Agreed Measures for the Conservation of Antarctic Fauna and Flora and implementing spatial protection measures in the 1960s. In the 1970s, it responded to unregulated krill fishing by negotiating the Convention on the Conservation of Antarctic Marine Living Resources. Malaysia raised the question of Antarctica at the United Nations in the 1980s, Antarctic Treaty Consultative Parties (ATCPs) also reformed the ATS to be more inclusive and therefore strengthen its legitimacy as the governance structure of the Antarctic. The adoption of the Protocol on Environmental Protection in 1991 addressed once again the emerging interests in mining with a renewed understanding of Antarctica’s ecological

and scientific values. Yet, as touched upon above, rapid environmental change, the arrival of new actors, and mounting geopolitical tensions now test the Treaty's ability to sustain its founding vision—enhancing scientific cooperation—are increasingly urgent if the ATS is to remain effective in the new realities of the twenty-first century. It is crucial to ensure that Antarctica remains a continent of peace and science in the decades to come.

Realign the collective strategic goals

The ATS was built on a foundation provided by the AT: to maintain Antarctica as a continent dedicated to peaceful purposes, mainly scientific research (Sampaio, 2017; Triggs, 2011). However, this collective vision must accommodate interests from an expanding group of countries with increasing diversity. Over recent decades shifts in global priorities—such as the rise of climate change and biodiversity conservation on the international agenda, increasing commercial interest in Antarctic tourism and fisheries, and the diversification of the ATS membership—have made it harder to sustain a unified set of strategic objectives (Hughes et al., 2022; McGee & Liu, 2019; Pettorelli et al., 2021). As the Antarctic Treaty Consultative Parties (ATCPs) pursue sometimes divergent national interests, there is a risk that the original spirit of the Treaty could become diluted (Gardiner et al., 2025; Press & Constable, 2022).

The challenge of realigning strategic objectives has deep roots in the ATS's institutional history. The AT manifests a pragmatic approach to addressing territorial claims stemming from legacies of the colonial era through institutionalisation based on the purpos-

es and principles embodied in the Charter of the United Nations (Dodds & Collis, 2017; Sampaio, 2017). For practical reasons, such as scientific cooperation, it postpones the resolution of territorial claims rooted in colonial-era international customs, with the institution of peace emerging after WWII (Headland, 2020). The fall of the Western colonial order during the Cold War gave rise to the Global South, a new bloc of global politics with increasing power in international institutions (Mignolo, 2011). As the Global South states resent colonial legacies due to their own history, they struggle to accept the colonial legacy “frozen” by Article IV of the AT; instead, they prefer to consider the Antarctic as a global common that shares the legal status of the international seabed (Cardone, 2022; Mancilla, 2020).

The Global South’s imagination of Antarctica is marginalised in the AT due to its lack of representation and participation (Dodds, 2006; Flamm & Verbitsky, 2022). The Global South’s economic and technological capacity is not proportional to its population or territorial space and thus limits its meaningful participation in international institutions, such as the ATS, which are dependent on knowledge and hardware capacities (Okereke, 2019). Despite the AT opening its membership to developing states, representation and substantive participation by the Global South in Antarctic governance have been limited by their national capacities (Verbitsky, 2014). In addition, Article IV of the AT ensures that every new ATCP and CCAMLR member accepts the arrangement of the unresolved territorial claims just as the original signatories, making it very hard to raise related questions for discussion in those fora.

The rise of China and India as developing yet powerful states has significantly altered the power distribution in the ATS (Liu, 2019b; Mohan, 2025). However, it is difficult to determine the extent to which they have represented the values and interests of the Global South, and the extent to which they have self-identified as global powers (Chaturvedi, 2012). On the one hand, sharing the history of being colonised with the Global South, they tend to view Antarctica as a global common and should apply fairer rules for its governance. On the other hand, they aim to utilise existing rules to advance their current interests and future aspirations, and therefore, they tend not to challenge the foundations of the ATS (Harrington, 2017).

Explicit joint statements are strong tools for aligning national objectives, as seen in Article IV's achievement when new members joined the ATS (Hughes et al., 2024). There is a pressing need to periodically revisit and realign the ATS's strategic goals, ensuring that the foundational principles of demilitarisation, freedom of scientific investigation, and environmental stewardship are not only upheld but also adapted to new realities (Madani, 2025). The Santiago Declaration (ATCM, 2016) demonstrated the collective will of such alignment. The Helsinki Declaration on Climate Change and the Antarctic (ATCM, 2023) represented the effort to adapt the ATCM's work within a global environmental context (Madani & Shibata, 2023). However, Antarctica rarely appears on the agendas of higher-level meetings. When it does, it is often constrained in scope and participation. For example, the Science and Technology Ministerial meeting of the G7 in 2024 discussed Antarctica, with a focus on research and observation. The US and France have arranged Antarc-

tic issues on higher-level diplomatic agendas, but only in bilateral forms (China, 2019, 2025; USWH, 2015).

Manage geopolitical competition

While the ATS has long been celebrated for insulating Antarctica from overt military confrontation and sovereignty disputes, the region is not immune to broader patterns of international rivalry. Major powers—including the United States, Russia, and China—are investing heavily in Antarctic infrastructure, scientific programs, and logistics (de Oliveira, 2021; Szpak, 2025). While their competition may involve leadership in addressing the continent's challenges, it can also contribute positively to research and stewardship. However, if mismanaged, it may marginalise substantive discussion and raise concerns about strategic positioning and long-term intentions.

International institutions are arenas for geopolitical competition where emerging powers often seek to challenge existing orders reflecting the values and interests of established powers (Alexandroff & Cooper, 2010; Mukherjee, 2022). While the established powers may criticise some of their challenges as “revisionist” behaviour, they also have sought to reach consensus through compromises on technical matters (Cohen et al., 2023). With the expansion of international institutions after World War II, the great powers must prioritise their competitive engagement among different institutions (Ikenberry, 2019). Institutions addressing core national interests, such as human rights and trade, often stand out for more intensive competition (Hayes, 2024). However, the impact of such competi-

tion on institutions dealing with “remote” issues, such as Antarctica, remains unclear.

Managing this renewed geopolitical competition requires major powers to agree on depoliticising Antarctic governance, focusing on specific issues, and establishing technical arrangements to safeguard the governance structure while maintaining windows for future opportunities (Haward & Jackson, 2023). Under such commitment, the combination of strengthening transparency, confidence-building, and robust diplomatic engagement can help contribute to the stability of the ATS (Lord, 2020). The ATS must continue to enforce strict reporting requirements on national activities, encourage regular exchanges of information, and support joint inspection missions to promote trust and accountability (Maurel, 2023). Additionally, maintaining open channels for dialogue—even during periods of global tension—can help prevent the spillover of external rivalries into Antarctic affairs.

The system should also be flexible enough to adapt its conflict-prevention mechanisms, ensuring that competition in Antarctica remains peaceful, regulated, and ultimately constructive.

Enhance scientific cooperation

Cooperation in scientific research lies at the heart of the ATS, forming both its legal foundation and its most significant practical achievement (Bentley et al., 2021). International collaboration in Antarctic science has yielded transformative insights into climate change, biodiversity, and global ocean systems. However, main-

taining this tradition of openness and cooperation is increasingly challenging. The proliferation of national programs, advances in research technology, and disparities in scientific capacity among Treaty members risk eroding the collaborative ethos that has long defined Antarctic research.

To enhance scientific cooperation, the ATS must prioritise the facilitation of joint research initiatives, open data sharing, and cross-national capacity-building (Kennicutt et al., 2019). This includes expanding multinational projects (such as the Southern Ocean Observing System overseen by the Scientific Committee on Antarctic Research and the Scientific Committee on Oceanic Research), supporting emerging research actors, and ensuring equitable access to field opportunities and logistical support (Gaffey et al., 2024). Embracing digital platforms for data exchange, promoting international training programs, and fostering interdisciplinary networks can help bridge gaps between countries with differing resources and expertise (Chown et al., 2022). Furthermore, scientific cooperation can yield inclusive and actionable knowledge to inform decision-making (Lidskog, 2024). Ultimately, strengthening scientific cooperation will not only advance knowledge but also reinforce the ATS's role as a model of peaceful, collective problem-solving on the global stage.

Relevance of CSFH: a key political narrative for China's foreign policy

China's self-identification as a member of the Global South, a peaceful great power and its ambition in science and technolo-

gy position it to play a critical role in addressing the governance needs introduced above: First, China has always identified itself as the largest developing state in its foreign policy, seeking alignment with the positions of other developing states (Zhao, 2015). Second, as one of the permanent members of the UNSC and the second-largest economy in the world, China is striving to reclaim its great power status as “the great rejuvenation of the Chinese Nation” (Goldstein, 2020). Third, the ambition of becoming a great power has driven China’s investment in scientific research and engineering development (Wilsdon, 2007).

While China’s engagement in the ATS has sparked suspicion and even criticism, it still lacks a national Antarctic strategy to explain its behaviour, leaving room for debate on how “Chinese wisdom” can positively contribute to addressing the governance needs in the ATS (McGee & Liu, 2019). This section unpacks the values and aspirations embedded in China’s official rhetoric of its foreign policy, “building a community of shared future for humankind”, to gain deeper insight into the relevance of such a narrative for the governance needs of the ATS, and how China’s engagement within the ATS can indicate the true meaning of this narrative.

What is “Community of Shared Future for Humankind (CSFH)”

CSFH is a rhetoric formulated by the current Chinese leadership to guide the development of its multilateral diplomacy. It is an overarching narrative that features prominently in many high-level speeches, such as President Xi’s speech at the UN, and political

documents, including the charter of the Communist Party and China's Constitution, demonstrating China's strong interest in enhancing its engagement in global governance, or, as some critics argue, reforming the existing international order (Zhao, 2018). Either way, it is critical to the formulation of China's foreign policies as well as of their interpretation (Lams, 2018). Here, we explain the concept based on the white paper titled "A Global Community of Shared Future: China's Proposals and Actions" published by the State Council Information Office of China in 2023 (China, 2023). The document presents the official narrative of the concept, encompassing its core values and potential applications. As the white paper was published after a decade of promotion for the narrative, it also elaborated on Chinese initiatives under it.

Despite the highly rhetorical nature of the narrative, the white paper outlined the rationale behind it. It highlights the contradiction between the interdependence of members of the international community and the governance deficit in security, the economy, and the environment and claims that the CSFH is deeply rooted in Marxism and Confucian philosophy (Khan et al., 2021; Wu, 2018), and therefore, represents a Chinese response to the "needs of our times" (Jia & Guo, 2023). It argues that a harmonious multipolar world represents the trajectory of the international community since the end of the Cold War and criticises confrontations among power blocs, as well as coercive and exclusionary approaches in international relations. It proposes that international relationships should be based on dialogue, cooperation, and non-intervention, and advocates for collective responses to global challenges, in-

cluding terrorism, climate change, and sustainable development (Hirono et al., 2019). The white paper lists five key positions under the CSFH concept: 1) mutual respect and equitable consultation in international relations; 2) peaceful resolution of differences; 3) free trade; 4) cultural diversity; and 5) green development, which are all widely accepted principles. It cites the Belt and Road Initiative, China's global initiatives on development, security and civilisation as applications of the CSFH concept (Liu & Dunford, 2016; Winter, 2021).

China's role in Antarctica is shaped by these elements and is often presented through principles of peaceful scientific collaboration, joint stewardship, and collective management of the global commons. In its official regulations and policy discourse, China emphasises scientific research, environmental protection, and multilateralism. These priorities are reflected in measures, such as China's issuance in 2018 the Regulations on Environmental Protection for Activities in Antarctica (《南极活动环境保护管理规定》), aimed at safeguarding the Antarctic ecosystem while ensuring the secure and orderly conduct of its expeditions. Later that year, the 13th Standing Committee of the National People's Congress (NPC) added the Antarctic Activities and Environmental Protection Law (《南极活动与环境保护法》) to its legislative agenda (Wang, 2019). Examining these initiatives through the lens of the CSFH highlights how China seeks to project an image of cooperative internationalism, scientific progress, environmental stewardship, and peace—values it presents as fundamental to maintaining Antarctica's unique global status and ecological integrity (Falcone, 2024). Despite China's

multi-year promotion, there are still significant challenges in communicating the CSFH concept. The generality and ambiguity of the narrative allow varying interpretations among nations, which can impede shared understanding. Differences in geopolitical interests may cause scepticism or resistance, especially from countries wary of shifting power dynamics (Bishnoi, 2023). Additionally, aligning new concepts with established international norms and existing frameworks can be complex, necessitating extensive diplomatic efforts and negotiations (Taskinen, 2020). Therefore, effective introduction and widespread acceptance of CSFH will require sustained dialogue, transparency, strategic advocacy, and pragmatic integration into existing governance structures. Here are a few elements of the CSFH that may help address Antarctica's governance needs once put into concrete policy proposals.

“Community”: Collaborative approach

Cooperation is a recurring theme in the CSFH narrative, and it has become especially salient in the context of Antarctic governance. Chinese policymakers have called for “consultative and participatory” mechanisms that ensure all treaty parties—regardless of their size, historical presence, or economic power—have genuine opportunities to contribute to policy debates and the formation of new norms (Nathan & Zhang, 2022). This stance is evident in China's support for consensus-based negotiation, which compels participants to engage with one another to find a compromise.

Collaborative decision-making on Antarctic affairs can go beyond procedural arrangements. While the ATS incorporates inclusive de-

cision-making into its consensus-based policy-making procedures, the inclusiveness of the ATS grows with the number of its Members (Madani, 2025). The effectiveness of inclusive decision-making is based on a collaborative approach that actively engages in dialogue. International environmental law obligates states to cooperate in seeking common ground when making collective policy decisions (Craik, 2019). For a non-proponent of a policy proposal, this obligation requires incorporating national interests through constructive and specific suggestions or articulating specific concerns to find compromise solutions (Goldsworthy, 2022). Such a collaborative approach is essential to achieving results from the consultation and dialogue emphasised in the CSFH narrative. Therefore, China's engagement in decision-making could indicate what CSFH actually means in practice. If China's Antarctic engagement continues to emphasise dialogue over dominance, it may provide broader lessons for how emerging powers can operate responsibly in other shared domains, such as the deep sea, outer space, and the Arctic.

“Shared future”: Ecological Civilisation

The green development pillar of the CSFH narrative corresponds to the “shared future” element of the concept. China's green development concept is best understood within the context of Ecological Civilisation, a meta-narrative that governs all of environmental policies (Geall & Ely, 2018). It envisions the harmonisation of economic development and the protection of natural systems, where environmental ethics are integrated into every aspect of governance and daily life (Chen, 2021). It is a human-centric concept originating

from a developing country, with a very different origin compared to ecological ethics based on aesthetic, eco-centric values (Hansen et al., 2018). The white paper on CSFH calls for a “clean and beautiful world,” implying a human perspective of a good environmental status that may not appreciate wilderness as much as some others do. By exporting the idea of ecological civilization to the Antarctic context, China can showcase its model of “green development” and contribute new philosophical resources to the debate over global environmental governance.

China’s Antarctic policy presents a mixed picture of the application of ecological civilization as a guiding framework. On the one hand, China’s official white papers and government statements underline the imperative to “protect the pristine environment of Antarctica” and to conduct all scientific, logistical, and exploratory work with minimal ecological impact (China, 2018). This approach is reflected in the construction of environmentally friendly research stations, investment in renewable energy sources for polar operations, adherence to strict waste management and environmental monitoring protocols, and the designation of specially protected areas (Wang, 2021). Chinese scientists are also active participants in global efforts to monitor Antarctic biodiversity, assess the impacts of climate change, and propose new conservation measures (Zhang & Haward, 2022). On the other hand, China has been reluctant to agree to several important initiatives on Antarctic protection, such as designating the emperor penguin as a protected species and establishing marine protected areas.

Nonetheless, we believe the CSFH and ecological civilisation concepts can still contribute to addressing the governance challenges

in the ATS if applied at a larger temporal and spatial scale. First, at the global scale, the ecological and security value of Antarctica is indisputable. It can be framed as a "white natural infrastructure" for the planetary ecological civilisation. Second, on a larger timescale, Antarctica will experience significant environmental changes due to global warming and ocean acidification. Understanding and actively managing these risks will be critical to ensuring the continued performance of this natural infrastructure. Such perspectives can help China align its political priorities with the ongoing conservation discussions and motivate it to contribute more to the collective production of actionable science.

"For Humankind": Inclusive decision making

The CSFH narrative of "benefit humanity" shares the aspiration expressed in Deng Xiaoping's inscription for China's Antarctic programme: "Contribute to the peaceful use of Antarctica for Humankind". While Mao aimed to "liberate humanity" with communism, Deng's inscription was based on his judgment that peace and development were the mainstream trends in the world in the 1980s (Chen, 2021). When the inscription was made, China was starting its national Antarctic programme and, at the same time, its economic reform and opening-up. It marks China's desire to rejoin the international community and its ambition to become a meaningful contributor.

At the same time, China also grumbles about what it views as the legacy of Western dominance in global commons management, arguing that existing governance frameworks like the ATS and CCAM-

LR have not sufficiently incorporated the perspectives and interests of emerging economies or the Global South (Chen & Zhang, 2024). Being a Global South state in the ATCM, China's self-identification as a developing state is subtle. In its early participation in the ATCM, as a newcomer, China often used the concerns of the international community to justify its positions. China's interventions in the 1980s stressed the global significance of Antarctica and highlighted the cooperation with the "international community" to address new issues within the ATS (ATCM, 1987). In comparison, Brazil openly identified itself as a developing state in the ATCM and highlighted its role in introducing new perspectives.

As Antarctic governance is based on the binding nature of responsibilities and rights, states that do not carry these responsibilities are excluded from decision-making (Barrett, 2015). When all states have a stake in Antarctica, but only some can participate in the decision-making, inclusive decision-making means taking the interests of all states outside the ATS into consideration (Solomonsz et al., 2021). Therefore, China can further demonstrate the concept of CSFH by clearly elaborating how its proposals are fairer to the Global South states that are not in the meeting room.

To summarise, China's CSFH narrative can address the governance needs in the ATS in several ways, subject to certain conditions. First, the collaborative approach can help realign collective strategic goals when it is applied at both the technical and political levels. Second, China's value of the environment, despite its human focus, would not prevent stricter protection of the Antarctic, but rather encourage

further cooperation in scientific research. However, such encouragement is conditioned by the alignment of objectives at the political level. Third, when China can systematically incorporate the interests of the Global South into its engagement in the ATS and offer understandable technical solutions, it can help ATS focus on substantive issues and resist the pressure of global geopolitics.

Conclusions

While understanding China's engagement in Antarctic governance requires an exploration of the political ideas and normative frameworks guiding its actions, it is also true in reverse: China's growing engagement in Antarctica, while often viewed through the lens of strategic competition, can also be a promising test case for peaceful international coexistence. China's expansion—through infrastructure development, scientific investments, and increased participation in governance forums—offers an opportunity to demonstrate the real meaning of its commitment to building a CSFH.

Rather than undermining existing norms, China has the potential to demonstrate its vision of a fairer and more inclusive international order by taking a collaborative approach to building consensus, contributing to scientific and management solutions to address environmental challenges, and articulating the rationale of its engagement from a Global South perspective. While participation by the Global South states is likely to increase only gradually, all ATCPs need to further articulate the rationale of their objectives, activities and decisions based on the interests of humanity. It is an ongoing competition for legitimacy.

China's increasing presence could help diversify leadership in Antarctic governance, bringing in new perspectives and resources that enrich global scientific understanding and bolster collective stewardship. If managed with transparency and mutual respect, China's contribution could serve as a contemporary model for peaceful power projection—one grounded in soft influence, public goods provision, and institutional commitment.

Ultimately, the peaceful evolution of China's Antarctic footprint could serve as a microcosm to envision a more cooperative and stable international order—where power is exercised through contribution and participation, rather than control and competition.

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Chapter 5

Negotiating the World's Largest Marine Protected Area – The Ross Sea as an Enduring Example of International Cooperation from the Antarctic Treaty System

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Abstract

This chapter examines the negotiation and adoption of the Ross Sea Region Marine Protected Area (Ross Sea Region MPA), the larg-

est marine protected area in the world and one of the most significant achievements of the Antarctic Treaty System (ATS). Drawing on the author's experience as a U.S. diplomat and head of delegation, it traces the five years of complex negotiations that culminated in consensus at the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) in 2016. The chapter situates the Ross Sea agreement within the broader accomplishments of the ATS, including demilitarization, environmental protection, fisheries management, and the mining ban. It highlights the challenges of consensus-based decision-making, the importance of scientific evidence, and the decisive role of high-level diplomacy and stakeholder engagement in overcoming opposition from key states such as China and Russia. The Ross Sea Region MPA demonstrates how science, diplomacy, and cooperation can converge to achieve large-scale conservation, while also offering lessons for future high seas governance under the UN High Seas Treaty. Ultimately, the Ross Sea case illustrates the resilience of the ATS, showing that even under strained geopolitical conditions, it remains capable of delivering landmark agreements for global marine conservation.

Introduction

The agreement by the members of CCAMLR to establish the Ross Sea Region Marine Protected Area was a significant achievement for the Antarctic Treaty System, among other notable ones over the six decades since the Antarctic Treaty was signed. In this book discussing the merits of the Antarctic Treaty regime, it has a special place not only because it was and still is one of the most import-

ant international acts of marine conservation – creating the world's largest high seas MPA – but because it provides a recent example of how states with disparate political and economic interests can overcome their differences to achieve a mutual goal. Despite the insistence from some quarters that the Treaty System does not accomplish enough – and indeed in some instances can be slow or unable to act – it has the ability to reach consensus on issues of importance to the international community.

This chapter describes some of the key strengths of the Antarctic Treaty System and then relates the history of the negotiation and eventual agreement on the Ross Sea Region MPA at CCAMLR in 2016. The perspective I provide is that of a practitioner and diplomat. I began my connection with Antarctic diplomacy in 1996 when I was assigned by the U.S. Department of State to be the Department's lawyer in charge of Antarctic legal issues. That same year, I attended my first Antarctic Treaty Consultative Meeting, in Utrecht, at a time when the parties were in the midst of negotiating an instrument that would later be adopted as a legally binding annex concerning liability. I subsequently attended seven more ATCMs as a legal adviser. In 2006, I became the head of the U.S. Delegation to the ATCM as well as its CCAMLR Commissioner, performing those duties and attending the annual meetings through the end of 2020. During 2010-2016, I led the U.S. team that negotiated the Ross Sea Region MPA.

Thus, I've had the opportunity to see Antarctic diplomacy up close. Having a ringside seat is important to understanding the Treaty System because Antarctic diplomacy proceeds almost en-

tirely via closed diplomatic meetings. Although a limited number of observers (experts and representatives of non-governmental organizations) can attend the annual ATCMs and CAMLR Commission sessions, these are mostly closed to the press and public. A meeting report is made available weeks after the meeting, but this is a negotiated and somewhat bland summary of what takes place in the public sessions, and does not provide the full flavor of the proceedings. These reports do not show the important interactions among delegations in informal sessions, where most of the main problems are worked out. Indeed, many difficult points in the negotiations are often resolved through bilateral interactions among officials inter-sessionally, and not necessarily at the ATCM or Commission at all.

When we speak of the Antarctic Treaty System, it is important to focus on its two main aspects – the Antarctic Treaty and the CAMLR Convention, and their related instruments, decisions and meetings. There is a formal definition of the System contained in the Environmental Protocol to the Antarctic Treaty, but the most important thing to keep in mind is that Antarctic diplomacy takes place in two major forums, each of which meet annually. One is the ATCM, which is hosted in or around May by the Antarctic Treaty Consultative Parties (the 29 states currently with decision-making rights and responsibilities) in roughly English alphabetical order. The ATCM carries out the mandate of the Antarctic Treaty as well as its Environmental Protocol, and a separate body, the Committee for Environmental Protection, meets in parallel with the ATCM and provides advice to the ATCM. The CAMLR Commission meets in late October in Hobart, the site of the Commission Secretariat, and handles the

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fisheries management and marine conservation responsibilities of its 27 current Members (plus additional acceding states).

There is substantial overlap between the countries that are parties to each of these, and it is often the case that diplomats and scientists who follow one of these processes also follow the other. As a result, the formulation of Antarctic-related policies regularly crosses-over between the forums, and the participants in one meeting are often discussing issues related to the other. Any analysis of the Treaty System and Antarctic diplomacy overall needs to take both into account.



Figure 1: Delegations of the United States and New Zealand in front of CCAMLR headquarters in Hobart, Tasmania after the adoption of the Ross Sea Region MPA in 2016. Photo by John Weller.

The role of consensus

Both prongs of the Treaty System have the same basic procedural core – they both operate based on the consensus of those states entitled to take decisions – the Consultative Parties under the ATCM and Members at CCAMLR. This fundamental aspect of how the bodies are run is intimately related to the results that they achieve. Only if all parties are on board does any substantive matter move forward.¹

Does this approach to decision-making lead to success? Not necessarily, and indeed it can create immense frustrations when most states see a need to take a particular path and one or just a few feel differently. But this rule does force the parties to strive for a broadly acceptable result, and when such a result is achieved, it has the strongest basis for being implemented fully.

As we consider the Ross Sea negotiations, it is important to bear in mind the significance of the consensus rule. The negotiators knew that all objections had to be removed or there would be no result – without consensus there would be no MPA. And it would be

1 The ATCM and CAMLR Commission follow a strict consensus procedure whereby an objection by any Consultative Party, in the case of the ATCM, or by a Member in the case of CCAMLR, causes any proposal on a matter of substance to fail. In normal practice, votes are not taken in either body and an expression by a state representative of lack of support for a decision in a public session is sufficient for that decision not to proceed. The consensus procedure is followed by the ATCM's and Commission's subsidiary bodies, such as the Committee for Environmental Protection (CEP) and the CCAMLR Scientific Committee – although in the case of the CEP and Scientific Committee there is provision for experts to be able to record their views regardless of whether consensus advice is achieved.

necessary to convince CCAMLR's Members one by one of the merits of this proposal.

The use of consensus helps ensure that parties with diverse geopolitical interests in Antarctica have a feeling of confidence in the Treaty System, as they know that decisions will not be taken that might undercut those interests. Hence, even where parties cannot agree on ways forward regarding, *e.g.*, tourism regulations or additional marine conservation measures, meetings under the Treaty System continue to serve interests that are important to the parties.

Treaty System Accomplishments

In order to understand the significance of reaching agreement on the Ross Sea Region MPA and how this fits into the panoply of Antarctic policy achievements, it is worth focusing on several key accomplishments of the Treaty System.

The Antarctic Treaty of 1959 sets aside Antarctica (the land and marine areas south of 60 degrees South latitude) for peace and science. All Treaty Parties conduct science in Antarctica, and the larger countries tend to have extensive scientific operations. Fundamentally, the Treaty System creates the conditions under which science can take place without undue interference, and this is accomplished in the context of rules that protect the environment – which is a matter of priority for the parties. Protecting the environment was not a major concern of the original Antarctic Treaty, but was addressed later through decisions taken by the parties and through the adoption of the Treaty's Environmental Protocol in 1991.

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Keeping the peace through demilitarization is a central accomplishment of the Treaty System, and in many ways the most important one. The Antarctic Treaty was negotiated at a time of rising Cold War tensions and was designed to prevent the continent from becoming a place of political contestation. Not only was Antarctica effectively demilitarized, but the potential tensions from existing territorial claims were addressed effectively. Through Article IV, the Treaty maintains the parties' differing positions on claims, including providing that no acts taken while the Treaty is in effect "constitute a basis for asserting, supporting or denying a claim ... or create any rights of sovereignty in Antarctica", and ensuring that no claim can be asserted while the Treaty is in force. In addition, the position of two countries, the United States and Russia, which consider that they have a "basis of claim", is also protected. This is the fundamental legal and political bargain that was struck among the 12 original signatories and has been accepted by all subsequent parties.

The Treaty established one of the first modern arms control regimes, and this allowed science and scientific cooperation to flourish. The provisions preventing military activity and nuclear testing have been widely acknowledged as a success over the six decades of the Treaty's implementation. There have been no military conflicts in Antarctica while the Treaty has been in force, although military personnel are permitted to facilitate logistics, and naval vessels and air forces provide similar logistics support. Inspections have found no stockpiles of armaments. Questions continue about whether certain activities of parties may have military purposes, such as technologies that may be used for both ci-

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vilian and military activities, or possible uses of research stations for intelligence gathering. Such questions are serious and need to be kept under consideration by parties, but the basic point remains that the Antarctic Treaty regime has kept the peace for decades in a large area of the planet.² The entire international community benefits from this.

The Treaty System has also established a largely successful system of fisheries management via CCAMLR. This is particularly important as fishing is the largest economic activity taking place in Antarctica, followed by tourism. Each year, parties representing both fishing and non-fishing nations gather in Hobart for difficult negotiations over catch limits, and for the most part succeed in not only reaching decisions but doing so on the basis of scientific advice. Indeed, the quality of science in CCAMLR has traditionally been considered some of the best among international organizations that manage fishing. Given the economic stakes involved, the negotiations tend to be hard-fought, but that is usual for fisheries talks. Moreover, CCAMLR takes a modern, ecosystem-based approach to fisheries management, and is largely effective in combating illegal, unreported and unregulated (IUU) fishing. There is much to question about whether CCAMLR makes the right decisions on particular fisheries, and its failure to reach its potential for large-scale conservation through a sufficient number of marine protect-

2 The Antarctic Treaty applies not only to the Antarctic continent and ice shelves – which are huge, covering an area 1.5 times the size of the continental United States – but also the Southern Ocean north to 60 degrees South Latitude. In other words, it is an immense area of the globe.

ed areas. Nevertheless, the establishment and implementation of CCAMLR overall is an achievement.

The Environmental Protocol to the Antarctic Treaty includes a ban on “mineral resource activities.” This provision, referred to as the mining ban, forbids any sort of mining or hydrocarbon extraction on land or in the ocean within the Antarctic Treaty Area, and marked a sea change for Antarctic policy. Prior to that time, the parties had negotiated but not entered into force a convention that would have allowed mining under strict regulation, but when the leaders of Australia and France announced their opposition to ratifying that convention, the parties reversed course and took the opposite approach. The Protocol contains many important provisions, but the mining ban is in many respects the most important and famous one. It has the effect of preventing a vast land area and ocean space from being subject to potentially ruinous environmental degradation and particularly significant types of economic pressures.

This was a very wise evolution in policy and has been, according to available evidence, implemented comprehensively by the parties. Despite occasional concerns arising about some possibly impermissible research into mining or other possible infractions, there have not been any indications of a breach. Moreover, since 1996 when the Protocol and all its provisions entered into force, the Consultative Parties have expressed by consensus in a number of declarations their continuing support for the mining ban. There are concerns that at some future time one or more parties might walk away from the Protocol. But no party publicly has indi-

cated it is contemplating this, and the record of successful adherence continues.

The Treaty System's key instruments have also continued to attract new members. The Antarctic Treaty started out with just 12 States Parties and now has 58. CCAMLR has 37 parties. Membership of these treaties includes all countries that have an active interest in Antarctica, and the growing membership acts as a counter to charges that the Treaty System is a kind of closed club.

Another Treaty System success is the acceptance by all parties of the right of inspection contained in the Antarctic Treaty as well as the Environmental Protocol. The right of any Consultative Party to inspect unannounced the facilities of other parties helps all parties maintain confidence that the key provisions of the treaties, in particular those related to military activities and environmental rules, are being adhered to. CCAMLR also has a system of inspection under which its members can board and inspect at sea the fishing vessels flagged by other members. The Antarctic Treaty's inspection regime is used regularly, despite the expense of sending inspection teams into the field, and countries almost always accept the arrival of inspection teams without incident.

There are many examples of how the Treaty System has failed to meet expectations or has not proven equal to the task of addressing various challenges. But a point worth stressing is that the Treaty System continues to offer some significant benefits to the international community. Moreover, the Ross Sea Region MPA fits nicely on the accomplishment side of the ledger.

Why the Ross Sea?

Although the original consideration by CCAMLR of MPAs began in the 1990s, CCAMLR committed in 2002 to establish a network of MPAs in response to international conservation targets established at the World Summit on Sustainable Development. Scientists with Antarctic expertise considered various locations in the Southern Ocean, and some forcefully pushed for the Ross Sea, noting its unique and vibrant characteristics. The original parties advancing proposals to protect the Ross Sea, New Zealand and the United States, had long studied this geographic area. For New Zealand this was in part due to proximity. For the United States, scientists going back decades had built data sets related to this region, where McMurdo Research Station, America's and the continent's largest station, is located. The region has a diverse set of plants and animals in a complex ecosystem, and was also subject to fishing pressures that an effective MPA would have to limit to some degree, thus allowing for comparisons between unfished, lightly fished and heavily fished areas.

What is a CCAMLR MPA?

At its heart, the CAMLR Convention is about conservation – it is not merely a fisheries management agreement. Article 2 codifies conservation as the Convention's objective. It is thus understandable that CCAMLR Members would be interested in the long-term conservation values served by marine protected areas.

CCAMLR has not adopted an MPA definition, and it has not needed to do so in order to adopt MPAs (although some states like China

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and Russia contend that a definition would be useful if not necessary for adopting additional MPAs). The International Union for Conservation of Nature (IUCN) defines an MPA as “a clearly defined geographical space, recognized, dedicated and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values.” A key element, then, is long-term protection – an MPA includes legal steps that require management beyond a season or a few seasons; it protects ecosystems more effectively than a short-term fisheries closure, or one open to change every year.

An MPA needs to be based on the best available science and requires careful analysis and argumentation from scientists. In the context of CCAMLR, that science is provided by the Commission's Scientific Committee and its related subsidiary bodies. The Commission makes a political decision to establish an MPA only after the Scientific Committee has identified the best available science and made its recommendations.

A CCAMLR MPA is also a complex, long and detailed document. I participated in the negotiation of the High Seas Treaty (formally known as the Agreement under the United Nations Convention on the Law of the Sea on the Conservation and Sustainable Use of Marine Biological Diversity of Areas beyond National Jurisdiction) at the UN, which is concerned in part with the establishment of MPAs in areas beyond national jurisdiction worldwide. During those negotiations, I often felt that some other delegates thought that MPAs involved making a simple decision: agree on geographic coordinates like a rectangular box and prohibit fishing in that box for an

agreed period of time. That's not what I experienced at CCAMLR, where the Ross Sea Region MPA was established through a legally binding measure of some 21 pages. This extensively negotiated document (referred to as Conservation Measure 91-05) contains provisions regarding, *inter alia*: detailed objectives, a division into three zones (General Protection Zone; Special Research Zone; and Krill Research Zone); terms for limited amounts of research fishing; a management plan; reporting requirements; period of designation; compliance and monitoring; and priority elements for research and monitoring. All of this required painstaking negotiations and numerous iterations.

And even this Conservation Measure did not include some elements that many find important, such as an agreed research and monitoring plan, which was left for later discussions.

Gaining agreement among what were then 25 members of the Commission (24 states plus the European Union) required five years of active diplomacy, and many prior years of scientific groundwork. The proposals had to be presented formally to the Scientific Committee and Commission, which together meet for a fortnight once a year in Hobart, the location of the CCAMLR Secretariat. The final details were worked out on the margins and in late night sessions. In addition, many details were discussed intersessionally, away from Hobart between the formal meetings.

Ultimately, the successful adoption of the Ross Sea Region MPA depended on many countries coming together, the work of numerous scientists and the efforts by officials at all levels of government.

History of the Ross Sea Negotiations

My work on the MPA began with a meeting in La Jolla, California hosted by the U.S. Chief CCAMLR Scientist George Watters, who was the main American technical expert and creative mind behind the project for the entire period of the negotiations. We were joined by my New Zealand diplomatic counterpart Carolyn Schwalger and New Zealand CCAMLR lead scientist Ben Sharp, and my State Department colleague Gustavo Bisbal (who was later replaced on the U.S. team by Jonathan Kelsey) (Jillian Dempster later replaced Amb. Schwalger as the New Zealand Commissioner leading efforts to negotiate the MPA).



Figure 2. *Ross Sea Map.* Adapted from New Zealand Ministry of Foreign Affairs and Trade. Source: The Pew Charitable Trusts.

Within the U.S. Government during the Obama Administration, there was strong support for international marine conservation efforts. The leaders at the State Department and the National Oceanic and Atmospheric Administration were fully behind establishing MPAs, including within the CAMLR Convention Area. Secretary of State Hillary Clinton fully backed the initiative, but once John Kerry succeeded her in 2013, the level of support within the government reached its zenith. As a U.S. Senator, John Kerry had been a strong advocate for the law of the sea and ocean conservation, and he was ultimately willing to spend personal time and effort to promote the Ross Sea proposal.

As previously noted, CCAMLR had already made a commitment to establish a network of MPAs. In 2009, CCAMLR adopted its first, the South Orkney Islands Southern Shelf MPA, based on a proposal by the United Kingdom. This initial step set an important precedent for the organization, however, this MPA was established in an area where no fishing had been known to have taken place and none was contemplated. As a result, the proposal did not raise particularly difficult economic or political issues. Work by scientists proceeded with respect to other larger-scale proposals.

At this point, many CCAMLR delegations accelerated their work on a variety of MPA proposals, and the amount of time devoted to MPAs within Commission and Scientific Committee sessions rose markedly. In 2011, with pressure mounting in the Commission to set parameters for new MPA proposals under development, the Commission adopted Conservation Measure, 91-04, a proposal initiated by Australia as a framework for the content of MPAs hence-

forth. Conservation Measure 91-04 had useful provisions, such as requiring MPAs to be established on the basis of best available scientific evidence and with the inclusion of certain enumerated elements, such as the MPA's specific objectives, spatial boundaries and a period of designation (if any) consistent with the objectives of the MPA. However, many key issues were left for later negotiation (such as the actual duration or period of designation), and nowhere therein was the term MPA defined.

In 2012, Australia and the EU (with France playing a leading role within the EU) tabled a proposal for a large-scale MPA in East Antarctica and the United States and New Zealand submitted their respective Ross Sea-related proposals. These MPA proposals were designed to follow the Conservation Measure 91-04 framework, as were later MPA proposals. Those later ones (still under consideration) include the Weddell Sea MPA proposal submitted in 2016 by the European Union (with a leading role by Germany), the Domain 1 West Antarctic Peninsula MPA proposal submitted by Argentina and Chile to the Commission in 2018 and the Weddell Sea Phase II MPA proposal submitted by Norway in 2023.

The Ross Sea MPA proposals began as separate documents. Although the U.S. and New Zealand delegations had good working relationships, each initially had different concepts concerning aspects of the MPA. Once the two proposals were reviewed by other countries at the Commission, however, there was a fair amount of confusion about how to proceed, and the two Members were asked to submit a combined proposal. They did so the following year in 2013.

The combining of the two Ross Sea proposals took extensive effort because so many details had to be worked through. In the end, this combined effort led to a strong working relationship between the delegations, which came to be quite important once adjustments needed to be made and mutually agreed, often under considerable time pressure, in the subsequent iterations of the draft document. Given the need for both teams to reach agreement on even the smallest revisions, having only two co-proponents for this MPA during the years of negotiation turned out to be advantageous. If additional Members had to be consulted at each step, it would have been difficult to agree expeditiously with other countries (like China and Russia) later on.

What ensued was years of intersessional negotiations by diplomats and scientists, usually against a backdrop of considerable frustration caused by having to figure out a path to gain agreement not only from countries that had major concerns (but seemed willing to negotiate) but also from those who demonstrated strong opposition until quite late in the negotiations.

The Commission agreed to hold a special intersessional meeting in Bremerhaven, Germany to discuss the MPAs in July 2013. The result was very little if any progress, with marked differences among fishing and non-fishing states, and lack of accord on MPA boundaries and other issues. At this meeting, political opposition from Russia was particularly clear. That delegation went so far as to state in the plenary session that the CAMLR Convention did not allow for the establishment of MPAs at all. The entire negotiation appeared very much off track at that stage.

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In-person intersessional diplomacy was essential from 2011 on. As a result, the U.S. delegation had numerous meetings bilaterally or with a limited number of states, in locations all over the globe. Some of the discussions involved travel just for this MPA topic, and some took advantage of our presence at conferences, such as the ATCM or United Nations sessions. Locations where I participated included Beijing, Qingdao, Seoul, Tokyo, Christchurch, Hobart, Buenos Aires, Santiago, Bremerhaven, Brussels, Hamburg, Moscow, Oslo, Paris, St. Petersburg, Sofia, Boston, New York, Seattle, and Cape Town not to mention numerous meetings in Washington, DC. In addition, senior officials including John Kerry and U.S. embassies raised the Ross Sea issue many times in their meetings and through demarches.

This active period of negotiation involved making numerous changes to the Ross Sea proposal to attract support by accommodating the suggestions and concerns of Members. The joint proposal submitted in 2013 to the Commission, for example, decreased the footprint of the MPA by about 40 percent, and at that stage, 20 Members expressed support.

Over the final stages of the negotiations, it was necessary to focus on the concerns of a limited group of countries and make accommodations to bring each on board. Japan, despite reservations, indicated that it could support the MPA as long as it met certain conditions. An understanding was reached with Norway after consultations in Oslo. In 2014, even after the Ross Sea proposal had been submitted four times to the Commission, China and Russia at the end of the Commission session that year con-

tinued to voice strong objections and there was no clear path to consensus.

Our focus then shifted to China. U.S. and New Zealand officials went to Beijing in September 2015 for talks at the Foreign Ministry. These discussions did not appear to the U.S. and New Zealand participants to make much progress, and the teams departed the capital. But when the others and I reached Washington and turned on our mobile phones at Dulles Airport, we had a surprise. Before leaving Beijing, the U.S. delegation had sent a report back to the State Department about our talks. It turned out that at that time, on September 24-25, President Obama was hosting Chinese leader Xi Jinping at the White House for a State Visit. The State Department reported to the White House about our discussions in Beijing, and the President was informed. He then took the Ross Sea matter up with Xi in person at the White House. We got this welcome news at the airport but didn't learn if President Xi reacted in any particular way.

In the following weeks, we didn't hear anything from China about the Ross Sea issue. In October, we traveled to Hobart for the annual Commission meetings, but we still had not heard anything. There was no information from the Chinese until late in the first week of the two-week session, when they urgently requested a meeting downstairs in the Secretariat building. At that meeting, it suddenly became clear that their opposition to the proposal had been withdrawn, and they were ready to move forward if some concrete points were addressed to their satisfaction. This led to about forty-eight hours of work among the delegations, including overnight, to reach a deal that

included adding a Krill Research Zone to the proposal. In that brief period, after years of deliberations, China came on board.

I cannot say for certain that President Obama approaching President Xi made the difference in causing China to take a new, positive view regarding the MPA, but I suspect that is the case. This change during negotiations suggests strongly that leader-level intervention can turn the tide on difficult issues – including environmental conservation issues, which some argue never quite make it high enough on the list of diplomatic priorities. Secretary Kerry had also been active on the Ross Sea issue with his counterparts and was likely due to him and his advisors that our report from Beijing got to Obama so quickly.

At the conclusion of the CCAMLR meetings in 2015, it remained to persuade one delegation: Russia. We then turned our attention to that purpose. The U.S. outreach to Russia benefited from bilateral ties that the two countries had established in Antarctica in recent prior years. In 2012 Vasily Titushkin (who would later be CCAMLR's chairman in 2016, as noted at the start of this chapter) and I led teams in Washington and St. Petersburg that negotiated a bilateral Memorandum of Understanding on Cooperation in Antarctica. The Memorandum was ultimately signed by Secretary of State Hillary Clinton and Foreign Minister Sergei Lavrov at a summit meeting in Vladivostok. This remains the only U.S.-Russian agreement on Antarctic cooperation ever concluded. In it, the parties indicated that they would promote scientific cooperation in and related to Antarctica and would consult in relation to and in preparation for CCAMLR meetings and the ATCM.

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A key reason for signing the MOU was to indicate agreement to conduct joint inspections under the Antarctic Treaty, which the parties proceeded to implement in the following months.³ This was the first time that the two countries whose “basis of claim” was reflected in the Antarctic Treaty had conducted inspections together on the continent. During two separate inspection trips, the respective national teams stayed at each other’s research stations and developed relationships that would assist in reaching agreement on other matters later on.

In 2016, many efforts were made to reach out to the Russian Federation, which had assumed the two-year chairmanship of the Commission. This included Secretary Kerry talking with Foreign Minister Lavrov on several occasions as well as other official contacts. We came to Hobart not knowing, however, whether Russia could be persuaded. Once there, delegations worked hard and at great length to construct a solution that would bring Russia on board, and a compromise was finally found involving the extent of fishing in the Special Research Zone.

As Antarctic photographer and videographer John Weller documented at the time, when the chairman of the Commission announced to the assembled delegates that agreement had been reached, there was an outpouring of emotion among the normally

3 MEMORANDUM OF UNDERSTANDING between the Government of the Russian Federation and the Government of the United States of America on Cooperation in Antarctica, September 8, 2012. This MOU was entered into at a time when both countries found it useful to find ways to cooperate with each other on polar issues and inspections. Given current tensions, the MOU is not being implemented today.

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staid diplomats in the meeting room – a sense that something momentous had taken place. So much work by so many people had led to the creation of the world’s largest marine protected area, an intricately crafted international agreement that had no precedent in other international organizations. It was very much an accomplishment of the Antarctic Treaty System – a result that was achieved through consensus-based procedures and certainly consistent with the highest aspirations of Antarctic cooperation.



Figure 3. Signed map of the Marine Protected Area. Photo of map by John Weller.

Following the Commission's decision to adopt the MPA, the CCAMLR Secretariat produced a map of the MPA for the delegates to sign. Most did, giving a visual representation of a large array of nationalities, all proud to show their connection to this accomplishment. The signed map was framed and now hangs on the wall at CCAMLR Headquarters.

One can speculate about what, in the end, induced Russia to come on board. In part it was no doubt that it did not wish to be the only holdout at the Commission; no country likes to find itself isolated in an international negotiation. In addition, holding the chairmanship gave Russia a stake in the outcome of the meeting, and the opportunity to take some credit for its success. It also gave an incentive for increased interagency coordination under the Russian Foreign Ministry, which took an active interest in the proceedings. There were evident crosscurrents within the Russian government weighing fishing interests against other concerns, and for whatever reason the balancing of interests allowed for compromise, albeit after some hard negotiating.

Terms of the MPA

The terms of the Ross Sea Region MPA are set forth in Conservation Measure 91-05. As agreed in 2016, the MPA entered into force on December 1, 2017. It has a duration of 35 years, although one part, the Special Research Zone, has a duration of 30 years. Most countries, including the United States and New Zealand, wanted the MPA to last perpetually, but this was not politically feasible. The Commission can extend the MPA in 2052 if it chooses to do so by consensus.

The Ross Sea Region MPA aims to protect large-scale ecosystem processes, conserve biodiversity, protect predators and prey (including penguins, seals, whales, krill and Antarctic silverfish), pro-

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protect areas of ecological importance, protect areas that are important to the life cycle of Antarctic toothfish, and promote research and other scientific activities (such as monitoring) on the marine living resources in the region.

The MPA covers 2.09 million square kilometers (over 800,000 square miles), including the Ross Ice Shelf. It is thus over twice the size of the U.S. State of Texas.

The MPA boundaries were carefully designed based on the best available science and management best practices. The MPA is divided into three zones, the General Protection Zone (GPZ), the Special Research Zone (SRZ), and the Krill Research Zone (KRZ), each of which is subject to various rules. Fishing is prohibited in about three-quarters of the MPA; some fishing for scientific research purposes is allowed in the other one-quarter of the MPA. So far, CCAMLR is the only organization that has adopted no-take measure on the high seas.

A set of scientific and protection objectives. These include protecting large-scale ecosystem processes, conserving biodiversity, protecting predators and prey (including penguins, seals, whales, krill and Antarctic silverfish), protecting areas of ecological importance, protecting areas that are important to the life cycle of Antarctic toothfish, and promoting research and other scientific activities (such as monitoring) on the marine living resources in the region.

The MPA objectives fall into three main categories, and related research should seek to address these categories:

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(i) Representativeness - research and monitoring to assess whether the MPA is protecting an adequate proportion of all benthic and pelagic environments in the Ross Sea region.

(ii) Threat mitigation - research and monitoring to assess the extent to which threats to the achievement of Article II.3 and the specific objectives of the MPA are being effectively avoided or mitigated by the MPA, in locations where the risk of ecosystem impacts from harvesting activities may otherwise be high.

(iii) Scientific reference areas - research and monitoring where the MPA provides opportunities to examine Antarctic marine ecosystems where no, or limited, fishing has taken, or is taking, place, to understand, for example, the effects of fishing, environmental variability and climate change on Antarctic marine living resources.

The MPA is “owned” by CCAMLR as a whole – all its members – not just those who proposed it or identified themselves as proponents. The parties report on related scientific research activities every five years. The Conservation Measure is subject to review by the Commission every ten years.

As part of the compromise leading to adoption, there was a redistribution of fishing effort – certain areas outside the MPA that had been closed were opened to fishing.

It is worth noting that the MPA does not cover the entire Ross Sea, and indeed it does not cover the central portion of the Ross Sea where most of the commercial fishing for toothfish takes place. There would have been substantial conservation-based reasons to

consider including that area within the MPA, and several scientists hoped for that, however that would not have been acceptable to a number of fishing nations. Such a result almost certainly could not have been negotiated. Nevertheless, the MPA's ultimate scope, duration and inclusion of substantial no-take areas still make it a very significant act of marine conservation.

Lessons from the Ross Sea Region MPA negotiating experience

In the recent history of the Antarctic Treaty System, the agreement to establish in the Southern Ocean the world's largest MPA is a major achievement. Considering the amount of diplomatic time and resources that were employed, it ranks with other major decisions related to Antarctica that required significant negotiations, such as the adoption of the Environmental Protocol to the Antarctic Treaty and the inclusion of a mining ban, the adoption of Annex IV to the Protocol on environmental liability (although it has not yet entered into force) and the establishment of the Antarctic Treaty Secretariat in Buenos Aires.

This MPA is one step along the road to increased protection of the ocean, and it needs to be followed by further acts of marine conservation within the CAMLR Convention Area to meet the Commission's commitment to establish a network of MPAs. What CCAMLR did in the Ross Sea has also spurred international marine conservation efforts and influenced ocean policy as a whole. It is an important milestone in the effort to protect thirty percent of the ocean by 2030, an objective set in 2022 by numerous nations

as part of the Kunming-Montreal Global Biodiversity Framework. Moreover, it was the main example of a high seas MPA that served as practical guidance for nations negotiating the new UN High Seas Treaty, which now has the requisite number of ratifications to enter into force. The High Seas Treaty stands as a clear indication of how important the creation of high seas marine protected areas (in that context called area-based management tools) is to the international community.

Despite the very real limits that consensus-based decision-making places on the Antarctic Treaty System bodies, with sufficient time and effort reaching agreement on contentious issues remains possible. There are certainly differences in the geopolitics of 2016 and today. Thus, it could well be more difficult for some countries to work out a deal with Russia given the effects of the Ukraine conflict. Indeed, Ukraine is also a Member of CCAMLR. That said, relations among key players like Russia, China, and the United States continue to develop, and other countries may step to the fore to broker compromises.

At the conclusion of CCAMLR's intersessional meeting in Bremerhaven, despite years of effort by numerous delegations, a successful outcome for any large-scale MPA seemed very far away. The route forward was quite unclear. Nevertheless, there was a strong desire among proponents to continue their efforts, and steadfast political support in capitals. The lesson here is that, in diplomacy, even when success seems out of reach, it may still be possible to reach the objective eventually.

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Internal high level political support within the U.S. Government ensured that resources were available to the U.S. negotiators – not just travel funds, but the ability to call on assistance throughout the government from scientists, diplomatic missions, and others. That support allowed the delegation to continue outreach to recalcitrant governments at all levels. Given the involvement at critical junctures by ministerial level officials (even if briefly), high-level diplomacy helped secure the adoption of the MPA, and that staff-level work – through scientific and diplomatic exchanges – was also a key element in parallel with what ministers were attempting.

Strong stakeholder engagement also made a difference in the negotiations. Civil society groups in many countries made their voices heard and influenced governments and their priorities.

The Ross Sea negotiating experience thus suggests a number of lessons, including the following:

- The agreement at CCAMLR shows that large-scale MPAs can be negotiated based on the best available science. Thus, although organizations in other regions that manage fisheries may differ from CCAMLR, the experience in CCAMLR may be instructive for how they too can establish MPAs.
- Negotiations on complex multilateral environmental issues can benefit from close collaboration between policy officials and scientists. The integration of diplomats and scientists on the negotiating teams allowed for the development of creative solutions and the removal of obstacles to agreement.

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- Fishing and non-fishing countries can collaborate to establish MPAs. In addition, countries with and without territorial claims in a particular region can find ways to work together. The close cooperation of New Zealand and the United States showed a strong commitment to cooperate, and their combined efforts had much more effect than if they had labored separately.
- MPAs and their negotiation spur science – not only to identify relevant best available scientific evidence, but to create areas in which science needed by the world can be undertaken. A key reason to protect the Ross Sea was to cordon off areas where the marine ecosystem can be studied without fishing effects, and to allow for comparisons between unfished, lightly fished, and heavily fished areas. MPAs are also important for studying the effects of climate change.
- The Antarctic Treaty System deserves credit for being capable of giving rise to the world's largest MPA. This successful effort at CCAMLR can serve as one piece of an argument to push back against the narrative that the Treaty System is ineffective or not fit for purpose. Today, when progress on a wide variety of issues at CCAMLR and in the ATCM seems impossible to achieve, it is worth remembering the Ross Sea example. Recall that at the conclusion of the Bremerhaven intersessional meeting, delegates could not have been more dejected. Yet parties pushed through, found compromises, and achieved something remarkable in the history of marine conservation.

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Chapter 6

Antarctic Marine Protected Areas: A Model of International Collaboration, Diplomacy, and Shared Environmental Stewardship

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Abstract

This chapter examines the establishment, governance, and geopolitical significance of Marine Protected Areas (MPAs) in Antarctica under the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR). It highlights how MPAs—particularly the Ross Sea region MPA—serve not only as conservation tools but also as instruments of peace, scientific collaboration, and multilateral diplomacy within the Antarctic Treaty System. Through analyses of current and proposed MPAs, including those for the East Antarctic, the Weddell Sea, and the Western Antarctic Peninsula (Domain 1), the chapter explores both the scientific foundations and political complexities of creating protected areas in international waters. The Ross Sea region MPA stands out as a landmark achievement, demonstrating that consensus-based diplomacy, grounded in robust science, can overcome global tensions to achieve shared environmental goals. However, subsequent MPA proposals have stalled amid rising geopolitical strains, shifting economic interests, and divergent national priorities. Despite these challenges, Antarctic

MPAs remain vital for protecting biodiversity, mitigating climate change impacts, and advancing global marine conservation targets. More broadly, they exemplify how cooperative governance and science diplomacy can transform environmental protection into a pathway for sustaining peace and reaffirming collective stewardship of the global commons.

1. Introduction

Marine Protected Areas (MPAs), defined as areas of the ocean where human activities are restricted to meet specific conservation objectives, can be a powerful example of what the international community can achieve through cooperative governance. In Antarctica, under the framework of the Antarctic Treaty System, and specifically the Convention on the Conservation of Antarctic Marine Living Resources (CAMLAR Convention), MPAs extend beyond environmental conservation—they can be tools for strengthening diplomacy, fostering scientific collaboration, and demonstrating that global challenges can be addressed through shared commitment and multilateral governance. They can symbolize not only protection for vulnerable ecosystems but also a collective rejection of national appropriation and unilateral action in favor of common stewardship.

At the heart of the Antarctic Treaty System lies a vision of peace, science and environmental protection (Berkman et al., 2011). The foundational agreement of the Antarctic Treaty, signed in 1959 – at the height of the Cold War – dedicated the continent to peace and international scientific cooperation, free of military conflict and

sovereignty claims (Antarctic Treaty 1959). Later, the Environmental Protocol to the Antarctic Treaty, signed in 1991, ensured the comprehensive protection of the Antarctic environment and designated Antarctica as a natural reserve, devoted to peace and science (Environmental Protocol 1991). The CAMLR Convention, signed in 1980, aimed to ensure that the marine life of the Southern Ocean would not be overexploited and that fisheries would not damage the wider ecosystem (CCAMLR 1980). Collectively, the agreements of the Antarctic Treaty System, including the Treaty and its Environmental Protocol, as well as the CAMLR Convention, have provided a stable foundation for a unique experiment in global governance (Berkman et al., 2011). The designation of Antarctic MPAs under the CAMLR Convention is among the most important developments in this shared governance, representing an opportunity to demonstrate the shared values of the Antarctic Treaty System of peace, science and environmental protection.

The governance of marine life in the Southern Ocean falls under the responsibility of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), a multi-national body composed of 27 Members (26 States and the European Union) that operates by consensus. This means that no single State can impose its will; instead, all decisions must be agreed upon by every Member. This consensus-based model ensures that all agreed measures, including MPAs, are not instruments of national sovereignty, but rather expressions of collective will, designed and managed through multilateral dialogue. Once designated, an Antarctic MPA is not owned, controlled, or administered by any one State; it

becomes the shared responsibility of CCAMLR, which oversees its implementation, enforcement, and review. Thus, Southern Ocean MPAs add a new layer of governance that reinforces the Antarctic Treaty's principles while expanding their geographic and ecological reach.

2. The Process Towards Establishing Antarctic MPAs

CCAMLR began discussions on creating a network of MPAs in the early 2000s (CCAMLR 2002). This arose out of the 2002 World Summit on Sustainable Development, where nations committed to establishing a global network of MPAs by 2012 (United Nations 2002). Recognizing the value of MPAs in meeting the objectives of the CAMLR Convention and supporting ecosystem health, CCAMLR committed to creating an MPA network in the Southern Ocean (CCAMLR 2002). In 2005 CCAMLR held its first MPA workshop (SC-CAMLR 2005) and another in 2007, the latter focused on Southern Ocean bioregionalization (SC-CAMLR 2007). This helped inform the development of the network of Antarctic MPAs.

In 2009, CCAMLR established the world's first high-seas MPA: the South Orkney Islands Southern Shelf MPA, covering 94,000 km² of the South Atlantic (CCAMLR 2009). This MPA was adopted swiftly, over the course of one meeting. It is fully off-limits to fishing (no-take), but at the time of negotiations, it did not affect existing or future fishing interests (Brooks 2013). Nonetheless, it set a precedent as both CCAMLR's first and the first high seas MPA, making an initial step towards a network of Southern Ocean MPAs. Then, in 2011,

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CCAMLR adopted Conservation Measure 91-04, which set out the *General Framework for the Establishment of CCAMLR MPAs* (CCAMLR 2011a). This framework outlines the necessary conditions for creating MPAs within the Convention Area, and while it was agreed after the adoption of the South Orkney Islands MPA, it served to guide the development of future MPAs. That year, CCAMLR also divided the area into nine 'planning domains', (Figure 1) providing a mechanism to plan and report on the development of MPAs (CCAMLR 2011b).

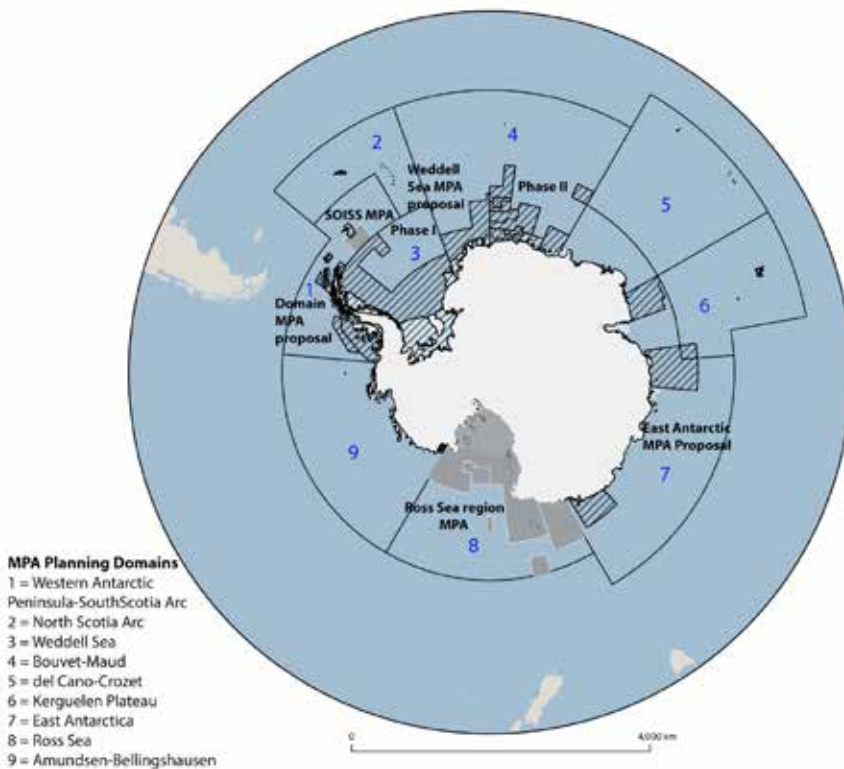


Figure 1. System of proposed and adopted MPAs under CCAMLR. Current MPAs are

shown in gray, and proposed MPAs are represented by dashed lines. CCAMLR planning domains are outlined in black and labeled in blue.

An important milestone came in 2016, when CCAMLR agreed by consensus to designate the world's largest MPA in the Ross Sea (described in more detail below) (CCAMLR 2016a). The Ross Sea region MPA set a historic precedent for high seas protection—it was the first-time international cooperation had resulted in the creation of a large-scale MPA. At that time, CCAMLR's 25 Member governments agreed to protect more than 2 million square kilometers, including waters beneath the Ross Ice Shelf. The MPA covers a large proportion of the Ross Sea shelf and slope and is almost 80% off limits to fishing, protecting areas of exceptional biodiversity (Figure 1) (Brooks et al., 2021).

Since the adoption of the Ross Sea region MPA, CCAMLR's MPA efforts have continued, but no further MPAs have been adopted (Brooks et al., 2025; CCAMLR 2024). Despite lack of adoption, many CCAMLR Members have continued to invest significant resources in advancing the network of MPAs that the Commission committed to more than 20 years ago.

2.1 The Ross Sea region Marine Protected Area

The Ross Sea region MPA is one of the most ambitious and remarkable examples of international cooperation for conservation. Located in one of the most pristine marine ecosystems on Earth, the MPA was adopted in 2016 by CCAMLR, entering into force in 2017. The creation of this MPA was the result of years of diplomatic negotiation, scientific collaboration, persistent advocacy from gov-

ernments and NGOs alike, and engagement with the global public (Brooks et al., 2020).

Background and Challenges

The idea of protecting the Ross Sea—often called the “Last Ocean” due to its relatively pristine ecosystem—emerged in the early 2000s (Young 2012; Weller 2013). Scientists and conservationists highlighted its importance as a global reference point for ecological baselines, hosting a disproportionate amount of marine life, including one-third of the world’s Adélie penguins and one-quarter of world’s Emperor penguins (Ainley, Ballard, and Weller 2010). The United States and New Zealand assumed responsibility for preparing the proposal, which was discussed and negotiated over many years.

Its establishment was not straightforward. The process took five years of intense negotiations, during which many obstacles had to be overcome (Brooks et al., 2020). These included differing national interests—some States prioritize conservation in the Antarctic, while others prioritize access to resources, as well as global geopolitical tensions. The consensus-based decision-making process of CCAMLR meant that all Members had to agree, which included major global powers like the United States, Russia, China, and the European Union. This required carefully considering ecological and conservation goals with political and economic motivations.

Some Member States, particularly those with commercial fishing interests in the Southern Ocean, were concerned about the potential loss of economic opportunities and the precedent that a large-

scale MPA like the one proposed for the Ross Sea would set for other parts of the Southern Ocean or even the high seas. Through negotiations, the Ross Sea region MPA proposal was continually revised and re-negotiated. Member States like Russia and China expressed strong reservations, mainly concerning fishing rights (now and in the future) and broader geopolitical issues, questioning at times whether the MPAs boundaries were political rather than ecological. Despite these challenges, the eventual success in 2016 marked a major milestone in international environmental diplomacy. The breakthrough came with strong scientific backing – scientists within and outside of CCAMLR had built the science case for 14 years – and sustained diplomatic efforts—particularly by the United States and New Zealand, the main co-proponents of the proposal. They worked extensively to engage with CCAMLR Members, and to revise the Ross Sea MPA proposal to meet the desires of Member States and build consensus. Achieving consensus ultimately required diplomacy at the highest level, between the presidents of the leading and opposing States (Brooks et al., 2020; Tang 2017). In doing so, the Ross Sea region MPA was not only an environmental win, but a diplomatic one, showing that despite international tensions, Antarctica can still be a region dedicated to peace and science.

The MPA covers an area of more than 2 million square kilometers, making it the largest in the world (MCI 2025). It includes three zones: some where all fishing is prohibited (no-take zones), and others where limited commercial and scientific research fishing is allowed (CCAMLR 2016a). The zones were an essential aspect of achieving consensus. A Special Research Zone was added to en-

sure the toothfish tag-recapture program would not be compromised, noting that this program underpinned the Ross Sea toothfish stock assessment which informed catch limits. The zone was then expanded to meet Russian interests. The Krill Research Zone (the western region of the MPA) was added to meet the interests of China (Brooks et al., 2020). Thus, the zoning approach sought to maintain the ecological integrity of the region while also striving to find consensus among Member States, the latter — a cornerstone of the Antarctic Treaty System.

International Cooperation and Peace

The establishment and continued existence of the Ross Sea region MPA is a symbol of peaceful international cooperation, especially significant given the geopolitical tensions that exist among some of the States involved.

Through CCAMLR, States with differing geopolitical interests agreed to set aside a part of the world's ocean for conservation, science, and peace. Consensus governance, while slow, ensured that all Member States had a voice, and the process helped build diplomatic trust and cooperation. Science served as a common language, with extensive research guiding the boundaries and rules of the MPA. This allowed evidence-based decisions that were acceptable to all parties, despite their political differences. Currently, multiple Member States engage in research and monitoring of the Ross Sea region MPA (CCAMLR 2025). A research and monitoring plan was endorsed by the CCAMLR Scientific Committee in 2017 (Dunn, Vacchi, and Watters 2017); however, it has not been adopted

by the Commission due to political barriers. Despite this, and some ongoing tensions around what qualifies as adequate research and monitoring, there is an extensive community of scientists, diplomats, and other community partners engaged in research and monitoring of the Ross Sea region MPA (Brooks et al., 2024).

The MPA reinforces the core principles of the Antarctic Treaty System, which declares Antarctica as a natural reserve devoted to peace and science. The Ross Sea region MPA strengthens the idea of Antarctica as a global commons, managed cooperatively for the benefit of all humankind. In doing so, it turns potential competition over marine resources into a platform for environmental diplomacy, fostering collaboration, mutual understanding, and peaceful coexistence.

The very existence of the Ross Sea region MPA demonstrates how shared environmental values can bridge geopolitical divides. Key elements of these negotiations are as follows:

- **Consensus Governance:** The MPA was established through CCAMLR, where 24 Member States and the European Union, including States with differing interests (and geopolitical tensions) like the U.S., Russia, and China, had to agree. This consensus-based decision-making fosters dialogue and compromise.
- **Science as Common Ground:** States with vastly different political systems and priorities united around peer-reviewed scientific evidence, reinforcing trust in science as a neutral platform for collaboration.

- **Peaceful Use of Shared Space:** Under the Antarctic Treaty System, military activity is banned, and Antarctica is dedicated to peace and science. The MPA strengthens this framework by adding ecological protection as a shared mission, turning potential competition over resources into joint stewardship.
- **Monitoring and Compliance:** Member States jointly manage and monitor the area. This cooperation builds collaboration and accountability, reinforcing peaceful international relations.

Legacy

The Ross Sea region MPA set a precedent for large-scale marine protection in international waters. It also strengthened global efforts to create a network of MPAs around Antarctica and can serve as a model for other high seas areas. Furthermore, it showed how science-based decision-making can drive policy, even in complex geopolitical environments.

Protecting the Ross Sea was not only about conserving biodiversity; but also stands as a clear example of how science and environmental diplomacy can work in tandem. It demonstrates the vital role that a multilateral body like CCAMLR can play in promoting peace and cooperation in the Antarctic.

3. Current Antarctic Marine Protected Area proposals

Antarctica is facing increasing threats that endanger its vulnerable ecosystems, the most pressing being climate change. This is driving

rapid warming of the western Antarctic Peninsula and reductions in sea ice, with potential impacts on krill populations, which are the foundation of the Antarctic food web (Atkinson et al., 2019). The ecological consequences of climate change remain difficult to predict, yet there is evidence of impacts on local wildlife in some areas. Adélie Penguin colonies have dramatically declined in some parts of the Antarctic Peninsula (Cimino et al., 2025) and Emperor penguin colonies are predicted to decline throughout Antarctica, most likely due to the impacts of climate change (Jenouvrier et al., 2025).

Concentrated fishing—particularly of krill—adds further pressure by reducing a critical food source for penguins, seals, and whales at a time when climate-driven changes are already placing these species under stress (Watters, Hinke, and Reiss 2020). There are a host of other threats to wildlife and ecosystems in the region. These include pollution, including marine plastics and chemical contaminants carried from distant regions (Hunter et al., 2024); disease, especially highly pathogenic avian influenza (Banyard et al., 2024); and other human impacts like tourism and scientific activities (Lee et al., 2022). Together, these pressures highlight the urgent need for stronger international action to mitigate climate change, manage fisheries sustainably, and safeguard Antarctic ecosystems through the establishment of MPAs, strong fisheries management, and the implementation of robust monitoring systems.

In the face of these threats, the establishment of MPAs in Antarctica is more critical than ever. At present, several proposals are on the table for establishing additional MPAs in the region, all of which would contribute to a representative system.

However, progress has been limited in recent years largely due to a variety of reasons. These include growing geopolitical tensions, such as the war in Ukraine (with one CCAMLR Member, Russia, waging war against another) and increased global geopolitical tensions between Members (Scott, Stephens, and McGee 2024), as well as increasing economic interests by some parties (e.g., China). Further, during the COVID-19 pandemic, CCAMLR had to meet online for two years, and Zoom-based diplomacy was not possible (Liggett et al., 2024).

Each of the proposals currently under discussion within CCAMLR has its own characteristics, history, and methodology in terms of how it was developed. Importantly, they include data and information contributed by many CCAMLR Member States. In many cases, proposals are initially put forward by one or two proponent States, but over time, additional States join in support, transforming them into truly international proposals.

Below is a summary of the current proposals under discussion within CCAMLR, including their status and the main challenges they face.

3.1 The East Antarctic Marine Protected Area

Background and Challenges

The East Antarctic harbors a vast expanse of ocean. Extending from 30°E to 150°E, it hosts areas containing an array of unique benthic and pelagic features, including continental shelf ecosystems, a continental ridge, seamounts, and canyons. It also supports

large populations of seabirds and marine mammals and is a presumed nursery ground for fish and krill.

There has been modest historical fishing in the East Antarctic, mostly targeting toothfish. Fisheries for toothfish continue, but are relatively constrained to specific research blocks, thus being at relatively low levels and spatial scales. The krill fishery in the East Antarctic has been sparse, with krill populations not as accessible as they are in the South Atlantic.

The process of establishing an MPA in the East Antarctic has been underway for over a decade. The proposal for the East Antarctic MPA was first introduced to CCAMLR by Australia, France, and the European Union in 2012 and originally envisioned a representative system of seven MPAs distributed across the region (CCAMLR 2012). Over time, to build consensus among CCAMLR Members, the proposal was continually revised and scaled down. The MPA was designed as a multi-use, rather than no-take area, with the intention of allowing for some fishing within the MPA so long as it did not interfere with the objectives of the MPA. Over time, specific zoning was introduced to clarify the MPA (Brooks et al., 2025). The current version of the proposal includes three core areas, each with different no-take and multi-use aspects, aiming to protect a subset of representative examples of the biodiversity and ecosystem processes in the region (CCAMLR 2024).

The current areas to be protected are: (1) MacRobertson, (2) Drygalski, and (3) the D'Urville Sea-Mertz region (Figure 1). All these regions include important foraging areas for Adélie and Em-

peror penguins, representative benthic habitats, and potential reference areas for monitoring environmental change. D’Urville also includes important spawning and nursery areas for Antarctic silverfish — a key species in the food web and in vulnerable marine ecosystems (AOA 2012). The design of the proposal was deemed by CCAMLR’s Scientific Committee to be based on the best available science, including the principles of systematic conservation planning (SC-CAMLR 2011). It aimed to protect ecosystem structure and function, and to support ecological resilience of the Southern Ocean.

Current status

Despite the extensive revisions to this MPA, it has not yet been adopted due to the consensus-based nature of CCAMLR’s decision-making process (Goldsworthy 2022). Most Members support the MPA, acknowledging that it has been revised to meet CCAMLR Members’ concerns. However, a few Members, especially Russia and China, have raised a variety of concerns about the East Antarctic, as well as some concerns about CCAMLR MPAs in general. For the East Antarctica MPA, these include adequacy of scientific evidence and lack of conservation need and threats to the region (e.g., CCAMLR 2022). These concerns, though often couched in technical terms, reflect underlying geopolitical dynamics that extend beyond environmental or resource management considerations.

This situation illustrates both the challenges and the opportunities inherent in consensus-based international environmental governance. On the one hand, it reveals how difficult it can be to

reach multilateral agreement in a system where every Member has the right to object to a proposal. On the other hand, it showcases a unique mechanism of peaceful negotiation and consensus-building among States with vastly different geopolitical interests (Goldsworthy 2022). Over the years, additional CCAMLR Members have joined in the effort for the East Antarctic MPA, and the proposal has since evolved into a truly multinational initiative. The current co-proponents are Australia, the European Union and its Member States, India, New Zealand, Norway, Republic of Korea, Ukraine, the United Kingdom, the United States of America, and Uruguay (CCAMLR 2024). Only a few Members have not joined as co-proponents, illustrating the continued dialogue and consensus building on the East Antarctic MPA.

The continued efforts to establish the East Antarctic MPA exemplify the complex but hopeful path of multilateral cooperation in environmental governance. While the road has been long and difficult, the pursuit of consensus — however slow — is itself a testament to the peaceful values that underpin Antarctic diplomacy. If adopted, the East Antarctic MPA would not only help protect biodiversity but also reinforce the Antarctic Treaty's legacy of peaceful, cooperative, and science-based stewardship of this important area of the Southern Ocean.

3.2 Weddell Sea

Background and Challenges

The Weddell Sea is a vast, deep embayment bordered by the eastern Antarctic Peninsula and extending along Queen Maud Land. It is

one of the most pristine marine ecosystems on Earth (Halpern et al., 2025). Despite its extreme conditions, the region is highly productive, dominated by dense sea ice that provides ideal habitat for Antarctic krill—a cornerstone species in the Southern Ocean food web that sustains mammals, fish, and seabirds. From the shallow continental shelf to the deep ocean, the Weddell Sea harbors exceptional biodiversity—new benthic species are found with each new scientific expedition (Teschke et al., 2020; Teschke et al., 2021). An estimated 60 million icefish nests have also recently been discovered there (Purser et al., 2022). The Weddell Sea has remained largely untouched by extractive industries, due in large part to its near-impenetrable sea ice—something famously experienced by polar explorer Ernest Shackleton. These historically harsh ice conditions limited fishing in the Weddell Sea. However, research fishing for Antarctic toothfish began in the eastern Weddell Sea in 2004 and continues at modest levels today.

The Weddell Sea is recognized for its pristine condition, unique oceanographic features, and high ecological value. The proposed MPA is designed to protect both benthic and pelagic ecosystems—including cold-water coral communities and sponge fields—as well as critical areas for krill, fish, seals, whales, and seabirds. The abundance and diversity of Vulnerable Marine Ecosystems is a key rationale for its designation. It also aims to establish scientific reference zones to monitor the impacts of climate change and other environmental changes over time, while preserving essential ecological processes such as water mass formation and sea-ice dynamics, which are of global climatic importance. In addition, the WSMMPA is designed to encompass climate refugia, supporting the long-term

conservation of key species such as Antarctic silverfish, Weddell seals, Emperor and Adélie penguins, and various whale species, among others (Teschke et al., 2020; Teschke et al., 2021).

The Weddell Sea MPA proposal was initially submitted by the European Union (led by Germany) to CCAMLR in 2016. Germany organized several international scientific workshops to support the development of this proposal. In 2018, the proposal was divided into two phases to address concerns raised by some of CCAMLR Members, most notably Norway (Apelgren and Brooks 2021). Thus, the MPA became Weddell Sea MPA Phase I, covering the western sector, and Weddell Sea MPA Phase II, focused on the eastern sector off Queen Maud Land (Figure 1).

Weddell Sea MPA – Phase I

The Weddell Sea MPA Phase I comprises the initial core proposal submitted in 2016 to protect a large area in the western Weddell Sea (CCAMLR 2016b). This phase focuses on conserving the most data-rich and scientifically studied part of the Weddell Sea, aiming to safeguard its unique benthic and pelagic ecosystems, diverse marine life, and essential ecological processes. The design includes zones with varying protection levels. The majority of the MPA is encompassed in a General Protection Zone, which is off limits to commercial fishing. There are also small Special Protection Zones, which are even stricter no-take zones, where no research fishing would be allowed. Finally, there are Fisheries Research Zones which allow for research fishing (Teschke et al., 2021). Thus, the proposal seeks to balance conservation with sustainable use.

Despite extensive scientific groundwork and repeated submissions to CCAMLR since 2016, Phase I has not yet achieved consensus. Over the years, this proposal has gained continued support from CCAMLR Members. Indeed, as of the time of writing, the co-proponents are the European Union and its Member States, Norway, Uruguay, Australia, the United Kingdom, New Zealand, the United States of America, Republic of Korea, India, Ukraine, and Chile (CCAMLR 2024). While this increase in formal Weddell Sea Phase 1 MPA proponents illustrates the movement towards consensus, a couple CCAMLR Members, notably Russia and China, have raised continued concerns. These concerns include a perceived lack of threat, data questions, and issues around research and monitoring (e.g., CCAMLR 2022). Nonetheless, the effort continues as part of a broader two-phase approach, with ongoing scientific and diplomatic engagement aiming to secure eventual adoption as CCAMLR slowly builds towards consensus.

Weddell Sea MPA – Phase II

While Weddell Sea MPA Phase I remains under negotiation, efforts for a Weddell Sea MPA Phase II have also progressed. This MPA is championed by Norway, with the United Kingdom as a co-proponent.

The conservation objectives of the proposed Weddell Sea MPA Phase 2 are broad and interconnected. They seek to protect essential habitats of key pelagic prey species, including Antarctic krill, ice/crystal krill, and Antarctic silverfish, as well as the essential habitats of Antarctic toothfish and other key demersal fish species. In addition to protecting benthic and pelagic marine environ-

ments, the proposal emphasizes safeguarding large-scale ecosystem processes that are critical to maintaining the productivity and functional integrity of the ecosystem. Also, an important objective is to provide scientific reference areas, as well as potential climate refugia. The MPA will include reference areas to promote scientific research that is important for understanding human impact and environmental change (CCAMLR 2023; Norwegian Polar Institute 2023).

The proposal is grounded in extensive scientific research and spatial planning. Norway has led workshops and coordinated data collection with CCAMLR Members and Observers, most recently in Oslo in April 2024, focusing on developing a robust research and monitoring plan.

Norway formally submitted Phase II to CCAMLR in 2023 and again in October 2024, partnering with the United Kingdom (CCAMLR 2023, 2024). Revisions have been made between the two versions to account for scientific feedback received from CCAMLR's Scientific Committee and its Working Groups. The latest version includes seasonal krill fishing closures in key seabird and penguin foraging areas. Although the proposal has received support from many Members, consensus building takes time, and as the more recent MPA proposal it will likely require more discussion among Members is likely required.

Norway and its partners continue to refine Phase II based on recommendations from the Scientific Committee. The proposal is being advanced in parallel with Phase I through annual CCAMLR

meetings, working groups, and intersessional workshops. It remains under active consideration, awaiting consensus for adoption.

The Weddell Sea MPAs are the most ambitious, in terms of scale, marine conservation proposals developed under CCAMLR. If adopted, the MPAs would play a crucial role in preserving the Weddell Sea's intact benthic habitats, krill populations, and top predators, in addition to supporting climate resilience, and while reinforcing international cooperation through the Antarctic Treaty System.

3.3 Western Antarctic Peninsula (Domain 1) MPA

Background and Challenges

The Antarctic Peninsula is the northernmost part of the Antarctic continent, extending north towards the tip of South America roughly 1,000 km away. The Peninsula is approximately 1,500 km long, with the Weddell Sea to the east and the Bellingshausen Sea to the west. Deep channels between the Peninsula's glacially sculpted embayments help transport nutrients toward the shelves (Ducklow et al., 2007), which helps to drive the region's remarkable productivity. This in turn supports the largest Antarctic krill aggregations in the Southern Ocean, estimated at 65-70% of the circumpolar population (Green et al., 2023; Atkinson et al., 2009). The Peninsula and islands of the Scotia Arc and Scotia Sea support great biodiversity, including type B2 killer whales (the small, fish-eating form) that are particularly abundant in that area (Fearnbach et al., 2022). Antarctic krill in the area sustain large breeding and foraging populations of penguins, seals and whales. This region is also the most threatened by climate change and human activities (Hogg et al., 2020). The Ant-

arctic Peninsula is one of the fastest changing places in the world due to climate change. The Peninsula is also subject to the largest amount of commercial fishing, especially for Antarctic krill, and to the majority of tourism as well as extensive science activities (Hogg et al., 2020). All these activities pose potential threats to the region. An MPA here would be critically important to safeguard key habitats, protect vulnerable species, and help mitigate the combined threats of climate change, concentrated fishing, and other activities that might result in ecosystem disruption within the region.

In 2011, Argentina and Chile agreed to take the lead in preparing a proposal for an MPA in the western Antarctic Peninsula—later known as the Domain 1 MPA (D1MPA). In 2012 an international workshop brought together seven CCAMLR Members, NGOs, and the fishing industry, laying the foundation for the proposal's conservation objectives, data needs, and spatial planning tools. That workshop aimed to identify conservation priorities. Then, in 2014, CCAMLR formed a Domain 1 Planning e-group, providing an inclusive online platform for managing data and facilitating coordination. Over the next two years, this effort grew to include national and international workshops and targeted scientific work, contributing ecological data and refining the MPA's design. This phase, supported by multiple community partners—including non-governmental organizations (NGOs), scientists, and industry—was marked by transparency, iterative science, and co-production principles (Sylvester and Brooks 2020).

In 2017, Argentina and Chile presented a preliminary version of the D1MPA proposal to the Scientific Committee, along with nine

supporting documents (SC-CAMLR 2017). The proposal was designed to encourage open discussion at CCAMLR. Another landmark occurred that year when a D1MPA Expert Group was established, which was endorsed by both the Scientific Committee and Commission, and tasked with fostering scientific co-production (CCAMLR 2017). The Expert Group—co-led by the Proponents—included Members, NGOs, and industry, and became the primary vehicle for proposal refinement and inclusive engagement. The creation of the expert group was an important milestone, as it had no precedent in the processes of the other proposals. This group allowed not only CCAMLR Members but also NGOs and industry to participate, fostering greater transparency and strengthening scientific diplomacy as one of the key pillars for achieving agreements among community partners (Sylvester and Brooks 2020).

In 2018, Argentina and Chile formally submitted the D1MPA proposal to CCAMLR. Grounded in seven years of collaborative work, the proposal included ten conservation objectives targeting the protection of key benthic and pelagic habitats, krill-dependent species, and scientific reference areas (CCAMLR 2018). The original spatial design of the D1MPA included three distinct zones, including no-take and multi-use areas.

Harmonizing marine protection with fisheries management

The Antarctic Peninsula supports a significant portion of the krill fishery, which plays a crucial role both ecologically and economically. The D1MPA proposal aims to balance biodiversity conservation and sustainable use by designating zones with different levels

of protection. It seeks to ensure the long-term sustainability of krill populations and the many species that rely on them, while incorporating adaptive management to respond effectively to ecological changes and evolving fishing pressures. In 2019, a krill workshop was conducted to advance the integration of ecosystem-based fisheries management and the D1MPA design, and its results fed into renewed negotiations later that year (CCAMLR 2019).

After years of stalled discussions on the D1MPA, CCAMLR agreed to convene a symposium aimed at advancing krill fishery management alongside the establishment of the MPA which would be held in 2024. In preparation for the symposium, and in response to previous concerns raised in 2023, the design was revised. The updated proposal reduced the system to two types of zones: General Protection Zones, where commercial fishing is prohibited, and Seasonal Protection Zones, where the fishery is closed during part of the austral summer (Figure 1). The proposal complied with Conservation Measure 91-04, including a 70-year designation period, mandatory five-year reporting, and a ten-year review cycle.

Finally, in July 2024, representatives from 11 CCAMLR Member States, along with scientists, NGOs, and fishing-industry representatives, met in Incheon, South Korea, for a dedicated Harmonization Symposium. The goal was to develop a unified approach to krill fishery management and the D1MPA, with a focus on aligning ecological protection with sustainable fishing. The symposium created a platform for dialogue and coordination among community partners focused on aligning krill fishery management with the Domain 1 MPA proposal. Participants emphasized the importance

of enhancing scientific collaboration to address data gaps and improve understanding of the ecosystem. They also underscored the need to promote transparency in decision-making processes and to develop integrated management approaches that consider ecological, economic, and social dimensions. Over the week-long meeting, participants reviewed scientific evidence, background materials, and policy papers submitted by CCAMLR's Member States. During the meeting, participants explored options for harmonizing krill catch limits with spatial protections, including time-area closures in key predator foraging zones. Industry representatives played an important role, engaging actively in designing harmonized solutions and helping identify viable compromises. By the end of the symposium, participants reached a set of consensus recommendations to improve ecosystem-based krill management—through smaller spatial catch limits, enhanced monitoring, and strategic closures—while also advancing the D1MPA proposal (SC-CAMLR 2024).

Momentum from Incheon was viewed as highly promising. All major community partners and Members, including China, participated and appeared ready to move forward on both fronts. However, at the CCAMLR meeting in October 2024, a “package deal” linking D1MPA and krill fisheries management reforms did not materialize into a final agreement. Some Members called for even more precautionary limits, while others argued that krill management and MPA designation should proceed separately. In addition, a long-standing interim measure accounting for krill catch limits was also not extended, which represented a step backward for CCAMLR (CCAMLR 2024).

In moving forward, it is essential that CCAMLR remains committed to the harmonization approach agreed in 2023 and completes the work started by the harmonization symposium in 2024. The management of fishery should be based on an ecosystem-based fishery approach that ensures the fishery is spatially distributed. Regarding the D1MPA, areas important to the ecosystem and to krill predators should be protected, including large no-take zones. In parallel, robust monitoring programs should be developed. This monitoring should target key species, including whales, and be capable of detecting ecosystem changes caused by fishing.

The marine area of the Antarctic Peninsula is a globally important ecosystem, supporting high biodiversity, key krill populations, and numerous top predators. The D1MPA represents a unique opportunity to safeguard the ecological values of this region.

4. Conclusions

The Southern Ocean is critical to the functioning of the Earth system. Its currents drive global ocean circulation, regulating climate and supporting life far beyond the Antarctic. It is also a global commons harboring remarkable biodiversity that includes species uniquely adapted to extreme conditions. Yet this biodiversity is increasingly threatened by climate change, fishing pressure, and broader geopolitical tensions. Protecting the Southern Ocean is therefore not only a matter of regional concern, but also an essential step in sustaining the health of our planet.

MPAs represent a powerful opportunity to safeguard these ecosystems while reinforcing the principles of cooperative governance. Importantly, Antarctic MPAs can also contribute to global conservation targets, helping achieve the global goal of protecting 30% of the ocean by 2030 by safeguarding extensive, ecologically significant areas beyond national jurisdiction through science-based, consensus-driven management.

The creation of MPAs under CCAMLR adds a vital layer to the Antarctic governance framework. While the Antarctic Treaty provides the overarching legal and political framework for preserving peace and promoting science, CCAMLR MPAs give practical and operational meaning to environmental protection objectives. These MPAs do not belong to any single Member State; they are managed collectively under the Antarctic Treaty's principle of no territorial sovereignty. This cooperative model helps reduce the risk of conflict, fosters trust, and demonstrates how shared global resources can be governed for the common good.

Accordingly, MPAs in Antarctica can represent a powerful example of what the international community can't achieve through cooperative governance. They can go far beyond environmental conservation—serving as tools for strengthening peace, fostering scientific collaboration, and illustrating how global challenges can be addressed through shared commitment and multilateral governance. In this light, Antarctic MPAs are not only about protecting biodiversity and ecosystems, but they also can offer a clear pathway to combine science and environmental diplomacy in ways that strengthen peace and enhance mutual understanding in this

region. Moreover, MPAs have the potential to become platforms for international cooperation through joint monitoring programs that deliver ecological benefits while strengthening networks of scientists, institutions, and policymakers dedicated to understanding and protecting the Southern Ocean. Ultimately, they may come to symbolize collective stewardship over national appropriation or unilateral action.

Despite their potential benefits, establishing Antarctic MPAs faces significant obstacles. Geopolitical tensions can influence negotiations, sometimes overshadowing scientific and conservation priorities. Additionally, some States remain cautious about creating precedents that could limit current or future access to marine resources. Past CCAMLR experiences show that political will, not scientific adequacy, often dictates conservation outcomes. Economic interests (e.g., krill and/or toothfish fisheries) and broader geopolitical dynamics have repeatedly undermined science-based decisions. In the case of the D1MPA, for example, opposition was likely shaped by concerns over limitations on future access and growing fishing interests. When it comes to the East Antarctic, although the area is not currently a major fishing ground and is unlikely to interfere with future fishing, concerns persist about maintaining access to resources such as krill and toothfish, including as climate change alters species distribution.

The establishment of the Ross Sea region MPA in 2016 was a landmark achievement, demonstrating that international cooperation and scientific diplomacy can deliver tangible protection for one of the most pristine marine ecosystems on Earth. It showed

that, under the right conditions – working across science-policy-public spheres - diverse interests can be aligned to safeguard a globally significant region. The Ross Sea region MPA proved what is possible, but the other MPA proposals under discussion—such as those for the East Antarctic, the Weddell Sea, and the Antarctic Peninsula—have not yet reached consensus. While there are scientific collaborations and ongoing diplomatic engagements, we might not have a political window of opportunity at present.

Indeed, progress on new MPAs may depend heavily on political windows. Broader geopolitical tensions, including ongoing armed conflicts and rising competition over natural resources, make it more difficult to open a favorable political window for advancing new Antarctic MPAs. In the past, strong international leadership played a decisive role in driving agreements forward, but such momentum is now harder to sustain. At the same time, new disputes over access to and use of marine resources have added layers of complexity to the negotiations. Some actors are increasingly vocal in defending their national interests in waters within the Convention Area, making achieving consensus within CCAMLR more challenging.

Despite these challenges, there are still opportunities to advance MPAs. If we have learned anything from the Ross Sea region MPA, it is that we must continue the science, policy and diplomatic work so that we are ready when a political window opens. Strengthening dialogue between scientists and policymakers can help bridge gaps in understanding and build greater trust in the conservation rationale. Continued diplomatic engagement—both within CCAMLR and through bilateral or multilateral channels—can gradually bring

more Member States on board. Informal exchanges, joint scientific initiatives, and the demonstration of shared conservation benefits can also help reduce resistance and create momentum for agreement. Building diplomatic trust is central to this process, enabling States to engage in good faith, bridge differences, and find common ground for the benefit of all.

The importance of Antarctic MPAs remains clear. They can represent far more than environmental conservation alone: they may serve as instruments for peace, scientific cooperation, and shared governance at a time when multilateralism is under strain. Precisely because Antarctic governance faces risks today, MPAs offer a pathway to reaffirm cooperation, resist unilateralism, and preserve Antarctica as a space for collective stewardship. In this sense, while geopolitical realities complicate progress, MPAs retain their symbolic and practical potential as vehicles for collaboration and peace amidst global tensions.

Ultimately, the creation of Antarctic MPAs demonstrates a shared responsibility for the planet. These protected areas embody the principle that some places are too important, unique, and fragile to be subject to exploitation or national rivalry. They represent an investment not only in marine ecosystem health, but also in peace through cooperation, the value of science as a guide for policy, and humanity's collective duty to protect the Antarctic.

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Chapter 7

The Rhetoric of Peace: From Myths to Policies in International Relations

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Abstract

This chapter explores the rhetorical construction of peace in international relations, highlighting the role of myths, narratives, and discourse in shaping cooperative frameworks and political legitimacy. Moving beyond the view of peace as merely the absence of conflict, it analyzes peace as a dynamic social construct sustained through language, symbolism, and institutional practices. Drawing on constructivist theory and discourse analysis, the chapter examines how myths function as cultural matrices that orient collective identity and legitimize political action. The Ant-

arctic Treaty System (ATS) serves as a central case study, demonstrating how the continent was discursively transformed from a potential zone of conflict into a "territory of peace and science." Through rhetorical strategies—such as the suspension of territorial claims, universalist appeals to the "interest of all mankind," and the framing of Antarctica as a natural reserve—the ATS institutionalized peace narratives in international law and practice. The analysis underscores the performative power of rhetoric: it not only enables cooperation but also creates resilient normative frameworks that continue to guide state behavior. At the same time, the chapter warns of the risks of uncritical "myths of peace," which may obscure underlying structures of domination. By tracing the trajectory from mythical ideals to political discourse and institutional frameworks, the chapter demonstrates how rhetoric remains indispensable for understanding, sustaining, and critically interrogating peace in global governance.

I. Introduction: The Discursive Construction of Peace

This chapter examines the central role of rhetoric in the construction and maintenance of peace within international relations. It begins with the premise that peace cannot be understood solely as the absence of conflict, but rather as a dynamic reality, socially constructed through shared ideas, symbolic narratives, and institutional practices. Within this framework, political language plays a constitutive role by transforming abstract ideals into concrete normative structures.

The case of Antarctica is presented as a paradigmatic example of this process: a territory that, once a potential focus of disputes, was redefined as a “*continent of peace and science*.” This transformation illustrates how a mythical narrative can give rise to a solid legal-political regime, based on multilateral agreements supported by convergent rhetoric. Throughout the chapter, the analysis will show how peace myths operate as cultural matrices that allow cooperative discourses to be institutionalized and the international order to become redefined.

The theoretical proposal is organized into three stages: first, the rhetorical foundations of peace as a discursive construction are introduced; then, the function of myths as articulators of collective meaning and political legitimacy is examined; and finally, the Antarctic case will be analyzed in depth as an exemplary scenario of these symbolic and geopolitical dynamics.

A. The “Rhetoric of Peace” in International Relations

The rhetoric of peace can be defined as the strategic use of language and communicative tools aimed at promoting the peaceful resolution of conflicts, as well as facilitating intercultural understanding between state and non-state actors. This approach redefines the notion of rhetoric, traditionally associated with manipulation or self-serving persuasion, by highlighting its constructive potential as an instrument of dialogue and diplomacy (Perelman & Olbrechts-Tyteca, 1989).

Within this framework, foreign policy becomes a high-level discursive exercise in which states construct narratives about them-

selves, formulate positions regarding the international order, and project their interests through practices of public diplomacy (Nye, 2004; Gilboa, 2008). Such discursive strategies are not neutral: they involve deliberate communicative action aimed at embedding values, identities, and strategic objectives in the global imagination, especially regarding issues related to war, peace, and international cooperation (Entman, 2008; Riorda, 2010).

Understanding the rhetoric of peace from this perspective reveals that language is not merely a descriptive instrument but an active force that shapes international reality. As Joan Costa affirms, communication can be more powerful than action itself, since it is capable of giving meaning. However, the meaning of action often proves difficult for audiences to grasp, either because of a lack of clarity or because of its polysemic nature. Thus, a well-communicated action can generate a deeper and more lasting impact than the action itself, since it disseminates and engraves it into collective memory (Costa, 1999).

Peace, therefore, is not a pre-existing condition to be discovered, but a reality created and sustained through conscious linguistic and communicative efforts. This perspective elevates the study of rhetoric from a secondary analytical tool to a central mechanism for understanding international outcomes, particularly in peacebuilding.

B. The Path from Mythical Narratives to Political Discourse

All cultures elaborate stories that give meaning to their collective existence, enabling them to articulate a symbolic memory of their past, interpret their present, and project aspirations for the

future. These stories may exalt heroic feats or, conversely, dwell on experiences of suffering, exclusion, or resistance. Among them, myths occupy a prominent place—not only because of their persistence over time but also because of their ability to condense shared values, fears, and aspirations.

As Páez (2022) notes, storytelling is an ancestral tool that facilitates understanding complex realities, promotes emotional identification, and allows the chaos of the social world to be ordered through intelligible and affectively mobilizing narrative structures.

Within this framework, the “narrative turn” in the social sciences has granted stories—especially those rooted in mythical archetypes—a central role in processes of identity construction, political leadership, and symbolic legitimacy. Mandoki (2007), for instance, applies the narratological categories of Russian structuralist Vladimir Propp to contemporary politics, revealing how the form of the fantastic tale—with its hero, villain, object of desire, and trials—adapts effectively to campaign discourses and charismatic leadership styles.

As Rey Lennon (2024) argues, in the realm of political communication, narratives not only inform: they seduce, move, and above all, orient collective desire. Effective storytelling does not impose but it persuades, because it connects with a deep longing of the electorate the need to believe in a promise that seems attainable yet still allows for dreaming. Narratives, then, do not merely reflect culture, they shape it, mobilize it, and in contexts of conflict or peace, orient collective emotions toward confrontation or reconciliation.

The transition from deeply rooted mythical understandings of peace to political discourse, policy, and concrete international agreements is not a simple linear progression. Rather, it is a process of institutionalizing these fundamental beliefs into political action. This implies that understanding the underlying “mythology of peace” (Preston, 2025) is crucial for unraveling the resilience and acceptance of specific peace policies.

Political discourse thus acquires strength and legitimacy when it succeeds in articulating preexisting cultural narratives deeply embedded in collective memory. This connection facilitates the translation of abstract values into concrete guidelines for international action. As Bernays explains through the technique of “transfusion” (Rey Lennon, 2024), persuasive efficacy increases when new ideas are linked to symbols or beliefs already accepted by society, thereby operating as catalysts for consensus and political mobilization.

C. Antarctica: A Unique Case Study of Peace Through Rhetorical Construction

Antarctica stands as a singular example: a continent where there has never been war, whose environment is completely protected, and where scientific research takes priority. This “white and pure” continent is described as “a natural reserve, devoted to peace and science.” The Antarctic Treaty System (ATS) has effectively set aside problematic differences over territorial claims and has been extraordinarily successful as a disarmament regime.

Despite a context marked by unresolved territorial disputes and heightened geopolitical rivalries after World War II, the signatory

states managed to reach a common stance on Antarctica's status. The Antarctic Treaty, signed in 1959 and in force since 1961, constituted a milestone in international diplomacy by establishing the first arms control regime within the Cold War framework. The agreement declared the continent a reserve dedicated exclusively to peaceful and scientific purposes, explicitly prohibited all military activity—including bases, maneuvers, and weapons testing (Beck, 1986; Dodds, 2010).

The formation of the ATS during the Cold War and the prevalence of realist thought in international relations suggest that the configuration of Antarctica as a "continent of peace and science" was not an inevitable outcome, but a deliberately constructed narrative. Political realism (*realpolitik*) emphasizes self-preservation and the pursuit of power. However, the ATS explicitly prohibits military activity and sets aside territorial claims, directly challenging realist assumptions. This demonstrates that rhetoric surrounding Antarctica actively redefined international relations in that specific context, showing that shared ideas and cooperation can prevail over material interests and power struggles—at least in certain domains. This case provides a compelling argument for constructivist theses about the malleability of international structures.

II. Theoretical Foundations: Ideas, Identity, and International Relations

To understand how peace is constructed and sustained in the international stage, it is necessary to turn to theoretical frameworks that go beyond merely a normative or legal vision. From a construc-

tivist perspective and drawing on tools from discourse analysis and narrative theory, it becomes possible to explore how ideas, stories, and language not only describe global reality but actively shape it. These schools of thought provide a privileged lens for interpreting how shared meanings and symbolic representations influence the way international actors conceive, negotiate, and perpetuate peace.

A. Constructivism in International Relations: Ideas as Social Forces

Constructivism, as a theoretical approach in international relations, holds that the fundamental structures of the international order are not determined solely by material elements but instead socially constructed through ideas, shared meanings, and discursive practices. This perspective, consolidated through the contributions of Alexander Wendt, has been expanded and reformulated by multiple authors who emphasize the central role of intersubjectivity in shaping the international system (Guzzini, 2002).

In contrast to realism—which presupposes an inherent structural anarchy and the primacy of material interests such as power or state security—constructivism begins from a different premise: anarchy is a social construct. As Wendt argues (cited in Lim, 2021), “*anarchy is what states make of it.*” In other words, the meanings attributed to anarchy are not objective but the result of historical, symbolic, and political processes. Along these lines, Lim (2021) highlights that international actors operate within ideal structures, where identity and interests are generated and transformed through language, narratives, and normative frameworks.

This perspective finds its epistemological grounding in the idea that “*the structures of human association are determined primarily by shared ideas, not by material forces*” (Wendt in Guzzini, 2002). Thus, both identities and interests are not fixed elements or preconditions of interaction but rather emerge from social practices that can be modified, negotiated, or contested. This is crucial for understanding how the rhetoric of peace—as a discursive strategy—can shape interpretive frameworks of conflict and reconfigure relations among actors.

Constructivism is also skeptical of treating cooperation or conflict as inherent; instead, it regards them as products of historical contexts and specific interactions. As Ni (2024) suggests in their analysis of German parliamentary discourse on Afghanistan, state roles and foreign policy decisions are rhetorically negotiated within preexisting normative and cultural frameworks, which themselves are subject to change through discursive disputes.

In this sense, rhetoric is not merely an instrument of persuasion but a constitutive act that can shape the perception of threats, allies, and solutions. The sustained articulation of discourses of peace—understood as a normative narrative—can, for example, displace belligerent notions and introduce new horizons of political action. As Saez and Bryant (2023) explain, effective humanitarian narratives not only persuade but also configure the symbolic terrain within which political priorities are defined.

From this standpoint, constructivism provides an indispensable interpretive lens for this study. It allows us to move beyond purely materialist explanations of the international order by incorpo-

rating the analysis of symbolic practices, mythical narratives, and legitimizing discourses. Since political identities are constructed through language and international norms emerged from shared understandings, the discourse of peace acquires performative power: it can consolidate, challenge, or transform the status quo.

B. The Power of Rhetoric and Discourse Analysis

Rhetoric plays a crucial role in contemporary international relations, functioning not only as a technique of persuasion but also as a tool for constructing meaning, shaping roles, and institutionalizing norms. From a constructivist and poststructuralist perspective, foreign policy can be understood as a discursive practice, in which speech acts, repeated narratives, and interpretive frames do not merely represent reality but actively give it meaning.

Authors such as Ni (2024) have shown how parliamentary debates on German military missions not only reflect ideological positions but also performatively constitute state roles and identities. Foreign policy, therefore, is not confined to rational decisions about objective interests; it also involves symbolic struggles over the meanings of security, legitimacy, and responsibility.

This constitutive capacity of rhetoric is especially evident in contexts of peacebuilding. Repeated discourses, as Lim (2021) points out, have the potential to stabilize social meanings and generate rules that guide state behavior. If international norms are shared understandings of what is acceptable and desirable, then the consistent use of peace-oriented rhetoric—by political leaders, multilateral organizations, and social actors—can contribute to institutionalizing

peace as a norm of international conduct. This discursive process not only alters expectations among actors but also redefines interpretive frameworks concerning the legitimacy of force, sovereignty, and collective responsibility. Indeed, pacifying rhetoric can transform state behavior, consolidate multilateral commitments, and open spaces for sustained diplomatic solutions, thereby becoming a strategic resource with far-reaching performative effects.

C. Understanding Collective Stories

Narratives are not mere instruments of communication; they constitute the framework through which actors make sense of the world, justify their actions, and project desirable futures. Senehi (2002) argues that the “constructive story” is a vital tool for processing trauma, transforming conflict, and promoting shared visions of peace. In this sense, narratives shape not only social imaginaries but also institutional practices.

Political myths, as a special form of narrative, function as foundational stories that legitimize collective projects, draw symbolic boundaries, and provide meaning to social identities. As Naficy (2024) notes, discourses that promote a “mythology of peace” can serve as a counterbalance to dominant narratives of war or domination. Yet he also warns that these pacifist myths, if uncritical and overly simplistic, risk concealing structural violence beneath a façade of superficial harmony. This duality reveals that narratives can both consolidate peace and justify new forms of exclusion or symbolic domination, depending on how they are articulated and whose interests they serve.

For this reason, the challenge of peace rhetoric lies not only in proposing inspiring stories but also in actively contesting existing narratives that glorify conflict or oversimplify peace. Peace, understood as a discursive process, requires a constant construction of shared meaning—grounded in inclusive, plural stories capable of engaging with the wounds of the past.

III. The Mythic Landscape of Peace

Often deeply rooted, the abstract ideas of peace that exist within cultures and societies contrast in various ways with narratives of conflict.

A. Universal Aspirations of Peace: The “Invisible Hand of Compassion”

Every culture develops a set of myths that, woven into a mythology, provide symbolic frameworks for interpreting life and its meaning. This tendency reveals a universal human drive to cling to fundamental truths that guide existence.

In this context, Preston (2014) introduces the notion of a “mythology of peace,” understood as a narrative framework that inspires a way of life grounded in harmonious coexistence, nonviolent politics, ecologically sustainable economic equity, and inclusive spirituality.

Far from being mere abstract constructs, these mythical stories have the potential to emotionally mobilize people and orient collective action toward peaceful ends. However, their effectiveness

depends on their translation into public policy and concrete practices; otherwise, they risk being co-opted, trivialized, or confined to the realm of ideals. This exposes a structural gap between the aspirational ideal of peace and the political conditions in which it must be implemented (Preston, 2014).

Mythologies not only shape beliefs but also orient ways of life. In the case of peace, Preston (2014) argues that an effective mythology must propose a desirable horizon—in other words, it must provide a narrative that weaves together values, emotions, and collective goals. Contemporary examples can be found in the myths of *Star Wars*, *Harry Potter*, or *The Lord of the Rings*. These share a powerful underlying myth: the triumph of good over evil. Specifically, Preston (2014) notes that these stories present “a victorious epic”—as seen in Luke from *Star Wars*, Frodo from *The Lord of the Rings*, or the young wizard in *Harry Potter*—which reflects a common modern myth: the victory of justice over conflict.

B. The Genesis of Peace Myths: Cultural Roots and Collective Memory

Myths operate as symbolic structures that condense psychological, sociological, cosmological, and metaphysical truths shared within a society. Rooted in collective memory and cultural identity, they provide meaning and orientation to social practices, justifying both continuity and change (Preston, 2014). Their universal presence reveals a persistent human need to believe in interpretive frameworks that guide life, especially in moments of uncertainty brought about by crises or profound transformations.

In the field of constructing a mythology of peace, this symbolic grounding takes on strategic significance. As Preston (2014) warns, an effective peace rhetoric cannot be limited to imposing new narratives through institutional or technical structures; it must engage in dialogue with existing cultural stories that lend legitimacy both to violence and to reconciliation. This perspective resonates with Senehi's (2002) view that shared stories are essential tools in peace processes because they enable societies to process trauma and envision desirable collective futures.

Here, the notion of "path dependency" becomes relevant: inherited symbolic conditions influence the very possibility of building peace. Gamboa-Vesga and Quijano-Mejía (2025) emphasize that any sustainable approach must consider local narratives and vernacular knowledge not as peripheral contributions but as central epistemic devices. Likewise, Guzzini (2002) argues that peace processes are not merely objective transitions but discursive productions that determine which actors, values, and memories are recognized as legitimate.

Thus, a mythology of peace must be more than a normative ideal: it must function as a mobilizing story, anchored in shared symbols and capable of being translated into public policies, institutional practices, and intersubjective relations. As Lim (2021) points out, repeated discourses produce structuring effects: they stabilize meanings, define the scope of possibility, and exclude alternatives. Peace rhetoric, therefore, is not ornamental but constitutive of the international order. Its effectiveness will depend on its ability to integrate historically marginalized voices, articulate common hori-

zons, and foster practices that embody this mythical narrative in everyday life.

C. The Transformative Potential and Dangers of Mythical Narratives

Narratives provide a symbolic foundation for action, as they possess what Naficy (2024) calls “narrative power”—the ability to generate meaning, mobilize emotions, and sustain social orders. Storytelling can be empowering when it creates closeness, community, and security, particularly when it articulates shared experiences in contexts of conflict or vulnerability (Senehi, 2002). Yet not every narrative of peace is emancipatory. If the “myth of peace” is presented as an idealized and homogeneous state, it risks oversimplifying deeply complex realities. This is especially problematic in contexts of occupation, colonialism, or structural violence, where peace does not equal the absence of conflict but may instead represent a “continuation of different forms of domination” (Naficy, 2024).

This critique is evident in current contexts such as Gaza or Ukraine, where pacifying narratives—if they fail to acknowledge structural dynamics of oppression—can turn into “mythic blind spots”: stories that conceal the persistence of violence under a discourse of normalcy (Naficy, 2024). As Perera (2024) argues, when “war is a permanent condition” in certain imperial orders, adopting a rhetoric of peace as an episodic rupture within a supposedly peaceful status quo becomes insufficient and potentially misleading. Within this framework, a robust peace rhetoric

must be dynamic, situated, and self-critical: it must be capable of adapting to changing contexts, rendering latent forms of violence visible, and avoiding becoming an instrument of legitimizing the existing order. As authors such as Guzzini (2002) and Lim (2021) remind us, the language of peace can construct realities—but it can also obscure them if it fails to recognize its own limits and assumptions.

IV. From Myth to Political Narrative: Institutionalizing Peace

It is essential to analyze the mechanisms through which the abstract mythical ideals of peace are translated into concrete political discourse, public policies, and institutional frameworks within international relations. To this end, this section examines the rhetorical strategies employed in this transition and the role of various actors.

A. Translating Abstract Ideals into Political Discourse

Political narratives can be understood as “stories with a purpose”—that is, accounts aimed at structuring a shared understanding of the social world and influencing the beliefs, attitudes, and behaviors that sustain political will (Saez & Bryant, 2023). These stories are prescriptive, as they define who must act, how, when, and why, with the goal of resolving complex political dilemmas. In this sense, peacebuilding—particularly since the end of the Cold War—has been framed as a key strategy for strengthen institutions and prevent the resurgence of violent regimes and conflicts

(Gamboa-Vesga & Quijano-Mejía, 2025). This approach entails addressing not only the visible consequences of conflict but also its structural causes, while developing endogenous capacities for the peaceful management and resolution of disputes (Kobayashi, Krause & Yuan, 2025).

A central mechanism in this process is the so-called “framing effect,” which explains how narratives—including those of a mythical character, such as peace—gain political traction when presented in emotionally resonant terms. According to Saez and Bryant (2023), “the way a problem or idea is presented—especially if framed in terms of losses or gains—has a far greater influence on decision-making than objective data.” Thus, political actors do not merely communicate facts; they construct interpretive frames that present peace as a gain or conflict as a loss, thereby fostering greater public receptivity and consolidating political will. This rhetorical resource is fundamental in translating abstract aspirations into concrete, sustainable public policies.

B. Rhetorical Strategies in Peacebuilding and Diplomacy

The application of rhetoric in peacebuilding and diplomacy manifests in various persuasive strategies. For instance, John F. Kennedy’s inaugural address appealed to logic (contrasting the threat of nuclear destruction with the necessity of peace), ethics (invoking a shared moral responsibility and the vision of a “new world of law”), and a careful choice of symbolically charged words, such as “new effort,” to promote a horizon of world peace (Ni, 2024). Similarly,

Franklin D. Roosevelt's speech after the attack on Pearl Harbor—though a call to war—illustrates the effectiveness of *pathos* and *ethos* in emotionally mobilizing a nation. These same principles can be strategically applied to advance peace processes (Gamboa-Vesga & Quijano-Mejía, 2025).

At the diplomatic level, rhetoric is used to build trust, establish credibility, frame and redefine problems, and negotiate mutually beneficial agreements (Senehi, 2002). The Camp David negotiations, for example, underscore the importance of personal relationships and the leaders' ability to build trust, persuade, and create conditions conducive to agreement (Ni, 2024). A key rhetorical element was the framing of the conflict, particularly through the formula "land for peace," which proved fundamental to advancing negotiations (Ni, 2024).

In this sense, the Oslo Accords represented a significant discursive shift, as they entailed mutual recognition between Israel and the Palestine Liberation Organization (PLO), with both rhetorical and political implications (Ni, 2024). However, the public discourse of the leaders involved did not always reflect the progress made in private negotiations. At times, public framing appealed to the past or to narratives of mistrust, demonstrating that public rhetoric can operate in tension with the substance of diplomatic dialogue (Ni, 2024).

The analysis of the Oslo process reveals a central distinction: public rhetoric—especially that of non-state actors—can adopt a more aggressive, retrospective, or even extremist tone, to reaffirm

and legitimize identities before their political bases. This performative rhetoric seeks to consolidate internal support, even when private negotiations move in the opposite direction (Ni, 2024). This paradox suggests that the public enactment of peace rhetoric can contradict its substantive content, producing what some authors have called a *Rashomon effect*: multiple interpretations of the same political event, shaped by divergent perspectives, internal tensions, and differentiated strategic goals (Perera, 2024). Thus, the translation of the peace myth into the language of real-world politics is neither linear nor transparent, but mediated by communicational demands that seek to balance domestic pressures with external objectives.

C. The Role of International Institutions in Perpetuating Peace Narratives

International organizations such as the United Nations (UN) play a crucial role in promoting human rights and standardizing international norms. Within its institutional architecture, the Peacebuilding Commission (PBC) was conceived as a body aimed at fostering common understandings and coordinating activities for peacebuilding (Gamboa-Vesga & Quijano-Mejía, 2025). This work includes addressing the structural causes of violence—economic, social, and political—through sustained interventions (Kobayashi, Krause & Yuan, 2025).

UN Security Council resolutions—particularly those adopted unanimously—are considered legitimate expressions of the “voice of the international community” and serve as normative “reference

points” for future action (Ni, 2024). The dominant legitimizing rhetoric, grounded in shared technical and diplomatic language, helps consolidate this consensus. Through instruments such as treaties, mandates, and declarations, international institutions not only disseminate ideals of peace but also institutionalize them in rules, procedures, and interpretive frameworks that grant pacifying narratives durability and legitimacy (Ni, 2024).

This process transforms peace rhetoric into a collective discursive commitment that is difficult to dismantle, as it shifts from individual persuasion to the structural and institutionalized plane. Nevertheless, this construction is not free of tensions. The very concept of “peacebuilding” is, as Gamboa-Vesga and Quijano-Mejía (2025) note, “inherently ambiguous” and subject to divergent interpretations, often stemming from conceptual vagueness and the differences in the mandates of international actors.

The dominant paradigm of “liberal peacebuilding”—which posits that sustainable peace requires the internal transformation of post-conflict states into democratic and free-market models—has been widely criticized for disregarding local contexts and reproducing “hegemonic Western knowledge” (Perera, 2024). This critique underscores the model’s inability to address structural violence, systemic racism, and white supremacy as a significant epistemological limitation (Perera, 2024).

Consequently, the institutional translation of peace narratives can paradoxically become a source of conflict, particularly when it reflects dynamics of colonial knowledge and power structures.

Hence, the need to move toward decolonial approaches that make visible and revalue local narratives as well as their “sophisticated informal theorizing” (Senehi, 2002). From this critical perspective, the passage from peace myths to public policy cannot be understood solely as a top-down process, but rather as an arena of symbolic contestation, where narratives of resistance from below also emerge.

V. Case Study: Antarctica. A Continent of Peace by Design

After World War II, significant geopolitical tensions and competing territorial claims arose in Antarctica, including military expeditions (Operation Highjump) and incidents such as warning shots between Argentine and British personnel. The United States proposed UN trusteeship and internationalization, but these ideas were rejected, with the Soviet Union insisting on representation due to fears that the Cold War would extend to the continent. The International Geophysical Year (IGY, 1957–58), in which 66 countries participated, during which 55 research stations were established, set a precedent for scientific cooperation. This operational and scientific collaboration served as a diplomatic expression that paved the way for the treaty.

The role of the IGY as a “precedent for collaboration” and the treaty’s subsequent emphasis on the “freedom of scientific investigation” suggest that the rhetoric of science was strategically used to overcome geopolitical rivalries. By framing Antarctica as a shared scientific endeavor, states were able to sidestep contentious terri-

torial claims and military competition. This implies that the “myth of Antarctic peace” was not based solely on an abstract ideal, but is concretely grounded in the shared, practical, and mutually beneficial pursuit of scientific knowledge—making it a more acceptable and effective rhetorical appeal.

B. The Antarctic Treaty System (ATS): A Deliberate Rhetorical Project

The Antarctic Treaty (1959) explicitly states its purpose: *“in the interest of all mankind that Antarctica shall continue forever to be used exclusively for peaceful purposes and shall not become the scene or object of international discord.”*

Demilitarization prohibits military bases, fortifications, maneuvers, and weapons testing, while allowing the use of military personnel or equipment only for scientific or other peaceful purposes.

Another key aspect is the “freezing” of territorial claims. Article IV explicitly states that the Treaty neither renounces nor diminishes existing claims, nor creates new ones while it remains in force, thereby effectively setting disputes aside. The freezing of territorial claims represents profound rhetorical and legal innovation. Instead of resolving disputes, it suspends them indefinitely.

This act of “setting aside” sovereignty claims—issues that are typically central to state identity and conflict—enabled cooperation in other areas. It represents a deliberate rhetorical choice to prioritize a shared, functional identity (scientific cooperation, peace) over inherently divisive ones (territorial claims). This suspension of sover-

eignty becomes both a powerful symbol and a practical mechanism for peace, demonstrating how a **negation** (not asserting claims) can generate an **affirmation** (peaceful cooperation).

C. Discursive Construction of Antarctica as a Territory of Peace

The construction of Antarctica as a “territory of peace” is achieved through careful use of language, symbols, and metaphors in the Treaty documents and in diplomatic discourse.

Some key phrases include:

- **“Exclusively for peaceful purposes”**: Central to Article I and used repeatedly, this phrase sets a clear normative boundary for all activities.
- **“In the interest of all mankind”**: This universalist framing elevates the continent beyond national interests by appealing to a shared human good.
- **“Natural reserve, devoted to peace and science”**: This metaphor frames Antarctica as a unique global common and emphasizes its environmental and scientific value as the basis for its peaceful status.

Key symbols and metaphors include:

- **“Demilitarized zone” / “Arms control agreement”**: The ATS functioned as the first arms control agreement of the Cold War, symbolizing a successful precedent for preventing conflict before it erupted.

- **"Scientific reserve":** The emphasis on research frames Antarctica as a shared laboratory, fostering a collaborative identity among nations.
- **"Last wilderness":** This metaphor evokes a sense of pristine purity and vulnerability, reinforcing the need for protection and collective stewardship consistent with peaceful intentions.
- **"Freezing" of claims:** Though a legal provision, the metaphor of "freezing" implies a deliberate suspension of conflict rather than its resolution, allowing for stable—if temporary—peace.

By emphasizing universal scientific and environmental values in the phrase **"in the interest of all mankind"**, the ATS effectively depoliticizes a potentially contentious geopolitical space. This suggests that a powerful rhetorical strategy for peace is to shift discourse away from zero-sum national interests toward shared universal goods, thus creating common ground for cooperation that avoids traditional power struggles. This constitutes a form of **"rhetorical quarantine"** against conflict.

D. The Perpetuation and Resilience of the Antarctic Peace Narrative

The ATS has evolved into a system with annual consultative meetings where decisions are made by consensus. This ongoing dialogue reinforces shared norms. The Madrid Protocol (1991), which designates Antarctica as a "natural reserve, devoted to peace and

science” and prohibits mining for 50 years, further solidified the environmental peace narrative. Qualities such as foresight, restraint, and recognition of other nations’ interests have come to characterize the Treaty system. However, challenges exist, such as future global pressures on resources and the emergence of new actors like Iran, which assert “property rights” and plan scientific and military projects.

The success of the ATS lies not only in its initial signing, but also in its continued performative durability through annual consultative meetings and consensus-based decision-making. This implies that the peace narrative is not a static declaration, but rather a discursive practice that is continuously reaffirmed. Each meeting, each consensus, each new protocol (such as Madrid) represents a rhetorical act that reinforces the foundational myth of Antarctica as a peaceful space. The emergence of new challenges (e.g., Iran’s claims) tests this durability, requiring the system to continually reaffirm and renegotiate its central narrative through diplomatic discourse.

VI. By Way of Conclusion: The Enduring Relevance of the Rhetoric of Peace

A. From Myth to Policy: A Trajectory

The analysis presented seeks to demonstrate that peace, in the realm of international relations, is a dynamic social construct rather than a natural state. Abstract mythical ideals of peace, rooted in

universal aspirations and collective memories, are translated into concrete political narratives and subsequently institutionalized through deliberate rhetorical strategies. This process is not automatic, but rather requires active discursive work, strategic framing, and the negotiation of shared meanings to transform aspirational visions into operational frameworks.

B. The Critical Role of Discourse in Maintaining International Peace

As noted earlier, rhetoric—far from being a mere ornament to language—is a fundamental mechanism for building trust, shaping identities, and fostering cooperation in an international system that, by nature, lacks a central authority. Constructivism, the central theoretical framework of this study, underscores that the structures of international relations are socially constructed, granting discourse a constitutive power over reality.

While the chapter emphasizes the discursive construction of peace, it is crucial to recognize that rhetoric does not operate in a vacuum. The ATS, for example, is backed by inspection mechanisms and the collective commitment of powerful states. This suggests that the “rhetoric of peace” is most effective when intertwined with and reinforced by material and institutional commitments. Peace is maintained through a dynamic feedback loop in which persuasive narratives legitimize and guide institutional practices, which in turn solidify and perpetuate the very narratives themselves.

C. Lessons from Antarctica for Global Peacebuilding Initiatives

The Antarctic model offers valuable lessons for global peacebuilding. It demonstrates the potential for states to exercise foresight and work in concert to prevent conflicts before they arise, through the strategic depoliticization of contentious issues and a focus on shared interests such as science and the environment. The “freezing” of territorial claims in Antarctica represents an innovative approach to managing intractable disputes, where direct resolution is unfeasible but cooperative management is attainable through discursive innovation. The importance of ongoing dialogue, consensus-building, and the adaptive evolution of peace narratives within institutional frameworks (such as the Antarctic Treaty’s consultative meetings) is crucial to the long-term maintenance of peace.

While Antarctica provides valuable lessons, it is important to critically assess the transferability of its peace rhetoric model to other contexts. Antarctica is unique in its lack of an indigenous population and its limited economic exploitation (though resource pressures do exist). This implies that while the principles of discursive construction, depoliticization, and shared identity are transferable, the specific details of the Antarctic solution may not be. The lesson is not simply to replicate the ATS, but rather to understand the underlying rhetorical and discursive strategies that enabled its success and adapt them to different material and political realities, while recognizing the coloniality of knowledge production and the need for local narratives.

Ultimately, peacebuilding is a continuous and adaptive effort, deeply rooted in the capacity of societies to narrate and re-narrate their shared futures.

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Chapter 8

Balancing Nuclear Threats in a Post-Multilateral World - Lessons from the Antarctic Treaty

Antarctica as a Nuclear-Free Zone and its Global Relevance

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Abstract

This chapter examines the Antarctic Treaty as the pioneering model for Nuclear Weapons Free Zones (NWFZs) and explores its enduring global significance in a post-multilateral world. It highlights how Antarctica's legal framework for demilitarization, peaceful use, and verification shaped later NWFZ treaties and inspired efforts in regions like Northeast Asia. The chapter also discusses emerging challenges to the Antarctic Treaty amid geopolitical shifts and environmental changes. Additionally, it emphasizes the

role of the Pugwash Conferences in promoting dialogue and confidence-building measures.

Introduction

The idea of Nuclear Weapons Free Zones (NWFZs), has been an important element of nuclear disarmament since virtually the beginning of the nuclear age. Such zones have been proposed and enacted for many reasons over the years. These have ranged from proposals made as part of attempts to gain diplomatic advantage over adversaries, efforts to contain nuclear proliferation in specific regions, or to stimulate broader, global nuclear disarmament efforts. In the latter case, the idea is that, by gradually expanding such zones, the regions of the world in which nuclear weapons are present or acceptable will diminish to the point where pressure grows for them to be abolished (Hamel-Green, 2011). Though not much discussed today, the idea that a collection of regional disarmament agreements would eventually lead to global disarmament, known to some as the “Zonal Disarmament” idea, was much considered in the 1960s (Sohn, 1962; Orear, 1963).

The first successful proposal for a denuclearized zone, the Antarctic Zone of 1959, is particularly significant. The Antarctic Treaty was the first international agreement to permanently ban nuclear weapons in a whole geographic region, serving as a pioneering legal, political, and operational model for the establishment of Nuclear Weapons Free Zones elsewhere. Its principles of demilitarization, peaceful use, verification, and multilateral cooperation helped

shape the development and acceptance of regional NWFZ treaties around the world.

History of the NWFZ Concept

The idea of Nuclear Weapons Free Zones dates back to the early years of the Cold War. The first such proposal was made in a speech to the UN General Assembly on October 2, 1957, when the Polish Foreign Minister, Adam Rapacki suggested that the production, storage and use of nuclear weapons be banned from the territories of both Germanies, Poland and Czechoslovakia (Stefanic, 1987). The essential elements of the Rapacki proposal would form the basis for all subsequent NWFZs: that there be a complete absence of nuclear weapons from the states covered by the Zone; that there must be verification provisions to ensure compliance; and that the Nuclear Weapons States must provide binding security guarantees to the states of the Zone not to use or threaten the use of nuclear weapons against them (Rapacki, 1963; UNDC, 1999).

This idea for a "Central European" NWFZ was rejected by NATO on the grounds that the alliances' evolving strategy envisaged the use of nuclear weapons to deter the conventional numerical superiority of the Warsaw Pact states. There were also concerns that it would "split" West Germany from the rest of NATO by giving it a different status (State Department). Despite this rejection, the ideas behind the Rapacki proposal became the basis for other such proposals in the late 1950s and early 1960s for Africa, East Asia, the Koreas and the Balkans (UNGA, 1975) conventional advantages of adversaries. This idea of using the threat of nuclear weapons to de-

ter conventional superiority was central to the Eisenhower Administration's "New Look" defence strategy of the era (Leighton, 2001).

Despite the rejection of most proposals in these early years, a significant discussion arose over the idea and it has been acted upon in several regions of the world. Indeed, it is, in some respects, one of the most successful disarmament movements in history. There are currently two broad concepts generally associated with the idea of multilateral NWFZs: (1) nuclear-weapon-free zones established by treaties between the states of such zones; and (2) nuclear-weapon-free geographical regions established by treaties between the states with interests in these areas. As of 2020, some 138 of 193 UN Member States adhere to at least one of the five formal NWFZ agreements: Latin America and the Caribbean (Treaty of Tlatelolco, 1967), the South Pacific (Treaty of Rarotonga, 1986), Southeast Asia (Treaty of Bangkok, 1997), Africa (Treaty of Pelindaba, 2009) and Central Asia (Treaty of Semipalatinsk, 2009).

Additionally, there are three nuclear-weapon-free geographical regions: the Antarctic as established by the 1959 Antarctic Treaty (which will be discussed further below); outer space as established by the 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies; and the seabed as established by the 1971 Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Sea-Bed and the Ocean Floor and in the Subsoil Thereof. (There is also one state with nuclear-weapon-free status, also known as a single-state

NWFZ: the UN recognized Mongolia's nuclear-weapon-free status in 1998 through General Assembly Resolution 53/77.)

There is a slight, but important distinction between the five NWFZs and the three denuclearized zones, though they seek to establish similar objectives. The difference is that they arrive at their goals differently, producing slightly different legal mechanisms. A NWFZ covers populated areas and is the result of the decision of the sovereign states within the prospective zone to prohibit nuclear weapons in that area. By contrast, treaties that address weapons of mass destruction in particular geographic areas like Antarctica, the seabed, or outer space, apply to non-populated regions and are agreed upon by states with interests in those areas, though not resident within them. For the purposes of discussion, both types of zones are often grouped together as "NWFZs," but there are differences in terms of who established these areas and what they sought to achieve. Moreover, denuclearized zones, such as Antarctica, are often also demilitarized by agreement, while NWFZs are areas within which conventional military activity continues as states exercise their right of self-defence.

The distinction is important. Thought of one way, a *NWFZ* is an expression of the states within the zone to prohibit the Nuclear Weapons States (NWS), as recognized under the 1968 Nuclear Non-proliferation Treaty, from using their zone for nuclear transit, deployment or storage purposes. It is an emphatic act on the part of the states of the zone to reject the right of the NWS to use their area for nuclear weapons purposes. The states of the region have led the process to achieve the agreement and are its custodians going forward. A *denuclearised region*, by contrast, is an agreement among

a number of states not to use a certain area for nuclear weapons purposes, but none of them claim ownership over the territory of the zone. More importantly, all of the denuclearized regions extant thus far have been created in processes in which the NWS actually *led* the diplomatic charge to achieve them and are the custodians of the agreement. There is thus a completely different relationship between the NWS in zones and in denuclearised regions in terms of how the agreements were achieved and who oversees them going forward. It seems likely that, when the regions were established, the NWS did not envisage placing nuclear weapons in them and thus could imagine banning such deployments. What happens to these denuclearized regions if this changes?

As defined by the UN General Assembly in 1975, such a zone or area consists of;

...any zone recognized as such by the General Assembly of the United Nations, which any group of States, in the free exercises of their sovereignty, has established by virtue of a treaty or convention whereby: (a) The statute of total absence of nuclear weapons to which the zone shall be subject, including the procedure for the delimitation of the zone, is defined; (b) An international system of verification and control is established to guarantee compliance with the obligations deriving from that statute (UN First Committee, 1975).

These zones, of whichever type, are not without their deficiencies. For example, in 2002, Jozef Goldblat, a leading expert in NW-FZs, analyzed the zones then in effect (Tlatelolco, Rarotonga, Pe-

lindaba and Bangkok) and highlighted a series of deficiencies in their effectiveness as true disarmament vehicles. He found that deficiencies common to all of the zones include (1) failure to specify that denuclearization applies in both peace and war; (2) failure to explicitly ban the presence of support facilities for nuclear weapons; (3) failure to explicitly ban the transit of nuclear weapons through the zones, including via port visits or aircraft transport; (4) the nuclear-weapon powers' undertaking to respect the denuclearized status of the zones is unverifiable; and (5) the assurances given by the nuclear-weapon powers' not to use nuclear weapons against zonal states are conditional (Goldblatt, 2002). Though he was not writing about the three geographical denuclearized regions, of which the Antarctic is one, similar issues exist in these areas.

The Antarctic Denuclearised Region

Considering the lack of enthusiasm which has often expressed by the US for the NWFZ idea generally, it is somewhat ironic that Washington itself was the author of the first such region/zone to succeed; the Antarctic Treaty of 1959. By the late 1950s, concerns were arising that the tensions of the Cold War would reach the world's only uninhabited continent. In addition, seven nations had already made territorial claims in Antarctica over the decades, some of which overlapped and there had been incidents as a result. To coincide with an intensive year of international scientific study of the continent in 1958, President Eisenhower convened a conference in Washington of twelve states with established geographic or economic interests in Antarctica to develop a legal framework that would govern the ar-

ea.¹ After intensive negotiations, the Treaty was signed on December 1, 1959, and came into effect on June 23, 1961.

The Treaty, and other agreements since reached pursuant to it on specific matters relating to environmental protection, covers many issues. It designates the land and ice sheets south of 60 degrees a demilitarized zone, including prohibiting nuclear explosions or the storage of radioactive waste therein. The only military activities permitted are those necessary to support peaceful scientific research, such as military transportation or logistics support for scientific stations. The Antarctic Treaty does not explicitly mention “nuclear weapons” as such. Instead, two provisions establish the framework that effectively prohibits their presence and use in the region:

- **Article I** prohibits “any measures of a military nature,” including the establishment of military bases, maneuvers, and the testing of “any type of weapons.”
- **Article V** explicitly bans “any nuclear explosions” and the “disposal of radioactive waste material” in Antarctica.

Taken together, these provisions have been interpreted by the international community as excluding nuclear weapons from the Antarctic Treaty area. The prohibition covers not only the testing or

1 The 12 nations were: Argentina, Australia, Belgium, Chile, the French Republic, Japan, New Zealand, Norway, the Union of South Africa, the Union of Soviet Socialist Republics, the United Kingdom of Great Britain and Northern Ireland, and the United States of America,

use of such weapons but also the establishment of related facilities. However, the Treaty does not explicitly forbid the mere *transit* of nuclear-armed or nuclear-powered vessels through adjacent waters. In practice, states have avoided introducing nuclear weapons into Antarctica, respecting both the letter and spirit of the Treaty, and reinforcing its role as a nuclear-weapon-free zone.

Additionally, the Treaty does not eliminate sovereignty disputes but instead suspends the recognition of new claims and prohibits actions that would assert, support, or deny existing ones. While the Protocol on Environmental Protection to the Antarctic Treaty may be subject to review after 2048, this does not alter the Treaty itself or its provisions. The Treaty does not have an expiration date. Finally, the Treaty declares the region open only to scientific research and not economic exploitation. The only permanent structures allowed are scientific research bases. The Antarctic denuclearized zone is thus part of a much larger, Treaty-based infrastructure which governs the Antarctic and cannot be separated from these wider objectives.

While the Antarctic Treaty has generally been implemented without significant controversy for most of its history, this is changing. In particular, climate change is making possible a degree of economic activity in the region that was previously impossible. This, in turn, is opening the potential for disputes over exactly what “scientific” research really is, with accusations that countries like Russia and China are undertaking exploration for exploitable resources under the guise of scientific surveys and using their militaries to support these efforts (Sukhankin, 2024; The Economist, 2024). Though this

type of activity does not portend imminent economic exploitation of the region, and does not threaten the specifically nuclear free aspect of the Antarctic Treaty System, the general weakening of the overall system is creating tensions. To some degree, these tensions are not intrinsic to Antarctica but are rather offshoots of the generally rising tensions between Russia, China and the West characterizing international relations more broadly. Other issues, such as growing and largely unregulated tourism in the area – which was not foreseen when the Treaty was negotiated – are threatening the increasingly stressed environment.

To some extent, the challenges faced by the Antarctic Treaty presage problems that are also beginning to characterize the fate of the two other treaty-based denuclearized zones – outer space and the deep seabed. As technology, both military and civilian, makes the exploitation of these areas feasible in ways not envisaged when the agreements governing them were signed, questions arise over whether they can endure. The fact that the traditional champion of these agreements, the United States, appears increasingly disinterested in multilateral restraints on its own military or economic activities in space or the deep seabed raises broad questions for the longer-term viability of these agreements.

NWFZ as a Vehicle for Change in Northeast Asia

The current security situation in Northeast Asia is far from ideal and may serve as an instructive case study for considering potential future peri-Antarctic scenarios in which multiple nuclear-weapon states could coincide. But each NWFZ has its unique character-

istic reflecting its specific security conditions. In order to consider NWFZ in Northeast Asia, the following are conditions that need to be considered.

1. The region includes three Nuclear Weapon States (Russia, China and the US) as well as Democratic People's Republic of Korea(DPRK) which is outside of The Nuclear Non-Proliferation Treaty (NPT) but has developed significant nuclear weapons program already.
2. Most states in the region remain affected by historical and territorial conflicts.
3. The US provides "extended nuclear deterrence" to the Republic of Korea (ROK) and to Japan, and now Russia has established a similar security arrangement with DPRK.
4. New tensions are rising in other parts of the world that may affect the region.

Given the experiences from past NWFZ Treaties, including Antarctic Treaty, one key concept that should be adopted by the region is "Common Security". This concept was introduced by the Independent Commission on Disarmament and Security Issues in 1980s, during the Cold War (Independent Commission on Disarmament and Security Issues, 1982). The Commission developed the concept as an alternative to national security anchored in threatening the use of nuclear weapons. It lays out the principle that nations and populations can only make themselves more secure by making their potential adversaries feel secure. "Common Security"

is the norm against a unilateral quest for national security. Security policies dependent on nuclear deterrence may result in short term “stability”, but are inherently vulnerable, as they may trigger a “security dilemma,” whereby opponents increase their nuclear capabilities to ensure their own security. Common Security offers a framework within which to replace nuclear deterrence with denuclearized peace.

Recently, a research group published a study proposing a NWFZ in Northeast Asia to overcome current security conditions based on the concept of “Common Security” (Gregory Kulacki et. al., 2025). The book analyzes current security conditions and draws lessons from past NWFZs. It proposes pragmatic approaches to address these difficulties by designing a NWFZ Framework matching the conditions in Northeast Asia. The authors call “NWFZ 2.0” featuring several innovative concepts. The basic approaches proposed are the following.

1. NWFZ 2.0 will require NWS in the region to secure a legal guarantee that they will not use nuclear weapons (or threaten to use them) against any state party (NNWS).
2. NWFZ 2.0 should provide security guarantee to two US allies without the “extended nuclear deterrence” through a comprehensive security framework. NWFZ 2.0 can co-exist with existing alliances.
3. NWFZ 2.0 must require DPRK to abolish nuclear weapons but also give it a binding guarantee of no nuclear threats and be accompanied by a comprehensive security framework that assures DPRK of its safety.

4. The NWFZ 2.0 process may start with a declaration by relevant states that they will terminate the state of war and start a peaceful relationship.
5. NWFZ 2.0 would have to be embedded in a comprehensive security framework that lays out arms control and disarmament in a way that enhances security and promotes peace for all.
6. NWFZ 2.0 must be accompanied by a regional security regime that is designed to promote Common, Comprehensive, and Cooperative security, what we call the "C3 Security Regime."

Although it seems unlikely at present that DPRK will enter into dialogue to dismantle its nuclear weapons, the above approach may at least provide an incentive for the DPRK to consider negotiations. For both ROK and Japan, the above approaches may reduce the risk of nuclear attack significantly and thus dependence on "extended nuclear deterrence" may no longer be essential.

As noted above, while the Antarctic Treaty has been implemented with little controversy, this situation may change in the future due to climate change and other changes in international relations. It may be possible that international conflict could undermine the Antarctic Treaty, or open conflictive scenarios in adjacent waters in the future. The 3C Security approach described above can also be applied to the countries that share interests and concerns over Antarctica. In order to avoid possible future conflicts in Antarctica, security dialogue based on 3C concepts can be a useful diplomat-

ic tool. Since the Treaty is already in place for Antarctica, dialogue could be easier. However, given the behaviors of some nuclear weapon states, international treaties and laws can be easily broken. It is necessary to take pro-active approach before the Treaty is broken. The 3C approach could help maintain the current relatively calm conditions.

The NWFZ Treaty is not just a product of political negotiation, but also a vehicle to reduce tensions and build trust among states in the region. That is exactly what we need in Northeast Asia and globally, where the risk of nuclear weapons use is growing.

The role of the Pugwash Conferences on Science and World Affairs

The Pugwash Conferences on Science and World Affairs, founded in 1957 in the wake of the *Russell–Einstein Manifesto*, have played a sustained and often discreet role in advancing dialogue on arms control, disarmament, and conflict resolution. Guided by the conviction that scientists bear a special responsibility to ensure their work serves humanity rather than destruction, Pugwash has consistently brought together influential figures from science, diplomacy, and policy—often across political divides— even when official channels of communication were frozen. Among its enduring priorities has been the prevention of nuclear war and the promotion of practical steps toward the eventual elimination of nuclear weapons, which led to the Nobel Peace Prize awarded jointly to the Pugwash Conferences and to Joseph Rotblat in 1995.

Pugwash has contributed to the conceptual development and political legitimization of Nuclear Weapon Free Zones (NWFZs). These zones, established through treaties in which states commit not to manufacture, acquire, test, or station nuclear weapons within their territories, as described above, have been recognized as a vital component of the global non-proliferation architecture. Inspired by the Antarctic Treaty, which was the first international agreement to permanently ban nuclear weapons in a complete geographic region, the concept of Nuclear Weapons Free Zones was developed.

The model began with the *Treaty of Tlatelolco* (1967) in Latin America and the Caribbean and has since expanded to cover vast regions, including the South Pacific (*Treaty of Rarotonga*), Southeast Asia (*Treaty of Bangkok*), Africa (*Treaty of Pelindaba*), and Central Asia. Such zones not only reduce regional nuclear risks but also reinforce the global norm against nuclear proliferation.

It is noteworthy that there is an important complementary mechanism to the Treaty of Tlatelolco in South America: the Brazil–Argentina Agency for Accounting and Control of Nuclear Materials ([ABACC](#)) emerged from a historic rapprochement between Argentina and Brazil, partly spurred by the physics societies in both countries, which had previously pursued sensitive nuclear capabilities independently. Through ABACC, both states agreed to mutual inspections and safeguards to verify the exclusively peaceful use of nuclear energy, in cooperation with the International Atomic Energy Agency (IAEA). This unprecedented arrangement between two neighboring states has been hailed internationally as a model for

confidence-building, transparency, and the prevention of a regional nuclear arms race.

Pugwash has supported these types of initiatives by providing informal spaces where policymakers and scientists from nuclear and non-nuclear states can explore the feasibility, scope, and verification measures for NWFZ agreements and complementary arrangements such as ABACC. By fostering trust and technical understanding, Pugwash dialogues have contributed to broadening the acceptance of these measures as legitimate and practical steps toward disarmament. The organization has also highlighted the role NWFZs and bilateral verification mechanisms can play in tension-prone regions, such as the Middle East and Northeast Asia, where a zone free of nuclear weapons could form part of a larger security framework.

In essence, the Pugwash approach to nuclear-weapon-free zones reflects its broader philosophy: progress is built incrementally through dialogue, confidence-building, and scientifically grounded policy solutions. While NWFZs and bilateral arrangements do not by themselves abolish nuclear arms globally, they demonstrate the possibility of binding international commitments that enhance security without reliance on nuclear deterrence—offering both a practical measure for today and a stepping stone toward a nuclear-weapon-free world.

Conclusions

The Antarctic Treaty has stood the test of time as a key disarmament agreement. Although the Antarctic regional system is fraying

at the edges for several reasons, it remains an important pillar of the nuclear disarmament regime. More broadly, the idea of NW-FZs is undergoing a re-thinking as global and regional conditions evolve. The lessons of the Antarctic Treaty are an important part of this process. Northeast Asia is a case in point. As we look to build on the legacy of the Antarctic Treaty for disarmament in other regions, the current tensions between the nuclear powers are a source of concern. The activities of organizations like the Pugwash Conferences can fill the gap left by the lack of leadership on this issue by key states, at least in terms of convening dialogues and pushing for consideration of these issues, but only to a point. If the Antarctic Treaty is to be saved, and its lessons and benefits replicated in other regions, the same leadership and vision that states displayed in the 1950s will be required.

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Chapter 9

A Brief History of Arctic Governance and Peace

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Abstract

This chapter traces the evolution of Arctic governance and peace, examining how historical traditions of Nordic diplomacy, trust-building, and institutional cooperation have shaped the region's stability from the Cold War to the present. It begins by outlining the concept of Nordic Peace, which since 1814 has fostered a culture of conflict resolution, dialogue, and restraint—principles that later influenced Norway's reassurance policies toward the Soviet Union during the Cold War. These measures, including cultural and scientific collaborations and self-imposed military limitations, built mutual trust and laid the groundwork for post-Cold War regional integration. The establishment of the Barents Euro-Arctic Council and the Arctic Council institutionalized this cooperative spirit, transforming the Arctic into a model of peace-oriented governance. However, the chapter also highlights recent disruptions caused by the war in Ukraine, which halted decades of collaboration and ushered in a new era of strategic competition. Despite these tensions, the authors argue that Arctic peace endures—albeit in a weakened state—and emphasize the importance of preparing for renewed dialogue and cooperation once the conflict subsides. Ultimately, the chapter calls for a return to the Nordic tradition of planning for peace, underscoring the enduring relevance of the Arctic as a zone of stability, scientific cooperation, and shared stewardship in a fragmented world.

Introduction

The Arctic today is a global region. It is no longer relegated to the periphery but rather becoming one of the most strategically important regions in the world. This shift has also marked the end of the post-Cold War *Arctic Exceptionalism*, a period characterized by peaceful collaboration and coexistence, as the war in Ukraine and new non-Arctic stakeholder actors engage in the Arctic. The circumpolar Arctic, therefore, stands at a critical juncture of geopolitical competition, economic opportunities, and strategic positioning. Within the Arctic, memories and narratives of how highly successful cooperation in the recent past transcended conflict and enabled shared resource management—which continues today across conflict lines—have created a complex regional history and understanding.

Vilhjalmur Stefansson's book *The Friendly Arctic* was early in challenging the misconceptions of the Arctic by introducing indigenous knowledge systems (Stefansson, et al., 1921). For the indigenous peoples, the Arctic was not a hostile place, but their home. This perspective was later reflected in the post-Cold War period, as Arctic collaboration and integration between former enemies started with the Barents Euro-Arctic collaboration in the high north and later with the Arctic Council through circumpolar memberships alongside observer states as seen today. Both institutions focused on governance and science collaboration and people-to-people diplomacy (European Commission, 2021).

As climate change and the war in Ukraine have been drivers pushing the doomsday clock closer to midnight, and while ten-

sions are rising in the Arctic, the region remains at peace. Since the Second World War, there has not been armed conflict in the Arctic, and practical collaboration continues in critical areas, such as joint fisheries management between Norway and Russia or search and rescue in the Barents Sea (Edvardsen, 2025). So, even as the international system becomes increasingly fragmented, a semblance of peace and continuation of past collaboration continues in the Arctic. The fact that peace endures is a clear indication of the region's geopolitical stability, which persists even as it erodes elsewhere.

To evaluate Arctic peace, we use Stein Tønnesson's notion that peace exists on a spectrum of quality from high to low (Tønnesson, 2019). A peace of high quality tends toward high levels of trust, institutional integration, and extensive collaboration, whereas low quality would represent merely the absence of violence. Even though Arctic peace is now degrading, it has shown resilience in the Nordic Arctic between Norway and Russia.

Arctic Impact of the Nordic Peace

The Nordic countries played an important yet often overlooked role in shaping the security landscape in Northern Europe during the Cold War. They transformed a potential flashpoint into a low-tension area. This stems from the idea of the Nordic Peace, an ad-hoc peace that came about in 1814, the year the Napoleonic Wars ended for the Nordics. The newly elected crown prince of Sweden, Charles John, implemented Swedish neutrality and non-alignment (Barton, 1930). This changed the Nordic region from a belligerent one to

one that would develop a strong preference for the conflict (Rekving, 2024). Since 1814, there have not been any intra-Nordic wars.

Nordic Peace is the historical backdrop that helped establish conflict resilience and enabled the Nordic countries to counter traditional realist doctrinal thinking. Consequently, the remarkable transformation of NATO's northern flank from one of high tension to low tension was accomplished by balancing hard deterrence with reassurance policies directed at the Soviet Union. This was especially true for Norway, a NATO founding member, bordering the Soviet Union and near the Kola Peninsula, home to a central part of the Soviet nuclear deterrence arsenal.

As part of these reassurance policies, Norway instituted self-imposed military restrictions: the base policy that banned foreign military bases on Norwegian soil in peacetime, the nuclear policy that barred nuclear weapons from Norwegian soil, and geographical restrictions that did not allow military exercises in North-Troms and Finnmark counties bordering the Soviet Union, nor east of 24 degrees east longitude (Børresen et al., 2004). These policies signaled to the Soviet Union that Norway understood the security concerns they had in the high north, especially as the Nazis invaded the Soviet Union from this border area in WWII.

Building on reassurance, Norway and the Soviet Union signed a cultural agreement in 1956, making Norway the first Western country to do so. This agreement encompassed sport, film, music, dance, and other cultural activities in the border area and was described as an opening in the *Iron Curtain* (Jentoft, 2014). These

cultural exchanges had a deeper fundamental meaning for the people in Northern Norway, reactivating memories of centuries of interaction with the Russians. For example, the Pomor trade involved Russian traders from the White Sea area exchanging tools and grains for fish (Niemi, 1992). And more importantly, when the cultural collaboration started, the liberation in WWII was fresh in memory. Norway was liberated by the Red Army in 1944 and was the only territory that the Soviets entered but then unilaterally withdrew from after WWII.

Following the cultural exchanges was scientific collaboration from 1957 onwards focused on managing fisheries in the Barents Sea (Russian Norwegian Fisheries Commission, n.d.). The Norwegian Russian joint fisheries commission was in 1975 and shared the quota equally (Government of Norway, 1976). This collaboration is still ongoing today and has shown remarkable resilience in spite of the war in Ukraine. The survival of the fisheries is existential for Norway and is relies on working with Russia, and halting this collaboration will not resolve the war in Ukraine.

Parallel to fisheries management, negotiations started to resolve the disputed maritime boundary in the Barents Sea. The negotiations continued until 2010 when an agreement on the boundary was reached based on compromise and a near-equal division of the area (Henriksen et al., 2011; Neumann, 2021; Office of the Prime Minister Norway, 2010).

These comprehensive trust-building activities stemmed directly from the conflict resilience that the Nordic Peace tradition had

established with clear patterns for conflict resolution through dialogue, compromise, and acceptance of supranational frameworks, rather than military confrontation and war.

The Arctic as a “Zone of Peace” was introduced by Mikhail Gorbachev in his 1987 Murmansk speech (Gorbachev, 1987). He proposed to make the entire circumpolar Arctic a nuclear weapons free zone and zone of peace. His message was a break from the confrontations of the Cold War and signaled a genuine wish to further reduce tensions with the West and end the nuclear weapons race. This seminal speech validated the Norwegian reassurance and trust-building model and laid the foundation for Arctic circumpolar collaboration in the post-Cold War period.

Post-Cold War Institutional Integration

With the dissolution of the Soviet Union in 1991, new opportunities arose in the Arctic. The Barents Euro-Arctic Council (BAEC) was established in 1993 with the Kirkenes Declaration comprising northern Norway, Sweden, Finland, and Northwest Russia (Kirkenes, 1993). This initiative was made possible thanks to the comprehensive trust-building that took place during the Cold War. The decades of cultural exchange, science collaboration and diplomacy, alongside the self-imposed military restrictions, established a foundation of trust that enabled this rapid institutionalization of the region. The BAEC region is home to approximately 5 million people.

The Arctic Council was established in 1996 and expanded the cooperative framework to the circumpolar level, manifesting a new vision

for Arctic governance based on collaboration, rather than strategic competition. These institutions were focused on people and thus helped create new narratives of community. They also included Indigenous groups and organizations as permanent participants (Bloom, 1999). The institutional frameworks were directly responsible for shaping collective memory of how negotiations, compromises, and constructive conflict resolution created good relations. Working groups, joint projects, and frequent meetings integrated and established an effective practice for working across traditional walled-off sectors. The Bar-ents cooperation especially established people-to-people initiatives that revived historical relations to increase understanding across the region. The Nordic Peace and the conflict resolution principles after 1814 were instrumental in the success of establishing the institutional architecture for post-Cold War governance.

New international agreements came from the collaborative framework now in place. One important treaty is the Central Arctic Ocean Fisheries Agreement (CAOFA) of 2018 (Harte, 2023). This treaty prohibits unregulated commercial fishing in the central Arctic Ocean for 16 years while comprehensive scientific evaluations are being done. The treaty encompasses the five littoral Arctic states, plus Iceland, Japan, South Korea, China, and the EU, and thus demonstrates how Arctic governance is expanding beyond the boundaries of the Arctic.

Current Disruptions and the War in Ukraine

The war in Ukraine marked a fundamental break in Arctic governance and brought the post-Cold War period to an end. Now in the

post-post-Cold War, institutional frameworks that had been built over decades came to a halt overnight. The Arctic Council suspended all activities involving Russia, and the Barents Euro-Arctic Council soon followed. This dramatic change represented more than diplomatic formalities; it affected how countries in the Nordic Arctic conceptualized Northern relations. The carefully constructed narrative of the Arctic as a zone of peace had to yield to memories of strategic confrontation and ideological divides. The return to a time of deterrence, but this time without reassurance, ended a most successful Nordic Cold War doctrine. Today, most of the reassurance policies are suspended. Norway now has foreign military bases on Norwegian soil in peacetime, allows military exercise in Finnmark county and east of 24 degrees east longitude, and the city of Tromsø is a port for U.S. attack submarines. This marks a paradigm shift where hard power is prioritized over dialogue. Couple with the end of neutrality for Finland and Sweden as they have joined NATO, this makes the Arctic Council in essence a NATO council plus Russia. The functions the Nordics had as bridgebuilders are now gone.

Lessons for Antarctica

The experience of the Arctic carries some important lessons for Antarctica when it comes to international cooperation. As in Antarctica, the Arctic has had strong frameworks for science collaboration and institutional integration through different forums like the Arctic Council or the Barents Euro-Arctic Council. This collaboration transcended ideological differences during the Cold

War and enabled Arctic exceptionalism after the fall of the Soviet Union. However, after the war in Ukraine broke out, the system that enabled decades of peaceful collaboration collapsed practically overnight. As such, it serves as a warning. What was thought to be a highly robust system turned out to be fragile when war came to an adjacent region. The Arctic is still at peace, but it is a low-quality peace today and continues to deteriorate. While the Antarctic treaty, a product of the Cold War, has remained intact since 1959, the Arctic case shows that a high-quality peace cannot be taken for granted. The disappearance of the Cold War reassurance policies that once built trust between ideological adversaries underscores that peace requires constant preservation and vigilance. This becomes especially true today as strategic competition increases globally. Antarctica as a demilitarized zone and its dedication to science will require vigilance to avoid the trajectory that the Arctic has followed. It is worth to look back to the Nordic approach during the Cold War to build mutual trust and understanding in a multipolar global order

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Chapter 10

Peace under Pressure: The Challenge of Militarization near Antarctica

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Abstract

This chapter examines how peace and militarization coexist uneasily in the world's southernmost regions. It analyzes the United Kingdom's enduring military presence in the South Atlantic, the growing involvement of the United States, and the controversy surrounding the installation of the LeoLabs radar in Tierra del Fuego (Argentina). These cases are understood not as isolated events but as expressions of a broader global trend of geopolitical competition in the region. Together, they reveal a wider pattern of strategic rival-

ries, in which states seek presence and readiness as instruments of influence. Recognizing these dynamics is about understanding the structural forces driving this expanding military footprint in an era of shifting global balances. The central question, therefore, is how to prevent such dynamics from extending into Antarctica—preserving it as a genuine zone of peace and cooperation amid intensifying geopolitical tensions.

1. Introduction

In May 2025, Pope Leo XIV met with the United States Vice President of the United States JD. Vance and Secretary of State Marco Rubio. During the traditional exchange of gifts, the Pope presented a bronze sculpture inscribed in Italian: “Peace is like a fragile flower” (Sherlock, 2025; Vatican News, 2025). This gesture sets the context for the present analysis of the geopolitics of peace.

Peace has a long-standing academic tradition as a field of study (Galtung, 1969), evolving into a multidimensional field, including peacebuilding, development, conflict, and geopolitics (Conca & Dabelko, 2002; Fathi, 2025; Galtung, 1996; Megoran & Dalby, 2018). Additionally, Latin America has made significant contributions to peace research, such as in recent publications and forums (Dominguez & Oelsner, 2023; Lozano, 2025; Maschietto & Mouly, 2025).

This chapter also builds on the literature about Antarctic geopolitics, which examines the peace-and-science status quo and the critical views of China and Russia as revisionist actors (Boulègue, 2023; Dodds, 2025). In contrast, other research focuses on the

power projection of Anglophone countries in the Antarctic region (Lorenzo et al., 2025; Lorenzo & Estenssoro, 2024), particularly in areas linked to the South Atlantic (Arpi & Press, 2021; Espach, 2021). This chapter contributes to that line of inquiry by analyzing how the United States and the United Kingdom project their interests in the South Atlantic and in the Isla Grande de Tierra del Fuego (Argentina) to assess their influence on the continuity and expansion of the Antarctic peace framework. In turbulent times (Liang et al., 2025), understanding the global power shifts enables us to design forward-looking policies to shape the future.

To examine how these global and regional dynamics take shape on the ground, this chapter adopts an empirical approach that connects the geopolitical with the territorial. By tracing concrete developments in the South Atlantic and the southernmost part of South America, it seeks to illuminate how structural transformations in global politics manifest in local settings.

2. Methods

The research was conducted using a qualitative research design, based on diverse primary and secondary sources. This included government documents, mainly for the United Kingdom and the United States. This evidence was triangulated with international and Argentine media, think tank reports, and other relevant scholarly sources.

I adopted an open-ended and systematic approach for data analysis, marked by iterative review of the material. Rather than relying

on a “top-down” framework with pre-defined variables and indicators, I adopted a more inductive, “bottom-up” method. During this phase, I aimed to provide a comprehensive account of each unit of observation by engaging closely with the material and assessing its theoretical significance. Through repeated reviews, I identified key analytical themes. This research approach is grounded in a detailed description aimed at addressing the political dimension of social realities (Friedrich, 1963).

The analytical axes were aligned with the geographies under study—the South Atlantic and the southernmost region of the South American continent, particularly Ushuaia and Tolhuin in Tierra del Fuego—selected to examine different contexts of the militarization near Antarctica. The temporal scope began with the contemporary situation (October 2025) and traced the historical evolution of the phenomenon.

It is important to note that Argentina refers to the territory as the “Islas Malvinas,” whereas the United Kingdom refers to it as the “Falkland Islands.” This chapter adopts the term “Malvinas Islands,” except when the term occurs within quotations from British actors.

The study also recognizes its limited scope, focusing solely on the United States and the United Kingdom and excluding other global actors in the regions of interest. Nonetheless, these cases offer empirical evidence to address the central objective.

Building on this framework, the chapter contributes to the understanding of peace from a Latin American geopolitical perspective (Lorenzo, 2023).

3. Emerging Dynamics in the South Atlantic

3.1 British Military Activities in the Malvinas Islands

The South Atlantic remains a region of economic and geopolitical relevance, linked to global shipping routes and natural resources (Leoni et al., 2025). It also includes the ongoing sovereignty dispute between Argentina and the United Kingdom over the Malvinas Islands, South Georgia, South Sandwich Islands, and surrounding waters, an issue regularly addressed by UN resolutions. Recent academic work has highlighted the economic activities associated with hydrocarbon and fishing resources (Berardi, 2024; Bilmes & Sala, 2022; Garrido-Quiroz, 2024), which form part of the broader context in which British military activities take place.

In 1985, the United Kingdom established a military complex in the Malvinas Islands shortly after the Malvinas War. The following year, in 1986, the then Commander of British Forces in the area acknowledged the strategic importance of maintaining full control over the position to prevent adverse consequences for British geopolitical interests (De La Billiere & Bolton, 1986). This situation remains largely unchanged: in November 2024, the UK Defence Minister Luke Pollard reported an estimated 830 personnel stationed as part of the ongoing military presence (UK Parliament, 2024).

In 2021, the British government released “Global Britain in a Competitive Age: The Integrated Review of Security, Defence, Development and Foreign Policy” (HM Government, 2021). The document reaffirmed the colonial status of the Malvinas Islands, South

Georgia, South Sandwich Islands, and their surrounding maritime waters, stating that the United Kingdom “will continue to defend the UK’s sovereignty of the Falkland Islands, South Georgia and South Sandwich Islands and ensure the interests of the 3,500 people who live there are protected in line with the principle of self-determination (HM Government, 2021, p. 64).

In 2024, David Cameron, the UK Minister for Foreign Relations, visited the Malvinas Islands and said that if they want to be part of the British family, they will receive support. He emphatically said, “Hope this happens for a long time and possibly forever” (France 24, 2024). This visit illustrates how the British military development in that region results from strategic decisions made in London.

During the same year, British Forces South Atlantic Islands trained in the Malvinas with the Falkland Islands Defence Force, the Royal Navy, and the Royal Air Force (BFSAI [@BFSouthAtlantic], 2024). In 2025, personnel from the Malvinas joined a two-week training program in Jamaica alongside other Overseas Territories forces (Bermuda Regiment, 2025). These activities foster interoperability and reaffirm Britain’s control and occupation of the Malvinas Islands, challenging the multilateral declarations of the South Atlantic as a zone of peace and cooperation (ZOPACAS, 2023).

Taken together, these activities indicate that British defense arrangements in the Malvinas Islands remain central to the United Kingdom’s posture in the South Atlantic. The combination of permanent personnel, modernization efforts, and political statements reflects the United Kingdom’s enduring geopolitical interest in the region and its ongoing projection toward the Antarctic.

3.2 AUKUS-Related Developments and the South Atlantic

In September 2021, Australia, the United Kingdom, and the United States established the AUKUS security alliance to counter China's growing influence in the Indo-Pacific. For Australia, AUKUS strengthens regional security; for the United Kingdom, it supports a post-Brexit strategic recalibration; and for the United States, it forms part of its broader competition with China.

Although centered in the Indo-Pacific, AUKUS reinforces strategic alignment among the same actors operating in the South Atlantic, strengthening the broader security posture from which the United Kingdom projects influence toward the Antarctic region.

Meanwhile, the founding members of this trilateral alliance have initiated talks with Japan, Canada, New Zealand, and South Korea to collaborate on various aspects of the partnership. This phenomenon of expansion has intensified significantly in 2024 (Business Standard, 2024; Defence Ministry, 2024; Johnson & Dominguez, 2024; The Canadian Press, 2024). Moreover, Australia paid 500 million U.S. dollars (February 2025) to the US naval industry to ensure the readiness of the U.S. industry for the technology transfer.

However, the Pentagon conducted a review of the AUKUS agreement since June 2025 (Shelbourne, 2025), triggering speculations about the alliance's future (Edel, 2025). This uncertainty prompted Australian experts to emphasize the crucial need for a clear strategic message to China (Denmark & Edel, 2025). Nevertheless, the issue remains high on the bilateral agenda, as shown by Prime Min-

ister Anthony Albanese's formal visit to Washington in late October 2025 (Butler, 2025).

Several points help contextualize AUKUS within broader strategic dynamics. The alliance among U.S. allies -specifically Australia and the United Kingdom - aimed to counter China's influence in the Indian Ocean. This can be interpreted not only as a regionalization of the broader U.S.-China global dispute, but also as a strategic imperative for Australia, which is regionally interested in maintaining a deterrent presence alongside Western nations. These countries are members of the North Atlantic Treaty Organization (NATO). While this does not mean AUKUS is a NATO initiative, it may be functional for strategic reasons.

In sum, this section has shown the persistence of a process of militarization in the South Atlantic centered on the Malvinas Islands. This control allows the United Kingdom to project power toward Antarctica, while the broader military presence and capability development—through infrastructure, equipment, and troop deployment—links regional dynamics with extra-regional alliances such as AUKUS. Despite the geographical distance between the South Atlantic and the Pacific, both spaces reveal a shared logic: the expansion of military presence by NATO members in areas adjacent to the Antarctic region.

The geopolitical dynamics observed in the South Atlantic extend across the continental margins of South America, where the southern provinces of Argentina play an increasingly visible role in global strategic calculations. The following section focuses on Tierra

del Fuego—specifically on Ushuaia and Tolhuin—as key locations where external powers project their presence and test new forms of geopolitical influence in proximity to Antarctica.

4. Strategic Dynamics in Tierra del Fuego

4.1 Ushuaia: local developments connected to U.S. Strategic Narratives

In recent years, U.S. officials have repeatedly expressed concerns about perceived vulnerabilities and geopolitical competition in South America, particularly in relation to China. When viewed from Tierra del Fuego (Argentina), these narratives intersect with concrete episodes in Ushuaia, where visits, meetings, and defense-related interactions have drawn increasing attention.

On January 19, 2023, the Atlantic Council interviewed U.S. Southern Command Commander Laura Richardson. She emphasized the abundant natural resources: “Why does this region matter? With all its rich resources and rare earth elements. You’ve got the lithium triangle, which is needed for technology today. 60% of the world’s lithium. is in the lithium triangle, Argentina, Bolivia, Chile.” In the same line, she added, “You have Venezuela’s resources as well with oil, copper, gold (...) We have the Amazon, lungs of the world. We have 31% of the world’s freshwater in this region too”(Richardson, 2023a). However, the U.S. Southern Commander tends to associate the region with vulnerability and instability.

The U.S. Southern Command asserts that developments in the region are directly linked to U.S. national security inter-

ests. As stated by Commander Laura Richardson, “This region absolutely matters to the national security of our country” (Richardson, 2023a). She identified three primary threats to the United States in the area: strategic competition with the People’s Republic of China, Russia, and transnational criminal organizations. Regarding China, she expressed concern about the country’s growing influence in the development of critical infrastructure and its expansion through the Belt and Road Initiative (Richardson, 2023a).

In August 2023, Laura Richardson was interviewed by Karian Bingen at the Center for Strategic and International Studies (CSIS). She described China’s activities in the region as “malign,” arguing that the country focuses on resource extraction rather than investment. She emphasized the importance of critical infrastructure—such as deep-water ports, telecommunications, space facilities, and the Strait of Magellan—in understanding China’s geopolitical strategy, citing the Panama Canal as a dual-use asset serving both commercial and military purposes (Richardson, 2023b).

In March 2024, two developments converged: rising U.S. concerns about China and renewed focus on the Chinese space facility in Argentina. That month, Laura Richardson, in an interview with Alex Ward at the Atlantic Council, reiterated her concerns about the region, describing the Chinese deep-space station as “a huge concern” due to its 50-year lease, limited Argentine access, and status as one of only three such facilities worldwide (Richardson, 2024). In relation to the U.S.

Southern Command's views on South America, Argentina is not exempt from the U.S.–China geopolitical rivalry.

During the same month, U.S. Ambassador to Argentina Marc Stanley was interviewed by *La Nación*. He criticized China's growing presence in Patagonia, stating: "It surprises me that Argentina allows Chinese armed forces to operate in Neuquén, in secrecy, doing who knows what." Stanley claimed that "soldiers from the Chinese army operate this space telescope". He questioned the lack of transparency: "I don't know what they're doing, and I don't think the Argentines know either — and they should understand why the Chinese are deployed there"(Rosenmberg, 2024).

While U.S. officials often frame Chinese activities as threats, little evidence is provided to substantiate military intent, reflecting the performative dimension of security discourse in the region. These statements were followed by a series of visits and public events in 2024.

In April, Argentine President Javier Milei met in Ushuaia with U.S. Ambassador Marc Stanley and General Laura Richardson of U.S. Southern Command, along with senior Argentine officials (Casa Rosada Presidencia, 2024). The Ushuaia meeting clearly signaled Argentina's strategic alignment. Rather than an isolated visit, it suggested that local Antarctic-related infrastructure is being drawn into U.S.-oriented security frameworks. The exclusion of provincial authorities reinforced perceptions of a growing external influence.

In his official remarks, Milei stated that the United States aimed to "monitor progress on the integral naval base and strengthen

friendship and cooperation”, highlighting Argentina’s readiness to align its Antarctic projection with U.S. strategic interests (Casa Rosada Presidencia, 2024). Ushuaia therefore emerges not only as a center for Antarctic operations but also as a node in a widening network of security interests in the Southern Cone.

In August 2025, during the South America Defense Conference (SOUTHDEC 25) in Buenos Aires, the U.S. Southern Commander Alvin Hosley explicitly stated that China’s presence in the Southern Cone near sea lines of communication, such as the Strait of Magellan and Drake Passage, challenges the national sovereignty of South American countries and the Antarctic neutrality (U.S. Southern Command, 2025). This statement illustrates the geopolitical rationale underpinning the U.S. presence in Argentina, in the context of its strategic competition with China.

Local media coverage reveals that the presidential decree authorizing the presence of US Marines in Ushuaia generated resistance from political parties in Tierra del Fuego. *Diario Prensa* (2025) published “Critics for the presence of U.S. marines in Ushuaia,” noting recent cold-weather training near the Martial Glacier—a key water reserve located close to the city center. According to the article, a National Legislator (Unión por la Patria) requested a report from the Executive Branch on the legal basis for the exercises, inquiring whether the Marines accessed strategic facilities, obtained Antarctic-related information, or handled classified material (*Diario Prensa*, 2025).

Moreover, the local press in Tierra del Fuego published the article “Strong opposition to the DNU that authorizes marines in Ush-

uaia" (Diario Fin del Mundo, 2025), highlighting Senator Pablo Blanco perspective (Radical Civic bloc, Juntos por el Cambio). Although ideologically closer to the National Government, he joined other politicians in opposing the Executive Branch when sovereignty issues arose—particularly its alignment with the United States.

The article features Tierra del Fuego legislator Pablo Blanco, who argued the issue was not legislative delay but last-minute changes by the Executive Branch, including adding Ushuaia to the exercise sites. He linked this to Milei's trip to the U.S. to meet President Donald Trump, noting that "the timing reinforces doubts about ongoing negotiations in terms of defence and sovereignty" (Diario Fin del Mundo, 2025). The article underscores the institutional gravity of the presidential decree authorizing joint exercises with U.S. forces and highlights how global power interests in the province challenge Argentina's sovereignty.

International reporting echoed these tensions. In October 2025, the BBC News World published "Operation Trident. Milei's controversial decision allowed U.S. soldiers to conduct military exercises at 3 naval bases in Argentina (Caro, 2025). The article discussed the September 2025 Emergency Decree authorizing U.S. troops to enter Argentina for Operation Trident, held at the Mar del Plata, Ushuaia, and Puerto Belgrano naval bases from October 20 to November 15, 2025 (Caro, 2025).

The article notes that Argentina's National Constitution requires authorization from the Parliament. For this reason, Milei's decision was justified by an exceptional situation and linked to "a strong

financial support plan to address the economic crisis afflicting the South American nation". It does not mention foreign debt; instead, the wording is that "the United States committed to providing financial support to the Argentine government, including granting loans and purchasing bonds and debt" (Caro, 2025).

However, the article includes criticism from political parties that question the support of the United States for the economic strategy deployed by the Argentine government, and highlights the geopolitical relevance of Ushuaia in relation to the Antarctic Region and to Argentina's claim over the Malvinas Islands (Caro, 2025).

Furthermore, the article mentions that Admiral Alvin Hosley (United States Southern Command) visited Ushuaia twice, aiming to counter China's influence in Latin America (Caro, 2025).

While the presence of U.S. forces in Ushuaia reveals how traditional military instruments are being reactivated in the southern cone, the controversy surrounding the LeoLabs radar in Tolhuin shows that militarization today also unfolds through technological and infrastructural domains. Together, these cases demonstrate how security logics are increasingly intertwined with military and commercial projects in spaces once perceived as peripheral.

4. Tolhuin: The LeoLabbs Radar controversy

In an increasingly connected world, space has become a major commercial domain poised for rapid growth. The World Economic Forum estimates that the global space economy will expand from USD 630 billion in 2023 to USD 1.8 trillion by 2035 (World Eco-

nomic Forum, 2024). Low-Earth orbit is also becoming crowded: by the end of 2022, about 6,700 operational satellites were in orbit—double the number in 2020—offering more services but also new challenges. (OECD, 2023).

However, the sector's rapid expansion has sharply increased space debris, raising serious environmental concerns. In February 2025, a CNN journalist reported debris from Blue Origin and SpaceX rockets on a beach in the Bahamas (Wattler, 2025). Tony Frazier, CEO of LeoLabs, told journalist Morgan Brennan that China is heavily investing in space, recently launching the first 18 satellites of a planned 14,000-satellite constellation to rival Starlink. However, the rocket's second stage exploded, creating 700 pieces of debris. Frazier warned that low-Earth orbit is becoming dangerously overcrowded—with up to 50,000 objects expected by decade's end—raising serious environmental concerns (Tony, 2024).

Beyond commercial growth and environmental impacts, the military dimension of space and satellites also deserves attention. In June 2023, SpaceX signed a Department of Defense contract to provide satellite communications for Ukrainian forces (Stone & Roulette, 2023). Karian A. Bingen, Director of the Aerospace Security Project and Senior Fellow in the Defense and Security Department at the U.S. think tank CSIS, wrote in "Extending the Battlespace to Space" (September 2025) that "space is now central to the day-to-day conduct of armed conflict" (Roulette et al., 2025). Russia targeted a commercial satellite network, disrupting Ukrainian military communications. Over the following three years, Ukraine received more than 50,000 Starlink terminals to maintain connectivity on

the battlefield and ensure communication for hospitals, schools, and critical infrastructure (Bingen, 2025). A 2025 Reuters Special Report noted that, on Musk's orders, Ukrainian troops suddenly faced a communications blackout when Starlink service was shut down over parts of Ukraine in 2022 (Roulette et al., 2025).

According to Charlie Metcalfe, Elon Musk's satellite internet service has been vital to Ukraine's defense. His report "On the Ground in Ukraine's Largest Starlink Repair Shop" describes a volunteer network of users and engineers known as "The People's Starlink," founded in March 2022. This group operates Ukraine's largest Starlink repair facility, supporting pilots, soldiers, and broader communication efforts (Metcalfe, 2025).

Although the southernmost part of the continent is often perceived as remote, the installation of the radar in Tolhuin — a city located in the Argentine part of the island of Tierra del Fuego — has sparked significant controversy because, according to experts, the radar represents a risk to national sovereignty due to the potential dual use of the information that can be collected from Low Earth Orbit (LEO). This issue must be understood in the broader context of the growing importance of outer space as both a commercial and military domain.

In 2023, the retired Lieutenant General Juan Martín Paleo released the article "9 July: sovereignty, military strategies and spatial field" (Paleo, 2023). Two key factors for foreign readers are that INFOBAE is a national newspaper in Argentina and that the publication date coincides with the country's Independence Day. These elements highlight the symbolic dimensions of the article.

The article has a clear objective: “to alert at a strategic military level, the risks to the national sovereignty that derive from the operation of the radar antenna facility for tracking low-orbit satellites, operated by the British-owned company LEOLABS in the province of Tierra del Fuego, Antarctica, and South Atlantic Islands” (Paleo, 2023).

Paleo says the radar can be of dual use: civil and military. The article introduces the LEOLABS company with the main branch in the United States (California), composed of British capital, whose board of directors includes “former members of the U.S. Department of Defence and U.S. intelligence community, as well as the Royal Australian Air Force” (Paleo, 2023). The article also warns the readers, saying this company has radar in countries that are part of the “Five Eyes”, such as the United States, Australia, and New Zealand. This radar generates information that can be shared between the intelligence community.

Despite the initial consent, debates continue at different levels of government regarding who will bear the cost of dismantling the radar (Minuto Fuego, 2025). At this point, it is essential to note that the current national government in Argentina has a strong preference for maintaining close alignment with the United States and has expressed its intention to join NATO (2024). Meanwhile, the radar remains installed in the Tierra del Fuego province, reportedly inactive. Its continued presence indicates an interest in preventing its removal, benefiting those positioned to exploit the information from its potential operation. This leads to the next point.

Despite the controversy, some perspectives continue to support the establishment of the LeoLabs radar in Tolhuin. In *La Nación*, one of Argentina's leading newspapers, the journalist Fernández Blanco published an article on this topic on October 4, 2025. From this article, I would like to highlight some points that shed light on the current debate.

This journalist points out that there were previous political decisions before the radar installation. He referred to the government of the previous President Alberto Fernández (Frente para la Victoria), pointing out that he had authorized and later revoked the decision during the same administration. So, the rationale is clear: it can not be exclusively associated with the current government of President Javier Milei, which has a libertarian political orientation.

Although sovereignty is highly relevant to the radar debate (Paleo, 2023), the journalist deliberately avoids the term, as well as any discussion of the interests held by the U.S. Embassy in Argentina and the LeoLabs company.

The journalist acknowledges that the notion of the 'British radar' is operating in the discursive sphere in the province of Tierra del Fuego, and this is an obstacle to the development of the project. In consequence, the reference to the U.S. Embassy serves to shift the geopolitical framing and generate political support for the initiative (Fernández Blanco, 2025).

The article concludes: "Argentina has an increasingly rich history of space-related controversies. In this sense, the Tolhuin radar aims much lower" (Fernández Blanco, 2025). This remark can be read as

an attempt to downplay the issue—suggesting such projects are not new in Argentina—or as a justification for the radar, acknowledging China’s greater advances in the field (Fernández Blanco, 2025).

In the current political context, the Tolhuin radar controversy gained new relevance after Milei’s U.S. trip to seek funding. Reports suggested the negotiations included authorizing U.S. military exercises in Tierra del Fuego—formalized two days later through a presidential Emergency Decree, bypassing Congress. The media also linked this to the radar’s reactivation, discussed in this section.

The controversy over the LeoLabs radar illustrates a new form of technological militarization, where civilian and commercial infrastructures gain strategic value. Tolhuin thus becomes part of a transnational network of dual-use facilities, revealing the growing overlap between space surveillance and territorial security.

The developments in Ushuaia and Tolhuin, though distinct in nature, converge in a broader pattern: the growing entanglement between defense imperatives, technological infrastructures, and geopolitical rivalries. This convergence challenges the idea that the southernmost regions can remain insulated from global power dynamics. It is against this backdrop that the following conclusions reconsider the meaning and fragility of peace in the Antarctic context.

5. Conclusions

Antarctic peace is integral to the geopolitics of peace. The status quo in the Antarctic region has the potential to serve as a source of global inspiration, demonstrating that states can resolve differ-

ences through diplomacy. However, the militarization of areas near Antarctica challenges this peace, as military capabilities, forces, and infrastructure expand for defense, control, or power projection. Notably, this process involves global actors who are members of the Antarctic Treaty System and profess commitment to Antarctic peace.

In the South Atlantic, the enduring British presence in the Malvinas Islands represents a legacy of unresolved sovereignty disputes. From the British perspective, this presence responds to defense and logistical needs; however, it also establishes a lasting geopolitical footprint near the Antarctic region. Similarly, in the southernmost areas of South America, U.S. initiatives and infrastructure have drawn attention, reflecting broader efforts to maintain regional influence within a shifting security landscape.

Signs of militarization near Antarctica are also evident across the southernmost part of South America, where U.S. operations have attracted significant media coverage. These activities underscore Washington's geopolitical interests and have provoked criticism from various sectors within Argentina's political arena. Moreover, the installation of the Leolabs radar has heightened national security concerns, deepened political divisions, and triggered international repercussions.

Both the Malvinas Islands and the island of Tierra del Fuego share a common feature: U.S. and British interests indicate an expanding military presence by NATO members in the region.

Although these dynamics do not necessarily imply a military expansion on the continent—which remains protected under the Ant-

arctic Treaty System—they do highlight the fragility of peace in the surrounding areas. The challenge lies in ensuring that actions taken in the name of national security do not erode the spirit of collective stewardship that underpins the Antarctic experiment.

As reminded by the sculpture that Pope Leo XIV gifted to the Vice President of the United States, JD Vance, “peace is a fragile flower”.

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Chapter 11

Pathways through Permafrost: Lessons from Arctic Shipping, Ocean Technology, and Environmental Stewardship for the Antarctic and the Southern Ocean

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Abstract

Climate change is having a significant impact on Earth's polar regions; effective mitigation measures are urgently needed. The integration of cutting-edge ocean observation technologies, such as autonomous underwater vehicles (AUVs) and gliders, will play a pivotal role in enhancing real-time understanding of ice dynamics, water properties, and ecosystem conditions. When embedded within maritime operations, these technologies contribute significantly to risk reduction and the sustainable navigation of increasingly trafficked Arctic routes. As ice levels in the Arctic (and the Southern Ocean surrounding Antarctica) continue to decline, it is a kind of self-fulfilling prophecy that demand for icebreakers will intensify in the coming years, as maritime traffic is expected to

increase in those (still quite frozen and treacherous) regions. Relevant findings from the “Future Ocean Programme” of the Sasakawa Global Ocean Institute of the World Maritime University (WMU) further emphasize the need for a blueprint for emerging ocean technologies, one that addresses legal, geopolitical, safety, data, and financial challenges, while also taking into account risks such as operational autonomy and accountability for these systems, their ecological impact on marine life, liability gaps, fragmented ocean data, and the development of a unified global ocean governance framework.

Importantly, lessons from both the Arctic and the Antarctic can provide complementary insights into how humanity manages global commons such as the high seas and polar oceans, ensuring environmental protection while enabling responsible innovation and navigation.

1. Introduction

As ice levels in the Arctic recede, shipping routes throughout the broader region are drawing increased attention by numerous state governments worldwide, as well as by influential stakeholders in shipping and environmental affairs. The Arctic marine ecosystem, along with the indigenous and local communities that rely on it for their livelihoods, is undergoing profound and historically unparalleled transformations driven by rising atmospheric temperatures, diminishing sea ice coverage, and increasing oceanic heat content (Drewniak, et al., 2021; Hildebrand et al., 2018; Johansson and Donner, 2015). These environmental

shifts are not only altering biodiversity patterns and disrupting traditional ways of life, but also threatening the long-term viability of subsistence practices, food security, and socio-economic stability in the region.

The Arctic region is warming twice as fast as the rest of the world (Collins et al., 2013). By mid-century, projections indicate that the Arctic Ocean may experience ice-free conditions for up to half the year. Under these circumstances, the Northwest Passage (NWP) could become navigable for two to four months annually, while the Northern Sea Route (NSR) might remain open for maritime traffic for three to six months per year (Poo et al., 2024; Stewart et al., 2020; Wagner et al., 2020). With less ice, crossing the Arctic Ocean in service of maritime transport is an increasingly attractive option, given the shorter distances compared with other more 'conventional' routes. Specifically, the Northwest Passage (NWP) of North America and the Northern Sea Route (NSR) of Eurasia can be effectively employed by the maritime industry to bypass traditional, longer routes, which often rely on costly and restrictive Panama or Suez Canal transits. For example, researchers suggest that the Northern Sea Route (NSR) could emerge as a commercially attractive alternative, offering a significantly shorter maritime link between select European and East Asian ports and reducing piracy threats along the traditional Suez Canal route (Devyatkin, 2018; Zhang, Meng, and Zhang, 2016). This naturally directs a spotlight onto the most critical vessel for capitalizing on this change: the icebreaker.

Furthermore, changes in sea ice patterns influence ocean stratification, nutrient distribution, and the timing of phytoplankton blooms, which are essential for the Arctic marine food web. Arctic marine ecosystems host an extraordinary diversity of life, including over 2,000 algal species, tens of thousands of microbes, more than 5,000 animal species, including polar bears and narwhals, and vast colonies of seabirds, with many species yet to be discovered (Michel et al., 2013). Current taxonomic records underestimate total biodiversity, with numerous species still undescribed due to observational constraints and the logistical challenges of Arctic research. The intricate and region-specific ways in which Arctic ecosystems respond to environmental change highlight the urgent need for long-term marine observation systems throughout the region to inform effective conservation and sustainable management efforts (Gauthier et al., 2013; Lemieux et al., 2025; Michel et al., 2013).

A range of autonomous platforms and sensor technologies is essential for monitoring the Essential Ocean Variables (EOVs) outlined by the Global Ocean Observing System (GOOS), which aim to harmonize data collection efforts across global observational networks. These variables span physical and biogeochemical domains, including sea ice, ocean temperature, currents, salinity, heat exchange, bottom pressure, oxygen, nutrients, and carbon compounds, alongside critical biological and ecological indicators. While notable advances have been made in tracking physical and chemical EOVs, the ability to directly observe biological and

ecosystem components remains comparatively underdeveloped (Muller-Karger et al., 2018; Pastra et al., 2025).

Given the ecological complexity and rapid environmental changes in the Arctic, the deployment of autonomous underwater technologies is considered essential for sustained observation. These platforms, including gliders, autonomous underwater vehicles (AUVs), and ice-tethered profilers, enable the year-round collection of data on EOVs, including biological EOVs such as phytoplankton and zooplankton biomass and diversity. Equipped with advanced sensor suites, including optical sensors for chlorophyll fluorescence, acoustic Doppler current profilers (ADCPs), biogeochemical sensors, particle imaging systems, and environmental DNA samplers, these autonomous systems can monitor marine environments with increasing spatial and temporal resolution, even in harsh and remote regions. Such technologies are uniquely suited to overcome the spatial, temporal, and logistical limitations of traditional ship-based surveys, particularly in ice-covered or remote areas. Figure 1 lists all the EOVs identified by the Global Ocean Observing System (GOOS) and their potential for measurement using autonomous underwater technologies.

Antarctica as a Model for Global Peace

Physics	Biochemistry	Biology and Ecosystems
Sea state	Oxygen	Phytoplankton biomass and diversity
Ocean surface stress	Nutrients	Zooplankton biomass and diversity
Sea ice	Inorganic carbon	Fish abundance and distribution
Sea surface height	Transient tracers	Sea turtles abundance and distribution
Sea surface temperature	Particulate matter	Seabirds abundance and distribution
Subsurface temperature	Nitrous oxide	Marine mammal abundance and distribution
Surface currents	Stable carbon isotopes	Coral cover and composition
Subsurface currents	Dissolved organic carbon	Seagrass cover and composition
Sea surface salinity		Macroalgal canopy cover and composition
Subsurface salinity		Mangrove cover and composition
Ocean surface heat flux		
Ocean bottom pressure		

Figure 1: Essential Ocean Variables (EOVs) Identified by GOOS and Their Measurability Using AUVs

Note: Blue color indicates the variables that can be easily measured using appropriate sensors fitted on AUVs

From the above, it is evident that the development of Arctic shipping cannot be separated from the introduction and practical application of new technologies aimed at increasing the monitoring of biodiversity and the safety of operations. In this context, the advancement of Arctic navigation is closely linked to the deployment of emerging technologies, such as unmanned underwater vehicles and aerial drones, which are critical for improving operational safety in such harsh and dynamic environments (Johansson et al. 2023; Pastra et al. 2023, Wan, Bäumlér, and Dalaklis, 2024). These technologies are essential for producing high-resolution environmental data and enhancing predictive modeling, thereby playing a critical role in maritime safety and marine science through real-time monitoring of sea ice, weather conditions, and ecological changes.

2. Main Challenges for Unmanned Ocean Technologies and Icebreakers

2.1 The Legal and Geopolitical Challenges

The Northern Sea Route (NSR), which lies within Russia's Exclusive Economic Zone (EEZ), and the Northwest Passage (NWP), which passes through the EEZs of multiple countries, including the United States, Canada, and the Kingdom of Denmark, are currently the two principal Arctic shipping corridors. Russia has asserted regulatory authority over the NSR through a combination of domestic legal measures and significant infrastructure investments. This includes the strategic expansion of Arctic port facilities, the development of a powerful fleet of nuclear and diesel-powered icebreakers, and

the implementation of a legal framework mandating that foreign vessels seek prior authorization and comply with Russian regulations while transiting the route (Boylan, 2021). Despite objections from other maritime powers concerning the compatibility of such practices with international maritime law, Russia's control over the NSR has remained largely uncontested in practice and deeply institutionalized.

In contrast, the legal status of the Northwest Passage remains fraught with uncertainty and international dispute. Canada claims that the waters of the NWP, which run through its Arctic Archipelago, are internal waters under its exclusive sovereignty. On this basis, it asserts the right to regulate all navigation, with no obligation to allow foreign vessels to exercise rights of innocent passage or of transit passage. However, this position is strongly contested by states such as the United States and members of the European Union, who argue that the NWP constitutes an international strait. According to this interpretation, navigation through the passage should be governed by the United Nations Convention on the Law of the Sea (UNCLOS) provisions that preserve the right of transit passage for vessels engaged in international navigation.

The growing strategic and commercial interest in the NWP underscores the need for a more coherent and universally accepted governance regime. As Arctic sea ice continues to melt and seasonal accessibility improves, stakeholders such as shipping companies, flag states, insurers, and environmental regulators will increasingly require legal clarity regarding the applicable jurisdictional and regulatory frameworks. The urgency for standardized navigation proto-

cols, environmental protections, and safety measures is amplified by the fragile ecological conditions of the Arctic and the operational hazards associated with polar navigation.

The United Nations Convention on the Law of the Sea remains the cornerstone of international ocean governance. It provides the overarching legal framework for defining maritime boundaries, assigning coastal state rights and duties, and regulating environmental protection and the use of ocean resources. Of particular relevance to Arctic navigation is Article 234, found in Part XII, Section 8 of UNCLOS. This provision enables coastal states to adopt and enforce stricter laws in ice-covered areas within their EEZs to prevent marine pollution. Given the Arctic's unique climatic and geographic conditions, Article 234 has played a critical role in legitimizing enhanced regulatory powers for states such as Russia and Canada, particularly in terms of environmental controls, mandatory reporting, pilotage requirements, and icebreaker escort obligations for foreign vessels. In practice, Article 234 has served as the legal foundation for Russia's enduring assertion of control over the NSR. Since 1965, no foreign-flagged ship has traversed the route without first securing permission from Russian authorities (Conley, 2013). This enduring compliance, whether driven by pragmatism or geopolitical calculation, reflects the *de facto* acceptance of Russia's regulatory authority, despite persistent concerns over its alignment with international law.

Similarly, Canada continues to invoke Article 234 in support of its claims over the NWP. Its position, however, remains subject to intense scrutiny and resistance from other maritime powers. While

Canada argues that its internal waters are not subject to international navigation rights, opposing states claim that the NWP, by its functional use, qualifies as a strait used for international navigation, where the right of transit passage must be upheld. This view inherently challenges Canada's ability to deny access or impose unilateral conditions, including restrictions on innocent passage, which UNCLOS permits in territorial seas under specific conditions. As Arctic accessibility increases due to climate-induced ice loss, the interpretation and continued relevance of Article 234 are coming under new scrutiny. Emerging debates question whether this provision can still justify enhanced jurisdiction in regions that are no longer ice-covered year-round. If the environmental preconditions that once justified Article 234's application begin to diminish, so too might the legal basis for extraordinary regulatory powers under its authority.

These evolving legal interpretations and jurisdictional assertions have significant implications not only for commercial shipping but also for scientific and environmental operations, particularly the deployment of unmanned ocean observation platforms such as gliders and Argo floats. As coastal states assert increasing control over Arctic waterways under provisions like Article 234 of UNCLOS, the status of autonomous or semi-autonomous floating devices operating in or transiting through these waters may become legally contentious.

While such platforms are primarily used for environmental monitoring, climate science, and biodiversity assessments, their operation in waters claimed as internal or subject to enhanced ju-

risdiction could be viewed by some states as requiring prior authorization or compliance with national regulations. For instance, gliders that drift across multiple jurisdictions or Argo floats that surface periodically to transmit data via satellite may be perceived as engaging in activities subject to coastal state control, especially in zones where environmental regulation is tightly enforced for strategic or ecological reasons. This presents a challenge for the scientific community, which relies on the widespread deployment of these instruments for baseline data collection across ocean basins, including the Arctic. The lack of precise legal classification for such devices under existing maritime law raises the risk of operational restrictions, seizure, or political disputes, particularly in areas with overlapping claims or heightened geopolitical sensitivity. As legal frameworks continue to evolve in response to technological change and environmental pressures, there is a pressing need for international agreements or interpretive guidance that clarify the permissible use and legal status of floating observation technologies in contested or environmentally sensitive maritime zones.

Adding to the complexity is the dual-use potential of many ocean observation technologies, including gliders and Argo floats. While these platforms are primarily designed for environmental monitoring, their capacity to collect high-resolution oceanographic data, such as temperature and salinity, can also be exploited for military and strategic purposes. The possibility that such devices could be used for hybrid operations, blurring the line between civilian science and national security, raises critical concerns in the context of Arctic governance. Coastal states may view the presence

of unmanned systems in their jurisdictional waters as a security threat, especially in regions adjacent to sensitive infrastructure or chokepoints.

These challenges may also be applicable to certain situations involving icebreakers. Although icebreakers are widely regarded as indispensable assets for Arctic navigation, scientific research, and emergency response, their operation is increasingly shaped by the evolving legal and geopolitical landscape. For example, foreign-flagged icebreakers seeking to assist commercial vessels or conduct joint scientific missions may be required to obtain prior authorization from coastal states, particularly where Article 234 of UNCLOS is invoked to justify enhanced environmental and navigational oversight. Moreover, the dual-use nature of icebreakers, frequently equipped to serve both civilian and military functions, raises questions about their status under international maritime law, especially when operating near disputed boundaries or in politically sensitive waters. Some coastal states may perceive the presence of foreign icebreakers as a strategic encroachment, potentially leading to diplomatic friction or the imposition of restrictive policies. These dynamics underscore the need for clear bilateral or multilateral agreements governing icebreaker operations in contested Arctic zones, particularly as traffic increases and international collaboration becomes more essential for safety and environmental stewardship.

2.2 The Safety Challenges

It is a self-explanatory fact that the continuous warming of the Arctic atmosphere and ocean is driving broad change in the region-

al environmental system; the overall situation of ice retreat in the region is, to say the least, breathtaking (Diebold et al., 2023). As already highlighted, the Arctic's physical environment is subject to significant changes, with diminishing sea-ice coverage, declining snow cover, and melting ice sheets standing out. On the other hand, it is this hefty reduction of Arctic sea-ice which is facilitating the opening of new shipping lanes and the increase in maritime traffic in the area (Cao et al., 2022) and is also providing greater access to highly valuable natural resources, (i.e., oil, natural gas, various minerals, large fisheries reserves), especially during the summer months. As ice coverage in the Arctic Ocean continues to diminish, additional ships are operating in this still frozen and treacherous region, and many of these vessels are specially constructed for such conditions. Statistics clearly show a rise in shipping activity in the area, driven by the reduction in sea ice, which has shrunk from 6.1 million square kilometres in 1999 to 4.3 million square kilometres in 2019 (PAME, 2020). At the same time, the number of days when navigation is feasible for voyages across the Arctic Ocean, from the Pacific to Atlantic Ocean or vice versa, is projected to increase—from about 70 days currently to 125 by 2050 and up to 160 by 2100 (Cariou & Fauray, 2015).

However, it is essential to note that the Arctic is still lacking crucial infrastructure support necessary to ensure safe passage for ships. Examples include the absence of fully updated navigational charts, the lack of high-quality weather services integrated with real-time navigational warnings, and inadequate means to address large-scale pollution incidents. Such events could have devastating impacts on

the region's habitat and disrupt the lifestyles of local indigenous communities. Oil spills, a significant risk in offshore drilling, could be catastrophic due to the difficulty of containment and cleanup in such a remote and hostile environment. Studies have shown that oil spills in cold-water environments can persist for longer periods compared to temperate regions, exacerbating their ecological impact (Peterson, Cumming and Carpenter, 2003). It should also be emphasized that historically, the lack of robust search and rescue (SAR) services in the Arctic has not been problematic because human activity in the region has been equally lacking. However, recent environmental, economic, and military activities threaten to alter the delicate balance. The forecasted increase in human activity in the Arctic from both ships and aircraft operating there in the coming years is expected to place higher demands on the existing SAR infrastructure (Christodoulou et al., 2022) therefore, enhancing cooperation among concerned nations in this remote region should be a high priority.

Cutting a long way short, a growing number of business entities already operate within (or, have considered to exploit) the Arctic region, focusing on previously untapped resources such as precious minerals and large quantities of oil and gas; tourism and fishing activities are clearly on the rise, with various initiatives of maritime transport also being put forward. On the other hand, poor charts, unreliable navigational aids and lack of infrastructure/support are obstacles difficult to overcome; the availability of icebreakers to keep the passages open and to escort vessels is another pressing issue (Dalaklis et al., 2018). To reap the benefits while avoiding environmental disasters in the Arctic, there is a need to strengthen available

support; icebreakers provide the ideal platform. Some may assume that decreased levels of ice coverage simply result in a corresponding decrease in demand for vessels to break ice. However, further investigation reveals the reverse is true. While overall ice coverage is certainly decreasing, ice thickness in some areas may still increase, making navigation more unpredictable (Hodges, 2015). Icebreakers should be approached as a necessary element to lessen the existing navigational safety risks as more shippers choose to operate in the Arctic region, and to ensure long-term stability and safety.

The significance of this type of vessel (icebreaker) becomes apparent from the need to reduce navigational risk through traditionally treacherous waters due to increased shipping volumes; the same is also true for the deployment of ocean observation technologies, which enable high-resolution environmental monitoring and predictive modeling to support maritime safety and sustainability. Unfortunately, as nations with jurisdictional claims in the Arctic Ocean attempt to address this challenge by amplifying their icebreaking fleets and oceanographic capacities, it is evident that execution of such enhancements often tends to fall short of recognized needs. For the time being, the availability of icebreakers is likely adequate to handle the limited level of traffic. However, since traffic is expected to increase, additional measures of support should also be introduced. Moreover, very low temperatures and ice remain major hindrances to shipping operations in the Arctic. The availability of icebreakers is, and will continue to be, essential to maintain a clear path for ships traveling in the region and to respond quickly in case of emergencies.

2.3 The Data Challenges

Globally, data sovereignty remains a contentious issue, as overlapping claims and ambiguous legal frameworks raise disputes over ownership, access, and jurisdiction concerning data collected in sensitive or contested maritime zones. Despite the abundance of Arctic-related data, much of it remains fragmented and difficult to locate, access, or synthesize effectively, particularly in the context of marine biodiversity, where data gaps persist across spatial, temporal, and taxonomic scales (Barry et al., 2023; Lemieux et al., 2025). This fragmentation of ocean biodiversity data hampers the ability to detect long-term trends, assess ecosystem health, and develop cohesive conservation strategies, especially as environmental pressures accelerate and decision-makers increasingly rely on comprehensive, high-resolution datasets to guide marine policy and resource management (Wetzel et al., 2018; Pastra et al., 2025). Ensuring that data collected by underwater technologies and technologies fitted on icebreakers comply with the FAIR principles—making them Findable, Accessible, Interoperable, and Reusable—is essential, particularly since many datasets still fall short of international standards and often lack the metadata required for effective integration and interpretation (Wilkinson, Dumontier and Aalbersberg, 2016).

2.4 The Financial Challenges

Advancing Arctic shipping and ocean innovations is both practical and essential for mitigating climate-related disruptions and strengthening the adaptability of global trade routes (Poo et al.,

2024). Investments in Arctic shipping safety are crucial and reflect the necessary expenditures to enhance maritime safety in the region. These include funding for icebreaker capacity, reliable weather and ice information services, icebreaker assistance, pilotage, safety training for personnel, well-equipped ports, and government-led hydrographic initiatives (Wan, Bäumler, and Dalaklis, 2024). The Arctic's remoteness, sparse infrastructure, and high operational costs deter private investment, while public funding remains limited and fragmented across national and regional jurisdictions. Addressing this gap requires the creation of innovative financing mechanisms and stronger international coordination. One promising approach is the development of Arctic-specific public–private partnerships (PPPs) that align commercial interests with long-term sustainability and safety goals. In parallel, multilateral development banks and climate finance institutions could play a catalytic role by offering concessional loans or blended finance models tailored to Arctic conditions.

European investments in polar research have been significantly shaped by strategic funding through the Horizon 2020 and Horizon Europe framework programmes. (European Commission 2025). These initiatives have supported a diverse array of scientific efforts aimed at deepening understanding of polar systems and advancing technological and policy solutions suited to extreme environments. The body of research funded under these programmes underpins key policy frameworks such as the European Green Deal, the EU Arctic Strategy, and the European Ocean Pact by delivering transparent, multidisciplinary, and policy-relevant scientific evidence.

When considered cumulatively, EU-funded research across both frameworks amounts to a total investment of €790 million in polar science. Of this, the Arctic region has received the largest share, with 179 projects funded at a total of €474 million, and the Antarctic has also benefited from 98 dedicated projects, supported by €216 million in funding (European Commission 2025). Additionally, 51 projects with a broader, pan-polar scope have been allocated €100 million.

3. The Future Ocean Program and the Need for a Blueprint for Emerging Ocean Technologies to address the challenges

The Future Ocean Programme (2024-2028) of the Sasakawa Global Ocean Institute of the World Maritime University, funded by the Nippon Foundation, adopts a long-range perspective on ocean governance, focusing on the critical decisions that will shape the future of ocean governance from 2024 to 2074, mainly in areas beyond national jurisdiction. Central to this vision is addressing the triple planetary crisis posed by rapid biodiversity loss, climate change driven by human activity, and the escalating pollution of the oceans, particularly from plastics. In this context, Pillar 3 of the Programme focuses on the creation of a blueprint for harnessing the potential of emerging ocean technologies and Artificial Intelligence. This need stems from the rapid advancement of emerging technologies, which prompts critical reflection on their ethical deployment, ecological consequences for marine environments, and the pressing need for coordinated international oversight. The

establishment of international standards and a clear blueprint is crucial for facilitating the broad adoption and efficient implementation of ocean observation technologies (Alexandropoulou et al., 2021; Johansson, 2022; Johansson et al., 2023; Trivyza et al., 2024; Pastra et al., 2025). Core concerns include questions surrounding control and access to data, the protection of privacy and intellectual property, and liability for harm arising from the use of such technologies in the marine environment (Bilawal Khaskheli et al., 2023). Addressing these challenges necessitates the development of comprehensive legal instruments at the international level to ensure responsible and equitable use.

This strategic blueprint has the potential to facilitate the widespread adoption of innovative approaches and technologies in polar regions. By offering a structured pathway for implementation, it can help mobilize a broader range of stakeholders, from policy-makers and industry leaders to scientific institutions and local communities. In doing so, it fosters inclusive dialogue and coordinated action aimed at addressing the multifaceted legal, data-sharing, safety, and financial challenges previously outlined. Crafting such a blueprint involves evaluating both current and anticipated legal norms and risks related to the development, deployment, and use of robotics and AI in marine settings.

The risks to be considered in the development of a blueprint for unmanned technologies, including cases where they are deployed alongside icebreaking operations, are as follows and will be further explored in the Programme:

- **Operational Autonomy and Accountability.** As ocean observation technologies evolve into autonomous and hybrid systems, the removal of direct human oversight introduces unknown variables that may lead to unintended environmental consequences, including transboundary harm. In such cases, questions arise regarding how established legal principles, such as the *precautionary principle* and the *polluter pays* doctrine, would apply when causality and accountability are unclear.
- **Ecological Impact on Marine Life.** Autonomous technologies deployed in marine environments may pose physical and behavioral risks to wildlife. Collisions with marine species, coupled with the disruptive effects of underwater noise and artificial lighting, can interfere with vital behaviors such as foraging, reproduction, and migration. The cumulative presence of such systems, particularly in biologically sensitive areas, could lead to long-term ecological imbalances.
- **Liability Gaps.** Currently, there is no unified regulatory framework that defines baseline environmental and safety standards for the use of unmanned ocean technologies. This includes a lack of clarity on liability provisions, environmental safeguards, and mechanisms to ensure that harm is either prevented or fairly compensated. The absence of such structures leaves legal and institutional gaps in addressing emerging risks.
- **Fragmented Data:** Despite technological progress, the collection of ocean data remains highly fragmented, with dis-

parate methodologies, platforms, and institutional mandates leading to inconsistencies in coverage, quality, and accessibility. This lack of coordination hinders the development of integrated, transboundary marine observation systems and limits the utility of collected data for comprehensive scientific and policy applications. To address this need, the World Maritime University-Sasakawa Global Ocean Institute (WMU), the Marine Biodiversity Observation Network (MBON), and the Atlantic International Research Centre (AIR Centre) have created a subject matter expert group to develop a higher-education curriculum on Ocean Data for Marine Biodiversity. The primary aim of the group is to develop a curriculum for interoperable ocean-biodiversity data, information management, and professional applications to be integrated into universities and other institutes.

- **Innovation Governance:** Without a coherent and globally articulated governance framework, innovation in ocean observation technologies risks becoming fragmented and poorly coordinated. This could result in overlapping or duplicative deployments that saturate the marine environment, leading to unforeseen systemic risks, inefficient resource use, and potential conflicts between commercial, scientific, and conservation interests. In general, in the maritime sector, it is evident that amid growing awareness of climate change's potential to disrupt trade, the shipping industry is under increasing pressure to adopt adaptation strategies; however, these efforts remain fragmented due to underdeveloped

policies and the absence of coherent global regulations (Jawara & Johansson, 2025). Adopting an inclusive and forward-looking strategy for ocean sustainability requires strong cooperation between port authorities, inland transport systems, and surrounding regions, enabling the regulatory framework to adapt and improve continuously over time (Doelle et al., 2023).

Within the Future of the Ocean context, the Arctic region stands out as a crucial frontier where the application of advanced ocean observation technologies can make a profound difference. As sea ice retreats and ecosystems face increasing vulnerability, AI-driven systems and autonomous sensors offer promising tools for monitoring, protecting, and managing marine biodiversity in this highly sensitive and rapidly changing environment. The Arctic thus represents not only a site of urgent environmental concern but also a proving ground for how cutting-edge technologies can contribute to conservation and sustainability. At the same time, this initiative calls for critical engagement with the social, legal, and ethical dimensions of these technologies, ensuring their deployment supports inclusive governance and responsible innovation.

The BBNJ Agreement plays a pivotal role in the Programme, paving the way for enhanced cooperation among Arctic and non-Arctic States in areas beyond national jurisdiction, where legal and regulatory frameworks have long been inadequate (Pastra et al., 2025). By introducing a mechanism to establish marine protected areas on the high seas, the treaty offers a crucial tool for addressing the ecological risks posed by climate change and growing economic activi-

ty in the fragile Arctic Ocean. Through its emphasis on collaboration with existing regimes, such as the CAO Fisheries Agreement and the IMO regulatory framework-the BBNJ treaty fosters more coherent and integrated ocean governance in one of the world's most rapidly changing marine regions.

4. The Way Forward for Ocean Observation Technologies in the Polar Regions

The emergence of next-generation ocean monitoring technologies has become instrumental in supporting safe and efficient maritime activity in the Arctic, especially when deployed alongside icebreaking operations. These innovations provide dynamic, real-time insights into critical environmental variables, such as sea ice extent, water salinity, and thermal conditions, thereby minimizing navigational risks in rapidly changing polar environments. In addition, these technologies play a crucial role in scientific research by enabling the continuous observation of marine life, offering essential data to evaluate ecosystem stability in the face of intensifying climate impacts. Advancements in compact and modular sensor technologies have significantly broadened the functional range of ocean observation systems, enabling their integration across diverse platforms and operational scenarios.

While these advancements are transforming operations and research in the Arctic, their relevance is equally critical for Antarctica, where extreme remoteness, harsher ice conditions, and limited logistical infrastructure create an even greater demand for robust, autonomous ocean observation technologies. Knowledge of how

Antarctica interacts with the wider Earth system, particularly along its coastal margins, remains limited, largely because of scarce data and the complexity of environmental processes (Heil et al., 2023). In this context, various national and international strategies relevant to the joint Ross Sea-Far East Antarctic Region (RSfEAR), such as the Southern Ocean Observing System 2021-2025 Science and Implementation Plan, consistently underline that the most significant barrier to progress in the Antarctic is the lack of ocean data, which constrains understanding of sea-ice-ocean linkages, sea-level rise, thermohaline change, and ecosystem resilience (Heil et al., 2023). Cutting-edge technologies form the foundation of the Southern Ocean Observing System (SOOS), a joint initiative of the Scientific Committee on Oceanic Research (SCOR) and the Scientific Committee on Antarctic Research (SCAR), enabling the collection of data on Essential Ocean Variables. These advances are reshaping Antarctic ocean science, as Argo floats now deliver unprecedented, year-round observations of the Southern Ocean interior to depths of 2,000 metres, while specialized polar floats provide critical access to regions beneath sea ice, and standard coastal or deep gliders enable real-time, multidisciplinary measurements across the water column. The deployment of autonomous platforms has significantly advanced the collection of carbon and biogeochemical data in the Southern Ocean, not only improving both the volume and quality of available measurements but also enabling continuous, wide-scale coverage across regions that were previously under sampled (Newman et al., 2022).

Emerging ocean observation technologies are rapidly evolving to offer advanced capabilities, including exceptional manoeu-

vrability, resistance to extreme pressure, and extended operational endurance in deep-sea environments. While current systems often require human oversight for deployment, navigation, and data retrieval, future innovations are expected to operate autonomously, minimizing or eliminating the need for direct human intervention. These next-generation platforms will be equipped with artificial intelligence and decision-making algorithms, allowing them to adapt to changing conditions, self-regulate their missions, and recharge through automated docking and energy transfer systems. Already, the scientific community is deploying sophisticated instruments such as hadal landers, capable of reaching depths between 6,000 and 11,000 meters in the hadal zones. As technological capabilities continue to advance, we are on the threshold of a new era marked by the widespread, networked deployment of autonomous observation systems across even the most inaccessible parts of the global ocean.

Advancing autonomous underwater vehicle (AUV) applications in the Arctic requires robust international cooperation, grounded in peaceful, science-driven principles. Existing agreements, such as those coordinated through the Arctic Council and the implementation of the IMO Polar Code, should be reinforced and adapted to explicitly support the responsible use of AUVs in polar environments. At the regional level, collaboration with Arctic coastal communities is essential, not only to ensure culturally informed practices but also to expand participation in the evolving architecture of future observation systems. In Antarctica, the absence of permanent human settlements and sovereign coastal states makes the deploy-

ment of AUVs primarily an international undertaking, coordinated through the Scientific Committee on Antarctic Research (SCAR) and the Committee for Environmental Protection (CEP) under the Antarctic Treaty Consultative Meetings. Advancing autonomous underwater vehicle applications in Antarctica, therefore, demands not only technical resilience to extreme conditions but also the development of a governance 'blueprint' that aligns with the Antarctic Treaty System (ATS) principles.

Equally vital is the establishment of transboundary data-sharing mechanisms that facilitate interoperability, reduce redundancy, and support joint climate and biodiversity assessments. Advancing scientific research in the Southern Ocean and the Arctic Ocean requires the deployment of diverse and innovative technologies; however, their impact will remain limited unless the resulting observations are managed in accordance with FAIR principles and supported by standardized, reproducible methodologies. The adoption of open standards and interoperable tools is essential to ensure that polar region data contribute meaningfully to global observing efforts, coordinated through the Global Ocean Observing System (GOOS). Ultimately, it is only through international cooperation and the integration of regional programmes, such as those coordinated by SOOS, that high-quality, accessible, and policy-relevant data can be delivered to address the pressing scientific and societal challenges associated with the polar region.

To enable the mass utilization of emerging ocean technologies in both polar and non-polar regions, there is an urgent need for a comprehensive blueprint that addresses the full spectrum of asso-

ciated challenges. This blueprint must confront legal, geopolitical, safety, data, and financial dimensions, while also accounting for risks related to operational autonomy and accountability, ecological impacts on marine life, unresolved liability gaps, and fragmented ocean data systems. Crucially, it should lay the foundation for a unified and inclusive global ocean governance framework, ensuring that these technologies are deployed responsibly, sustainably, and to the benefit of the global community.

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Chapter 12

Beyond Ice and Borders: Civil Society as Planetary Actor

Lessons from Antarctica on Political Possibility and Imaginative Governance

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Abstract

This chapter examines the important role of environmental NGOs and civil society in Antarctic governance, focusing on how imagination, persistence, and long-term strategies have expanded political possibilities within the Antarctic Treaty System (ATS). Starting in the late 1970s, NGOs began to challenge the secretive Antarctic Treaty System, pushing for more transparency and accountability. While Antarctic Treaty states were negotiating a mining regulatory framework, NGOs instead promoted an ambitious vision for Antarctic environmental protection, including the creation of a "World Park Antarctica" that would make the entire continent off-limits to extractive activities. They also played a central role in landmark achievements including the development of Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR), the adoption of the Madrid Protocol (banning all minerals activities indefinitely and creating a modern environmental protection framework for the region), and the designation of the Ross Sea Marine Protected Area. By persisting even when their ideas were dismissed as unrealistic, NGOs ultimately made significant contributions to Antarctic environmental protection and helped steer Antarctic governance towards a strong conservation ethos. The chapter argues that bold

civil society action remains essential in the face of climate change, growing human pressures, and stalled decision making within the ATS. Lessons from Antarctica demonstrate that forward-thinking advocacy, patience, and collaboration can turn visionary ideas into international policy, offering guidance for civil society engagement in global environmental governance.

1. Introduction & Problem Description

Since the late 1970s, environmental civil society has played a key role in motivating the Antarctic Treaty System to adopt ambitious conservation and environmental protection policies. Today, the countries involved in the governance of Antarctica express pride in the strong focus within the ATS regarding environmental protection. However, these successes were not easily achieved, and policy proposals initially faced significant opposition. NGO actors were at first unwelcome at Antarctic governance meetings and faced significant obstacles in gaining formal observer status. Nevertheless, NGOs have had a clear impact on Antarctic policy and governance ever since they became involved and began influencing the system. This impact can largely be credited to the fact that NGOs presented imaginative and ambitious proposals and advocated for them persistently, even when told by governments that their ideas were unrealistic. This chapter will explore the role of NGOs in bringing imagination to Antarctic governance and, in doing so, expanding notions of what was politically possible among Antarctic Treaty nations. Due to their status as organizations outside government, civil society groups have more freedom to promote innovative and un-

precedented policies. By making use of this greater flexibility and employing long-term strategies, NGOs achieved major victories for Antarctic environmental protection.

The world is facing enormous environmental challenges, including climate crisis and biodiversity loss. These are international problems that require international solutions, and leadership from individual states is crucial. The primary way nations currently engage with these issues is through various international organizations, such as the Conferences of the Parties (COPs) of the United Nations Framework Convention on Climate Change (UNFCCC) and the Convention on Biological Diversity (CBD). The pace of progress within these bodies has been frustratingly slow, and is even moving backwards at the UNFCCC, as nations either disavow climate change as a threat or refuse to follow through on emissions reduction commitments. Despite these challenges, NGOs and activists continue to ask for ambitious action, which at times can feel out of step with political reality.

When nations are explicitly turning away from making environmental issues a priority, asking for massive emission cuts or the designation of large protected areas may seem like a lost cause. Even sympathetic commentators or public officials will tell NGOs that they should water down their demands. Our personal experiences within the Antarctic Treaty System have firmly convinced us that “going big” with respect to policy asks is not only viable, but also *required* to achieve any meaningful outcomes. At the time of this writing in 2025, many environmental NGOs and civil society actors are facing serious uncertainty about their ability to make

progress in Antarctica and elsewhere due to a tense geopolitical environment dominated by conflict between states. It is important for those in civil society (including our own organization) to maintain and even increase their ambition despite these discouraging trends. Societal progress has never been made through half measures. If we want to live in a better world, we must first decide what that world should be and then create a map to get there.

2. Current Context & Update

The Antarctic Treaty System is currently facing an important test: can it stick to its traditional principles of environmental protection, precaution etc., or will it shift at a time when those principles are most in need of being put into practice?

When the Antarctic Treaty was signed in 1959, it was carefully constructed and ambitious. Governing an entire continent collectively was unprecedented, and the Treaty was a welcome example of international cooperation during the height of the Cold War. The subsequent operation of the Treaty, however, indicated that the Treaty Parties had simply established an exclusive club – albeit one based on lofty principles of peace and scientific cooperation. Publicly available information on discussions during meetings where decisions were made (called Antarctic Treaty Consultative Meetings or ATCMs) was limited, and there were no observers.



Figure 1: The French and Japanese representatives at ATCM II, 18-28 July 1962 in Buenos Aires. © Antarctic Treaty Secretariat (ATS). Source: Antarctic Treaty System Image Bank. <https://imagebank.ats.aq/index/C0000sclbO.rkPac/G0000OcQaS4Z-BH.w/I0000fNo16MUI7So>

Today, many more countries have ratified the Treaty and are therefore able to take part in decision making, thereby expanding the Antarctic “club”. There are more observer organizations, including scientific and industry organizations, as well as UN agencies, which participate actively in meetings. More importantly, the issues facing the continent are quite different, including climate change, growing fishing and tourism industries, and invasive species. However, the sterling reputation of the ATS is unfortunately at risk, precisely when the world needs models for cooperation on environmental protection. Few binding decisions on key issues such as climate change, protected areas and tourism have been taken in recent years, and there are prolonged formal discussions on even

modest conservation proposals. For example, Ukraine has engaged in multiple rounds of consultation with other Antarctic Treaty Consultative Parties (ATCPs) over the designation of an Antarctic Specially Protected Area (ASPA) that would cover only 1.84 km² (Ukraine 2025). This lack of progress toward consensus on a wide range of environmental issues has led to greater scrutiny. Some commentary portrays the system as no longer adhering to “fundamental governing principles” such as the precautionary approach (Goldsworthy et al., 2024). One analysis noted that “the system may face new challenges if the customary collaborative approach is not promptly restored.” (Arpi et al., 2022).

Protecting a changing Antarctic

The 1991 Environmental Protocol and the 1980 CAMLR Convention are remarkable agreements. They enshrined tools and principles for environmental protection that were cutting edge for their time, and that remain surprisingly fit-for-purpose in addressing today’s environmental challenges. But those tools and principles must be implemented to be effective, and they are severely underused. Below, we examine some of the biggest issues facing Antarctica from a civil society perspective, and how current ATS discussions have been proceeding.

Climate change

Climate change is already putting Antarctic ecosystems at risk and changing how Antarctica and its surrounding Southern Ocean

function in key planetary systems¹. While climate change has been on the agendas of both the ATCM and CCAMLR for years, neither body has been able to adopt a comprehensive response, even though many promising ideas have been proposed by states and civil society. Thus, the countries of the ATS find themselves in an odd situation. They are the ones funding much of the high-quality scientific research that has revealed the dramatic and numerous impacts of increasing CO₂ emissions. They are also the ones who generate a large proportion of those emissions and have made pledges at the UNFCCC to reduce emissions, not to mention statements about how seriously they take the issue. Despite the evidence revealed by their own science, and their global commitments, a small minority of countries has withheld consensus on decisions that would soften the heavy blow of climate change impacts in the Antarctic and help species adapt. These include creating protected areas, regulating tourism and fishing, and designating the highly climate vulnerable emperor penguin as a specially protected species.

The reasons for not agreeing to these actions are puzzling and often couched in language that may not express outright opposition, but ultimately result in a failure to achieve consensus, effec-

1 For an excellent overview of how climate change is affecting Antarctica, and how those changes impact the rest of the planet, see Chown, S.L., Leihiy, R.I., Naish, T.R., Brooks, C.M., Convey, P., Henley, B.J., Mackintosh, A.N., Phillips, L.M., Kennicutt, M.C. II & Grant, S.M. (Eds.) (2022) *Antarctic Climate Change and the Environment: A Decadal Synopsis and Recommendations for Action*. Scientific Committee on Antarctic Research, Cambridge, United Kingdom. www.scar.org. Updates to this report are available here: <https://scar.org/library-data/scar-publications/antarctic-climate-change-and-the-environment/acce-reports-to-the-antarctic-treaty-consultative-meetings-atcm>

tively killing the adoption of climate response policies. In 2021, efforts to revise the Climate Change Response Work Plan (CCRWP) of the ATCM's Committee for Environmental Protection (CEP) were broadly supported by "all but one Member" (ATCM 43 2021a). On other occasions, China has noted that "more research and monitoring efforts were required in order to understand the impacts of climate change on the Antarctic" (ATCM 42 2019). While ongoing research is essential to our understanding of regional and global climate impacts, a large body of evidence already supports science-based policy making is already available. However, when the Scientific Committee on Antarctic Research (SCAR) brought forward clear scientific advice and recommendations to the ATCM from the global Antarctic science community, China asked "whether SCAR was the appropriate body to provide policy recommendations" (ATCM 44 2022). SCAR has been the prime provider of scientific advice to the Treaty System for decades and has special status in the Antarctic Treaty (AT), CCAMLR, and Protocol.

Unfortunately, the fragmented and often siloed nature of international governance means that it has also been difficult to link Antarctic research on climate change to global action. States have often insisted on clear delineations between the work of various bodies, even when their interests overlap, as do those of the ATS and the UNFCCC. Although these delineations are artificially created by humans and can be changed, states often behave as if these agreements were as immutable as the law of gravity. This fragmented system of governance even leads to disconnects *within* a state. For example, Resolution 8 (2021) of the ATCM recommended that

Antarctic Treaty Parties convey information about climate change implications to their counterparts attending UNFCCC meetings. The Resolution also linked action at the global level to the Parties' commitment to the Environmental Protocol (ATCM 2021b).

That language may seem odd to those who do not attend international diplomatic meetings regularly – shouldn't their delegations already be aware of implications for Antarctica, since their governments are part of the ATS? In reality, this language was actually a welcome but atypical linkage between the work of the ATCM and another international body. Previously, the ATCM had not made that rather obvious link to the UNFCCC. A Resolution adopted at ATCM 2015 focused more on simply supplying scientific information "to support the objective of the 21st Conference of the Parties of the United Nations Framework Convention on Climate Change, which is due to be held in Paris in December 2015" (ATCM 2015). It was therefore encouraging that governments were willing to recognize the connection between their obligations under the Protocol and decisions made in another forum, even if that connection was made in a non-binding, hortatory resolution.

Since then, however, progress on climate change has been limited, with much discussion but few concrete actions taken. Recent efforts, supported by the vast majority of ATCPs, to designate the emperor penguin as a specially protected species have been blocked, with China stating that there was insufficient scientific justification, and Russia calling for further research (CEP, 2025). The emperor penguin is at high risk from global warming, and some colonies are already declining (Fretwell et al., 2025).

Increasing human activity

Despite Antarctica's remoteness, human activities such as tourism, fishing and scientific activity in the region have been increasing in recent years. Once again, the Treaty System has been moving slowly to manage these activities, despite many countries proposing new policies and regulations. Tourist numbers reached over 100,000 before the ATCM committed to establishing a comprehensive framework for the management of tourism. CCAMLR established a conservation measure in 2009 to ensure the krill fishery did not become overly concentrated in a small area, as this could impact the many species that feed on krill even if the overall krill population remained large. This was intended to be an interim measure to allow scientists to obtain data needed to distribute the catch in a precautionary way. That measure expired in 2024 but there was no consensus to renew it, so the fishery proceeded without even the basic precautionary regulation it previously had. The ATS now finds itself increasingly reactive regarding fishing and tourism, despite making repeated statements about the importance of taking action on these issues.

Tourism

Commercial tourism to Antarctica began in the 1960s and has grown rapidly since then, with the number of visitors exceeding 100,000 for the first time in the 2022-2023 season. This milestone was a major factor in the ATCM deciding in 2023 to engage in a process to develop a comprehensive and consistent framework for regulating Antarctic tourism. Currently, while there are some regula-

tions that apply to tourism, they are piecemeal and do not allow the activity to be managed effectively. Unfortunately, it appears that ATPs needed tourism to reach historic levels before committing to regulating it. Nevertheless, it is at least positive that countries are able to agree on the need for a comprehensive framework, and that they have agreed to devote significant time to the ATCM agenda.

But the road to adoption of the framework is likely to be a long one. During discussions at the 2025 ATCM in Milan, Parties at long last discussed concrete and actionable tourism regulations yet faced a long list of issues to discuss – everything from whether tourists should pay a fee to how to establish a program monitoring tourism’s impact on the Antarctic environment. Parties also still had a range of views on how the framework should be structured, whether it should take the form of a new legal instrument encompassing multiple regulations, or a series of separate decisions (ATCM 2025). It is critical for Parties to make progress on tourism regulation in the next few years. Tourism is currently growing and changing rapidly, and it is up to Antarctic Treaty Parties to ensure that a system is in place to prevent the industry from having a negative environmental impact. A recent forecast states that Antarctic tourism could reach half a million by 2033 if nothing is done to rein it in (Gibson 2025).

Fishing

When it comes to fishing, Antarctica’s remoteness is both a positive and a negative. It is positive because, although whaling, sealing, and fishing have all occurred and even caused population collapses, the Southern Ocean’s marine ecosystems remain less

disturbed than others (Halpern et al., 2008). Unfortunately, this relative health also means that many view the region as a new frontier for exploitation, especially as fisheries elsewhere have been exhausted. The organization that manages fishing in the Southern Ocean, the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) was founded by Antarctic Treaty Parties concerned about unregulated fishing in the region. They developed a new international agreement, the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR Convention) with conservation as its primary objective. The Commission has largely succeeded in establishing regulations for fishing, and in ensuring compliance with these regulations. Even more promising, in 2009, CCAMLR committed to the creation of a representative system of marine protected areas (MPAs) and established the world's first high seas MPA. Unfortunately, CCAMLR's reputation has dimmed in recent years, and the promised MPA system has yet to materialize.

Instead, there is growing interest in fishing for Antarctic krill (*Euphausia superba*), and the average yearly catch of krill is increasing (CCAMLR Secretariat 2025). In 2025 the fishery was closed early in the season due to having reached its maximum catch for the first time.

While the overall size of Antarctic krill biomass is enormous, the sharp increase in krill fishing is a serious conservation challenge. Krill fishing is concentrated in a few relatively small areas, which can result in localized depletion. Krill predators are therefore vulnerable to a temporary lack of availability of their primary food source. For breeding penguins and seals raising their chicks and pups, this

can be devastating. Unlike a krill trawler, they cannot travel hundreds of miles to find new sources of krill. Adding to the picture is one of the biggest conservation success stories of the 21st century – the recovery of the great whales after being severely depleted by whaling. Fin whales and humpback whales have rebounded, while blue whales are recovering more slowly. These whales require tremendous amounts of krill to survive. Fin whales have been shown to form “supergroups” of hundreds of whales that can consume krill at a rate similar to that of the most technologically advanced krill fishing vessel. Research has already shown that levels of fishing below the trigger level could cause negative ecosystem effects (Watters et al., 2020). In 2025, CCAMLR must address krill fishery management and the Antarctic Peninsula MPA again – the historically high catch may shock CCAMLR Members into investing extra effort to reach consensus. The demand for krill, which is primarily used for fishmeal for farmed fish and for omega-3 nutritional supplements only continues to grow.

Alongside these worrying developments in the krill fishery, CCAMLR has been unable to reach consensus on decisions concerning a wide range of conservation-oriented measures, while fisheries catch limits are largely approved routinely. ASOC has noted that the “burden of proof” seems to fall more heavily on conservation than on fishing, which is contrary to the intention of the Convention (ASOC 2023). Argentina has echoed this, stating that some Members were “requiring increasing amounts of scientific information ... to support decisions ensuring conservation, while very little is being required to authorise the use of those resources. If

similar amounts of information were required prior to any harvesting authorisations, fisheries would have serious difficulties” (CCAMLR 2018, paragraph 6.23).

The early history of ASOC demonstrates two important principles. One, civil society has fewer constraints than governments and is often best placed to introduce new ideas or imagine new possibilities for governance. Two, NGOs often eventually succeed even when their ideas are rejected or criticized as unworkable or unrealistic at first. Therefore, patience is required, and civil society organizations should not weaken their proposals, but rather, pursue a variety of tactics and be prepared for sudden shifts. In this section, we will explore how ASOC effectively implemented these two concepts and helped convince the ATS to implement ambitious Antarctic environmental protection measures.

As previously noted, initial meetings of Antarctic Treaty Parties were closed and little information was shared publicly about the decisions being made. There was little sustained civil society attention to the Antarctic region despite the fact that the modern environmental movement was well underway. In 1977, that all began to change. U.S. President Jimmy Carter initiated the concept of including civil society, scientists and business representatives on Public Advisory Committees. Jim Barnes was working at the Center for Law and Social Policy (CLASP) in its International Department, one of the first three public interest law firms in the U.S. Two CLASP attorneys (Dick Frank and Eldon Greenberg) were chosen to head NOAA and nominated Barnes to join the Antarctic Treaty (AT), Law of the Sea and Tanker Safety Committees. Committee members were

provided with low-level security clearances so they could review documents and participate in preparations for treaty meetings and negotiations.

That proved to be an eye-opener. Jim learned about a secret discussion and informal negotiation of a minerals convention, and about ongoing discussions concerning what to do about Southern Ocean fisheries collapsing due to uncontrolled and completely unregulated fishing by a few countries. Soon after, Jim was asked to serve on U.S. delegations to the AT, the Law of the Sea (UNCLOS negotiations), and the International Maritime Organization (IMO) for a new tanker safety treaty. In 1978, alarmed at the pace of the closed-door minerals talks, and frustrated by the absence of controls over fishing, Jim reached out to colleagues in the U.S., U.K., Australia, New Zealand and France to join in creating the Antarctic and Southern Ocean Coalition (ASOC), to share information and take coordinated actions about the vision of a World Park, a concept endorsed at the *1972 World Parks Congress* (IUCN 1972). The response was immediately positive – colleagues all over the world grasped the significance of Antarctica and the rationale for a World Park. ASOC began working to monitor all negotiations on fishing and minerals. Member groups in Australia created a Southern Hemisphere secretariat, while Washington, DC was the home of the Northern Hemisphere secretariat.

Environmental civil society had turned its attention to Antarctica at exactly the right time. The Antarctic Treaty Consultative Meeting in 1977 adopted Recommendation (IX-2) that called for the development of a new regime to protect Antarctic marine living re-

sources. Promisingly, the Recommendation called for a regime that conserved the “Antarctic ecosystem as a whole” (ATCM 1977). But because the Antarctic Treaty requires consensus, the question of how to regulate fishing involved an intricate ‘dance’ among the governments once actual negotiations began. Although only a handful of states engaged in fishing, many supported a typical RFMO (Regional Fisheries Management Organization) model focusing on regulating individual species based on the concept of “maximum sustainable yield” (MSY), which is defined as the largest catch that can be taken from a population without affecting its ability to reproduce in the long term. Although MSY had already faced criticism, it was still widely applied to manage fisheries, including in recent fisheries agreements, including the International Convention for the Conservation of Atlantic Tunas (ICCAT, 1966) and the Convention on Cooperation in the Northwest Atlantic Fisheries (NAFO, 1978). Environmental NGOs, then in their nascent stage, and scientific allies had new ideas about how to create this “ecosystem-as-a-whole” regime, based on ever-evolving science. This approach flipped the burden of proof so that harm to the species or ecosystem had to be proved. In the new regime, potential fishers would have the burden of proving that their fishing was safe.

ASOC worked quickly to seize the opportunity presented by discussions on a new international treaty that could rein in harmful unregulated Antarctic fishing. In 1979 and 1980 Jim worked with Dr. Sidney Holt (renowned fisheries and whale scientist) and Dr. Lee Talbot (IUCN Director General) to bring together an informal group including Dick Laws (head of the British Antarctic Survey) and

Robert Hofman (Chief Scientist of the U.S. Marine Mammal Commission). Their mission: propose a draft for an article in this new treaty that would write the ecosystem approach into international law. Then, they needed to obtain support from scientists to convince governments, especially the early fishing states, to agree. ASOC and IUCN convened two informal scientific workshops focused on drafting language for the key Article 2, using the principles contained in Holt's and Talbot's seminal paper published in 1978. In 1980 as negotiation of CCAMLR was coming to an end, Jim urged Dick Laws to explain to the delegates in Canberra what the Antarctic Marine Ecosystem was, and why the proposed ecosystem-as-a-whole wording was crucial. That lecture was a turning point. After private discussion between the scientists and Russia, it proved possible to find consensus on the agreement,

During this time, several ASOC member organizations were invited to be advisors on country delegations from 1979-82, including in the U.K, Australia, New Zealand, and the U.S. Their presence provided ASOC with a window into most aspects of what was happening behind closed doors. They also invested countless hours to ensure their delegations continued to support a strong ecosystem approach and resisted pressure to water down the concept. The result was Article II of the Convention for the Conservation of Antarctic Marine Living Resources (CAMLR Convention), which contains three key principles of conservation that represented a precautionary, ecosystem-based approach. In 1980, the agreement was adopted and swiftly ratified, entering into force in 1982.

With CCAMLR up and running, the Antarctic Treaty Consultative Parties (ATCPs) turned their attention to minerals. Since the mid-1970s, seismic reports of varying quality suggested huge oil and gas potential in coastal Antarctica, with periodic reports of gold and other minerals. These generated much discussion, leading ATCPs to analyze how to regulate extractive activities. Those resources were there, so the sensible next step was to make sure they were used “responsibly”. According to Tucker Scully, an official at the U.S. State Department at the time, “the question of Antarctic commercial resources is a genie that’s out of the bottle, and it’s got to be met.” (Large 1981) (see Figure 2). These claims drove the ATCPs to open formal negotiations in Wellington, NZ in 1982. ASOC and its member groups were ready, mounting daily demonstrations and generating substantial media coverage. An ASOC team produced the NGO newspaper ECO and kept the press informed about what was happening. Once again, ASOC representatives from several countries were invited onto their national delegations so we they an inside view. Greenpeace International led the World Park campaign within ASOC, and all member organizations provided support in an integrated global campaign structure. Over 200 environmental organizations supported the World Park campaign, a strong show of civil society, an impressive feat of international coordination in the pre-Internet era.

Antarctica as a Model for Global Peace

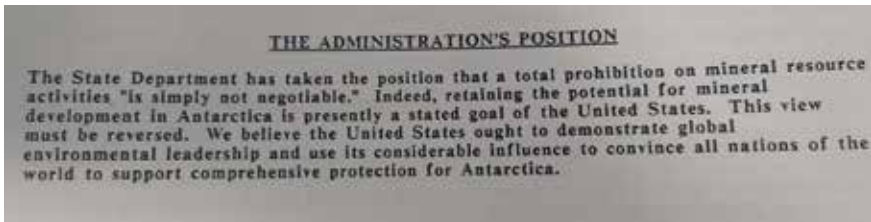


Figure 2: Excerpt from an internal ASOC memo about the official U.S. position on the minerals ban from the late 1980s, before the U.S. agreed to support the ban. (ASOC, n.d.)

Source: Photo copyright ASOC.

As discussions on minerals began to heat up, Malaysia made a proposal to the UN General Assembly (UNGA) in 1982 to consider The Question of Antarctica, meaning that such a large portion of the world was governed by a small club of countries. To further bring attention to the secretive system, Jim, along with colleagues Kelly Rigg and Cornelia Durrant, wrote background documents on behalf of Greenpeace for Malaysia and the Secretary General's office to help inform the debate. All ATCPs actively opposed even discussion of the topic, but by 1984 it became enshrined on the annual agenda, marking the beginning of some transparency for the global community. Greenpeace submitted detailed reports to the UNGA for each debate (Greenpeace International 1983, Greenpeace International 1986a and 1986b, *inter alia*), including leaked copies of the evolving text of what became the Convention on the Regulation of Antarctic Mineral Activities (CRAMRA). Up to that time, the global community had no access to the draft agreement. ASOC members used a form of direct action to make the drafts public.

Among the creative ideas put forward was Ghana's 1985 proposal for a "centralized, professional agency such as an Antarctic Environmental Protection Agency" under United Nations auspices. The UN debates helped expand international awareness about Antarctica and the major resource questions at stake. ATCPs could no longer do as they liked without scrutiny. To further stimulate discussion outside the ATS, ASOC turned to the International Union for the Conservation of Nature (IUCN). IUCN is an unusual organization because its membership includes both NGOs and governments. Every four years, IUCN holds a World Conservation Congress, at which all members vote on resolutions that establish the direction IUCN will take in the next four years. ASOC spearheaded a number of resolutions about CRAMRA and World Park Antarctica. These resolutions stressed both the need for transparency and civil society participation as well as substantive support for countries to abandon the "minerals quest". The World Park concept featured prominently in those resolutions. Ultimately, they helped change government positions.

As the ATCPs continued their minerals discussions around the world from 1984 to 1988, ASOC teams followed them, mounting demonstrations, producing press materials, and publishing ECO to promote World Park Antarctica. Millions of signed petitions were collected. In 1987 Greenpeace set up World Park Base at Cape Evans on the Ross Sea, near the U.S. and New Zealand bases, which became another major tool in the global campaign toolkit.² Being

² https://en.wikipedia.org/wiki/World_Park_Base

able to see first-hand how the U.S. and New Zealand managed their waste sites allowed Greenpeace and ASOC to show the world an ugly reality – that Antarctic scientific research and logistics activities were often polluting the Antarctic environment. That became a mini-campaign of its own. The Greenpeace World Park Base operated to a higher environmental standard on a small budget, demonstrating the feasibility of national research stations doing the same.

As discussions on the mining agreement, which came to be known as CRAMRA, continued, ASOC identified a few countries to target. CRAMRA would have to be adopted and ratified by all ATCPs to enter into force, and therefore even two claimant countries breaking the consensus would be difficult to undo. ASOC made a strategic alliance with the Cousteau Foundation in 1987 to share intelligence and work in concert to convince France to abandon CRAMRA. Jacques Cousteau had a huge international profile and influence, and his organization made a big difference in that effort. In Australia, Lyn Goldsworthy at Greenpeace and several other NGOs worked to convince Robert Hawke's government to also reject the minerals agreement. In 1989, formal negotiations were concluded and the final text of CRAMRA was unfortunately agreed. But the NGO pressure had worked: first Australia, and then France decided they couldn't ratify. Soon after their announcements, Spain, Belgium, Italy, and others began to shift away from minerals. CRAMRA was effectively dead.

The last piece of this puzzle is perhaps the most surprising. With consensus broken on the minerals question, most ATCPs saw a void to be filled but with what? ASOC member groups had been work-

ing for more than a year on a proposed Environmental Protocol to the AT, with the ambitious goal of permanently banning all mineral activities. Several countries led by France and Australia adopted that general approach, although finding the ASOC draft too radical (Tenenbaum 1990).

During negotiations from 1989-1991, all ATCPs finally agreed on an indefinite moratorium the question until at least 2048. At that time or thereafter, a debate on minerals could be put on the agenda; a cumbersome procedure ensures there will not be a rapid decision to end the moratorium, which continues indefinitely. ASOC and IUCN were allowed to participate as official observers in each session, while continuing to promote the World Park vision throughout the negotiations. ASOC celebrated a great day in Madrid on October 4, 1991, when the Environmental Protocol to the Antarctic Treaty was signed. Greenpeace continued to drive the World Park campaign throughout the negotiations (May 1988).

But not every government liked the result, and it took seven more years before all twenty-eight ATCPs ratified. ASOC led a more modest campaign during those years, again working closely with Jacques Cousteau and his team to convince “difficult” countries to join the consensus. Russia, the U.S. and Japan were the last to ratify, in 1997, and the Protocol entered into force in 1998. The “not negotiable” minerals ban turned out to be viable after all.

While imagination is an essential element, ASOC’s experience shows that patience and collaboration are also vital for achieving ambitious objectives, particularly in multilateral fora. Even govern-

ments supportive of conservation move cautiously. ASOC has often complemented splashier and more public strategies with those that have a more methodical focus, including working with scientists to make research findings more widely known.

CCAMLR has faced a succession of conservation challenges since its entry into force. Initially, the most pressing objective was to rein in unregulated fishing that had already caused several stocks to collapse in the 1970s. Subsequently, the emergence of a massive illegal, unreported and unregulated fishery for toothfish (*Dissostichus spp.*) in the late 1990s, with devastating incidental bycatch of albatrosses and petrels, required significant time and attention. Meanwhile, there was a growing interest in fishing for Antarctic krill (*Euphausia superba*). Concerns over the potential severe ecosystem impacts of krill fishing had motivated the creation of CCAMLR, and as the market for krill and krill products began to grow in the early 2000s, it was clear that the Convention's conservation principles would be put to the test. ASOC, with extensive involvement from its member organization The Pew Charitable Trusts, began implementing a strategy that included working closely with CCAMLR government scientists to advocate for a science-based, precautionary approach to krill fishery management. This strategy led to the support of the Ukrainian government for a proposal to keep the krill fishery at a precautionary "trigger level" that was lower than the overall catch limit and to spatially distribute the catch into small-scale management units to prevent fishing from being concentrated in a few areas. Even though krill are an incredibly abundant species, krill fishing can cause localized depletion, making it difficult for

predators to find enough food. Penguins, for example, have a limit to how far they can forage in a day before they have to get back and feed hungry chicks. With Ukraine's leadership, the trigger level was adopted, another example of ASOC's longer-term collaboration with a particular country to encourage more conservation-oriented policies.³

Around the same time, CCAMLR began to seriously discuss the creation of MPAs. While a few countries had established marine parks or reserves, the concept had begun to attract international attention in the 1980s and 1990s and was introduced to CCAMLR in 1997 by the IUCN in a paper submitted to that year's meeting (IUCN 1997), which ASOC supported. At the United Nations World Summit on Sustainable Development in 2002, States developed a wide range of objectives for sustainable development, including "the establishment of marine protected areas consistent with international law and based on scientific information, including representative networks by 2012" (A/CONF.199/20, paragraph 32(c). CCAMLR took note of this and placed it on the agenda for future meetings (CCAMLR 2002, paras 4.19 and 4.20). Following this step, discussions on MPAs slowly became more and more active, with a workshop on MPAs in 2005. ASOC was not invited to attend this workshop but promoted the concept of MPAs in CCAMLR papers (see *inter alia* ASOC 2006 and ASOC 2007). It was clear that MPAs were an important new avenue for CCAMLR to pursue.

3 At the time of the writing of this chapter, the trigger level was reached for the first time since its adoption and the fishery had to be closed. Without it, the catch could more than double in the Antarctic Peninsula, increasing the risks to the ecosystem substantially.

In 2008, as CCAMLR MPA discussions continued, ASOC submitted a paper to CCAMLR titled "The Ross Sea: A Candidate for Immediate Inclusion in a Network of Marine Protected Areas". The paper was a partnership between scientist David Ainley and ASOC. Dr. Ainley had studied the Ross Sea for decades and had previously submitted papers to CCAMLR's scientific Working Group on Ecosystem Monitoring and Management (WG-EMM) on the unusually undisturbed nature of the Ross Sea's large marine ecosystem. While these purely scientific papers had been submitted by the U.S. government, this paper was not exclusively scientific – it made a bold policy proposal, though one that was firmly grounded in an extensive body of research. Dr. Ainley approached ASOC because he knew that it supported MPAs and, crucially, that it could be more flexible than a government when it came to proposing new policy ideas.

Jim immediately grasped the conservation importance of the Ross Sea and the opportunities presented by working with Ainley. The Ross Sea is an incredibly unique place, even within Antarctica. It has a disproportionate share of key Antarctic species – 38% of the world's population of Adélie penguins, 26% of the world population of emperor penguins, and 45% of the Southern Ocean Pacific sector population of Weddell seals. While Antarctica hosts many important scientific programs, the Ross Sea is a particular hotspot, with research into marine geology, glaciology, hydrography and biology, along with many of Antarctica's longest continuous data sets on benthic communities, penguin populations, and toothfish.

Ainley was working with two others to promote the protection of the Ross Sea – photographer John Weller and filmmaker Peter

Young. From 2005 - 2009, John traveled to the Ross Sea and took an incredible series of photos, including some underwater. Peter Young was working with John and David on a documentary about the Ross Sea. Together, the three of them formed The Last Ocean project. Once The Last Ocean joined ASOC, an international campaign was born. After submitting the paper to CCAMLR in 2008, ASOC continued campaigning to get the Ross Sea declared an MPA. One important milestone was when ASOC worked with David Ainley Conservation Congress (IMCC), which was held in Washington, DC in 2009. The workshop brought together many scientists working on Ross Sea research and highlighted the wealth of information that could be used to develop an MPA proposal. This effort got a boost when CCAMLR officially committed to creating a representative system of MPAs in 2009 and designated its first MPA in the South Orkney Islands.

Once CCAMLR had made its commitment, marine conservation funders began to take note. The opportunity was, without exaggeration, unprecedented. With only a small percentage of the global ocean within protected areas, the designation of MPAs in Antarctica could inspire more ambitious efforts in other regions. ASOC had been operating on a tight budget, but thanks to CCAMLR's commitment, it was then able to get the support needed to mount a more effective campaign. In 2011, the U.S. and New Zealand each put a "scenario" for a Ross Sea MPA up for consideration by CCAMLR's scientists. Both the U.S. and New Zealand conduct significant amounts of research in the Ross Sea region, so it made sense that both would be interested in the protection of the region. Unlike the U.S., how-

ever, New Zealand was active in a fishery for a species known as Antarctic toothfish. Their two scenarios overlapped considerably, but the U.S. scenario included some areas where fishing often took place that New Zealand had left out. Obviously, the two scenarios would need to merge before an MPA could be adopted. ASOC wanted to ensure that the more ambitious U.S. scenario was not completely conceded during that process. The new financial support from foundations made that possible by supporting a public and media-savvy MPA campaign.

The new campaign (called the Antarctic Ocean Alliance) brought in several new tactics not entirely unfamiliar to ASOC, but which hadn't been used actively for several years. AOA sharply increased the profile of Antarctica MPAs and the Ross Sea MPA in the media and built an audience on social media. It got endorsements from celebrities like Leonardo DiCaprio and secured meetings with officials in CCAMLR governments who ranked higher than the usual CCAMLR delegates. The thinking was that CCAMLR delegates needed additional resources from their governments to bring China and Russia to the negotiating table, and external pressure from civil society would help. In 2012, Peter's documentary, *The Last Ocean*, was released and shown at numerous film festivals, helping to raise the international profile of the MPA designation effort.

The new focus on higher-level officials turned out to be key to the ultimate adoption of the MPA. The U.S. and New Zealand finally merged their proposals in 2013 and secured the support of most other CCAMLR countries, even those initially hesitant because they also fished in the Ross Sea. This support did come with a compro-

mise in the form of the addition of a research fishing zone that would allow for a limited catch. Russia and China remained unconvinced. As discussions stalled, one of the members of AOA/ASOC, the Pew Charitable Trusts, made a strong push for the U.S. government to close the deal, and the Obama Administration agreed, investing substantial resources into diplomatic outreach to Russia and China. Both were brought on board with concessions that ASOC did not necessarily like, including an expiration date for the MPA, something that is not standard practice for protected areas. The result still offered significant conservation benefits, and ASOC and AOA were jubilant when the MPA was finally adopted by CCAMLR in 2016, the world's largest.



Figure 3: The ASOC delegation celebrates the designation of the Ross Sea Marine Protected Area in 2016. (Zuur, 2016)

The success of the Ross Sea MPA campaign attests to the need for multi-pronged, multi-stakeholder approaches. While NGOs made key contributions by raising the public profile of the Ross Sea MPA and getting high level officials in the Obama Administration to spend diplomatic capital, the campaign was buoyed by the pre-existing scientific basis for the MPA and the powerful visual materials produced by the Last Ocean group, including photos and the documentary film. Once again, it also shows the need for patience, given that it took eight years from the submission of ASOC's paper to CCAMLR to get the MPA designated.

Summary and Recommendations

The examples described above demonstrate that it is possible to turn ambitious and imaginative proposals for environmental protection into settled policy, even in the face of significant opposition from decision makers. While Antarctic Treaty nations once infuriated by ASOC's advocacy for a World Park Antarctica, those same nations today speak proudly of their commitment to the Environmental Protocol and the mining ban. Yesterday's wildly unrealistic idea is tomorrow's common sense. As our planet continues to experience the crises of climate change and biodiversity loss, we can take inspiration from Antarctic governance. While there are considerable challenges today, the system is nevertheless vastly different from what it was when NGOs first became involved. The ATS now has a strong conservation focus, and countries often see themselves as "guardians" of Antarctica with the responsibility to protect it on behalf of all humankind (ATCM 2025) rather than members of a

club who deserve special privileges in the region. It took decades of tireless advocacy and vision to bring that about, and it requires ongoing work to sustain it and ensure timely decision making in response to emerging conservation challenges. Therefore, we make the following recommendations for civil society groups engaging in global governance on environmental or climate change issues:

- Aim to achieve the most ambitious policy decisions – imagine the best possible outcome and work towards it, rather than thinking about the most realistic or easiest wins.
- Pursue a variety of strategies – work within the system but also look for ways to disrupt it or get it to work better.
- Cultivate relationships with a wide range of colleagues and stakeholders and always be open to the possibilities of new information or ideas.
- Maintain a sense of urgency, but don't get discouraged by setbacks or opposition. Change takes time.
- Be prepared for all contingencies. Sometimes proposals that have been progressing slowly suddenly gain momentum.

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Chapter 13

Educating for Peace: Empowering the Next Generation to Uphold Antarctica's Legacy

Integrating Antarctica into global education for lasting peace, cooperation, and environmental stewardship

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Abstract

This chapter explores the vital role of education in shaping current and future generations as stewards of Antarctica's peaceful and cooperative legacy. As the global landscape faces growing geopolitical, environmental, and ethical challenges, the preservation of Antarctica's status as a demilitarized, scientifically governed, and internationally managed region depends on new and transformed leaders equipped with a sense of responsibility and imagination. By examining formal, informal, and experiential education models—from study abroad programs to curriculum integration and the use of digital tools and pedagogy—this chapter highlights impactful and scalable strategies to instill a commitment to peacebuilding, sustainability, and shared governance in learners worldwide. Cross-disciplinary, hands-on, and intercultural learning environments can empower educators and institutions to translate Antarctic values into global action.

Introduction:

Anyone who has traveled to Antarctica has probably faced a curious mix of questions and misconceptions: *Is it the North or South Pole? Is it really a continent? There are polar bears, right?* The truth is, Antarctica is not on the radar of most people, whether ordinary citizens or policymakers. Antarctica lies far from the public imagi-

nation. While this chapter is written from the perspective of educators in the United States, the lack of knowledge about the continent exists everywhere, particularly outside the gateway cities in the southern hemisphere.

At a time of escalating planetary change and rising geopolitical uncertainty, fostering global understanding of Antarctica's role in climate stability and peaceful international cooperation has never been more essential. Formal and informal education offers one path forward. Antarctica can be woven into minds and cultures in myriad ways, from story to science, and from art to activism – but research on successful pedagogical approaches for sharing Antarctica is minimal. In this chapter, we explore an experiential, field-based study abroad approach, examine its contradictions and benefits, including citizen science, and highlight scalable strategies for expanding the reach of Antarctica and its lessons for humanity.

At Arizona State University (ASU), since 2019 the College of Global Futures has offered an interdisciplinary Antarctica study abroad program through American Universities International Programs (AUIP) as a signature experience for students and faculty, highlighting the important intersection of politics and science to shape global mindsets and environmental stewardship. A cornerstone of the ASU program is student and faculty participation in the Scripps Institute Fjord Phyto Citizen Science project. Faculty, undergraduate and graduate students from a diversity of backgrounds participate in phytoplankton sample collection at sites along the Antarctic Peninsula, fostering a profound awareness and sense of

ownership over the science and diplomacy that sustain Antarctica as a globally shared space. However, only a small fraction of people—and a small percentage of students at public universities—will ever have the opportunity to visit the continent. This reality compels us to consider how the values and insights of Antarctica as a model of global peace and science can reach broader audiences through curriculum integration and the adoption of interdisciplinary approaches that connect the humanities, social sciences and natural sciences. In doing so, we can help learners engage with the urgent, interconnected social and ecological challenges of our time using a diversity of perspectives and tools.

Study Abroad in Antarctica:

Nothing takes the place of physically traveling to Antarctica and experiencing its power, beauty, and isolation in person – feeling the bite of the southern wind, hearing the boom of a calving glacier, and contemplating the stark contrast between a vast blue-and-white landscape and the compounding threats of climate change and growing industrial pressures. Study abroad experiences, and the active social learning that occurs on these trips, transform people across both cognitive and affective domains (Resler & Ogburn 2025).

Study abroad programs are especially powerful in sustainability education, where immersive, active learning environments help students engage with complex, wicked problems facing the planet (Cusick 2009). Research shows that the more students are engaged during these experiences, the more lasting the intellectual

and emotional learning (Cusick et al., 2025). But the opportunity to study in Antarctica remains highly limited. The cost and distance make travel prohibitive for most people, constraining the continent's potential to serve as a shared classroom.

Each year, only a small number of students travel to Antarctica, and most are enrolled in science-based or discipline-specific programs. Although tourism to the continent is increasing, students participating in Antarctic study abroad programs still represent less than 1% of the global study abroad population, in part because trips are expensive, often running over \$10,000 USD per person for a 10 to 12-day trip. For U.S. students, two organizations run most expeditions: the School for International Training in Vermont, and AUIP in Canterbury, New Zealand. With few students and programs, it is not surprising that data on student learning outcomes are sparse. Many existing programs tend to be discipline specific, particularly focused on science (Resler & Ogburn 2025, Garcia 2009) or tourism (Johnston et al., 2014), with few deliberate efforts to design holistic curricula that bridge humanities, social sciences, and natural sciences to reflect the integrated goals of peace through science and shared governance.

In December 2024, a group of faculty leaders, undergraduate, and graduate students from ASU traveled to Antarctica as part of an interdisciplinary study abroad course, following similar programs since 2019. Participants brought diversity in age, income, nationality, gender, and ethnicity, as well as backgrounds in conservation biology, international politics, engineering, sustainability, economics, political science, psychology, biology, religious studies, tourism,

innovation, education and music. Previous iterations of the course yielded similarly diverse groups. Interdisciplinarity is a core design principle at ASU, where traditional departments have been reformed into innovative, mission-driven schools composed of faculty and degree programs ranging across fields of study, methods, and perspectives (Crow & Dabars 2014). This design principle shapes the culture of the university and is also reflected in a general education curriculum required for all students that is intentionally structured to integrate knowledge across fields and equip learners to address complex social challenges.

For the participants in the December 2024 study abroad experience, the value of an interdisciplinary and intercultural approach was apparent from the beginning of the course, which began with pre-departure sessions in Arizona. Students and faculty engaged in rich discussions on topics ranging from the role of sound in understanding polar environments to the philosophical and ethical implications of travel to remote and endangered places. An important discussion centered on the tension of traveling to Antarctica to learn about its unique biodiversity and climate vulnerability, and the actual impact of our travel and witnessing the continent first-hand alongside thousands of other annual visitors. The curriculum developed with AUIP included lectures from experts on climate change, the history of exploration, marine life, land animals, international politics, and more.

Yet the most powerful learning moments weren't taught – they were *felt* – most often outside the formal curriculum. On one occasion, as we ventured away from the ship in our small zodiac to

collect plankton and sea water together, we were startled by the sudden, loud whoosh of air from the blowhole of a nearby whale. Being on the water close to the animal was an unparalleled experience, far more intimate and awe-inspiring than a whale watching tour or other distant encounter that we may have previously had with these large marine creatures. It was impossible not to feel like a visitor in their home. This multidisciplinary and multisensory curriculum, absorbed by this group of many backgrounds and disciplines, had a rippling effect beyond our learning group. Two students live-streamed or blogged about the experience and their love of the continent to primary and secondary school learners in the U.S. and Korea, thus widening the impact of their study abroad.

Citizen Science and Study Abroad

A central feature of the ASU Antarctica experience is a citizen science project, Fjord Phyto, developed by the Scripps Institution of Oceanography to study the long-term effects of glacial freshwater melt on phytoplankton populations – the foundation of the Southern Ocean food web (Fjord Phyto 2025). Phytoplankton is the food source for krill, which in turn is consumed by a range of creatures, from fish to whales and penguins. Our job as citizen scientists was to train in scientific field methods before the trip and then collect water and plankton samples in Antarctica at specific locations for later analysis by an international network of researchers. We were also able to present the collected plankton samples to the rest of the passengers on our ship. The photo is of a plankton sample, displayed and photographed by one of the students. (Figure 1.)

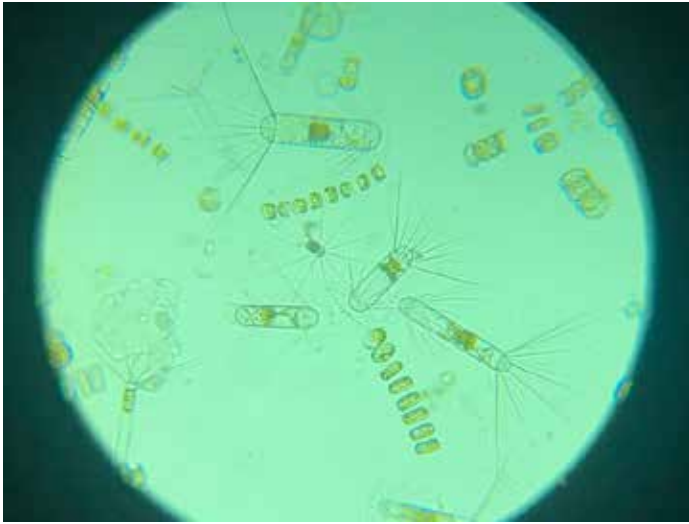


Figure 1. Phytoplankton filtered from ocean water along the Antarctic Peninsula as part of the FjordPhyto citizen science project in December 2024. The long, pill-shaped organisms are *Corethron* spp., the chains are *Thalassiosira* spp., and the circular organisms are *Coscinodiscus* spp. (Eklund, 2024)

The experience of working on a citizen science project together was highly significant for the students, as evidenced by their reactions and written reflections at the end of the program. The photos below show participants deep in concentration while collecting water and plankton samples (Figures 2 & 3). This multidisciplinary team gained an appreciation for the central importance of the region to international politics, global climate, and biodiversity. They were especially struck by the juxtaposition of ecological richness with competing economic interests. Seeing banks of krill-fishing vessels operating nearby from multiple countries sparked conversations about the limited regulatory oversight in the Southern Ocean and the growing global demand for krill-based supplements

in urban markets. We also visited small historic Chilean and British non-military, but intelligence-gathering 'bases', which made clear to our group that national interests persist in the region despite the Antarctic Treaty. (Figure 4)

The citizen science component exemplified the power of immersive, interdisciplinary education. Students learned not only to conduct ecological fieldwork, but also to critically examine governance structures, geopolitical tensions, and the ethics of environmental stewardship. These are lessons that will likely carry through to their future roles as parents, educators, scientists, engineers, policymakers, and engaged global citizens. Furthermore, interdisciplinary groups of faculty and students can effectively disseminate their experiences and acquired knowledge of the continent to wider circles and audiences.



Figure 2. *Students gathering filtered phytoplankton in the field. (Hashim, 2024)*



Figure 3. *Students preserving collected water samples for later analysis by the FjordPhyto scientific team. (Hall, 2024)*



Figure 4. *Chilean Air Force Base, Antarctica.*
(Parmentier, 2024)

Limitations of Study Abroad

As transformative as the study abroad experience in Antarctica can be, there are some rather obvious and serious limitations. Few university students and educators, let alone citizens, will ever have the opportunity to travel to Antarctica due to costs and limited travel slots. Moreover, the ecological footprint of even well-intentioned educational expeditions raises questions about sustainability. Tourism is surging, from ~8,000 visitors annually in the 1990s to over 120,000 in 2023 (Convey 2024; Senigagli et al., 2025). The potential benefits of tourism are substantial, such as the 'ambassador effect' where visitors develop lasting environmental awareness and become advocates for Antarctic protection. But these long-term, positive outcomes are uneven. Johnston et al., (2014) found that only about half of participants in their study translated their Antarctic experience into meaningful, long-term

climate action or career shifts. Importantly, there is real concern about the environmental impact of so many ships producing waste, and humans disturbing the ice and snow where animals live. This issue raises critical questions about the scalability and long-term influence of such programs, and highlights the need to develop complementary, inclusive educational models that extend Antarctica's lessons far beyond the few who can visit in person.

Democratizing Antarctic Education

Who learned about Antarctica at any point between primary school and university? Probably not many of us, although numerous resources are now freely available, particularly for early-age learners. Yet there is little evidence of curricular integration of Antarctica into higher education or professional learning, apart from select study abroad courses. How can we overcome the barriers to in-person field experiences to bring Antarctica to learners from all backgrounds?

Mainstreaming Interdisciplinary Sustainability Education

Sustainability education (also referred to as education for sustainable development; ESD) can provide a precedent and a model for mainstreaming Antarctic education. For nearly twenty years, educators in various countries have trained primary and secondary teachers to integrate concepts of sustainable development or sustainability into their curricula across many subjects (see for instance Down 2006, and the Rob & Melani Walton Sustainability Teachers Academy at ASU). More recently, including sustainability in some

form across higher education curricula has become more common (Piza et al., 2018). At ASU, a 2024 overhaul of our general studies requirements for all students resulted in a required sustainability category that “provides students with an interdisciplinary understanding of socio-ecological systems in relation to global challenges and opportunities.” (ASU 2025)

Information about Antarctica and its significance for scientific research and climate change can easily fit within sustainability curricula, integrating Antarctic images, history, politics, science, and stories across the disciplines. For example, the field of global development – a central part of sustainability – is a multidisciplinary study of global challenges such as poverty, lack of access to basic human needs, and worldwide gaps in wealth and growth. Antarctica may not seem an important place to study– after all, it has no citizens! Yet on the ASU study abroad program, students were able to gain insight into global inequities as they acutely felt their privilege in visiting the continent. They also observed the region being exploited for global markets, particularly industrialized countries, and noted only some countries laid claim to the land, despite the treaty system. International relations and politics are also important for a sustainable global society, and the discipline often includes Antarctica in discussions of international treaties.

Antarctica could be incorporated much more richly into curricula on science, humanities, international peace and conflict, and cooperation and competition. Sustainability subtopics in geology and geography can discuss the story of Pangea and Gondwana, and how the current Antarctic continent came to have a cold climate, while still

containing pre-historic fossils from warmer days. Courses on conservation biology and earth science can explore the importance of Antarctic ice sheets for global climate, and the central role of the Southern Ocean in supporting fisheries and livelihoods thousands of miles away. The history of Western imperialism and colonialism is dramatically illustrated by the age of exploration in which European and later U.S. men competed to reach and claim both polar regions for their nations. Literature courses in science fiction that look at technology and plausible, near futures can effectively assign Kim Stanley Robinson's *Antarctica* (1999), based on Robinson's experiences on the continent, which imagines a credible future where the treaty system breaks down and companies are illegally mining, among other things. The novel highlights both the importance and potential fragility of the Antarctic Treaty System, and why it is critical that it be sustained. These are just a few examples, and it is likely that faculty and learners in almost all facets of sustainability can find ways to incorporate an awareness of Antarctica into their courses.

Improving Access to Antarctica through Digital Tools and Pedagogy

Online educational resources

Another way to expand the impact of Antarctica is to bring the frozen continent into classrooms and homes. Numerous educational resources are freely available online, including materials from the National Geographic Society, the British Antarctic Survey, the Australian Antarctic Program, and various U.S. National Science Foundation-funded research teams. However, perhaps more well known are the count-

less videos of various lengths and inconsistent connections to fact-based reality on YouTube, TikTok, and other social media platforms. A recent study by Hardy and colleagues (2025) found that many widely viewed Antarctica posts showcased irresponsible activities and ship-based luxury, failing to advocate for the region's value, historic and political context, or pro-environmental behavior. Still, high-quality, verified educational resources like SciShow, TED-Ed, and content from non-profits and individual researchers (e.g., @icy_pete) are great ways to build awareness and excitement for learners of all ages.

Digital resources also expand the possibilities for citizen science. Projects like Fjord Phyto involve in-person experiences, but many citizen science platforms like Zooniverse and SciStarter offer virtual participation in real-time research (LaRue et al., 2020). As broadband access improves globally, these online tools can democratize science education by giving students and the public hands-on engagement with Antarctic data—no passport or polar gear required.

Virtual field experiences

Virtual Field Experiences (VFEs) offer another promising model for scaling access to Antarctic learning. VFEs use digital technology to simulate the experience of being at a field site or remote location, ranging from 2D video tours to fully immersive 3D simulations in virtual or augmented reality. They can be guided or self-paced, synchronous or asynchronous, and often somewhere in-between, utilizing the best techniques from all learning modalities (Semken et al., 2025). Critically, VFEs can serve thousands of learners simultaneously, far more than could ever access Antarctica in person.

At ASU, virtual reality (VR) is integrated into foundational science courses. In introductory biology, VR technology through the Dreamscape Learn platform helps instructors teach critical thinking and team science skills to thousands of online and campus-based learners per week. Assessments show that participating students earn higher grades in subsequent upper division genetics courses and were more likely to remain in the biology major than students who took a traditional course section without VR (Hale et al., 2025). Although data on the outcomes and reach of VFEs in Antarctica are limited, trends in VFE availability are promising. For example, the Byrd Polar and Climate Research Center's *Virtual Ice Tours* allow learners to explore Antarctic ice cores and research camps in interactive 360° environments, providing a sense of place and process that textbooks alone cannot offer (Harris et al., 2021).

Although the technology used in VFEs is impressive, the quality and impact of these digital, immersive experiences are shaped less by the gear itself and much more by intentional instructional design and inclusive pedagogy principles. Giamellaro et al., (2024) and others emphasize that effective VFEs require alignment with clear learning objectives, time for educator facilitation, opportunities for peer interaction, and integration of adaptive learning elements. When done well, VFEs can enhance content mastery as well as critical thinking and engagement (Dolphin et al., 2019), allowing students to pause, revisit, and reflect—features that are especially valuable for neurodiverse learners or those new to environmental science. But when designed poorly, VFE participants can feel lost, frustrated, and disengaged.

As the field evolves, VFEs are increasingly recognized not only as replacements for physical field experiences but also as powerful complements. For example, they can be used before and after a trip to build or reinforce familiarity with geographic features, scientific tools, or ethical questions, enriching the in-person experience and preparing students for deeper engagement (Semken et al., 2025). For the lessons of Antarctica and other extreme locations, VFEs could potentially increase participants' curiosity and interest in exploring novel environments, which could lead to future opportunities for travel (Hoang et al., 2023). A new, guided virtual field experience at ASU brings participants to the Arctic Circle, where they plunge together underneath the ice to explore algal communities that are central to the productivity of krill (Faller, 2024). Few studies have explored the long-term outcomes of virtual simulations of extreme locations. However, it is clear that virtual experience technology is likely to successfully democratize Antarctic education only when it paired with thoughtful and inclusive pedagogy grounded in evidence and experience.

As new digital tools continue to emerge, educators and institutions face an important design challenge: how to create virtual experiences that not only simulate Antarctica's remote environment but also instill its core, interdisciplinary values of peace, science, and international cooperation. Future VFEs may integrate real-time sensor data, live interactions with polar researchers, and scenario-based decision-making to help students grapple with real-world challenges at the intersection of climate change, conservation, governance, and ethics.

Conclusion: Educating for Antarctica's Legacy

Antarctica is more than a frozen continent at the bottom of the world, it is a living model of what science, international cooperation, and shared governance can achieve when nations choose collaboration over conflict. Education plays a central role in sustaining this legacy. Whether through coursework, immersive study abroad programs, sustainability education, citizen science, or innovative digital tools like virtual field experiences, there are growing pathways to engage learners with the beauty, values and vulnerabilities of Antarctica. (Figure 5)

Broadening the reach of Antarctica is essential to serve as a model of human cooperation and innovation in a rapidly changing world. Physical travel to the continent will remain limited to a privileged few, and technology will continue to advance rapidly, helping learners experience its awe-inspiring and ever-more-real landscapes and scientific frontiers. But democratizing Antarctic education means more than affordability or digital availability – it's also about reimagining education to draw from all aspects of the human experience: our history and collective knowledge, our emotions and obligations, our actions and their consequences, and ultimately our hopes and dreams for a safe, thriving planetary future. By educating for humanity, Antarctica will move from the margins to the heart of how we prepare a new generation to lead with imagination, integrity, and global solidarity.



Figure 5. *Serenity of the Antarctic Peninsula.* (Parmentier, 2024)

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Educating for Peace: Empowering the Next Generation...

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Antarctic Leading Voices

This chapter presents reflections from leading voices whose experience and insight highlight Antarctica's role as a model of peace and cooperation. Their perspectives reveal how the principles that guide this unique region can inspire broader efforts toward global understanding and shared responsibility.

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1. How would you characterize the potential influence and inter-play between the Arctic System and the Antarctic Treaty System (ATS), if such a relationship exists?

Tensions exist in both the Arctic and Antarctic, but they manifest through different legal and geopolitical frameworks. The comparison is clearest when framed as *Contested Waters (the Arctic)* versus *Contested Land (the Antarctic)*. In the Arctic, disputes center on maritime jurisdiction - extended and sometimes overlapping continental shelf claims, and control over emerging sea routes like the Northern Sea Route and Northwest Passage. The region is increasingly militarized, now sharply divided between NATO and Russia, particularly following Finland's accession to NATO in 2023 and Sweden's in 2024. The U.S., for its part, contests both Rus-

sia's control over the Northern Sea Route and Canada's claim to the Northwest Passage, insisting that both constitute international straits.

By contrast, the Antarctic remains primarily a contest over land. Sovereignty claims, though frozen by Article IV of the Antarctic Treaty, remain politically active and symbolically reinforced through scientific station placement, and the assignment of place names. The ATS has preserved a legal architecture of restraint by demilitarizing the continent and banning mining under the 1991 Madrid Protocol. Yet this ban is not eternal. Article 25 of the Protocol allows for its potential review starting in 2048, and includes a U.S.-engineered "walk-out clause" to preserve strategic flexibility. At the same time, U.S. interest in Greenland and its growing focus on critical minerals, suggests that land-based strategic competition may be re-emerging in the Arctic as well.

The contest for land and resources in Antarctica is accelerating. China has introduced a controversial discourse: "protection and utilization." This language, used publicly by Vice Premier Zhang Gaoli during the 40th Antarctic Treaty Consultative Meeting (ATCM) in 2017, marks a stark departure from the normative consensus that Antarctica is a continent for peace and science, rather than a continent to be exploited. Though cloaked in diplomatic ambiguity, it signals an interest in rebalancing the Antarctic Treaty System (ATS) toward development rights - a position that reflects the strategic posture of multiple actors preparing for a post-2048 landscape. Russia, too, has signalled its intent to contest the current ATS ar-

chitecture more strongly. At the 46th ATCM in 2024, it submitted a working paper referencing its geological and geophysical research, including seismic studies, to argue that future activities in Antarctica must balance scientific inquiry with the potential for “sustainable resource use.”

While competition in the Arctic is out in the open, in Antarctica it is still under the radar. At the Arctic Council Ministerial Meeting in Rovaniemi in 2019, U.S. Secretary of State Mike Pompeo openly declared “The region has become an arena for power and for competition. And the eight Arctic states must adapt to this new future.” In Antarctica tensions are operational, embedded within the formal processes of the Treaty System. Sovereignty is signalled through research infrastructure and supposed scientific activity, underpinned by a long-term view of potential legal realignment.

Thus, the Arctic and Antarctic are not disconnected systems; they are structurally analogous theatres of geopolitical assertion shaped by climate change, resource interest, and legal strategy. The ATS currently disciplines competition—but its durability is contingent on whether it can continue to channel national ambition without rupture.

2. What are the key political challenges confronting the Antarctic Treaty System in the context of global climate change?

The key political challenge confronting the Antarctic Treaty System (ATS) is the growing paralysis of its decision-making framework.

While consensus - as required under Article IX of the Antarctic Treaty - has long been heralded as a mechanism for cooperation, it now serves to entrench deadlock, particularly as the system expands to include new and increasingly assertive polar actors.

Among the most visible manifestations of this systemic deadlock are the repeated stalemates over environmental initiatives—particularly within the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), where proposals to establish Marine Protected Areas (MPAs) have been persistently blocked. Actors like China and Russia have exercised their right to object. These rising polar powers are not violating the ATS; they are operating within its bounds, much as traditional claimants have done for decades. The objections of China and others to proposed MPAs are often framed as environmental obstruction, but in reality, these states fear that MPAs are being used as thinly veiled instruments for asserting sovereign control—effectively *de facto* Exclusive Economic Zones (EEZs) in a system where such zones are not legally recognized. This suspicion reflects a deep-seated structural tension within the ATS regarding how space is managed and claimed.

Nowhere is this tension more evident than in the stalled debate over China's proposed Antarctic Specially Managed Area (ASMA) around Kunlun Station at Dome A. Submitted in 2013 under Annex V of the Protocol on Environmental Protection to the Antarctic Treaty, the proposal has remained unresolved for over a decade. While ASMAs are intended to coordinate activities and minimize environmental impacts, they can also serve as instruments for states to establish a managerial presence in strategically significant areas.

China's persistent advocacy for the Dome A ASMA, despite concerns from other parties about its scope and purpose, exemplifies how such designations can be perceived as steps toward territorial control. Simultaneously, China's refusal to support the designation of the emperor penguin as a specially protected species—despite broad scientific consensus on its vulnerability to climate change - illustrates how one procedural deadlock can invite another, leading to system paralysis.

In this climate, the ATS faces a dual threat: procedural gridlock on substantive environmental measures and creeping spatial control through managerial designations like ASMAs. Both trends erode the foundational vision of Antarctica as a continent dedicated to peace and science. As climate change accelerates the continent's accessibility and strategic value, the ATS's current architecture may prove insufficient to contain the ambitions of both longstanding and emerging polar actors - unless it evolves.

3. What constitutes a feasible and pragmatic approach to ensuring the protection of the Antarctic ecosystem?

Protecting the Antarctic ecosystem must begin with confronting the long-unresolved *Question of Antarctica* - a geopolitical issue that has occupied the United Nations agenda for decades. This question extends far beyond environmental concerns; it encompasses sovereignty over land and resources, and the legitimacy of a governance system that freezes territorial claims without resolving them, while essentially giving a blank cheque to scientific activity. Scientific

research in Antarctica is not a neutral enterprise; it has long functioned as a proxy for sovereign presence and future entitlement. For environmental protection to be durable, it must be embedded within a broader political settlement that resolves these underlying tensions. That settlement must address not only the long-standing question of mineral exploitation - currently deferred by the Madrid Protocol - but also the emerging and largely unspoken issue of human habitation about which the Antarctic Treaty is completely silent. Without tackling all these issues head-on, there can be no lasting environmental protection - only the appearance of it, maintained by legal silence and geopolitical avoidance.

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1. How can the Antarctic Treaty System continue to serve as a model of demilitarized governance in an increasingly competitive geopolitical environment?

The Antarctic Treaty is central to maintaining a territorial *status quo* that none of the parties involved wish to see substantially altered. If it were to begin deteriorating as a tool for diplomatic negotiation and as an instrument for achieving outcomes acceptable to all parties, we would start facing a situation of accelerated competition similar to what is occurring in the Arctic region. Nevertheless, the Antarctic Treaty cannot serve as a model for other regions due to the unique dynamics that exist in the Southern Oceans, where competition among major powers does not correlate with the presence of geographically proximate powers, as is the case in the Arctic or other parts of the world.

The presence of major powers in Antarctica is the result of the technological capabilities derived from their material power, which allow these nations to establish an active presence in that territorial domain.

Likewise, nations that lay territorial claims—stemming from their continental projection—must strive to avoid the most negative consequences of potential competition involving military dominance. At the same time, they must not neglect maintaining a certain response capacity in the event of *de facto* changes that could arise if major powers or actors with Antarctic interests begin to adopt more assertive or unilateral behaviors, prompted by the growing perception of reduced international stability.

The best way to maintain the continent's demilitarized status is to continue fostering international cooperation with countries that hold Antarctic interests, even if they lack territorial claims, and to work jointly with those with whom territorial disputes exist, under the framework of the Antarctic Treaty.

2. How do you see Argentina's and Latin America's role in promoting Antarctica as a global example of peace and cooperation, especially given the region's long-standing involvement in Antarctic affairs?

Argentina's role is one of the most active within Latin America, expressed through its position as a key gateway for cooperation with those wishing to carry out Antarctic activities. Collaboration between the scientific community and the military—the latter being the backbone of Antarctic operations and the guarantor of connectivity between South America and the White Continent by both air and sea—remains fundamental. Although overlapping sovereignty claims mean that the sense of ownership and asser-

tion of sovereignty are always present, it is worth emphasizing that Argentina's collaborative work with all those engaged in Antarctic affairs has ensured stability, safeguarding the interests of all parties involved.

As the question suggests, the success of maintaining Antarctica as a zone of peace lies in the fact that the Treaty is respected by all parties involved and has established mechanisms ensuring that scientific—and increasingly economic—activities are coordinated through the Antarctic Treaty Secretariat, with the rule of consensus applied unequivocally. While the military domain is one of cooperation, it is also, and primarily, one of unilateral responsibility. Thus, the scope for disruptive behavior is minimal, given the likelihood of being questioned by peers. Discretion within established limits requires coordination, overturning the old adage that it is “better to ask for forgiveness than permission.”

Argentina and Chile have worked to prevent nationalist factions in each country from generating rivalries that could cause unnecessary tensions. The Armed Forces of both nations play a key role—not only in the formulation of Antarctic policies in each country but also in joint operations such as medical evacuations or assistance to those confronting the harshness of the Antarctic environment.

It is also true that Ushuaia (Argentina) competes with Punta Arenas (Chile) as the main logistical hub, and this competition is reflected in the relative importance that both countries assign to Antarctica as an integral element of their respective international strategies, which is

of interest to them as it enhances their geopolitical and economic relevance in the Southern Hemisphere. This competition, however, remains within the bounds of cooperation and mutual respect, since both nations understand that stability in Antarctic governance ultimately benefits their long-term interests and strengthens their standing as key regional actors in the governance of the Southern Ocean.

3. What lessons from Antarctica's cooperative security framework could be applied to other global commons, such as the high seas, cyberspace, or outer space?

Regarding the lessons that may be drawn from the cooperation achieved in the Antarctic context and applied to other common spaces, it is worth noting that the cooperative effort in Antarctica emerged when countries, at a given historical moment (see the date of the Antarctic Treaty), decided to work together to avoid the worst possible scenarios. This approach led to a specific type of rationality regarding how governance should be exercised in that domain, particularly because it is a defined territorial space whose geography, while changing due to progressive ice loss, still maintains clear physical boundaries. The so-called "common aversion dilemma" helps prevent the most damaging effects of international anarchy from impacting the Antarctic environment.

However, assuming that this dynamic can be translated into other common spaces such as outer space or the high seas is ambitious. The Antarctic cannot truly be considered a global common; ulti-

mately, it has “ownership,” as it is defined by territoriality. In other words, common spaces are open for use by all in times of peace, but in times of war, they serve as platforms for power projection and depend on technological and military capacities that are primarily reserved for the great powers. Therefore, the same logic that applies to Antarctica cannot be directly extended to the so-called global commons.

The physical and virtual nature of the global commons allows for the partial application of the “common aversion dilemma” to specific cases—such as fisheries control—but given that these areas already hold military utility and are systematically exploited by the armed forces of various nations, it becomes extremely difficult to envision a governance system that can meaningfully apply lessons extrapolated from Antarctica.

It is also worth highlighting that, conversely, certain competitive tendencies emerging in the global commons could be projected onto Antarctica. This could occur once that region begins to be discreetly studied as a potential space for power projection or as a secondary theater within broader global operations. In this regard, all actors responsible for thinking about the defense of interests in that domain must exercise prudent pessimism concerning the potential degradation of the international environment and its impact on Antarctica.

Perhaps the most important lesson to be drawn is that, when political will exists, progress can indeed be made on issues of global concern. Yet such advances depend on specific windows of op-

portunity and on a collective awareness of the consequences that power-maximizing policies—based on relative advantage—would have for humanity.

4. Looking ahead, what emerging risks—whether technological, environmental, or strategic—do you believe could challenge Antarctica’s peaceful status, and how can the international community preemptively address them?

Continuing with this prudent skepticism about how the current deterioration of the international environment affects the Antarctic context—and recognizing that global challenges such as climate change and geopolitical competition are already exerting pressure—it is foreseeable that the need to quantify the continent’s existing resources will grow. This will place increasing pressure on the region as other areas of the world become depleted or compromised by the aggressive dynamics of continental competition.

As author Michael Klare (2012) noted in his book *The Race for What’s Left*, competition for the remaining zones rich in strategic natural resources is intensifying. He emphasized the growing focus on the Arctic and anticipated a similar trend in the Antarctic. Recently, a British parliamentary hearing revealed that Russia has begun exploring and gathering information on areas for potential future exploitation of energy resources in the sector claimed by both Argentina and the United Kingdom, adding another layer of potential tension between the two countries.

It is also expected that Antarctic tourism will increase significantly. While measures are being taken to coordinate requirements and promote sustainable practices, the “pristine” nature of the region will inevitably begin to erode as a result of the growing scale of operations. Larger vessels, though designed to minimize ecological impact, remain vulnerable to critical incidents that could affect the fragile environment in which they operate.

The challenges in Antarctica are particularly complex: we are navigating familiar waters, guided by a well-established map—the Antarctic Treaty—while at the same time facing new actors and challenges that demand all players involved to rethink the map and the waters we once charted, address these challenges, and protect our common interests. These factors suggest that future discussions on the present and future of Antarctica will increasingly reflect current international dynamics. Consequently, it is essential to be prepared for both present and emerging challenges through decisive diplomacy and a capable military instrument to safeguard national interests on the White Continent.

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1. Why has Antarctica been considered such a powerful symbol of peace and cooperation, and why do you believe this status is now under threat?

Antarctica has long been regarded as an extraordinary success story: a continent without weapons, without borders, and without persistent rivalries. The 1959 Antarctic Treaty was groundbreaking: even at the height of the Cold War, adversaries such as the United States and the Soviet Union agreed to freeze territorial claims, prohibit military activities, and dedicate the continent to science and peace. For decades, Antarctica embodied the idea that cooperation and restraint could be achieved, making it one of the clearest symbols of international peace.

But this narrative is increasingly fragile. Russia has blocked efforts to establish new marine protected areas. China is using scientific stations in ways that raise military concerns. India has introduced BRICS dynamics into polar governance. What was once perceived as a demilitarized and remote continent has become a testing ground for global power competition. Add to this climate change, economic interests, and consensus mechanisms that often stall progress, and Antarctica's cooperative foundations are now visibly under strain.

2. In light of these challenges, what strategies do you see as necessary to preserve Antarctica's role as a cooperative, demilitarized space?

When consensus is blocked, simply appealing to the spirit of the Antarctic Treaty is no longer enough. More robust strategies are required. One path lies in "coalitions of the willing": if actors such as Russia and China prevent progress, other treaty Parties—like the EU, the United States, Australia, New Zealand, and Norway—can still move forward by coordinating closely, establishing common standards, and applying them in research, tourism, or ecological protection. Such coalitions would not break the Treaty but would keep its spirit alive by preserving agency.

Equally important is the interconnection of science and diplomacy. Scientific data, such as data from the Alfred Wegener Institute, is not only valuable academically but also politically: they provide credibility and legitimacy in negotiations over marine protected areas or tourism regulation. In this sense, research is no longer a

neutral backdrop but an active instrument of geopolitical influence. Finally, Antarctica would benefit from greater institutional consolidation: inspections, transparency mechanisms, and crisis management tools would help identify and sanction violations more quickly, preventing the erosion of cooperative security.

3. What responsibilities and opportunities does Europe, and particularly the EU, have in ensuring Antarctica remains a beacon of peace and cooperation?

Europe has not yet developed a coherent Antarctic strategy, even though it plays an influential role in CCAMLR and the Antarctic Treaty Consultative Meetings. Unlike the Arctic, where the EU already has a defined policy, the Antarctic remains an emerging concern. This is a risk: blockades of proposals like the Weddell Sea marine protected area highlight the vulnerabilities of the current system. Europe cannot afford to be reactive; it must develop clear policies that recognize Antarctica as part of its broader security and foreign policy agenda.

Concrete steps are possible. An EU Special Envoy for Antarctica could give political weight and visibility, but only if equipped with clear competencies, resources, and a real mandate. Even more valuable would be an "Antarctica Desk" within the European External Action Service, consolidating expertise and ensuring continuity on issues such as tourism, marine protection, and science diplomacy. Europe must also frame ecological protection as a matter of security: defending the Antarctic ecosystem means stabilizing global climate systems, which directly impacts European resilience.

4. How does the dispute over the Weddell Sea Marine Protected Area illustrate both the weaknesses and the urgent needs of Antarctic governance?

The Weddell Sea case is a clear example of the system's strengths and weaknesses. In 2016, Germany, supported by the EU, proposed what would be the largest marine protected area in the world—1.8 million square kilometers—based on strong scientific evidence. Yet, despite overwhelming data and support, the proposal has been blocked for years by Russia and China under consensus rules. This demonstrates how even a minority can stall progress under the current system.

To move forward, Europe must use its scientific capabilities as diplomatic leverage and build broader coalitions with partners such as Australia, Chile, and South Africa to counter blockages. Linking initiatives like EU-Polarnet with foreign policy tools could also enhance influence. Ultimately, this dispute shows that Antarctic governance is not only about environmental or scientific policy—it is a test case for multilateral cooperation. A coordinated EU strategy would send a strong geopolitical signal: Europe takes Antarctica seriously as a pillar of its own security and as a space where peace and ecological responsibility must be defended.

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1. In your view, how can Antarctic scientific research — particularly in oceanography and climate studies — serve as a bridge between nations, fostering not only environmental stewardship but also geopolitical peace?

Since December 1959, when the Antarctic Treaty was signed by 12 countries (now 58 Parties), it has been clear that Antarctica must be used solely for peaceful purposes, with scientific cooperation as a key activity. Scientific investigations and collaborations are encouraged, guided by protocols that maintain the “status quo” and minimize environmental impact on Antarctic ecosystems. Recent efforts, such as the November 2023 “One Planet Polar Summit” in Paris, where UNESCO introduced the “Antarctic Sync Project” as part of the UN “Decade of Ocean Science for Sustainable Development,” have reinforced these

principles. The central argument is that international scientific collaboration—free from nationalistic self-protectionism and polarization—is essential for upholding Antarctica’s role as a space for cooperation. The global challenges facing Antarctica, particularly climate change and its impact on the Southern Ocean, can only be addressed through strengthened, inclusive scientific partnerships.

In terms of geopolitics, there are seven countries signatory to the Antarctic Treaty with territorial claims; however, Antarctica must be used only for peaceful purposes, and the scientific data obtained must be exchanged and freely available. This is another reason to promote collaborations among countries and scientists, even those with territorial claims. Antarctica should never be a space for territorial or national conflicts; instead, it serves as a model for world peace.

As a scientist with long experience in research, I am absolutely convinced that science is the way to break down barriers and, more than competition, collaboration is the most important value that the scientific community should appreciate.

2. Climate change is introducing unprecedented stress on the Southern Ocean’s ecosystems. How might the ecological transformations you study challenge the Antarctic Treaty System’s capacity to protect both the environment and the spirit of peaceful collaboration it represents?

Antarctica is one of the regions experiencing severe impacts from climate change, and its ecosystems are very sensitive to rapid environmental shifts, such as air and seawater warming, and ocean

acidification. Moreover, melting ice sheets and rising sea levels will affect the survival of valuable species, including that endemic to the area. However, research in Antarctica remains highly challenging due to its remote location and extreme weather. No single country or research program can alone handle these challenges. This is why collaboration among regions and countries is a fundamental pillar for addressing this rapidly changing scenario. For example, sea-level rise is monitored using satellite images collected by different entities that continuously measure and compile data. Oceanographic surveys around Antarctica are taking place across different regions of the Southern Ocean, providing data on key parameters such as water temperature, salinity, pH, species diversity and density, plankton, and bacterioplankton, among other datasets from surface to deep layers. These datasets are being compiled and freely published by various organizations as part of ongoing research programs under the “Ocean Decade.” As the parties may have different levels of accuracy in their data sets, mostly due to differences in the instruments used in field and post-field measurements, data calibration programs at international levels are underway. This shows that these challenges must be addressed collectively by different countries, regions, institutions, and stakeholders. Without doubt, these activities align with the Antarctic treaty spirit of protecting the environment and biota through peaceful collaborations.

3. Given your experience working on collaborative, multinational scientific projects, what lessons from Antarctic marine research could be applied to other global commons — such as the high seas or the Arctic — to promote science-driven, cooperative governance?

Recently, the Arctic Ocean has become one more example of the devastating effects of climate change. The Arctic Ocean contains valuable natural resources, such as oil, minerals, including rare earth, and commercially important fish stocks, among others. As a result of global warming, melting ice sheets are facilitating access to these resources, opening new shipping routes (such as the Northern Sea Route) and exacerbating geopolitical tensions and conflicts. At the same time, several countries are submitting applications to the UN for extensions of their continental shelf rights, and some powerful countries are increasing military patrols. Within this scenario, the United Nations Convention on the Law of the Sea (UNCLOS) provides a framework for managing activities on the high seas, including the conservation and management of living resources. However, due to rising geopolitical interest in the Arctic, combined with the rapid environmental changes driven by climate change, UNCLOS provisions have become less effective in managing all the emerging issues.

In this context, scientific cooperation may help reduce polarization, promote global research collaborations, and ultimately support more peaceful governance of the region. As in the Southern Ocean, research in the Arctic Ocean is a difficult challenge due to the extreme weather conditions and the vast geographic extent. No single country or research program alone can handle all the emerging scientific and management challenges. However, current and future scientific collaborations must follow pre-established protocols and rules. Even scientific research programs involving environmental sampling, deploying permanent or temporary sensors or observa-

tion stations, can cause anthropogenic disturbance and contamination in pristine ecosystems.

One very useful tool to protect such pristine ecosystems, which serve as model ecosystems and reservoirs of genetic diversity, is the creation of Marine Protected Areas (MPAs). For example, the establishment of local and regional MPAs in coral reef ecosystems around the world (such as several MPAs along the Great Barrier Reef) has proven to be an effective tool for reducing local stressors like overfishing and pollution, protect biodiversity, and build ecosystem resilience against global stressors like climate change. The success of MPAs hinges on their design and the consistent enforcement of their regulations. If in the near future the Arctic Ocean were to establish an "Arctic Treaty" with the participation of numerous Parties, geopolitical rivalries and polarization could gradually be replaced by a cooperative research-based regime, where peaceful management interactions prevail.

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1. How do you perceive Antarctica's symbolic and strategic value in shaping a peaceful and cooperative international order?

Antarctica holds a unique symbolic significance and strategic value in the current international order. It is not just a remote icy continent, but it is also an exceptionally precious example of the spirit of global governance cooperation. Especially against the backdrop of escalating geopolitical tensions in recent years—such as the militarization trend in the Arctic and statements like the Trump administration's public proposal to "purchase Greenland"—the polar regions have become a critical arena for great-power competition.

Antarctica, however, stands in stark contrast to this logic of confrontation. During the Cold War, the international community managed to sign the Antarctic Treaty amid highly hostile conditions, designating the entire continent for peaceful scientific research while prohibiting military activities and resource exploitation. This in itself reflects an institutional imagination that transcends zero-sum games.

To me, this experience of peaceful coexistence is not just a historical legacy but also a reminder to nations today: even at the height of strategic competition, humanity can still achieve coexistence through transparent mechanisms, legal frameworks, and scientific consensus.

As the global climate crisis intensifies, the stability of the Antarctic ice sheet directly impacts the future of hundreds of millions of people in coastal regions worldwide. Its strategic importance and resource potential are also growing.

Therefore, upholding the Antarctic Treaty System and adhering to the principles of demilitarization and science-first has become increasingly urgent. Antarctica is like a mirror, reflecting whether we can choose cooperation and restraint in the face of shared destiny, rather than repeating cycles of competition and confrontation.

2. What stories or framing strategies do you believe could elevate its relevance in public conversation in China?

In my view, the most crucial step in increasing public attention to Antarctic issues in China is bridging the gap between the continent and people's daily lives. Many perceive Antarctica as distant and irrelevant, so I believe multi-layered narrative strategies are needed to break down this disconnect.

For example, I would link changes in Antarctica to the fate of coastal cities in China, showing how the melting of the Antarctic ice sheet is not just a remote natural phenomenon but directly affects the

safety and living conditions of cities like Shanghai and Guangzhou in the coming decades.

Secondly, I would emphasize communicating China's national-level polar research achievements effectively. China has invested significant scientific resources in Antarctica, establishing multiple research stations and participating in extensive international collaborations. However, public awareness of these efforts remains limited. By sharing personal stories of researchers, the daily details of polar expeditions, the challenges behind scientific discoveries, and cross-border collaborations with scientists from other countries, we can humanize the topic and make it more relatable.

Additionally, I believe innovative communication methods—such as short videos, interactive maps, and AI-powered visualizations—can transform seemingly dry scientific data into vivid, engaging experiences. For instance, using 3D animations to demonstrate glacier calving or virtual reality to let audiences “step into” an Antarctic research station. When Antarctica evolves from an abstract map into a series of stories and visuals tied to the future, the nation, and ordinary people, it will naturally carve out a space in public discourse.

3. How can communication professionals and journalists help ensure that peaceful governance models—such as the Antarctic Treaty System—are better understood, protected, and adapted to other regions under geopolitical stress?

I've always believed that as media professionals, it's our responsibility to present governance models like the Antarctic Treaty Sys-

tem—which may seem technical and distant—in clearer, more relatable ways. Many people don't realize that Antarctica is one of the few regions globally where demilitarization, scientific collaboration, and environmental protection are balanced. This in itself is a valuable institutional experiment.

For me, the first and most important step is to break down complex treaties and agreements into accessible language, clarifying their underlying principles: Why do nations freeze territorial claims? Why is scientific data shared? Why are strict environmental regulations necessary? These seemingly technical rules ultimately answer a fundamental question: Can we exercise restraint and build trust in potentially contentious regions?

Secondly, I think the media must also play a watchdog role by monitoring potentially destructive actions within the Antarctic cooperation framework, such as illegal fishing, environmental pollution, or the blurring of boundaries around military presence. Only through transparency and public vigilance can the peaceful governance of Antarctica remain more than just words on paper.

Thirdly, I particularly hope to adopt a comparative lens, connecting the Antarctic experience to other regions. For example, many nations today face similar resource competitions and security concerns in the Arctic, the deep sea, or even outer space. While the Antarctic governance model may not be directly replicable, it at least offers a "cooperation before competition" and "institutions before exploitation" approach.

I believe that through rigorous investigations, compelling stories, and cross-border dialogues, the public can come to see Antarcti-

ca not just as a frozen wilderness but as a possibility for peaceful governance—a spirit worth extending to other geopolitically tense regions.

4. From a communications and media strategy standpoint, what role can storytelling play in connecting younger generations all over the world to the values of international cooperation, scientific diplomacy, and environmental stewardship exemplified by Antarctica?

I've always believed storytelling is our most powerful tool, especially when engaging younger generations. If we present Antarctica in technical jargon, many might scroll past it without a second thought. But when we tell it through human experiences, the impact is entirely different.

I strongly believe in the power of personal perspectives. For instance, sharing the story of a young researcher's first steps onto the Antarctic continent, their emotions during months of isolation through polar night while collaborating with an international team on weather observations—these details can make the realities of international cooperation and science diplomacy feel tangible and warm.

Similarly, using short videos or documentaries to show Chinese, Norwegian, and Australian scientists collecting samples on the same ice sheet, then using shared data to explain the truths of climate change, can transcend borders and convey a sense of "we're all in this together."

I also value visual and immersive methods, like VR and interactive maps, allowing young people to “explore” Antarctica themselves—discovering changes in penguin habitats, the rate of ice shelf collapse, or simulating future sea-level rise scenarios. When they “experience” it firsthand, environmental stewardship shifts from an abstract slogan to a personal concern.

Finally, I think it’s essential to give young people a sense of participation and agency. For example, inviting them to join citizen science projects or engage in polar protection campaigns on social media helps them realize that every share or like contributes to raising awareness about Antarctica. I believe that when stories combine emotion, science, and clear pathways for action, they can truly resonate, passing on the spirit of Antarctica to future generations.

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1. As an educator and communicator dedicated to making Antarctica more accessible to diverse audiences, how do you see education—especially digital and participatory forms—as a pathway to strengthening Antarctica’s role as a model of peace and international cooperation?

The role of education is to spread the idea that Antarctica is a model of peace and international cooperation — something that could be applied to many other global issues. Cooperation between countries is complex, as it involves different interests. Issues such as carbon emissions or plastic pollution, for example, could benefit from governance models like that of Antarctica.

In the white continent, a space without national sovereignty and dedicated to science, dialogue becomes more feasible. That is why I believe that education is the basis of everything. From childhood, it should encourage reflection on planetary issues and the search for cooperative solutions.

If we are unable to incorporate this vision into educational systems, we will not advance as humanity. Communication — whether digital, printed or traditional — must work in an integrated, transmedia manner, to reinforce this idea of cooperation. It is a long process, but one that must begin urgently.

2. InterAntar has pioneered innovative tools—such as podcasts, games, and teacher training—to connect Brazilian society with the polar regions. What role do you believe public understanding and education play in defending Antarctica as a demilitarized, cooperative, and environmentally protected region?

By demystifying science and the work of scientists, by showing what is done in Antarctica and how this research impacts humanity, we strengthen the environment protection, international cooperation and the non-militarization of the continent. Science plays an important political role: protecting not only Antarctica, but the entire planet.

If we fail to protect Antarctica, we will jeopardize the global balance. Education and communication — whether traditional or innovative — need to work together to convey this message. Scientific development guarantees sovereignty to countries and, in the case of Antarctica, that sovereignty must be shared cooperatively, as it already is in much of its research, though this reality is still little known to the wider public. We need to broaden this understanding.

3. In your experience working with educators and students across Brazil, what has most surprised or inspired you about how people connect with Antarctica? What do these reactions reveal about the continent's symbolic and educational potential as a space of peace?

Regardless of the audience, there is great sympathy for wildlife, especially penguins — even if people still mistakenly believe that they live with polar bears. This reveals how little is known about Antarctica and the Antarctic Treaty itself.

What is most surprising, however, is to realize that our climate, agriculture and survival depend deeply on what happens on the continent. As one of the planet's main thermal regulators, its preservation is essential, and this awareness underscores the importance of international cooperation to protect it.

Another striking aspect is the understanding of science as a process. This leads to the appreciation of science as a strategic national tool, valuable from an economic, environmental, historical and cultural point of view. This is one of the main legacies of polar outreach and education programs: to educate more aware citizens who value science and support peace and protection agreements for the continent.

Francyne Elias-Piera, Founder, Instituto de Educação e Pesquisa Gelo na Bagagem / Brazil

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1. Your work spans scientific research, environmental education, and youth engagement through Gelo na Bagagem. From this multidisciplinary perspective, how do you see Antarctica as a living model for global peace and cooperation?

Antarctica is a living example of what many peace declarations only attempt to achieve. It is a continent where more than 30 nations, some with a history of political tension, have agreed to set aside territorial disputes and prioritize science and environmental preservation. As a researcher and educator leading the Instituto Gelo na Bagagem, I see this agreement as concrete proof that international cooperation is not only possible, but also deeply transformative when driven by a shared purpose.

Through environmental education, science communication, and emotional storytelling about polar ecosystems, we demonstrate that Antarctica is more than just ice, it is a territory of hope. Our work

is grounded in the belief that peace is built through knowledge, respect for diversity, and a shared commitment to the common good. Antarctica, in its essence, already embodies the future we aim for: demilitarized, collaborative, and focused on planetary well-being.

2. Gelo na Bagagem inspires young people to become environmental guardians through polar science and storytelling. In your view, how can education—especially in the Global South—amplify the Antarctic message of peaceful coexistence and shared responsibility across generations?

Education is the most effective bridge between the unknown and engagement. In the Global South, where resources may be limited but creativity and urgency abound, environmental education is a powerful tool for social transformation. When we bring Antarctica into public and underserved schools, we are not just teaching science, we are empowering students.

By showing how Antarctica affects global climate, oceans, and biodiversity, we help young people understand that they are part of a global community with shared responsibilities. Gelo na Bagagem uses accessible narratives, emotional language, and sensory experiences to make Antarctica present and meaningful, even from thousands of kilometers away. This approach humanizes science, builds identification, and inspires action. Educating, especially in the Global South, means ensuring that the preservation of Antarctica is not just a diplomatic goal, but an intergenerational cultural commitment.

3. As a Brazilian researcher working with institutions across the globe—from PROANTAR to Korea Polar Research Institute—what does your international collaboration teach you about the power of science diplomacy in fostering peace and mutual understanding?

Science has been my bridge between countries, languages, and cultures. Working with PROANTAR and the Korea Polar Research Institute taught me that science is, by nature, a common language and when practiced ethically and collaboratively, it can bring even the most distant nations closer. Science diplomacy is more than data exchange: it is about building trust among countries, grounded in evidence, listening, and shared goals.

This international collaboration also deepened my awareness of global inequalities in access to science, reinforcing my commitment to democratize scientific knowledge, especially in Brazil. Through Gelo na Bagagem, we translate global experiences into local impact, bringing borderless science into schools and communities, and while planting seeds of peace and belonging. Antarctica has taught me that the true power of science lies in its ability to unite and transform.

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1. From a legal and geopolitical perspective, how does the Antarctic Treaty System represent a unique contribution to the global order, and what lessons can be drawn from its principles to strengthen peace and cooperation beyond the region?

The Antarctic Treaty is arguably one of the most successful international agreements in human history, effectively maintaining absolute peace across an entire continent and its adjacent seas. Moreover, through the Antarctic Treaty Consultative Meetings (ATCMs), an international regime has been gradually developed, demonstrating adaptability to the evolving challenges of global society – initially by promoting the sustainable use of natural resources and later by

advancing environmental protection. This comprehensive framework forms the Antarctic Treaty System (ATS).

This international regime has served – and continues to serve as a prime example of how to address broader global governance issues that require collaboration among many states and actors to achieve shared goals. Its core principles—including exclusive peaceful use, science as a tool for international cooperation, sustainable resource management, and the protection of a unique environment vital to life on Earth—offer a normative framework that could undoubtedly serve as a model for other areas of global concern. The most evident examples of this influence are seen in the governance frameworks for the oceans and outer space, both of which have historically been influenced by the Antarctic model.

2. How does Chile's historical and legal approach to Antarctica reflect its commitment to maintaining the continent as a zone of peace, science, and international collaboration? What distinctive perspective does Chile bring to the evolving challenges of Antarctic governance?

Chile, like other States asserting sovereignty over parts of the Antarctic continent, has historically adopted a policy that balances its national interests with a clear understanding that the governance of the Antarctic continent and its surrounding seas can only be achieved through international cooperation.

In this regard, Chile has consistently adopted a dual approach, already reflected in the text of the Antarctic Treaty itself. This approach

recognises that, beyond matters related to sovereignty, Antarctica is regarded as a region to be preserved for the benefit of all humankind.

For Chile, as for Argentina and other Southern Hemisphere States bordering the Southern Ocean and situated near Antarctica, it is vital that the continent remains a zone of peace. Achieving this aim necessarily involves promoting international collaboration, where scientific activity plays a key role.

Throughout its Antarctic engagement, Chile has actively supported the development of the regime in line with the needs and concerns of each historical period. A clear example of this was Chile's crucial role in negotiating the Protocol to the Antarctic Treaty on Environmental Protection, most of which was agreed in Viña del Mar in 1990, although the Protocol was formally concluded the following year in Madrid.

3. In your view, what are the main legal and diplomatic priorities to preserve Antarctica's status quo of peace amid increasing geopolitical interest, and how can the international community—and particularly Latin American countries—contribute to protecting this legacy for future generations?

International relations currently face increasing geopolitical tensions. In this context, one of the most urgent challenges – and a diplomatic priority – is to keep Antarctica as insulated as possible from global conflicts. Although such isolation may never be entirely achievable, the Cold War's historical precedent shows that it is possible to keep Antarctica a peaceful continent even amid global rivalries.

Another significant challenge for upholding the Antarctic regime is the need to improve the effectiveness and responsiveness of decision-making processes, both within the Antarctic Treaty Consultative Meetings (ATCM) and the meeting of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR). The ongoing legitimacy of the Antarctic Treaty System relies on its capacity to meet the changing expectations and objectives of the international community.

The prestige of the ATS largely depends on its remarkable success in maintaining peace in Antarctica for over sixty years. However, in recent years, new and urgent objectives have emerged, such as the sustainable exploitation of resources and the protection of the Antarctic environment – goals that have become especially critical due to climate change. It remains clear, nonetheless, that the ATS has yet to achieve the same level of effectiveness in addressing these emerging priorities as it has in keeping Antarctica a demilitarised and peaceful region.

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1. How do you assess the resilience of the Antarctic Treaty System (ATS) in maintaining peace and cooperation amid growing geopolitical tensions?

The Antarctic Treaty System (ATS) has been quite a success story and has weathered difficult geopolitical storms before. The negotiation of the Antarctic Treaty itself during the Cold War was a remarkable achievement in balancing competing interests. Later, when mineral exploitation was discussed in the 1980s, ATS member states again managed to develop a regulatory framework that balanced the interests of territorial claimant states and the Cold War superpowers. Generally, the ATS already has several tools at its disposal to once again ease geopolitical tensions: it is a denuclearized and demilitarised zone with an inspections regime, and there is a transparency mechanism in place obligating all parties to inform the others about their planned expeditions and infrastructure and of course there is

the diplomatic glue holding everything together (and sometimes holding everyone back a little bit) — the consensus decision making process.

What is perhaps missing is the determination and political will in the Antarctic diplomatic community to confront the geopolitical developments head-on. For example, by strengthening some of the inspections regime or the transparency mechanism and futureproofing them. There seems to be a prevailing view that it is best to just keep things slowly ticking along, managing crises instead of taking a more strategic and structural perspective. In my view the structural changes in the international system cannot be underestimated and if the Antarctic Treaty System is supposed to have a future it will need to adapt to this new geopolitical rivalry. The rise of Asia and in particular China is ongoing, while the West is fracturing. Europe is losing influence and Trump's America is a very unreliable partner for the foreseeable future. Furthermore, international science is fragmenting with Chinese academia increasingly decoupling from Western research networks, where universities and research funding are increasingly under pressure. In this context, it is more important than ever to keep the Antarctic as an island of international scientific and diplomatic cooperation, mostly for the sake of the Antarctic environment itself but also as a symbol that scientists from all corners of the world and political rivals can still work together under certain conditions. But for this to happen there needs to be less of a technical-managerial and more of a political-strategic approach to Antarctic diplomacy.

Moreover, I'd also like to note that when we speak of peace, we have to clarify what we're talking about: are we working towards an absence of violence or is there a way to nurture something more ambitious, some type of special spirit of Antarctic cooperation through which Antarctic states resolve their conflicts over different issues solely through deliberation and negotiation? Also, are we talking about peace between a few nation states, or peaceful relations with the Antarctic environment, with fish in the Southern Ocean or with penguins on land and elsewhere? One can make the argument that Southern Ocean krill have not perceived human fishing fleets – whether regulated by quotas or not - as particularly peaceful, and it is also important to keep in mind that the ban on nuclear testing in the Antarctic merely displaced testing to other parts of the world particularly in the Pacific. Finally, the climate crisis caused by the influential, rich and high-emitting Antarctic nations isn't particularly peaceful for future generations either. However, this issue won't be solved in Antarctica, but only through seriously ambitious climate action at home.

2. What strategies would you propose to strengthen multilateral engagement in Antarctica to ensure the ATS remains inclusive and adaptive to 21st-century challenges?

I think the most important thing is to change towards a realistic and pragmatic mindset: neither is there any automatic mechanism through which the ATS will forever be exempt from tension and competition (it never really was), nor is a collapse of the ATS a foregone conclusion. Both perspectives are dangerous, as the first one leads to complacency, and the second could turn out to be a

self-fulfilling prophecy. In contrast, we would do well to think more about how to accommodate and balance the different and sometimes diverging interests, and how to keep everyone, from Washington to Beijing and Canberra and Moscow, on board. That might mean some difficult compromises, for sure, especially for countries in Europe, but the world has changed.

Some promising avenues that are worth discussing by academics and the Antarctic diplomatic community include strengthening the inspections regime and overall transparency within the system, building or coordinating a political coalition to ratify the liability annex, as well as some other ideas. For example, for new pieces of infrastructure, Antarctic states could try to share and pool resources more internationally.

Alan Hemmings asked 15 years ago why we have an International Space Station but still no international research station in Antarctica. This question is still valid. And together with Alan, a few years ago I raised the idea of a forever ban on Antarctic hydrocarbon extraction. In our view there is a compelling case for converting the present general moratorium on Antarctic mineral resource activity from the Environmental Protocol, potentially subject to review from 2048, into an explicit prohibition of hydrocarbon extraction. This should be much easier now—when there are no extraction activities and few vested interests—than it will be in the future. It could rally Consultative Parties around a common goal that is not very costly but carries high symbolic value. Certainly, as we know from South African investigative journalists, Russia has been prospecting for hydrocarbons in the Southern Ocean on some of its science cruises in the last few

years, but that doesn't mean we should not try to move this issue forward. Maybe there is a chance to engage China on this issue, as the People's Republic is a leader in green technology (some call it the first electro-state already) and President Xi himself is quite invested in the eco-modernist "ecological civilisation" agenda domestically. Teasing out what is possible here should be a greater focus of Antarctic diplomats and researchers alike.

3. Where do you see the most promising avenues for civic society or youth engagement in shaping Antarctica's future?

In many regards the ATS is a victim of its own success: things seem to work well here, so it often slips under the global radar. But it's not all just happy scientists and happy penguins. The climate crisis is seriously threatening Antarctica's future and in consequence – because Antarctica is central to the global climate and to global sea levels - the habitability of large parts of planet Earth. In my opinion, there is great value in global civil societies connecting to, first, keep Antarctic decision-makers on their toes by demanding that they continually find ways to keep the Antarctic "a natural reserve, devoted to peace and science," and second, to press their respective governments to take genuinely ambitious climate action to protect Antarctica—and, by extension, large parts of humanity. This especially is the responsibility of the people who live in Consultative Party states that are democracies. About that first point, there is this thought-provoking international initiative called Antarctica Rights, which seeks recognition of Antarctica as an autonomous, rights-bearing entity with a voice in decision making that

affects it. That's a very novel approach—in Western legal terms—to regulating human–nature relations, and it carries strong normative power. If more people around the world organize and mobilising around Antarctica as a rights-bearing entity, then this is something that the Antarctic decision-makers cannot ignore forever.

4. How might Antarctica's cooperative framework inspire innovative approaches to "ecological peacebuilding" in regions affected by climate-related conflicts?

I am not sure to be honest. There has been and continues to be a symbolic value in Antarctic cooperation, but in the end, it is about Antarctica and the Southern Ocean. How can we keep this unique, vast and biodiverse place "a natural reserve devoted to peace and science" in an international system that is changing quite substantially, becoming less ordered and more dangerous? How can we keep this space an "island of cooperation" for scientists all over the world, despite geopolitical rivalries and competition internationally? I'd be very happy if this can be achieved for another 60 years through the Antarctic Treaty regime. It won't be easy, but it is possible. The alternative would certainly be far worse, for everyone involved, the penguins included.

Matt Frost, Head of International Office, Plymouth Marine Laboratory
/ United Kingdom

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1. With your extensive background in marine science diplomacy and global partnerships, how do you see Antarctica contributing to our understanding of peace and cooperation across borders—especially in the context of climate and ocean governance?

Whenever I speak on marine science-diplomacy, I always begin by showing the famous Spilhaus Projection, a map centered on Antarctica that presents the ocean as a single, unified body of water. This is significant because, while some see the ocean as boundaries that separate peoples and nations, I see the ocean as something that binds humanity together. The ocean needs to be studied and managed with global cooperation at the heart of this endeavour.

Global cooperation is important because firstly, it is ineffective to manage the ocean by working only at a local scale, as ecological and climatic impacts in one region often ripple across borders. Secondly, the challenges we face are global in nature – climate change

for example is a global scale pressure with drivers that need addressing in international forums, such as the UNFCCC process.

However, there are challenges to working collaboratively across borders and administrations. I have had the privilege of working with countries across the globe and there are often tensions between the research community's desire to cooperate at an international level and national interests such as resource exploitation, territorial claims, maritime boundary disputes and political disagreements.

Antarctica exemplifies this tension but also offers a way forward in that it is completely unique; a landmass and surrounding waters not 'owned' by anyone that is governed purely through multilateral agreements with peaceful scientific research at the core. While this approach is not replicable in a world dominated by nation states and territorial sovereignty, it demonstrates how initiatives can be taken for the benefit of the environment and the planet when shared interests take precedent over national claims. Too often multi and bi-lateral cooperation is subordinated to national agendas when seeking to address global ocean environmental challenges and establish a coordinated scientific approach. The protracted negotiations surrounding some of the key global conventions are testimony to this difficulty.

What Antarctica offers is a model for how we can address key challenges for the planet using diplomacy and scientific research to achieve shared goals. Although the Antarctic arena is not free from geopolitical tensions, putting science and peaceful cooperation at the forefront illustrates the power in diplomacy for ocean governance. Practices like knowledge sharing, capacity building and dis-

pute resolution are central for Antarctica cooperation, where formal borders don't exist and territorial claims are unrecognised. These practices should be replicated when working across borders as well, rather than only in an area such as the Antarctic.

The more we understand about transboundary impacts, utilise a source-to-sea approach and seek synergies across governance regimes such between the Rio Conventions (UNFCCC, CBD and UNC-CD), the clearer it becomes that science-diplomacy and cooperation are essential, not a luxury. The Antarctic model is, therefore, an ideal example of what global cooperation can achieve.

2. The Southern Ocean and Antarctica are critical to global climate regulation. From your perspective as a climate science advisor, what role does Antarctic research play in shaping evidence-based policies that support both peace and planetary resilience?

As Chair of the UK's primary independent advisory body on marine climate change impacts (the Marine Climate Change Impacts Partnership), I can state that the Antarctic is important from a UK perspective. The UK undertakes significant research in the South Georgia and the South Sandwich Islands (SGSSI) and in the British Antarctic Territory (recognising that the Antarctic Treaty suspends all territorial claims). In a recent report on of the polar area, climate change impacts on the region were reported as having a range of direct and indirect effects on marine ecosystems, which will also have 'widespread ramifications for the planet.

There are also important fisheries in the Antarctic, so mechanisms

such as the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) are necessary to promote planetary resilience (a key part of adapting to the impacts of climate change) and also peace by facilitating global cooperation. As climate change continues to impact Antarctic ecosystems however, including fisheries, there will need to be a new management approach

There are also sharp disagreements around the use of Area-Based Management Tools in the Antarctic, such as marine protected areas, which may impact our ability to mitigate climate impacts as well as manage resources in a sustainable way. The outcomes of these discussions are important as Antarctica has been a model of peaceful cooperation for years with robust mechanisms and agreements in place for data and knowledge sharing.

If the processes for evidence-based decision-making fail in the Antarctic, then it raises concern for other parts of the world that don't have the same history of cooperation and mechanisms in place. We can have all the evidence necessary on climate impacts, but ultimately countries need to implement evidence-based (or at least evidence-informed) policy in response.

3. As someone who has spent decades building global networks and translating science into policy, how might Antarctica's cooperative legacy serve as inspiration for new multilateral approaches to managing other global commons, such as the High Seas or even Outer Space?

Antarctica is not the only part of the world (or indeed the universe!), which is in effect a global common. This is a difficult concept to grasp

for many people as we grow up and spend most of our lives in areas defined by borders. Since at least the Neolithic period, human societies have settled in areas and made territorial claims, and the modern concept the Nation State has really been with us since the treaty of Westphalia in 1648. The 20th century then saw the formalization of concepts such as territorial seas and Exclusive Economic Zones (EEZ). The challenge that has developed more recently is that we now have the ability to not only exploit the area within the national boundaries but also to explore the deepest parts of the ocean and the High Seas utilising new and rapidly developing technologies.

Therefore, we need to remember that peaceful cooperation in the Antarctic has only been achieved through a lot of effort and goodwill to establish treaties, fora and mechanisms enabling countries to collaborate within this framework. Also, the Antarctic Treaty was agreed at the height of the Cold War, during a time when nobody expected it to succeed, due to geopolitical tensions. We should take inspiration from these efforts to ensure a strong High-Seas treaty (the 'BBNJ' agreement), which enables humanity to collaborate peacefully despite the geopolitical challenges in our time.

Using science as a basis for peaceful cooperation is also a key lesson. I am also Chair of the World Association of Marine Stations (WAMS), which promotes cooperation and collaboration between the approximately 850 marine stations worldwide (including the Antarctic). Most of these stations are located on the coast as that is where the focus of most of the research would have been historically. These marine stations can operate ships, satellites, autonomous

systems and other technologies out to the farthest-flung parts of the ocean. Thus, there is a necessity to collaborate internationally on both cross-border issues and in the High Seas. It has been encouraging to see the appetite among marine station directors and others to engage on ocean governance, capacity building and managing seas for the benefit of everybody.

Recent meetings have brought stakeholders from every continent to look at how we can strengthen global collaboration. Having multi-lateral scientific networks and partnerships such as these at the heart of any model for high seas exploration and cooperation will be key to managing this area and, again, using the Antarctic model of scientific cooperation can be a key inspiration.

This thinking can also be applied beyond the ocean, with the Outer Space Treaty and joint scientific endeavours such as the International Space Station providing excellent examples of science-based peaceful cooperation.

Maybe we should consider developing a global commons network where best practice can be shared on science-diplomacy and cooperation in the four global commons (common heritage of humankind in the language of the UNEP Division of Environmental Law and Conventions) recognised under international law the High Seas, the Atmosphere, Antarctica and Outer Space. The Antarctic would be a key player in this discussion with its long history and legacy of cooperation.

In summary – many of today's challenges we face around managing the ocean amid geopolitical tensions are not new. Antarctica is a

great model to show how peaceful cooperation can be achieved if there is the political will to do so and the humility to allow science and research to drive the development of policy and appropriate ocean governance.

Emilie McGlone, Director, Peace Boat / USA

BA in Cultural Studies from the University of North Carolina at Chapel Hill. Prior to leading Peace Boat US, she served as the International Director for Peace Boat's Global Voyages and was instrumental in developing its youth, climate, and partnership programs with the United Nations, including the "Youth for SDGs" scholarship program for the United Nations Ocean Decade. Her work focuses on peace education, youth leadership, and sustainable development, and she has directed numerous initiatives connecting youth from around the world to peacebuilding, ocean conservation, and climate action.
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1. From your perspective leading Peace Boat's sustainability and peace programs, how does Antarctica symbolize or inspire global peace and cooperation in today's fragmented world?

Since 2020, one of the foremost motivators for Peace Boat's global voyages is the SDG 14 Life Below Water, as part of the UN Decade of Ocean Science for Sustainable Development. These programs are underscored by UNESCO's Ten Ocean Decade Challenges for Collective Impact, which aim to "unite partners in collective action, thus ensuring that the whole of the Ocean Decade is greater than the sum of its parts." Peace Boat works to advance this goal in partnership with UNESCO. Antarctica requires global cooperation because the continent does not "belong" to any one nation, and therefore the global community has a responsibility to collaborate for the preservation and protection of the land. Peace Boat's mission aims to build cross-cultural connections with a shared vision

of peace and sustainability for the planet. The organization aligns with international conventions governing Antarctica and the global movement for peace and cooperation.

2. Peace Boat has a strong legacy of advocating for nuclear disarmament and youth empowerment. In what ways do you think Antarctica's demilitarized and nuclear-free status can serve as a model for other global commons or conflict-prone regions?

Antarctica's demilitarized and nuclear-free status offers a powerful example of how international cooperation prioritizes peace over conflict. While Antarctica's lack of population and political structures makes demilitarization logistically easier, the continent still stands as a rare symbol of what global commons can look like when governed by consensus, scientific exchange, and environmental stewardship. Countries can look to Antarctica as a model as they shape their own disarmament policies—especially in other global commons like the Arctic or space—and strive toward the broader goal of global peace and de-nuclearization. Its status underscores how diplomacy and collective responsibility can prevail even in the face of geopolitical complexity.

3. You've worked with youth from around the world through Peace Boat's Global Voyages. How do young people perceive Antarctica, and how can their voices and actions contribute to protecting it as a zone of peace and scientific cooperation?

Through Peace Boat's "Youth for the SDGs" program for the UN Ocean Decade, young leaders from across the globe have had

the opportunity to experience Antarctica firsthand. For many, it's a transformative journey that turns abstract environmental and peace issues into tangible, urgent realities. Youth participants observe glaciers, penguin colonies, and other polar marine life up close, fostering a sense of responsibility. After the voyage, they return home not just with memories and impressions, but also data, tools, and new perspectives that empower them to become advocates for Antarctica's continued protection. Their lived experiences and peer-to-peer communication play a vital role in raising awareness and amplifying calls for conservation of this important global common space.

4. Peace Boat often highlights the intersection of environmental justice and peace. What lessons can be drawn from Antarctic governance and conservation efforts, particularly Marine Protected Areas, for global ecological justice?

Peace Boat focuses on the deep connection between peace and environmental justice, and Antarctica offers a powerful model for this intersection. Through the Antarctic Treaty System and the creation of Marine Protected Areas like the Ross Sea, the continent stands as a symbol of international cooperation, demilitarization, and ecological preservation.

These conservation efforts reflect core principles of environmental justice: protecting global commons, centering science and diplomacy, and prioritizing long-term sustainability over short-term exploitation. For Peace Boat, which advocates for disarmament and

ocean protection, Antarctica demonstrates how peacebuilding and environmental governance can reinforce one another. As we confront climate change and ecological injustice globally, the lessons from Antarctic governance offer a hopeful blueprint for collective, peaceful action.

5. As someone who fosters international understanding through intercultural dialogue and civil society initiatives, what role do people-to-people exchanges play in preserving Antarctica's peaceful legacy?

People-to-people exchanges, like those facilitated by Peace Boat US' "Youth for SDGs" Program, which refers to the United Nations' Sustainable Development Goals, onboard Peace Boat, are crucial in demystifying Antarctica, and reinforcing its importance as a zone for peace and science. Many people are unaware of Antarctica's demilitarized status or its environmental vulnerabilities. Firsthand experiences, such as those gained by Peace Boat participants, build empathy and motivate action. When individuals return from these programs, they become informal ambassadors, spreading awareness in their communities, and advocating for continued protection. These exchanges turn distant geopolitical and environmental issues into personal commitments, making global cooperation and justice actionable.

6. How can Antarctica serve as a model for global peace, and what lessons from its governance framework could be applied to enhance international cooperation amid rising geopolitical tensions?

Antarctica provides a unique and hopeful model of what peaceful global governance and cooperation can look like. It shows that nations with vastly different interests can agree to suspend territorial claims, demilitarize a region, and commit to scientific collaboration for the common good. In today's world where conflict and polarization are worsening, this model is more relevant than ever. Antarctica's emphasis on shared responsibility and long-term thinking can be applied to other conflict-prone or contested regions, especially where natural resources are at stake.

Jojo Mehta, Co-founder & Executive Director, Stop Ecocide International / United Kingdom

Co-founded Stop Ecocide alongside legal pioneer, the late Polly Higgins, to support recognition of ecocide as an international crime. She convened the Independent Expert Panel for the Legal Definition of Ecocide (2021) which has catalyzed legislative progress at national, regional and international levels. She has overseen the remarkable growth of the ecocide law movement, coordinating between legal developments, diplomatic traction and public narrative.
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1. Antarctica is often described as a “natural reserve, devoted to peace and science.” In your view, how does the legal recognition of ecocide intersect with the spirit and legal framework of the Antarctic Treaty System?

Antarctica is widely recognized as one of the global commons, an area not owned by any one nation but held in trust for all of humanity and future generations. This status makes it especially relevant to discussions of ecocide law, precisely because current international environmental frameworks lack enforceable legal mechanisms with sufficient power to protect such vulnerable transnational ecosystems.

International environmental law is largely structured around principles such as sustainable development, which often carry an implicit assumption that ecosystems are primarily used for economic benefit. Ecocide law introduces a crucial shift in perspective, moving from regulating the

use of ecosystems to recognizing and preventing their severe harm. It operates on the principle that the most severe widespread or long-term damage to nature should be criminalized. It complements the protective ethos of the Antarctic Treaty by reinforcing a legal boundary against the most destructive forms of environmental abuse.

This approach is particularly relevant in the context of the global commons, where no single state holds jurisdiction and where enforcement gaps are especially pronounced. In a similar way to the medical principle behind the Hippocratic Oath —“first, do no harm”— ecocide law effectively draws a red line, stating that if human activity reaches a level of environmental harm that is severe and widespread or long-term, then that activity is not just problematic—it is criminal.

In short, recognizing ecocide in international law would offer a much-needed legal backbone to the values already enshrined in the Antarctic Treaty, reinforcing the idea that some places and some harms must simply be off-limits.

2. You've worked extensively to integrate ecocide into international criminal law. What potential do you see for Antarctica to become a global symbol or precedent-setting region in the fight against ecocide?

Antarctica is certainly one of the regions with powerful symbolic and practical potential in the fight against ecocide, though it is not alone. Other areas like the high seas and outer space also fall into this category of global commons, places considered the common heritage of humanity.

There is often a misunderstanding about the nature of the commons, shaped in part by the widely cited concept of the 'tragedy of the commons', the idea that if no one owns something, it won't be properly cared for. But in truth, neglect often stems not from the absence of ownership, but from the absence of strong and appropriate legal protections.

This is where ecocide law can make a real difference. Enshrining a basic legal standard could serve as a foundational rule for how we treat ecosystems globally. The global commons, precisely because they don't belong to anyone, provide a powerful context in which to set such a precedent. They illustrate more clearly than anywhere else that some places must be protected for the sake of all.

Antarctica is one of a small number of regions that carry a special symbolic weight. Anchoring ecocide law in the protection of such commons could provide a flagship model for rethinking our relationship with nature and sending a strong message that global responsibility must be matched by global accountability.

3. The Southern Ocean and its ecosystems are critical to planetary health. How might the criminalization of ecocide shift corporate and governmental accountability for environmental harm in remote, vulnerable regions like Antarctica?

What makes the criminalization of ecocide particularly powerful, especially in the context of remote and vulnerable ecosystems like the Southern Ocean, is that it goes beyond regulatory frameworks

and introduces personal accountability. This is especially significant in the corporate sphere.

Unlike other core international crimes such as genocide or crimes against humanity, which are often ideologically driven, environmental harm caused by corporations is typically the result of calculated business decisions. 'Rational actors' are highly attuned to reputational risk and shareholder value; if a senior executive becomes personally liable for ecocidal harm it not only impacts their own standing and freedom, but also the public image and financial value of the company. That's a level of deterrence regulatory fines simply do not reach.

Criminal law also holds a unique cultural and psychological power. It helps define what is socially and morally unacceptable. Once environmental destruction is recognized as a crime on par with other grave offenses, it can shift public norms and business behavior in a far deeper way than policy guidelines or fines could. This applies not only to non-state actors, but to governments as well. When the prospect of criminal liability exists, state and non-state actors alike must reconsider decisions that could lead to severe widespread or long-term environmental harm.

Moreover, in regions like Antarctica, surveillance technology such as satellite imagery makes the monitoring of these areas feasible and straightforward, and the idea that remote locations are beyond scrutiny is no longer tenable. For example, if a company considers undertaking an activity that risks ecocidal harm, it must also consider that the evidence could be visible from space—and used as proof in a criminal investigation. Together, these factors make the criminaliza-

tion of ecocide a transformative tool that can shift behavior and accountability in even the most remote and fragile parts of our planet.

4. As someone deeply involved in cross-cultural and multilateral advocacy, what lessons from Stop Ecocide's global coalition-building could be useful for Antarctic-focused diplomacy and protection efforts?

One of the key elements that has helped move the conversation on ecocide law forward quickly is our very clear, singular focus. In large multilateral settings, such as the UN, there's often a tendency for campaigns or organizations to present broad, multi-point plans to address complex global challenges. While well-intentioned, such approaches can be overwhelming for decision-makers and difficult to translate into concrete political action.

In contrast, our laser focus on one specific legal objective has been a major strength. For those working on Antarctic protection, maintaining that same clarity and specificity of purpose is crucial. If you're focused solely on the Antarctic region, with a clearly defined goal, that precision will make your advocacy more accessible and actionable for diplomats and policymakers.

Another important lesson we've learned is to be strategic about the coalitions we join. Sometimes broader agendas can dilute or conflict with your core objective.

Discretion is another vital ingredient, particularly in diplomatic contexts. At Stop Ecocide International, we're very careful only to

publicize what is already in the public domain or explicitly cleared for release. This approach has helped us build lasting trust with political and diplomatic actors. They know we aren't going to breach confidence or politicize conversations, which in turn encourages more open and constructive engagement.

Lastly, and perhaps most importantly, we focus on solutions. It's easy to get caught up in blame or anger about environmental destruction. Our approach has always been to stay positive and future-focused. Most environmental harm is not driven by a direct intent to destroy but is instead a consequence of economic or operational priorities. We go into conversations assuming goodwill, and frame ecocide law as a common-sense solution: a safeguard for what we all value. That tone of constructive optimism has served us well, and I believe it could do the same in Antarctic diplomacy.

5. The inclusion of voices from civil society is central to your work. How can campaigns like Stop Ecocide inspire or connect with Southern Hemisphere nations and communities that see themselves as guardians of the Antarctic?

Responsibility is the key. It resonates deeply not only in legal terms, where criminal law is ultimately about taking responsibility for harm, but also in cultural and moral frameworks, particularly those found in many Southern Hemisphere nations and Indigenous communities.

One of the underlying aims of our work at Stop Ecocide International goes beyond legal reform. While on the surface it's about

establishing a new international crime, at a deeper level it's about helping to embed a collective sense of responsibility for the Earth. This is where we see an important and natural meeting point between civil society movements and legal systems.

In our experience, Indigenous leaders and community representatives across the globe almost always respond positively to the concept of ecocide law. It reflects something they already understand intuitively and culturally, namely, that serious harm to the Earth carries consequences. Yes, that's a scientific truth, but for many, it's also a spiritual and cultural reality.

That resonance offers a strong foundation for building connections with Southern Hemisphere nations and communities that view themselves as guardians of Antarctica. Initiatives such as recognition of ecocide can provide legal language for what many communities already practice: a custodial relationship with nature. In doing so, we're not introducing something foreign but validating and reinforcing values that already exist.

This alignment between living tradition and legal evolution is incredibly powerful. It offers a way to unite civil society, legal reformers, and frontline communities under a shared principle: that protecting the Earth is not only a moral duty but a legal imperative.

Hyoungh Chul Shin, President, Korea Polar Research Institute (KOPRI)
/ Republic of Korea

PhD and a biological oceanographer by training, coordinated numerous expeditions to the Antarctic and the Arctic for the Korean program, including two winters in the Antarctic. He has previously served as the Vice President, ex officio the chief scientist of the Korea Polar Research Institute. He has been an advocate of international cooperation with his service on the national delegation to ATCM, CCAMLR, SCAR, and many more. *hcshin@kopri.re.kr*

1. Given Korea's active role in Antarctic scientific collaboration, how has KOPRI leveraged polar research to foster trust and cooperation among nations-even those with geopolitical tensions elsewhere?

Science and scientific cooperation, which enable and facilitate the peaceful coexistence of humanity on the Antarctic continent and in the Southern Ocean, have been core values for the Republic of Korea and central pillars of its national program since its inception and throughout its development. The Korea Polar Research Institute (KOPRI), the principal working agency of the national Antarctic program, operates two year-round research stations and a research vessel that sails between the two poles of the globe. These major assets underpin Korea's Antarctic science.

There are two main ways in which Korea uses its capabilities to make a positive contribution to Antarctic science. First, KOPRI provides opportunities and platforms for researchers both within and

outside Korea, striving to share our research outcomes and the resulting knowledge with potential users and the wider public. Second, the Korean program works to align its scientific activities with global priorities and challenges. For instance, understanding the Antarctic's role in regulating the climate—and its diminishing buffering capacity—provides essential insights that help shape our responses to the climate crisis and its immediate consequences. Biodiversity loss and ecosystem transformation represent another critical dimension, both of which fall within the scope of Korea's program.

Korea's Antarctic program aims to be a constructive influence by using its capacities and platforms for that purpose. Yet it is only relatively recently that KOPRI has developed the capability to do so. In the past, exchanges of opportunities and personnel were the main form of cooperation, often serving as demonstrations of the program's growing stature. This is changing. Rapid expansion in infrastructure and logistics has led to notable scientific outcomes and greater capacity for independent research. Joint conception and implementation are becoming the norm, and Korean research teams are increasingly taking on leading roles in multi-partner projects.

We are now entering a stage where cooperation itself serves to build trust and collaboration among national programs. While science cannot always bridge deep geopolitical divides, Korea is willing—and preparing—to act as an honest and capable broker of scientific cooperation where potential partners face political challenges. Operational capability, scientific expertise, and sincerity are

all required, along with patience and trust. Korea stands ready to shoulder such a role whenever the opportunity arises.

2 How can science-driven diplomacy in Antarctica inspire conflict resolution in other contested regions?

The core tenets of the Antarctic Treaty combine the peaceful use and demilitarization of the continent with the promotion of scientific research, cooperation, and the suspension of territorial claims. Science-driven diplomacy and evidence-based decision-making are both the means and the proof of this principle in action.

The Antarctic Treaty has long served as a model for cases in need of reasonable and peaceful resolutions while conditions remain uncertain. However, recent tensions displayed at major Antarctic governance forums, such as the ATCM and CCAMLR, remind us that the Treaty System is not immune to geopolitical conflicts. In fact, it can easily mirror existing divisions or perpetuate them. Having survived both the Cold War and the pressures of resource exploitation, the Treaty now faces new challenges.

Emphasizing science and collaboration cannot guarantee that the Treaty's original purpose is met, but they remain necessary conditions for achieving it—possibly providing remedies for politically difficult circumstances. We are learning that evidence and trust are both essential to produce success stories and build legitimate, sustainable governance structures. Science still possesses the unique capacity to create the factual foundation on which agreements among divergent parties can be based.

The task, however, is to identify shared goals that all parties can accept, even if their broader interests differ. A practical starting point may be to explore undesirable scenarios that all wish to avoid, regardless of political position. Another useful approach is to complement official meetings with more flexible and informal dialogues, where both experts and officials can participate in their individual capacities. Such spaces allow freer discussion, help reduce tension, and support the discovery of minimal common ground.

In this way, the Antarctic Treaty can continue to serve as an inspiration—and even an exportable model—for other international regimes, not only in politically contested regions but also wherever complex and interlinked challenges require cooperative management.

3. How do you envision engaging younger generations to uphold Antarctica’s demilitarized, collaborative spirit amid rising global instability?

The spirit of Korea’s Antarctic program is to help prepare for and build the shared future of the world and the nation—particularly together with the next generation. KOPRI has been developing a range of next-generation initiatives, in addition to supporting graduate-level education. We operate fellowship programs that enable short-term exchanges for students and early-career researchers between Korea and other countries, covering both scientific and policy disciplines. Participants learn the value of collaboration and the role that grassroots initiatives can play in reducing tensions and enhancing global stability.

In the coming years, Korea will have exciting opportunities. It is scheduled to host the Antarctic Treaty Consultative Meeting (ATCM) in 2027 and has also been selected to host a Joint Bipolar Conference in 2030. This conference will be a key milestone leading towards the large-scale international research campaign known as International Polar Year (IPY) 5 in 2032–33.

Field campaigns such as Antarctica InSync and IPY5—five to eight years away—will be critical opportunities to involve young researchers from the outset. By engaging them in planning and execution, we can cultivate at least two cohorts of future polar scientists: one involved in designing the campaign and another in implementing it, possibly using the results for their theses. These young scientists need not come exclusively from like-minded nations; indeed, collaboration across different political backgrounds will best embody the Antarctic spirit.

Equally important is outreach to the wider public, explaining the societal significance of Antarctic research in accessible ways. The “future generation” is no longer confined to the not-yet-born or newly-born—many members of today’s generation are already stepping into that role amid accelerating environmental and political change.

Korea, once a small nation on the periphery of great powers, has long carried aspirations for peace and respect for wisdom in its cultural DNA. The Antarctic is an ideal setting to realize Korea’s ambitions as a responsible middle power—accountable, capable, and committed to contributing to a peaceful world supported by international cooperation. Engaging and empowering younger gen-

erations may well be the most cost-effective and enduring way to uphold the continent's demilitarized and collaborative legacy.

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1. As a linguist specializing in language contact in Antarctic and subantarctic regions, how do you see language as a tool for fostering peaceful coexistence and intercultural understanding in Antarctica's uniquely international environment?

Coexistence is fundamentally mediated by language. It is through language that we express opinions, negotiate, ask for advice, and make decisions, yet we often forget how deeply embedded language is in our daily lives. Cultivating language awareness is key to maintaining peace in such a complex and multicultural environment. In Antarctica's international setting, language becomes not only a means of communication but also a way to acknowledge and respect perspectives, ensuring that all voices are heard in governance and on the field.

From the early heroic age of Antarctic exploration, language was not merely functional, it was foundational. The diaries and expedition logs of figures like Shackleton, Scott, and Amundsen reveal that communication was vital to both survival and morale. They relied on language to define purpose, calm fears, build cohesion, and manage interpersonal tensions in some of the harshest conditions on Earth. Their experiences make clear that language has long been critical to the success of cooperative ventures in Antarctica.

Today, language remains just as central —perhaps even more so— to Antarctic coexistence. English is the dominant working language across most stations as well as in international governance forums like the Antarctic Treaty Consultative Meetings. While this common linguistic ground facilitates communication, it also creates imbalances. Not all stakeholders have equal access to English language education or the same degree of fluency. Operating in a second or third language can be cognitively demanding, reduce participation in discussions, and constrain the expression of nuance or dissenting views. In this way, the dominance of English can marginalize voices and reinforce existing inequalities. At the same time, working in a shared foreign language may promote clarity, mutual respect, and inclusiveness, especially when no one holds the advantage of native fluency. This linguistic leveling can foster a kind of solidarity among international teams, an understanding that communication is a collaborative effort rather than a test of fluency.

In many multilingual teams stationed in Antarctica, English often becomes the default working language —even when none of the members are native speakers. This reflects English’s global status as

a lingua franca, but it also points to the compromises and asymmetries inherent in international communication. On one hand, shared non-nativeness can foster patience and mutual effort; on the other hand, it may obscure underlying power dynamics and inhibit contributions from those less confident in their linguistic abilities.

Cultivating language awareness is a prerequisite for successful collaboration. In a multilingual context like Antarctica, fostering plurilingual practices can prevent miscommunication, build trust, and expand participation. By reflecting on language dynamics, we move closer to the ideal of Antarctica not only as a hub of scientific cooperation, but also as a model for peaceful and inclusive international engagement.

2. Your research on place-naming practices in Antarctic Territories explores how language shapes perceptions of space. What can these linguistic choices tell us about the power dynamics, cooperation, and cultural narratives present in Antarctica today?

Place-naming in Antarctica reflects not only historical trajectories of exploration, but also contemporary power dynamics among states. In most inhabited parts of the world, toponyms emerge organically through local usage, rooted in collective memory, identity, and daily life. Antarctica has no permanent indigenous populations and no long-standing settlements. As a result, place-naming is largely an institutional act led by national authorities —committees, ministries, and mapping agencies far from the icy landscapes they name. The names assigned to Antarctic features are frequently chosen to

honour national figures —explorers, scientists, politicians— or to commemorate events deemed significant to the naming country. These choices carry symbolic weight, often functioning as subtle assertions of sovereignty or national interest. This is especially evident in cases where different countries assign distinct names to the same location —an occurrence common in areas with overlapping historical claims, for example those involving Argentina, Chile, and the United Kingdom. These discrepancies reveal how naming can both reflect and shape geopolitical interests, even in a region governed by principles of neutrality.

This symbolic layer of language is far from trivial. As with naming a child or a company, naming a place carries authority and often signals ownership. In Antarctica, where a single location may bear multiple names depending on the national map consulted, such discrepancies can generate both political tension and practical confusion. Inconsistencies in toponymy can hinder scientific collaboration, complicate logistics, and obstruct understanding. The coexistence of competing naming systems serves as a reminder that Antarctica, despite its formal neutrality and ethos of cooperation, continues to be shaped by national agendas and historical asymmetries.

I am currently examining place-naming practices in a specific Antarctic Territory as part of a broader project on the linguistic dynamics of remote and extreme environments. My research explores how naming reflects and shapes spatial perception, historical memory, and institutional presence. In many cases, naming decisions expose an enduring tension between the ideals of shared governance and the realities of national influence.

The so-called *British Antarctic Territory* offers a clear example. The United Kingdom, like several other claimant nations, has a long-standing practice of assigning English-language names to geographic features—including those located in areas also claimed or operated by other countries. These names are often institutionalized through national archives, scientific repositories, and official cartographic systems. Meanwhile, countries such as Argentina and Chile may use entirely different toponyms for the same locations. This dual or even triple naming leads to inconsistencies that can complicate international cooperation, disrupt logistical coordination, and hinder effective scientific communication.

Place names tell stories about who arrived first, who mapped what, who founded the expedition, and which values were deemed worth commemorating. A mountain named after a 19th-century naval officer does not simply function as a GPS locator; it carries with it the imprint of a cultural legacy of exploration and empire, one that continues to shape Antarctic imaginaries today.

While deeply embedded in institutional tradition, this practice is not without consequences. Linguistic choices in toponymy can influence international diplomacy, complicate station coordination, affect environmental reporting, and shape how scientific data circulates. When a single glacier bears multiple names across different national and linguistic contexts, referencing it in policy or publications becomes not just a technical issue but a matter of political negotiation. This is particularly problematic in a region that depends on precision, transparency, and international cooperation to confront shared challenges such as climate change.

3. Given your interdisciplinary work and interest in the sociocultural dimensions of Antarctic spaces, how might linguistic and anthropological insights contribute to broader efforts in preserving Antarctica as a symbol of peaceful collaboration and shared human heritage?

Linguistic and anthropological insights are essential for understanding how humans interact with Antarctica—not just physically or scientifically, but socially and symbolically. Yet humanities remain largely underrepresented in polar research, which continues to be dominated by the so-called natural sciences. I believe in the human dimension: how people communicate, coexist, and construct shared meaning in this environment demands closer attention.

For example, how do individuals from different linguistic and cultural backgrounds establish shared routines, resolve conflicts, or manage everyday life in close quarters? How do language barriers impact safety, morale, or operational efficiency? These are not peripheral concerns—they speak directly to the sustainability of international cooperation.

Just as crucial is the need to address language more explicitly in Antarctic governance. Linguistic issues should be incorporated into discussions at the Antarctic Treaty Consultative Meetings, where discussion of these topics is only beginning to gain institutional visibility. The recent creation of SCAR's *Equality, Diversity and Inclusion Action Group* offers a timely platform to advance these conversations. This group is well positioned to lead efforts on promoting language awareness, drafting best practices for multilingual

signage, providing language support in collaborative research, and ensuring that all participants are linguistically included.

I am convinced that as we turn our attention to future frontiers —such as outer space— the lessons learned in Antarctica become increasingly valuable. Like Antarctica, space represents a domain of shared governance, extreme conditions, and diverse international stakeholders. If we can understand how language has both enabled and constrained collaboration on the southernmost and coldest continent, we will be better prepared to approach other shared spaces with greater linguistic and cultural sensitivity. Language is not simply how we speak to one another; it is how we build worlds together —even in the most remote and demanding environments known to humanity.



The Konrad Adenauer Foundation is a German political institution established in 1964 that is committed to the Christian Democratic movement. It provides political education, develops scientific foundations for political action, awards scholarships to highly talented individuals, researches the history of Christian democracy, supports the European unification movement, promotes international understanding, and fosters cooperation in development policy. In its international work, the Konrad Adenauer Foundation cooperates to maintain peace and freedom worldwide, strengthen democracy, fight poverty, and preserve the natural living environment for future generations.



Fundación Agenda Antártica is a non-profit organization devoted to promoting peace, cooperation, and the conservation of nature in the Antarctic region and the Southern Ocean. Through research, education, outreach, and international partnerships, it encourages responsible human activity in harmony with the environment and supports policies that protect Antarctic ecosystems. The Foundation works with governments, academic institutions, civil society, and private sector organizations to advance dialogue, innovation, and conservation-oriented collaboration. Its activities include public awareness, the dissemination of Antarctic knowledge, and the management of collaborative projects that link science, policy, and society. It also serves as the editor of the Antarctic Affairs Journal (since 2012), a bilingual (English-Spanish) publication focused on Antarctic affairs, scientific cooperation, and environmental governance. Its vision is to preserve Antarctica and the Southern Ocean as living symbols of a healthy planet, protected nature, and enduring peace.