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ANTARCTICA

STRATEGIC COMPETITION'S NEXT FROZEN FRONTIER

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EXECUTIVE SUMMARY

Of the seven continents, only one has no indigenous population and no internationally recognized sovereign government: Antarctica. While larger than Europe and Australia, the continent's remoteness and inhospitable climate have ensured it remains at the edge of the map and the margins of most deliberations about international relations and military strategy. Antarctica's 5.5 million square miles are governed by the Antarctic Treaty, which entered into force in 1961. In 2048, these countries will have the opportunity to open up part of the ATS for review, reopening questions about how to govern the world's only nuclear- and weapons-free continent.

Antarctica is a region considered rich in mineral resources, in addition to being valuable for the magnitude of its land size. Most notably, Antarctica holds great promise for scientific discovery and exploration. Beyond the renewable and non-renewable resources that might be available, the continent has great strategic promise because of its location. Ground stations in Antarctica could support satellites in polar orbits, which are visible from the poles multiple times a day, allowing for a more frequent download of information.

Commercial mineral activities are prohibited in Antarctica under the Protocol on Environmental Protection to the Antarctic Treaty, signed in Madrid in 1991 and entered into force in 1998. The protocol commits the parties to "the comprehensive protection of the Antarctic environment" and designates Antarctica as a "natural reserve, devoted to peace and science" (Art. 2). The protocol prohibits mining and related activities in one simple article: "Any activity relating to mineral resources, other than scientific research, shall be prohibited" (Art. 7). The protocol, like the treaty itself, has no end date. It does, however, contain a provision in Article 25, stating that "If, after the expiration of 50 years from the date of entry into force of this Protocol, any of the Antarctic Treaty Consultative Parties so requests by a communication addressed to the Depositary, a conference shall be held as soon as practicable to review the operation of this Protocol."[1] Modifications or amendments could then be made to the protocol, if the majority of signatories and ¾ of the countries that had obtained Consultative Party status as of 1998 agree. In 1998, all current consultative members had joined and obtained consultative status except for Ukraine (2004) and Czechia (2014). China became a consultative party in 1985 during a period of renewed interest in the region.[2] The protocol was negotiated in 1991 but entered into force in 1998, meaning the "expiration of 50 years" will occur in 2048.

Antarctic activities and the possible renegotiation of the Madrid protocol have important implications for the United States and the U.S. Department of Defense (DoD). In particular:

- Antarctica, specifically Antarctic governance, is an area in which the United States will face its near-peers in strategic competition over managing the continent, including what uses are allowed. In the Antarctic Treaty System (ATS), the United States and its near-peers have equal voting power: the United States, Russia, and China are all consultative parties to the ATS. This power balance means that all would have to compete for influence among the remaining parties, some of which have territorial claims on the continent.
- Increased scientific and tourism activity in Antarctica will require greater support from DoD and its counterparts in other ATS countries.
- Increased activity in Antarctica could make it increasingly harder to determine whether engagement in the region is consistent with the continent's peaceful nature, as described in the ATS. This could potentially increase the need for and frequency of inspections.
- Lastly, the preservation of Antarctica has important and as-of-yet-understudied implications for addressing climate change. Developments in Antarctica present a long-term concern for DoD because of their potential impact on climate change and because climate change could change the nature of the environment on the continent.

INTRODUCTION

Of the seven continents, only one has no indigenous population and no internationally recognized sovereign government: Antarctica. While larger than Europe and Australia, the continent's remoteness and inhospitable climate

have ensured it remains at the edge of the map and the margins of most thinking about international relations and military strategy. Antarctica's 5.5 million square miles are governed by the Antarctic Treaty, which entered into force in 1961. At the time, the United States was in the middle of the Cold War, when roughly one-third of the world's population lived under communism, and the longest flight in operation covered a distance of just under 5,000 miles. The United States was still eight years away from becoming the first country to land a man on the moon. When the treaty was signed, only eight countries had established a presence on the continent through a research station (Argentina, Australia, Chile, France, Japan, New Zealand, Russia, and the United States). Since then, 22 additional countries have established research stations (Belarus, Belgium, Brazil, Bulgaria, China, Czechia, Ecuador Finland, Germany, India, Italy, Netherlands, Norway, Peru, Poland, South Africa, South Korea, Spain, Sweden, Ukraine, United Kingdom, and Uruguay.) Presently, 56 countries are signatories to the treaty, including 12 countries in the Western Hemisphere, in addition to the United States. In 2048, these countries will have the opportunity to initiate discussions to potentially revise part of the treaty, reopening questions about how to govern the world's only nuclear- and weapons-free continent.

Antarctica is a region thought to be rich in mineral resources, in addition to being valuable for the magnitude of its land size. Most notably, Antarctica holds great promise for scientific discovery and exploration. An Australian study underway is attempting to dig out a fragment of the ice core to investigate historical climate patterns and draw inferences about climate change.[3] U.S. scientists discovered a bacterium that produces palmerolide A, a compound that holds great promise for treating melanoma. Argentine scientists have been studying volcanic activity in Antarctica, including on the island of Decepción, where the country has a station. Even tourists have been able to make discoveries in Antarctica and view seldom-seen species like the giant phantom jellyfish.

The region plays a crucial role in climate change and is directly affected by it. Climate change impacts Antarctica and is impacted by Antarctica. On the one hand, warmer temperatures melt the continent's ice sheets and the surrounding sea ice. This, in turn, affects the continent's flora and fauna, including, for example, Antarctic Silverfish, which are producing fewer larvae, affecting not only this species but also penguins and others that prey on it.[4] On the other hand, warmer temperatures affect the Antarctic ice sheet and ice shelves. Since the 1950s, about 25,000 square kilometers (km^2) (9,600 mi^2) of the ice shelf has disappeared around the Antarctic peninsula.[5] The Antarctic ice sheet is second only to the Greenland ice sheet melt as a contributor to rising sea levels. Given its size, however, the effects of increasing temperatures in Antarctica could be catastrophic. As the ice sheet and shelves melt and retreat, they also potentially expose more ice-free land that any country engaged on the continent could use.

The promises and challenges for international actors seeking to engage in Antarctica are many and increasing as technological advances bring into focus the region's potential. Its character as a place of peace and the durability and resilience of the international agreements that govern it have forestalled discussions about the continent's strategic importance. Considering recent and forthcoming events, these issues now seem ready for analysis and discussion. This research paper describes the strategic value of Antarctica, what activities and actors are allowed to capitalize on this value under the current framework, and the possible implications of changes to this framework for the United States and the U.S. Department of Defense (DoD), in particular.

ANTARCTICA: GEOGRAPHY

Antarctica is the coldest, highest,[6] and driest place on the planet. Antarctica has an area of 5.1 million square miles, is about 1.5 times the size of the United States, and is larger than Oceania and Europe. The Southern Ocean surrounds the continent.

Antarctica's geography makes it the coldest place on Earth. At South Pole Station (also called Amundsen-Scott Base), the average monthly summer temperature is 46°F (8°C), while the average winter monthly temperature is –76°F (-60°C), according to the U.S. Antarctic Program.[7] Conversely, in the Arctic, temperatures can approach 48°F or (9°C) in the summer and

about –40°F (-40°C) in winter. On land, most of Antarctica is covered with an ice sheet that blankets approximately 98 percent of its surface area. This ice sheet is one of only two on Earth—the second covers most of Greenland.[8]
In addition to contributing to the cold temperatures, Antarctica's ice sheet adds to the continent's elevation. The sheet's thickness averages 7,086 feet and can reach elevations as high as 15,600 feet at its thickest point.[9] The Transantarctic Mountains, which subdivide the continent into eastern and western regions, stretch for more than 2,000 miles from Victoria Land to the shores of the Weddell Sea. Mount Kirkpatrick in the Queen Maud Mountains is the highest point on the range, where the elevation reaches 14,856 feet. Altitude adds to the challenging weather conditions that make the region hostile to human settlement and exploration.

Though the Antarctic ice sheet contains about 30 million km^3 of frozen water, Antarctica is one of the driest places on Earth. It experiences only about two inches of precipitation annually (a total only higher than that of the Atacama Desert in Chile and Death Valley in California.) Some areas within Antarctica known as "dry valleys" reserve the distinction of being the driest places on Earth; it has not rained there in more than two million years. The dry valleys are lodged between the Transantarctic Mountains and are some of the most inhospitable environments on the continent. Some have said the harsh conditions of the valleys are the closest equivalent on Earth to the conditions on Mars.

Antarctica's challenging conditions at least partly explain the absence of an indigenous population. The lack of a permanent human population stands in contrast to the Arctic, which is home to more than three dozen indigenous groups. The Arctic's indigenous populations actively participate in the governance of the region, through their national governments and serve as permanent participants in the Arctic Council. In contrast, Antarctica's population is composed primarily of researchers rotating in and out of the continent. They are estimated to number between 1,000 and 4,000, with larger numbers of researchers residing in the relatively milder summer months.[10] In addition, an estimated 1,000 personnel live nearby on boats. To put this into perspective, Denmark's Faroe Islands, a small semi-autonomous territory near the Arctic, has a permanent population nearly 50 times that of Antarctica, during the Austral summer months.

Antarctica's remoteness, challenging geography, and lack of a permanent human population make the region unlike almost any place on Earth. This uniqueness, combined with a stated desire to protect the last parts of the planet that haven't been affected by human activity, led to the creation of an innovative governance framework based in part on the idea that its preservation is important and that to ensure it, no state can own or exploit it. This core principle of non-ownership, first enshrined in the Antarctic Treaty halfway through the twentieth century and reaffirmed in the subsequent protocols, might be challenged in 2048 when there is an opportunity to discuss modifications to the Protocol. International actors may see 2048 as an opportunity for opening discussions of the Environmental Protocol as a way to reshape the region's governance and capture some of the strategic potential of the coldest, driest, and highest place on Earth.

STRATEGIC VALUE OF ANTARCTICA: NAVIGABLE WATERS, BASING, AND NATURAL RESOURCES

There is evidence that Antarctica is rich in renewable and nonrenewable resources. Yet, the focus on the preservation of Antarctica for peaceful and scientific purposes and the prohibitions on commercial fishing in some protected areas (The Convention on the Conservation of Antarctic Marine Living Resources or CCAMLR) and on "any activity relating to mining resources" (Protocol on the Environmental Protection of the Antarctic Treaty) has limited not just the extraction of these resources but also any assessments of what the stocks of these resources might be.

Despite the difficulty of collecting such information, some estimates are available on the renewable natural resources available in Antarctica. These estimates exist because resource extraction hasn't always been prohibited, and some of this activity is still allowed under

the current framework. Many species unique to the Southern Ocean are commercially fished in the waters around Antarctica, while some that have been historically fished are no longer. Whale and seal hunting were two of the earliest commercial activities in the Antarctic. Antarctic whales were harvested for baleen and blubber oil, and fur seals were killed for their pelts. Both practices have since ceased. Antarctica's most abundant resource might be krill, which exists in massive quantities in the waters surrounding the continent. Due to the high amount of protein they contain in their bodies, krill is the single largest protein mass on the planet.

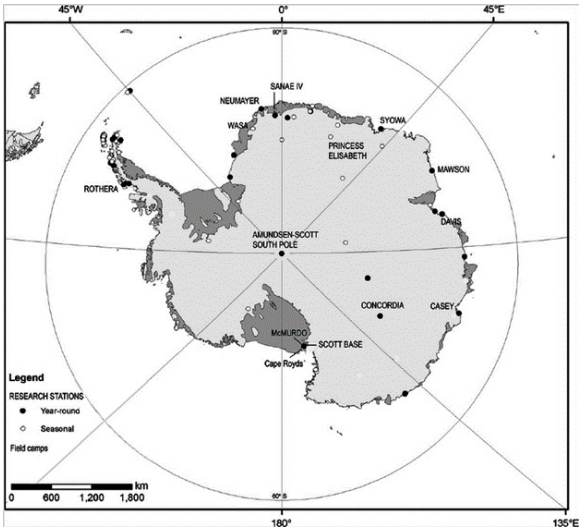
Today, krill is the primary species targeted in Antarctic fisheries, and is a keystone species in the region's ecosystem. The Southern Ocean has an estimated 400 million tons of Antarctic krill. While not an endangered species, krill is vital to preserving the many endangered species that live in and around Antarctica and depend on krill for sustenance and survival. Overfishing krill is linked to the death of whales in the Southern Ocean, for example.[11] To manage the resource, the ATS has capped seasonal krill fishing at 620,000 tons per season/year. Because it is an expensive activity and difficult to carry out, fishing vessels have thus far been able to catch, at most, 450,000 tons in one season (2020).[12] However, as investment in trawlers increases, so too does the expected catch. China is building the world's largest Antarctic krill trawler, Fu Yuan Yu 9199, scheduled for completion in 2023.[13] Russia, too, is investing US$640 million in krill fishing, as krill catch is an essential part of Russia's strategy for doubling its seafood exports, a goal announced in 2018.[14]

For the United States, the National Oceanic and Atmospheric Administration studies and monitors the distribution and abundance of Antarctic krill in relation to environmental conditions. This information, compiled using a combination of ship-based net and acoustic technology and stationary mooring, is used to help manage krill populations in the Southern Ocean. In addition to playing a vital role in sustaining other marine life, krill is also fit for human consumption. The United States is a leading consumer of krill, though not as a food. This is despite an exceptionally forward-looking 1977 National Aeronautics and Space Administration (NASA) report that argued for the critical role of krill in increasing the supply of fish to expand the availability of fish in the human diet. The report did highlight the challenge of "getting people (particularly North Americans) to accept krill as a dietary staple."[15] Its main use in the United States is as the primary input into krill oil, a nutritional supplement. Nonetheless, despite the U.S. public not having incorporated krill into its diet, the preservation of this resource is important to the United States for normative reasons: krill plays an important role in the preservation of other species, something the United States strongly supports, and its responsible fishing stands in contrast to practices of illegal, unregulated, and unreported (IUU) fishing, which the United States opposes.

Relatively less is known about the types and quantities of nonrenewable resources that might be available in Antarctica, though as often happens with unexplored lands, there are estimates of riches that are probably exaggerated. Perhaps the most authoritative estimates come from a U.S. Geological Survey report published in 1974 before the environmental protocols and restrictions on mining were in place. At that time, nearly 50 years ago, the report announced that "although the existence of mineral deposits in Antarctica is highly probable, the chances of finding them are quite small."[16] The report further clarified that "Antarctica now has no known economically recoverable resources of any category, nor does Antarctica have any known mineral districts."[17] Many minerals have been found in Antarctica, including chromium, cobalt, copper, gold, graphite, iron, magnesium, mica, manganese nodules, nickel, phosphate rock, silver, and tin. Most of these were found in trace amounts or locations where it was not commercially viable.

The assessment that the recovery of these minerals was not of commercial interest was made five decades ago with information about the technology available at that time, especially about the cost of advanced technology required for their extraction. Though mineral extraction in Antarctica remains extremely expensive and dangerous, primarily because of the hostile weather conditions and the distance from industrialized areas, technology is improving and, with it, the risk of extraction. Moreover, as the Antarctic ice sheet continues to shrink as a consequence of climate change, one of the

main physical obstacles to mineral extraction shrinks as well.[18] Using measurements acquired by satellite, NASA has estimated that Antarctica has lost about 151 billion metric tons of ice per year since 2002.[19] Under the strongest forcing scenario, ice-free areas of the continent, which currently account for less than 1 percent of its surface area, could expand by over 17,000 km^2 by the year 2100. Predictions suggest most of this expansion will occur in the Antarctic Peninsula.[20] The peninsula has the continent's mildest climate and thus hosts the largest number of bases, including Carlini Base and San Martin Base (Argentina), Comandante Ferraz



Antarctic Station (Brazil), O'Higgins Riquelme Base (Chile), Bellingshausen Station (Russia), Rothera Research Station (United Kingdom), and Palmer Station (United States).

Figure 1: Map of research stations[21]

Table 1: Permanent active research stations in Antarctica

Station	Country	Year Established
Belgrano II	Argentina	1979
Carlini	Argentina	1953
Esperanza	Argentina	1953
Marambio	Argentina	1969
Orcadas	Argentina	1903
San Martin	Argentina	1951
Casey	Australia	1957
Davis	Australia	1957
Mawson	Australia	1954
Comandante Ferraz	Brazil	1984
Arturo Prat	Chile	1947
Eduardo Frei	Chile	1969
Escudero	Chile	1995
General Bernardo O'Higgins	Chile	1948
Great Wall	China	1985
Zhongshan	China	1989
Eco Nelson	Czechia	1988
Dumont d'Urville	France	1956
German Antarctic Receiving Station	Germany	1991
Neumayer III	Germany	2009
Bharati	India	2012
Maitri	India	1989
Concordia	Italy and France	1995
Showa	Japan	1957
Arrival Heights Laboratory	New Zealand	1959
Scott Base	New Zealand	1957
Troll	Norway	1990
Arctowski	Poland	1977
Bellingshausen	Russia	1968
Mirny	Russia	1956
Novolazarevskaya	Russia	1988
Progress	Russia	1988
Vostok	Russia	1957
SANAE IV	South Africa	1997
Jang Bogo	South Korea	2014
King Sejong	South Korea	1988
Vernadsky	Ukraine and United Kingdom	1994
Halley	United Kingdom	2013
Rothera	United Kingdom	1975
Amundsen–Scott South Pole	United States	1957
McMurdo	United States	1956
Palmer	United States	1968
Artigas	Uruguay	1984

Existing environmental protections also limit the amount of information available on Antarctica's fossil fuel potential. This contrasts with the Arctic, for which there are resource estimates. Specifically, the U.S. Geological Survey has estimated that the Arctic holds 90 billion barrels of the world's undiscovered conventional oil resources (which would account for 13 percent of these resources) and 30 percent of its undiscovered conventional natural gas resources.[22] In contrast to the Arctic, Antarctica's oil reserves are challenging to calculate accurately. The first indications of petroleum and natural gas were encountered during the U.S. Deep Sea Drilling Program Leg 28 in 1973 (the year of the oil embargo) on the continental shelf in the Ross Sea.[23] Some estimates suggest there could be 45 billion barrels of oil in West Antarctica alone.[24] In addition to the Ross Sea Shelf, oil reserves are also likely to exist on the Amery Ice Shelf, Ronne-Filchner Ice Shelf, Ross Sea and Ice Shelf, and the Weddell Sea.[25]

Beyond the renewable and non-renewable resources that might be available in Antarctica, the continent holds great strategic promise because of its location. During the early part of the Cold War, both the United States and the Union of Soviet Socialist Republics (USSR) expressed interest in the continent due to its potential military significance.[26] At the time, the United States was concerned about "Antarctica's becoming a scene of East-West conflict or being used for military or nuclear development purposes."[27]

Antarctica is a logical location on which to maintain a satellite ground station. Ground stations provide the infrastructure required to support spacecraft operations, including satellites. Ground stations in Antarctica could support satellites in polar orbits, which are visible from the poles multiple times per day, allowing for a more frequent download of information or uplink of new commands. The United States and Japan, among others, already have ground stations in their research facilities in Antarctica. In addition to these, several commercial stations are also in operation. SpaceX recently installed a a terminal at McMurdo to allow improved satellite communications on the continent, which is the only one on Earth not connected by subsea fiber optic cable.[28] More recently, China announced it would build a ground station at one of its research stations to collect data from Chinese satellites in polar and near-polar orbits.[29] Countries could build satellite and ground stations on existing research stations in Antarctica if they comply with the ATS by supporting ostensibly for peaceful purposes. Satellite stations have existed in Antarctica for almost 40 years.

The construction of Chinese ground stations in South America and Antarctica has led to concerns. The stations and the satellites they support have clear civilian uses and, thus, do not violate the ATS. However, the People's Republic of China (PRC) has declared that its space industry "serves the overall national strategy."[30] The stated mission of its space program includes national security and the protection of "China's national rights and interests," including a mission to "build up its overall strength."[31] A second use of this technology that aligns with the goals outlined in its white paper would make the PRC's activities in Antarctica inconsistent with the ATS. Such technology would be considered dual-use because it could be "seamlessly repurposed between scientific and military capabilities."[32] This should concern the countries that have repeatedly expressed their commitment to keeping military activity out of Antarctica.

To summarize, Antarctica is a region that holds great promise. It is also a continent that could be a testing ground for opposing ideas about how to manage the last remaining uninhabited continent in the world. Rules about its use for peaceful purposes only are included in the treaty and are thus likely to be tested through dual-use technologies but unlikely to be changed. Guidelines around the extraction of natural resources—particularly mineral resources—are included in the Madrid Protocol and could be modified in the coming decades. Though the parties of the ATS have repeatedly reiterated their commitment to the prohibition of mining, including through the Santiago declaration of 2016,[33] such commitment could waver in the face of increased economic incentives or a redistribution of power within the ATS.

ANTARCTICA: SOVEREIGNTY AND ADMINISTRATION

Many great explorers have planted their

country's flag on Antarctica, starting as far back as 1820 with Fabian Gottlieb Bellingshausen and Mikhail Lazarev's sighting of Antarctica. Years later, Anglo-Norwegian explorer Carsten Borchgrevink's expedition was the first to construct human settlements in Antarctica from 1898 to 1900, erecting two huts. One hut was used for living quarters, while the other contained a collection of 500 Union Jacks that they planned to use to claim Antarctic regions for the British Empire.[34] Ultimately, the British Empire laid a claim to land in the Antarctic. Six other countries have also done so: Argentina, Australia, Chile, France, New Zealand, and Norway. The largest claims are made by Australia (2,276,651 square miles), Norway (1,042,476), and the United Kingdom (660,003 square miles). Argentina and Chile also have significant claims (564,326 and 482,727 square miles, respectively). Of these, the most problematic area is the Antarctic peninsula and surrounding islands, which are claimed simultaneously by Argentina, Chile, and the United Kingdom. The United States has not made any claims in Antarctica, but it "has reserved all rights which it may have in the area."[35]

In 1959 all parties with claims on Antarctica, together with five other countries (Belgium, Japan, South Africa, the United States, and the USSR), signed the Antarctic Treaty,[36] which established the legal framework that governs the continent to this day. As part of treaty negotiations, all seven countries with claims in Antarctica agreed to set them aside. The treaty, however, does not require its parties to renounce their claims, so the claims still exist, but there is no way to pursue them under the current framework. The Antarctic Treaty came into force two years after its original drafting, on June 23, 1961.

The treaty includes 14 articles, which collectively establish Antarctica as a region of peace (Article I, Article V), to be used for scientific purposes only (Article II, Article III), and establish rules for engagement between parties, including the right to designate observers and carry out inspections (Article VII), a dispute mechanism (Article XI), and the possibility of modifying or amending the treaty at any time (Article XII.) As outlined above, the treaty further clarifies that signing on to the treaty does not constitute "a renunciation by any Contracting Party of previously asserted rights of or claims to territorial sovereignty in Antarctica" (Article IV). The treaty may be modified or amended at any time, but only by unanimous agreement of all voting parties.

In the 62 years since ratification, no state has requested a modification or amendment using this mechanism. In fact, the treaty contains a provision that allows for a review 30 years after ratification. At that meeting, held in Bonn in 1991, the parties described the agreement as "uniquely successful," stating they were "convinced of the continued effectiveness of the Antarctic Treaty for cooperation in Antarctica."[37] The results of this commitment is seen in research output: In 1980, only 15 published scientific papers on Antarctica included researchers from two or more countries. In 1990, the year before the countries committed, that number reached 54. Since then, there has been significant growth in scientific collaboration. By 1994, the number of articles that included authors from more than two countries had doubled to 107; by 2002, it more than doubled again to 242.[38]

Membership in the Antarctic Treaty System

The Antarctic Treaty stipulates the treaty "shall be open for accession by any State which is a Member of the United Nations." It adds that it is also open to "any other State which may be invited to accede to the treaty with the consent of all the Contracting Parties whose representatives are entitled to participate in the meetings provided for under Article IX of the Treaty" (Article XIII). In referring to each other effectively, Articles IX and XIII create two categories of belonging to the Antarctic Treaty. The contracting parties referenced in Article XII are states that have "demonstrate[d] its interest in Antarctica by conducting substantial scientific research activity there, such as the establishment of a scientific station or the dispatch of a scientific expedition." These states are parties to the treaty and have voting rights. A second category comprises states that have acceded to the treaty but have thus far not engaged in the degree of scientific research determined to be sufficient by the consultative paties for full membership. These are referred to as non-consultative parties. Non-consultative parties may contribute to the discussion but not to decision-making.

The ATS' consultative parties, those with voting power, now number 29: the original twelve signatories plus 17 states that have ratified the treaty and engaged in "substantial scientific

research" (see Table 1). Some of these additional 27 acceding countries are unlikely to become consultative parties given the high economic cost of entry into Antarctic research. Consider that for 2023, Australia, an original signatory of the treaty, pledged $578 million for research, nearly five times the gross domestic product of Cuba, which acceded to the treaty in 1984, or 25 percent of Bulgaria's defense spending. For comparison, the 2022 budget request to the U.S. Congress included $216 million for research in Antarctica.[39] Likewise, whereas most of the original signatories had some territorial claim or historic exploration connection to Antarctica, some of the new parties that have acceded to the treaty are more than 10,000 miles away (as is the case of Estonia, which acceded in 2001).

Table 2: Parties to the Antarctic Treaty System

Country	Entry into ATS	Consultative Status	Entry Into Consultative Status	Environmental Protocol Ratified
Argentina	1961	Yes	1961	1998
Australia	1961	Yes	1961	1998
Austria	1987	No	N/A	2021
Belarus	2006	No	N/A	2008
Belgium	1961	Yes	1961	1998
Brazil	1975	Yes	1983	1998
Bulgaria	1978	Yes	1998	1998
Canada	1988	No	N/A	2003
Chile	1961	Yes	1961	1998
China	1983	Yes	1985	1998
Colombia	1989	No	N/A	2020
Costa Rica	2022	No	N/A	
Cuba	1984	No	N/A	
Czechia	1993	Yes	2014	2004
Denmark	1965	No	N/A	
Ecuador	1987	Yes	1990	1998
Estonia	2001	No	N/A	
Finland	1994	Yes	1989	1998
France	1961	Yes	1961	1998
Germany	1979	Yes	1981	1998
Greece	1987	No	N/A	2018
Guatemala	1991	No	N/A	
Hungary	1984	No	N/A	
Iceland	2015	No	N/A	
India	1983	Yes	1983	1998
Italy	1981	Yes	1987	1998
Japan	1961	Yes	1961	1998
Kazakhstan	2015	No	N/A	
Korea	1986	Yes	1989	1998
Korea (DPRK)	1987	No	N/A	
Malaysia	2011	No	N/A	2016
Monaco	2008	No	N/A	2009
Mongolia	2015	No	N/A	
Netherlands	1967	Yes	1990	1998
New Zealand	1961	Yes	1961	1998
Norway	1961	Yes	1961	1998
Pakistan	2012	No	N/A	2012
Papua New Guinea	1981	No	N/A	
Peru	1981	Yes	1989	1998
Poland	1961	Yes	1977	1998
Portugal	2010	No	N/A	2014
Romania	1971	No	N/A	2003
Russian Federation	1961	Yes	1961	1998
San Marino	2023	No	N/A	
Slovakia	1993	No	N/A	
Slovenia	2019	No	N/A	
South Africa	1961	Yes	1961	1998
Spain	1982	Yes	1988	1998
Sweden	1984	Yes	1988	1998
Switzerland	1990	No	N/A	2017
Turkey	1996	No	N/A	2017
Ukraine	1992	Yes	2004	2004
United Kingdom	1961	Yes	1961	1998
United States	1961	Yes	1961	1998
Uruguay	1980	Yes	1985	1998
Venezuela	1999	No	N/A	2014

Source: Antarctic Treaty System Secretariat; https://www.ats.aq/devAS/Parties?lang=e

Antarctic Treaty System membership has been viewed as hierarchical and argued to be an inappropriate management system for a part of the world owned by no single party but instead preserved for all.[40] Its membership has been described by Christopher C. Joyner, as a "self-designated exclusive club, without any clear legal authority to manage Antarctica for the rest of mankind."[41] In contrast, the deep sea bed, comparable to Antarctica for its value to humanity, is governed by a regime stipulating that all states share in its management.[42] This issue was of interest to Malaysia, which in 1982, in an address at the United Nations General Assembly, urged the UN to focus its attention on Antarctica, arguing the area belonged to the international community. Malaysia's plea was part of Prime Minister Mahathir bin Mohamad's efforts to position the island nation at the vanguard of the non-aligned movement.[43] Malaysia repeated its plea a few months later in Jamaica at the signing of the UN Convention of the Law of the Sea, where it insisted that Antarctica holds immense potential for the "benefit of all mankind."[44] A year later, bin Mohamad repeated his position at the Seventh Summit of the Non-Aligned Movement, arguing that "Antarctica, the last undeveloped continent on Earth, should be regarded as a common heritage of mankind and not just the exclusive preserve of a few nations that have access to it."[45]

Though Malaysia failed to change the ATS, it

introduced a resolution that encouraged all parties to the ATS to "provide to the Secretary-General, on a continuing basis, more information and documents covering all aspects of Antarctica."[46] Before Malaysia's involvement in the matter, meetings of the ATS were generally closed-door. One representative from an ATS member state described ATS meetings as including two levels of membership: those who are there to shape the agenda and those who are there to receive information.[47]

In contrast to the ATS, the Arctic Council only allows states with territory in the Arctic to become members. It does leave the door open for other states to participate as observers with consultation rights. They can propose projects through an Arctic State and make a financial contribution toward these projects. In some instances, observer states can make statements, present written statements, and submit relevant documents.[48] As a result of its requirements, the Arctic Council's membership has remained static since its formation in 1996. The member states of the Arctic Council are Canada, Denmark, Finland, Iceland, Norway, Russia, Sweden, and the United States. In addition, there are 13 observer states, including China, which joined in 2013.

The ATS, therefore, has evolved from being a treaty conceived to guarantee peace in a remote region of the world during the Cold War to an exclusive membership club to an international organization with a permanent secretariat and a high barrier for entry.

Meetings of the Antarctic Treaty System

The Antarctic Treaty System's annual Antarctic Treaty Consultative Meetings (ATCM) are the international forum for the administration and management of the region. Only consultative parties, which account for 29 of the 56 parties to the agreements, have the right to participate in decision-making at these meetings, though the other 27 are still allowed to attend.[49] Though the parties have met continuously since 1961, when the treaty was first established, the ATS did not have a permanent secretariat charged with organizing meetings. The treaty's original vision was to provide a forum for intergovernmental cooperation in a contested region. Until ATCM XVII, held in 1992 in Venice, Italy, the ATS operated with a non-permanent secretariat in which the duties of the secretariat were assumed by the host of the following year's meeting in a manner similar to how the Conference of Defense Ministers of the Americas operates. After lengthy discussions about the location of the secretariat, the parties agreed on Buenos Aires. The office opened its doors in 2004 to welcome its first Executive Secretary, Johannes Huber of the Netherlands.[50]

In summary, the ATS began during the Cold War to ensure conflicts over territory in Antarctica did not escalate. It was an agreement and was arguably not intended to become an international organization. As frameworks governing other areas of potential benefit to all humanity began to emerge, and with the end of the Cold War, the ATS' role as a guarantor of peace on the continent was challenged by new actors with a stated interest in preserving the continent. With an increase in the number of actors interested in the outcomes of ATS meetings and the establishment of a permanent secretariat, the ATS has become a full-fledged international organization. As such, it is an institution that is simultaneously difficult to change and a possible target for reform.

Documents Composing the Antarctic Treaty System

In addition to its pillar document, the Antarctic Treaty (1961), the Antarctic Treaty System includes four other documents: the Convention for the Conservation of Antarctic Seals (1972), the Convention on the Conservation of Antarctic Marine Living Resources (1980), the Convention on the Regulation of Antarctic Mineral Resource Activities (1988), and the Protocol on Environmental Protection to the Antarctic Treaty (1991). The Convention for the Conservation of Antarctic Seals forbids the killing or capturing of seals except in very limited circumstances and was the first of the additional documents to which the members agreed. The CCAMLR intends to preserve Antarctic marine life. The Convention on the Regulation of Antarctic Mineral Resource Activities was signed by several parties but never ratified. As a result, it never entered into force. Instead, three years after it was signed, the consultative parties agreed to the Protocol on Environmental Protection to the Antarctic Treaty (also called the Madrid Protocol), which replaced the 1988

document. Interestingly, the predecessor to the Madrid Protocol, the Convention on the Regulation of Antarctic Mineral Resource Activities (CRAMRA), would have allowed mining activities in Antarctica if all parties could agree there was no risk to the environment.[51] The United Kingdom and New Zealand were the lead supporters of CRAMRA, each having considerable mining sectors and corresponding economic and commercial interests in their homelands. Ultimately, opposition to CRAMRA, led by Australia and France, won out, and CRAMRA was discarded, making room for the stricter framework now in place.

The CCAMLR was first established to protect krill stocks in Antarctic waters. Krill is near the bottom of the food chain and thus play an essential role in the subsistence of larger animals and the continuation of marine life more generally. They are fished commercially for use in aquariums, to support aquaculture, and recreational fishing, and feature in the diets of some cultures. To address its mandate, the parties to the CCAMLR agreed in 2009 to create several marine protected areas (MPAs) in which commercial fishing would not be allowed, and in fisheries outside of MPAs there are catch limits in place.

The Protocol on Environmental Protection to the Antarctic Treaty was signed in Madrid in 1991 and entered into force in 1998. The protocol commits the parties to "the comprehensive protection of the Antarctic environment" and designates Antarctica as a "natural reserve, devoted to peace and science" (Art. 2). The Madrid Protocol stresses the importance of cooperation and calls for the promotion of cooperative scientific and technical programs (Art. 6). Most consequentially, the protocol prohibits mining and related activities in one clearly worded article: "Any activity relating to mineral resources, other than scientific research, shall be prohibited" (Art. 7). The protocol created a Committee on Environmental Protection with membership open to all parties that ratified the document and observer status extended to any party of the Antarctic Treaty that did not sign the protocol.

The protocol, like the treaty itself, has no end date. The protocol does, however, contain a provision in Article 25 stating that "If, after the expiration of 50 years from the date of entry into force of this protocol, any of the Antarctic Treaty Consultative Parties so requests by a communication addressed to the Depositary, a conference shall be held as soon as practicable to review the operation of this Protocol." This mechanism has the potential to allow for a redrafting of the agreement without the unanimous agreement required by Article XII of the ATS. Indeed, the same article states that a modification should be agreed to by "a majority of the Parties, including three-quarters of the states which are Antarctic Treaty Consultative Parties at the time of the adoption of this protocol."[52] In 1998, all current consultative members had joined and obtained consultative status except for Ukraine (2004) and Czechia (2014). China became a consultative party in 1985 during a period of renewed interest in the region.[53] (The protocol was negotiated in 1991 but entered into force in 1998, meaning the "expiration of 50 years" will occur in 2048.

EXISTING FRAMEWORK: ANTARCTICA AS A REGION OF PEACE

The ATS focus on Antarctica as a region of peace has forestalled most discussions of the strategic value of the continent. Australia, for example, has an Australian Antarctic Strategy and 20 Year Action Plan (2022), but its focus is "support for new scientific research and environmental protection." New Zealand has the "Aotearoa New Zealand Antarctic Research Directions and Priorities" (2021) document, which likewise focuses on scientific research and preserving the continent's natural resources. This approach to Antarctica is in contrast to the Arctic for which China, for example, has published an Arctic policy that outlines its goals to "understand, protect, develop and participate in the governance of the Arctic, so as to safeguard the common interests of all countries and the international community in the Arctic, and promote sustainable development of the Arctic."[54] The United States likewise has a "National Strategy for the Arctic Region" that names security, climate change and environmental protection, sustainable economic development, and international cooperation and governance as the key pillars of its approach. Despite the focus on scientific research, countries engage strategically with

Antarctica and the ATS. An example is Malaysia's insistence on transparency within the system, as explained above.

To ensure compliance with its provisions on environmental protection, the Madrid Protocol allows for inspections by any party of another party's activities in Antarctica (Art. 14). These inspections are in addition to those authorized under Article VII of the Antarctic Treaty. Since the first inspection in 1962 by New Zealand, Antarctica's facilities have been inspected hundreds of times. Russia's Bellingshausen Station (formerly the Soviet Antarctic Station at Collins Harbor) has had 15 inspections, more than any facility. The United States has completed the most inspections of any party in the ATS: fifteen inspections of facilities and vessels owned by Argentina, Australia, Belgium, Brazil, Bulgaria, Chile, China, Denmark, France, Germany, India, Italy, Japan, Korea, New Zealand, Norway, Poland, Russia, South Africa, Spain, Ukraine, United Kingdom, and Uruguay, as well as inspections of its own stations. Inspections are expensive and are paid for entirely by the party carrying them out, which partly explains why only a fraction of consultative parties have inspected other parties' facilities.

This, combined with the high technical and logistical capabilities required to conduct inspections, means the prospects for using them as a compliance instrument are limited.[55] Notwithstanding the need for an increased frequency of inspections and the difficulty of orchestrating them, inspections on the continent have enjoyed success in showing that even inspections of traditionally antagonistic states—can be conducted in a peaceful manner.[56]

EMERGING FRAMEWORK: NEW ACTORS, NEW IDEAS

The treaty begins by establishing that "Antarctica shall be used for peaceful purposes only." It adds that "measures of a military nature, such as the establishment of military bases and fortifications, the carrying out of military maneuvers, as well as the testing of any type of weapons" are prohibited. The treaty does not specify what constitutes "measures of a military nature" and does not address the role of technology, which has evolved in leaps and bounds since the signing of the treaty. The legitimacy and effectiveness of the ATS largely depend on its ability to provide an internationally agreed-upon framework that can address emerging challenges with the same gravitas as it did for earlier issues.

As new issues emerge, they allow opportunities for actors to challenge and contest aspects of the treaty regime. The framework governing Antarctica, coupled with the prohibition of using military force on the continent, makes lawfare attractive for states interested in reshaping the environment to affect Antarctica. Lawfare is the use of law to accomplish what might otherwise require the application of traditional military force.[57] Applied to Antarctica, lawfare is the use of opportunities to reshape ATS (and related legal frameworks) to accomplish objectives like controlling resources or land that would, under other circumstances, be pursued by military force, an option not only prohibited on the continent but also very difficult given the geographic conditions. The same potential exists in the Arctic, where legal ambiguities coupled with deep fault lines divide the small number of member states.[58] In that context, Russian lawfare, for example, led to its appeal to the Commission on the Limits of the Continental Shelf for a vastly expanded extended continental shelf.[59] While the review committee has not yet made a determination on Russi'as submission--initially made in 2001 and expanded in 2013, and revised in 2015 and 2023-- this is a perfect example of a state using a legal argument (in this case, the dispute relates to the borders of the continental shelf around the Russian Arctic) to pursue a goal without using military force.

While the ATS doesn't allow for these challenges to result in a short-term reframing of the treaty, it does allow for eventual changes. Specifically, the ATS has two provisions that, taken together, could mean the ATS of the future could become a very different framework than the one agreed to in 1959. First, the ATS allowed states beyond the original signatories to join the treaty and had provisions for these new actors to stand equally among the original signatories. These provisions have allowed new actors to join the ATS, creating a new, expanded treaty regime whose members have diverging interests. Second, the Madrid (or Environmental) Protocol specifically allows for modifications to be discussed every fifty years,

ensuring a mechanism for making changes. The Madrid Protocol requires that a consultative party express interest in renegotiation, which is like the mechanism in the treaty itself. Interestingly, though there is a provision that would allow a similar discussion of the Antarctic Treaty itself, no consultative party has ever requested modification of the treaty, instead using meetings to reiterate their commitment to the treaty.

There are solid arguments for modifying the ATS. Many of these stress issues relevant to Antarctica today that were simply not on the diplomatic radar screen in the autumn of 1959.[60] These issues fall into two broad categories. The first set is related to technological change and the possibilities it affords for engagement in Antarctica. The second regards how the Antarctic (and ATS) are related to other ideas and agreements.[61] The ATS has proved itself a strong instrument and has been remarkably effective at stalling territorial disputes and preventing conflict over land ownership. The fact that there hasn't been more conflict over a region with so much potential and overlapping claims is a testament to the strength of the ATS.

Notwithstanding its success at stalling conflict over sovereignty, the ATS must address both sets of issues described above. Technological change-related matters are directly relevant to the Protocol on Environmental Protection to the Antarctic Treaty. On the one hand, technological advances, decreases in the cost of technology, and climate change impacts might make mineral exploration and extraction more feasible today than when the protocol was negotiated 25 years ago. Moreover, countries will need the potential minerals in the Antarctic to develop emerging technologies for energy generation and storage. The current protocol specifically prohibits nearly all activity related to Antarctic mineral resources. Many of the consultative parties have continued to assert this commitment, but as membership in ATS has expanded, so too, presumably, has the range of interests in the continent's mineral resources.

Issues related to the agreements that intersect with the ATS must also be addressed. Recently, almost 200 nations signed the UN Convention on Biodiversity Beyond National Jurisdiction to protect marine life in international waters. The agreement covers areas including the creation of marine parks and sanctuaries in the high seas, the areas beyond 200 nautical miles from the coastlines of states. The ATS contains provisions to create MPAs, and the system has succeeded in creating two within the CCAMLR area: one on the South Orkney Islands' southern shelf and the other in the Ross Sea region (established in 2016). The South Orkney Islands MPA was proposed by the United Kingdom and established in 2010. The Ross Sea MPA was proposed in 2010 by the United States and New Zealand and approved in 2016. It is not immediately clear how the UN agreement's guidelines on the creation of marine parks and sanctuaries would affect the guidelines contained in the ATS, which were referred to obliquely in the lead-up to the negotiations as belonging to a patchwork of documents that provide some protection to marine life.

The UN agreement also addressed the sharing of marine genetic resources, stating as one of its objectives "the fair and equitable sharing of benefits arising from activities with respect to marine genetic resources."[62] The agreement further specifies that "activities with respect to marine genetic resources of areas beyond national jurisdiction are in the interests of all States and for the benefit of all humanity."[63] No similar language exists in the ATS. Currently, discoveries made during scientific research on the continent belong to the country that sponsored the research. Moreover, any patents resulting from that research belong to the individual scientist who made the discovery. Given that Antarctic research is prohibitively expensive for most countries in the world, including most of the parties to the ATS, it is reasonable to expect that, in the future, some parties might demand more equitable sharing of materials related to scientific discovery, such as what is now enshrined in the UN agreement described above.

Crucially, the agreement included the adoption of the "common heritage of mankind" as the guiding principle for the high seas. The common heritage of mankind principle (also referred to as the "common heritage of humankind principle") also applies to the Moon (1970 Moon Agreement, Article 11) and the deep seabed (Declaration of Principles Governing the Seabed

and Ocean Floor). The principle, in essence, represents the idea that individuals, states, or corporations should not unilaterally exploit certain common territories but instead engage under an agreement or regime that would see that it benefits humanity as a whole.[64]

IMPLICATIONS FOR U.S. DEPARTMENT OF DEFENSE

Though not as proximate to the continental United States as the Arctic, Antarctica has important implications for the Department of Defense (DoD). There are three principal areas of interest for DoD. First, it is a contested area on which national interest is tested. Second, increased activity in Antarctica, both scientific and possibly tourism, will require greater support from DoD, which, while not the lead for Antarctic programs in the country, must still ensure that it can support all U.S. activity in the region. Lastly, the area has important implications for climate change and the preservation of natural resources, both of which the United States has linked to national security.

Antarctica, specifically Antarctic governance, is an area in which the United States will face its near-peers in strategic competition over managing the continent, including what uses are allowed. In the ATS, the United States and its near-peers have equal voting power; the United States, Russia, and the PRC are all consultative parties to the ATS. This power balance means that the three would have to compete for influence among the remaining parties of the ATS, some of which have claimed land on the continent. To be clear, the balance of power currently favors the United States, especially if it presents itself as a champion of environmental preservation, a cause important to many of the consultative parties of the ATS. However, the renewal will not happen for another 25 years and without sufficient attention to strengthening the partnerships this balance of power could change.

Antarctica also holds great promise for U.S. space agencies, including NASA, not only because of its advantageous location but also because of the conditions on the ground. In 2023, the European Space Agency deployed a 12-member crew to Concordia Station, the most remote of the EU's scientific stations, to study the effects of isolation on humans. Hoping to gather useful information for spaceflight research, the crew will spend six months in isolation, conducting experiments on themselves to understand the effects of these conditions on humans.[65] Though the United States also runs simulations to prepare its space crews, these have taken place in the deserts of the southwestern U.S. and have not taken advantage of the conditions in Antarctica.[66]

Increased activity in Antarctica will require increased support from DoD. Under the current arrangement, DoD executes the mission logistically to support U.S. research stations in Antarctica and is reimbursed for these costs by the National Science Foundation (NSF). This arrangement is consistent with the U.S. understanding of the peaceful nature of the continent as outlined in the ATS. While NSF reimburses DoD for the cost of Operation Deep Freeze, the yearly operation to resupply the U.S. stations, it does not provide for the acquisition of new vessels or aircraft, or the specialized training of personnel supporting this mission. Deep Freeze requires a ski-equipped LC-130 Hercules and the icebreaker U.S. Coast Guard Cutter POLAR STAR. Joint Task Force-Support Forces Antarctica has primary responsibility for the execution of the operation. POLAR STAR is one of only two Coast Guard polar-class icebreakers. The Coast Guard is slated to acquire three new polar icebreakers, with three additional medium polar icebreakers to follow at some point in the future.[67] The Coast Guard was expected to receive a new heavy icebreaker, the Polar Security Cutter, by 2024; however, delivery of the vessel has been delayed into 2025 and possibly as far as 2027.[68] The new delivery date has raised concerns that the POLAR STAR might end its viable service life before the new cutter arrives.[69]

An increase in activity in Antarctica might result in a stronger U.S. presence, which, in turn, would mean more DoD support. Already in 2019. the Coast Guard argued its Arctic Strategy is "the sole provider and operator of the U.S. polar-capable fleet but currently does not have the means to assure access in the high latitudes. Closing the gap requires persistent investment in capacity for polar operations."[70] While this statement was addressing Arctic operations specifically, the same would apply to operations

on the other pole. In fact, Coast Guard polar operations are called "polar operations" and not "Arctic operations" because they are meant to support activity in both poles.[71] The United States isn't the only country facing this challenge. Countries with primary responsibility over search and rescue missions in Antarctica anticipate increased support activity due to higher volumes of tourism activity.[71]

Greater activity in Antarctica could also make it increasingly harder to determine whether engagement in the region is consistent with the continent's peaceful nature as described in the ATS. The construction of satellite ground stations is a good example of this. Earlier this year, the PRC announced that China Aerospace Science and Industry Corporation, a behemoth state-owned defense and space contractor, won a bid to construct an ocean observation satellite ground system in Zhongshan Station, one of the PRC's research stations in Antarctica.[72] (Previously, the PRC relied on existing Swedish ground stations to help fly and transmit data from its satellite, but Sweden ended this arrangement in 2020.)[73] The PRC station won't be the only one on the continent: Norway has operated Troll Satellite Station since 2008. TrollSat, as it is known, supports multiple satellites as one of only two existing polar stations optimized for low-earth orbit (the other station is in Norway). Though the stations are subject to the ATS inspections regime, monitoring them for non-compliance with the treaty would be costly. Increased activity in Antarctica could increase the need for and frequency of inspections. The last U.S. inspection was in 2020 and focused on Mario Zucchelli (Italy), Jang Bogo (South Korea), and the station under construction at Inexpressible Island (China). Before that, the United States hadn't conducted an inspection since the 2012-13 season.

Lastly, the preservation of Antarctica has important and as-of-yet-understudied implications for addressing climate change impacts. The White House has argued that "climate change will increasingly exacerbate a number of risks to U.S. national security interests," including physical impacts that could cascade into security challenges.[74] This elevation of climate change to a priority issue is mirrored in the 2022 National Security Strategy, which stresses that "the climate crisis is the existential challenge of our time.[75] Consistent with this, developments in Antarctica present a long-term concern for DoD because of their potential impact on climate change and because climate change could change the nature of the environment on the continent.

We can deduce specific implications for U.S. Southern Command (SOUTHCOM) from the implications for DoD summarized above. First, increased support requirements from DoD don't immediately translate to increased requirements for SOUTHCOM. U.S. Indo-Pacific Command (INDOPACOM) has primary responsibility for Antarctic operations through Joint Task Force-Support Forces Antarctica and U.S. Pacific Air Forces. Support for U.S. Antarctic programs has shifted from the U.S. Navy to the U.S. National Guard and the Air National Guard. Support for Antarctic programs could move again in a way that gives SOUTHCOM a role in these missions. McMurdo station, for example, is only about 4,000 miles (6,500 km) from Argentina and Chile, within the SOUTHCOM area of responsibility (AOR). INDOPACOM, which currently supports it, is nearly twice as far at 6,915 miles (11,129 km).

From the competition for influence, we derive the most obvious implication for SOUTHCOM: Two of the original 12 consultative parties and just over 20 percent of the current signatories to the environmental protocol are within the SOUTHCOM AOR. Meanwhile, the competition for influence among U.S. near-peers is playing out in the region, as described in SOUTHCOM's posture statement. While the competition hasn't yet had direct observable implications in Antarctica, an erosion of U.S. influence with these partner nations could result in a rebalancing of the negotiating partners favorable to U.S. competitors. As the United States prepares a strategy to approach the anticipated 2048 renegotiation of the environmental protocol, it is critical to consider strengthening partnerships within the SOUTHCOM AOR as an essential component of that strategy.

Countries in the SOUTHCOM AOR have shown a robust commitment to the environmental preservation of Antarctica, especially as the conservation of its marine life resources directly impacts the marine ecosystems within the territorial waters and exclusive economic zones (EEZs) of coastal countries in South America,

Central America, and the Caribbean.[76] The U.S. commitment to environmental preservation and addressing climate change will resonate with U.S. partners in the Western Hemisphere who are committed to preserving Antarctica and its resources. Continuing to engage with partner nations on the issue of climate change could be a promising way to signal shared values between the United States and the SOUTHCOM AOR—and to increase agreement in this area ahead of the expected negotiations.

CONCLUSION

Antarctica is the only demilitarized region in the world. Countries initially committed to its preservation as a region of peace to prevent conflict from the Cold War from spilling over to the most remote place on Earth. As the world again enters an era of competition among great powers, countries must renew their commitment to Antarctica as a region of peace. The first likely opportunity to reconsider what activities can occur will likely be in 2048, 50 years after the environmental protocol entered into force. Though the date is still 25 years removed, the events that will shape that discussion must take place now before it is too late.

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