



# International law, climate change and the Antarctic Treaty System: re-contemplating governance questions apropos of the mounting challenges

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**Abstract:** More than 60 years since it entered into force in 1961, the Antarctic Treaty is experiencing significant challenges. These challenges also affect its associated instruments known as the Antarctic Treaty System (ATS). These are mostly external dynamics that are increasingly challenging the ATS from outside of the Antarctic region. They encompass a spectrum of issues relating to global legal regimes and to what extent they are applicable in the Antarctic context. Climate change appears to be the most significant of these challenges, as the tangible planetary impacts of global warming and the perception of its urgency and seriousness by states have prompted additional challenges to the ATS. The physical changes that continue to be scientifically unveiled in the Antarctic are manifesting severe impacts on a planetary scale, and this fact has underscored the need for broader and more rapid international engagement within the Antarctic governance discourse. Nevertheless, the existing decision-making mechanisms compounded by the adversarial atmosphere within the ATS due to external factors have become challenges of themselves. Such challenges call for the re-contemplation and reassessment of the legal regime of the Antarctic in general, and the ATS in particular, to find ways forward for an otherwise historically effective international legal system. This paper utilizes both scientific and legal lenses to underscore the urgent need to achieve better communication between the ATS generally, the Antarctic Treaty Consultative Meetings specifically and the UN Framework Convention on Climate Change and Intergovernmental Panel on Climate Change regimes and to overcome the multiple barriers that stand in the way of achieving that objective.

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## Introduction

The 14-article-long Antarctic Treaty, which is void of any reference to the notion of 'environment' in its entirety, has been complemented substantively through the adoption of further instruments shaping the Antarctic Treaty System (ATS). The Antarctic Treaty is experiencing significant challenges after 60 years of it entering into force in 1961. These challenges also affect its associated instruments under the ATS, such as the Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR). These are mostly external dynamics that are increasingly challenging the ATS from outside of the Antarctic region. The challenges in question encompass a spectrum of issues, including those around what international legal regime is applicable in the Antarctic and to what extent. Amongst these, global climate change appears to be the most significant.

The impacts of climate change are being felt around the globe with no apparent exceptions. These changes to the Antarctic and the Southern Ocean marine ecosystem

have been occurring for ~50 years (Turner *et al.* 2009). Changes caused by natural and anthropogenic drivers are communicated to Antarctica by oceanic and atmospheric processes, influencing the polar atmosphere, ocean, ice sheet, sea ice and biosphere (Naish 2017). Some observations suggest that in the first half of the twentieth century, the extent of the sea ice in some locations used to be greater in size as compared to the present time. However, the impacts originating from climate change are not uniform across a massive area such as Antarctica and the Southern Ocean.

Despite that, previous studies on Antarctica suggested that some areas are experiencing increases in sea-ice extent while in others sea ice is decreasing, with measurable impacts on wildlife (Turner *et al.* 2009). New evidence suggests that the sea-ice extent increasing slightly in the Ross Sea region over the twentieth century was linked to the deepening of the Amundsen Sea Low, and that Antarctic sea ice reached its lowest extent recorded since 1979 in February 2022 (Chown *et al.* 2022). However, there is low confidence in Antarctic

sea-ice predictions for the remainder of the twenty-first century due to disagreement between model projections and observations and uncertainty caused by seasonal cycles, interannual sea-ice variability and the long-term increase in sea-ice extent. Model improvement, including explicit simulation of Southern Ocean eddies, is required to address these uncertainties (Chown *et al.* 2022). When ice shelves collapse, the changes from a unique ice-shelf-covered ecosystem to a typical Antarctic shelf ecosystem are likely to be among the largest ecosystem changes on the planet (Convey *et al.* 2009). While ship observations suggest that the extent of sea ice was greater in the first half of the twentieth century, satellite measurements from 1979 to 2006 show a positive trend of ~1% per decade. The greatest increase, at ~4.5% per decade, occurred in the Ross Sea, whereas the reduction in sea-ice cover affected the Bellingshausen Sea (United Nations 2017).

Such change has caused the Antarctic to be reachable by a wider range of actors, so the isolation from global affairs that once described this continent is no longer the case. A significant example is the outbreak of COVID-19 in Antarctic stations. According to a report by the Chilean army, 36 individuals at its Bernardo O'Higgins research station on the Antarctic Peninsula have contracted the virus, 26 of whom are military personnel and 10 maintenance of whom are workers. As a result, these individuals have been evacuated to Chile (<https://www.bbc.com/news/world-latin-america-55410065>). In addition, a Belgian scientific research station in Antarctica has also been hit by an outbreak of COVID-19 (<https://www.bbc.com/news/world-europe-59848160>). The more reachable Antarctica becomes, the more challenges its legal regime will encounter. This prompts the critical question as to whether the Antarctic legal regime, and, at the core of it, the Antarctic Treaty, is still fit for purpose in today's governance of Antarctica after 60 years the regime's its legal existence. Moreover, the emergence of global climate change with its tangible planetary impacts and the global awareness that has followed from the perception of its urgency and seriousness by states have led to additional challenges facing the Antarctic Treaty and the ATS. Global climate change and its effects, which continue to be unveiled in the Antarctic, are having severe impacts on a planetary scale, which appears to underscore the need for broader international engagement within this discourse. This includes engagement and participation in relevant decision-making processes. Nevertheless, the existing decision-making mechanisms that have long been in place are also beginning to become a challenge from within the ATS.

The problem of achieving decision-making unanimity/consensus in individual Antarctic domains (e.g. tourism, fishing) that are perceived to intersect with national

interests is one that has long been recognized as a challenge within the ATS. It can be argued that climate change, arguably because of its planetary-wide impacts across multiple issue areas, is bringing into sharper relief and consciousness the ways in which the high-threshold decision-making procedures of the ATS can be utilized by state actors to give precedence to national over collective interests and delay time-critical decision-making. Such challenges call for re-contemplation and reassessment of the legal regime of the Antarctic in general, and the ATS in particular, to find ways forward for an otherwise historically effective international legal system.

This paper utilizes both scientific and legal lenses to underscore the urgent need to achieve better communication between the ATS generally, the Antarctic Treaty Consultative Meetings (ATCMs) specifically and the UN Framework Convention on Climate Change (UNFCCC) regime and the Intergovernmental Panel on Climate Change (IPCC) and the multiple barriers that stand in the way of achieving that objective. In so doing, this paper looks initially into climate change effects in Antarctica and their consequences for Antarctic governance and management under the ATS instruments and the existing decision-making processes. It further examines ATS interactions with global legal systems, with special attention given to climate change issues, and it discusses major governance questions for re-contemplation within Antarctic governance mechanisms. It concludes by providing some policy considerations and options.

### **Climate change in Antarctica and consequences for Antarctic governance**

Global climate change should be considered the most significant challenge facing Antarctica. The potential implications of climate change for the Antarctic marine ecosystem have been under general discussion for approximately two decades now (e.g. see <https://meetings.ccamlr.org/system/files/e-sc-xxi.pdf>). In 2006, the Commission for the Conservation of Antarctic Marine Living Resources acknowledged the need to address climate change effects and to monitor such effects in relation to future potential changes in and influences on the species and area for which the CCAMLR is responsible (CCAMLR 2006). Subsequently, and since 2008, the issue of climate change has become a regular reporting item on the agendas of both the Commission and its Scientific Committee, and in Resolution 30/XXVIII of 2009 (<https://cm.ccamlr.org/en/resolution-30/xxviii-2009>) CCAMLR recognized climate change as one of the greatest challenges facing the Southern Ocean and urged increased consideration of climate change impacts in the Southern Ocean to better inform its management decisions (Rayfuse 2020).

Antarctica contains an ice volume that translates into a sea-level rise of > 57 m (Rignot 2019). Its annual net input of mass from snowfall is 2100 gigatons, excluding ice shelves, equivalent to a 5.8 mm fluctuation in global sea level (Rignot 2019). A further impact is the effect of replacing bright ice cover, which reflects most of the sun's radiation, with darker ocean water and/or land, which absorbs far more of this radiation (Summerhayes *et al.* 2020). As the impacts of climate change on the Antarctic region are on a planetary scale, the Antarctic law, policy and governance regime, known as the ATS, has an important role to play in promoting the relevance of climate-related Antarctic research to the climate change community. Such a role would be in line with the objective and purpose of Article III of the Antarctic Treaty, which promotes international cooperation in scientific investigation in Antarctica and encourages cooperative relations with the United Nations (UN) and other international organizations having a scientific or technical interest in Antarctica (ASOC 2015). The impacts derived from the global climate change are far more severe in certain areas in contrast to others. The West Antarctic Peninsula, for instance, is one of the fastest-warming areas on Earth (Turner *et al.* 2009), and its marine ecosystem has been noticeably affected by global climate change through its warming water and the declining sea ice as well as a subtle increase in westerly winds resulting in rising surface air temperatures over the Antarctic Peninsula.

The Antarctic marine ecosystem has been affected by climate change for the past 50 years, especially on the western side of the Antarctic Peninsula, with its warming water and declining sea ice. Westerly winds around the continent have increased by 20% since the 1970s, and surface air temperatures have also increased over the Antarctic Peninsula. Information from ice cores suggests that warming started *ca.* 1800. The Antarctic Circumpolar Current temperature increased by  $\sim 0.5^{\circ}\text{C}$  at between 300 and 1000 m. Studies (e.g. Boning *et al.* 2008) on historical and recent data from drifting buoys found that the wind-driven Antarctic Circumpolar Current has not augmented its transport and reported warming and freshening of the current on a hemispherical scale extending below 1000 m, meaning that transport and meridional overturning are insensitive to changes in wind stress. Although the responses of the Antarctic Circumpolar Current and the carbon sink to wind stress changes are under debate, it has been suggested that the Antarctic Circumpolar Current's response to an increase in wind is a change in eddy activity rather than a change in transport. Given the importance of the Antarctic Circumpolar Current and its system of eddies in structuring the pelagic ecosystem, the consequences of these changes cannot be foreseen (United Nations 2017).

According to the Antarctic and Southern Ocean Coalition (ASOC), an environmental non-governmental organization (NGO) that is admitted to the ATCM as an expert, activities relating to climate change mitigation should mainly take place in four areas: 1) reduction of greenhouse gas emissions, 2) implementation of climate adaptation strategies, 3) promotion of globally important climate science and 4) designation of marine protected areas. Designation of marine protected areas with the objective of protecting large areas from fishing and pollution will provide refuges for vulnerable species whose habitats may be changing dramatically. The Ross Sea, an area that is expected to warm more slowly than the rest of the Antarctic, is a particularly important area of focus (<https://www.asoc.org/campaign/marine-protected-areas/>, Brooks *et al.* 2021). In addition, the socioeconomic impacts of climate change include increased fishing activities near the Antarctic continent, especially for krill, and an increase in tourism and its associated risks, including accidental pollution from maritime accidents as well as the introduction of alien species (Larsen *et al.* 2014). Moreover, model projections generally agree that over the next 50–100 years, Antarctic sea ice will decrease, with significant physical and biological implications for the polar region and beyond (e.g. regarding global climate, sea-level rise and ecosystems). However, there is currently substantial uncertainty as to the magnitude, regionality, seasonality and timing of the future change in Antarctic sea-ice coverage and properties (Clem *et al.* 2022).

The impacts of climate change are twofold: changes in Antarctica and the Southern Ocean would have worldwide consequences, and they both are not immune to the changes in climate occurring elsewhere on the planet. A very evident example is global sea-level rise, which thus far has added up to 20 cm globally as a result of only  $1^{\circ}\text{C}$  warming (Naish 2017). There are major concerns regarding the future contribution of the Antarctic ice sheet to global sea-level rise. No matter what we do from now on, we have already committed the planet to 25–30 cm of sea-level rise over the next 40 years due to the greenhouse gas-related warming that has already occurred (Naish 2017). It appears that at the moment Greenland is contributing more than Antarctica to sea-level rise, but Antarctic ice loss is expected to overtake Greenland to become the dominant contributor by the end of the century. This is because the ocean around Antarctica is warming and the ice sheet is thinning and retreating rapidly where these warm water currents are moving onto the continental shelf and under the ice shelves (Naish 2017). Some scholars have gone further in stating that 'the magnitude of risk resulting from substantial temperature rise such as the shut-down of the thermohaline circulation or the melt-down of the West Antarctic Ice Sheet, releasing

enough water to raise sea level by 6 m, is certainly comparable to the risk of damage caused by nuclear or space accidents' (Verheyen *et al.* 2005).

There are also some secondary impacts arising as a result of the aforementioned impacts originating from global climate change on the Antarctic and Southern Ocean. As an example, the sea-ice reduction has affected the pelagic ecosystem of the Southern Ocean. Krill populations have not increased after the near-extinction of some whale stocks. The krill stock, of which 150 million tons were being eaten by whales, would have been an estimated three times larger in the pre-whaling period, and this is despite the fact that there may have been a significant decline in the abundance of krill predators in some areas (United Nations 2017). Estimates of krill abundance derived from the analysis of net samples in 2004 indicate a decline of up to 81% in the krill stock (United Nations 2017). Another expected impact of climate change is the change in pH levels, with seawater becoming more acid. It seems probable that the skeletons of planktonic pteropoda and of cold-water corals will become thinner. Hatching rates of krill eggs are also demonstrated to be negatively affected by the level of ocean acidification projected for the end of the century and beyond. As the Southern Ocean has low saturation levels of calcium carbonate, it is at higher risk of this than other oceans. In addition, the negative trends regarding the extent of sea ice and the overall decrease in krill biomass over recent decades would be expected to have profound implications for the Southern Ocean food web (United Nations 2017).

According to the 2019 report of the IPCC on the ocean and cryosphere in a changing climate, the greatest warming of the top 2000 m has occurred in the Southern Ocean. Despite holding the highest inventory of oxygen in the ocean, oxygen levels in the Southern Ocean contributed 25% to the global oxygen decline between 1970 and 1992, with levels having fallen by over 150 Tmol per decade from the 1960s to the present. In the Southern Ocean, the decrease in consumer biomass is mainly in the southern Indian Ocean, while other parts of the Southern Ocean are projected to have an increase in animal biomass by the year 2100 (Bindoff *et al.* 2019). These changes present a whole host of challenges for the development of normative frameworks for the regulation of human activities in the warming Antarctic (Rayfuse 2020).

Critically, the initial issue regarding climate change in Antarctica is that this is not something that the ATS has oversight of as it is a global environmental, legal and political issue. International climate law regime postdates the adoption of the ATS, and, notwithstanding the sensitivity of Antarctica to the impacts of climate change, no direct reference is made to the region in such law (Rothwell 2021). In addition, the existing

governance regimes in the polar regions in general and in Antarctica in particular are not designed to limit or restrict emerging activities in those regions but rather to encourage, and ultimately facilitate, their conduct (Rayfuse 2020). Although broad international cooperation is a critical enabler for achieving ambitious climate change mitigation goals (IPCC 2022), this does not mean that there is no role for the Antarctic Treaty Consultative Parties (ATCPs) in particular in taking a lead role to seek the development and implementation of a robust global climate regime with a view to enhancing the protection of Antarctica. As a matter of fact, a substantial portion of the Antarctic environmental regulations has been shaped through the deliberations and decisions of the Consultative Parties, when the Antarctic Treaty was originally silent on this crucial matter (Madani 2015). In this regard, it can be observed that all parties to the Antarctic Treaty are also parties to the Paris Agreement and the 1992 UNFCCC (Rothwell 2021). This, however, raises the question of how effectively the decision-making mechanisms and processes within the ATS could function to appropriately address these challenges.

### Antarctic Treaty System

The term 'Antarctic Treaty System' is not referred to in the Antarctic Treaty. It was first mentioned in the measures adopted by the ATCMs in the late 1970s and 1980s, an example of which is a measure adopted in 1979 that refers to the value of scientific advice from the Scientific Committee on Antarctic Research (SCAR) in 'the development of the Antarctic Treaty System' (Barrett 2020). Furthermore, the 1991 Protocol on Environmental Protection to the Antarctic Treaty (Madrid Protocol) defines the ATS as follows:

'Antarctic Treaty System' means the Antarctic Treaty, the measures in effect under that Treaty, its associated separate international instruments in force and the measures in effect under those instruments.

The ATS is composed of the Antarctic Treaty, the Protocol on Environmental Protection (Madrid Protocol), the Convention on the Conservation of Antarctic Seals (CCAS), the CCAMLR, instruments adopted under the Antarctic Treaty, instruments adopted under the Madrid Protocol, instruments adopted under the CCAMLR and ATS institutions as well as their constituent instruments.

The Antarctic Treaty remains the underpinning of the ATS. In fact, the Antarctic Treaty spawned the ATS, which is generally considered to encompass the associated international instruments and treaties adopted by the ATCPs, including the 1980 CCAMLR and the 1991 Madrid Protocol (Rothwell 2021).

### *The Antarctic Treaty*

The Antarctic Treaty, as a Cold War treaty and as the legal basis for Antarctic governance, and its associated legal instruments known as the ATS have been established with the intent of a strong orientation towards international public values (Shibata 2015). This can be vividly understood by looking at the Preamble of the Antarctic Treaty. In paragraph 3 it states: '[the Contracting Parties acknowledge] the substantial contributions to scientific knowledge resulting from *international cooperation* in scientific investigation in Antarctica' (Antarctic Treaty, Preamble). It further reads: '[the Parties are convinced] that the establishment of a firm foundation for the continuation and development of *such cooperation* on the basis of freedom of scientific investigation in Antarctica ... with the interests of science and *the progress of all mankind*' (Antarctic Treaty, Preamble), and 'that a treaty ensuring ... the continuance of *international harmony* in Antarctica will further the purposes and principles embodied in the Charter of the United Nations' (Antarctic Treaty, Preamble) (all emphases added).

Under the Antarctic Treaty, the measures to promote the Treaty's principles and objectives would become effective only when approved by all of the Consultative Parties that are entitled to participate in the ATCM that adopted them (Article IX(4)). According to the Rules of Procedures of the ATCM, those measures must be adopted in the Meeting by 'all Consultative Parties present', effectively implementing the unanimity rule in decision-making under the Antarctic Treaty. Since 1995, those measures are categorized into 'Measures' that are intended to be legally binding, 'Decisions' that are for internal rulemaking and 'Resolutions' that are hortatory recommendations. The so-called double unanimity rule at both the adoption and the entering into force stages now applies only to 'Measures'.

Membership of the Antarctic Treaty has grown from 13 in 1961 to 56 now in 2023. San Marino and Costa Rica are the latest accession cases to the Antarctic Treaty. San Marino deposited its instrument of accession to the Depositary Government of the Antarctic Treaty on 14 February 2023 and Costa Rica on 11 August 2022, making them the 56<sup>th</sup> and 55<sup>th</sup> Parties to the Antarctic Treaty and the 27<sup>th</sup> and 26<sup>th</sup> Non-Consultative Parties, respectively (<https://www.ats.aq/devph/en/news/220>). This not only suggests that greater membership makes the path to decision-making tougher, it also implies the emergence of diverse political philosophies, expectations and aspirations. In hindsight, making decisions among the 12 original signatory states parties during the early years of the Antarctic Treaty certainly seems easier in contrast to the 29 Consultative Parties and counting today, each of which is equipped with power to obstruct

decision-making. That is partially why it has become increasingly difficult for the ATCM to adopt binding instruments to address major challenges, whether regulation within the ATS or coordinated action outside the ATS (Barrett 2020). This also encompasses the efforts to respond to climate change challenges.

### *Madrid Protocol*

The Protocol on Environmental Protection to the Antarctic Treaty (Madrid Protocol) was signed in Madrid in 1991 and was in fact a replacement for the 1988 Convention on the Regulation of Antarctic Mineral Resource Activities (adopted 2 June 1988, not in force) that never entered into force (Berkman 2020). The Madrid Protocol encompasses a regime for the comprehensive protection of the Antarctic environment, which, according to Article 7 of Madrid Protocol, among others, prohibits all activities relating to Antarctic mineral resources except for scientific research activities.

The Preamble to the Madrid Protocol reads: '[The States Parties to this Protocol to the Antarctic Treaty acknowledge ...] the unique opportunities Antarctica offers for scientific monitoring of and research on processes of *global* as well as regional importance' (Madrid Protocol, Preamble), and that they '[are convinced that] the development of a comprehensive regime for the protection of the Antarctic environment and dependent and associated ecosystems *is in the interest of mankind as a whole*' (Madrid Protocol, Preamble). Some scholars are of the view that such stipulations in the Preamble reinforce the view that the Antarctic Treaty was to be firmly embedded within international law and global governance (French 2012, Hemmings 2014) (all emphases added).

Admittedly, environmental and resource-related issues are some of the most significant challenges facing Antarctica and the Southern Ocean today. Among the matters that the ongoing climate change impacts on the Antarctic have given rise to is the issue of accessibility in the context of mining activities. The fact that the Madrid Protocol has only 40 States Parties means there exist 153 states within the international community not bound by the mining prohibition (Johnstone & Joblin 2020). Although no third-party states have expressed an interest in Antarctic mineral resources to date, should such an interest arise, the question of the status of the ATS Parties as self-appointed trustees of the region may well be called into question. The challenge of a state that does not accept the principles of the ATS would inevitably prove a major diplomatic and institutional test (Johnstone & Joblin 2020).

While mining activities have been set aside for the duration of the Madrid Protocol, there remains ongoing debate as to whether the mining prohibition may be

overturned as a result of a review of the Protocol or the actions of states that choose to act outside of the ATS. There also remain issues regarding the status of the Southern Ocean deep seabed, which would legally fall under the concept of areas beyond the national jurisdiction of any state and, consequently, would fall within the remit of the International Seabed Authority in accordance with the United Nations Convention on the Law of the Sea (UNCLOS). Apart from the direct impacts of global climate change in the Antarctic, other developments involving the growing presence of diverse state and non-state actors in that continent and growing potential resource-related activities and competition supported by potential advancement of technological methods and equipment may deepen the impacts and transform the existing dynamics in the Antarctic in various and unexpected fashions.

#### *Convention on the Conservation of Antarctic Marine Living Resources*

CCAMLR (1980), adopted 20 May 1980 and entered into force 7 April 1981, is a pivotal part of the ATS that applies to the marine areas south of the Antarctic Convergence. The principal objective of CCAMLR is to conserve and manage all marine living resources, except whales and seals, in the area south of 60° S latitude and in the area between 60° S latitude and the Antarctic Convergence (Warner 2020). This Convention, which has established a main organization known as the Commission for the Conservation of Antarctic Marine Living Resources, provides a framework for the regulation and management of Antarctic marine living resources that, over time, has expanded from merely regulating fishing activities to more recently taking an ecosystem-based management approach, namely through the designation of the marine protected areas (for a discussion on marine protected areas in the Antarctic, see, among others, Lalonde 2020). A feature that distinguishes CCAMLR from typical regional fisheries management organizations (RFMOs), as set forth in CCAMLR's Article II, is a focus on ecosystem-based management utilizing a precautionary approach within its area of competence, making it a conservation body with the attributes of a RFMO (Haward 2020). It should be noted that Article II of CCAMLR (as the Convention predates the concept of the precautionary approach that had become prevalent in fisheries conventions) does not explicitly provide the precautionary approach; rather, the provision itself is for a more standard management based on available scientific knowledge. It is instead the case that through the CCAMLR's practice, particularly during the 1990s and early 2000s, it has developed its precautionary approach to management. That being said, CCAMLR has been the location for hard-fought annual contests over fishing

rights, and there is a persistent battle over the balance between conservation and sustainable use (Bloom 2022).

A major feature of CCAMLR is that substantive decisions are taken by consensus of all Members of the Commission, and, once adopted by consensus, the conservation measures automatically become binding upon all of its Members after 180 days of a notification, unless a Member notifies within 90 days that it is unable to accept them (Articles XII and IX(6)). It should be noted that, from a legal standpoint, the decision-making rule and the entering into force of the decisions under ATCM are different. Under ATCM, the adoption of Measures requires a unanimity of 'all Consultative Parties present' (Rules of Procedure (RoP) Rule 24), and the RoP does not use the term 'consensus'. Under Antarctic Treaty Article IX(4), the unanimous approval of 'all Consultative Parties entitled to participate in the ATCM held to consider those Measures' would be required for those Measures to become effective (legally binding). CCAMLR has been successful in adopting binding conservation measures for decades, establishing an intricate fisheries management system with stout monitoring and enforcement measures (Press *et al.* 2019).

However, in recent years, the issue of consensus decision-making has had a considerable impact on the operation of both bodies, making it impossible to move forward on items including the designation of marine protected areas when the agreement of all consultative parties or members cannot be obtained (Bloom 2022). CCAMLR, just like the ATCM itself, has faced challenges to its consensus-based decision-making processes following division amongst Parties over efforts to agree upon Southern Ocean marine protected areas in the Ross Sea and in other waters. Although CCAMLR was seen as a model for effectively addressing illegal, unreported and unregulated (IUU) fishing in the Southern Ocean in 2021, for CCAMLR, which greatly relies on flag states as well as CCAMLR Member States when it comes to enforcement, the requirement for consensus in decision-making has created impediments. One of those impediments is that it still struggles with IUU fishing. It has failed to address IUU fishing in a case involving a Russian flagged vessel, as Russia uses the aforementioned method of decision-making as a veto, hampering any pertinent conservation/enforcement measures being adopted while being reluctant to cooperate (with regards to the most recent issues related to IUU fishing in the Convention Area raised within CCAMLR's discourse, see <https://meetings.ccamlr.org/system/files/e-cc-40-rep.pdf>).

#### *Antarctic Treaty Consultative Meetings*

Under the Antarctic Treaty, a meeting established under its Article IX functions as a forum where Treaty Parties

'consult together on matters of common interest pertaining to Antarctica, and formulating and considering, and recommending to their governments, measures in furtherance of the principles and objectives of the Treaty'. These meetings are now called the ATCMs. Historically, efforts to consider climate change as a global concern can be seen to have commenced in the early meetings of the ATCM in 1961, where cooperation with the World Meteorological Organization (WMO) as a collective endeavour within the Antarctic regime was addressed (WMO 2017). In addition, in 1963, a Proposal was considered in the ATCM with the aim of setting up a Standing Committee of the Congress on meteorology in the Antarctic by the WMO. In addition, the matter of relations with other organizations was among the agenda items in that meeting (ATCM 1963).

Notwithstanding the fact that the issue of the environment and its preservation and protection was somehow neglected in the original texts of the Antarctic Treaty and that there is no reference to the term 'environment' in the entire text of the Antarctic Treaty, the protection of the Antarctic environment has been a noticeable feature in the evolution of the Antarctic regime and its treaty system (Francioni 1992, Vidas 2000), and it is appropriately regarded as a normative component of the ATS (Scott 2013). Already in 1964 the ATCM had adopted Agreed Measures for Conservation of Antarctic Fauna and Flora through the legal system of specially protected species and specially protected areas. Based on Article IX(1)(f) of the Antarctic Treaty, which mandates the ATCM to consult on the issue of 'preservation and conservation of living resources in the Antarctic', ATCM had successfully led initiatives that resulted in two treaties, namely the Seals Convention in 1972 and CCAMLR in 1980. Then, in 1991, at the end of the 11th Special ATCM, the Consultative Parties adopted the Madrid Protocol to the Antarctic Treaty, in which its Parties commit to the comprehensive protection of the Antarctic environment and dependent and associated ecosystems and to designate Antarctica as a natural reserve devoted to peace and science (Article 2). Article 3 of the Madrid Protocol states that the protection of the Antarctic environment and dependent and associated ecosystems and its intrinsic values such as its wilderness and aesthetic values shall be fundamental considerations in the planning and conduct of all activities in the Antarctic Treaty Area.

There have been several attempts within which ATCM has taken approaches with the aim of engaging the ATS with other relevant global regimes, with a view to triggering global and regional interaction regarding climate change. On numerous occasions, ATCM has emphasized the importance of regular communication between ATCM and other relevant UN bodies (ATCM

2015a). In a report produced by the Antarctic Treaty Meeting of Experts (ATME) on the implications of climate change for Antarctic management and governance in 2010, it was observed that the WMO Executive Panel of Experts on Polar Observations, Research and Services promotes and coordinates relevant programmes, and the ATME recommended inviting WMO to provide regular reports to the ATCM (ATME 2009, Recommendation 9). The report further urged ATCM to increase its close cooperation and synergy with existing climate observing and assessment initiatives such as the Global Climate Observing System (GCOS) and the IPCC (ATME 2009, Recommendation 16). It also deemed it necessary to set up extensive and well-established systems of cooperation in the Antarctic in order to achieve concrete results. Furthermore, it stated that the results and findings of such work should be shared with other bodies, such as the IPCC and UNFCCC (ATME 2009, Recommendation 16).

In 2012, during the 35th ATCM, the implications of climate change for the management of the Antarctic Treaty Area were elaborated upon broadly. A number of suggestions were made, such as ATCM should develop a more active function in delivering information on the Antarctic while still acknowledging the central role of the UNFCCC regarding the negotiation of international effects on climate change mitigation. Notwithstanding the clear connections between the objectives of the Antarctic Treaty Parties (ATPs) and the UNFCCC, there is currently no direct or formal interaction between the two groups (ATME 2009, Recom16).

During the aforementioned ATCM, and particularly within item 14 on implications of climate change for management of the Antarctic Treaty Area, it was suggested that the ATS be registered as an observer organisation to UNFCCC negotiating sessions and also to issue a joint statement on Antarctic issues to the UNFCCC Conference of Parties or a subsidiary body. In addition, engaging with the Nairobi Work Programme on Impacts, Vulnerability and Adaptation to Climate Change of the UNFCCC's Subsidiary Body for Scientific and Technological Advice as a Partner Organisation and hosting a side event on Antarctic issues during the UNFCCC Conference of Parties were also encouraged.

#### **ATS interactions with global legal systems on matters related to climate change**

The ATS stands as a testament to international cooperation and environmental protection, aiming to preserve the pristine Antarctic region for scientific research and peaceful purposes. However, the challenges posed by climate change have brought the ATS face to

face with the need to interact with global legal systems in order to address this pressing issue. Climate change, with its planetary-wide impacts, transcends national boundaries and necessitates collective action on a global scale. This section examines the interactions between the ATS and global legal systems concerning matters related to climate change. It explores the complexities and opportunities arising from this engagement, delving into the approaches taken by the ATS in balancing its governance framework and the global imperatives for climate action. By analysing the ATS's interactions with global legal regimes, including the UNCLOS and UNFCCC, this section sheds light on the challenges and potential synergies that emerge when regional governance intersects with global efforts to combat climate change.

### *ATS and UNCLOS*

The UNCLOS was fashioned with the understanding that 'the problems of ocean space are closely interrelated and need to be considered as a whole', and thereby developed 'a legal order for the seas and oceans which will facilitate ... the conservation of their living resources, and the study, protection and preservation of the marine environment', with the desire to settle 'all issues relating to the law of the sea' (UNCLOS, Preamble) (UNCLOS 1982). Such a broad arrangement is mainly due to the fact that the issues arising from the marine environment need to be addressed through a global overarching approach.

Change in the Earth's climate and its adverse effects are common concerns of humankind (United Nations 2002). Based on that, there is a need for global reporting and assessment of the marine environment to be guided by international law, including UNCLOS and other applicable international instruments and initiatives. This process should contain the following principles:

- (a) Viewing the oceans as part of the whole Earth system; ...
- (g) Inclusiveness with respect to communication and engagement with all stakeholders through appropriate means for their participation, including appropriate representation and regional balance at all levels; ...
- (k) Effective links with, and building on, existing assessment processes, in particular at the regional and national levels; ... (UNGA 2016)

As such, the comprehensive global consideration of the issues within the marine environment set forth in UNCLOS is a realistic and robust approach. Such a broad approach would also encompass the Southern Ocean and the marine areas governed by the Antarctic Treaty regime, meaning that there ought to be constant

consideration of the relationship between the global regimes developed within the framework of UNCLOS (and generally the international law of the sea) and the instruments and institutions (or generally the regime) established in the framework of the ATS.

Although UNCLOS is meant to deal with and settle all issues in the domain of the law of the sea, it should be noted, however, that it further sets the obligation upon States to cooperate on both a global as well as a regional basis, either directly or indirectly by means of competent international organizations, in formulating and elaborating international rules, standards and recommended practices and procedures for the protection and preservation of the marine environment. Such obligations must be implemented while taking into account the characteristic features of the particular region (UNCLOS, Article 197) (UNCLOS 1982). Such an approach has been the basis for developing coexistence and interaction among various relevant global and regional regimes. Some examples of such interactions among global and regional regimes can be found in the arena of RFMOs and the 1992 Convention on Biological Diversity (CBD).

UNCLOS, just as many other international instruments with a global approach, encompasses a number of general obligations and develops principally an extent of application that covers all ocean spaces. However, in the domain of marine environment protection, it mainly takes a regional and sectoral approach rather than a global one. This can be seen generally in Part XII of UNCLOS, and specifically in Articles 197, 207, 208 and 210, among others (UNCLOS 1982). Paragraph 4 of Article 210, for example, reads: 'States, acting especially through competent international organizations or diplomatic conference, shall endeavour to establish global and regional rules, standards and recommended practices and procedures to prevent, reduce and control such pollution (UNCLOS 1982). Such rules, standards and recommended practices and procedures shall be re-examined from time to time as necessary.' Article 208, paragraph 4, in the context of pollution from seabed activities subject to national jurisdiction, reads: 'States shall endeavour to harmonize their policies in this connection at the appropriate regional level' (UNCLOS 1982). Regional cooperation does not necessarily imply cooperation between the states of a specific region. For instance, in accordance with Article 118 of UNCLOS on high seas fisheries, such cooperation has to involve all of the states whose nationals exploit the resources of a given area, whether they come from the region or from the other side of the globe (Molenaar *et al.* 2013).

This is mainly because in the realm of marine environmental protection an ecosystem approach is an essential element. This is despite the fact that the application of the UNCLOS regulation for the sake of



protection of the marine environment is largely restricted to areas within the scope of national jurisdiction (UNCLOS, Articles 194, 196 and 206). Areas outside the scope of national jurisdiction generally are enforced based on the rights, obligations and the discretion of the flag state (UNCLOS, Articles 209, 211 and 212) (UNCLOS 1982). Such regulation may generally overlap with the functions of other governance and regulatory regimes. A good example could be the International Maritime Organization (IMO): although it is basically established as a specialized agency under the auspices of the UN with responsibility for the safety and security of shipping, it incorporates the mandate and functions for the prevention of marine and atmospheric pollution by ships (IMO Convention 1948, Articles 1(a) and 1(d)). Without an ecosystem approach, such overlaps may cause malfunctioning across the entire regime.

Although UNCLOS encompasses most of the general obligations pertaining to global and regional cooperation in relation to the oceans, there are regional regimes that function as governing structures with detailed and specific obligations. In the case of the Antarctic and Southern Ocean, the issue of governance and management would therefore need to take all of the existing global and regional regimes into consideration in order for it to be overarching and effective. Following that route of interaction and coexistence, there have been numerous cases in which a norm or standard in particular regions often serves as a model or inspiration for other regions and may eventually be transformed into minimum standards in global instruments through the progressive development of international law (Molenaar *et al.* 2013).

This is raised particularly when the matter of global climate change and preservation of a certain region are in question. Issues within the scope of international environmental law have long been perceived to possess a wider impact than the region in question, reaching out into the global environment. On the one hand, the environmental impacts of pollutants may be wider than the region or location where they have originally been discharged, because they may travel long distances. In cases of spills, marine ecosystems have required as long as 10 years to fully recover from a previous spill (Joyner 1986). On the other hand, however, there are marine migratory species that travel long distances through the oceans and so may be exposed to the threats and impacts of marine pollution hundreds and sometimes thousands of miles away (Lascelles *et al.* 2014).

#### *ATS and UNFCCC*

Assuming climate change is 'the greatest transformation of all' (Dodds & Hemmings 2013) in the Antarctic and Southern Ocean, there is a need for a closer relationship with the UNFCCC, which is also in conformity with

Article III of the Antarctic Treaty that accentuates the encouragement of 'cooperative working relations with those Specialized Agencies of the United Nations and other international organizations'. Thus, it was observed that ATCM should consider the establishment and enhancement of effective working relationships, and not merely formal institutional linkages, with other international organizations. This includes a closer engagement with the UNFCCC, which is consistent with the provisions of the Antarctic Treaty. Such an approach would advance the protection and management of the Antarctic region. It was further suggested for ATCM to have a more active role in delivering information on Antarctica into UNFCCC mechanisms, while still recognizing that UNFCCC is the primary framework for negotiating international action on climate change.

The UNFCCC State Parties reached a significant decision on global climate change in 2015. They acknowledged that climate change is a common concern of humankind (Paris Agreement, Preamble) and agreed to keep the global average temperature increase caused by global warming below 2°C and pursue efforts to keep this level even below 1.5°C (Paris Agreement, Article 2.1(a)). This agreement (known as the Paris Climate Agreement) was signed and consequently entered into force on 4 November 2016, and thus far 195 Parties (out of 198 Parties to the UNFCCC) have ratified this Agreement (<https://unfccc.int/process/the-paris-agreement/status-of-ratification>), which is deemed a considerable number of Parties when compared to other international instruments.

The commitments or obligations made by States under the Paris Agreement, which calls for holding the global average temperature increase to below 1.5°C, may have been weakened, undermined or not fully realized due to various factors. But despite this compromised nature of the obligations under the Paris Agreement, Parties are still encouraged to make diligent efforts to achieve this goal. Nevertheless, it is crucial to acknowledge that the agreement holds immense significance for addressing the global environment as a whole, with particular relevance to the Antarctic and Southern Ocean region. Among others benefits, one would be that, based on some studies, the Paris Agreement goal of stabilization of the global temperature below 2°C would reduce sea-level rise resulting from Antarctic ice loss due to melting to < 0.5 m. This dramatically improves the prospects for island and low-lying coastal nations. In other words, there appears to be a stability threshold in the Antarctic ice sheet at ~2°C of global warming that, once exceeded, commits the planet to multi-metre sea-level rise (Naish 2017).

Although issues resulting from climate change have been increasingly discussed in recent years within the ATS entities in general and the ATCM in particular, the most notable practical endeavour undertaken thus far

has been the establishment of a cooperation method through SCAR with the IPCC and UNFCCC. However, the ATS has never had any status within the UNFCCC, the Parties of which argued that the ATS needs to be more involved in the climate change debate, as impacts of climate change in Antarctica have a global effect. Overall, there is apparently an emergent mutual dependency on cooperation between the ATS regime and the international regime governing climate change on a global scale. While the IPCC and UNFCCC need scientific data regarding climate change, the ATS, in turn, is dependent on knowledge regarding the impacts of climate change for its own decision-making.

### *SCAR and UNFCCC*

SCAR, as a non-governmental organization that coordinates international scientific research efforts in Antarctica, has had an Observer status in the UNFCCC, and sometimes it uses its Observer status in the International Science Council (ISC), as its parent organization, to attend relevant working group or other meetings of the IPCC. SCAR is one of the only three Observer organizations recognized under the ATCM (RoP Rules 31–35), which have extensive participatory rights in the ATCM, including the right to submit working papers (which is not the case for 'experts from International Organizations'; RoP Rules 39–45). SCAR acts to provide the IPCC and UNFCCC with important information regarding the impacts of climate change in Antarctica and to ensure that climate issues in the Southern Ocean are adequately addressed. In 2011, SCAR began an initiative to ensure that information related to climate change in the Antarctic region (in particular the outputs of Antarctic Climate Change and Environment (ACCE)) were communicated to bodies such as the IPCC and UNFCCC in an effective manner (SCAR 2014). SCAR had also been invited by the International Cryosphere Climate Initiative (ICCI), in collaboration with the IPCC, to participate in a series of meetings to bring climate scientists and policymakers into direct contact in the lead up to the 2015 Conference of Parties in Paris (SCAR 2014).

More importantly, SCAR helps to mobilize the international science community to address the impacts of climate change on Antarctica and the role that Antarctica plays in the global climate system (Naish 2017). Although SCAR is already an observer to the UNFCCC and also interacts with the IPCC, which per se can provide outreach opportunities regarding Antarctic climate issues, it seems necessary for the ATCM to engage proactively with the UNFCCC. The ATCM should further consider how best to provide information about Antarctic climate change to fora discussing and negotiating climate change (Australia 2012).

### *Committee for Environmental Protection*

The Committee for Environmental Protection (CEP) functions as an advisory body to the Parties on a range of environmental protection issues under the Madrid Protocol. The CEP has made efforts to achieve wider global participation in issues relevant to Antarctica, with the aim of facilitating both global and regional interactions. Such an approach is evident when it comes to global efforts to address global climate change. Those efforts range from biodiversity through safeguarding ecosystems, species and genetic diversity to enhancing sustainable development through global and regional participatory planning, knowledge management and capacity building. With respect to global and regional interactions on biodiversity, CEP, based on a recommendation made by SCAR and the government of the Principality of Monaco, 'considers the development, in collaboration with its partners, of an integrated biodiversity strategy and action plan for Antarctica and the Southern Ocean that would help give effect to the pledge of the Antarctic Treaty Consultative Parties to further strengthen their efforts to preserve and protect the Antarctic terrestrial and marine environments, and form the basis for an Antarctic and Southern Ocean contribution to a truly global assessment of the state of biodiversity and its management in 2020' (SCAR *et al.* 2017, emphasis added).

The Report of the CEP to the 36th ATCM on climate change impacts on the environment encourages SCAR and the Treaty Parties to engage with the UNFCCC and IPCC to ensure that climate issues in the Antarctic and Southern Ocean are fully considered. Based on the CEP report, ATCM conveys the key points of the ACCE updated report more broadly to ensure awareness of the critical role of Antarctica and the Southern Ocean in the climate system and the importance of the associated impacts on the region (ATCM 2013).

In a significant effort, the CEP developed the Climate Change Response Work Programme (CCRWP), which provides annual progress reports to the ATCMs (ATCM-CEP 2015). Furthermore, in 2017, the CEP established the Subsidiary Group on Climate Change Response (SGCCR) to help the CEP in its considerations of how to address the implications of climate change for the protection of the Antarctic environment, including recommendations arising from the 2010 ATME (Hughes *et al.* 2018). SGCCR, with a focus on the fundamental importance of understanding the implication of climate change in Antarctica and the necessity of acting on the basis of the existing science (ATCM 2019), is mandated to facilitate the coordination and communication of the CCRWP (ATCM 2019), and, based on the CEP decision, it should continue its work while encouraging active participation by all interested

members, observers and experts (ATCM 2019). While it is important for the CEP to remain informed about the phenomenon of climate change, it should also take a leadership role through more effective recommendations through providing robust scientific evidence to the ATCM and through considering the implications of climate change for the Antarctic environment, including the implications of possible warming beyond a 1.5°C scenario (ATCM-CEP 2019). It should be noted, however, that this is difficult, given China's heavy criticism, even in the case of SCAR update reports on climate change, and challenging of the underlying science.

## Discussion

On matters with a global scope, such as climate change, the ATCM seems at times reluctant to interact with international mechanisms available beyond the scope of the Antarctic system. Perhaps a noteworthy example is the UN General Assembly (UNGA) reaching out to the ATCPs in 2017 regarding the forthcoming negotiations within the UNGA on the new international legally binding instrument in relation to biodiversity beyond national jurisdiction (BBNJ). The ATCM, however, reacted with a response letter stating that the ATS is the appropriate framework to address the conservation and sustainable use of biodiversity in the Antarctic region. In a letter of invitations from the UN Secretariat pertaining to the process referred to in General Assembly Resolution 69/292 in relation to BBNJ negotiations, the executive secretary of the Antarctic Treaty responds: '... the Antarctic Treaty System is the competent framework within which to address the conservation and sustainable use of biodiversity in the Antarctic region' (ATCM 2017). Such a reaction by the ATCM implies that the ATCPs are willing to separate the governance scheme for the Antarctic Treaty Area and its environmental issues from that of global regimes such as the BBNJ treaty under the auspices of the UN and its UNCLOS.

Arguably, another example may be found in the 40th meeting of the Antarctic Consultative Parties. Expressing concern with regard to the Paper on Antarctica and the Strategic Plan for Biodiversity 2011–2020 (SCAR *et al.* 2017), Argentina, a claimant original signatory and a Consultative Party of the Antarctic Treaty, states that 'from a legal-political aspect, even though the Antarctic Treaty promotes cooperation with the specialized agencies of the UN, it is clear that the regulatory framework for the Antarctic Treaty Area is the Antarctic Treaty. Therefore, a careful approach is required for those cases which start from a regulatory approach with different goals, targets, measures and indicators' (ATCM 2017).

The supporters of the notion of separating the governance scheme of the ATS and its environmental issues from global regimes are of the opinion that this notion stems from the unique legal and political framework established for Antarctica, in that the governance scheme of the ATS is specific to the Antarctic region and is primarily guided by the Antarctic Treaty and its associated agreements, such as the Madrid Protocol. On the other hand, they are also of the view that global regimes, such as treaties and agreements developed under the auspices of the UN or other international institutions, address broader global issues and concerns. These global regimes may have different goals, objectives and mechanisms for addressing environmental or biodiversity-related matters.

The idea of separating the ATS governance scheme and its environmental issues from global regimes is rooted in the belief that Antarctica requires a unique and specialized approach due to its distinct legal (particularly the shelving of territorial disputes in Article IV of the Antarctic Treaty) and environmental conditions, as well as its geopolitical considerations. The Antarctic region is ecologically sensitive and globally significant, and decisions regarding its governance and environmental protection need to consider its specific characteristics. Proponents of this separation argue that the ATS, with its consensus-based decision-making and specific regulations, provides a more tailored and effective framework for addressing Antarctic environmental issues. They contend that global regimes may not adequately account for the unique challenges and requirements of Antarctica and could potentially undermine the specialized governance established by the ATS.

Against the arguments above, one can emphasize the interconnectedness of global environmental challenges and the potential benefits of aligning efforts. A key aspect of this is employing an integrated approach. It can be argued that global environmental issues, including biodiversity conservation and climate change, are inherently interconnected and do not adhere to geopolitical boundaries; therefore, addressing these challenges requires a holistic and integrated approach that encompasses both regional and global perspectives. Separating the ATS governance scheme from global regimes may hinder our ability to effectively coordinate efforts, share knowledge and implement consistent measures.

Another aspect is comprehensive protection. Global regimes, such as UNCLOS and the recently adopted BBNJ (as the historical agreement adopted at the UN for the conservation and sustainable use of biodiversity aimed at ensuring the conservation and sustainable use of marine biodiversity of areas beyond national jurisdiction; <https://www.un.org/sustainabledevelopment/>

[blog/2023/06/press-release-historic-agreement-adopted-at-the-un-for-conservation-and-sustainable-use-of-biodiversity-in-over-two-thirds-of-the-ocean/](https://doi.org/10.1017/S0954102023000226)), provide a broader legal framework for the protection and sustainable use of marine resources. These regimes can potentially contribute to the comprehensive protection of the marine environment, including areas adjacent to the Antarctic. Disregarding or avoiding engagement with these regimes may limit the ATS's ability to leverage and contribute to global conservation initiatives. Evolving legal frameworks can be regarded as the next aspect in this argument in that global regimes, including UNCLOS, are constantly evolving to address emerging challenges and incorporate new scientific knowledge. Engaging with these frameworks allows the ATS to influence the development of global environmental norms and regulations. By actively participating in global discussions and negotiations, the ATS can contribute its unique expertise and experience while also benefitting from the knowledge and perspectives of other states and stakeholders.

It can also be argued that the separation of the ATS governance scheme from global regimes may limit opportunities for sustainable resource management and equitable sharing of benefits derived from Antarctic resources. Engaging with global regimes could provide mechanisms for addressing issues such as access to genetic resources and the fair distribution of benefits arising from bioprospecting or biotechnological research. From a more general perspective, one can allude to international cooperation as another aspect of this argument. Global environmental challenges, including climate change, require international cooperation and collective action. Engaging with global regimes allows the ATS to collaborate more closely with other states, international organizations and non-state actors to tackle shared environmental concerns. By aligning efforts and sharing resources, the ATS can enhance its effectiveness in addressing global challenges while safeguarding its specific interests and governance principles. These counterarguments, in general, emphasize the need to balance the unique governance framework of the ATS with the benefits of collaboration and integration within the broader global environmental context. Striking a balance between regional specificity and global cooperation can help us to ensure the preservation of Antarctica's unique environment while contributing to global environmental goals.

Some observations have even gone further than separating the governance scheme by suggesting an avoidance approach. By interpreting the global regimes and mechanisms as threats to the Antarctic regime and the ATS, some scholars argue that, rather than employing coherent and integrated interaction between global regimes on the one hand and the Antarctic

regime on the other, the ATS should avoid such interactions by addressing issues related to the Antarctic earlier than relevant global institutions and mechanisms. With regard to the possible interactions between the international law of the sea regime and the governance regime within the ATS, they are of the opinion that 'the most obvious threat to the ATS from the law of the sea regime has been the potential for the ATS to be overtaken by a global regime addressing an oceans issue ahead of the regional regime. The ATS has needed to stay ahead of the game' (Scott 2013). They further support this observation by arguing that being ahead of any pertinent global regime and consequently avoiding the potential application of such a regime in the Antarctic region are results that the ATS has been proud of (Scott 2013).

The strong orientation towards international public values within the ATS (Madani & Jabour 2018) can be linked to the avoidance approach in relation to global regimes and the claim by the ATCPs that they are stewards of Antarctica on behalf of the international community. The ATS, as a collective governance framework, has always emphasized the preservation and protection of Antarctica as a global common, recognizing that the region holds significant scientific, environmental and intrinsic value for all of humanity. This commitment to international public values is reflected in the ATS's primary goal of ensuring peace, scientific cooperation and environmental conservation in Antarctica.

In claiming to be stewards of Antarctica on behalf of the international community, the ATCPs acknowledge their responsibility to safeguard the interests of all nations and future generations. They recognize that decisions made within the ATS have implications beyond their individual national interests and that the preservation of Antarctica requires collective action and a long-term perspective. This linkage underscores the commitment of the ATCPs to prioritizing the collective good over narrow national interests. By maintaining a strong orientation towards international public values, the ATS seeks to navigate the complexities of global governance while ensuring the sustainable and responsible management of Antarctica. The avoidance approach, coupled with the claim of stewardship, reinforces the responsibility of the ATCPs as advocates for the shared interests of the international community, aiming to protect Antarctica for the benefit of present and future generations.

The avoidance approach, even if it were to be sustained, should take into account the present-day limitations of international law development at the structural level. First, within the ATS, as highlighted above in the context of CCAMLR, because of the adversarial atmosphere becoming increasingly prevalent, an

adequate response at the regional level has not been easily forthcoming. For example, very much relevant to the UN BBNJ negotiations have been the discussions within the ATS on the issue of biological prospecting in the Antarctic. Within the ATS, discussions have taken place regarding the management of biological prospecting in the Antarctic, taking into account the potential impacts on the unique and fragile Antarctic ecosystems. These discussions involve considering the sustainable use of Antarctic biological resources, the sharing of benefits derived from such activities and the preservation of biodiversity. However, while biological prospecting discussions within the ATS have relevance to the BBNJ negotiations, the ATS Member States have generally expressed the view that the Antarctic Treaty provides an appropriate framework for addressing the conservation and sustainable use of biodiversity in the Antarctic region. This perspective suggests a desire to separate the governance of the Antarctic Treaty Area from global regimes such as the BBNJ treaty (SCAR *et al.* 2017).

Second, global agreements with intended global application will remain hampered by falling short of addressing the complex interrelationships currently at work between the polar regions and the global environments in the Earth system. Interconnecting the 'global' with the 'polar' against the background of changing conditions will become a vital task for policymakers in the decades to come, during which the development of international law will necessarily be led by several complex drivers, such as the changing conditions of the Anthropocene and the unchanged objective of international law to contribute to the maintenance of international peace and security (Summerhayes *et al.* 2020). It will become increasingly necessary for decision-makers within the ATS to employ such a global vision to address existing and future challenges in the Antarctic.

The question that remains to be addressed is whether or not analogous approaches to the above can be employed for global climate change as well. Failure in addressing the issue within the Antarctic context may lead to a critical institutional challenge for the ATS. This may eventually undermine regime security if, for example, it results in ATS Parties taking action in other fora unilaterally or 'in coalitions of the willing', or if other organizations or non-Party States sense a vacuum in Antarctic regulation that they can profit from (Barrett 2020).

The issue of achieving decision-making unanimity adds to the existing complexity. Achieving consensus in individual Antarctic domains (e.g. tourism, fishing) that are perceived to intersect with national interests is an issue that has long been recognized as particularly problematic and challenging for decision-making within the ATS. It can be argued that climate change, arguably

because of its planetary-wide impacts across multiple issue areas, is bringing into sharper relief and consciousness the ways in which the high-threshold decision-making procedures of the ATS can be utilized by state actors to give precedence to national over collective interests and delay time-critical decision-making.

The ATS was established in 1959 with the goal of preserving the Antarctic continent for peaceful purposes and promoting international scientific cooperation. However, as human activities in Antarctica have expanded, including tourism and fishing, decision-making processes within the ATS have faced increasing complexity and potential for conflict between national and collective interests. The requirement for unanimity in decision-making within the ATS can be seen as both a strength and a challenge. On the one hand, it ensures that all Parties have an equal voice and can participate in decision-making processes. On the other hand, it can create difficulties in reaching timely and effective decisions, particularly when national interests are at stake or there are diverse viewpoints among the Member States.

Climate change adds another layer of complexity to decision-making in the Antarctic domain. The impacts of climate change are not limited to a single issue/area but affect various aspects of the Antarctic ecosystem and its surrounding regions. These impacts can include melting ice, changes in species distributions and changes in marine ecosystems. Given the global nature of climate change, addressing its effects requires coordinated and timely action. However, the high-threshold decision-making procedures of the ATS, combined with the need for unanimity, can potentially impede the ability to respond quickly to climate change and prioritize collective interests over national ones. Some states may prioritize their immediate national concerns, leading to delays in making time-critical decisions and implementing effective measures to mitigate the impacts of climate change.

Addressing these challenges requires striking a delicate balance between national interests and collective action. It may involve exploring alternative decision-making mechanisms within the ATS that allow for more flexibility, while still ensuring the participation and representation of all Member States. Additionally, increasing awareness and understanding of the interconnected nature of climate change and its impacts on Antarctica can help foster a stronger sense of collective responsibility and motivate timely decision-making. Continuing efforts within academia and the scientific community are underway to underscore the significance of these issues, urging Member States to recognize the crucial role of effective decision-making and collaboration in safeguarding Antarctica for future generations.

At least some glimmers of hope have surfaced, suggesting a sense of optimism and anticipation. Through Decision 4 (2022), adopted by all the 29 Consultative Parties present at ATCM 2022 and recognizing the important role of the Antarctic region in global climate processes, the Meeting decided to send its Decadal Synopsis Report on Antarctic Climate Change and Environment (ACCE Report) produced by SCAR to the Executive Secretary of UNFCCC, the Secretary of the IPCC, the Secretary-General of WMO and the Executive Secretary of the Intergovernmental Science-Policy Platform and Biodiversity and Ecosystem Services (IPBES; ATCM 2022b). However, this is challenged by China's open criticism (ATCM 2022a). China, while generally supportive of the recommendations put forward in the papers, noted the scientific uncertainties in sea-level rise trends, the biodiversity and climate models SCAR had used in its report and as the achievability of the proposed management goal of preserving the Southern Ocean environment in a state close to that of the past 200 years. Recognizing the crucial role of SCAR in providing independent and objective scientific advice to support and inform the work of the ATCM and CEP, as expressed in Resolution 7 (ATCM-CEP 2019), China expressed concerns regarding whether SCAR was the appropriate body to provide such policy recommendations.

## Conclusion

Global climate change calls for '... the deepening sense of solidarity amongst the nations of the international community to tackle worsening environmental and ecological degradation of the Earth' (Shibata 2021), and it must be considered the most significant challenge facing the Antarctic and the ATS. Both poles are not only sites of much critical global fieldwork, but also are regions where climate change is having the most profound effects, as well as regions whose physical destabilization threatens consequences of global import (Rothwell & Hemmings 2020). Most model predictions concur that Antarctic sea ice will shrink over the next 50–100 years, having substantial physical and biological repercussions for polar areas and beyond.

The double unanimity rule within the ATCM for legally binding Measures has imposed significant challenges on the legal development of the Antarctic regime (e.g. Annex VI on environmental liability has not yet entered into force 18 years after its adoption in 2005; <https://www.state.gov/wp-content/uploads/2021/12/website-4-Antarctic-Protocol-Annex-6-1.pdf>). The application of the principle of substantive consensus is undeniably time-consuming, and at times arduously so, as evidenced

by recent proposals to establish large marine protected areas under CCAMLR (Shibata 2015). This is particularly the case within recent decades, as an adversarial atmosphere has become increasingly prevalent. The Russian invasion of Ukraine has worsened this atmosphere, and, for the first time in its history, the Final Report of the 2022 ATCM in Berlin was adopted without a consensus (ATCM 2022a). It merits noting that, according to the Rules of Procedure of the ATCM, the Final Report can be adopted by majority (ATCM 2015b). There have also been complaints regarding decision-making over time-sensitive issues such as environmental protection or climate change (Capurro *et al.* 2021, Bastmeijer *et al.* 2023).

The necessity for wider international participation within this discourse seems to have been highlighted by the fact that the changes brought about by global climate change are having serious repercussions on a planetary scale. Included in this are involvement and participation in the pertinent decision-making processes. However, the ATS itself is beginning to face difficulties with these decision-making processes, which have been in place within it for a long time. In addition, the fact that the Antarctic Treaty has not been subject to any amendment despite being in force for 60 years seems rather exceptional. According to Rip Bulkeley (2010), 'much has changed in the Antarctic Treaty regime since the 1960s, thanks to further international agreements and to a transformation in the arrangements under which scientists take part in Antarctic governance. The question of whether that evolution has preserved or supplanted the status quo, the nexus of international rivalries, claims, resource postulations and other aspirations that prevailed in the early 1950s, is a matter for continuing debate.'

The structural level of international law has revealed its limitations for some time now. In order to provide adequate responses to the issues posed by global climate change, regional governance regimes, such as the ATS, face their own varied constraints. This is separate from the fact that multilateral instruments with intended worldwide application continue to be hindered either by political roadblocks or by failing to adequately address the existing complexities currently at play in the Earth system. ATCM Decision 4 (2022) - Letters on Antarctic Climate Change and the Environment: A Decadal Synopsis and Recommendations for Action report - as well as the more recent Helsinki Declaration on Climate Change and the Antarctic (ATCM 2023) may be regarded as small signs of hope. It remains to be seen how in practice the ATS will more effectively respond to the current and future issues while facing these ongoing challenges.

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## Author contributions

Zia Madani - conceptualization; methodology; validation; formal analysis; writing (original draft, review and editing); resources. Akiho Shibata - writing (analysis, review and editing).

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