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The Big Thaw: who governs Antarctica's ice?

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Introduction

The Antarctic continent covers an area of around 14 million km², with almost all of its surface covered by ice sheets. At the littoral edge of the continent, there are large ice shelves that extend seawards — in some cases by many hundreds of kilometres. Further seawards lies an expanse of sea ice that grows in winter and contracts in summer.

Antarctica, like all places on Earth, is being transformed by human activities.[2] The volume and area of Antarctica's ice are declining, with flow-on effects for Antarctic ecosystems, for regional and global climate systems, and for sea level rise. Australia has a special interest in preserving Antarctica, not only because of what it means for the Australian Antarctic Territory, but also because changes both to Antarctica's ice cover and to deep ocean currents in the Southern Ocean influence temperature and rainfall patterns in Australia, affecting communities, ecosystems and agriculture.

As early as 1989, the parties to the Antarctic Treaty adopted a resolution which expressed an awareness of "the role that Antarctica and the Southern Ocean play in interactive physical, chemical and biological processes that regulate the total Earth System," recognised that "the Antarctic region has a high negative radiation budget and so acts as one of the Earth's 'refrigerators'," noted that "the Antarctic ice sheet contains enough water to raise global sea level world-wide some 60 metres," and warned that "warming which makes even a small change to this volume of ice will have a significant impact on sea level."[3] Thanks to scientific advances in the decades that have followed, we now have a clearer understanding of what is happening to Antarctica and how sensitive it is to rising temperatures.

We can agree it is important that we pay attention to Antarctica's ice, and hold on to as much of it as we can. But how can this be achieved? How is Antarctica's ice governed?

Governing Antarctica

Before addressing these questions, it is necessary to introduce the unique set of legal arrangements for Antarctica. Historian David Day describes Antarctica as "a mirror

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2 See generally Meredith MP, Melbourne-Thomas J, Naveira Garabato AC and Raphael M (eds) (2025) *Antarctica and the Earth System*. London: Routledge. https://doi.org/10.4324/9781003406471

3 Antarctic Treaty Consultative Meeting (1989) *Recommendation XV-14: Promotion of International Scientific Cooperation*. ATCM XV, Paris. Available at: https://www.ats.aq/devAS/Meetings/Measure/183 (Accessed 10 July 2025).

on which centuries of human hopes, fears and desires have been projected."[4] These projections have taken a myriad of legal forms. In the early twentieth century, seven states made claims to Antarctica: Argentina, Australia, Chile, France, New Zealand, Norway and the United Kingdom. These resulted in most of the continent coming under sovereignty claims. It was a former President of the Royal Society of NSW, Sir Edgeworth David, leader of the first expedition to reach the South Magnetic Pole in 1909, who played a central role with Sir Douglas Mawson, in establishing Australia's claim alongside Douglas Mawson. Australia's Antarctic claim remains the largest, bringing approximately 42 per cent of the continent within the Australian Antarctic Territory. Australia's claim is not widely recognised by other governments, but the absence of express recognition does not undermine the objective legal basis for Australia's Antarctic possessions.[5]

In the middle of the twentieth century there was to be a decisive change in Antarctica's international legal treatment, from being a domain of territorial designs to becoming an object of international concern and management. This was achieved in the Antarctic Treaty,[6] signed in Washington DC in 1959 by the seven claimants and five other countries[7] active during the International Geophysical Year of 1957–58. The very first meeting of the Antarctic Treaty parties took place in Old Parliament House, Canberra in 1961.

Several factors, including scientific fascination with Antarctica, explain this shift from competition to cooperation. However, the main driver was the Cold War superpower antagonism. There were very real fears that Antarctica would be a new front in the nuclear standoff between the United States and the Soviet Union.[8] And so the Antarctic Treaty's preamble declares that "it is in the interest of all [hu]mankind that Antarctica shall continue forever to be used exclusively for peaceful purposes and shall not become the scene or object of international discord."

To give effect to this goal the Treaty has three main elements. First, it provides that Antarctica is to be used exclusively for peaceful purposes and prohibits the deployment of military forces in Antarctica, except for scientific research or other peaceful uses. It also prohibits nuclear explosions in Antarctica and the disposal of radioactive wastes. In addressing the risks associated with nuclear weapons and waste, the Antarctic Treaty was a response to one of the defining technologies of the Anthropocene, the human-dominated period in Earth history which we now inhabit.[9]

4 Day D (2012) Ice works: Three portraits of Antarctica. *The Monthly*, March, p. 56. See Day D (2013) *Antarctica: A Biography*. Sydney: Vintage.

5 Scott SV (2021) The irrelevance of non-recognition to Australia's Antarctic territory title. *International and Comparative Law Quarterly* 70(2): 491–503.

6 Signed at Washington, D.C., 1 December 1959. United Nations Treaty Series, vol. 402, p. 71.

7 Belgium, Japan, South Africa, Soviet Union and the United States.

8 Dodds K (2017) Antarctic Geopolitics. In: Dodds K, Roberts P and Hemmings AD (eds) *Handbook on the Politics of Antarctica*. Cheltenham: Edward Elgar Publishing, pp. 199–214, p. 205.

9 While not recognised as a formal geological interval, the 'Anthropocene' is described by the International Union of Geological Sciences as an 'invaluable descriptor of human-environment interactions' in 'discussions

Second, the Antarctic Treaty promotes the freedom of scientific investigation, and requires states to co-operate to the greatest extent possible in research endeavours. The Antarctic Treaty has made a major contribution to understanding global challenges, including ozone depletion and climate change, thanks to the central place that science occupies in Antarctic governance. As environmental anthropologist Jessica O'Reilly has observed, Antarctica is less a *terra nullius* or *terra incognita*, and instead is more a *terra clima* in constituting both a barometer of climate change and also as one of the key "geographic epicentres of climate science."[10] Illustrating this is the central place that climate science plays in the Antarctic science programs of Australia[11] and other Antarctic states.

Third, and most importantly, the Antarctic Treaty includes a carefully drafted provision on sovereignty. To employ an overused metaphor, this provision freezes sovereign claims for the life of the treaty. It provides that existing territorial claims are neither recognised nor rejected, while no new claims or the enlargement of existing claims is permitted. It is this delicate compromise that is central to the stability of the Antarctic Treaty, allowing parties to manage Antarctic affairs without having to defend or protest territorial interests.

Another consequence of the suspension of sovereignty is that claimant states cannot exercise their usual jurisdiction over the territories they claim. So in the Australian Antarctic Territory, and indeed anywhere in Antarctica, the Australian Government will extend Australian law to Australian nationals.[12] The government, however, will not apply Australian law to non-nationals, including in the Australian Antarctic Territory, such as Japanese whalers who operated around Antarctica from the 1980s. Japanese so-called scientific whaling offshore Australia's Antarctic Territory was brought to an end by Australia through successful litigation in the International Court of Justice[13] on the basis of breaches of the 1946 International Convention for the Regulation of Whaling,[14] not through the enforcement of national jurisdiction.

A central feature of the Antarctic Treaty was that it established an evolving legal regime. The Treaty laid the legal foundations for what was to become the Antarctic

of the anthropogenic impacts on Earth's climatic and environmental systems.': International Union of Geological Sciences (2024) *The Anthropocene: IUGS-ICS Statement (Extended)*. IUGS. Available at: https://www.iugs.org/post/the-anthropocene-iugs-ics-statement (Accessed 15 July 2025).

10 O'Reilly J (2013) Antarctic climate futures: How terra incognita becomes terra clima. *The Polar Journal* 3(2): 384–399.

11 Press T (2014) *20 Year Australian Antarctic Strategic Plan: The Press Report*. Canberra: Australian Government. Available at: https://www.antarctica.gov.au/site/assets/files/53318/20-year-plan_press-report.pdf (Accessed 15 July 2025)

12 Stephens T and Boer B (2007) Enforcement and compliance in the Australian Antarctic Territory: Legal and policy dilemmas. In: Kriwoken LK, Jabour J and Hemmings AD (eds) *Looking South: Australia's Antarctic Agenda*. Australia: Federation Press, pp. 54–70.

13 *Whaling in the Antarctic (Australia v. Japan: New Zealand intervening)*, Judgment of 31 March 2014, I.C.J. Reports 2014, p. 226.

14 *International Convention for the Regulation of Whaling*, Washington, 2 December 1946. United Nations Treaty Series, vol. 161, p. 72.

Treaty System, a collection of treaties and other instruments for governing Antarctica. It is through this process that Antarctica has gained new elements, such as the 1980 Convention on the Conservation of Antarctic Marine Living Resources[15] to protect Antarctic fisheries, and even an Antarctic emblem. It is now one of the world's most comprehensive international legal arrangements.[16] As Don Rothwell has observed, the Antarctic Treaty System stands apart as one of the world's most durable and resilient legal regimes.[17]

One fascinating aspect of the regime is the pivotal role that scientists have played in constructing the Antarctic Treaty System. As Alessandro Antonello explains, after the Antarctic Treaty was agreed, "a group of states and their diplomats and officials, scientists, and scientific institutions transformed the Antarctic from a cold, abiotic, and sterile wilderness, a lifeless and inert stage for geopolitical competition, into a fragile environment and ecosystem demanding international protection and management."[18] The key moment in this transformation came in the late 1980s when the mining question was confronted and resolved. The Antarctic Treaty did not deal with the issue, and it was not clear on what legal basis mining in the Antarctic could take place. To resolve the uncertainty, the 1988 Convention on the Regulation of Antarctic Mineral Resources[19] (Minerals Convention) was adopted in Wellington, New Zealand, to permit mining under strict conditions.

However, when the environmental implications of Antarctic mining were understood by publics in a number of states there was a quick turn-around in international attitudes. Australia and France reversed their support for the Minerals Convention and pushed instead for a comprehensive treaty to protect the Antarctic environment. The diplomatic effort was led by French Prime Minister Michel Rocard and Australian Prime Minister Bob Hawke.[20] This resulted, in a short time, in the effective abandonment of the Minerals Convention, which never entered into force, and the adoption of the 1991 Environmental Protocol.[21] The Environmental Protocol not only established an indefinite mining ban,[22] but the

15 *Convention on the Conservation of Antarctic Marine Living Resources*, Canberra, 20 May 1980. United Nations Treaty Series, vol. 1329, p. 47.

16 See further Saul B and Stephens T (2015) *Antarctica in International Law*. Oxford: Hart Publishing.

17 Rothwell D (2021) The Antarctic Treaty at sixty years: past, present and future. *Melbourne Journal of International Law* 22(2): 1–25.

18 Antonello A (2019) *The Greening of Antarctica: Assembling an International Environment*. Oxford: Oxford University Press, p. 4.

19 Convention on the Regulation of Antarctic Mineral Resource Activities (1988). Concluded at Wellington, New Zealand, 2 June 1988. Not in force. Depositary: Government of New Zealand.

20 See generally Jackson A (2021) *Who Saved Antarctica? The Heroic Era of Antarctic Diplomacy*. Cham: Palgrave Macmillan, ch. 6.

21 Protocol on Environmental Protection to the Antarctic Treaty, Madrid, 4 October 1991. United Nations Treaty Series, vol. 2941, No. 5778.

22 Resolution 6 (2016) — ATCM XXXIX — CEP XIX, Santiago: Confirming ongoing commitment to the prohibition on Antarctic mineral resource activities, other than for scientific research.
Available at: https://www.ats.aq/devAS/Meetings/Measure/642 (Accessed: 15 July 2025).

parties also committed themselves to the comprehensive protection of the Antarctic environment, and designated Antarctica as a natural reserve, devoted to peace and science.

The conversion of the Antarctic regime from a relatively narrow, sovereignty- and science-focused regime to one concerned with comprehensive environmental protection goals was not inevitable. It was the outcome of the efforts of scientists and other actors to open new possibilities for perceiving the continent and the Antarctic Treaty's foundational principles. The abandonment of the Minerals Convention and the adoption of the Environmental Protocol also served to allay suspicions of Asian and developing states that western powers were seeking to arrogate the continent and its resources to themselves. The Antarctic Treaty now has 58 parties, 29 of which have "consultative" status to make decisions about the continent at Antarctic Treaty Consultative Meetings.[23] The Environmental Protocol also established the Committee on Environmental Protection, a central forum for the governance of Antarctic environmental matters.

Over time the agenda of these meetings has become very full, dealing with issues ranging from Antarctic heritage sites, to environmental impact assessment of Antarctic aerodromes, to Antarctic tourism. I have had the privilege of an attending a consultative meeting, as an academic observer with the Australian Government Delegation, and have seen first-hand the professionalism and commitment of Australia's diplomats and scientists.

Governing the ice

So we now know how Antarctica is governed in a general sense, and can turn to examine how the world's ice and snow (known collectively as the *cryosphere*) is governed, including in Antarctica.

In 1959 the United States constructed Camp Century under the Greenland Ice Sheet with the hope of deploying nuclear ballistic missiles there. Despite its centennial ambitions, Camp Century was abandoned within a decade. Yet the base was never decommissioned, as it was assumed that the facility's hazardous contents would remain forever entombed. This turned out to be a dangerous assumption. Glaciologists have discovered that with the Greenland Ice Sheet melting, Camp Century and its radiological wastes are now being released from their icy clutches.[24] Greenland's ice sheet is melting much faster than previously estimated,[25] adding freshwater that slows down the Atlantic's circulation.[26]

23 The consultative parties comprise the 12 original parties together with 17 subsequent parties that have demonstrated interest in Antarctica by conducting substantial scientific research activity there: Antarctic Treaty, Art. 9(2). See Hughes KA, Gray AD and Ager BJ (2024) 'Attainment of consultative status by parties to the Antarctic Treaty: past, present and future', *The Polar Journal* 14(2): 560–591.

24 Colgan W, Dethloff K, Fettweis X et al. (2016) The abandoned ice sheet base at Camp Century, Greenland, in a warming climate. *Geophysical Research Letters* 43(12).

25 Greene CA, Gardner AS, Wood M et al. (2024) Ubiquitous acceleration in Greenland Ice Sheet calving from 1985 to 2022. *Nature* 625: 523–528.

26 Pontes GM and Menviel L (2024) Weakening of the Atlantic Meridional Overturning Circulation driven by subarctic freshening since the mid-twentieth century. *Nature Geoscience* 17: 1291–1298. https://doi.org/10.1038/s41561-024-01568-1

Furthermore, the Arctic's summer sea ice is disappearing before our eyes.[27]

There is a strong sense across the Arctic that the Anthropocene has arrived, with Indigenous communities at the front lines of this change. Arctic researchers have been posing and answering research questions in response to this reality for some time; it was over a decade ago that the United States National Academy of Science released a book-length report on "The Arctic in the Anthropocene."[28] At the other pole there has been a belief, or wish, or hope, that Antarctica is more resistant to change. Perhaps Antarctica is the place that this new era has overlooked? However, the ice is telling a different story.

There are three main types of ice in Antarctica — the ice sheets, the ice shelves (land ice that flows out over the coastal ocean), and surrounding floating sea ice. Let us begin with the latter first and then move landwards. There is considerable natural variation in Antarctic sea ice extent,[29] although the recent and abrupt retraction is concerning. The average Antarctic sea ice extent for July 2024 was 11% below the 1991–2020 average.[30] This was the second-lowest extent for July, and 2024 was the third year in a row characterised by a relatively large negative anomaly. This indicates that a "regime shift" may be underway, with sea ice pushed to a new state of diminished coverage similar to that in the Arctic, from which it may not recover. Australian Antarctic Division sea-ice scientist Dr Petra Heil has highlighted the wide-ranging effects this is having on "the climate and ecosystems, both nearby and further afield, including at lower latitudes, which are home to the majority of the human population and their economic interests."[31]

More troubling still is the melting of Antarctic ice shelves and ice sheets, as it involves change of sufficient scale to transform both the continent and the planet. Antarctica's ice is not a fixed feature of the landscape; it is a dynamic system that has been in equilibrium for thousands of years. That balance is changing as temperatures rise, and the ice is assailed from warm air from above and warm waters from below. In 2025, surface melting on the Antarctic ice sheet set a record for the satellite observation period.[32]

Research by glaciologist Rob DeConto and others suggests that Antarctic ice sheets

27 NASA Earth Observatory (2024) *Arctic and Antarctic sea ice approached historic lows*. Available at: https://earthobservatory.nasa.gov/images/153457/arctic-and-antarctic-sea-ice-approached-historic-lows (Accessed 15 July 2025).

28 National Research Council (2014) *The Arctic in the Anthropocene: Emerging Research Questions*. Washington, D.C.: The National Academies Press. Available at: https://nap.nationalacademies.org/catalog/18726/the-arctic-in-the-anthropocene-emerging-research-questions (Accessed 11 July 2025)

29 Matear RJ, Oke PR, Risbey JS et al. (2015) Sources of heterogeneous variability and trends in Antarctic sea-ice. *Nature Communications* 6: Article 8656.

30 National Snow and Ice Data Center (NSIDC) (2024) 2024 Antarctic sea ice maximum extent finishes at second lowest. Available at: https://nsidc.org/sea-ice-today/analyses/2024-antarctic-sea-ice-maximum-extent-finishes-second-lowest (Accessed 11 July 2025)

31 Australian Antarctic Division (2024) *Antarctic sea ice in crisis*. Available at: https://www.antarctica.gov.au/news/explore-antarctica/antarctic-sea-ice-in-crisis/ (Accessed 11 July 2025)

32 National Snow and Ice Data Center (NSIDC) (2025) The Great Un-Freezing: Record Antarctic surface melt extent set; Peninsula melting slows. Available at: https://nsidc.org/ice-sheets-today/analyses/great-un-freezing-record-antarctic-surface-melt-extent-set-peninsula-melting-slows (Accessed 11 July 2025).

are far less stable than generally thought.[33] The last time CO_2 concentrations were as high as they are today was during the Pliocene, three million years ago, in which the sea level was 10–30 metres higher, there was no West Antarctic Ice Sheet, and the East Antarctic Ice Sheet was in retreat. As glaciologist Knut Christianson has commented in relation to the Thwaites Glacier in West Antarctica, "[w]e like to think that change happens slowly, especially in a landscape like Antarctica … [b]ut we now know that is wrong."[34]

Continued growth in concentrations of CO_2 in the atmosphere will eventually trigger the collapse of Antarctica's ice, as the buttressing shelves melt and the sheets then slide into the sea in much the same way as a ship is launched down a slipway. DeConto has described this process as "literally remapping how the planet looks from space."[35] The good news is that substantial ice mass loss may be avoided if greenhouse-gas emissions are reduced sufficiently to limit the average global temperature rise to about 2 °C.[36] This happens to be upper temperature goal of the 2015 Paris Agreement on Climate Change,[37] the most recent and significant treaty adopted under the 1992 United Nations Framework Convention on Climate Change (UNFCCC).[38]

To date, we have mostly imagined humanity's physical power over Antarctica, with states projecting an abstract authority through exploration, map-making, nationalist claims and gestures, and the passing of myriad Antarctic laws, many of which have little more than symbolic effect. However, in the Anthropocene the future of Antarctica is now in human hands, with the fate of its mass of ice and snow determined from afar by human-induced changes to the global climate. We have therefore collapsed the separation between global human activities and their impact on Antarctica.

While the Antarctic Treaty System has been effective in enabling the detection and anticipation of state change in Antarctica, principally by rendering Antarctica a *terra clima*, ironically it has shown reluctance to confront implications of the big thaw. As Antonello puts it, "[i]ce still has not become a central diplomatic concern of the Antarctic Treaty parties," despite the efforts of civil society groups and scientists.[39] Governments have sought refuge in science, responding to the climate threat by intoning the refrain that climate impacts on the continent need

33 DeConto RM and Pollard D (2016) Contribution of Antarctica to past and future sea-level rise. *Nature* 531: 591–597; Aitken ARA, Roberts JL, van Ommen TD et al. (2016) Repeated large-scale retreat and advance of Totten Glacier indicated by inland bed erosion. *Nature* 533: 385–389.

34 Goodell J (2017) The doomsday glacier. *Rolling Stone*, 10 May. Available at: http://www.rollingstone.com/politics/features/the-doomsday-glacier-w481260 (Accessed 10 July 2025)

35 Tollefson J (2016) Antarctic model raises prospect of unstoppable ice collapse. *Nature* 531: 562–563.

36 Stokes CR, Abram NJ, Bentley MJ et al. (2022) Response of the East Antarctic Ice Sheet to past and future climate change. *Nature* 608: 275–286.

37 Paris Agreement on Climate Change, Paris, 12 December 2015. United Nations Treaty Series, vol. 3156, p. 79.

38 United Nations Framework Convention on Climate Change, New York, 9 May 1992. *United Nations Treaty Series*, vol. 1771, p. 107.

39 Antonello A (2019) *The Greening of Antarctica: Assembling an International Environment*. Oxford: Oxford University Press, p. 173. A key civil society organisation in this arena is the Antarctic and Southern Ocean Coalition, https://www.asoc.org/ (Accessed 15 July 2025).

to be understood better if Antarctica is to be protected, but leaving unsaid how this protection is to occur and who will have responsibility for achieving it. This is understandable. The Antarctic regime has an ingrained culture of exceptionalism; at times it has operated as an exclusive club of nations. There is also the reality that climate change cannot be directly addressed within the Antarctic Treaty System, and necessarily requires action through global forums, principally the 2015 Paris Agreement on Climate Change.

The fundamental challenge, as veteran Australian Antarctic diplomat Andrew Jackson observes, is that "the greatest risk to Antarctica's environment comes from events outside the Treaty area, rather than within," and therefore beyond the apparent purview of the Antarctic Treaty System.[40] The Antarctic Treaty System cannot by itself govern Antarctica's ice, and so it is through the Paris Agreement that states are seeking to avoid dangerous climate change, and all that comes with it, including the melting of the cryosphere. The Paris Agreement was adopted in 2015 and is intended to put the world on the path to carbon neutrality. However, as the United Nations Environment Programme reports, there remains a sizeable gap between the goals of the agreement and global emissions,[41] which reached a record high in 2024.[42]

The links between the Paris Agreement goals and the Antarctic environment are not widely understood, including by the parties to the Paris Agreement itself, despite the efforts of climate scientists, such as paleoclimatologist Tim Naish, who delivered the Scientific Committee on Antarctic Research lecture at the 40th Antarctic Treaty Consultative Meeting. Naish highlighted the links between the Paris Agreement and the Antarctic environment. He explained that the "threshold for loss of Antarctica's stabilizing ice shelves may be the Paris target of 2 °C of global warming. Go above it and you commit the planet Earth to multi-metre sea-level rise that may be irreversible for millennia."[43] Naish noted that we are now at a critical moment, and time to act is short. He argued that despite the significant impacts of climate change on "Antarctic activities and operations … the ATS does not have a coherent voice under the Paris Agreement" and made a number of suggestions for greater engagement by the Antarctic Treaty System with the UNFCCC and the Paris Agreement.

We are at a critical point of potential disruption of the existing Antarctic order, with environmental change causing more serious and permanent harm to physical and living components of the Antarctic ecosystem than mining or tourism or any activity on the continent ever could. There are at least

40 Jackson A (2021) *Who Saved Antarctica? The Heroic Era of Antarctic Diplomacy*. Cham: Palgrave Macmillan, pp. 366–367.

41 United Nations Environment Programme (UNEP) (2024) *Executive summary*. In: *Emissions Gap Report 2024: No more hot air … please! With a massive gap between rhetoric and reality, countries draft new climate commitments*. Nairobi: UNEP. Available at: https://doi.org/10.59117/20.500.11822/46404 (Accessed 11 July 2025).

42 International Energy Agency (IEA) (2025) Global Energy Review 2025: CO_2 emissions. Available at: https://www.iea.org/reports/global-energy-review-2025/co2-emissions (Accessed 11 July 2025).

43 Naish T (2017) What does the United Nations Paris Climate Agreement mean for Antarctica? *Antarctic* 35(4): 46–51.

two plausible scenarios in how the Antarctic Treaty System will respond to the "big thaw." One is that the Antarctic environment is radically transformed (e.g. the complete loss of sea ice, with all the implications that carries for the whole Southern Ocean ecosystem[44]) such that the regime loses its key environmental protection rationale, in which case dormant tensions over access, resources, and even sovereignty could be reanimated. If the Antarctic environment is altered to such an extent that all, or the majority of, existing environmental protection measures become ineffective, then new measures become largely without object. Once this occurs, the rationale for controlling or prohibiting various activities on the continent could be challenged, and disputes over access to resources could resurface.

Antarctic biologist Steven Chown notes that "[s]igns of discord in the ATS bodies are ... already visible, such as the inability of parties to [the Convention on the Conservation of Antarctic Marine Living Resources] to agree on further marine protected areas."[45] Among a small number of parties to this Convention, there has been significant backlash against centring climate-related concerns in the regime, and several states are now blocking all new conservation measures.[46] There is a possibility that parties to the Antarctic Treaty, including potentially even the United States, will abandon an interest in Antarctic science and conservation for other reasons, including domestic political considerations,[47] or renewed geostrategic tensions.

A second, more optimistic, scenario, sees a concerted effort to centre environmental concerns in Antarctic governance, in a manner analogous to the mining debate, to build consensus within the Antarctic Treaty System and reinforce global support for the regime. Under this scenario, Antarctica again becomes a centre of global environmental attention — as a kind of "Ark" — consistent with the "last wilderness" narratives that have been dominant in Antarctic discourses. The Antarctic Treaty System is imbued with the romantic environmentalism of wilderness, even if this narrative oversimplifies the legal reality. Elizabeth Leane has explained in her work on representations of the South Pole that the notion of Antarctica as a pristine wilderness, indeed the "last wilderness," "last refuge" and "last hope," has been central to depictions of the continent since the rise of global environmental consciousness in the 1980s.[48]

Rather than the Antarctic Treaty System becoming fragmented, it could thereby become the voice of Antarctic protection

44 Silvano A (2025) Completely unexpected: Antarctic sea ice may be in terminal decline due to rising Southern Ocean salinity. *The Conversation*, 30 June 2025. Available at: https://theconversation.com/completely-unexpected-antarctic-sea-ice-may-be-in-terminal-decline-due-to-rising-southern-ocean-salinity-259743 (Accessed 15 July 2025).

45 Chown SL (2017) Antarctic environmental challenges in a global context. In: Dodds K, Hemmings AD and Roberts P (eds) *Handbook on the Politics of Antarctica*. Cheltenham, UK: Edward Elgar, pp. 523–539.

46 Barraclough A (2024) *Russia and China block every proposal at Antarctic marine life conservation conference in Hobart*. ABC News. Available at: https://www.abc.net.au/news/2024-10-28/russia-china-block-proposals-antarctic-marine-life-conservation/104523490 (Accessed 15 July 2025).

47 Press T and Goldsworthy L (2025) As Donald Trump cuts funding to Antarctica, will the US be forced off the icy continent?. *The Conversation*, 11 May 2025. Available at: https://theconversation.com/as-donald-trump-cuts-funding-to-antarctica-will-the-us-be-forced-off-the-icy-continent-254786 (Accessed 15 July 2025).

48 Leane E (2016) *South Pole: Nature and Culture*. London: Reaktion Books.

to a global audience. The Antarctic Treaty parties could, through a Resolution or series of Resolutions, make a contribution to governing the cryosphere by affirming the importance of retaining Antarctica's ice shelves and sheets, and by noting the CO_2 concentrations and temperature tipping points at which they will begin an irreversible collapse.[49] In practical terms, this could occur through dialogue with the annual climate conferences. Just such a proposal was made by Australia in 2012 at the 35th Antarctic Treaty Consultative Meeting, with the possibility mooted that the Antarctic Treaty Secretariat could become an observer organisation to UNFCCC.[50] However, the suggestion was not adopted at the meeting and has not been progressed since. Accordingly, the Antarctic Treaty System remains largely disconnected from the global climate regime. This is in sharp contrast to the Arctic Council, which has been heavily engaged in global climate diplomacy.[51] The effect of this is that there remains a substantial governance gap when it comes to the preservation of Antarctica's ice — it is not a central concern of either the Antarctic Treaty System or the UNFCCC.

While it is too early to ascertain which of the two suggested scenarios (or another scenario) the Antarctic Treaty System is heading towards there are some hopeful signs. At the 2023 Antarctic Treaty Consultative Meeting, the Antarctic Treaty parties adopted the Helsinki Declaration on Climate Change and the Antarctic[52] which, for the first time in decades, foregrounded the importance of the Antarctic for the Earth system and its cryosphere. The Declaration opened by "[r]eaffirming [the] firm commitment [of the parties] to combat the adverse impacts of climate change" and proceeded, in a lengthy preamble, to recognise the "critical role" of Antarctica and the Southern Ocean for the global climate. It went on to express "deep concern" that "further irreversible change is likely to occur without accelerated efforts to reduce greenhouse gas emissions" in line with the Paris Agreement, including the "multiple metres of sea level rise resulting from ice-sheet loss that is irreversible for centuries to millennia [and] would have devastating to catastrophic impacts, particularly on millions of people living in low elevation coastal zones." The parties also noted the "tools … at their disposal for action, such as research, monitoring management, environmental protection, advocacy and communication."

The operative paragraphs also included several interesting and note-worthy departures from the past reticence of the parties. There is a commitment to "substantially increasing … efforts to communicate the global implications of climate change in Antarctica within our own countries and in international

49 See further Stephens T (2020) Governing Antarctica in the Anthropocene. In: Leane E and McGee J (eds) *Anthropocene Antarctica*. Abingdon, UK: Routledge, pp. 17–32.

50 Commonwealth of Australia (2012) *ATCM interests in international climate change discussions — options for enhanced engagement*. Working Paper 32, ATCM XXXV, CEP XV, Hobart.

51 Although the Council's work has been severely impeded following Russia's invasion of Ukraine: Andreeva S and Rottem SV (2024) How and why the Arctic Council survived until now — an analysis of the transition in chairship between Russia and Norway. *The Polar Journal* 14(1): 229–246.

52 Antarctic Treaty Consultative Meeting (2023) *Resolution 2 (2023): Helsinki Declaration on Climate Change and the Antarctic*. ATCM XLV. Available at: https://documents.ats.aq/ATCM45/ad/atcm45_ad006_e.pdf (Accessed 15 July 2025).

forums, and the need to prevent the irreversible changes to Antarctica and consequential implications for the planet." Notably, the Helsinki Declaration specifically emphasised the climate significance of mining ban under Article 7 of the Environmental Protocol, by noting that this includes a prohibition on the extraction of fossil fuels. These more novel elements sit alongside familiar regime responses, including encouraging all states and operators in Antarctica to reduce their carbon footprint, and inviting the Scientific Committee on Antarctic Research to continue providing annual climate reports to the parties. Climate change was also a prominent issue on multiple agenda items at the 2024 and 2025 Antarctic Treaty Consultative Meetings, with the parties "highlight[ing] the need to continue collectively making progression on advancing the goals set in the [Helsinki Declaration]."[53]

Conclusion

Antarctica's ice is governed in formal terms by two regimes: the Antarctic Treaty System and the global climate regime under the UNFCCC and Paris Agreement. However, both have to date shown a marked reluctance to confront directly the challenge of maintaining the stability of Antarctica's ice cover and mass. The current preoccupations of the Antarctic Treaty System are with localised environmental impacts, such as stationing, expeditions, research, fishing, and tourism. It is almost as if the hyper-environmental focus of Antarctic regional governance is a coping strategy, a fixation being pursued to compensate for the regional and global failure to address the larger and more serious threat.

There is therefore currently no straightforward answer to the question as to who governs Antarctica's ice. While the Antarctic Treaty System has brought attention to the issue since 1989, this has not progressed beyond the identification of the scale of the problem via increasingly sophisticated climate science research, made possible by this unique legal regime that has prioritised science in Antarctic diplomacy. Antarctica has become one of the most important sites of climate research globally, yet the Antarctic Treaty System itself has not been a central forum for governance of the cryosphere. The 2023 Helsinki Declaration signalled that a more proactive approach is required; however, in order for this to occur, there will need to be concerted effort by like-minded parties to elevate Antarctica's "big thaw" on the international agenda, in a manner akin to the Antarctic minerals debate in the late 1980s and early 1990s. This is difficult to achieve in the current unstable geopolitical context,[54] one in which several parties to the Antarctic Treaty have shown uninterest or even hostility towards mainstreaming climate concerns in Antarctic governance.

53 Antarctic Treaty Consultative Meeting (2024) *Final Report of the Forty-Sixth Antarctic Treaty Consultative Meeting*, p. 68. ATCM XLVI. Available at: https://documents.ats.aq/ATCM46/fr/ATCM46_fro01_e.pdf (Accessed 15 July 2025).

54 See generally McGee J, Edmiston D and Haward M (2022) *The Future of Antarctica: Scenarios from Classical Geopolitics*. Singapore: Springer.