

Inquiry into the importance of Antarctica to Australia's national interests

We welcome the opportunity to comment on the importance of Antarctica to Australia's national interests. We are making this submission as a collection of Chief Investigators of the ARC Australian Centre for Excellence in Antarctic Science. This submission aims to add detail from our personal experiences of decades of Antarctic research here in Australia.

Antarctica is far more important to the daily lives of Australians than is often imagined. It is remote and often forgotten but it matters every day to each of us. Our economies and way of life have been built on Antarctica being the way it has been. Australia's current rainfall patterns, air temperatures and sea levels are heavily governed by the status quo of Antarctica. Antarctic ocean circulation sustains the distribution of nutrients in the ocean, contributing to sustaining marine life as we know it. The Southern Ocean absorbs enormous amounts of carbon dioxide and heat, reducing further climate warming. It is alarming, therefore, when surprises emerge – such as a 40 degree warmer-than-average heatwave that hit in 2022, or record-shattering low sea ice that happened in 2023. And it is more alarming again when the expert scientists globally do not understand these changes and are themselves taken aback by them.

The complexity of Antarctica makes scientific progress challenging. The atmosphere, ocean, land, sea ice, and ecosystems all interact in very complex ways. For example, understanding if future carbon dioxide absorption will grow or shrink will depend on the future extent of sea ice, uncertain ocean processes, changing atmospheric winds, and growth and death of microbial algae which in turn depends on the amount of dust that blows off the continents. Future sea levels will depend on ocean and atmospheric warming and melting of ice, but also processes hundreds of kilometres within the solid Earth, and the degree to which ice breaks and creates icebergs. Understanding this complexity is severely challenged by the remoteness of Antarctica and the relatively short time humans have had to understand it. There is much to learn and understand if we are to shift from being surprised to suitably forewarning policymakers.

Accelerating our knowledge will require large, multidisciplinary programs which integrate expertise from the universities and Government. Three major Australian university-based programs currently lead (inter)national development of new knowledge through a combination of observations, process understanding, and predictive capabilities that inform Government decision- and policy-making. The ARC Special Research Initiative for Excellence in Antarctic Science (SRIEAS) funds the Australian Centre for Excellence in Antarctic Science (ACEAS), led by University of Tasmania, and Securing Antarctica's Environmental Future (SAEF), led by Monash University. The Department of Climate Change, Energy, Environment and Water (DCCEEW) sponsors the Australian Antarctic Program Partnership (AAPP) through the Antarctic Science Collaboration Initiative, led by University of Tasmania. Further details for the three programs are provided in Table 1. Combined, these programs represent approximately 300 of Australia's leading Antarctic and Southern Ocean researchers and publish ~50% of Australia's research output on Antarctica and the Southern Ocean.

Australia asserts sovereignty over 42% of the Antarctic continent and is an original signatory to the Antarctic Treaty. Maintaining sovereignty over the Australian Antarctic Territory (AAT) and related maritime claims and ensuring Antarctica continues to be effectively managed under the Antarctic Treaty System (ATS) is therefore of critical strategic importance for Australia. The Antarctic Treaty sets the continent aside as a region to be used for peaceful purposes, establishing scientific investigation as a central purpose of activity. The Environmental Protocol to the Treaty reprises this language, designating "Antarctica as a natural reserve, devoted to peace and science." The Treaty emphasizes the importance of scientific research and cooperation. As such, scientific assets, capability, and outputs provide the basis for influence and leadership in the ATS. Australia's leadership in Antarctica is, in large part, due to its long history of undertaking impactful research in Antarctica and the Southern Ocean, including contributing evidence-informed scientific advice to the ATS.

The 2016 Australian Antarctic Strategy and 20-year Action Plan 2022 update¹ clearly states that Australia's national interests in Antarctica will be advanced through: (i) leadership and influence in Antarctica; (ii) leadership and excellence in Antarctic science; (iii) leadership in Antarctic environmental stewardship; and (iv) development of economic, educational and collaborative opportunities.

Antarctic science is critically important for understanding the changing climate and Antarctic environment, and this has global implications. Improved scientific understanding of Antarctica is crucial for preparing robust future-climate scenarios and making informed decisions to mitigate the impacts of climate change. For example, research on the Antarctic Ice Sheet informs Australia's preparations for future sea-level rise; data collected from Australian Antarctic ice cores yields insights into Australian droughts that inform improved water management and scientific observations of Antarctica's unique ecosystems support the design of Marine Protected Areas, such as the proposed East Antarctic Marine Protected Area.

Change in Antarctica is a substantial economic threat to Australia (and the world). The Antarctic status quo provides ecosystems services to the planet, most notably through regulating climate, sea-level and weather. The economic value of Antarctica and the Southern Ocean's ecosystem services was recently assessed, with fisheries, tourism and interrelated regulating and maintenance services conservatively valued at US\$180 billion annually. Changes in Antarctic sea ice are projected to result in changes to Australian rainfall and temperature. Changes in Antarctic sea ice also have downstream impacts on global ocean circulation and hence the global distribution of heat and nutrients. Australia has \$230 billion of physical assets within reach of 1m sea level rise, while a recent study of the economic (both physical and societal) impacts of sea level rise for Victoria gives an annual loss of \$9.44 billion in 2040 rising to \$23.66 billion per annum by 2100. Antarctic ice-sheet melt will be a major contributor to future sea level rise. Large-scale programmatic research can help resolve the scale of economic, ecosystem, and societal threats to Australia from Antarctica.

We welcome the drafting of an Australian Antarctic Science Decadal Plan. The draft plan submitted to the Australian Antarctic Science Council in Dec 2023 was constructed through a prioritisation process involving extensive consultation with a large group of Australia's scientists and policymakers. To deliver on Australia's national interests in Antarctica (as per above), it is essential that Australia adopts this ambitious Decadal Plan for Antarctic and Southern Ocean science. Strong alignment already exists between the science outcomes identified in the Decadal Plan and research being undertaken through the large programs, and researchers are ready to pivot as new challenges emerge.

However, the University sector's ability to deliver large-scale ambitious science is currently impaired by disjointed research funding and inadequate logistics support. Currently, funding of research is disconnected from the provision of fieldwork. Annual budget cycles in the Australian Antarctic Division impair the multi-year planning required to effectively undertake Antarctic fieldwork, and match commitments by international partners. For example, collaborative fieldwork in some of the most critical regions of Australia's Antarctic Territory is currently being planned by various nations for the end of this decade, while a final decision will be made only in May this year if Australia will commit to a long-planned marine science voyage onboard Australia's icebreaker *RSV Nuyina* in February next year. This voyage is to the Denman Glacier, a barely studied region adjacent to the AAT which, on its own, holds the potential for 1.5m global sea-level rise. In recent years Germany and Japan have been undertaking substantial scientific voyages along the AAT coastline, with further work planned by the Republic of Korea in coming years. The Australian Antarctic Program needs a longer-term planning model, with associated governance, that integrates science and logistics to facilitate Australian-led research and enables Australia to lead and participate in ambitious international science programs including [Antarctic InSync](#), [International Polar Year](#), [IPCC](#), [UN Ocean Decade](#).

A new Antarctic funding and governance model is urgently required. Considering the complex and challenging operational environment to deliver Antarctic science, the terminating status of the various

¹ <https://www.antarctica.gov.au/about-us/antarctic-strategy-and-action-plan/>

collaborative Antarctic science programs (ACEAS, SAEF and AAPP) and the need to deliver science priorities set out in the Australian Antarctic Science Decadal Plan, the Australian Antarctic Science Council undertook a review in 2023 to identify an enduring and simplified research funding model. The review recommended that the uncertainty and discontinuity of terminating funding measures should be permanently ended, with the current annual funding levels set as a baseline. We fully support this recommendation.

Antarctic funding and logistics need integration and flexibility to cope with the unrelenting challenges of working in the Antarctic. Antarctic research, and notably Antarctic fieldwork, is incredibly challenging and prone to delays due to weather and unanticipated operational issues. The Australian Antarctic research environment is, in large part, supported by short-term terminating funding measures that do not provide contingency for delayed or cancelled delivery of field programs. In the past 3 years operational issues have majorly impacted Antarctic fieldwork, including the delayed arrival of *RSV Nuyina* resulting in the cancellation of the long-planned Marginal Ice Zone voyage and accumulation of snow berms delaying the 2023 aviation program. Antarctic science requires a flexible, adaptive system, able to plan and budget for such delays, roll science logistics support between years, and provide long-term funding that encourages researchers to tackle the most ambitious scientific questions rather than just the safe ones.

Australia also needs to efficiently and effectively use its marine logistics assets. Currently, Australia has just one ice breaker, the \$528M *RSV Nuyina* delivered in 2021. The last marine science voyage undertaken by the Australian Antarctic Program was on *RSV Aurora Australis* in 2017, a 7-year break in Antarctic marine science at a time when Antarctic change is accelerating (e.g. the record low sea-ice levels experienced throughout 2023-24). The current level of Antarctic ship time dedicated to marine science is clearly insufficient to support an Australian research program that delivers on the national interest. The first substantive marine science expedition on *RSV Nuyina* is planned to occur in early 2025 to the Denman Glacier. The commitment of “up to 60 days marine science per annum” includes transit time to and from some of the most remote science locations on Earth. To effectively exploit Australia’s investment in *RSV Nuyina* for science, a second cargo ship should be acquired to resupply Antarctic stations. The value of a second ship has also been identified in the Government’s Gateway Review Report². Further, improved coordination to make optimal use of *RSV Nuyina* (managed by AAD) in conjunction with *RV Investigator* (managed by CSIRO Marine National Facility) would best support marine science in the Southern Ocean and up to the ice edge.

A revised governance model is also needed to deliver the future of Australia’s Antarctic science and secure Australia’s strong support to the ATS. This need was first highlighted by the 2017 Clark review³, and accepted by the government at the time. The 2021 O’Kane review⁴ into the AAD science branch echoed these earlier recommendations. The 2023 AASC report to DCCEE⁵ recommended that a new Commonwealth entity be initiated for Antarctic science, the “Australian National Antarctic Research Institute”. This would ensure consistent leadership in science, diplomacy, policy and logistics, and draw together strategic focus, governance, funding and research in a coherent way. This recommendation has the full support of the academic science community.

The rapid change currently underway in the Antarctic and Southern Ocean region means we must act now. We are running out of time to address these challenges, and failing to do so creates significant and ongoing risk to our nation. Ensuring an appropriate funding allocation and governance model for Antarctic and Southern Ocean research, that provides certainty and continuity for University-led large scale multidisciplinary research programs, will enable the types of national and international partnerships required to implement the Decadal Plan and for Australia to achieve its stated national interests in Antarctica.

² https://www.aph.gov.au/Parliamentary_Business/Tabled_Documents/5515

³ <https://www.dcceew.gov.au/science-research/antarctic-review>

⁴ <https://www.antarctica.gov.au/science/information-for-scientists/changes-to-the-australian-antarctic-science-program/okane-review/>

⁵ <https://www.aph.gov.au/DocumentStore.ashx?id=e717b68c-a59c-4197-a8ed-0f4b37aa33e8> page 19-

Recommendations:

1. Resolve the currently disjointed funding and governance models and create an operational environment for Australian Antarctic science that provides certainty for long term planning and research delivery, best achieved through establishment of an Australian National Antarctic Research Institute, as proposed by the Australian Antarctic Science Council.
2. Pursue a second (cargo type) ship for resupply of Antarctic stations and release *RSV Nuyina* for marine science.
3. Adopt an ambitious rolling Australian Antarctic Science Decadal Plan, with aligned logistics and other resources.

We would be happy to answer any questions or provide further details as may be required.

Yours Sincerely,

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Table 1. Details of the three large university-based programs

Department	DCCEEW (Australian Antarctic Program Partnership)	Education (ARC SRIEAS)	Education (ARC SRIEAS)
Term	10 years, 2019-29	4 years, 2021-25	7 years, 2021-28
Mechanism	Antarctic Science Collaboration Initiative	Australian Centre for Excellence in Antarctic Science	Securing Antarctica's Environmental Future
Delivery Lead	University of Tasmania	University of Tasmania	Monash University