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## **Australian Academy of Science submission to the inquiry into the importance of Antarctica to Australia's national interests**

Australia's leadership and capacity in Antarctica demands a comprehensive scientific agenda capable of addressing both national and global research priorities in the Antarctic and Southern Ocean to advance Australia's national interests.

The Academy regards Antarctic science as essential for the following reasons:

- The role of Antarctica and the Southern Ocean in the global climate system and their significance to Australia and the Asia-Pacific region through rising sea levels and shifting weather patterns in a changing climate.
- The value of the unique biodiversity in Antarctica and the Southern Ocean and the interconnectedness with Australia's natural ecosystem.
- Australia's long and enduring commitment and central role in the Antarctic Treaty System - enabling Australian leadership, diplomacy and fulfilment of our international obligations.
- The importance of the Australian Antarctic Program's research in promoting Australia's scientific, environmental, economic, social, and strategic interests in Antarctica, and contributing to policy outcomes in Australia and globally, which depends on sustained and secure support.

### [Antarctica's significant and ongoing relevance](#)

Antarctica is a continent reserved for scientific investigation and peace. Its unique biodiversity and influence on the broader climate system are significant for Australia and the world.

Antarctica and the Southern Ocean play a notable role in the global climate system. Antarctica affects the global climate system through various means, including its extensive ice sheets and sea ice, which reflect solar energy and limit heat absorption, thus limiting climate warming. Additionally, the circulation of the Southern Ocean modulates global climate by affecting the exchange of heat and carbon dioxide between the ocean and the atmosphere.

Scientific advances in understanding and modelling Antarctic climate systems aid Australia's preparedness to address national and global climate challenges, particularly regarding sea level rise and changing weather patterns impacting the Asia-Pacific region. This not only impacts Australia's climate, including extreme climate events, but also the ongoing shift to weather-dependent energy sources such as solar and wind power.

Antarctic and Southern Ocean biodiversity contains commercially significant species, such as toothfish, but also species that form the basis of one of Earth's most spectacular ecosystems, involving plankton, krill, whales, penguins, seals, albatrosses, and diverse communities of species on the seafloor. The Southern Ocean ecosystem delivers services to nature and society, including climate regulation and health.

### [The importance of Antarctic science to Australia](#)

For Australia to meet its national interests and maintain a strong sovereign presence in Antarctica, we must have a robust scientific program equipped to respond to national and global priorities for Antarctic and Southern Ocean research.

Australia is a leader in Antarctic science and has frequently contributed evidence-informed advice to the international Antarctic Treaty System. As an original signatory to the Antarctic Treaty, our leadership in these agreements is determined by our Antarctic science capability. Upholding the Antarctic Treaty System is important for regional geopolitics and safeguarding Australia's national claims to Antarctic territory.

Beyond the Antarctic Treaty System, Australia's Antarctic science is necessary for the policy-relevant climate and environmental assessments of the Intergovernmental Panel on Climate Change (IPCC) and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES). Australia's leadership is also evident in international Antarctic conservation frameworks, such as the Convention for the Conservation of Antarctic Marine Living Resources (CCAMLR).

Further, Antarctic and Australian ecosystems are highly interconnected. As one of the nearest landmasses to Antarctica, Australia is directly influenced by Antarctic ecosystems and Southern Ocean weather patterns. Understanding Antarctic biodiversity is crucial for comprehending the ecological connections between Antarctica and Australia's shared marine environments, impacting species such as the humpback whale, which migrate between Australian and Antarctic waters. Australia has agreed to value, understand and protect the region's biodiversity as part of its national interests, especially under the agreements of the Antarctic Treaty System.

### Australia's capacity for Antarctic science

Australia's Antarctic science capability spans across the university sector and governmental organisations, highlighting the importance of both sectors in Australia's Antarctic science achievements and international standing.

Over the past decade, Australian researchers have led or contributed to more than 1 in 8 global publications on Antarctic and Southern Ocean science. Of these, 77% have an Australian university affiliation and 39% have an Australian government affiliation<sup>1</sup>. The Australian Antarctic Program spans the Australian Antarctic Division (AAD), over 13 Australian universities funded through major Antarctic science initiatives, and other government organisations including CSIRO, the Bureau of Meteorology, and Geoscience Australia. Australian universities are also pivotal in training students and early-career researchers to sustain Australia's Antarctic science workforce.

The AAD manages logistical support for field-based Antarctic science, including stations, flights, the icebreaker *Nuyina*, and the professional workforce required to support science activities. Other national research infrastructure that underpins Australia's Antarctic science capabilities includes the Australian Community Climate and Earth System Simulator, National Computational Infrastructure, Integrated Marine Observing System, Marine National Facility, and AuScope.

The highest scientific priorities in Antarctica and the Southern Ocean frequently require intensive, multi-year, interdisciplinary campaigns in remote areas away from established stations. The successes of the 2023/24 Denman Terrestrial Campaign exemplify Australia's Antarctic science capacity, addressing critical issues such as the impact of climate change on the Denman Glacier, which could lead to a 1.5 m sea level rise and threaten Australia and our regional neighbours. These scientific endeavours support Australia's national environmental and economic interests and offer the evidence base to guide policy decisions domestically and globally.

### Risks to Australia's Antarctic science capabilities

Due to the large and remote areas covered by Australia's Antarctic Territory, research in Antarctica requires not only significant and sustained funding but also long-term financial planning. This certainty in funding is also required for Australia to capitalise on major international initiatives in Antarctic and Southern Ocean science, which typically have decade-scale planning horizons.

#### *Terminating funding programs*

A major risk to Australia's Antarctic Program is the termination of funding measures that currently support Australia's university-led Antarctic science and training. This includes funds that will terminate in 2025 for the Australian Centre of Excellence in Antarctic Science, in 2028 for Securing Antarctica's Environmental Future, and in 2029 for the Australian Antarctic Program Partnership. The lack of long-term certainty in dedicated science and logistics budgets for the AAD also impairs the ability to deliver high-priority Antarctic science and

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<sup>1</sup> Scopus publications search using "Antarctic" or "Southern Ocean" in topic, and "Australia" in affiliation.

provide the planning horizons needed to support the Australian Antarctic Program. The Academy supports the three recommendations put to Minister Plibersek by the Australian Antarctic Science Council for a more secure Australian Antarctic science funding model<sup>2</sup>.

#### *Access to marine infrastructure*

Australia's Antarctic science interests are limited by the capacity to carry out marine science campaigns. The last marine science voyage supported by the AAD was in 2017. A significant campaign scheduled for 2022/23 to study the marginal sea ice zone was cancelled due to delays in the commissioning of the icebreaker *Nuyina* despite receiving government Australian Research Council funding. Another major campaign, the Denman Marine Voyage, planned for the 2024/25 summer season, awaits confirmation from the AAD.

Budget uncertainties pose risks to government investments, scientific priorities, and career prospects for early career researchers. Although *Nuyina* was expected to allocate 60 days annually for marine science voyages, its competing priorities, notably station resupply, strain Australia's capacity to conduct extensive marine research, particularly in remote and climate-sensitive areas of Australia's Antarctic Territory.

Inconsistency and short-term funding models erode Australia's leadership of Antarctic science. To safeguard its national interests and assert a robust presence in Antarctica, Australia needs a comprehensive scientific agenda capable of addressing both national and global research priorities in the Antarctic and Southern Ocean. Such measures are essential for upholding the integrity of the Antarctic Treaty System and ensuring regional and national security.

This submission has been prepared with the assistance of the National Committee for Antarctic Research. The Academy is grateful for its contributions. To discuss or clarify any aspect of this submission, please contact Mr Chris Anderson, Director Science Policy at [Chris.Anderson@science.org.au](mailto:Chris.Anderson@science.org.au).

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<sup>2</sup> Publicly available through Questions on Notice #2 (DCCEEW, 6/11/2023) to Senate Inquiry into funding of the Australian Antarctic Division. [Additional Documents – Parliament of Australia \(aph.gov.au\)](https://aph.gov.au/Additional-Documents-Parliament-of-Australia)