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Australian Academy of Science

Position statement: Australia's scientific leadership in Antarctica and the Southern Ocean

Summary of position

Australia's scientific leadership in Antarctica and the Southern Ocean has never been more critical than in this era of rapid progression towards abrupt Earth system changes and increased geopolitical tension in the Antarctic Treaty System. Australia should urgently adopt an ambitious, strategically prioritised and explicit Antarctic and Southern Ocean research agenda supported by a consolidated whole-of-government commitment.

Australia's interests in Antarctica are best served by a long-term, sustainable funding model to maintain Australian scientific research and leadership in the Antarctic governance system. An uplift in scientific investment is required, along with improved coordination of funding and logistics, to maintain Australian leadership in the Antarctic governance system.

Statement of principle

Australia is a global leader in Antarctic and Southern Ocean science, delivering essential knowledge of the future of our environment and climate that will shape Australia's economy and society, and that of our region and the world.

Science plays a pivotal role in advancing Australia's national interests in Antarctica and the Southern Ocean, supporting the nation's claim on the Australian Antarctic Territory and broader strategic interests.

Australia conducts scientific research which aligns with national priorities in protecting the Antarctic environment, contributing to developments in the region, as well as fostering economic opportunities. In accomplishing these, Australia strengthens its position in international scientific cooperation and diplomatic leadership within the Antarctic Treaty System, ensuring both national and regional stability.

Much of the success of international agreements within the Antarctic Treaty System has been the result of understanding derived from the collaborative scientific endeavour that delivers a shared understanding of, and solutions for, regional environmental and governance challenges.

Statement of context

Antarctic and Southern Ocean science is critical because this region has a profound effect on the Earth's climate and oceanic systems. Antarctica has a key role as a global driver of biodiversity, and the region is important to Australia's climate and geopolitical security.

Australian Antarctic science provides seminal knowledge on abrupt changes, tipping points and environmental futures that impact Australian society and our global context. Antarctica and the Southern Ocean significantly influence climate extremes – heat, fire, drought, flooding and coastal inundation – at home and abroad.

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Managing Australia's domestic and international exposure to climate risks is heavily dependent on projections of the scale, extent and timing of environmental changes in Antarctica. Australia's Antarctic science helps shape national and international policy and supports domestic climate-sensitive sectors, including agriculture, energy, water resources, fisheries, human health and the built environment.

Antarctica's melting ice sheets are raising sea levels, and they will increasingly do so – determining the future of coastal societies globally. Nowhere is sea level change more geopolitically critical than in the Indo-Pacific.

Notable changes marked in the Southern Ocean in recent years suggest our world may have already entered a new age of permanently low sea ice cover and dramatically reduced deep ocean overturning circulation. These changes will have profound effects on the global climate system and Southern Ocean ecosystems.

Despite its strategic and scientific importance, Australia's Antarctic science capabilities are beset by uncertain, interrupted, 'just-in-time' funding. Multiple reviews suggesting governance and funding reforms to address this have not been implemented.

The Academy's position

The Australian Academy of Science maintains that an aligned and integrated community of multidisciplinary researchers across universities and government is critical to accelerate knowledge of Antarctica in the face of the emerging climate crisis.

Australia's interests in Antarctica are best served by a long-term, sustainable funding model to maintain Australian scientific research and leadership in the Antarctic governance system.

An uplift in scientific investment is required, along with improved coordination of funding and logistics, to maintain Australian leadership in the Antarctic governance system, which includes the Antarctic Treaty Consultative Meetings, Committee for Environmental Protection, Commission for the Conservation of Antarctic Marine Living Resources, and the Scientific Committee on Antarctic Research.

The Australian Academy of Science further maintains that Antarctic research in Australia's national interests must be directed at five critical issues, identified through extensive strategic consultation of the Australian science community:

1. *Climate change*. Improved projections of Antarctic and Southern Ocean changes, and their influence on Australia in a global, Earth system context.
2. *Ice sheets and sea level vulnerability.* Enhanced capability to project the behaviour of the Antarctic ice sheet and its contribution to sea level rise, especially in our region and the broader Indo-Pacific.
3. *Environmental protection*. Comprehensive understanding of the current and future dynamics of Antarctic environments, including biodiversity, to support Australian leadership of their protection through the Antarctic Treaty System.
4. *Digital, data-driven innovation.* An interdisciplinary digital platform and analytical capabilities to strengthen Australian science and geopolitical leadership.

5. *Monitoring capability.* An enduring Antarctic monitoring program that enables Australia to track ecosystems and environmental changes in our area of responsibility and to demonstrate that through our scientific activities, Antarctica is valued, protected and understood.

Transformational progress in projecting Antarctica's response to a changing climate will require collaborative, cross-disciplinary scientific approaches built on integrated Earth system thinking and supported with high-performance computing infrastructure. Sustainable, multidisciplinary large-scale research campaigns and improved field access will be essential to progressing knowledge of critical regions in East Antarctica.

The humanities provide cultural, historical and ethical perspectives that deepen our understanding and appreciation of Antarctica's role in the Earth system. Integration of science and humanities will promote a more comprehensive and engaging narrative that motivates Antarctic and Southern Ocean stewardship.

The Australian Antarctic Program should strengthen approaches to foster equity, inclusion and a positive culture and promote diverse workforce development. Building Antarctic research capability requires an operational model that better supports the development and sustained capability of the Antarctic scientific workforce, particularly early-career researchers. This requires an uplift in Antarctic-focused education and research training within Australian universities in collaboration with government and its agencies.

International collaboration underpins Antarctic science. The Australian Antarctic Program should continue to foster existing scientific cooperation with international partners and extend collaboration to a broader array of nations. The Australian Academy of Science, as host of the International Science Council Regional Focal Point for Asia and the Pacific, is well positioned to support new and existing research partnerships.

Research to address the critical scientific and geopolitical issues outlined above will have a whole-of-government impact – beyond the traditional partnerships with the Department of Climate Change, Energy, the Environment and Water. The Australian Academy of Science therefore asserts that delivery of Australia's Antarctic science agenda is dependent on a whole-of-government approach and commitment.

Statement of authorisation

This position paper was subject to expert review by the Australian Academy of Science and authorised by the Academy Council at its meeting of 25 June 2025.

Relevant recent submissions

- Australian Antarctic Science Decadal Strategy 2025-2035
- Australian Academy of Science submission to the inquiry into the importance of Antarctica to Australia's national interests
- A decadal plan for Australian Earth system science 2024–2033