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Submission to the Senate Inquiry into the funding of the Australian Antarctic Division

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I wish to make a submission to the senate inquiry into the funding of the Australian Antarctic Division. I am a senior lecturer at the Institute for Marine and Antarctic Studies (IMAS) at the University of Tasmania, as well as the associate head learning and teaching at IMAS. In my associate head role, I lead the delivery and strategic planning of our learning and teaching portfolio, as well as being part of IMAS senior management. As a researcher my expertise is in the impacts the climate change on Southern Ocean marine ecosystems.

I teach undergraduate students about the Southern Ocean and guide research higher degree (PhD) students as they develop skills to become successful independent researchers capable of contributing to solving the significant challenges we face in understanding the Southern Ocean, the marine ecosystem it contains and the threats it faces due to anthropogenic climate change.

I am the co-chair of an international research program: the Integrating Climate and Ecosystem Dynamics in the Southern Ocean (ICED) program; a member of the executive leadership team of the Southern Ocean Decade Collaborative Centre, which coordinates Southern Ocean and Antarctic engagement in the UN Decade of Ocean Sciences for Sustainable Development (the only Australian in this team); and the chair of the Southern Ocean regional team for the Predicted Ocean Decade Collborative Centre, which is focused on improving ocean prediction throughout the UN Decade of Ocean Sciences.

I wish to comment with respect to the impacts of recent cuts to the science program at the Australian Antarctic Division on the division itself in relation to:

- Australia's international commitments and obligations, to Australia's geopolitical and strategic interests
- the delivery of the Australian Antarctic strategic science plan, the 20 year action plan and Australia's Antarctic strategy
- the impact on Australia's capacity to produce the next generation of Antarctic and Southern Ocean scientists and
- the general catastrophic nature of these cuts in the face of the current extreme changes in the Antarctic environment, and inability to monitor those changes due to decreased presence in the Southern Ocean and on Antarctica.

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The impacts of anthropogenic climate change have been clearly felt this year, for example catastrophic bushfires in Greece, Canada, the US state of Hawaii and China and unparalleled heatwaves across large parts of Europe and North America. However, while less visible, the impacts of global climate change are being felt even more severely in the polar regions. For example, in March 2022, parts of the Antarctica continent recorded a heatwave that saw temperatures more than 40 degrees above the long term average for that time of year (https://climateextremes.org.au/simultaneous-antarctic-and-arctic-heatwaves/). In 2023 we have seen the smallest extent of winter sea ice ever recorded in the Antarctic (https://earthobservatory.nasa.gov/images/151692/exceptionally-low-antarctic-sea-ice), with an area roughly the size of Western Australia missing from what we would usually expect. The impacts of these extreme events are significant, both to the global climate cycle and the Antarctic ecosystem that is valued by so many people (https://www.theguardian.com/world/2023/aug/25/emperor-penguins-thousands-of-chicks-in-antarctica-likely-died-due-to-record-low-sea-ice-levels).

In order to understand the changes that are occurring in the Antarctic right now, we need to know what is happening. In short, we need to be observing the system in greater detail than ever before. The Antarctic and Southern Ocean is a chronically under-observed region, and Australia's recent step back has worsened an already poor situation. The closing statement from the recent International symposium for the *Southern Ocean Observing System*, hosted in Hobart in late August clearly highlights the need for increased investment in science and observing programs. In part, the statement said:

The chronic lack of observations for the Southern Ocean challenges our ability to detect and assess the consequences of change. As such, it is more pressing than ever to have a sustained and coordinated Southern Ocean observing system to provide an understanding of current conditions, inform predictions of future states, and support policies and regulations for the benefit of society.

The full statement can be seen here (https://soossymposium2023.au/). This statement is in line with another recent communique, this time from a group of more than 150 scientists who attended a conference hosted by the Scientific Committee for Antarctic Research. This communique (https://www.theguardian.com/world/commentisfree/2023/aug/04/antarctica-heatwaves-sea-ice-levels-melting) highlighted the narrow window we have to avert catastrophic effects of climate change on the ecosystem an animals that live on and around Antarctica. Part of the communique read:

Antarctica is a crucial component of the Earth system and a sentinel for growing change. As Antarctic scientists, we see the evidence of mounting

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change, including changes in food webs, rapid change in populations, breeding failure and local ecosystem collapse, with projections of rapid transformation of a region that makes our planet liveable and contributes in extraordinary ways to global biodiversity.

The recent budget decisions by the Australian Antarctic Division have lessened the ability of Australia's Antarctic research community to contribute to international efforts to understand and ultimately address the rapid changes we are now seeing in the region. To do this at a time when calls are being made internationally to increase our commitment to understanding and observing the system diminishes our international reputation for excellence in science. It is the equivalent of removing the canary from the coal mine as it starts to choke due to a lack of breathable air.

A stark example of how financial decisions from the Division have impacted our ability to observe the system when it is most needed is the cancellation of the "Marginal Ice Zone" voyage that was originally scheduled to depart Hobart in late winter 2023 (i.e. now). Voyage planning had been underway for almost 3 years and was developed based on observations over several years that the sea ice extent in the Southern Ocean was becoming more variable. The voyage was fully funded and supported by the AAD (and a host of partners). During the 3 years of planning considerable time and money had been consumed scoping the research program, sourcing equipment and employing staff to participate. In November 2022 the voyage was cancelled due to ongoing issues with the RSV *Nuyina*. This year has seen the most significant change in sea ice conditions ever observed in the Antarctic. We could and should have had a science voyage in the Southern Ocean right now studying why this unprecedented event (which was entirely unpredicted) has happened, but instead we are left to speculate with limited observations from satellites and relying on data collected by other nations (which rarely go to the regions of Australia's geopolitical interest).

Along with the loss of knowledge and international reputation due to a lack of observations in this critical time, the other significant outcome of the recent budget decisions of the Australian Antarctic Division is the deleterious impact on the careers of research students and early career researchers.

Research higher degree (HDR) students (those undertaking a PhD) have a short window of time (3.5 years) to transition from an undergraduate student who received known information imparted to them by an expert (a lecturer) to an independent researcher capable of solving problems of national or international significance. Part of that research training experience is access to unique datasets, and for many, field experience is also a critical part of the learning journey. Since 2019 when the *RSV Aurora Australis* completed its final season there have significantly reduced opportunities for HDR students to

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participate in Antarctic and Southern Ocean field work. There are now PhD graduates who began research higher degree study at IMAS with the hope (maybe even an expectation) that an opportunity for Southern Ocean field work was part of their PhD, who never set foot on an icebreaker or experienced working on the Antarctic continent. These students have graduated without that crucial aspect of their training and so cannot list fieldwork as a demonstrable skill in their job applications in Australia or internationally. This is having a real impact at IMAS as potential students are choosing to study internationally at universities that offer a better chance of fieldwork, and in at least one case at IMAS a student considering withdrawing from their research higher degree candidature due to perceived negligible chance of fieldwork.

The situation is similar for early career scientists who are generally in insecure employment contracts of 1-3 years. Many of these positions have deliverables that rely on data being collected through fieldwork. The cancellation of projects, including scientific voyages, has sometimes made collection of crucial data impossible. This then impacts the outcomes of short-term contracts and can have significant implications for future employment options for such early career researchers. A stark example of this situation is the ~18 science positions advertised by the Australian Antarctic Division in April this year. These positions had Cabinet level sign-off to be filled and were extensively advertised and a recruitment process undertaken. None of these positions have had an offer of employment made and I understand that due to changes in the AAD budget, none will be filled.

In both the cases of research higher degree students and early career researchers, the impacts of this lack of field work are greater than the immediate prospect of finding the next job. These people are our next generation of scientists and leaders in our field. A lack of opportunities now forces them to make choices on career and many have moved out of Antarctic and Southern Ocean research. Most will never return. This lost generation will potentially be felt for the next 40 years as their careers flourish in other fields.

I ask the Committee to seek answers on the strategic direction for funding of the Australian Antarctic Division, including how Australia will meet its international obligations under commitments such as those for the International Whaling Commission and the Commission for the Conservation of Antarctic Marine Living Resources, as well as contributing to science deemed internationally important by bodies such as the Scientific Committee for Antarctic Research, for understanding the global impacts of anthropogenic climate change on the earth system. I also ask the Committee to investigate the impacts of funding decisions on the future Antarctic

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Science capability of Australia due to the significantly curtailed opportunities for career development for research students and early career researchers and seek to answers on the Australian Antarctic Division's role in providing access to field work for the future leaders in the field of Antarctic science.

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