ANTARCTIC CLIMATE & ECOSYSTEMS COOPERATIVE RESEARCH CENTRE

SUBMISSION 12

Antarctic Climate & Ecosystems Cooperative Research Centre
Private Bag 80, Hobart, Tasmania 7001. Australia
P +61 3 6226 7844 F + 61 3 6226 2973 W: www.acecrc.org.au

JOINT STANDING COMMITTEE ON NATIONAL CAPITAL AND EXTERNAL TERRITORIES

INQUIRY INTO THE ADEQUACY OF FUNDING FOR AUSTRALIA'S ANTARCTIC PROGRAM

A submission from
The Antarctic Climate and Ecosystems Cooperative Research Centre.

Background

Australia's Antarctic Program

Australia's Antarctic Program was established in 1947. From an initial focus on activities on the sub-Antarctic islands, the Australian Antarctic Program has expanded to include activities on the Antarctic continent and in the Southern Ocean. The program is administered by the Australian Antarctic Division (AAD), based at Kingston, near Hobart, Tasmania.

Australia's Antarctic Program embraces activities in Antarctica and the Southern Ocean of:

- The AAD and other government agencies, including but not limited to the Commonwealth Bureau of Meteorology (BoM), GeoScience Australia (GA), and relevant divisions of the Commonwealth Scientific and Industrial Research Organisation (CSIRO);
- Non-government bodies and individuals, including staff and programs in Universities and Museums around Australia; and
- The Antarctic Climate and Ecosystem Cooperative Research Centre based at the University of Tasmania (ACE CRC).

The Australian Antarctic Program focuses on scientific and policy issues that address the following four key goals:

- To maintain the Antarctic Treaty System and enhance Australia's influence within the system;
- To protect the Antarctic environment;
- To understand the role of Antarctica in the global climate system; and
- To undertake scientific work of practical, economic and national significance.

These goals were established by the Australian Government in response to a report from the Antarctic Science Advisory Committee (ASAC) – the *Foresight Review* – released in 1997.

The Antarctic Climate and Ecosystems Cooperative Research Centre

The Antarctic Climate and Ecosystems Cooperative Research Centre (ACE CRC) is a joint venture between the core partners AAD, CSIRO Marine Research, CSIRO Atmospheric Research, the BoM and the University of Tasmania. Contributing Supporting Partners include the Australian Greenhouse Office, the Tasmanians Department of Economic Development

(TDED), the Australian National University (ANU), Silicon Graphics Inc, the National Institute of Water and Atmospheric Research (NIWA, New Zealand), and the Alfred Wegener Institute (AWI, Germany). The ACE CRC research program involves collaborations and research partnerships with individuals and institutions in 13 countries, including Belgium, China, France, Germany, Italy, Japan, New Zealand, Norway, United Kingdom and the United States of America among others.

The ACE CRC's goals are to:

- Advance Australia's aspirations for its Antarctic territory and Southern Ocean exclusive economic zones;
- Increase international engagement in Southern Ocean and Antarctic research relevant to Australia's interests;
- Deliver strategic science for climate adaptation, ecosystem management, carbon budgeting, and marine and ice operations;
- Deliver the knowledge and information needed by our diverse research users and ensure that policy and commercial opportunities are realised;
- Produce expertly-trained scientists with international experience, skills in research, its broad application, and its role in enterprise.

ACE CRC's research program thus supports each of the four goals of the AAP.

The ACE CRC goals are being addressed through five research programs focused on *Antarctic Marine Ecosystems, Climate Variability & Change, Ocean Control of Carbon Dioxide, Sea Level Rise, and Antarctic and Southern Ocean Policy*. The research programs are supplemented with education, communication and extension and commercialisation programs.

Together, these programs will:

- Provide a factual base for the sustainable management of Antarctic and Southern Ocean fisheries and ecosystems in line with Australia's obligations under the Convention on the Conservation of Antarctic Marine Living Resources;
- Provide predictions of the impacts of changes in climate and Antarctic and Southern Ocean conditions on Antarctic and Southern Ocean ecosystems;
- Provide estimates of the ability of the Southern Ocean to act as a carbon sink, including the efficacy and risks of iron fertilization to enhance CO_2 uptake, thereby increasing Australia's influence in international climate negotiations;
- Deliver systems for operational prediction of Southern Ocean currents and sea-ice conditions for use in Antarctic operations, ranging from shipping to fisheries management to tourism;
- Contribute key observations and insights on the role of the Southern Ocean and Antarctica in climate in order to produce more reliable projections of variability and change, allowing Australia to benefit from opportunities and minimise risks;
- Increase the reliability of projections of sea level rise for Australia and neighbouring nations for use in coastal zone management and other risk assessments.

ACE CRC Submission

ACE CRC programs clearly support the Australian Antarctic Program goals and are closely aligned with AAD research and policy activities. Accordingly, the ACE CRC strongly supports ongoing funding to the Australian Antarctic Program through the AAD and other relevant Commonwealth agencies to ensure that Australian goals for the Antarctic can be achieved. The ACE CRC seeks to be a major contributor in achieving those goals but will be enabled to do so only with a well supported and secure Australian Antarctic Program administered through the Australian Antarctic Division.

Premises of the Submission

This submission derives from consideration of the future funding requirements for fulfilment of Australia's goals in the Australian Antarctic Program based on the following premises:

- Australia has responsibility for more Antarctic territory (42%) than any other nation and so has major international obligations in Antarctica and the surrounding Southern Ocean;
- Australia has established a leading international role in Antarctic and Southern Ocean affairs, including policy, governance, conservation and research;
- Maintaining or enhancing Australia's international standing in Antarctic and Southern Ocean Affairs is both desirable and important for Australia and the Antarctic and Southern Ocean regions;
- The Antarctic and Southern Ocean are increasingly recognised as critical to global climate, ocean circulation and green house processes;
- Thorough understanding of the interactions between the Antarctic and Southern Ocean and these global processes is necessary for prediction of future climate change, sea level rise and green house effects;
- Such predictions are vital to Australia's capacity to anticipate the risks and threats from changing global and regional climate processes and devise strategies to ameliorate the impacts of those changes;
- Antarctica and the Southern Ocean support unique and important ecosystems that are subject to international conservation and environmental protection agreements;
- Understanding the impacts on Antarctic and Southern Ocean ecosystems of changes in global and regional oceanographic and climatic processes is central to planning for conservation and sustainable use of those ecosystems;
- Australia plays a leading role in providing such understanding and in the development of international policies for conservation and sustainable use of the Antarctic and Southern Ocean ecosystems.

Key Issues for a Future Australian Antarctic Program

Given the brief of the ACE CRC, this submission is focussed primarily on those matters that affect, directly or indirectly, Antarctic and Southern Ocean research and Australia's role in such research. There are three main areas in this context where the ACE CRC recommends enhanced funding for the Australian Antarctic Program:

1. Operational logistics – working in the Antarctic and Southern Ocean;
2. International partnerships – Strengthening Australia's leading role in Antarctic and Southern Ocean research; and
3. Research funding – supporting Australian researchers.

Operational Logistics

Activities in the Antarctic are logistically very demanding, requiring large, purpose built ships, specialised equipment and long planning times. Such logistic requirements apply to all Antarctic activities, including research, infrastructure maintenance and occupation.

Research in the Antarctic and Southern Ocean currently is supported operationally in association with the staffing and supply operations for Australia's Antarctic bases. This means that voyages to the Southern Ocean and Antarctica are usually multi-functional, involving some research, some supply and some staff-transport functions. Such multi-functionality might appear at first glance to be a good efficiency measure but, on reflection, historically this has rarely the case. For example, such a cruise will typically involve staff transiting to or from Australian bases spending lengthy periods at sea whilst research is in progress, scientists being 'passengers' for prolonged periods during supply and provisioning activities and ever-present compromises between carrying scientific equipment and researchers and supplies and staff for bases. Most research voyages are far longer than is required to conduct the planned research and many Australian and non-Australian scientists are unable to participate in these voyages because of their extreme length (often greater than 70 days). Australia's Antarctic research voyages, because of their multi-purpose nature, are amongst the longest regularly scheduled research voyages by ships from any institute in the world. For example, French research voyages are limited in duration to 30 days.

The ACE CRC submits that Australia's Antarctic interests would be better served by separating the functions of provisioning Australia's bases, supporting research and transporting people to and from Antarctica. This is not a novel suggestion, having been promoted in the Foresight Review of 1997 and supported in principle the Government response to that review, but it reflects a still present need.

Such separation of functions would be facilitated in part by the proposed air link between Australia and Antarctica. The air link would greatly aid the deployment of people, both researchers and base staff, to Antarctica, thus improving the efficiency of operating the bases. The air link would also reduce 'idle time' for personnel traversing to or from Antarctica during long multi-purpose sea voyages.

Properly instrumented, the aircraft used for flights between Australia and Antarctica also would provide an invaluable opportunity to gather important atmospheric data that is not available from

other sources. Added to the essential long-term meteorological data gathered through the Commonwealth Bureau of Meteorology and automatic weather stations in Antarctica, such information would improve significantly our understanding of high latitude atmospheric signals relevant to global changes in climate.

Research activities and supply operations would benefit from scheduling dedicated research *or* supply voyages to the Antarctic and Southern Ocean[1]. Dedicating voyages for one or other purpose would allow those voyages, the vessels required for them and the productivity from research cruises to be streamlined and facilitate considerably greater flexibility to meet Australia's identified research needs in the region. Establishing an air link to the Antarctic mainland also would create the opportunity for research vessels to service several research cruises during one trip, without having to return to Australia to change research crews or carry multiple research teams for the entire trip, with each being effectively passengers for part of it. Alternatively, where research did not require passage to the Antarctic continent, that research could be done during shorter, more cost-effective voyages than are currently possible.

Establishing an Australia – Antarctica air link, however, alone will not resolve the logistic constraints and inefficiencies for marine science in the Southern Ocean. Demand for research vessel time and facilities by both Australian researchers and our international collaborators considerably exceeds the vessel time currently available through the Australian Antarctic Program. It must be acknowledged, however, that increasing research vessel time will also increase the support overhead required at the Australian Antarctic Division to support research cruises. This overhead might be moderated to some degree by increased flexibility in scheduling research cruises if they were not also of necessity supply voyages. Thus, there is a need to increase the amount of vessel time available for research and, more importantly, the flexibility with which limited vessel time is scheduled.

Such separation of functions in a future Australian Antarctic Program will require significantly increased funding. Importantly, however, any increased funding should be provided with maximum flexibility such that the necessary logistics for research, and supply, can be managed more in concert with innovative research directions (see below) to produce the best possible outcomes for the least expense. The dividends of such funding will be enhancement of Australia's capacity to fulfil its responsibilities in Antarctica and the Southern Ocean and vastly improved capacity to respond to global and regional changes in climate and ocean processes.

International Partnerships

Australia has established a leadership role in Antarctic activities, including in relation to the Antarctic Treaty system, responsibility for Antarctic Territories, national and international policy and research. Moreover, Australia has built this leadership on active collaborations with other nations with interests in Antarctica and the Southern Ocean. Maintenance of this high standing

[1] It is recognised that there will always be a proviso on research voyages that they may have to be diverted for urgent service or emergency needs of Australia's Antarctic bases, though such situations are likely to be infrequent. For this reason, however, it is important that vessels operating in support of Australian interests in Antarctica and the Southern Ocean are managed centrally through the AAD.

and diverse network of collaborations into the future will require significant ongoing funding of the Australian Antarctic Program.

Several national and international research initiatives now in train will increase international focus on Antarctic and Southern Ocean research and likely increase significantly investments by other nations. The realisation of the International Polar Year (IPY) in 2007 will focus international attention on high latitude research and the role of the poles in global climate systems, ecosystem function and policy matters. Antarctica and its adjacent oceans will figure prominently in the IPY activities. Activities developed as a result of the IPY will have long-lasting consequences, precipitating on-going collaborative research and monitoring ventures around Antarctica and the Southern Ocean. Australia should be seen as a lead agent in those activities if it is to retain its international standing in Antarctic affairs. Doing so will require greater strategic investment in the Australian Antarctic Program and international research partnerships.

Nationally, both New Zealand and Germany, among others, are considering their investments in Antarctic and Southern Ocean research over the next decade. For example, the New Zealand government has initiated a review of its strategic directions in Antarctic and Southern Ocean science. There would be considerable merit in Australia engaging with New Zealand in forward planning Southern Ocean activities and building a stronger research partnership focused on the Antarctic regions under Australia's and New Zealand's stewardship.

Germany is considering commissioning a new polar research vessel to support its Arctic research and re-deploying the existing outstanding vessel to the Southern Ocean, signalling a significant increase in research investment in the region. A strengthened Australian Antarctic Program with significantly improved infrastructure and capacity for international collaboration, particularly in the marine sphere, has the potential to attract that investment to an Australian home-port and un-equivocally establish Australia as the primary base for Antarctic and Southern Ocean research.

It is strategically important that Australia maintains or enhances its position, in partnership with collaborating nations, at the forefront of the growing Antarctic and Southern Ocean research agenda. Secure, increased funding of the Australian Antarctic Program over the next 5-10 years will be a particularly important step in realising that aim.

Funding for Research through the Antarctic Science Research Program

Logistic support for Australian research in the Southern Ocean is highly valued. There are, however, direct costs of research that are required to enable researchers to take advantage of the opportunities provided by a strong logistics base. Current funding for these direct costs is relatively slight outside of the direct funding for the ACE CRC and AAD activities. As the costs of research increase, it is important that the amount of funding available for Antarctic and Southern Ocean research by diverse Australian institutions is also increased. Also important in this context is continued support for long term monitoring of the Southern Ocean and Antarctic atmosphere (e.g., work done by the Commonwealth Bureau of Meteorology) that underpins the interpretation of much of our research data and the interpretation of apparent changes in the Antarctic system. The compound interest on such funding includes increased collaboration with

international researchers, increased likelihood of joint funding from foreign sources and a considerably increased information base from which to realise Australia's aspirations and responsibilities in the Antarctic region.

The ACE CRC strongly supports the Antarctic scientific research program management and funding model. Guided by the Antarctic Science Advisory Committee (ASAC), the program involves rigorous processes for appraisal of proposed research through the Antarctic Research Assessment Committees (for Life Sciences and Physical Sciences) and centralised management of research by the AAD. This mechanism has the key strengths that diverse research is considered within a coherent framework targeted specifically at delivering research to meet Australia's national priorities for Antarctica. Synergies among research proposals can be identified and encouraged via feedback to researchers, unnecessary duplication in research is obviated, the ethical and environmental safeguards so important in Antarctica are ensured and research from the wider research community is fostered in a manner consistent with the major research initiatives of the AAD and its research partners (including the ACE CRC).

Simply maintaining Australia's outstanding record of research in Antarctica and the Southern Ocean will require increased investment. Given the premium on improving our understanding of climate change processes and the increasing awareness of the Southern Ocean in climate change, however, there may be considerable benefit in increasing Australian research in the region. New technologies such as sophisticated drifting or moored monitoring devices, Autonomous Underwater (and Under-Ice) Vehicles and unmanned aircraft provide the potential to rapidly gather information remotely in places and at times hitherto unfeasible. Much of that information would fill gaps in our current understanding of the specific mechanisms in the Southern Ocean that most affect and are affected by global climate change. Such innovative approaches to Antarctic and Southern Ocean research should be considered together with reconsideration of the logistic issues discussed above, essentially seeking smarter rather than only larger (i.e., more sea-time) solutions to the existing constraints on research.

The ACE CRC submits, therefore, that Australia should be seeking to increase its activities in the region and significantly increase the funds available to the Antarctic scientific research program accordingly.

ACE CRC Recommendations

- The ACE CRC recommends that investment in the Australian Antarctic Program be increased in the next and subsequent years.
- Such increased funding should be provided for administration through the established processes of the Australian Antarctic Division and other relevant Commonwealth agencies.
- Such increased funding should be in addition to existing funds provided to the AAD and other Commonwealth-funded agencies working in Antarctica and should not necessitate further compromises of their functions.
- Increased funding for logistics and infrastructure should be provided to allow:
    - Purchase and scheduling of dedicated voyages by appropriately configured vessels for supply and provisioning of Australia's bases in Antarctica;
    - Purchase and scheduling of dedicated research voyages by state of the art research vessels to maximise the benefits from Australian research in Antarctica and the Southern Ocean;
    - Commencement of fast air links between the Australian mainland and Antarctica and enhancement of air transport within Antarctica for more efficient management of Australia's Antarctic bases and research activities; and
    - Greater flexibility in the provision of logistics and technology to enhance Australia's research capacity in Antarctica and the Southern Ocean.
- Dedicated funding to support Australian participation in international collaborative research partnerships should be provided over the next 5 years, with special focus on Australia's leadership of research associated with the International Polar Year (2007) and increasing strategic partnerships with selected nations (especially New Zealand and EU countries).
- Funding for the Antarctic scientific research program should be increased to accommodate the increased costs of research and provide for growth and innovation in Australian research in Antarctic and the Southern Ocean.