



JOINT STANDING COMMITTEE ON NATIONAL CAPITAL AND EXTERNAL TERRITORIES

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

A submission from CSIRO

CSIRO has a strong involvement in Australia's Antarctic Program.

This is evident through a long history of partnership programs with the Australian Antarctic Division. CSIRO is responsible for coordinating the Oceanography component of the Australian Antarctic Program and CSIRO leads the atmospheric composition monitoring and research in the Australian Antarctic Program. CSIRO has been a core Partner in the Antarctic CRC and is now a core partner in the Antarctic Climate and Ecosystems CRC.

CSIRO research is directly aimed at three of the Government's Antarctic Program goals

- Understanding Antarctica's role in the global climate system,
- Protecting the Antarctic Environment, and
- Conducting scientific research of practical, economic or national significance.

By directly addressing these goals and by the quality and scale of CSIRO's program, CSIRO's research underpins the remaining Government goal of

- Maintaining the Antarctic Treaty system and enhancing Australia's influence in it.

Because of the importance of the Antarctic region for global and regional climate, particularly anthropogenic climate change, **CSIRO's Antarctic Research also directly addresses the recently affirmed Commonwealth Government National Research Priority:**

- An Environmentally sustainable Australia – Responding to climate change and variability.

CSIRO's Antarctic Research Program includes:

- **Determining the role of the Southern Ocean in climate variability and change and detecting ongoing change:** the Southern Ocean is a key element of the climate system and CSIRO has overall responsibility for coordinating the Oceanography program. The circumpolar extent of the Southern Ocean means the regional impact of climate change will be different in the southern hemisphere compared with the northern hemisphere.
- **Estimating the uptake of carbon dioxide in the Southern Ocean:** the Southern Ocean is one of the largest long-term sinks for carbon dioxide but estimates of the rate of carbon dioxide uptake are very poorly known.
- **Reducing uncertainty of the amount and rate of sea-level rise:** the major cause of sea-level rise during the 21st century is very likely to be ocean thermal expansion from a warming ocean. The Southern Ocean is a key pathway by

which this heat enters the ocean. CSIRO's input to the ice core program helps reveal how the Antarctic ice sheet is contributing to sea level changes.

- **Atmospheric monitoring from Australian Antarctic Stations and ships:** CSIRO's results are very important for assessments of global and regional atmospheric change (the driving force resulting in greenhouse/global warming and stratospheric ozone change).
- **Past atmospheric and climatic information from analysis and interpretation of ice core composition:** these results provide critical evidence of historic values of greenhouse and ozone depleting chemicals in the global atmosphere. They are also climatic indicators and glaciological tools (such as for dating). The results are being used to assess global and regional change (Australia and Southern Ocean) and to determine the effectiveness of strategies to predict and combat global warming and ozone depletion.
- **Improved projections of global and regional climate change allowing an improved ability to respond to climate change and variability:** the accuracy of regional projections of climate change and variability are critically dependent on the ability of climate models to represent the atmosphere, ocean and cryosphere in the Southern Ocean and the Antarctic region.
- **Improved understanding, observations and climate and ocean models in support of ecosystems studies:** current climate change scenarios suggest profound change in the Antarctic environment but the impact on Antarctic ecosystems is unknown.

Much (but not all) of this work is conducted through the Antarctic Climate and Ecosystems Cooperative Research Centre. CSIRO is a core partner in the ACE CRC.

CSIRO's Antarctic Research Program has major international partnerships and our work leverages considerable international resources to address climate issues in the Australian region of the southern hemisphere. CSIRO's work and that of the ACE CRC positions Australia as a key leader in the region. The high quality of our work was established in the recently completed international evaluation of the Antarctic Program, overseen by the Antarctic Science Advisory Committee.

CSIRO's program is a key component in the US/Australia Climate Action partnership.

Adequacy of Funding

Antarctica and the Southern Ocean are difficult environments in which to conduct research. Some of the greatest and most important challenges in the Australian Antarctic Program are in marine and atmospheric science and the program is critically dependent on continuing marine science support of the highest quality. CSIRO Programs are also dependent on logistic support for travel to Antarctica, support in Antarctica and for year-round sampling.

While the recently completed international discipline evaluation recognized the high quality of the Australian Program, it also recognized the fragility of the program and the need for targeted funds to ensure its continuing viability.

Specific issues that CSIRO wishes the Committee to consider, so that the continuing productivity and relevance of the Australian Antarctic Program can be guaranteed, include:

- **In assessing the adequacy of funding for the AAP, we recommend that expenditure on scientific and environmental research should get high priority, and a sufficient proportion of the AAP dollar.** This is the only effective way by which the four declared goals of the Australian Antarctic Program can be achieved.
- **We recommend there should be sufficient funds to continue an effective marine science program.** While the air link will improve access to Antarctica, some of the most important science questions are in the ocean and the atmosphere. Answering these questions is critically dependent on the availability of marine science support, both shipping and support personnel. An additional 30-40 days to the currently available 70-80 days should be provided. For effective use of research personnel time, the resupply and transport operations should be separated from the marine science activities, to the maximum extent possible.
- **We recommend that there should be sufficient funds to continue and enhance strategic marine and atmospheric research.** Much of the marine and atmospheric research in the Antarctic region outlined above is long term and strategic. This often makes it difficult to attract partnership funding to match the CSIRO investment. Logistical support through the Antarctic Division and the Bureau of Meteorology is available, and highly valued. However, access to funding from the Australian Antarctic Program is needed to ensure a continuing CSIRO involvement. Note that currently CSIRO cannot obtain research funding from AAS grants (which is traditionally a rather small pool of funds).
- **We recommend there should be greater flexibility in the use of resources and the establishment of a budget for ongoing observations.** A successful program is dependent on a mixture of in situ observational programs, satellite observations (from international partners) and numerical modelling. The in situ observational program should not only include ship observations but also include modern sampling instrument such as ocean moorings, autonomous vehicles and drifters. The recently completed international discipline evaluation called for a dedicated budget to support these activities but at present there are currently no available resources.
- **We recommend that there should be sufficient funds to adequately instrument the aircraft for atmospheric studies.** Aircraft resupplies are expected to improve the logistics of existing continental atmospheric monitoring and ice core projects. Aircraft also provide opportunistic platforms for monitoring atmospheric composition. Some investment will be needed to fit newly-developed CSIRO sampling and monitoring equipment to the aircraft. Provision should be made for the science program required to interpret these observations.

- **We recommend the international linkages of the Australian Antarctic Program should continue and be enhanced.** This includes the support of overseas personnel at Australian Bases and on Australian marine science voyages and the international sharing of resources (for example exchange of ship days between nations). Such a program is dependent on there being sufficient resources in the program to participate effectively with international partners. The Australian program already leverages considerable resources from developed northern hemisphere nations but such a program could increase this leverage.

Concluding remarks

In summary, there is significant pressure on funding for strategic research in Australia. Current funding models demand that research is carried out and funded through partnerships and in close consultation with users. CSIRO research makes a significant contribution to the Australian Antarctic Program and to national policy developments on greenhouse, climate change and ozone depletion. However, under the CSIRO funding model, where research has to be supported by external parties, CSIRO will in future require significant support for its Antarctic research to allow us to continue to make this contribution. This requirement is partly met by the Antarctic Climate and Ecosystems CRC but the CRC has insufficient resources to support all of the highest priority Antarctic programs. Major changes to logistics, such as the planned introduction of aircraft, must complement the present scientific effort and not draw from it. **Hence it is important for the Committee to assess whether the current funding for all agencies contributing to the Australian Antarctic Program is adequate, and whether it needs to be enhanced to ensure the research aimed at the officially approved goals of the AAP continues at effective levels.**

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