



Australian Government
**Department of Industry,
Innovation and Science**

Joint Standing Committee on the National Capital and External Territories

Inquiry into Australia's Antarctic Territory

Submission from the Department of Industry, Innovation and Science

Provided on 18 August 2017

This submission to the Joint Standing Committee on the National Capital and External Territories inquiry into Australia's Antarctic Territory provides information in relation to the Antarctic Climate and Ecosystems Cooperative Research Centre (ACE CRC), and Australia's Antarctic research infrastructure capabilities.

Antarctic Climate and Ecosystems Cooperative Research Centre

The Antarctic Climate and Ecosystems Cooperative Research Centre (ACE CRC) was established in 1991 as the CRC for Antarctica and the Southern Ocean. It is currently in its fifth round of CRC Programme funding with a commitment of Australian Government funding of \$25 million over the period 2014-19. The Department of Industry, Innovation and Science is working with the ACE CRC and the Department of Environment and Energy to explore implications and options post 2019 for the Government's support of Antarctic research.

The ACE CRC is focussed on the role of Antarctica and the Southern Ocean in the global climate system, the impacts of climate change on Southern Ocean ecosystems and the broader implications for Australia and the world. The ACE CRC has been an important stakeholder in Australia's Antarctic Programme, has contributed to Intergovernmental Panel on Climate Change Assessment reports and delivered high profile, world-class research outcomes over its 25-year history, including:

- analysis of the physical, chemical and biological properties of the Southern Ocean;
- investigation of the nature of the Antarctic ice sheet and Antarctica's surrounding sea ice;
- re-creation of historic climate records from high resolution ice cores;
- analysis of changes in the acidity of the Southern Ocean and impacts on ocean life;
- modelling sea-level rise to better understand its impacts on the globe and Australia and Antarctic marine life; and
- development of a web-based decision-support tool for understanding the implications of sea-level rise for coastal infrastructure

The ACE CRC website is found at <http://acecrc.org.au/>.

Australia's Antarctic Infrastructure

Maintaining Antarctic infrastructure, including research stations, laboratories and vessels, was included as a priority area for Australian National Research Infrastructure in the [2016 National Research Infrastructure Roadmap](#) (Roadmap). The Roadmap was developed by an expert working group led by the Chief Scientist, Dr Alan Finkel AO.

The Roadmap has identified existing and potential infrastructure as being necessary for the next decade to support marine and Antarctic systems, including facilities hosted by the Industry, Innovation and Science Portfolio. For example, the state-of-the-art Research Vessel *Investigator* supports atmospheric, oceanographic, biological and geological research across the tropical north to the Antarctic ice-edge.

The importance of such research was demonstrated in early 2017, with an international team of scientists creating the world's first detailed map of the sea floor on the east coast of Antarctica. The team also collected a range of sea bed cores, dating back some 3 million years. These samples will yield information on past sea surface temperatures, sea ice, as well as oceanography.

The Roadmap also noted that the Australian Antarctic Programme is an example of global collaboration where national research infrastructure is shared with other parties to the Antarctic Treaty. Vessels and infrastructure, both research and logistics, are used collaboratively for operational support and long-term projects in Antarctica. Internationally, Australia is seen as playing a leadership role in the Antarctic Treaty System, and our Antarctic research capability and infrastructure are seen as important in maintaining this leadership. In addition, the Roadmap highlighted that the Australian Antarctic Programme includes major national research infrastructure that supports high latitude climate observation and other prioritised Southern Ocean and Antarctic research. These observations improve our climate models by understanding past climate and climate drivers, as well as sea level rise.

The Department of Education and Training is developing an investment plan for Australia's future research infrastructure needs in consultation with Innovation and Science Australia and the Commonwealth Science Council. The plan will inform how we approach future investment in national research infrastructure needs across the sector consistent with the 2016 Roadmap, including in the publicly funded research agencies.

Ice Core Library

The CSIRO ice core 'library' is a collection of ice cores mainly from the unique Law Dome ice sheet in Antarctica. These cores contain climate and atmospheric composition information over the past three centuries with unparalleled resolution and precision. There are also air samples in tanks filled directly from the upper 'firn layer' of the Antarctic and Greenland ice sheets. The cores were drilled over the past few decades by CSIRO in partnership with the Australian Antarctic Division, ACE CRC and international groups including the National Centre for Scientific Research in France. They are held by CSIRO in a commercial cold storage in Clayton, Victoria. More than 500 metres (several tonnes) of ice are held.

The records that CSIRO produces from the samples have appeared in all Intergovernmental Panel on Climate Change (IPCC) scientific assessments and numerous other scientific and policy documents by CSIRO and our collaborators.

There are other ice cores in the Australian Antarctic Program, notably those held by the Australian Antarctic Division and ACE CRC in Tasmania, and samples from other sites in Antarctica by the University of NSW, ANSTO and Macquarie University.

CSIRO also carry out research into the Antarctic atmosphere through observations of greenhouse gases and related tracers at Casey, Mawson and Macquarie Island, with support from the Bureau of Meteorology and Australian Antarctic Division.