

**Antarctic Climate Science: Australia's efforts in the icy frontier and what we can learn
about the future.**

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Abstract

Australian scientists are at the forefront of international efforts to understand the role that Antarctica and the Southern Ocean play in the global climate system. Much of this effort is focussed through the Antarctic Climate and Ecosystems Cooperative Research Centre¹ based at the University of Tasmania. Over the past two decades Antarctic research has revealed the significant influence the Antarctic has on global climate. Studies of ice cores have produced detailed climate records dating back over 800,000 years and recent studies have revealed close relationships between Antarctic phenomena and regional climate in Australia. The Southern Ocean appears to be changing physically and biologically in ways that were considered to be only theoretical a decade ago. Increasingly, collaborative research in the Antarctic is integrating physical and biological sciences to understand not only what climate change is occurring, but its real and potential impacts on ecosystems. Studies undertaken during the past austral summer have uncovered unique benthic ecosystems which are vulnerable to ocean acidification, and long term data sets are showing changes in plankton communities in the Southern ocean. Future Antarctic and Southern Ocean climate research will focus on unravelling the world's paleoclimate climate record beyond 1 million years; understanding current physical climate phenomena and rates of change and providing the basis for making informed predictions of climate futures; and ecosystem studies which will provide early signals of climate change.

¹ The Antarctic Climate and Ecosystems CRC has as its major partners the Australian Antarctic Division, The University of Tasmania, CSIRO Marine and Atmospheric Science and the Bureau of Meteorology as its major Australian Partners.