Australian Academy of Science

MEDIA RELEASE

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Review of Australia's climate science capability reveals a mixed picture

Australia can improve coordination of national climate science programs to deliver better climate information to farmers and infrastructure planners, and to guide national efforts to mitigate the future impacts of climate change, according to a review by leading scientists.

The Australian Academy of Science report recommends that government consider mechanisms to ensure better coordination of climate research across Australia's universities and climate agencies. It also recommends increasing climate science capability in a number of critical areas, amounting to around 80 new research positions over the next four years.

The review surveyed all of Australia's climate research agencies and centres, including the Bureau of Meteorology, the CSIRO, the Australian Antarctic Division and universities to identify how many Australian researchers are working across the various disciplines and sub-disciplines of climate science, and how well these different areas are performing.

It reports that while Australia is strong in areas such as thermodynamics and extreme weather events, there are some significant weaknesses in areas such as climate model development. This includes the Australian Community Climate and Earth System Simulator (ACCESS), micrometeorology (the branch of meteorology that deals with weather conditions on a small scale), boundary layer dynamics (the dynamics of the lowest part of the Earth's atmosphere) and the modelling of two-way human/climate interactions.

Academy Fellow Professor Trevor McDougall, who led the review, said under-resourcing in specific areas detracts from Australia's ability to deliver necessary climate and weather information to domestic end users and national and international organisations.

"Australia's climate research sector is a fraction of the size of those in America or Europe, but we cover most of the Southern Hemisphere in terms of climate modelling and understanding," Professor McDougall said.

Contact Dan Wheelahan | **T** (02) 6201 9452 | **M** 0435 930 465 | **E** dan.wheelahan@science.org.au

“Many of our universities are considered to be world-class in this effort, but as a country we are falling behind in areas such as climate modelling.”

The report found that there are around 420 dedicated climate scientists across all of Australia’s universities and research agencies, with their research providing constant improvements in weather prediction and climate models in Australia and throughout the world.

The area most in need of attention is climate modelling, where critical under-resourcing means that Australia’s climate models are failing to keep pace with world’s best practice. To address this issue, the review estimated that around 30 new climate modellers and scientists would be needed over the next four years.

“These capability requirements are brought into sharper focus when you consider that our country is potentially more exposed to the impacts of climate change than most developed nations,” Professor McDougall said.

“Our location means that key factors that influence the climate in our region are not well represented in climate models developed by other countries. It is in our national interest to ensure our national climate science capability, built up over the past 50 years, is maintained. This will also mean Australia maintains its custodianship of many aspects of climate science research in the Southern Hemisphere.”

Other key recommendations from the report include ensuring the work of the Antarctic Climate and Ecosystems Cooperative Research Centre is funded beyond 2019 and that a broader review of climate-related research capabilities is undertaken by the Australian Government.

For a copy of the report visit the Australian Academy of Science website.

Media note: The Australian Science Media Centre will host an embargoed media briefing regarding the report at 10am AEST, Wednesday, 2 August 2017. The expert panel includes Professor Trevor McDougall Associate Professor Julie Arblaster and Dr Graeme Pearman.

QUESTIONS AND ANSWERS

Is there a difference between climate science and climate change science?

Climate change science refers to the study of the long-term changes to the climate caused by natural and human factors. Climate science in contrast looks at climate processes more broadly. For example, one of the most significant natural influences on the variability of climate in the Australia is the El Niño – Southern Oscillation (ENSO). Climate science studies how the ENSO operates and a significant scientific challenge remains in extended prediction of ENSO events. Climate change science studies look at, for example, how ENSO may change under future emissions.

What does Australia's current climate science workforce look like?

Climate science activity in Australia is carried out by approximately 420 full-time equivalent research staff working across four broad areas: 1) climate observation, 2) climate understanding, 3) climate modelling and 4) climate services. This figure takes into account the 15 full-time staff employed at the CSIRO Climate Centre in Hobart and staff at the new ARC Centre of Excellence for Climate Extremes.

Why was the review conducted?

The Academy instigated the review to assess how well Australia's climate science sector is positioned to meet current and future demands for weather and climate knowledge, in the context of increasingly powerful and sophisticated tools and methodologies. Domestic and international changes in the way in which climate science is undertaken mean that there are both challenges and opportunities for Australia's future climate science efforts, and this review is aimed at assisting the Australian government and the broader community to best manage this planning, by identifying those climate science capabilities of critical importance to the national interest.

Who conducted the review and what is their expertise?

The review was overseen by a steering committee including Professor Trevor McDougall FAA FRS (chair), Associate Professor Julie Arblaster, Dr Helen Cleugh, Professor David Griggs FTSE, Professor Rod Keenan, Professor Neville Nicholls FAA and Dr Graeme Pearman AM FAA FTSE. Members of the committee have expertise in meteorology, international research hubs, atmospheric research, climate adaptation and other areas of climate research.

How many submissions were received?

The Australian Academy of Science received 71 individual submissions and 14 organisational submissions to the review, including from organisations such as the CSIRO, Bureau of Meteorology, Antarctic Climate and Ecosystems CRC and the Great Barrier Reef Marine Park Authority.

What were the terms of reference for the review?

The review committee reported on:

1. The extent and size of climate science in Australia.
2. Current arrangements and characteristics of support of climate science in Australia, and the appropriateness of these arrangements for Australia's future interests in climate science.
3. Australia's potential to sustain its climate science workforce in the future.
4. Australia's ability to respond to new developments in climate science.
5. The means by which Australia's climate science is disseminated to its users, and the appropriateness of the current arrangements for its dissemination.

Climate impacts and climate adaptation research were not part of this review.