



## **Australian Government**

Australian Government response to the  
House of Representatives Standing Committee on Industry, Science  
and Innovation report:

Long-term meteorological forecasting in Australia

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**Australian Government response to the House of Representatives  
Standing Committee on Industry, Science and Innovation report into long-term  
meteorological forecasting in Australia**

**Recommendation 1**

The Committee recommends that CSIRO and the Bureau of Meteorology provide to the Australian Government a report with detailed explanatory information as to why a particular dynamic forecasting model or system was chosen for use in Australia. The report should be completed by the end of 2010.

Government response

The Bureau of Meteorology (the Bureau) provides comprehensive reports to the Australian Government on its weather and climate forecasting models through its Annual Report, and therefore does not agree to provide an additional detailed report to the Australian Government.

The 2011 Annual Report provided an outline of Australia's chosen dynamic forecasting model, the Australian Community Climate and Earth System Simulator (ACCESS) – a joint initiative of the Bureau and the Commonwealth Scientific and Industrial Research Organisation (CSIRO) in collaboration with the Australian university sector. ACCESS is currently used by the Bureau for day-to-day weather forecasting and is expected to integrate with the Bureau's dynamic forecasting model for seasonal prediction and longer range El Niño/La Niña outlooks. This model is called POAMA (Predictive Ocean Atmosphere Model for Australia).

ACCESS is a major improvement upon previous models in several areas, and is the most sophisticated weather model running in Australia. Analysis conducted as part of the Intergovernmental Panel on Climate Change 5<sup>th</sup> Assessment Report shows that ACCESS is showing good skill in capturing the local and broad scale features of the climate system, and is one of the better performing representations of 20th century climate when compared with all international models.

ACCESS uses world leading technologies for incorporating observations of the atmosphere and oceans and its physics explicitly account for changes in greenhouse gases and other atmospheric constituents. ACCESS can also be used across a range of space and time scales, and it is based upon internationally tested and peer reviewed technologies.

**Recommendation 2**

The Committee recommends that weather and climate variables and influences, for example, particulates, be identified, thoroughly examined to assess their degree of impact on our weather and climate, and incorporated into forecasting models as necessary. Priority areas for incorporating these variables should be published.

Government response

The Australian Government agrees that scientifically proven influences on Australian weather and climate, including the impacts from particulates, should be incorporated into models where it is appropriate and cost effective to do so. This requires rigorous scientific assessment, along with appropriate observational systems and scientific capability, to support the evaluation of these variables and to identify priority areas for their incorporation into model predictions.

The Climate Variability and Change (CVC) program, in the Centre for Australian Weather and Climate Research (CAWCR – a partnership between CSIRO and the Bureau), has responsibility for scientific research assessing the drivers of Australian climate.

Furthermore, through moving to ACCESS as the dynamic forecasting model for seasonal prediction, the Bureau will be better able to account for influences on Australian weather and climate, including particulates, in its seasonal forecasts. The Bureau will continue to publish information about ACCESS in its Annual Report and seek opportunities for modelling improvements within existing available resources.

### **Recommendation 3**

The Committee recommends that the Australian Government increase funding for research into the effects of weather and climate variables such as El Niño and Indian Ocean Dipole that impact on Australia's forecasting abilities.

#### Government response

The Bureau currently draws on a large body of research, generated domestically and internationally, into the effects of phenomena such as El Niño Southern Oscillation and Indian Ocean Dipole and their impacts on Australia's weather and climate. For example, through the *Australian Climate Change Science Program*, a collaboration between the Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education (DICCSRTE), CSIRO and the Bureau (through CAWCR), Australian researchers are investigating the effects of climate variables, including research into how extreme El Niño events and their impacts may change in a warming climate, and how feedback processes associated with the Indian Ocean Dipole will change in a warming climate.

In addition, Phase 2 of the *South East Australian Climate Initiative* (SEACI), a \$9 million collaborative research program between CSIRO, the Bureau, the Murray Darling Basin Authority, the Victorian Government and DICCSRTE, investigated the causes and impacts of climate variability and change across south-east Australia. SEACI research improved understanding of the drivers of climate variability and change in south-east Australia, and provided seasonal and longer term hydroclimate projections. Where appropriate, this information is incorporated into the Bureau's forecasting models.

The Australian Government, through the Bureau, will continue to investigate, review and assess the effects of El Niño and the Indian Ocean Dipole on seasonal forecasting within available resources.

### **Recommendation 4**

The Committee recommends that the Australian Government conduct a short review to determine what supercomputing facilities are required by CSIRO and the Bureau to conduct crucial forecasting operations and research. Any additional funding to increase supercomputing capacity should be made available as a priority so that all model research, development and application can be undertaken in Australia.

#### Government response

The Australian Government does not support the view that all model research, development and application should be solely undertaken in Australia. The Australian Government will continue to support robust forecasting operations and research in Australia, within available resources, as outlined below.

As part of its Super Science Initiative, the Australian Government is funding half the cost for a \$100 million supercomputer at the National Computational Infrastructure Facility to be used for data-intensive research on climate change, earth sciences and national water management. This effort will also help to fast-track advances in computational research techniques. The project is a partnership between the Australian Government, the Australian National University (ANU), CSIRO, the Bureau, Geoscience Australia and several leading universities. The new supercomputer, to be housed in the ANU, underwent successful stability testing in April 2013. The initial service for key stakeholders commenced in May 2013 and service to all users will be operational in the second half of 2013.

For day-to-day and seasonal weather forecasting, the Bureau provides high quality forecasts and warnings using its existing operational supercomputing infrastructure. The Bureau also draws on model research, development and applications undertaken overseas, especially through partnerships with the UK Met Office and the United States National Oceanic and Atmospheric Administration, to ensure its forecasts and models are of a high quality and reflective of international best practice. To achieve this, the Bureau relies on sound working relationships with international meteorological agencies.

A 2011 review of the Bureau's capacity to respond to extreme weather and natural disaster events and to provide seasonal forecasting services (the Review) considered the Bureau's future supercomputing needs. The Review acknowledged the high quality services already provided by the Bureau through its existing supercomputer, but also identified possible options to enhance the Bureau's supercomputing capacity to further enhance the accuracy of its forecasts. The Australian Government is giving consideration to these options as part of its response to the Review.

#### **Recommendation 5**

The Committee recommends that the Australian Government undertake an audit of weather stations that contribute data to forecasting models, to ensure that they comply with World Meteorological Organization guidelines. All necessary actions should be taken to ensure that all stations comply.

#### Government response

The Australian Government, through the Bureau, already follows World Meteorological Organization guidelines for the placement of its observation networks. The Bureau will continue to report on the status of its observation systems in its Annual Report.

#### **Recommendation 6**

The Committee recommends that the Australian Government budgets for the purchase, installation and maintenance of additional weather stations in critical areas around the country. There should be broad consultation to consider the number of new stations needed and their placement.

#### Government response

The Bureau already has a strong observations program that is the subject of regular internal review to ensure that it is delivering efficient and effective outputs. The Bureau will continue to follow these well established processes to ensure that the purchase, installation and maintenance of weather stations is undertaken to maximise benefits to the Australian community.

Where possible, the Bureau also works with other organisations that operate weather stations to ensure that all relevant and available data contributes to the generation of forecasts and warnings.

#### **Recommendation 7**

The Committee recommends that the Bureau of Meteorology employment conditions be reviewed and that a more secure tenure be provided to relevant staff, including increasing contracts from three years to five years.

#### Government response

The Bureau already offers attractive and competitive working conditions for employees in line with other Australian Government agencies and in accordance with all relevant legislation and regulations and therefore does not agree to review employment conditions at this time. To provide an effective service, the Bureau employs a mixture of ongoing and non-ongoing staff with non-ongoing staff generally employed to meet temporary increases in demand for specific skills and capabilities.

#### **Recommendation 8**

The Committee recommends that the Australian Government establish an institute of meteorological science to develop an ongoing partnership between relevant research bodies and implement a coordinated research agenda.

#### Government response

Given the significant work already underway in relation to this recommendation, the Australian Government does not support the need for a separate institute of meteorological science.

The Australian Government acknowledges that enduring partnerships between research bodies and a coordinated research agenda are critically important for the delivery of meteorological and climate research. Two initiatives have already been implemented to coordinate research.

The first is the CAWCR which was established in 2007. This is a research partnership between CSIRO and the Bureau to build weather and climate modelling capability and to enhance research collaboration between the two agencies. An expert review of CAWCR in 2011 cited the benefits of the partnership and recommended its continuation.

The second is the National Framework for Climate Change Science, which articulates national climate change science priorities and facilitates research collaboration. A High Level Coordination Group that included all relevant research agencies, including the universities and the Australian Research Council, developed *A Plan for Implementing Climate Change Science in Australia* (the Plan). The Plan sets out in detail the science that is needed to answer key policy questions and provides both funding and research agencies with a single statement of the science Australia needs to guide investment decisions. This coordinated approach will ensure that the maximum benefit is delivered to the Australian community. The Plan is available on the DICCSRTE website at [www.climatechange.gov.au/en/climate-change/national-framework-science/plan.aspx](http://www.climatechange.gov.au/en/climate-change/national-framework-science/plan.aspx).