

# Editorial

For more than two decades, CSIRO has taken a leading role in providing national projections, with products released in 1992, 1996, 2001, and most recently in 2007 (with BoM), and these projections have been widely cited and used in Australian climate change adaptation work.

CSIRO and BoM were contracted in 2012 by the Department of Environment to provide an updated assessment of climate change for Australia. The new projections that were released in January 2015 differed from earlier products in a number of important respects.

The projections on this occasion were aimed specifically at supporting the needs of planning in the natural resource management (NRM) sector. Indeed, the projections for Australia formed part of a larger package of products developed with funding from the Commonwealth Government's Regional Natural Resources Management Planning for Climate Change Fund. This fund was established to support regional Natural Resource Management organisations to update their plans to account for likely climate change impacts and to maximise the environmental benefits of carbon farming projects.

One consequence of this NRM focus was the distinctive regionalization of Australia used in these projections (and illustrated in some of the papers in this volume, e.g. *Moise et al.*). This was based on the fifty-six individual NRM regions, but with these brought together into eight 'clusters' which broadly shared similar bioclimatic conditions. These clusters (with some subdivision into sub-clusters) were the regions used for the climate change projections.

The focus on the needs of natural resource planners also led to increased attention to delivering the projections in ways tailored to the needs of various practical applications. In particular, in addition to brochures and reports released in January 2015, the projections website ([www.climatechangeinaustralia.gov.au](http://www.climatechangeinaustralia.gov.au)) has been greatly expanded for its release in April 2015 and contains a range of new tools, downloadable data and guidance material suitable for adapting projection data to a variety of user needs.

In addition to the NRM focus, the new projections are based on the latest global climate model archive (known as the Coupled Model Intercomparison Project 5 (CMIP5)) which comprises more than forty models. The new projections also provide quantitative regional projections not previously provided, e.g. regional sea level rise. Furthermore, the science underpinning the projections has been further developed compared to previous projection products, particularly with regard to model evaluation, projections from downscaling, and assigning confidence to regional projections.

It is some of these scientific developments which are highlighted in the papers for this special issue of the Australian Meteorological and Oceanographic Journal. Two of the papers concern detailed regional evaluation of the simulation by the global climate models of historical Australian climate. *Moise et al.* assess the CMIP5 climate models against a broad range of measures of current climatology, whereas *Bhend and Whetton* examine how well climate models simulate historical temperature and rainfall trends. Current climate evaluation is also a feature of the paper by *Grose et al.* on the subtropical ridge, although this paper also attempts to draw links between the evaluation and projected changes in this circulation feature, and examines the implications for rainfall change in southeast Australia.

In the NRM projections project there was focus on understanding and assessing the physical processes implicated in the regional changes simulated by global climate models (GCMs), comparing these with other lines of evidence such as downscaling, and assigning levels of confidence in the regional projections. This process is illustrated in three papers examining the confidence in regional rainfall projections. *Dowdy et al.* examines the various lines of evidence for confidence in eastern Australian rainfall projections. A second paper by *Grose et al.* compares the various GCM and downscaling outputs available for eastern Australia, to look for any robust regional detail in the climate change signal in this region. This paper also explores the issue of how best to use downscaling results in conjunction global climate model projections. *Hope et al.* explores the regional and seasonal expression of the projected rainfall decline in southern Australia, and explores the lines of physical evidence that support the projection. Finally, probably the most important new inclusion in these projections, projected regional changes to mean and extreme sea level, is described in the paper by *McInnes et al.*

For further information on the new projections, the science associated with their production (including topics not covered in the papers included here), and region by region projected changes for all variables, the reader is referred to the website (see above) and the detailed NRM Technical and Cluster-specific reports (downloadable from the website.)

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