

# CLIMATE CHANGE AND CLIMATE VARIABILITY IMPACTS ON WATER

## SPECIALISTS IN CLIMATE CHANGE AND CLIMATE VARIABILITY

The Climate Change Research Centre (CCRC) has a highly regarded international reputation in climate science.

The CCRC is the largest university based research centre covering all major aspects of the climate system. It is the headquarters of the Australian Research Council Centre of Excellence for Climate System Science (ARCCSS).

## THE TOOLS OF OUR TRADE

The CCRC has state-of-the-art resources that include:

- A team of highly experienced staff comprising academics, research scientists, graduate students and support staff.
- Access to the nation's largest supercomputing facilities through the National Computational Infrastructure (NCI)
- Extensive computational resources at UNSW to house and facilitate the analysis of very large climate datasets.
- An array of climate (and related) models to facilitate investigation of the climate system across spatial scales and with various levels of complexity.

## WHAT WE DO

The CCRC leads the nation in understanding the entire climate system. No other group in Australia has the unique combination of expertise in land, ocean and atmosphere sciences.

We undertake investigations utilizing state-of-the-art numerical model studies to understand: El Niño - Southern Oscillation (ENSO) and related phenomena in the Tropics and their impacts on regional climate and water security; temperature and rainfall variability and extremes - and how these are affected by land processes at regional scales; factors that control rainfall and drought; and extremes such as heat waves and heavy precipitation events.

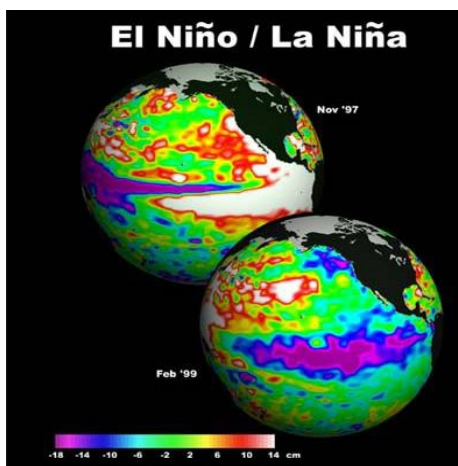
We apply advanced statistical methods to climate observations to test theoretical ideas and improve our understanding of the climate system.

Our expertise includes atmospheric, oceanic and land processes, and their interactions. Water is a key component of these systems.

We undertake the production of regional climate projections to produce information relevant to water and catchment managers. These climate projections are being used across a broad range of climate change impact and adaptation studies.

## OUR PARTNERS

CCRC academics collaborate extensively with university researchers both internationally and within Australia. Collaboration with leading international institutions in climate science is particularly strong. In addition to this, extensive collaboration with government and industry is also a hallmark of CCRC.



## ACADEMIC EXCELLENCE

Our key academic disciplines include: mathematics, physics of the climate system, ocean dynamics, atmospheric sciences, land surface processes, hydrology and remote sensing.

## KEYSTONE PROJECTS

- NSW / ACT Regional Climate Modelling (NARClIM) project
- Climate change impact on precipitation extremes
- Influence on regional climate of tropical phenomena such as El Niño – Southern Oscillation
- Improving the model representation of tropical convection and clouds
- Climate change impact on the Australian Alps
- Incorporating climate change into design storms through Intensity-Frequency-Duration curves

## OUR EXPERTS



**Professor Andy Pitman** is the Director of ARCCSS. Andy's current research interests include terrestrial processes in global and regional climate models. He has explored the global and regional impacts of land cover change. He has interests in climate extremes and how these are likely to change in the future, in particular how droughts, heat waves and land processes interact.



**Professor Steven Sherwood** is Director of the CCRC and an ARC Laureate Fellow. He studies how the various processes in the atmosphere conspire to establish climate, how these processes might be expected to control the way climate changes, and how the atmosphere will ultimately interact with the oceans and other components of Earth.



**Professor Matt England** a former ARC Laureate Fellow and Fulbright Scholar. His main water research activities reside in large-scale ocean drivers of rainfall variability and extremes, ocean-atmosphere dynamics and climate variability, with a particular focus on the Southern Hemisphere.



**Associate Professor Jason Evans** is an ARC Future Fellow. He has expertise in water resource issues at the regional scale, particularly the impact on water resources of changes in climate and changes in land-use. He has particular expertise in producing regional climate projections and applying these projections in climate change impacts studies, and in engaging with users of climate information for climate adaptation.



**Associate Professor Lisa Alexander** is an expert in the analysis of extreme climatic events. Much of her work has been focused on the creation of high quality global datasets and comparison with state of the art climate models.



**Dr Gab Abramowitz** is interested in models of natural systems and especially trying to understand when models are useful for making inferences about a natural system. He works primarily with climate and land surface models, but also hydrology and ecology models. He uses a range of observations in model evaluation, benchmarking and uncertainty assessment through ensemble modelling, and has focused on standardisation of evaluation internationally and assessment of model dependence.



**Dr Alex Sen Gupta** is researching the role of the ocean in the climate system, how the ocean influences regional climate, the influence of ocean change on biological systems and what global climate models tell us about the future of the ocean. Recently I have been using climate models to understand changes to the Tropical Pacific and Southern Oceans in a warming world.

*More information:*