Hydro-meteorological Research to support Rainfall Forecasting

The Rainfall Prediction projects focus on improving the accuracy, usability and range of Australian rainfall forecasts.

April 2013

Transforming Australia's water resources information

The need to accurately monitor, assess and forecast the availability, condition and use of Australia's water resources is now more important than ever. The past decade of severe drought and recent extreme climatic events in Australia pose significant challenges to the management of Australia's water resources as we attempt to deal with an ever-increasing demand for water. The Water Information Research and Development Alliance is transforming the way Australia manages water resources, by bringing together the research and development expertise of CSIRO's Water for a Healthy Country Flagship in water and information sciences, and the Bureau of Meteorology's operational role in hydrological analysis and prediction.

Objective

Improving the accuracy, range and usability of the Bureau's rainfall prediction is key to providing robust and reliable water information for flood prediction and water management. The advances in rainfall forecasting delivered by these projects will lead to more accurate water estimates and help Australian water users make more informed risk management decisions.

Key research areas

The Rainfall Prediction projects will seek to improve rainfall forecasts through three projects:

- seamless production and presentation of forecasts across different space and time scales
- improvements in modelling cloud processes and convection to provide more accurate forecasts
- research into a unified approach to extend rainfall prediction out to 30 days with improved skill.

Approaching storm clouds near Griffith, NSW (Image credit: Gregory Heath, CSIRO)

Australian Government
Bureau of Meteorology

Water Information
DATA › INFORMATION › INSIGHT

A water information R & D alliance between the Bureau of Meteorology and CSIRO's Water for a Healthy Country Flagship

Delivering outcomes

a. Seamless rainfall forecasts

This project aims to deliver a seamless underpinning framework that will ultimately provide users with a single point of entry for requests for calibrated rainfall forecasts, for time scales ranging from 10 minutes to 10 days, and for a range of spatial resolutions from 1 to 100 kilometres. The forecasts will include quantitative uncertainty information and will be available in several commonly used formats.

b. Improved short-range numerical weather prediction (NWP) rainfall forecasts

This project involves the development and use of a short-range NWP 'precipitation test-bed'. This will bring developments into a framework to explore in detail how the ACCESS (Australian Community Climate and Earth-System Simulator) model simulates rainfall, then apply that knowledge to further develop the model's physics to improve the accuracy of rainfall forecasts, with a particular focus on extreme events.

This project also involves the development of a high-temporal resolution radiation scheme. This aims to improve the accuracy of rainfall forecasting by better capturing the surface heating that leads to the onset of convection.

(Image credit: John Coppi CSIRO)

c. Improving multi-week rainfall predictions

Multi-week forecasting is in its infancy, with only a handful of operational centres worldwide routinely making predictions. Multi-week prediction of rainfall sits in between short-timescale NWP and long-timescale seasonal prediction. This project's fundamental research will investigate the potential for multi-week prediction using the ACCESS model. It builds on analyses of preliminary multi-week forecasts based on the POAMA2, which is a seasonal prediction system that indicates encouraging prospects for multi-week prediction of Australian rainfall.

Partners

From 2008 to 2013, the Water Information Research and Development Alliance is delivering the scientific and research innovation required by the Bureau to fulfil its national water information mandate. Through a strategic investment of $50 million over five years, more than 40 researchers are focusing on several challenging areas. These include large-scale information architectures, earth observation, hydrological modelling, water accounting, water resource assessment and water forecasting.

Other partners in the Rainfall Prediction projects include:

- Met Office (UK)

CS ACT 2013 • LR120674_WIRADA_RainfallForecastingFactsheet.indd

CONTACT US
t 1300 363 400
+61 3 9545 2176
e enquiries@csiro.au
w www.csiro.au

YOUR CSIRO
Australia is founding its future on science and innovation. Its national science agency, CSIRO, is a powerhouse of ideas, technologies and skills for building prosperity, growth, health and sustainability. It serves governments, industries, business and communities across the nation.

FOR FURTHER INFORMATION
Dr Peter May
Assistant Director Research and Development
Centre for Australian Weather and Climate Research
Bureau of Meteorology
t 61 3 96694490
e p.may@bom.gov.au

Find out more about the Water Information Research and Development Alliance at www.csiro.au/partnerships/WIRADA