



*The Australian Energy and Water Exchange Initiative*



Albert van Dijk  
GEWEX GHP meeting  
10-13 December, Pasadena, US

# What?

Overarching science question:

***understand and predict Australia's fresh water resources and water security into the future given Australia's many climate zones, relatively large climate variability and future climate change.***

- promoting and facilitating data sharing
- collaboration and engagement between researchers, data providers, research users, resource managers and research managers.

Working groups around science priority areas:

1. Observational Data
2. Model Evaluation and Benchmarking
3. Data Assimilation
4. Trends and Extremes
5. Vegetation Processes
6. Hydrological Prediction

Working group activities:

- organising workshops
- data collection, collation and hosting
- collaborative experiments and development.



## OzEWEX

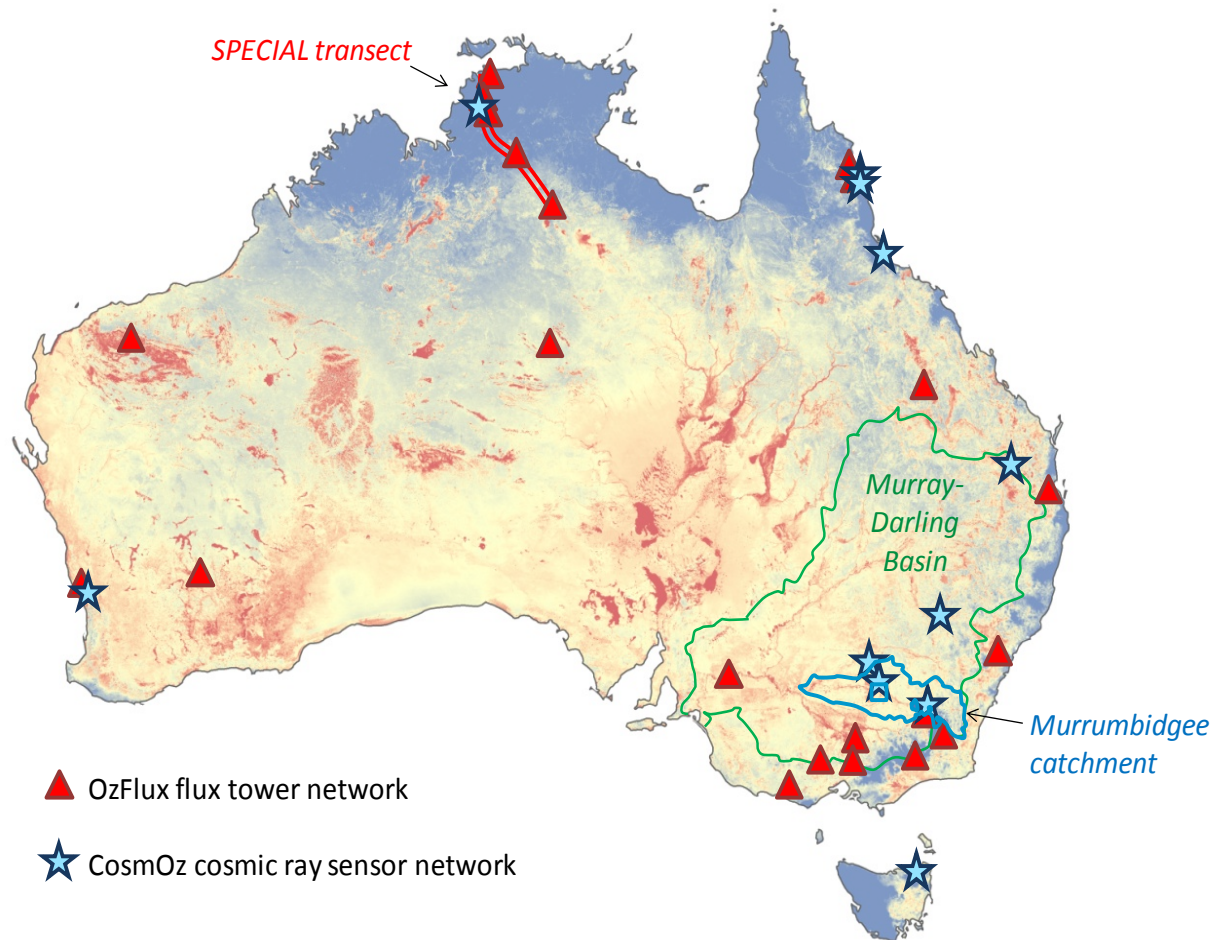
The Australian Energy and Water Exchanges  
Regional Hydroclimate Project



## Science Plan

2014– 2019

# Where?



# Who?

Universities

Governments and  
water managers

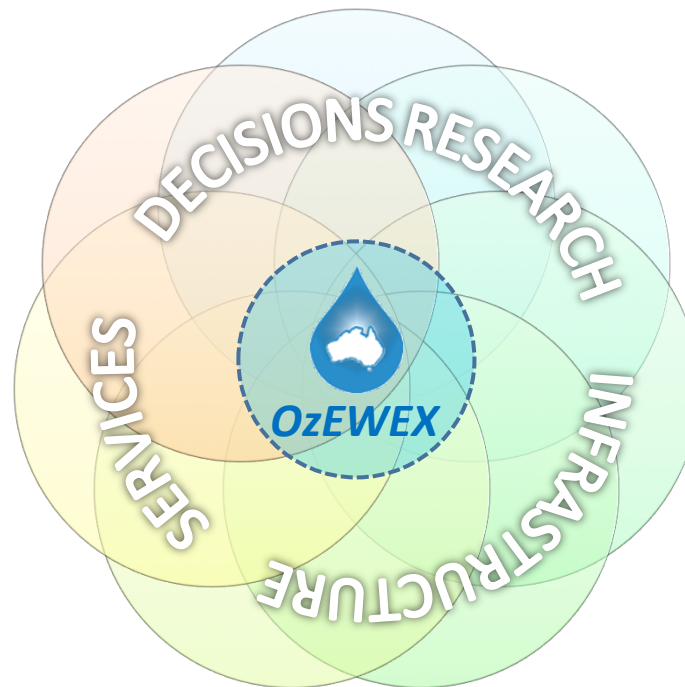
ARC Centre of  
Excellence for  
Climate System  
Science (ARCCSS)

Bureau of  
Meteorology

Commonwealth  
Scientific and  
Industrial Research  
Organisation (CSIRO)

National  
Computational  
Infrastructure (NCI)

Terrestrial Ecosystem  
Research Network  
(TERN)





# Institutional Support

*"..we need to be well connected and collaborating with work occurring in universities and the broader research sector. OzEWEX provides an excellent opportunity to do that.."*

Rob Vertessy, CEO Bureau of Meteorology

*"I strongly support OzEWEX objectives and recognise the important role it plays in linking experts across institutions..."*

Warwick McDonald, Research Director CSIRO Land and Water

*"I [recognise the value and importance of the OzEWEX science objectives] in Australia and via GEWEX to the international community"*

Andy Pitman, Director, ARCCSS

*"The recent successful workshop [...] demonstrated that there is purpose and need for an initiative such as OzEWEX in Australia; and the extent to which it contributes to the development and use of [...] TERN."*

Tim Clancy, TERN Director

## WG1 - Observational Data

chair: Juan Pablo Guerschman, CSIRO

15 members



### Goal

*To promote awareness, access and continuity of existing observation data sources that are critical for research of the energy and water cycle, and to evaluate new observations.*

### Pathways

- Pursue for free research access to existing data collections and use of data standards
- Demonstrate value of data provision to custodian institutions
- Communicate and promote newly available data sets and collections

### Specific activities

- Forum to exchange data intelligence and find data
- Web-publish hyperlinked summary of currently available data and data portals
- Advertising new data sets on OzEWEX web site
- Coordinate community priorities for NCI data services
- Support networks (OzNet-Murrumbidgee, CosmOz cosmic ray sensor network, etc)

### Key partners

NCI, TERN, Bureau of Meteorology, CSIRO, Geoscience Australia, universities

## WG2 - Model Evaluation and Benchmarking

chair: Gab Abramowitz, UNSW/ARCCSS

16 members



### Goal

*To develop an automated, online, evaluation and benchmarking environment for hydrological and land surface models.*

### Pathways

- Develop infrastructure to evaluate land surface and hydrology models against climate and water observations
- Promote standards (NetCDF, ALMA) in benchmarking activities
- Link to GEWEX ALMA and GHP LSM Validation and Benchmarking Cross-Cutting Study

### Specific activities

- Develop PALS web infrastructure for CABLE and AWRA models
- Integrate widely useful Australian water and climate evaluation data in PALS
- Support model-data assimilation (WG3) and remote sensing validation (WG1)

### Key partners

ARCCSS, BoM, CSIRO, universities

## WG3 - Data Assimilation

Luigi Renzullo, CSIRO

23 members



### Goal

*To develop successful new approaches for data assimilation into energy and water balance models.*

### Pathways

- Strengthen and grow the Australian DA community
- Develop shared community DA data, model and computing infrastructure

### Specific activities

- Forum and workshops to exchange expertise and collaborate
- Test and evaluate alternative DA platforms (LIS, DART, OpenDA)
- Develop DA infrastructure on NCI (data collections, platforms)
- Joint soil moisture remote sensing, modelling and DA evaluation experiment (with WGs 1 and 2)
- Contribution to FP7 Earth<sub>2</sub>Observe multi-model ensemble

### Key partners

NCI, CSIRO, TERN e-Mast, Bureau of Meteorology, universities



## WG4 – Trends and Extremes

chair: Seth Westra, University of Adelaide

14 members



### Goal

*To describe, analyse and attribute observed variability and change in averages and extremes of water- and energy-related variables.*

### Pathways

- Detect and attribute trends and extremes in water and climate phenomena
- Improve links between science and policy development
- Link to GEWEX GHP Sub-daily Precipitation Cross-Cutting Study

### Specific activities

- Coordinate review of trends in extreme events in Australia (floods, droughts, coastal extremes, bushfires, heatwaves, severe weather, cold extremes) to be published as special issue and summary paper

### Key partners

- Bureau of Meteorology, CSIRO, universities

## WG5 – Vegetation Processes

chair: Brad Evans, TERN/Macquarie University

26 members



### Goal

*To better understand the role of different vegetation types and functioning in coupling the energy, water and carbon cycles through field experimentation, analysis of field data, and modelling*

### Pathways

- Data collation for hypothesis testing
- Joint reviews and publications

### Specific activities

- Coordinate review on use of phenocams (submitted)
- Coordinate review on the uniqueness or otherwise of the biophysical functioning of Australia's ecosystems
- Link to TERN

### Key partners

TERN, CSIRO, universities

## WG6 Hydrological Prediction

chairs: Tom Pagano, BoM & Fiona Johnson, UNSW

11 members



### Goal

*To improve and provide hydrological predictions over time scales of hours to decades*

### Pathways

- Hind-cast experiments to compare prediction techniques.
- Develop operations-relevant test cases (events, catchments) for skill assessment.
- Link to HEPEX

### Specific activities

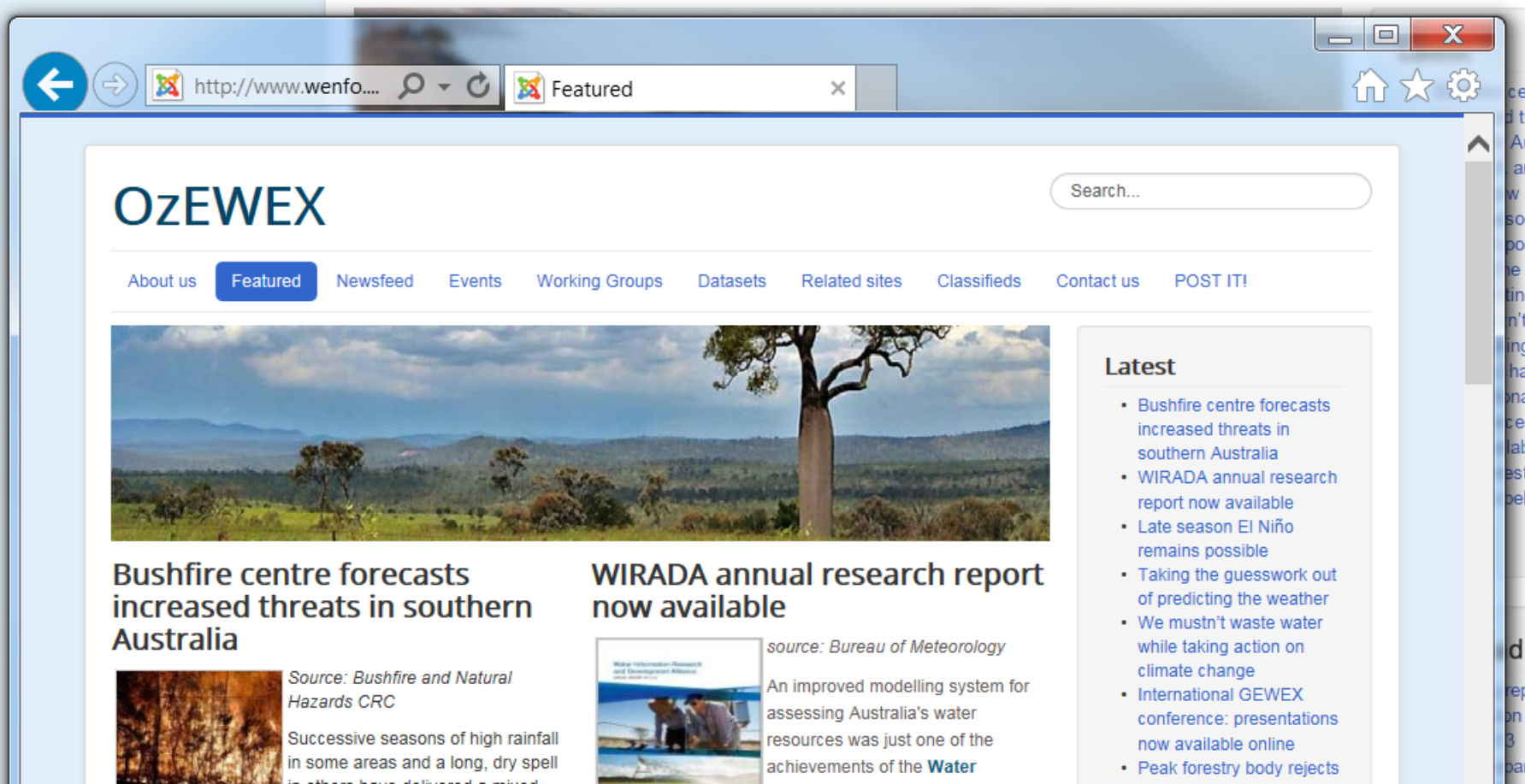
- Pursuing access to BoM forecast feeds for research
- Meetings to discuss science and operations R&D priorities
- Contribution to global multi-model forecasting system (with Deltares)

### Key partners

Bureau of Meteorology, CSIRO, universities

# Web site and Newsletter

- Web site had 67 articles over the last year – [www.ozewex.org](http://www.ozewex.org)
- Email newsletter sent to 606 email subscribers quarterly, summarising latest posts





The Australian Energy and Water Exchange Initiative

# OzEWEX 2014

1<sup>st</sup> national workshop | Canberra, ACT | 28-29 October



Australian  
National  
University

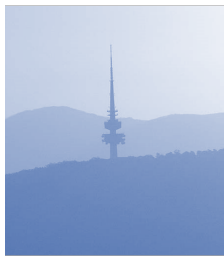


ARC CENTRE OF EXCELLENCE FOR  
CLIMATE SYSTEM SCIENCE



Australian Government  
Bureau of Meteorology





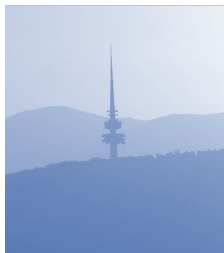
The Australian Energy and Water Exchange Initiative

# OzEWEX 2014

1<sup>st</sup> national workshop | Canberra, ACT | 28-29 October

- Examine the water and climate information needs for tomorrow
  - Compare these needs to the current state of, and developments in, information services, observation sources, scientific knowledge, and model technology
  - Identify opportunities and challenges to meet new the new information needs
- 
1. Are we getting close to integrating water and climate prediction?
  2. With ground networks in decline, can satellites meet our needs?
  3. How well can we trust our models, and how can we be sure?
  4. What new water and climate information should we be developing?
  5. Is Australia's data and model infrastructure ready for the future?
  6. Have we reached the limits of what can be forecast?



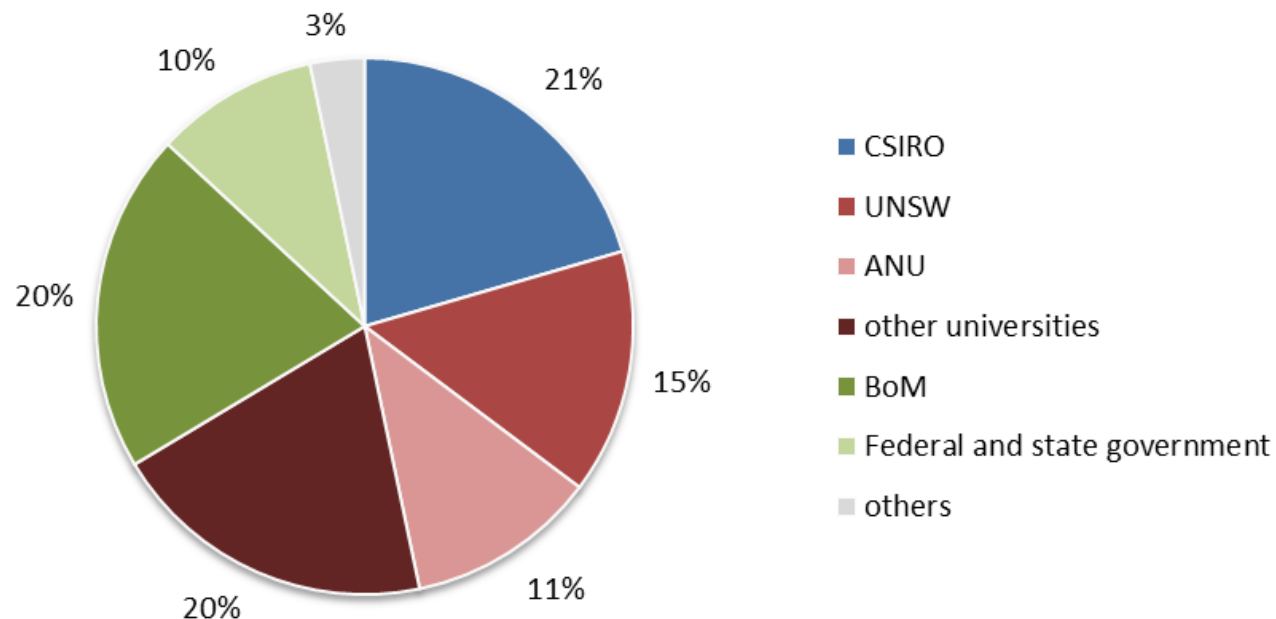


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# OzEWEX 2014

1<sup>st</sup> national workshop | Canberra, ACT | 28-29 October

>100 participants  
40 oral presentations  
6 discussion sessions  
20 posters



<http://www.ozewex.org/workshop/>





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Questions?