



## **2nd Aus2K Regional Network Workshop: Data Synthesis and Research Program Development**

### **Dates**

Wednesday 27– Friday 29 April 2011

### **Venue**

Ernst & Young Lecture Theatre, Business School  
University of Western Australia, Perth, Australia

### **Overview**

The [1st Aus2K Workshop](#) held at Melbourne in July 2010 helped galvanise the Australian palaeo community to focus research efforts on the last 2000 years. A [metadata inventory](#) of high-resolution Australasian palaeoclimate records has now been populated and an [Aus2K online forum and mail list](#) has been developed to allow the community to interact. A number of ‘proxy groups’ and group leaders were established to provide an inventory of records with annual–sub-decadal temporal resolution.

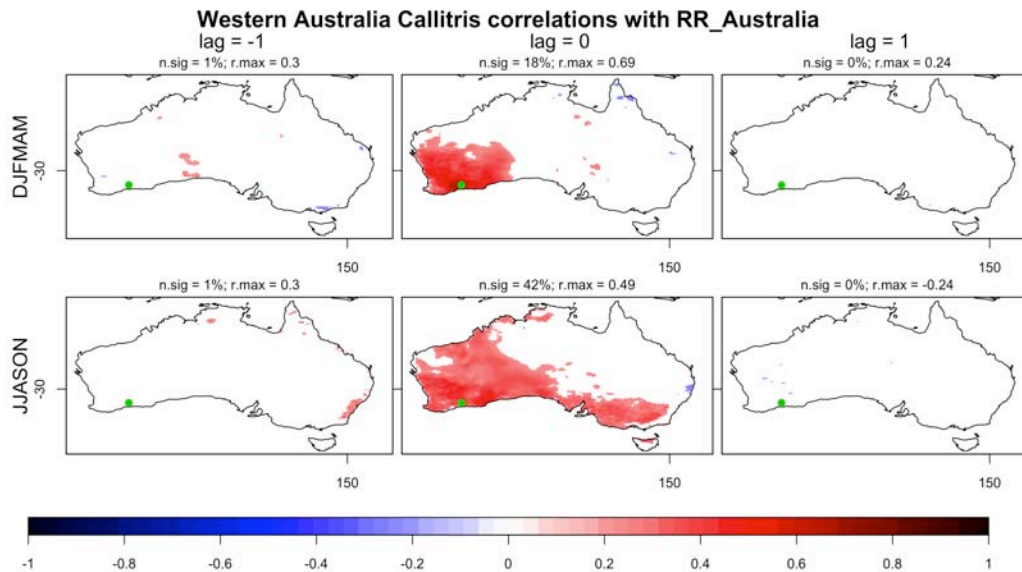
The aim of the 2nd Aus2K workshop is now to gather and assess the records identified through the metadatabase to generate a range of Australasian temperature reconstructions covering the last 2,000 years in time for IPCC AR5. Specifically, the aim is to contribute to the [PAGES regional 2K network’s](#) synthesis book and a consortium paper presenting the best temperature reconstructions currently available from each of the eight 2K working groups. The February 2011 issue of the PAGES 2K circular states:

*We are aware of the fact that the spatiotemporal data density is very different from region to region. We therefore recommend that each regional team elaborates 1-3 best temperature time series for a clearly defined area within the perimeter of the 2k group. Ideally, we would expect this time series to be a multi-proxy regional field reconstruction based on available best proxies. It should cover the last 2000 years and be characteristic of the defined areas.*

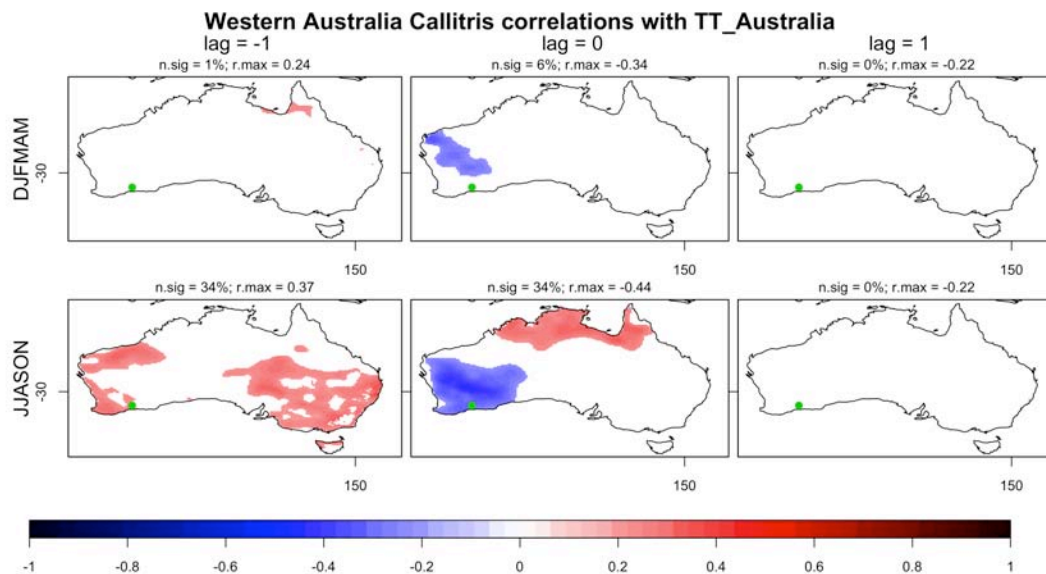
*Although we know that this will be difficult, it would be very valuable if some groups could (beside the reconstruction for their continental areas) work out additional SST reconstructions for the surrounding ocean area. These ocean areas have to be clearly defined at the Bern workshop [28 July 2011, Bern, Switzerland].*

*Even though it would be desirable, we do not expect that all groups use one single reconstruction technique. However, all groups are requested to strictly use state-of-the-art reconstruction methods (e.g., multivariate principal component regression, composite plus scaling, regularized expectation maximization). The paper will finally be amalgamated and published as a joint article in a highly ranked scientific journal with the list of all co-authors under the heading “PAGES 2k consortium”.*

The first day of the 2nd Aus2K workshop will be an half-day open symposium reviewing the state of Australasian palaeoarchives, followed by the start of the closed part of the meeting reassessing the climate sensitivity of the currently available Australasian palaeodata network. An example of proxy–field correlation maps to be discussed are given below with the example of the Western Australian *Callitris columellaris* tree ring record with rainfall (Figure 1) and temperature (Figure 2).



**Figure 1.** Spatial field correlation of Western Australian *Callitris columellaris* tree ring record with the Australian Bureau of Meteorology 0.05°x0.05° (5kmx5km) [AWAP rainfall grid](#) for summer (top) and winter (bottom) half years, 1900–2005 for lags -1, 0 and +1. Green circle indicates record location.



**Figure 2.** Spatial field correlation of Western Australian *Callitris columellaris* tree ring record with the Australian Bureau of Meteorology 0.05° x0.05° (5kmx5km) [AWAP temperature grid](#) for summer (top) and winter (bottom), 1911–2005 for lags -1, 0 and +1. Green circle indicates record location.

Days two and three of the workshop will further the discuss issues associated with calibration and the development of high-resolution temperature reconstructions for the PAGES Regional 2K synthesis effort, and other climate reconstructions for a special issue of *Journal of Climate*.

## **Workshop objectives**

The objectives of the 2nd Aus2K workshop are to:

1. Develop annual–decadal Australasian temperature reconstructions for as much of the past 2000 years that is feasible for the PAGES Regional 2K synthesis effort
2. Establish protocols for the selection of records using agreed site and sample criteria
3. Bring together palaeoclimatologists, modelers and dynamicists working in Australasia to initiate collaborative research papers for *Journal of Climate* special issue
4. Develop sub-regional products (for Tasman/South East Australia; South West Australia; Northern Australia/Indonesia; Southwest Pacific) as a basis for developing full regional reconstructions
5. Establish a preliminary list of suggested papers for the Special Issue of *Journal of Climate* (approximately 15–20 paper suggestions required)

## **Outcomes**

The workshop will produce the following:

1. Mean and spatial field temperature reconstructions for Australasia including a detail description of agreed methodology (late 2011/early 2012)
2. Workshop report for PAGES newsletter (mid 2011)
3. Synthesis papers for an Australasia2K special issue of *Journal of Climate* (15 Oct 2011)

## **Aus2K contact**

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## **Workshop organiser contact**

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**Workshop website:** <http://pages-142.unibe.ch/cgi-bin/WebObjects/calendar.woa/wa/calendar?id=518>

**Aus2K website:** <http://www.pages-igbp.org/index.php/workinggroups/aus2k>

## Proposed 2nd Aus2K workshop program

We'd like to frame the meeting around possible paper submissions for a special issue of *Journal of Climate* (proposal accepted by the editor in February 2011). People should come with a view to establishing collaborative partners with whom they will produce inter-disciplinary studies. People should bring with them two general ideas for a collaborative paper e.g. multi archive sub-regional reconstruction, methodological papers etc.

Sub-regional reconstructions are a rigorous test of the larger Australasia-wide climate field reconstruction that will not perform as well on regional scales (lowest common denominator captured by full domain). Papers interested in integrating and/or comparing records on high and low resolution timescales are particularly welcomed.

### Wed 27 April, Day 1: Overview of Australasian palaeoarchives: climate sensitivity and database development

#### Day 1 Morning session: An overview of Australasian palaeoarchives

8.00 am	Registration Table Opens	
8.30-8.35	Pauline Grierson	Welcoming remarks
8.35-8.45	Joelle Gergis	Introduction to PAGES Regional 2K network and objectives of the 2nd Aus 2K workshop
8.45-9.15	Ed Cook	Australasian tree ring records
9.15-9.45	Janice Lough	Coral reef history books
9.45-10.15	Tas Van Ommen	Antarctic ice cores linked to rainfall decline in SW WA
10.15-10.45	COFFEE BREAK	
10.45-11.15	Yun Li	Deducing regional rainfall variability in Western Australian from remote teleconnections in NE China
11.35-11.55	Scott Mooney	The prehistory of fire in Australasia with emphasis on the last 2K
11.15-11.35	Ross Edwards	Changes in black carbon aerosol deposition to West Antarctica over the past 2400 years
11.55-12.15	Russell Drysdale	The role of cave records in understanding climate variability
12.15-12.35	Discussion and closing remarks	
12.35-1.30	LUNCH	

#### Day 1 Afternoon session: Assessing climate sensitivity of proxy records and an Aus2K database

**1:30–2:00** Ed Cook: Reconstructing climate over the past millennium: recommendations from a tree ring perspective

**2:00–2:30** Ailie Gallant: Observational climate co-variations, proxy calibration and addressing uncertainty

**2:30–3:00** Joelle Gergis and Raphael Neukom: Assessing climate sensitivity of palaeoclimate records: proxy–climate spatial field correlation maps and the development of an Aus2K database (DCCEE-funded)

**3:00–3:30 COFFEE BREAK**

**3:30–4:30** Discussion of proxy selection, resolvable timescales (annual vs multi-decadal subsets), annual-decadal variations in climate, target seasonal windows, defining climatologically-based sub-regional domains, use of appropriate gridded data, circulation indices etc

## **Thurs 28 April, Day 2: Multi-proxy climate reconstructions: what is possible for the 2K period?**

We ask that multi proxy people give thorough descriptions of their methodology e.g. Principal component regression techniques, climate field reconstruction, regional synoptic typing etc Talks will be based on annual and multi-decadal resolution techniques followed by methodological critique and discussion

### **Day 2 Morning session: Data synthesis methods, results and climate modeling**

**9:00–9:30** Annual resolution: Ed Cook – Asia and North American Drought atlases, 1200 years

**9:30–10:00** Annual resolution: Raphael Neukom –South America and European, 1000–500 years

**10:00–10:30** Annual resolution: Joelle Gergis – Australian temperature reconstruction, 1000–500 years

**10:30–11:00 COFFEE BREAK**

**11:00–11:30** Annual resolution: Chris Turney – Southern Hemisphere temperature, 1000–500 years

**11:30–12:30** Discussion on high-resolution methods, possibilities and issues

**12:30–1:30 LUNCH**

### **Day 2 Afternoon session: Open discussion on data, methodology and formation of working groups**

**1:30–2:00** Multi-decadal resolution: Drew Lorrey (NZ synoptic typing, full 2K)

**2:00–2:30** Multi-decadal resolution: Ian Goodwin (Southern Hemisphere MCA, full 2K?)

**2:30–3:00** Modeling: Steven Phipps (the role of modeling in the last 2K)

**3:00–3:30 COFFEE BREAK**

**3:30–4:30** Discussion on low-resolution methods and modeling

**4:30–5:30** Breakout group discussions on calibration and reconstruction methods, caveats and possibilities.

Topics may include:

1. Techniques used to address uncertainty in palaeoclimate reconstructions (e.g. ensemble techniques, pseudo-proxy analyses with climate observations and models)
2. Uncertainties and caveats for low resolution Australasian palaeoclimate proxies
3. Stability of C20th century proxy–climate relationships
4. Dealing with non-stationarity issues (e.g. regional climate–large-scale, proxy–regional climate)
5. Use of modeling to assess the changing relationship between proxies and climate variables over time
6. Identification of working groups around research paper ideas, discussion of proxy– climate field correlation maps for regions of interest etc

**Evening: Group dinner: [Jo Jo's Café, Nedlands, Perth](#)**

## **Fri 29 April, Day 3: Research planning**

### **Day 3 Morning session: Sub-regional collaboration and planning discussion**

1. Sub-regional groups to meet and discuss collaborative plans for *Journal of Climate* special issue
2. Further discussion of proxy–climate spatial field correlation maps
3. Discuss roles, data requirements and responsibilities for reporting back to Aus2K

### **Day 3 Afternoon session: Aus2K timelines to meet PAGES Regional 2K goals**

1. Full group reconvenes to discuss goals and 15 October 2011 deadlines for *Journal of Climate* and PAGES Regional 2K deadlines.
2. Agree on methodological framework for PAGES 2K temperature reconstructions
3. Federal Department of Climate Change and Energy Efficiency (DCCEE)-funded help for database and full Australasian domain synthesis work.