

How green were our deserts? Evidence for Late Quaternary climate change and the source of water in the Lake Eyre basin

Megalake filling and deflation in central Australia.

This project has revealed when central Australia was significantly wetter than present, focussing on two of the largest mega-lakes; Mega Lake Eyre and Mega Lake Frome. We have shown that dramatic climate change occurred at 48 – 50 ka in the Lake Eyre basin; the same time the giant flightless bird *Genyornis* became extinct. We have also demonstrated the ongoing aridification in central Australia occasionally punctuated by short intervals when these lakes filled to much higher levels than present.

We have completed the final field season for the ARC DP in 2012 and have established a chronology for the lower Cooper Creek plus additional high resolution sampling of sedimentary sequences that will allow us to compare river activity to the newly established Lake Eyre lake level curve. We have completed sample analysis of Holocene aged samples for Lake Eyre allowing us to reconstruct an extended Lake Eyre lake level record into the Holocene. We have also obtained a high resolution lake floor record in Lake Frome that extends beyond the Last Glacial Maximum.

2013 field campaigns will focus on obtaining detailed Holocene sequences from barriers around Lake

Frome and obtaining a second lake-floor core from Lake Callabonna. Future work will concentrate on separating the relative contribution of the Flinders Ranges with that of the Cooper by using rare earth element analyses and zircon dating. This will unravel the dominant sources of sediment and water through time to the Frome-Callabonna mega-lake system. We will then continue correlating these records with newly emerging precisely dated stalagmite records from Mairs Cave

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