

## CLIMATE AND VEGETATION CHANGE SINCE THE FIRST PEOPLE ARRIVED IN THE KIMBERLEY REGION

On 2 April 2014, our speaker was [Associate Professor Karl-Heinz Wyrwoll](#) from the School of Earth and Environment at The University of Western Australia. His research interests extend across the fields of physical geography, geology and past climates utilising the modern technology of [climate modelling](#) with the aid of computers.

His talk highlighted the extreme climate changes and the controls that have characterised the Earth over the last 100,000 years, showing how some of these have "played out" in north-western Australia. It also drew attention to the likely impact of [traditional vegetation burning practices](#) by indigenous Australians on the northern Australian climate.

Karl-Heinz commenced with a series of satellite images showing the changing shape of Lake Gregory ([Paruku](#)) providing the evidence of extensive climate change. Some of the changes in the dimensions of the lake can be attributed to the monsoon response to higher summer incoming radiation at various times in the last few hundred thousand years.

There is also clear evidence of a weaker monsoon regime, evidenced by desert dunes at the margins of King Sound. These were first observed by [Rhodes Fairbridge](#) and formed part of the basis of his 'Ice Age Aridity' model, which saw low latitudes arid zone extensions, at times when massive ice covers developed in high latitudes. Fairbridge was a geologist at UWA and after leaving for the United States became one of the leading Quaternary geologists of his time. He and his UWA colleagues, [Joseph Gentili](#) and [Curt Teichert](#), laid the foundations for the study of past climates in Western Australia.

Other evidence of climate change is provided by river deposits, providing evidence of active stream flow resulting from strong rainfall – monsoon related events. Associated with these, is evidence of human habitation dating to 30,000 to 33,000 years ago. Stalagmites have also acted as guides to past climate events. These have allowed us to recognise abrupt climate 'shifts'. One of these occurred about 15,000 years ago, when climates over the north Atlantic collapsed. This may have triggered 'cold surges' of air out of eastern China, resulting in stronger summer monsoons over northwestern Australia.

In reconstructing past climates complex global-scale climate models are now used. These are the same models that are being employed to predict future climate states. It has proven possible to use these models to explore whether there has been a climate response to Aboriginal vegetation burning practices. The models have shown that a more open vegetation, resulting from vegetation burning, has changed the temperature and rainfall regime of the spring to early summer months in the northwest monsoon region. Such model studies make it now possible to claim that people have impacted on global climates long before the industrial era.

An important outcome of the study of past climates, with geological data being linked to global-scale climate models, is that it is now possible to test the validity of climate models. In this sense it becomes possible to claim that "the past becomes our guide to the future".

### Further reading

Wyrwoll, Karl-Heinz. '[How Aboriginal burning changed Australia's Climate](#)', *The Conversation*, 12 January 2012.

Wyrwoll, Karl-Heinz, Jennifer M. Hopwood, and Guangshan Chen. 'Orbital time-scale circulation controls of the Australian summer monsoon: a possible role for mid-latitude Southern Hemisphere forcing?' in *Quaternary Science Reviews*, 35 (2012), 23–28.