Geophysical Research Abstracts
Vol. 19, EGU2017-4109, 2017
EGU General Assembly 2017

Palaeomonsoons: the state of knowledge and outstanding challenges

Sandy P. Harrison

University of Reading, Centre for Past Climate Change and School of Archaeology, Geography and Environmental Science, Reading, United Kingdom (s.p.harrison@reading.ac.uk)

A wealth of different kinds of palaeoenvironmental evidence documents the waxing and waning of regional monsoons during the Late Quaternary. Together with modelling experiments, these data are providing a picture of the interrelations between forcings, feedbacks and monsoon dynamics. The planned CMIP6-PMIP4 palaeoclimate simulations of the mid-Pliocene Warm Period, Last Interglacial, Last Glacial Maximum and mid-Holocene, and associated PMIP4 transient and sensitivity experiments, provide an opportunity to test our understanding of monsoon dynamics and model encapsulation of this understanding. Major challenges include explaining:

• The limited expansion of desert regions under glacial conditions;
• The persistent mismatch between observations and simulations for northern hemisphere monsoon expansion during interglacials;
• The anomalous behaviour of the southern African and Australian monsoons in response to insolation forcing;
• Differences in the response of different environmental sensors, including the indicators of the rapidity of monsoon collapse, and their relationship to insolation-driven differences in the seasonal timing of the monsoon;
• Mitigation of vegetation responses to precipitation variability through CO_2-induced changes in water-use efficiency and allocation;
• The lack of coherent patterns between changes in short-term variability and mean climate state.