Geophysical Research Abstracts, Vol. 9, 01487, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-01487


# Coral records of the changing seasonal characteristics of the Indian Ocean Dipole during the Holocene

**N.J. Abram** (1,2), M.K. Gagan (1), Z. Liu (3), W.S. Hantoro (4), M.T. McCulloch (1), B.W. Suwargadi (4)

(1) Research School of Earth Sciences, The Australian National University, A.C.T, Australia, (2) British Antarctic Survey, Natural Environment Research Council, Cambridge, U.K., (3) Center for Climatic Research, University of Wisconsin-Madison, Wisconsin, U.S.A., (4) Research and Development Center for Geotechnology, Indonesian Institute of Sciences, Bandung, Indonesia, (nabr@bas.ac.uk / Phone: +44-1223-221539)

The Indian Ocean Dipole (IOD) is a coupled ocean-atmosphere climate system that causes climatic extremes and socio-economic hardship throughout the tropical Indian Ocean region. It is believed that the IOD interacts with the El Niño/Southern Oscillation (ENSO) and Asian monsoon systems, but the scarcity of long historical and proxy records from the IOD region has meant that the exact nature of these interactions has remained unclear. Furthermore, recent changes in the historic ENSO-monsoon relationship, and predicted future strengthening of the Asian monsoon raise the possibility that the IOD, and its climatic impacts, may also be evolving. To examine how past changes in ENSO and the Asian monsoon may have affected the IOD, we use coral geochemical records from the equatorial eastern Indian Ocean to reconstruct the seasonal characteristics of surface-ocean cooling and drought associated with IOD events during the mid-Holocene (when the Asian monsoon was strong) and the late-Holocene (when El Niño was strong). We find that IOD events during the mid-Holocene were characterised by a longer duration of strong surface-ocean cooling and droughts that peaked later than those during late-Holocene IOD events. Climate model simulations suggest that this enhanced cooling and drying was the result of stronger cross-equatorial winds driven by the strengthen Asian monsoon of the middle Holocene. These results imply that future changes in Asian monsoon strength could have consequences that extend throughout the Indian Ocean region, with the potential for both a change in the seasonal timing and length of IOD droughts.