AAPG Annual Convention
Salt Lake City, Utah
May 11-14, 2003

Stephen A. Nathan[1], R. Mark Leckie[2], Brooke Olson[1], Robert M. DeConto[3] (1) University of Massachusetts, Amherst, MA (2) Micropaleontology Laboratory, University of Massachusetts, Amherst, MA (3) Department of Geosciences, University of Massachusetts, Amherst, MA

The Western Pacific Warm Pool: A Probe of Global Sea Level Change and Indonesian Seaway Closure During the Middle to Late Miocene

The Western Pacific Warm Pool (WPWP) greatly influences tropical Pacific climate and ocean circulation. When did this oceanographic feature become established and did it influence the East Asian monsoon? We present preliminary results of an investigation into the development of the WPWP as the Indonesian Seaway (IS) narrowed during middle to late Miocene time. This study combines planktic foraminiferal population analyses with stable isotope data from ODP Sites 1146 (northern South China Sea; SCS), 1143 (southern SCS) and 806 (Ontong Java Plateau, OJP; western equatorial Pacific) at three time slices (0, 7, and 11 Ma).

At Site 1146 the modern assemblage, which is influenced by the monsoon, is 42% surface and 58% thermocline dwellers. At OJP, surface dwellers dominate (81%) over the thermocline dwellers (19%), reflecting the thicker mixed layer and deeper thermocline observed at the WPWP. ??d18O enrichment compared to modern values. Both the 7 Ma population structure and the isotopic data show that the WPWP was absent at OJP. At 11Ma, the assemblages at both sites are nearly identical to the modern OJP.

We suggest that a proto-WPWP (~ 11-9.5 Ma) may have developed as a consequence of IS constriction and the major sea level fall at the middle/late Miocene transition. (This interval also coincides with decreased tropical carbonate mass accumulation rates.) Further, the subsequent late Miocene sea level rise increased IS throughflow, reduced the WPWP and increased tropical Indo-Pacific carbonate mass accumulation rates (~ 8-5 Ma).

Copyright © 2003 by AAPG