Geophysical Research Abstracts,
Vol. 10, EGU2008-A-04984, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-04984
EGU General Assembly 2008

Pacific circulation during the middle Miocene climate transition (16.5-12.5 Ma)

Ann Holbourn (1), Wolfgang Kuhnt (1), Marcus Regenberg (1), Brian Haley (2), Alan Mix (3) and Nils Andersen (4)

(1) Institute of Geosciences, Christian-Albrechts-University, Kiel, Germany, (2) Leibniz Institute of Marine Sciences IFM-GEOMAR, Kiel, Germany, (3) COAS, Oregon State University, Corvallis, USA, (4) Leibniz Laboratory for Radiometric Dating and Stable Isotope Research, Christian-Albrechts-University, Kiel, Germany (ah@gpi.uni-kiel.de)

We use benthic and planktonic foraminiferal δ^{13}C and δ^{18}O, planktonic Mg/Ca together with Nd isotopes and deep-water ventilation proxies (benthic foraminiferal accumulation rates, proportion of coarse fraction $>$ 63 μm and XRF Fe) in four ODP cores from the northwestern, central and southeastern Pacific to monitor sea surface temperature and salinity gradients and to track circulation changes across the Pacific during the middle Miocene climate transition (16.5-12.5 Ma). Our high resolution (3-4 kyr) planktonic δ^{18}O record from the South China Sea (Site 1146) exhibits high amplitude variability and significant power in the 21 and 19 kyr precessional band, suggesting that a monsoonal regime was established in SE Asia by the middle Miocene. During episodes of major ice expansion at 14.6 and 13.9 Ma, planktonic δ^{18}O values strikingly decreased, amplitude variations in δ^{18}O increased and SST estimates indicate that surface waters became overall warmer and fresher in the tropical northwestern Pacific. Nd isotopes and ventilation proxies reveal that Antarctic glaciation at 13.9 Ma was also associated with increasing stratification of the upper ocean, major deepening of the Calcite Compensation Depth and the establishment of a more vigorous deep water ventilation. Therefore, our results indicate that middle Miocene Antarctic glaciation events were synchronous with (1) the onset of steeper latitudinal temperature gradients, (2) the expansion of a West Pacific Warm Pool and intensification of the Asian Summer monsoon and with (3) a major reorganization of intermediate and

deep water circulation in the Pacific.