Geophysical Research Abstracts
Vol. 12, EGU2010-15224, 2010
EGU General Assembly 2010

Dynamics of sea surface temperature and organic burial off equatorial west Africa (ODP Site 959) across the Late Miocene/early Pliocene climate transition

Olunbunmi Eniola (1), Thomas Wagner (1), and Erin McClymont (2)

(1) School of Civil Engineering and Geosciences, Newcastle University, Newcastle upon Tyne, NE1 7RU, UK (olubunmi.eniola@ncl.ac.uk, thomas.wagner@ncl.ac.uk), (2) School of Geography, Politics and Sociology, Newcastle University, Newcastle upon Tyne, NE1 7RU, UK (erin.mcclymont@ncl.ac.uk)

The late Miocene–early Pliocene (11 to 3.5 Ma) was a period of major transition in global climate and ocean circulation that had irreversible consequences for atmospheric and ocean circulation leading to global cooling, northern hemisphere glaciations and modern climate conditions. Long term cooling contributed to a change in global vegetation from C3 plants to C4 plants. Norris (1998) and Wagner (2000) proposed from bulk ^{18}O foraminifera and TOC records covering the Miocene-Pliocene transition at ODP Site 959 off Ivory Coast/Ghana the initial onset of modern atmospheric circulation and linked continental upwelling off tropical West Africa in response to the emplacement of the ITCZ into its modern position at that time. In this project, we aim to investigate the nature of the observed TOC cycles and its relationships to continental climate, vegetation change and surface ocean dynamics at centennial time scale resolution. To infer variations in SST and supply of continental organic matter (OM) we have started to obtain bulk and molecular data including TOC, alkenone-derived SST and leaf wax n-alkanes. The results show TOC to be generally low, between 0.1 and 0.7 %, and highly variable at cm-scale (2.5-5 kyr) resolution. Alkenones ($C_{37:2}$ and $C_{37:3}$) were ubiquitously identified. U^K_{37} based SST estimates ranging from 25-28°C indicate fluctuations of about 3°C within the range of modern day conditions. Long chain odd numbered n-alkanes C_{27-33} were also identified, with leaf wax concentration peaking at C_{31} at 25μg/TOC. The evidence for leaf waxes in the sediments argues for wind driven deposition from terrestrial sources. The high amplitude record of the TOC confirms a distinct cycle pattern that is probably related to orbital precession. Time frequency analyses of the TOC records by depth support the existence of two domi-nant periods related to eccentricity and precessional cycles at approximately the 92cm, 52cm and 42cm corresponding to 100kyrs, 19kyrs and 23kyrs respectively. Elevated TOC tend to compare with elevated leaf wax n-alkanes but seems less clear when compared with the SST. Further molecular work on the δD and δ^{13}C of the n-alkanes is planned to reconstruct precipitation and vegetation change.