Geophysical Research Abstracts
Vol. 16, EGU2014-1562, 2014
EGU General Assembly 2014

Surface and subsurface/intermediate ocean circulation and monsoonal influence on the eastern equatorial Atlantic during the late Glacial and Holocene

Andrea Fischel (1), Henriette Vinther Jacobsen (1), Marit-Solveig Seidenkrantz (1), Christof Pearce (1), Antoon Kuijpers (2), Fabienne Marret (3), and James Scourse (4)

(1) Centre for Past Climate Studies, Aarhus University, Department of Geoscience, Aarhus C, Denmark (andrea.fischel@geo.au.dk or mss@geo.au.dk), (2) Geological Survey of Denmark and Greenland, GEUS, Copenhagen, Denmark, (3) School of Environmental Sciences, University of Liverpool, UK, (4) School of Ocean Sciences, College of Natural Sciences, Bangor University, UK

Planktonic foraminiferal assemblages from giant gravity Casq core MD03-2708CQ, retrieved off the Ogooué River mouth (01°10.33′S, 08°19.01′E; 920 m water depth) off West Africa, were analysed in order to reconstruct climate variability in the eastern equatorial Atlantic.

During the Last Glacial Maximum (25–19.1 kyr BP) the assemblage suggests a high influx of Antarctic Intermediate water (AAIW) into the eastern equatorial Atlantic region triggered by enhanced trade wind-induced upwelling causing a high productivity and comparatively low sea surface temperatures (SST) of 25–26°C. A stronger than present trade wind system and thermocline shoaling during this period may possibly have caused a stronger ventilation and possible elevation/expansion of the AAIW.

The deglacial period (19.1–10.8 kyr BP) experienced reduced upwelling and a significantly decreased AAIW inflow into the Gulf of Guinea causing a thickening and warming of the surface water layer and a low productivity. This was presumably linked to weaker trade winds and strong summer monsoons during this period, also resulting in a warm and moist climate in the nearby continental West Africa. Two minor, short-term SST maxima in the eastern tropical Atlantic coincide temporally with the Heinrich 1 event and the Younger Dryas. These warming events concur with setbacks in the northward movement of the ITCZ, and are presumably linked to the mechanism of the Atlantic bipolar seesaw.

During the Holocene (10.8 kyr BP to the present) the inflow of AAIW into the Gulf of Guinea was again strengthened and modern oceanographic conditions became fully established ca. 5.2 kyr BP. Slightly lower SST and a higher productivity suggest a stronger trade wind system combined with a weaker monsoon, effecting regional cooling and drier climate in the region of Gulf of Guinea.