Geophysical Research Abstracts, Vol. 9, 02056, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-02056

Impacts of the North Atlantic gyre circulation on Holocene climate off Northwest Africa

J.-H. Kim (1), H. Meggers (2), N. Rimbu (3), G. Lohmann (3), T. Freudenthal (2), P.J. Müller (2), R.R. Schneider (4)

(1) Royal Netherlands Institute for Sea Research, Department of Marine Biogeochemistry and Toxicology, PO Box 59, 1790 AB Den Burg, Texel, Netherlands, (2) Universität Bremen, FB 5 Geowissenschaften, Klagenfurter Straße, D-28359 Bremen, Germany, (3) Alfred Wegener Institute for Polar and Marine Research, Bussestrasse 24, D-27570 Bremerhaven, Germany, (4) Christian-Albrechts-Universität zu Kiel, Institut für Geowissenschaften, Ludewig-Meyn-Str. 10, D-24118 Kiel, Germany (jhkim@nioz.nl / Telephone: (+31) (0)222-369410 / Fax: (+31) (0)222-319674)

We present well-dated Holocene, high-resolution records of sea-surface temperature (SST), phytoplankton productivity, and upwelling intensity obtained from core GeoB 6007–2 recovered from coastal Northwest (NW) Africa (30˚51.0′N, 10˚16.1′W, 582 m water depth). We identify long-term cooling trends over the Holocene in the subtropical North Atlantic in response to boreal summer insolation. A pronounced cooling event of $\sim$1 ˚C around 8.5 thousand years before present (kyr BP) indicates a large-scale reorganization of the ocean current system possibly induced by meltwater from the northern North Atlantic. Our alkenone SST record off Cape Ghir provides strong evidence for the impact of ocean circulation changes on subtropical North Atlantic SSTs. It is likely that cold waters were propagated to the subtropics via the Canary Current in a similar way to Heinrich Events and the Younger Dryas off Cape Blanc. Superimposed on the cooling trend, we find 2–3 kyr periodic variations in SST and upwelling intensity off NW Africa. Such a cycle has been documented in various paleoclimate archives in phase with solar forcing. We show that these variations on millennial time scales are linked to the North Atlantic subtropical gyre circulation and the Northern Hemisphere atmospheric circulation, and in particular to changes in the pressure gradient between the Icelandic Low and the Azores High. This suggests that oceanic circulation, in response to solar forcing, played a more important role in the generation of 2-3 kyr cyclicity than has been previously considered.