Geophysical Research Abstracts, Vol. 8, 02524, 2006
SRef-ID: 1607-7962/gra/EGU06-A-02524

Reconstruction of sea surface temperature variations in the Western Mediterranean between 145 and 250 Kyr using the $U^{k'}_{37}$ and TEX_{86} organic proxies

C. Huguet (1), B. Martrat (2), J.O Grimalt (2), J. S. Sinninghe Damsté (1) and S. Schouten

(1)Royal Netherlands Institute for Sea Research (NIOZ), PO Box 59, 1790 AB Den Burg, Texel, The Netherlands (+31(0)2220369 569/huguet@nioz.nl), (2)Department of Environemntal Chemistry, Institut d' Investigacions Quimiques i Ambientals de Barcelona, Consell Superior d'Investigacions Cientifiques (CSIC) 08034 Barcelona, Spain.

Several proxies have been proposed for the reconstruction of sea surface temperature (SST) in the past, the most common being δ^{18}O and Mg/Ca ratios from planktic foraminifera and the $U^{K'}_{37}$ index of long-chain unsaturated ketones synthesized by haptophyte algae. Recently, Schouten et al. (2002) introduced a new SST proxy, the TEX_{86}based on the relative distribution of glycerol dibiphytanyl glycerol tetraethers (GDGTs), which is based on the membrane lipids produced by non-thermophilic Crenarchaeota. These organisms are ubiquitous and abundant in seawater. Marine crenarchaeota biosynthesize different GDGTs with a varying number of cyclopentane rings, which relative abundance changes according to temperature. Therefore, by measuring the relative amounts of GDGTs present in sediments, the temperature at which Crenarchaeota were living can be reconstructed. Culture experiments showed that changes in salinity and nutrients do not substantially affect the temperature signal recorded by the TEX_{86}. Particulate organic matter analysis revealed that the TEX_{86} correlates well with surface water temperatures (depths $<$100m) and that the signal in the deeper water layers and surface sediments is primarily derived from the surface. In addition, this new proxy also seems to be unaffected by water redox conditions.

Multiproxy studies provide better descriptions of paleoclimate parameters such as SST. Thus, in the present study we have combined two lipid biomarker proxies, $U^{K'}_{37}$ and TEX_{86}, to obtain complementary information on SST variations in the Western

Mediterranean (core ODP-977A). TEX_{86} SST temperatures are compared to $U_{37}^{K'}$ records for the Saalian complex. Alkenone records show temperature trends similar to $\delta^{18}O$ records of *G. bulloides*, but $U_{37}^{K'}$ also show abrupt temperature changes following the Dansgaard-Oeschger events (Martrat et al. 2004). Here, the reconstruction of the past SST between 145 and 250Kyr at high resolution is also performed with TEX_{86}.

Schouten, S., E. C. Hopmans, E. Schefuss, and J. S. Sinninghe Damsté, Distributional variations in marine crenarchaeotal membrane lipids: a new tool for reconstructing ancient sea water temperatures?, *Earth.Planet.Sc.Lett.*, 204, 265-274, 2002.

Martrat, B., J.O.Grimalt, C. Lopez-Martinez, I.Cacho, F. J.Sierro, J. A.Flores, R.Zahn, M.Canals, J. H. Curtis and D. A. Hodell, Abrupt temperature changes in the western Mediterranean over the past 250,000 years. *Science*, 306, 1762-1765, 2004.