Geophysical Research Abstracts, Vol. 8, 03281, 2006
SRef-ID: 1607-7962/gra/EGU06-A-03281

High resolution multiproxy records of sea-surface conditions in the northeastern North Atlantic during the Last Glacial maximum

EYNAUD, Frédérique (1)

TURON, Jean-Louis (1)

DE VERNAL, Anne (2)

DUPRAT, Josette (1)

(1) Département de Géologie et Océanographie, UMR CNRS 5805 - EPOC, Environnement et Paléoenvironnemts OCéaniques, Université Bordeaux I, Avenue des facultés, 33405 Talence cedex

(2) GEOTOP, UQAM, Montréal, Quebec

We used five marine sequences distributed from the Capo Verde basin (18˚N) to the Voring Plateau (65˚N) on the eastern North Atlantic margin to generate a compilation of sea-surface conditions during the Last Glacial Maximum (LGM, sensu EPILOG from ca. 23 to 19 CAL-kyr BP; Mix *et al*., 2001). Our work aims at providing centennial-scale records of this interval, which is commonly considered as an integrated snap-shot for modelling and model-data comparison despite its 4000 years duration.

We used stable isotope (δ^{18}O and δ^{13}C) measurements in foraminifers, coarse lithic grain counts ($>$ 150 μm; including ice-rafted debris), coupled to the determination of planktonic foraminifera and organic-walled dinoflagellate cyst assemblages, to identify major changes in the properties of sea-surface water masses.

Our results permit to divide the LGM in two major periods. (1) The first one, spanning from 23 to 21.5 CAL-kyr BP, corresponds to a period of transition between the cold polar conditions of Heinrich Layer 2 (HL2) toward temperate conditions. (2) The second one, from 21.5 to 19 CAL-kyr BP, is identified as a period of mild con-

ditions preceding HL1, with an active penetration of the North Atlantic Drift in the Nordic seas (Norwegian Sea). Discrete climate events are also recorded at the Nordic sites with recurrent and quasi- periodic cooling. These results highlight an internal high frequency variability that could partly explain the large discrepancies between sea-surface conditions obtained from the different proxies for the LGM (cf. MARGO exercise, Kucera et al., 2005).

For all investigated sites, our data also suggest large seasonal gradient of sea-surface temperature (SST) with very low February SSTs, but August SST as warm as the modern ones. In this way, the hydrological mode of the glacial North Atlantic Ocean could be compared to a mega-fjord, with stratified water masses fostering low thermal inertia in a buoyant surface layer.

Our results indicate that the LGM was characterized by conditions with no perfect analogues in the modern Ocean. They also show that this interval was marked by large instabilities, which lead to question the relevance of data-model integration assuming "average LGM state" within the frame of paleoclimate model experiments.

Mix, A. E., Bard, E., and Schneider, R., 2001. Environmental processes of the ice age: land, ocean, glaciers (EPILOG). Quaternary Science Reviews, 20, 627-657.

Kucera, M., Rosell-Melé, A., Schneider, R., Waelbroeck, C. & Weinelt, M. (2005), Multiproxy approach for the reconstruction of the glacial ocean surface (MARGO), Quaternary Science Reviews, 24, 813-819.