PALEOTEMPERATURE AND PALEOPRODUCTIVITY OFF THE NORTHWESTERN IBERIA MARGIN DURING THE LAST 140 KY (TALK)

Emilia **Salgueiro**[1,3], A. Voelker[1], L. de Abreu[1, 2], Fátima Abrantes[1], H. Meggers[3], G. Wefer[3] & C. Lopes[1,4]
[1] Instituto Nacional de Engenharia, Tecnologia e Inovação I.P., Dept. Geologia Marinha e Costeira, Alfragide, Portugal
[2] Godwin Laboratory, University of Cambridge, Pembroke Street – New Museums Site, Cambridge CB2 3SA, United Kingdom.
[3] FB Geowissenschaften, University of Bremen, Bremen, Germany
[4] College of Oceanic and atmospheric Sciences, Ocean Administration Building 104, Oregon State University, Corvalis, OR 97331-5503, USA; emilia.salgueiro@ineti.pt

Paleoceanographic conditions of the northwestern Iberian margin during the last 140 ky were investigated through a multi-proxy approach (planktonic and benthic foraminifera stable isotopes, grain size analysis, carbonate content, planktonic foraminiferal assemblages and detrital grain counts) along core SU92-03 (3005 m water depth) off Cape Finisterra. Planktonic foraminifera census counting was used to reconstruct Sea Surface Temperature (SST) and Productivity with the modern analog technique SIMMAX 28 (Pflaumann *et al.,* 1996, 2003), using as reference the Portuguese margin database (Salgueiro *et al.*, submitted) added to the surface samples data from the North Atlantic used by the MARGO project (Kucera *et al.*, 2005). Modern SSTs for 10 m water depth were taken from the World Ocean Atlas 1998 and the modern oceanic primary productivity is based on satellite measurements of Antoine *et al.* (1996).

Present day hydrographic conditions at the study area are characterized by seasonal (May to September) intense and persistent upwelling of cold and nutrient-rich North Atlantic Central Waters (NACW). Filaments of upwelled water penetrate about 200 km offshore from the Finisterra Cape (Fiúza *et al.*, 1998). The site is bathed by North Atlantic Deep Water (NADW), below which Antarctic Bottom Water (AABW) occurs.

$\delta^{18}O$ of planktonic and benthic foraminifera preliminary results allow the identification of the last two deglaciations, interglacial and glacial periods back to Marine Isotope Stage (MIS) 6. The six youngest Heinrich events (H) and respective Bond cycles are also clearly marked by the deposition of large sized detritic grains (>2 mm) and an increase in smaller size lithic grains, both of which are interpreted as Ice Rafted Debris (IRD). Furthermore, abundance of *N. pachyderma* (sinistral) reaches more than 70%, and summer temperature and productivity drop by 11-14ºC and 50–80 gC/m^2/y, respectively. Heinrich event H2 is an exception, with *N. pachyderma* (sinistral) abundance around 30%, and temperature and productivity drops of 8ºC and 30 gC/m^2/y, respectively.

Carbonate content shows typical Milankovitch cycles with maxima in MIS 5e, 5c, 5a, and MIS 1. Low benthic foraminifera $\delta^{13}C$ values (<0.4‰) during MIS 6 reflect less ventilated waters and indicate the replacement of NADW by AABW.

Higher percentage of the upwelling species, like *G. bulloides*, are contemporary with increases in organic carbon content, and transfer-function-estimated productivity maxima clearly indicate periods of high productivity.

References

Antoine, D., André, J.-M. & Morel, A. 1996. Oceanic primary production. 2. Estimation at global scale from satellite (coastal zone color scanner) chlorophyll. *Global Biogeochemical Cycles* 10: 57-69.

Kucera, M., Weinelt, M., Kiefer, T., Pflaumann, U., Hayes, A., Weinelt, M, Min-Te Chen, M-T., Mix, A., Barrows, T., Cortijo, E., Duprat, J., Juggins, S. & Waelbroeck, C. in press. Reconstruction of sea-surface temperatures from assemblages of planktonic foraminifera: multi-technique approach based on geographically constrained calibration data sets and its application to glacial Atlantic and Pacific Oceans. *Quaternary Science Reviews*.

Fiúza, A.F.G., Hamann, M., Ambar, I., del Rio, G. D., González, N. & Cabanas, J. 1998. Water masses and their circulation off western Iberia during May 1993. *Deep-Sea Research I*, 45: 1127-1160.

Pflaumann, U., Duprat, J., Pujol, C. & Labeyrie, L. 1996. SIMMAX: A modern analog technique to deduce Atlantic sea surface temperatures from planktonic foraminifera in deep-sea sediments. *Paleoceanography* 11: 15-35.

Pflaumann, U., Sarnthein, M., Chapman, M., de Abreu, L., Funnell, B., Huels, M., Kiefer, T., Maslin, M., Schulz, H., Swallow, J., van Kreveld, S., Vautravers, M., Vogelsang, E. & Weinelt, M. 2003. Glacial North Atlantic: Sea-surface conditions reconstructed by GLAMAP-2000. *Paleoceanography* 18: 1065, doi: 10.1029/2002PA000774

Salgueiro, E., Abrantes, F., Meggers, H., Pflaumann, U., Voelker, A., Loncaric N., Oliveira, P., Bartels-Jónsdóttir, H.B., Moreno, J. & Wefer, G. submitted. Planktonic Foraminifera from Modern Sediments Reflect Upwelling Patterns off Portugal: Insights from a Regional Transfer Function. *Quaternary Science Reviews*.