Reconstruction of permanent thermocline temperatures in the Atlantic during Heinrich Stadial 1

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Changes in Atlantic Meridional Overturning Circulation (AMOC) have been modeled to lead to a global adjustment of the depth of the thermocline via the propagation of Kelvin waves, particularly in the North Atlantic with warming during AMOC slowdown. The aim of this study is to test for significant warming during AMOC shutdown by reconstructing permanent thermocline temperatures for the Deglaciation at key locations in the Atlantic. Therefore, we used Mg/Ca-paleothermometry on the deep-dwelling foraminifer *Globorotalia inflata*.

We established a new Mg/Ca-temperature calibration for *G. inflata* based on core top samples from the South Atlantic. The reconstructed apparent calcification depth for dominantly non-encrusted specimens is 350-400 m making *G. inflata* ideal to reconstruct temperature changes in the permanent thermocline.

First results from core GeoB9508-5 off northwest Africa, which is close to the boundary between the predicted thermocline warming (to the north) and cooling (to the south), show a significant warming during HS1 of ~4°C supporting the prediction of subsurface warming in the North Atlantic during AMOC slowdown. Interestingly, this warming occurs after the actual start of HS1.

Temporal dynamics of arsenic-bearing phases during the suspended transport

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In a former gold mining district (Isle river basin, France), arsenic-bearing phases have been characterized in suspended particulate matter by in-situ techniques (EPMA, SEM-EDS/ACC system and synchrotron based μXRD) in order to describe the temporal dynamics of As at a particle scale during the solid transport.

The most frequent As-bearing phases but the least As-concentrated (0.10-1.58 wt% As) were aggregates of various fine clay particles (chlorite-phlogopite-kaolinite assemblage during the high flow and chlorite-illite- muscovite assemblage during the low flow). They were also associated to Fe-coatings and nano- to micro- particles of Fe oxyhydroxydes like goethite (0.18 - 0.45 wt% As, Fig. 1).

Iron and Mn oxyhydroxydes were the 2 other types of As-bearing phases (0.12-2.80 wt% As and 0.14-1.26 wt% As respectively), present as discrete particles. Their occurrence and in-situ concentrations varied throughout the hydrological cycle, according to their detrital or newly formed origins.

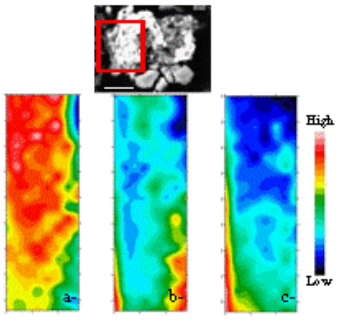

Figure 1: BSE image of a grain of Fe oxyhydroxyde associated to μ-XRD maps representing the relative abundance of a- goethite (4.18 Å), b- chlorite (7.07 Å) and c- muscovite (9.9 Å).