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Late Pliocene to early Pleistocene millennial-scale fluctuations in SST and stratification within the North Atlantic

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The late Pliocene to early Pleistocene (5.6–1.8 Ma) represents in many ways a key interval of Cenozoic palaeoceanography, including two major changes of the Earth system: the significant glaciation of the northern hemisphere, cluminating in a major expansion of Arctic ice sheets (Northern Hemisphere Glaciation, NHG) and the closure of the Panama Gateway. The impact of changes associated with the NHG on surface-water hydrology (SST and stratification) of the subpolar North Atlantic is, however, not fully understood yet. Given its proximity to the large dynamic ice-sheets of the northern hemisphere and the role in deep-water formation, however, the North Atlantic represents one of the climatically sensitive regions on Earth.

This study focuses on the combination of Mg/Ca and δ^{18}O analyses on planktic foraminifera in order to understand and reconstruct millennial-scale climate variability during the final stage of the NHG, especially marine oxygen isotope stages (MIS) 103-95 (late Pliocene to early Pleistocene, 2.6 to 2.4 Ma). In particular, this is relevant to better understand fluctuations in the magnitude of SST and stratification changes and their link to the intensification of NHG.

Stable isotope and Mg/Ca analyses have been carried out on the deep-dwelling planktic foraminiferal species *Globorotalia crassaformis* from IODP Site U1313 (North Atlantic, 41°N). This site is located at the base of the upper western flank of the Mid-Atlantic Ridge. It therefore is under direct influence of North Atlantic Deep Water and lies on the southerly limit of the so-called 'IRD belt'. Samples are taken in millenial-scale resolution from 2.6 to 2.4 Ma, comprising isotope stages 103 to 95. Samples from this site were already used before to test the existence of a relationship between the emergence of large-amplitude millennial-scale climate oscillations and an intensification of glacial conditions during the intensification of NHG by measuring mixed-layer stable isotope data on the surface-dwelling planktic foraminifera *Globigerinoides ruber*. Comparison of our results with these surface-water data reveal relatively stable conditions in surface waters while intermediate waters show strong fluctuations on a glacial-interglacial time scale, most probably reflecting changing intermediate-water masses.