

THE MID-LATITUDE NORTH ATLANTIC OCEAN DURING MARINE ISOTOPE STAGES 10-14

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High-resolution proxy records of IODP site U1313 (41°N, 32.96°W; 3412 mwd) and core MD01-2446 (39.06°N, 12.62°W; 3570 m) offshore Portugal are used to reconstruct interglacial and glacial hydrographic conditions in the mid-latitude North Atlantic Ocean during the Mid-Brunhes. Surface water temperatures are reconstructed based on the Mg/Ca ratio in *G. inflata* shells. Deep-water conditions are referred from the benthic foraminifer stable isotope records. Nowadays, surface waters at both sites are derived from the Gulf Stream/ North Atlantic Drift and the deep water is North Atlantic Deep Water (NADW) in form of the Deep Western Boundary Current (DWBC) at site U1313 and as Northeast (NE)ADW at site MD01-2446. Both sites experienced similar temperatures during the interglacial periods (MIS 11c, 13) and during glacial MIS 14 and 10. Surface waters at site U1313, however, started to become more variable and colder earlier than off Portugal during the second half of MIS 11c, probably due to advection of subpolar waters. Largest temperature differences between the sites existed during glacial MIS 12 when temperatures off Portugal were in general colder and overall less variable hinting to a strong gradient between the western and eastern basin. Also deep-water conditions were similar during the interglacials with both sites being bathed by well ventilated N(E)ADW conform with a strong Atlantic meridional overturning circulation (AMOC). During MIS 12, the site MD01-2446 isotope data indicates a better ventilated deep water in the eastern basin than in the western basin, pointing to a secondary, deep penetrating source of Glacial North Atlantic Intermediate Water, potentially formed in the Rockall Plateau region, and/ or a well ventilated overflow from the Norwegian Sea. Surface-water temperature and deep-water ventilation changes are contemporary at site MD01-2446, and for the greater part also at site U1313. At both sites, a clear phase shift is observed at the end of MIS 13 when surface water cooling is lagging deep water ventilation and thus the slowdown of the AMOC. Additional decoupling between surface and deep records is observed at site U1313 during the MIS 12 glacial maximum and during the second half of MIS 11c. During the glacial maximum warmer surface waters already reached site U1313 while the AMOC was still reduced (AABW presence) indicating that the surface water warming had no effect on the AMOC. During late MIS 11c, on the other hand, surface-water cooling preceded the ventilation change in the DWBC. Because the changes were synchronous in the eastern basin, the Nordic Sea overflows appear to be the sources for the NEADW and the DWBC during this period.

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