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A micropalaeontological perspective on export productivity, oxygenation and temperature in NE Atlantic deep-waters across Terminations I and II

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Abstract

Census counts of benthic foraminifera were studied from the SW Iberian Margin to reconstruct past changes in deep-water hydrography across Terminations I and II. Detailed benthic faunal data (> 125 μm size-fraction) allow us to evaluate the limitations imposed by taphonomic processes and restricted size-fractions. The comparison of recent (mudline) and fossil assemblages at IODP Site U1385 indicates the quick post-mortem disintegration of shells of astrorhizoid taxa (~80% of the present-day fauna), resulting in impoverished fossil assemblages. While the application of quantitative proxy methods is problematic under these circumstances, the fossil assemblages can still provide a qualitative palaeoenvironmental signal that, while most fully expressed in the 125–212 μm size-fraction, is nonetheless also expressed to some degree in the > 212 μm size-fraction.

Variations in the benthic foraminiferal assemblages reveal information about changing organic matter supply, deep-water oxygenation and temperature. MIS 2 is generally characterized by an elevated trophic state and variable oxic conditions, with oxygenation minima culminating in the Younger Dryas (YD) and Heinrich Stadials (HS) 1, 2 and 3. Low oxic conditions coincide with decreased water-temperature and lower benthic $\delta^{13}C$, pointing to the strong influence of a southern sourced water-mass during these periods. HS 1 is the most extreme of these intervals, providing further evidence for a severe temporary reduction or even shutdown of

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