Environmental and rock magnetic investigations into provenance and processes of west Iberian margin sediments

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Ocean sediment records from the West Iberian margin can be correlated to both Antarctic and Greenland ice cores as well as to European terrestrial pollen data. Previous studies have focussed on comparatively short sediment cores collected from relatively deep-water sites (i.e. >~2500mbsl). Here we present magnetic mineralogy and grain size from Integrated Ocean Drilling Programme Sites U1385 (2585mbsl) and U1391 (1085mbsl) to further understand magnetic sediment provenance and palaeocurrent evolution on the west Iberian margin dating back to ~416 ka. The gradient of IRM acquisition curves, shape of hysteresis loops, and marked decrease in magnetic susceptibility at ~580°C indicate that magnetite is the dominant magnetic phase at Site U1391. At depth, increased contributions of a higher coercivity component are seen at intervals where the concentration of magnetic material is low. FORC diagrams indicate the presence of a narrow ridge elongated along the Bc axis consistent with a higher coercivity component observed in IRM acquisition data. Magnetic grain size proxy (k\(\text{ARM}/k\)) records from Site U1391 also show a significant difference in pattern of variability at depth. After ~130 ka k\(\text{ARM}/k\) closely follows relative sea level, however prior to ~130 ka there is higher frequency variability with apparent coarser magnetic grain size, suggesting the higher coercivity component could have resulted from diagenetic processes. This is particularly apparent during warm intervals where magnetic material concentration is low (MIS 7, 9 and 11). This behaviour differs from that observed at either Site U1385, or in the younger portion of the record at Site U1391. We infer that the intervals of diagenetically effected sediments at U1391 could have resulted from increased productivity, vertical migration of the Mediterranean outflow water and associated changes in bottom water ventilation. Further understanding of sediment composition, redox conditions, transport and provenance through the last few glacial cycles underpins much of the other palaeoclimatic investigation at these sites. Results from our analysis of rock magnetism will be used to guide the reconstruction of reliable relative palaeointensity records from the Iberian Margin sediments to assess past geomagnetic changes in the region.