The environmental magnetic signatures for provenance indication of ice-rafted debris in Heinrich layers 1 and 2 on the NW European continental slope

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The composition of ice-rafted debris (IRD) within a sediment core from the European continental slope (core OMEX-2K; 49˚5ı N 13˚26ı W) has been examined using environmental magnetic analyses. The data demonstrate that there is compositional variability of the IRD within Heinrich layers 2 (H2) and 1 (H1) and these differences are most readily explained by changes in the IRD source contribution. Some IRD within the main Heinrich layers show high magnetic susceptibility (χ), soft IRM values and are dominated by magnetic minerals with low coercivity behaviour, suggesting similarities to IRD derived from the Laurentide Ice-Sheet found in cores from within the main North Atlantic IRD-belt. In contrast, other IRD-rich layers, both prior to and within the main Heinrich layers, demonstrate different magnetic behaviour (lower χ values and higher coercivity behaviour), suggesting a contribution from a non-Laurentide sourced IRD, most likely derived from ice-streams of the European ice-sheets. These data are consistent with published mineralogical data from the same core and suggest that environmental magnetic analysis has considerable potential for characterising IRD materials within marine sediments for the purposes of defining provenance.