



## **Ocean-Climate Interactions and the Early Glacial History of the Last British Ice Sheet: A multi-proxy study of a marine sediment core from the Rockall Trough, N.E. Atlantic**

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The last interglacial was followed by progressive climate deterioration towards glacial conditions with high/mid latitude marine and ice cores documenting 'unstable' climate from the demise of the last interglacial. Amphiatlantic sea surface temperature (SST) cooling episodes and enhanced ice-rafted debris (IRD) deposition in North Atlantic marine sediment cores within Marine Isotope Stage (MIS) 5 (ca. 130 to 70 kyr), document the inception of Northern Hemisphere glaciation. The penetration of warm waters into the high Nordic Seas provided a moisture source for the formation of the early Weichselian ice sheets, as Northern Hemisphere insolation decreased and climate cooled at the end of the last interglacial (MIS 5e).

Proxy data for sediment core MD04-2822 from the Rockall Trough (56° 50'N, 11° 20'W, 2344m water depth) is presented for the last interglacial to MIS 4/3 transition (ca. 128 to 60 kyr). The core documents the growth of these high northern latitude ice sheets as a series of SST cooling events during MIS 5, which are associated with the advance of the polar front into the North Atlantic, increases in IRD and a reduction in Atlantic Meridional Overturning Circulation (AMOC). These reductions in AMOC may have been forced by input of freshwater (icebergs/meltwater) from the existent Northern Hemisphere ice sheets. The changing influence of hydrography upon inputs of IRD to the site and evidence for early history of the last British Ice Sheet (BIS) is presented.

The terrestrial records of the British Late Quaternary are often incomplete with evidence removed or obscured by later ice sheet oscillations. However marine records afford a potentially uninterrupted record of ice sheet dynamics. MD04-2822 presents an unprecedented opportunity to begin unravelling the early history of the last BIS, as it extends beyond other high resolution cores within the vicinity. The first tentative evidence for substantial NW British ice growth early within the last glacial cycle (ca. 72 kyr) is presented. Provenance indicators (including radiogenic isotopes and lithological characterisations) suggest a likely presence of a BIS during the latter stages of MIS 5 with enhanced input within MIS 4. The early BIS therefore appears to be highly sensitive to prevailing climatic conditions, with warm surface waters providing a moisture source for growth during a period of global cooling.