



Early deglaciation of the British Irish Ice Sheet from the Malin Sea continental shelf: west of Scotland.

S. Louise Callard (1), Colm Ó Cofaigh (1), Sara Bennetti (2), Richard C. Chiverrell (3), Katrien J. J. Van Landeghem (4), Margot M. Saher (4), Jenny A. Gales (5), David Small (1), Chris D. Clark (6), Stephen J. Livingstone (6), Derek D. Fabel (7), and Steven G. Moreton (8)

(1) Department of Geography, Durham University, Durham, United Kingdom, (2) School of Environmental Sciences, University of Ulster, Coleraine, United Kingdom, (3) School of Environmental Sciences, University of Liverpool, Liverpool, United Kingdom, (4) School of Ocean Science, Bangor University, Menai Bridge, United Kingdom, (5) School of Biological and Marine Sciences, University of Plymouth, Plymouth, United Kingdom, (6) Department of Geography, University of Sheffield, Sheffield, United Kingdom, (7) SUERC, University of Glasgow, East Kilbride, United Kingdom, (8) NERC Radiocarbon Facility, East Kilbride, United Kingdom

During the Last Glacial period, the British Irish Ice Sheet (BIIS) extended to the continental shelf break offshore western Ireland and Scotland. Despite global sea levels at 134 m lower than present two thirds of the BIIS was marine influenced and drained by ice streams. Although, recent research offshore Britain and Ireland, using marine geophysical data, has significantly enhanced our understanding of the glacial geomorphology of the shelf, the extent and dynamic retreat of most of the marine-based sectors of the BIIS are still not well constrained chronologically. BRITICE-CHRONO, a NERC consortium project, has sought to constrain the timing and rate of the retreating BIIS with both marine and terrestrial archives collected along eight transects that extend from the continental shelf edge to a few tens of kilometres onshore. This contribution provides an overview of the marine research carried out on one transect located offshore western Scotland and northern Ireland that reconstructs the Barra Fan Ice Stream (BFIS). New geophysical data, marine sediment cores and over forty radiocarbon dates provide important constraints on maximum extent of the BFIS and the timing and pattern of retreat back across the Malin Shelf. Dated moraines and grounding-zone wedges seen in sub-bottom profiles provide evidence that the BFIS reached a maximum shelf edge extent around 26.7 ka cal BP. Retreat from the shelf edge was underway by 25.9 ka cal BP, with the majority of the continental shelf ice free by 23.2 ka cal BP, and that grounded ice reached the coastline by 20.1 ka cal BP at the latest. Collectively these results indicate that the majority of the Malin Shelf was free of grounded ice by ~21.5-20 ka cal BP, which is up to 4,000 years earlier than previously reconstructed. A similar pattern of early retreat is reconstructed from other transects along the Atlantic margin of the BIIS. The timing of retreat coincides with a period of falling global sea level and cooler sea surface and air temperatures in this region indicating that local ice dynamics, bed morphology and relative sea-level were significant actors upon the stability/instability of the BIIS.