



## **Ice streaming in western Scotland and the deglaciation of the Hebrides Shelf and Firth of Lorn**

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Previously, numerous studies have been undertaken both onshore and offshore to decipher the morphological and sedimentological record in order to better constrain the limits and duration of the British-Irish Ice Sheet (BIIS) (Ballantyne et al. 2009, Bradwell et al. 2008b, Clark et al. 2011, Dunlop et al. 2010, Howe et al. 2012, O’Cofaigh et al., 2012). Late glacial ice sheet dynamics have been revealed to be far more rapid and responsive to climatic amelioration than had previously been considered.

Notable in this debate has been the evidence that has been obtained in the inshore and, to a lesser extent, offshore on the UK continental shelf. Here new geomorphological data, principally multibeam echo sounder (MBES) data has provided imagery of previously unseen features interpreted as being glacial in origin.

In the wake of these new discoveries this projects aims to investigate the extent, timing, growth and final disintegration of the BIIS across Western Scotland. This area of particular interest for the development of the glaciated North Atlantic margin has been generally neglected in past studies, especially across the mid-outer shelf, which constitutes a missing part in the jigsaw of the reconstructed BIIS during the last ~20.000yrs.

We aim to mainly focus on geomorphological analyses of MBES data collected in the Firth of Lorn and Sea of Hebrides; a study of features as moraines, glacial lineations and drumlins will provide important clues on the dynamics and maximum extension of the sheet.

Subsequently we will examine the geometry and composition of the shelf sediment infill, aiming to constrain the influence of ice retreat on depositional environments using multi-element geochemical (Pb-isotopes ratios, <sup>14</sup>C and OSL dating) and sedimentological techniques. Such an investigation will also give retrospective information on the sources for these sediments, hence more indications on ice configuration. Ultimately we aim to provide a model of deglaciation for the western sector of the BIIS.

Keywords: British-Irish Ice Sheet, NW Scotland, glacial bedforms, geochronology

### References

Ballantyne, C.K., Schnabel, C. & Xu, S. 2009. Readvance of the last British Ice Sheet during Greenland Interstade (GI-1): the Wester Ross Readvance, NW Scotland. *Quaternary Science Reviews*, 28, 783-789

Bradwell, T., Fabel, D., Stoker, M., Mathers, H., McHargue, L., Howe, J., 2008b. Ice caps existed throughout the Late glacial interstadial in northern Scotland. *Journal of Quaternary Science* 23, 401-407.

Clark, C.D., Hughes, A.L.C., Greenwood, S.L., Jordan, C., Sejrup, H.P. 2012. Pattern and timing of retreat of the last British-Irish Ice Sheet. *Quaternary Science Reviews*.

Dunlop, P., Shannon, R., McCabe, M., Quinn, R., Doyle, E. 2010. Marine geophysical evidence for ice sheet extension and recession on the Malin Shelf: New evidence for the western limits of the British-Irish Ice Sheet. *Marine Geology*, 276: 86-99.

Howe, J. A., Dove, D., Bradwell, T. & Gaferia, J. 2012. Submarine geomorphology and glacial history of the Sea of the Hebrides, UK. *Marine Geology* 315-318, 64-78

O’ Cofaigh, C., Dunlop, P. Benetti, S., 2012. Marine geophysical evidence for Late Pleistocene ice sheet extent and recession off northwest Ireland, *Quaternary Science Reviews*. In press.