



Post-glacial sea-level history for NE Ireland (Belfast Lough) based on offshore evidence

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Glacio-isostatic adjustment (GIA) models suggest a complex relative sea-level (RSL) pattern around the Irish Sea Basin after the Last Glacial Maximum (LGM), with modelled sea-level lowstands ranging from -12 m in the north to greater than -60 m in the south of the Basin. However, these GIA models are poorly constrained by observational data offshore. Belfast Lough, on the NE coast of Ireland, is one of seven sites chosen to investigate this complex RSL history as part of the project 'Late Glacial Sea level minima in the Western British Isles' (NERC NE/H024301/1). Belfast Lough was chosen as one of the candidate sites on the basis of location (at the northern end of the Irish Sea Basin), sedimentary environment (grossly depositional) and the fact that the lowstand predicted for the Belfast Lough area by a recent version of the GIA model (-16.5 m) differs significantly from the (limited) extant observational data, which interprets the lowstand at -30 m. In 2011 and 2012 we gathered new multi-beam echo-sounder data, >200 km trackline pinger- and boomer- seismic reflection data and 46 vibrocores in Belfast Lough. Radiocarbon dating and palaeoenvironmental analysis are used to constrain the interpretation of the seismic and sediment data. Five seismo-stratigraphic units are interpreted, with a distinct erosional surface between U3 and U4 interpreted as a transgressive surface associated with sea level rise post-dating a RSL lowstand. Foraminiferal evidence indicates an increase in marine species (from lagoonal/estuarine to fully marine) from U4 to U5. Integration of the seismic and core data indicate an erosional event prior to 12.7 cal yr BP resulting in a planated surface in the inner Lough and wave-eroded drumlins at the mouth of the Lough between -15 and -22 m, interpreted as a possible slowstand. On the basis of seismic evidence in the outer Lough, an as yet undated lowstand at -42 m is tentatively interpreted to pre-date this stillstand. These results will be used to tune the Earth and ice model parameters in a new run of the GIA model.