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Offshore evidence of postglacial relative sea-level change from eastern Ireland.

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Field evidence and Glacial Isostatic Adjustment (GIA) models help constrain the extent of the British Irish Ice Sheet (BIIS) during and since the Last Glacial Maximum (LGM). Because of differential ice loading histories, relative sea-level (RSL) changes at sites from around the Irish Sea basin are complex. Existing GIA models are constrained using sea-level observations and some poorly dated and unevenly distributed ice margin data, but there is a paucity of RSL observations below -10 m OD that spans the Late Glacial, a period of abrupt RSL change that includes at least one meltwater pulse. Addressing this interval of time requires the collection of new field data from offshore regions around Ireland, taking advantage of recent advances in remote sensing techniques.

This paper presents results from offshore eastern Ireland, one of seven areas targeted as part of a larger NERC funded project 'Late Glacial sea-level minima in the Irish Sea'. Previous research in this region has focused on dating raised marine sediments from exposed onshore coastal sections that represent periods of RSL highstands during the early deglaciation. However, the significance of these data for RSL reconstruction and hence their constraints on GIA models is debated. Here we use a combination of marine geophysics (multibeam bathymetry and backscatter, pinger sub-bottom profiler) vibro-coring and laboratory analyses to reconstruct Late Glacial RSL change from this region. The area's bathymetry demonstrate a strong glacial imprint on the northern side of the study area, with a large arcuate fan extending from Dundalk Bay to -18m, perhaps formed during a period of ice readvance, most likely during the Killard Point Stadial (c. 16.5 k cal a BP). Pinger seismic data allow the identification of six seismo-stratigraphic units, of which the most notable is a chaotic unit sitting on a prominent reflector that can be traced between -22 m to -50 m. The unit is interpreted as a gravel lag overlying either a till or glaciomarine material. Twelve vibro-cores retrieved from between -21 m to -35 m confirm the presence of a gravel layer that overlies a stiff glaciomarine clay, confirming the presence of a transgressive surface. Radiocarbon ages provide a minimum age for this unit of $\sim$13.3 k cal a BP. Preliminary mapping indicates that the transgressive surface dips to below the modelled lowstand (-30 m). This suggests that existing models require revision. Our data also suggest deglaciation following the LGM was interrupted by a short-term readvance that happened sometime before c. 13.3 k cal a BP – most likely during the Killard Point Stadial.