Deglaciation of the Irish Sea basin

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1. Introduction: The last British – Irish Ice Sheet declined rapidly after 24,000 years ago, with the Irish Sea home to one of the largest ice streams draining this former ice mass. Geochronological modelling constrains the decline of this ice mass to 24,000 to 19,000 years ago (Chiverrell et al., 2013; Mccarroll et al., 2010). The sea floor geomorphology (e.g. van Landeghem et al., 2009) shows the evidence for subglacial landforms and a sedimentary record for this deglaciation. Britice-Chrono is a 5 year NERC Consortium Project running 2012-2018 for which the explicit aim is constrain the rates and styles of ice stream retreat during the last deglaciation. The motivation is that better data are needed by the icesheet modelling community to test and validate their simulations to increase confidence in future scenarios for Antarctica and Greenland. The recent Britice-Chrono cruise of the RRS James Cook obtained >40 cores and 100’s km of geophysical (seismic) and multibeam morphological data for the Irish Sea. This coupled with >270 cores and a comprehensive survey dataset for the High Voltage Direct Link (HVDL) that crosses the Irish Sea from the Wirral to the Firth of Clyde provides an unrivalled opportunity to test hypotheses about rates and styles of deglaciation.

2. Project Summary: This project will use an unrivalled geophysical data archive and comprehensive collection of core materials to explore the environments and ice marginal retreat sequence in the Irish Sea broadly north from the Llyn Peninsula to SW Scotland and Cumbria. Focusing almost entirely on the offshore record the project will test hypotheses about: nature and influence of grounded ice, the extent and ice flow indications in the subglacial landforms, the sediment signature across the subglacial to proglacial transition, the extent and degree of marine influence (the glacimarine debate), sediment provenance and ice source / flow paths. The overarching aim is to reconstructing the environmental changes in the basin across this deglaciation. The research will benefit from a comprehensive marine and land-based geochronology developed in parallel through the proposed PhD research (Britice-Chrono) and the PhD candidate would benefit from the connections and research environment of the Britice-Chrono research community (Field and Annual Meetings, and Conferences). The lead supervisor (Chiverrell) is the Terrestrial Lead for Britice-Chrono and Transect Lead for Irish Sea East.

3. Training: The student will receive training in the use of an array of sediment description and analysis, geophysical data and accompanying software. It will be expected that the student will participate in workshops that provide additional training in research skills, GIS and experimental design. The School of Environmental Sciences requires that the student participate in a comprehensive postgraduate research programme. The British Geological Survey (BGS) is a CASE partner and so though based at Liverpool you will spend between 3 and 12 months at the BGS during the 3-4 years of your research training. Tom Bradwell and Claire Mellett will be a key part of your supervisory team and contribute to the training programme that will include classroom-based technical training (e.g. BGS GeoSchool).
4. **Background of applicant**: The student will have a relevant undergraduate and/or postgraduate degree in the Earth Sciences with interests or experience in palaeoglaciology, sedimentology, geophysical data and analysis – some experience in GIS, geophysical data collection, clastic sedimentology, or laboratory work would be advantageous but not essential.

5. **References**

