

EGU2020-9438

<https://doi.org/10.5194/egusphere-egu2020-9438>

EGU General Assembly 2020

© Author(s) 2022. This work is distributed under the Creative Commons Attribution 4.0 License.



The evolution of the terrestrial-terminating Irish Sea glacier during the last glaciation

Richard Chiverrell¹, Geoff Thomas, Matthew Burke¹, Alicia Medialdea², Rachel Smedley¹, Mark Bateman³, Chris Clark³, Geoff Duller⁴, Derek Fabel⁵, Geraint Jenkins⁴, Xianjiao Ou⁴, Helen Roberts⁴, and James Scourse⁶

¹University of Liverpool, Environmental Sciences, Geography and Planning, Liverpool, United Kingdom of Great Britain and Northern Ireland (rchiv@liv.ac.uk)

²Institute of Geography, University of Cologne, Cologne, Germany

³Department of Geography, University of Sheffield, Sheffield, UK

⁴Department of Geography and Earth Sciences, Aberystwyth University, Ceredigion, UK

⁵Scottish Universities Environmental Research Centre, Rankine Avenue, Scottish Enterprise Technology Park, East Kilbride

⁶Centre for Geography and Environmental Science, College of Life and Environmental Sciences, University of Exeter

Comprehensive mapping and the Britice Chrono geochronology provides a reconstruction of the last advance and retreat of the only land-terminating ice lobe of the western British Irish Ice Sheet. The Irish Sea Glacier was fed by ice from Lake District, Irish Sea and Wales, and extended to maximum limits in the English Midlands. During ice retreat after 27 kyrs, a series of reverse bedrock slopes rendered proglacial lakes endemic in the land-system. Not resembling the more extensive definitions of the classical 'Glacial Lake Lapworth', these ice contact lakes were smaller time transgressive moraine- and bedrock-dammed basins that evolved with ice marginal retreat. Combining, for the first time on glacial sediments, OSL bleaching profiles for cobbles with single grain and small aliquot OSL measurements on sands, has produced a coherent chronology from these heterogeneously bleached samples, and constrained for the Irish Sea Glacier a post 30ka ice maximum advance, 26.5±1.8ka maximum extent, and 25.3±1.6 to 20.6±2.2ka retreat vacating the region. With retreat of the Irish Sea Glacier an opportunistic Welsh re-advance 19.7±2.5ka took advantage of the vacated space and rode over Irish Sea Glacier moraines. Our geomorphological chronosequence shows a glacial system forced by climate, but mediated by piracy of ice sources shared with the larger and marine terminating Irish Sea Ice Stream to the west. The Irish Sea Glacier underwent changes flow regime and fronting environments driven by stagnation and decline as the primary impetus to advance was diverted. Ultimately, the glacier of the English Midlands display complex uncoupling and realignment during deglaciation and ice margin retreat towards upland hinterlands ~17.8 kyrs (Lake District and Pennines) and asynchronous behaviour as individual adjacent ice lobes became increasingly important in driving the landform record.