Geophysical Research Abstracts
Vol. 21, EGU2019-13966, 2019
EGU General Assembly 2019

Reconstructing the response of the British-Irish ice sheet to atmospheric temperature during Termination 1

Gordon Bromley (1), Aaron Putnam (2), Brenda Hall (2), Stephen Barker (3), Kurt Rademaker (4), and Alexandra Balter (5)

(1) Palaeoenvironmental Research Unit, Geography, NUI Galway, Galway, Ireland (gordon.bromley@nuigalway.ie), (2) School of Earth & Climate Sciences, University of Maine, Orono, USA, (3) School of Earth & Ocean Sciences, Cardiff University, Cardiff, UK, (4) Department of Anthropology, Michigan State University, East Lansing, USA, (5) Lamont-Doherty Earth Observatory, Columbia University, New York, USA

Ice sheets are both a clear physical representation of climate – fluctuating in response to temperature and precipitation – and a key contributor to climate variability, via feedbacks including albedo and meltwater input. Deciphering the scales of these respective roles from the geologic record of glaciation, however, requires glacial chronologies of sufficiently high resolution to be directly comparable to other, more continuous palaeoclimate records (e.g., ice and marine cores, speleothems). With the recent refinement of cosmogenic nuclide (CN) surface-exposure methods and, crucially, robust local calibration of CN production rates, glacial chronologies are now approaching this resolution. We present a new glacial-geologic record from the northern British Isles, constrained with cosmogenic 10Be and calculated using a new locally calibrated production rate, that documents the discrete pattern of ice sheet retreat in this part of the North Atlantic basin following the Last Glacial Maximum. This data set provides a nuanced view of phases during which the terrestrial cryosphere shrank, which we interpret as indicating strong atmospheric warming, and brief periods when the ice margin stabilised and/or readvanced, reflecting atmospheric cooling. Coupled with similar emerging glacial chronologies, these new data from northern Britain paint a terrestrial picture of stadial-interstadial climate during Termination 1 that contrasts with the traditional view of these severe climatic perturbations. Ultimately, our objective is to provide a robust terrestrial baseline for conceptual and computer models of cryosphere–climate interactions, both within and beyond the North Atlantic basin.