



Varved sediment records in Scotland: towards improving the chronology of events during the Last Glacial-Interglacial Transition

Alison MacLeod (1), Adrian Palmer (1), John Lowe (1), Jim Rose (1,2), and Charlotte Bryant (3)

(1) Royal Holloway University of London, Centre for Quaternary Research, Geography, Egham, United Kingdom
(a.macleod-1@rhul.ac.uk), (2) British Geological Survey, Keyworth, Notts, NG12 5GG, UK, (3) Natural Environment Research Council Radiocarbon Facility (Environment), East Kilbride, G75 0QF, UK

This paper focuses on investigating the timing, rates and duration of key shifts in climate during the Late Quaternary in Scotland. The Greenland Ice Core records have demonstrated how rapidly climate shifts can take place. How rapidly they are propagated, however, and how they are expressed in marine and terrestrial records at hemispheric or global scales is still contended. Many traditional chronological tools applied in these latter contexts, i.e. radiocarbon; do not currently provide the accuracy or the precision required to precisely constrain the timing of the onset and end of short-lived, high-magnitude events such as the Younger Dryas. Results are presented from two former glaciolacustrine basins in Scotland which preserve annually laminated sediments. These indicate that Glacial Lake Blane, in the south of the Loch Lomond Readvance (LLR) ice cap, existed for a minimum of 259 ± 3 years directly following deposition of an organic layer dated to between 12,117 and 11,650 cal yrs BP. Loch Laggan East, in the north of the LLR ice cap existed for 509 ± 4 years, its onset dated to between approximately 12,300 and 12,090 cal yrs BP. The absolute age of the two varve series are constrained by discrete tephra horizons and multiple radiocarbon determinations, which are combined within Bayesian statistical frameworks. These are integrated with other robust stratigraphic and chronological information and provide the most precise age estimates yet attained for the timing and duration of key events in Scotland during the Loch Lomond Stadial. They suggest that ice arrived at its maximal position later than previously supposed and may have lingered in parts of the Scottish Highlands into the Early Holocene. This research begins to pave the way for comparing events occurring in Scotland during the Lateglacial period with those elsewhere in the North Atlantic region, with sub-centennial precision.