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Reconstruction of Holocene climate change from peatlands in the North of Ireland

G.T. Swindles and H.M. Roe

School of Geography, Archaeology & Palaeoecology, Queen's University Belfast, Belfast BT7 1NN, United Kingdom (g.swindles@qub.ac.uk / Tel: +44 (0) 2890 273929)

Peatlands have been established as important archives of Holocene palaeoclimate data. However, there is a need to improve the quality and quantity of regional datasets. High-resolution palaeohydrological records have been generated from three raised bogs in Northern Ireland spanning a period from the Hekla 4 tephra isochron (2395-2279 *cal*. BC) to present day. The reconstructions are based on testate amoebae and humification analyses, which provide proxies of past changes in effective precipitation. Accurate and precise chronological control, based on the presence of Icelandic tephras, is used to provide clear evidence of complex bog surface wetness dynamics at 10^1 – 10^2 year resolution.

The records show good agreement, although the sites have very different hydromorphological and floristic characteristics. This illustrates the allogenic effects of climate overshadowing the strength of signals related to the autogenic development of the individual peatlands. The humification and testate amoebae-derived water table reconstruction also show good agreement, especially when large-magnitude changes are registered. However, it is suggested that testate amoebae-derived proxies are more plausible ecologically and less prone to bias than the humification signals.

Spectral analysis has revealed significant periodicities of c.260, 380, 560 and 1080 years in the datasets. Periods of wetter conditions in Northern Irish peatlands coincide with times of high Holocene lake levels in Europe and seem to be related to the wider Holocene cooling events. These events are associated with periods of reduced solar activity as inferred from the ^{14}C calibration curve, especially during the late Holocene anomalies (Wolf, Spörer and Maunder minima) and the Homeric minimum in the 1^{st} Millennium BC (c.850 *cal*. BC). However, the precision provided by a tephrochronol-

ogy shows that the wet-shifts are not entirely synchronous with the climatic deteriorations. For instance, the wet-phase in the first millennium BC postdates the 850 *cal.* BC anomaly in all three sites by a century. This calls into question the solar forcing mechanisms and the associated amplification effects at these times.