

**Peat's secret archive: Interpreting the geochemical and palaeodust
record from Scottish peat as a potential index of North Atlantic
storminess and Holocene climate change.**

Helena K. Stewart

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Faculty of Natural Sciences

University of Stirling

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ABSTRACT

Four continuous high-resolution peat records for the Holocene have been reconstructed across a ~300km transect from Shebster in Caithness to Yell in the Shetland Isles. These records describe the nature and extent of North Atlantic climate changes inferred from indicators of storminess and minerogenic aeolian dust, and are supported by radiogenic isotope analysis, tephrochronology and radiocarbon dating. The environmental changes at all four sites displays a significant degree of synchrony in response to changes in the position of the polar front jet (PFJ) stream and the phase of the North Atlantic Oscillation (NAO). Bromine concentrations in the peat, derived from sea spray, are used to reconstruct storm frequency and storm intensity, and mire surface wetness is used as an indicator of longer-term climate shifts. The results suggest a strong link between positive phases of the NAO and storminess. Subtle differences between the bromine concentrations and the mire surface wetness suggest that high intensity but perhaps less frequent periods of storminess are not necessarily associated with a wetter climate. Atmospheric minerogenic dust concentrations are used to reconstruct large-scale climate changes across the wider North Atlantic region. The results suggest a sympathy between dust activity and periods of glacial advance and a negative index of the NAO. Radiogenic isotope analysis suggests that the smallest particles may originate from Iceland.