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**TITLE:** Multi-proxy evidence of a mid-Holocene shift in the climatic system of Maritime Canada at ca. 6.8 ka BP.

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**ABSTRACT BODY:** Persistent cyclical patterns of centennial- to millennial-scale changes in key climate drivers, such as North Atlantic Deep Water formation and the Atlantic Meridional Overturning Circulation, have frequently been identified in Holocene palaeorecords of the mid- and eastern-Atlantic region. Given its proximity to the major discharge routes of the Laurentide Ice Sheet and repeated meltwater discharge of varying magnitude, the western Atlantic region, however, experienced disruptions to such cyclical climate patterns during the early Holocene. Here we present evidence of a shift in the climate system of Maritime Canada coinciding with the end of meltwater discharge at ca. 6.8 ka BP. Petite Bog (45°8'43"N, 63°56'36"W), a large ombrotrophic plateau bog in central Nova Scotia, was cored and analysed as part of the PRECIP (Palaeo-REconstructions of ocean-atmosphere Coupling In Peat) project, which aims to reconstruct the spatial-temporal pattern of moisture balance changes on the eastern seaboard of North America. A multi-proxy approach using stable isotope (C, H, and O) from Sphagnum cellulose, testate amoebae and plant macrofossil analysis was used to reconstruct palaeoclimatic changes at Petite Bog. Peat accumulation of ca. 1 yr.mm<sup>-1</sup> was consistent and near-linear throughout most of the Holocene with the exception of a clear 1,400 year long slowing to ca. 10 yr.mm<sup>-1</sup> following the '8.2 ka BP cold event'. A robust chronology, constrained by 34 <sup>14</sup>C radiocarbon dates, 3 typed tephra layers and an uncut surface, provides a suitable platform for palaeoclimatic reconstructions and multi-centennial to millennial-scale time series analysis. Results show a 325-year cyclicity in bog surface wetness (BSW), and consequently atmospheric moisture availability, following the mid-Holocene slow down in accumulation. This multi-centennial cycle is not present prior to ca. 6.8 ka BP, suggesting that the end of the meltwater influence marks a distinct shift in the regional climatic regime. Underlying the entire Holocene record is a cycle with a periodicity of ca. 2,800 years. However, no evidence of the well-documented millennial-scale climate cycles was found, suggesting that Petite Bog was either insensitive to or outwith the reach of the forcing factor responsible for such climate variability in the North Atlantic region. This stands in stark contrast to the millennial-scale climate cycle identified in BSW reconstructions at Nordan's Pond Bog, Newfoundland. Findings from Petite Bog show a clear shift to a multi-centennial cyclicity in the regional climate system

following the end of meltwater influence and highlight the complexity of Holocene climate in Atlantic Canada.

**KEYWORDS:** 1616 GLOBAL CHANGE Climate variability, 1637 GLOBAL CHANGE Regional climate change, 4950 PALEOCEANOGRAPHY Paleoecology.

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### **Additional Details**

**Previously Presented Material:**

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