

CONTRASTING EVOLUTION OF NORTHERN NEW ENGLAND POST-GLACIAL LAKES

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Sediment records from lakes in northern New England (VT, NH and ME) provide insight into the changes in surface and lacustrine processes that took place during the early Holocene. The timing and rate of aquatic and terrestrial ecosystem development can be determined using elemental and isotopic compositions of sedimentary organic matter. This study concentrates on lakes formed in the barren, carbon and nutrient poor watersheds that resulted from deglaciation during the late Pleistocene/early Holocene.

Sediment cores were retrieved from five small (0.07 to 1.43 square km) post-glacial lakes in NH and ME. Each core contains the transition from organic-poor sands and silts to organic-rich gyttja-type sediments. This transition is interpreted as the combined result of landscape revegetation and the onset of primary productivity within the lakes. The amount of sedimentary organic matter is a function of lacustrine paleoproductivity and the magnitude of organic input from the revegetating watershed. Stable carbon isotope and carbon/nitrogen (C/N) ratios can help determine the relative importance of each of these two sources of organic matter through time, allowing us to track the development of aquatic and land plants.

The isotopic and elemental composition data from the NH and ME lakes were compared to data previously produced for four post-glacial lakes in VT. Initial observations show significant differences in the records from the three states. The clear correlation between organic matter increase and sharp decrease (up to 15 per mil) in δ -13C values documented in the VT cores, is not observed in the sediments from NH and ME. Although present, the negative isotopic shift found in the NH and ME cores is of lower magnitude (<7 per mil) and the sediments display less negative δ -13C values compared to the VT lakes. These differences may result from differences in the physical characteristics of the lakes, as well as from distinct deglaciation histories of the three states.

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