

TERRIGENOUS LAYERS IN LAKE CORES DOCUMENT FLUCTUATIONS IN NEW ENGLAND'S HOLOCENE CLIMATE

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Four lake cores (4.5-6 m long) from Ritterbush Pond, north-central VT, record a history of Holocene climate change. 28 14-C (AMS) ages document the instantaneous deposition of sand and silt layers, 1 to 10 cm thick, interrupting slow (0.5 mm/yr) background accumulation of organic rich, clay-sized material. The sand and silt deposits cluster temporally, suggesting fluctuations in sedimentation dynamics since stabilization of the 2.2 sq. km, forested watershed around 9000 14-C yr. BP. The organic matter in the sand and silt layers has $\delta^{13}\text{C}$ and C/N values supportive of a terrestrial origin. Grain size data show the thickest layers are graded and fine toward the center of the lake, suggesting deposition by bottom currents from stream discharge or lake marginal and delta sediment reworking. Charcoal data do not support hillslope clearing fires as a trigger mechanism, nor is there geomorphic evidence, such as slump scarps or debris flow deposits, for large-scale landslide events on the steep hillslopes surrounding the pond.

The apparent driving force for deposition of these terrigenous layers is change in basin hydrology as controlled by short- and long-term climate fluctuation. Hydrologic events as brief as a seasonal storm, or as prolonged as decades of increased precipitation, could scour alluvial and snow-melt channels and undercut stream banks, delivering sediment to the lake and/or causing failure of sandy, lake marginal slopes. The clustering of such events into 500-900 year periods, initiated at 2500, 6000, and 8500 14-C yr. BP, implies significant, possibly regional change in storm frequency or intensity in New England during the Holocene.

Holocene, climate-change, New England, lake, sedimentation