

## **Simulating the response of eight forested lake-watersheds in the Adirondacks region of New York to acid deposition**

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In this study the model PnET-BGC was applied to eight drainage lakes in the Adirondack region of New York to assess the response of soil and surface waters to change in atmospheric deposition. The eight lakes are located throughout the Adirondack Park and monitored through Adirondacks Long Term Monitoring program (ALTM). The lakes studied are Brook Trout Lake, Constable Pond, Grass Pond, Middle Branch Pond, Middle Settlement Pond, Squash Pond, West Pond, and East Copperas Pond. All lakes except Grass Pond (which classified as medium till and moderately sensitive to acidification) have thin deposits of glacial till and are sensitive to acidification. Squash and East ponds have high dissolved organic carbon, but the others have low DOC. The model-simulated monthly and annual volume-weighted concentrations of the major solutes indicated that model simulations responded well to changes in atmospheric deposition and captured the trends of measured water chemistry at all eight sites. A sensitivity analysis was performed on Brook Trout Lake to assess the sensitivity of major state variables in response to change in Al weathering rate and water holding capacity (WHC). The result indicated that model predictions of inorganic monomeric aluminum, organic aluminum and base saturation were highly sensitive to variations in Al weathering rate. Sensitivity analysis also showed decrease in ANC and NO<sub>3</sub> and increase in Mg and soil base saturation in response to increase WHC.

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