
University of Pennsylvania
Institute for Environmental Studies

presents

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Stream Chemistry as an Integrator of Ecosystem Processes: Unexpected Responses to Changing Atmospheric Deposition in Pennsylvania

Long-term trends in stream chemistry can be effective indicators of ecosystem processes and related changes in pollutant loadings. Trends in stream chemistry on five relatively-pristine, small forested watersheds in Pennsylvania during 1991- 2008, a period with general decline in levels of atmospheric deposition of both S and N compounds, have shown both expected and some unexpected responses. Expected declines in stream nitrate and sulfate concentrations due to reduced atmospheric deposition were generally observed with some variations due to local watershed conditions. Salvage logging at the beginning of monitoring increased the rate of nitrate decline on one basin and naturally high sulfate retention delayed the sulfate decline on another basin.

Unexpected changes in stream dissolved inorganic carbon (DIC) and silica (DSi) were also observed which implied that soil levels of CO₂ and weathering/decomposition rates had also changed during the period. DIC and DSi increased during 1991-2003 and then decreased or remained constant during 2004-2008. Increasing atmospheric CO₂ levels may explain increases in stream DIC and DSi up to 2003, but probably not trends after 2003. An alternative hypothesis is that observed DIC and DSi trends were related to variations in annual N deposition and consequent effects on soil respiration and diatom activity. Although the causes of unexpected changes in stream chemistry remain unexplained at this time, long-term monitoring data suggest that stream chemistry is a sensitive indicator of changes in watershed pollutant loadings as well as more subtle shifts in ecosystem nutrient cycling.

Date: October 7, 2009

Time: NOON - 1:30 pm

Place: Carolyn Hoff Lynch Auditorium

On the Penn campus: Chemistry Building

34 & Spruce Sts. (enter on 34 St)

NO REGISTRATION REQUIRED

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NO FOOD OR DRINK PERMITTED IN THE AUDITORIUM
