Tracing Nitrate Sources in Surface Water in a Northern Hardwood Forest. (S07-piatek080215-Oral)

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Abstract:

We used del 15N and del 18O of nitrate and water chemistry data to determine whether atmospheric deposition (snow and rain), soil, or groundwater were the sources of nitrate in surface waters at the Huntington Wildlife Forest in the Adirondack Region of New York State. Nitrate in surface waters was concentrated on anion resin, reacted into silver nitrate, and analyzed for 15N/14N and 18O/16O isotopic ratios. Surface water was analyzed for major cations and anions, and for DOC. In the winter of 2001, groundwater was the major source of nitrate in surface waters. Snowmelt resulted in the largest nitrate export of the year, with most of the nitrate being derived from soil. Meltwater was stored in the watershed (soil) during a relatively dry period that followed snowmelt, so that nitrate from the snowpack was first flushed by a major rain event that occurred in mid-June. The results of this study suggest that contribution of soil-derived nitrate is of particular importance during snowmelt. Future studies should focus on factors regulating winter production and retention of N solutes in the soils of this region, including the importance of climatic factors that affect snowpack formation and soil freezing.

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