# Soil biogeochemical processes in hydropedologic units in a northern hardwood forest Jennifer L. Morse<sup>1</sup>, Samuel F. Werner<sup>2</sup>, Peter M. Groffman<sup>1</sup>, and Scott W. Bailey<sup>3</sup> <sup>1</sup>Cary Institute of Ecosystem Studies, Millbrook, NY, USA <sup>2</sup>Syracuse University, Syracuse, NY, USA <sup>3</sup>Northern Research Station, US Forest Service, North Woodstock, NH, USA



#### **Soil Horizons**



Oie: forest floor Oa/A: humic soil

Bhs (spodic) Bh (illuvial) horizons combined

- Typical Spodosols are thought to dominate soils at HBEF
- Lateral <u>and</u> vertical flowpaths can form distinct Hydropedologic Units (HPUs)

### **Research Questions**

- Is there higher BGC activity where hydrologic flowpaths converge?
- Bh podzols? Is BGC activity different by horizon
- within soil profiles? - B horizons, where
  - OM accumulates?





### Horizons

- Robust patterns of higher C and N concentrations and cycling rates in Oie and/or Oa horizons, across all metrics (per g of soil)
- On an areal basis, all metrics were higher in Oa/A and B horizons. Deeper soil horizons are

biogeochemically active and important in the landscape

### Conclusions

### HPUs

- No significant differences between HPUs (perg soil) or overall (per m<sup>2</sup>).
- BGC processes tend to increase downslope, from Typical
- Spodosols to Bh Podzols. May need more replicates to detect differences.



## Results

Strong correlations of C content (and water content) with C and N cycling rates and concentrations across soil horizons and HPUs.

Controls



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#### **Contact Information**







