Dynamics of Ecosystem P in Chronosequences: A Mechanistic Analysis. (S02-huffman132942-Poster)

Authors:

- S.A.Huffman* - *Natural Resource Ecology Laboratory*
- C.V.Cole - *Natural Resource Ecology Laboratory*

Abstract:

Long term P availability and transformation are important in maintaining or improving ecosystem productivity since C and N cycles are closely linked to P transformations. Known P reserves are not enough to raise production on all the soils that are currently limited by P availability, particularly in the highly weathered soils in the tropics. Phosphorus transformations in chronosequences as investigated by Walker and Syers (1976) provide a useful framework for the investigation of P dynamics. Our objectives were to use a P chronosequence model to investigate the effects of climate and management on P transformation in ecosystems. We considered 100,000 years of P dynamics over a climatic range represented by savannah, grassland, taiga, temperate forest, temperate rain forest and tropical rain forest ecosystems. The P forms included were primary, secondary, occluded, organic and biological P. There were considerable differences in P transformations across these ecosystem types. Accumulations of biological and organic P represent mechanisms for minimizing the occlusion of P and reducing P losses by erosion and leaching. These results also suggest management strategies that conserve or improve P sustainability in various ecosystems.

Corresponding Author Information:

Steven Huffman
Natural Resource Ecology Laboratory
1649 S. Kingston Way
Aurora, CO 80012

phone: 303-369-6863
fax: 303-337-2682
e-mail: shuff110@attbi.com

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