Anaerobic Carbon Cycling in Peatlands. (S10-bridgham112503-Oral)

Authors:

- S.D.Bridgham* - *University of Notre Dame*
- M.Vile - *Princeton University*
- J.Pastor - *University of Minnesota*
- J.Keller - *University of Notre Dame*

Abstract:

While peatlands only occupy about 3% of the earth's land surface, they have accumulated approximately one third of the world's soil carbon due to very slow decomposition rates under waterlogged conditions. Additionally, peatlands are a globally significant source of methane, an important greenhouse gas and a terminal product of anaerobic decomposition. We examine the factors that control overall rates of anaerobic decomposition in peatlands along an ombrotrophic (only atmospheric inputs) - minerotrophic (with ground-water inputs) gradient from a number of experiments in Minnesota and Michigan, USA, Alberta, Canada, and the Czech Republic that have been performed over the last decade. We also examine factors that control relative rates of methane production in peatlands. Our data suggest that fermentation reactions dominate anaerobic carbon degradation in peatlands, with a surprising secondary importance of sulfate reduction. We suggest that ultimate controls over methane production result from the anaerobic microbial consortia that produce the substrates for methanogens, with plant production, nitrogen availability, and environmental factors also being important.

Corresponding Author Information:

Scott Bridgham
University of Notre Dame
Department of Biological Sciences
Notre Dame, IN 46556-0369

phone: (574) 631-4921
fax: (574) 631-7413
e-mail: bridgham.1@nd.edu

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