

Title:

Microbial Enzyme Activities of Peatland Soils in South Central Alaska Lowlands

Abstract text: (max 1500 characters)

Microbial enzyme activities related to carbon and nutrient acquisition were measured on Alaskan peatland soils as indicators of nutrient limitation and biochemical sustainability. Peat decomposition is mediated by microorganisms and enzymes that in turn are limited by various physical conditions and nutrient availability. We sampled 24 peatlands representing different vegetation and hydrological types (sedges versus shrubs) and geomorphological origins (relict glacial drainageways and lakebeds). We analyzed samples from shallow and deep peat samples for the following enzyme activities: aminopeptidases (N acquisition), esterases (S and P acquisition), glycosidases (labile C acquisition), and oxidases (refractory C decomposition). Most enzyme activities were greater in the ≤ 50 cm depth acrotelm than deeper catotelm peat in all peatland types. There were significant correlations of enzyme activities to total carbon of the peat. There was no relationship of enzyme activities with porewater pH although catotelm peat was less acidic. Stoichiometry of the microbial enzymes showed a tendency for peatland decomposition to be C and N limited. Results from this work have been a first characterization of soil enzymes in Alaska wetlands, yielding better understanding of the biogeochemical sustainability of the vast peatlands that are under threats from global climate change and human development in south central Alaska.

(This abstract does not necessarily reflect U.S. EPA policy.)

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Research ecologist for the U.S. EPA, Office of Research and Development, National Health and Environmental Effects Research Laboratory. Ph.D. in Microbiology and Masters in Ecology from the University of Kansas, 1991 and 1985. Current research interest focuses in wetland microbial ecology (especially peatlands), wetland indicators for regional condition assessments, and determinations of landscape areas of influence for wetland classification.

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