METHANE EVOLUTION FROM MINNESOTA PEATLANDS

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Peatlands in the northern hemisphere (346 x 10^8 ha) store large amounts of carbon; estimated at 455 petagrams (Pg) (=10^{15}) (Gorham 1991). This is about 30% of the world's pool of soil carbon (excluding peat), about 64% of the atmospheric pool (Bolin 1983), and about 55% of total plant biomass. This stored organic matter is passed to the atmosphere as both carbon dioxide (CO_2) and methane (CH_4) through aerobic or anaerobic decomposition, respectively. This review summarizes the annual evolution of methane from peatlands in north central Minnesota (1990-1993), its seasonal variance, its variance with air pressure, and its dependence on active transport through the stems of peatland emergents. Soil temperature, and water table position are major factors correlated with methane evolution. Modeling studies of possible climate changes (associated with 2X changes in CO_2 concentrations in the atmosphere) show that methane in the Lake Region will not change water levels. However, extended growing seasons and elevated peat temperatures will lead to additional methane evolution at rates 50 to 80 % higher than currently experienced. In this scenario, warming begets warming. However, field studies in 1994 testing the impact of elevated ammonium sulfate loading on peatlands, show that methane evolution is suppressed under atmospheric loading rates typical of Europe today.

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