Methane Dynamics of Vegetation-Soil Interactions in Bald Cypress and Other Bottomland Hardwood Forests

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Project Abstract

Methane (CH_4) is one of the most important greenhouses gas and more than 30% of the total CH_4 emissions originate from wetlands. There is high uncertainty in the contribution of mineral soil wetland to global CH_4 budgets. *Our project objectives are (1) to improve our understanding of the controls on CH_4 fluxes in forested mineral soil wetlands, and (2) to better understand the effects of landscape position and forest composition on the CH_4 fluxes between terrestrial ecosystems and the atmosphere*. *Using a coupled modeling-experimental approach*, we plan to measure the spatial and temporal dynamics of CH_4 fluxes in soils and woody structures (stems and "knees") of temperate bald cypress (*Taxodium distichum*) and other bottomland hardwood stands and incorporate our measurement into a land surface model to improve the model representation and predictions of CH4 fluxes. We are currently selecting suitable sites within the Clarks River National Wildlife Refuge (CRNWR) and Murphy's Pond in Western Kentucky that span a hydrologic gradient from the terrace to the stream channel. Soil's physical and chemical properties have already been measured at terrace sites. Preliminarily results show a significant difference in soil phosphorus loss and uptake by post oak and cherry bark sites and will be considered in future modeling efforts. Results from this project will enhance our understanding of CH_4 processes at bald cypress swamp and bottomland hardwood forests and will improve our knowledge of environmental processes in a hydrologically oscillating zone on CH_4 fluxes.