Title: Dissolved organic matter release at the soil-water interface in isolated wetlands

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Abstract:

Isolated wetland landscapes have dynamic terrestrial-aquatic interfaces as water levels rise and fall seasonally in response to evapotranspiration or precipitation events. During rain events, when the groundwater table rises and the extent of surface water inundation expands, previously unsaturated soils are rapidly reconnected to the wetland surface water-groundwater continuum and may release pulses of soil-derived dissolved organic matter (DOM). In addition to pulses of DOM released at the soil-water interface upon initial rewetting, there may be lagged groundwater inputs carrying soil-derived DOM from the surrounding landscape. The relative magnitude and timing of these soil-derived DOM sources remains largely unknown. To quantify changes in concentration and composition of DOM as water moves across the dynamic soil-water interface during rain events, we sampled surface water and porewater along shifting soil-water interfaces at two Delmarva Bay isolated wetlands located in the Mid-Atlantic United States. We collected surface water and porewater at four predetermined spots both before and during a rain event as the soil-water interface expanded outwards from the wetland center. Samples were analyzed for DOM concentration, DOM composition, and water isotope signatures. Preliminary results during pre-event conditions suggest that porewater DOM concentrations are higher than wetland surface water and that porewater isotopic signatures reflect a mixture of surface water and groundwater sources. As wetland-dominated landscapes are expected to be altered by climate change (e.g., more intense precipitation events, longer drought periods), it is increasingly important to understand how shifting terrestrial-aquatic interfaces influence wetland carbon cycling and downstream carbon export.