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4:00pm in W330

3:45pm Refreshments

Host: Kim Hageman

Aquatic organic matter composition and reactivity of permafrost influenced systems in interior Alaska

Organic matter in soil and aquatic phases serves a number of important biogeochemical roles in their surrounding ecosystems. Permafrost contains a large reservoir of organic carbon, and its thaw in northern latitudes has been attributed to changes in surficial water composition and quality. However, the impact of permafrost thaw on the character of organic matter in overlying watersheds is not well understood. Quantifying organic matter reactivity in permafrost impacted systems remains challenging due to its strong dependence upon molecular composition and source material. To this end, permafrost cores were sampled from discontinuous permafrost sites in interior Alaska, whereby leaching experiments were used to identify the mobilizable fraction of soil organic carbon from active layer and permafrost soils using ^{13}C multi-CP-MAS nuclear magnetic resonance (NMR). Preliminary results indicate heterogeneity of carbon pool composition with site and depth, as well as preferential mobilization of functional groups, as alkyl content was retained on the permafrost soil after leaching. In addition, several lakes and streams of varying talik formation were sampled within a residential watershed in interior Alaska over multiple seasons. Dissolved organic matter in sampled waters and isolates was characterized through optical spectroscopy methods and NMR. Seasonal differences in organic matter composition were observed, especially during winter and just prior to thaw, as well as among water bodies. Organic matter characterization was coupled with aqueous geochemical analyses to integrate trends in talik development with the influence of thaw on organic matter composition. Overall, this study highlights the complex heterogeneity of permafrost organic composition and the importance of assessing its potential biogeochemical contributions to the surficial environment upon thaw.

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