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MOLECULAR INSIGHTS INTO SEASONAL PATTERNS OF PARTICULATE ORGANIC MATTER RELEASE IN THREE MAJOR ARCTIC RIVERS

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Permafrost soils at northern latitudes store more than half of all the soil carbon on earth. When frozen soils thaw, they release their organic matter (OM) into Arctic streams and rivers that facilitate degradation and transport towards the ocean. Arctic river hydrology is characterized by an exceptional seasonality; a cold, ice-covered base-flow period during winter is replaced by a violent ice break-up during spring freshet, followed by a low-flow period in summer and autumn. Permafrost characteristics show a similarly strong seasonal pattern; frozen grounds in winter and spring freshet restrict water to shallow flow paths, whereas active layer deepening allows for increasing water flow through soils as the summer progresses.

This study focuses on particulate OM collected during three distinctly different periods (under-ice, freshet, low-flow) in three major Arctic rivers: the Mackenzie River in NW-Canada, Yukon River in Alaska, and Kolyma River in NE-Siberia. Through a wide array of molecular (lipid biomarkers, lignin phenols, GDGT's) and isotopic analyses (^{14}C , ^{13}C , ^2H) we will shed light on the sources, degradation state and transport pathways of permafrost OM throughout the year.