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Sources and degradation status of particulate organic carbon in the Kolyma River watershed

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Ongoing permafrost thaw potentially increases the organic matter loads of Arctic rivers. Organic carbon remobilized by abrupt thaw processes such as thermokarst, river bank and coastal erosion, is mostly released in the particulate form (POC) and may either enhance or attenuate global warming, depending on its propensity for decomposition. Strong seasonality in discharge and soil hydrological flow paths in watersheds underlain by permafrost enable transport of different carbon pools with contrasting lability. For this study, we focus on the Kolyma River watershed in North East Siberia, the world's largest watershed entirely underlain by continuous permafrost. To evaluate seasonal differences in carbon delivery to the rivers, we collected POC samples every 4-7 days from late May to early October from the Kolyma River mainstem close to its delta near Cherskiy and from a small nearby tributary draining an area completely underlain by Yedoma permafrost (Pleistocene icy organic-rich loess-like deposits). Concentrations of POC along with carbon (δ^{13}C, Δ^{14}C) and hydrogen isotope analysis on bulk POC and lipid biomarkers (long-chained n-alkanoic acids and n-alkanes) will be used to study the contributions of different sources (contemporary terrestrial versus deeper permafrost/yedoma), as well as their qualitative degradation state. This high-resolution POC sampling combined with isotopic fingerprinting and extensive geochemical analysis will allow us to assess present-day fluvial release and fate of POC from permafrost thaw in a major Arctic watershed.