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SUSCEPTIBILITY OF ANCIENT ORGANIC CARBON TO RAPID TURNOVER IN ARCTIC STREAMS AND RIVERS

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Northern perennially frozen soils and deposits contain approximately one-third to half of the global estimated belowground organic carbon (OC) pool. Arctic permafrost carbon therefore represents one of the most significant potential positive climate feedbacks due to the size of these carbon pools coupled with the intensity of warming across these regions. As permafrost degrades, ancient OC can be mobilized into streams and rivers, allowing this carbon to shape and interact with the contemporary OC cycle.

This study focused upon the bioavailability and age of the aquatic OC pool from contrasting sites throughout the Kolyma River basin, Siberia. More specifically, we investigated if the rate of OC biological utilization (BDOC) varied between modern and ancient OC pools, and traced how bulk dissolved OC and CO_2 ^{14}C age changed during short-term incubations (12 d) - a period relevant to the transit time of dissolved OC in these rivers. We will discuss how these studies may help us to reconcile relatively modern ^{14}C-DOC age measurements in dissolved aquatic OC with apparent increases in permafrost degradation across Arctic river catchments.