Title: **Loading of Dissolved Organic Carbon to Western Arctic Rivers from Process-Based Modeling**

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Project Abstract:

The mobilization and land-to-ocean transfer of dissolved organic carbon (DOC) in Arctic watersheds is intricately linked with the region's climate and water cycle, and furthermore at risk of changes from climate warming and associated impacts. This study quantifies model-simulated estimates of runoff, surface and active layer leachate DOC concentrations and loadings to western Arctic rivers, specifically for basins that drain into coastal waters between and including the Yukon and Mackenzie rivers. Model validation leverages data from other field measurements, synthesis studies, and modeling efforts. The simulations effectively quantify DOC leaching in surface and subsurface runoff and broadly capture the seasonal cycle in DOC concentration and mass loadings reported from other studies that use river-based measurements. A marked east-west gradient in simulated spring and summer DOC concentrations of 24 drainage basins on the North Slope of Alaska is captured by the modeling, consistent with independent data derived from river sampling. Simulated loadings for the Mackenzie and Yukon show reasonable agreement with estimates of DOC export for annual totals and four of the six seasonal comparisons. Nearly equivalent loading occurs to rivers which drain north to the Beaufort Sea and west to the Bering and Chukchi Seas. The modeling framework provides a basis for understanding carbon export to coastal waters and for assessing impacts of hydrological cycle intensification and permafrost thaw with ongoing warming in the Arctic.