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Dynamics of rare earth elements (REE) in the Arctic land-ocean continuum

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Permafrost thaw, coastal erosion and increasing river discharge due to global environmental changes are expected to alter trace element inputs, pathways and deposition in the Arctic Ocean. The goal of this research is to advance knowledge on the biogeochemical processes affecting rare earth elements (REE) across the land-ocean continuum at high latitudes in the Canadian Arctic. Our dataset includes novel observations on: (i) the speciation of dissolved REE and their flocculation in estuarine waters of the Sasapimakwananisikw (Sas) River draining peatland regions of Nunavik, Canada; (ii) the vertical profiles of REE and dissolved organic matter in sediment porewater and overlying water in the Mackenzie River and Delta, Northwest Territories; and (iii) the depth-distribution of total and operationally defined extractable REE fractions in sediment cores from the Mackenzie Delta, the continental margin in the Beaufort and Chukchi Seas and the Canada Basin in the central Arctic Ocean. During this communication, we will detail the speciation of REE in the Sas River water, demonstrate that flocculation of REE enriched colloids is likely an important removal mechanism in the Arctic continental shelf, interpret the strong seasonal variations in the porewater composition of the Mackenzie Delta sediments, and discuss the factors influencing the large-scale distribution of total and labile REE sedimentary concentrations in our study area.