



MASTER THESIS PROJECT

Trace Metals in the Arctic Rivers of Southern Greenland: Distribution, Controls, and Reactivity

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ABSTRACT

Trace metals (TMs) play a crucial role in Earth's biogeochemical cycle and are considered limiting and co-limiting nutrients in the ocean. Their complex role raises concerns about their distribution, concentration, and transport, particularly in the Arctic, a region highly vulnerable to climate change. This study presents an investigation into the distribution, concentration, reactivity, and transport of TMs in two distinct settings in Southern Greenland: glaciated and non-glaciated. The spatial variability in TM distribution reveals the dominant influence of geology, primarily silicates, while minor anthropogenic effects from land-use changes are observed. Proglacial rivers exhibit higher concentrations of labile particulate TMs compared to Tundra rivers, although TMs in Tundra rivers display higher reactivity. We estimated the annual flux of reactive particulate TMs in both settings, demonstrating that Proglacial rivers have a higher total flux of reactive TMs, predominantly driven by labile particulate flux. However, Tundra rivers contribute higher amounts of dissolved TMs, which could serve as a critical source of reactive nutrients in the ocean due to their proximity and the influence of other environmental processes on the transport of labile particulate TMs. This study is the first of its kind, providing high spatial resolution on TM distributions in 44 rivers of Southern Greenland, across diverse environmental settings.