

## Iron and macronutrient distributions near the fronts of marine-terminating glaciers in Inglefield Gulf, northwestern Greenland

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The Greenland Ice Sheet drains freshwater into the ocean through land- and marine-terminating glaciers. Runoff from land-terminating glaciers is assumed to be iron (Fe) and silicate source to the ocean. However, influence of discharge from marine-terminating glaciers on Fe or macronutrient enrichment is poorly understood due to the difficulty of oceanographic observations in a proglacial fjord. Here we present Fe and macronutrient dataset obtained in Inglefield Gulf region of northwestern Greenland, which is fed by ~10 marine-terminating glaciers.

In the summers of 2016-18, we collected meltwater samples on Bowdoin Glacier, one of marine-terminating glaciers feeding Inglefield Gulf. Seawater was sampled in Inglefield Gulf with acid-cleaned Teflon-coated Niskin-X samplers and a Teflon coating messenger suspended on a Kevlar wire. Dissolved Fe (DFe, passes 0.2  $\mu\text{m}$  acid-cleaned filters) in the seawater samplers was pre-concentrated using NOBIAS Chelate PA-1 resin (Hitachi High-Tech. Corp.). The DFe in the seawater and the glacial meltwater were analyzed with and without pre-concentration on a Graphite Furnace Atomic Absorption Spectrometer (Hitachi High-Tech. Corp.). Macronutrient in these water samplers was analyzed using an auto-analyzer (QuAatro, BL TEC Inc.) with a continuous flow system. Near the terminus of three marine-terminating glaciers (Melvill, Sharp, and Hart Glaciers), relatively cold (1~2°C) and fresh (as low as 28) waters were distributed in the upper 50 m. We deduce that the water masses in the upper 50 m have been modified by interaction with these glaciers, as previously reported. The DFe in the glacially modified waters ranged from 1.5 to 4.3 nmol/kg. On the Bowdoin Glacier, DFe in the meltwater ranged from 15.6 to 636 nmol/kg, with an average of  $197 \pm 179$  nmol/kg ( $n = 13$ ). The glacial meltwater was significantly enriched in DFe, and thus discharge from marine-terminating glaciers is a potentially important DFe source of the glacially modified waters. The DFe:nitrate ( $\text{NO}_3^-$ ) ratios in the glacially modified waters varied from 0.7 to 147 mmol/mol, which were notably higher than phytoplankton cellular Fe:N ratios (~0.02 mmol/mol, Sunda and Huntsman, 1995). This suggests that phytoplankton in the glacially modified waters were under Fe replete conditions in Inglefield Gulf.

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