

Contrasting the distributions of dissolved iron and manganese in seawater of the Canadian Arctic Ocean

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The Canadian Arctic Ocean is an important pathway connecting the North Pacific and North Atlantic, where inflowing Pacific waters are modified (e.g. continental shelf interactions and freshwater discharge) along a pathway from the Canada Basin through the Canadian Arctic Archipelago to the Labrador Sea and the North Atlantic Ocean. In this study we investigated the distribution of the essential trace nutrients dissolved iron (dFe) and manganese (dMn) along a section through the Canadian Arctic Ocean, during the Canadian Arctic GEOTRACES program in 2015. The study area includes the Canada Basin, the Canadian Arctic Archipelago, Baffin Bay and the Labrador Sea.

Our preliminary results show that dFe and dMn have distinct distributions. dFe is controlled primarily by biological uptake, remineralization, organic matter complexation and scavenging. In contrast, dMn behaves more conservatively with its distribution governed by scavenging throughout the water column. Overall, the deep open ocean stations have lower dFe and dMn, whereas the highest concentrations were measured in the shallow Canadian Arctic Archipelago (CAA) as a result of fresh water inputs and sediment-water interactions. Notably high dFe and dMn peaks in sub-surface waters (~100-300 m) in the Canada Basin and Baffin Bay were associated with the advection of water masses across shallow shelves in the Chukchi Sea and the CAA respectively.

This work will provide a better understanding of the biogeochemical and physical processes (e.g. biological uptake, scavenging, sediment resuspension, lateral advection, etc.) affecting the spatial and vertical distribution of dFe and dMn in the Canadian Arctic Ocean.