

The Distribution of Mn, Ga and Pb in the Canadian Arctic Ocean

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The Arctic Ocean plays a crucial role in climate, global ocean circulation, and global distribution of nutrients and trace metals. The Canadian Arctic Ocean is an important pathway connecting the North Pacific and North Atlantic, where Pacific waters get modified (e.g. continental shelf interactions and freshwater discharge) during its flow from Canada Basin to Labrador Sea. In this study we investigated the geochemistry of dissolved Mn, Ga and Pb along the Canadian Arctic Ocean, displaying 18 profiles sampled during the Canadian Arctic GEOTRACES program in 2015. The study area covers the Canada Basin, the Canadian Arctic Archipelago, Baffin Bay and Labrador Sea.

Our preliminary results show: 1) Open ocean stations have lower concentrations for Mn, whereas higher values of Mn were measured in the shallow Canadian Arctic Archipelago. A distinctive peak in Mn concentrations was found in Canada Basin between ~100-300 m (Pacific waters). 2) Dissolved Ga effectively trace the evolution of Pacific origin waters, with low concentrations (2-6 pmol/Kg), traveling from the Canada Basin through the Canadian Arctic Archipelago; contrasting with Atlantic waters which have distinctively higher values of Ga (16-33 pmol/Kg). 3) Overall, Atlantic waters display high values of Pb with noticeably elevated levels between ~100-300 m, whereas Pacific waters have low concentrations with elevated levels of Pb between ~50-100 m in Canada Basin.

This work will provide a better understanding of the spatial and vertical distribution of selected trace metals in the Canadian Arctic Ocean, along with an investigation of the processes (e.g. biological uptake, scavenging, sediment resuspension, lateral advection, etc.) which influence/alter the trace metal signature of the water masses studied in this region.