Dissolved trace metal micronutrients Fe, Mn, Zn, Ni, Cu and Cd in the Western Arctic Ocean (U.S. GEOTRACES GN01)

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The Arctic Ocean is a dynamic and rapidly changing environment, dominated by broad continental shelves and both advective and *in situ*-formed water masses. These features provide a unique environment in which to study micronutrient trace metal fluxes. The sources and sinks of trace metals are likely to change in a warming environment as a result of sea ice melt and altered hydrography. Here, we report the dissolved concentrations of six micronutrient metals (Fe, Mn, Cu, Cd, Zn, and Ni) from 26 stations along the U.S. GEOTRACES GN01 Western Arctic section, which extended across the Bering Strait to the North Pole and back. We identified multiple metal sources in the basin: sea ice, river water, shelf/margin sources as a result of both remineralization and sediment resuspension, and water mass signatures. Correlations between metals and fractional ice melt in the surface waters suggested that some metals such as Fe and Pb are sourced from sea ice while others like Cd, Cu and Ni are diluted by sea ice melting in the surface ocean. A large surface input of Fe, Cu and Ni near the North Pole correlating to low salinity values and fractional meteoric water indicated the influence of the Transpolar Drift, a cross-basin current bringing water from the riverine-influenced Siberian shelf across the pole towards Fram Strait. Furthermore, metal maxima in the halocline were likely derived from shelf remineralization and/or sediment resuspension. In Arctic deepwaters, metal concentrations showed no basin-to-basin differences and were generally very low, with nepheloid layers evident in Fe, Zn, and Pb at very few stations. By quantifying and comparing these various sources, a deeper understanding of micronutrient cycling in the Arctic can be gained and used in forecasting models of Arctic biogeochemistry upon climate change.