

Oceanography Seminar

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“GEOTRACES Arctic Section: Shipboard determination of key trace elements”

Bioactive metals, especially Fe, are essential components for biological activities in the surface ocean. The high-resolution distributions of dissolved Fe and other metals such as Al and Mn together help us to understand the mechanisms responsible for their distributions within the ocean. During the U.S. Arctic GEOTRACES expedition, samples were collected throughout the water column at 28 stations using the GEOTRACES trace element rosette containing 24 Teflon-coated GO-FLO bottles. Additional water samples from 6 stations were collected at nominal depths of 1, 5, and 20 m from under the sea ice, using a portable pumping system. All of these samples were filtered through a 0.2 μm AcroPak filter yielding a total of 411 samples that were analyzed for dissolved Al, Fe, and Mn using shipboard Flow Injection Analysis. Enrichment of Fe and Mn values were seen in the shelf waters of the Chukchi Sea as a result of remineralization processes. A contour plot of the concentrations from surface samples shows elevated Fe values north of 85N, coincident with the presence of ice cover. Surface water fluorescence, which is quite low across the Arctic Ocean, is also slightly higher in the central Arctic Ocean, despite this region having greater ice cover. Interestingly, CDOM values are also higher in this area, suggesting the presence of terrigenous organic material. This suggests that this enrichment of Fe is a result of transported Eurasian river water or a coastal feature resulting from the Transpolar Drift.

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