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Saito Lab Marine Bioinorganic Chemistry: GEOTRACES —N. Atlantic Section: High-Throughput Analysis of Total Dissolved Cobalt and Cobalt Speciation in the North Atlantic

PROJECT SUMMARY

We are participating in the first US GEOTRACES ocean chemical mapping expedition by conducting analyses and interpretations of total dissolved cobalt and cobalt speciation measurements by voltammetric techniques. Cobalt has a complex geochemistry, often described as hybrid type where its role as a micronutrient competes with scavenging removal and other input processes. In this study we aim to broaden the state of knowledge for cobalt marine biogeochemistry by investigating surface depletion, cobalt-phosphate correlations with stoichiometries that vary significant based on geographic location, redox cycling that occurs in oxygen minimum regions, and complexation chemistry. In addition, there are distinctly different biological requirements for cobalt, cadmium and zinc that appear to manifest themselves as a cobalt preference for cyanobacteria and a zinc preference for eukaryotic phytoplankton, with biological demand and recycling for each element in the subtropical gyres and coastal environments, respectively.

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