Statement of Interest:

GP17 GEOTRACES : Dissolved Cobalt and Proteins

Mak Saito – Woods Hole Oceanographic Institution

1. **Science Objectives:** we are interested in the study of the biogeochemical cycling of cobalt (Co) and its influence on biotic processes. As one of the scarcest biologically utilized trace metals, Co has been shown to be highly responsive to both biological and geochemical processes throughout the oceans. The South Pacific Ocean and Southern Ocean traverse areas of considerable biogeochemical and ecosystem interest. The South Pacific Ocean has some of the lowest Co abundances observed to date, and contains a large oxygen minimum zone. The Southern Ocean and Amundsen Sea appear to be changing with regards to the Co distributions and can be prone to Co-containing vitamin B_{12} co-limitation. We propose to study the biogeochemical cycling of Co in relation to macronutrients and other metals, as well as proteins that are of biogeochemical interest.
2. **Contribution to GEOTRACES Goals:** Our research supports GEOTRACES overall goals and mission of program through the first two themes of the original Science Plan, where cobalt biogeochemistry is heavily involved in both fluxes at ocean interfaces and in internal cycling. Prior GEOTRACES and GEOTRACES-compliant sections have shown that cobalt is particularly abundant in the oxygen minimum zones, due to the combined effect of increased sedimentary and coastal sources and decreased oxidative scavenging processes. Moreover, due to its small inventory cobalt has a short residence time within the euphotic zone, and can replace other biological functions involving the metals zinc and cadmium. Notably, our recent studies suggest that there are changes occurring in both dissolved and labile cobalt in polar regions, particularly in the Southern Ocean coastal waters (Amundsen Sea and Ross Sea). The proposed expedition tracks would be valuable in further assessing these changes.
3. **Parameters:** We will likely propose to conduct dissolved and labile Co measurements throughout the sections, taking advantage of the high-throughput cobalt electrochemical system we have adapted. In addition, we propose to measure protein samples for metaproteomic biomarkers as a Biogeotraces component, including samples from the flow through seawater line and McLane pump subsamples. Protein biomarkers have been shown to be able to detect metal and vitamin stress associated with scarcity, and will provide a valuable additional dataset for comparison with a variety of parameters.