The organic complexation of dissolved iron

Kristen Buck (University of South Florida) plans to submit a proposal to study dissolved iron-binding ligands along the U.S. GEOTRACES Arctic Section.

Scientific Objectives:

1) Determine the concentrations and conditional stability constants of natural iron-binding organic ligand classes along the U.S. GEOTRACES Arctic section using the same technique as applied to previous U.S. GEOTRACES sections in the Atlantic and Pacific.
2) Assess the contributions of iron-binding ligands, in terms of concentrations and conditional stability constants, from aerosol dissolution, ice melt and river plumes to surface waters.
3) Quantify the effect of freezing samples at -20 ºC over time on iron organic complexation characteristics. Previous studies from the North Atlantic suggest that while ligand concentrations may not be affected by freezing, there may be an offset in the conditional stability constants determined.

Sample Needs:

1) 2 x 500 mL filtered seawater from the trace metal clean GEOTRACES (GO-Flo) rosette at all depths of all full water column stations
2) 500 mL seawater aerosol leachates and filtered seawater blanks, as available
3) 500 mL rain/snow precipitation samples, as available
4) 500 mL ice melt samples and ice-seawater mix samples, as available

Anticipated Scientific Collaborators:

1) PI(s) measuring dissolved iron concentrations along the section. These values are required for completing the calculations of ligand concentrations and conditional stability constants, and Buck will work closely with the PI responsible for these numbers, as was done for previous sections.
2) PI(s) studying iron in aerosols, precipitation and ice.
3) PI(s) studying dissolved organic matter.
4) PI(s) studying organic complexation of trace elements, such as copper.

Berths and Logistics:

Protocols for sample collection are expected to be similar to previous U.S. GEOTRACES expeditions, with filtered samples for iron-binding ligand studies collected from the trace metal clean GEOTRACES (GO-Flo) rosette immediately following sample collection for dissolved iron measurements. One berth is requested for this work, which will allow for completion of most analyses shipboard as well as a comprehensive assessment of sample storage at -20 ºC over time.