US GEOTRACES Alaska-Tahiti Section
Letter of Interest

Collaborative Research: Characterizing the organic complexation of dissolved iron

Kristen N. Buck, University of South Florida, kristenbuck@usf.edu
Randelle M. Bundy, Woods Hole Oceanographic Institution, rmbundy@whoi.edu

1) <u>Nature of proposed work</u>
   We plan to propose to determine the organic complexation of dissolved iron (Fe) using primarily competitive ligand exchange-adsorptive cathodic stripping voltammetry (CLE-ACSV) techniques and on a subset of samples using liquid chromatography inductively coupled plasma mass spectrometry with high resolution electrospray ionization mass spectrometry (LC-ICP/ESI-MS).

   Complete depth profiles from all full and super stations would be analyzed for dissolved Fe organic speciation using the same single analytical window technique employed previously for the US GEOTRACES North Atlantic and East Pacific sections. Multiple analytical windows in CLE-ACSV will be employed for Fe speciation measurements at demi stations in complement to the single analytical window analyses at the full and super stations. This combination will augment the resolution of Fe speciation across the section, facilitate intercalibration activities between the two groups and allow for the assessment of the full complexation of dissolved Fe. The LC-ICP/ESI-MS technique will also be applied to a subset of samples in surface waters and at the demi stations samples to directly characterize the organic Fe-binding ligands measured by CLE-ACSV.

2) <u>Justification</u>
   Fe is a key trace element identified by the GEOTRACES Science Plan. Fe-binding organic ligands appear to control the solubility of Fe and govern Fe cycling processes, in particular between dissolved and particulate phases. Fe speciation data emerging from the US GEOTRACES Atlantic and Pacific datasets and from the Dutch GEOTRACES data in the Atlantic reveal an apparent decrease in strong Fe-binding ligands with aging of water masses. The Alaska-Tahiti section will uniquely allow characterization of Fe speciation in the oldest waters of the global ocean and will facilitate characterization of Fe speciation across strong productivity gradients in the open ocean. Finally, this work will contribute to the development of new investigators trained in GEOTRACES protocols.