

**Statement of Interest: Particulate and Dissolved TM  
Pacific Peru-Tahiti Geotraces meeting**

Rob Sherrell  
Rutgers University  
July 5, 2011

My interests in the Peru-Tahiti section involve aspects of trace metal dynamics in both the Peru upwelling zone and the distal EPR neutrally-buoyant hydrothermal plume. I would propose to carry out some subset of the following analyses on the cruise, all of which are relevant to core variables in Geotraces:

1. Particulate metals (35 elements) on filters collected from Go-Flo samples: this effort would complement in situ pumping and allow particulate sampling of stations where pumping cannot fit in the shiptime schedule.
2. Dissolved Fe, Mn, Cu, Ni, Zn and possibly Co using a new on-line preconcentration ID-ICP-MS method. We are in final stages of developing this method and would expect to demonstrate its performance characteristics at the workshop.
3. Dissolved Th-232 by direct SW analysis. We are interested in exploring the utility of this method for efficient analysis of large sample sets for Th-232, a terrigenous input tracer with a shorter residence time than Al. The planned transect covers a very large gradient in continental inputs, from shelf waters to oligotrophic waters with the lowest known atmospheric inputs outside of the southern ocean; a very good region for exploring Th-232 dynamics.
4. Carbonate system: We are interested in, though not necessarily prepared to make, measurements of carbonate system variables in the slope water region, for potential purposes of regional calibration of the U/Ca carbonate ion proxy in deep water corals, which are abundant in this region (Anagnostou et al., GCA, 2011).

Peru upwelling questions of interest:

What is the elemental stoichiometry of phytoplankton growing in recently upwelled water that is affected by metal concentrations and speciation as influenced by the underlying OMZ? How do upper water column particulate and dissolved Metal/P ratios vary with distance from upwelling centers and with depth? How do primary producers respond to varying trace element availabilities? How does the elemental composition of large cells in upwelling regions compare to that of small cells in the oligotrophic microbial-loop dominated waters to the west?

East Pacific Rise hydrothermal plume questions:

How does the distal plume affect particulate Fe distributions in the far field, what is the evidence for dissolved or colloidal "escape" of Fe from eventual scavenging and removal? How do particulate transformations in the near- to far-field plume affect the scavenging or co-precipitation of trace metals, especially REEs, and what is the REE fractionation from seawater in the plume, relative to that recorded in metalliferous carbonate sediments on the western ridge flank? What can we learn about deep water column speciation of Th-230 vs. Th-232 by observing their association with near-field and distal plume Fe particles?