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To: GEOTRACES Scientific Steering Committee
From: ***Rick Murray***, Boston University & ***Brad Moran,*** University of Rhode Island
Re: Pacific Planning, and Workshop Participation
Title: ***Pacific Ti***

We are writing to express our strong interest in participating in the September workshop for planning the initiation of the Pacific GEOTRACES sections. Our research addresses the processes controlling the distribution of dissolved Ti in seawater. Despite Ti's importance as a biogeochemical and paleogeochemical tracer, there are only a few open ocean profiles published (Orians, Boyle, and Bruland in the early 1990's). More recent work by Skrabal along the continental margin has provided helpful guidance regarding Ti removal along boundaries.

One of us (Murray) is currently funded through an EAGER Chemical Oceanography grant to develop a new methodology to measure Ti in open ocean seawater. We are working with the PA-1 resin (Sohrin et al, 2008) for preconcentration, followed by ID-ICP-MS for the measurements themselves. This work is being performed in Brad Moran's clean lab at URI, and has benefitted from input and training provided by Bruland and Boyle. We have made considerable progress, and are poised to make our first Ti measurements on samples graciously collected by Boyle and colleagues on the GEOTRACES Atlantic transect last fall. Prior to doing so, we will be working with GEOTRACES reference standards (SAFe, etc.) Thus, our progress is on track for participation in the upcoming Pacific field study.

Because of the paucity of data on Ti, virtually anything we learn about Ti's distribution in any open ocean environment will represent a major step forward. In the paleogeochemical realm, Ti is used as a provenance indicator and to help assess abundances of terrigenous material in mixed component particle assemblages. Some work, also from Murray's group, suggests an association of Ti with organic matter in open ocean sediments with << 1% terrigenous matter. It's highly reactive behavior further suggests that it alone could prove to be a useful tracer of particle flux. Furthermore, the few open ocean profiles that exist indicate a considerable enrichment in dissolved Ti from surface (several pmol) to deep water (250+ pmol). These limited data point to Ti's reactivity in the upper water column and, perhaps, an unknown deep enrichment process. In addition to improving our understanding of the geochemical behavior of Ti, our participation in GEOTRACES is likely to provide important constraints on the behavior of other particle reactive TEI's.

More specifically, our work aligns well with GEOTRACES' goals for the Pacific zonal section. We anticipate studying both high-resolution upper ocean processes and deeper water-column processes. Targeting the upwelling regime would enable us to study the boundary environment characterized by high nutrient/productivity and high particle flux. The EPR hydrothermal plume region is a terrific natural system to study uptake and release mechanisms in metalliferous environments. Studying processes in/out of the OMZ should shed light on particle regeneration

and variability in supply. We are particularly interested in collaborating with other researchers targeting Al, Pa/Th, other U-series, and further particle reactive species.