

US GEOTRACES  
Scientific Steering Committee

4 January, 2012

To whom it may concern:

I plan to submit a proposal to the NSF Chemical Oceanography program for the 15 February 2012 deadline that focuses on the measurement of selected anthropogenic radionuclides on the US GEOTRACES section between Peru and Tahiti. Specifically, we are interested in determining the dissolved and particulate concentrations of the anthropogenic radionuclides including  $^{239}\text{Pu}$ ,  $^{240}\text{Pu}$ ,  $^{237}\text{Np}$ , and  $^{137}\text{Cs}$ .

The isotopes of interest, in addition to being transient tracers, exhibit a range of  $K_d$  values (sediment water distribution coefficients,  $\text{Pu} > \text{Np}, \text{Cs}$ ), and geochemical behaviors as well as provide a means to resolve different sources of radioactive contamination. This will allow us to address processes such as advection (new water mass tracers), sources and sinks (characteristic isotopic signatures), as well as processes related to scavenging and particle dynamics across a range of contrasting regions. The Peru-Tahiti section includes several features that exert controls on trace metal supply, removal and cycling, such as a productivity gradient from east to west, a large  $\text{O}_2$  minimum zone, and the largest known hydrothermal plume.

We are in the process of analyzing samples from US, German, and Dutch cruises in the Atlantic from regions that represent a full suite of physical and biogeochemical processes that affect TEIs. In addition to providing information regarding the distribution and levels some 40 years after GEOSECS, work to date suggests that water column inventories of the anthropogenic radionuclides of interest can provide Pu particulate flux estimates in regions where different processes dominate. The US GEOTRACES sampling program is the only one thus far that has been able to provide matching filtered and particulate samples that are large enough for our analyses, analysis of which should provide additional insight into particle related processes.


Whereas the main focus will be samples from the US GEOTRACES section, I am very interested in making this an international collaboration by obtaining samples from other Non US GEOTRACES Pacific cruises. This approach has worked well in the Atlantic. My goal would be to secure letters of collaboration from cruise organizers to provide samples and include these with my proposal.

Work in the Pacific will allow us to compare/contrast results from two very different ocean basins. Further, in light of the recent reactor releases from Fukushima and depending on where we obtain samples, our sampling scheme would also allow us to identify their presence and evaluate transport as well.

Assuming that the general approach followed on the US GEOTRACES Atlantic cruises and discussed in the earlier Pacific Planning Workshop is implemented, we are interested in samples

collected at regularly occurring super-stations. We typically require 20 liter samples of filtered seawater collected by the standard Niskin rosette at 18 of the 24 depths planned to match in situ filtration for each full depth station. Where possible, we will also collect surface water samples using the ship's supply, coordinate with other groups to take advantage of sample availability at higher resolution (i.e., upper water column, and near-bottom), and collect samples for replicate analysis and intercalibration. We will request filter aliquots from the PIs responsible for in situ filtration for particulate samples. The approach used in the Atlantic was to obtain the QMA filters after other groups had obtained samples and non-destructive analysis for  $^{228}\text{Th}$  had been completed.

At this point we do not plan to request a berth. That being said, we are very interested in playing a larger role in cruise related activities/support and collaborating with other groups. Thank you.

Best regards,  
  
Timothy C. Kenna