

Measurement of selected anthropogenic radionuclides on the US GEOTRACES section between Peru and Tahiti

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I plan to submit a proposal that will focus on determining the dissolved and particulate concentrations of the anthropogenic radionuclides including ^{239}Pu , ^{240}Pu , ^{237}Np , ^{137}Cs , and ^{90}Sr . This project would be an international collaboration, and we plan to obtain samples from other Non US GEOTRACES cruises in the Pacific 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}Th had been completed. In addition, we would also like to work with the PIs responsible for in situ filtration to include copper ferrocyanide (CuFeCN) impregnated cartridge filters for Cs isotopes (^{137}Cs and possibly ^{134}Cs) in the sampling configuration at super stations where we collect other samples. If MnO_2 -coated fibers are deployed for Ra-isotope analysis, these might also be of interest if available.

One to 2 berths are requested for this sampling. We will be prepared to take responsibility for filtering water from the Niskin rosette for other investigators as needed, and help other groups where necessary.

Our approach will allow the broad brush characterization of the anthropogenic radionuclides some 40 years after GEOSECS. 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. 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, our sampling scheme would also allow us to identify their presence and evaluate transport as well. 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.