

^{210}Po and ^{210}Pb Distributions along the GEOTRACES GP17 Section

I am requesting support to attend the GEOTRACES Southern Ocean GP17 Planning Workshop. I am interested in measuring the distributions of ^{210}Po and ^{210}Pb , likely principally along the OCE section. I will be the lead PI in this effort and will be joined by David Kadko (FIU), who will participate in the analytical and sampling responsibilities. We participated in the GP15 Alaska-to-Tahiti section, and the sampling and sample processing have been successful. The patterns of disequilibrium between these natural ^{238}U -series radionuclides (and between ^{210}Pb and its grandparent ^{226}Ra) permit assessment of many of the processes highlighted for study on the GP17-OCE section. Both ^{210}Po and ^{210}Pb show gradients in the oceanic water column, and their distributions were mapped during the GEOSECS program and subsequent efforts. More recent research has involved process studies that exploited disequilibrium between ^{210}Po and ^{210}Pb to characterize and quantify export fluxes of particulate organic carbon from the photic zone. This application is complementary to the use of $^{234}\text{Th}/^{238}\text{U}$ disequilibrium as a POC flux proxy. The aspects of these radionuclides that make them especially relevant to GEOTRACES include:

- Deposition of ^{210}Pb from the atmosphere to the surface ocean
- Patterns of $^{210}\text{Pb}/^{226}\text{Ra}$ disequilibrium that show enhanced scavenging in ocean boundaries
- Patterns of $^{210}\text{Po}/^{210}\text{Pb}$ disequilibrium that show enhanced removal of ^{210}Po from the photic zone in high productivity areas and release due to remineralization of sinking POC at depth

My involvement with these radionuclides dates from the GEOSECS program. Three laboratories (Yale, Scripps, WHOI) were supported for measurement of ^{210}Pb and ^{210}Po . I represented Karl Turekian's group at Yale in this effort and was involved in the development of sampling and analytical procedures to measure Po and Pb in water and particulate samples, intercalibration efforts and the field program in the Indian Ocean (by which point in GEOSECS the methods were well established and the labs were intercalibrated). More recent research by my group focused on $^{210}\text{Po}/^{210}\text{Pb}$ disequilibrium in the Mediterranean as part of the MedFlux project and in the GEOTRACES GP15 section as described briefly above.

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