Award Abstract #0851032

Collaborative Research: GEOTRACES- Methods development and intercalibration for the 210 Pb and 210 Po radionuclide pair

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ABSTRACT

Over the past three decades since GEOSECS, the naturally-occurring Po210-Pb210 natural radionuclide pair has had wide application in studies of particulate scavenging and carbon flux in the ocean and at its boundaries. Not surprisingly, measurement of this isotopic pair has been designated as a programmatic priority in the Principles and Priorities of the U.S. GEOTRACES Intercalibration Initiative document. Intercalibration of trace elements and isotopes is the highest priority for U.S. GEOTRACES during its first two to three years.

In this project, researchers at the University of Delaware and Wayne State University will conduct a systematic intercalibration effort to ensure that Pb210 and Po210 will be accurately measured under the GEOTRACES program. On the first GEOTRACES Intercalibration Cruise in June 2008, a large integrated volume (250 L) of filtered and acidified sea water was collected from the 2000 meter calibration depth for about a dozen Po210-Pb210 aliquots. Likewise particulate aliquots were collected in common with other GEOTRACES radionuclides using in-situ pumps with various filter substrates, porosity and filtration rates. These dissolved and particulate aliquots have been distributed to about a dozen international investigators participating in the Po210-Pb210 intercalibration following their own protocols for processing and radionuclide...
analyses. The investigators on this project will lead the effort to intercompare and synthesize the participants’ results to identify inconsistencies and recommend improvements.

The proposed work will be closely coordinated with GEOTRACES PIs already funded to intercalibrate other particle-reactive (e.g. Th, Pa) or dissolved (e.g. Ra) radionuclide isotopes.

The broader impacts of this proposal are closely linked to the GEOTRACES Program as a whole and to the significance of the Pb210-Po210 isotopic system as a research tool in a variety of oceanographic subdisciplines. The project will (1) enhance research infrastructure by providing a User’s Manual for the collection and radiochemical assay of Po210 and Pb210, (2) provide for the support and training of graduate and undergraduate students, and (3) provide broad dissemination of our research on dedicated public websites at the University of Delaware.

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