Aug. 8, 2016

Alaska-Tahiti US GEOTRACES Pb Isotopes Letter of Intent

Ed Boyle and Cheryl Zurbrick are interested in submitting a science proposal to measure Pb isotopes along the US GEOTRACES Alaska-Tahiti Section. We anticipate collecting about 700 one-liter samples, one third of which would be analyzed for Pb isotopes, and the remaining sample would serve as library backup samples. It should be noted that we expect at least one other lab to submit a proposal to measure Pb concentrations by isotope dilution with an automated multi-element method. We therefore see no need for a separate laboratory to run Pb concentration measurements, so as part of this proposal for Pb concentrations, we simply propose taking advantage of our long-term Pb measurement program and participation in five GEOTRACES expeditions to run three key profiles for Pb concentrations for the purpose of long-term intercalibration. It of course is understood that Pb isotope measurements are a key parameter for the International GEOTRACES program.

Scientific Objectives:

1) Determine Pb isotope ratios along the U.S. GEOTRACES Alaska-Tahiti section. Only a limited number of measurements are available as of this data, while major changes in Pb sources (phasing out of leaded gasoline, but increasing Asian coal combustion and industrial sources) are occurring. There will be a few stations from previous decades where the Pb concentration evolution can be established.
2) Assess the extent to which suspended particulate matter reversibly exchanges with dissolved Pb. We have good evidence from Atlantic section GA-03 that particulate MnO_2 and lithogenic particles reversibly exchange with dissolved Pb via a K_d-type behavior. We expect that another lab will propose to sample and measure particulate Pb, and will be able to give us some samples for Pb isotope analysis.

Sample Needs:

- 1000 ml for dissolved Pb isotopic Pb samples from trace metal clean GEOTRACES bottles at all depths and stations, and also for intercalibration purposes at three selected stations.
- Some samples of aerosols and particulate matter for Pb isotopic analysis.

Anticipated Scientific Collaborators:

PI(s) studying aerosols, precipitation and particulates; reactive scavenged trace elements and radioisotopes; transient tracers

Berths and Logistics:

Sample collection would resemble samples collected during the Atlantic, Pacific, and Arctic ocean transects. W are willing to consider sending one trace metal savvy individual to serve in the GEOTRACES trace element sampling team if it is necessary.