Pb and Pb isotopes

Ed Boyle (MIT) and Russ Flegal and Céline Gallon (UCSC) plan to submit a collaborative proposal to study dissolved Pb and Pb isotopes in waters and Pb isotopes in aerosols collected along the Peru- Tahiti section.

SCIENTIFIC OBJECTIVES: 1) Produce the first detailed sectional "snapshot" of Pb and Pb isotopes (204, 206, 207, and 208) in the South Pacific Ocean in order to document the evolving penetration of anthropogenic Pb into the deep ocean and determine if "natural" Pb can be seen despite the anthropogenic overprint. Evaluate the importance of different regional sources using Pb isotope fingerprinting. 2) Determine if any significant water column dissolved Pb derives from hydrothermal vents. 3) Examine the distribution of Pb in relation to other scavenged metals and radioisotopes (e.g. ^{230}Th, ^{231}Pa, ^{10}Be, Fe, Al, etc.) in order to better understand scavenging processes and rates. 4) Examine the Pb isotope data to establish whether exchange with sinking particles plays a significant role in the vertical distribution of Pb in this region.

SAMPLE NEEDS: 1) Two liters of 0.2µm Acropak-filtered water from each sampling depth taken by the GEOTRACES GOFlo Carousel. 2) Two liters of 0.2µm Acropak-filtered water from the surface fish sampler at each station. 3) Aerosol samples for Pb isotope analysis

ANTICIPATED SCIENTIFIC COLLABORATORS: 1) All PIs studying dissolved trace metals along the section, especially scavenged or anthropogenic metals. 2) All PIs studying scavenged radioisotopes such as ^{230}Th, ^{231}Pa, ^{10}Be, ^{210}Pb. 3) PIs studying trace metal transport and release from atmospheric particles. We have tentatively initiated a study of Pb isotopes on Atlantic GEOTRACES aerosol samples with Ana Aguilar-Islas and Bill Landing. 4) PIs studying ^{7}Be to quantify elemental dust fluxes. 5) Scientists at the Universidad de Concepcion, who are working on sources of industrial metal pollution in Chile and in southeast Pacific coastal waters and sediments.

BERTHS AND LOGISTICS: We have participated in the GOFlo Carousel sampling on the GEOTRACES North Atlantic Transect and have confirmed that samples drawn according to these protocols are good for Pb and Pb isotopes. For each cast, samples are drawn from 12 pairs of 12 liter GOFlos by a team of four trace-metal savvy individuals over a period of 4-6 hours. Given the GEOTRACES station and vertical sample density, these four individuals work full time (~15 hours per day) on this sampling effort and associated bottle staging and storage. We will be prepared to send one individual to contribute to these efforts unless the cruise is oversubscribed in which case we would be happy to cede this work to other trace metal savvy individuals.