



EAPS

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To: US GEOTRACES Planning Office
Concerning: Pacific Statement of Interest

There are many reasons why Pb and Pb isotopes should be done on the South Pacific transect, even apart from the fact that they are essential GEOTRACES properties. First, anthropogenic Pb is very low in the deep waters of the south Pacific because these waters are very old (Flegal et al., 1983, EPSL 64:19). However, low may not mean zero because of potential sinking particle exchange (e.g. see proposal of Wu et al., 2010 GCA 75:460). We know that Pb in hydrothermal sediments of the East Pacific Rise comes from basalt via hydrothermal circulation (Dasch et al., 1971, EPSL 13:175, based on Pb isotope data from EPR sediments), but we don't know if any significant quantity escapes from the near-vent field; perhaps it all precipitates close to the vents along with sulfides or ferromanganese oxides. But we (Boyle and Jenkins, in prep.) have recently seen that the EPR Fe is seen distally in the southeast Pacific (even if the correlation with $\delta^3\text{He}$ indicates that it is only about 1% of the total hydrothermal Fe flux), so it is not impossible that some small fraction of hydrothermal Pb is also transported. It would be unwise to ignore the possible role of Fe colloids in this transport.

So scientifically there is a strong case to be made for including Pb, Pb isotopes, and Fe colloids in the US GEOTRACES South Pacific Transect. We are very interested in seeing this happen. We are less concerned that the measurements be made at MIT as that the measurements are carried out at all "full" stations and made to the same quality level (or better) as we have been able to achieve at MIT for our Atlantic GEOTRACES samples. That includes measurements of all four isotopes, and precisions of at least 1 permil for $^{206}\text{Pb}/^{207}\text{Pb}$ and $^{208}\text{Pb}/^{207}\text{Pb}$, and at least 5 permil for $^{206}\text{Pb}/^{204}\text{Pb}$. At the very least we should expect to participate in intercalibrations with other labs that may want to do these measurements, and perhaps some alternation between labs at adjacent stations might be wise. We also have been making Fe colloid measurements on the North Atlantic system, and measurements such as these should be undertaken for the South Pacific Transect.

Sincerely,

Ed Boyle