John Lupton, NOAA/PMEL, Statement of Interest

Helium isotope measurements for the GEOTRACES section

I am interested in supporting the hydrothermal aspects of the GEOTRACES project by measuring helium isotopes along the long E-W section proposed along latitude ~15°S. Helium-3 is a completely conservative tracer, and in the deep ocean it is an unambiguous indicator of hydrothermal input. Helium-3 is thus the most sensitive indicator of the presence of the far-field hydrothermal plume which trends westward from the EPR axis at this latitude and which is the result of cumulative hydrothermal input along the ridge crest. Using helium isotopes, this plume can be traced for thousands of kilometers from the EPR axis out beyond longitude 170ºW. In fact, the track of the proposed GEOTRACES section has been carefully selected to go down the core maximum of the plume emanating from the southern EPR.

Helium isotope measurements will thus be critical for providing a baseline tracer to which other properties can be "normalized". In addition to providing this important baseline support for other GEOTRACES measurements, there is also an opportunity to study the time evolution of this large hydrothermal plume. My laboratory was involved in a large project conducted in 1987 on Helios Expedition which mapped out the areal extent of this large helium plume in the region west of the EPR. As part of this project, about 1200 samples for helium isotopes were collected at some 75 stations and then analyzed in my laboratory. This 1987 data base will thus afford an opportunity for a valuable comparison to study the evolution of this helium plume over a 26 year period.