

Statement of Interest –  
Helium isotopes along the GEOTRACES section between Peru and Tahiti

The Lamont noble gas group would like to express interest in measuring helium isotopes along the Pacific GEOTRACES section from Peru to Tahiti. We propose to add helium/neon isotopes as a desirable complementary parameter within GEOTRACES Pacific.

The section from Peru to Tahiti includes an extensive hydrothermal plume originating from the fast spreading southern East Pacific Rise. The primary goal of this section is to study the impacts of this hydrothermal input on ocean biogeochemistry. Of particular interest is to constrain the input of iron and other trace metals such as manganese, define their budget and the significance of their hydrothermal input (vs other inputs such as dust deposition, upwelling or lateral input from margins) for the marine biogeochemistry of iron, and potentially for processes such as ocean productivity or climate change.

We suggest that on this transect helium isotope data will be critical for interpreting the trace element and isotope data. Hydrothermal vent fluids are highly enriched in Helium-3 and, given the conservative nature of helium in the ocean and the sensitivity of the signal, can be traced 1000s of kilometers from the hydrothermal source. Parallel measurements of TEIs and helium isotopes would therefore allow to (1) map the hydrothermal plume and track the fate of the TEIs discharged by the hydrothermal system along the gradient perpendicular to the ridge axis, from the near-field to the far-field of the SEPR plume, (2) thereby quantify their sources and sinks and (3) establish key questions such as how much of the hydrothermal iron is present in the far-field of the plume.

Gisela Winckler and Peter Schlosser  
Lamont-Doherty Earth Observatory  
Columbia University  
61 Route 9W  
Palisades, NY 10964  
winckler@ldeo.columbia.edu