

Twining statement of interest for Alaska-Tahiti section planning workshop

I request support to participate in the Alaska-Tahiti Pacific GEOTRACES section planning meeting. I have been involved in the collection and analysis of bottle-collected particulate TEIs on the US Atlantic, Pacific and Arctic cruises. In each of these projects the focus of my work has been the upper water column and the phytoplankton that reside there. I am interested in collecting particles on 0.45 μ m Supors and analyzing them for all key GEOTRACES elements (Fe, Al, Zn, Mn, Cd, Cu), as well as additional lithogenic tracers (Ti), bioactive trace metals (Ni, Co, V), and other elements of interest (Ba, Cr, P). I would like to measure both total and chemically-labile particulate fractions

Additionally, I would like to measure metal quotas (Mn, Fe, Co, Ni, Cu, Zn) in individual phytoplankton cells with synchrotron X-ray fluorescence microscopy. I have done this on the three prior US GEOTRACES section cruises, and the data provide a valuable indication of biological response to chemical gradients.

Finally, I plan to advocate for the collection of filtered material from the upper water column for genetic (transcriptomic) measures of nutrient stress that would be performed by collaborators. Such measurements can be conducted on relatively small volumes (likely 5L) and could provide a plethora of valuable information about the physiological response of ambient phytoplankton to the multiple micronutrient gradients that will be encountered as the transect crosses 2 HNLC regions.

This work directly addresses several GEOTRACES objectives, including mapping the distributions of bioactive trace metal micronutrients and understanding the uptake and subsequent sub-surface remineralization of these micronutrients.