

## GP17 STATEMENT OF INTEREST

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Is zinc a limiting nutrient in the oceans? Can it ever be? There is evidence for extensive biological cycling of Zn (evident in its mysterious correlation to Si), low concentrations in surface waters (as low as  $10^{-11}$  mol L<sup>-1</sup>), and strong Zn ligands that decrease bioavailable Zn<sup>2+</sup> even further. Yet, unambiguous evidence of phytoplankton Zn limitation has not been found. A central reason why this question persists is that bioavailable Zn<sup>2+</sup> concentrations are rarely measured – even on GEOTRACES transects – and there is an absence of high-resolution data of Zn<sup>2+</sup> and Zn-binding ligand concentrations in regions suspected to be more prone to Zn limitation.

The two GP17 sections provide the perfect venue to examine Zn<sup>2+</sup> and Zn ligand biogeochemistry because they transect 1) major oceanographic gradients associated with overturning circulation in the Southern Ocean that are crucial to the global Zn distribution, and 2) several distinct productivity regimes (ultra-oligotrophic South Pacific Gyre to blooming polynyas). **I am interested in conducting full-depth Zn speciation measurements by voltammetry on both OCE and ANT cruise legs, which will also help constrain mechanisms of Zn scavenging and stability in the deep ocean.** Zn speciation data are needed to explain Zn distributions in the ocean (GEOTRACES Objective 1) and to investigate the influence of Zn on the carbon cycle (Objective 2). This has yet to be addressed on any US GEOTRACES cruise (to my knowledge), even though Zn<sup>2+</sup> directly affects the biogeochemical cycles of Cd, Mn, Cu, and Co via well-documented competitive inhibition of phytoplankton metal transporters. Because of this, the high Zn<sup>2+</sup> expected south of Polar Front may increase the likelihood of Mn or Co limitation. Participation in inter-laboratory collaboration to analyze the speciation for all of these elements would be ideal.

Attending the GP17 Section Planning Workshop is essential to identifying collaborations/intersections with other GP17 investigators and for evaluating interest and feasibility of conducting at-sea incubation experiments to screen for Fe, Zn, Co limitation and co-limitation (which would directly serve GEOTRACES Objective 2). As I have just begun to set up my laboratory at the University of Hawai'i, participation in GP17 is important for building capacity for quality trace metal research that will be continue beyond the GEOTRACES era.