

Ana M. Aguilar-Islas (University of Alaska Fairbanks) aaguilar@iarc.uaf.edu
Cliff Buck (University of California Santa Cruz) cliftonsuck@gmail.com
William Landing (Florida State University) wlanding@fsu.edu

Statement of Interest for US GEOTRACES Pacific Section: Aerosols

We will propose to focus on **dry and wet atmospheric deposition** sampling, analysis, and subsample distribution to the community. The US GEOTRACES aerosol and rainfall sampling equipment, as well as Aguilar-Islas aerosol sampler will be used. Total suspended matter (TSM) aerosol samples will be collected onto acid-washed Whatman-41 cellulosic filters and pre-baked quartz micro fiber (QMA) filters on a 24hr-integrated basis. A 4th high-volume aerosol sampler will be equipped with a 5-stage Sierra-style slotted impactor to collect size-fractionated aerosols (>7.2 μm , 3.0 μm , 1.5 μm , 0.95 μm , and 0.49 μm) onto Whatman-41 cellulosic filter strips. Aerosol filters will be frozen aboard the ship, and returned to FSU and UAF for subsampling in our clean lab with a subset to be leached onboard. The samplers are operated with wind sector and wind speed control to eliminate stack exhaust contamination, and will be deployed on the deck as far forward and as high as possible.

Twin automated rain samplers will be used to collect unfiltered rainwater. The receiving bottles will be acid-washed FEP Teflon. The rain samplers will be operated on an “event” basis and samples will be subsampled on the ship (for time-critical TEIs such mercury or others, and for N and O isotopes in nitrate). Subsamples for anion/cation analysis will be frozen for return to FSU. A subsample will be filtered through a 0.4 μm Nuclepore polycarbonate track-etched membrane filter. The remaining sample will be stored frozen or acidified to 0.024M Q-HCl, as appropriate.

We will also propose to leach a subset of TSM samples onboard by three methods. One subset will be leached using an instantaneous local seawater leach protocol, and a second subset will be leached using an instantaneous ultrahigh purity water protocol. From these leaches soluble (< 0.4, and < 0.02 μm) and insoluble (> 4 μm) inorganic TEIs will be determined. A third subset will be slowly leached and filtered (0.4 μm) in-line with large volumes of local surface seawater, collected from the towed-fish pumping system. For these, the fraction of TEIs that is soluble in seawater will be determined by the difference in particulate metals between leached and unleached replicates. The first 350 ml of filtered leachate will be collected to determine the organic complexation of Fe. Digestion of samples and analysis of leaching solutions collected onboard will take place at UAF. Organic complexation analysis will be solicited from colleagues who do that work.

Rainfall analysis will take place at UAF and FSU. Multi-element ICPMS analysis for TEIs will be done at UAF or FSU. An aliquot from these leaches will be frozen and analyzed in the lab at FSU for chloride, sulfate, nitrate, oxalate. Frozen replicate filters will be digested for total aerosol TEIs. TEIs of interest include Al, Mn, Fe, Co, Ni, Cu, Zn, Cd, and Pb.

We will coordinate the reporting of aerosol and rainfall data to the appropriate data managers. The proposal would be for three years, and we would expect to have at least one person on each leg of the cruise. Two people would be ideal, and they will also be available to assist with the logistics and sampling operation for GoFlos.