

⁷Be Aerosol TEI Supply

David Kadko (RSMAS/University of Miami)

One of the stated goals of GEOTRACES is to create a unique opportunity for exploration and discovery by determining the distributions of novel TEIs that have received little attention to date. I intend to make measurements of one such species, the radioactive isotope ⁷Be, which will provide important biogeochemical rate information pertinent to the TEIs that will be measured during the US GEOTRACES section between Peru and Tahiti. Many processes in the ocean cannot be directly observed and as such, tracers can provide important constraints to the rates and pathways of these processes. Be-7 is a tracer that, because of its half-life (53.3d), allows the study of processes occurring over seasonal timescales. This timescale is critically important to studies of biological production, nutrient regeneration, and atmospheric deposition, to name a few. However, it has been one that is difficult to approach because of the lack of oceanographic tracers suitable for integrating processes over this temporal range.

Recent advances in sampling and analytical techniques, coupled with a better understanding of the behavior of ⁷Be in ocean biogeochemical cycles present us with an opportunity to fully utilize this tracer. The work will:

- 1) Use measurements of ⁷Be in the surface waters and in the lower atmosphere along the cruise track to provide estimates of the atmospheric input of relevant TEIs. The atmospheric input into the global ocean is an important budgetary component of numerous chemical species, yet is very difficult to constrain (Duce et al., 1991). The data generated in this work will be available to allow ground-truthing of aerosol deposition models and atmospheric input.
- 2) Determine regeneration rates and depth scales of TEIs in the subsurface ocean.
- 3) Use ⁷Be as a tracer of physical processes which redistribute biologically active species. Be-7 will survive in the water column even as reactive species are being removed by biological processes; ⁷Be provides a measure of physical processes such as mixing and upwelling which allows processes such as biologic uptake and remineralization to be assessed. This will contribute to a goal of GEOTRACES to obtain realistic estimates of the underlying transport processes influencing TEI distribution