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Collaborative Proposal: GEOTRACES Atlantic Section: Collection and analysis of key trace elements in size fractionated marine particles

Phoebe Lam, Rob Sherrell, and Jim Bishop plan to submit a collaborative proposal to the Feb 15 2009 NSF OCE panel to collect size-fractionated particulates. We will analyze all key trace elements listed in Table 2 of the science plan, selected other trace elements of interest (eg. Co, Ti, Ba,), and major carrier phases (eg. CaCO3, biogenic Si, and POC). Our main scientific objectives include understanding lateral transport of key particulate trace metals from the margins, phytoplankton/bioactive metal interactions, and vertical trace metal particle dynamics.
Further, we will provide particulate samples to interested investigators, such for the key long-lived isotopes (eg. ^{230}Th, ^{231}Pa, Nd isotopes, …), important ancillary parameters such as phytoplankton pigments and organic biomarkers, and will provide the in-situ pumping platform to attach adsorption cartridges for the short-lived radionuclides (eg. Ra isotopes, ^{234}Th). In order to accommodate the volume requirements for the key TEIs, and optimize spatial sampling resolution, we will propose a 3 system particulate sampling approach:
-filtration from rosette-mounted GO-Flo bottles (Sherrell)
-in-situ sampling in the upper 1000m by MULVFS (Bishop)
-in-situ sampling in the bottom 1000-5000m by McLane (Lam)
We expect that we will require ~6 dedicated berths plus occasional part-time help from one or two other science crew members with particulate needs, for the successful operation of all three systems and processing and subsampling of particulate samples.