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Title: Nd isotope distribution, sources, sinks and internal cycling

We intend to submit a proposal to measure the ϵ_{Nd} and Nd concentrations of seawater samples collected during the US Geotraces North Atlantic zonal transect. There are two key objectives of the proposed research:

Objective 1: Compare Nd isotopes and conservative tracer measurements (e.g., salinity, temperature, CFC's) from water column profiles to identify deviations in water mass ϵ_{Nd} values from expected water mass distributions.

Objective 2: Determine the concentration and isotopic composition of dissolved Nd from stations proximal to the margins to assess the potential for Nd addition to water masses via the process of boundary exchange.

Objective 3: Measure the isotopic composition and concentration of Nd in sinking particles in eastern and western stations to evaluate the influence of different particles on the downward transport of Nd in the water column.

For objectives 1 & 2, We plan to sample all 24 depths planned for each of the 22 full-depth stations and an additional 4 near-bottom depths/station at three stations on the continental margins for dissolved Nd. The seawater will be filtered directly from the Niskin bottles, and the bottles will be shared with the Pa, Th group (Anderson, Robinson, Moran, Edwards). Two berths will be required to accommodate people that will carry out the sampling. These participants will be available to assist other people requiring samples from the Niskin bottles.

To address objective 3, we will request particulate subsamples of particles from 300L seawater per subsample from the PIs funded to conduct in-situ filtrations along the cruise track. Particles will be analyzed for Nd isotopes and concentrations.

This work plan comprises ~550 analyses that will be split among the PI's (two Thermal ionization mass spectrometers [UH, LDEO]) and a multi-collector inductively coupled plasma mass spectrometer (USC).