

U.S. GEOTRACES Atlantic Workshop : Specific Cruise Objectives

Draft Form for Discussion

GEOTRACES ATLANTIC SECTION OBJECTIVES, GOALS, HYPOTHESES

Ordered as discussed...

1. Aerosol deposition and rain for TEIs with a significant atmospheric source (?sink?)
 - emphasize techniques for establishing source and provenance (Nd, Pb isotopes, - aerosol deposition (?rain?) is particularly relevant for the North Atlantic because of strong aerosol dust and anthropogenic sources (?²¹⁰Pb?)- also note that nitrate N isotopes may illuminate N cycle- water consequences: Al, ²³²Th, Mn, Hg
2. Ventilation: this factor is important for TEIs in N. Atlantic, but not well-quantified - use CFCs, SF₆ (?³He, ¹⁴C?) ?would CLIVAR be interested in paying for sample collection and analysis?- link to Pb and Pb isotopes as a chemically active transient tracer- Nd isotopes and paleoventilation interpretations- ²³¹Pa, ²³⁰Th as tracers of boundary scavenging and ventilation
3. Boundary processes; lateral inputs from continental margins Important in Atlantic because of nepheloid layers and broad shelves (also note issue of Nd isotope exchange). Need for closely spaced near-bottom samples. Ra isotopes, Al for close-spaced near bottom samples, ²³²Th, ²²⁸Th, FeInputs from abyssal sediments
4. Mode water formation and its influence on TEI distributions (Al, Pb, ³He/³H, CFCs, SF₆)
5. Trace element association with dominant phases - scavenging (all Th, ²¹⁰Pb, ²¹⁰Po, Nd, REE, iso)- SiO₂, MnO₂ [southern track advantage] and Fe₂O₃ as scavengers (?selective leaches?)- biogenic phases; remineralization functions
6. Hydrothermal inputs – importance of slow-spreading ridges for deeper mantle rock sources sink of TEI from ocean. ?Hg?.
7. Effect of Mediterranean water on TEI distributions (Al & other atm elements, Pb, Pb isotopes, Nd isotopes; ²²⁸Ra anomaly); Med outflow end-member; exchange w/bottom sed
8. surface Al gradient between eastern and western N. Atlantic: why is this there, does it have implications for other TEI?
9. d¹³C as a critical GT parameter – what is its importance in N. Atlantic (paleo tracer?)
10. trace element / nutrient correlations (Cd, Zn, Co), paleoceanographic implications
11. Redox processes near OMZ, boundary sediments

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