

The US GEOTRACES Arctic Cruise: Letter of Intent:

Quantifying aerosol composition/morphology and air-to-sea fluxes of key trace elements

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I am interested in participating in the US GEOTRACES Arctic cruise and planning to prepare a proposal. My goal is to generate the data that can be used for better understanding of the air-to-sea fluxes of selected trace elements to the Arctic Ocean, which is relevant to the GEOTRACES mission “To identify processes and quantify fluxes that control the distributions of key trace elements and isotopes in the ocean, and ...” A rough plan is as follows:

Objectives:

1. Measure aerosol composition, morphology and size distributions to explore the processes affecting aerosol chemical and physical properties,
2. Identify sources and transport patterns of target natural and anthropogenic elements to characterize their distributions,
3. Quantify the air-to-sea fluxes of key trace elements to the Arctic Ocean to address trace element biogeochemical cycles.

Tasks:

1. Sampling and analysis of bulk and size-segregated aerosol particles,
2. Sampling and analysis of individual aerosol particles,
3. Analysis of precipitation samples,
4. Calculation of the air-to-sea fluxes of trace elements to the western section of the Arctic (measurement-based),
5. Simulations of the air-to-sea fluxes of the elements to the Arctic basin (Atmospheric transport model-based)

Collaborations:

I am hoping to collaborate with all who are also working on atmospheric collection; some of the above tasks could be coordinated with others. I am also interested in collaboration with those who are working on the water-column chemistry and biology for better characterization of trace element biogeochemical cycles in the Arctic.

Requirement:

1. One berth could be required for operating 2 special aerosol samplers, but such sampling may be carried out with help by others and thus a berth may not be needed, depending on field work coordination.
2. Aliquots of filter and precipitation samples that will be collected and provided under the management proposal.