

The US GEOTRACES GP17-ANT: Letter of Intent:

Quantifying aerosol composition, size distributions and air-to-sea fluxes of key trace elements

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I am interested in participating in the US GEOTRACES GP17-ANT section and planning to prepare a proposal. My goal is to generate the new data that can be used for better understanding of aerosol properties and the air-to-sea fluxes of selected trace elements (TEs) to the west Antarctic continental shelf waters, particularly the Amundsen Sea. I believe that this goal is closely 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 and size distributions to explore the processes affecting the chemical and physical properties of aerosol TEs,
2. Identify sources and transport patterns of the target TEs to characterize their distributions,
3. Quantify the air-to-sea fluxes of key TEs to the Amundsen Sea to contribute to a better understanding of the regional trace element biogeochemical cycles.

Tasks:

1. Sampling and analysis of size-segregated aerosol particles,
2. Sampling and analysis of individual aerosol particles,
3. Sampling and analysis of deposition samples,
4. Calculation of the air-to-sea fluxes of key TEs (measurement-based),
5. Simulations of the air-to-sea fluxes of TEs (Atmospheric model-based).

Collaborations:

I would welcome collaborations with colleagues who will be working on atmospheric sampling and water-column chemistry/biology. I will share the new data from my project and would use the new data from others if funded to better characterize biogeochemical cycles in the study region.

Requirements:

- (1) One berth is needed for operating 3 air samplers. However, air sampling under this project can be carried out with help from a science team member onboard with training from the PI in advance, if the berth is unavailable. Thus, coordination on sampling is needed.
- (2) Cleanroom/lab space onboard is needed for sample handling, which could be shared.