

Primary Investigator: Peter Sedwick

Institution: Old Dominion University

Project: Impact of Convective Processes and Sea Ice Formation on the Distribution of Iron in the Ross Sea: Closing the Seasonal Cycle

NSF Division: OPP **Solicitation Info:** NSF 15-529 - Antarctic Research

PLR - ANTARCTIC OCEAN & ATMOSPHERIC SCIENCES **Submission Date:** 04/15/2015

Overview: This project will leverage the ship time awarded for a detailed physical study of air-sea-ice interactions in the Ross Sea during April-May 2016 (PIPERS, PI Steve Ackley) to obtain the first direct observations of the impact of convective overturn and sea ice formation on the vertical redistribution of benthic iron, the incorporation of iron into sea ice, and the importance of these processes for supporting seasonal phytoplankton production.

Data description: Data will include hydrographic data, and the concentration of dissolved iron (colloidal and soluble size fractions) and particulate iron (labile and total) in water column, surface water and sea ice samples.

Data analysis summary: PI Sedwick will be responsible for initial analysis and interpretation of the trace metal data. This will be followed by further analysis and synthesis of the project data, in the context of the physical and other ancillary data collected by the PIPERS program and their collaborators.

Includes field work? Yes

Description of field work: April-June 2017: Participation in expedition aboard RVIB Nathaniel B. Palmer, in conjunction and integrated with the NSF-funded PIPERS expedition (Stephen Ackley, PI). During this cruise, sampling activities will be focused in the polynyas of Terra Nova Bay and adjacent to the Ross Ice Shelf, as well as stations occupied along the inbound and outbound cruise track over the Ross Sea continental shelf (<1,000 m depth). Sampling activities will include:

- 1). Water column sampling using the ODU 12-bottle trace-metal clean CTD-rosette system, which has previously been used on RVIB Palmer.
- 2). Uncontaminated surface seawater and surface frazil ice will be collected using the ODU trace-metal clean towfish system, which has previously been used on RVIB Palmer.
- 3). Samples of frazil ice/unconsolidated sea ice will be collected using a pole sampler deployed from afterdeck of RVIB Palmer and/or zodiac.
- 4). If conditions permit, cores of consolidated sea ice will be collected using powered trace-metal clean ice corer.

Expected data product #1

Data type: Observational, Analytical, Processed Data

Responsible investigator: Peter Sedwick

Product description: Hydrographic (temperature, salinity, depth, fluorescence) and trace metal concentration data (dissolved and particulate iron species), primarily associated with sampling operations (water column, sea ice) during the research cruise. Finalized project data will be archived by BCO-DMO, with link to the Antarctic Master Directory.

Intended repository: BCO-DMO

Timeline for data release: Two Years from acquisition/analysis