U.S. GEOTRACES Newsletter

Spring 2024 | Issue 2

Data Products

GEOTRACES Intermediate Data Product 2025 (IDP2025)

- Deadline for guaranteed inclusion is **15 May 2024!**
  - ✓ Check the timeline for IDP2025
- How to make sure your data are included in IDP2025?
  - ✓ Check the IDP flowchart

GEOTRACES Intermediate Data Product 2021 (IDP2021)

The IDP2021 is available for:

- bulk download at the British Oceanographic Data Centre Published Data Library; contains hydrographic and biogeochemical data; global coverage; provided in 3 data formats: ASCII, NetCDF and ODV
- subset via GEOTRACES webODV extractor online service hosted by the Alfred Wegener Institute.

In addition,

- you can analyze, explore and visualize the data online with WebODV Explore
- you can overview relevant tracers with section plots, 3D animations) with the eGEOTRACES Electronic Atlas
- ✓ **IDP2021 Survey**: Please take part in this survey to help improving future data products (*complete before April 30, 2024*)

Photo: GP17-ANT Science Team in the Amundsen Sea. Source: GP17-ANT Cruise Report

Section Cruises

GP17-ANT

The *R/V Nathaniel B. Palmer* arrived in Lyttelton, New Zealand on January 28, 2024, completing the science operations of the U.S. GEOTRACES cruise GP17-ANT. The almost two months cruise was largely successful in achieving its science goals, with stations over the Amundsen Sea continental shelf, the continental slope and off-shelf, including one station as a crossover with the preceding GP17-OCE cruise. All stations included collections of samples with a near-surface towfish, a conventional CTD-rosette, a trace-metal clean CTD-rosette, and McLane in-situ pumps. Additional sampling activities included the collection of aerosols, precipitation, sea ice and snow as well as sediment cores for pore-fluid extraction and high-volume pumped seawater samples for radium isotopes and beryllium-7. The heavy sea ice cover prevented access to a number of planned stations including the Thwaites Ice Shelf, Pine Island Bay and the eastern portion of the outer Amundsen Sea shelf. Nonetheless, samples were collected from stations adjacent to the Dotson and Getz Ice Shelves, as well as on- and off-shelf stations impacted by melting sea ice, polynya stations where phytoplankton biomass was extraordinarily high, and a station adjacent to fast ice with near-zero chlorophyll fluorescence. With support from the U.S. National Science Foundation, samples were collected from 23 separate science projects, which together encompass measurements of nearly all of the GEOTRACES key trace elements and isotopes.

Synthesis

We encourage the scientific community to develop integrative synthesis studies, both global and regional, that link the chemical, biological and physical components along with modeling efforts that effectively incorporate the available data sets from U.S. GEOTRACES and other ocean programs. We highlight recent works that serve as examples of these activities:

- *Xu and Weber, 2024.* Developed a one-dimensional model that simulates both dissolved and adsorbed phases of ^{230}Th and ^{232}Th. *Evaluating Thorium Mass Balance Methods for Reconstructing Dust Deposition in a One-Dimensional Model. OSM2024.* https://agu.confex.com/agu/OSM24/meetingapp.cgi/Paper/1481119
- *Mete et al., 2023* on the utility of machine learning in simulating the distributions of tracers in the sea. *Barium in seawater: dissolved distribution, relationship to silicon, and barite saturation state determined using machine learning.* doi: 10.1029/2021GB007049
- *Xu and Weber, 2021* combined GEOTRACES IDP2017 data with a data-assimilation global ocean model to constrain Aluminum inputs to the ocean from dust deposition. *Ocean Dust Deposition Rates Constrained in a Data-Assimilation Model of Marine Aluminum Cycle.* doi: 10.1029/2021GB007049

For more Synthesis Publications please check our Database

Contributions

If you would like to contribute to the contents of our next issue and/or would like to share educational material in the Educational Resources page of our website, please send us an email

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Photo: STING Leg 1 (Feb/Mar 2023) Cruise Participants in the Gulf of Mexico. Source: Angela Knapp

Process Studies Cruises

STING *by Angela Knapp*

A seven-PI GEOTRACES process study on the West Florida Shelf (WFS), "STING" (Submarine Groundwater discharge, *Trichodesmium*, Iron, and Nitrogen in the Gulf of Mexico) has completed two cross-shelf cruises in Feb/Mar and July 2023, as well as quarterly sampling of submarine groundwater wells, rivers, and estuaries. The team presented preliminary results at the Ocean Sciences Meeting in February 2024, including evidence for geochemically distinct margin sources entering the WFS from the north vs. south of Tampa Bay, as well as distinct organic matter composition and dynamics associated with *Trichodesmium spp*. and with a bloom of the harmful algae *Karenia brevis* encountered on the Feb/Mar cruise. Next, the team will determine cross-shelf elemental fluxes from distinct margin sources using radium isotopes mass balances. They will also evaluate whether submarine groundwater discharge is the dominant source of bioavailable organic nutrients and iron on the WFS, and whether submarine groundwater discharge-derived trace metals influence the distribution and rates of nitrogen fixation by *Trichodesmium spp.* on the WFS.

Angela Knapp, Associate Professor at the Earth, Ocean and Atmospheric Science Department at Florida State University (http://myweb.fsu.edu/anknapp/)

Funding

Reminder that the U.S. GEOTRACES Project Office has some funds *to support synthesis activities,* up to $5000 per event. This is useful, for example, if a group of people want to get together to work on a GEOTRACES synthesis project (e.g., paper) over a weekend after a meeting (e.g., OSM, ASLO, OCB, Goldschmidt). In that case, additional hotel and per diem expenses could be reimbursed by the U.S. GEOTRACES Project Office. Other forms of synthesis are eligible as well. Participants may be from other nations but the synthesis project must be led by an investigator from the U.S. to qualify for these funds. For more information send us an email.

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