

## US GEOTRACES: Tahiti-Antarctica-Chile (GP17) section planning workshop

US GEOTRACES will hold a workshop 6 - 8 May 2020 at Old Dominion University to coordinate the scientific objectives and supporting logistics for a section to run from Tahiti to Amundsen Sea to the Chilean shelf (GEOTRACES Section GP17). Because of logistics issues this section would involve two separate research cruises, tentatively planned for late 2021 and early 2022. Principal investigators interested in conducting research as part of one or both of these cruises are invited to attend a project planning workshop in Norfolk, VA (details to follow). No prior involvement in GEOTRACES is necessary to participate.

An essential goal of this workshop is to supply potential participants and collaborators with all the pertinent details on, and science behind, the proposed cruises so that they can write successful proposals and therefore make the collaborative GP17 cruises a success. Workshop participants will have an opportunity to present their anticipated research contributions for the section in very brief advocacy talks.

### Timeline, Scientific Objectives and Logistics

Two separate management proposals to secure ship time and support logistics will be submitted to the NSF-OCE Chemical Oceanography 18 February 2020 proposal deadline. Project leaders for the two proposed cruises are Ben Twining, Jessica Fitzsimmons, and Greg Cutter (Tahiti-Antarctica-Chile leg), and Pete Sedwick, Bob Anderson and Rob Sherrell (Chile-Amundsen-Chile leg). In addition to laying out the principal scientific rationales for the GP17 section, the management proposals will include the proposed ports, numbers and types of stations, sampling systems (e.g., conventional rosette and GEOTRACES trace metal sampling carousel, underway towed surface fish) and other information. These details will be reviewed during the workshop to ensure that prospective PIs have accurate information for preparation of their proposals. Science proposals from individual investigators will be submitted to the 15 August 2020 NSF-OCE proposal deadline.

The tentative, approximate cruise tracks for both of the GP17 legs are shown below. The Tahiti-Antarctica-Chile section (GP17-OCE) will extend southward from the 2018 GP15 GEOTRACES PMT section and follow the CLIVAR P16 line for much of its length along 152°W. Thus, we anticipate lessons can be learned from the recent (2015) CLIVAR experiences along the planned section length, as well as connections with the 2018 GP15 cruise. The Antarctic leg of GP17 (GP17-ANT) will cover the sea ice-covered portions of the western Bellingshausen and the Amundsen Seas, including on- and off the continental shelf, as well as the coastal polynyas on the shelf and regions adjacent to the bordering ice shelves. The cruise track shown in the figure is a placeholder for now. Details of station locations will be decided upon further discussion. Previous NSF-funded work on trace element distributions in this region will inform station choices and initial hypotheses. The cruises will include at least two crossover stations in ice-free, off-shelf waters.

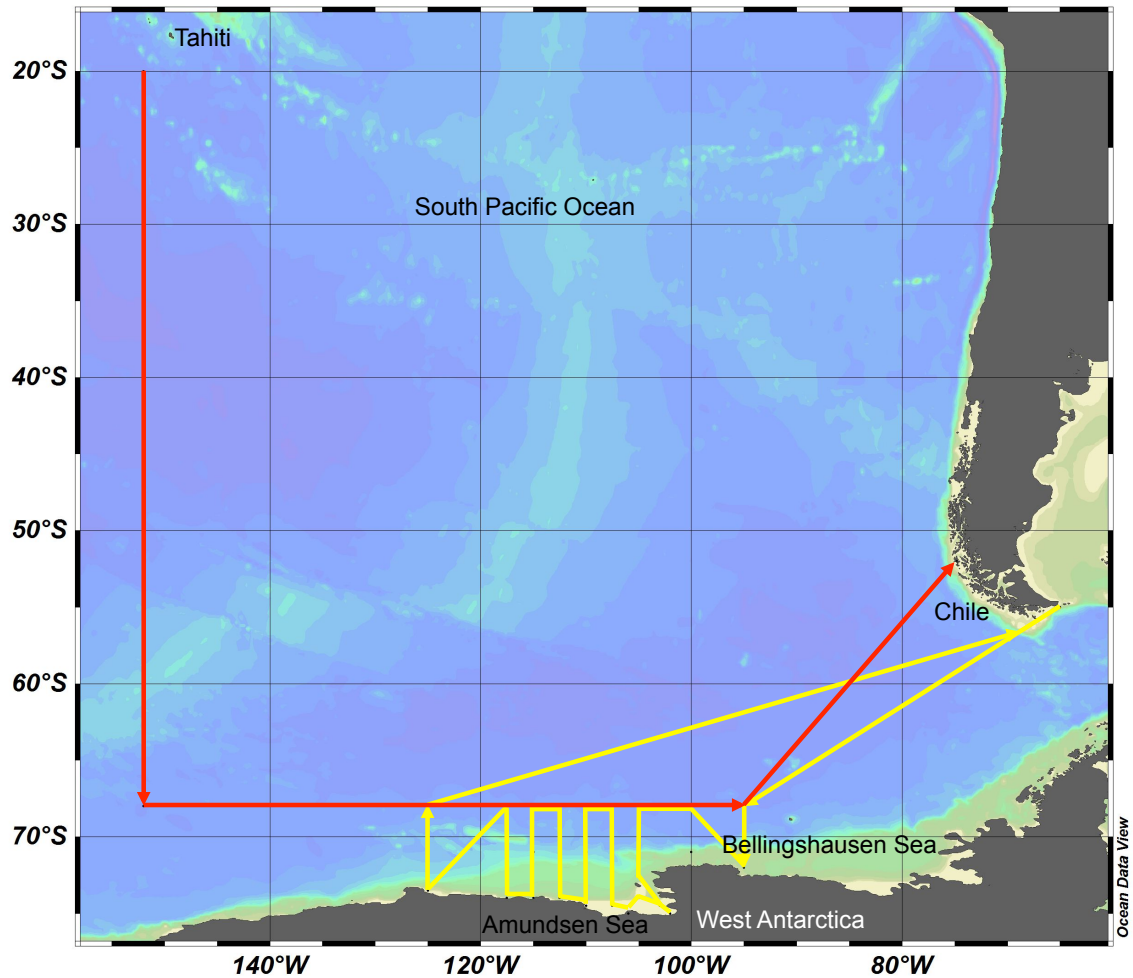


Figure: Tentative track of the US GEOTRACES GP17 sections, GP17-OCE (in red) and GP17-ANT (in yellow).

The overarching scientific objectives of the proposed GP17-OCE section include:

- 1) Compare and contrast the distributions of trace elements and their isotopes (TEIs) across the low productivity South Pacific Gyre, the high productivity sub-Antarctic front, and Antarctic polar waters, which influence pre-formed nutrient ratios across the global ocean;
- 2) Characterize near- and far-field TEI inputs from Antarctica to the South Pacific Ocean;
- 3) Evaluate inputs of Fe and other TEIs from the Chilean margin, as well as the exchange of TEIs transported by Pacific Deep Water as they enter the Southern Ocean south of Chile.

The overarching scientific objectives of the proposed GP17-ANT section include:

- 1) Quantify the gradients in TEI distributions from the open ACC to the sea-ice covered regions both on and off-shelf, to the open polynyas and finally to the waters adjacent to the ice shelf faces and continental margins of the inner shelf;
2. Characterize the influence of sea ice, glacial and subglacial meltwater inputs on the distributions of TEIs in the Amundsen Sea during summer;

- 3) Determine the TEI composition of the Circumpolar Deep Water (CDW) as it flows southward across the shelf-slope break, as well as its modification by mixing and sediment interactions as it flows toward the coastal ice shelves;
- 4) Estimate advective fluxes of TEIs and meltwaters through the region in both the upper and lower water column, including the westward-flowing coastal current that accumulates inputs from several ice shelf cavities, and the exchanges between shelf waters and the open Antarctic Circumpolar Current (ACC).

### Selection of Workshop Participants and Travel Support

In preparation for the workshop, the US GEOTRACES Scientific Steering Committee (SSC) requests that those interested in participating **submit a brief (300 word maximum) statement of interest by 1 Feb 2020**. Statements should (a) define the nature of the work to be done on the section, (b) clearly express interest in participating in one or both of the GP17 cruise sections, and (c) justify the research in terms of GEOTRACES objectives. Statements can be emailed (preferably as Word documents) to [geotraces@ldeo.columbia.edu](mailto:geotraces@ldeo.columbia.edu). Statements will be reviewed by a subcommittee of the SSC and used to select investigators who will be offered travel support to attend the workshop (see below). Following the workshop, investigators will be invited to revise their statements of interest to be posted on the US GEOTRACES web site, in order to facilitate coordination and planning of individual PI proposals to be submitted to NSF. Investigators may elect to use their pre-workshop statements of interest without change.

Participation in the workshop is not a prerequisite to submit a proposal for research as part of the GP17 section. It is expected that some investigators will desire to participate in both sections, while others may have interested limited to only one of the sections. Both are welcome at the planning workshop.

Workshop travel expenses will be subsidized by the US GEOTRACES project office. The project office budget can cover full travel expenses for approximately 35 to 40 participants. However, the SSC prefers to limit the level of travel reimbursement rather than limit the number of participants. Therefore, the level of reimbursement may have to be less than the full travel cost, as the number of participants is expected to approach 60. As for previous U.S. GEOTRACES meetings, it may be necessary for participants to either share a hotel room or cover half the cost of a single room as the most likely strategy to increase the number of participants receiving travel support.

### GEOTRACES Priorities

Members of the SSC will participate in the workshop and prepare a set of priorities informed by workshop deliberations to guide the submission to and evaluation of proposals by NSF. The overriding criteria for establishing priorities is the degree to which an activity will enable US scientists to achieve the goals of GEOTRACES as defined in the international GEOTRACES Science Plan (<http://www.geotraces.org/science/science-plan>) within the context of the overarching objectives of this section (see above).

The GEOTRACES Science Plan defines a number of key TEIs that must be measured on every section. It also identifies a number of complementary parameters that would be desirable to measure. These include other TEIs that are of interest in their own right, for example in illuminating specific processes of interest, or variables that may be critical for interpreting the distributions of key TEIs (e.g., circulation tracers). The SSC will consider these factors when establishing priorities for the section.

Funded investigators are obliged to follow GEOTRACES standards and intercalibration procedures (<http://www.geotraces.org/science/intercalibration/945-intercalibration-procedures>). This involves analysis of GEOTRACES reference standards (where applicable), collection and analysis of samples at crossover stations, collection of duplicate samples for analysis by other labs, or traceable standardization back to GEOTRACES reference samples. This policy will be further explained at the workshop. Investigators must also follow GEOTRACES data submission policies (<http://www.geotraces.org/library-88/geotraces-policies/110-data-policy>).