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Statement of Interest **Measurement of CFCs and SF₆ on GEOTRACES Tahiti-Antarctic-Chile (GP17) Cruises**

The objectives are to use the circulation tracers, chlorofluorocarbons/sulfur hexafluoride, CFCs/SF₆, to put bounds on time scales of ventilation and biogeochemical processes of interest for GEOTRACES. The tracer data will contribute to the following specific objectives.

- Characterize tracer end points near source regions, in particular, for the large volume Subantarctic Mode Waters that fill the subtropical gyre, and for warming Bottom Waters across the shelf regions and coastal polynyas that now contain measurable CFCs and have spread into the South Pacific.
- Put the GP17 data in historical context to quantify decadal changes in thermocline ventilation and spreading rates of Bottom Waters.
- Use changes in the tracer data to help understand what is driving changes in oxygen and nutrients and thus TEIs, e.g., changes in subduction rates versus particle fluxes.

Using shipboard measurements of CFCs/SF₆ and hydrographic data, we will calculate ages, AOU, AOUR and rates of other biogeochemical processes. Time scale information will help distinguish between the processes affecting the TEIs. There is spatial and temporal variability in these processes, and in speciation of TEIs. It is helpful to consider the circulation and sources of water to understand the TEI processes. The historical data will be useful to evaluate how ventilation and sources have changed. The Tahiti-Antarctic transect will be along ~152°W, known as P16; it was occupied several times in the past by WOCE, Clivar, GO-SHIP programs, and last in 2015. The proposed South Pacific transects are complex as they cross many circulation regimes and water masses including: ventilated and highly oligotrophic South Pacific subtropical gyre, well ventilated and productive Subantarctic, older Circumpolar Deep Water, Antarctic polar region and the Chile margin. In summary, measurement of circulation tracers on the proposed Pacific transects will contribute data to constrain rates for processes important for understanding TEIs.