**Scientific Objective:** This project will estimate excess nitrogen in the Southern Ocean (S. Ocean) and North Atlantic (N. Atlantic), using the Global Ocean Ship-Based Investigations Program (GO-SHIP) dataset and Biogeochemical (BGC) Argo float dataset.

**GO-SHIP Datasets[[1]](#footnote-1):** The GO-SHIP database consists of hydrographic sections throughout the ocean with measurements of a variety of parameters ( ~10-14 per cruise). Measurements are made from Niskin bottle samples, and cruises last around one month. Data typically exhibits seasonal bias and does not capture temporal variability. In the N. Atlantic, there are ~33 transects collected from 2003-2015, and, in the S. Ocean, there are ~37 transects collected from 1999-2018. The data is formatted csv files with Pm rows and 2V columns, where P is the number of pressure measurements per sampling site, m is the number of sampling sites, and V is the number of measured parameters (data has QC flags). This data will be used to create a model that will be applied to the BGC Argo data to allow one to estimate phosphate in the water column from location, temperature, oxygen, salinity, and nitrate data.

**BGC Argo Datasets[[2]](#footnote-2):** BGC Argo datasets consist of vertical profiles made from drifting floats that measure BGC variables. They do not measure phosphate. Floats make measurements every 10 days for ~1-5 years, so they capture temporal variations and do not exhibit seasonal bias. 250 floats have been deployed in the North Atlantic since 2003, and 190 floats have been deployed in the Southern Ocean since 2014. The data is formatted in netcdf files that have roughly Pm x 2V data points. The model derived from the GO-SHIP data will be applied to this dataset to allow one to determine excess nitrogen over a larger spatial and temporal region.

**Potential Data Analysis Methods**: Principal component analysis (compare excess nitrogen in different oceans), multiple linear/nonlinear regression (build model), gridding (make maps)

1. GO-SHIP website: <https://www.go-ship.org/>; Data download website: <https://cchdo.ucsd.edu/> [↑](#footnote-ref-1)
2. N. Atlantic Argo: <ftp://ftp.ifremer.fr/ifremer/argo>; S. Ocean Argo <https://library.ucsd.edu/dc/object/bb0756262d> [↑](#footnote-ref-2)