**Motivation**

To better understand the carbon cycle in the Southern Ocean, including the mechanisms governing the exchange of CO₂ between the atmosphere and the surface ocean and between the surface and deep ocean.

**Biogeochemical Floats**

Autonomous profiling floats have been equipped with sensors to measure temperature, salinity, pressure, oxygen, nitrate, pH, and optical properties.

**Southern Ocean regimes**

The floats sampled a variety of waters and can be grouped into four basic regimes, which are defined in relation to the Antarctic Circumpolar Current (ACC) and the sea ice edge.

**Observations**

The first full year of data reveals a complex seasonal cycle which varies considerably across regimes. At most locations, oxygen is produced and nitrogen is consumed in association with the spring phytoplankton bloom and restratification of the mixed layer.

**Temperature**

Temperature has largest effect on pCO₂ at subtropical location

**Salinity**

**Oxygen**

Apparent oxygen utilization = [O₂]_{sat} - [O₂]_{meas}

**Nitrogen**

Nitrate

**Carbon cycle**

Total carbon is calculated from measured pH together with alkalinity estimated from nitrate, oxygen, temperature, and salinity using a regression model developed with all available bottle data.

Carbon concentrations directly estimated from the data suggest that the exchange of CO₂ with the atmosphere is driven more by thermodynamics in the subtropical region, while biological production becomes more important at higher latitudes.

**Conclusions and Future Work**

New data from biogeochemical floats offer an unprecedented look at the seasonal cycle of nutrients, oxygen, and carbon in the Southern Ocean, one of the most poorly-sampled regions in the world ocean.

Current work is focused on quantifying net community production, analyzing the optical data to infer chlorophyll and particulate organic carbon, and comparing these observations with the results of a high resolution coupled-climate simulation.