OCB Scoping Workshop

Observing Biogeochemical Cycles at Global Scales with Profiling Floats and Gliders

April 28-30, 2009 Moss Landing, CA

Southern Ocean Breakout Group Report

Discussed three pilot-scale (~3 years) experiments:

A. Intermediate and mode waters of the Southern ocean: Pre-formed chemical properties and their biological determinants (this one generated the most interest)

B. Annual cycle of coastal Antarctic productivity, export and CO_2 uptake

C. Degree of coupling between export and productivity

Contact Zanna Chase (OSU) for more information

Southern Ocean Breakout Group Report

A. Intermediate and mode waters of the Southern ocean: Pre-formed chemical properties and their biological determinants

Integrative measure of biological efficiency: important site for carbon uptake by the oceans

Mechanism to supply nutrients to much of the ocean thermocline, and oxygen to low oxygen zones.

Sensitive to climate change on inter-annual and decadal timescales

Perfect opportunity to piggy-back on ARGO

~100 floats with O_2 and nitrate

~10 including chl

Deploy in south east Pacific- near OOI mooring

Involve process cruise, possibly gliders from Chile

B. Annual cycle of coastal Antarctic productivity, export and CO_2 uptake

- Debate about importance wrt CO_2 sink
- Exploratory research- go where ships can't go
- High productivity has ecological impacts
- Lower limb of MOC. Long term impacts on $N_{preformed}$
- Document full annual cycle, including seasonal edges
- Technological challenge

Somewhere accessible- Ross Sea?
Deploy floats beneath the ice, or ice-tethered profiling floats
Would require a more sophisticated suite of sensors,
chl, O_2, NO_3, export, optics

C. Degree of coupling between export and productivity

- High surface productivity not always associated with high export, and vice versa
- Differences between north and south of the Polar Front
- Differences as a function of iron limitation?
- Difficult to asses using traditional methods because of time and space scales involved

Use Bishop-style carbon explorer floats coupled with surface productivity estimates based on satellite, OBS, FLU, and changes in nitrate