Recent trends in Southern Ocean Biogeochemistry

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Maps of Southern Ocean summer (DJF) mean state of and linear trends in calcification rate and particulate inorganic carbon, corrected for the presence of summer sea ice. Only those trends significant at the 95% level are shown. The black line and gray shading indicate the average summer location of the Antarctic Polar Front. Boxes indicate regions singled out for further analysis.

Recent trends in the location of the Polar Front

Changes in Carbonate Ion

(a) Significant trends (at the 95% level) in summer surface carbonate ion from continuous underway CO$_3$ (1998-2011) and pCO$_2$ (1998-2013).
(b) All trends in the zonal mean carbonate ion concentration at depth from bottle data along repeat transect SR03 in our Region 3, where filled circles indicate significance and open circles, otherwise. Summer mean position of AMSR-E Polar Front indicated in black/gray.

Future Work

Drake Passage

Annual Mean Silicate

Monthly Variance

(Left) Example snapshot of AMSR-E SST and computed absolute SST gradient in Drake Passage. AMSR-E Polar Front location shown as white contour.
(above) Annual mean silicate concentration from World Ocean Atlas (2013) and monthly variance computed from monthly climatologies. The Moore et al. (1999) PF as black contour.