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Biogeosciences Discussions

Interactive comment on "Summer microplankton community structure across the Scotia Sea: implications for biological carbon export" *by* R. E. Korb et al.

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We thank the reviewer for their helpful comments and here respond to the specific points made in their review.

Methods. We concur with the reviewer's comments with regards to frequent storms and mixing maintaining a deep mixed surface layer in much of the Southern Ocean. However, this is not always the case (e.g. under sea-ice) and we are satisfied that our methods of identifying Winter Water as a θmin band is robust. To illustrate that a 60 m deep mixed layer is the exception we will include an average as well as a range for θmin along with more detail about our method that we will move into section 2.2.

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Interactive Discussion

Discussion Paper

Results 1. Phaeocystis antarctica, abundant elsewhere in the Southern Ocean, was not observed during the two surveys. In fact, it is virtually never seen in the waters around South Georgia, nor was it found during subsequent cruises across the Scotia Sea.

Discussion 1. Unfortunately, we do not have biomass estimates for the 2003 survey. We state on page 9785 that the taxonomic resolution of the 2003 cruise was course. We will now add in a line to state that additionally biomass was not estimated. Although we admit that the 2003 data set is not as robust as the 2008 set, we believe it is useful to include it in this paper as indicates the degree of diatom:dinoflagellate prevalence from year to year, which in turn can influence the degree of carbon or silica export. 2. Although F. kerquelensis was the dominant Fragilariopsis present in most samples, small numbers of other Fragilariopsis species, with similar cell sizes (e.g. F cylindricus), were also observed. Cells of C pennatum are $\sim$4X the size of F. kerquelensis, and contain $\sim$50X more carbon. Hence, compared to most diatom species found in the S Ocean, C pennatum cells are "heavily silicified". However, we also recognise the reviewers point: on a cellular perspective (C:Si), Fragilariopsis spp are more heavily silicified than C pennatum, and we have changed the text to reflect this. 3. It is unknown as to whether the majority of naked dinoflagellates found in this study were hetero/mixo/photo-trophic. The cells were very pale in Lugol's solution and hence are assumed to have not been obligate phototrophs. 4. Most of the Chaetoceros spp present, especially when they were abundant, were small (5-10 um) and medium (10-20 um) sized cells of the sub-genus Hyalochaetae - large Phaeoceros (e.g. C criophilus) were very rare.

Figs & Legends. 1. This is a difficult problem. In the methods it is acknowledged that very small dinoflagellates were not counted and this could under-estimate the numbers found on the 2003 cruise. However, given the differences in Chl concentrations across the Scotia Sea between years (e.g. the last paragraph in the discussion section "Central Scotia Sea) , differences in dinoflagellate numbers may be due to interannual

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6, C3286–C3288, 2009

variability. For example, in the Georgia Basin near to South Georgia, dinoflagellate numbers ranged from ∼10 to 40% of the total cell count during 3 summer cruises (MEPS 368: 75-91). At present we cannot assess how or if dinoflagellate communities vary from year to year across the Scotia Sea. However, this paper includes the 2003 data set, with its limitations, to make a first assessment of interannual variability of Scotia Sea communities. 2. See point on biomass above.

All technical corrections will be made in the manuscript as suggested by the reviewer.

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