

Interactive  
Comment

## ***Interactive comment on “Exchange across the shelf break at high southern latitudes” by J. M. Klinck and M. S. Dinniman***

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We would like to thank the reviewer for the positive comments on our submission.

We agree that discussion of the effects of tides are lacking in the manuscript. (A similar issue was raised by Reviewer 1 and we repeat much of the text here.) In some areas, such at the western Ross Sea shelf break (as shown by the AnSlope observations), tides seem to play a role in regulating the export of dense water by moving the shelf break front. Tidal flow is also seen to play a role in basal melt of glaciers which influences the properties of water on the continental shelf. We have added comments to Section 2 (Overview of Antarctic Shelves) to mention these important effects of tides on these high latitude areas. It is beyond the scope of the current manuscript to delve too deeply into the effects of tides. This issue is clearly a topic for future research.

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Diapycnal mixing on high latitude continental shelves remains a difficult issue. There are indications of the influence of fluxes across the pycnocline, but the mechanism is not clear. Budgets indicate the need for such exchange of heat, salt and nutrients. Appropriate levels of turbulence have not been found in those rare cases where direct microstructure measurements have been made. It might be that these exchanges are episodic and localized making them hard to detect and analyze. The issue of sub-grid-scale turbulence models is very broad and well beyond the scope of this paper.

The dynamics of dense plumes are an active area of research with a number of recently published papers. We chose to avoid discussion of this topic in our paper to constrain the number of topics under consideration.

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Interactive comment on Ocean Sci. Discuss., 7, 143, 2010.

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