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***Interactive comment on* “Transport of warm upper circumpolar deep water onto the Western Antarctic Peninsula Continental Shelf” by D. G. Martinson**

Anonymous Referee #2

Received and published: 11 February 2012

General comments

Martinson uses data from moorings and hydrographic surveys on the west Antarctic Peninsula shelf to explore the mechanisms that lead to the influx of warm oceanic water to that shelf. The manuscript is well written and mostly well organized, but it needs some work in spelling out with greater detailed what is the evidence for the different mechanisms listed, as well as a fuller exploration of the data available.

Specific comments

Major Comments

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page 2 line 14 (p2l14): I found the discussion of the mechanisms listed in the abstract to be too brief and incomplete. Given that this seems to be the first time all these mechanisms are discussed in the same paper, a complete summary of the available evidence is warranted. One key aspect here is the “or assumed” parenthetical in the abstract. The reader should be given a clearer picture of which mechanisms have already been shown to be present, and the relative strengths of the evidence to support each of the other ones.

p10l24 “Eddies at that site are not investigated since this study focuses on how the UCDW enters the shelf from the ACC waters over the slope.” This seems like a regrettable omission, given that there is very little or no published studies using moored data from that area. It is a rather interesting observation that the eddies at this location seem to show similar properties as those found in Marguerite Trough - although with fewer eddy events. This should be fully explored, as the previous studies, both observational and model-based, have concluded Marguerite Trough as a preferred path for this warm water intrusions to move across the shelf, but there’s very little data from moorings outside Marguerite Trough itself. Completing the eddy analysis for the other moorings that show eddies should be included in a revised manuscript.

p3l15: Please include the water mass involved. Also, the analysis should include LCDW intrusions, as again there have been very few studies of this, and they show that UCDW and LCDW intrusions are rather different in nature.

p11l10: The analysis in Section 3.3 seems weak. There data simply doesn’t seem to be appropriate to carry out this kind of analysis. Was the ADCP data detided? What about inertial frequency and other high-frequency variability? More importantly, it is unclear how the “upwelling heat flux” is calculated from the simple mass balance argument that precedes it. I would recommend simply removing this section and, if this mechanism is to be retained as a possibility, saying that there is no data to evaluate it at this point.

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p3110: source for... the shelf, I assume.

p615 Shouldn't T_f be function of z ? please clarify

p1016: how is could these eddies be generated? Any instability criteria?

p1219: Probably better to quantify the statement by stating the correlations, or saying "no significant correlation".

Throughout the paper, I would recommend using the mooring numbers, which are easy to look up on the map in Fig. 1, instead of the LTER-based named convention.

Interactive comment on Ocean Sci. Discuss., 8, 2479, 2011.

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