

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

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Reviewer #2: 1) 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.

We have now made better definitions of the other mechanisms from previous studies,

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including a summary (as requested) in the main text. This eliminates “or assumed” in the abstract (abstract rewritten to accommodate the new information).

2) “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.

We are presently working on a second manuscript to address eddies at each of our mooring sites, but prefer to stay focused in this paper on the single issue of how UCDW enters the shelf in the study region. We have also made it more clear that we are interested in how UCDW is transferred into the shallower waters of the shelf (above what we call the nominal shelf depth – now explained as per Reviewer #1 request). The water above the nominal shelf floor influences the main biology and ecosystem of the WAP, hence our focus of water outside of the trough, which has been well studied as you mention (and we clearly state in the paper).

3) 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.

We now include a discussion of all water masses present in the region (including LCDW). Unfortunately we are unable to assess LCDW’s role in intrusions given the current configuration of our moorings (with no salinity sensors).

4) The analysis in Section 3.3 seems weak. There data simply doesn’t seem to be

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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.

We have eliminated this discussion and state our inability to evaluate upwelling as you suggest.

5) A number of "minor" comments are listed.

We have addressed each of these.

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