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Interactive comment on "Interannual Variability of Summer Surface Mass Balance and Surface Melting in the Amundsen Sector, West Antarctica" *by* Marion Donat-Magnin et al.

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We thank David Bromwich for these comments that have pushed us to improve our manuscript.

C1 :One major shortcoming is that it really underplays the comparisons of the present results with those obtained by Deb et al. (2018) also based on regional climate modeling for 1979-2015 summers where a leading conclusion is: "El Niño episodes during austral summer drive warmer conditions over Amundsen Sea Embayment ice shelves that cause enhanced surface melting". El Niño influences play a relatively minor role in the current analysis. The explanation likely lies in the discussion on lines 475-486.

Deb et al. (2018) was cited 4 times in the submitted manuscript, but going back to our text, we agree that there should be more comparison to the results obtained by Deb et al. (2018) about the connections to ENSO and the ASL. We have added that "The relationship between ENSO and the number of melt days was identified by Deb et al. (2018) using both regional simulations and a satellite product". Our results are difficult to compare more quantitatively because different methods and metrics were used in Deb et al. (2018) and in our study. We now also mention that "longitudinal migrations of the ASL are not the main driver of surface melting variability, as previously noted by Deb et al. (2018)".

C2: I didn't think the analysis for a lagged relation between El Niño forcing SMB/melting (Fig. 13) to be very compelling, at best possible.

See our response to Reviewer #1: we have substantially expanded our discussion of this hypothesis based on further literature review and on an additional DJF sea ice composite for JJA Niño events. Although providing perfectly robust evidence of causality would require specific AOGCM experiments, we believe that several lines of evidence indicate that such physical lag is highly probable.

C3: I don't understand what is meant by humidity divergence (Figs. 10 and 11). Normally one evaluates moisture transport divergence in relation to P-E. Please clarify.

We apologize for the lack of clarity and we did plot the moisture transport divergence. We have nonetheless decided to show the meridional integrated vapor transport instead of the divergence, which better shows the moisture transport from the mid-latitudes to the Antarctic ice sheet.

Please also note the supplement to this comment:
https://www.the-cryosphere-discuss.net/tc-2019-109/tc-2019-109-AC2-supplement.pdf