

## ***Interactive comment on “Changing pattern of ice flow and mass balance for glaciers discharging into the Larsen A and B embayments, Antarctic Peninsula, 2011 to 2016” by Helmut Rott et al.***

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The manuscript provides a comprehensive and detailed analysis of the current glaciological changes along the north-eastern Antarctic Peninsula, a region which is highly dynamic and of high interest for the scientific community. The paper is well written and most of the methods are well described. However, the authors should provide some more detailed information on the analysis, in order to facilitate a better traceability of the results.

My main concern is about the horizontal and especially vertical registration of the TanDEM-X DEMs (L177)? No information is provided on this issue, which is an im-

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portant processing step to generate accurate elevation change information.

Another mayor concern is about the deduction of the ice thickness along the flux gates. (L271) How is the ice thickness deduced for glaciers without sounding data and no floating terminus? What was done if sounding data was only available for sections of the flux gate profiles? Plots of the obtained ice thickness (indicating measured values and values obtained from the floatation criterion...) along the cross section profiles (e.g. in the supplement) would be helpful for the reader.

Kind Regards

Thorsten Seehaus

Some more minor issues regarding the description of the methods and discussion are listed below.

I167 please add a reference to other studies where this approach was already successfully applied to generate glacier mass balance information

I191: how is the RMSE calculated (mean value?, also not clearly mentioned in the supplement) and in the supplement L83: S\_e random error = RSME of SEC-IDHDT4 difference? It would be helpful to plot the coverage of the IDHDT4 data in one of the maps.

I199: how was the SAR backscatter intensity difference measured? Pixel by pixel or was any algorithm applied to reduce speckle noise?

I226: how was the bulk uncertainty estimated? Based on previous studies? In Section 2.1 the link to the respective section on error assessment in the supplement is missing and vice versa.

L252: where are the sample points located? Ice streams? Nunataks? Slow moving areas?

L361: what was the SMB under precollapse conditions? Did you try to calculate the ice

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flux for precollapse conditions using your vel. field from 1993? How does it compare to the modeled results?

L452-459: Is there a correlation between the velocity of the detached ice blocks (or velocity relative to the glacier velocity) and the slowdown and frontal advance of the calving glaciers? This would be an interesting indicator, if there is any correlation.

L498: A discussion and explanation of the difference between your values and the findings by Scambos et al.(2014), would be helpful for the reader.

L530: Is there a correlation between acceleration events and retreat events and vice versa?

L537: Is there a reason, why the loss rate was higher in the period 2001-2008.

L552: What are other sources for the differences in sea ice pattern and ice drift?

Discussion: A more advanced discussion regarding the observed glacier changes in respect to changes in the local climate (e.g. considering recent publications on climatic conditions along the Peninsula: (Cook et al., 2016; Oliva et al., 2017; Turner et al., 2016) and previous mass balance estimates in this region (even just covering individual catchments) would be beneficial for the manuscript. Since, there is no mass balance information available for the whole study region before 2001 (by Scambos et al. 2014), a more detailed discussion of the temporal changes of the mass balance of at least some individual glaciers (where lit. data is available) would be quite interesting to illustrate the long-term evolution of the mass loss after the disintegration of the ice shelves in 1995 (PGC and Larsen A).

Table3: Is the calving flux the average interpolated value for the respective period?

Fig. 7 Caption: 2103 -> 2013

Supplement: Information on grounding line position in the plots in Section 1 (or magnified subsets) would be helpful in order to see which glaciers have floating sections

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(Also in respect to the flux gate position)

Why are the tide model sample points in Fig. S3? Not explained in the paper and supplement?

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Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2017-259>, 2017.

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