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Interactive comment on "Melt in Antarctica derived from SMOS observations at L band" *by* Marion Leduc-Leballeur et al.

Anonymous Referee #1

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Interesting demonstration of SMOS (1.4 GHz) capability for melt detection compare to higher frequency (19 GHz). To my knowledge this is the first time that such a comparison has been done. Even if the observed results were expected : less sensitivity at 1.4 than at 19 GHz, the differences are well described and analysed. I suggest that the authors put more emphasis on these differences that could bring complementary climatological information compared to SSMIS. In that sense, the Fig. 7 is very interesting (mean melting days detected at 1.4 GHZ but dry at 19 GHz). What are the temporal variations of such observations over the SMOS period? Do you observe particular events, for particular years? For example, the years 2002/2003 and 2015/2016 are known to be particularly wet in the Antarctic Peninsula due to a strong ENSO events. See Zheng et al. 2019 RSE, 232 : Variations in Antarctic Peninsula snow liquid water

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during1999–2017 revealed by merging radiometer, scatterometer and model estimations

This is unfortunate that the Fig. 1 stops in April 2015, because 2016 could be a good example of differences between 1.4 and 19 GHz data?

See also Wiesenekker et al., 2018. A Multidecadal Analysis of Föhn Winds over Larsen C Ice Shelf from a Combination of Observations and Modeling. Atmosphere 9(5), 172. https://doi.org/10.3390/atmos9050172. for the relationship between particular Föhn events and melting.

I also suggest to add Zheng et al. 2019 reference (and others) for mentioning scatterometer and radar capabilities compared to radiometers (not mentioned in the paper).

The DMRT-ML analysis is a very good added-value to this paper.

Also, could you specify which ice/water mask do you used for SMOS? same as for resampled SSMI mask? source of error? Does the Fig. 5 cover the entire SMOS period and for the whole Antarctica?

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