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Interactive comment on "A wavelet melt detection algorithm applied to enhanced resolution scatterometer data over Antarctica (2000–2009)" *by* N. Steiner and M. Tedesco

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1 The Response to Anonymous Referee #1 (Ref1)

Referee Suggestions 1 (RS1)

Section 2.3, pg 2646, line 23: The authors tell that the melting events whose melt duration < 3 days are removed. Why? Is it also the case in the AWS measurements and in the SSM/I based melt time series? Because the removal of these short melt events could impact a lot the comparisons afterwards.

Authors Response 1 (AR1)

This convention allows for the elimination of obvious outliers, in terms of detection of melt using a threshold in a constant manner. The use of a 3 day minimum threshold for melt detection has been previously used in other studies (e.g. Tedesco, 2007) and is also used in the passive microwave records compared here. The goal is to reduce the number of melting events related to processes that are not related to meltwater production (e.g. wind-driven melting or extreme snow property changes) and that can be misclassified (and therefore eliminated from the data record). However, those short-term events have been included in the seasonal cumulative totals in order to compare the remote sensing results with those obtained from ground observations

RS2A

Section 4.1: I suggest to put this section earlier in the text because it is strange to discuss the results of the new melt detection technique in Section 4.0 before validation with AWS measurements.

AR2A

We have reversed the order of the two sections in the manuscript.

RS2B

It should be also very interesting to add in this comparison and in Fig 7 the M+30K and M09 SSM/I based technique to see which satellite data/melt detection algorithm compares the best with the AWS measurements and what is the interest of the QuickSCAT data (high resolution) in respect to the SMMI data (low resolution). It should be also interesting to add M+30K and M09 in Figs. 3-6 and in the discussion if it is not a too big job for the authors.

AR2B

We appreciate the comment from the reviewer but we would rather to leave fig. 7 as is.

TCD

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The focus of our study is the active mw data set and we want to point out the relationship between backscattering and surface temperature and how the two melt-detection algorithms can identify melting. Also, the plots including also passive microwave results would become more confusing.

RS3

Section 4.2: This section is difficult to read and I suggest to put all the statistics listed in the text in a Table.

AR3

A table of statistics has been added, please refer to Table 2 in the manuscript. Additionally, the text has been edited to refer to this additional table.

RS4

Section 4.3: I am very sceptical about the correlations plotted in Fig 10. because they were made over time series with 9 values only (2000-2009). For me, the time series are too short to perform realiable correlations and the correlations shown in Fig10 are not signi[FB01?]cant. It is likely that the differences between FT3 and CWT are just due to the noise in the 9 values time series. Therefore, I suggest to remove this section and to only focus this paper on the different melt detection techniques

AR4

This point was also risen by another reviewer. We accept the reviewer's suggestion and decided to remove this section.

TCD
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