

***Interactive comment on “Melting trends over the Greenland ice sheet (1958–2009) from spaceborne microwave data and regional climate models” by X. Fettweis et al.***

**Anonymous Referee #2**

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This paper compares the melt trends over Greenland as computed from passive microwave satellites and two regional climate models. It is an important topic and this paper does contribute to scientific knowledge on the subject. It provides a good explanation of the different passive microwave melt algorithms and their strength and weaknesses. The paper also provides good explanations of the differences in the melt from the models and the satellites investigating albedo responses, rain events and mixed pixels. The paper presents numerous comparisons but it is sometimes difficult for the reader to understand the comparison because of the paper's format. I would suggest the authors read through the manuscript for grammar and clarity and try to limit the focus of the paper to make it more readable. Some of the background material

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is not completely relevant to the paper and could be left to a citation to focus the paper more on the results.

My major scientific concern with the paper is that I believe the passive microwave data is used in the reanalysis data used to drive the models that are being compared to the passive microwave data. The authors need to address the amount of correlation that is expected because the passive microwave data is being used on both sides of the comparison. I do not think this will change the results but it needs to be addressed.

Below are specific comments. Page 2434 line 18 reword for clarity to „twice that of the 1980's. Page 2435 Line 3,4 the parenthetical information should be explained more in its own sentence. Page 2435 line 2 you should also site the work of Luthcke. Introduction, in general the introduction is a bit confusing, it goes from melting to mass balance to temperature to near surface melting and is not tied together until the second to the last paragraph. Consider moving your motivation stated in the paragraph starting on line22 page 2435 to the beginning of the introduction. Page 2436 line 22 aim 3 is unclear and needs to be reworded. Page 2436 line 25 Satellite data used here consists of .. Page 2437 line 11 what is done for data gaps larger than 3 days? How often are data gaps filled, what % of the time? Page 2437 Paragraph starting with line 12. Please address in this paragraph if the satellite microwave data is used in any way to force the models. Is the passive microwave satellite data used in the reanalysis data used in the models? Page 2438 line 16 change following to follows Page 2439 Section 3.1 remove the numbers and turn this into text. Also this section should be renamed. Methodology implies that you will be discussing the methodology used in the paper not a review of methodologies. Page 2442 line 7 check wording. Figure 2 is confusing a bit confusing. State what the dashed line is and that melting is determined if above the line. Page 2444 Line 26 check grammar and define resp. Table 1 is very confusing. What does the (temp) column number represent? The dashes for the numbers could be separated into different columns for clarity. Page 2447 Line 5 Give more explanation on why you are using the 1.2 % as opposed to the 1 % and the difference it makes. Page 2447

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Line 17 add the RMSE for low melt years and high melt years for comparison in the paper.

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Interactive comment on The Cryosphere Discuss., 4, 2433, 2010.

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