

Interactive comment on “Twenty-one years of mass balance observations along the K-transect, West Greenland” by R. S. W. van de Wal et al.

Anonymous Referee #1

Received and published: 10 July 2012

The following is based on the review guidelines as listed on the ESSD homepage here: http://www.earth-system-science-data.net/review/ms_evaluation_criteria.html

The data presented is an extension of a previously published time series of SMB along a transect in western Greenland. The data presented is therefore new - the methods are traditional. SMB measurements done by way of stakes is a simple technique and is expected to be well-known by the target audience. No further explanation is therefore necessary. A citation to current SMB work being carried out by the Geological Survey of Denmark and Greenland in their PROMICE program would be appropriate in the introduction. The data is very useful for the purposes suggested by the authors (validation of satellite products, comparisons with RMCs, etc.) and the publication of this is therefore appropriate.

C92

Data download works as expected and the data set appears to be complete. The data is in the form of a simple text file that can be used without further processing. A measure of uncertainty on the calculated SMB measurements are presented in the manuscript (Table 1), but not in the data set available for download. The expected uncertainty on a single stake measurement is not mentioned. The data appears consistent and adheres to commonly used units and terminology in the discipline.

General comments to the presentation (manuscript and figures): The manuscript is generally well written and clear. The structure is ok. The language could use a bit of polishing, but not being native-English speaker I will leave that to others, except for a few places (see specific comments below). The length seems appropriate for the journal.

The data is very useful, unsurpassed in detailed coverage and easily available through this publication.

Specific comments, all minor:

P352, L10-14: I think the tense is unnatural in these first sentences. Consider rewriting to past perfect tense.

P352, L23: limited in length time wise, I presume? Perhaps "temporally" is better to avoid confusion.

P353, L19-20: Which sites are you referring to as in the "lower region"?

P354, L11-14: This sentence is unclear to me. What is larger? The period? I think I understand, but can you please clarify.

P354, L17-19: It is not clear to me if you're referring to your reproduction of the analysis using Krabill's periods in this statement. If so, it would be interesting to see a plot of the calculated SMB gradients for the four periods, since this is an important point. If you refer to the total time series (i.e., Fig. 3) I'm not sure how the increasing SMB gradient you imply is evident? The fit you've made is linear, which is a constant gradient, yes?

C93

If, however, you by increasing gradient mean increasing spatially when moving towards the margin – which seems to be the case – this could be stated a bit clearer. Alternatively this discussion-like section could be shortened somewhat due to the scope of the journal.

P354, L22: Surely a question of convention/semantics, but you say the mass balance decreases when changing from e.g. -6 to -1. One could also say it increases.

P354, L23: In *an* absolute sense [..]

P355, L4-5: How did you derive the small correction?

P355, L16: [..] melt extent, both important [..]

Table 1: Perhaps add a horizontal line above the row of mean values to improve readability

Fig. 1: Good, clear map. Perhaps state the source of the satellite image?

Fig. 3: Use "Time" on x axis label to be consistent with figure 2. Please explain more clearly which sites are represented by the different line-types. Adding labels like you already have on SHR, S5 and S4 would be fine.

Fig. 4: Please add a legend so each year can be distinguished.

Fig. 5 (b): Unit on Y-axis should be Cumulative SMB (m w.e./yr)?

Interactive comment on Earth Syst. Sci. Data Discuss., 5, 351, 2012.