

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.

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In van de Wal et al. (2012) the best long term mass balance network extending from the ablation zone into the accumulation zone on the Greenland Ice Sheet is presented. This is a valuable data set that can be utilized for model calibration and remote sensing interpretation. The paper is well written and provides a data set that has no substitute. Surface energy balance and meteorological assessment of the network has been provided in other papers and is correctly not covered here.

354-12: Why is Krabill et al. (2004) used and not more recent papers on the same topic by Zwally et al. (2011) or Sørensen et al. (2011)

354-18: The observation that the balance gradient is increasing and this would in-

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crease climate sensitivity is a key point to this data set. Figure 4 does not present compelling support for this argument at present. The legend for Figure 4 needs to identify the individual years. Further to avoid confusion the years should be color shaded systematically, for example with all the 1990's shades of say blue and green and the 2000's shades of yellow-red. This would provide better visual evidence of the changing balance gradient and its robustness. The actual slope of each line for each year would be useful to report along with what the authors determine is a robust measure of the difference in mass balance with elevation. A quick comparison of Site 4 and Site 9 data indicate a difference less than 4 m in three years, all in the 1990's, and six years with difference greater than 4.5 m, all since 2000. This is not a very robust measure, but indicates the value of adding a figure or tabular data similar to Figure 2 that illustrates the differences between a measure of this nature such as $(S4+S5+SHR) - (S8+S9)$. This may or may not be a more robust measure of mass balance change than the balance gradient.

355-4: In terms of ELA on this section of the GIS, the ELA does not correspond to the altitude of the transient snow line at the end of the melt season. However, the elevation of the transient snow line would have value, and can be recognized in the daily MODIS imagery with sufficient frequency for an end of the year elevation assessment (Pelto, 2011). Has this been done? If it has this would be useful to report as well as the ELA. If it has not I am not suggesting the authors include this analysis in this publication.

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