

Interactive comment on “Surface mass budget and meltwater discharge from the Kangerlussuaq sector of the Greenland ice sheet during record-warm year 2010” by D. van As et al.

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van As et al. (2011) combine two unique data sets of runoff and energy balance for the Kangerlussuaq sector of the GIS. This offers the potential for a watershed scale comparison of meltwater input versus output. For this reason the data set and the approach of the study is of considerable potential value. This value is not realized in the current draft. I found that the study just did not portray the data in nearly as quantitatively a detailed fashion for albedo, surface energy balance (SEB) or ablation as the van den Broeke et al (2011) paper. I constantly had to refer to the former paper and continually noted the superior documentation of the aforementioned processes for

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the same transect, though not the identical period or purpose. We are left with no clear spatial view of the difference in the 2010 SEB versus other years. There is no clear spatial view of the ablation for the 2010 melt season in the watershed. Given the connection to the meltwater drainage system, we also need a schematic or map that will better define in a qualitative sense at least this system. The paper should depict the first two components in a map based format. This paper can be a valuable contribution, but at present it simply is a step backward from the earlier paper by the same research group.

2323-5: Why is albedo derived strictly derived from MODIS not compared to, verified by the stations themselves used as described by van den Broeke et al (2011: 378) and portrayed in Figure 2.

2330-3: Figure 5 is not nearly as informative in terms of the surface height changes largely resulting from ablation as Figure 4 in van den Broeke (2011). What is the specific ablation differences at the stakes from 2009 to 2010?

2330-10: The meltwater drainage network is an important ingredient in this paper. A schematic figure or a map based figure of at least a portion of the watershed is essential.

2331-8: The energy balance difference is not as clearly portrayed as is needed. The anomaly versus 2009 and other years at each station is just not clearly conveyed. Table 2 in van den Broeke (2011) is an example of how clearly the annual average energy balance has been quantified at S5, S6 and S9. What are these values for 2010?

2331-22: The spatial variation of ablation is not well conveyed. A map or figure of the modeled ablation along the K-transect is needed, not just at the stakes, since the whole basin is being modeled. Of course this also suggests that the model results must be better compared to the observed ablation at the stakes themselves.

2332-4: As noted above document the energy balance changes for more than just and

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for each station, not just a general statement that ablation was due to a more negative long wave radiation balance. Figure 6 attempts to do this but just compares two years and for what location?

2332-1: The conclusion that albedo was more important than temperature to the higher melt rate at the upper stakes, can be much better illustrated with a figure like that of Figure 7 in van den Broeke (2011). How did the albedo vary in 2009 versus 2010 at Kan M and S6 and S9?

2334-15: It is noted that many moulins transport the water from the surface quite close to the origin of that meltwater. Quantify this statement, the suggested figure may do so.

Interactive comment on The Cryosphere Discuss., 5, 2319, 2011.

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