

***Interactive comment on “The seasonal cycle and interannual variability of surface energy balance and melt in the ablation zone of the west Greenland ice sheet” by M. van den Broeke et al.***

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This paper does an exceptional job of building on the previous energy balance work from the same AWS stations (Van den Broeke et al., 2008). The data set is sufficiently long now to provide a good test of robustness of the surface energy balance model and to observe the season and interannual variability in this region. One key point that is touched upon that I believe bears further analysis is the conditions during particularly high melt periods at S5 and the role of SHF during these periods. The need is made apparent by the authors comment that, "...associated melt climate as presently observed at S5 will become representative for large parts of the marginal ice sheet that

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are currently adjacent to the ocean."

791-25: How persistent are the high SHF values at S5, such as in the summer of 2006? In Figure 8 there are two months where SHF is nearly 100 MJ/month (July 2005 and July 2007). You noted that variations in SHF are key to interannual variations in ablation at S5, can you provide a better measure of this relationship for S5 for May-September for the various years.

Fig. 4: There are six 10-day periods when ice melt at S5 exceeds 50 kg m<sup>-2</sup> day<sup>-1</sup>. Though they are not common these periods can account for a considerable percentage of the annual melt, around 15% for a single such period. What is the key energy source during the S5 high melt periods? It would be useful to have more information on these intervals, though they are few and statistically an insufficient data set to draw robust conclusions at this point. It is expected that the conditions at S5 would become representative of larger areas of the ice sheet, and these are the key melt events. The exceptional melt amounts suggest specific events of a duration that would be useful if it could be defined.

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Interactive comment on The Cryosphere Discuss., 5, 779, 2011.

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