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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Received and published: 21 September 2011

Overall Assessment The study that makes a nice set of physical interpretations after a somewhat tedious model description and validation description. By page 14, "In the lower(or upper) ablation zone", the paper becomes fruitful. It is very nice that the study makes "Evaluation of the calculations" ... [using three independent methods."

The following key points should be mentioned in abstract and (if not already) conclusions: "we can fully attribute the 2010 melt excess at low elevation to high temperatures" ..."low albedo allowed for higher solar radiation absorption rates, roughly contributing half to the melt increase. During warm episodes in the future we can expect a
melt response of at least the same magnitude."

The following major comments appear in "stickies" inserted using Acrobat. I past the comment text here for convenience. Several minor comments and copious text edits (owe me a beer) appear in the .pdf document.)

Major Comments

The (usually upwind) proximity of Greenland’s largest land mass seems an important factor to consider in discussion of heat sources.


I recommend you use MOD10A1 because it has the highest temporal resolution.

re: "we can fully attribute the 2010 melt excess at low elevation to high temperatures" ignores the importance of changing albedo and increasing downward longwave. Fettweis (2007) showed that only the increase of the longwave downward flux explains the recent warming over the Greenland ice sheet and that the decrease of surface albedo amplifies the impacts of this warming + Fettweis, X. (2007), Reconstruction of the 1979–2006 Greenland ice sheet surface mass balance using the regional climate model MAR, The Cryosphere, 1, 21-40, doi:10.5194/tc-1-21-2007.


Suggestions + suggest to connect the red dots in Fig. 2 with solid red line segments. + avoid using "reflected" or "reflects" to refer to non-radiative concepts + downward instead of downwelling; upward instead of upwelling or reflected

Please also note the supplement to this comment: http://www.the-cryosphere-discuss.net/5/C983/2011/tcd-5-C983-2011-supplement.pdf

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