

***Interactive comment on “Surface melt magnitude retrieval over Ross Ice Shelf, Antarctica using coupled MODIS near-IR and thermal satellite measurements” by D. J. Lampkin and C. C. Karmosky***

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Dear authors,

Thank you for your extensive and comprehensive response to the referees' comments. It is clear that you have gone to considerable effort to address the various comments. Many of the comments are of a technical nature and relate to better defining the uncertainties resulting from errors in NCEP and/or the AWS data and you have provided useful additional results that address some of these issues.

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You have made a compelling argument for the importance of measuring melt volume and LWF in snowpack in Antarctica and why PMR observations are not sufficient for this purpose. I am, however, in agreement with referee 2 that, despite this, your data and results are subject to uncertainties that are larger than the signal you wish to extract. If I understand your albedo sensitivity plot correctly, then a 10% reduction in albedo appears to increase melt from ~2% to up to 11%. I also concur with referee 2 about the importance of turbulent fluxes in the energy balance. As they state, melt volumes are generally low and dependent on small imbalances of a few tens of  $\text{w/m}^2$ . I did not understand your explanation for how you bounded NCEP s/w uncertainties. The fact that these uncertainties generally exceed the energy required for the melt events you detect makes the LWF estimates highly sensitive to the errors. Despite the sensitivity analyses provided in your supplement, it appears that uncertainties in the inputs to SNTHERM makes the calculation of LWF questionable, although a worthy goal.

Because of fundamental issues raised by referee 2, I am not recommending that this paper be published in The Cryosphere. I would, however, encourage you to submit a revised m/s to TCD taking into account the referees' comments and the additional analyses provided in your supplement.

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Interactive comment on The Cryosphere Discuss., 3, 1069, 2009.

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