

Interactive comment on “Diagnosing the extreme surface melt event over southwestern Greenland in 2007” by M. Tedesco et al.

Anonymous Referee #1

Received and published: 4 July 2008

General overview

This is an excellent, detailed and insightful paper concerning Greenland Ice Sheet melt anomalies of summer 2007. The paper makes a useful incremental advance in knowledge, and should be of broad interest to TC readers. I strongly recommend publication once the minor issues listed below have been attended to.

Specific comments

The authors should add in their Introduction the recent new evidence attributing recent warming and increased melt/runoff in Greenland in the last ~15 years to global warming: E. Hanna, P. Huybrechts, K. Steffen, J. Cappelen, R. Huff, C. Shuman, T. Irvine-Fynn, S. Wise & M. Griffiths (2008) Increased runoff from melt from the Green-

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land Ice Sheet: a response to global warming. *Journal of Climate* 21, 331-341, doi: 10.1175/2007JCLI1964.1.

p.386, lines 20-21 (& elsewhere): Please give all trends as percentages rather than just values, and comment on their statistical significance.

p.388, l.12: Please comment on the significance of the $+22 \text{ W m}^{-2}$ incoming longwave radiation anomalies.

p.388, l.15: Re. incoming shortwave radiation anomalies, "generally negative" is rather vague - please tighten up, and comment on the significance, of these anomalies.

p.391, ll.9-10: typo - change "southeastern" to "southwestern".

p.391, l.12: After sentence "While the NCEP/NCAR data also document southerly air flow over the south-WESTERN part of the Greenland Ice Sheet...", I suggest inserting a reference to the in press paper by Hanna et al. (2009)* that examines the 500 hPa geopotential height anomalies over Greenland in more detail and found that summer 2007 was exceptional in the entire 60 years of NCEP/NCAR reanalysis data: *E. Hanna, J. Cappelen, X. Fettweis, P. Huybrechts, A. Luckman, M.H. Ribergaard (2009) Hydrologic response of the Greenland Ice sheet: the role of oceanographic warming. *Hydrological Proc.* (Invited Paper for Special Issue on Hydrological Effects of Shrinking Cryosphere), in press. (A preprint of this paper, which was accepted in April 2008, is available to at least one of the authors.)

p.391, ll. 18-20: "Interestingly, the 2007 surface mass balance...as simulated by MAR is the most negative of the period 1979-2007 (Fettweis 2007)." The authors should add that this is a model-dependent result, as e.g. Hanna et al. (2005, 2008, updated) find 2007 is only the 2nd or 3rd lowest, not the lowest SMB year.

Lettering on Figures 1, 3 & 4 needs to be enlarged to be made easily legible.

Interactive comment on *The Cryosphere Discuss.*, 2, 383, 2008.

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