

Interactive
Comment

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

M. Pelto

mspelto@nichols.edu

Received and published: 10 June 2008

This paper presents a detailed and persuasive first analysis of energy balance inputs to the anomalous 2007 ablation season melt on the Greenland Ice Sheet. The regional nature of the exceptional melting above 2000 m is evident in Fig. 1 extending along the western side of the ice sheet to 70 N. In Fig. 2b-c the MAR long wave radiation and surface temperature anomalies show extensive positive anomalies along the western margin of the Greenland Ice Sheet extending to 74 N. This region coincides with the region of enhanced melt, but extends well north of this region also. In Fig. 2j the maximum surface energy flux is centered around 71 N, north of the maximum melt index region. Is there any explanation for the difference in the energy input patterns and the melt pattern? In Fig. 3 the correlation between the daily melt index, Fig. 3a, and the

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper



Interactive
Comment

500-1000 hPa thickness, Fig. 3c, appears to be very good, what is this correlation? A table illustrating the correlation for various years would be useful in helping to delineate what was different in 2007. The albedo anomalies as a whole for the summer of 2007 are negative, and attributed to the effects of strong melt increasing snow grain size, and low simulated snow accumulation over the winter of 2006–2007, which would lead to more exposed bare ice. In Fig. 4 the sharp albedo declines around 7/11 and 8/12 are noteworthy. However, the mechanisms noted are each long term processes and it is not clear to me how these explanations can account for the rapid short term change in the albedo on the aforementioned dates. Is there any data to reference on the reduced winter snowpack? The final two sentences are key.

...Mote (2007) while the seasonal melt departure index is significantly correlated with summer temperatures at coastal stations around Greenland, 2007 showed more melt than expected based on these records. The MAR simulation lends credence to his suggestion for a role of reduced albedo...

I agree but the credence could be made more quantitative in this paper through use of appropriate statistical comparisons and a more detailed look at the rapid albedo response. In particular albedo in Fig. 4b can be directly related to Fig. 3a-c.

A minor detail but important for ease of viewing, is the font for the scale on the axes of each figure is insufficient for accurate reading.

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

[Full Screen / Esc](#)[Printer-friendly Version](#)[Interactive Discussion](#)[Discussion Paper](#)