

Interactive comment on “Evidence and analysis of 2012 Greenland records from spaceborne observations, a regional climate model and reanalysis data” by M. Tedesco et al.

Anonymous Referee #2

Received and published: 27 January 2013

General comments

This is a good paper about an important event (record surface melting of the Greenland Ice Sheet in July 2012), based on a wide variety of complementary climate model and satellite datasets. In general the analysis is well done, although the quality of written English can be improved in places. I recommend publication once the following points have been addressed.

Specific/minor comments

page 4940, line 25 "During the past decade, surface melting over the Greenland Ice Sheet has been increasing" (and in reference list): please add the following reference:

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Hanna, E., Huybrechts, P., Steffen, K., Cappelen, J., Huff, R., Shuman, C., Irvine-Fynn, T., Wise, S. and Griffiths, M. (2008). Increased runoff from melt from the Greenland Ice Sheet: a response to global warming. *Journal of Climate*, 21(2), 331-341, doi:10.1175/2007JCLI1964.1.

p.4941, lines 18-20: reword to "drivers, IN ORDER to overcome the limitations of a single method, WHICH THUS PROVIDES a more more comprehensive understanding of the phenomenon under observation."

p.4941, l.26: add that "satellite-derived snow/ice surface temperature" data have been available since 1979, to make consistent with the other time series datasets listed in the same sentence.

p.4943, l.13 "Microwave sensors can also detect sub-surface liquid water" - please add up to how far beneath the surface (I think just a thin surface skin)?

p.4943, l.15: reword to "the difference between the two datasets is generally small (ABOUT 1-2K at MOST but below that on average..."

p.4945, l.9 "data within 0.04 of the median are not rejected" - how was this threshold determined?

p.4946, l.26: change "physically based" to "physically-based" .

p.4947, l.3 "A et al. (2012)"??

p.4948, l.10: change "Hanna et al. (2012a)" to "Hanna et al. (2012b)".

p.4948, l.24: change "more than tripled the 1981-2010 average" to "more than four times the 1981-2010 average"?

p.4948, l.25: change "The 2012-updated trend..." to "The updated 1979-2012 trend...".

p.4948, ll.26/27: Give percentages for the melt trends discussed on these two lines.

p.4948, l.10: Regarding the correlation coefficient $r=0.23$ given, is this statistically sig-

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nificant?

p.4949, l.22: change "standardized melting index" to "standardized melt index".

p.4950, l.5: change "To this aim" to "Following this aim".

p.4951, l.6: change "This quasi-absence" to "The relative lack". Change "more sunny" to "sunnier".

p.4951, l.10: change "rainfall" to "rain" and "snowfall" to "snow".

p.4951, l.18: change "Box et al. (2012) ruled out" to "Box et al. (2012) discounted".

p.4951, l.24 "Differences between the two maps..." - which two maps?

p.4953, l.7: change "modelled bare ice exposed area remained relatively low" to "modelled bare ice exposed area remaining relatively low".

p.4954, l.23: change "associated to the NAO" to "associated with the NAO".

p.4955, l.1: change "The identified frequency of the JJA days classified as anticyclonic during summer is the highest in 50 yr (e.g. 2007..." to "The identified frequency of the JJA days classified as anticyclonic during summer 2012 is the highest in 50 years (compared with 2007...".

p.4955, l.5: change "correlated to" to "correlated with".

p.4955, l.26: change "melting in Greenland" to "melt in Greenland" or "Greenland melt". Similarly, change "melting" to "melt" on following line.

p.4956, l.9: change "2012 hydrological year" to "2011-12 hydrological year".

p.4956, l.22: not sure what you mean exactly by "local conditions" - please explain.

p.4960 The reference Hanna et al. (2012b) was submitted to International Journal of Climatology (NOT Journal of Climate) and has now been provisionally accepted for publication.

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Figure 5 caption, 3rd line: change "anomalies are given in respect" to "anomalies are given with respect" .

Figure 6 caption, 3rd line: change "anomalies are two times above" to "anomalies are at least twice".

Figure 6 caption, 6th line: change "run-off" to "runoff".

Fig. 7 caption, 3rd line: change "data is" to "data are".

Interactive comment on The Cryosphere Discuss., 6, 4939, 2012.

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