

## ***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.***

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Tedesco et al (2012) provide a detailed, data rich examination of the exceptional 2012 melt season on the Greenland Ice Sheet. The authors have provided considerable context and comparison..This is an important paper that I would suggest deserves prompt review and publication. The numerous comments below are all minor, several are merely suggestions to be considered, and each can be quickly addressed.

4941-4: The following description is both tentative and generic. “. . .which can translate into runoff to the surrounding ocean, depending on the evolution of the ice sheet hydrological system”

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4941-10: reword, ..”compared to bare ice surface ablation rates.”

4942-12 and 14: Provide reference

4947-21: The mean anomaly should be referred to here instead of on the next page at 4948-6.

4947-26: The fact that MAR temperature anomalies are limited close to coast because near surface temperatures are near the melting point for most of the season, does not appear to be a reliable statement. 4948-8 notes the coastal temperature records set. If this was MODIS surface temperature reference the statement would be true, but this was made based on MAR it seems, please clarify.

4948- 14: Add GrLS before melting.

4948-16: Quantify how many days during the 2012 melt season experienced above normal melt.

4948-23: It is worth elaborating on not just the 97% but the number of days with melt area above 70%, which is level that has only been broken once, in 2002. This is also I believe the only year with more than a single event breaking 60%, and had four according to Figure 2a.

4948-27: Figure 4b of Mernild et al (2011) does a particularly good job of indicating the temporal variation of maximum melt extent through the season for each year. Would this approach along with Figure 2a, provide a useful visual quantification.

4949-7: A reference in this paragraph to the values of Mernild et al (2011) would be appropriate.

4949-11: A key aspect of the earlier initiation of melt beyond the immediate margin is the potential for an earlier evolution of the hydrologic system. One measure of this is supraglacial lake filling and emptying dates. It would be nice to include the timing of lake filling and emptying in 2012 for comparison if the data is in hand. I would suggest

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just focus on one area such as that of Box and Ski (2007). If the data is not in hand then ignore.

4949-17: It would be useful maybe in a table to provide the 2012 melt season length at various elevations even if it is only in one region, Northwest Greenland for example.

4953-7: A brief reference to the K-Transect data would be useful which shows that both S5 at 500 m and S9 at 1500 m initial significant surface ablation noted by the sonic rangars occurred simultaneously around Julian day 144-148.

4953-15: Possibly the wrong location in the paper but would it be useful to briefly reference with respect to the two main July melt events the Summit Station temperature records?

4954-17: What is the implication for 2013 already in the region just below the ELA?

4954-29: What are the mean values of the various types since the NAO changed in 2006?

4956-7: For example what was melt season length in 2012 at the ELA, how many days above the previous normal was this?

Box, J.E. and Ski, K.: Remote sounding of Greenland supraglacial melt lakes: implications to sub-glacial hydraulics,. *Journal of Glaciology*, 181, 257 – 265, 2007

Mernild, S. H., Mote, T. and Liston, G.R. : Greenland Ice Sheet surface melt extent and trends, 1960–2010,. *J. Glaciol.* 57, 621-627, 2011.

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

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