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***Interactive comment on “Brief communication
“Important role of the mid-tropospheric
atmospheric circulation in the recent surface melt
increase over the Greenland ice sheet”” by
X. Fettweis et al.***

N.-J. Schlegel (Referee)

nicole-jeanne.schlegel@jpl.nasa.gov

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The following is a review of “Important role of mid-tropospheric atmospheric circulation in the recent surface melt increase over the Greenland ice sheet” By Xavier Fettweis et al.

This manuscript is a brief communication describing the role of local natural variability, driven by larger-scale atmospheric dynamics, in the recently observed warming of the Greenland Ice Sheet and other nearby locations. The authors apply a creative method-

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ology to a pertinent question regarding climate change in the Arctic. The discussion and conclusions are interesting and the authors bring up important considerations for future research in this area. The paper is appropriate for publication in TC, after technical revision.

The biggest problem with this manuscript is the writing, as the language is awkward. Long sentences hurt the logical flow of the arguments, especially in the discussion sections (4-6). A general rewording of the longer paragraphs, especially the ones that build the authors' case by discussing results of this and other studies as well as observational evidence, is needed before this paper is published.

Below, I offer some specific suggestions that may aid in the editing process.

Page 4102 Line 5: Recent melt records agree with a trend of increased melt over the GrIS, which has been observed since the end of 1990s (Mote, 2007; Fettweis et al., 2011b) and attributed to increased atmospheric greenhouse gas concentration (Fettweis, 2007; Hanna et al., 2008).

Page 4103 Line 11: You don't need but and paradoxically

Line 16: Please break this sentence up so the cause and effect is clearer. The sentence is too long and confusing.

Page 4104: Line 1: Some thing like: a Circulation Type Classification (CTC) method for extracting . . . would be more clear

Line 5: I would suggest a “;” instead of a “:” here.

Page 4105: Line 29: This sentence is wordy and need rephrasing for clarity. Something like: . . . (at both the surface and 500 hPa) over GrIS than 20 yr ago, a configuration that tends to favour warm air advection along the Western GrIS due to weaker Icelandic lows (Fig. 2a), as found by Hanna et al. (2012).

Page 4107: Line 6: This sentence is awkward. Try something like: In addition, instead

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of fixing the number of circulation types allowed in our CTC to eight, as in Fettweis et al. (2011a), here it is set to three, to distinguish only neutral, cyclonic and anticyclonic regimes.

Line 22: I had to read this sentence many times to understand what you were saying. Maybe adding some “;” would help break the sentence up so that it is more clear.

Page 4108: Line 7: Try using a “:” after are, or something similar to indicate your list is beginning. Line 7: What is meant by “near”? Line 8: Not sure why there is an “s” in “types”.

Line 24 and line 26: The use of “on the other hand” twice is confusing and hurts the progression of your argument. This second paragraph could be reworked to make clear logical steps in the argument.

Page 4109: Line 14: Affirming that the correlation “validates our flow analogues technique” after presenting all the nice statistics in Line 15-17, instead of before, would make it a more powerful statement.

Page 4110: Line 9: The word “knowing” seems out of place: maybe “considering”, or “using a linear trend of”.

Line 14: Try using “though” instead of “while”.

Line 23: ... changes in the general circulation that are independent of ...

Page 4111: Line 2: This sentence is awkward.

Line 6: ... our results imply that the general circulation plays an important role in the forcing... Line 7: The rest of this sentence is confusing and awkward.

Page 4112: Line 9: This sentence needs rewording because it is awkward. Something like: Over Svalbard, located 500 km away, the Greenland anticyclones instead tend to induce a southward flux, which explains why, unlike Greenland, no increased melt has recently been observed there.

Line 10: Suggested reword of this sentence: ... we have estimated that these changes in the general circulation account for $70\pm 5\%$ (resp. $65\pm 5\%$) of the 1992–2011 (1982–2011) summer warming simulated by the NCEP-NCAR reanalysis at 700 hPa over Greenland.

Line 13: This is in agreement with CMIP5 GCMs, which seem to suggest ...

Interactive comment on The Cryosphere Discuss., 6, 4101, 2012.

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