

Summary Comments

The authors present an excellent dataset in regards to Petermann Glacier terminus position. This research, however, feels like step one in a longer project rather than a complete analysis that is ready for publication. This paper is missing much of the important background information for Petermann Glacier, such as a discussion of thickness and velocity, and imagery showing grounding line as compared to the terminus region of interest.

While the authors are focusing on Petermann Glacier, they fail to put the changes at Petermann into perspective in respect to other northern Greenland glaciers. This includes mention of terminus changes on other glaciers (e.g., as mentioned by Moon and Joughin, 2008, for C.H. Ostenfeld Gletscher and Zachariae Isstrom) or discussion of the type of calving events expected from this sort of glacier (large tabular icebergs) versus the more commonly studied western and eastern Greenland tidewater glaciers (small icebergs and bergy bits).

The authors have overstated the conclusions of the Rignot and Steffen (2008) paper, which did not show a recent change in basal melt, but rather documented the significant basal melt on Petermann, which may or may not be changing. With no additional research in the submitted paper, it is appropriate for the authors to speculate that the channelized basal melt influenced the 2010 calving event but not to provide this as a more conclusive mechanism for the event.

I find the discussion seriously lacking as well as a dearth of additional data considered, even though much more information can be readily found. In the final sentence in the Discussion, the authors state that calving was ultimately triggered by strong winds, but they provide no data or analysis for the reader to view, nor do they provide a reference if this was not work completed by the authors. How does this strong wind event compare to other wind events or mean winds? Was this truly an anomaly of the magnitude that one can conclude it was the ultimate cause of calving? Similar questions could be asked for the other points raised in the final sentence of the Discussion – sea ice, ocean water temperature, surface and subsurface melt. Each of these points should be separated and discussed individually.

In “Future Research” the authors mention interest in looking at Petermann Glacier velocities. There is data available on the topic, yet the authors make no use of it in this paper, even though it could greatly aid their analysis. The authors should consider combining the work presented in this paper with the work they state will be published in a subsequent paper, as the work presented here simply does not provide a thorough analysis. The authors also mention, in Future Research, the need for more glaciological, meteorological, and oceanographic data. They have, however, failed to use additional data that is already available. This is a major weakness of the paper.

I will not repeat them here, but I urge the authors to carefully consider the excellent comments made by Mauri Pelto.

I do not recommend publication of this paper until major revisions in analysis and discussion are completed.

Specific Comments (notation is for Page/Line)

P1/L1, P1/L17 – Use of the word “drained” is a bit odd in these sentences. Please reword and refer to “mass loss” or similar terminology.

P1/L8, P2/L15, P5/L4, P5/L11 – There are many places in the paper where the authors use words like “massive”, “gigantic”, and “giant”. These are not particularly useful and I think their use detracts from the paper. Please avoid these subjective descriptors.

P1/L22 – I think we have moved into a period beyond “until recently”, as it has now been over 5 years since rapid glacier changes in Greenland have entered conversation. Perhaps just reference a year or revamp the sentence. Similar use of “recent” in L24.

P1/L24 – Rapid changes in melt have not been observed. There are calculations suggesting important melt changes (e.g., Holland et al. 2008) and measurements of melt (e.g., Rignot et al. 2010), but I think there are no observations at this point of rapid changes in basal melt.

P2/L1 – “role in the melting” changed to “role in subsurface melting”

P4/L21 and L26 – Moon and Joughin 2008 does not comment on the Petermann Glacier terminus position

P5/L13 – delete “as illustrated here”. This paper does not illustrate that is it either (1) or (2).

Figure 1 – Please include an image in this or another figure that shows the grounding line.

Figure 2 – The authors make a special note of the difference pattern of calving in (d) than (b) and (c), but do not provide any discussion or analysis in the text. Please discuss this difference if you consider it important or significant. Or perhaps this pattern is simply a reflection of the more sporadic pre-1990s data, in which case it might not warrant any mention.

Technical Corrections

P1/L6 – delete “here”

P1/L7 – delete “Here”

P1/L23, P3/L26, P4/L16, P5/L1 – Use of the + notation is awkward. Please replace with actual value or words.

P2/L10 – insert period “(2010).”

P2/L18 – add this sentence to previous paragraph

P3/L24 – insert value at “~ km”

P3/L24 – delete “as summarizes in Figs. 2 and 3 and described as follows”

P4/L1-6 – combine these sentences together with the paragraph above them for one complete paragraph

P4/L5 – “which has” to “was”

P4/L15 – delete “here”

P4/L17 – insert period “(Fig. 3).”

Figure 1 – add date information to each image

Figure 1 – delete “massive” from first sentence