

Interactive comment on “Recent changes in area and thickness of Torngat Mountain glaciers (northern Labrador, Canada)” by N. E. Barrand et al.

M. Pelto (Referee)

mauri.pelto@nichols.edu

Received and published: 7 October 2016

Barrand et al (2016) provide a detailed examination of Labrador glacier area, volume and mass balance change. The data set for some aspects is temporally limited. The methods utilized are well explained and effective. Given the lack of temporal mass balance data and finer temporal resolution for area change, the relationships identified to climate are overstated. Most of the changes indicated below are minor. I would encourage use of AAR data when possible. This is an important benchmark study of glacier change in the area, but the climate sensitivity identified is too preliminary to be of significant value.

Specific Comments 1.2: “last” to “only”.. Last implies residual from some previous
C1

period.

1.7: List years., could be shorter than as stated.

2.23: icecaps around the GIS and Canadian Arctic Islands. This connection could be better made by citation of Nilsson et al (2015) and Gardner et al (2012).

2.27: Given their small size can the statement of important to Arctic tundra and fjord ecosystem be defended?

2.33: Remove the sentence beginning with... “The majority,” This is a distraction that is best left unsaid.

3.68: Reword to make accurate, this is not the first assessment in all the respects noted, since I have previously reviewed two other papers looking at these glaciers in the

4.118: “editing” to “identifying”

5.154: Three different values are listed, which are applied when?

6.194: 2005-2008, 2008-2009 and 2009-2009 should this be changed to 2009-2011?

7.224-230: Reorder the sentences to be chronologic. Begin with 1950 not 2005.

8.242: Move this sentence to make chronologically sequential.

8.255: Worth noting the area change in terms of percent for each of the three glaciers.

8-267: Volume loss appears large compared to resulting area change, deserves a comment.

8.270: Worth noting that Figure 4 illustrates the lack of a sustained accumulation zone for Hidden and Abraham Glacier. Meanwhile Minaret has an accumulation zone, this seems an important distinction.

9.288: This should be put in a Table and largely removed from the text. Figure 7 is not

a substitute for this. Also is there any AAR data that could be added? It is noted that AAR is 0 in some years.

10-313: Sentence needs reworking, hard to discern meaning now.

11.344: how many of the 13 years were above average?

11.345: This indicates PPT trend is inverse to Ba.

11.365: What about Hidden 2005-2008? Examine that one year 2006 and impact of ppt total.

11.373: Which year did the ablation season extend into the Sept.-Nov. period?

11-374: I understand that only preliminary climate-mass balance linkages can be made. However, if no statistical information is provided on these linkages, and this is because the data set is too scant, then I do not think such a linkage can be made.

12.391: Cite Figure 4 in reference to low elevation thinning

12.398: Should this be changed to? These findings suggested that Labrador annual glacier mass balance are controlled by...

Figure 2. Some of the shading issues can be minimized with a bit of photo editing.

Figure 5 and 6 are referenced in the paper after Figure 7

Gardner, A., Moholdt, G., Arendt, A., and Wouters, B.: Accelerated contributions of Canada's Baffin and Bylot Island glaciers to sea level rise over the past half century, *The Cryosphere*, 6, 1103-1125, doi:10.5194/tc-6-1103-2012, 2012.

Nilsson, J., Sandberg Sørensen, L., Barletta, V. R., and Forsberg, R.: Mass changes in Arctic ice caps and glaciers: implications of regionalizing elevation changes, *The Cryosphere*, 9, 139-150, doi:10.5194/tc-9-139-2015, 2015.

Interactive comment on *The Cryosphere Discuss.*, doi:10.5194/tc-2016-171, 2016.