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

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Barrand et al. 2016: In this paper well established methods are used to extract information on glacier mass balance in the Labrador area glaciers, where little has been known to now. The structure of the paper is logical and description of the methods used is clear and easy to read. As often in papers on this topic there could be more rigid justification for error estimates; perhaps using methods similar to i.e. Rolstad 2009 and Magnusson et al. 2016. This would increase significance of the mb results presented, but may be beyond the scope of this work. Given the sparse data available, the attempt to analyse climate sensitivity of the area may be a worthwhile exercise, but is not rigorous enough to add significantly the scientific value of the paper. The mb record however is

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an important contribution. (Rolstad, C., Haug, T., and Denby, B.: Spatially integrated geodetic glacier mass balance and its uncertainty based on geostatistical analysis; application to the western Svartisen ice cap, Norway, J. Glaciol., 55, 666-680, 2009. E. Magnússon, J. Muñoz-Cobo Belart, F. Pálsson, H. Ágústsson, and P. Crochet. 2015. Geodetic mass balance record with rigorous uncertainty estimates deduced from aerial photographs and lidar data - Case study from Drangajökull ice cap, NW Iceland.The Cryosphere, 10, 159-177, 2016/www.the-cryosphere.net/10/159/2016/doi:10.5194/tc-10-159-2016)

Below: I have seen M. Pelto comments and agree to all his suggestions and in addition: Line 10. 27% glacier shrinkage: this refers to the area I am sure? not volume?; perhaps adding the word area helps for better clarity Line 12. “negative geodetic mass balance” seems odd when referring to a physical change; I suggest “volume loss”; Lines 13-15. I am not sure if the sparse data allows for such a strong phrasing of the change for control by winter snow variability to control by summer conditions. Consider whether the sentence should be rephrased. Remember that distribution of the winter snow (both from snowfall and redistribution by wind) can play a major role so prevailing wind during winter can be a hidden Joker. 50-53. Slightly negative or slightly positive: I wonder what is the error estimate for the mb for individual glaciers deduced from the in situ survey. Mb spatial variability tends to be high for small valley or cirque glaciers. It would not be surprizing that the error is $\sim$0.5m weq; that is two times the mb values mentioned so maybe close to zero is better. 105. The resultant (resulting?) RMS error of 1950. . . is not a “the” missing before 1950; and the error: is it the difference between the orthoimages and GSPs or.. clarify. 165-179. This is far to detailed, should be boiled down to 2-3 sentences. (All this detail could be included in a supplement document if you find necessary,). Section 3.1. It would be of great advantage to rewrite this section to chronological order as suggested by M. Pelto. You should also consider changing some of the numbers, taking into account the estimated errors. For example should reduction of 0.66 +-0.41 not be written as 0.7 +-0.4 ?? Do the error estimates allow for stating 0.49% rather than 0.5% or 27% instead of $\sim$30% and so on. Also consider if

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a small volume change (in order of or less than error estimates) and small mb values should be stated as close to zero instead of positive or negative; 3.2 It would help to add a table with all these numbers as suggested by M. Pelto, but a figure similar to the lowest frame of fig 7. or fig 9a in Magnússon et al. (with points w. error bars added for mb of individual years as from the in situ survey) would help the reader to easily grab all this information. This will also help to omit the current reference to fig. 7 prior to that of 5 and 6.

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