

Interactive comment on “Brief communication: Historical glacier length changes in West Greenland” by P. W. Leclercq et al.

Anonymous Referee #1

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Weidick (1968) is benchmark literature for everyone interested in glacier fluctuations in Greenland. It is, therefore, gratifying to see an update on parts of this work. The contribution by Leclercq et al. is also very timely as there is currently a lot of attention on recent glacier variations in length, area and volume in Greenland (as evidenced by the many contributions on this topic in 2012). However, one could have wished for a full research paper that included all 80 local glaciers from Weidick (1968) and not just 18 glaciers. The methodic reasons for excluding the remaining 62 glaciers are given by the authors (3493, 17-21), but it is still disappointing that the authors were unable to extend so many of the records. This said, it does not change the fact that this is a valuable contribution to the existing literature. The main reason for this is that there is currently very limited information on glacier fluctuations in the three regions covered by this study (Nuussuaq peninsula, Sukkertoppen, Julianehaab). Therefore, this study will

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remain valuable at least until detailed regional studies have been conducted in these regions.

Specific comments (there seems to be a mismatch between page and line numbers in the online and printer-friendly versions at the end of the manuscript. The numbers below refer to the online version):

3492, 15-16: I am a bit uncertain on what Zemp et al. (2009) actually refers to. If it is the fact that “long-term direct measurements of mass balance are scarce”, then it is a very passive reference (i.e. to lack of something) and could probably be neglected to make space for more active references (see below; to keep within the 20 references cap for brief communications).

3492, 22: The term ‘local glaciers’ has traditionally been used for decades to categorize all glaciers in Greenland from the Greenland Ice Sheet. However, with the recent focus on IPCC and global glacier classifications (e.g. GLIMS) the term ‘glaciers and ice caps’ is now widely used and has been applied to categorize local glaciers by authors, who are less familiar with the regional terminology. Therefore, I suggest that you insert something like “... (also referred to as glaciers and ice caps)”.

3493, 2: Two studies by Kargel et al. (2012) and Mernild et al. (2012) have recently been published in The Cryosphere, showing results of glacier recession rates of local glaciers in central East Greenland and Southeast Greenland, respectively. It is relevant to include them here and in the Results and discussion section. Both studies show rates of glacier retreat of 10 ma⁻¹, which are comparable to your finding of 11 ma⁻¹ (3496, 13) and support your statement that the 20th century has been a period of widespread rapid retreat in Greenland (3496, 21-22).

3494, 12: Here and in the references, change Alstrom to Ahlstrom.

3495, 9-10: Only six glaciers are mentioned here, but in the Introduction (3493, 14) it says that seven glaciers were formerly tidewater glaciers. Please clarify.

3496, 8: What is meant by small? Insert the number.

3496, 13: Include the standard deviation of the average retreat rate.

3496, 14-15: Insert the retreat rate that is used for comparison, so that the reader does not have to look in the reference to find the number.

3496, 23: Replace (Dowdeswell, 1995) with (Weidick, 1968). Weidick (1968) finds an accelerated recession between 1920 and 1940 and relates that to the rapid air temperature increase between 1920 and 1930. This also spins back to what is mentioned in the Abstract and the benchmark value of Weidick (1968). In addition, the statement here is supported by Yde and Knudsen (2007), who find higher recession rates during the first half of the 20th century on Disko Island.

3496, 23: What I really miss here is a short paragraph that focuses on the recent decadal fluctuations of these glaciers from the end of Weidick's (1968) measurements to 2008/2010, including a comparison to recent fluctuations of other local glaciers in Greenland.

3497, 25: Sermikassak is misspelled.

3501, Figure 2, caption, line 3: Record 4 should probably be Record 8 (cf. 3494, 22-23).

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