

Interactive comment on “Global glacier retreat: a revised assessment of committed mass losses and sampling uncertainties” by S. H. Mernild et al.

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Mernild et al. use observed accumulation area ratios to (i) determine future glacier mass losses caused by present climate, but not yet realized, and (ii) to estimate the influence of the sampling bias (most observations of glaciers in regions with a small fraction of global glacier mass). It was a pleasure to read the paper, as it is well written and presents the concept in a very accessible way. The authors also do a great service to the community by including a complete and very well-described data set in the supplement. But the comprehensive supplement also comes at a cost, since the readability of the paper is somewhat lowered by frequent references to (especially figures in) the supplement. In some places I also had to refer to the supplement without explicitly being pointed there. Generally speaking, I would have preferred

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a more strict limitation of the text in the supplement to the description of the data, including the figures and description of procedures relevant to the main manuscript within the manuscript itself (or perhaps in an Appendix).

However, I don't see this as a major problem, and I only have a few questions/suggestions below.

Specific questions/suggestions:

- Fig. 3: I think it would be good if somewhere in the paper the mass glaciers are committed to loose would be in a Figure. Wouldn't it be possible to add a vertical axis on the right side to this plot, showing globally committed mass loss – based on one of the three averaging methods (probably method 3)? This would also be helpful in giving an impression how strong the temporal variability of this number might be, and to what degree the difference between this and the BDM estimate is due to the more recent reference time or due to the generally increased data basis.
- To estimate future values of α the past trend is extrapolated to the future. The number of glaciers with $\alpha = \text{AAR}=0$ increases over time, but $\alpha < 0$ is not possible. From this, I would expect (just roughly speaking) that the sensitivity of α to temperature increase is smaller for higher temperatures. (Or in another way: Doesn't this approach contradict the rationale of excluding glaciers with $\text{AAR}=0$ or $\text{AAR}=1$ from the analysis?) I am not sure if and how this impacts the extrapolation, but I would appreciate if the authors could discuss this.
- The authors are using Radic & Hock (2010) for both dividing the regions into high mass and low mass, and for the regional calculations. Is there a reason not to

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use the more recent, and more complete Randolph Glacier Inventory? I doubt it would change the results much, but given the effort that went into creating that data set, why not use it.

- page 1990, line 6: shouldn't it be $\gamma = 1.375$?

Interactive comment on The Cryosphere Discuss., 7, 1987, 2013.