

Interactive comment on “Brief communication: Ad hoc estimation of glacier contributions to sea-level rise from latest glaciological observations” by Michael Zemp et al.

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We thank the two anonymous referees for their positive and thorough reviews. We revised our manuscript under consideration of all their feedback, which helped to improve the clarity of the brief communication.

In the following, we give a short response to the general comments by the reviewers:

Limited data availability for 2017/18: We re-computed all calculations with a newer release of the glaciological dataset as meanwhile available from the World Glacier Monitoring Service (DOI: 10.5904/wgms-fog-2019-12) with improved data coverage in

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2017/18, and correspondingly updated all values, tables and figures. As a consequence, our ad hoc estimates are now based on similar sample sizes and provide mass change estimates for all glacier regions for both years 2016/17 and 2017/18. Overall this update resulted in minor changes of regional and global results well within error bars and support the applicability of the proposed method.

General assumptions and error budget: Several questions by the reviewers were related to our basic assumptions and to the uncertainty estimates for the glacier mass-balance anomaly. We decided to maintain our approach but introduced an additional paragraph in the method section (2.4) with a corresponding figure in the supplement (Fig. S1a–e) explaining our general assumptions. In addition, we clarified the section (2.5) about our uncertainty estimates and added an additional figure and table (Fig. S2a–s, Table S2) discussing our approach in more details.

Sensitivity to choice of reference period: In general, our approach is not supposed to be (very) sensitive to changes in the selection of the reference period: a possible change in the mass-balance trend of the reference data is (partly) compensated by a corresponding change in the mass-balance anomalies of the glaciological dataset. However, larger changes in the reference period will influence the results due to a change in the glaciological sample size (which is decreasing back in time) and, hence, can force the use of data from neighbouring regions. In the revised manuscript, we clarified the corresponding discussion section (3.2) and demonstrate the related effect by using a different reference periods in Fig. S3a–e as compared to Fig. 1.

A detailed point-by-point reply is provided in the supplement to this comment.

Please also note the supplement to this comment:

<https://www.the-cryosphere-discuss.net/tc-2019-180/tc-2019-180-AC1-supplement.pdf>