

Authors response to Editor, Dr. Chris R. Stokes

“Strong acceleration of glacier area loss in the Greater Caucasus over the past two decades”

by L. G. Tielidze, et al.

The Cryosphere Discuss.,

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Dear Dr. Chris R. Stokes,

We appreciate your help for the constructive comments which have significantly improved the quality of our manuscript. We have made our best effort to revise the manuscript based on your and the referee’s comments and suggestions.

Please see our response to your latest comment below and the revised manuscript as a separate document.

All corrections and changes we did in the text are marked in **green**.

Levan Tielidze on behalf of all co-authors

Comments to the author:

Dear Levan,

The reviewer comments were mostly very positive and they have suggested only minor revisions to the manuscript. I have read your thoughtful response and I'm therefore inviting you to submit a revised manuscript with changes tracked. I accept your point about not analysing changes in debris-cover in the future and so you might just want to add some brief discussion of this in your manuscript, i.e. likely changes that might be taking place and how further work might move this topic forward. I think your thoughts would be of interest to the readership and a few sentences could be added to the Discussion or Conclusions.

Kind regards,

Chris Stokes

We took your suggestion into account and added the new paragraphs to the Discussion (6.2) section, covering all aspects of the missing debris analysis and imperfect DEM timing (additional comment from Referee #1) which now reads:

“We have not analyzed here the temporal evolution of debris-covered glacier parts, as this is considerable extra effort and because we wanted to keep this study focused on the new inventories

and the change assessment. However, we intend analyzing changes in debris cover in a separate study that might also consider recently developed methods Holobăcă et al. (2021).

We used the ASTER GDEMv3 from around 2010 to derive topographic information for each glacier although it does neither fit to 2000 nor to 2020. The simple reasons for this decision are larger artifacts found in the SRTM DEM from 2000 and that a year 2020 DEM was not available for the study region. Accordingly, for shrinking and retreating glaciers mean and median elevations are underestimated for 2000 and – along with minimum elevation – overestimated for 2020. We assume that the related biases are within the uncertainty of the GDEM for most glaciers, but wanted to stress that they have to be considered when working with the data. Unfortunately, this caveat is common in most similar studies (e.g. Paul et al., 2020) as the repeat frequency of freely available DEMs is still small. The impact of the wrong DEM timing on mean slope and aspect should be negligible.”

Please see P 16 L 367-379