

Coverletter

Multi-decadal mass balance series of three Kyrgyz glaciers inferred from modelling constrained with repeated snowline observations.

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Dear Editor,

Thank you very much for the editing of our manuscript and your command on the model input data. We added a statement in the abstract and the conclusion to clarify the use of meteorological input data, as suggested. Changes are highlighted in the track-change version and summarized below. However, we would like to emphasize that the insensitivity of the model to meteorological data (and their accuracy) is demonstrated by two independent tests: (1) the perturbation ($\pm 1^\circ\text{C}$ for temperature and $\pm 25\%$ for precipitation) of the meteorological input data, and (2) the use of the long-term climate mean described in Section 4.3 under point 4 of the uncertainty calculation. The latter showed that the model is able to reproduce annual mass balance with satisfying accuracy when using the long-term climate mean instead of the daily meteorological variables. Thus, we are very confident that the approach can be applied on unmeasured glaciers without local meteorological measurements using for example non-adjusted Reanalysis time series. However, we understand that it might not be proven with sufficient credibility in the presented manuscript since we relied on the available measurements for the simulations to guarantee the best estimate of the mass balance series for the three glaciers instead of using Re-analysis datasets only.

We hope to have adequately taken into account your comment in the updated version of the manuscript and would like to thank you once more for your help to improve our study.

Yours sincerely,
the authors

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"By combining modelling with remotely acquired information on summer snow depletion, it was possible to infer glacier mass changes for unmeasured years. The model is initialized with daily temperature and precipitation data collected at automatic weather stations in the vicinity of the glacier or with adjusted data from climate Reanalysis products."

Page 26, Lines 22-24

"We proposed a methodology to derive glacier SMB series for unmeasured glaciers based on mass balance modelling constrained by repeated snowline observations relying either on in situ temperature and precipitation data or climate Reanalysis datasets."