

Dear Editor, dear Reviewers

We greatly acknowledge the detailed, careful and constructive review. Please find below a reply of how we handled the reviewer's comments and questions. Please note that we took the opportunity to correct the coordinate framework of Figure 6. The original coordinates were offset as the framework was shifted by a few hundreds of meters. We have now corrected this pitfall. Please do not hesitate to contact me for further information.

On behalf of the co-authors

Fritz Schlunegger

Anonymous reviewer comment

The revision has addressed the reviewers' recommendations well, and has improved the manuscript considerably. I appreciate that more sedimentological and chronological context is provided, and that some additional, important aspects have been addressed in the discussion.

What is striking me, now that the drill logs have been added, is the difference in sediment infill between Marzili and Metas (where the riegel is proposed), and at Brunnenbohrung and Rehhag. At the latter two sites it consists to a large portion of lacustrine fines. At the former it is described as 'mud and sand layers, which contain isolated clasts' but shown as 'gravel with mud' in the log. I think it is important to be as precise as possible here, as gravelly sediments can have bulk densities as high as the bedrock density (e.g. <https://doi.org/10.5194/sd-32-27-2023>, <https://doi.org/10.5194/sd-33-191-2024>). I suggest to harmonize the sediment description in text and drill log,

This has been done. Thanks for this suggestion. We additionally added the log of a further drilling to Figure 2d.

... and to discuss what kind of impact these sedimentological differences might have on the inferred valley morphology.

This is indeed the case, and we further discuss this point in section 2.5 of the revised text. However, based on 3D gravity modelling (Bandou et al., 2023; Swiss J. Geosci.), we found that the bulk densities of the Quaternary sediments depend less on the lithological architecture of the material or the depositional environment in which the sediments were deposited. Instead, they are primarily a function of the maximum depth of the overdeepening fill and the number of glaciations, during which the Quaternary sediments were compacted under a thick glacial cover. For instance, a sequence postdating MIS 6 was compacted by the piedmont glacier during the Last Glacial Maximum (LGM) during MIS 2 only, while older sediments experienced a glacial compaction during at least two full glaciations. We thus expanded the revised text accordingly.

If this last point can be addressed by the authors, I don't see anything opposing publication of the paper.

Thank you very much for the careful review.