Comment on esurf-2022-63

Anonymous Referee #1

Referee comment on "Evolution of an Alpine proglacial river during seven decades of deglaciation quantified from photogrammetric and LiDAR digital elevation models" by Livia Piermattei et al., Earth Surf. Dynam. Discuss.,
https://doi.org/10.5194/esurf-2022-63-RC1, 2023

The presented work provides a significant contribution to quantitative research on fluvial sediment changes by estimating the sediment balance of a main Alpine river (Fagge River, European Alps) in a glaciated catchment system (Kaunertal in Austria), using multiple sources of historical and digital images and LiDAR data. Nineteen survey periods from 1953 to 2019 spanning inter-survey periods between one month and 16 years are analyzed by using high-resolution DEMs. The analyses allow for identifying periods of different sediment budgets and for relating detected changes to glacier front variation, lateral hillslope activity and runoff events as well as to the location and activation of possible sediment sources.

This work can certainly contribute to solving one of the key problem of existing current studies which is the lack of information over a longer time period. Process monitoring efforts are usually restricted to a few decades (at best).

The material is very well presented and the manuscript is in all parts very well written. The manuscript is in my eyes excellent and has no significant flaws.

However, I have one issue the authors might consider: The authors highlight that their detailed analyses are built on a unique dataset. Referring to this point, I would like to ask if some more critical discussion on the potential of using the selected approach also in other study areas could be added. How likely is it to carry out this type of in-depth study in a successful way also in other glaciated catchment in the European Alps and in other high-mountain areas worldwide? How likely is it to create directly comparable results for different selected study sites within the European Alps and worldwide? Please judge also the possible restrictions.