Editor report for brief communication 'Rapid ~335 106 m3 bed erosion after detachment of the Sedongpu Glacier (Tibet)' by Kääb and Girod
May 2023

Dear Andreas Kääb and Luc Girod,

Thanks a lot for having responded to the new comments during the second round of revisions and for having updated the manuscript accordingly. When comparing the current manuscript to the version at the stage of initial submission (December 2022), I think it is fair to say that the manuscript has improved in clarity and that the additional details that you added make the story very interesting, also for those who are not directly in the field of glacier geomorphology/erosion/hazards (like me). I am convinced that this short ,yet very clear story will be of interest to the readers of *The Cryosphere*. After reading the latest version of your manuscript, I have formulated a series of mostly minor and easy to incorporate suggestions that I hope you will find helpful. I invite you to consider these comments, after which we should normally be able to proceed to the final acceptance of your manuscript.

- l.12: probably best to have a consistent use of m^3 or km^3 to make quantities directly comparable. Not only here, but throughout the manuscript.
- l.15-16: this last sentence of the abstract was quite difficult to understand. Consider rewriting to something along the lines of: "…the Himalayas. This high-magnitude low-frequency event illustrates a potential for rapid post-glacial landscape evolution and associated hazards that have rarely been observed (at such high intensity) so far".
- l.19: "…disappearance, these newly uncovered areas are… "
- l.23: "…comparably slowly, over…"
- l.26: not sure you need "respectively" here, since you do not refer to anything mentioned before in a given order. Would suggest removing this here. Same for occurrence on l. 67.
- l.29: "…indication on the maximum…"
- l.30: "…detachment, entire…" (also other occurrences where a "," would be needed: e.g., in l. 53 "Obu et al. (2019), …"), l.99 ("..study site, only very…")
- l.36-38: hard to understand. Possibly change to: "We summarize key site information on the 2018 glacier detachment, and quantify the glacier-bed volume changes and other landscape changes in the basin until 2022" (possibly even add until which month in 2022)
- l.40: for the study site description, in the current formulation, it seems like there is no glacier remaining at all? While in reality a part of the glacier survived / did not collapse? Would be good to specify this a bit more. Also, to frame it better, maybe start the sentence with: "At the time of its detachment, the Sedongpu glacier was…"
- l.40: elevation of about 3700 m: could you provide the elevation range of the glacier at the time of detachment? And possibly also for what is now remaining of the glacier?
- l.42: "… The highest point"
- l.43-44: extreme angles of the slopes: could you provide a quantification for this statement? What slope for the angles are we to expect here?
- l.45: "…Tsangpo has an…"
- l.52: "The wider study region…"

- l.68: "…avalanches ran from the Gyala west flank over…"
- l.72: "entire tongue": so from this I tend to understand that the entire glacier did not collapse? See related comment above. Would be good to have a quantitative indication about how much of the glacier was lost and e.g., the elevation range of the glacier before and after the collapse.
- l.72: possibly reword to: "…detached, complemented by an additional…"
- l.82: yes, indeed quite high uncertainties for the ice thickness reconstruction. Aside from the change in velocity, the fact that relative errors are very large for velocities of slow-flowing glaciers also leads to a large (relative) error in the corresponding ice thickness reconstruction by Millan et al. (2022). Would be good to mention this in one or two additional sentences.
- l.89: "until 2022" (add white space)
- l.88-92: quite a long and fragmented sentence. Suggest splitting this up in two sentences, e.g., "and its surroundings, with maximum erosion depth of 360 m and an average of 135 m over an area of 2.5 km^2, amounting to about 335+-5 10^6 m^3. This volume corresponds to about 2.5 times the detached glacier volume (Figs. 1-2…"
- l.92: "…can be observed at limited…"
- l.93: "…elevation changes from January…"
- l.94: "…contribute by far to the largest…"
- l.110-111: "… (Yang et al., 2023). A new early…May 2022, and was then also…"
- l.118: glacier bed being "likely temperate": is there any evidence for this statement? Measurements and/or modelling of glaciers in this region? Would be good to specify and provide additional info for this.
- l.127: "contributed to the ice and sediment properties in the valley": sounds a bit vague/mysterious here: can this be reformulated to be more specific? Or possibly remove this? (the sentence also works well without this)
- l.132: maybe reword to "…was able to transport most of the…": i.e. omit "further"
- l.136: "It would be interesting…"?
- l.141: "In summary, between early 2017 and November 2022, around…": and ideally, be even more specific for what early 2017 is (i.e., which month)
- l.141: 659 +- 7: this +-7 remains a remarkably small error estimate (i.e., a mere 1% of the total volume)…
- l.141-143: suggest splitting up in two separate sentences: "…bedrock and sediments. About half of time volume (335+-5 10^6 m^3) is estimated to be eroded from the…"
- l.144: "…in the latter volume": what is this exactly? Can you be more specific here?
- l.151: "…could be particularly prone to erosion. This…" + on l.162: "…bed was much more prone to erosion than the…"
- l.160: "…sediments, which are perhaps…"
- l.169: very little precipitation. Has this been quantified, and could you provide a figure for these numbers? e.g., how this compared to other (standard) years, with this year having for instance X% less precipitation?
- l.172: "…terrain gradients. Numerical modelling": i.e., suggest removing the "though" here.
- l.174: other glacier detachments. Can you mention here how many detachments these are? e.g., "…detachments (X in total) listed in Kääb et al. (2021)"

- l.175: suggest rewording to: "…, we do not find as important extreme erosion in these other cases compared to Sedongpu, but…"
- l.178: "…potentially pronounced soft sediments…"
- l.180: "…most glacierized mountains on Earth": reference for this statement?
- l.200: when calculating the size of the hypothetical catchment, you may want to refer to how much larger this is than the actual catchment, e.g., "…catchment (X times more than actual size of the catchment)"
- l.211: unclear what signal is in change of GLOFs. Would be worth mentioning recent study in Nature by Veh et al. (2023), who suggest that GLOFs are reducing in frequency (https://www.nature.com/articles/s41586-022-05642-9). Eventually, in warm future climate, frequency will reduce if glaciers are very small to inexistant: if there's no glacier, it cannot produce a GLOF anymore… Although could indeed expect a rise at first with strongly changing glaciers and large amounts of melt: i.e., a bit like peak water concept for glaciers, but then instead for GLOFs.
- l.214-215: last sentence, in which you seem to directly make a link with climate change. But are we sure this is the case and that this event can (statistically) be attributed to climate change? It may be more likely due to climate change (from the limited evidence we have), but need to be careful to explicitly make this link. A bit in same line as collapse of Marmolada glacier last summer (e.g., EGU 2023 abstract by Gascoin and Berthier): could this event not have occurred without climate change? Difficult to make concluding statements about this without dedicated calculations and (many/detailed) field observations and measurements.

Thanks a lot for considering these comments. I look forward to receiving an updated (final?) version of your manuscript. And thank you once again for choosing 'The Cryosphere' for disseminate this interesting brief communication.

Best regards,
Harry Zekollari