We thank the reviewer for their comprehensive and constructive comments on our work. Below, we respond to their comments in blue font and describe how we will address these comments in the revised manuscript in black font. References to specific lines refer to the initial manuscript.

#Referee 1

R1C1: It is always a pleasure to review a well-written manuscript presenting interesting data such as this one. The authors compiled unprecedently detailed inventory of GLOFs that happened on Earth in past ca 1300 years. This dataset has potential to be cited in studies dealing with GLOF occurrence patterns in space and time and GLOF hazard and risk assessment studies, and I find it generally suitable for ESSD. I have two general and few specific comments (below) to this manuscript:

R1A1: We thank the reviewer for recognising the value and potential applications of our database, and address any remaining comments in our point-by-point replies below.

General Comments:

R1C2: While this is a data science paper and the authors declare that "the goal is to present a global dataset that covers consistently and systematically the largest number of reported GLOFs" (L58-59), only limited methodological details are actually revealed in Section 2.1. I wonder what was the workflow of systematic search for GLOFs (i) in peer-reviewed literature; and especially (ii) in non-peer reviewed literature, news and social media. I acknowledge that it is nearly impossible to go through all diverse sources but I feel that the authors should make it clear what types of sources (news outlets, social media, repositories of local authorities, DRR reports, …) they went through and how. What about non-English sources? I find this especially important because it will allow future researchers easily identify and address possible gaps and avoid work redundancy. So please provide more details on your GLOF search methodology and its consistency and systematic aspects.

R1A2: We agree with points raised by the reviewer. In our revised manuscript, we will extend the section on literature search as follows (L71): "*We compiled these sources by searching online literature archives (e.g., Web of Science), and web platforms that are commonly used by researchers, governmental agencies, or newspapers to spread news and new research (e.g., ResearchGate, Google Scholar, Twitter). We have repeatedly revisited these databases over a four-year period (2019-2022) to include any updates and new literature in our inventory. Guided by previous literature reviews (Emmer et al., 2018, 2022), we used a keyword search on these platforms including terms in English language such as "glacial lake", "glacial lake outburst flood", "glacier floods", "glacier hazards", and added local or regional names such as "Himalaya", "Canada" or "Patagonia" to obtain more specific research items. We traced back each reported GLOF to the original source, and contacted the authors or consulted libraries if the sources were not available online.*" Those cases were then checked in more detail (L84): "*All resources were comprehensively checked for any available information on GLOF events (…) We compiled 57 attributes to capture quantitative and qualitative information on location; timing; hydrodynamic characteristics; socio-economic and geomorphic impacts; and references associated with all reported GLOF in our database (**Fig. 3**). We summarize these attributes below.*"

We acknowledge that our search was guided by a stepwise, case-by-case selection over several years. Other scientific disciplines have used "systematic" reviews to search for one or more specific keys and downloading the entire literature archive at a given point in time. Such a compilation, though desirable, is beyond reach: as of April 28, 2023, Google Scholar returns almost 1 million results for the key "glacial lake".
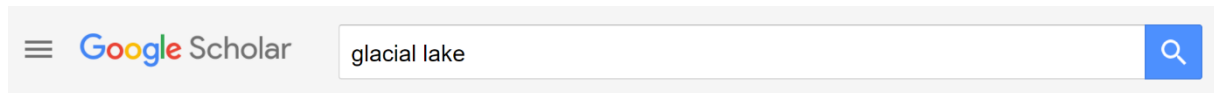
Screenshot of Google Scholar search for the key word "glacial lake" as of April 28, 2023.

We will therefore remove the term "systematic" in our manuscript and change it to more appropriate wording to remain consistent with previous appraisals.

We will further add information on the underlying languages of our resources (L75): *"We have compiled GLOFs from literature sources written in English, Russian, German, Spanish, Icelandic, and Chinese. Sources not written entirely in English must include at least an abstract and keywords in English to meet our search criteria. We were also supported by 14 local researchers who reviewed our compilation and contributed additional cases with their local knowledge (see Acknowledgements). With their help, we were able to expand the previously available catalogue of GLOFs substantially, especially in Iceland and Central Asia (Carrivick and Tweed, 2016).*

R1C3: The authors refer to different versions of their database. One (let's call it 'static' database) is published at Zenodo (allright), while the other ('active') is found at Uni Potsdam website. I'm convinced that future development of the active one is especially important and interesting, because new GLOFs will happen / unreported ones will be discovered. Yet, it is not clear how newly discovered or recently occurred GLOFs can be added (?), following the statement of "joint contribution within the research community". This goes hand in hand with what you mentioned on L316-317, i.e. "local experts are important for identifying and validating individual GLOFs.". Absolutely, yes (and this is something we called for already in our 2016 effort, and we failed; 10.1007/s10346-016-0686-6), but what is your strategy of ensuring that? Please make clear how can a person contribute to this joint effort and what is the future (and sustainability) of this 'active' database branch on the one hand; and how will you ensure quality standards among various contributors on the other hand?

R1A3: We agree that active input from the research community is key to successfully maintaining our database and avoiding major data gaps. We followed the reviewer's idea and implemented a submission form on our website http://glofs.geoecology.uni-potsdam.de/ to ease the reporting of missing events for other researchers (see screenshot below). We will review each submitted case or reference individually and add these new observations to the next version release of the database. To inform the reader about this option, we will add to the data availability section (L373): *"Our database is an ongoing project, and we offer a web-based, interactive map that grants access to the most recent state of the database (http://glofs.geoecology.uni-potsdam.de). (…) This website includes a submission form that enables the user to report missing or recently occurred GLOFs (**Fig. 12**)"*. Considering future updates, Zenodo will remain the version-controlled access to our database. Zenodo allows us to update our database under a new version using the same DOI, and we are going to release a version 3.1 as soon as a sufficient amount of new data has gathered (see also our reply **R2A2** to reviewer #2). Furthermore, we plan to discuss schemes for standardized reporting and joint contribution within the GLOF community at an upcoming GSA Penrose conference on outburst floods (https://www.jsg.utexas.edu/penrose-2023/).

Figure 12: Submission form on http://glofs.geoecology.uni-potsdam.de **that users can use to report missing or recently occurred GLOFs.**

Specific comments:

R1C4: L10: magnitude, frequency and impacts of processes …

R1A4: We will change our wording accordingly.

R1C5: L45: is there any specific reason for mentioning this particular GLOF?

R1A5: We mention this GLOF as an example of the historic catastrophic consequences of GLOFs. There was no specific reason for mentioning this particular event, and welcome any other suggestions to emphasize the societal impacts from GLOFs.

R1C6: L62: more info about the workflow and explored types of resources is needed (see my general comment)

R1A6: We refer the reviewer to our reply R1A2.

R1C7: L96: strictly speaking, lake dam type is not a characteristic of a location

R1A7: We agree and will relabel the box in Figure 3 to "Location and lake characteristics".

R1C8: L129: did you map lakes or GLOF (impacts)?

R1A8: We will clarify the sentence as follows (L129): *"We manually mapped the outlines of lakes that burst out between 1984 and 2021 using multispectral optical images from eight satellite missions:*

Landsat 4, 5 (TM), 7 (ETM+), and 8 (OLI), Geo-Eye 1, RapidEye, Sentinel-2, and Planetscope. ~~due to limited operation times~~ *(…) In each case, we selected images as temporally close as possible before and after the outburst date, filtering images with cloud cover of <20%, and minimum snow and shadow cover."*

R1C9: L129-136: this procedure applies also for Dates, right?

R1A9: Yes; we will add the following paragraph to the date section to highlight this (L109):

"*For cases without reported date, we used optical satellite imagery (e.g., Landsat, RapidEye, and Planetscope) to determine a range of plausible dates. We further used this approach to narrow reported date ranges when feasible.*"

R1C10: L221: I guess that this recent gap 2021-2022 is rather due to the reporting lag (I'm aware of at least one GLOF from moraine-dammed lake in 2022: https://repositorio.inaigem.gob.pe/items/c0beb0b1-e989-41e4-a785-8d5b699a48de) that leads me to my general comment about systematic search among various resources and the need to specify that in more detail)

R1A10: The thank the reviewer for bringing this recent case to our attention, and will include it our next version of our database. We discuss limitations and reasons for data gaps in section 4.2 (see L307): "*Our inventory shows that most GLOFs were reported with some delay, likely causing the decrease in the annual number of reported GLOFs between 2020 and 2022 (Fig. 6). Immediately reported GLOFs such as those determined by hydrometric stations, field photographs and videos, or satellites with high repeat rates are usually published through governmental websites or social media.*"

R1C11: Fig. 7: intuitively, I would expect no data in grey color

R1A11: We thank the reviewer for pointing this out. We will reverse the colour scale in Fig. 7 accordingly:
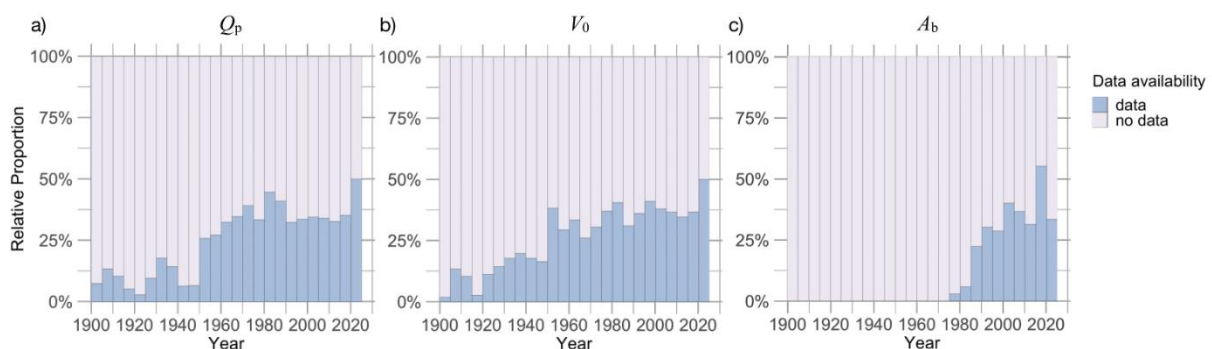
Figure 7 with adjusted colour scale.

R1C12: L242: those % should be related to share of individual lake dam types among GLOF-producing lakes

R1A12: We are unsure about this comment. We feel that these percentages show that ice-dammed lakes are abundant and also frequently caused damage.

R1C13: L353-368: please consider a separate sub-section discussing the future of the active branch of your database and ways how local experts are planned to be involved (see my general comment)

R1A13: We refer the reviewer to our previous comment R1A3.

R1C14: L368: Interesting, would you consider outbursts of thermokarst lakes in high latitude regions to be GLOFs? That would increase a total numbers a lot (see e.g. http://doi.org/10.1002/ppp.2038)

R1A14: We exclude thermokarst lakes as GLOF sources from our database. Thermokarst lakes are not necessarily fed by meltwater from glaciers and are therefore different from the formal definition of a glacier lake (Carrivick and Tweed, 2013).

R1C15: L369: please make clear what should preferably be cited if your data are used – zenodo repository, uni-potsdam website or this paper?

R1A15: The goal of articles considered in ESSD is to *"enable the reader to review and use the data, respectively, with the least amount of effort. To this end, all necessary information should be presented through the article text and references in a concise manner and each article should publish as much data as possible"* (https://www.earth-system-science-data.net/about/aims_and_scope.html). The data itself can be archived in any citable and freely accessible source (i.e. including a digital object identifier, DOI, as Zenodo does). We therefore would like to leave this choice to the users whether they cite the data description paper or the database itself.

R1C16: To sum up, I support the publication of this manuscript once some moderate revisions addressing my two general comments are made.

R1A16: We highly appreciate the reviewers support for publication of our work and are confident that we will be able to address all general comments in a revised manuscript.

References:

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Emmer, A., Allen, S. K., Carey, M., Frey, H., Huggel, C., Korup, O., Mergili, M., Sattar, A., Veh, G., Chen, T. Y., Cook, S. J., Correas-Gonzalez, M., Das, S., Diaz Moreno, A., Drenkhan, F., Fischer, M., Immerzeel, W. W., Izagirre, E., Joshi, R. C., Kougkoulos, I., Kuyakanon Knapp, R., Li, D., Majeed, U., Matti, S., Moulton, H., Nick, F., Piroton, V., Rashid, I., Reza, M., Ribeiro de Figueiredo, A., Riveros, C., Shrestha, F., Shrestha, M., Steiner, J., Walker-Crawford, N., Wood, J. L., and Yde, J. C.: Progress and challenges in glacial lake outburst flood research (2017–2021): a research community perspective, Nat. Hazards Earth Syst. Sci., 22, 3041–3061, https://doi.org/10.5194/nhess-22-3041-2022, 2022.