Response to Reviewer Comments

Manuscript ID: egusphere-2025-4454
Title: Simulating avalanche-triggered lake overspill and downstream impacts at Birendra Lake using RAMMS and HEC-RAS
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Dear Editor and Reviewers,

We thank the reviewers and community members for their insightful and constructive feedback on our manuscript. We have addressed the comments, particularly regarding the manuscript structure, technical terminology, and overspill volume calculations.

Our point-by-point responses are provided in the table below:

Response to Community #1 (CC1)

ID	Reviewer Comment	Author Response
CC1.1	*I am happy to read the manuscript by Thapa et al. which have used RAMMAS modeling. Initially, I anticipated this research to be a reconstruction of the 2024 Birendra Lake GLOF event, however, it appears to be focused on a hazard assessment instead. This distinction should be made explicit to avoid potential misunderstandings.*	Thanks for your time and constructive feedbacks. We agree with this distinction. The manuscript will be revised to explicitly frame the study as a hazard assessment rather than a reconstruction of the April 2024 event. Clarifications have been added to the Abstract and Introduction to ensure this focus is clear to the reader.
CC1.2	*Given the numerous published studies after the Birendra GLOF event (Khadka et al., 2024; Banerjee et al., 2025; Chaulagain et al., 2025; Poudel et al., 2025), it is essential for this study to acknowledge these prior works to build up the study and articulate what new insights or findings it brings to show the credibility.*	Yes, you have rightly mentioned and all the previous studies are acknowledged. Sections have been revised with sufficient discussion to acknowledge these studies and highlight our focus on the hazard process chain.
CC1.3	*My main concern is that the authors claim 0.01-0.18% of total lake volume 4.7×10^6 m3 (=8460 m3 max) is spilled from lake which seems speculative and small when comparing to downstream discharges and time given in the manuscript. Please make me clear if I missed anything. Further, impact/exposure assessment as shown in Figure 3 has not been conducted.*	Correction: The overspill range is 1.0% to 18% of total lake volume, not 0.01% - 0.18%. This decimal error is corrected throughout the manuscript.
CC1.4	*L49 What does ice-debris avalanche mean? The feeding glacier is a clean glacier*	Correction: Term changed to "ice avalanche".

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CC1.5	*L50 vulnerability to susceptibility*	Correction: Term changed to "susceptibility".
CC1.6	*L52 I think this event is a small event and has not affected or had impacts on downstream community/settlements*	Clarified that while the event was small-scale, it destroyed the bridge connecting Samagaun and Samdo.
CC1.7	*L55-L58 cite previous studies that have investigated this event*	References added, including Maharjan et al. (2024), Khadka et al. (2024), Chaulagain et al. (2025), and Banerjee et al. (2025).
CC1.8	*L61 two semi colon*	Corrected
CC1.9	*L94 check the exact cause of the 2016 Gongbatongsaco GLOF*	Corrected. The 2016 Gongbatongsha GLOF was triggered by heavy precipitation causing a slope failure and debris deposition into the lake, leading to a moraine dam breach and rapid drainage.
CC1.10	*L119 mention the glacial lake*	Corrected. Lake Palcacocha specifically mentioned.
CC1.11	*L134 once the full form is abbreviated it is wise to use abbreviation throughout the ms*	Corrected. Abbreviations now used consistently following first mention.
CC1.12	*L145 use another term for vulnerability*	"Vulnerability" changed to "proneness."
CC1.13	*L167 glacier detach: is it recently or since the end of LIA? Prove if its recent from satellite imagery*	"Recently" removed to avoid temporal ambiguity regarding the glacier detachment.
CC1.14	*Study area is poorly described. It would be great to know the climatology, glaciers, glacial lakes and their characteristics in the region. Why studying such event is important in the region?Authors could have used also reviewed more published studies in Nepal Himalaya for structuring the background/introduction and for study area (some maybe https://doi.org/10.1007/s10113-023-02142-y, https://doi.org/10.3390/rs9070654, https://doi.org/10.3390/rs10121913)*	The Study Area has been expanded to include regional climatology and glacier characteristics. The suggested published studies were referenced.
CC1.15	*L226 which high resolution DEM?*	Clarified the use of ALOS 12.5m DEM.
CC1.16	*L242 in repeated*	Redundant text removed.
CC1.17	*L285 et al. is missing in the reference when there are more than 2 authors*	Citations corrected to include "et al."
CC1.18	*Table 1 How was depth determined? Is it mean depth or max depth?*	Table 1: Depth removed; it represented mean depth and was non-essential for the final analysis.
CC1.19	*L346 Why not to use HMA DEM of better resolution than ALOS?*	L346: ALOS DEM was used instead of HMA DEM because it contained fewer data voids in the glacierized sections, ensuring better simulation stability in RAMMS.

ID	Reviewer Comment	Author Response
CC1.20	*L348 mention the weblink or cite it*	Citation and weblink for Adventure Consultants added.
CC1.21	*For figures 9, 10 and 11, merge them and describe giving sub-number*	Figures 9, 10, and 11: Merged into a single composite figure with sub-number.
CC1.22	*L715 cite the published paper not the preprint* *Banerjee A, Meadows EM, Yadav N, et al. Glacier and glacial lake dynamics from 1990 to 2024 and their impact on flood hazard in the central Nepal Himalaya[J]. Journal of Mountain Science: 2025, 22:1926-1943. 10.1007/s11629-024-9298-0* *Chaulagain M, Chand MB, Pradhananga D, et al. Recurring avalanche hazards at Birendra Lake, Manaslu region: Interdisciplinary insights from the April 21, 2024, avalanche event[J]. 2025, 7:59-77.* *Khadka N, Zheng G, Chen X, et al. An ice-snow avalanche triggered small glacial lake outburst flood in Birendra Lake, Nepal Himalaya[J]. Natural Hazards: 2024, 121:6357-6365. https://doi.org/10.1007/s11069-024-07014-0* *Poudel U, Gouli MR, Hu K, et al. Multi-breach GLOF hazard and exposure analysis of Birendra Lake in the Manaslu Region of Nepal[J]. Natural Hazards Research: 2025. 10.1016/j.nhres.2025.03.007* *Citation: https://doi.org/10.5194/egusphere-2025-4454-CC1*	Updated all citations from preprints to the final published versions for Banerjee et al. (2025), Chaulagain et al. (2025), Khadka et al. (2024), and Poudel et al. (2025).