

## Point-by-point reply to the comments – Bazin et al., 2026

To W. Haeberli

*Comments regarding greater precision in the description of the event/risk management* → we have taken the suggestions on board and carried out sufficient research to address these points.

*Missing scientific references, particularly to supplement Swiss and international risk management data* → we have taken into account and incorporated the numerous references provided (regarding the EU-PACE project, GAPHAZ, the Gruben Glacier, the Belvedere Glacier, the Mattmark event and its trial, monitoring of the Matterhorn faces, Lake delle Locce, assessment and international collaboration with authorities).

*Comments on the rather marked bias regarding sources (numerous French sources, websites, references of limited scientific value)* → we have justified the source bias, but above all we have reinforced the sources to gain a better understanding of management outside France. We have replaced non-scientific data with recognised scientific references.

*Absence of the Three Swiss National Research Programmes (NRPs) and their influence on mountain risk management policy* → we took care to research these specific projects on high-mountain risks, aimed at providing authorities with improved, forward-looking approaches.

*Difficulty in understanding the paragraph on the feedback pillar* → we have removed this paragraph, which did not aid understanding of the overall argument, and we have explained that the feedback experience is covered in Pillar 1.

*Errors in the bibliography* → each bibliographic reference has been carefully checked and corrected where necessary.

## To C. Huggel

*Reword clearly: The central research question, the specific objectives of the article, and what the database reveals that was not previously known* → We have clarified the objective of this research, which is to examine how methods of managing hazards and risks have evolved over time, primarily in France, Switzerland and Italy. This is to enable the acquisition of new knowledge across different environmental, societal and political contexts, over a fairly long period, by examining a large number of Alpine events. The existing literature often focuses on a specific event but does not conduct a cross-sectional study. This study is innovative in that it takes a broad view of all glacial and periglacial events that have occurred across the Alps and examines management methods. Our article forms part of a collective approach, complementing existing literature, and represents a first step in what could become a collaborative project. Furthermore, it constitutes an initial analytical framework within a field that remains relatively unstructured from the perspective of the humanities, or in terms of the interplay between the humanities and the physical dynamics of risk.

*Inaccurate or inappropriate technical terminology* → we have carried out a professional proofread of the English text to improve the accuracy of the technical terminology and the overall quality of the wording.

*The theoretical basis of the state of the art needs to be strengthened* → the numerous references (from all reviewers) have been studied and used to inform and refine this article.

*Questions regarding the relevance of going into detail on the geophysical processes of mass movements* → We have opted to maintain the status quo, i.e. to reduce the level of detail in the geosciences, to best understand both the geoscientific and management aspects. By choosing to reduce the geoscientific content, we provide numerous scientific references to enable the reader to explore the subject further.

*Exposure should be explicitly integrated into the risk equation* → The concepts of exposure and vulnerability in mountain valleys are better defined and illustrated in the introduction. We refer to them throughout the article so that the reader can grasp the characteristics and importance of exposure in risk management.

*Regarding the 7 pillars: the risk management cycle of response, mitigation, recovery, prevention and preparedness is missing. We have aligned the standard '5 phases of emergency management' cycle – prevention, mitigation, preparedness, response and recovery – with the management pillars outlined in the article* → We have incorporated the definitions of the 5 phases into the individual definitions of the 7 pillars. In addition, we have added an 8th pillar of “response”, which was missing from our pillars as direct crisis management. We have re-examined all the events in our database using this new analytical framework corresponding to the “response” pillar; Figures 2, 3, 4 and their analyses have therefore been modified to include the “response” pillar.

*Overly superficial analyses of evolution of management over time* → analyses that were previously too superficial have largely been revisited and expanded upon with the aid of Figures 3, 4 and 5. We have established the contextual link between different eras and the way in which risk management evolves.

*Feedback paragraph difficult to understand* → as with W. Haeberli, the paragraph has been removed for clarity, but the concept of feedback experience is better explained in the Discussion section.

*The method of the satellite imagery era is missing, which has made it possible to document events that were previously invisible or poorly documented (particularly in remote areas)* → We considered the integration of recent improvements related to the use of satellite imagery. We have therefore

incorporated this into the methods implemented in our pillars 1 and 4 and expanded the scientific literature utilising it.

*Figures: insufficient quality for publication, issues with map legibility, bar charts requiring improvement*  
→ all figures have been redrawn. Maps that did not provide additional information have been removed. The sole remaining map summarises the others; the legend has been improved and readability significantly enhanced. Figures 2, 3 and 4 have been revised (see comments above).

## To F. Troilo

*As a result of the methodological issues outlined above, biases may be identified in relation to specific regions where more detailed information has been accessed* → Considering the comments from other reviewers, we have significantly expanded our references to include more data on Switzerland, Italy and Austria. We remain, however, aware of the source biases discussed in the comments. The data for Switzerland and France appear to us to be complete. We hope this article will serve as a complement to other works, whilst striving to provide a broader and more comprehensive review given the significant number of references and events selected over the past two centuries, as other articles have done (Niggli et al., 2024, for example).

*Gaining a better understanding of the Marmolada's impact on the organisation of glacial risk management, with a National Working Group* → the Marmolada event, has been effectively utilised as a catalyst for management and its collective organisation.

*Add the example of the Santa Margherita chapel to the chapter on processions* → we have removed the chapter on risk management through religious processions as it did not correspond to any pillar and was unnecessary. It was merely a rather unhelpful anecdote.

*The quality of the figures could be improved* → the figures have all been redrawn for greater clarity and usefulness

*Insufficient Italian references* → numerous Italian and Swiss references have been added to the analysis and drafting of this new version

*Lack of short introductions before the sub-sections* → we have added some short introductions where useful, but not for every sub-section, due to lack of space and to comply with the criteria of the scientific journal NHESS.