

The paper presented by Giacona et al. deals with an interesting topic and even more addresses the approach to a region which has not been known so far for its avalanche activity. As such, the reconstruction presented is of high relevance, as these low elevation mountain ranges, as the Vosges, are likely to be the first and most severely affected by climate change and could thus serve as examples/illustrations of what one needs to expect at higher altitudes. Also, the number of sources collected by the authors is impressive and shows the great ability of the team to cross natural and human science approaches, which is still rare. The main weaknesses of the paper reside in the way it was written, and this for several reasons. First of all, and despite the fact that the authors acknowledge a native speaker for the proof-reading, the text is written in a rather poor English, and many technical words have been translated simply from French (such that they either have a different or no more meaning in English). The language will need to be polished substantially in a new version. The style of the paper also seems awkward to a natural scientist as it uses footnotes (and even in large numbers), which is all but normal in natural sciences (by contrast to human sciences). This needs to be clarified as well. Thirdly, the manuscript is fairly descriptive in the introduction and not very clear either in the abstract. Overall, the text needs to become much more concise and focused, and also much clearer in view of terminology. What is a nonconventional source (for me, natural or written archives are conventional indeed, but not sufficiently used)?

Authors' response: We have deeply reworked all the formal aspects of the paper. Modifications made in the revised version of the paper we would gladly submit to your kind consideration include:

- A slight overall reorganization to better distinguish the content of the different sections. Also, the discussion section has been slightly expanded to put the results in perspective with regards to a larger context;
- A real effort for precisising and defining the exact meaning of all the terms we are using, especially those related to the typology of avalanche events, and also those arising from the fields of history and social science (and therefore arguably less familiar to natural hazards (geo)scientists). To this end, we have included an additional table which contains the definition of such terms;
- Suppression of all footnotes, with inclusion of the relevant information within the text core;
- Yet, significant shortening of the text core;
- Correction of all typos, awkward sentences, etc., and further English smoothing by a professional English corrector.

However, we want to stress that the first author has her background in history, and that the main outcome of the paper, in addition to specific findings for the case study, is the contribution of this discipline to a better understanding of the evolution of natural hazards on the long range. This has two consequences for the paper:

- First, the data/result/discussion organization may remain a bit different from a pure geoscience paper. Specifically, analyzing the source amount, quality and evolution through time clearly belongs, for the historian, to the results section and not only to the discussion section. It is even one of the most important points of the work to illustrate that the two aspects cannot be truly distinguished;
- Second, the text style remains truly a bit more literary than in standard geoscience articles.

As stated before, we have polished the paper with regards to the first submission, which should contribute to make it easier and more convenient to read for the NHESS readership. For instance, the additional table in the revised version of the paper should help making the bridge between historical / social science concepts and the field of natural hazards. Yet, we

don't want to completely get rid of these intrinsic specificities of the work, which also contribute, in our opinion, to its value.

Where do you address hazards, and where are you really addressing risks? This is used in a mixed way and needs clarification as well. What are risk historians? What is a geohistorical methodology/resources/approach? etc. (I could provide many more examples, but would like to suggest that the authors stick to the international literature when using definitions or terms.

Authors' response: We adhere to the classical distinction between hazard and risk, where risk arises as the conjunction of the hazard (all possible avalanches, generally expressed as a probability distribution) with elements at risk such as humans, roads, etc. Yet, it must be stressed that our geo-chronology was built to be as close as possible of the material reality of avalanches in the Vosges Mountains, which means that it includes both damageable and non-damageable events. As stated in the paper, old data are strongly biased towards damageable events whereas more recent ones include much more non-damageable events. As a consequence, our geo-chronology is neither a chronicle of avalanche hazard nor a chronicle of avalanche risk. Notably, it is clearly one of the main scopes of the discussion section to shed light on the different effects that combine to explain the actual shape of the event chronology, and to which extent it corresponds to a chronology of hazard and risk as function of time. We have made an additional effort through the whole text to clarify this point and specifically to distinguish the two concepts as much as possible.

For many words like *geo-history*, see the new table.

"Risk historians" was an awkward formulation. We meant historians working on risk due to natural hazards. This has been changed.

The results will need to be presented in a much clearer, and more organized way. There is more in the data than you are showing so far.

Authors' response: See before regarding the new organization.

By the way, we agree that we do not provide a detailed analysis of all the information the data convey. Specifically, we only perform a rapid analysis of its main features a function of time, geomorphology, events typology, sources, etc. The reason for this is that the main objective of the work is to illustrate how historical data such as ours, generally considered as too lacunar and uncertain to be exploited in the field of natural hazard, can be valued by a careful historical analysis. Of course, once this is done, and especially once the different effects that combine in the event geo-chronology have been discriminated, further exploitation of the data for, *e.g.*, climate inference, flow modelling, etc., becomes possible. Since the paper is already really long, we let this for further research, and we have added a more explicit remark in this direction in the conclusion/outlook section.

In the same line of thoughts, please make sure that you put your data into a larger context, the discussion is very much focused at the case-study site so far and introduces many new results rather than seeing them in a broader context.

Authors' response: As stated before, the paper has been slightly reorganized. The discussion section now includes a specific subsection with summarizes different elements that put our results in perspective with regards other contexts/studies. These include a few new elements and references and several elements already present in the first version of the paper but, we agree, in a too diffuse way. However, we want to stress that, as stated in introduction, studies as ours are very seldom, especially for avalanches, where knowledge and published time series are mostly limited to last decades and on which very few

historians have worked. This makes the value of our work higher, but also makes it more difficult the comparison of our results to other case-studies.

In my opinion the paper can become a very nice and relevant piece, and certainly will be suitable for NHESS, but more work is needed to reach this goal, and I would be happy to see a new version on that interesting topic sometimes soon.

Authors' response: We thank aging the referee for his encouragements and hope he will receive and enjoy the revised version of our paper.