Response to the Anonymous Referee #2

The authors would like to thank the second referee for his attentive lecture of the manuscript and his valuable comments and constructive suggestions. Answers to the questions are in italic.

Referee comments

Database compilation methodology

- The authors cite that a fraction of their database has no affect on the roadway, trail or railway in terms of disruption, etc. So why is it included in the database?

  All collected events have generated traffic disruptions. If 18% of events have generated no damage on tracks, they have, at least, generated traffic disruptions (please see next question/answer).

- It is not clear what the authors deems as the minimum impact or threshold of when a natural hazard event is considered. The authors first must be clear what they are setting as the minimum threshold for being included in the database.

  *A **sentence** in Section 3, data and methods, **was added**: "The minimum threshold for being included in the database is a traffic disruption (for example, a large velocity reduction) for at least 10 minutes following a natural hazard event that have reached to a transportation track."*

- It is also not clear from the current presentation of the methodology how the volume of the events or timing of events are determined.

  ***Sentences** in Section 3, data and methods, **were added**: "Data about date, location, event characterization and damage come from the online press articles". "Images from the press articles are used to estimate many attributes as the event classification, the track damage and the volume of the deposit material if it is not given in the press article."*

- There are also variations in the reporting of the date range the database is compiled from, citing 2011-2016 and 2012-2016 throughout the manuscript.

  Dates were effectively different along the manuscript. They were corrected: 2012-2016.

- The methodology of using Google Alerts is reasonable, however, since this practice was only started in 2014, there are clear discrepancies between the number of events obtained before this practice was adopted and after. The authors specifically cite the change in number of hazards reported (a 2 fold increase from before and after 2014!).

  *Exact, the methodology has its limits. Expect for floods (and landslides), the difference of number of events does not increase so much since the use of Google Alerts. **Sentences were added**: " Google Alerts permits mainly to improve the event collection of floods. Moreover, the total number of event increases year after year, even after the use of Google Alerts (mid 2014) because of the increase of floods disruptions (Figure 25 of submitted manuscript; Figure 6F of the new corrected version). This shows that the use of Google Alerts is not fully responsible of*

the yearly increase of number of events. Those numbers depend strongly to the weather conditions that are different each year".

- The comparison to the Canton of Vaud dataset for hazards is confusing. It appears that it could be a useful dataset from which to compare but the authors are not clear about what specifically the differences are, they merely report the number of events. It may be helpful to look more into the differences in types of events between these two databases to provide more quantitative metrics on potential biases with the database presented in this paper.

*In order **to shorten the document**, this section "Comparison with the Canton of Vaud database" was removed.*

- The determination of event cost is interesting and could be a valuable contribution to the paper if it was further substantiated in its own section. In the current way it is presented it is a bit unclear how robust or realistic the assigned cost values are.

*As the direct damage cost assessment is difficult and can range according the event features, the direct cost determination is, above all, a cost comparison tool of the different damage classes. **Sentences were added** at the end of section 3, Data and methods: "Since direct damage costs are difficult to assess (this is event more true for indirect damage costs), the proposed methodology to determine them must be considered, above all, as a tool to compare the costs of the different damage classes. The cost values should not be considered as true costs for all events but as a order of magnitude of the projected costs (please see also section 5.4)". Furthermore, the section 5.4, direct damage cost estimation, should discuss about this challenge of cost determination. Even if they are not easy to assess them, direct damage costs may be important giving a order of magnitude of direct costs induced by all events that affect the transportation networks.*

<u>Presentation of database statistics</u>

- While it is important to highlight the different characteristics of the database, I feel there is no need to present every aspect of this database as percentages based on the type of hazard and attribute being considered. This makes the paper much longer than it needs to be and in my opinion does not add value.

Concerning the percentage given in the results, the opinions of the authors is that both number of events and percentages are a source of information that must not be removed. We realize that percentage and number of events do not make the text simpler but we consider that it can be important for the reader to know the absolute values of the given data. We let the Editor select to keep or not the % and absolute values.

- I would recommend the authors significantly reduce the number of figures into several key attributes that the authors feel best describe the unique aspects or findings of this database and include any other metrics or distributions the authors feel are relevant in supplementary material (or not include them at all).

*We have **deleted figures** about sinuosity and affected population. All remaining **figures were regroup** in few images.*

- The manuscript presents many statistics without much or any discussion of why it is significant, what is suggests about the nature of the hazard for the specific attribute collected or cites other sources of information or analysis that supports the findings. Many of the sections outlining the statistics end with one to two sentences that should be significantly strengthened to clearly summarize the points being made.

The main issue of this paper is to present the collected data and to discuss those of them that have global interest (and not a interest only for Swiss people). It is a synthesis of the database and not a detailed discussion about collected results that could be part of a other paper. We have chose not to discuss in detail all presented data because it would be much longer and because there is too much material for one paper. With the presented data, the reader have an detailed overview of the features of NH that have affected the Swiss transportation networks last 5 years. He can compare freely those results with other sources if he so wishes, especially with the detailed results that can be found in the Tables of the Supp. Material.

Overall structure and content

- The paper overall is currently much longer than it needs to be with far too many figures. I recommend the paper be drastically shortened to highlight the most salient points in the database…

*Right! The paper as too long. He **was reduced of 28%** although it contains now **new analysis** as the **risk ratios** and the **kernel density maps**. All initial figures were regrouped in three images. Some sections were deleted as the "track sinuosity" or the "population affected".*

- … and take more time in the discussion section to outline how this database can be used or should be interpreted to make clear points about the role of small natural hazards on transportation networks in Switzerland. The discussion section at present seems to go off on several apparent tangents about the limitations and lack of interest in this type of database; however, the authors could instead use this opportunity to outline the value of the database despite its limitations and the potential applicability of the database within communities of interest. Finally, there are a large number of grammatical and language errors in the manuscript that must be corrected.

*We have **added a short section** about the value of the database in the risk management in Switzerland: "Risk management in Switzerland may therefore be improved with such a database. For examples, it shows the important alternative ways to bypass the obstacles. We have highlighted that for one quarter of events, there were no deviation routes. This proportion is high and must be reconsidered by the authorities. It is evident that to protect all swiss tracks against natural hazard processes would me much to expensive. Thus, it is essential to guaranty alternative tracks and to fund protective measures with the best ratio cost / risk reduction. Minor roads often belong to the municipalities which does not have a great interest to maintain them. The Cantons and the Confederation would be advised to participate or even to take over the maintenance of some of them that can be vital in case of closure of main roads or railway tracks. This is particularly appropriate in transportation corridor when the minor road is located on the other valley side than the major road. With its national scale, this database helps to consider the risk of transportation networks tracks more from a network perspective than from a track scale."*

Section about the limitation of the database were reduced but kept, as it is important to know its limitations.