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Reply on RC2

Veronika Hutter et al.

Author comment on "How is avalanche danger described in textual descriptions in avalanche forecasts in Switzerland? Consistency between forecasters and avalanche danger" by Veronika Hutter et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2021-160-AC2>, 2021

We greatly appreciate you reviewing our manuscript and providing helpful, constructive comments. Please find below our response (bold**) to your comments (*italics*).**

The manuscript describes an effort to examine the consistency of text descriptions of the avalanche danger with the avalanche danger rating. The authors use a unique, or at least uncommon, dataset to address two research questions about the use of text to convey key elements of the public avalanche forecast with the danger level and if the use is consistent at different danger levels. The author's approach is interesting and it is a unique application of these ideas in this context. Their results are also interesting, although maybe not surprising, and worthy of documentation in the literature. The structure of the manuscript and the writing within it has room for improvement and I do not feel it should be published in its current form. The revisions required are more than minor and thus my recommendation is for the authors to complete major revisions before other reviewers evaluate the work.

The manuscript reads little like it was extracted from a larger document. There is both too much detail and use of very specific terms (like `phrase_option`) in some sections and not enough background and explanation in others (see note on semiotic triangle below). This issue runs through many parts of the manuscript. It makes interpreting some of the figures difficult as they are dense with information, but don't provide the reader with much guidance on what is included to provide a wholistic view of the work and what is critical to understanding it (Table 3 is a good example). The Methods section includes descriptions of which author produced different parts of the analysis, although I'm not sure if this is important for me to know and if so why.

Thanks for this useful pointer. We will revise the manuscript taking care to make the level of detail more appropriate and more "reader friendly".

The Data section explains a lot about how the avalanche forecasts are issued and identifies elements of the products, but it does not paint a clear picture of how the structure of the phrase catalog informs or affects the analysis or results.

We will be more clear about this. The catalogue of phrases impacts the forecast

product as all forecasters use the same set of words. It also impacts the analysis as the number of words, though quite large, is finite. Only this combination makes the research possible.

The Results section is very dense with a lot of information, but sorting through it is challenging (thank you for the summaries by danger level!).

We intend to provide a summary table showing the key results (as currently on lines 240-244 and 257 - 261, together with the description used in the European Avalanche Danger Scale, EADS; EAWS, 2018) to allow a better comparison between our findings and the definitions in the danger scale.

I am both intrigued and confused by the appendix, which has lots of information that is interesting but I'm not sure how important it is for understanding or documenting the work.

We consider the appendix as complementary information: for researchers who intend to reproduce such work, but also for those who understand both German and English. Importantly, the analysis was fully conducted on German text, and we consider it important to make clear the (possible) implications of translation, without impacting on the readability of the main body of the paper. We will provide more explanation with the tables in the Appendix to facilitate their understanding.

The text in the manuscript could be improved. It is free of errors and typos. However, the writing does not always help the reader focus on the most important issues faced by the researchers or highlighted by the research. An example is paragraph 40. It is rich with ideas and constructed so it is hard for the reader to move through it smoothly.

We will rephrase this paragraph. We intend to provide a figure highlighting the concept of the semiotic triangle with regard to avalanche forecasting, giving an example, and highlight more clearly where previous research and our study fits in.

Here are a few specific comments:

Title – The subtitle feel closer a description of what is contained in the manuscript. The main title is quite broad and I do not feel like it really helps the reader know what to expect within the article. I suggest they authors refine the title and subtitle structure.

We will reword the title taking this suggestion into account.

Terminology – The authors use some terms in ways that are consistent with previous work, but also that are probably not part of current general use for most of the readers they are trying to reach.

We will introduce the terms more clearly, including their origin. We will stick primarily to European terms (i.e. European Avalanche Danger Scale) as these are still the binding guidelines in European avalanche forecasting. However, we will link these terms to the Conceptual Model of Avalanche Hazard (Statham et al., 2018), which is increasingly used in Europe as well.

They do dedicate a paragraph in the introduction to explain the linguistic model they are applying, which is admirable. However, I found the layout and use of some terms in the manuscript confusing. One example is symbol. This is important to the model the author's use and it is also commonly used in warning communication. The authors use it in the

context of the linguistics model and also to refer to graphical elements. The paragraph on the linguistics model contains a lot of good information, but the liberal use of parenthetical phrases makes the material difficult to digest. My suggestion is to do one of two things: remove the discussion of the semiotic triangle and associated ideas and focus on the consistency issues in the stated research questions, or expand the discussion of the semiotic triangle and associated concepts. If this concept is integral to the work, maybe it deserves its own section with a clear explanation. Applying this concept to avalanche forecasts is certainly interesting, but I am not sure if it is fundamental to understanding the work. To me the work described in this manuscript focuses on issues of forecast consistency (consistency of elements within a forecast). If the authors opt to keep the concepts of the semiotic triangle, I suggest they take some time in the proposed section to clearly define how the terms and concepts in this linguistic model are represented in the avalanche forecasts they are analyzing.

After careful consideration of your recommendation, we decided to stay with the semiotic triangle as our theoretical framework. However, besides introducing the concept in greater detail and with regard to avalanche forecasting and avalanche forecast research, we will highlight more clearly that consistency in the use of the terms, for instance when compared to the EADS, is another important objective in our study.

Focus of the results – This work is very specific to the public avalanche forecasts in Switzerland. The authors acknowledge this in the title. In many other parts of the manuscript, the text is not as specific and often is phrased in a way that makes the reader feel like they are learning about avalanche forecasts in a broad sense. This could and should be improved. The authors should focus on Swiss products. This study would probably not be possible with a broader dataset. This provides the authors opportunity to focus on specific aspects of the dataset and interpret the results in a realistic and targeted fashion.

We will take up this suggestion and be more explicit that we are analyzing Swiss forecasts.

Last sentence of abstract – "Our results provide data-driven insights that could be used to refine the ways in which avalanche danger could and should be communicated, especially to recreationalists, and provide a starting point for future studies on how users interpret avalanche forecasts." These are very important issues and certainly worth studying and improving. However, I don't see how that is done in this work. The work focuses on the internal consistency within an avalanche forecast – text descriptor and avalanche danger. It really doesn't tackle how avalanche danger or the threat to a person could or should be communicated. Just the consistency within the public product in Switzerland. This is a study of how avalanche danger IS being communicated. Given that internal consistency is an important element of any warning product, this work could be a measure of the effectiveness of that product from the producer's perspective (ie consistent elements are important and reduce the potential of confusing of the target audience). However, there is no measure of how the target user is accepting, comprehending, or effectively applying the warning product.

We will rephrase the abstract and carefully go through lines 345 - 350, where we discuss which findings may potentially impact users of the avalanche forecast.

References:

EAWS: European Avalanche Danger Scale (2018/19), https://www.avalanches.org/wp-content/uploads/2019/05/European_Avalanche_Danger_Scale-EAWS.pdf, last access: 14 Feb 2020, 2018.

Statham, G., Haegeli, P., Greene, E., Birkeland, K., Israelson, C., Tremper, B., & Kelly, J. (2018). A conceptual model of avalanche hazard. *Natural Hazards*, 90(2), 663-691. <https://doi.org/10.1007/s11069-017-3070-5>