Open discussion https://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2018-183/#discussion

Authors' response to RC2 review by B. Zweifel. The response is shown in blue.

1. Introduction

Page 2, Line 33: Instead of Landrø et al., 2013 I would rather refer to EAWS, 2017 which would be the newer synthesis.

Thanks, we will add this reference.

Page 3, Line 2-4: Travel advises are in some regions also given within the avalanche danger assessment section of the report. There they do not resist as a general advice but more as a specific advice for the actual situation.

We will add this point in the text.

2. Methods and data collection

Either in this section or in the discussion at the end I encourage you to address a possible bias of your study sample towards participants with an over – average interest in avalanche safety and its possible different answers (e.g. Haegeli, Strong-Cvetich, and Haider (2012), p. 806)

We will address this point in the text.

Page 11, 12: Is there any reason how you determine the classes for positive and negative weights of the communication effectiveness score? For my feeling this was one of the weak points of the analysis. It seems a bit made up out of thin air. Maybe you can bring some more evidence how you chose this classes?

Our reasoning is that there is no objective correct answer. Accordingly, we use the expert answers, where a factor receives +1 if the majority of experts provides support, 0 for inconclusive support by the experts, and -1 if a small minority of experts regards this factor as relevant.

The rationale behind this approach was to give a penalty (a weight of -1) to statements that were selected by few/no NAWS experts and a point to statements that were selected by many NAWS experts. In the design phase, we explored using different algorithms for calculating the scores, for example by using the relative number of experts selecting the Statement as a weight. However, in order to keep the method and results relative easy to understand and interpret, we choose a straightforward approach. We will add a statement in Chapter 5, where we recommend exploring and developing better methods for quantifying the effectiveness of communication in a future study.

Page 13, Line 18, 19: I guess that this values could be biased towards a population with more avalanche expertise than average (see point described above).

We agree.

Page 12, Line 28, 29: As well here a see a possible bias towards people who use the forecast more of ten than average (see point described above).

We agree.

Page 14, Table 4: "Ski tours per year" is in my opinion only one important value of experience. It is also important to know how many years of experience someone has. Did you survey this as well? Further, I

suggest adding total values in Table 4, so that one can see how many percent of all members fell within the different competence classes.

We initially included a number of other questions and test, but had to significantly reduce the volume in order to ensure users would complete the survey. This was one of the questions we had to remove, unfortunately.

3. Results

I was a bit confused to find answer values from the experts here in the result section since I understood from the method section (page 11, line 4) that the expert answers just define the "correct" answers. Anyway I recognized that the comparison between the two values (from the experts and from the recreational users) is of interest of course. Therefore I propose to adopt Figure 4 and 5 in a way that you show both values (from the experts and from the recreational users) for each factor.

We have data from two surveys, the NAWS experts and the users. In Chapter 3.1 and 3,2 we present the results from the user survey, but use different names (users, recreational users, experts etc) in different ways. These inconsistencies were also pointed out by referee in RC1. We will rewrite these chapters and use

- "users" and "user respondents" instead of users, participants, recreational users and experts
- "NAWS experts" and "NAWS expert survey" instead of experts

The results from the NAWS experts will be included where relevant, but the main results are the results from the user survey. We would therefore prefer to improve the text, and keep the figures as they are.

Page 17, Line 15, 16: I assume that this point corresponds to paragraph 3.2.2 as well? Maybe you mention that here.

We will mention this.

Page 17, Line 19: I would write "Avalanche size" instead of "Size" only, so it gets clearer.

Indeed.

Page 18, Line 1-8: This is quite a bit of criticism and would demand major changes in the RegObs application. It does not really become clear, whether you intend to do so or not. I suggest you to give this point some more weight in the discussion section.

We will. The users will always ask more functionality. Several of these features will be developed in 2018.

Page 18, Figure 6: In my opinion the pictures are not really very suitable for what you want to show. The wind slab could also be a persistent slab or a new snow problem. A picture with more varying slab thickness would be clearer in my eyes. Further, the picture showing the persistent slab shows only the upper fracture. This could also easily be from a wind slab problem. You address this problem in the discussion section anyway, so I see not really a need for action here.

We agree that the pictures could be better. We recommend a separate study on the topic.

Page 19, Line 16, 17: I would prefer to have two sentences here (instead of the parentheses), it would make the text more readable.

Will do.

4. Discussion

Page 22, Line 15: Probably you could add a reference here which addresses the of the snow cover (e.g., Schweizer, Kronholm, Jamieson, and Birkeland, 2008).

Nice suggestions, we will do.

Page 23, Line 15: Would you have any examples of AWS who show different danger levels and/or avalanche problems and is it possible to shortly discuss pros and cons of it?

Nice suggestions, we will do.

Page 23, Line 15: Isn't there any possible conflict with red color for the core zone with the red color from danger level 4?

Could be. However, this is probably less of a problem since red is associated with danger in general and the users will quickly see that red is used in the core zone diagram independently of the danger rating.

Page 23, Line 21: A mentioned above I see the pictures as not perfectly suitable for the phenomena you want to show. This means that your chosen sample is probably not the best and I find it delicate to generalize that pictures are not suitable for this kind of communication. However, I saw that you addressed this point properly later on (line 30 ff) and accordingly do not see a necessary action here.

Ref. comment above,

Page 24, Line 27, 28: Maybe you take my comment from above with the number of years in experience into account here.

Will do.

5. Conclusions and recommendations

Page 26, Line 17-21 (referred to as Line 4, 5 in RC): How would you illustrate parts of regions most affected by an avalanche problem? Would you further divine the region into sub-regions? This does not become clear here.

Our study does not explore possible ways to present this information on maps, this is left as a matter for NAWS to explore. One way to do this could be to show a map of the region next to each avalanche problem where the subregion or relevant elevation interval is symbolised or colour-coded in such a manner that the user easily understand which parts of the region is most affected. If the avalanche problem is related to heavy precipitation, wind or temperature, detailed maps of these properties may show the user which parts of the region are most affected. We do use sub-regions, as a way to provide better information in the text analysis. We will probably not have information with the required detail to present higher resolution maps of danger level or avalanche problems (yet).

We will add some text on this matter.

Page 26, Line 17-21 (referred to as Line 4, 5 in RC): What do you mean with higher or lower avalanche hazard? Are you talking about another danger level or about variations within one danger level?

We are referring to another danger level, and will specify this in the text.

Page 27, Line 5, 6: I suppose here to refer to a simple "public danger scale" which has only a short characterization and a travel advice for backcountry recreationists for each danger level (e.g., https://www.slf.ch/en/avalanche-bulletin-and-snow-situation/about-the-avalanche-bulletin/danger-levels.html, https://avalanche.org/avalanche-encyclopedia/danger-scale/).

We will rephrase.

Page 27, Line 19: Concerning the communication of the core zones it would probably be worth to develop a EAWS standard design. However, I know this will be a challenge. I don't think you have to mention that in the paper anyway.

We agree.

Technical note

Page 3, Line 17: There is a point missing after "(DeJoy, 1999)"

Will correct.

We will include these references:

Haegeli, P., Strong-Cvetich, L., & Haider, W. (2012). How mountain snowmobilers adjust their riding preferences in response to avalanche hazard information available at different stages of backcountry trips International Snow Science Workshop 2012, Proceedings (pp. 800-806). Anchorage, AK.

Schweizer, J., Kronholm, K., Jamieson, J. B., & Birkeland, K. W. (2008). Review of spatial variability of snowpack properties and its importance for avalanche formation. Cold Regions Science and Technology, 51 (2–3), 253-272. doi:http://dx.doi.org/10.1016/j.coldregions.2007.04.009.