Firstly, we'd like to thank the reviewer for the very constructive review. In the following, we respond in detail to each comment.

1 Detailed comments

RC: p.1, abstract: the abstract shall report at the end some quantitative results of the analysis.

AC: We agree with this comment and will update the abstract. However, we suggest that reporting the results qualitatively is more meaningful (our method outperforms a slope-based approach especially for more frequent avalanches) since single values from our ROC curves (e.g. Figures 9 and 10) are not very meaningful in isolation.

RC: p.3, Introduction: the last part of the introduction shall be devoted to the explanation of the novelties of the proposed method with respect to the stat of the art.

AC: We suggest improving the introduction as follows:
In this paper we present a new algorithm to define potential release areas which improves over existing approaches by taking into account the effects of snow cover and wind transport on the summer terrain. Specifically, we introduce a multi-scale roughness parameter, where scale is adjusted as a function of snow depth and we include a wind shelter index to define release area scenarios as a function of varying snow accumulation due to wind. This allows calculation of potential release area size with a snow distribution dependent parameter. By using fuzzy logic to combine information we can further distinguish between different grades of release propensity. Thus, our approach allows for a definition of potential release areas which goes beyond purely terrain-based parameters. Such approaches are particularly important for frequent avalanches and avalanche dynamics simulations of short-term hazard, for example in the case of road closures.

RC: p.3, Section 2: the authors shall add a flow chart which describes the steps of the proposed approach. This will help a lot the reader.

AC: This is an excellent suggestion, we will add a flow chart detailing the different steps of the algorithm.

RC: p. 6, line 378: the authors shall indicate from which procedure and/or model these parameters are obtained.

AC: The model input parameters (2.2) were derived from analysis of data collected at the Vallée de la Sionne, test site, situated in south-western Switzerland. Details on the measurements and data analysis can be found in the companion paper Veitinger et al. 2016. We will add this reference to the manuscript.

RC: p.9, section 2.5: here the authors describe the data used for the model. Could the authors comment on which data have been used for the setup of the model (training) and which for the validation? Are ground data used in the training of the algorithm? How is the snow depth evaluated ?

AC: The model doesn't use any "training data" per se – rather the parameters are based on empirical work (c.f. previous comment) and can be tuned by a user to a given scenario. This means that the model should be used to carry out sensitivity analyses, and emphasises further the importance of the fuzzification of the results. Snow depth can be derived from a local weather station, or more rarely, from remotely sensed values.

RC: p.12, line 698-700: as indicated here the algorithm when applied to a new case needs some adaptation. The authors shall clearly report which parts need adaptation/calibration so that possible users can evaluate it. This comment shall also be reported in the conclusion, where the authors shall indicate what is needed to use this approach to other areas and if the approach could become operational.

AC: When speaking of adaptation in line 698, we only mean that we set a mean snow depth and a wind direction as input parameter, corresponding to the conditions in the release area during avalanche release. However, no changes were applied to the algorithm code. We will clarify this in the manuscript.

Nonetheless, the reviewer is right in saying that the algorithm would need some adaptation when applied in areas with, as for example, different snow climates such as coastal snowpacks or Himalayan regions, where avalanches may occur in steeper areas than the Alps or North America. In such cases

the algorithm could be easily adapted to other conditions, by modifying the fuzzy membership functions in section 2.2. In this way the algorithm could be optimized/calibrated to any given mountainous area where slab avalanches may occur.
We will add a statement in the conclusions, suggesting an approach to adapting the algorithm in other snow-climatic areas.

2 Technical comments:

RC: p.5, line 308: in 1.5 please substitute the comma with a point. p.9,
line 574: delete will.

AC: We will correct the aforementioned issues.

Literature:

Veitinger, J. and Sovilla, B.: Linking snow depth to avalanche release area size: Measurements from the Vallée de la Sionne fieldsite, Nat. Hazards Earth Syst. Sci. Discuss., doi:10.5194/nhess-2016-7, in review, 2016.