

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC1
<https://doi.org/10.5194/nhess-2021-330-RC1>, 2022
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Comment on nhess-2021-330

Markus Eckerstorfer (Referee)

Referee comment on "Automated snow avalanche release area delineation in data-sparse, remote, and forested regions" by John Sykes et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2021-330-RC1>, 2022

Dear authors!

First of I would like to commend you on an interesting and generally well-presented study. I took the opportunity to review your study based on my interest in using EO data for avalanche applications as well as based on the opportunity to learn a couple of new things, especially about deriving PRAs.

I am suggesting minor review as I do not see any major shortcomings in your study or how you present it. I would like you to consider some suggestions of restructuring paragraphs as well as providing a bit more information on certain technicalities. I commented on these issues directly in a pdf version of your manuscript that is attached.

However, I do have a couple of higher-level questions that I would like you to consider in a next version of the manuscript:

- How often should one update PRAs based on changes in vegetation and snow climate, especially in the light of rapid climate change? And how good are avalanche observations then anyway for validation purposes?
- You talk about the cost effectiveness of Spot 6/7 data. In my experience such data is

expensive and for many avalanche operations and forecasting centers not financeable. Do you see other EO-based data sources (not only optical but also radar) that could be used?

- How representative are the validation polygons for the entire tenure? Are these runs characteristic for most of the other runs in the area in terms of topography, vegetation, and snow climate? From Figure 1 it seems that the validation runs are nestled in the northern part of the tenure only.
- It seems to me that there is quite some technical knowledge needed for DEM creation based on EO data. Are you aware of any services that could provide such data to overcome this technical threshold in order to make your method easier and wider applicable?
- I am missing an overall flow chart of all the technical steps you carried out to derive PRAs. Would it be possible to provide such a figure since you talk a lot about how technically trivial all the work is?
- After reading the methods section I expected a higher improvement of accuracy from Buehler 2018. You claim that an improvement of over 11 % is highly satisfying and I must believe you. What I am wondering, however, is if the additional costs and technical steps warrant the improvement, especially if you would calculate PRAs for the entire tenure of a BC forecasting region? I am also wondering what more / other things could be done to improve the accuracy of these PRAs even further, given that you err on the side of overestimation (I agree with you on that!).
- Finally, it seems to me that your study area and the area around Davos are not so different in terms of topography, vegetation, and snow climate. Could you maybe discuss the performance of your method in a more maritime setting? Finally, what would you suggest doing if there would be no local knowledge to determine avalanche terrain?

I found some typos (see attached pdf), however, I did not comment on the language overall since I am not an English native speaker myself.

Please also note the supplement to this comment:

<https://nhess.copernicus.org/preprints/nhess-2021-330/nhess-2021-330-RC1-supplement.pdf>