Dear reviewer,

First of all, we would like to thank you for your comments and for considering our paper for publication. You will find in the following paragraphs, our responses to your comments. They are in blue in the manuscript.

Thanks for taking up my input and comparing your results to our 2018 data from Switzerland. I am aware that it is not straight forward to compare these two approaches. However, I think this is very important to get an idea about the strength and weaknesses of your algorithm. I think it is important to have a Figure, illustrating the comparison between the two products. The dataset you used can also be cited itself and has a DOI (Hafner, E. and Bühler, Y.: SPOT6 Avalanche outlines 24 January 2018, EnviDat [dataset], doi:10.16904/envidat.77, 2019.)

Once again, we would like to thank you for sharing those data with us. We agree that one illustration of the comparison is needed and have decided to add a new figure (F4) line 321. Moreover, we have added the following lines to comment on this figure (lines 317-320):

"Figure 4 shows an illustration of this comparison. It appears that the deposit zones detected by SAFE are in line with SPOT6 outlined avalanches. The later however covers the entire avalanches while SAFE only detects, automatically, the deposit zones.

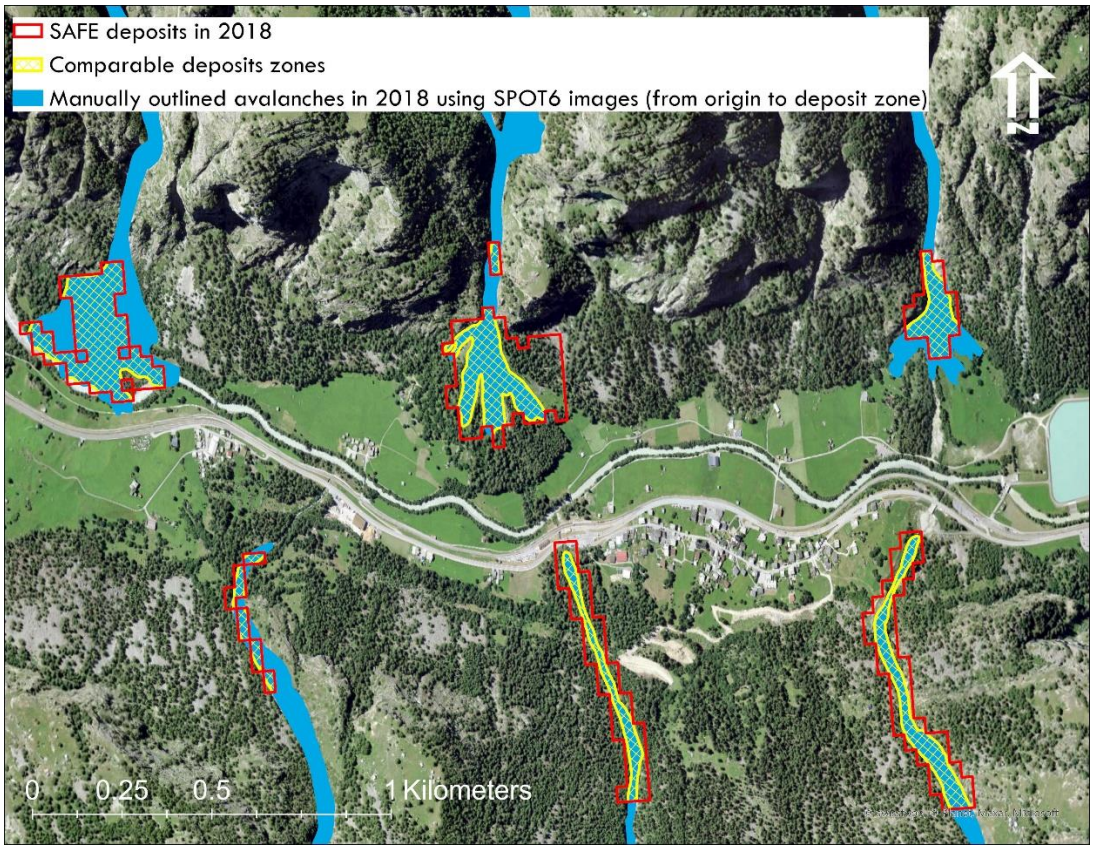

Figure 4. An illustration of the comparison between automatic detection of deposit zones using Landsat archives in SAFE and manually outlined snow avalanches (from origin to deposit zones) using SPOT6 images in Switzerland"

As for the reference dataset, we have added your suggestion line 312-314, where we cited Hafner et al., 2021: "As a potential method of strengthening our testing of SAFE, outputs of our model were compared with a method that applied a more precise and expensive remote sensing product in Switzerland in 2018 (Bühler et al., 2019b; Hafner and Bühler, 2018)."

P1L10: The statement "only local maps to estimate snow avalanche risk have been produced" is not true! Another example would be in this publication: Soteres, R. L., Pedraza, J., and Carrasco, R. M.: Snow avalanche susceptibility of the Circo de Gredos (Iberian Central System, Spain), Journal of Maps, 16, 155-165, 10.1080/17445647.2020.1717655, 2020. Just now our most recent paper published producing such maps for the entire canton of Grisons in Switzerland: Bühler, Y., Bebi, P., Christen, M., Margreth, S., Stoffel, L., Stoffel, A., Marty, C., Schmucki, G., Caviezel, A., Kühne, R., Wohlwend, S., and Bartelt, P.: Automated avalanche hazard indication mapping on a statewide scale, Nat. Hazards Earth Syst. Sci., 22, 1825-1843, 10.5194/nhess-22-1825-2022, 2022 (https://nhess.copernicus.org/articles/22/1825/2022/nhess-22-1825-2022.html). Please add this publication where you cite Bühler et al. 2018a as this publication is the further development of this approach.

Thank you for sharing those relevant references. First of all, we have added Soteres et al., 2020 to the manuscript where we mention the DEM maps lines 101-103: "Terrain parameters like slope gradient and curvature have also been added to the avalanche detection process using DEMs (Soteres et al., 2020) combined with Landsat-8 images (Bühler et al., 2018b; Singh et al., 2019)."

In order to avoid any confusion and based on your comments, we have removed "only local maps to estimate snow avalanche risk have been produced" from the abstract.

As for the paper in Grisons, we have added the reference as suggested lines 71-72: "Moreover, the combination of snow measurements (depth) and high resolution DEMs have proved useful in snow hazard detection (Bühler et al., 2022, 2018a)."

p11L299: you say SAFE can be considered as conservative and robust. This might be true but this gets a problem if you calculate frequency (e.g. Fig. 5) from it as it misses a large part of the avalanches in high winter (but these avalanches are at least as dangerous as the avalanches in spring). This point has to clarified and the limitations have to be described very clear in particular in connection with avalanche frequency.

Thank you for this comment. We had already written the following sentence in the previous version of the manuscript, clearly stating that SAFE cannot detect early winter deposits line 353-354: "Much of the discrepancy is related to SAFE's inability to detect individual events and missing deposits that rapidly melt (mostly from the early winter snow avalanches)".

However, in order to further clarify, we have added the following sentence as suggested in lines 302-307: "Moreover, it should be understood by the users that another limitation is that SAFE does not detect early winter avalanche deposits due to melting and snow coverage on and around the snow deposit, which might affect the deposits frequency estimations. However, based on our findings, SAFE can be considered as a conservative, yet robust and efficient tool to automatically identify snow avalanche depositional zones in very remote areas and can be applied in any mountainous region."

P10L271: how much do they need to overlap to count as OK? Only by one pixel? This should be explained maybe also with a figure.

We considered the snow deposits extracted from SAFE as reliable when more than 50% of the polygons was overlapping the actual deposits on Google Earth Image. In order to improve the understanding; we have added the following lines to the manuscript (lines 274-276): **"**Deposits identified by SAFE were considered valid when the two datasets overlapped at the same location and when more than half of the polygon surfaces extracted from SAFE overlapped the actual deposits visible on Google Earth images.**"**

We haven't added a new figure since we believe that there are already many figures in our paper, moreover, we believe that the new figure 4 about the comparison between SAFE and Swiss data already shows how SAFE outputs look compared to actual avalanches manually outlined.

P25L542: I would add "in spring and early summer" only then the avalanches are mapped.

We have modified the text accordingly line 557: "SAFE can be considered as a universal approach to assess snow avalanche depositional zones in spring and early summer where ground data are very limited, such as in the Afghan mountains."