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Comment on nhess-2021-198

Luigi Lombardo (Referee)

Referee comment on "Investigating causal factors of shallow landslides in grassland regions of Switzerland" by Lauren Zweifel et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2021-198-RC1>, 2021

Dear authors,

I will start by saying that I have really enjoyed reading your work.

I think that from a technical perspective, it is impeccable. You used LASSO and you designed an interesting experiment where you test the susceptibility of various sites and compare it with a model that features all the sites. The validation tools you presents are appropriate, which is uncommon in the landslide susceptibility literature with the exception of some cases. For instance, you used a spatial cross-validation structure, you used cutoff dependent and independent performance metrics, you introduced the concept of the Brier score (at least I did not know it, I do not know if it has been used in other landslide papers).

So, from that perspective I have no doubt the paper should be published right away.

I have only some minor comments. In terms of literature review, some of the operations you perform have been introduced in certain papers that have become quite relevant with time and yet I did not see them mentioned. This is particularly true for the spatial cross-validation and for the choice of a balanced dataset.

Figure-wise, everything is very clear and neat. I have suggested combining figures 6 and 7 in the attached pdf.

The only thing I struggle a bit with is the absence of a susceptibility map. Now, I do

understand the complexity this will require, but it would be nice to take at least one site as a reference and then estimate the susceptibility there from all the models you tested. This will mean transferring the predictive function from other single-site-models and from the all-site-models. Then you could show the difference for each case with respect to a reference model which was generated locally,

Other than these minor suggestions, it is a very good work there and thanks for the nice reading once more!

Kind regards,

Luigi Lombardo

Please also note the supplement to this comment:

<https://nhess.copernicus.org/preprints/nhess-2021-198/nhess-2021-198-RC1-supplement.pdf>