Natural Hazards and Earth System Sciences Discussions

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Reviewer Comment on nhess-2022-154

Anonymous Referee #1

Referee comment on "Assessing uncertainties in landslide susceptibility predictions in a changing environment (Styrian Basin, Austria)" by Raphael Knevels et al., Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2022-154-RC1, 2022

The manuscript is a good piece of science addressing a relevant issue, i.e. the evaluation of the uncertainties in landslide susceptibility modeling, taking into account also climate and environmental changes. The manuscript is clear, written in fluent English, and well-organized. The figures and tables are useful for presenting and discussing the results. The introduction is complete and useful for focusing on the topic. The method is well presented and the discussion is clear. However, I've found some issues that need to be addressed and explained before the manuscript can be reconsidered for publication.

Although earlier work by some of the authors is recalled in several places, the whole manuscript is rather long, so I would suggest trying to shorten it by at least 10% of the current length.

In the following, I list the main methodological issues I found in the manuscript. Overall, I think that minor revisions are needed.

You use the term "storyline approach". I can't grab what you mean with "storyline" and "storyline approach". It seems to me that this term is not common in landslide analyses. I would suggest adding some explanation

You defined the events that occurred in June 2009 and September 2014 as "extreme". How can you classify such events as "extreme"? Was a statistical analysis carried out?

You added in the susceptibility analysis the rainfall data on the landslide failure day, i.e. the triggering precipitation conditions. I think this is questionable and in contrast with the theoretical definition of susceptibility (see e.g. Reichenbach et al. (2018) [https://doi.org/10.1016/j.earscirev.2018.03.001]; van Westen et al. (2008) [https://doi.org/10.1016/j.enggeo.2008.03.010]). Landslide susceptibility is "the likelihood of a landslide occurring in an area on the basis of the local terrain and environmental conditions", therefore the triggering rainfall conditions should be removed from this analysis.
You also wrote "For the landslide susceptibility analysis, we linked predisposing and triggering factors to landslide occurrences.". I think this can be considered a methodological issue.

Regarding the environmental change simulation, you wrote (line 153) that "Adopting active forest management in the developed future LULC scenario, coniferous forest was replaced by climate resilient mixed forest".
If I have understood well, all LULC changes were defined to have a potentially positive effect on slope stability. If it is so, why not considering also some "negative" changes?

Furthermore, you wrote (line 161) "Specifically, for each grid cell we determined the maximum three-hour rainfall intensity, and we took the maximum five-day rainfall."
In my opinion, also this is questionable, given that it is not always the most severe rainfall condition during a meteorological event that can trigger landslides. An explanation is needed.

Finally, I suggest using round brackets for units of measurement. Please check all over the text.