Natural Hazards and Earth System Sciences Discussions

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC2
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Review of nhess-2021-317

Anonymous Referee #2

Referee comment on "Rainfall-Induced Landslide Early Warning System based on corrected mesoscale numerical models: an application for the Southern Andes" by Ivo Fustos et al., Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2021-317-RC2, 2021

Review of NHESS-2021-317 by Fustos et al.

Overview

The manuscript (MS) deals with the development of a mathematical tool useful for setting up a landslide early warning system (LEWS) in the Southern Andes, Chile. The methodology combines bias correction of precipitation products and a model for estimating the probability of landslide triggering. The topic is within NHESS and the Special Issue. Language and structure of the MS is acceptable but should be improved. I think the MS has potential for publication, but the current version needs major revisions, mainly because some important methodological aspects need to be explained more clearly and thus it is difficult to understand how scientifically sound are the results.

Specific comments

- Abstract needs to be improved: the various sentences are not adequately linked, so it is difficult to understand what is being done in the MS
- Methodology: it should be better explained how the results are supposed to be used within a LEWS. How is rainfall supposed to be used as input to the developed models to produce a warning? Which is the value of probability for which a warning should be issued?
- Section 3.3: When computing ROC sensitivity and specificity how do you treat observed landslides? I mean, observed landslides are point features, while the output of your model is spatially distributed: how is the comparison between the two done? Is a buffer

considered around observed landslide points, or you just take the value at the cell including the point?

- Figure 8 and 9, model 1 and model 4 have basically the same performance. This means that Seven-day precipitation does not add much information. Perhaps the authors should think and comment on this
- Table 2 – Model 4 is the only one combining 3 explanatory variables. Why do not investigate also all the other possible combinations of 3 and 4 variables?
- Figure quality should be improved (all)
- 4.2 is mainly a list of the calibrated parameters for the logit and probit models. Perhaps revise but creating a table with the parameters' values, while the text comments the table
- Section 5.1 Precipitation accuracy, and about uncertainty in general: the paper may benefit from a more complete literature overview on this point: see, in addition to cited papers e.g.: https://doi.org/10.1016/j.geomorph.2015.04.028 , https://doi.org/10.1016/J.GEOMORPH.2014.06.015 https://doi.org/10.5194/hess-21-4525-2017 https://doi.org/10.1016/j.jhydrol.2015.10.010 https://doi.org/10.1016/j.geomorph.2016.11.019 https://doi.org/10.1016/j.geomorph.2017.02.001 https://doi.org/10.1007/s11069-018-3508-4 https://doi.org/10.1007/s11069-019-03830-x
- L 134: you use only 20 – 30 % of the data for calibration. Why not an higher percentage?
- It is unclear how you select 57 landslide events from the available 4,987 RIL. 57 events are a quite few, according to the literature (see, e.g. DOI: 1007/s10346-021-01704-7; https://nhess.copernicus.org/articles/21/2125/2021/)

Technical corrections

I have annotated the manuscript with some technical corrections (See attachment).

Please also note the supplement to this comment:
https://nhess.copernicus.org/preprints/nhess-2021-317/nhess-2021-317-RC2-supplement.pdf