Natural Hazards and Earth System Sciences Discussions

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC1
https://doi.org/10.5194/nhess-2022-175-RC1, 2022

Comment on nhess-2022-175

Anonymous Referee #1

Referee comment on "Using principal component analysis to incorporate multi-layer soil moisture information in hydrometeorological thresholds for landslide prediction: an investigation based on ERA5-Land reanalysis data" by Nunziarita Palazzolo et al., Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2022-175-RC1, 2022

General Comments:

This is a mostly well-written preprint that I feel only needs minor revisions. The use of PCA to reduce the dimensionality of the hydrometeorological space is novel, and the thresholds produced are an improvement over other methods. There are some missing details regarding the landslide inventory selection process, described below. These missing details constitute the bulk of my concerns and if addressed, I feel that the paper will tell a more complete story of the authors' methodology.

Specific Comments:

Regarding the landslide selection process described near the end of section 2.1:

The selection of ground truth is a critical decision for this type of analysis, especially if that ground truth is partially derived from other algorithms or datasets, such as what you are doing with CTRL-T. I believe this section needs two additions to help convince readers that what you're doing is scientifically sound.

Firstly, for the "adjustable parameters" of CTRL-T, I would like to see some description of how and why you chose the final parameter values. I believe you briefly mention the separating length of time for rainfall events in wet and dry periods later on in the paper. There is also this sentence in line 135: "Rainfall event parameters were calibrated adopting the monthly soil water balance model and evapotranspiration analysis." But I'm unclear on if this calibration process was done automatically by the program or manually by the authors. A final list of adjustable parameter values, with some brief defense of their

selection, would help readers understand what parts of CTRL-T are automated and which are tuned by hand.

Secondly, I would describe briefly in greater detail how you decided that landslides did not have identifiable or uncertain landslide conditions. I presume some threshold on the weights was used. If so, what what were those thresholds values and how did you decide them? Or if some other metric was used to quantify the landslide cause as being uncertain, briefly provide and defend those decisions.

Technical Comments and Optional Suggestions:

See attached PDF for grammar corrections and other suggestions for additional figures or figure revisions that I do not feel are mandatory.

Please also note the supplement to this comment:
https://nhess.copernicus.org/preprints/nhess-2022-175/nhess-2022-175-RC1-supplement.pdf