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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "An improved method of Newmark analysis for mapping hazards of coseismic landslides" *by* Mingdong Zang et al.

Anonymous Referee #1

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This study applies an approach for mapping slope susceptibility to seismic failures, which, within the framework of the standard Newmark analysis, introduces some elements of novelty in the evaluation of critical acceleration and of hazard representation. The topic can be certainly of interest for NHESS readers and, in my opinion, requires a minor-moderate revision to reach a shape acceptable for publication. Main comments are listed below.

1) A general effort of editing should be carried out to clarify some passages and improve the readability of the manuscript. On the enclosed copy, I marked statements that need to be corrected and/or rephrased, reporting some suggestions, for which, however, the authors should verify that correctly reflect what they meant.

2) The geological setting of the study area seems to be too poorly illustrated: an at

least schematic map of the study area geology should be provided.

3) With regard to the statements of lines 156-159, it is unclear to me why an angle of 45° + 1/2 of friction angle was assumed as representative of sliding surface inclination on slopes where DEM provides angle greater than 60°. Clarification would be desirable.

4) At lines 197-199, the authors declare that the critical acceleration was found to reach, in the study area, a maximum of 14 g in areas of lower susceptibility. This maximum seems to me meaningless for the context of a dynamic slope stability analysis. It could be reported that the areas with lower susceptibility are those with critical acceleration greater than 1 g.

5) At lines 262-263, the authors state that "most of the actual triggered landslides lie in the higher confidence-level areas with CF values greater than 0.60". It would be desirable to have a more quantitative information at this regard: what is the percentage of such landslides?

6) In my opinion, Fig. 15 is poorly significant. The certainty factor CF and the proportion p(H/E) occupied by landslides within areas falling in Newmark Displacement bins are two quantities uniquely related to each other, once the "a priori" probability p(H) is fixed, through the equations (9) and the corresponding inverse functions reported on Fig. 15. Thus, the perfect fitting of black dots along the red curve depends merely by the fact that the black dots are randomly selected samples of the red curve itself. More significant would be to show how CF values are related to the Newmark Displacement values Dn, as Jibson et al. (2000) did for the proportion of landslide cells, corresponding to what is here defined p(H/E), plotted versus Dn. In that study, it was this relation that was modelled through a Weibull curve, whose coefficients were derived by regression (see Fig. 14 of the cited paper). A similar plotting of CF as function of Dn would make possible to evaluate the consistency between these two quantities. Thus, one could obtain hazard estimates also for a seismic scenario

different from the one used in the present study, once, following the same procedure described here, the Dn values expected for the new scenario is calculated.

Please also note the supplement to this comment:
https://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2019-274/nhess-2019-274-RC1-supplement.pdf

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