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Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Temporary confined water responsible for triggering the landslide of a piedmont gentle slope in Ningzhen Area, China" *by* Shulan Guo et al.

Anonymous Referee #2

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General comment

The manuscript deals with apotentially interesting cas study of a landslide driven by the temporary build up of pressure in a gravel layer itnterbedded between the bedrock and an overlying clay layer with much smaller hydraulic conductivity. The manucript is correctly structured, the English langauge is poor, and should be revised with the help of a native speaker, but ithe manuscirpt is anyway understandable. In spite of the interesting case study, which could be of interest for part of the readership of NHESS, th manuscript suffers from many issues, related to: the description of the study case; the mathematical modeling; the interpretation of the results. All these issues make the

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drawn conclusions too weak, and so I regret to recommend rejection of the manuscript in its present form.

Detailed comments (more can be found in the attached annotated manuscript)

The description of the scientifiic context which this study belongs to is incomplete. The literature review is poor, and some of the cited papers seems not relevant to the studied type of landslide.

The description of the case study lacks much information: the slope is poorly described; the installed monitoring sensors are not described at all; the description of the supposed failure mechanism is confuse and unclear.

The interpretation of the monitoring results is triviial: aruing that an increaseof pore water pressure under the destabilized layer strongly contributes to the failure is obvious. What is less obvious, and should be the focus of he study, is why water easily infiltrates into the coarse layer, but it is not drained out wih the same easiness. The reason for this cannot be searched in the characteristics of the rianfall (intensity and duration), nor in the hydraulic conductivity of the gravel (in fact, it controls both infilration and drainage), but rather on some feature of the hydraulic boundary condition at the toe of the slope, which can be related to the geometry and/or to some factor external to the gravel layer. Here the authors completely miss the chance of making this study really novel and interesting, aas they completely neglect the drainag mechanism, both in the intepretation of the esults and in the (following) mathematical modelling exercis.

The mathematical model is not clearly described: the hydraulic boundary conditions are are only partially specified, and in the end it is not clear how water gets in and out of the modelling domain. Although somewhere in the paper it seems that the authors would link the release of the pressure (also 9 to the deformations of the soil, the model seems to be developed in the hypothesis of rigid soil (although also this information is not explicitly given).

The results of the model simulations are quite far from the observed evolution of the landslide: the maximum predicted pressure is half the observed, although the simulations have been carried out with rainall events much more intense than the observed, and with a conductivity of the gravel much smaller than what is declared. Given the lacking information about the model, it is difficult to understand the reason for these-large discrepancies. I guess that something about the boundary conditions, controlling the rate of infiltration and drainage from the system is completely missing in the model.

Finally, the drawn conclusions are quite obvious, and indeed it could not be different, given the neglection fo the most interesting features of the studied phenomenon. The authors come ou with some ideas for stabilization measures, also quite bvious, as they suggest to avoid too much water entering the gravel layer, and to extract water to facilitate the drainage of water already entered.

Please also note the supplement to this comment:
https://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2019-404/nhess-2019-404-RC2-supplement.pdf

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