

Interactive comment on “Quantitative assessment of rainfall-induced landslide susceptibility in new urban area of Fengjie County, Three Gorges area, China” by Haijia Wen et al.

Anonymous Referee #2

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The paper deals with an interesting topic, quantitative assessment of rainfall-induced landslide susceptibility at regional scale. Yet the paper has many major flaws and therefore it should be, in my opinion, rejected.

Major comments

The data and the results are not presented in a clear and well-structured way.

The method proposed by the Authors is not clear. In the Abstract they state the methodology is based on a “combination of mechanical stability analysis and artificial neural network (ANN) and of Geographic Information Systems (GIS) and detailed field investigation”. At the end of the introduction they state “The study develops an infinite

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stability model using Geo-studio software concerning rainfall infiltration to obtain safety factor for individual slopes, then combining the calculation results with artificial neural network (ANN) to figure out the relationship between influencing factors and potential landslides, based on the trained model, using GIS, a landslide susceptibility assessment map could be made”. Yet they do not clearly explain, in chapter 3, how the various parts of the procedure (i.e. data from field investigation, stability analyses, ANN, susceptibility mapping) work and interact. The hypotheses of the various analyses performed are not stated.

Concerning the data from the field investigation, how are the ranges of values presented in Table 1 retrieved? How did the Authors derive the 30 combinations of values reported in Table 2? Where do the original data come from? Are they representative of the field conditions in the whole study area or only in the areas where landslides occurred? For instance, the unit weight and the strength properties (extremely large ranges are reported for the cohesion and friction angle values) are representative of what type of soil/rock? How may landslides are there in the study area and in what type of soil/rock do they occur?

Concerning the stability analyses, are they conducted considering an infinite slope schematization (as written in page 3, line 6 and page 4, lines 19-20) or a boundary value problem in 2D (as one may infer from the fact they use the Geo-studio software)? In the latter case, what's the geometry of the considered slope(s)? The Authors do not provide any detail on the schematization of the slopes and on the shape and position of the sliding surfaces. What's the meaning of the 30 factors of safety computed (Table 2) in relation to the slopes and landslides present in the study area?

Concerning the ANN and susceptibility mapping, is the data from Table 3 (derived from Table 2) the only data used to train the ANN looking for a relationship between the six so-called “influencing factors” and the safety factor? If so, what's the significance of the trained ANN in relation to the slopes and landslides present in the study area? How were the FS values computed with the trained ANN converted into the five reported

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classes (Table 6 does not report any range of values for FS)? What are the landslide data used for validation, years 1998-2014 or 2006-2014? In the paragraph starting at the end of page 7 the Authors state “after the impounding of Three Gorges Project in 2003, the environment in Fengjie has experienced large changes, thus the bank slopes would have a fair chance to slide owing to water-level rising .. It would be more convincing to use landslide data after 2006 to verify feasibility of the susceptibility assessment model.” Does it mean the trained ANN is valid only for conditions in the study area successive to the impounding of Three Gorges Project in 2003? It appears that the Authors believe there’s a role played by the reservoir level. If so, it should have been considered in the analyses.

Some of the sentences in the discussion seem to disprove the relevance of the obtained results, e.g. “Our work did not take the water-level rising effect into consideration as there exist problems to quantify the effect. Hence it should be more careful when applied the rainfall-induced landslide susceptibility model in the study area. .. Due to the uncertainty lies in rainfall patterns and slope properties, it is difficult to precisely predict a landslide, and the slope failures may not in accordance with the predictions.”

The use of the English language is not adequate.

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