

## ***Interactive comment on “Predictive analysis of landslide susceptibility in the Kao-Ping watershed, Taiwan under climate change conditions” by K. J. Shou et al.***

**Anonymous Referee #1**

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REVIEW “Predictive analysis of landslide susceptibility in the Kao-Ping watershed, Taiwan under climate change conditions”

K. J. Shou, C. C. Wu, and J. F. Lin

The paper is focused on the estimation of landslide susceptibility following two typhoons in Taiwan. In addition introducing a rainfall index as predisposing factors, the authors speculate on the impact of different rainfall scenarios on the susceptibility. Not all the figures are strictly necessary, one figure is wrong, legends contains grammar errors and colour schema are not properly used in maps comparisons. One of most

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important concern is the quality of the English, since many grammar errors occur. It is really difficult to understand some parts of the paper (e.g. section 3). Some parts needs to be much more descriptive to support conclusions. A deep language editing service is needed. The paper has a major problems: adopting a criterion for the landslide mapping that use slope as a variable, compromise the use of this variable in the susceptibility analysis (see specific comments for a greater detail). In conclusion for a proper analysis all the susceptibility assessment should be completely redone. In addition some the conclusion and not well supported by empirical evidences, or not properly justified. Please see the following for a greater detail.

COMMENTS AND SUGGESTION TO THE AUTHOR TEXT Page 576 Line 2 The sentence is not clear. Rephrase. Page 576 Line 7 Substitute “the study area” with “study area” Page 576 Line 24 Substitute “the study area” with “study area” Page 577 Line 8 Rephrase. Which model are you referring? Add a reference. Page 577 Line 10 Moved this detail in §2.3. Page 577 Line 21 Substitute “vibrant tectonic” with “tectonic” Page 578 Line 4 Describe briefly how you did use the “properly chosen threshold” to identify landslides. Basically, here you should explain the Table 1 criterion. Page 578 Line 8 Remove italic font from NDVI. Page 578 Line 24 Why you don’t use the correct slope thresholds? Another possible explanation could be the lacking of relative spectral normalization to make comparable the two images acquisition conditions, or better to make the mapping criterion “really” applicable in both cases. Please consider the implications of the above on the susceptibility analysis (see comments Page 579 Line 5). Page 578 Line 25 Please check the comments on Table 1. Given the above comments, last part is subjective conclusion and not supported by empirical evidences. Page 579 Line 5 Adopting a criterion for the landslide mapping that use slope as a variable, compromise their use in the susceptibility analysis: since you “filter” the territory by slope, you are conditioning (adding a bias) the training of the susceptibility model. Basically you are “deciding a priori” the importance of such variable in susceptibility modelling. Page 579 Line 5 Give some detail on the DEM you use in the analysis from which these variable are derived. Page 579 Line 7 Unclear. Rephrase the sentence. Page

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579 Line 14 Please be more descriptive, which is the possible reason? Page 579 Line 16 Not sure if “accumulative rainfall” is correct here. Please consider to use “cumulated rainfall”. Page 579 Line 17 Substitute “control factors” with “controlling factors” Page 579 Line 20 See comments Page 579 Line 16. Page 579 Line 22 This part to the end of the section is a bit confused. Rephrase. Page 580 Line 5 Check the sentence grammar (there are many grammar errors and some sentence are not clear) till line 12. Page 580 This section should be rewritten. Mathematic notation should be consistent (e.g. what is  $S_i$  and  $X_i$ ?). For a reader is difficult to understand the technique from this description. Probably you could cite the original paper and describe this part more generally indicating the general assumptions and advantages of the technique. Page 581 See previous comment also for this section. The last part of the section is probably valid for both the techniques. Put this in a new different section. Page 582 Line 16 Substitute “Kolmogorov-Smirnovest” with “Kolmogorov-Smirnov”. Which KS test did you use? Which distribution you considered. How did you use the standard error? Page 583 Line 3 Specify which GIS environment did you use. Page 583 Line 6 Split the paragraph in two or more sentences. Page 583 Line 14 What does “predictive” means here? Page 585 Line 19 This conclusion is weak. The larger susceptibility area is the results of using in the training phase an event inventory due to a much more severe typhoon affecting. Here is a conceptual problem: observing landslide maps overlapped to the susceptibility models, it seems that the Morakot typhoon solicited the entire basin, while the Krosa a smaller portion of the basin. This basically makes the susceptibility maps obtained for the two typhoon uncomparable. Page 586 Line 1 Check comment on Fig 11 Page 586 Line 7 How do you justify this choice? Page 586 Line 13 What do “major” mean here? Page 586 Line 16 Something missing here after “the more” Page 586 Line 17 Something missing here after “the more” Page 586 Line 17 These conclusions are weak and too much obvious. Here you don’t need maps, but just the susceptibility model equations. Provide additional information: e.g. how much is the increase in the percentage of the susceptible area, etc. . . Page 587 Line 11 Not clear. Rephrase. Page 587 Line 15 This is not obvious. Be more descriptive. Page

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587 Line 16 This is not obvious. You don’t need to add, but to create more significant training dataset

FIGURE Fig 3 Use “return period” in place of “recurrent period” in the legend Fig 4 Use “return period” in place of “recurrent period” in the legend Fig 5 Use “return period” in place of “recurrent period” in the legend Fig 6 Change “accumilative” in “cumulated” in the legend Fig 7 Change “accumilative” in “cumulated” in the legend Fig 9 To be comparable the two maps should have the same color legend (same color and ranges) Fig 10 To be comparable the two maps should have the same color legend (same color and ranges in this case from 0 to 1). Fig 11 The figure is wrong. Here the susceptibility maps are shown and not the roc plots. Fig 13 To be comparable the two maps should have the same color legend (same color and ranges). Use “return period” in place of “recurrent period” in the legend. Fig 14 To be comparable the two maps should have the same color legend (same color and ranges). Use “return period” in place of “recurrent period” in the legend. Fig 15 To be comparable the two maps should have the same color legend (same color and ranges).

FIGURE CAPTIONS Fig 2 Explain the meaning of L1 and L2. TABLES Table 1 Basically, you are using indices derived from a contingency table: eg the third column is the hit rate and given by the ratio of  $(TP)/(FN+TP)$  where TP are True Positives and FN the False Negatives. Please use here and in the rest of paper the appropriate statistical terminology. The last value of the last column is strange. Is it correct? To check this you could add also the four values of the contingency table TP, TN, FP, FN.

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