Hydrology and Earth System Sciences Discussions

Interactive comment on "Spatial pattern analysis of landslide using landscape metrics and logistic regression: a case study in Central Taiwan" *by* Y.-P. Lin et al.

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Reviewer 2

1.The paper "Spatial pattern analysis of landslide using landscape metrics and logistic regression: a case study in Central Taiwan" by Y.-P. Lin, H.-J. Chu, and C.-F. Wu presents an application of landscape metrics and logistic regression to evaluate landslide susceptibility in a study area in Taiwan. The tools and the analysis proposed are potentially interesting in the field of landslide susceptibility and hazard assessment. Landscape metrics could be a new approach for the landslide research community but

unfortunately is very poorly described. The authors introduce several terms without giving a clear definition.

Reply: Thanks for comments. Several unclear terms such as landslide susceptibility and landslide patch were explained firstly and modified in the reversion. 1. The landslide susceptibility is the degree of stability based on the estimated significance of the driving factors in inducing instability (Anabalagan, R., 1992). 2. In landscape metrics, a patch of a given cover type (i.e. landslide in the study) is defined as a cluster of cells of the same cover type. Thus, the sentence was modified to 'landslide patch number.'

2.Several step of the analysis are poorly described. The authors never describe the type of landslides they have mapped in the study area. There is an improper use of the words susceptibility, hazard and risk throughout the paper.

Reply: The study discusses about landslide susceptible areas in a landscape scale, rather than local landslide types. To be consistent, 'risk' was changed to 'susceptibility.'

3.Some chapters are not useful to understand the analysis (for example the description of the logistic regression and of the ROC curve) and several statements are not supported by data.

Reply: Logistic regression was used to predict probabilities of landslide occurrence (i.e. susceptibility) by analyzing the functional relationships between driving factors and landslides. Moreover, the area under the Relative Operating Characteristic (ROC) curve was calculated to measure the explanatory power of logistic regression model (Pearce and Ferrier, 2000). In addition, the several statements which are not supported by data were explained or modified in the reversion.

4.The authors propose different models for "low-occurrence" and "high-occurrence" landslides but they do not explain the rational and/or the motivation for this choice. The information on the temporal occurrence of failures should be exploited to evaluate the temporal probability of landslide and not to prepare different susceptibility models.

Reply: Eight landslide images were collected during ten years. Occurrence number = 4 was cut-off value in the study. Landslides are classified with the low-occurrence landslides (occurrence number 4) and high-occurrence landslides (occurrence number >4). Results show that landslide patch composition and configuration are various in high-occurrence and low-occurrence landslides across Chenyulan watershed. Landslide patches in low-occurrence landslide spread the catchment near stream channel while the high-occurrence landslide areas cluster near the ridge and stream channel. Based on this point, the different models should be prepared.

5.The quality of the paper is quite scarce: is poorly organized, presents several mistakes, errors and unclear sentences. The text should be revised by an English speaking person. Other comments are reported throughout the text in the attached document.

Reply: We restructured introduction, method, and results in the reversion. Moreover, grammatical and writing style errors in the original version have been corrected by our colleague who is a native English speaker.

References Anabalagan, R., 1992. Landslide hazard evaluation and zonation mapping in mountainous terrain. Eng. Geol., 32: 269-277.

Pearce, J., and Ferrier, S.: Evaluating the predictive performance of habitat models developed using logistic regression, Ecological Modelling, 133, 225-245, 2000.

Please also note the supplement to this comment:
http://www.hydrol-earth-syst-sci-discuss.net/7/C1210/2010/hessd-7-C1210-2010-supplement.pdf

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