Natural Hazards
and Earth System
Sciences

Discussions

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Interactive comment on "Landslide susceptibility analysis by means of event-based multi-temporal landslide inventories" *by* C. M. Tseng et al.

Anonymous Referee #1

The authors mapped landslides induced by four typhoon rainfalls in Taiwan and examined the relationships between their distribution and related factors, lithology, elevation, slope, slope aspect, landform, vegetation, distance to geological structure, and distance to stream. They found that lithology, slope, elevation, and vegetation are the most important factors to estimate the landslide susceptibility and proposed the methodology of landslide susceptibility mapping. This paper would be interested by the readers of the NHESS but I think the following issues must be cleared. 1. The effect of rainfall amounts on landslide occurrence must be described and discussed, because rainfall amounts are probably different within the study area. 2. Relationships between slopes and foliation attitudes must be referred, because they have strong effects on the occurrence of landslides instead of distances between slopes and lineations that is not

specified. 3. There are some papers that rock avalanches are preceded by gravitational slope deformation. I suggest the authors to refer to these papers and discuss briefly why they have not included that factor to evaluate landslide susceptibility.

P1140, L23-24: Baye's theorem needs a reference. P1140, L25: I do not understand the meaning of "to map four different rainfall scales…inventories." P1141, L14-L16: The ages of the rocks must be referred. Gravel and sand seem to be riverbed deposits, which must be mentioned. P1142, L 10-L11: NDVI needs a reference. P1142, L16-L19: The authors say that scars of deep-seated slides are included. If so, it would be better they mapped landslide scars or rock/debris avalanches rather than shallow debris slides. P1142, L24-L26: I wonder the averaged cumulative rainfall means the average in the study area or not. I think the distribution patterns of rainfall amounts need to be referred, because they must have influenced landslide occurrence. P1143, L27 – P1144, L1: redundant. P1144, L1-L2: Landslides also occurred in metasandstone areas, and only sand and gravel areas had much less numbers of landslide, which suggests that riverbed had few landslides. P1144, L9-L10: I think rainfall distribution is more important than the wind and rainfall direction. P1144, L20-P1145, L2: Slope aspects of landslides must have relationships with the attitudes of foliations, so this point must be discussed. P1145, L6-L7: I do not see that a large number of the landslides were in the area of the interval 1400-2000 m. P1146, L1-L2: The authors must describe the geological structures to be considered in the study area, because I see only a word of lineation in Figure 4. P1146, L12: To measure the distance between a landslide and a stream, definition of the distance is necessary. P1147, L17: AUC need to be spelled out and explained at the first appearance. P1147: Calculated parameters, like W+. W-. C, ln(Qf) need to be shown. P1150, L19: Landslides analyzed are not only small-ones but also large ones like Hsiaoling. P1151, L2: Is this threshold a rainfall amounts? P1151, L10-L11: When the aspects of landslides are discussed, the attitudes of foliation need to be included. P1153-1155: The description in the conclusions is redundant, because some are only repetition of what is written in the discussion. I suggest to make it more compact.

Figure 1: The numbers along the frame are too small to read. They seem to be special coordinates. I think degrees of latitude and longitude would be better. Figure 2: New formed landslides in the legend must be newly formed landslides or new landslides. Study area in the legend is not necessary. Table 2: It is strange that only 60 mm of rainfall brought by the typhoon Mitag induced so many landslides. The authors mention typhoon scale in the text, so their scales need to be added in the table. Figure 3: Slope (°). The symbol of the degree is odd. Stable area is odd in this category so it would be better to describe as area with a slope less than 5°. Figure 4: In the landform column, there are concave, straight, and convex types for valley, slope, and ridge, respectively. They must be defined in the text.

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