

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC2
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Comment on nhess-2021-409

Anonymous Referee #2

Referee comment on "Rapid landslide risk zoning toward multi-slope units of the Neikuihui tribe for preliminary disaster management" by Chih-Chung Chung and Zih-Yi Li, Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2021-409-RC2>, 2022

General comments:

This article presents a rapid risk zoning method together with an example in a small village in Taiwan. This qualitative approach to risk analysis can be a relevant approach to work with scarce data and this study could therefore be an interesting contribution to NHESS. However, the method is not sufficiently well described and does not seem to be appropriate. In addition, the text is not easy to read because of the language quality and the quality of the illustrations is insufficient. In my opinion, an extensive work is needed before this article could be published.

My main concern is the evaluation of the hazard. The hazard is evaluated here by combining a susceptibility and two activity criteria. The susceptibility analysis is based a method developed for deep-seated landslides (unfortunately only published in Chinese) defined as having a surface of at least 10 hectares but is applied here on a region that is around 20 hectares according to the text and about 10 hectares according to my measurements on Figure 1. In addition, the only example of landslide that is given is a landslide with a depth of 30-60 cm, so I doubt that the method developed for deep-seated landslides can be used here. It would be necessary to better describe the type of landslide that is considered to make sure that the method is appropriate. When it comes to the activity criteria, I do not really understand:

- why it is divided in two when there is a lot of redundancy between the two grades
- why the relation between the bedding and the slope is considered in the activity in addition to dip-slope being a criterion in the susceptibility analysis
- what cliff activity means. I assume that it refers to the scarp, but I am a bit confuse here about the landslide type that is considered. I assume those criteria were developed to be applied to evaluate an acceleration of slow-moving landslides.

I would like to see some examples of how those criteria are evaluated on the study area, especially since this analysis is done on aerial photos, while only low-quality images are provided in the article.

Finally, the method is presented as "initially validated" by showing that a landslide occurred where the risk has been identified as the highest. The reason for the risk to be the highest in that slope unit is mainly that it is one of the few where there are elements at risk, although the hazard is relatively high as well. The susceptibility is medium and the activity high, but does the activity include the landslide that is described? Anyway, it is difficult to validate such a method and another aspect that I would like to be discussed is the applicability of the method on a more regional scale. It is thought to be fast, but I suspect that it is relatively time-consuming, and I would therefore like to read more about the context in which it could be used and how it would perform compared to a more regional analysis.

Specific comments:

- I am not a native speaker, but I wonder if the word "Tribe" is really what you mean?
- l 33-67: there is a long list of articles, but I cannot really understand why they are listed here, how they relate to your work and what knowledge gap your study intends to fill
- l 89-93: the description of the area is quite confusing. For example, the last sentence states that "most residents have moved north..." but where were they coming from? And does Neikuihui belong to the Kueihui village?
- l 102 (and figure 2): you present two different formations, but the rock type is mentioned only for the Tatongshan/Tatungshan formation. Further details on the Aoti formation would be useful
- Figure 1: the map to the left lacks a scale and the north arrow does not correspond to the image on the right since its top points to the south. Also, the quality of the image on the right is not sufficient to understand what we are looking at. A map with buildings and roads would help the reader. I am also wondering if it is a perspective view.
- Figure 2: I assume this one is a perspective view. I am disappointed by the quality since you apparently have a 1m-DEM. Could you improve the quality and provide a hillshade? Also I don't think that the CS-map is very helpful
- Figure 4: The sizes of the slope units are very different. I wonder how it impacts the analysis.
- Table 4: I don't understand the "raw grades" and "adjusted grades" and why for example the class with "less than one household" (isn't that 0?) gets a raw grade of 3 and an adjusted grade of 9 when it should be 0 if there is no household. "Households 3 to 4" and "Households 1 to 2" should be renamed "3 to 4 households" and "1 to 2 households" respectively. "More than five households" should be renamed "5 or more households". The summation of grades gives a "low" level from 1 to 11, but if "less than one household" gives 9 points, then it can't be below 9. I think the exposure level should be 0 if there is nothing otherwise the method gives an "extremely low risk" when there is actually no risk
- Vulnerability analysis: the vulnerability analysis is based on the distance to the landslide, but how are the landslide source, run-out and deposition areas defined?
- l 217: The citation refers to an article describing a vulnerability index that is combining several criteria including the physical properties of the buildings. I do not see the

similitude with the method you are using

- Table 7: Slope unit 4 is considered a dip-slope, but only a tiny portion of it is inside the dip-slope polygon. I wonder if the polygon of dip-slope has been drawn at an appropriate scale for this analysis. Otherwise, is the slope unit well-defined? Or is the rest of the slope unit not a dip-slope because of a geological folding?
- Table 12: There are 9 households in unit 5, but 1-2 according to table 11... which one is wrong?
- I 341: what is the residential house No. 8. Do you mean a house in slope unit No. 8?
- I 395: JSPJ is mentioned in the author contributions, but is not a co-author