Natural Hazards
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Discussions

Interactive comment on "Study on the combined threshold for gully-type debris flow early warning" *by* Jian Huang et al.

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Review: Study on the combined threshold for gully – type debris flow early warning by Huang et al. (2018)

âĂČ 1 Summary of the paper

Huang, et al., 2018 implement an early warning system for gully-type debris flows, especially for the northern part of Qingping town, Mianzhu city, Sichuan province, southwest China. The authors attributed the recent occurrence of such mass movements in this region to the fact that the area was hit by an earthquake and heavy rainfalls over a short period of time. That resulted in the gully – type debris flows mentioned before. As a consequence, the authors developed a three-step warning system choosing the

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critical pore pressure and rainfall factors as their key parameters. Their system/model, which should be pointed out, is quite an accomplishment considering they developed and applied a new model from scratch.

2 Comments

To enable an easy overview, these comments are divided into a "minor comments" section and a "Content" section.

2.1 Minor Comments

Reading the paper it was sometimes hard to follow the thread since there were some structural in the paper under review by Huang, et al., 2018 in the methodology chapter. It not only contains methodological aspects but also the data analysis. That being said, the methodology chapter should end at line 144 and the data analysis should be put into a new chapter called e.g. "Results". The discussion chapter (starting at line 270) limits the application of said model to one specific gully, but in the introduction they suggested that they developed a model that was applicable for more than just the one gully. Maybe a change in phrase should be considered, since it is a little misleading for the reader. Even more so as they give an outlook that a broader application must be done in future studies. The same could be said for the abstract which leads the reader to believe that they indeed developed a model that is applicable for mountainous areas in general which in other ways is very well written and summarizes the paper well.

2.2 Comments on the Content

Given that it is indeed a new model and that its application is limited to southwest China at the moment, the question arises why the authors have developed it in the first place. There are several other models on slope stability as well as warning systems that should have been at least mentioned in the paper. The authors, moreover, do not give a reason why they have decided in favour of their specific model to calculate their parameters since there are several other models to calculate them and therefore

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Huang et al. should make their motivation clear. There is for example the SINMAP – Model (Deb & El-Kadi, 2009), a GIS -based model for example used in Hawaii in order to predict landslides or the even older TOPMODEL from 1979 (Beven & Kirkby, 1979) to account for the hydrology. On the other hand, the authors (Huang, et al., 2018) made it clear why a warning system for the south west part of China was needed, since the model's first and foremost application should be to save lives in the region.

As for choosing the critical pore pressure, the authors do not justify their preference of this parameter over, for example, the Factor of Safety or the critical soil depth (MEMPS – Model, (Michel & Kobiyama, 2016)) to estimate the debris flows. The application and presentation of their findings benefit from the large amount of data which were collected through their measurements but it lacks a specific figure/map overlaid with their model. That would have made it easier for the reader to see where the different warning levels had occurred.

2.3 Summary

All in all, the paper describes quite a new approach for estimating the danger of debris flows but it does not give a motivation why this specific model has been chosen and not other methods already published. On the other side, the authors of the study clearly stated why a model is needed. This should make a good basis for future studies on gully – type debris flows even though the use of the chosen model is still limited to testing the area described. On a positive note, it can be said that, the paper is also suitable for people that are not familiar with the topic and besides the methodology chapter being not that structured and the discrepancies between abstract/discussion on the one hand and the introduction on the other it is indeed very well written.

3 References

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