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Comment on egusphere-2022-772

Anonymous Referee #2

Referee comment on "Hazard assessment modeling and software development of earthquake-triggered landslides in the Sichuan–Yunnan area, China" by Xiaoyi Shao et al., EGUsphere, https://doi.org/10.5194/egusphere-2022-772-RC2, 2022

I have read the manuscript with interest. The paper develops a software for susceptibility assessment of coseismic landslides considering three stages after earthquake. The paper is well written, but I have some major concerns regarding the innovation and the method used by the paper.

I agree with the authors that rapid assessment of coseismic landslides is crucial to emergency response after strong earthquakes. The paper combined logistic regression and Bayesian probability methods in Matlab for assessing the spatial probability of landslides. Even the authors emphasized that there is no specialized software for seismic landslide hazard assessment, particularly in the various needs of different stages after a major earthquake, however, the methods they use are traditional methods, nothing new about the methodology itself. There are quite many existing toolbox or packages in ArcGIS, QGIS and R, which can be used for the same analysis as the authors did in Matlab. In addition, the three-stage methodology is just classified considering the different time window after an earthquake. The methods at all stages are the same. The only difference is adding more and more landslide data after an earthquake due to more available information with time, such as remote sensing images. At third stage, if we already know all coseismic landslide distribution by RS imagery interpretation, why we still need the susceptibility model? Even at this stage, you get high R2, it is because the overfitting of the model. It does not mean the model will have good prediction power for next event.

Major comments:

- Why the authors did not try CNN or other more advanced AI methods, which should have better performance than logistic regression and Bayesian probability methods?
- PGA and PGV are considered as the most important seismic factors, why the authors used intensity rather than PGA and PGV data? Besides, distance to river and distance to transportation lines are also important factors considering the river incision in mountainous regions and human work effect, why they are not considered in the

model?

- It is quite obvious that from Fig.4 that the actual landslides (black polygons) are not falling in high probability zones? The model seems not satisfactory for the first stage. Many landslides in all events are failing into blue (low probability zones), while the predicted high probability zones have a few landslides. This indicates that the model has quite high false alarms from prediction perspective. In the second stage, Fig.6, it still has the mis-matching problem. In the third stage, it looks better, but this is because as I mentioned above, the overfitting of model by using a large amount of known landslides. Actually the first stage, the rapid prediction using very limited or even no available landslide information, is most important one considering the emergency response and rescue work. The model's performance at this stage is not good.