Nat. Hazards Earth Syst. Sci. Discuss.,
https://doi.org/10.5194/nhess-2017-461-RC2, 2018
© Author(s) 2018. This work is distributed under
the Creative Commons Attribution 4.0 License.

Natural Hazards and Earth System Sciences
Discussions

Interactive comment on "Brief communication: Roads and landslides in Nepal: How development affects risk" *by* Brian G. McAdoo et al.

Anonymous Referee #2

Received and published: 2 March 2018

Summary This is a valuable piece of work that approaches the question of interactions between road building and landslides from a statistical perspective. This type of approach may be particularly useful in countries like Nepal where the physical processes may not be fully understood, due to issues such as informal road building and access to detailed data. I suggest that the paper should be expanded from a brief communication to allow more room to describe the data and methods so that others could attempt to repeat the analysis performed here, which would not be possible with the information provided at present. I have some concerns about the statistical approach used, which can most likely be addressed through a more detailed description which I outline below. Overall, I believe this paper will be a good contribution to the literature with appropriate medium level revisions.

Medium level comments:

Use of OpenStreetMap. Although I agree that OSM may be the most appropriate choice of data for an area where may of the roads are not 'official', I would like to know roughly how complete the authors feel OSM is for their area of interest. OSM can be highly heterogeneous in terms of spatial coverage and quality, so I would like to be assured there is no bias in the data (e.g., if one part of the study area has been mapped to great detail, and others have not, or roads have been traced reasonably accurately).

Landslide inventories used. In a statistical study like this, landslide inventory completeness will be key to fully understanding the spatial distribution of landslides. Please describe the methods used to create the inventories and give some indication of completeness.

Monte Carlo simulations. Please describe this process in more detail - e.g., how many iterations? Did you generate landslide areas, or just landslide point locations? If point locations, which part of the landslide do these correspond to?

Figure 2. I feel this figure should possibly be presented as a bar graph, or a clearer description is needed to explain the increments of buffer used. By using a continuous line to represent % of landslides at a given distance from the road, it implies that the total % of landslides adds up to more than 100%.

Random distribution of landslides. I am not convinced that landslides would be spatially randomly distributed within a given soil class. There is plenty of literature discussing how other factors such as topography control the distribution of landslides. I understand this is an assumption for the statistical model, but needs further discussion.

Distribution of roads. Similar to the above, I believe that the spatial distribution of roads will be linked to the landscape/topography. For example, are roads preferentially built in valley bottoms or ridges, or are they generally mid-slope? This may affect the number

of landslides that occur within a given distance of the roads. I would like to see some discussion of this in the paper.

Peak in landslide occurrence at 100 m from the road. I believe the finding that the distribution of landslides is different compared to a random distribution at around 100 - 200 m from the road is the most interesting finding from your work, but needs further discussion. What does it mean in terms of road building and physical process for landslide occurrence to peak at this distance from roads? This distance is considerably wider than the road plus the likely zone of influence either side (i.e., I would image that either side of a road, there would only be about 20 m maximum that is affected by road building).

Discussion and conclusion. Although interesting, the discussion and conclusion feel quite separate from the analysis, and do not particularly reflect on the findings. As mentioned above, a deeper discussion is required of why there might be a peak in landslide occurrence at a given distance. Following this, you can then go on to discuss this in light of road building policy.

Minor Level Comments:

I appreciate that it may be hard to find peer-review literature to support some of the statements made, but there are several places where there should be some citation. E.g., Line 46, 55, 67.

Line 43 'serves' should be corrected to 'services'

Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2017-461, 2018.