Reply on RC2

Joshua N. Jones et al.

Author comment on "Multi-event assessment of typhoon-triggered landslide susceptibility in the Philippines" by Joshua N. Jones et al., Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2022-88-AC2, 2022

The authors present an interesting and well-written manuscript presenting an analysis of typhoon-triggered landslides as input to susceptibility maps for two regions in the Philippines. The paper focuses on three separate typhoon events, two in one region and one in another, and discusses spatial and temporal effects on landslide susceptibility. Overall the reviewer thinks the manuscript is well written and explains the problem, method and conclusions in a clear and understandable manner.

Two general comments:

- The discussion about the accuracy of the Abuan model includes discussion on whether "something is better than nothing" with regard to susceptibility mapping. The reviewer thinks this is a very relevant comment, and should be highlighted in the conclusions of the manuscript. If the authors believe the input data into the model is not sufficient enough to produce a reliable susceptibility map, it should not be concluded that a new susceptibility map is produced, particularly when the region did not already have a map available.

Response – we will highlight this better in the conclusion and agree that it should be concluded that a map should not be considered produced and useable if the input data is insufficient. So we will make sure this point is clear in the discussion / conclusion.

- The aim of the paper was to use data from multiple typhoon events to assess typhoon-triggered landslide susceptibility in the Philippines. The reviewer thinks the topic of time-dependance is discussed sufficiently within the Itogon region, with analysis completed on two individual typhoon events and then a combination of the two events. These three models are then tested on the 2019 data from the Abuan region, with poor results (AUROC between 0,54 and 0,59 according to Figure 6 and 7). To the reviewer this seems that some discussion is warranted on the spatial dependancy, although it is mentioned in Line 574 that this is not the focus of the paper (but not mentioned or excluded from the paper in the introduction or abstract). If the focus of the paper is really only discussing time depenance, it may not be relevant to include the Abuan region, which is only analysed using one typhoon event.

Response – we do wish to retain the Abuan work as it is fundamental to some of the important discussion points about whether "bad maps are better than no maps". However, we agree that the introduction / abstract perhaps don't fully capture why Abuan is included, so we will update the introduction/abstract and other relevant places to ensure that the reasoning for including Abuan is clear – i.e., that whilst it is only based on one event, it gives some preliminary insight into spatial dependency that could be further investigated in future work, and allows important discission on the importance of model input data and how this impacts "bad vs no models".

Specific comments:

- Section 2 general comment - There is a mixing of unit systems here. Amount of rain is listed in millimeters, while wind speeds are noted in mils per hour.

Response – will change all to SI units.

- The accuracy of the model from the 2009 typhoon was classified as "good/excellent", and the combined 2009/2018 model as "good", are there any complications with building a susceptibility model from a typhoon event which was described in Section 2.1 as influenced by the Fijiwhara effect, where the typhoon was impacted/worsened by a nearby typhoon?

Response – yes, there are likely some complications as it is hard to assess the specific impacts of the Fijwhara effect. We will add a few sentences to properly discuss how the Fijwhara effect might complicate the process.

- Line 227 - the reviewer thinks the toolbox in ArcGIS may be called "Spatial analyst", not Spatial Analysis.

Response – correct, this was a typo on our part and we will correct it.

- Line 286-289 - In point 4 it would be nice to mention what the other predisposing factors are. Here it is listed that three factors are categorical, but one must look to Table 1 to find the other factors.

Response – agreed, we will list all the other factors here to make it easier for the reader to know what they are from the offset.

- Line 443-447 - The figure caption for Figure 7 was challenging to read, with similar years being discussed. Perhaps make it more clear on the figures that a and b are using a different model year than c and d.

Response – we will update the figure captions / labels to make this clearer as suggested.

- Line 449 - the word "models" is missing after 2009.

Response – we will correct.

- Figure 8 - In the plot for e) Aspect, the reviewer does not understand why the distributions for the Itogon catchments have a peak at E/SE aspects, when the bar charts are approximately equal to the Abuan catchment data.

Response – The landscape distributions of aspect are similar in the Itogon and Abuan regions. However, in the Itogon case, landslides were found to predominantly occur at E/SE aspects. I.e. they were occurring in these aspects proportionally more than would be expected if their distributions were random. This is not surprising, as many factors such as thermal weathering, rain and wind direction etc, have been shown to cause landslides to preferentially occur at different aspects. Conversely, in the Abuan case, landslides were found to occur across all aspects, with seemingly no predisposition for landslides to occur at any particular aspect of slope. We will add a sentence or two to better explain this in the paper.

- Line 520-527 - The sentences discussing the three main zones (core zone, middle zone and peripheral zone) are not really sentences and are slightly challenging to read. Consider restructuring.

Response – we agree that these sentences aren't the easiest to read and will re-structure them.