

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC2
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Comment on nhess-2022-77

Anonymous Referee #2

Referee comment on "Estimating the likelihood of roadway pluvial flood based on crowdsourced traffic data and depression-based DEM analysis" by Arefeh Safaei-Moghadam et al., Nat. Hazards Earth Syst. Sci. Discuss.,
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Summary

This study utilized crowdsourced flood reports from Waze along with storm events and topographic data to build a statistical model for pluvial flash flood frequency and flood likelihood. Empirical Bayes (EB) model and Random Forest (RF) models were compared for this purpose. EB was found to outperform RF in identifying flood locations. The objective of this paper is interesting and would be helpful in improving knowledge. However, the manuscript is not well organized and requires some clarification to be ready for publication.

Comments

- The manuscript is difficult to follow. There are pieces of information on the same thing throughout the manuscript rather than organized in the same section. As a result, I had to read back and forth to get a clear view. For example, depression extraction is described in Sections 2.1.1 and 4.1 storm event clustering is described in Sections 2.1.4 and 4.2. It would be easier for the reader to follow the methodology if the information were presented concisely and organized.
- Section 2.1.1: It is vague how depth extraction was used to find flooding that can cause travel disruption. Was the depth of depressions at L2-1 and L2-2 considered to determine if there was any impact? The depth of flooding at the different levels of depressions is not mentioned in the manuscript.
- Crowdsourced flood reports like Waze often have multiple reports surrounding a flooded area for the same event. There was no mention of removing duplicates in the manuscript. Not removing duplicates could falsely increase the probability of flooding on a depression.
- Line 427-431: The comparison is not clear. Equation 11 used " $y_{i,j}$ is the predicted number of floodings on depression i and storm type of j ". Isn't the predicted number of

flooding derived using historical flood reports? In that case, the likelihood of flooding should be higher when there were Waze reports. If the purpose is to evaluate model performance in predicting flood probability, some performance metric should be used.

- Line 437-440 and Figure 16: This part needs further clarification. The probability of flooding and jam could be shown on two maps, if they are overlapped. Jam level 3 is not clear on the map. Please consider changing the color. The jam during the storm event should be compared with the jam during the same time and same days to conclude it happened due to the flooding.

Minor Comments

- Line 22-23: This sentence should go to the last paragraph of Introduction. The first paragraph in Introduction usually provides a general background of the problem rather than specifying the goal of the study at the very first sentence.
- Line 126: "L2 1" or "L2-1"?
- Table 2. There is no definition of the storm clusters until Section 4, line 376.