

Interactive comment on “MobRISK: A model for assessing the exposure of road users to flash flood events” by Saif Shabou et al.

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Dear Reviewers,

We would like to thank the reviewers for their thorough analysis of our manuscript and very constructive comments. Based on both reviewers comments, we revised the paper entirely to address the concerns related to the English and technical language.

Below each comment the answer is displayed starting with an arrow (the response is also included as a pdf document). We respond to each comment of the reviewers and refer to the portion of text that was modified or added in the revised manuscript. The revised manuscript including all the figures shows in red the corrections in the text and is submitted as a separate pdf file (supplement material).

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Answers to Referee #1 comments

General Comment: This paper introduces a new microsimulation system for estimating exposure of drivers/travellers to flooded roads during flash flood events. The system builds on a physical model for understanding and quantifying the vulnerability of certain road segments to flash floods using different classes of risk. Furthermore, the system includes other components regarding the road network's and road users' characteristics. The authors acknowledge that this is an early attempt to address this pressing topic and provide an insightful discussion on how this modelling approach can be improved in future research. The manuscript is technically sound and is generally well written. The reviewer has a few suggestions for improving and revising the manuscript. The reviewer suggests that the article be 'accepted with minor revisions'.

Specific Comments: 1. The paper needs a discussion on how such a model can be validated with real-life data.

=> This discussion has been introduced in a new section called "Discussion and perspectives" L24-25 p19 and also in the conclusion L11-16 p21.

2. A discussion on potential practical applications of the model is also needed.

=> This discussion has been introduced in the last paragraph of the conclusion.

3. The authors can expand the discussion of "road-cuts". This is similar to the "low-water crossing" term used in some parts of the US. Also, road flooding is not necessarily at the intersection of a road and a stream.

=> To clarify this ambiguity and the fact that the proposed study only focuses on road-river intersections that are sensitive to flooding the following note has been added to L9, p8:
Even though the points exposed to flooding may be of 3 distinct types: river crossings, low accumulation points and river adjacent points. Low points and river bordering points are much more difficult to identify as they are mostly due to very local settings that are not detectable on the DTM (Versini et al., 2010). Therefore those 2

types were not considered in Versini's work and in the study presented in this paper.
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4. Fatal accidents occur at road-cuts only when water level and velocity would cause a vehicle to be washed away. This is not highlighted.

=> This precision has been mentioned in the first paragraph of the introduction.

Technical Corrections: 1. Page 1, Line 17: Better use "enable prediction of the sequence of activities performed by individuals and locating them . . .". 2. Page 1, Line 18: Better use "MobRISK microsimulation system: a model. . .". 3. Page 1, Line 23: Better use "The results show that risk of flooding mainly exists (or occurs) in. . .". 4. Page 5, Line 10: Better use "section 5 discusses the results and provides insights (ideas). . .". 5. Page 7, Line 4: Better use "they have some differences regarding the activity. . .". 6. Page 7, Lines 16, 17 : Define SpatiaLiTE and SQLiTe. 7. Page 9, Line 6: Better use "also called Optimal. . .". 8. Page 9, Line 8: Lesnard et al., 2009 not on the reference list. 9. Page 11, Line 20,21: Better use "The more important the probability of crossing submerged road cut is, the higher is the individual exposure". 10. Page 13, Line 13: Better use "Similar to ANOVA test. . .". 11. Page 14, Line 2: Use male and female or men and women. 12. Page 17, Line 13-15: Better split into two sentences. 13. Page 18, Line 18: Replace "several perspectives for future research remain" with "several issues need to be addressed in future research. 14. Page 18, Line 28: Better use "future efforts are needed...". 15. Page 19, Line 5: Better use "This underestimation. . .".

=> All the technical corrections suggested have been addressed according to the referee's suggestions.

Please also note the supplement to this comment:

<https://www.nat-hazards-earth-syst-sci-discuss.net/nhess-2017-21/nhess-2017-21-AC1-supplement.zip>

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Interactive comment on Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2017-21>, 2017.

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