

Nat. Hazards Earth Syst. Sci. Discuss., referee comment RC2  
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## **Comment on nhess-2021-345**

Anonymous Referee #2

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Referee comment on "Augmentation of WRF-Hydro to simulate overland-flow- and streamflow-generated debris flow susceptibility in burn scars" by Chuxuan Li et al., Nat. Hazards Earth Syst. Sci. Discuss., <https://doi.org/10.5194/nhess-2021-345-RC2>, 2022

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The manuscript deals with assessment of the debris flow hazard in burned areas through simulations that used high-resolution weather radar-derived precipitation. The manuscript has several interesting points, and overall is well written. It is certainly worth to be considered for publication, but I have a couple of points which need to be clarified.

The first (and main) one regards the terminology used. I am afraid that, throughout the article, the term hazard is not used correctly. In my opinion, Authors are rather talking about susceptibility, and not hazard, the difference being that hazard should depict the probability of occurrence of a certain phenomenon not only spatially but also temporally. This latter issue (time) is not considered in the study. I suggest go back to the original definition by Varnes (1984) and UNESCO, and in later works as well, to clarify the meaning of susceptibility and hazard, and to change accordingly the terms in the manuscript.

Another point which needs more details is the description of the debris flows. Authors talk about several debris flows that occurred, and start to cite them in section 2.1. However, a clear description of the events, in terms of geology, morphology, morphometry, volumes is never properly given. This should be done the first time debris flows are mentioned (possibly in section 2.1) to let the reader understand the main characters of the events. For instance, were these debris flows individual phenomena, or did they start from multiple source areas? Further, were they channelized or open slope? More geomorphological info would be useful to understand the conditions under which the debris flows initiated and developed. Only at page 18 some info are provided, but these should appear much before than that, and be well organized, rather than distributed in different parts of the manuscript.

Other issues:

Figure 1 definitely needs a location map, showing where we are in California, and in USA. Authors give for granted that anybody knows the site, but for an international journal a location map is always necessary.

Throughout the manuscript, references should be listed in chronological order when more than two references are cited.

Some incomplete or wrong references are present in the list. Please check at this regard the attached file.

Eventually, some minor issues are indicated in the accompanying file.

Overall, I evaluate positively the manuscript, which however needs to clarify the points outlined above, and recommend minor revisions.

Please also note the supplement to this comment:

<https://nhess.copernicus.org/preprints/nhess-2021-345/nhess-2021-345-RC2-supplement.pdf>