Comment on nhess-2021-47

Anonymous Referee #1

Referee comment on "Rapid assessment of abrupt urban mega-gully and landslide events with Structure-from-Motion photogrammetric techniques validates link to water resources infrastructure failures in an urban periphery" by Napoleon Gudino-Elizondo et al., Nat. Hazards Earth Syst. Sci. Discuss., https://doi.org/10.5194/nhess-2021-47-RC1, 2021

General comments:

The paper by Gudino-Elizondo et al. entitled "Rapid assessment of urban mega-gully and landslide events with Structure-from-Motion techniques validates link to water resources infrastructure failures" analyzed the effectiveness of SfM photogrammetric techniques for rapid erosion assessment following water resources infrastructure failures (WRIF) events that affected the Urban development in Tijuana, Mexico. The study monitored for a five-year period three hazardous mass-movement events including two mega-gullies and one landslide and evaluate the significance of WRIF events with respect to mass movement hazards and sediment budgets at neighborhood- and watershed scales.

Overall, this is an appropriate subject area for NHESS journal, and the amount of data collected is very important from a risk monitoring and prevention perspective. However, this work should try to better illustrate the application of the photogrammetric technique to the case of study, adding some aspects related to data post-processing and error assessment. I believe that this paper has great potential and interesting aspects that could be improved to make it more appealing to a reader. It requires an upgrading, maybe assessing the limits and errors associated with the used topographic techniques and the comparison with other technologies and studies in terms of gullies and landslides monitoring. With some improvements, this work can be interesting and useful for the scientific community.

Specific comments

- Abstract: I suggest rewriting it to make it more attractive to the reader perhaps emphasizing the innovative aspect of this work and the usefulness of these results in terms of the mitigation of WRIF hazard problems.
- Introduction: this part should be underlined the innovative aspects of the work, motivated the choice of technologies used for the surveys, and highlighted the usefulness of the data obtained.
- Methods:
    - A GoPro 3+ camera was used to carry out the SfM surveys, but it was not shown

how the problems related to image distortion were solved given the use of a fisheye lens with a flight altitude very high.

- Where are GCPs/ECPs located in the study area (a figure could be added about this)? Are the errors related to ECPs referred to the DSMs? and the errors related to point cloud?
- Are the difference of DSM (DoDs) thresholded to account for the errors or do they represent raw differences?
- It would be useful to add more information about the SfM workflow, in particular, the post-processing of the point cloud (e.g. filtering, errors) through to the DSMs.
- Has the problem of co-registration of point clouds been considered in making multi-temporal DSMs?

Discussion: misses an in-depth analysis on the problems and errors caused by the technologies used, how to improve these aspects, and a comparison with other works using the same techniques.

Technical corrections

- Figure 1: It would be better to put someplace names in the background to better identify the position of the catchment because it is not clear where it is located. Or put an image with its location on a larger scale next to it.
- Table 1: Use UAV or UAS, not both because it is confusing for the reader.
- Table 1: I would avoid entering "RMSE of ECPs" here, which should be reported in the results.
- Line 123: "the difference DSM" > it is better to use the acronym DoD, which is widely used in this context of multi-temporal surveys.
- Lines 175 and 180: I think the reference should be to Figure 2d.
- Figure 2: What is the purpose of Figure 2c? is not explained in the manuscript.
- Figure 2: here and in other captions the word DEM is used instead of DSM. In order to be consistent in the manuscript, it is good to specify the type of digital model used and always indicate it in the text.
- Lines 191 and 194: should be moved to the discussion section.
- Figure 3: It is not clear what the blue stars refer to. A legend is needed.
- Line 221: the citation of Figure 4d, I don't think is located in the correct place and it is still not clear what the blue star in the figure refers to.
- Line 228: after 'DSM' perhaps Figure 4b should be mentioned?
- Line 234: Figure 4a should be mentioned before the others (Figure 4b, c, d) in the text. Remember that order matters.
- Table 2: is not very clear. A better division between data measured in the field and estimated by the model would be better (not by indicating simple asterisks).
- Table 3: sediment units are missing in columns 2 and 3.
- Line 379: here the word DEM is used instead of DSM. It is better to choose which term to use throughout the manuscript.