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Discussions

Interactive comment on "Pre-disaster mapping with drones: an urban case study in Victoria, BC, Canada" *by* Maja Kucharczyk and Chris H. Hugenholtz

Anonymous Referee #2

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The use of drones for natural hazards damages evaluation is a well-known topic. It is important to point out that there is a special issue published on NHESS dedicated to UAV and natural hazards, I think that authors can find several interesting suggestions considering the published revision paper or the others. Another revision paper has been published by Gomez, C. and Purdie, H.: UAV- based Photogrammetry and Geocomputing for Hazards and Disaster Risk Monitoring – A Review, Geoenvironmental Disasters, 3, 1–11, 2016. Page 3 line 20: the use of nadiral acquisition (both by drones or planes) can be critical in urbanized areas. In Giordan et al 2018, (see comment on chapter 4.2) the effect of damages caused by a flood was defined using a mixed approach based on drone and terrestrial acquisitions. Page 4 line 15 "The RTK/PPK

image georeferencing capabilities of the drone replaced the need for ground control points (GCPs), which are not practical to distribute and survey in an emergency mapping context." This is not correct. The RTK/PPk correction improves the accuracy of images acquisition points. The number and the needs of GCPs depend on the required accuracy of the SFM results. During the mission planning, it is possible to have an estimation of final accuracy and decide if GCPs are required or not. For fast acquisitions, often GCPs are not required, but for a pre-event acquisition, the required accuracy should be high, and I do not think that it is possible to avoid GCPs. Page 6 line 10: In my experience, this is not the correct way to operate. The first step is the check of the right alignment of surveys. This can be done in particular using large plane areas (like car parking). Then you can compare buildings or other structures. The validation of the right position of DTM is mandatory to be sure that all used DSM are correct form the geodetic point of view. In an exercise like the one presented by authors, they could easily use as a sequence of Ground checkpoints to assure the accuracy of the obtained DSM. These checkpoints can be acquired using natural or artificial elements like (manholes) also after the UAV acquisition. To be rigorous, authors should present a more detailed study of the accuracy of the obtained DSM. This is a crucial point because the accuracy of the DSMs comparison is a function of the accuracy of used DSMs. Chapter 2.6 it is not clear which is the goal of this chapter. Using nadiral images for facades is not correct, and this is not a novelty. Authors should clarify better if the final goal is the identification of damages comparing the geometry of roofs or the study of facades. Authors should present the metadata of 2013 LiDAR before using it as a benchmark like the number of acquired points per meters, the accuracy of the survey, and the density of DSM point cloud. In particular, the DSM density is an important data. If the LiDAR density is not adequate, how authors can be sure that they comparing two points acquired in the same position or they are comparing a surveyed point and an artifact?

Chapter 4.1 the presented "key lesson 1" is quite trivial. Authors presented obvious data for people familiar with LiDAR and drones DSM. Several critical issues are quite evident in this chapter: the most critical point is the a priori definition of LiDAR resolution and accuracy using García-Quijano et al. (2008). The final resolution of LiDAR surveys is a function of many parameters, like the point density, the flight velocity, the post processing accuracy, and many others. In this paper, authors never mentioned the characteristics of the available LiDAR survey. Another important element is that without the acquisition of checkpoints, authors are not able to define the accuracy of their UAV DSM. I think that this lack of information cannot be accepted in a scientific paper. Page 10, line 5. The presence of differences in the geometry of several houses in the studied area could be useful for better development of the DSM comparison methodology. Using the comparison of DSM an images to check the first results, authors can be able to distinguish damages from building modifications. An improvement of the presented approach and the definition of an effective methodology for the recognition of damages can be an essential add value for this work, and it can also reduce the need of a continuous update of the DSM, which can generate a strong improvement of cost with a limited benefit. The only real result presented in chapter 4.1 is the difference between the results obtained by pix4d using the “rapid” and “full” point cloud. In my opinion, this cannot be considered an adequate result.

Chapter 4.2 the presented “key lesson2” is focused on an interesting point. The nadiral acquisition of an urbanized area is not enough for the correct reconstruction of facades. Giordan et al. (Giordan, D., Notti, D., Villa, A., Zucca, F., Calò, F., Pepe, A., Dutto, F., Pari, P., Baldo, M., and Allasia, P.: Low cost, multiscale and multi-sensor application for flooded areas mapping, Nat. Hazards Earth Syst. Sci., 18, 1493-1516, 2018) published a multi-scale approach aimed to detect and measure damages on facades. The approach is different, but the topic is important for a correct estimation of damages. One of the problems of this article is the organization. If the authors want to analyze facades, they have to introduce this topic in advance and propose a possible methodology. The publication of a sequence of well-known limitations cannot be considered sufficient for an international scientific journal like NHESS.

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