

Interactive comment on “Monitoring snow depth change across a range of landscapes with ephemeral snow packs using Structure from Motion applied to lightweight unmanned aerial vehicle videos” by Richard Fernandes et al.

Anonymous Referee #1

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This work presents an interesting dataset of almost sixty UAV acquisitions to estimate the error under different terrain and snow conditions. Despite there are several works already published on this topic, the authors address interesting questions not very analyzed so far and the work deserves publication once some questions will be considered in a revised version.

In my opinion one of the most interesting things of the paper is to use the high number of acquisitions to relate the impact of snow conditions (mainly snow fresh and icy conditions) on the density of point clouds and the error on SD estimation. However,

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I think that this effect should be presented in a more quantitative way than is done in the manuscript. The information presented in Figure 7 could be used for more detailed analyses and to provide mean and dispersion values for fresh snow, icy conditions and “other days”. Perhaps this could be presented in box-plots being complemented with a statistical test to confirm whether the error under the three different conditions belong to a same population. In addition to the density of points I would present the same for the error in snow depth estimation. I would also consider to compare obtained errors with wind speeds during the missions, as far as I know, this has not been addressed yet in literature in detail and your dataset is nice for this purpose.

Why does Figure 13 exclude snow fresh and icy conditions? I think they should be also included or at least to evaluate what happens when they are also included.

Other point that can be considered is that most of the plots referred to errors are based on the snow depth differences between consecutive days, and the discussion mentions that future research should focus more on this than in total snow depth. I do not fully agree in this statement, since differences between days are interesting for many purposes, but most of the snow research in areas such hydrology or glaciology (for mass balance) is more interested to have a total estimation of snow depth rather than analysing in detail changes along a snow season. Thus, I would give same weight in the results to show errors for snow differences and total snow depth estimation.

In general, the paper is written very clearly but in my opinion the figure captions are very difficult to be understood by themselves, I would consider to have a look them and add the text necessary to facilitate its understanding.

When the equipment is described, there is indicated the resolution of the camera but not about the size of the sensor and their distortion parameters, I would mention about this as probably it is more important than the resolution itself. Was the distortion of the images corrected? I am not sure if this is related with points 4 and 6 of point 18. I do not understand exactly what is meant to say in those points. . . Hoping my comments

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will result useful

Interactive comment on The Cryosphere Discuss., <https://doi.org/10.5194/tc-2018-82>, 2018.

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