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Interactive
comment

Interactive comment on "A low-cost technique to measure bank erosion proces ses along middle-size river reaches" *by* Gonzalo Duró et al.

Anonymous Referee #2

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The paper covers mapping a 1.2 km long river bank using a low-cost drone and structure from motion, and a comparison of this method with airborne laser scanning and RTK-GPS data. I do find this to be an interesting topic relevant for those working with morphology, environmental assessment and measurements in rivers, and it shows the potential of using drones and photogrammetry to gain data for river analysis. The comparison between different methods is also useful and relevant for other similar data collection efforts.

The paper is introduced in the abstract mostly as an example of developing a low-cost drone and the SfM method to measure the bank processes. The authors have employed a commercially available drone and commercial available software for this process, which in practice means that you already have a low-cost technique readily

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Discussion paper

available. This is then applied here to a new problem, and I think the manuscript should be focused on what is new here from the many other applications of the same combination of drone/software.

Issues related to the SfM procedure is covered in detail in another comment, but in line with the previous comment I would also like to ask for some more discussion in the paper on:

- The linear placement of the GCPs and the effect this might have on the point cloud. The placement of the control points and the effect this has on accuracy beyond the control points, and this could be combined to a more through discussion. - Issues related to the selection of flight paths only in parallel with the river bank that was measured.

I also think it would be good to show the targets used to define the GCP (what was the size of the tile?), and maybe also a picture showing how these looked in the images from the drone and how they were identified in Photoscan since this is relevant for the accuracy.

Further on GCPs, on P12 there is a discussion on the GCP identification between tracks. It would be particularly interesting to see some more info on how well you think the accuracy of the GCP identification from pictures were for Track 1 were you see the GCP tiles at an angle in all pictures. To what extent do the identification of the tile centre influence the results.

P7 – Was the grid from the ALS automatically generated from the scanner software or did you make it from the 10 points pr. square meter measured by the instrument? If it was automatic, could generating a finer grid improve the ALS results?

P8 – Did you use automatic or manual settings for shutter speed, ISO, etc.?

P10 - Figure 3: A top-view perspective could be added to improve the understanding of camera positions.

P10 – Line11: How was the removal of trees etc. done?

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P11 – Table 2: Can you give a short explanation for the colour scale in the caption? Do the colour change for every 0.01 meters? I also think grouping mean and std.dev. together like it is done for the "all grounds" would be more readable also for Grassland, Bank and Terrace.

P13 – Figure 7 is hard to read. Is it possible to divide it into a panel with different sections of the bank in each panel to improve the readability of the figure?

P13 – Figure 8. I assume this is based on results after the removal of the data outside the GCP limit. How is the GCP limit defined?

P16 Figure 10a: Do I understand it correctly that the change of elevation of the flood plain is mainly caused by development of the grass?

P16: Figure 10. Would it be possible to illustrate the development here by also showing the images of at least some of the observations? The data presented in figure 10 is useful, but since there is both images and DTMs it would be interesting to see these processes and the basis for the development of figure 10.

P17-line 29: Can't you just write "A RMSE of 2.8 cm"?

P18 – Line19: Do you think GCP's at the bank toe would reduce the error? With reference to the previous comment on GCP placement and the further discussion on page 18, what was the rationale for the selected choice of GCP locations?

A last question just out of curiosity. Was the flight done in autonomous mode or under control? What regulations govern the use of small drones for research purposes in this area? I understand that this varies between countries and could be an issue in planning similar st