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Earth Surface Dynamics Discussions
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Interactive comment on "Quantifying uncertainty of remotely sensed topographic surveys for ephemeral gully channel monitoring" *by* Robert R. Wells et al.

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REVIEW OF THE PAPER "Quantifying uncertainty of remotely sensed topographic surveys for ephemeral gully cannel monitoring" by Wells et al.

GENERAL COMMENTS This paper presents an interesting comparison of techniques-methods used to produce high-resolution topographic surfaces from pictures and laser. These techniques are used to reproduce the surface of an ephemeral gully. I think the results could be of interest for a broad audience, as they will increase the available datasets testing several methods to produce high-resolution topography. Before that, I suggest some modifications that could be used to improve the paper before considering its publication. I would say that these are minor revisions:

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Discussion paper

1) I miss some important references in the Introduction and Discussion sections, are there other papers comparing terrestrial or aerial SfM to LIDAR-LTS? This, in my opinion, may be addressed in the introduction section. Additionally, the result of these works could be used to enrich the discussion. Other important point that should be considered is DGPS. GCPs measured by a DGPS are ensuring, probably, a centimeter-level accuracy, so I suggest considering this point in the interpretation of the results. 2) In general, I consider that the text of the manuscript is well-organized but in some parts of the work there are too many sections and sub-sections, I suggest integrating some of them and this would increase the readability of the paper. 3) I also miss some methodological details, please see my comments below. The order of figures and tables should be reviewed. References should be reviewed (see my comments below).

SPECIFIC COMMENTS

Title: I understand that ephemeral gullies are, probably, not visible in satellite images but the terms “remotely sensed” could let to think in the use of this kind of info, so I recommend modifying the tittle to clarify this point, I suggest using “High-resolution remotely sensed”. Abstract: Lack of standards in landform surveying is due, at least in part, to the variability, complexity, etc. of relief. Line 17, UAVs are not a technique more a platform, the technique is SfM or classical photogrammetry, so I suggest modifying this part of the abstract. In general for the text, when an acronyms is written, please, the first time when you use the extended form, use capital letters. INTRODUCTION L5: I guess you refer to Casali instead Casalli, by the way this reference is not in the reference list, please check. L11-14: I do not completely agree, LIDAR devices are now available to be the payload of a UAV so you can get great spatial-resolutions, on the other hand you can have the desired temporal resolution for LIDAR data, you just need money to pay for that, I suggest modifying the paragraph. L18: using multiple scan stations is not just for that, but more for avoiding shadows and normalizing the spatial resolution. L30: this paragraph does not flow with the rest of the introduction,

you start talking about point clouds but the reader could not know why you start discussing file formats, I suggest you start talking about the typical file format recorded by TLS, LIDAR and produced by SfM and later talking about the classical use of 2.5D file formats like DEM to represent surfaces. Equation 1: Does the ICP algorithm include the scale factor? I miss this in the explanation and formulation. Section 2.2.1 I miss error estimations for the DGPS, I guess 2-3 cm, would be nice to tell the readers about that. Section 2.2.4. I suggest including some points to support the selection of different software packages to run terrestrial and aerial photogrammetry. Section 2.2.4.1 I miss many details here: Overlaps, number of photos, UAV model, etc, etc. Section 2.4.1 Sampling intensity I have doubts here about the strategy used, did the authors sampled the number of points using a planimetric (XY) grid? In this case, they need to support this strategy. I think that estimations of volumetric point densities and 3D representations of this variable would work well in this case as. Problems using a grid in this case are important when representing vertical walls or headcut walls where points are distributed in the Z-coordinate direction, in this case, if you use a grid you will have a high value for the sampling intensity however, if you have a look to the point cloud, in some cases, you will realize that sampling intensity can be low.

Figure 10: better explanations with A)..., B)..., C)..., what kind of information was used? Figure 11: very difficult to understand and quite difficult to get conclusions from it! More than Fixed 122 is not working well for this Cross-section.

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