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Interactive comment on "Very high-resolution terrain surveys of the Chã das Caldeiras lava fields (Fogo Island, Cape Verde)" *by* Gonçalo Vieira et al.

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This publication presents a 25 cm resolution digital surface model (DSM) and accompanying orthophoto covering lava fields erupted from Fogo (Cape Verde) volcano during 2014-2015. The dataset appears to be of high quality, and will be of interest to volcanology researchers working in the Cape Verde Islands. However, I suggest that the manuscript needs to be edited for clarity and restructured before it can be accepted for publication. Specifically, the following points should be addressed:

(1) The significance of this dataset to the general earth-system science community needs to be better communicated. The manuscript currently focuses on volcanological applications of DSMs, but I suggest that the dataset could be useful for a much broader

audience in e.g., ecology, hydrology, planning and remote sensing. Clearer messaging would increase interest in the paper and associated dataset.

(2) In this vein, the scope of the introduction needs to be better defined and constrained. Some review of the relevant volcanology literature is justified, but this should be kept concise and relevant. For examples, the paragraphs at lines 125 and 130 could be contracted to a short statement. The order ideas are presented in is also not intuitive – e.g., line 170 should be placed much earlier in the manuscript. I would suggest shortening and restructuring the introduction to (i) briefly review UAV photogrammetry and applications of ultra-high-resolution topography in earth-system science and volcanology, (ii) briefly describe the geological setting of Fogo and summarize the 2015 eruption to develop the volcanological motives for the study, and (iii) summarize the previous DTMs that are available. I suggest that this could be achieved in ∼50% of the length of the current introduction.

(3) The aims of the survey need to be much more clearly stated, as these justify the choice of survey parameters (e.g., GSD) and required resolution/accuracy. Furthermore, photogrammetric survey parameters (e.g., forward and lateral overlap) need to be fully described. I strongly recommend the authors to follow protocols for reporting photogrammetric data outlined in Dering et al., (2019) and James et al., (2019).

(4) The authors should consider applying the sensitivity analysis procedure presented by James et al., (2017), and James (2017) to their data, as this would provide a far more robust and quantitative error assessment than the largely qualitative description currently included.

(5) In the interest of reproducibility and open access, the entire dataset being described should be made publicly available, including: (1) the unprocessed UAV images, (2) dense photogrammetric point clouds (prior to smoothing), and (3) the 10-cm resolution orthomosaics and DEMs mentioned in the manuscript. Ideally these could be exported as multiple tiles to avoid unreasonably large individual file sizes.

(6) Long sentences need to be broken down for clarity. Sentences with >2 commas should be the exception, not the norm.

Other more specific suggestions are included in the annotated pdf. Thanks for sharing what appears to be a great dataset!

Cheers, Sam Thiele

References:

Dering, G. M., Micklethwaite, S., Thiele, S. T., Vollgger, S. A., & Cruden, A. R. (2019). Review of drones, photogrammetry and emerging sensor technology for the study of dykes: Best practises and future potential. Journal of Volcanology and Geothermal Research, 373, 148-166.

James, M. R., Robson, S., & Smith, M. W. (2017). 3âĂŘD uncertaintyâĂŘbased topographic change detection with structureâĂŘfromâĂŘmotion photogrammetry: precision maps for ground control and directly georeferenced surveys. Earth Surface Processes and Landforms, 42(12), 1769-1788.

James M. R., Precision maps and 3-D uncertainty-based topographic change detection with structure-from-motion photogrammetry. ResearchGate (2017).

James, M. R., Chandler, J. H., Eltner, et al., (2019). Guidelines on the use of structureâĂŘfromâĂŘmotion photogrammetry in geomorphic research. Earth Surface Processes and Landforms, 44(10), 2081-2084.

Please also note the supplement to this comment:
https://essd.copernicus.org/preprints/essd-2020-289/essd-2020-289-RC1-supplement.pdf

Interactive comment on Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2020-289, 2020.

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