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

**Gonçalo Vieira et al.**

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Dear Dr Gaia Stucky de Quay, Thank you very much for taking your time to provide a detailed review of our manuscript and very good comments and suggestions that complement very well with the other reviews. Accounting for your comments, we have made the following changes in the manuscript, but in fact, the manuscript has suffered a significant revision and is now very different than the original one: - We have highlighted the potential applications of the DEM in the Introduction. - We have substantially improved the figures following your suggestions, as well as from other authors. - We went through your specific comments/suggestions section and included all (thank you), although some have disappeared due to subsequent text edits following the changes

proposed by other reviewers. - We agree that figures with examples of landforms, both including field pictures and perspectives from the models, may enrich the manuscript and we will try to add them in the next round or revisions. I hope to be able to upload the new version of the manuscript very soon. Our sincere thanks for your review and for the very useful comments. Best wishes, Gonçalo Vieira
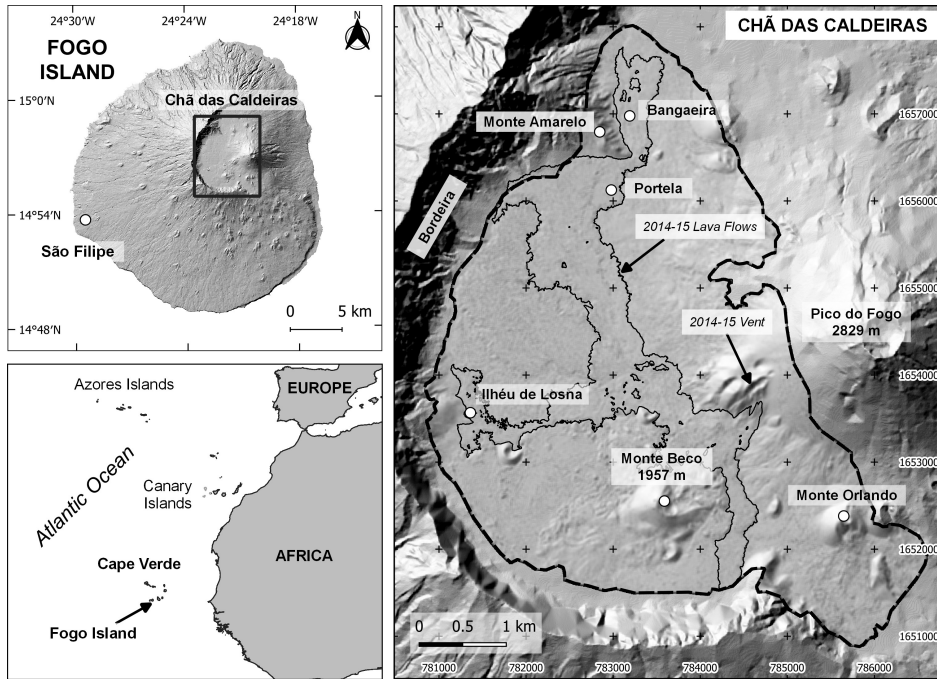
**Fig. 1.** Figure 1 – Location of the Chã das Caldeiras and of the surveyed area (dashed line) in Fogo Island (Cape Verde). The 2014-15 lava flows are limited by a thin black line. Shaded relief derived from th

**Fig. 2.** Figure 2 – The Chã das Caldeiras and Pico do Fogo during the 2014-15 eruption. View towards the southeast with the 'a'ÄĄ lava flows of 2014-15 in the foreground, evidencing a very irregular and inacces
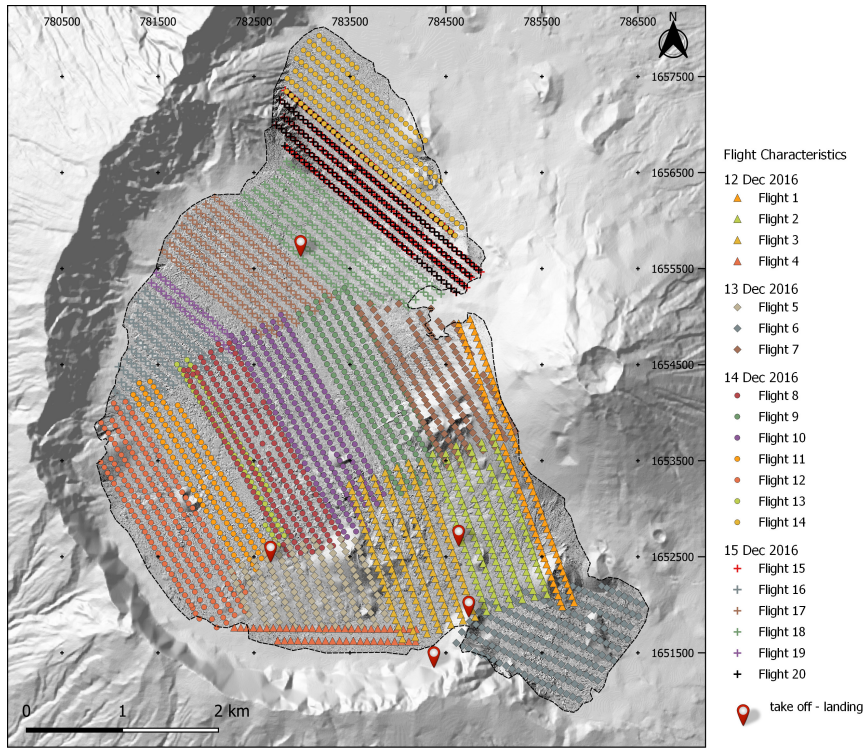
**Fig. 3.** Figure 3 – General characteristics of the aerial survey of the Chã das Caldeiras with the geolocation of the photographs according to the flights and take-off and landing locations. Shaded inside the
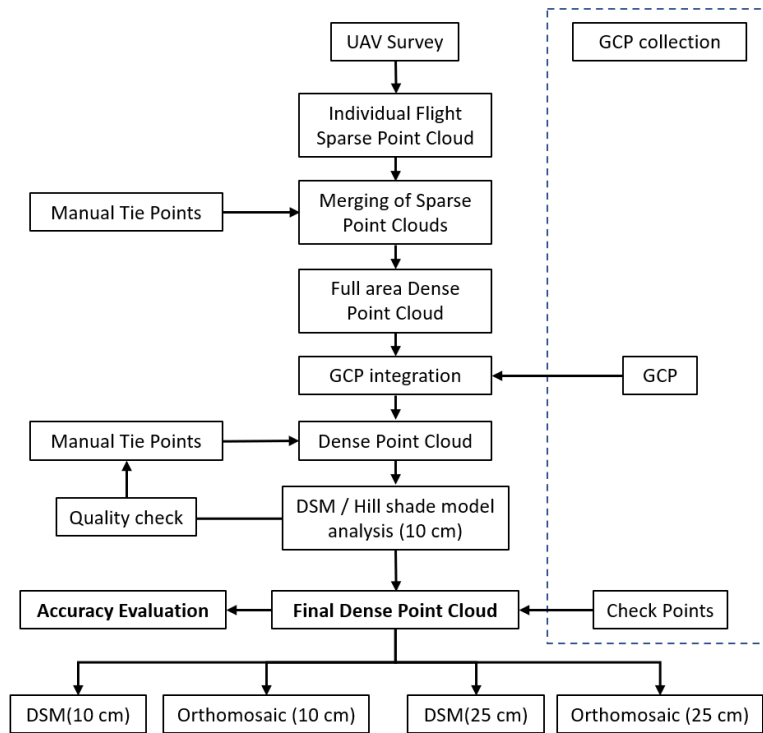
**Fig. 4.** Figure 4 – Work flow from the field survey to the generation of the DSMs and orthomosaics.
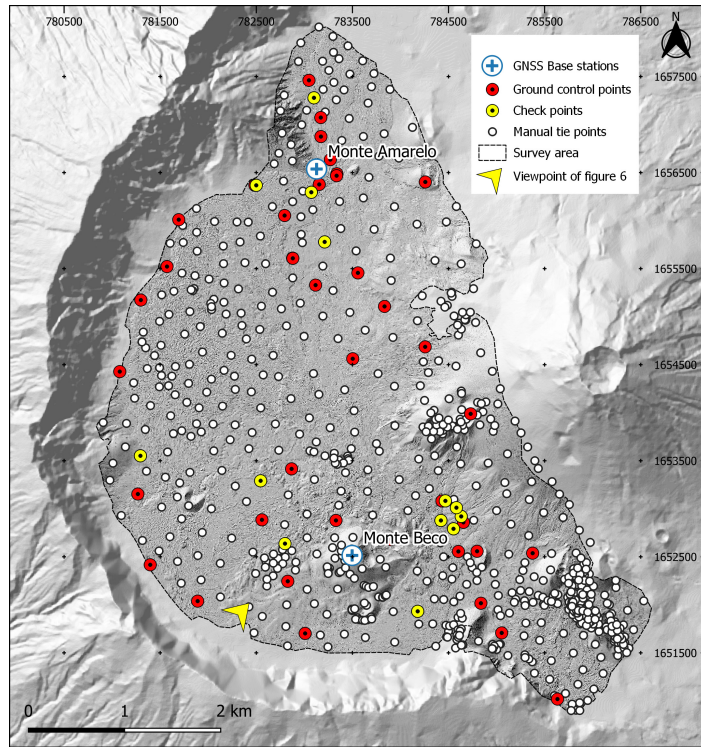
**Fig. 5.** Figure 5 – Ground control points used for the model and for the accuracy evaluation (check points), manual tie points used to improve the point cloud accuracy and location of the GNSS base stations se
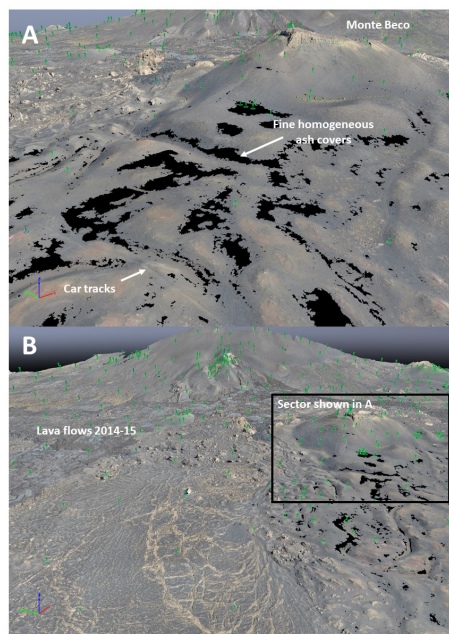
**Fig. 6.** Figure 6 – Examples of the quality of the 3D dense point cloud. A. Low quality areas in ash surfaces close to Monte Beco (car tracks for scale), B. Most of the point cloud shows dense point coverage a
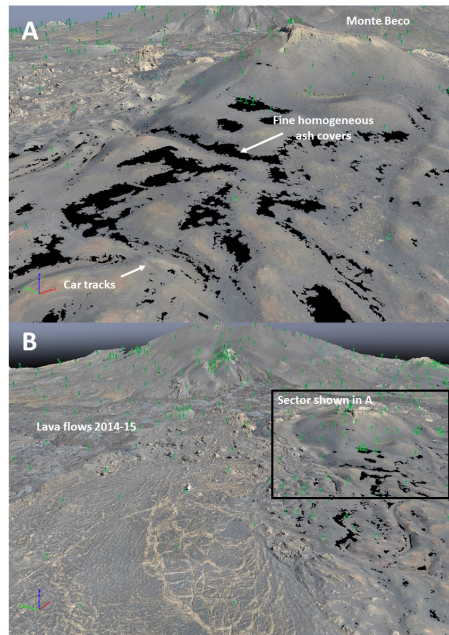
**Fig. 7.** Figure 7 – Example of manual delineation of the lava flow by making use of the: A. Orthomosaic, B. Elevation contours with 50 cm interval, C. Hill shade model, D. Hill shade model and elevation contou
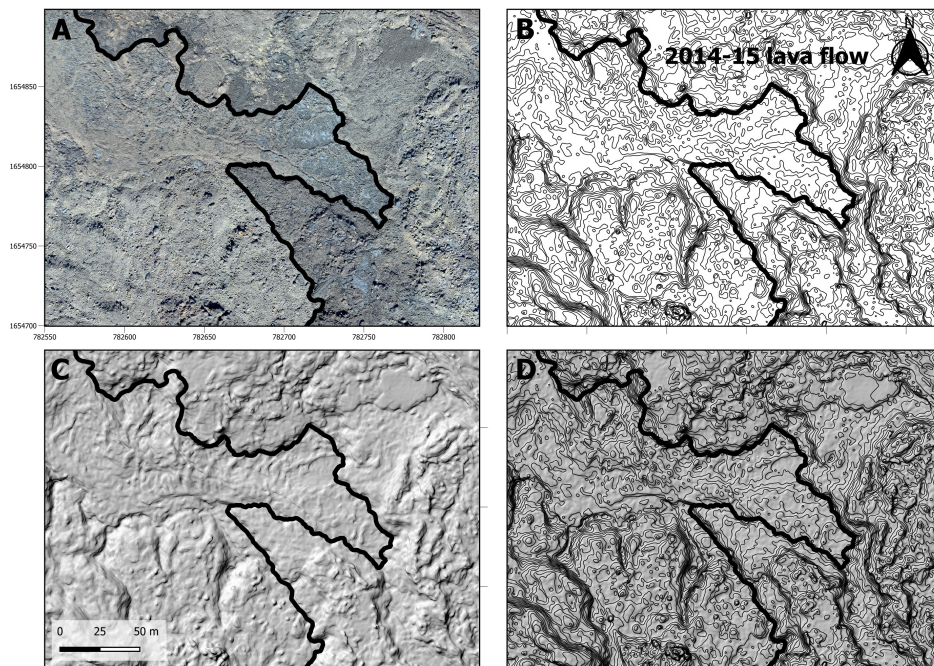
**Fig. 8.** Figure 8 – Assessment of the quality of the dense point cloud and digital surface model in the Chã das Caldeiras and location of the sectors shown in figures 8 to 10. Shaded relief outside the surveye
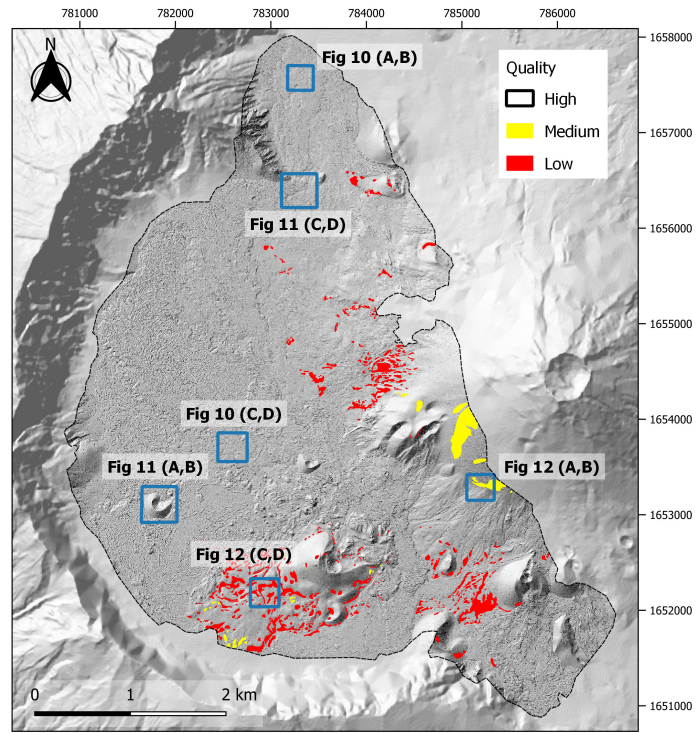
**Fig. 9.** Figure 9 – Digital surface model of the Chã das Caldeiras (A) and DSM shaded relief model (B). The surveyed area is overlaying the DEMFI (2010) 5 m DEM.
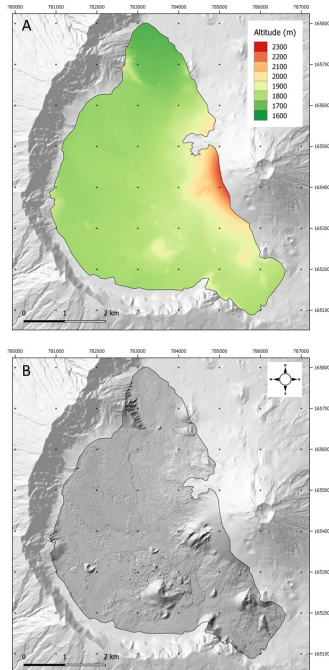
**Fig. 10.** Figure 10 – Examples of surfaces in the Chã das Caldeiras with high-quality results for the digital surface model, with orthomosaic for visualization (10 cm resolution) and contour lines derived from
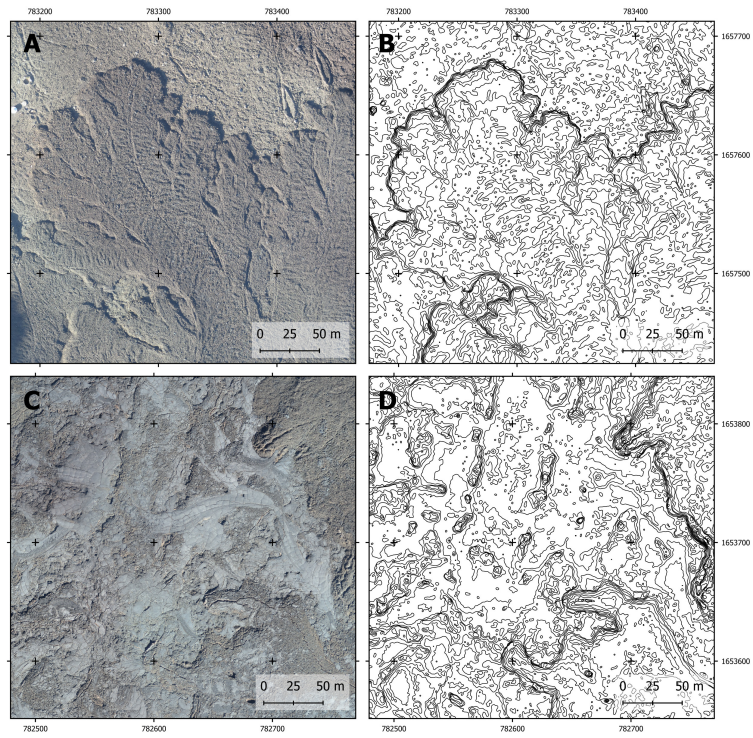
**Fig. 11.** Figure 11 – Examples of surfaces in the Chã das Caldeiras with high-quality results for the digital surface model, with orthomosaic for visualization (10 cm resolution) and contour lines derived from
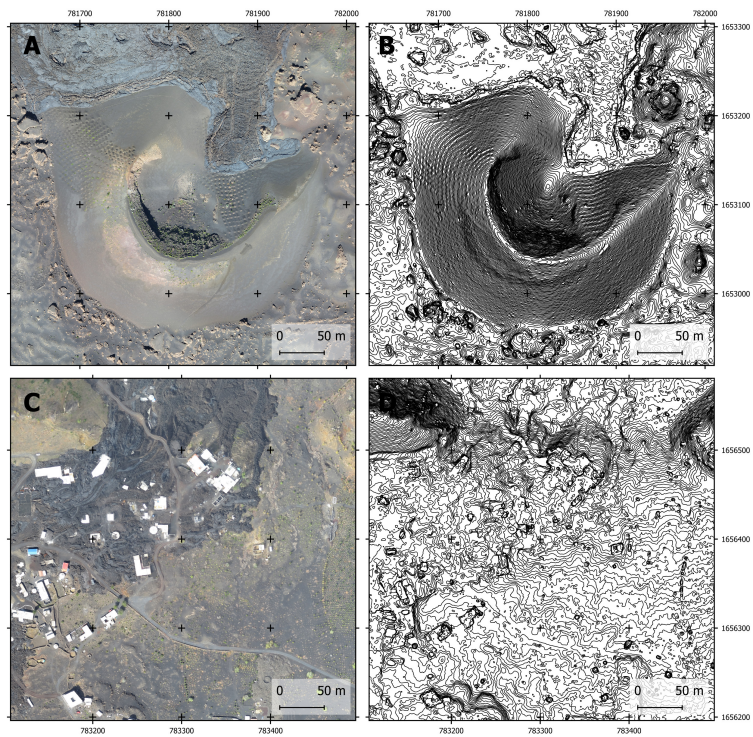
**Fig. 12.** Figure 12 – Examples of surfaces with medium and low quality. A and B: Steep slope covered with ash with medium-quality results (M) for the digital surface model, with orthomosaic (A, 10 cm resolution
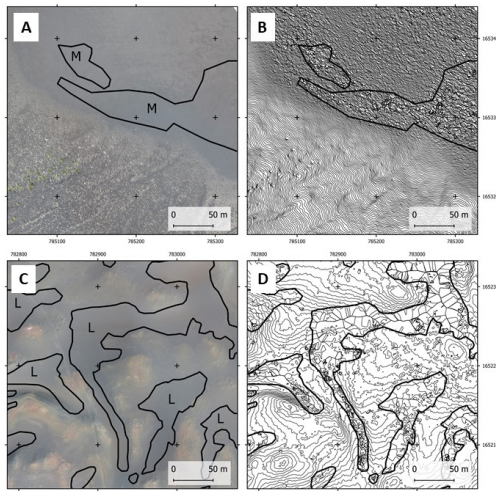
**Fig. 13.** Figure 13 – Digital orthophoto mosaic with 25 cm resolution of the Chã das Caldeiras. The quality of the point cloud is shown in Fig. 7. Shaded relief outside the surveyed area derived from the DEMFI
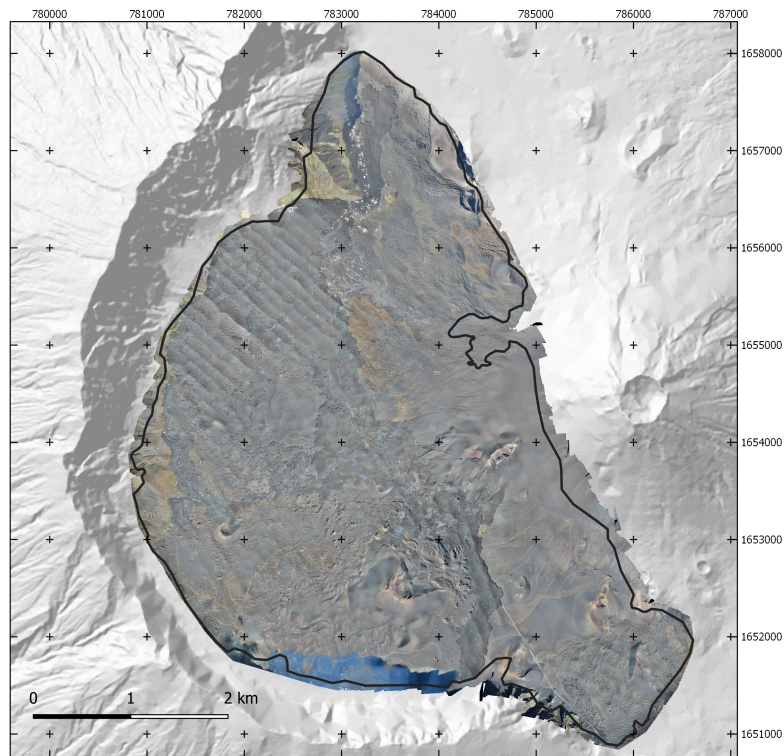
**Fig. 14.** Figure 14 – 3D visualization of the texture mesh of the Chã das Caldeiras.

**Fig. 15.** Tables 1 and 2