

## **Geology of Lonar Crater, India Supplementary Materials for online GSA Data Repository**

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### **Digital Elevation Model Files**

Zipped files of the digital elevation model (Fig. DR4) are provided in three common formats: (1) ArcGIS, (2) GeoTIFF file, and (3) IMG file. The file named `lonar-dem.zip` can be downloaded from the GSA Data Repository at <http://www.geosociety.org/pubs/ft2009.htm>.

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Table DR1

UTM locations in meters for sections in Fig. 3 of main text.

Section	Easting	Northing
North Quarry N	660035	2213709
North Quarry S	659299	2212187
North Canyon	657580	2210407
Dahr Canyon	658294	2210432
Fault Canyon	658393	2210326
Hotel Canyon	658662	2209448
Durga Devi Quarry	660753	2209124
Penpalmer Dam Quarry	664208	2205793
Kalapani Dam	656246	2208328

## **References**

Nandy, N. and Deo, V., 1961, Origin of Lonar Lake and its salinity: TISCOP, v. 8, p. 1–2, referenced by Ghosh and Bhaduri (2003).



Figure DR1. Panoramic views of Lonar crater.





Figure DR2. Dhar canyon and temple, looking toward the northwest.



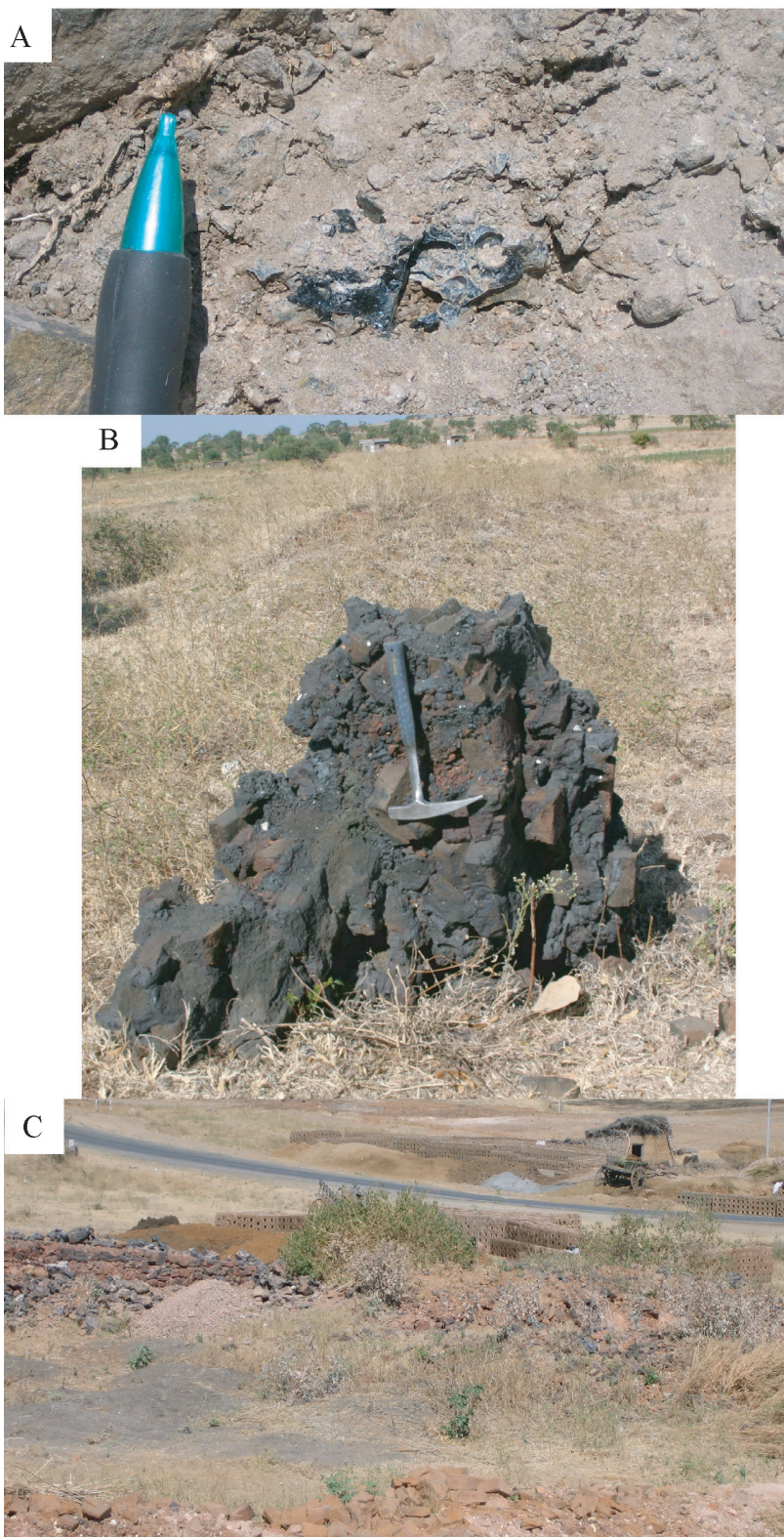


Figure DR3. (A) Impact glass at Little Lonar (UTM: 658122E, 2211223N). (B) Fired bricks (UTM: 659645E, 2212671N). (C) Brick factory near Durga Devi Hill Quarry (UTM: 660423E, 2208956N). Bricks are  $\sim 15$  cm in length.

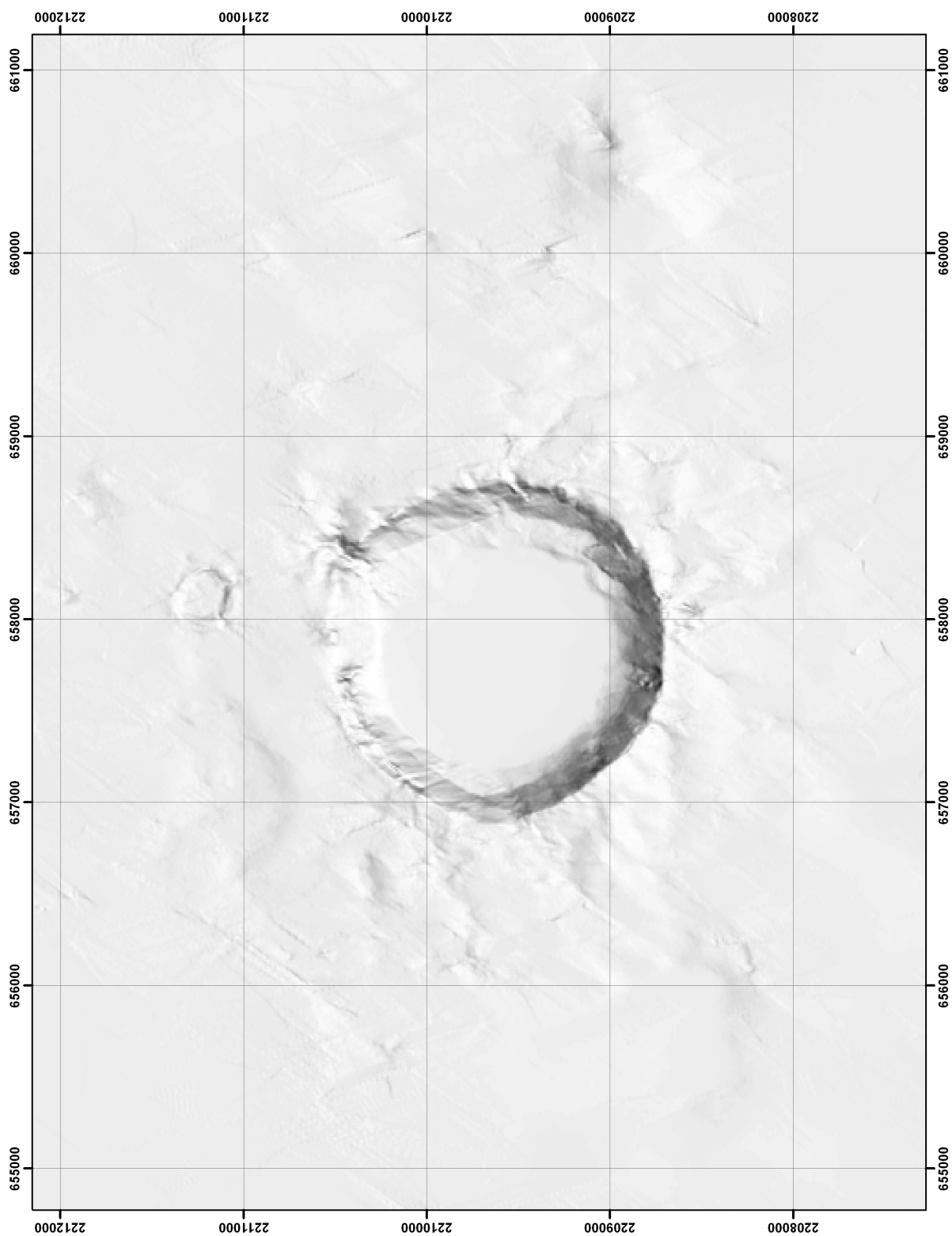


Figure DR4. (A)

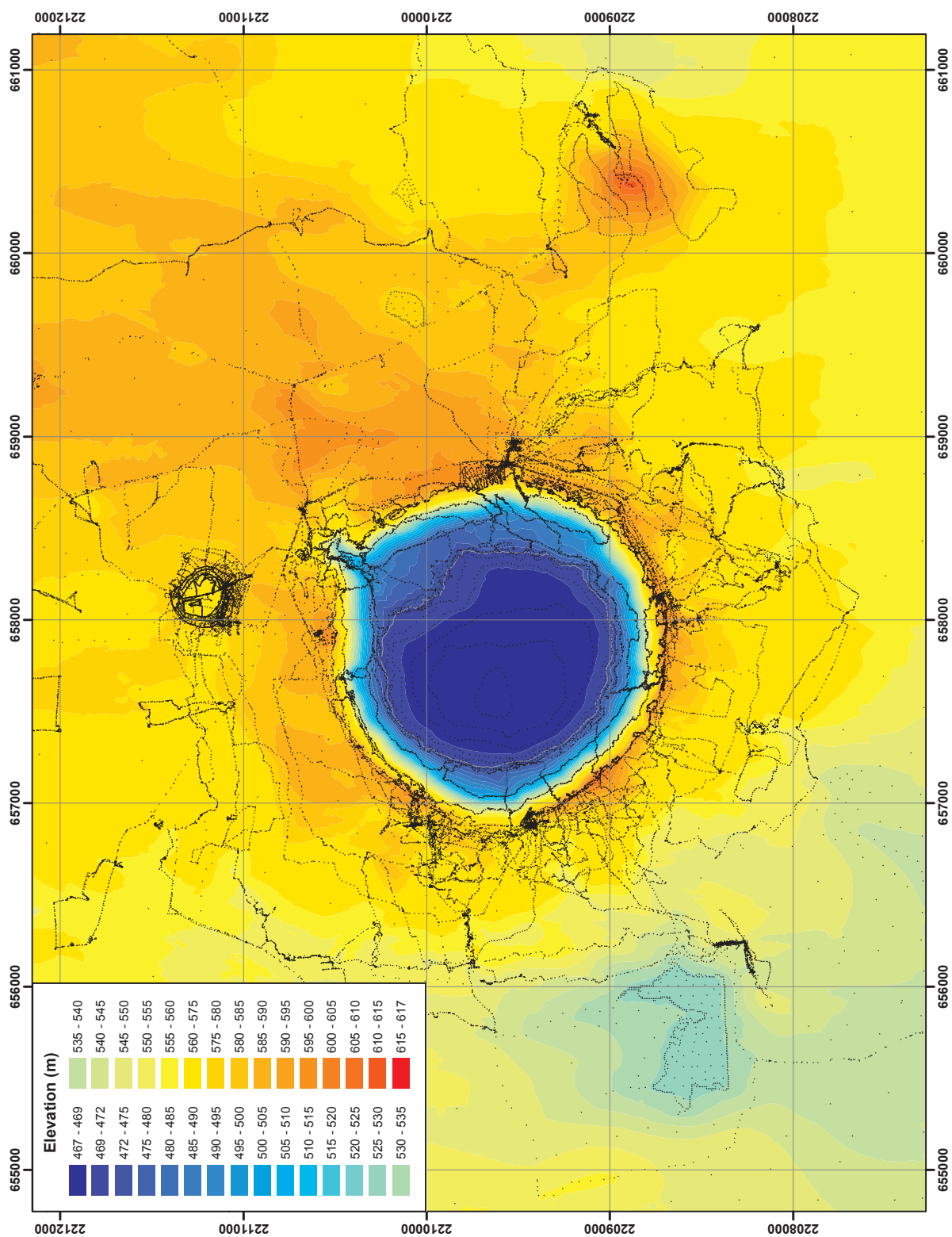


Figure DR4. (B)

Figure DR4. GPS-derived digital elevation model for Lonar crater. (A) Shaded relief map with illumination from the south at  $75^\circ$  inclination. Elevation range is 466-617 m. (B) Filled contour map with 64,000 individual GPS measurements shown as black dots. Bathymetric data in Lonar lake are derived from contours presented by Nandy and Deo (1961). Kalapani and Lonar town lakes do not have bathymetric data, but are very shallow and we approximate them as flat surfaces. Easting (655000-661000) and Northing (2208000-2212000) coordinates are in UTM (WGS84) meters.



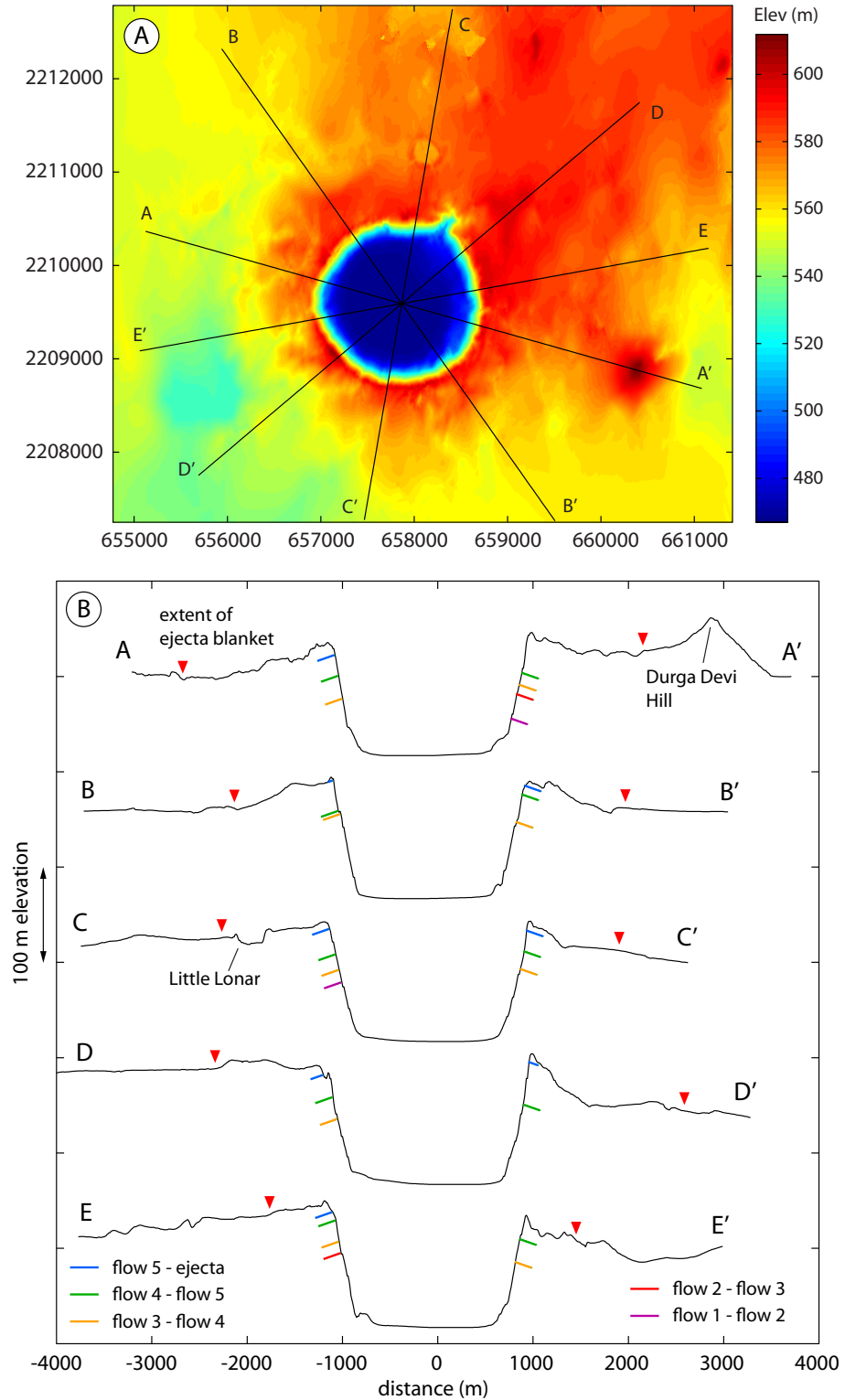


Figure DR5. Topographic profiles of Lonar crater. (A) Plan view digital elevation map of Lonar crater based on the GPS points (Fig. DR4). Colors indicate absolute elevation. Easting (655000-661000) and Northing (2208000-2212000) coordinates are in UTM (WGS84) meters. (B) Selected topographic profiles corresponding to the lines drawn in (A). Red triangles indicate the end of the continuous ejecta blanket. Outcropping locations of pre-impact Deccan basalt flows are indicated in each profile (Tf1-Tf5, see Fig. 3 in main text).

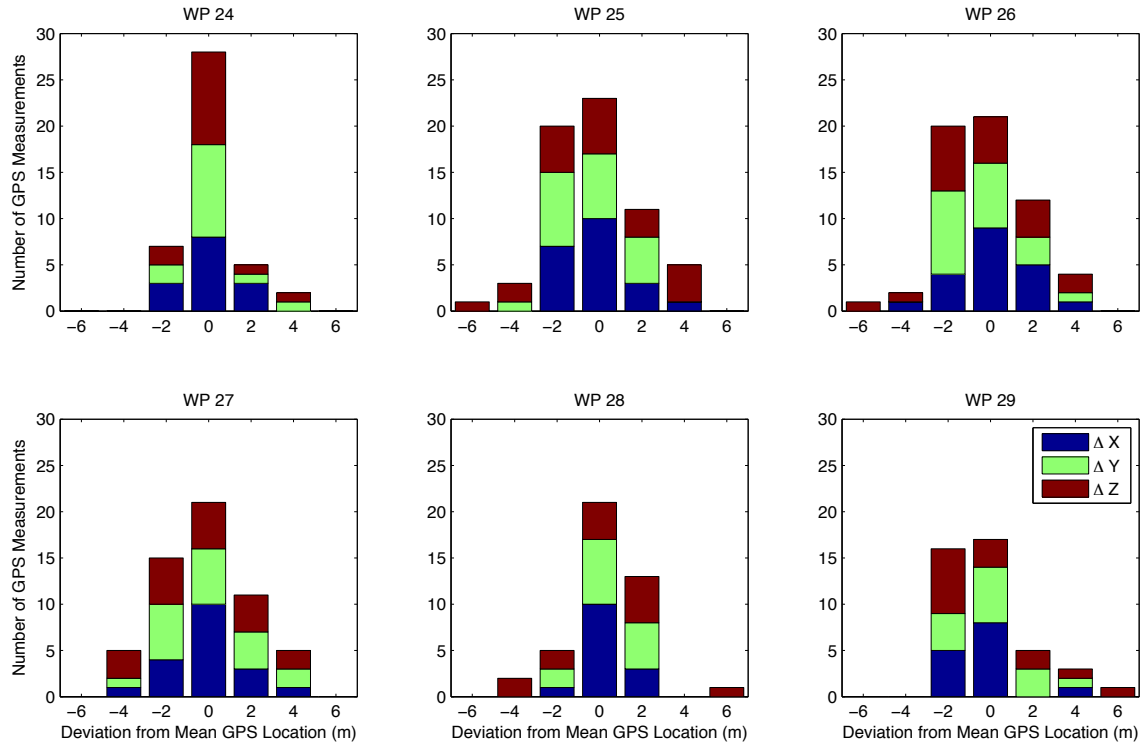


Figure DR6. Histograms of deviation from the average x, y, z position of each control point (labeled WP 24-29).

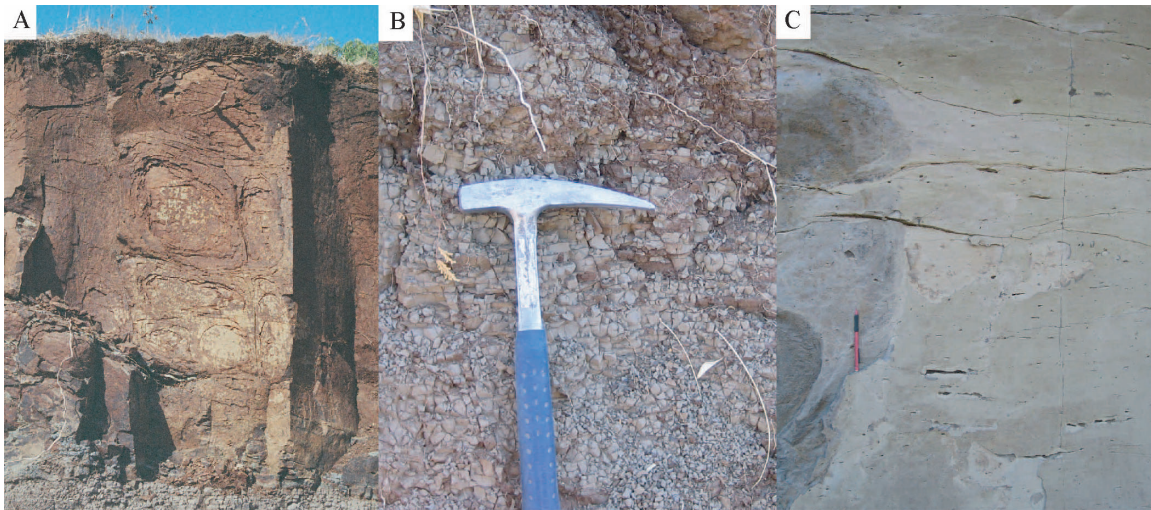


Figure DR7. Massive Deccan basalts in the Lonar crater region: (A) spheroidally weathered [Tf6; UTM: 659324E, 2212201N; vertical scale of the outcrop is 2 m]; (B) fractured at top of Durga Devi Hill [Tf5; UTM: 660423E, 2208956N]; and (C) with elongated vesicles along the flow banding at Palakshed Quarry [Tf5; UTM: 662077E, 2212089N].



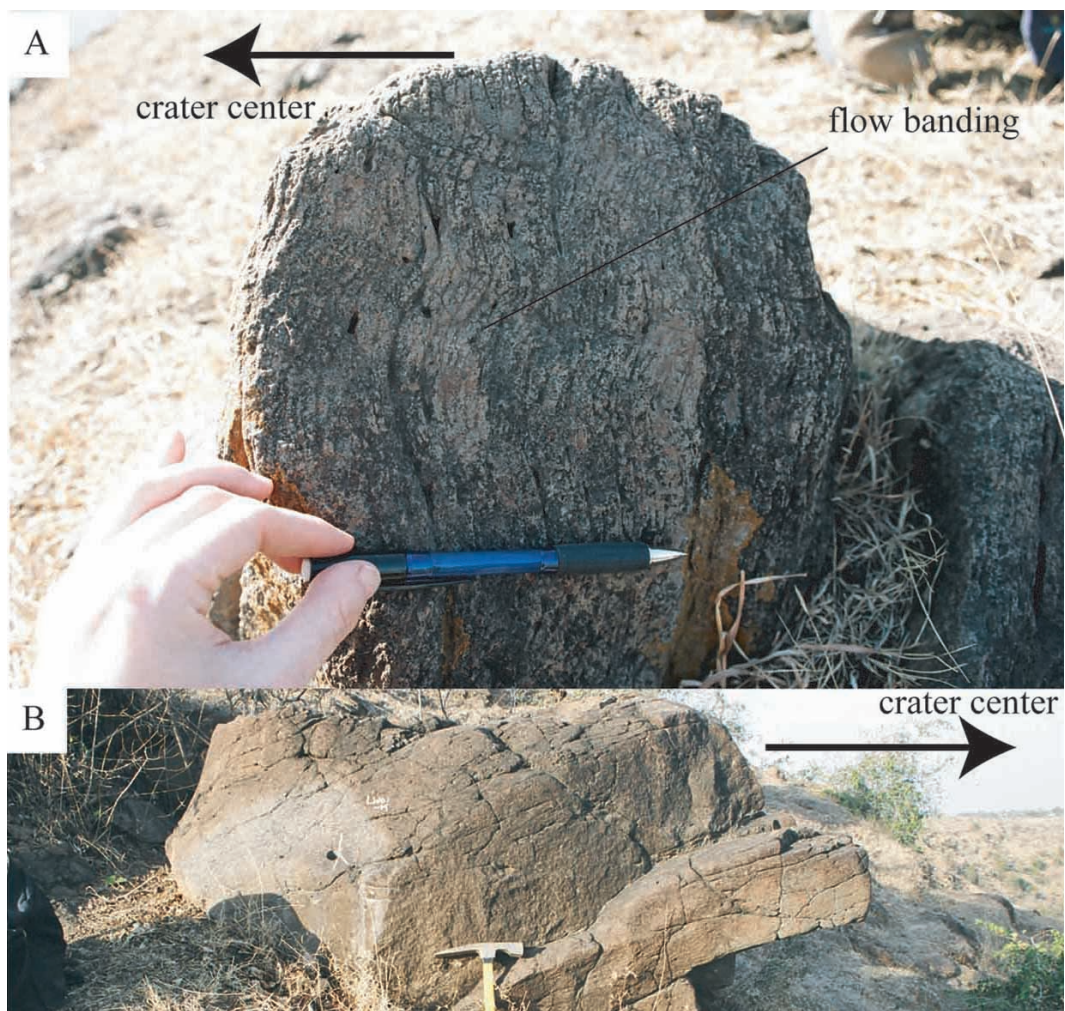


Figure DR8. Flow banding in Tf5 illustrates recumbently folded and upturned basalts along the crater rim: (A) (UTM: 657045E, 2210044N), and (B) (UTM: 657019E, 2210044N).

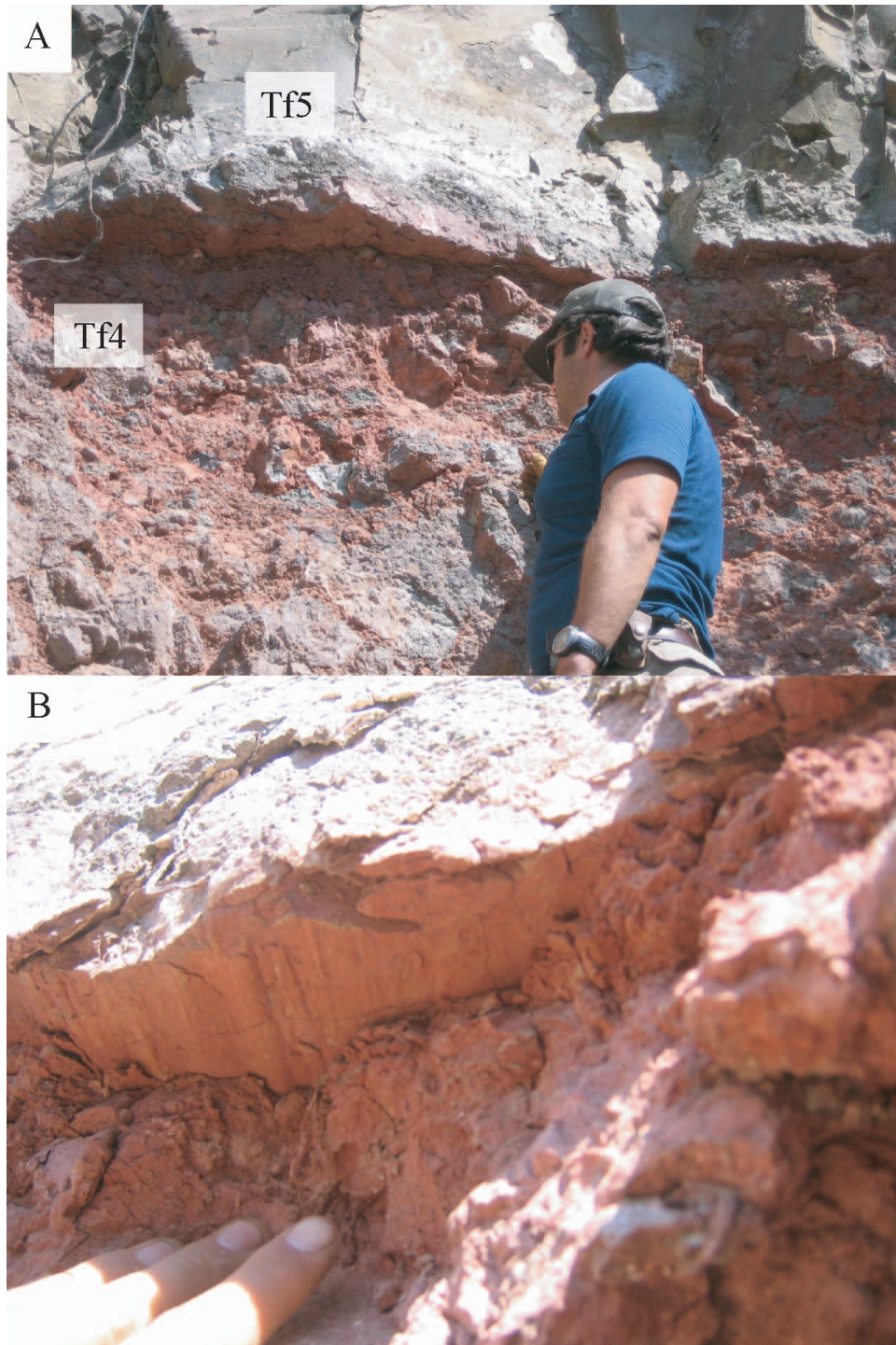


Figure DR9. (A) The contact between the autobrecciated and chemically-weathered Tf4 flow top and the massive base of Tf5, Maloof for scale (see also Fig. 8 F in main text); and (B) slickensides at the contact between Tf4 and Tf5 at Fault Canyon (UTM: 658393E, 2210326N) indicating layer parallel slip, with hanging-wall motion toward the crater center (see Figs. 1 B and 8 G in main text).



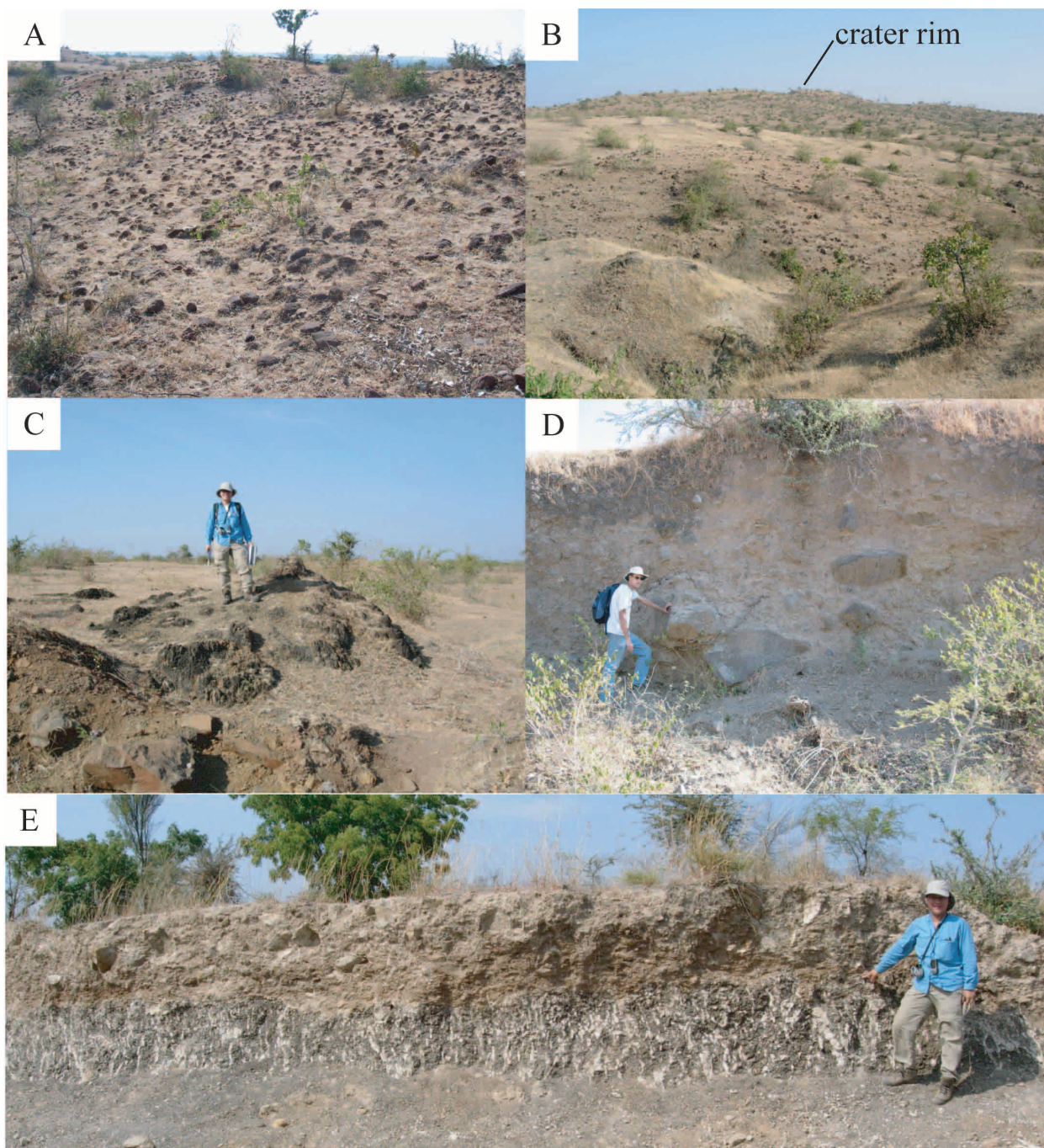


Figure DR10. (A) Ejecta blocks 10s cm in size, approximately 100 m SW of rim. (B) Similar-sized ejecta blocks near the eastern rim looking to the west. Residents have cleared surface ejecta blocks from some areas. (C) Large ejecta blocks near the SW crater rim. (D) Unsorted angular clasts in a coarse matrix. Large ejecta boulders have been mixed to the top of the flow at Kalapani Quarry. (E) Ejecta flow over mud at Kalapani Quarry (UTM: 658693E, 2208545N) indicating little mixing with the pre-impact surface near the edge of the continuous ejecta blanket.

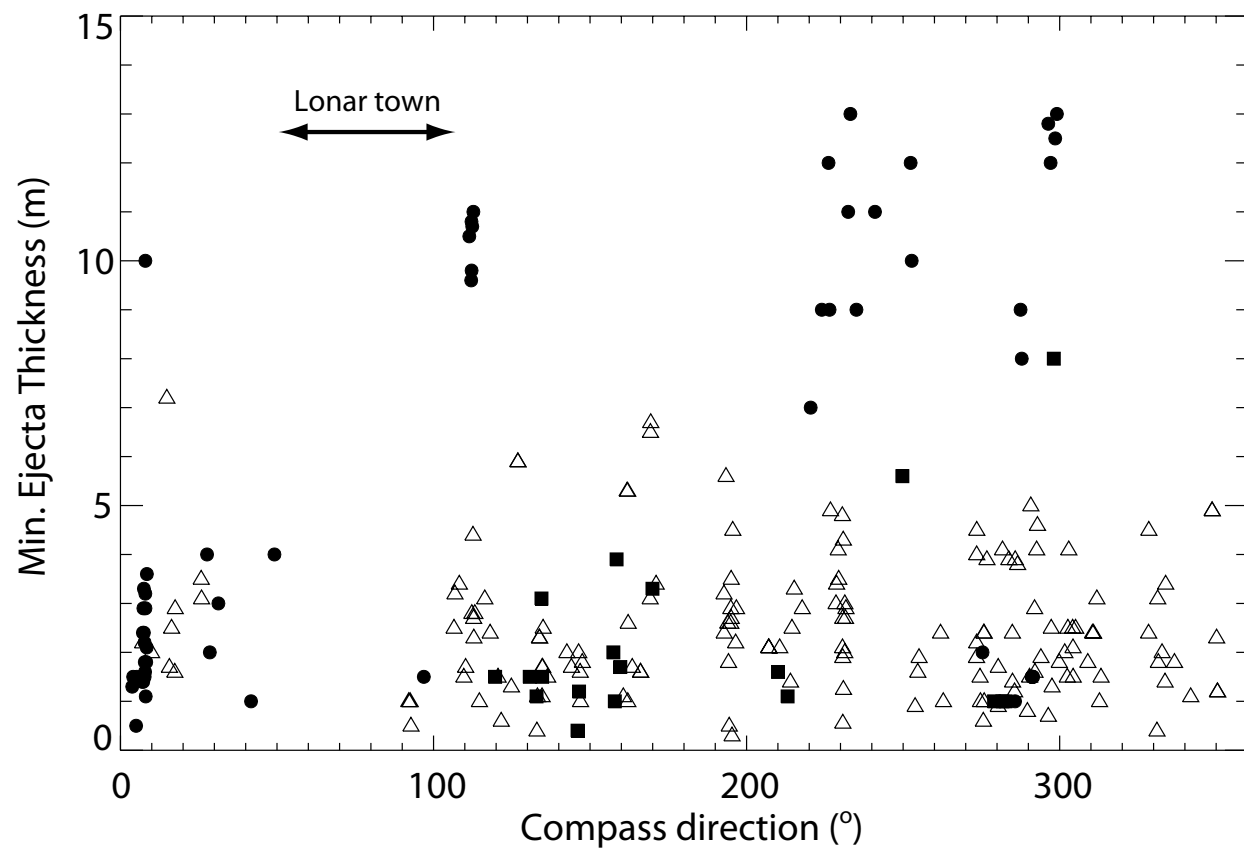


Figure DR11. Minimum ejecta thickness measurements vs. compass direction. There is no bias for thicker ejecta deposits downslope ( $\sim 225^\circ$ ). Symbols denote ejecta subgroups: filled circles-rim fold, filled squares-large blocks, open triangles-small clasts in coarse matrix.

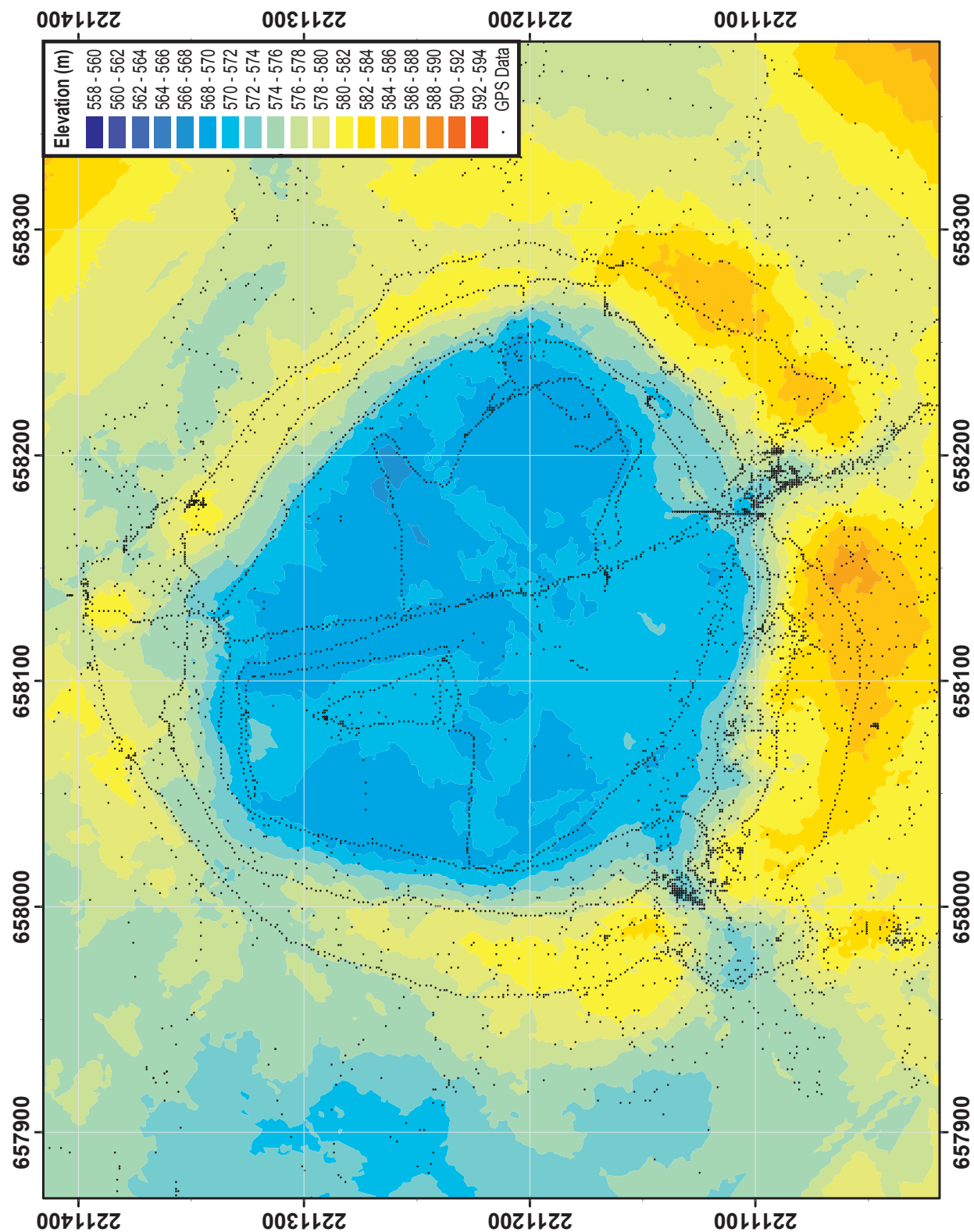


Figure DR12. GPS-derived digital elevation model for Little Lonar, displayed as filled contour map with individual GPS measurements shown as black dots. Easting (655000-661000) and Northing (2208000-2212000) coordinates are in UTM (WGS84) meters.





Figure DR13. 4-m deep trench used to determine the minimum ejecta thickness in the southeast rim of Little Lonar (UTM: 658122E, 2211223N). At this location the total thickness of ejecta-like material was 12.4 m.



Figure DR14. Durga Devi quarry (UTM: 660753E, 2209124N). The yellow arrow points to columnar jointed basalt at the top of Tf4 that is depicted in Fig. 5 C in the main text.