IN SITU MAPPING OF THE STRUCTURAL AND STRATIGRAPHIC COMPLEXITIES OF ENDEAVOUR CRATER’S RIM

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• 45 km total traverse
• 15 km on rim

Summary Points

1, 2 Opportunity completed a traverse of 15 km along west rim of 22 km-diameter Endeavour impact crater, including rim transects at Marathon Valley and Perseverance Valley. This is the first geologic traverse on the topographic rim of a complex impact crater.

3, 6 Ground truth geologic mapping of lithology, stratigraphy, and structure was done along the crater rim traverse out to 20 m from Opportunity. Interpretive geologic sections are based on contacts and attitudes determined from rover observations.

4, 5 Contact planes routinely dip inward toward crater floor between 14° to >25° inboard of the crater rim.

6-8 Bedrock outcrops record evidence for faults with significant throw that cross-cut the rim; some alteration zones tend to be associated with the rim-cutting fault lines and segmented offsets of the crater rim.

7, 8 No unequivocal evidence for water erosion is detected in Perseverance Valley; current observations from within valley floor are consistent with selective erosion by wind along identified fault zones.

5 A geologic section through the rim constructed from ground truth mapping shows that bedrock uplift and antiformal deformation is a significant component of the topographic relief in crater rims.


Ground truth geologic mapping of Marathon Valley.

Ground truth geologic mapping of Perseverance Valley.

Oblique view of fault lines and apparent offset mapped within Perseverance Valley.

Geologic section at Perseverance Valley.

Geologic section through the rim constructed from ground truth mapping shows that bedrock uplift and antiformal deformation is a significant component of the topographic relief in crater rims.