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Paper No. 166-12

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### 3 MYR AGE FOR SHORTY CRATER AT TAURUS-LITTROW, SITE OF ORANGE AND BLACK PYROCLASTIC ASH

**SCHMITT, Harrison H.**, Engineering Physics, University of Wisconsin-Madison, P.O. Box 90730, Albuquerque, NM 87199

Light-gray regolith ejecta about one-meter thick protected pristine pyroclastic ash deposits at Shorty Crater at Taurus-Littrow for about 3.5 billion years (Schmitt (2017)). This ejecta apparently came from an old, highly degraded, ~100 m diameter impact crater, here named "Fitzgibbon," that lies half outside the south rim of the much younger Shorty Crater.

Eugster, Eberhardt and Geiss (1977) report that the large, intensely fractured boulder on the rim of Shorty (sample 74255), lying a few meters from the ash deposit, has a two-stage exposure history. Another nearby sample, 74275, shows the same history as 74255. Both samples had a change in GCR shielding conditions ~3 million years ago after previously having been exposed for  $17.8 \pm 1.4$  Myr ( $^{81}\text{Kr}$ ). A comparable change in shielding at 2.8 Myr for 74255 also is indicated by the track analysis of Goswami and Lal (1974). Such a change in shielding requires the loss of about 20 cm of rock surface.

Because the light gray regolith ejecta from Fitzgibbon covered and protected the orange and black ash now exposed around Shorty Crater, and the post-deposition exposure of the youngest ash was 24 Myr (Eugster, Kiesel and Grogler (1981)), the Fitzgibbon impact occurred 24 Myr after final ash eruption (~3.48 Ga), minus post-Shorty exposure. The exposure age evidence indicates that the 74255 boulder first was exposed to GCRs for 17.8 Myr before being ejected by the Fitzgibbon impact and buried and shielded in its ejecta. Alternatively, the Fitzgibbon impact may have ejected the boulder, but it was buried in ejecta at a shallow enough level where it slowly accumulated the equivalent of 17.8 Myr of GCR exposure over ~3.46 billion years before the Shorty impact.

As the 74255 boulder now lies on the south rim of Shorty Crater where that rim is superposed on the buried northern ejecta blanket of Fitzgibbon Crater, its two stage exposure to GCRs indicates that Shorty impact occurred about 3 Myr before present (supported by only ~1/2 cm thin regolith on exposed ash surface). The Shorty impact re-excavated the boulder from Fitzgibbon ejecta by about 3 Myr ago and stripped it of ~20 cm of surface fragments at that time. The extreme fracturing apparent in the boulder make such a loss during the Shorty impact highly plausible.

Session No. 166

[T145. Apollo 17 Forty-Five Years on: Reanalysis of the Geochemistry, Geophysics, and Field Geology in Light of Data from the Lunar Reconnaissance Orbiter and Other Recent Missions](#)

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