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COLOR-BALANCING OF *IN SITU* DOCUMENTATION PHOTOGRAPHS OF THE APOLLO 17 ORANGE AND APOLLO 15 GREEN VOLCANIC ASHES

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Seven photographs of a trench dug across an orange tinted, oval area on the rim of Shorty Crater at Station 4 by Apollo 17 Astronaut Harrison H. Schmitt documented one of the most remarkable discoveries of the Apollo program. Later analysis of a sample from the trench showed it to consist of very small orange volcanic glass spherules and shards rich in titanium and low in silica— material erupted from a depth of 500 km or more in fire fountains at ~3.6 Ga (Schmitt (2017)). The bright colors described *in situ* by Schmitt (viewed at zero phase angle relative to the Sun) have never been adequately portrayed in prints or electronic images of the digital scans of the prime Ektachrome 360 film. These products have depicted the materials in the trenched area as having a dull, muddy brown color and without the described gradations to red and yellow. We outline the software techniques that were used to balance the colors captured in the unprocessed digital scans so as to match Schmitt's original descriptions. The results show the rich reddish color of the central exposed volcanic ash and its transition to yellow at both ends of the trench as well as the oval area of orange tints in the undisturbed surface that originally captured Schmitt's attention. Balancing techniques likewise were applied to four Apollo 15 photographs documenting green ejecta from Spur Crater and sampled at Station 7. This green colored material was later confirmed to be made up of green glass spherules similar to the Apollo 17 orange ash. These photos have also never been printed showing the distribution of green ash in the ejecta clods. The orange and green lunar volcanic ashes have profound implications related to the geochemical and geophysical nature of the Moon's interior, to the origin of water-ice present at the lunar poles, and to the origin of the Moon.

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
Tuesday, 6 November 2018: 8:00 AM-12:00 PM

Room 236-237 (Indiana Convention Center)

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