Geophysical Research Abstracts
Vol. 20, EGU2018-16955, 2018
EGU General Assembly 2018

Geology and crater size-frequency distributions of the Apollo 11 landing site

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The Apollo 11 landing site in Mare Tranquillitatis is one of the important calibration points for the lunar cratering chronology. The lunar chronology correlates crater size-frequency distribution (CSFD) measurements with radiometric sample ages to allow derivation of absolute model ages (AMAs) for unsampled units across the Moon and is modified for use throughout the Solar System [e.g., 1-6]. Data collected from recent lunar missions, including Lunar Reconnaissance Orbiter Camera (LROC) Narrow angle (NAC) and Wide-angle (WAC) images, Digital Elevation Models (DEM) and spectral Clementine data allow us to generate a new comprehensive geologic map and measure high-resolution CSFDs for the landing site.
Stöffler et al. (2006) [6] summarized the sample analyses and classified the Apollo 11 rocks into four groups of different compositions and radiometric ages. Group A (3.58 Ga) contains high-potassium basalts; Group B consists of complex crystalline basalts further divided into sub-groups B1-B3 (3.70 Ga) and B2 (3.80 Ga); finally the oldest Group D (3.85 Ga) consists of fines. Regardless of the compositional and age differences, all of these groups are rich in titanium [6,7].
The newly measured CSFDs of the Apollo 11 landing site show an average age of 3.59 $\pm$ 0.02 Ga, which is consistent with the age of the young lava flow according to Neukum et al. (1983) and Stöffler et al (2006) [3,6]. Hiesinger et al (2000) [8] also determined an absolute model age (AMA) of 3.6 Ga for the mare basalt unit T17, that contains the landing site. These results correspond best with the radiometric age of the High-K basalts, Group A. Together with the radiometric ages, the newly determined N(1) values of our CSFD measurements of the landing site can now be plotted and compared with the Neukum et al (2001) lunar chronology [4] to check its validity and accuracy.
We are also investigating the geology and CSFDs of the other landing sites along with updated sample studies, with the goal of further testing/improving the calibration points for the lunar chronology function.

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