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Spectral mapping and crater statistics reevaluated for all Apollo landing sites

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In order to decipher the planetary surface evolution, geologic events are relatively dated thanks to crater counts. This method has been calibrated on the Moon and adapted to other planetary bodies. A good calibration on the Moon is thus a precious key to understand the chronology of planetary bodies.
Crater counts are linked to radiometrically-dated Apollo and Luna samples to give absolute model ages. The observed crater size frequency distributions (CSFD) on defined surface units are fit with crater production functions that have been suggested. These are used to calibrate the crater density measurements, which resulted into several lunar chronology models. The definition of a crater production function is therefore crucial for the definition of lunar cratering chronology. Indeed, the crater production function must be determined over a large diameter range and over large homogeneous units.
Several problems have risen regarding this method such as i) the lack of craters on very young terrains, ii) the saturation of the cratering surface for old terrains, iii) a lack of samples with ages between 3.0 and 1.0 Gyrs and the uncertainty of the link between samples and crater count terrains used as templates. This has led to uncertainties and diversities on lunar cratering rates and chronology models.
We here focus on the crater size frequency on Apollo landing sites to better constrain the lunar cratering chronology models. We first analysed the Moon Mineralogical Mapper data (M3) using spectral parameters to define large homogeneous units at each Apollo landing sites. We then determine CSFDs on a diameter range of 250 m to 1 km. Crater counts were done using CraterTools on Kaguya Television Camera data and ages were determined with CraterStats.
We will compare our results to previously defined CSFD and surface units and discuss the correspondence to radiometric ages obtained from Apollo and Luna samples. Our results will help to define a new lunar cratering chronology.