Apollo 17 and M³

A Comparison of the Geology and Petrology of the Apollo 17 landing site using M³ Spectroscopy

OBJECTIVE: To use remote sensing data accurately new data is "ground-truthed", which compares the remotely sensed data with laboratory analyses of samples taken from site. Our goal was to compare Moon Mineralogy Mapper (M³) spectra of the Apollo 17 sampling stations to the four respective Apollo 17 samples for which there is mineral, chemical, maturity, and spectral data. We then extended this comparison to the other ten Apollo 17 sample stations for which laboratory spectra of the soils does not exist in an effort to determine how well M³ can be used to characterize the surface composition.

METHODOLOGY PART 1:

There are four lunar mare samples from the Apollo 17 Landing site that had spectra (from RELAB) and complete petrology information. These samples were used to ground truth the M³ spectra for the rest of the study.

For the samples with partial petrologic information, the petrology was compared to the M³ spectra. If the petrology and spectra did not agree with each other, an explanation is given.

CONCLUSION: We were able to identify and match spectral features between the M³ and four known RELAB soil samples. We were able to validate our compositional interpretations of the spectra to the mineralogy, chemistry, and maturity determined in laboratory analyses from the literature. This degree of certainty gave us confidence to look at the other Apollo 17 sample sites, even with the incomplete modal mineral abundances published for the other soil samples.

REFERENCES:

Goettsch, Michael et. al. "Reflectance Spectroscopy Lab." Space Exploration Resources, School of Earth and Space Exploration, ASU. Northwestern University


Moon Mineralogy Mapper Data and Images provided by Georgiana Kramer.


Petrology of soils on sketch map of Apollo 17 landing site (from Heiken & McKay, 1973). Boundary and scale of map and figure at left are the same.