POSTER SESSION II: A NEW MOON: SPECTRAL CONSTRAINTS ON LUNAR CRUSTAL COMPOSITION
7:00 p.m.  Town Center Exhibit Area

Petro N. E. Gaddis L. R. Rodriguez S. R.
Mapping Global Lunar Basalt Compositions with Clementine UVVIS and NIR Data [#2628]
With the online release of a calibrated and coregistered Clementine NIR global mosaic (100 m/pixel nominal resolution, 1100–2000 nm in four bands) both UVVIS and NIR data can now be used for detailed spectral characterization of lunar mare basalts.

Antonenko I. Osinski G. R.
Automated Detection of Basalt Spectra in Clementine Lunar Data [#2237]
We empirically developed an automated method for detecting fresh basalt spectra in Clementine UVVIS data. Application of this method to a large study area consistently identified basalt spectra on the ejecta and/or slopes of selected craters.

Bhattacharya S. Chauhan P. Rajawat A. S. Ajai Kiran Kumar A. S.
Study of Central Part of Mare Moscoviense Using Chandrayaan-1 Hyperspectral Imager (HySI) Data [#1870]
Study of mare and highland units across the central part of Mare Moscoviense based on spectral parameters as applied on hyperspectral HySI data from Chandrayaan-1 mission with implication of multiple basaltic source regions and mantle heterogeneity.

Kubo N. Namiki N. Ohtake M. Haruyama J. Matsunaga T.
Layering and Thickness of Basaltic Lava Flows in Mare Humorum: New Spectral Analysis of Multiband Imager Data of Kaguya (SELENE) [#1915]
In this study, using spectral image data of Multiband Imager (MI) onboard Kaguya (SELENE), we estimate both thicknesses of mare basalt and lava flow units in Mare Humorum.

Kobayashi Y. Ohtake M. Haruyama J. Matsunaga T. Iwata T. Morota T. Yokota Y. Yamamoto S. Kitazato K.
Estimating Composition of Dark Mantle Deposit in Schrödinger Basin Using SELENE Spectral Data [#1636]
Dark Mantle Deposit (DMD) regions are considered to contain glassy or crystallized pyroclastic beads. We used the spectrum data acquired by SELENE Multi-band Imager to analyze a DMD in Schrödinger basin, and estimated the composition of the DMD.

Cloutis E. A.
Basalt-Ilmenite Mixtures: Spectral Reflectance Changes as a Function of Grain Size and Ilmenite Abundance [#1139]
Reflectance spectra of basalt + ilmenite mixtures show measurable differences, particularly in the UV region, that can potentially be used to constrain ilmenite abundances.

Liu F. Shi J. Li Q. Rong Y.
Lunar Titanium Characterization Based on Chang'E (CE-1) Interference Imaging Spectrometer (IIM) Imagery and RELAB Spectra [#1642]
FWHM, absorption position, absorption depth, absorption area and absorption asymmetry are used to characterize titanium spectral features by Chang’E-1 and RELAB data around Apollo 17 and 16 landing sites.

The Goldschmidt Region as Viewed from Moon Mineralogy Mapper (M3) Data [#1962]
The geology of the region near Goldschmidt crater on the northern lunar nearside has been investigated using M3 data. The spectral character of local soils is heterogeneous and is influenced by material excavated by large nearby craters.
Cheek L. C. Pieters C. M. Parman S. W. Cooper R.  
*Anorthite Synthesis Experiments with Applications to Lunar Spectroscopy* [2438]

Experiments to synthesize a suite of plagioclase samples for reflectance studies have produced Fe-bearing anorthite with broad absorption features in the near-IR.

Wyatt M. B. Donaldson Hanna K. L. Paige D. A. Greenhagen B. T. Helbert J. Maturilli A.  
*Diviner Observations of Pure Plagioclase Regions as Identified by SELENE and the Moon Mineralogy Mapper* [2498]

Diviner thermal infrared observations of plagioclase regions on the Moon are analyzed along with laboratory emissivity spectra of the plagioclase solid solution series to determine if plagioclase compositional variations exist on the lunar surface.

Song E. Bandfield J. L. Glotch T. D. Lucey P. G. Greenhagen B. T. Paige D. A.  
*Investigating Lunar Central Peak Compositions Using LRO Diviner Thermal Infrared Measurements* [2578]

Multispectral thermal IR measurements from Diviner were used to analyze compositional variability of impact crater central peaks. Compositional variations can be distinguished, but the effects of space weathering dominate spectral features.

Chauhan P. Srivastava N. Pieters C. M. Ajai Kiran Kumar A. S. Navalgund R. R. Head J. W. Petro N. Runyon C. Goswami J. N.  
*Integrated Analysis of Topographically High Mafic Exposures at Apollo–17 Landing Site Using Data from Imaging Sensors on Chandrayaan–1* [1606]

Mafic exposures at topographically high locations surrounding Apollo 17 landing site have been studied using imaging sensors onboard Chandrayaan-1 (TMC, HySI, and M3). Compositionally, most of them have been found to be noritic.

*A New Lunar Globe as Seen by the Moon Mineralogy Mapper: Image Coverage, Spectral Dimensionality and Statistical Anomalies* [1716]

NASA’s Moon Mineralogy Mapper, flown on ISRO’s Chandrayaan-1, collected a global imaging spectrometry data set. We explore the M3 coverage, the principal components of the whole data set and the detection of anomalous areas, revealing a new Moon.

*Updates on Scientific Results and Products of SELENE Spectral Profiler* [2242]

Updates on scientific results and products of the SELENE Spectral Profiler (SP) will be given. Scientific results highlight recently published papers and ongoing research. Status of available products and a plan for future products will be presented.

*New Discoveries of Lunar Holes in Mare Tranquillitatis and Mare Ingenii* [1285]

We recently reported the discovery of a vertical hole at Marius Hills region on the Moon in data acquired by SELENE Cameras. Here we report new discoveries of two additional deep holes in Mare Tranquillitatis and Mare Ingenii.

Tsuboi N. Sugita S. Hiroi T. Nagata K. Okada M.  
*A New Modified Gaussian Model (MGM) Using the Cross-Validation Method* [1744]

We propose a new MGM that can determine the optimum number of Gaussians, using the cross-validation. This method can detect the presence of olivine in OLV-OPX mixtures and may become a very useful tool for analyzing planetary spectra.
Yan B. K.  Wang R. S.  Gan F. P.  Wang Z. C.

*Minerals Mapping of the Lunar Surface With Clementine UV-VIS-NIR Data Based on Spectra Unmixing Method and Hapke Model* [###1295]

The distribution of clinopyroxene, orthopyroxene, olivine, ilmenite, and plagioclase on the lunar surface has been mapped with Clementine UV/VIS/NIR data. The results were validated using mineral composition data of Apollo samples.


*Mixing of Surface Materials Investigated by Spectral Mixture Analysis with the Moon Mineralogy Mapper* [###2215]

Lithological and mineralogical mapping of lunar surface is one main goal of the Moon Mineralogy Mapper imaging spectrometer. Spectral mixture analysis provides large scale maps of the main components that show diverse mare units and mineral contents.

Li L.  Li S.

*Deriving Lunar Mineral Abundance Maps from Clementine Multispectral Imagery* [###2189]

The effectiveness of the genetic algorithms (GA)-partial least square (PLS) regression for mapping lunar mineralogy was demonstrated using the Clementine UV-VIS-NIR image of the lunar surface covering eastern nearside maria.


*Emission Measurements of Lunar Analogues for Interpretation of Returning Data from the Diviner Lunar Radiometer on NASA’s Lunar Reconnaissance Orbiter* [###1364]

Mineral emission spectra are altered by the lunar environment, therefore a new spectral database is being made of many lunar analogue minerals, which can then be compared to data returned from Diviner in order to constrain lunar surface composition.

Green R. O.  Pieters C. M.  Boardman J.  Eastwood M.  Mouroulis P.  Lundeen S.  White M.

*Assessment of the Complete Moon Mineralogy Mapper Data Set and On-Orbit Validation of the Spectral Calibration* [###2190]

We present assessment of the complete Moon Mineralogy Mapper imaging spectrometer data set that covers more than 95% of the Moon as well as on-orbit validation of the spectral calibration.

Green R. O.  Boardman J.  Pieters C. M.  Clark R.  M3 Team

*An Algorithm for Estimation and Correction of the Thermal Emitted Radiance with Preservation of Spectral Structure in Data Measured by the Moon Mineralogy Mapper* [###2331]

An novel algorithm for estimation and correction of the thermal emitted radiance with preservation of spectral structure in data measured by the Moon Mineralogy Mapper is present with initial test results.

Holsclaw G.  Snow M.  Hendrix A.  McClintock W.

*The LASP Lunar Albedo Measurement and Analysis from SOLSTICE (LLAMAS)* [###2696]

Description of ultraviolet lunar irradiance dataset from SOLSTICE.

Nefian A. V.  Kim T.  Broxton M.  Beyer R.  Moratto Z.

*Towards Albedo Reconstruction from Apollo Metric Camera Imagery* [###1555]

The goal of this research is to model the image formation process and extract the albedo information using digital elevation and surface reflectance models. This paper describes our results on lunar albedo reconstruction from images captured by the Apollo missions.

Denevi B. W.  Robinson M. S.  Hapke B. W.  Lawrence S. J.  Wiseman S. M.  Jolliff B. L.  LROC Team

*Global Ultraviolet Through Visible Color Observations of the Moon with the Lunar Reconnaissance Orbiter Wide Angle Camera* [###2263]

This study focuses on initial results from the LROC Wide Angle Camera, which provides a rich new dataset for the study of the photometric properties of the Moon and variations in ultraviolet-visible reflectance.
Mall U. Korokhin V. Shkuratov Yu.  
*Photometric Investigations Using the SIR-2 Data of the Chandrayaan-1 Mission* [#1616]  
NIR data from the SIR-2 point spectrometer on Chandrayaan-1 allow to estimate the phase function of lunar maria. We present a photometric correction technique for the SIR-2 data and show a comparison with Clementine UVIS data and first results.

Hicks M. D. Buratti B. J. Staid M. Pieters C. Nettles J. Boardman J. W. Sunshine J.  
*A Visible and Infrared Spectrophotometric Model for the Moon Based on ROLO and Chandrayaan-1 Moon Mineralogical Mapper Data* [#2076]  
We present a photometric model of the Moon from 430 nm to 3000 nm based on ground-based ROLO observations. This model is used for first-order phase reddening and absorption band attenuation correction.

*Refinement of Lunar Vis/NIR Phase Curve Acquired by SELENE Spectral Profiler* [#2532]  
The SELENE Spectral Profiler (SP) acquired lunar visible to NIR spectral data at a spatial resolution of 500 m. we report refined results of the phase curves derived from SP data.

*Rayleigh Scattering in Reflectance Spectra of the Moon* [#2337]  
Rayleigh scattering is observed in the lunar surface with Moon Mineralogy Mapper data.

Lucey P. G.  
*Nanophase Iron that Darkens but Does Not Redden: A Mie-Hapke Model* [#1604]  
Mie theory is used to compute the absorption properties of nanophase iron inclusions of any size including those that darken but do not redden. This approach reproduces experimental results better than prior approaches.

Garrick-Bethell I. Head J. W. III Pieters C. M.  
*Spectral Properties of Lunar Swirls and Their Formation by Dust Transport* [#2675]  
Albedo anomalies on the Moon associated with crustal magnetic fields can be explained by dust transport processes.

*An Investigation into the Effects of the Magnetic Anomaly on Regional Space Weathering at Mare Ingenii and Its Influence on the Spectra of the Basalts and Lunar Swirls* [#2594]  
Our analysis of Mare Ingenii points to the importance of solar wind implanted protons in creating npFe⁰ on the lunar surface both within and outside the influence of a magnetic field.

Coman E. I. Blewett D. T. Hawke B. R. Gillis-Davis J. J. Purucker M. E.  
*Lunar Swirls and Crustal Magnetic Anomalies: Further Examination of the Link* [#1222]  
This report presents additional results from our ongoing study of the lunar swirls, their relation to lunar crustal magnetic anomalies, and the phenomenon of space weathering on airless rocky bodies of the solar system.

Kramer G. Combe J.-P. McCord T. Pieters C. Head J. Taylor L. Staid M.  
*Colorful Views of the Moon: Comparing Spectra from Clementine and the Moon Mineralogy Mapper* [#2338]  
M³ spectra derived from immature craters show a significantly increased spectral contrast compared with their Clementine counterparts. The M³ dataset improves our ability to interpret mineralogy, petrology, surface and subsurface processes.