Tuesday, March 20, 2012
POSTER SESSION I: LUNAR VOLATILES: FROM THE SURFACE TO THE INTERIOR
6:00 p.m. Town Center Exhibit Area

Schorghofer N.
On the Theory of Migration of Water on the Moon **[#1110]**
It has been suggested and questioned that water molecules on the lunar surface move on ballistic trajectories. I investigate the migration process in and on the Moon with an improved physical model of H_2O-regolith interaction.

Livengood T. A. Mitrofanov I. G. Boynton W. V. Chin G. McClanahan T. P. Starr R. D. Evans L. G. LEND Team
A Search for Hydrogen near the Lunar Terminator at Low Latitude **[#2643]**
We search for the signature of hydrogen in the lunar regolith in the near-equatorial region as a function of local time. Concentrations of water suggested by reflectance spectroscopy are consistent with the LEND instrument on LRO.

Lemelin M. Roberts C. E. Blair D. M. Runyon K. D. Nowka D. Paige D. A. Spudis P. D. Kring D. A.
Finding Volatiles in the Lunar Surface: An Innovative Multi-Source ArcGIS-Based Approach **[#1067]**
We evaluated locations optimally suited for exploration of lunar polar volatiles using spatial analyst in ArcGIS. We propose four regions at each pole for lunar polar volatile examination.

Thompson T. W. Ustinov E. A. Spudis P. D. Fessler B. W.
Modeling of Radar Backscatter from Icy and Rough Lunar Craters **[#1069]**
Our model for radar backscattering from lunar craters was examined for 4 nonpolar craters and 12 polar craters using LRO Mini-RF 13-cm wavelength data. Results indicate that icy craters can be distinguished from young rough craters.

Boynton W. V. Droege G. F. Harshman K. Schaffner M. A. Mitrofanov I. G. McClanahan T. P. LEND Team
Constraints on Lunar Hydrogen Mobility Provided by High Spatial Resolution Studies of Epithermal Neutron Emission **[#2244]**
The enhanced H content in the polar regions that is not associated with NSRs is due to differences in thermal volatilization rates, which are a strong function of surface temperature.

Mitchell E. H. Schaible M. J. Raut U. Fulvio D. Dukes C. A. Baragiola R. A.
Photodesorption of Adsorbed Water on the Moon **[#2362]**
We experimentally examine the removal of adsorbed water from lunar highland soil by Lyman-α (121.6-nm) photons and by 193-nm photons. These results will yield lifetimes of H_2O/OH species on the lunar regolith due to the solar photon flux.

Runyon K. D. Blair D. M. Lemelin M. Nowka D. Roberts C. E. Paige D. A. Spudis P. Kring D. A.
Volatiles at the Lunar South Pole: A Case Study for a Mission to Amundsen Crater **[#1619]**
The in situ study of lunar polar volatiles is a high National Research Council priority. Amundsen crater is a prime south-polar location for a landed mission to study volatiles.

Smith D. E. Zuber M. T. Head J. W. Neumann G. A. Mazarico E. Torrence M. H. Aharonson O. Tye A. R. Fassett C. I. Rosenburg M. A. Melosh H. J.
Brightening and Volatile Distribution within Shackleton Crater Observed by the LRO Laser Altimeter **[#1663]**
The Shackleton crater is in almost permanent shadow and brighter than the surrounding terrain. The walls are the brightest part of the crater. Crater counts suggest the floor is over 3 billion years old.

McGovern J. A. Bussey D. B. J. Greenhagen B. T. Paige D. A. Cahill J. T. S. Siegler M. Spudis P. D.
Mapping and Characterization of Non-Polar Permanent Shadows on the Lunar Surface **[#2550]**
We have discovered permanent shadows as far from the pole as ±58° of latitude. Here we report the results of our analyses of these areas, specifically evaluating whether they are cold enough to harbor volatile deposits.

Speyerer E. J. Robinson M. S. Lawrence S. J. Burns K. Stopar J. D.
In Search of Shade in Persistently Illuminated Regions near the Lunar Poles **[#2633]**
The Moon's slightly tilted spin axis relative to the ecliptic normal provides a unique lighting environment near the lunar poles. Using LROC images, we identify both persistently illuminated and shadowed features in close proximity to one another.

Siegler M. A. Bills B. G. Paige D. A.
Spatio-Temporal Evolution of Lunar Polar Cold Traps **[#2376]**
We model the spatial, temporal, and quantitative variability of lunar ice. In this study we develop components of a comprehensive thermal-diffusion model of ice migration and stability, which evolves as a function of changes in the lunar orbit.

Hurley D. M. Lawrence D. J. Bussey D. B. J. Vondrak R. R. Elphic R. C. Gladstone G. R.
Two-Dimensional Distribution of Ice in the Lunar Regolith — Modeling and Interpretation **[#1145]**
We model ice in lunar cold traps under the effects of space weathering. Impacts poke holes creating dry spots at early times. Later, holes outnumber wet spots. Finally, the distribution becomes homogenized. Lateral coherence disappears quickly.

Alford J. A. Hodges A. R. Heggy E. Crotts A. P. S.
Exploring Volatile Deposition in Lunar Regolith **[#2938]**
Various evidence indicates volatiles trapped in the regolith near the lunar poles. We present results from two studies useful in understanding these processes: radar exploration of hydrated regolith and regolith buildup in low-lying areas.

Jacob S. R. Mercer C. N. M.
Tracking the Process of Volatile Release from the Lunar Highland Breccia Meteorite Northwest Africa 2996 Using Vesicle Size Distributions **[#1291]**
Vesicles are frozen records of degassing processes in magmas. We apply quantitative textural analysis methods, commonly used to study gas exsolution in terrestrial volcanism, to explore the role of volatiles in generating vesicular lunar rocks.

Robinson K. L. Taylor G. J. Hellebrand E. Nagashima K.
Water in Evolved Lunar Rocks: Implications for Water Distribution in the Lunar Mantle **[#1727]**
Water concentrations in lunar pyroclastics, mare basalts, and our analyses of KREEP-related rocks indicate that water is distributed heterogeneously in the lunar mantle.

Barnes J. J. Anand M. Franchi I. A. Starkey N. A. Ota Y. Sano Y. Russell S. S. Tartese R.
The Hydroxyl Content and Hydrogen Isotope Composition of Lunar Apatites **[#1797]**
We report δD values and hydroxyl contents of apatite grains from Apollo mare basalt 12064 and lunar mare basalt meteorite Miller Range MIL 05035.

Liu Y. Mosenfelder J. L. Guan Y. Rossman G. R. Eiler J. M. Taylor L. A.
Sims Analysis of Water Abundance in Nominally Anhydrous Minerals in Lunar Basalts **[#1866]**
Preliminary examination of Fe-rich NAMs in lunar basalts shows promising results.

Nunn M. H. Thiemens M. H.
High Precision Oxygen Isotopic Measurements of Water Extracted from Selected Lunar Samples **[#2752]**
We present here the first high precision measurements of oxygen isotopic ratios in water extracted from lunar material and discuss scenarios of water production, transport, and delivery that explain the observed ratios.

Treiman A. H. Gross J.
Abundant Apatite in Granulite 79215: Spoor of Another Volatile-Rich Lunar Fluid **[#1223]**
Lunar granulite 79215 contains abundant apatite concentrated in curvilinear traces, implying deposition from fluid. The fluid was rich in P, F, and Cl, but was not KREEPy; 79215 has P/Sm >> KREEP. Most likely, the fluid was aqueous or a dense vapor.

Ustunisik G. Nekvasil H. Lindsley D. H. McCubbin F. M.
Vapor Phase Evolution During Sequential Degassing of Cl-, F-, H_2O- and S-Bearing Lunar Magams: Insights from Time Studies **[#1879]**
Experiments were conducted as time studies to monitor the changes in relative volatile contents during successive intervals of degassing. The first vapor (after 1 hr) was water-rich; the successive vapor was dry but rich in metal chlorides and fluorides.

Shearer C. K. Jr. Sharp Z. D. McCubbin F. M. Steele A. Burger P. V. Provencio P. P. Papike J. J.
Chlorine Distribution and Its Isotope Composition, Alteration Mineralogy, and Micro-Textural Analysis of "Rusty Rock" 66095. Implications for the Petrogenesis of "Rusty Rock", Origin of "Rusty" Alteration, and Volatile Element Behavior on the Moon **[#1416]**
We examine the isotope composition and distribution of Cl in 66095, and the associated alteration mineralogy to gain additional insights into its petrogenesis, and transport of volatiles in the lunar crust and on the lunar surface.

Boyce J. W. Ma C. Eiler J. M. Baker M. B. Liu Y. Stolper E. M. Taylor L. A.
Sulfur Speciation in Lunar and Terrestrial Apatite **[#2675]**
Apatite from 14072,16, 14053,61, and 14053,241 have S Kα peak shifts consistent with incorporation of both sulfide and sulfate. Sulfur concentration is inversely correlated with the percentage of sulfide.

Wetzel D. T. Jacobsen S. D. Rutherford M. J. Hauri E. H. Saal A. E.
The Solubility and Speciation of Carbon in Lunar Picritic Magmas **[#1535]**
Lunar green glass experiments give new information about the speciation and solubility of carbon in hydrogen-bearing, graphite-saturated picritic melts for a range in oxygen fugacity and pressure at liquidus temperatures.

Newcombe M. Brett A. Beckett J. R. Baker M. B. Newman S. Stolper E. M.
Solubility and Diffusivity of H-Bearing Species in Lunar Basaltic Melts **[#2777]**
We have measured the solubility and diffusivity of water in silicate melts similar in composition to lunar magmas under conditions similar to those thought to exist on the Moon.