Tuesday, March 24, 2009
POSTER SESSION I: LRO AND LCROSS
6:30 p.m. Town Center Exhibit Area

Mazarico E. Neumann G. A. Rowlands D. D. Lemoine F. G. Smith D. E. Zuber M. T.
Multi-Beam Altimetric Crossovers for the Precision Orbit Determination of the Lunar Reconnaissance Orbiter **[#2244]**
We study a new type of altimetric crossovers enabled by LOLA multi-beam configuration. Those use the cross-track information and can help the LRO goal of creating a new lunar reference frame by providing stronger constraints on the orbit.

Greenhagen B. T. Paige D. A.
Overview of the 2009 LRO Diviner Lunar Radiometer Compositional Investigation **[#2255]**
The Compositional Investigation will analyze data from Diviner's nine spectral channels (0.3–300 μm). Diviner's channels are sensitive to different aspects of composition and have the potential to enhance our understanding of the lunar surface.

Thomas I. R. Bowles N. E. Greenhagen B. T.
Reflectance and Emission Measurements of Lunar Analogues for Interpretation of Returning Data from the Diviner Lunar Radiometer on NASA's Lunar Reconnaissance Orbiter (LRO) **[#2110]**
In support of the Diviner Compositional Investigation, spectra of many lunar analogues were measured from UV/VIS to FIR. Reflectance and emission spectra were found for samples with differing mineralogy and grain size, in various atmospheric pressures.

Sanin A. B. Boynton W. Evans L. Harshman K. Kozyrev A. Litvak M. Malakhov A. McClanahan T. Milikh G. Mitrofanov I. Mokrousov M. Sagdeev R. Shevchenko V. Schvetsov V. Starr R. Trombka J. Vostrukhin A.
Lunar Exploration Neutron Detector (LEND) for NASA Lunar Reconnaissance Orbiter: Searching for the Water Ice **[#1249]**
The LEND instrument is orbital neutron telescope for orbital mapping of the Moon's neutron albedo. The LEND instrument on board the NASA LRO spacecraft will measure neutron emission from the lunar surface and the local neutron background in orbit.

Lawrence S. J. Robinson M. S. Jolliff B. L. Bowman-Cisneros E. Tranh T. Stopar J. D. Hawke B. R. Thompson S. D. Koeber S. LROC Targeting Action Team
Preparing to Scout the Next Frontier: Hardware and Operational Constraints Encountered During Targeting of the Lunar Reconnaissance Orbiter Camera Narrow Angle Cameras **[#2316]**
The two Lunar Reconnaissance Orbiter Camera Narrow Angle Cameras (LROC-NAC) will take 0.5m/pixel images of the lunar surface. This abstract details the important hardware and operational constraints on LROC-NAC observations.

Jolliff B. L. Lawrence S. J. Stopar J. D. Robinson M. R. Gaddis L. R. Hawke B. R.
Targeting the Lunar Reconnaissance Orbiter Narrow Angle Cameras: Target Sources and Selection Strategy **[#2343]**
Strategies and resources used by the LRO Camera Team in developing its exploration/science target list are presented.

Tschimmel M. Robinson M. S. Humm D. C. Denevi B. W. Lawrence S. J. Brylow S. Ravine M. Ghaemi T.
Lunar Reconnaissance Orbiter Camera (LROC): Ready for Rocks **[#2475]**
The Lunar Reconnaissance Orbiter Camera (LROC) consists of three cameras: the Wide-Angle Camera and two identical Narrow Angle Cameras. This abstract describes the properties of the instruments and the results of the laboratory calibration efforts.

Heldmann J. L. Colaprete A. Wooden D. Asphaug E. Schultz P. Plesko C. S. Ong L. Korycansky D. Galal K. Briggs G.
Lunar Crater Observation and Sensing Satellite (LCROSS) Mission: Opportunities for Observations of the Impact Plumes from Ground-based and Space-based Telescopes **[#1898]**
The primary objective of the LCROSS mission is to investigate the presence or absence of water on the Moon. Ground-based and orbital observatories can observe the dust and water vapor plume caused by the two impacts into the lunar surface.

Ennico K. Colaprete A. Heldmann J. Kojima G. Lynch D. Shirley M. Wooden D.
Lunar Crater Observation and Sensing Satellite (LCROSS) Science Payload Ground Development, Test, and Calibration **[#1878]**
The Lunar CRater Observation and Sensing Satellite (LCROSS) is an impactor mission designed to target and impact a permanently shadowed region at a lunar polar latitude. This paper describes the payload, testing, and calibration.

Bart G. D. Colaprete A.
Shadow Depths and Other Characteristics of Potential LCROSS Impact Sites **[#2151]**
LCROSS impact site selection is critical to mission success. We discuss the critical constraints site selection, the ongoing work to characterize potential sites, and the most recent work of determining shadow depths at potential impact sites.

Summy D. Goldstein D. B. Colaprete A. Varghese P. L. Trafton L. M.
LCROSS Impact: Dust and Gas Dynamics **[#2267]**
We present results from simulations of the plume resulting from the impact of the LCROSS vehicle(s) into a shadowed lunar polar cold trap. Results may be of particular interest to those planning observations of the H_2O, OH and dust plumes.

Hermalyn B. Schultz P. H. Heineck J. T.
LCROSS Early-Time Ejecta Distribution: Predictions from Experiments **[#2416]**
Experimental results of the early-time ejecta distribution from impacts of projectiles with a range of relative densities are presented, with implications and predictions for the upcoming LCROSS mission.

Tuesday, March 24, 2009
POSTER SESSION I: GEOPHYSICAL ANALYSIS OF THE LUNAR SURFACE AND INTERIOR
6:30 p.m. Town Center Exhibit Area

Reiff P. H. Freeman J. W. Vondrak R.
Apollo ALSEP Results — 40 Years Later **[#2363]**
This paper will discuss the main results from the Apollo/ALSEP SIDE and CPLEE experiments.

Lawrence K. P. Johnson C. L.
Magnetic Characterization of Lunar Samples: Back to Basics **[#1433]**
We present preliminary results of low and high temperature hysteresis, low and high temperature magnetic susceptibility, and Curie temperature analyses of multiple lunar samples.

Chi P. J. Russell C. T. Walker R. J. Williams D. Hills H. K. Mehlman R.
Restoration of Apollo Magnetic Field Data: A Progress Report **[#1894]**
Under the support by NASA's LASER Program we are restoring the Apollo data from Lunar Surface Magnetometer and Subsatellite Biaxial Magnetometer. These restored data will be accessible through a dedicated online server, PDS, and NSSDC.

Halekas J. S. Lillis R. J. Purucker M. E. Louzada K. L. Stewart S. T. Manga M.
Interpreting Lunar Impact Demagnetization Signatures Using Lunar Prospector Magnetometer/Electron Reflectometer Data **[#1354]**
We investigate impact demagnetization signatures observed by Lunar Prospector. We construct crater demagnetization models and compare to observations in order to constrain the strength and coherence scale of lunar crustal magnetization.

Williams J. G. Boggs D. H. Ratcliff J. T.
A Larger Lunar Core? **[#1452]**
New data improves lunar science results. A fluid core and tidal dissipation are inferred from dissipation effects on orientation. Detection of core-mantle boundary flattening and fluid core moment are additional evidence for a fluid core.

de Vries J. van den Berg A. P. van Westrenen W.
The Formation and Evolution of a Lunar Core from Ilmenite-rich Magma Ocean Cumulates **[#1244]**
The possibility of forming an ilmenite-rich core in the moon is studied, using numerical models. It is shown that core density and sharpness of the core-mantle boundary depend on the heat production in and the density of the ilmenite-rich material.

Sakai R. Kushiro I. Nagahara H. Ozawa K. Tachibana S.
Experimental Constraints on Composition of Lunar Magma Ocean from Physical Properties of Magma **[#1839]**
We performed high-pressure experiments to determine density and viscosity of magma with chemical compositions plausible to the anorthosite crust formation in order to put physical and chemical constraints on differentiation of the lunar magma ocean.

Tronche E. J. van Westrenen W.
Experimental Petrology of a Lunar Bulk Composition Constrained by Geophysical Data **[#1782]**
The crystallization sequence and phase chemistry of a cooling lunar magma ocean is experimentally investigated for a new lunar bulk composition relatively Al-poor and Fe-rich derived from inversion of seismic and gravity data.

Bauch K. E. Hiesinger H. Helbert J.
Estimation of Lunar Surface Temperatures: A Numerical Model **[#1789]**
We present global temperature estimates for sunrise, noontime and sunset. This work provides new and updated research on the temperature variations by taking into account the surface and subsurface bulk thermophysical properties.

Weber R. C. Bills B. G. Johnson C. L.
A Simple Physical Model for Deep Moonquakes **[#1870]**
Tidal stress is widely believed to influence the occurrence times of deep moonquakes. We explore several simple models of stress buildup and release that can be used to create moonquake-like time sequences of events.

Kawamura T. Tanaka S. Saito Y. Kobayashi Y. Horai K. Hagermann A.
Re-Determination of Deep Moonquake Sources Using the Apollo 17 Lunar Surface Gravimeter **[#1653]**
We performed the first seismic analysis of deep moonquakes using the Apollo 17 Lunar Surface Gravimeter. We re-determined the seismic source of the deep moonquakes and evaluated the contribution of the LSG.

Mazarico E. Han S.-C. Lemoine F. G. Smith D. E.
A New Solution of the Lunar Gravity Field Using Localized Spectral Constraint **[#2248]**
We use localized spherical harmonics to create a lunar gravity field solution with the Kaula constraint applied only to the far side. The differences with a globally constrained solution are correlated with the topography, suggesting an improvement.

de Meijer R. J. van Westrenen W.
An Alternative Hypothesis for the Formation of the Moon **[#1847]**
We propose an alternative explanation for the compositional correspondence between Moon and silicate Earth: the Moon formed from the ejection of terrestrial mantle material, triggered by a run-away natural georeactor at Earth's core-mantle boundary.

Tuesday, March 24, 2009
POSTER SESSION I:
REMOTE OBSERVATION AND GEOLOGIC MAPPING OF THE LUNAR SURFACE
6:30 p.m. Town Center Exhibit Area

Campbell B. A. Campbell D. B. Carter L. M. Chandler J. Ghent R. R. Nolan M. Anderson R. F.
Earth-Based Radar Mapping of the Lunar Nearside at 12.6-cm Wavelength **[#1275]**
We are collecting a dual-polarization radar backscatter map of the lunar nearside at 12.6-cm (S-band) wavelength and 40-m single-look horizontal spatial resolution.

Wells K. S. Campbell D. B. Campbell B. A. Carter L. M.
Radar Circular Polarization Ratio Determination of Tycho Secondary Craters **[#1778]**
We identify 128 small lunar craters in the Newton-A Crater basin within the furthest extent of a Tycho Crater ray and classify secondary craters within the population by their elongated CPR ejecta blankets parallel to the Tycho ray.

Thompson T. W. Campbell B. A. Ghent R. R. Hawke B. R.
Differences in the Mega-Regolith Depth Across the Moon's Southern Highlands **[#1240]**
Differences in the frequencies of small (1–16 km diameter) radar-bright craters is not uniform across the southeastern nearside lunar highlands indicating a deeper megaregolith depth of 1 km associated with the South Pole Aitken Basin ejecta.

Chevrel S. D. Pinet P. C. Daydou Y. Le Mouélic S. Langevin Y. Costard F. Erard S.
The Aristarchus Plateau on the Moon: Nature and Stratigraphy of the Substratum **[#1234]**
From Clementine UVVIS and NIR spectral data, a statistical analysis and a mixture modeling, we present the mineralogy and the stratigraphy of the materials forming the substratum and volcanic deposits of the Aristarchus Plateau on the Moon.

Souchon A. L. Chevrel S. D. Pinet P. C. Daydou Y. H. Shevchenko V. V. Grieger B. Josset J. L. Beauvivre S. Shkuratov Y. Kaydash V. G. AMIE Team
Characterization of the Optical Properties of J. Herschel Pyroclastic Deposit Using SMART-1/AMIE Photometric Data **[#1237]**
SMART-1 data have been processed to estimate Hapke's photometric parameters on the dark deposit located on the floor of Herschel Crater. The comparison with natural and synthetic terrestrial materials strengthens the case for a pyroclastic origin.

Hawke B. R. Giguere T. A. Lawrence S. J. Campbell B. A. Blewett D. T. Carter L. M. Gaddis L. R. Hagerty J. J. Lucey P. G. Peterson C. A. Smith G. A.
Remote Sensing Studies of Pyroclastic Deposits in the Mare Humorum Region **[#1146]**
The two large regional pyroclastic deposits are dominated by Fe^{2+}-bearing pyroclastic glasses. Portions of the deposits are relatively thick and exhibit smooth, rock-poor surfaces that would be well suited for resource exploitation.

Weider S. Z. Crawford I. A. Joy K. H.
Investigating Oceanus Procellarum Basalt Flows Using Integrated Clementine UV-VIS and NIR Data **[#1573]**
We use UV-VIS and NIR data from Clementine to investigate the basaltic stratigraphy in a region of Oceanus Procellarum. This enables us to study the FeO and TiO_2 compositions, major mafic mineralogy, and extent of space weathering of these deposits.

Srivastava N.
Spectral Reflectance Studies for Maturation Trends in a Mare and Highland Swirl **[#1577]**
Regions shielded by maximum magnetic field intensity in the proto type swirl Reiner Gamma and the one near Airy Crater, have been investigated for maturity trends. Both the cases show differences (though of reversed nature) from the trend seen in nearby unshielded areas.

FuPing G. YanMei Y.
Geological Features Study of the Lunar Surface Using the Lunar Remote Sensing Data **[#1457]**
Taking typical craters of lunar surface as the test areas, using the Clementine UVVIS, NIR and lidar data, we study the relationship between the geological features and physiognomy, analyze the rule of lithology or mineral distribution of the lunar.

Ambrose W. A.
Distribution and Chronostratigraphy of Asymmetric Secondary Craters in the Nectaris Basin **[#1015]**
The Nectaris Basin contains well-preserved examples of radially distributed, asymmetric secondary craters, scours, and crater chains. They are unique morphological features that constrain estimated ages of overlapped landforms in the basin.

Dominov E. Mest S. C.
Geology of Antoniadi Crater, South Pole Aitken Basin, Moon **[#1460]**
Antoniadi crater is unique for three reasons: 1) unique impact crater shape; 2) deep impact depth; and 3) smooth crater floor material. Research was done by utilizing ArcGIS program in mapping the ejecta blanket of Antoniadi and crater counting.

Tuesday, March 24, 2009
POSTER SESSION I: LUNAR SPECTROSCOPY
6:30 p.m. Town Center Exhibit Area

Cheek L. C. Pieters C. M. Dyar M. D. Milam K. A.
Revisiting Plagioclase Optical Properties for Lunar Exploration **[#1928]**
Preliminary NIR analyses of a suite of terrestrial plagioclase identify the 1.3 μm CF absorption and highlight the importance of constraining compositional controls on spectral features and effects of minor absorbing phases in transparent mediums.

Aarthy R. S. Sanjeevi S. Vijayan S. Krishnamurthy J.
Spectral Studies of Anorthosite and Meteorite **[#2216]**
The aim of this study is for the better understanding of the lunar highland surface. Thus for the study anorthosite and meteorite (not yet being approve) spectral studies were carried out.

Foote E. J. Paige D. A. Johnson J. R. Grundy W. M. Shepard M. T.
The Bidirectional Reflectance of Apollo 11 Soil Sample 10084 **[#2500]**
We measured the bidirectional reflectance of Apollo 11 soil sample 10084 using the Bloomsburg University Goniometer (BUG) and fit the measured reflectances using Hapke's photometric model that includes the effects of large-scale roughness.

Li L. Lucey P. G.
Quantifying TiO_2 Abundance of Mare Soils: A Stratified Partial Least Squares Approach to Qualitative Interpretation **[#2226]**
A stratified partial least squares approach is used for the estimation of mare soil samples and qualitative interpretation of the result is achieved using stepwise multivariate regression analysis.

Li L. Lucey P. G.
Use of Multiple Endmember Spectral Mixture Analysis and Radiative Transfer Model to Derive Lunar Mineral Abundance Maps **[#1934]**
A new approach combining multiple endmemeber spectral mixture analysis (MESMA) and radiative transfer model (RTM) is proposed to generate lunar global mineral abundance maps from Clementine 1 km UVVIS data.

Hiroi T. Isaacson P. J. Klima R. L. Pieters C. M. Sarbadhikari A. B. Liu Y. Taylor L. A.
Reproducing Visible and Near-Infrared Reflectance Spectra of Lunar Rocks Directly from Their End-Member Spectra: Importance of Ilmenite in Estimating the Lunar Surface Composition **[#1723]**
Spectral mixing calculations have been performed on the bulk samples and major mineral separates of four Apollo basalts. The results demonstrate the importance of considering coexisting ilmenite in remotely estimating the lunar silicate composition.

Dhingra D.
Lithological Mapping of Lunar Terranes using Hybrid Classification Approach **[#1456]**
A new classification approach integrating mineralogy, elemental composition and maturity for lithological mapping on the lunar surface is discussed.

Donaldson Hanna K. L. Wyatt M. B. Helbert J. Maturilli A. Pieters C. M.
Constraining Lunar Surface Mineralogy with Combined Thermal- and Near-Infrared Spectral Data **[#2286]**
We examine the extent to which combined thermal- and near-infared anayses can be used to constrain the mineralogy of immature lunar surface lithologies using thermal infrared laboratory spectral measurements of minerals, a mineral mixture, and lunar highlands and mare soils.

Stockstill-Cahill K. R. Cahill J. T. S. Lucey P. G. Hawke B. R.
Radiative Transfer Modeling of Lunar Hyperspectral Data **[#1629]**
We have previously developed multispectral methods for deriving minerals from spectra. We are now extending these methods to continuous (hyperspectral) telescopic data for various locations on the nearside of the Moon.

Tuesday, March 24, 2009
POSTER SESSION I: VENUS GEOLOGY, GEOPHYSICS, MAPPING, AND SAMPLING
6:30 p.m. Town Center Exhibit Area

Peters G. H. Mungas G. S. Murray S. D. Polk J. E. Lindeman R. Beegle L.
Venus Analog Testbed for RASP and Sample Collection Testing **[#2518]**
Describes a testbed and method for simulating the fluid conditions of Venus in order to test RASP systems to provide samples during *in situ* missions to Venus.

Sharma S. K. Misra A. K. Clegg S. M. Barefield J. E. Wiens R. C. Quick C. R. Dyar M. D. McCanta M. C. Elkins-Tanton L.
Venus Geochemical Analysis by Remote Raman–Laser Induced Breakdown Spectroscopy (Raman-LIBS) **[#2548]**
The goal of this presentation is to demonstrate that remote Raman – LIBS spectra can be acquired under Venus conditions to yield quantitative geochemistry on Venus-analog rocks.

Treiman A. H.
Canali-forming Magmas: Generation of Carbonate-Sulfate Melts on Venus **[#1347]**
Venus' canali, long meandering channels, may have carried carbonate-sulfate (carbonatite) melts. Such liquids may arise by melting weathered basalt, which requires geotherms much hotter than Venus' average, or another heat source (intrusion, impact).

Orth C. P. Solomatov V. S.
The Effects of Dynamic Topography and Thermal Isostasy on the Topography and Geoid of Venus **[#1811]**
The magnitude of the dynamic topography on Venus is small. Long wavelength global geoid and topography anomalies can be explained by thermal thinning of a thick lithosphere with only a limited contribution from crustal thickness variations.

Guseva E. N.
Spacing of Structures in the Rift- and Groove Belt-related Coronae on Venus **[#1152]**
The spacing values of structures in the rims of the rift- and groove belt-related coronae on Venus appear to be almost identical.

Martin P. Stofan E. R. Smrekar S. E.
Volcano-Tectonics on Venus: A Comparison of Parga and Hecate Chasmata and Perunitsa and Khosedem Fossae **[#1041]**
In this study, we are undertaking comparative analysis of chasmata and fracture belt systems on Venus over a range of scales, to help constrain models of the formation and evolution of rift systems and associated volcanic processes on Venus.

Hansen V. L. López I.
Implications of Venus Evolution Based on Ribbon Tessera Terrain Relations Within Five Large Regional Areas **[#2306]**
We examine ribbon tessera terrain outcrop and structural relations within five large regional areas: A) lowland environment, B) lowland-volcanic rise transition, C) volcanic rise environment, D) mesoland environment, and E) a single planitia basin.

Gleason A. L. Glaze L. S. Herrick R. R. Garvin J. B.
Stereo-derived Topography from the Venus Magellan Dataset: An Assessment of the Quantitative Scientific Value of Sub-km DEM Products **[#1253]**
Quantitative information is difficult to extract from sub-km DEMs (derived from stereo SAR images) on surface properties and processes for a range of different landforms on Venus, including tesserae, coronae, lava flows, and lava channels.

Ivanov M. A.
Embayed Craters on Venus: How do They Correspond to the Catastrophic and Equilibrium Resurfacing Models? **[#1150]**
The style of resurfacing on Venus changed significantly during the observable portion of the geologic history from the catastrophic resurfacing to the equilibrium resurfacing.

Ivanov M. A. Head J. W.
Geological Mapping of the Fortuna Tessera Quadrangle (V-2), Venus: Preliminary Results **[#1151]**
Preliminary results of the geological mapping in the V-2 quadrangle on Venus are presented.

Hurwitz D. M. Head J. W.
Geologic Map of the Snegurochka Planitia Quadrangle (V1): Implications for Tectonic and Volcanic History of the North Polar Region of Venus **[#1174]**
We present our progress in mapping the spatial and stratigraphic relationships of material units of Snegurochka Planitia (V1) and our initial interpretations of the tectonic and volcanic history of the region surrounding the north pole of Venus.

Tuesday, March 24, 2009
POSTER SESSION I: PLANETARY DIFFERENTIATION
6:30 p.m. Town Center Exhibit Area

Kegler Ph. Holzheid A. McCannon C. Rubie D. C. Palme H.
Pressure and Temperature Dependent Partitioning of Copper: Implications for Terrestrial Core Formation **[#1685]**
To better understand the abundance of Cu in the Earth's mantle we studied the metal - silicate partitioning of Cu as function of P, T, silicate composition, and alloy composition (Cu, Fe, Ni, and C contents). The first results are presented here.

Yu G. Jacbosen S. B.
Core Formation and the Fe/FeO Ratio of the Earth, Mars and Vesta: Constraints from the ^{182}Hf-^{182}W System **[#2123]**
A dynamic core-formation model with a deep magma ocean for the Hf-W system, which can match the partitioning of Ni, Co and W in mantles of Earth, Mars and Vesta and yield mean age of formation of these planets of 12, 8 and 3 Myr respectively.

Prissel T. Colson R. O.
Additional Experiments Suggesting that Neutral Nickel is Soluble in Silicate Melts at Low Concentration **[#1172]**
Metal nuggets occur in experiments run at low fO_2 in silicate systems. We find a correlation between quench rate and nugget size, suggesting nuggets form during quench and neutral nickel may be an important species during differentiation at low fO_2.

Sharp Z. D. Draper D. S. Agee C. B.
Core/Mantle Partitioning of Chlorine and a New Estimate for the Hydrogen Abundance of Earth **[#1209]**
The core/mantle D value for chlorine was determined experimentally to be less than 0.01 at high P-T. Using mantle and crustal Cl abundances, and the H/Cl ratio of chondrites, the H content of Earth is estimated to be 2.8×10^{24} g or less.

Khan A. Connolly J. A. D.
A Geophysical Perspective on the Major Element Composition of Mars' Mantle **[#1013]**
We have inverted a set of areophysical data for Mars' mantle compostion andcore state, size and composition. We find an overall SNC-like mantle composition, with no transition to a lower mantle taking place as on Earth. Core radius and density are ~1680 km and ~6.7 g/ccm.

Elkins-Tanton L. T.
Early Planetary Evolution: The Crust and Mantle Before Plate Tectonics **[#1298]**
Magma ocean models that include small water contents predict a potentially important redistribution of mantle water, a "water catastrophe," after solidification. This event introduces fluid to the upper mantle and may speed onset of plate tectonics.

Gelman S. E. Elkins-Tanton L. T. Seager S.
Mantle Thermal Evolution in Tidally-locked Super-Earths **[#1338]**
We present a preliminary model of the mantle thermal evolution for tidally locked Super Earths and investigate the presence of magma ponds and liquid water/the habitable zone.

Duncan M. S. Agee C. B.
Partial Molar Volume of CO_2 in Peridotite Partial Melt at High Pressure **[#1406]**
Using the sink/float method with carbonated and non-carbonated peridotite partial melts, the partial molar volume of CO_2 is calculated at high pressure.

Riches A. J. V. Rogers N. W. Charlier B. L. A. Bodinier J.-L.
The Earth as a Planet: The Re-Os Isotope Evolution of Bulk Silicate Earth **[#1726]**
Re-Os isotopes provide pertinent age information in the Lherz peridotite (the type locality of terrestrial mantle lherzolite), and are used to constrain the composition and evolution of bulk silicate Earth.

Luo Y. Yin Q. Z. Ayers J. C. Ryerson F. Hutcheon I.
Experimental Measurements of Zircon/Melt Trace Element Partition Coefficients: Key Issues and Possible Solutions with Nano-SIMS **[#2516]**
We highlight the current problems with obtaining zircon/melt trace-element partition coefficient data and point out that Nano-SIMS *in situ* analysis at the zircon/melt interface (< submicron scale) may solve the long standing problem.

Ricolleau A. Fei Y. Castro V.
Oxygen Partitioning Between Metallic Alloy and Silicate Melts **[#2340]**
We investigated the solubility of oxygen in metallic alloy, such as Fe, Fe-Ni, Fe-Ni-S, Fe-Ni-S-C, in the presence of silicates melts, at 2 and 8 GPa, and at 2000° and 2600°C.

Larson A. L. Colson R. O.
Reintepretation of Observed Effects of CO on Crystallization in Silicate Melts at 1-Atmosphere Pressure **[#1343]**
We observe an effect of CO at 1-atm pressure on crystal growth in silicate melts, concluding that at least some of the observed effect is related to an effect of CO on melt quenchability.

Gupta G. Sahijpal S.
Planetary Differentiation of Vesta with ^{26}Al and ^{60}Fe as Heat Sources **[#1530]**
Numerical simulations have been performed for the planetary differentiation of Vesta and other differentiated meteorite parent bodies with ^{26}Al and ^{60}Fe as heat sources.

Tuesday, March 24, 2009
POSTER SESSION I: BUNBURRA AND BUZZARD COULEE: RECENT METEORITE FALLS
6:30 p.m. Town Center Exhibit Area

Hutson M. L. Ruzicka A. M. Milley E. P. Hildebrand A. R.
A First Look at the Petrography of the Buzzard Coulee (H4) Chondrite, a Recently Observed Fall from Saskatchewan **[#1893]**
Buzzard Coulee is a recent (November 20, 2008) fall from Saskatchewan, Canada. Here we discuss the classification of this meteorite and point out some unusual features, including abundant cryptocrystalline chondrules and igneously-textured light-colored inclusions.

Walton E. L. Herd C. D. K. Duke M. J. M.
Mineralogy, Petrology and Cosmogenic Radionuclide Chemistry of the Buzzard Coulee H4 Chondrite **[#2072]**
The Buzzard Coulee H4 chondrite was collected as fragments from a fireball witnessed at 5:23.46 MST on November 20, 2008 by thousands of residents across the Canadian prairies.

Spurny P. Bland P. A. Borovička J. Shrbený L. McClafferty T. Singelton A. Bevan A. W. R. Vaughan D. Towner M. C. Deacon G.
The Bunburra Rockhole Meteorite Fall in SW Australia: Determination of the Fireball Trajectory, Luminosity and Impact Position from Photographic Records **[#1498]**
We present basic data of the Bunburra Rockhole, the new photographically recorded meteorite fall by the Desert Fireball Network in SW Australia. It is the first achondrite with known orbit and the first such meteorite fall in the southern hemisphere.

Tuesday, March 24, 2009
POSTER SESSION I: METEORITES: TERRESTRIAL HISTORY
6:30 p.m. Town Center Exhibit Area

Jourdan F. Maier W. Andreoli M. A. G. McDonald I.
$^{40}Ar/^{39}Ar$ Thermochronology of a Fossil LL Chondrite from Morokweng Crater, South Africa **[#1221]**
$^{40}Ar/^{39}Ar$ thermochronology applied to plagioclase from the Morokweng LL chondrite possibly suggests large asteroid collisional (breakup?) events at ~2Ga and ~0.7 Ga and records the age of the impact on Earth at ~145 Ma.

Welten K. C. Nishiizumi K. Caffee M. W. Leclerc M. D. Jull A. J. T.
Cosmogenic Radionuclides in Chondrite Shower from Otway Massif, Antarctica **[#1488]**
Cosmogenic radionuclides in ordinary chondrites from the first strewnfield identified in Antarctica indicate that the strewnfield was preserved since its fall ~15 kyr ago, while cautioning that not all meteorites in the strewnfield area represent the same fall.

Heck P. R. Ushikubo T. Schmitz B. Kita N. T. Spicuzza M. J. Valley J. W.
High-Precision Oxygen Three-Isotope SIMS Analyses of Ordovician Extraterrestrial Chromite Grains from Sweden and China: Debris of the L Chondrite Parent Asteroid Breakup **[#1119]**
High-precision 3-O isotope SIMS data provide strong evidence chromite grains from 470 Ma fossil meteorites from Sweden and fossil micrometeorites from Sweden and China are genetically related to each other and to the L chondrite parent body breakup.

Losiak A. Velbel M. A.
Geographic Influences on Evaporite Formation During Weathering of Antarctic Meteorites **[#1394]**
The aim of this paper is to research influence of geographic location of meteorite-bearing ice fields on evaporite occurrence.

Tuesday, March 24, 2009
POSTER SESSION I: CAIs AND CHONDRULES: RECORDS OF EARLY SOLAR SYSTEM PROCESSES
6:30 p.m. Town Center Exhibit Area

Makide K. Nagashima K. Krot A. N. Huss G. R.
Oxygen Isotopic Compositions of Solar, Micrometer-sized Corundum, Hibonite and Spinel Grains in Acid-resistant Residues from Ordinary and Carbonaceous Chondrites **[#2079]**
We report O-isotope compositions of refractory oxide grains in acid-resistant residues from primitive chondrites using the UH ims-1280 ion microprobe. They are consistent with $\Delta^{17}O$ values of the solar nebular and the Sun, ~−25‰, inferred from CAIs.

Craig J. Sears D. W. G.
Induced Thermoluminescence Properties of Forsterite and Implications for the History of Primitive Solar System Materials **[#1169]**
A study of micrometeorites and Semarkona matrix indicated forsterite is responsible for the TL. We examined forsterite from several terrestrial environments. Results indicated the forsterite in these materials may have an igneous origin, possibly from chondrule formation.

Ma C. Beckett J. R. Rossman G. R. Connolly H. C. Jr. Guan Y. Eiler J. M. Hofmann A. E.
In-Situ Discovery of a Cluster of Refractory Grains in an Allende Ferromagnesian Chondrule **[#2138]**
A unique corundum-rich cluster of irregular micrometer-sized refractory grains has been discovered in a type IA chondrule from Allende. The cluster also contains refractory phases of rutile, khamrabaevite, and a new mineral Ti_2O_3.

Boesenberg J. S. Ebel D. S.
Experiments to Confirm Condensed Phase Assemblages Predicted by Equilibrium Thermodynamic Calculation in Dust-Enriched Systems: Preliminary Results **[#2125]**
Experiments were run to investigate Cr-bearing, Mg-, Al-spinel assemblages that are predicted to form during condensation in dust-enriched systems. The spinels are compared to natural Cr-rich spinels found in the carbonaceous chondrite, Allende.

Hood L. L. Ciesla F. J. Artemieva N. A. Marzari F. Weidenschilling S. J.
Chondrule Formation in Nebular Shock Waves Generated by Planetesimals Passing Through Jovian Resonances: Relative Importance of Bow Shocks and Impact Shocks **[#1775]**
We investigate (a) the relative importance for chondrule formation of planetesimal bow shocks and impact shocks; and (b) whether these shocks were numerous and widespread enough to explain the observed abundance of chondrules in chondrites.

Morris M. A. Desch S. J. Ciesla F. J.
Tying Up Loose Ends in Chondrule Formation by Shocks **[#2300]**
We discuss two unresolved issues in modeling nebular shocks: the appropriate input radiation boundary condition and the dust opacity. Resolving these issues and line cooling now allows a full calculation of shock-heated chondrule thermal histories.

Bouvier A. Wadhwa M. Simon S. B. Grossman L.
Magnesium Isotope Compositions of Chondrules from the Murchison and Murray Carbonaceous Chondrites **[#2193]**
We present new Mg isotope compositions of petrographically well-characterized chondrules from Murchison and Murray CM2 carbonaceous chondrites with the goal of understanding their formation processes and time scales.

Das J. P.
Fe/Mg-Fe/Mn Systematics of Chondrules and Their Host Chondrites: Clues for Their Evolution **[#1497]**
Fe-Mg-Mn diagram is used for chondrules and bulk of Semarkona (LL3.0), Chainpur (LL3.4), Allende (CV3), Renazzo (CR2) and Qingzhen (EH3) to understand effect of the major processes that have affected chondrites and chondrules during nebular and planetary stage evolution.

Fries M. Steele A.
Graphite Whiskers Discovered in CV3 Meteorites **[#2514]**
We report the serendipitous discovery of a small number of graphite whiskers (GWs), a rare polymorph of carbon, in a range of settings within several CV3 meteorites and present implications pertaining to meteoritics and astronomy for this finding.

Hewins R. H.
Minor Element Zoning of Olivine in Type IIA Chondrules in Semarkona **[#1669]**
P-rich zones, preserved because P diffuses slowly, mark periods of rapid growth and generally show continuous crystallization of olivine grains. They also mark onset of growth on resorbed relict grains. P X-ray maps can clarify the evolution of individual chondrules.

Varela M. E. Zinner E. Kurat G.
Chondrule Tieschitz IIIM: Clues to the Origin of Early Liquids? **[#1390]**
We report the results of an ASEM and SIMS study of Tieschitz IIIM, a porphyritic olivine chondrule that is very rich in microcrystalline mesostasis, from the Tieschitz (H3.6) unequilibrated ordinary chondrite.

Teitler S. A. Paque J. M. Cuzzi J. N. Hogan R. C.
Statistical Tests of Turbulent Concentration of Chondrules **[#2388]**
Statistical tests of several sets of chondrules support the hypothesis of sorting by an aerodynamic process, specifically the turbulent concentration mechanism. The tests rule out several other classes of sorting mechanisms.

Petaev M. I.
Revised Thermodynamic Properties of Ca Aluminates: Implications for the Condensation Sequences **[#2407]**
I provide a new dataset of thermodynamic properties of hibonite, grossite, and dmitryivanovite and discuss how it affects condensation sequences.

Jacobsen B. Matzel J. Hutcheon I. D. Ramon E. Krot A. N. Ishii H. A. Nagashima K. Yin Q.-Z.
The ^{36}Cl-^{36}S Systematics of Wadalite from the Allende Meteorite **[#2553]**
The AJEF wadalite shows very large ^{36}S excesses correlated with the respective ^{35}Cl/^{34}S ratios. The slope of the best-fit line through the data yields an inferred ^{36}Cl/^{35}Cl ratio at the time of wadalite formation of $(17.2 \pm 2.5) \times 10^{-6}$.

Bullock E. S. MacPherson G. J.
A Pristine Amoeboid Olivine Aggregate Protolith from the Vigarano CV3 Chondrite **[#2385]**
A recently discovered amoeboid olivine aggregate from Vigarano CV3 chondrite contains a refractory, melilite-rich spherule that will allow high-precision Al-Mg isotopic dating, and will help to constrain the ages of these types of inclusion.

Farkaš J. Yu G. Huang S. Petaev M. I. Jacobsen S.
Formation of CAIs: Constraints from the Calcium Isotope Composition of CAI (SJ101) from the Allende CV3 Chondrite **[#2036]**
We present results of mass-dependent and non-mass-dependent calcium (Ca) isotope variations in the Ca-Al Rich Inclusion (CAI) from the Allende meteorite.

Tuesday, March 24, 2009
POSTER SESSION I: VOLATILE AND ORGANIC COMPOUNDS IN CHONDRITES
6:30 p.m. Town Center Exhibit Area

Orthous-Daunay F. R. Quirico E. Lemelle L. Beck P. De Andrade V. Simionovici A. Derenne S.
Sulfur Speciation in Carbonaceous Chondrites HF/HCl Residues by S K-Edge XANES Microspectrometry **[#1777]**
Sulfur oxidation state of insoluble OM from 3 CI1, 5 CM2, Renazzo (CR2) and Tagish Lake was determined by S-XANES. Different redox ratios are reported among these chondrites, possibly evidencing chemical effects of hydrothermalism.

Court R. W. Sephton M. A.
Volatile Yields Upon Pyrolysis of Carbonaceous Chondrites as Determined by Quantitative Pyrolysis-Fourier Transform Infrared Spectroscopy **[#1556]**
We have used quantitative pyrolysis-fourier transform infrared spectroscopy to determine the production of water and carbon dioxide upon the stepped pyrolysis of a range of carbonaceous chondrites.

Hilts R. W. Herd C. D. K. Morgan D. Edwards L. Huang Y.
Carboxylic Acid Abundances in the Tagish Lake Meteorite: Lithological Differences and Implications for Formic Acid Abundances in Carbonaceous Chondrites **[#1925]**
Analysis of two different Tagish Lake rocks found: 1) a very low GCMS response for formic acid, 2) formic acid concns above 100 ppm and 3) that formic acid to higher homologue ratios indicate the average level of oxidation for the soluble organics.

Wilson K. B. Wilson T. L.
Radial Breathing Modes in Cosmochemistry and Meteoritics **[#1627]**
Radial breathing modes in Raman spectra are “smoking gun” signatures of some Q-phase candidates in cosmochemistry and meteoritics. These active vibrational modes are either ignored or are not being reported. The resolution of Q depends upon them.

Tuesday, March 24, 2009
POSTER SESSION I: CRASHING CHONDRITES: IMPACT, SHOCK, AND MELTING
6:30 p.m. Town Center Exhibit Area

Frank E. A. Wittmann A. Kring D. A.
Petrography and Metallographic Cooling Rate of H-Chondrite Impact Melt Breccia LAP 04751 **[#2034]**
An impact event melted a portion of the H-chondrite parent body, mixing with surviving clastic material. The melt-rich breccia was deposited as a thin unit at a depth <10 m, implying an ejecta blanket or the uppermost fraction of a breccia lens.

Schrader D. L. Lauretta D. S. Connolly H. C. Jr. McCoy T. J. Greenwood R. C. Franchi I. A.
NWA 4477: A Unique Impact Melt Breccia. **[#1854]**
We discuss a unique impact melt breccia, NWA 4477.

Ozawa S. Ohtani E. Terada K.
Pressure and Timing of the Shock Events Recorded in L6 Chondrites **[#1474]**
Shock pressures of two L6 chondrites (Sahara 98222 and Yamato 74445) were estimated based on the mineralogy of shock melt veins. We also estimated the impact age of Sahara 98222 based on U-Pb dating of phosphates in and around the shock melt veins.

Niihara T. Kaiden H. Misawa K. Sekine T.
U-Pb Isotopic Systematics of Experimentally Shocked Baddeleyite **[#1562]**
We performed shock recovery experiments on baddeleyite at the shock pressures of 24, 34, and 47 GPa. The data on U-Pb isotope and corresponding ages for experimentally shocked baddeleyite are indistinguishable from those of unshocked baddeleyite.

Fürj J. Gyollai I. Bérczi Sz. Gucsik A. Nagy Sz. Veres M.
Raman Spectroscopy of Shocked Olivine in the Hungarian L-Chondrite, Mócs **[#1110]**
Mócs (L5) meteorite contains shock-metamorphic effects in olivines: (1) weak-moderate shock mosaicism, (2) PF's and PDF's, and (3) presence of highly deformed olivine grains indicated by wadsleyite peaks of their Raman spectra.

Hutson M. L. Hugo R. Ruzicka A. M. Rubin A. E.
Olivine Microstructures in the Miller Range 99301 (LL6) Ordinary Chondrite **[#1081]**
We used Transmission Electron Microscope (TEM) imaging to examine microstructures in MIL 99301 (LL6) olivine grains in order to understand more fully this meteorite's deformation and thermal history.

Gyollai I. Fürj J. Bérczi Sz. Gucsik A. Nagy Sz.
Petrographic Study of Thermal and Shock Metamorphism of the Hungarian L-Chondrites: Mezomadaras (L3,7), Knyahinya (L5), and Mócs (L6). **[#1066]**
We studied by optical microscopy and Raman spectroscopy three Hungarian L-chondrites and we observed mineralogical signals of the shock stages of Mezomadaras (S2-S3), Knyahinya (S4), and Mócs (S3-S5).

Izawa M. R. M. Flemming R. L. Banerjee N. R.
Shock Stage Assessment and Petrography of 11 Antarctic Enstatite Chondrites **[#1322]**
EH and EL chondrites from a range of metamorphic grades were assessed for petrographic indicators of shock. A micro X-ray diffraction technique was used to determine lattice mosaicity. Moscaicity and petrographic shock stage are well correlated.

Dixon L. Herd R. K. Samson C. Hunt P. A.
A Detailed Investigation of the Mineralogy and Textures of the L4 Ordinary Chondrite Saratov **[#1465]**
SEM documentation and textural interpretation of 370 chondrules >100 microns in diameter, in a single polished thin section of Saratov, is revealing their complex histories. A revised classification scheme for chondrules is envisaged, reflecting their origins and processing.

Tuesday, March 24, 2009
POSTER SESSION I: UREILITE STUDIES
6:30 p.m. Town Center Exhibit Area

Trappitsch R. Cosarinsky M. Hofmann B. Leya I.
Noble Gas Studies of the Ureilites Kenna and Ramlath As Samah 247 **[#1246]**
We present noble gas data on two ureilites, Kenna and RaS 247 (desert find). Our measurements indicate cosmogenic He and Ne release at low temperatures, Ar is mostly primordial. Total gas concentrations are highly variable within the samples.

Jakubowski T. Karczemska A. Kozanecki M. Gucsik A. Stanishevsky A. Mitura S.
Micro-Raman Spectroscopy of Diamonds from Hot Desert Ureilites **[#1382]**
The samples of all types of ureilites, from less shocked up to highly shocked, were examined using Raman spectroscopy and Scanning Electron Microscopy. The results show the presence of diamonds in all of our samples.

Garren M. K. Singletary S. J. Bell D. R. Busek P. R.
Ureilite Lithium Isotopic Composition **[#1668]**
Lithium abundances and isototpic compositions from three ureilites are reported. Spot analyses reveal spatial correlations between abundances and isotopic compositions with features such as cracks, grain boundaries and the ubiquitous reduced rims.

Gabriel A. D. Pack A.
Ureilite Vein Metal — Indigeneous or Impact Material? **[#2462]**
Ureilite vein metal is not in chemical and isotopic equilibrium with ureilite silicate. We discuss if the vein metal can be produced by solid/liquid-fractionation in the parent body or if an outside source is nessary.

Goodrich C. A. Van Orman J. A. Domanik K. Berkley J. L.
Metal in Ureilites: Petrologic Characterization **[#1132]**
Metal and siderophile elements in ureilites appear to be inconsistent with a smelting model. We address this problem with detailed petrographic and trace element characterization of the types of metal in ureilites.

Le Guillou C. Rouzaud J. N. Remusat L. Bourot-Denise M. Jambon A.
Coupled Raman/TEM Study of an Ureilite Carbon Phases Compared to Shocked Graphite Analogs: Implication for Shock History and Noble Gases Carriers Evolution **[#2108]**
Carbons in an ureilite compared with analogs of shocked graphite suggest the presence of two diamond generation. The disordered carbon identified as a diamond coating may contain the noble gases released at low temperature in the mass spectrometer.

Tuesday, March 24, 2009
POSTER SESSION I: PETROLOGY AND MINERALOGY OF THE SNC METEORITES
6:30 p.m. Town Center Exhibit Area

Bunch T. E. Irving A. J. Wittke J. H. Rumble D. III Korotev R. L. Gellissen M. Palme H.
Petrology and Composition of Northwest Africa 2990: A New Type of Fine-grained, Enriched, Olivine-Phyric Shergottite **[#2274]**
We characterize a fine-grained martian magmatic rock that is different from those previously described.

Satake W. Mikouchi T. Makishima J. Miyamoto M.
Comparison of Redox States Between Geochemically-Intermediate and Enriched "Lherzolitic" Shergottites **[#1717]**
We analyzed geochemically-intermediate (ALH77005 and LEW88516) and enriched (RBT04262 and NWA4468) lherzolitic shergottites to compare their redox states. Fe-XANES analysis of ulvospinel in enriched samples showed slightly higher Fe^{3+} abundance.

Shearer C. K. Burger P. V. Papike J. J. Karner J.
ComparisonsBetween RBT 04262 and lherzolitic Shergottites (ALHA 77005 and LEW 88516) **[#1300]**
In this poster, we compare lithology A in RBT 04262 to two other lherzolitic shergottites to gain a better understanding of the petrogenesis of RBT 04262 and the lherzolitic shergottites, and their relationship to the basalts that produced the complete suite of shergottites.

O'Sullivan K. M. Neal C. R.
The Crystal Stratigraphy of Shergotty **[#1709]**
Pyroxene crystal size distributions, residence times, and geochemical variations are presented.

Mikouchi T.
Petrological and Mineralogical Diversities Within the Lherzolitic Shergottites Require a New Group Name? **[#2272]**
"Pyroxene-oikocrystic" shergottite can be an appropriate group name of lherzolitic shergottite because recent discovery of new shergottites such as RBT 04262 and NWA 4468 has revealed petrological and mineralogical diversities of this group.

Pinet P. C. Clenet H. Heuripeau F. Chevrel S. D. Rosemberg C. Daydou Y. Toplis M. Baratoux D.
Mafic Mineralogy of Martian Meteorites Based on a Systematic Deconvolution Using an Improved Modified Gaussian Model (MGM) Approach **[#1612]**
An improved MGM deconvolution procedure tested on SNC reflectance spectra leads to reliable detection of complex mafic lithologies based on the band positions in the 1 and 2 µm domains, with implications for interpreting the martian spectra.

Hui H. Peslier A. Lapen T. J. Brandon A. Shafer J.
Northwest Africa 5298: A Basaltic Shergottite **[#2087]**
Martian meteorite NWA 5298 found in 2008 is a moderately-evolved "enriched" shergottite. It is mainly composed of pyroxene grains with complex composition zoning and lath-shaped maskelynite. Oxygen fugacity recorded by Fe-Ti oxides is about QFM.

Basu Sarbadhikari A. Liu Y. Day J. M. D. Taylor L. A.
Olivine-hosted Melt Inclusions in Olivine-Phyric Shergottite LAR 06319 **[#1173]**
A newly-found, Antarctic, olivine-phyric shergottite, LAR 06319 which contains an enriched REE signature are studied. The results on olivine-hosted MI and their implications on the evolution of the LAR 06319 parental melt are reported.

Galenas M. G.. Jones J. H. Danielson L. R.
Experimental Crystallization of Yamato 980459 **[#1920]**
Fractional and equilibrium crystallization experiments find a correlation between major element compositions and differences in minor element compositions between Y-980459 and QUE 94201 suggesting that Y-98 is not a parental melt for QUE.

Draper D. S.
Yamato 980459 Liquid Line of Descent at 0.5 GPa: Approaching QUE94201 **[#1696]**
Anhydrous equilibrium crystallization experiments on a synthetic Yamato 980459 composition at 0.5 GPa produce residual liquids approaching the composition of QUE 94201.

Karner J. M. Papike J. J. Shearer C. K. Burger P. V.
Chemical Signatures in Plagioclase from Martian Meteorites **[#1327]**
Plagioclase composition holds signatures of planetary origin and igneous history.

Channon M. B. Bonifacie M. Stolper E. M. Eiler J. M.
Oxygen Isotope Compositions of Mineral Separates from SNC Meteorites: Constraints on the Petrogenesis of Martian Magmas **[#2450]**
Oxygen isotope data of martian meteorites from whole rock measurements may not reflect the isotopic composition of martian magmas. This study uses mineral separates to reconstruct oxygen isotope melt values and constrain mantle characteristics.

Nagao K. Park J. Okazaki R. Imae N. Kojima H.
Noble Gas Distribution in the Yamato 000593 Nakhlite Deciphered by Laser Ablation Analysis and Mineral Separation **[#1682]**
Noble gases measured for olivine, plagioclase and pyroxene separates, and by laser ablation on thin plate prepared from Y-000593 nakhlite indicate that plagioclase and/or mesostasis are the main carrier of elementally fractionated martian atmosphere.

Cartwright J. A. Burgess R. Gilmour J. D.
Xenon Isotopes in Shergottites RBT 04262, DaG 489, Shergotty and EET 79001 **[#1907]**
Xenon isotope analysis has been performed on mineral separates of shergottites EET 79001, Shergotty, DaG 489 and RBT 04262. All meteorites show similar distribution of martian components, except for clear overprinting from terrestrial contamination.

Tuesday, March 24, 2009
POSTER SESSION I: MARTIAN METEORITES
6:30 p.m. Town Center Exhibit Area

Albarede F. Bouvier A. Blichert-Toft J.
More Old News from Martian Meteorites **[#1914]**
We report new Pb isotopic data on whole-rocks and minerals from RBT 04262 (shergottite), MIL 03346 (nakhlite), and ALH 84001. ALH 84001 carbonates and silicates give ages of ca. 4.1 Ga. All SNC formed in three episodes dated at 4.3, 4.1, and 1.3 Ga.

Jagoutz E. Bowring S. Jotter R. Dreibus G.
New U-Th-Pb Data on SNC Meteorite ALHA 84001 **[#1662]**
We report new Th-U-Pb data on ALHA 84001. A ^{206}Pb-^{207}Pb age of 4135 ± 12 Ga and U – Pb of 41173 ± 2,3 are found. However, ^{208}Pb systematic is not consistent with U – Pb evolution, Th-Pb system shows a much younger age of 2926 ± 410 Ma.

Righter M. Lapen T. J. Brandon A. D. Beard B. L. Shafer J. T. Peslier A. H.
Lu-Hf Age and Isotope Systematics of ALH 84001 **[#2256]**
Lu-Hf age and isotope data of ALH 84001 yields crystallization age of 4086 ± 30 Ma and an initial εHf of –4.76 ± 1.04, indicating this meteorite is derived from ancient enriched reservoir on Mars.

Shafer J. T. Brandon A. D. Lapen T. J. Righter M. Beard B. Peslier A. H.
Lu-Hf Age of Martian Meteorite Larkman Nunatek 06319 **[#1803]**
The Lu-Hf age of martian meteorite LAR 06319 is 197 ± 29 Ma. An initial ε^{176}Hf of –18.0 is similar to other enriched shergottites (Shergotty, Zagami, RBT 04262, and Los Angeles) and extend the existing data set for the enriched shergottite group.

Park J. Ming D. W. Garrison D. H. Jones J. H. Bogard D. D. Nagao K.
Noble Gas Analysis for Mars Robotic Missions: Evaluating K-Ar Age Dating for Mars Rock Analogs and Martian Shergottites **[#2186]**
Noble gas investigation was organized for the possibility of measuring noble gases in martian rocks and air by future robotic missions such as MSL. We suggest the possibility of K-Ar age dating by lab simulation experiments on MORB and martian meteorites.

Greshake A. Fritz J.
Discovery of Ringwoodite, Wadsleyite, and γ-$Ca_3(PO_4)_2$ in Chassigny: Constraints on Shock Conditions **[#1586]**
The olivine high-pressure polymorphs ringwoodite and wadsleyite as well as the high-pressure phosphate γ-$Ca_3(PO_4)_2$ were discovered in melt pockets of the martian dunite Chassigny attesting a minimum prevailing shock pressure of ~20 GPa.

Walton E. L. Irving A. J. Bunch T. E. Kuehner S. M. Herd C. D. K.
Extreme Shock Effects in Relatively Enriched Shergottite Northwest Africa 4797 **[#1464]**
NWA 4797 is distinguished by its strong degree of shock damage, representing a growing group of martian meteorites shocked to pressures >55 GPa, previously represented only by Dhofar 378.

Fritz J. Greshake A.
Petrographic Constraints on Shock Induced P/T Conditions in Shergottites **[#1581]**
Quantitative shock pressure barometry and post shock temperature calculations of rock forming minerals are presented. The two independent data sets are in good agreement with the petrographic observations in shergottites.

Kurihara T. Mikouchi T. Saruwatari K. Kameda J. Miyamoto M.
Fe-Ni Metal and Magnetite Nano-Particles in "Brown" Color Olivines from Martian Meteorites **[#1049]**
Our TEM study revealed that brown olivines in Dhofar 019, LAR 06319 and NWA 1950 contained magnetite nano-particles instead of Fe-Ni metal nano-particles. These results indicate that magnetite nano-particles are widely present in martian meteorites.

Hoffmann V. H. Mikouchi T. Kurihara T. Funaki M. Torii M.
Magnetic Signature of Experimentally Shocked San Carlos Olivines: Simulation of the Neoformation Processes of Nano-sized Fe-Ni and Magnetite Particles in Brown Colored Olivines of Some Martian Meteorites (SNC) **[#2194]**
The magnetic signature and phase composition of experimentally shocked San Carlos olivines is investigated. The basic idea is to simulate the likely neoformation processes of nano-sized Fe-Ni/Magnetite particles in brown colored olivines of some martian meteorites.

Tuesday, March 24, 2009
POSTER SESSION I: PHOENIX LANDING SITE: PERCHLORATE AND OTHER TASTY TREATS
6:30 p.m. Town Center Exhibit Area

Sykulska H. M. Pike W. T. Vijendran S.
Microscopy Analysis of the Salt Content of Soil and Dust at the Phoenix Landing Site **[#2366]**
Colour and spatial information of the material in the soil is combined to give a measure of the salt concentration. Analysis of various samples allows lateral and vertical comparison of salt content of the soil.

Sutter B. Lauer H. V. Golden D. C. Boynton W. V. Morris R. V. Niles P. B. Ming D. W.
Thermal and Evolved Gas Behavior of Calcite Under Mars Phoenix TEGA Operating Conditions **[#1843]**
Calcite may have been detected by the Thermal Evolved Gas Analyzer (TEGA) at the Phoenix lander site. Laboratory thermal analyses of calcite under TEGA operating conditions will be presented to aid the interpretation of calcite detection by TEGA.

Niles P. B. Boynton W. V. Hoffman J. H. Ming D. W. Phoenix Science Team
A First Look at Carbon and Oxygen Stable Isotope Measurements of Martian Atmospheric CO_2 by the Phoenix Lander **[#1806]**
The TEGA instrument on the Mars Phoenix Lander has measured the stable isotope composition of martian atmospheric CO_2. The results indicate that martian atmospheric CO_2 is slightly depleted in both ^{13}C and ^{18}O compared to atmospheric CO_2 on Earth.

Catling D. C. Claire M. W. Quinn R. C. Zahnle K. J. Clark B. C. Kounaves S. Hecht M. H.
Possible Atmospheric Origins of Perchlorate on Mars **[#1567]**
The Phoenix Mars lander measured perchlorate as a key soluble anion in the soil at an abundance of ~1wt%. Here, we discuss how the perchlorate was likely formed from atmospheric oxidants acting on chlorine-bearing species in Mars' arid environment.

Fisher D. A. Hecht M. Kounaves S. Catling D.
Perchlorate Found by Phoenix Could Provide a Mobile Brine Sludge at the Bed of Mars Northern Ice Cap that Would Allow Flow with Very Low Basal Temperatures: Possible Mechanism for Water Table Re-Charge **[#2281]**
The north cap of Mars has basal temperature that precludes the flow of ice. Phoenix discovered polar soils contain perchlorate salts. These salts depress the melting point so it could form a sludge that provides a mobile bed that moves the ice outwards.

Ming D. W. Lauer H. V. Jr. Archer P. D. Jr. Sutter B. Golden D. C. Morris R. V.
Niles P. B. Boynton W. V.
Combustion of Organic Molecules by the Thermal Decomposition of Perchlorate Salts: Implications for Organics at the Mars Phoenix Scout Landing Site **[#2241]**
The presence of a strong oxidizer (i.e., perchlorate salt) in the soils at the Phoenix landing site will most likely combust organic materials during pyrolysis by the Thermal and Evolved Gas Ananlyzer.

Lauer H. V. Ming D. W. Sutter B. Golden D. C. Morris R. V. Boynton W. V.
Thermal and Evolved Gas Analysis of Magnesium Perchlorate: Implications for Perchlorates in Soils at the Mars Phoenix Landing Site Perchlorates in Soils at the Mars Phoenix Landing Site. **[#2196]**
Perchlorate salts were discovered in the soils around the Phoenix landing site on the northern plains of Mars.The purpose of this paper is to evaluate the thermal and evolved gas behavior of perchlorate salts using TEGA-like laboratory testbed instruments.

Marion G. M. Catling D. C. Claire M. Zahnle K. J.
Modeling Aqueous Perchlorate Chemistries with Applications to Mars **[#1959]**
The paper will examine thermodynamic modeling of perchlorate chemistries with applications to the Phoenix mission site.

Morris R. V. Golden D. C. Ming D. W. Graff T. G. Arvidson R. E. Wiseman S. M. Lichtenberg K. A. Cull S.
Visible and Near-IR Reflectance Spectra for Smectite, Sulfate, and Perchlorate Under Dry Conditions for Interpretation of Martian Surface Mineralogy **[#2317]**
Visible and near-IR reflectace spectra were acquired under dry conditions for smectite and for sulfate- and perclorate-bearing phases. The spectra are used for interpretaton of martian surface mineralogy.

Pike W. T. Sykulska H. Vijendran S. Phoenix Microscopy Team
Fractal Analysis of the Microstructure of the Martian Soil at the Phoenix Landing Site **[#1909]**
A fractal analysis of the Mars soil at the Phoenix site is presented. It indicates that the primary particles of the soil are up to 15 μm in size with larger particles formed by agglomeration resistant to fracture.

Shaw A. Arvidson R. E. Keller H. U. Lemmon M. Mellon M. T. Trebi-Ollennu A. Robinson M. Siebach K. Volpe R.
Phoenix Mission Trenching in Arctic Mars **[#2097]**
The Phoenix Mars Lander dug twelve trenches in polygonal terrain of the high northern latitudes. Forces measured while digging trenches help compare the properties of the soils in which the trenches were dug. The trenches sample polygons and troughs.

Markiewicz W. J. Kossacki K. J. Keller H. U. Hviid S. F. Goetz W. El Maarry M. R. Bos B. J. Woida R. Drube L. Leer K. Madsen M. B. Mellon M. T. Smith P.
Sublimation of Exposed Snow Queen Surface Water Ice as Observed by the Phoenix Mars Lander **[#1667]**
From the rate of sublimation of Snow Queen as imaged by the RAC we infer that the soil grain size is of the order of 1 micron which is consistent with atmospheric dust and Phoenix imaging at all scales.

Saraiva J. Antunes J. Bandeira L. Pina P.
Identification and Characterization of Small-Scale Polygons Around the Phoenix Landing Site **[#1323]**
This work presents a study of small-scale polygons in the area where the Phoenix probe landed. Large numbers of polygons are automatically identified and briefly characterized in geometric and topological terms, illustrating the potential of the methodology employed.

Cull S. C. Arvidson R. Mellon M. Wiseman S. McGuire P. Clark R. Titus T. Searls M.
Seasonal Ices at the Mars Phoenix Landing Site: Observations from HiRISE and CRISM **[#1814]**
CRISM spectra are used to determine when ices appear at the Phoenix landing site, how their grain sizes and relative abundances evolve through time, and what controls sublimation patterns during the spring defrosting period.

Searls M. L. Mellon M. T. Cull S. Hansen C. J.
Seasonal Frost at the Phoenix Landing Site **[#2402]**
This work provides a spatial and temporal characterization and analysis of the seasonal frost at the Phoenix landing site.

Levy J. S. Head J. W. III Marchant D. R.
Phoenix Landing Site Geomorphology: Surface Stability and Implications for the Martian Latitude-dependent Mantle **[#1625]**
Geomorphological observations of the Phoenix landing site suggest a history for local permafrost recently dominated by excess ice removal through sublimation, ongoing thermal contraction cracking, and limited cryoturbation by wet or dry processes.

Davis J. A. Lange C. F. Taylor P. A.
Numerical Study of the Effect of the Phoenix Mars Lander on the Temperature Sensors **[#2135]**
A numerical study of the effect of the Phoenix Mars lander on the temperature sensors show that under certain conditions, the heat produced by the lander can influence the temperature sensors.

Taylor P. A. Weng W. Cook C. Dickinson C. Akingunola A. Polkko J. Kahanpää H.
Pressure Data from the Phoenix Landing Site **[#1868]**
During the Phoenix mission surface pressures were measured at a frequency of 2 Hz for 150 sols. Seasonal and diurnal features of these data will be discussed. Short time scale features associated with convective vortices were also observed.

Nelli S. M. Renno N. O. Feldman W. C. Murphy J. R. Kahre M. A.
Reproducing Meteorological Observations at the Mars Phoenix Lander Site Using the NASA Ames GCM V.2.1 **[#1732]**
Using the NASA Ames General Circulation Model (GCM) v2.1, we reproduce atmospheric conditions at the Mars Phoenix Lander site in an effort to explain the measured atmospheric phenomena (water ice clouds, ground frosts, dust devils, etc.).

Bean K. M. Lemmon M. T. Phoenix Science Team
Surface Stereo Imager Observations of Dust Devils at the Phoenix Landing Site **[#1799]**
The Surface Stereo Imager observed 76 wind events during Phoenix's surface operations. There were 37 unique dust devils, and 11 strong gusts of wind. Dust devils were not observed until the last third of the mission.

Ellehøj M. D. Gunnlaugsson H. P. Taylor P. A. Gheynani B. T. Whiteway J. Lemmon M. T. Bean K. M. Tamppari L. K. Drube L. Von Holstein-Rathlou C. Madsen M. B. Fisher D. Smith P.
Dust Devils and Vortices at the Phoenix Landing Site on Mars **[#1558]**
Near continuous measurements of pressure and temperature by the MET instrumentation on the Phoenix Mars lander are used to identify the passage of vertically oriented vortex structures at the Phoenix landing site (126W, 68N) on Mars.

Leer K. Drube L. Goetz W. Gunnlaugsson H. P. Lemmon M. Madsen M. B. Morris R. V. Smith P. Phoenix Science Team
Optical Study of Particles On Mars Phoenix Magnets **[#1923]**
Particles collected by magnets on the Phoenix Lander on Mars are compared to data from orbiter missions.

Drube L. Leer K. Madsen M. B. Goetz W. Morris R. V. Lemmon M.
Airborne Dust Experiment (iSweep) on the Phoenix Mars Lander **[#2266]**
The calibration targets for Phoenix also act as an experiment (called iSweep) looking at the airborne dust that is magnetically attracted to settle on its surface. Some results of which will be shown here.

Stein T. C. Arvidson R. E. Scholes D. M. Heil-Chapdelaine V. M.
Phoenix Analyst's Notebook: A Holistic Tool for Accessing Integrated Mission Data and Documents **[#1079]**
The Phoenix Analyst's Notebook (http://an.rsl.wustl.edu) provides access to the Mars Phoenix Lander mission data archives by integrating engineering and science data, observation planning and targeting, and documentation into web-accessible pages.

Tuesday, March 24, 2009
POSTER SESSION I: MARS POLAR ATMOSPHERES AND CLIMATE MODELING
6:30 p.m. Town Center Exhibit Area

Furfaro R. Panfili P. Luciani A. Kargel J. S. Ganapol B. Palmero-Rodriguez A. Mostacci D.
Deterministic Neutron Transport Modeling for Planetary Applications **[#1846]**
This paper shows how to model thermal and epithermal neutron fluxes leaking out from Mars using a deterministic approach. The model has been validated on Mars data and tuned for fast and accurate prediction of subsurface water-ice.

Helbert J. Head J. W. Marchant D.
The Berlin Mars Near Surface Thermal Model (BMST) — Modeling the Formation and Evolution of Sublimation Lags on Mars **[#1521]**
Phoenix for the first time directly studied ice on Mars and the SHARAD instrument detected clear evidence for glacial deposits in the equatorial regions of Mars. We study with the BMST model if these deposits are the remnants of an earlier climate cycle.

McMenamin D. S. McGill G. E.
Thermal Anomalies Suggest that Ongoing Clathrate Dissociation in Icy Sediment Contributes to Martian Atmospheric Methane **[#1848]**
Thermal anomalies in eroding icy sediments indicate sites of ongoing methane clathrate dissociation that release atmospheric methane on Mars.

Brown A. J. Wolff M. J.
Atmospheric Modeling of the Martian Polar Regions: One Mars Year of CRISM EPF Observations of the South Pole **[#1675]**
We have used CRISM Emission Phase Function gimballed observations to investigate atmospheric dust/ice opacity and surface albedo in the south polar region for the first Mars year of MRO operations. This covers the MY28 "dust event" and cap recession.

Hayne P. Paige D. A.
Clouds in the Polar Night of Mars: Modeling and Observations with the Mars Climate Sounder **[#1849]**
We present evidence from the Mars Climate Sounder and radiative transfer modeling, that polar cold spots are caused by carbon dioxide clouds.

Pankine A. Tamppari L. Smith M.
Water Vapor over Martian North Polar Cap from MGS TES **[#2145]**
We present retrievals of water vapor abundances from MGS TES data over martian north polar cap during spring and summer.

Tuesday, March 24, 2009
POSTER SESSION I: MARS POLAR INVESTIGATIONS
6:30 p.m. Town Center Exhibit Area

Litvak M. L. Boynton W. V. Kozyrev A. S. Mitrofanov I. G. Sanin A. B. Tretyakov V. I. Varenikov A. Golovin D.
Observation of Martian Seasonal Caps: Dimensions, Density, Mass, Inter Annual Variations **[#1254]**
Results of long term (eight years) observations of martian seasonal caps onboard Mars Odyssey are presented.

Pathare A. V. Chuang F. C.
The Mass Balance of Stratigraphic Anomalies in the Martian North Polar Layered Deposits **[#1400]**
The present-day mass balance of stratigraphic anomalies within north polar troughs is constrained by incorporating CRISM spectral observations of surface water ice into an NPLD sublimation model.

Fortezzo C. M. Tanaka K. L.
Unconformities Revealed by MRO Context Images in the Polar Layered Deposits of Planum Boreum, Mars **[#2270]**
Details of unconformities mapped using a CTX image mosaic in the martian north pole indicate that one regional, and multiple localized erosion or non-deposition episodes occurred during the formation of the polar plateau in the Gemini Scopuli region.

Rodriguez J. A. P. Tanaka K. L. Berman D. C.
Depression Systems in Western Planum Boreum, Mars: Distributions, Orientations, and Cross-Cutting Relationships **[#2371]**
Planum Boreum, in the north polar region of Mars, forms a domical plateau largely dissected by depression systems of various dimensions. In this investigation we discuss their distributions, orientations, and cross-cutting relationships.

Russell P. S. Byrne S. Fishbaugh K. Herkenhoff K. Thomas N. HiRISE Team
Heights and Slopes on Mars North Polar Scarps Using HIRISE Point-to-Point Stereo Measurements **[#2479]**
We present a technique for making vertical elevation-difference and slope measurements between two points that yields results more accurate than MOLA (at polar scarps) yet is not as complex and resource-intensive as producing a full scale DEM.

Guallini L. Rossi A. P. Marinangeli L. Biccari D. Pettinelli E. Seu R.
New Elements on Stratigraphy of South Polar Layered Deposits on Promethei Lingula Region and a Possible Structural Approach **[#1602]**
New stratigraphical/tectonical elements was found on Promethei Lingula south polar layer deposits. We assume two possible depositional cycles marked by an angular unconformity. Layers strain response could be useful to define sequence stratigraphy.

Betz E. O. Titus T. N. Cushing G. E.
Determining the Heights and Distributions of Swiss Cheese Features on Mars South Polar Residual Cap using Photoclinometry **[#1363]**
Strange features known as "Swiss cheese" form in the thin CO_2 veneer of Mars south polar residual cap. Here we determine the heights and distributions of Swiss cheese features using photoclinometry in order to constrain the thickness of this veneer.

Langevin Y. Hansen C. Thomas N. Vincendon M. Titus T. Piqueux S. Bibring J.-P. Gondet B.
Investigations of Cryptic Regions of the South Seasonal Cap, 12/2008–02/2009 **[#2017]**
The origin of dust contamination in a major fraction of the cryptic region of the South seasonal cap of Mars has yet to be determined. An observation campaign in late 2008 / early 2009 with OMEGA, HIRISE, CRISM and THEMIS has been set up for adressing this issue.

Gardin E. Quantin C. Allemand P.
Defrosting Sequence on the Russell Megadune, Mars **[#2032]**
We have observed the complete defrosting sequence over the Russell megadune from small size dark spots to large dark streak spreading down the slope. Our results based on HiRiSE and CRISM data may question the current proposed model for defrosting features formation.

Westbrook O. W. Zuber M. T. Byrne S.
Southern Circumpolar Crater Ice Deposits on Mars **[#2147]**
Just beyond the martian south polar layered deposits (SPLD) are numerous impact craters containing mounded deposits that resemble outliers of the SPLD. We catalog and measure these crater-filling deposits and seek to understand their distribution, morphologies, and origins.

Moore M. Dasgupta A. Alva S. Casey S. Figueroa M. Hendershot C. Hwang D. Nagarajan S. Nguyen T. Szymanski J. Wilson R.
Defining Correlations Between Presence of Ice Deposits and Area Covered by Craters in Vastitas Borealis **[#1951]**
The Klein MSIP team gathered a number of THEMIS images to analyze. Areas of images covered by craters were correlated with areas covered by persistent ice deposits.

Kuzmin R. O. Zabalueva E. V. Christensen P. R.
Mapping of the Water Ice Amount in the Martian Surface Soil on the Periphery of the Retreating Seasonal Northern Polar Cap Based on the TES Data **[#1917]**
We present the results of the mapping of the water ice amount in the martian surface soil layer in the area around the Northern seasonal polar cap at the different stages of its recession.

Kuti A.
Thermal Behavior of Dokka Crater and its Surroundings in the North Polar Region of Mars **[#1006]**
The basic characterists of Dokka Crater and its surroundings in the north polar region of Mars are presented, focusing on the thermal properties and frost behavior. The results imply that the different thermal behavior is caused by H_2O ice.

Hovius N. Conway S. J. Barnie T. B. Besserer J.
Ice Filled Craters in Mars' North Polar Region — Implications for Sub-Surface Volatiles **[#2042]**
We present a study of impact craters above 65°N, to assess the sub-surface water budget, with emphasis on 17 craters containing lumps. We suggest these impacts formed a conduit to a periodically overpressurized aquifer, producing the lumps.

Swindle T. D. Thomas C. Mousis O. Lunine J. I. Picaud S.
The Trapping of Ar, Kr, and Xe in Martian Clathrates and the Possibility of Detecting Clathrates on Mars by Seasonal Changes in the Xe/Kr Ratio **[#1660]**
Calculations show that Xe would be much more readily trapped in multiple guest clathrates on Mars than would be Kr. Measurement of the Xe/Kr ratio over the course of a martian year would be a sensitive detector of seasonal formation of clathrate.

Blackburn D. G. Bryson K. Chevrier V. F. Roe L. A. White K. F.
Sublimation Kinetics of CO_2 Ice and Evolution of the Martian Polar Caps **[#1339]**
We report the experimentally measured sublimation rate of pure CO_2 ice under simulated martian conditions and compare them to data from MOLA, MOC, HiRISE, and CRISM. We predict the perennial CO_2 cap should disappear in approximately three martian years.

Tuesday, March 24, 2009
POSTER SESSION I: MARS NEAR-SURFACE ICE
6:30 p.m. Town Center Exhibit Area

Morgan G. A. Head J. W. III Marchant D. R.
The Use of Equilibrium Landforms to Identify Recent Climate Change on Mars: Insights from Field Studies in the McMurdo Dry Valleys of Antarctica **[#2217]**
Recent climatic change on Mars has been recorded in a series of equilibrium landform assemblages located in Noachis Terra. We explore these features through the detailed mapping of terrestrial analogs in the Antarctic Dry Valleys.

Boyce J. M. Mouginis-Mark P.
Martian Impact Crater Ejecta Run-Out Efficiency: Its Implications for Water in the Subsurface **[#1009]**
Martian impact crater ejecta efficiency provides information about the water content of the ejecta. Based on new estimates of martian ejecta run-out distances, they appears to require saturation with water during their emplacement.

Kress A. Head J. W.
Ring-Mold Craters on Lineated Valley Fill, Lobate Debris Aprons, and Concentric Crater Fill on Mars: Implications for Near-Surface Structure, Composition, and Age. **[#1379]**
Analysis of ring-mold crater populations on lineated valley fill, lobate debris aprons, and concentric crater fill on Mars and of ice-impact experiments suggest crater-count-derived ages may be erroneously old.

Drake J. S.
Thermokarst on Mars? Insights from a Survey of Rimless Depressions **[#1797]**
Rimless depressions on Mars have been mapped in THEMIS imagery from 50º north to 60º south latitude. Geomorphic evidence, along with MOLA observations of the features' depths, suggests that their interior stratigraphy is depositional in nature.

Head J. W. III Marchant D. R.
Inventory of Ice-related Deposits on Mars: Evidence for Burial and Long-Term Sequestration of Ice in Non-Polar Regions and Implications for the Water Budget and Climate Evolution **[#1356]**
We compile an inventory of non-polar ice deposits on Mars to estimate water abundance with time during different ancient climate conditions. We find that significant volumes are removed from the system and sequestered in non-polar ice reservoirs.

Putzig N. E. Phillips R. J. Head J. W. Campbell B. A. Egan A. F. Plaut J. J. Carter L. M. Seu R. SHARAD Team
Do Shallow Radar Soundings Reveal Possible Near-Surface Layering Throughout the Northern Lowlands of Mars? **[#2477]**
SHARAD soundings across the Northern Lowlands yield returns delayed by about 0.5 microsec from the surface return. These features may correspond to subsurface interfaces due to layering in the near surface, possibly including water ice.

Pearce G. D. Osinski G. R. Soare R. J.
Intra-Crater Glacial Deposits and Ice-Mantling in Utopia Planitia, Mars **[#2428]**
We describe glacial and periglacial features found within a crater in Utopia Planitia, northern plains of Mars and suggest that there is strong evidence for multiple emplacement events of ice-rich mantles.

Pedersen G. B. M. Head J. W. III
Overview of Possible Ice-related Morphologies in the Transition Zone Between Elysium and Utopia Basin, Mars **[#2081]**
Small scale ring mold-like craters, thermally distinct craters and craters with bipartite ejecta are observed. We evaluate their distribution and compile an overview in connection with other landforms, which have been ascribed to the presence of ice.

Orloff T. C. Kreslavsky M. A. Asphaug E.
Organization of Rocks on Patterned Ground in the Northern Latitudes of Mars **[#2205]**
The time and spatial scale of rock migration on the surface of patterned ground on Mars is studied by observing patterning effects around impact craters. Rock organization is linked to the degradation of craters and the patterned ground mechanism.

Kress A. Head J. W.
Lineated Valley Fill and Lobate Debris Aprons in the Deuteronilus Mensae Region, Mars: Implications for Regional Glaciation **[#1632]**
Studies of lineated valley fill and lobate debris aprons in the Deuteronilus Mensae region, Mars, reveal that they are endmembers of a continuum of morphologies with the same mode of origin, which is that of debris-covered glacier.

Balme M. R. Murray J. B. Gallagher C. Muller J-P. Kim J-R.
A Recent, Equatorial, Periglacial Environment on Mars **[#1837]**
We present geomorphological evidence for geologically recent freeze/thaw conditions in the equatorial Elysium Planitia region of Mars. This suggests a (perhaps transient) recent, warmer, martian climate than current models predict.

Zanetti M. Hiesinger H. Reiss D. Hauber E. Neukum G.
Scalloped Depression Development on Malea Planum and the Southern Wall of the Hellas Basin, Mars **[#2178]**
We offer support for a solar insolation model of scallop depression development from THEMIS-IR images, and suggest that scallops form from thermal contraction cracks in the surface of the latitude-dependent ice-rich dust mantle on Malea Planum.

Zanetti M. Hiesinger H. Reiss D.
Thickness Estimate of Ice-rich Mantle Deposits on Malea Planum, Southern Hellas Basin, Mars **[#2365]**
A quantitative estimate of the thickness of ice-rich dust mantles on Malea Planum has been determined using the crater diameter-rim height ratio for buried ‘ghost’ craters. Results show a marked thickening on the southern wall of Hellas Basin.

Tuesday, March 24, 2009
POSTER SESSION I: MARS: A VOLATILE-RICH PLANET
6:30 p.m. Town Center Exhibit Area

Withers A. C. Hirschmann M. M. Tenner T. J.
The Effect of Fe on OH^- Content of Olivine: Implications for Extraction of H_2O from the Martian Mantle **[#1490]**
Experimental determinations of the effect of Mg# on H_2O storage capacity in olivine + opx suggests that extraction of H_2O from the martian mantle is similar to that of a LREE. By analogy to K we infer that ~50% of martian H_2O remains in its mantle.

Wood J. Filiberto J. Treiman A. H.
The Effect of Flourine on the Liquidus of an Adirondack-Class Martian Basalt **[#1105]**
As a preliminary study on the effect of F on phase equilibria, we have shown that F depresses the liquidus to a greater extent than water suggesting that fluorine is important during martian basalt genesis.

Brückner J. Dreibus G. Haubold R. Huisl W. Spettel B. Gellert R. Athena Science Team
Mobility of Phosphorus on the Martian Surface and in a Martian Meteorite **[#1613]**
The mobilization of P in an acidic environment was studied for meteorite Zagami by leaching experiments and for martian rocks by measurements of the APXS onboard the two Mars Exploration Rovers along their traverses.

Miura Y.
Formations of Martian Plagioclases and Flow Textures by Carbon Dioxides-rich Gas and Fluid Compared with Natural Rocks and Artificial Products on the Earth **[#1090]**
Carbon-bearing grains formed in basalts and syntheses are applied to carbon-fixing on martian plagioclases which are formed by impact pressures from carbon dioxides gas.

Nakamura N. Nyquist L. E. Reese Y. Shih C.-Y. Numata M. Fujitani T. Okano O.
Chlorine Isotopes as a Possible Tracer of Fluid/Bio-Activities on Mars and a Progress Report on Chlorine Isotope Analysis by TIMS **[#1946]**
We present a progress report on chlorine isotopic analysis using TIMS at NASA-JSC, and discuss the possible application of Cl isotopic analysis to martian meteorites in a search for fluid- and possibly biological activity on Mars.

Changela H. C. Bridges J. C.
TEM Study of Alteration Assemblages in the Nakhlites: Variation with Burial Depth on Mars **[#2302]**
TEM study of nakhlites shows a variation in secondary minerals between different meteorites. Lafayette from the greatest depth on Mars shows coarse crystalline Ca-Mn-Mg siderite and phyllosilicate whereas Y-000593 veins are amorphous silicate gel.

Greenwood J. P. Itoh S. Sakamoto N. Yurimoto H.
Hydrogen Isotope Measurements of Gypsum and Jarosite in Martian Meteorite Roberts Massif 04262: Antarctic and Houstonian Weathering. **[#2528]**
Ion microprobe measurements of hydrogen isotopes via spot mode and 2D ion imaging of gypsum and jarosite are best interpreted as last equilibrating with water in Houston and Antarctica, respectively.

Tuesday, March 24, 2009
POSTER SESSION I: MARS: GEOCHEMISTRY AND ALTERATION PROCESSES
6:30 p.m. Town Center Exhibit Area

Ling Z. C. Wang A. Li C.
Comparative Spectroscopic Study of Three Ferric Sulfates: Kornelite, Lausenite and Pentahydrate **[#1867]**
We have synthesized a new phase ferric sulfate with six structural waters, which is believed to be "lausenite". Its XRD, Raman and Vis-NIR spectral patterns are distinct from those of kornelite and pentahydrate.

Muirhead A. C. Bishop J. L. McKeown N. K.
The VNIR Spectral Properties of Iron Oxide/Oxyhydroxide Mixtures and Applications to Iron Oxides in the Mawrth Vallis Region of Mars **[#1652]**
The objective of this study is to measure the spectral properties of mixtures of FeOx minerals in order to better constrain the types and abundance of FeOx on Mars.

Beavon L. J. Lindsley D. H. McLennan S. M. Tosca N. J.
Experimental Constraints on Trace Element Mobility in Martian Basalt: Progress Report **[#1879]**
Low pH alteration experiments on a martian analog are being conducted to better understand the mobility of Ni, Zn, and Cr on the martian surface. Preliminary results will be presented.

Zhao Y. McLennan S. M. Tosca N. J.
Experimental Constraints on Trace Element Behavior during Martian Fe-Oxidation Processes at Meridiani Planum **[#1978]**
Trace elements Ni, Cr and Zn behavior during Fe-oxidation processes and reaction with precipitation products were experimentally investigated in this study. Preliminary results are reported here.

Hamilton V. E. Ruff S. W.
Mini-TES Spectra of Mazatzal and Other Adirondack-Class Basalts in Gusev Crater, Mars: Spectral/Mineralogical Evidence for Alteration **[#1418]**
We use Mini-TES data from the Spirit rover to demonstrate mineralogical evidence for sulfate in Adirondack-class rocks and the Mazatzal coating and to demonstrate for the first time that Adirondack-class basaltic exotics are present on the West Spur.

Gunnlaugsson H. P. Rasmussen H. Madsen M. B. Nørnberg P.
Inhomogenity of Basaltic Rocks at Gusev Crater on Mars **[#1656]**
Samples from Gusev crater on Mars show (Mössbauer-) inhomogeneities in the surface layer. Possible reasons for this are discussed and a simple explanation for the magnetic anomalies on Mars is offered.

Mølholt T. E. Gunnlaugsson H. P. Merrison J. P. Morris R. V. Nørnberg P. Madsen M. B.
Results from a Mössbauer and VNIR Study of Dust Generated from Olivine Basalt: Application to Mars **[#1622]**
It is shown that VNIR spectroscopy can greatly underestimate the ratio of olivine to pyroxene and olivine may be more abundant on Mars than hitherto believed. The possibilities of using electrodes to collect samples on Mars are discussed.

Fleischer I. Agresti D. Klingelhöfer G.
Mössbauer Hematite Temperature Study on Samples from the MER Landing Sites **[#1832]**
We use simultaneous fitting of Mössbauer spectra for a temperature-dependent study of hematite-bearing samples from both MER landing sites.

Le Mouélic S. Sarago V. Combe J.-Ph. Massé M. Bourgeois O. Mangold N. Bibring J-P. Gondet B. Langevin Y. Sotin C.
Global Mapping of Minerals on Mars with OMEGA Hyperspectral Data: Results of a Linear Unmixing Approach **[#1594]**
We use a linear unmixing algorithm to retrieve the main minerals contributing to the signal in OMEGA/Mars Express data. The result is a distribution map for each endmember selected in the input library, which covers the main mineral families.

Hughes C. G. Ramsey M. S. Bandfield J. L.
Detection of Small-Scale Mineral Deposits in Super-Resolved THEMIS TIR Data **[#2359]**
Super-resolved THEMIS TIR data allows more reliable detection of different subpixel-sized surfaces, and can be compared to Earth analogue sites or modeled further using more traditional approaches such as linear spectral deconvolution.

Roush T. L.
Estimated Optical Constants of Magnesite ($MgCO_3$) **[#1080]**
Carbonate minerals are of interest to the volatile and climate history on Mars. Spacecraft observations suggest the presence of magnesite at locations on the martian surface. The optical constants of magnesite are estimated and presented.

Lira C. Saraiva J. Pina P. Bandeira L. Antunes J.
A Mathematical Morphology Approach to the Analysis of Martian Soil Samples **[#2044]**
This work introduces a mathematical morphology tool to analyse the granulometry of soil samples *in situ* on Mars through image processing.

Needham A. W. Tomkinson T. Howard K. T. Grady M. M.
Clay Minerals in Nakhlites and on Mars **[#1969]**
Clay minerals, known to be present both in martian meteorites and on the surface of Mars, contain unique information about the planet's climate history. Analyses of terrestrial analogues and clay minerals in nakhlite meteorites are underway.

Viviano C. E. Moersch J. E. Piatek J. L.
Using THEMIS to Extend Mapping of Phyllosilicates on Mars **[#2107]**
We use a THEMIS spectral index to extend mapping of phyllosilicates in the Terra Sirenum region, suggesting possibilities for a THEMIS global phyllosilicate distribution map.

McKeown N. K. Bishop J. L. Wray J. J. Noe Dobrea E. Z. Silver E. A.
Textures and Morphologies of Phyllosilicate-bearing Units at Mawrth Vallis **[#2433]**
Coordinated analysis demonstrates that different phyllosilicate mineralogies identified in CRISM data have distinct textures in HiRISE images. This will help future rovers like MSL to identify different units and focus on unique outcrops.

Annex A. Marion-Spencer M. Jones M. Guthrie S. Grigsby B. Turney D.
CRISM Analysis of Graben in Terra Tyrrhena; A Search for Water in Equatorial Mars **[#1453]**
High school students lead CRISM and HiRISE study of Graben in Terra Tyrrhena, answering previous hypotheses about the formation of the graben and the presence of possible laccoliths.

Craig M. A. Osinski G. R. Flemming R. L. Cloutis E. A.
UV-Vis-NIR Reflectance Spectra of Shocked Carbonates from the Haughton Impact Structure, Devon Island, Canada: 0.35–2.5 µm; Implications for Carbonate Identification on Mars **[#1643]**
A preliminary look at the spectral effects of hypervelocity impact-induced shock metamorphism and melting in carbonates from the Haughton Impact Structure.

El Maarry M. R. Gasnault O.
A Preliminary Assessment of the Role of Impact Craters in Forming Hydrous Minerals on the Surface of Mars **[#1883]**
The role of impact craters in forming hydrous minerals on the surface Mars is discussed through correlations with the elemental hydrogen map from the gamma-ray spectrometer on board Mars Odyssey.

Fraeman A. A. Mustard J. F. Ehlmann B. L. Roach L. H. Milliken R. E. Murchie S. L.
Evaluating Models of Crustal Cooling Using CRISM Observations of Impact Craters in Terra Tyrrhena and Noachis Terra **[#2320]**
Occurrence of CRISM-detected hydrated silicates around Southern Highlands impact craters are used to assess models of crustal cooling. Preliminarily, lack of mineralogy-depth correlation favors cooling mediated by hydrothermal processes.

Schwenzer S. P. Abramov O. Kring D. A.
Impact-generated Hydrothermal Systems on Noachian Mars: The Path of Water **[#2328]**
We explore the path of water in impact-generated hydrothermal systems describing the mechanics of the fluid flux, the nature and distribution of alteration minerals and the amount of water stored in them.

Tornabene L. L. Osinski G. R. McEwen A. S.
Parautochthonous Megabreccias and Possible Evidence of Impact-induced Hydrothermal Alteration in Holden Crater, Mars **[#1766]**
Using CRISM with HiRISE, we report on the detection of phyllosilicates correlated with dikes within parautochthonous megabreccias originating from the well exposed basement of Holden Crater.

Barge L. M. Petruska J.
Experimental Tests of Micro-Concretion Nucleation in Porous Media **[#1910]**
We present an experimental study of nucleation and growth of spheroidal concretions in porous media.

Travis B. J. Feldman W. C.
Salt Deposits, Ice Lenses and Convective Brine Aquifers on Mars **[#1315]**
This abstract summarizes results of a numerical modeling study of possible brine aquifer dynamics in the shallow martian subsurface, subject to geothermal gradients, with implications for surface salt deposits and ice lenses.

Jänchen J. Morris R. V. Bish D. L. Hellwig U.
The H_2O Sorption Properties of a Martian Dust Analog **[#1395]**
Palagonitic dust is a geologically reasonable hydrated phase on the surface of Mars. Its presence as dust may account for the presence of the 3 μm absorption band as seen by OMEGA and CRISM at the martian surface for the entire planet.

Beck P. Pommerol A. Schmitt B. Brissaud O.
Experimental Study of Water Transport Across an Adsorbing Regolith **[#1291]**
We measured adsorption kinetics on analogs of the martian surface, we characterize the effect of adsorption on the transfert properties with implications on the coupling between the atmosphere and the sub-surface.

Robertson K. R. Bish D. L.
Thermal Behaviour of the Calcium-Sulfate-H_2O System **[#1829]**
Experimental results are presented here that provide a more thorough picture of dehydration rates in the calcium-sulfate-H_2O system. Our results suggest that gypsum desiccation will not occur over a diurnal or seasonal cycle under current martian conditions.

Tuesday, March 24, 2009
POSTER SESSION I: MARTIAN PHYLLOSILICATES: IDENTIFICATION, FORMATION, AND ALTERATION
6:30 p.m. Town Center Exhibit Area

Maturilli A. Helbert J. D'Amore M.
Identification of the Surficial Component from Martian Remote Sensing Infrared Spectra: Application to Mars Express PFS Measurements **[#1257]**
Target transformation and factor analysis techniques are applied to PFS LWC observations of the Nili Fossae region, where previous instruments detected phyllosilicates. PFS spectra are interpreted using the Berlin Emissivity Database (BED) spectral library.

Carter J. Poulet F. Bibring J.-P. Murchie S. Langevin Y. Mustard J. F. Gondet B.
Phyllosilicates and Other Hydrated Minerals on Mars: 1. Global Distribution as Seen by MEx/OMEGA **[#2028]**
This abstract presents the global spatial distribution of the phyllosilicate-bearing deposits on Mars as seen by MEx/OMEGA.

Makarewicz H. D. Parente M. Bishop J. L.
Determining the Composition of Phyllosilicates Using Automated Gaussian Modeling of Spectral Features **[#1358]**
Kaolinite-montmorillonite and nontronite-ferrihydrite mixture spectrawere analyzed using automated modified Gaussian modeling in order torelate relative band depths with endmember composition in lab spectra,and eventually in CRISM spectra on Mars.

Amador E. A. Bishop J. L. McKeown N. K. Parente M. Clark J. T.
Detection of Kaolinite at Mawrth Vallis, Mars: Analysis of Laboratory Mixtures and Development of Remote Sensing Parameters **[#2188]**
Laboratory mixtures and spectral parameters were created to better characterize and detect kaolinite in the Mawrth Vallis region of Mars where Al-phyllosilicates, including kaolinite and montmorillonite, have been detected.

Tosca N. J.
Clay Mineral Assemblages Derived from Experimental Acid-Sulfate Basaltic Weathering **[#1543]**
Basaltic weathering experiments lasting 295 days have yielded a variety of clay mineral assemblages. Linking clay mineral chemistry to aqueous chemistry provides insight into major controls on clay formation through basaltic weathering.

Hurowitz J. A.
Clay Mineral Formation and Evolution in an Experimental Basaltic Weathering Profile **[#2083]**
This work reports on a new experimental approach aimed at understanding basaltic weathering profile chemical evolution processes using a unique packed-bed flow through reactor design that enables *in situ* analysis of undisturbed alteration minerals.

Che C. Glotch T. D.
The Infrared Spectra Study of Dehydrated and Dehydroxylated Phyllosilicates **[#1482]**
We report the results of changes in the infrared spectra of thirteen phyllosilicates with exposure to increasingly higher temperatures. We hope this will increase the understanding of possible processes affecting phyllosilicate evolution on Mars.

Fairén A. G. Davila A. F. Marzo G. A. Roush T. L. McKay C. P.
Recent Liquid Water on Mars Inferred from Shock Decomposition Analysis of Phyllosilicates Within Impact Craters **[#1156]**
The analysis of the stability of phyllosilicates against shock pressure and temperature after an impact reveal recent water activity on Mars.

Altheide T. S. Chevrier V. F.
Acidic Weathering of Martian-Relevant Phyllosilicates **[#1012]**
Acidic weathering of phyllosilicates with varying pHs of sulfuric acid solutions demonstrates potential relationship between sulfates and phyllosilicates, and may also help explain recent observations of phyllosilicate layered deposits on Mars.

Gavin P. Chevrier V. Ninagawa K. Gucsik A. Hasegawa S.
Experimental Investigation of the Effect of Meteoritic Impacts on Clays on Mars **[#2069]**
Analysis of shock pressures and temperatures reached during impact experiments, as well as XRD and NIR spectral analysis, help determine whether clays found in association with impact craters on Mars were pre-existing or formed during the impact.

Tuesday, March 24, 2009
POSTER SESSION I: ASTROBIOLOGY
6:30 p.m. Town Center Exhibit Area

Kurosawa K. Sekine Y. Sugita S. Ohkouchi N. Ogawa N. O. Ishibashi K. Kadono T. Ohno S. Matsui T.
Cyanide Production by Chemical Reactions Between Impactor Material and an Ambient Atmosphere After Oblique Impacts **[#1636]**
We conducted laser ablation experiments in redox-neutral gas mixtures using graphite and Murchison meteorite. The results suggest that CN radicals generated by interactions between impactor material and an atmospheric N_2 are fixed into the condensates efficiently.

Hasenkopf C. A. Beaver M. R. Freedman M. A. Tolbert M. A. Toon O. B.
Optical Growth Measurements of Titan and Early Earth Organic Aerosol Analogs **[#1417]**
We report optical growth factors measured for Titan and early Earth aerosol analogs. Water uptake is observed for both analogs. This has important implications for the direct and indirect effects of aerosol that may have existed on Archean Earth.

Cooper G. Sant M. Asiyo C.
Anomalous Enantiomer Ratios in Meteoritic Sugar Derivatives **[#2537]**
The enantiomer (mirror-image) ratios of sugar acids in carbonaceous meteorites have been measured. D-enantiomer excesses are found in all acids measured thus far. This includes rare as well as common compounds.

Foucher F. Westall F. Bény J.-M. Brandstätter F. Demets R.
STONE-6 Experiment: Testing the Survival of Microfossils in Martian Analogues Rocks During Entry into the Earth's Atmosphere **[#1583]**
The aim of the STONE-6 experiment was to determine if martian sedimentary rocks, and the hypothetical microfossils they could contain, can survive the Earth's atmospheric entry.

LeVoci G. Burchell M. J. Tepfer D.
Survival of Seeds in Impacts at 1 km s^{-1} and Above **[#1239]**
Survival of viable seeds in impacts at 1 km/s is demonstrated in laboratory experiments using a light gas gun. Work is continuing to determine the upper limit on impact speeds for seed survival. The implications for Panspermia are discussed.

Edwards L. Huang Y. Schultz P. H.
Preservation of Organic Materials During Hypervelocity Impact Experiments **[#2524]**
Experiments at the AVGR explore the survivability of organic materials trapped within glasses produced by oblique and vertical hypervelocity impacts.

Howe K. L. Gavin P. Goodhart T. Kral T. A.
Methane Production by Methanogens in Perchlorate-supplemented Media **[#1287]**
Perchlorates, found on the martian surface, create a harsh environment. Methanogens are familiar with harsh environments and their growth was tested in perchlorate salt media. All four species of methanogens produced methane at all concentrations of each salt tested.

Conrad P. G. Fogel M. L. Glamoclija M. Kerr L. Mogensen C. Eigenbrode J. Mahaffy P. R. Steele A.
Metrics for Habitability Assessment **[#1384]**
We report an approach to evaluation of habitability potential on another planet, with special relevance to Mars Science Laboratory. We are developing a tool for optimizing the most critical measurements for extraterrestrial environmental assessment.

Vítek P. Jehlička J. Bezdek J. Francu E.
Degradation of β-Carotene Under UV-rich Irradiation Conditions: Implications for Martian Environment **[#1970]**
In this work, degradation of beta-carotene was studied, depending on exposure to the light obtained by metal halide lamp in order to simulate Mars irradiation mainly in the UV region. The protective role of the mineral matrix was also studied and is further discussed.

Allen C. C. Oehler D. Z. Baker D. M.
Mud Volcanoes — A New Class of Sites for Geological and Astrobiological Exploration of Mars **[#1749]**
Mud volcanoes are a unique low-T window into the Earth's subsurface and may prove to be significant sources of atmospheric methane. We report new work suggesting that features in Acidalia Planitia are most consistent with their being mud volcanoes.

Westall F. Foucher F. Cavalazzi B.
No Stromatolites on Mars? **[#1759]**
Easily identifiable microbial traces such as stromatolites are not to be expected on Mars because they could not have evolved before climate change. Martian life will be subtle and difficult to detect *in situ*.

Androes D. L. Dixon J. C. Zachry D. L.
The Evolution of Astronomically-forced Siliclastic Rhythmites of the Ancient Earth and their Correlation to Banded-Iron Formations **[#2323]**
Although the bulk of past research presumes that metamorphism, Milankovitch or climatic events have annihilated or overprinted any small-scale, orbitally-influenced, ubiquitous BIF laminations, recent research suggests preservation of small scale patterns is possible.

Socki R. A. Niles P. B. Blake W. Jr. Leveille R.
Covariant C and O Isotope Trends in Arctic Carbonate Crusts and ALH 84001: Potential Biomarker or Indicator of Cryogenic Formation Environment? **[#2218]**
Covariant C and O micro-scale isotope trends in arctic carbonate crusts mimic, to a lesser extent, those in ALH 84001 and are ideal terrestrial analogs for the isotopic composition of the ALH 84001 carbonates, implying a similar formation environment.

Lemelle L. Salome M. Westall F. Susini J. Simionovici S.
In Situ Search for Traces of Life in Extraterrestrial Samples Using X-Ray Spectromicroscopy at the Sulfur K-Edge **[#1842]**
Two selected case studies (Stardust keystones and Draken's Neoproterozoic cells) exemplify the relevance of micro-X-ray fluorescence at the S K-edge performed at the ID21 beamline of the ESRF to search for traces of life in extraterrestrial samples.

Jimenez-Lopez C. Romanek C. Rodriguez-Navarro A. Perez-Gonzalez T. Rodriguez-Navarro C.
Magnetites Formed from Thermal Decomposition of (Ca,Mg,Fe)CO_3: "Foreign" Cation Incorporation into the Estructure of Magnetite **[#1255]**
Pure magnetites are obtained from ankerite thermal decomposition. Chemical purity is typical of bacterial origin magnetites. Chemical purity of magnetites produced by thermal decomposition of ankerites containing different cations was analyzed.

Gánti T. Pócs T. Bérczi Sz. Horváth A. Kereszturi A. Sik A. Szathmáry E.
Ideal Microhabitats on Mars: The Astrobiological Potential of Polar Dunes **[#1618]**
Astrobiological potential of polar Dark Dunes: they may hold less oxidants, trap water-ice, mm layer of them shields UV radiation, allows light income for photosynthesis. Water uptake in nighttime, temperature in daytime is favorable for metabolism.

Banerjee N. R. Bridge N. J. Izawa M. R. M. Anderson L. D. Bebout G. E. Flemming R. L.
Glassy Subaqueous Lavas as a Habitat for Life on Earth, Mars, and Elsewhere? **[#1331]**
Biogeochemical and mineralogical traces of life preserved in modern and ancient terrestrial subaqueous lavas suggest basaltic rocks on Mars and other rocky bodies may represent an underappreciated habitat for life in the solar system.

Kong F. J. Zheng M. P. Wang A. L. Ma N. N.
Endolithic Halophiles Found in Evaporite Salts on Tibet Plateau as a Potential Analog for Martian Life in Saline Environment **[#1216]**
Mg-sulfates was found within salt deposits of the Da Langtan playa on Tibet plateau, similar as those found on Mars. Halophiles were isolated from the evaporative salts in the environment for analogs of the search for martian life in subsurface.

Cabrol N. A. Grin E. A. Wynne J. J.
Detection of Caves and Cave-bearing Geology on Mars **[#1040]**
Regions on Mars likely to contain caves and/or cave-bearing geology are identified using multispectral imagery from orbital missions and the exploration of terrestrial analogs for the characterization of associated thermal, and geo-signatures.

Tuesday, March 24, 2009
POSTER SESSION I: INSTRUMENT CONCEPTS, SYSTEMS, AND PROBES FOR INVESTIGATING ROCKS AND REGOLITH
6:30 p.m. Town Center Exhibit Area

El Shafie A. Ulrich R. Roe L.
Penetration Forces for Subsurface Regolith Probes **[#1205]**
Penetration and withdrawal forces have been measured for a variety of sizes and tip angles of penetrometers designed to carry instrumentation beneath the surface of a planetary body.

Pilgrim R. Ulrich R. Leftwich M.
Subsurface Spectroscopic Probe for Regolith Analysis **[#1219]**
A subsurface penetration probe is being developed for *in situ* FTIR analysis of the first 1/2 m of planetary bodies. The work describes the optical configuration.

Paulsen G. Zacny K. Maksymuk M. Wilson J. Mumm E. Craft J. Davis K. Kumar N.
Drilling in Ice Bound Lunar Regolith Simulant **[#1138]**
We describe drilling tests in frozen, water saturated lunar regolith simulant and present designs of the 3 m tall Mars chamber dedicated to 1 meter drilling tests.

Glass B. Thompson S. Hanagud S. Statham S. Cohen J. Lee P. Osinski G. Huffman S.
Planetary Drill Prototype Testing at an Impact Structure Palaeo-Hydrothermal Site **[#2197]**
A July 2008 field test effort updated and tested DAME drilling automation in a relevant planetary analog environment (a palaeo-hydrothermal chimney in permafrost inside Haughton Crater). Cores and cuttings were successfully retrieved and archived.

Johnson J. B. Mungas G. S. Zacny K. Albert D. G. Banerdt B. Buehler M. Elphic R. C. Lambert J. Sturm M. Johnson K.
A Lunar Regolith Characterization Kit (LRoCK) **[#1987]**
The Lunar Regolith Characterization Kit (LRoCK) project is a concept study to define a semi-autonomous instrument package for use by astronauts during future human lunar sortie missions.

Zacny K. Mungas G. Chu P. Craft J. Mumm E. Hedlund M. Paulsen G. Davis K.
MarsVac: A Two Step Regolith Sampling System **[#1068]**
A system for acquiring regolith consists of tubing embedded inside each leg of a lander. After landing, the tube will be pushed into regolith. With one puff of gas, the trapped regolith can be lifted/guided inside the tubing into a sample chamber.

Simionovici A. S. Lemelle L. Beck P. Ferroir T. Westphal A. Chazalnoel P. Debus A. Fihman F.
Methodology and Sample Holder for Analyses Under Quarantine of Martian Return Samples **[#2543]**
A method and a sample holder for analysis in quarantine conditions of Mars return samples is presented.

Scheeres D. J. Sánchez P. Dissly R. W. Asphaug E. I. Housen K. R. Swift M. R. Yano H. Roark S. E. Soto J. C.
Extra Low-Gear: A Micro-Gravity Laboratory to Simulate Asteroid Surfaces **[#2447]**
The conceptual design and application of a low-speed centrifuge for carrying out milli to micro-*G* gravity experiments to simulate the granular nature of the surface and interiors of asteroids and comets is described.

Bartlett P. W. Heys S. Drozdowski Z. Kennedy T. Wagner M.
Vertical Exploration Using Tethers **[#2146]**
Unobserved geologic features and epochs on multiple planetary bodies could be accessed using robotic tethers. Recent technology development shows the promise of tethers enabling steep slope mobility, downhole measurements and *in situ* sensing from aerial platforms.

Curtis S. A. Clark P. E. Minetto F. A. Calle C. I. Keller J. Moore M.
SPARCLE: Creating an Electrostatically Based Tool for Lunar Dust Control **[#1128]**
Here we present the results of our ongoing efforts to design and develop tools to remove dust on the lunar surface based on our characterization of the nature of dust particles and forces affecting them.

Anderson R. C. Peters G. H. Beegle L. Pounders E. Manatt K. Solitt L. Fleming G.
Particle Transport on the Mars Science Laboratory Mission: Effects of Triboelectric Charging **[#1648]**
One of the major challenges facing the 2009 Mars Science Laboratory (MSL) onboard analysis system is the ability to successfully transfer fine-grained powders from the sample acquisition unit to the analytical instruments that make the scientific measurements.

Brinckerhoff W. B. Zacny K. ten Kate I. L. Kusack A. Conrad P. G. Franz H. B. Eigenbrode J. Mahaffy P. R. Corrigan C. M. Onstott T. C.
Precision Subsampling System for In Situ Analysis at Mars (and Beyond) **[#2240]**
A new MIDP-supported effort seeks to develop a precision subsampling system (PSS) for Mars and other planetary bodies. The PSS will enable localized chemical and isotopic analyses of drill core layers and other small features in rock samples.

Dreyer C. Zacny K. Skok J. Steele J. Paulsen G. Szczesiak M. Nakagawa M. Schwendeman J.
Progress on the Development of a Thin Section Sample Preparation Device for Space Exploration **[#2463]**
We are researching the component step for thin section preparation with the aim of producing a device for space exploration. We show results of a prototype system that has produced a thin section adequate for petrographic analysis.

Furutani K. Ikeda E. Okada T. Saiki K. Ohue H.
Prototype of Cutting Machine by Wire-sawing in Vacuum for In-Situ Investigation of Rocks **[#1044]**
Cutting characteristics of rocks in air and vacuum were investigated for the preprocess of the scientific inspection. The machining amount of basalt with a wire saw in vacuum was saturated in a short time due to loading of pulverized debris.

Tuesday, March 24, 2009
POSTER SESSION I: SEEING IS BELIEVING:
UV, VIS, IR, X- AND GAMMA-RAY CAMERA AND SPECTROMETER INSTRUMENTS
6:30 p.m. Town Center Exhibit Area

Nuñez J. I. Farmer J. D. Sellar R. G. Gardner P. B.
The Multispectral Microscopic Imager (MMI) with Improved Spectral Range and Resolution **[#1830]**
The MMI advances the capabilities of current and planned microimagers, such as Phoenix' Robotic Arm Camera and Mars Science Laboratory's Mars Hand Lens Imager, by extending the spectral range into the infrared and increasing the number of spectral bands.

Michael G. Neukum G.
Image Enhancement of the Super Resolution Channel (SRC) of the Mars Express HRSC Experiment **[#1851]**
The poster describes and shows the application of the Richardson-Lucy algorithm to recover degraded images from the super resolution channel (SRC) of Mars Express HRSC.

Weinberg J. D. Dissly R. Nicks D. Miller K. L.
Applications and Field Testing of a Flash LIDAR System for Future Planetary Missions **[#2078]**
A flash LIDAR instrument is being developed by Ball Aerospace. This instrument enables multiple applications for planetary missions such as topographic mapping, ranging, surface mobility, autonomous rendezvous and docking, and descent and landing.

Istenes Z. Hargitai H. Tepliczky I.
The Information System of the HUNVEYOR-10 on the MDRS **[#2435]**
We created a portable and autonomous meteorological station, called HUME/HUNVEYOR-10, for the 71st. mission of the Mars Desert Research Station (MDRS), to measure continuously meteorological data, to take videos and to transmit them.

Bramall N. E. Stoker C. R. Price P. B. Allamandola L. J.
Detecting Organics In Situ Using Fluorescence **[#2470]**
Fluorescence spectroscopy is a powerful tool for the detection of a wide class of organics. We will discuss instruments we have developed and are developing.

Sharma S. K. Misra A. K. Acosta T. Bates D. Lucey P. G.
Compact Portable Remote Raman System for Planetary Exploration and Rapid Detection of Water and Hydrous Minerals **[#2398]**
We present a compact remote Raman system utilizing only a 85 mm Nikon camera lens for measuring good quality Raman spectra of various minerals, water, water-ice, CO_2-ice, organic and inorganic chemicals to a distance of 9-m with 1-s integration.

Vance S.
Mars Analog Tunable Laser Spectroscopy at a Site of Active Serpentinization **[#2005]**
We discuss measurements of isotope compositionsfrom spring samples collected at The Cedars, a site of active serpentinization and possibly an analog for the Nili Fossae, using tunable laser spectroscopy withinstrumentation similar to TLS on MSL.

Helbert J. Maturilli A. D'Amore M.
Mercury in a Box — In the Planetary Emissivity Laboratory (PEL) at DLR Berlin **[#1560]**
Analyzing the surface composition of Mercury is a challenging task. In support of MESSENGER and BepiColombo the upgraded Planetary Emissivity Laboratory can obtain emissivity measurement for fine grain sizes and at temperatures typical for Mercury's low-latitude dayside.

Bowles N. E. Calcutt S. Reininger F. Green S. F. Mortimer H.
The Asteroid Thermal Mapping Spectrometer: An Imaging Mid-IR Spectrometer for the Marco Polo NEO Sample Return Cosmic Vision Candidate Mission **[#1591]**
We describe the Asteroid Thermal Mapping Spectrometer (ATMS) instrument, a compact imaging mid-IR Fourier transform spectrometer currently being developed at the University of Oxford for NEO remote sensing applications.

Sobron P. Freeman J. J. Wang A.
Field Test of the Water-Wheel IR (WIR) Spectrometer on Evaporative Salt Deposits at Tibetan Plateau **[#2372]**
A new NIR reflectance spectrometer (WIR) was tested at the field sites on the Tibetan Plateau, a potential analog for the precipitation sequence and subsequent dehydration/degeneration of martian salts. Hydrated sulfates were identified.

Kozyrev A. S. Litvak M. L. Malakhov A. A. Mokrousov M. I. Mitrofanov I. G. Rogozhin A. A. Sanin A. B. Schulz R. Schvetsov V. N. Tretyakov V. I. Vostrukhin A. V.
Gamma-Rays and Neutron Spectrometers NS HEND — Tool for Study of Phobos Surface Composition **[#1865]**
NS HEND instrument, as the part of "Phobos-Grunt" mission, will be able to provide observational data for composition of Phobos regolith and content of natural radioactive elements K, U and Th, and also for content of hydrogen or water ice in the Phobos subsurface.

Elam W. T. Kelliher W. C. Shuler R. L. McLennan S. M. Carlberg I. A.
Improvements in X-ray Spectrometry for Planetary Surface Exploration **[#1820]**
There have been dramatic advances in X-ray spectrometry (XRS) hardware in recent years. Together they permit construction of XRS units with very low mass, power, and size yet have performance comparable to that of terrestrial laboratory units.

Grunthaner P. J. Bryson C. Gill D. Grunthaner F. Kelly M. DeFlores L. White V. Quinn R.
Ambient-Pressure X-Ray Photoemission Spectrometer for Surface Analysis of Planetary Surfaces **[#2294]**
Ambient-pressure X-ray photoemission offers the possibility of probing the surface chemistry of martian soils, rocks, and ices, including the atmospheric species interacting with these surfaces, to study geochemical surface processes.

Chemtob S. M. Yen A. Blake D. F.
The X-Ray Fluorescence Capabilities of CheMin IV: Data Reduction and Calibration **[#2171]**
CheMin, the primary instrument on the MSL rover for determining mineralogy, also features XRF capabilities. Here we present data reduction and calibration methods for determining composition of geologically relevant materials from CheMin XRF spectra.

Flemming R. L. McCausland P. J. A. Gellert R.
In Situ X-Ray Diffraction on the Moon, Mars and Asteroids **[#1888]**
In situ XRD can directly determine mineralogy of samples on planetary surfaces via crystal structural information, to compliment chemical data (e.g. APXS), with no need for sample extraction/pulverization. Lab-based e.g. are given using meteorites.

Sarrazin P. Dera P. Downs R. T. Blake D. F. Bish D. Gailhanou M.
Hybrid X-ray Diffraction for Planetary Mineralogical Analysis of Unprepared Samples **[#1496]**
A new type of X-ray diffraction (XRD) planetary instrument is being developed based on an innovative hybrid concept that allows performing both powder and single-crystal XRD measurements, making it possible to analyze minerals with limited or no sample preparation.

Tuesday, March 24, 2009
POSTER SESSION I: UP CLOSE AND PERSONAL: IN SITU ANALYSIS WITH LASER-INDUCED BREAKDOWN SPECTROSCOPY AND MASS SPECTROMETRY
6:30 p.m. Town Center Exhibit Area

Maurice S. Wiens R. Parès L. Bender S. le Roch N. Dalmau J. Berthé M. Langevin Y. Herkenhoff K. Bridges N. Saccoccio M. ChemCam Team
Characterization of the ChemCam (MSL) Imaging Capability **[#1864]**
The ChemCam instrument comprises a Remote Micro-Imager (RMI) to place the LIBS analyses in their geomorphologic context. We present RMI flight unit test results, including the characteristics and performances of this imaging capability on MSL.

Forni O. Clegg S. Wiens R. C. Maurice S. Gasnault O.
Multivariate Analysis of ChemCam First Calibration Samples **[#1523]**
We present a multivariate analysis of the first calibration of the ChemCam LIBS instrument on board MSL. We use two methods PCA and ICA on the same data set and compare them.

Mungas G. S. Dreyer C. B. Bauer A. J.
Elemental Abundance Measurement Using Micro-LIBS for Space Exploration **[#2264]**
LIBS elemental measurements suffer from inaccuracies we believe are fundamentally tied to uncertainty in the LIBS plasma thermal history. We propose a method to decode plasma temperature history with elemental abundance from observed emission lines.

Perkins J. J. Sharma S. K. Clegg S. M. Misra A. K. Wiens R. C. Barefied J. E.
Remote Laser-induced Breakdown Spectroscopy (LIBS) Analysis of Hydrated Sulfates **[#1397]**
We report here the use of remote LIBS for determining degree of hydration in sulfate minerals. With LIBS onboard MSL it will be possible to glean information about the degree of hydration along with major and minor elements on the surface of Mars.

Fabre C. Maurice S. Sautter V. Wiens R. Dubessy J. Boiron M. C. CHEMCAM Team
Onboard Calibration Silicate Targets for the Chemcam LIBS Instrument (MSL Rover) **[#1502]**
The MSL rover lander will carry rover-mounted calibration targets. The chemical compositions of the basaltic targets were checked using electron microprobe. The homogeneity is very good at the micrometric scale, even for the trace elements.

Rauschenbach I. Jessberger E. K. Hübers H. W. Pavlov S. G.
Miniaturized Laser-induced Breakdown Spectroscopy for Planetary Surface Analysis **[#1563]**
LIBS is currently under development for future lander missions to Mars and other planets and moons. Here we report on our study of different parameters that are of importance for a lightweight LIBS instrument specifically in the martian environment.

Cousin A. Maurice S. Parot Y. Michel Y. Le Roch N. Dalmau J. Parès L. Perez R. Cros A. Wiens R. ChemCam Team
ChemCam (MSL) Autofocus Capabilities **[#1684]**
ChemCam is a remote instrument to investigate martian geochemistry, using the LIBS technique, a board of the MSL rover. The aim of this work is to present the initial calibration of ChemCam, and to investigate the effect of the rocks' parameters on the autofocus function.

Laan E. C. van Westrenen W. Wielders A. Heiligers J. MoonShot Partners
MoonShot: A Combined Raman/LIBS Instrument for Lunar Exploration **[#1836]**
A consortium led by the Dutch Organisation for Applied Scientific Research with partners from Dutch industry and academia aims to provide a combined Raman/LIBS instrument as scientific payload for lunar and planetary exploration missions.

Vaniman D. T. Clegg S. Lanza N. Newsom H. Wiens R. C. ChemCam Team
Fabrication of Sulfate-bearing Ceramic Calibration Targets for the ChemCam Laser Spectroscopy Instrument, Mars Science Lander **[#2296]**
A need for sulfur-bearing calibration targets for LIBS analysis by ChemCam on the Mars Science Lander required development of low-fire ceramics. A range of sulfur contents can be obtained that mimic soil or rock at the potential landing sites.

Tucker J. M. Dyar M. D. Clegg S. M. Schaefer M. W. Wiens R. C. Barefield J. E. II
LIBS Analysis of Minor Elements in Geologic Samples **[#2024]**
The first investigation of minor element detection by LIBS for ChemCam calibration shows promise for identification and quantification of minor elements by statistical techniques.

Anderson F. S. Nowicki K.
In-Situ LDRIMS Geochronometry for the Moon and Mars **[#2290]**
Latest progress on the development of a Laser Desorption Resonance Ionization Mass Spectrometer (LDRIMS) instrument for *in situ* rubidium-strontium (Rb-Sr) geochronology.

Strashnov I. Blagburn D. J. Gilmour J. D.
Resonant Photoionization Mass Spectrometer for Determination of Isotopic Compositions of Krypton in Extraterrestrial Samples **[#1645]**
An ultra sensitive MS for determination of Kr has been developed. A four wave mixing in Xe is used for generation of vuv light necessary for the first resonant step of three color ionization scheme. Kr isotopic ratios of air samples and Stannern meteorite determined.

Mahaffy P. R. Hodges R. R. Benna M. Harpold D. N. Kasprzak W. K. Kellogg J. W. King T. T.
Neutral Mass Spectrometer Under Development for the Lunar Atmosphere and Dust Environment Explorer (LADEE) Mission **[#1217]**
Description of the Neutral Mass Spectrometer that is one of three instruments under development for the Lunar Atmosphere and Dust Environment Explorer (LADEE) Mission.

Nagashima K. Huss G. R. Kosaka K. Kunihiro T. Keil K. Krot A. N. Taylor G. J. Yurimoto H.
Development of Isotope Imaging System with Two-Dimensional Ion Detector SCAPS for ims-1280 Secondary Ion Mass Spectrometer **[#2066]**
We are developing a new imaging detector system using the SCAPS in combination with the University of Hawaii Cameca ims-1280 SIMS instrument. We present results of initial tests of the system as well as details of the system.

Davis A. M. Stephan T. Veryovkin I. V. Pellin M. J. Savina M. R.
The Ion Nanoprobe: A New Instrument for Studying the Isotopic and Elemental Composition of the Solar System and Beyond at the Few-Nanometer Scale **[#2472]**
The ion nanoprobe is a new instrument designed for isotopic, chemical, and possibly molecular analysis at lateral resolutions of a few nanometers. This instrument, now under construction, will be applied to a broad range of problems in cosmochemistry.

Hilchenbach M. Lang T. Hornung K. Thirkell L. Briois C.
UV-Laser Desorption Ion Source Applied to a Secondary Ion Mass Spectrometer **[#1162]**
We were focusing on using a new UV laser ion desorption source combined with a SIMS laboratory time-of-flight mass spectrometer, the latter being very similar to the COSIMA flight instrument onboard Rosetta.

Greer F. Fisher A. Corso T. MacAskill J. Willis P. A.
Nanospray Ionization for Coupling Capillary Electrophoresis with Mass Spectrometry for In Situ Titan Exploration **[#2200]**
This paper will present the status of our effort to develop a Lab-on-a-Chip instrument coupling microCE to MS via nanospray ionization enabling *in situ* detection and analysis of target compounds on Mars or the moons of the outer solar system.

Tuesday, March 24, 2009
POSTER SESSION I: JUPITER AND INSCRUTABLE IO
6:30 p.m. Town Center Exhibit Area

Visscher C. Sperier A. D. Moses J. I. Keane T. C.
Phosphine and Ammonia Photochemistry in Jupiter's Troposphere **[#1201]**
A photochemical model is developed for Jupiter's troposphere using updated constraints. The results suggest that diphosphine is an important aerosol component and that coupled ammonia-acetylene photochemistry is inhibited in Jupiter's atmosphere.

Williams D. A. Keszthelyi L. P. Crown D. A. Geissler P. E. Schenk P. M. Yff J. Jaeger W. L.
Volcanism on Io: Insights from Global Geologic Mapping **[#1403]**
We discuss latest insights into the volcano-tectonic evolution of Io based on global geologic mapping.

Bunte M. K. Williams D. A. Greeley R. Jaeger W. L.
Geologic Mapping of the Hi'iaka and Shamshu Regions of Io **[#1468]**
We present regional geomorphologic maps of the Hi'iaka and Shamshu regions of Io. The regions are characterized by varied volcanic and tectonic activity as well as progressional degradation. Volcano-tectonic interactions formed the Hi'iaka complex.

Barth B. Radebaugh J. Christiansen E. H.
Classification of Io's Paterae: Active vs Inactive **[#2397]**
On Io, the proportion of paterae with active volcanism, as judged from the presence of dark deposits within their margins, correlates with the total number of paterae in a longitudinal band and is highest in the sub-jovian and anti-jovian regions.

Allen D. Radebaugh J.
Ionian Volcanoes Reveal Their Temperatures **[#1475]**
Color temperature analyses were conducted on three hotspots using Cassini ISS data of the surface of Io in eclipse by Jupiter. The data for Pillan, Loki, and Wayland will be presented.

Keszthelyi L. P. Davies A. G. McEwen A. S.
Optimal Wavelengths for Studying Thermal Emission from Active Volcanoes on Io **[#1943]**
Eruption temperature of Io lavas can be constrained by new observations at ~0.8 and ~1 microns. Eruption style and heat flow are best studied at 2, 3, 4, 6, 8, 15, and 20 microns with 2, 5, and 8 microns being the most essential.

Rathbun J. A. Spencer J. R.
Ground-based Observations of Io in Support of the New Horizons Flyby **[#2177]**
We observed Io on 21 nights in 2006–2007 in support of the February, 2007 New Horizons flyby. We found that Tvashtar had been volcanically active for at least a month prior to the flyby and that at least four volcanoes were active on the Jupiter-facing hemisphere.

Borer N. Chen E. M. A. Choi D. S. Kraft K. L. Fortenberry R. Harben J. Issacson P. Johnson A. Jones I. Mabry J. McDunn T. Millham R. A. Pankine A. Prater A. Cowardin H. M. Smith D. J. Snowden D.
Argus: A New Frontiers Mission to Observe Io **[#1062]**
A proposal to study Io, the most volcanically active solar system body. Study of volcanic activity, composition, tidal heating, atmospheric composition, mass wasting and magnetosphere interactions furthers understanding of dynamic planetary process.

McDoniel W. J. Goldstein D. Varghese P. Trafton L. Stewart B.
DSMC Modeling of 3D Vent Geometries for Ionian Plumes **[#2223]**
We study the effects of vent asymmetry on Io's volcanic plumes, with a focus on the difference between a disk source and a half annulus source, and show how the half annulus source can still lead to a fairly symmetric deposition ring.

Tuesday, March 24, 2009
POSTER SESSION I: TANTALIZING TITAN
6:30 p.m. Town Center Exhibit Area

Hayne P. McCord T. B. Barnes J. W.
Titan's Near Infrared Atmospheric Transmission and Surface Reflectance from the Cassini Visual and Infrared Mapping Spectrometer **[#1863]**
Using a ground calibration target method, we calculate Titan's atmospheric transmission and surface albedo in the 0.8 - 5.0 micron wavelength range. Two of Titan's most interesting features, Tui Regio and Hotei Regio, are depleted in water ice.

Rodriguez S. Crapeau M. Le Mouelic S. Paillou P. Barnes J. W. Brown R. H. Sotin C. Wall S.
Cassini VIMS and RADAR Altimeter Joint Study of Titan Surface **[#1596]**
Correlations between Cassini/Altimeter data and VIMS underlying images of Titan's surface suggest the presence of very local enrichments in water ice linked with smooth depressions, maybe hinting an ancient channel connected to a large basin.

Langhans M. Jaumann R. Stephan K. Brown R. H. Buratti B. J. Clark R. Baines K. H.
Nicholson P. D. Lorenz R. D.
Fluvial Valleys on Titan — A Global Perspective **[#1681]**
Fluvial valleys on Saturn's largest moon, Titan, are investigated in this study. A global overview about the arrangement of fluvial channels is given. Spectral properties of fluvial regions were analysed based on Cassini-VIMS-data.

Burr D. M. Aliaga-Caro J. F. White B. R. Marshall J. R. Greeley R. Bridges N. T.
Numerical Modeling of Titan Aeolian Sediment Transport: Preliminary Threshold Wind Speed and Trajectory Results **[#2098]**
Preliminary numerical modeling of aeolian sediment transport parameters under Titan conditions is provided, for future testing in wind tunnel experiments.

Savage C. J. Radebaugh J.
Titan as a Laboratory for Linear Dune Formation **[#1005]**
We present results of a detailed morphological study of Titan's linear dunes showing sediment induration by liquids may be causing differences in dune width and interdune spacing between northern and southern hemispheres.

Neish C. D. Lorenz R. D. Kirk R. L.
Out of Africa: Radarclinometry of the Sand Seas of Namibia and Titan **[#1071]**
Far from the Namib; Dunes of organic solids; Mimic quartz cousins.

Stofan E. R. Farr T. Kirk R. L. Lopes R. M. Lorenz R. Lunine J. I. Mitchell K. L. Paillou P.
Radebaugh J. Wall S. W. Wood C. A. Cassini Radar Team
Morphology of Four Flow Fields on Titan: Implications for Modes of Origin **[#1043]**
We describe four flow fields associated with channels that have been observed in Cassini Radar data of Titan.

Wood C. A. Stofan E. R. Paganelli F. Lorenz R. D.
Fluctus and Virgae of Titan **[#2277]**
Fluctus are bright flows on Titan with lobate margins and linear sources. If they are volcanic features they are evidence for tectonic control. Shiwanni Virgae is dune material that diverts around obstacles. They are not tectonic.

Janssen M. A. Le Gall A. Wye L. C. Zebker H. A. Lorenz R. D. Paillou P.
Paganelli F. Cassini Radar Team
Anomolous Radar Backscatter from Titan's Xanadu **[#1916]**
We use simultaneously measured radar reflectivity and microwave emission from the Cassini Radar instrument to show that the radar backscattering seen across Titan's Xanadu region is too high to be explained by any known surface model.

Le Gall A. Janssen M. A. Lorenz R. D. Zebker H. Wye L. Paillou P.
Radar-Bright Channels on Titan **[#1533]**
The Cassini SAR observed channels in the Xanadu region of Titan which exhibit very large radar cross-sections. We propose the presence of (transparent) rounded, icy rocks with size larger than the radar wavelength (2.18 cm) to explain observations.

Lorenz R. D. Hayes A. Callahan P. Gim Y. Janssen M. Wall S. Le Gall A. Mitchell K. Zebker H. Wye L. Lunine J. Aharonson O. Kirk R. Wood C. Alberti G.
Ontario Lacus: Brilliant Observations of a Titan Lake by the Cassini Radar Altimeter **[#1990]**
Rad altimetry, Ontario, truly flat, Glints like a mirror..

Jaumann R. Neukum G.
The Surface Age of Titan **[#1641]**
Although the statistical precision of the Titan cratering results is not very high it is obvious that Titan's surface is partly as old as the other saturnian satellites and has been partly modified and heavily resurfaced .

Zahnle K. Korycansky D.
Some Possible Consequences of Menvra Impact on Titan **[#2390]**
The energy released by the Menvra impact was marginally large enough to melt and evaporate significant amounts of water, and thus cause rain. The energy of this and other impacts was large enough to evaporate significant amounts of methane.

Fukuzaki S. Sekine Y. Kurosawa K. Sugita S. Kadono T. Matsui T.
Impact Devolatilization of Ammonium Sulfate: Implications for the Origin of N_2 in Titan's Atmosphere **[#1575]**
We assess the role of devolatilization of $(NH_4)_2SO_4$ in Titan's crust by cometary impacts for the origin of N_2 by laboratory experiments. Our results suggest that the N_2 production for 4.5 Gyr reaches ~2.5–10 times that in the present atmosphere.

Berezhnoy A. A.
Nitrogen on Early Titan **[#1077]**
An early NH_3-rich Titan's atmosphere can be converted into the N_2-rich atmosphere without significant changes in the isotopic composition of N and H. The dissociative fractionation factor and the initial atmospheric mass of Titan are estimated.

Tuesday, March 24, 2009
POSTER SESSION I: ENIGMATIC ENCELADUS AND INTRIGUING IAPETUS
6:30 p.m. Town Center Exhibit Area

Hanna B. J. Yeoh S. K. Goldstein D. B. Varghese P. L. Trafton L. M.
Free-Molecular and Collisional Studies of Enceladus' Water Vapor Plumes **[#2389]**
The free-molecular and the direct simulation Monte Carlo (DSMC) codes are used to simulate the water vapor plumes observed on the south pole of Enceladus during the three orchestrated flybys in 2005 by Cassini.

Lisse C. M. Weaver H. A. Perry M. E. Turtle E. P. Hibbits C. A. Dello Russo N.
Comparing Enceladus to Comets: Implications for Their Outgassing Activity **[#2299]**
Using results from Voyager and Cassini observations, we investigate the compositional similarities between Enceladus' plumes and cometary comae and compare the physical properties (densities, speeds, collimation) of the plumes and cometary jets.

Boice D. C. Goldstein R.
Is Enceladus a Comet? A Cometary Perspective **[#1506]**
The discovery of icy plumes emanating from Saturn's moon, Enceladus, by the Cassini spacecraft has raised questions about its cometary nature. Enceladus represents a transitional object, intermediate to the atmospheres of large satellites and the extended comae of comets.

Barr A. C.
Limits on Heat Transport and Resurfacing Rates Due to Mobile Lid Convection Beneath Enceladus' South Polar Terrain **[#2378]**
The high heat flux and intense surface deformation at Enceladus' south pole suggests that convective plumes reach close to the surface. I derive limits on the heat flux and resurfacing rate due to mobile lid convection.

Patthoff D. A. Kattenhorn S. A.
Establishing a Long-Term Fracture History of the South Polar Terrain on Enceladus **[#2513]**
Fracture mapping of the SPT on Enceladus will help to resolve the history of the tiger stripes and the surface of the moon through detailed analysis of the fracture types, orientations, and relative ages.

Hurford T. A. Bills B. G. Helfenstein P. Greenberg R. Hoppa G. V. Hamilton D. P.
Using Geological Implications of a Physical Libration to Constrain Enceladus' Libration State **[#1631]**
We describe how a physical libratrion might affect eruption variability, tidal shear heating and crack formation. These effects might be observable with Cassini data and allow the libration state to be constrained.

Morito H. Kimura J. Kawamura T. Morota T. Honda C. Kobayashi Y. Okada T.
Sublimation Impact for the Temporal Change of Albedo Dichotomy on Iapetus **[#1621]**
In this work, we evaluate the effect on icy sublimation and temporal change of surface albedo, and we try to reconstruct the original distribution the dark material on Iapetus.

Galuba G. G. Denk T. Neukum G.
Dark Crater Surfaces in Bright Areas on the Saturn Moon Iapetus **[#1792]**
The explanation why the Cassini Regio on Iapetus is dark is supplemented by an explanation why on the bright trailing side there are dark crater bottoms.

Tuesday, March 24, 2009
POSTER SESSION I: ICY SATELLITES: CRYPTIC CRATERS
6:30 p.m. Town Center Exhibit Area

Kirchoff M. R. Schenk P.
Impactor Populations in the Saturnian System: Constraints from the Cratering Records **[#2067]**
We use the cratering records of heavily cratered terrains of Mimas, Tethys, Dione, Rhea, and Iapetus to help constrain characteristics of impactor populations in the saturnian system.

Karpes B. A. Stoddard P. R.
The Cataloging of Craters on Enceladus **[#1306]**
We catalog craters of Enceladus, using publicly available images, and make some preliminary analysis.

Yozzo J. E. Kirchoff M. R. Schenk P.
Apex-Antapex Asymmetry of Impact Crater Density on Ganymede's Dark Terrain **[#2214]**
This abstract focuses on the asymmetry of impacts between Ganymede's apex and antapex of motion using the dark terrain of Ganymede and attempts to provide an explanation for the lack of a large predicted asymmetry.

Mukherjee P. Barlow N. G.
A Catalog of Impact Craters on Ganymede **[#2071]**
We are compiling a catalog of all impact craters on the jovian moon Ganymede which are larger than 3 km in diameter. We discuss preliminary results regarding interior morphologies associated with these craters.

Alzate N. Barlow N. G.
Analysis of Central Pit Craters on Ganymede and Implications for Pit Formation Models **[#1921]**
We have completed our survey of central pit craters on Ganymede. We discuss the characteristics and distributions of these central pit craters and the implications for central pit formation models.

Tuesday, March 24, 2009
POSTER SESSION I: ICY SATELLITES: GELID GEOLOGY/GEOPHYSICS
6:30 p.m. Town Center Exhibit Area

Schulson E. M.
Frictional Sliding of Cold Ice **[#1795]**
This paper reviews current knowledge of frictional sliding in water ice Ih, a fundamental process underlying tectonic activity within the icy crusts of Enceladus and Europa, and raises a number of questions.

Bland M. T. McKinnon W. B. Showman A. P.
Forming Ganymede's Grooves: Producing Large-Amplitude, Complex Deformation **[#1690]**
We present the first numerical simulations that realistically reproduce the complex deformation observed in Ganymede's grooved terrain. This deformation results from the inclusion of strain weakening effects in the ice rheology.

Damptz A. L. Dombard A. J.
Time-dependent Flexure on the Icy Satellites of Jupiter and Saturn **[#1316]**
In this work we explore the "static" assumption of models of lithospheric flexure that have been used on these icy satellites. We find that creep within the lithospheres is non-negligible, leading to progressive thinning of the lithosphere.

Goff-Pochat N. Collins G. C.
Strain Measurement Across Fault Scarps on Dione **[#2111]**
In this presentation we display the calculated surface strain over fault sets on Dione, and provide an analysis of the overall surface strain accommodated on Dione.

Wagner R. J. Neukum G. Stephan K. Roatsch T. Wolf U. Porco C. C.
Stratigraphy of Tectonic Features on Saturn's Satellite Dione Derived from Cassini ISS Camera Data **[#2142]**
Cassini ISS images were used to derive a stratigraphic sequence of tectonic landforms (troughs, ridges, scarps, lineaments) on Saturn's icy satellite Dione.

Kay J. P. Kattenhorn S. A.
Searching for Evidence of Active Tectonics on Europa **[#2454]**
Evidence of recent tectonic activity on Europa logically starts with the geologically young, ridgeless surface fractures. The temporal relationship between young fractures and their orientations could yield information about recent tectonic activity.

Coulter C. E. Kattenhorn S. A. Schenk P. M.
Topographic Profile Analysis and Morphologic Characterization of Europa's Double Ridges **[#1960]**
Ridges on Europa have very low slopes and limiting values of height/width that suggest viscoplastic gravitational collapse over time. Variability between ridges may point to disparate formation kinematics.

Singer K. N. McKinnon W. B.
Pits, Spots, Uplifts, and Small Chaos Regions on Europa: A Search for Regional Variations **[#2336]**
Mapping of a sample region illustrates how data obtained in ArcMap can be used to investigate the spatial and size frequency distribution of small features on Europa. We hope further mapping will shed light on the physics of feature formation.

Rodriguez N. J. Rathbun J. A. Spencer J. R.
Europa's Thermal Surface from Galileo PPR **[#2166]**
We present Galileo Photopolarimeter-Radiometer data of Europa and, from these, model the thermal inertia and bolometric albedo of the surface. We also derive an upper limit for detection of endogenic activity.

El Maarry M. R. Sierks H.
Geological, Geochemical and Engineering Considerations for Choosing a Landing Site on the Jovian Moon Europa **[#2014]**
Geological, geochemical, and engineering constraints on choosing a suitable landing site for lander on the jovian moon, Europa, are discussed briefly.

Stryk T. Stooke P. J.
Triton Crescent Imaging Revisited: Cartography and Geology **[#1710]**
Voyager 2 images of the outbound crescent of Triton are specially processed, added to a global map and interpreted geologically. Plains, hills, cantaloup-type areas and possible flows are mapped.

Tuesday, March 24, 2009
POSTER SESSION I: ICY SATELLITES:
COOL CHEMISTRY AND SPECTACULAR SPECTROSCOPY
6:30 p.m. Town Center Exhibit Area

Hansen G. B. Apple S. K. Shin-White E.-J. Z.
Water Ice Abundance and Grain Sizes, and Non-Ice Materials on the Saturnian Satellite Phoebe from Cassini/VIMS Observations **[#2227]**
We are modeling Cassini-VIMS spectra from an observation of the Saturn satellite Phoebe with water ice and non-ice components, assuming linear mixing, to find abundances and grain sizes.

Stephan K. Jaumann R. Wagner R. Clark R. Cruikshank D. P. Hibbitts C. A. Roatsch T. Brown R. H. Buratti B. J. Filacchione G. Hansen G. B. McCord T. B. Baines K. H. Nicholson P. D.
VIMS Coverage of Saturn's Icy Satellite Rhea **[#1377]**
The present status of observing Saturn's satellite Rhea by the Cassini VIMS spectrometer will be presented showing that the derived spatial variations of Rhea's spectral properties appear to be similar to the neighboring satellite Dione.

Filacchione G. Cuzzi J. N. Clark R. N. Buratti B. J. Capaccioni F. Tosi F. Coradini A. Cerroni P. Adriani A. Cruikshank D. P. Jaumann R. Stephan K. Brown R. H. Nicholson P. D. Baines K. H. Nelson R. M. McCord T. B.
Revised Full-Disk Spectra by Cassini-VIMS of the Saturnian Minor Icy Moons **[#1780]**
This abstract concern with a detailed re-analysis of the disk-integrated spectra of the minor moons of Saturn (Atlas, Prometheus, Pandora, Janus, Epimetheus, Calypso and Telesto) obtained by Cassini-VIMS.

Hendrix A. R. Buratti B. J.
Multi-Wavelength Photometry of the Icy Saturnian Satellites: A First Look **[#2438]**
We present results from analyses of phase curves of Enceladus and Dione made using data from Cassini UVIS and VIMS. The investigation provides critical insight into the evolution of the moon regoliths and an understanding of their current environments.

Phillips C. B. Dalton J. B.
Combining Galileo SSI and NIMS Spectra for Europa **[#1367]**
We are combining spectral information from visible-wavelength color Galileo SSI images of Europa with multi-spectral near-infrared data from Galileo NIMS. These combination spectra will help us understand the composition of Europa's surface.

Collins G. C. Hibbitts C. A. Hansen G. B.
Investigation of Carbon Dioxide Distributions on Saturnian and Galilean Satellites Through Fusion of Spectrometer Data with Geological Maps **[#2327]**
We have converted spectrometer data from Cassini VIMS and Galileo NIMS into GIS layers that can be queried along with geological map data. This presentation shows examples from CO_2 band depth mapping on Dione and Ganymede.

Dupire C. Le Menn E. Grasset O. Le Mouélic S.
In Situ Infrared Studies of Water and CO_2 Frost Between 1 and 5 µm: From the Grain to the Icy Surfaces Signatures **[#1242]**
In situ infrared spectra and images of well controlled water and carbon dioxide ice grains have been experimentally acquired in the laboratory. The spectral influence of gaseous CO_2 in an icy matrix is discussed.

Palmer E. E. Brown R. H.
Carbon Dioxide on the Surface of Iapetus, Its Stability and Production **[#2442]**
CO_2 has been found on Iapetus, where it should be thermally unstable. We generate CO_2 using water ice and carbon grains using UV light as a source for Iapetus. We evaluate how CO_2 can be trapped on the surface.

Cook J. C. Olkin C. B. Desch S. J. Mastrapa R. M. Roush T. L. Verbiscer A. J.
Examination of the K-Band Spectrum of Charon: Possible Evidence for Multiple Ammonia Ices **[#2222]**
We present a new K-band (1.9–2.4 microns) spectrum of Charon and show there is evidence that the surface has different forms of ammonia ice.

Peeters Z. Hudson R. Moore M.
Carbonic Acid Stability in Solar System Ices **[#2561]**
We have investigated spectral properties and the stability of carbonic acid (H_2CO_3) at different temperatures upon irradiation with MeV protons. The results are extrapolated to life times in outer solar system bodies.

Choukroun M. Barmatz M. Castillo-Rogez J. C. Sotin C.
New Growth Setup of Planetary Clathrate Hydrate Analogs for Physical Properties Measurements **[#2313]**
We present a new high pressure – low temperature setup for the synthesis of large clathrate hydrate samples. We are ready to grow CO_2 clathrates, and to conduct initial measurements of their mechanical properties, with applications to Enceladus.

Dougherty A. J. Hogenboom D. L. Kargel J. S.
Volumetric and Optical Studies of High Pressure Phases of Na_2SO_4-$^{10}H_20$ with Applications to Europa **[#2033]**
We use optical images of high-pressure phases of the Na_2SO_4-H_2O system,coupled with measurements of pressure, temperature, and volume changes, toreport eutectic transitions for pressures up to 325MPa, with implicationsfor modeling Europa’s ocean.

Tuesday, March 24, 2009
POSTER SESSION I: ASTEROIDS AND COMETS
6:30 p.m. Town Center Exhibit Area

De Sanctis M. C. Lasue J. Magni G. Capria M. T. Turrini D. Coradini A.
Models of ROSETTA Target Comet 67P/Churyumov-Gerasimenko **[#1510]**
We will present the results of a new quasi three-dimensional comet evolution model for non-spherically shaped cometary nuclei. We applied this model to comet 67P/Churyumov-Gerasimenko.

Emery J. P. Cruikshank D. P. Burr D. M.
Near-Infrared Spectroscopy of Trojan Asteroids: Evidence for Two Compositional Groups **[#1442]**
We present near-infrared spectra of ~70 Trojan asteroids. No clear absorption features are detected, but the data reveal two spectral groups. These results are in agreement with other observational evidence, and we suggest the groups indicate distinct compositions.

Hibbitts C. A. Jauhari S. Hagaman S. Lisse C.
Near-Far IR Spectra of Refractory Minerals Relevant to Comets **[#1932]**
We present our results for transmission spectra from ~ 2–200 μm and derived absorption constants for these and other materials relevant to comets, including pyrrhotite, other sulfides, carbonates, and several clay minerals.

Zolotov M. Yu.
Ceres: A Case for Porous, Undifferentiated, and Non-Icy Hydrated Body **[#2329]**
As opposed to previous deductions, this work argues for a porous internal structure of Ceres without a dense core and water mantle.

Li J.-Y. McFadden L. A. A'Hearn M. F. Feaga L. M. Russell C. T. Coradini A.
De Sanctis C. Ammannito E.
UV Absorption Features of Asteroid 1 Ceres **[#2101]**
New images and spectra of asteroid Ceres at UV were obtained with HST/ACS/SBC. The absorption feature at about 280 nm in the spectrum of Ceres is confirmed.

Milliken R. E. Rivkin A. S.
Spectral Evidence for a Brucite-Carbonate Alteration Assemblage on Ceres **[#1481]**
We present a new interpretation for the 3 um hydration feature in Ceres' reflectance spectrum. The features in this wavelength region are consistent with brucite and Mg carbonate, suggesting alteration on Ceres is distinct from the chondrites.

Ostrowski D. R. Sears D. W. G. Gietzen K. M. Lacy C. H. S.
An Investigation of Phyllosilicates, C Chondrites, and C Asteroids Using Continuum Slopes of Near Infrared Spectra **[#1136]**
We have measured the near-IR spectra of five phyllosilicates heated in 100°C intervals to 1100°C. We conclude that the surfaces of C asteroids are essentially amorphous, being impact-dehydrated phyllosilicates.

Reynolds C. M. Reddy V. Gaffey M. J.
Compositional Study of 51 Nemausa: A Possible Carbonaceous Chondrite-like Asteroid **[#1285]**
This is a compositional study on the main-belt asteroid 51 Nemausa.

Cloutis E. A. Hardersen P. S. Reddy V. Gaffey M. J. Bailey D. T. Craig M. A.
Metal-Orthopyroxene and Metal-Olivine Mixtures: Spectral Reflectance Properties and Implications for Asteroid Spectroscopy **[#1332]**
The spectral reflectance properties of metal + mafic silicate mixtures indicate that mafic silicate band centers can be successfully recovered, and mafic silicate compositions derived, from analysis of the spectra.

Gietzen K. M. Lacy C. H. S. Ostrowski D. R. Sears D. W. G.
Low-Calcium and Calcium-Free Clinopyroxene Spectra and the Implications for UOC Material on Asteroids **[#1348]**
Many S asteroids have spectral bands for Ca-rich clinopyroxene, which distinguish them from most ordinary chondrites. Five low-Ca clinopyroxenes have the same spectral feature and this likens the asteroids to unequilibrated ordinary chondrites.

Burbine T. H. Buchanan P. C. Dolkar T. Binzel R. P.
Pyroxene Mineralogies of Near-Earth Vestoids **[#1922]**
We determine the mineralogies of seven near-Earth asteroids that have reflectance spectra similar to howardites, eucrites, and diogenites (HEDs). All of these observed near-Earth V-type asteroids have pyroxene mineralogies consistent with eucrites or howardites.

Chapman C. R. Enke B. Merline W. J. Nesvorný D. Tamblyn P. Young E. F.
Reflectance Spectra of Members of Very Young Asteroid Families **[#2258]**
We present SpeX infrared spectra for members of the dynamically young Datura, Iannini, Karin, and Veritas asteroid families (plus Koronis and Themis family controls). S-types are space-weathered on timescales of a few million years.

Fauerbach M. Marks S. A. Behrend R. Bernasconi L. Bosch J.-G. Conjat M. Rinner C. Roy R.
Shape Models of Minor Planets 242 Kriemhild and 287 Nephthys **[#1279]**
Lightcurve inversion of photometry has been shown to be a viable source to obtain information about physical attributes like rotation period, shape and spin axis orientation for asteroids. We will present results for 242 Kriemhild and 287 Nephthys.

Takeuchi H. Miyamoto H. Oku M.
Distributions and Morphological Characteristics of Bright Spots on Boulders Covering the Surface of Asteroid Itokawa **[#1566]**
We scrutinized the highest-resolution images of the asteroid Itokawa to identify 387 bright spots on the surfaces of 123 boulders. Our preliminary results indicate ~90% of these bright spots are formed as results of micrometeoroid impacts.

Dachev Ts. P. Semkova J. V. Maltchev S. Tomov B. Matviichuk Yu. N. Koleva R. Benghin V. Chernykh I. Shurshakov V. Petrov V. Angelis G. De.
Radiation Environment Study During Phobos Sample Return Mission by Charged Particle Telescope Liulin-Phobos **[#1297]**
This paper describes the Liulin-Phobos experiment, which will be flown onboard the future Phobos – Soil sample return mission to the satellite of Mars – Phobos. The main goal is the investigation of the radiation environment and doses on the path and on Phobos surface.

Hamelin M.
Surface and Near Surface Dynamics on Phobos: Possible Grooves Formation by Impact Ejecta **[#1764]**
The motion of a test mass on an ellipsoidal model of Phobos is computed and compared with the grooves patterns around Stickney. It is shown that trajectories are not generally down slope and that a gliding mass can take off over some distance.

Ipatov S. I. A'Hearn M. F.
Deep Impact Ejection from Comet Tempel 1 as a Triggered Outburst **[#1022]**
Results of our studies of velocities and rates of ejection testify that the Deep Impact collision with Comet 9P/Tempel 1 was a trigger of a large outburst that had a local peak of ejection at about 10 seconds and a sharp decrease at ~60 s.

Doressoundiram A. Roques F. Boissel Y.
Probing the Radial Distribution of the Kuiper Belt Using Stellar Occultations **[#1074]**
We conducted a survey for serendipitous occultations. We report on 19 hours of fast-photometry data. We run a complex procedure to analyse the lightcurve. The results bring strong constraints on the Kuiper Belt structure.

McEachern F. M. Cuk M. Stewart S. T.
Dynamical Evolution of the Hungaria Asteroids **[#2554]**
In this study we investigate some 30 of the largest Hungaria asteroids for which taxonomic classes have been assigned, specifically to shed light on their possible dynamical histories.

Bradley P. A. Plesko C. S. Weaver R. P. Clement R. R. C. Guzik J. A.
Pritchett-Sheats L. A. Huebner W. F.
Modeling the Dynamic Response of an Asteroid or Comet to a Nuclear Deflection Burst **[#2314]**
The most technically feasible method of deflecting a Potentially Hazardous Object is a nuclear stand-off burst. We show results from our initial models that use bursts ranging from 1 to 1000 kt on 100 meter diameter targets of various compositions.

Tuesday, March 24, 2009
POSTER SESSION I: COMET WILD 2: MINERALOGY AND MORE
6:30 p.m. Town Center Exhibit Area

Rost D. Henkel T. King A. Lyon I.
Study of Aerogel Surface Exposed to the Particle Flux of Comet Wild 2: An Update **[#2480]**
Surfaces of Stardust aerogel have been analyzed with latest technology ToF-SIMS, utilising a beam of 40kV C60 ions, most suitable to measure heavy organic compounds at high lateral resolution.

Stephan T.
TOF-SIMS Analysis of Cometary Fragments Extracted from a Stardust Aerogel Track **[#1698]**
TOF-SIMS of cometary fragments from Stardust aerogel show that terminal particles are less mixed with aerogel than material from bulbous cavities. For a comprehensive picture of Wild 2 matter, all material from along the tracks needs to be analyzed.

Stodolna J. Jacob D. Leroux H.
Mineralogy and Petrology of Stardust Particles Extracted from the Walls of Track 80 **[#1762]**
We report a TEM examination of a compressed wall piece extracted from track 80. The sample shows a large diversity of mineralogy suggesting that the incident particles was a complex fine grained aggregate.

Stodolna J. Jacob D. Leroux H.
ATEM Study of Four Thermally Modified Stardust Particles from Track 80 **[#1754]**
We compare the microstructure and composition of thermally modified particles extracted from track 80. Elements distribution attests for capture induced reduction process. No evolution of the thermal alteration is observed along the track.

Ogliore R. C. Butterworth A. L. Fakra S. C. Gainsforth Z. Marcus M. A. Westphal A. J.
Fe-bearing Mineral Groupings in Stardust Fragments **[#2215]**
The Fe-bearing minerals in 193 micron-sized fragments from 11 Stardust tracks are shown to cluster into five groups, giving clues to the heterogeneity scale of comet Wild2.

Schmitz S. Brenker F. E.
Microstructural Indications for Protoenstatite Precursor of Cometary $MgSiO_3$ Pyroxene: A Further High Temperature Component of Comet Wild 2 **[#1580]**
We investigated samples from comet Wild 2 using the TEM. Here we present evidence for the former existence of the high temperature $MgSiO_3$ polymorph protoenstatite as a precursor for the formation of clino- and minor orthoenstatite.

Leroux H.
Mineralogy of Track 77 (PUKI): Toward the Understanding of the Fine-Grained Components of Wild 2 **[#1809]**
Using TEM we show that samples from track 77 display a combination of non-equilibrated crystalline silicates and amorphous material, the latter originates from a fine-grained material thermally altered during the capture in the aerogel.

Joswiak D. J. Brownlee D. E. Matrajt G.
Mineralogical and Textural Changes of a Wild 2 Terminal Particle Pentlandite from Capture Heating in Aerogel **[#2150]**
A ~3 µm pentlandite grain observed in Stardust track 59 and derived from comet Wild 2 was disaggregated and thermally modified (partially) to monosulfide solid-solution (MSS) and heazlewoodite from heating during capture in silica aerogel.

Price M. C. Kearsley A. T. Burchell M. J. Hörz F. Cole M. J.
Comet 81P/Wild 2: The Updated Stardust Coma Dust Fluence Measurement for Smaller (Sub 10-Micrometre) Particles **[#1564]**
Presented is an updated coma dust fluence measurement for comet 81P/Wild 2 for sub-10 micron particles based upon new experimental data. We show this brings the cumulative particle size distribution closer to that measured by the DFMI.

Ishii H. A. Joswiak D. Bradley J. P. Teslich N. Matzel J. Hutcheon I. D. Brownlee D. Matrajt G. MacPherson G. McKeegan K. D.
Enabling Al-Mg Isotopic Measurements on Comet Wild 2's Micro-CAIs **[#2288]**
In order to enable Al-Mg isotopic measurements otherwise not possible on the micro-CAIs returned by Stardust from comet 81P/Wild 2, we combined TEM mineral mapping and precise and selective removal of interfering minerals by focused ion beam milling.

Leroux H. Jacob D. Cordier P.
Fine-grained Material Trapped in Stardust Track Walls **[#1785]**
Using TEM we describe micro-tracks in the Stardust aerogel medium. The size and composition of the cometary material present as discrete patches along these micro-tracks suggest that it originates from an ultrafine matrix, CI-like in composition.

Khodja H. Raepsaet C. Burchell M. J. Flynn G. J. Gainsforth Z. Herzog G. F. Keller L. P. Lanzirotti A. Rao W. Sutton S. R. Taylor S. Westphal A.
Characterization of 81P/Wild 2 Prticles C2103,1,98,1,0, C2103,1,98,2,0, and C2065,1,97,1,0 **[#1746]**
Three aerogel-coated Stardust grains have organics and CI-like Cr/, Mn/, Ni,/ and Zn/Fe ratios. Some flight aerogel has 5 wt% C. C and N in 30 × 30 μm areas of Alais and Orgueil match CI values to within a factor of two. Coal shot into aerogel left a track but no terminal particle.

Tuesday, March 24, 2009
POSTER SESSION I: HYPERVELOCITY IMPACTS: STARDUST MODELS, LDEF, AND ISPE
6:30 p.m. Town Center Exhibit Area

Dominguez G. Wilkins G.
Temperatures and Time Evolution of Hypervelocity Impact Generated Tracks in Aerogel **[#2535]**
I present a novel method for calculating the temperatures and dynamics of track in aerogel that are generated by the capture of hypervelocity projectiles.

Anderson W. W. Cherne F. J.
Material Models for Aerogel Dust Collectors **[#2549]**
A new material model is being developed for shocked aerogel that will significantly improve description of the effects of capture. The model takes into account chemistry and ionization of the silica and also provides estimates of transport properties.

Price M. C. Kearsley A. T. Burchell M. J.
Hydrocode Simulations of Aggregate Dust Particle Impacts Onto Stardust Al Foils **[#1617]**
3-D measurements of complex craters on Stardust foils allows models of their aggregate impactors to be constructed. Hydrocode modelling is used to validate these models. Its ability to recreate the morphology and formation of such craters is shown.

Stadermann F. J. Floss C. Brownlee D. E. Rodruck M.
Revisiting LDEF: High Resolution Elemental and Isotopic Characterization of Hypervelocity Impacts **[#2120]**
We have studied impact craters from the Long Duration Exposure Facility (LDEF) satellite which was flown in low Earth orbit for a duration of 69 months from 1984 through 1990.

Westphal A. J. Allen C. Bajt S. Basset R. Bastien R. Bechtel H. Bleuet P. Borg J. Brenker F. Bridges J. Brownlee D. E. Burchell M. Burghammer M. Butterworth A. L. Cloetens P. Cody G. Ferroir T. Floss C. Flynn G. J. Frank D. Gainsforth Z. Grün E. Hoppe P. Kearsley A. Lemelle L. Leroux H. Lettieri R. Marchant W. Mendez B. Nittler L. R. Ogliore R. Postberg F. Sandford S. A. Schmitz S. Silversmit G. Simionovici A. Srama R. Stadermann F. Stephan T. Stroud R. M. Susini J. Sutton S. Trieloff M. Tsou P. Tsuchiyama A. Tyliczszak T. Vekemans B. Vincze L. Warren J. Zolensky M. E.
Stardust Interstellar Preliminary Examination (ISPE) **[#1786]**
The Stardust Interstellar Preliminary Examination (ISPE) is a three-year effort to characterize the Stardust interstellar dust collection and collector using non-destructive techniques. We summarize the status of the ISPE.

Tuesday, March 24, 2009
POSTER SESSION I: PRESOLAR GRAINS
6:30 p.m. Town Center Exhibit Area

Zinner E. Gyngard F.
FIB in the NanoSIMS **[#1046]**
The O and Mg isotopic analysis of small presolar spinel grains in the NanoSIMS is substantially improved if nearby grains of isotopically normal composition are sputtered away with the finely focused Cs primary ion beam.

Leitner J. Hoppe P. Zipfel J.
NanoSIMS Investigation of Presolar Silicates and Oxides in Primitive Solar System Materials **[#1512]**
Impact residues in 76 small Stardust craters were investigated, as well as 12500 μm² of matrix of the CR chondrite NWA 852, for their O isotopes. All residues are isotopically normal, and 27 presolar silicates and oxides were found in NWA 852.

Tachibana S. Nagahara H. Ozawa K. Tamada S. Ogawa R.
Condensation Experiments of Mg-rich Crystalline and Amorphous Silicates in Vacuum **[#2512]**
We compare results of two types of kinetic condensation experiments of Mg-silicates; "quench" and "cooling" experiments. Highly non-equilibrium condensates can be obtained in quench-type experiments at very low pressures.

Takigawa A. Tachibana S. Nagahara H. Ozawa K.
Condensation Anisotropy of Corundum Around AGB Stars and Its Effect on Infrared Spectra **[#1731]**
In order to understand the forming processes of refractory dust, we conducted condensation experiments of corundum at high and low supersaturation and investigated the e?ects of condensation conditions on the shape of dust and infrared spectra.

Verchovsky A. B. Fisenko A. V. Semjonova L. F. Wright I. P.
Preparations and Analysis of a New Set of Grain-size Fractions of Nanodiamonds from Kainsaz **[#1908]**
A new set of grain-size fractions of nanodiamonds from Kainsaz have been prepared and analysed. A three populations of nanodiamonds with different carbon isotopic compositions have been identified.

Kashiv Y. Kratz K.-L.
The α-Process in Supernova Presolar SiC Grains **[#2534]**
Preliminary results of the new High Entropy Winf model of nucleosynthesis in SN Type II are presented. It is shown that the Mo isotopic composition measured in SiC X grains could be explained by the primary a-process.

Levine J. Savina M. R. Dauphas N. Davis A. M. Isselhardt B. H. Knight K. B. Lewis R. S. Pellin M. J. Stephan T.
First Four-Isotope Measurements of Chromium in Presolar SiC Grains **[#1982]**
We report measured abundances of all four chromium isotopes in presolar SiC grains, obtained by resonance ionization mass spectrometry.

Fujiya W. Sugiura N. Hiyagon H. Takahata N. Sano Y.
Ion Probe Analysis of ^{54}Cr Isotopic Compositions of an Organic Residue from Murchison CM2 Chondrite **[#1486]**
We measured ^{54}Cr/^{52}Cr ratios of Cr bearing grains contained in an organic residue from Murchison CM2 chondrite using the NanoSIMS 50 to search for carriers of ^{54}Cr isotopic anomalies found in bulk carbonaceous chondrites.

Yokoyama T. Walker R. J. Alexander C. M. O'D. MacPherson G. J.
Osmium Isotope Anomalies in Chondrite Components: Refractory Inclusions, Chondrules, Metal and Presolar Grains **[#1489]**
We present precise Os isotope data for chondrite components (CAIs, chondrule, metal and IOMs). None of the CAIs, chondrule or metal show Os isotopic anomalies that are resolvable from the solar, while the IOMs possess large nucleosynthetic anomalies.

Jagoutz E. Jagoutz O. E. Ott U.
A Rb Osotopic Shift Due to Nucleosynthesis (S-Process)? **[#1815]**
We describe experimental procedures for high-precision measurements of Rb isotopes and briefly discuss evidence for a component in meteorites that may be due to enhanced abundance of Rb from the weak s-process.

King A. Henkel T. Chapman S. Rost D. Lyon I.
First Analysis of Gently Separated Presolar Graphite **[#2501]**
A gentle separation procedure has been used to isolate presolar graphite grains from the Murchison meteorite. This provides pristine samples with which to study stellar environments. We report the the first TOFSIMS analyses of a gently separated presolar graphite grain.

Davidson J. Busemann H. Alexander C. M. O'D. Nittler L. R. Schrader D. L. Orthous-Daunay F. R. Quirico E. Franchi I. A. Grady M. M.
Presolar SiC Abundances in Primitive Meteorites by NanoSIMS Raster Ion Imaging of Insoluble Organic Matter **[#1853]**
We present results obtained with NanoSIMS raster ion imaging to determine the abundance of presolar SiC in the insoluble organic matter (IOM) extracted from a number of different classes of chondrites (both carbonaceous and ordinary).

Gilmour J. D.
Late Loss of "Planetary" (Actually Presolar) P3 Gases from Nanodiamonds **[#1603]**
The relationship between Xe and Kr in the solar wind and P3 suggests P3 is presolar and includes a contribution from 129I that was alive in the early solar system, constraining the timing of trapping of P3.

Hynes K. M. Gyngard F.
The Presolar Grain Database: http://presolar.wustl.edu/~pgd **[#1198]**
We present a website containing a compilation of the available presolar grain isotopic data. The database is available for use by the entire cosmochemistry community and all data is available for download.

Hoppe P. Huth J. Ott U.
NanoSIMS Studies of Presolar Graphite Grains: Are C-Isotopic Ratios Grain-Size-Dependent? **[#1010]**
We performed C, N, O, and Si isotope measurements on presolar graphite grains with the NanoSIMS. While micrometer-sized graphite grains have predominantly isotopically light C, most of submicrometer-sized graphite grains have heavy C.

Tuesday, March 24, 2009
POSTER SESSION I: EARLY NEBULAR PROCESSES: MODELS AND ISOTOPES
6:30 p.m. Town Center Exhibit Area

Perret B. Timmes F. X. Desch S. J.
Supernova Bullets Impinging Upon Molecular Clouds **[#1999]**
We present preliminary results of the contamination of molecular clouds by supernova ejecta in the form of bullets.

Muralidharan K. Stimpfl M. de Leeuw N. H. Deymier P. A. Runge K. Drake M. J.
Some - Perhaps Most - Water in the Earth Must Result from Adsorption on to Grains in the Accretion Disk **[#1882]**
We show that adsorption of water onto grains in the accretion disk must be a significant source of Earth's water. Using density functional theory we show that HDO may be preferentially retained relative to H_2O in adsorption/desorption kinetics.

Nielsen S. G. Prytulak J. Halliday A. N.
Vanadium Isotope Ratios in Meteorites: A New Tool to Investigate Planetary and Nebular Processes **[#1549]**
This abstract presents the first method that produces high precision vanadium isotope data for terrestrial rocks and meteorites. Vanadium isotope ratios may be used as a tool to test the X-wind model or as an indicator of planetary core formation.

Birck J. L. Petitat M. Luu T. H. Gounelle M.
^{54}Cr Anomalies in the Tagish Lake and Orgueil Carbonaceous Chondrites **[#1683]**
In this study we extend the survey of meteorites exhibiting Cr anomalies to Tagish Lake. We report the highest ^{54}Cr excess so far for the silicate fraction of this meteorite.

Chakrabarti R. Jacobsen S. B.
A Combined Silicon and Magnesium Isotopic Study of Bulk Meteorites and the Earth **[#2089]**
Si and Mg isotope ratios in bulk chondrites, Earth, Mars and achondrites are identical and suggests that the solar nebula was homogeneous with respect to Si and Mg isotopes.

Shi X. Yin Q.-Z. Ng C.-Y.
Testing "Self-Shielding" Model with Laboratory Experiment for the Oxygen Isotope Evolution in the Early Solar Nebula **[#2251]**
We point out weaknesses in recent experiments by Chakraborty et al (2008), and propose to use high-resolution VUV laser for photodissociation and photoionization of CO to directly test the self-shielding model under relevant temperature condition.

Barr A. C. Canup R. M.
Constraints on an Outer Solar System Late Heavy Bombardment from Callisto's Interior State **[#1309]**
A recent theory for the origin of late heavy bombardment impactors suggests an outer solar system source. Limits on the size of rocky core in Jupiter's moon Callisto are used to constrain the contribution of outer solar system impactors to the LHB.

Cuzzi J. N. Hogan R. C. Bottke W.
Primary Accretion: The Birth Population in the Asteroid and KBO Regions **[#2418]**
We explore the implications of a new theory of primary accretion, in which chondrule-sized objects are transformed directly into 10–100km size bodies in nebula turbulence, for the "birth function" of primitive bodies in the asteroid and Kuiper Belt regions.

Futó P. Gucsik A.
Compaction and Sticking of Planetesimals due to Porosity **[#1008]**
It was estimated using numerical methods that numbers, sizes and masses of planetesimals are ranging from 1016–1020 kg in the boundary of the early inner solar system.

Ipatov S. I.
Formation of Binaries at a Stage of Rarefied Preplanetesimals **[#1021]**
The angular momentum of two identical collided rarefied preplanetesimals exceeded the angular momentum of the corresponding present binary that could be formed as a result of contraction of the rotating preplanetesimal originated at the collision.

Ciesla F. J. Collins G. S. Davison T. M.
The Thermal Evolution of Post-Impact Planetesimals **[#1086]**
We investigate the thermal evolution of energy that is deposited after the collision of two porous planetesimals. Regions of planetesimals can be shock heated to temperatures >1000 K, with the subsequent cooling lasting hundreds of thousands of years.

Korycansky D. G.
Modeling Rubble-Pile Impacts: Spheres vs. Polyhedra **[#1124]**
Rubble-pile collisions: spherical elements vs. polyhedra: does it make a difference?

Korycansky D. G. Asphaug E.
Some Further Results from Rubble-Pile Impact Calculations **[#1320]**
We present results on energy scaling and axis ratios of fragments from impact simulations of rubble-pile planetesimals.

Holland G. Ballentine C. J. Cassidy M.
Primordial Krypton in the Terrestrial Mantle is Not Solar **[#1824]**
Analysis of Kr isotopes in terrestrial well gas samples indicate the Earth's mantle contains a primitive component identical to the average value for carbonaceous chondrites, distinctly different from solar.

Tang H. Dauphas N. Craddock P. R.
High Precision Iron Isotopic Analyzes of Meteorites and Terrestrial Rocks: ^{60}Fe Distribution and Mass Fractionation Laws **[#1903]**
We present a new method for high precision Fe isotope analysis of bulk meteorites and terrestrial rocks to examine the ^{60}Fe distribution in the protoplanetary disk and assess Fe mass fractionation laws among geo- and cosmochemical processes.

Burkhardt C. Kleine T. Oberli F. Bourdon B.
Search for Mass-independent Molybdenum Isotope Anomalies in Iron Meteorites **[#2482]**
We present improved analytical techniques for the precise measurement of Mo isotope compositions of meteorites. Our first results for magmatic iron meteorites do not show any resolvable mass-independent Mo isotope anomalies. Further analyses are in progress.

Sanders I. S.
CAIs Made by Giant Impact **[#2275]**
Since CAIs in metal-rich chondrites may have formed in an impact plume, a case is made for CAIs in CV chondrites originating in a very early impact between planetary embryos.

Tuesday, March 24, 2009
POSTER SESSION I: SOLAR WIND AND GENESIS:
MEASUREMENTS AND INTERPRETATION
6:30 p.m. Town Center Exhibit Area

Yamada A. Nanbu S. Hiraki Y. Seta T. Kasai Y. Ozima M.
Mass Independent Isotopic Fractionation of Oxygen in Earth Wind (EW) with Relevance to Exotic Oxygen in Lunar Metals **[#1478]**
To test suggestion by Ozima et al. (2008), we calculate photodissociation cross sections of O_2 for isotopomers using quantum chemistry method and estimate isotopic ratios at the altitude of 300–400 km.

McKeegan K. D. Kallio A. P. Heber V. Jarzebinski G. Mao P. H. Coath C. D. Kunihiro T. Wiens R. Allton J. Burnett D. S.
Oxygen Isotopes in a Genesis Concentrator Sample **[#2494]**
Oxygen isotopic compositions of solar wind collected by the Genesis concentrator sample are reported.

Heber V. S. Wiens R. C. Jurewicz A. J. G. Baur H. Vogel N. Wieler R. Burnett D. S.
Isotope Fractionation of Solar Wind Implanted into the Genesis Concentrator Target Determined by Neon in the Gold Cross and Implantation Experiments **[#1485]**
All four arms of the concentrator gold cross were analyzed for Ne, proving that the entire concentrator target was radially homogeneously irradiated. An implantation experiment showed, however, that backscatter loss of Ne from AuSS is not controllable.

Mabry J. C. Meshik A. P. Hohenberg C. M. Burnett D. S.
Real-Time Diffusive Losses of Light Noble Gases from Genesis Aluminum Collectors **[#1783]**
Genesis collector pieces were baked for an extended time in order to quantify the effect that diffusive losses of light noble gases from the Genesis collector materials have on the measured isotopic and elemental ratios.

Cetina C. Dr. Grabowski K. S. Dr. Knies D. L.
SIMS-AMS Method for Measuring Solar Wind Silicon in DLC Genesis Collectors **[#2550]**
We are illustrating the use of the NRL facility to determine the amount of solar wind silicon retained in DLC collectors. We are encouraging the Genesis science community to consider this method as an alternate solution in other cases.

Humayun M. Huang S.
Low-Level Magnesium Isotopic Analysis for the Genesis Mission **[#1272]**
A method for multicollector ICP-MS analysis of Mg isotopic composition on 1E12 atoms of Mg with 1‰ precision is presented, together with initial results.

Rodriguez M. C. Calaway M. C. Allton J. H. McNamara K. M. Hittle J. D.
Status of Reconstruction of Fragmented Diamond-on-Silicon Collector from Genesis Spacecraft Solar Wind Concentrator **[#1337]**
The Genesis concentrator was comprised of four quadrants: two of SiC, one of 13C diamond and one of DLC on silicon (this target did not survive the hard landing). This is a report on identifying the DLC pieces and finding their initial orientation.

Burkett P. J. Rodriguez M. C. Calaway M. C. Allton J. H.
Genesis Solar Wind Array Collector Cataloging Status **[#1373]**
A focused characterization task was initiated in May 2008 to document the largest array fragments in the Genesis solar wind collection. To date, the collection consists of 3460 samples. By area, total percentage of cataloged array material is 18%.

Calaway M. J. Rodriguez M. C. Allton J. H. Stansbery E. K.
Decontaminating Solar Wind Samples with the Genesis Ultra-Pure Water Megasonic Wafer Spin Cleaner **[#1183]**
The cleaning efficiency of the Genesis Ultra-pure Water Megasonic Wafer Spin Cleaner will be presented. Results show the effectiveness of the new cleaner removing particle contamination from Genesis silicon wafers implanted with solar wind.

Tuesday, March 24, 2009
POSTER SESSION I: EDUCATION AND PUBLIC OUTREACH
6:30 p.m. Town Center Exhibit Area

Hsu B. C. Weir H. M. Bleacher L. V.
Using Web 2.0 to Disseminate Information About NASA's Lunar Reconnaissance Orbiter **[#2280]**
The Lunar Reconnaissance Orbiter (LRO) is NASA's first step in establishing a permanent human presence on the Moon. In order to capitalize on the excitement of the mission, the LRO team makes use of social media networking and Web 2.0 platforms.

Davidson J. Bartlett S. Carter A. Cornwall M. A. Dryer B. J. Fernandes C. D. Harrison S. K. Janmohamed I. H. S. Mason J. P. Masteika V. Morris A. K. R. Otter S. Tomkinson T. Wilkinson P. T.
The European Student Moon Orbiter and its Biological Lunar Experiment: A Unique Outreach Mission to the Moon **[#2182]**
The ESMO mission provides an ideal opportunity to increase public awareness of lunar missions and to train the current generation of space/planetary science students whilst also conducting novel science via the BioLEx scientific payload.

Terazono J. Tanaka S. Sakamoto S. Watanabe J. Wakabayashi N.
Ten Years in Lunar and Planetary Exploration Outreach: "The Moon Station" Challenge **[#1231]**
This presentation summarizes the website for public outreach on Japanese lunar and planetary exploration. We will address the status, lessons and future prospects based on our ten years' web operation.

Runyon C. Shipp S. Tuthill G. Garver K.
What's New with the Moon Mineralogy Mapper/Chandrayaan-1 E/PO Program? **[#1725]**
The Moon Mineralogy Mapper (M3) team is actively engaged in E/PO activities that provide educators with exposure to lunar geology and experience with spectroscopy as a means of exploring and understanding the composition of the lunar surface.

Bérczi Sz. Gucsik A. Hargitai H. Józsa S. Kereszturi A. Nagy Sz. Szakmány J.
Concise Atlas of the Solar System (11): Petrographic Textures and Evolutionary Processes from the Chondritic Parent Bodies, Moon and Mars **[#1718]**
The 11th atlas of the Solar System helps students in a systematic approach to petrographic textures of planetary materials of processes on asteroids, Moon and Mars, arranged in their igneous units of their geological settings in the parent body.

Boros-Olah M. Hargitai H. Hirsch T. Kereszuti A. Muhi A. Tepliczky I.
HungaroMars2008: Analog Research in the Education of Planetary Sceince **[#1492]**
Between 13–26 of April 2008 a Hungarian crew worked at Mars Desert Research Station. The planetary science related educational aspects are summarized from the meteorolgical station, Husar-2D autonomous rover, geologic and geomorphologic analysis.

Gulick V. C. Deardorff G. Davatzes A. E. K. Kanefsky B.
Education and Public Outreach With the Mars Reconnaissance Orbiter's High-Resolution Imaging Science Experiment: A Virtual Science Team Experience **[#2354]**
Looking back over one Mars year, we report on the accomplishments of the HiRISE EPO program during the primary science phase of MRO.

Grigsby B. Capages C. Christensen P. R. Murchie S. Turney D. Beisser K. Seelos F. Seelos K. Harvel C. Barnouin-Jha O. Patterson W. McGovern A. Buczkowski D. Malaret E. Hash C. Ehlmann B. Roach L.
Involving Students in Authentic Research: First Year Results from the Mars Exploration Student Data Teams Project **[#2185]**
The Mars Exploration Student Data Teams (MESDT) program, created by Arizona State University's Mars Education Program, focuses on immersing teams of high school students in an authentic research Science, Technology, Engineering and Mathematics (STEM) based experience.

Bitter C. Buxner S. R.
Martian Multimedia: The Agony and Ecstasy of Communicating Real-Time, Authentic Science During the Phoenix Mars Mission **[#2172]**
The Phoenix Mars Mission faced robust communication challenges requiring real-time solutions. Managing the message from Mars and ensuring the highest quality of science data and news releases were our top priorities during mission surface operations.

Hines R. Stopar J. Taylor W. Minitti M. E. Wadhwa M.
Enhancing and Expanding Educational Outreach Programs at the Center for Meteorite Studies, Arizona State University **[#1875]**
New outreach and education programs are being developed at ASU's Center for Meteorite Studies, in conjunction with an improved and expanded web presence, to impact a broader local and international audience of students, educators, scientists and interested individuals.

Kolb K. J. Keller J. M. Novodvorsky I.
Investigating Alternative Conceptions about Water on Mars Held by Middle School Science Teachers **[#2143]**
We report on alternative conceptions about water on Mars that are held by middle school science teachers in AZ and CA.

Urquhart M. L.
Designing Standards-driven Space Science Educational Outreach for Formal Education **[#2408]**
Space science is an exciting topic for many students, but research is rarely on the specific topics typically found in K–12 standards. This paper discusses the importance of standards-based approaches to outreach intended for formal education.

Bleamaster L. F. III Crown D. A. Canizo T. L. Lebofsky L. A.
Planets are Places Too: Professional Development Workshops for K–8 Teachers **[#1695]**
The Planetary Science Institute, in partnership with the Tucson Regional Science Center, is offering a series of professional development workshops targeting elementary and middle school teachers within the Tucson, Arizona region.

Kadel S. D. Williams D. A.
Carrying the Fire: Classroom and Field-based Teacher Training Using a Newly Institutionalized E/PO Product **[#2448]**
The Worlds of Fire E/PO is institutionalized as a college course, GLG231AA Special Topics in Geology: Volcanoes of Northern Arizona, providing a classroom overview of volcanism on Earth and Io and a field excursion to volcanoes around Flagstaff, AZ.

Hegyi S. Göcze Z. Hegyi A. Kovács P. Baksa L. Bérczi Sz.
Field Trip Tasks and Simulations with Husar-2 Rover at the Mars Analog Desert Station, Utah, USA **[#1163]**
Husar-2d rover was used by Hungarian Crew No. 71 at MDRS, Utah, USA, 2008 April in surface activities in their high relief movements with high car-chassis, material collecting plate, geological, geographical, chemical mesurements.

Boice D. C. Asbell H. E. Reiff P. H.
Engaging Students in Research — Young Engineers and Scientists (YES) **[#1507]**
Young Engineers and Scientists (YES) is a community partnership between SwRI and local high schools in San Antonio, Texas. It provides high school students a bridge between classroom instruction and real world, research experiences in science and engineering.

McCoy T. J. Baldwin D. W. Olm W. Ironstrack G. M. Yingst R. A. Doudrick S. R.
Myaamionki: Ašiihkiwi Neehi Kiišikwi (The Place of the Miami: Earth and Sky) **[#1283]**
We report on a workshop and summer camp held within the Miami Tribe of Oklahoma to examine the overlap between science (planetary science, geology, and astronomy) and traditional ways of knowing derived from myaamia culture, including lessons learned.

Toyota T. Kasahara S. Narita N. Hirasawa T. Watanabe M. Kodera C. Homma N. Kaburagi Y. Yokoyama H.
Interdisciplinary Collaboration for Outreach by Young Scientists in a Japanese University **[#1606]**
In this paper, we introduce our activities for inter-disciplinary communication of young scientists in a Japanese university. We also report an educational activity of the astrobiology class at an elementary school in Japan.

Wednesday, March 25, 2009
ANCIENT MARTIAN CRUST: PRIMARY MINERALOGY AND AQUEOUS ALTERATION
8:30 a.m. Waterway Ballroom 1

Chairs: **Joseph Michalski**
Janice Bishop

8:30 a.m. Mustard J. F. * Murchie S. L. Ehlmann B. L. Milliken R. E. Bibring J-P. Poulet F. Head J. W.
Stratigraphy of Noachian-aged Crust in the Nili Fossae-Syrtis-Isidis Region **[#2115]**
A section of well-exposed Noachian crust exists surrounding the Isidis Basin. Over thousands of km it is largely a breccia consisting of blocks of sedimentary and primary igneous rocks in a phyllosilicate-bearing matrix, and capped by impact melt.

8:45 a.m. Skok J. R. * Mustard J. F. Murchie S. L.
Identification of Primary Noachian Crustal Blocks on Mars with CRISM Observations **[#2180]**
The early Noachian crust of Mars has been obscured by impacts, alteration, and resurfacing, resulting in the earliest crust exposed as breccia blocks across the planet. We use spectral observations to constrain the mineralogy of these crustal blocks.

9:00 a.m. Tosca N. J. * Knoll A. H.
Juvenile Chemical Sediments and the Duration of Aqueous Activity on Ancient Mars **[#1538]**
A general lack of diagenetic maturation among martian chemical sediments suggests that liquid water could not have persisted at these localities much beyond initial precipitation.

9:15 a.m. Chevrier V. F. *
Early Martian Surface Conditions from Thermodynamics of Phyllosilicates **[#2515]**
Thermodynamic equilibria are used to determine the geochemical conditions during the Noachian era. Results show that CO_2 pressure and temperature can explain observations of various phyllosilicates and carbonates.

9:30 a.m. Velbel M. A. *
Mechanisms of Pyroxene Alteration to Smectite: Implications for Inferring Elemental Mobility in Martian Paleoenvironments **[#1415]**
Pyroxene and smectite compositions are an observational basis for inferring former chemical conditions that facilitated differential elemental mobility in systems in which the water that mediated the weathering reactions is no longer present.

9:45 a.m. Carter J. * Poulet F. Bibring J.-P. Murchie S. Langevin Y. Mustard J. F. Gondet B. Seelos F.
Phyllosilicates and Other Hydrated Minerals on Mars: 2. Detailed Analysis **[#2058]**
This abstract focus on the spectral diversity and the geological setting of phyllosilicate-bearing deposits detected on Mars.

10:00 a.m. Michalski J. R. * Poulet F. Bibring J.-P. Mangold N.
Combined Visible/Near Infrared and Thermal Infrared Analyses of the Nili Fossae Region, Mars **[#1365]**
We present evidence for two main classes of phyllosilicate minerals in the Nili Fossae region of Mars based on the combined use of TES and OMEGA data. Both dioctahedral Fe^{3+} and trioctahedral Fe/Mg^{2+} clay minerals exist together.

10:15 a.m. Bishop J. L. * McKeown N. K. DesMarais D. J. Noe Dobrea E. Z. Parente M. Seelos F. Murchie S. L. Mustard J. F.
The Ancient Phyllosilicates at Mawrth Vallis and What They Can Tell Us About Possible Habitable Environments on Early Mars **[#2239]**
Phyllosilicates observed at Mawrth Vallis indicate a wide range of past aqueous activity. The phyllosilicate stratigraphy, possible formation scenarios, and possible links to prebiotic chemistry and biosignatures are presented.

10:30 a.m. Ruff S. W. * Hamilton V. E.
New Insights into the Nature of Mineralogic Alteration on Mars from Orbiter, Rover, and Laboratory Data **[#2160]**
TES spectra now appear to support the identification in some places of phyllosilicates observed by OMEGA/CRISM. Enigmatically, spectra from Mini-TES in Gusev crater show no such phases on rocks that clearly are altered. Amorphous phases are implicated.

10:45 a.m. Gavin P. * Chevrier V.
Thermal Alteration of Nontronite and Montmorillonite: Implications for the Martian Surface **[#1027]**
We investigate the spectral properties of thermally altered nontronite and montmorillonite and compare them to those of clays detected in impact crater ejecta on Mars.

11:00 a.m. Dyar M. D. * Murad E. Sklute E. C. Bishop J. L. Muirhead A. C.
Mössbauer and Reflectance Spectroscopy of Iron Oxide Mixtures **[#2209]**
Mössbauer spectroscopy is used to identify and quantify abundances of iron oxide and hydroxide minerals in mixtures that are analogs for martian rocks and soils.

11:15 a.m. Ehlmann B. L. * Mustard J. F. Murchie S. L.
Detection of Serpentine on Mars by MRO-CRISM and Possible Relationship with Olivine and Magnesium Carbonate in Nili Fossae **[#1787]**
Reports the first orbital detection of serpentine on Mars' surface, made by CRISM in the Thaumasia and Nili Fossae regions. Evidence for serpentinization of an olivine-magnesium carbonate-serpentine bearing rock unit in Nili Fossae is discussed.

11:30 a.m. Glotch T. D. * Rogers A. D.
Reexamination of Global Carbonate Abundances Using TES Data **[#1605]**
In this study, we reexamine global carbonate abundances in the TES data set. Results of the study generally support previous work indicating that carbonates are not widely present on Mars at the outcrop scale.

Wednesday, March 25, 2009
SPECIAL SESSION: MESSENGER AT MERCURY:
A GLOBAL PERSPECTIVE ON THE INNERMOST PLANET
8:30 a.m. Waterway Ballroom 4

Chairs: **Sean C. Solomon**
Brett Denevi

8:30 a.m. Solomon S. C. * Freed A. M. Hauck S. A. II Head J. W. III Kerber L. Phillips R. J. Robinson M. S. Watters T. R. Zuber M. T.
MESSENGER's Newly Global Perspective on Mercury: Some Implications for Interior Evolution **[#1750]**
MESSENGER's first two flybys of Mercury have revealed a planet with a richer history of magmatism, deformation, and impact basin modification than heretofore appreciated, placing new constraints on the planet's formation and interior evolution.

8:45 a.m. Purucker M. E. * Johnson C. L. Anderson B. J. Korth H. Uno H. Blewett D. T. Sabaka T. J. Solomon S. C. Head J. W.
Mercury's Internal Magnetic Field from MESSENGER **[#1277]**
The internal magnetic field at Mercury is overwhelmingly of core origin, although small-scale fields of crustal origin may yet be shown to exist. None of the craters profiled during the MESSENGER flybys exhibit any magnetic signature.

9:00 a.m. Zurbuchen T. H. * Raines J. M. Gloeckler G. Slavin J. A. Krimigis S. M. Killen R. M. Sprague A. L. McNutt R. L. Jr. Solomon S. C.
First Ion Plasma Measurements in the Mercury Magnetosphere **[#2141]**
This paper discusses results from the two 2008 MESSENGER flybys. It addresses the relative importance of surface sputtering, chemical sputtering and micrometeoroid impact for the creation of Mercury's ionized exosphere.

9:15 a.m. Vervack R. J. Jr.* McClintock W. E. Bradley E. T. Killen R. M. Sprague A. L. Mouawad N. Izenberg N. R. Kochte M. C. Lankton M. R.
MESSENGER Observations of Mercury's Exosphere: Discoveries and Surprises from the First Two Flybys **[#2220]**
The MESSENGER flybys have provided excellent opportunities to probe the tenuous exosphere of Mercury, have led to the discovery of magnesium, and have revealed unexpected and puzzling structure in the spatial distributions of several species.

9:30 a.m. Lawrence D. J. * Feldman W. C. Goldsten J. O. Solomon S. C.
Identification of Neutron Absorbing Elements on Mercury's Surface Using MESSENGER Neutron Data **[#1761]**
Thermal neutrons provide a sensitive measure of elements such as Fe, Ti, Gd, and Sm. We present MESSENGER Neutron Spectrometer data along with an initial modeling analysis; implications for the abundance of neutron absorbing elements are described.

9:45 a.m. Izenberg N. R. * McClintock W. E. Holsclaw G. M. Blewett D. T. Helbert J. Solomon S. C. MESSENGER Team
Resolved Ultraviolet to Infrared Reflectance Spectroscopy of Mercury from the Second MESSENGER Flyby **[#1663]**
MESSENGER's MASCS instrument obtained resolved reflectance spectra from the ultraviolet to near-infrared (115–1450 nm) during the second Mercury flyby, sampling a variety of geologic terranes and units.

10:00 a.m. Denevi B. W. * Robinson M. S. Blewett D. T. Domingue D. L. Head J. W. III McCoy T. J. McNutt R. L. Jr. Murchie S. L. Solomon S. C.
MESSENGER Global Color Observations: Implications for the Composition and Evolution of Mercury's Crust **[#2247]**
A near-global view of Mercury from MESSENGER provides the first opportunity to perform a planet-wide assessment of Mercury's major geologic units and their significance.

10:15 a.m. Ernst C. M. * Murchie S. L. Barnouin-Jha O. S. Robinson M. S. Denevi B. W.
Exposure of Red Material by Impact Craters on Mercury: Implications for Buried Plains Material **[#1900]**
Occurrences of the red unit associated with impact craters on Mercury are examined using MESSENGER data to determine their extent, burial depth, and origin. The examination of one small area on Mercury reveals a complex local stratigraphy.

10:30 a.m. Blewett D. T. * Kerber L. Head J. W. Denevi B. W. Robinson M. S. Murchie S. L. Gillis-Davis J. J. Solomon S. C.
Mercury Pyroclastics: Color, Morphology, and Volatile Content **[#1793]**
We examine potential pyroclastic deposits with Mariner 10 and MESSENGER images. The best candidates have high reflectance and red spectral slope. Eruption physics calculations place constraints on magma volatile content, and suggest 1000s of ppm CO.

10:45 a.m. Zuber M. T. * Farmer G. T. Hauck S. A. II Ritzer J. A. Phillips R. J. Solomon S. C. Smith D. E. Head J. W. III Neumann G. A. Robinson M. S. Watters T. R. Johnson C. L. Oberst J. Barnouin-Jha O. McNutt R. L. Jr.
Observations of Ridges and Lobate Scarps on Mercury from Messenger Altimetry and Imaging and Implications for Lithospheric Strain Accommodation **[#1813]**
Ridges and scarps profiled by the Mercury Laser Altimeter on MESSENGER display offsets that significantly exceed those of martian wrinkle ridges. The structures can be used to constrain the early lithospheric structure and thermal state of Mercury.

11:00 a.m. Smith D. E. * Zuber M. T. Phillips R. J. Solomon S. C. Lemoine F. G. Neumann G. A. Head J. W. III Torrence M. H.
Does Mercury Have Lunar-like Mascons? **[#1802]**
In 2008 MESSENGER conducted two flybys of Mercury and experienced greater perturbation than expected. We investigated the possibility of gravity anomalies associated with surface features being the cause.

11:15 a.m. Prockter L. M. * Watters T. R. Chapman C. R. Denevi B. W. Head J. W. III Solomon S. C. Murchie S. L. Barnouin-Jha O. S. Robinson M. S. Blewett D. T. Gillis-Davis J.
The Curious Case of Raditladi Basin **[#1758]**
Raditladi Basin was imaged by MESSENGER during its flyby of Mercury. The basin appears to be very young – perhaps less than 1 Ga – and exhibits unusual extensional troughs. The presence of the troughs is at odds with Raditladi's apparent youth.

11:30 a.m. Head J. W. III* Solomon S. C. McNutt R. L. Jr. Blewett D. T. Chapman C. R. Domingue D. L. Gillis-Davis J. J. Hawkins S. E. III Helbert J. Holsclaw G. M. Izenberg N. R. McClintock W. E. Merline W. J. Murchie S. L. Phillips R. J. Prockter L. M. Robinson M. S. Denevi B. W. Sprague A. L. Strom R. G. Vilas F. Watters T. R. Zuber M. T.
The MESSENGER Mission to Mercury: New Insights into Geological Processes and Evolution from the First Two Encounters **[#2198]**
The first two Mercury MESSENGER mission encounters imaged much of the surface unseen by Mariner 10, establishing the widespread nature of volcanism, the presence of pyroclastic deposits, and the volcanic filling of impact craters and basins.

Wednesday, March 25, 2009
CAIs AND CHONDRULES: RECORDS OF EARLY SOLAR SYSTEM PROCESSES
8:30 a.m. Waterway Ballroom 5

Chairs: **Kim B. Knight**
Harold C. Connolly Jr.

8:30 a.m. Simon S. B. * Sutton S. R. Grossman L.
First Ti-XANES Analyses of Refractory Inclusions from Murchison **[#1626]**
Ti valence in refractory phases is an important recorder of redox conditions in the early solar nebula. We report the valence of Ti in pyroxene, spinel and hibonite in spinel-hibonite and spinel-pyroxene inclusions and in a coarse hibonite grain.

8:45 a.m. Ma C. * Beckett J. R. Rossman G. R.
Allendeite and Hexamolybdenum: Two New Ultra-Refractory Minerals in Allende and Two Missing Links **[#1402]**
We report here two newly discovered ultra-refractory minerals from Allende: Allendeite, $Sc_4Zr_3O_{12}$, a new Sc- and Zr-rich oxide; and hexamolybdenum, (Mo,Ru,Fe), a Mo-dominant alloy.

9:00 a.m. Knight K. B. * Kita N. T. Davis A. M. Richter F. M. Mendybaev R. A.
Mg and Si Isotope Fractionation Within Three Type B Ca-Al-rich Inclusions **[#2360]**
Isotopic profiles of Mg and Si in melilite were measured within three Type B Ca-Al-rich inclusions from the CV3 chondrites Allende (USNM-3529.16 and AL-4884) and Leoville (USNM-3535.1) by secondary ion mass spectrometry.

9:15 a.m. Mendybaev R. A. * Richter F. M. Georg R. B. Davis A. M.
Evaporation Kinetics of Forsterite-rich Melts and Thermal Histories of FUN CAIs **[#2461]**
We present the results of our experiments on evaporation kinetics of forsterite-rich melts in vacuum. The results are used to place constraints on the thermal history of FUN CAIs.

9:30 a.m. Krot A. N. * Nagashima K.
Istopically Uniform, ^{16}O-Depleted CAIs in Metal-Rich Carbonaceous Chondrites. **[#1036]**
The metal-rich carbonaceous chondrites (CH, CB, and Isheyevo) contain a population of igneous CAIs, which are isotopically uniform and ^{16}O-depleted [$\Delta^{17}O \sim -7‰$] compared to CAIs from other chondrite groups ($\Delta^{17}O \sim -23.5‰$), suggesting a unique origin.

9:45 a.m. Petaev M. I. * Jacobsen S. B.
Nebular History of the Allende FoB CAI SJ101 **[#1388]**
We compare petrologic and chemical characteristics of a unique FoB CAI SJ101 with the results of thermodynamic modeling of condensation of its precursors in a system of solar composition and speculate about nebular formation history of this CAI.

10:00 a.m. Richter F. M. * Mendybaev R. A. Christensen J. Gaffney A. Ebel D.
Elemental and Isotope Fractionation of Chondrule-like Liquids by Evaporation into Vacuum **[#2321]**
The talk will present new experimental data on the evaporation kinetics of Na and K from a chondrule-like melt, and new isotopic data on the K isotopic fractionation of the evaporation residues.

10:15 a.m. Kropf A. Huss G. R. Krot A. N. Pack A. *
Closed System Behavior of Alkalis in Type-1 Chondrules — Understanding Chondrules as Igneous Systems **[#2464]**
New SIMS and high-current EPMA data on type-I chondrules from Semarkona show that they behaved as chemically closed systems during melting and olivine crystallization.

10:30 a.m. Weisberg M. K. * Ebel D. S. Connolly H. C. Jr. Kita N. T. Ushikubo T.
Petrologic-Geochemical Study of Chondrules in Enstatite Chondrites **[#1886]**
Chondrules in E3 chondrites differ markedly from chondrules in other chondrites. They are records of a highly reducing nebular environment and/or precursor assemblage. Oxygen isotope data is being collected to better constrain their history.

10:45 a.m. Ushikubo T. * Kimura M. Kita N. T. Valley J. W.
Oxygen Isotopic Compositions of Phenocrysts in Chondrules from the Primitive Carbonaceous Chondrite Acfer 094 **[#1383]**
We measured O isotopic compositions of 29 chondrules from Acfer 094. We found ^{16}O-poor relict olivine from 3 chondrules, suggesting that their precursors formed in a ^{16}O-poor environment and were processed in a relatively ^{16}O-rich environment.

11:00 a.m. Berlin J. * Jones R. H. Brearley A. J.
Identification of FeO-rich Relict Olivines in Type IIA Chondrules Using Fe-Mn Systematics **[#2399]**
We identified FeO-rich relict olivines in type IIA chondrules from Kainsaz (CO3.2) and Semarkona (LL3.0). Host chondrule olivines show linear trendlines in a Mn vs. Fe diagram, while relict grains plot in different regions of the diagram.

11:15 a.m. Nakashima D. * Matsuda S. Iio H. Bajo K. Nagao K.
Solar Wind Like Noble Gases in a Chondrule in the NWA 852 CR2 Chondrite **[#1674]**
We found through laser extraction noble gas analysis of the NWA 852 CR2 chondrite that a chondrule contains solar wind like noble gases in its interior, suggestive of solar gas acquisition before/during the chondrule formation.

11:30 a.m. Hezel D. C. * Armytage R. M. G. Georg R. B. Keren E. Russell S. S.
Combined Fe- and Si-Isotope Measurements of CV Chondrite Chondrules and CAIs **[#1772]**
Chondrules have variable Fe-isotopic, but similar Si-isotopic compositions. 3D tomography revealed 1–7 vol% sulfide/metal in Allende. We conclude that isotopic and chemical variabilites among chondrules were established during chondrule formation.

11:45 a.m. Schrader D. L. * Zega T. J. Lauretta D. S. Connolly H. C. Jr.
Microstructure of Sulfide-Assemblages in a Renazzo Type-II Chondrule as Revealed by Transmission Electron Microscopy **[#2181]**
We report on a combined focused ion beam scanning electron microscopy and transmission electron microscopy analysis of the microstructure of sulfide-assemblages in a type-II chondrule from Renazzo.

Wednesday, March 25, 2009
SMALL BODIES: SHAPES OF THINGS TO COME
8:30 a.m. Waterway Ballroom 6

Chairs: **Al Conrad**
Debra Buczkowski

8:30 a.m. Conrad A. R. * Merline W. J. Drummond J. D. Carry B. Dumas C. Campbell R. D. Goodrich R. W. Chapman C. R. Tamblyn P. M.
Recent Results from Imaging Asteroids with Adaptive Optics **[#2414]**
We report results from recent high-angular-resolution observations of asteroids using adaptive optics (AO) on large telescopes.

8:45 a.m. Marchis F. * Descamps P. Durech J. Emery J. P. Harris A. W. Kaasalainen M. Berthier J.
The Cybele Binary Asteroid 121 Hermione Revisited **[#1336]**
The combination of adaptive optics, photometric and Spitzer mid-IR observations of the 121 Hermione binary asteroid system allowed us to confirm the bilobated nature of the primary derived a bulk density of 1.4 g/cc implying a rubble-pile interior.

9:00 a.m. Schmidt B. E. * Thomas P. C. Bauer J. M. Li J. -Y. Radcliffe S. C. McFadden L. A. Mutchler M. J. Parker J. Wm. Rivkin A. S. Russell C. T. Stern S. A.
The 3D Figure and Surface of Pallas from HST **[#2421]**
We present Pallas in three dimensions and surface maps.

9:15 a.m. Besse S. * Groussin O. Jorda L. Lamy P. Gesquiere G. Remy E.
3-Dimensional Reconstruction of Asteroid 2867 Steins **[#1545]**
The OSIRIS imaging experiment has imaged asteroid Steins. We have combined three methods to retrieve the shape: limbs, Point of Interest and light curves. The mean radius of Steins is 2.7 ± 0.3 km, for a volume of 78 ± 30 km^3 and a surface of 98 ± 25 km^2.

9:30 a.m. Burchell M. J. * Leliwa-Kopystynski J.
The Large Crater on Asteroid Steins: Is it Abnormally Large? **[#1525]**
Comparison of the large crater on asteroid Steins (observed during the recent Rosetta fly by) to large craters on other small rocky bodies, shows that, whilst large, it is not abnormally so and follows an already established trend.

9:45 a.m. Heggy E. * Kataria T. Clifford S. M. Lasue J. Kofman W.
Dielectric Model of Comet 67P/Churyumov-Gerasimenko in Support of the CONSERT Radar Tomography Experiment On Board Rosetta **[#1944]**
We present parametric dielectric model of Comet 67P/Churyumov-Gerasimenko and corresponding radar wave propagation through the comet in Support of the CONSERT Radar Tomography Experiment on Board Rosetta.

10:00 a.m. Sánchez P. * Scheeres D. J.
Granular Mechanics in Asteroid Regolith: Simulating and Scaling the Brazil Nut Effects **[#2228]**
The simulation and scaling of granular mechanics flows in asteroid regolith is studied to interpret observations of asteroid surfaces and topography. We focus on the "Brazil Nut Effect" in gravitational fields of different magnitudes.

10:15 a.m. Asphaug E. *
Shattered Dirt: Surface Fracture of Granular Asteorids **[#1438]**
The fracture grooves prevalent on Eros, Phobos and other small bodies cannot be indicators of a competent rocky bedrock. They are expressions of soil cohesion exceeding the minuscule gravitational overburden in the upper meters.

10:30 a.m. Richardson J. E. *
The Seismic Effect of Impacts on Asteroid Surface Morphology: Three-Dimensional Modeling Results **[#2144]**
We investigate impact-induced seismic effects on cratered asteroid terrain, utilizing a two-stage modeling process: a numerical shake-table to compute regolith motion, which is then applied to a three-dimensional model of cratered terrain evolution.

10:45 a.m. Durda D. D. *
Constraining Source Crater Regions for Boulder Tracks and Elongated Secondary Craters on Eros **[#2173]**
Dynamical models of reaccretion of impact ejecta on asteroids are used to 'back track' the derived landing trajectories of selected boulders on Eros, placing constraints on the source regions for the primary impact craters.

11:00 a.m. Buczkowski D. L. * Barnouin-Jha O. S. Wyrick D. Prockter L. M.
Further Analyses of the 433Eros Global Lineament Map **[#1187]**
While some linear features identified on Eros are clearly formed by impact, others do not obviously follow any model predictions of lineation formation by impact and possibly represent a pre-existing internal structure. New analyses are presented.

11:15 a.m. Scheeres D. J. * Jacobson S. A.
Fission and Stability of Ellipsoidal Contact Binary Asteroids **[#2040]**
The initial relative equilibrium state for contact binary asteroids spun to fission are always unstable. Thus their initial evolutionary phase should be strongly unstable and the application of classical tidal results may not be correct.

11:30 a.m. Holsapple K. A. *
The Deformation of Asteroids from YORP Spin-Up **[#2053]**
YORP spin-up is a candidate for forming binary asteroids. Results of an analytical study of the deformation of a spinning ellipsoidal body with imposed increasing angular momentum are presented, and compared to a numerical N-body study.

Wednesday, March 25, 2009
SULFUR ON MARS: ROCKS, SOILS, AND CYCLING PROCESSES
1:30 p.m. Waterway Ballroom 1

Chairs: **Scott McLennan**
Deanne Rogers

1:30 p.m. McLennan S. M. * Grotzinger J. P.
Sulfur and the Sulfur Cycle on Mars **[#2152]**
Elevated S in martian mantle/crust and absence of plate tectonics results in a S-enriched sedimentary mass. The S-cycle of Mars is analogous to the Earth's C-cycle, with long-term storage in the rock record and shorter-term S-recycling processes.

1:45 p.m. Milliken R. E. * Edgett K. S. Swayze G. Clark R. N. Thomson B. J. Anderson R. Bell J. F. III
Clay and Sulfate-bearing Rocks in a Stratigraphic Sequence in Gale Crater **[#1479]**
CRISM reflectance spectra of a >5 km thick sequence of strata in Gale Crater reveal the presence of diverse mineralogy, including clay-bearing rocks interbedded with sulfate-bearing rocks. Gale is one of four final MSL candidate landing sites.

2:00 p.m. Wiseman S. M. * Arvidson R. E. Morris R. V. Murchie S. L. Seelos F. P. Andrews-Hanna J. C. CRISM Team
Hydrated Sulfate Deposits Detected Within Schiaparelli Crater, Mars **[#1798]**
Hydrated sulfate deposits are detected within Schiaparelli crater using CRISM spectral data. The hydrated sulfate deposits occur in association with likely sedimentary outcrop and may be related to hydrated sulfate deposits in Meridiani.

2:15 p.m. Niles P. B. * Michalski J.
The Origin of the Meridiani Sediments: The Key for Understanding the Formation of Sulfates and Layered Deposits on Mars **[#1972]**
The provenance of the Meridiani deposits is best explained by reworking of acid-weathered sublimation residue from a large scale ice/dust deposit. The acid weathering is hypothesized to have occurred inside of the ice powered by solar radiant energy.

2:30 p.m. Lichtenberg K. A. * Arvidson R. E. Morris R. V. Murchie S. L. Bishop J. L. Glotch T. D. Noe Dobrea E. Mustard J. F. Andrews-Hanna J. Roach L. H. CRISM Team
Stratigraphy and Relationship of Hydrated Minerals in the Layered Deposits of Aram Chaos, Mars **[#2326]**
Hydrated minerals such as hematite and monohydrated, polyhydrated, and Fe-OH sulfates in Aram Chaos, Mars show stratigraphic relationships indicative of their formation history as a depositional unit in an aqueous environment.

2:45 p.m. Roach L. H. * Mustard J. F. Murchie S. L. Bishop J. L. Ehlmann B. L. Milliken R. E. Lichtenberg K. Parente M.
Hydrated Mineral Stratigraphy in Ius Chasma, Valles Marineris **[#1834]**
Kieserite, a polyhydrated sulfate, hydrated silica, Fe/Mg phyllosilicate, and a hydrated silicate (possibly consistent with an acid-leached phyllosilicate) are found in light-toned units within Ius Chasma, Valles Marineris.

3:00 p.m. Flahaut J. * Quantin C. Allemand P.
Geology and Mineralogy of the Interior Layered Deposits in Capri/Eos Chasma (Mars), Based on CRISM and HiRiSE Data **[#1639]**
We studied HiRiSE and CRISM data over Capri Chasma, a small canyon of Valles Marineris. Layered Deposits in this area show various hydrated minerals signatures, as abundant sulfates, implying a strong past water activity there.

3:15 p.m. Rogers A. D. * Reeder R. J. Glotch T. D.
Infrared Spectroscopy of Amorphous Sulfate Phases **[#1202]**
Stability experiments have indicated that amorphous sulfate phases may be important constituents of martian surface materials. IR spectral properties of X-ray amorphous Mg- and Fe-sulfate phases are described and compared with their crystalline counterparts.

3:30 p.m. Freeman J. J. * Wang A. Ling Z. C.
Ferric Sulfates on Mars: Mission Observations and Laboratory Investigations **[#2284]**
A change was observed in the Pancam spectra of Tyrone salty soils after 190 sols exposure at Gusev. Based on the results of laboratory experiments, we suggest dehydration, amorphization, and phase transition of copiapites to be the potential causes.

3:45 p.m. Hausrath E. M. * Golden D. C. Galindo C. Sutter B. Morris R. V. Ming D. W.
Column Experiments to Interpret Weathering in the Columbia Hills, Mars **[#2423]**
Column dissolution experiments were performed to interpret weathering in the Columbia Hills, Mars. Results suggest that the formation of an amorphous aluminum phosphate and gypsum are likely, and that Si and Ti are relatively immobile.

4:00 p.m. Golden D. C. * Ming D. W. Sutter B. Clark B. C. Morris R. V. Boynton W. V. Hecht M. H. Kounaves S. P.
Sulfur Mineralogy at the Mars Phoenix Landing Site **[#2319]**
The sulfur mineralogy of the soils at Phoenix lander site was derived using Thermally Evolved Gas Analyzer (TEGA) data in combination with known geochemistry of the martian polar regions. The most likely S mineral phase at the Phoenix site is anhydrite.

4:15 p.m. Vaniman D. T. * Bish D. L. Chipera S. J.
Bassanite on Mars **[#1654]**
There are several ways to desiccate gypsum on Mars and form bassanite but rehydration in presence of ice at cold, dry conditions tends to form only bassanite or gypsum plus bassanite. This product may provide a paleoclimate or paleogeothermal marker.

4:30 p.m. Halevy I. * Schrag D. P.
Experimental Inhibition of Carbonate Precipitation by Sulfite Minerals **[#1030]**
Experiments show that sulfite minerals inhibit carbonate precipitation at pH ~7, consistent with the presence of clays and absence of carbonates on early Mars. Subsequent oxidation of these sulfites yields acid and mixtures of sulfates and Fe-oxides.

Wednesday, March 25, 2009
MERCURY: EVOLUTION AND TECTONICS
1:30 p.m. Waterway Ballroom 4

Chairs: **Thomas Watters**
Mark Wieczorek

1:30 p.m. Robuchon G. * Tobie G. Choblet G. Cadek O. Mocquet A.
Thermal Evolution of Mercury: Implication for Despinning and Contraction **[#1866]**
Mercury's surface exhibits specific features, lobate scarps, that suggest that Mercury has experienced a change of shape during its history. We perform 3D simulations to evaluate: evolution of the temperature, despinning, shape and stress field.

1:45 p.m. Wieczorek M. A. * Le Feuvre M. Rambaux N. Laskar J. Correia A. C. M.
Evidence for a Pre-Caloris Synchronous Rotation of Mercury **[#1276]**
The distribution of ancient impact basins on Mercury is decidedly non-uniform. Both the magnitude and direction of this asymmetry are consistent with this planet having been in a state of synchronous rotation when the ancient basins formed.

2:00 p.m. Watters T. R. * Murchie S. L. Robinson M. S. Head J. W. Chapman C. R. Solomon S. C. Denevi B. W. André S. L. Fassett C. I. MESSENGER Team
A Newly Discovered Impact Basin on Mercury Revealed by MESSENGER **[#1817]**
Images obtained from the second MESSENGER flyby of Mercury in October 2008 have revealed a large, previously unrecognized impact basin in the southern hemisphere.

2:15 p.m. Freed A. M. * Solomon S. C. Watters T. R. Phillips R. J. Zuber M. T.
Could Pantheon Fossae be the Result of the Apollodorus Crater-forming Impact within the Caloris Basin, Mercury? **[#1362]**
We use finite element models to explore the idea that the Apollodorus crater-forming impact induced the formation of the radially oriented graben of the Pantheon Fossae complex near the center of the Caloris basin, Mercury.

2:30 p.m. Klimczak C. * Nahm A. L. Schultz R. A.
Evaluation of the Origin Hypotheses of Pantheon Fossae, Mercury **[#1251]**
By means of a detailed study of the graben pattern on MESSENGER image PIA10397, a strain analysis along five concentric traverses, and an analysis of the loading of the mercurian lithosphere, different origin hypotheses of the Pantheon Fossae structure are evaluated.

2:45 p.m. Rothery D. A. * Massironi M.
Beagle Rupes — Evidence for a Basal Decollement of Regional Extent in Mercury's Lithosphere **[#1702]**
Beagle Rupes is a thrust bounded by transpressive lateral ramps. To remain in the elastic lithosphere, the dip of the fault must become shallower at depth. This is evidence for thin-skinned tectonics, with out-of-sequence thrusts, on Mercury.

Wednesday, March 25, 2009
VENUS GEOLOGY, VOLCANISM, TECTONICS, AND RESURFACING
3:00 p.m. Waterway Ballroom 4

Chairs: **David Senske**
Martha Gilmore

3:00 p.m. Kreslavsky M. A. * Ivanov M. A. Head J. W.
The Geological History of Venus: Constraints from Buffered Crater Densities **[#1096]**
We apply buffered crater density technique to a new global geological map of Venus (Ivanov, 2008) and obtain robust constraints on relative timing of resurfacing history. We show that the atmospheric mass in the past was not significantly different.

3:15 p.m. Hansen V. L. * López I.
Venus Preserves a Rare Record of Early Terrestrial Planet Processes **[#2064]**
Geologic relations and thermal modeling indicate that ribbon tessera terrain (rtt) records a unique and ancient era of Venus evolution. A new global geologic map of rtt preserves a rare record of early terrestrial planet evolution processes.

3:30 p.m. Basilevsky A. T. * Raitala J. Head J. W.
Venus: Estimates of Absolute Time Duration of Corona Activity **[#1827]**
In the representative sample of coronae of Venus (55 coronae) we have found six coronae whose activity lasted for several hundred million years. Four of them which, represent the evolution of individual mantle plumes have astrum-like components.

3:45 p.m. Senske D. A. * Plaut J. J.
Geologic Evidence for a Thick Volcanic Crust in Part of Tellus Tessera, Venus **[#1707]**
Geologic mapping is performed to provide insight into the make-up of part of Tellus Tessera and suggests that some of this terrain may be a thick sequence of volcanic deposits.

4:00 p.m. Gilmore M. S. *
Tellus Regio, Venus: Evidence of Tectonic Assembly of Tessera Terrain and Implications for Exploration **[#2015]**
SW Tellus Regio is formed from the collision of distinct tessera units and plains materials.

4:15 p.m. White O. L. * Stofan E. R. Guest J. E.
A New Survey of Intermediate Volcanoes on Venus **[#1148]**
A new catalogue of intermediate volcanoes on Venus broadly incorporates four volcano types: cones, domes, shields and calderas. Frequency, size, altitude, latitudinal distribution and total areal cover statistics are presented for each type.

4:30 p.m. Aubele J. C. *
Shield Fields and Shield Plains on Venus: Contrasting Volcanic Units Exemplified in Shimti Tessera (V-11) and Vellamo Planitia (V-12) Quadrangles **[#2396]**
Shield fields and shield plains appear to represent different volcanic styles and may represent different temporal associations in Venus geologic history.

Wednesday, March 25, 2009
ASTEROID–METEORITE CONNECTIONS
1:30 p.m. Waterway Ballroom 5

Chairs: **Andrew Rivkin**
Phil Bland

1:30 p.m. Hildebrand A. R. * Milley E. P. Brown P. G. McCausland P. J. A. Edwards W. Beech M. Ling A. Sarty G. Paulson M. D. Maillet L. A. Jones S. F.
Characteristics of a Bright Fireball and Meteorite Fall at Buzzard Coulee, Saskatchewan, Canada, November 20, 2008 **[#2505]**
A bright fireball was widely observed across Alberta, Saskatchewan and Manitoba from 17:26:40 to 17:26:45 MST during late twilight on November 20, 2008.

1:45 p.m. Bland P. A. * Spurný P. Towner M. C. Bevan A. W. R. Singleton A. T. Chesley S. R. Bottke W. F. Jr. Shrbený L. Borovička J. McClafferty T. Vaughan D. Benedix G. K. Deacon G. Hough R. M.
A Eucrite Delivered from an Aten-type Orbit: The Last Link in the Chain from 4 Vesta to Earth **[#1664]**
A likely scenario is that our meteorite is a fragment of a Vestoid, derived from the innermost region of the main belt, delivered from the ?6 resonance, evolving onto an Aten-type orbit, before entering the atmosphere over south-western Australia.

2:00 p.m. Gaffey M. J. *
Identifying Asteroidal Ordinary Chondrite Assemblages and Petrographic Types from VNIR Spectra **[#1412]**
Existing spectral calibrations are sufficient to identify asteroidal ordinary chondrite assemblages from VNIR (~0.7–2.5 µm) spectra, but have limitations due to systematic mineralogical variations between and within the H-, L-, and LL-types.

2:15 p.m. Beck A. W. * McSween H. Y. Jr.
Interpretation of the Origin of Olivine in Diogenite Breccias **[#1127]**
This study proposes that the presence of olivine in diogenites is caused by the brecciation and incorporation of harzburgite fragments. This is based on textural observation and chemical analyses of olivine and two distinct orthopyroxene phases in ten diogenite breccias.

2:30 p.m. Lim L. F. * Emery J. P. Moskovitz N. A.
Diogenite-like Features in the Spitzer IRS (5–35 µm) Spectrum of 956 Elisa **[#2204]**
We report preliminary results from the Spitzer IRS (Infrared Spectrograph) observations of the V-type asteroid 956 Elisa. Several features of this spectrum suggest the presence of diogenitic material at a relatively coarse particle size.

2:45 p.m. Delaney J. S. *
The Surface of 4 Vesta: A Petrologist's View **[#1600]**
Vesta has provinces with distinct spectral characteristics. The regolith is best represented by howardites. The howardite meteorites provide the optimum sample suite for constraining the Dawn spectral data.

3:00 p.m. McFadden L. A. * Ammonito E. Cloutis E. A. Coradini A. deSanctis M. C. Fulchignoni M. Hadamcik E. Hiroi T. Kolokolova L. Levasseur-Regourd A. C. Psarev V. Renard J. -B.
Coordinated Laboratory Studies of Meteorites Supporting Rosetta Mission's Asteroid Flyby Target: 2867 Steins **[#2287]**
Aubrite ALH7 8113,82 is studied to support Rosetta flyby of Steins, an E-type asteroid. Two questions are, what is the spectrally active material in Steins at 500 nm? Is Steins a fragment from an aubrite?

3:15 p.m. Bottke W. F. * Nesvorný D. Vokrouhlický D. Morbidelli A.
The Gefion Family as the Probable Source of the L Chondrite Meteorites **[#1445]**
Fragments from the Gefion asteroid family-forming event 470 My ago are the probable source of the tiny fossil L-chondrite meteorites found in an marine limestone quarry in Sweden as well as the larger L-chondrites reaching Earth today.

3:30 p.m. Rivkin A. S. * Thomas C. A. Trilling D. E. Enga M. T. Grier J. A.
Small Koronis-Family Objects as a Probe of Space Weathering: Broadband Spectrophotometry from Magellan and Kitt Peak **[#1774]**
Broadband spectrophotometry of 1–5 km Koronis family objects shows them spanning the range from S-class to Q-class colors. This is consistent with space weathering rather than composition as the cause for similar findings in the NEO population.

3:45 p.m. Roth A. S. G. * Baur H. Heber V. S. Reusser E. Wieler R.
Cosmic-Ray-produced Helium and Neon in Chondrules in Allende and Murchison **[#1838]**
Most chondrules in Allende and Murchison show nearly identical cosmic ray exposure ages. Six chondrules in Murchison show large cosmogenic gas excesses, most likely acquired during tens of Ma of exposure in a parent body regolith.

4:00 p.m. Fieber-Beyer S. K. * Gaffey M. J. Hardersen P. S.
Near-Infrared Spectroscopy of 3:1 Kirkwood Gap Asteroids 1379 Lomonosawa and 974 Lioba: Plausible Parent Bodies of L- and LL-Chondrites **[#1115]**
We present a mineralogical assessment of 3:1 Kirkwood Gap asteroids, 1379 Lomonosawa and 974 Lioba, using data obtained May 19 and 20, 2008 UT using the NASA Infrared Telescope Facility.

4:15 p.m. Sunshine J. M. * Day J. M. D. Ash R. D. McCoy T. J. Bus S. J. Klima R. L. Hiroi T.
Searching for the Evolved Crust of Oxidized Asteroids **[#1965]**
The spectral properties of the unique GRA 06128/9 meteorites are examined so similar asteroids can be recognized. Giving the geochemical links to brachinites, they may occur near previously identified brachinites-like asteroids.

4:30 p.m. Sasso M. R. * Macke R. J. Britt D. T. Rivers M. L. Ebel D. S. Friedrich J. M.
Physical Properties of Incompletely Compacted Equilibrated Ordinary Chondrites: Implications for Asteroidal Structure and Impact Processing **[#1670]**
We detail our synchrotron x-ray microtomographic investigations into the 3D nature of pore spaces in several unusual chondrites. Implications for asteroidal structures and the historical mechanical processing of these materials will be discussed.

Wednesday, March 25, 2009
IMPACTS I: MODELS AND EXPERIMENTS
1:30 p.m. Waterway Ballroom 6

Chairs: **Kai Wünnemann**
Keith Holsapple

1:30 p.m. Hammond N. P. * Nimmo F. Korykansky D.
Hydrocode Modeling of the South Pole Aitken Basin-forming Impact **[#1455]**
We model vertical lunar impacts to investigate whether the formation of the South Pole Aitken Basin excavated lunar mantle.

1:45 p.m. Plesko C. S. * Asphaug E. Weaver R. P. Wohletz K. H. Korycansky D. G.
Initial Conditions of an Impact-generated Greenhouse Event from Hydrocode Models of Large Impacts on Noachian Mars **[#2167]**
We model impacts into Mars-like stratigraphies to constrain initial conditions and energy partitioning of hypothesized impact-generated greenhouse events. Early results show impactors as small d = 50 km may trigger a greenhouse event.

2:00 p.m. Senft L. E. * Stewart S. T.
The Role of Phase Changes During Impact Cratering on Icy Satellites **[#2130]**
We conducted simulations of impacts onto the Jovian satellite Ganymede using a new EOS for H_2O. We find that including the high-pressure solid phases produces more complex crater formation phenomenology.

2:15 p.m. Collins G. S. * Davison T. Elbeshausen D. Wünnemann K.
Numerical Simulations of Oblique Impacts: The Effect of Impact Angle and Target Strength on Crater Shape **[#1620]**
Impact craters are asymmetric if the impactor's trajectory is below a threshold angle of incidence. Lab experiments and 3D numerical simulations show that the threshold angle is higher if target strength is high and cratering efficiency is low.

2:30 p.m. Stöffler D. * Meyer C. Reimold W. U. Artemieva N. A. Wünnemann K.
Ries Crater and Suevite Revisited: Part I Observations **[#1504]**
A reevalution of the geologic setting and properties of suevite at the Ries Crater reveals a new hypothesis based on "phreato-magmatic"-like explosions of a clast-laden impact melt sheet induced by surficial water.

2:45 p.m. Artemieva N. A. * Wünnemann K. Meyer C. Reimold W. U. Stöffler D.
Ries Crater and Suevite Revisited: Part II Modelling **[#1526]**
Presented numerical models can not reproduce the previous hypotheses on suevite origin as plume-related non-ballistic ejecta. We suggest an alternative explanation.

3:00 p.m. Kimberley J. * Ramesh K. T. Barnouin-Jha O. S. Swaminathan P. K. Ernst C. M.
Visulization of High- and Low-Rate Compressive Failure of Quartz **[#2337]**
Quasistatic and dynamic compression experiments were performed on single crystal quartz specimens. In cases where the specimens were loaded below catastrophic failure crack propagation was observed only during the unloading of the specimen.

3:15 p.m. Mikouchi T. * Ohsumi K. Ichiyanagi K. Adachi S. Nozawa S. Koshihara S. Zolensky M.
Nano-Second Time-Resolved Synchrotron X-Ray Diffraction Study of Olivine Under Laser-induced Shock Compression **[#2250]**
We performed *in situ* nano-second time-resolved synchrotron X-ray diffraction analysis of olivine by synchronization of X-ray and laser pulses. We could successfully obtain 0–30 ns Laue diffraction images at the shock pressure of 1.2–6.5 GPa.

3:30 p.m. Bell M. S. *
Relative Shock Effects in Mixed Powders of Calcite, Gypsum, and Quartz: A Calibration Scheme from Shock Experiments **[#1321]**
A systematic experimental shock study of calcite, gypsum, and quartz powders mixed 1:1:1 was carried out in order to calibrate shock pressures in naturally shocked carbonates and sulfates to shock effects in quartz.

3:45 p.m. Ishibashi K. * Yagi T. Matsui T.
Determination of the Decomposition Boundary of $CaCO_3$ at High Temperature: Implications for Impact-induced Degassing of $CaCO_3$ **[#1569]**
We experimentally determined the decomposition boundary of $CaCO_3$ up to ~5000 K and ~10 GPa with a technique of laser-heated diamond-anvil cell. Then, impact-induced degassing of $CaCO_3$ is discussed using the newly determined decomposition boundary.

4:00 p.m. Hermalyn B. * Schultz P. H. Heineck J. T.
Early-Stage Ejecta Velocity Distribution **[#2492]**
This study investigates high speed early-time departures from the accepted power-law relationship of ejecta velocity over a range of projectile diameters by utilizing a new high speed 3D-Particle Imaging Velocimetry technique.

4:15 p.m. Kraus R. G. * Stewart S. T.
Thermodynamics of Impacts onto Icy Mixtures: Peak and Post-Shock Temperature Measurements in an Ice-Sand Mixture **[#2508]**
We present the first experimental shock and release temperature data on ice-sand mixtures.

4:30 p.m. Schultz P. H. * Anderson J. L. B. Hermalyn B.
Origin and Significance of Uprange Ray Patterns **[#2496]**
Arcuate uprange crater rays occur on the Moon, Mercury, and Mars. This pattern reflects depends on the evolution of initial coupling that depends on both impactor (density, speed and angle) and target (porosity).

Wednesday, March 25, 2009
SOLAR WIND AND GENESIS: MEASUREMENTS AND INTERPRETATION
1:30 p.m. Montgomery Ballroom

Chairs: **Kathy Kitts**
Nadia Vogel

1:30 p.m. Meier M. M. M. * Schmitz B. Baur H. Wieler R.
A Regolith Pre-Exposure Signature in Fossil Micrometeorites from an Asteroid Collision 470 Million Years Ago **[#1153]**
Some 25% of fossil micrometeorites (MM) from an asteroid collision 470 Myrs ago have Ne-21 CRE ages of 10–50 Myrs due to regolith preexposure, requiring to revisit the cometary origin interpretation of a similar pattern observed in recent MM and IDP.

1:45 p.m. Vogel N. * Heber V. S. Baur H. Burnett D. S. Wieler R.
Preliminary Genesis Bulk Solar Wind Ar, Kr, and Xe Abundances in Comparison to Young Lunar Regolith and Solar Photosphere Data **[#1964]**
We present preliminary Genesis bulk solar wind Ar, Kr, and Xe isotope and element compositions. These are compared to SW abundances inferred from young lunar regoliths and to photospheric data to rule on fractionation between the Sun and the SW.

2:00 p.m. Grimberg A. * Bühler F. Wieler R. Bochsler P.
Comparison of Solar Wind Noble Gas Data from Genesis with Apollo/SWC — New Results from Implantation Experiments **[#1537]**
We will show new results from extensive implantation experiments to adress differences of isotopic and elemental solar wind noble gas data between Genesis and Apollo/SWC.

2:15 p.m. Heber V. S. * Wiens R. C. Bochsler P. Wieler R. Burnett D. S.
Fractionation Processes in the Solar Wind Revealed by Noble Gases Collected by Genesis Regime Targets **[#2503]**
Significant differences in isotopic and elemental compositions of noble gases among the different SW regimes were found. Here we discuss fractionation processes in the solar wind.

2:30 p.m. Meshik A. P. * Hohenberg C. M. Pravdivtseva O. V. Mabry J. C. Allton J. H. Burnett D. S.
Relative Abundances of Heavy Noble Gases from the Polished Aluminum Solar Wind Collector on Genesis **[#2037]**
Here we report the results of our Ar-Kr-Xe analysis of solar wind captured by the Genesis Polished Aluminum Collector.

2:45 p.m. Kitts K. * Choi Y. Eng P. Sutton S. R.
X-Ray Standing Wave Based Internal Reference Method for Quantification of Implanted Fe in Genesis Samples **[#1439]**
We present a new internal reference method for XSW and XRF that does not require a separate standard and compare that directly to the implant standard method and present the absolute Fe solar wind abundance in Genesis sapphire 50722.

3:00 p.m. Veryovkin I. V. * Tripa C. E. Zinovev A. V. Pellin M. J. Burnett D. S.
Solar Wind Calcium and Chromium in GENESIS Bulk Silicon Collector: Simultaneous Measurements by RIMS **[#2422]**
First results for simultaneous RIMS measurements of solar wind Ca and Cr in Genesis collectors are reported.

3:15 p.m. Pepin R. O. * Becker R. H. Schlutter D. J.
Solar Wind Nitrogen in Genesis Gold-on-Sapphire (AuOS) Collectors **[#2103]**
We report direct measurements of the isotopic composition of solar wind nitrogen in nitrogen extracted from Genesis gold-on-sapphire (AuOS) collectors by a low-temperature amalgamation technique. The measured $\delta^{15}N$ value is ~ +325‰.

3:30 p.m. Marty B. * Zimmermann L. Burnard P. G. Burnett D. L. Heber V. S. Wieler R. Bochsler P. Wiens R. C. Sestak S. Franchi I. A.
In Search of Solar Wind Nitrogen in Genesis Material: Further Analysis of a Gold Cross Arm of the Concentrator **[#1857]**
We have analysed nitrogen and noble gases in another gold cross arm of the Genesis concentrator by laser ablation - static MS. Results define a correlation that points to a light N isotope composition within the range of Jupiter atmospheric value.