Tuesday, March 2, 2010
GROUND TRUTH GALORE: TERRESTRIAL IMPACT CRATERS
8:30 a.m. Waterway Ballroom 5

Chairs: **Axel Wittmann**
Horton Newsom

8:30 a.m. Ormö J. * Sturkell E. Lepinette A.
Geological and Numerical Evidence for a Crater Bound Sedimentary Impact Breccia Lining the Basement Crater at the Lockne Impact Structure **[#1420]**
Drill core data combined with numerical simulation show that some more plastic parts of the 80 m sediments that covered the basement at the 7.5 km diameter marine-target Lockne impact remained inside the crater cavity before onset of water resurge.

8:45 a.m. Bron K. A. *
Tookoonooka Impact Sedimentation: Evidence for Resurge Cyclicity within the Crater Fill **[#2034]**
The buried Tookoonooka complex impact structure in Australia has been interpreted as being the product of a marine impact event. Evidence of a marine impact resurge sequence capped with post-impact debris flow deposits in the crater fill is presented.

9:00 a.m. Watson J. S. Gilmour I. * Jolley D. W. Kelley S. P. Gilmour M. A. Gurov E. P.
Molecular Parameters of Post Impact Cooling in the Boltysh Impact Structure **[#2296]**
Molecular parameters of thermal maturity combined with palynology and carbon isotope stratigraphy indicates post impact thermal processes in the Boltysh crater were short-lived.

9:15 a.m. King D. T. Jr. * Ormo J. Harris R. S. Petruny L. W. Markin J. K.
New Core-Hole Drilling at Wetumpka Impact structure, Alabama — Preliminary Results **[#1424]**
We present preliminary interpretations from each of the four new core holes drilled during 2009 into the marine-target, Late Cretaceous, Wetumkpa impact structure, Alabama.

9:30 a.m. Kalleson E. * Dypvik H. Riis F.
The Ritland Impact Structure, Western Norway **[#1326]**
The Ritland impact structure is 2.5 km in diameter and 350 m deep. Based on the geological setting, an age between 500 and 600 Ma is proposed for the impact. Impactites include brecciated basement and minor amounts of a melt-rich unit.

9:45 a.m. Biren M. B. * Spray J. G.
Shock Veins in the Central Uplift of the Manicouagan Impact Structure **[#2314]**
We report our investigations of target rocks located in the central uplift of the Manicouagan impact structure of Quebec. Thin white veins there appear to be shock derived features similar to shock veins observed in lunar and martian meteorites.

10:00 a.m. O'Connell-Cooper C. D. * Spray J. G.
Geochemistry of the Manicouagan Impact Melt Sheet **[#1755]**
Acquisition in 2006 by the University of New Brunswick's Planetary and Space Science Centre (PASSC) of ~18 km of core has shed new light on the extent and nature of the Manicouagan impact structure, Quebec.

10:15 a.m. Ukstins Peate I. * Kloberdanz C. Peate D. W. Chung Wan L. Cabrol N. Grin E. Piatek J. Chong G.
Non-Modal Melting of Target Rocks to Produce Impactite at Monturaqui Crater, Chile **[#2089]**
Monturaqui (Chile) is a small young impact with five melt rock compositions: (1) bulk melt of plag. + quartz, (2) bulk melt of ignimbrite target rock, and (3) multi-component melts with iron-rich impactor, non-modal biotite melt, and target rock.

10:30 a.m. Osinski G. R. * Sukara R. Grieve R. A. F.
“Suevites” of the Popigai Impact Structure, Russia: (Mis)understood? **[#2171]**
“Suevites” are a poorly understood product of meteorite impacts. Here, we present new data on “suevites” from the Popigai structure. These impactites do not conform to the original definition of suevite (cf. “suevites” at the Ries and Rochechouart structures).

10:45 a.m. Poelchau M. H. * Kenkmann T.
Feather Features: Microstructural Deformation in the Low-Shock Pressure Regime **[#1987]**
Feather features, a recently discovered planar microstructure in shocked quartz, are analyzed in natural and experimentally shocked samples. They are proposed as a diagnostic low-shock pressure indicator.

11:00 a.m. Buchner E. * Schmieder M. Schwarz W. H. Trieloff M. Jourdan F. Wartho J.-A. van Soest M. C. Hodges K. V. Pösges G.
A New Look at the Ries-Steinheim Event **[#2151]**
$^{40}Ar/^{39}Ar$ dating of monomineralic K-feldspar melt yielded an age of ~14.4 Ma for the Ries crater, S Germany. Isotopic dating of newly recovered impact melt lithologies from the nearby Steinheim Basin is attempted.

11:15 a.m. Jourdan F. * Moynier F. Koeberl C.
First $^{40}Ar/^{39}Ar$ Age of the Lonar Crater: A ~0.65 Ma Impact Event? **[#1661]**
We obtained a statistically robust global $^{40}Ar/^{39}Ar$ isochron age at 656 ± 81 ka (MSWD = 1.29; P = 0.12), dating the Lonar impact event. This age is based on the combination of five isochrons and strongly contrasts with a previous age estimate of ~52 ka.

11:30 a.m. Wartho J-A. * van Soest M. C. Cooper F. J. Hodges K. V. Spray J. G. Schmieder M. Buchner E. Bezys R. K. Reimold W. U.
Updated (U-Th)/He Zircon Ages for the Lake Saint Martin Impact Structure (Manitoba, Canada) and Implications for the Late Triassic Multiple Impact Theory **[#1930]**
New (U-Th)/He zircon ages from a Lake Saint Martin impact melt sample yield a Late Triassic age of 213.3 ± 3.0 Ma (2σ), which suggests that the Lake Saint Martin impact structure may be a candidate for the hypothesized ~214 Ma multiple impact chain.

Tuesday, March 2, 2010
SPECIAL SESSION: A NEW MOON: LCROSS, CHANDRAYAAN, AND CHANG'E-1 RESULTS
8:30 a.m. Waterway Ballroom 6

Chairs: **Alian Wang**
Jennifer Heldmann

8:30 a.m. Colaprete A. * Ennico K. Wooden D. Shirley M. Heldmann J. Marshall W. Sollitt L. Asphaug E. Korycansky D. Schultz P. Hermalyn B. Galal K. Bart G. D. Goldstein D. Summy D.
Water and More: An Overview of LCROSS Impact Results **[#2335]**
This talk reviews the current results from the LCROSS impact as observed by the instrument suite on the LCROSS Shepherding Spacecraft.

8:45 a.m. Heldmann J. L. * Colaprete T. Ennico K. Shirley M. Wooden D. Science Team LCROSS.
Lunar Crater Observation and Sensing Satellite (LCROSS) Mission: Results from the Visible Camera and UV/Visible Spectrometer Aboard the Shepherding Spacecraft **[#1015]**
This paper will report on science results from the visible camera and UV-visible spectrometer aboard the LCROSS shepherding spacecraft.

9:00 a.m. Wooden D. H. * Colaprete A. Ennico K. Shirley M. H. Heldmann J. L. LCROSS Science Team
Lunar Crater Observation and Sensing Satellite (LCROSS) Mission: Results from the Nadir Near-Infrared Spectrometer Aboard the Shepherding Spacecraft **[#2025]**
The nadir-viewing Near-Infrared Spectrometer (1.17–2.45 µm) on the LCROSS Shepherding Spacecraft observed 4 min of the impact plume/curtain from the Centaur impact inside Cabeus Crater. We present identifications of water and other absorption bands.

9:15 a.m. Hong P. K. * Sugita S. Okamura N. Sekine Y. Terada H. Takatoh N. Hayano Y. Fuse T. Kawakita H. Wooden D. H. Young E. F. Lucey P. G. Furusho R. Watanabe J. Haruyama J. Nakamura R. Kurosawa K. Hamura T. Kadono T.
Hot Bands Observation of Water in Ejecta Plume of LCROSS Impact Using the Subaru Telescope **[#1939]**
We observed infrared spectra of LCROSS impacts using the Subaru telescope to find H_2O hot band emission lines. Although there was no clear sign of H_2O line detected, the upper limit of H_2O mass is much lower than pre-impact predictions.

9:30 a.m. Hayne P. O. * Greenhagen B. T. Paige D. A. Foote M. C. Siegler M. A.
Diviner Observations of the LCROSS Impact **[#2484]**
With its synoptic-scale view of the LCROSS impact site from orbit, combined with excellent sensitivity across a broad range of temperatures, Diviner provides an important set of constraints on the impact process and subsequent evolution.

9:45 a.m. Schultz P. H. * Hermalyn B. Colaprete A. Ennico K. Shirley M. LCROSS Team
Interpreting the LCROSS-EDUS Impact **[#2503]**
The LCROSS-EDUS impact excavated material from beneath a permanently shadowed region of the Moon. Here we discuss the results in the context of the impact with implications for the nature and source of buried volatiles.

10:00 a.m. Okamura N. * Sugita S. Hong P. K. Kawakita H. Sekine Y. Terada H. Takatoh N. Hayano Y. Fuse T. Wooden D. H. Young E. F. Lucey P. G. Furusho R. Watanabe J. Haruyama J. Nakamura R. Kurosawa K. Hamura T. Kadono T.
The Estimate of the Amount of Ejecta in LCROSS Mission **[#1821]**
Using the Subaru telescope, we observed LCROSS impacts. Although no clear signal of ejecta plume has been detected, an upper limit for the ejecta mass beyond 2.5 km of height is 1000 kg, only 1/20 of a pre-impact theoretical estimate.

10:15 a.m. Goswami J. N. *
An Overview of the Chandrayaan-1 Mission **[#1591]**
An overview of the Chandrayaan-1 mission, including performance of the eleven payloads, their lunar coverage and examples of salient results from the mission are presented. Chandrayaan-1 mission made important discoveries that provide new insights on lunar evolution.

10:30 a.m. Huang Q. * Ping J. S. Wieczorek M. A. Yan J. G. Su X. L.
Improved Global Lunar Topographic Model by Chang'E-1 Laser Altimetry Data **[#1265]**
The improved global lunar topographic model, a 360th degree and order spherical harmonic expansion of the lunar shape, is designated as Chang'E-1 Lunar Topography Model s01 (CLTM-s01).

10:45 a.m. Jiang J. S. * Wang Z. Z. Zhang X. H. Zhang D. H. Wu J. Li Y. Lei L. Q. Zhang W. G. Cui H. Y. Guo W. Li D. H. Dong X. L. Liu H. G.
China Probe CE-1 Unveils the World First Moon-Globe Microwave Emission Map — The Microwave Moon: Some Exploration Results of Change'E-1 Microwave Sounder **[#1125]**
With the data obtained by the China probe Chang'E-1 Lunar Microwave Sounder (CELMS), China has created a Moon globe microwave brightness temperature distribution map, and some new conclusions were drawn from it, which will make the Moon closer to its true nature.

11:00 a.m. Ling Z. C. * Zhang J. Zhang W. X. Liu J. J. Zhang G. L. Liu B. Liu J. Z.
Preliminary Results of Mapping Iron Abundance from Chang'e-1 IIM Data **[#2061]**
We present a preliminary study to map FeO from Chang'e-1 Imaging Interferometer (IIM) data. As shown by our studies in comparison with Clementine UVVIS results, IIM data exhibit the potential to extract FeO abundance distributions on Moon surface.

11:15 a.m. Wu Y. Z. * Tang Z. S.
Mapping the Absorption Center of the Lunar Minerals: Preliminary Results from CE-1 IIM Data **[#1216]**
We showed our experience in the use of Chang'E-1 IIM data. We produced the global map of the stagnation point of the Moon with IIM data. This global map can contribute to the lunar research and has some potential to be explored.

11:30 a.m. Zhu M. H. Mr. * Chang J. Dr. Ma T. Dr. Xu A. A. Dr.
Chang'E-1 Gamma-Ray Spectrometer and Its Preliminary Radioactive Results **[#1046]**
This abstract describes the preliminary radioactive results on the lunar surface from Chang'E-1 gamma-ray spectrometer.

Tuesday, March 2, 2010
UREILITIC ASTEROIDS: INSIGHTS FROM ALMAHATA SITTA
1:30 p.m. Waterway Ballroom 1

Chairs: **Jason Herrin**
Scott Sandford

1:30 p.m. Herrin J. S. * Ito M. Zolensky M. E. Mittlefehldt D. W. Jenniskens P. M. Shaddad M. H.
Thermal History and Fragmentation of Ureilitic Asteroids; Insights from the Almahata Sitta Fall **[#1095]**
We detail the thermal history of recovered fragments of asteroid 2008 TC3 (the Almahata Sitta ureilite) and compare the size of fragments within TC3 to those initially dislodged from the ureilite parent body.

1:45 p.m. Welten K. C. * Meier M. M. M. Caffee M. W. Nishiizumi K. Wieler R. Jenniskens P. Shaddad M. H.
High Porosity and Cosmic-Ray Exposure Age of Asteroid 2008 TC3 Derived from Cosmogenic Nuclides **[#2256]**
Cosmogenic radionuclides in the Almahata Sitta ureilite, combined with measured size of 28 m^3, indicate that asteroid 2008 TC3 had a density of 1.5 g/cm^3 and a porosity of 55%. Cosmogenic noble gas concentrations indicate a cosmic-ray exposure age of 15 Myr.

2:00 p.m. Mikouchi T. * Zolensky M. Takeda H. Hagiya K. Ohsumi K. Satake W. Kurihara T. Jenniskens P. Shaddad M. H.
Mineralogy of Pyroxene and Olivine in the Almahata Sitta Ureilite **[#2344]**
Two Almahata Sitta samples (7 and 3-1) analyzed are two unique members of ureilites with possible genetical relationship on the same parent body. All low-Ca pyroxenes have a pigeonite crystal structure, suggesting the formation at high temperature.

2:15 p.m. Rumble D. * Zolensky M. E. Friedrich J. M. Jenniskens P. Shaddad M. H.
Oxygen Isotope Composition of Almahata Sitta **[#1245]**
It is demonstrated that a single asteroidal body, asteroid 2008 TC3, contained clasts representative of all known ureilite monomict and polymict ureilites in their oxygen isotope compositions.

2:30 p.m. Qin L. * Rumble D. Alexander C. M. O'D. Carlson R. W. Jenniskens P. Shaddad M. H.
Chromium Isotopic Composition of Almahata Sitta **[#1910]**
The $\varepsilon^{54}Cr$ values of Almahata Sitta samples are similar to that of HEDs. This suggests that they are derived from a parent body that is different from that of known carbonaceous chondrites. No correlation was found between $\delta^{54}Cr$ and $\delta^{17}O$.

2:45 p.m. Sandford S. A. * Milam S. N. Nuevo M. Jenniskens P. Shaddad M. H.
Infrared Spectroscopy of Samples from Multiple Stones from the Almahata Sitta Meteorite **[#1229]**
The infrared spectra of samples from 26 different stones from the Almahata Sitta meteorite strewn field will be presented.

Tuesday, March 2, 2010
VESTA AND DAWN
3:15 p.m. Waterway Ballroom 1

Chairs: **Carol Raymond**
Rhiannon Mayne

3:15 p.m. Raymond C. A. * Russell C. T. Dawn Science Team
Exploring Asteroid 4 Vesta with the Dawn Mission **[#2155]**
Dawn reaches Vesta in August 2011. Science observations planned during the one-year stay using cameras, visible/infrared and gamma ray/neutron spectrometers, and radiometric tracking are discussed in the context of the mission's science goals.

3:30 p.m. Nugent C. R. * Margot J. L. Russell C. T. Nolan M. C. Magri C. Giorgini J. D.
SHAPE Modeling of (4) Vesta for Dawn Mission Support and SHAPE Inversion Validation **[#2637]**
This work supports the Dawn mission by using SHAPE software to invert radar images, light curves, and optical images of Vesta to generate a 3-D model of an asteroid as well as characterize its spin state.

3:45 p.m. Reddy V. * Gaffey M. J. Kelley M. S. Nathues A. Li J.-Y. Yarbrough R.
Rotationally-resolved Compositional Study of Asteroid (4) Vesta's Southern Hemisphere: Implications for the DAWN Mission **[#1373]**
We present results from the first rotationally-resolved spectroscopy of Vesta's Southern Hemisphere including the South Pole Crater. Existence of olivine in this crater will be explored.

4:00 p.m. Jutzi M. * Asphaug E.
Impacts on Vesta **[#2129]**
We present three-dimensional SPH simulations of impacts on asteroid 4 Vesta using a new model to simulate the granular flow of post-impact regolith.

4:15 p.m. Schmidt B. E. * Moore W. B.
Giant Impacts Can Drive Asteroid Dynamics: Lessons for Vesta **[#2700]**
We present the result of geophysical modeling of Vesta to determine its interior state prior to impact and the subsequent surface deformation and rotational and thermal evolution of the asteroid.

4:30 p.m. Bills B. G. * Nimmo F.
Are the Spin Poles of Ceres and Vesta Fully Damped? **[#2604]**
We examine the possibility, and implications, of fully damped spin poles for Ceres and Vesta. Their spin poles are close to estimates of damped states. If confirmed, damped spin poles would yield estimates of moments of inertia.

Tuesday, March 2, 2010
MARS POLAR PROCESSES: SEASONAL ICE AND POLAR LAYERED DEPOSITS
1:30 p.m. Waterway Ballroom 4

Chairs: **Timothy Titus**
Candice Hansen

1:30 p.m. Hansen C. J. * Portyankina G. Thomas N. Byrne S. McEwen A.
HiRISE Images of Spring on Mars **[#2029]**
Spring on Mars is a time of active change at latitudes covered by seasonal CO_2 ice. HiRISE on MRO has imaged two southern and one northern spring seasons. We compare phenomena in the south to the north and investigate interannual variability.

1:45 p.m. Portyankina G. * Thomas N. Hansen C. Aye K.-M.
Cracks in Seasonal Semi-Translucent Ice Layer in Martian Polar Areas **[#2671]**
We report observations of cracks in translucent ice layer in martian polar areas, both south and north. We argue in favour of them being fracture cracks.

2:00 p.m. Russell P. S. * Byrne S. Hansen C. J.
Active Mass Wasting of Ice Layers and Seasonal CO_2 Frost in the North Polar Region of Mars **[#2667]**
We discuss new findings relating to two dramatic forms of recently discovered mass-wasting in the north polar region: block-wise failure of NPLD and basal-unit scarps as rockfalls and rockslides, and actively observed CO_2 frost-dust falls and avalanches at steep NPLD scarps.

2:15 p.m. Smith I. B. * Holt J. W. Mohrig D. Kim W.
Quantitative Radar Stratigraphy of the Uppermost North Polar Layered Deposits, Mars, and Processes Controlling Spiral Trough Migration **[#2431]**
We quantitatively look at radar stratigraphy within the northern polar layered deposits to map accumulation patterns and learn about the processes governing spiral trough migration.

2:30 p.m. Holt J. W. * Byrne S. Fishbaugh K. Christian S. Putzig N. E. Phillips R. J. Tanaka K.
Chasma Boreale, Mars: A Product of Non-Uniform Polar Accumulation Influenced by Basal Topography **[#2547]**
The mapping of radar unconformities within Planum Boreum, Mars reveals episodes of deposition and erosion leading to non-uniform accumulation of the NPLD and the early creation of Chasma Boreale, Gemina Lingula, and a now-buried, major chasma.

2:45 p.m. Guallini L. * Rossi A. P. Marinangeli L.
"Unconformity-Bounded" Units on Mars SPLD (Promethei Lingula): A First Step Towards Formal Stratigraphic Classification? **[#1721]**
Preliminary SPLD stratigraphy (Promethei Lingula) has been defined using "Unconformity-Bounded" units. The unconformities allow us to correlate sections regionally. At present we hypothesize two depositional cycles divided by one erosional event.

Tuesday, March 2, 2010
PLANETARY AEOLIAN PROCESSES: DUNES, DUST, AND DEVILS
3:15 p.m. Waterway Ballroom 4

Chairs: **Jani Radebaugh**
Matt Golombek

3:15 p.m. Radebaugh J. * Lorenz R. D. Lancaster N. Savage C. J. Wall S. D. Stofan E. R. Lunine J. I. Kirk R. L. Le Gall A.
Winds and Sand Transport Patterns on Titan from Dune Interactions with Topography **[#2513]**
Dunes on Titan interact with topographic obstacles, leading to features like those seen in the Namib and Saharan deserts. These results are correlated with studies of wind directions from dune morphologies, not with current GCM model wind directions.

3:30 p.m. Edgar L. A. * Grotzinger J. P. Hayes A. G. Squyres S. Bell J. III
Large-Scale Eolian Bedforms and Stratigraphic Architecture at Victoria Crater, Meridiani Planum, Mars **[#2626]**
Victoria Crater exposes cliffs up to ~15 m high, revealing thick bedsets (3–7 m) of large-scale cross-bedding, interpreted as fossil eolian dunes.

3:45 p.m. Michaels T. I. * Fenton L. K.
Characterizing the Sensitivity of Daytime Turbulent Activity and Aeolian Erosion Potential on Mars with the MRAMS LES **[#1955]**
Daily aeolian erosion potential is preliminarily characterized for two landing sites on Mars (VL1 and Phoenix), using a turbulence-resolving model.

4:00 p.m. Chojnacki M. * Burr D. M. Moersch J.
Recent Dune Changes at Endeavour Crater, Meridiani Planum, Mars, from Orbital Observations **[#2326]**
Here we present orbit-based evidence that aeolian bedforms in Endeavour crater, Meridiani Planum, Mars, have been active (erosion) in the span of the past decade. Also we suggest these modest dunes are not in equilibrium with their environment.

4:15 p.m. Silvestro S. * Fenton L. K. Vaz D . A.
Ripple Migration and Small Modifications of Active Dark Dunes in Nili Patera (Mars) **[#1820]**
We present the first evidence of widespread ripple migration on Mars detected from orbit. The movement of the ripples, together with other morphological changes, indicates that sand saltation can occur on Mars in present-day atmospheric conditions.

4:30 p.m. Golombek M. * Robinson K. McEwen A. Bridges N. Ivanov B. Tornabene L. Sullivan R.
Constraints on Ripple Migration at Meridiani Planum from Observations of Fresh Craters by Opportunity and HiRISE **[#2373]**
The most recent phase of ripple migration at Meridiani Planum from Opportunity observations of a fresh crater cluster and HiRISE observations of fresh rayed craters occurred between ~100 ka and ~300 ka.

Tuesday, March 2, 2010
IMPACT MODELS, EXPERIMENTS, AND IMPACT DEPOSITS
1:30 p.m. Waterway Ballroom 5

Chairs: **Gareth Collins**
Kieren Howard

1:30 p.m. Fritz J. * Wünnemann K. Reimold W. U. Hornemann U.
Shocking Cool Quartz **[#1341]**
We present results of shock recovery experiments on quartz targets pre-cooled with liquid nitrogen, and show that the shock deformation effects in quartz are dominated by pressure and not temperature.

1:45 p.m. Price M. C. * Burchell M. J. Miljkovic K. Kearsley A. T. Cole M. J.
Shock Synthesis of Organics from Simple Ice Mixtures? **[#1830]**
Preliminary results from a programme of impact experiments on simple ice mixtures (CO_2, NH_3 and H_2O) give a tantalising suggestion of the successful shock synthesis of complex organics — including glycine.

2:00 p.m. Kraus R. G. * Stewart S. T.
Impact Induced Melting and Vaporization on Icy Planetary Bodies **[#2693]**
Using hydrocode simulations we calculate the volume of ice that is melted and vaporized for a wide range of impact conditions and derive scaling laws as a function of initial temperature, projectile size, impact velocity, and impact angle.

2:15 p.m. Elder C. M. * Bray V. J. Melosh H. J.
Central Pit Formation in Ganymede Craters via Melt Drainage **[#2519]**
We investigate the hypothesis that central pits in craters on Ganymede can form by impact melt draining into fractures beneath the crater and compare the predicted drainage volume to the volume of observed central pits.

2:30 p.m. Stickle A. M. * Schultz P. H.
Comparing Experimental and Numerical Results for Subsurface Failure Following Oblique Impacts into Planar Targets **[#2598]**
Comparison of experimental results and CTH codes of subsurface failure under oblique impacts to identify distinct markers for the style of target damage and to better interpret styles of failure in terrestrial and planetary craters at broader scales.

2:45 p.m. Jahn A. * Riller U.
The Deep Structure of a Collapsed Central Uplift — Insights in the Development of the Vredefort Dome, South Africa **[#2311]**
We constructed a three-dimensional structural model for the overturned upper parts of the Vredefort Central Uplift. From the orientation and truncation relationships of sedimentary rocks and major dislocations a succession ofmovements through the modification phase was deduced.

3:00 p.m. Tong C. H. * Lana C. Marangoni Y. R. Elis V. R.
Resistivity Tomography of the Araguainha Impact Structure: Constraints on Melt and Breccia Emplacement **[#1783]**
We discuss the novel application of resistivity tomography to imaging the shallow subsurface of the central uplift of the Araguainha impact structure for understanding melt and breccia emplacement during an impact event (Tong et al., Geology, 2010).

3:15 p.m. Wünnemann K. * Lynett P. Weiss R.
The Impact-induced Tsunami Hazard — Insight from Numerical Modeling of the Eltanin Event **[#2220]**
We present numerical models to simulate the Eltanin impact and assess the hazardous potential of generated tsunami waves. We combine hydrocode modeling with wave propagation models to quantify wave generation and decay as a function of distance from point of impact.

3:30 p.m. Pierazzo E. * Garcia R. Kinnison D. Marsh D.
Quantifying the Perturbation of Atmospheric Chemistry from Medium-sized Asteroid Impacts in the Ocean **[#2445]**
We used a whole atmosphere general circulation model with interactive chemistry to investigate the perturbation of atmospheric chemistry in oceanic impacts of 500-m and 1-km asteroids.

3:45 p.m. Kyte F. T. * Omura C. Snead C. McKeegan K. D. Gersonde R.
Trace Elements in Refractory Eltanin Impact Spherules **[#2619]**
Spherules from the Eltanin impact can have refractory compositions that reflect distillation and/or condensation processes in the impact plume. We examine this effect with new electron and ion microprobe analyses of major and trace elements.

4:00 p.m. Deutsch A. * Schulte P.
Carbonates in the Proximal Ejecta Deposits of the K/T Chicxulub Impact Crater **[#1596]**
We show that the carbonate spherules in the Chicxulub-related K/T ejecta deposits have a primary origin as impact melt droplets — they are neither a diagenetic nor an alteration product of silicic impact melt spherules.

4:15 p.m. Simonson B. M. * Hassler S. W. Beukes N. J. Sumner D. Y.
Large Impacts Around the Archean-Proterozoic Boundary: An Update **[#2386]**
At least four large impacts generated spherule-rich layers in Australia and/or South Africa within 140 million years around the A-P boundary. They differ from Phanerozoic ejecta layers, e.g., in target and impactor compositions.

4:30 p.m. Lowe D. R. Byerly G. R. *
Did LHB End Not with a Bang but a Whimper? The Geologic Evidence **[#2563]**
We present evidence for three new major impacts from our geologic studies of the 3.55 to 3.25 Ga Barberton greenstone belt, increasing the number of major impacts to seven.

Tuesday, March 2, 2010
SPECIAL SESSION: WATER IN THE SOLAR SYSTEM: MOON
1:30 p.m. Waterway Ballroom 6

Chairs: **Francis McCubbin**
Richard Elphic

1:30 p.m. Clark R. * Pieters C. M. Green R. O. Boardman J. Buratti B. J. Head J. W. III Isaacson P. J. Livo K. E. McCord T. B. Nettles J. W. Petro N. E. Sunshine J. M. Taylor L. A.
Water and Hydroxyl on the Moon as Seen by the Moon Mineralogy Mapper (M^3) **[#2302]**
A new water+hydroxyl map was constructed using M^3 data which shows that the water and hydroxyl detected by M^3 is more extensive than first reported and in better agreement with the VIMS and Deep Impact results.

1:45 p.m. McCord T. B. * Taylor L. A. Orlando T. M. Pieters C. M. Combe J.-Ph. Kramer G. Sunshine J. M. Head J. W. Mustard J. F.
Origin of OH/Water on the Lunar Surface Detected by the Moon Mineralogy Mapper **[#1860]**
We present characteristics of the M^3 3-µm OH/H_2O spectral feature across the observed Moon and explore solar-wind induced surface chemistry as the source.

2:00 p.m. Farrell W. M. * Killen R. M. Delory G. T. NLSI-DREAM Team
The Case of Reactive Surface Geochemistry at the Moon **[#2228]**
There is a mounting body of evidence suggesting that there are active geochemical processes occurring at the lunar surface.

2:15 p.m. Hurley D. *
Surficial OH/H_2O on the Moon: Modeling Delivery, Redistribution, and Loss **[#1844]**
We model the solar wind interaction with the lunar regolith to understand the observations of OH on the lunar surface and what they imply for the migration of water to the lunar poles.

2:30 p.m. Burke D. * Dukes C. A. Famá M. Kim J. Shi J. Baragiola R. A.
Negligible Contribution of Solar Wind Protons to Surficial Lunar Water: Laboratory Studies **[#2567]**
We performed a series of laboratory simulations irradiating lunar simulants with low and high energy protons and examined the results of infrared reflectance absorption spectroscopy (IRAS) for signs of the O-H absorption band for water.

2:45 p.m. Zent A. P. * Ichimura A. I. McCord T. B. Taylor L. A.
Production of OH/H_2O in Lunar Samples via Proton Bombardment **[#2665]**
We report on a laboratory simulation of solar-wind lunar implantation, and demonstrate that we are able to dehydrate/dehydroxylate lunar samples, expose them to moderately energetic H plasma, and detect the presence of newly formed OH/H_2O.

3:00 p.m. Elphic R. C. * Paige D. A. Siegler M. A. Vasavada A. R. Eke V. R. Teodoro L. F. A. Lawrence D. J.
South Pole Hydrogen Distribution for Present Lunar Conditions: Implications for Past Impacts **[#2732]**
We compare the inferred hydrogen distribution at the Moon's south pole to what might be expected after deposition from a large, volatile-rich impact, as the deposits evolve with time under model temperatures.

3:15 p.m. Mazarico E. * LOLA Science Team
Illumination of the Lunar Poles From Lunar Orbiter Laser Altimeter (LOLA) Topographic Data **[#1828]**
LOLA data enable precise modeling of polar illumination conditions over timescales relevant to mission planning. At 10 m above the surface, an area near the South Pole offers 95% average illumination, and continuous sunlight ~200 days in most years.

3:30 p.m. Greenwood J. P. * Itoh S. Sakamoto N. Taylor L. A. Warren P. H. Yurimoto H.
Water in Apollo Rock Samples and the D/H of Lunar Apatite **[#2439]**
Hydrogen isotopes of lunar water in apatite are measured in Apollo rock samples for the first time. The Moon has a unique D/H.

3:45 p.m. McCubbin F. M. * Steele A. Nekvasil H. Schnieders A. Rose T. Fries M. Carpenter P. K. Jolliff B. L.
Detection of Structurally Bound Hydroxyl in Apatite from Apollo Mare Basalt 15058,128 Using TOF-SIMS **[#2468]**
Using TOF-SIMS, we have shown that hydroxyl is present within apatite in lunar mare basalt 15058,128. This is the first find of water in a lunar magmatic mineral, and this result holds important implications for the water content of the lunar interior.

4:00 p.m. Liu Y. * Boyce J. W. Rossman G. R. Guan Y. Eiler J. Taylor L. A.
Water in Lunar Mare Basalt: Confirmation from Apatite in Lunar Basalt 14053 **[#2647]**
We present direct analyses of H (presumably OH) in apatite through ion microprobe measurements of apatite in Apollo 14 basalt 14053 (1640 ± 180 ppm H_2O by weight), with implications to water in the primary melt.

4:15 p.m. Elkins-Tanton L. T. *
Water in the Lunar Mantle: Results from Magma Ocean Modeling **[#1451]**
Modeling lunar magma ocean solidification including a small amount of initial water produces predictions for the locations and quantities of water that should be found in the lunar interior, and which would have been de-gassed and possibly interacted with the lunar surface.

4:30 p.m. Grieves G. * Hibbitts C. A. Dyar M. D. Orlando T. M. Poston M. Johnson A.
Mobility and Subsurface Redistribution of Volatiles Through Regolith Materials **[#2552]**
Increasing evidence supports the notion that water is present on the Moon. We report here on development of models to assess the mobility of volatiles such as hydrogen (as H_2O and OH) on grain surfaces within the top meter of a regolith.

Tuesday, March 2, 2010
MERCURY AFTER MESSENGER'S THIRD FLYBY
1:30 p.m. Montgomery Ballroom

Chairs: **Sean C. Solomon**
Noam Izenberg

1:30 p.m. Solomon S. C. * McNutt R. L. Jr. Anderson B. J. Blewett D. T. Evans L. G. Gold R. E. Krimigis S. M. Murchie S. L. Nittler L. R. Phillips R. J. Prockter L. M. Slavin J. A. Zuber M. T. MESSENGER Team
MESSENGER's Three Flybys of Mercury: An Emerging View of the Innermost Planet **[#1343]**
MESSENGER's three Mercury flybys revealed a planet with a rich geological history and interactions among solar wind, magnetosphere, internal field, and surface that are stronger and operate on shorter timescales than for any other solar system body.

1:45 p.m. Vervack R. J. Jr. * McClintock W. E. Bradley E. T. Burger M. H. Killen R. M. Sprague A. L. Mouawad N. Izenberg N. R. Kochte M. C. Lankton M. R.
MESSENGER Observations of Mercury's Exosphere: Where Do We Stand After Three Flybys? **[#2329]**
The three MESSENGER flybys have revealed never before seen details of Mercury's exosphere. Observations of sodium, calcium (both neutral and ionized), and magnesium show interesting and as yet unexplained spatial distributions about the planet.

2:00 p.m. Lawrence D. J. * Feldman W. C. Goldsten J. O. McCoy T. J. Blewett D. T. Boynton W. V. Evans L. G. Nittler L. R. Rhodes E. A. Solomon S. C.
Measurements of Neutron Absorbing Elements on Mercury from the Three MESSENGER Flybys **[#1465]**
With MESSENGER neutron data, we find that Mercury's surface composition is similar in neutron absorption to a Luna 16 soil. These data cannot be matched by prior models of Mercury surface composition, which have low abundances of Fe, Ti, Gd, and Sm.

2:15 p.m. Perry M. E. * Kahan D. S. Ernst C. M. Solomon S. C. Zuber M. T. Smith D. E. Phillips R. J. Oberst J. Asmar S. W.
Mercury Radii from MESSENGER Flyby Occultations **[#2188]**
During flybys 1 and 3, MESSENGER's RF transmissions were occulted by Mercury. The occultation times provide estimates of the planet radius at the surface location of the grazing ray with uncertainties of 100 m to 300 m.

2:30 p.m. Barnouin O. S. * Zuber M. T. Oberst J. Pruesker F. Smith D. E. Neumann G. A. Solomon S. C. Hauck S. A. Phillips R. J. Head J. W. III Prockter L. M. Robinson M. S.
The Morphology of Craters on Mercury: Results from the MESSENGER Flybys **[#1243]**
Altimetry and imaging from the MESSENGER spacecraft were used for investigations of the relationship between depth and diameter for impact craters on Mercury.

2:45 p.m. Prockter L. M. * Ernst C. M. Denevi B. W. Chapman C. R. Solomon S. C. Blewett D. T. Head J. W. III Cremonese G. Marchi S. Massironi M. Merline W. J.
Evidence for Young Volcanism on Mercury from MESSENGER's Third Flyby **[#1931]**
During MESSENGER's third flyby of Mercury, a new basin was imaged which contains comparatively young smooth plains that show evidence of flow and extensional deformation. Nearby is the largest candidate explosive volcanic feature seen on Mercury.

3:00 p.m. Martellato E. Massironi M. * Cremonese G. Marchi S. Ferrari S.
Age Determination of Raditladi and Rembrandt Basins and Related Geological Units **[#2148]**
Mercury surface has revealed new interesting features during the three fly-bys of the MESSENGER spacecraft. Among these, we analyzed Raditladi and Rembrandt basins with age determination and geological purposes.

3:15 p.m. Blair D. M. * Freed A. M. Melosh H. J. Solomon S. C. Prockter L. M. Watters T. R. Zuber M. T. Phillips R. J.
Testing Mechanisms for the Formation of a Ring of Graben in Central Raditladi Basin, Mercury **[#1762]**
We use finite element models to test a number of possible scenarios to explain the formation of a ring of circumferentially oriented graben near the center of the Raditladi basin on Mercury.

3:30 p.m. Ritzer J. A. * Hauck S. A. II Barnouin O. S. Solomon S. C. Watters T. R.
Mechanical Structure of Mercury's Lithosphere from MESSENGER Observations of Lobate Scarps **[#2122]**
Lobate scarps detected by the MESSENGER spacecraft are the main expression of contraction at Mercury. We model these scarps using a finite element analysis to constrain their geometry to gain a better understanding of lithospheric structure.

3:45 p.m. De Sanctis M. C. * Capaccioni F. Filacchione G. Ammanito E.
Classification of MESSENGER MASCS Data **[#1198]**
We applied classification method to MASCS data to obtain mineralogical maps of Mercury surface, giving indication of the different mineralogy and maturity of the soil present on the Hermean surface.

4:00 p.m. Helbert J. * D'Amore M. Maturilli A. Izenberg N. R. Holsclaw G. M. Head J. W. Solomon S. C.
Combining High-Temperature Spectroscopy and Principal Component Analysis to Understand Mercury Surface Spectra from MESSENGER **[#1496]**
For the first time we a PCA approach for the MESSENGER spectral data with new spectral data obtained in the Planetary Emissivity Laboratory (PEL) at the Deutsches Zentrum für Luft- und Raumfahrt (DLR) in Berlin.

4:15 p.m. Zuber M. T. * Smith D. E. Phillips R. J. Solomon S. C. Neumann G. A. Lemoine F. G. Peale S. J. Margot j.-L. Hauck S. A. II Head J. W. Johnson C. L. Purucker M. E. Oberst J. Farmer G. T. Lu J. Sun Y. Toksöz M. N. Barnouin O. S. Perry M. E. Srinivasan D. K. Torrence M. H.
Emerging Perspectives on Mercury's Internal Structure from MESSENGER Flyby Observations and Geophysical Modeling **[#1832]**
Study of the current internal structure of Mercury from MESSENGER geophysical observations and past plausible internal structures from modeling provide constraints on Mercury's internal dynamics over time that can be linked to the surface record.

4:30 p.m. Hauck S. A. II * Solomon S. C. Peale S. J. Margot J.-L. Phillips R. J. Smith D. E. Zuber M. T.
Constraints on the Internal Structure of Mercury After Three MESSENGER Flybys **[#2107]**
Gravity results from MESSENGER's three flybys of Mercury have provided improved constraints on the internal structure of the planet. We investigate the implications of these new results for Mercury's internal density structure.