Tuesday, March 20, 2012
POSTER SESSION I: MOVERS AND SHAKERS: PLANETARY DYNAMICS AND TECTONICS
6:00 p.m. Town Center Exhibit Area

Pendleton M. W. Hansen L. N. Zimmerman M. E. Kohlstedt D. L.
Anisotropic Viscosity of Olivine-Chromite-MORB Aggregates **[#2036]**
Experiments were performed at high P-T conditions to quantify the viscous anisotropy of olivine-MORB aggregates. Our results provide insight into the effect of melt segregation on geodynamic processes and help constrain models of planetary interiors.

Tielke J. A. Zimmerman M. E. Kohlstedt D. L.
The Influence of Hydrogen Content on the Viscosity of Olivine Single Crystals Under Lithospheric Conditions **[#2616]**
In order to more fully characterize the rheological properties of the lithospheric mantles of terrestrial planets, an investigation is underway to derive constitutive equations that describe the flow behavior of hydrous olivine single crystals.

Schulson E. M. Fortt A. L.
Friction of Ice **[#1502]**
New results: The kinetic coefficient friction of ice sliding slowly upon itself at temperatures from 98 to 263 K varies from 0.15 to 0.76, independent of grain size and texture, but not of roughness. Pressure-aging raises the static coefficient.

Walker C. C. Bassis J. N.
Mechanical Failure of the Icy Moons: Modeling Planetary Ice with Discrete Ice Sheet Fracture Models **[#2928]**
We describe the use of a new model developed for terrestrial ice sheet fracture as applied to the ice shells of Enceladus and Europa.

Soderlund K. M. Schmidt B. E. Blankenship D. D.
Convective Heat Transfer in Europa's Ocean and the Formation of Chaos Terrain **[#2903]**
This work implies that thermal gradients along the bottom of the ice shell due to underlying ocean circulation are important to consider for the formation of chaos terrain and evolution of Europa's ice shell.

Tyler R.
Estimates of the Dissipative Heat Generated by Oceans on Icy Satellites in the Outer Solar System **[#2701]**
We show that in the case of several of the icy satellites with potential oceans tidal resonant states with elevated tidal heat are not only possible but may be typical.

Sekhar P. King S. D.
Non-Newtonian Convection Modeling and the Possibility of Present Day Internal Activity on Ceres? **[#2017]**
Using a three-dimensional spherical shell convection model to understand the internal activity of Ceres. Also, to analyze the geoid, topography and heat flow from our models and compare it with observational data from Dawn when it arrives at Ceres in 2015.

Sterenborg M. G. Crowley J. W.
Thermal Evolution of Early Solar System and the Possibility of Sustained Dynamos **[#2361]**
We investigate the possibility of a small-body dynamo powered by thermal convection and seek to determine which parameters are relevant for its occurrence and duration as suggested by paleomagnetic analyses of certain meteorites.

Shebalin J. V.
Magnetic Helicity and Planetary Dynamos **[#1147]**
A model of a planetary dynamo based on the Boussinesq approximation along with homogeneous boundary conditions is considered. A statistical theory describing a large-scale MHD dynamo is found, in which magnetic helicity is the critical parameter.

Williams J.-P.
Stagnant Lid Heterogeneity on Mars **[#2847]**
The mantle of Mars is in the stagnant lid convection regime where most of the cold upper boundary layer is immobile and conductive. It is shown here how crust thickness can influence the thickness and heat flow of the lid.

Jiang W. Roberts J. H. Kuang W.
Effects of Basin-Forming Impacts on the Historical Martian Dynamo **[#1561]**
We simulate the martian dynamo with a heterogeneous heat flux across the boundary arising from the impacts. Our results show that both the location and the intensity of the impacts have significant effects on the subcritical martian dynamo.

Boutin D. Arkani-Hamed J.
Low-Magnetic Early Noachian Crust of Mars **[#1667]**
We show that the crust of several old Noachian regions of Mars are very low magnetic. This implies that there was no strong magnetic field on Mars during the formation and cooling of the primordial crust of Mars.

Langlais B. Thébault E. Ostanciaux E. Mangold N.
A Late Martian Dynamo Cessation Time 3.77 Gy Ago **[#1231]**
A new analysis of the magnetic field signature over appropriately sized impact basins and volcanoes on Mars prove that the dynamo lasted until 3.77 Ga, which may explain why most of the liquid water surface activity persisted through that epoch.

Yin A.
High Mantle Viscosity Controls the Enormous Size of Martian Volcanoes: A Hypothesis Based on Inferences from Rayleigh-Taylor Instability Theory **[#1309]**
The size and spacing of Tharsis volcanoes increase with time. This is explained by an increase in mantle viscosity with time that controls volcano spacing assuming eruption centers were initiated by Rayleigh-Taylor instability.

Anderson R. C. Dohm J. M. Robbins S. Hynek B. Andrews-Hanna J.
Terra Sirenum: Window into Pre-Tharsis and Tharsis Phases of Mars Evolution **[#2803]**
The Terra Sirenum region contains some of the oldest stratigraphic units on Mars. Detailed examination of the structures and units provides an excellent window into identifying the processes that influenced the early geologic evolution of Mars.

Karasozen E. Andrews-Hanna J. C. Dohm J. M. Anderson R. C.
The Formation Mechanism of the South Tharsis Ridge Belt, Mars **[#2592]**
Origin of ridges in the South Tharsis ridge belt is evaluated, using evidence from topographic profiles,deformed craters,tectonic modeling, and crustal thickness.Though no one model explains all aspects of ridges,results support an extensional origin.

Kromuszczyńska O. Mège D. Lucas A. Gurgurewicz J.
Giant Sackung in Valles Marineris **[#1161]**
New CTX-derived DEMs allows quantitative analysis of gravitational spreading of topography in Valles Marineris. In southeast Valles Marineris, 20–40% of vertical fault displacement is estimated to be of gravitational origin.

Zhang Y. X.
Is Valles Marineris a Spreading Basin Due to a Divergent Plate Boundary? **[#1346]**
I propose that Valles Marineris is a narrow basin due to spreading of a divergent plate boundary on Mars, similar to the Red Sea on Earth.

Watkins J. Yin A.
Spatial and Temporal Relationships of Landslides in Valles Marineris, Mars: Constraints on Their Triggering Mechanisms **[#1719]**
Two distinguishable martian landslide types, thick-skinned and thin-skinned, are characterized through systematic mapping of surface morphology, spectral data, and runout ratio in order to constrain landslide trigger and emplacement mechanisms.

Akers C. Schedl A. D. Mundy L.
What Caused the Landslides in Valles Marineris, Mars? **[#1932]**
Our work suggests that Mars-quakes produced most of the landslides in Valles Marineris.

Hooper D. M. Smart K. J.
Morphometric Analysis of a Subset of Landslides in Valles Marineris, Mars **[#2323]**
Morphometric analysis was conducted on four landslides in Valles Marineris indicating complex mass wasting events. Topographic texture, defined as the standard deviation of elevation, serves as a measure of local relief or surface roughness.

Weller M. B. McGovern P. J. Fournier T. Morgan J. K. Katz O.
Eastern Olympus Mons Basal Scarp: A Landslide Story? **[#1565]**
Olympus Mons is surrounded by aureole deposit landforms that may be the result of catastrophic failures of the edifice. We examine the stability of the eastern basal scarp to evaluate a landslide mechanism for the formation of the aureole lobes.

Okubo C. H.
Discovery of Deformation Band Damage Zones on Mars **[#1077]**
High-resolution structural mapping within the layered deposits in west Candor Chasma provide the first detailed documentation of fault-related damage zones on Mars. These damage zones are interpreted to be largely composed of deformation bands.

Clark J. D. Hurtado J. M. Jr.
Characterization of Thrust Fault on the Moon Using Thermoelastic Stress Calculations and 3D Visualizations **[#2895]**
An investigation on lunar thrust fault scarps to determine better constraints on the amount of crustal shortening and improve understanding of the stress state of the Moon with thermoelastic equations and 3D visualizations.

Williams N. R. Bell J. F. III Watters T. R. Banks M. E. Robinson M. S.
Tectonic Mapping of Mare Frigoris Using Lunar Reconnaissance Orbiter Camera Images **[#2708]**
New populations of lobate scarps, wrinkle ridges, and graben have been discovered and mapped in and around Mare Frigoris using Lunar Reconnaissance Orbiter Camera images.

Teanby N. A. Wookey J.
Meteor Impacts as a Seismic Source on Mars **[#1492]**
There is currently great interest in missions to Mars that include a seismometer. Here we investigate if meteorite impacts provide a viable source for studying Mars' interior.

Stark A. Oberst J. Preusker F. Gwinner K. Peale S. J. Margot J.-L. Zuber M. T. Solomon S. C.
In-Situ Measurement of Mercury's Physical Librations Using Image and Laser Altimeter Data from MESSENGER: General Approach and Sensitivity Analysis **[#1389]**
We present the analysis of an idea for direct measurement of Mercury's physical librations by combining in situ laser altimeter and image data obtained by the MESSENGER spacecraft.

Van Hoolst T. Rivoldini A. Baland R.-M. Yseboodt M.
The Effect of Tides and an Inner Core on the Forced 88 day Libration of Mercury **[#2082]**
Mercury's librations depend on the moment of inertia of its silicate shell and contain information on the interior structure and composition of Mercury. Here we study the effect of tides and the existence of a solid inner core on the librations.

Rivoldini A. Van Hoolst T.
Constrainst on Mercury's Core Size and Composition **[#2234]**
We determine to what precision Mercury's core radius and core light-element concentration can be constrained from its global gravity field measured by MESSENGER and from radar measurements about its spin state.