

Thursday, March 4, 2010
POSTER SESSION II: PLANETARY DYNAMICS AND TECTONICS
7:00 p.m. Town Center Exhibit Area

Neesemann A. van Gasselt S. Hauber E. Neukum G.

[*Insights to the Evolution of the Tempe Terra Region, Mars: Refinements of Geologic and Tectonic Units*](#) [#2685]

The tectonic and volcanic history of Mars is mainly concentrated on the Tharsis rise. As a further contribution to a better understanding of this region we chose Tempe Terra with its complex pattern of graben and faults to estimate changes in orientation with time.

Fuete F. Robinson A. Stesky R. MacKinnon P. Hauber E. Zegers T. Gwinner K.

[*Dip of Chasm Wall Faults in Ophir Chasma, Valles Marineris, Mars*](#) [#1449]

The mean dip of normal fault facets within the walls of Ophir Chasma is approximately 36°. We suggest that the shallow faults were initiated as thrust faults during a localized uplift phase of the basin formation and reactivated as normal faults.

Birnie C. Fuete F. Stesky R. Hauber E. Zegers T. Gwinner K.

[*Fracture Orientations Within HiRISE Images of Ceti Mensa, West Candor Chasma, Mars*](#) [#1753]

Fracture morphology and orientations measured within HiRISE images around Ceti Mensa show a large variation in orientation and are generally not parallel to the proposed trend of the major basin-forming faults.

Chadwick D. J.

[*Deflection of Lava Flow Directions Relative to Modern Topographic Slopes in the Tharsis Region of Mars: Indications of Post-Flow Subsidence*](#) [#2444]

High-resolution topographic data and imagery are used to identify angular deviations between lava flow directions and topographic slopes.

Kattenhorn S. A. Meyer J. A.

[*Magmatic Dikes and Megafloods: A Protracted History of Interactions Between Magma and Subsurface Ice, Cerberus Fossae, Mars*](#) [#1271]

A protracted period of dike intrusion away from Elysium Mons, Mars, resulted in a segmented fracture system (Cerberus Fossae) that induced multiple megafloods as intruding magma interacted with subsurface ice.

Craft K. Lowell R. Germanovich L.

[*Dike Emplacement and Hydrothermal Circulation on Mars*](#) [#2583]

Using a finite element program, we model a dike propagating on Mars and calculate how the resulting surrounding stresses affect circulation in an adjacent porous medium. We also investigate the melting of an ice layer overlying the porous medium.

Wyrick D. Y. Buczkowski D. L. Bleamaster L. F. Collins G. C.

[*Pit Crater Chains Across the Solar System*](#) [#1413]

Pit crater chains exist on a range of planetary bodies — from small asteroids to icy moons to large terrestrial planets — raising important questions about formation mechanisms and near-surface crustal properties of solid bodies in our solar system.

Kneuer C. B. Lang N. P.

[*Formation and Evolution of the Peneus Patara Caldera*](#) [#2429]

Here we present our initial results on the evolution of the Peneus Patara caldera.

Schumacher S. Zegers T. E.

[*Chaotic Terrain and Its Constraints on the Surface Heat Flux of Mars*](#) [#1345]

Geological analysis of Aram Chaos on Mars suggests that this chaotic terrain could have formed by the collapse of an underground lake. We show how this concept can be used to constrain the surface heat flux during the Hesperian.

Wenkert D. D. Nunes D. C.

[*Gravitational Signatures of Large Martian Craters*](#) [#2044]

Recent improvements in Mars' gravity field model make it possible to analyze the effects of smaller impact basins than previously possible. We are analyzing the effects of larger impact craters (small basins) on the gravity field.

Han S.-C. Mazarico E. Lemoine F. G.

[*Towards Improved Regional and Global Gravity Fields on Mars by Means of Localized Harmonic Analysis*](#) [#2504]

We present the ongoing progress towards improved Mars gravity fields to understand the density structure of the martian crust and polar layered deposits by optimally resolving the geopotential from radio tracking data.

Reese C. C. Solomatov V. S.

[*Early Martian Dynamo Generation due to Giant Impacts*](#) [#1948]

Giant impacts produce localized melt regions facilitating rapid iron-silicate segregation. Impactor iron heated by the collision can carry thermal energy to the core and establish conditions favorable for core cooling and dynamo generation.

Reese C. C. Orth C. P. Solomatov V. S.

[*Impact Origin for the Martian Crustal Dichotomy: Half-Emptied or Half-Filled?*](#) [#1988]

We suggest an alternative impact origin for the martian crustal dichotomy in which impact generated melt floods the excavated cavity, produces thickened crust, and generates an antipodal topographic basin.

Milbury C. Schubert G.

[*Modeling of Mars' Large-Scale Crustal Magnetization*](#) [#2288]

We present a very simple model of the crustal magnetization in order to match the large-scale features of the magnetic field observations.

King S. D.

[*The Influence of Core Radius on the Planform of Stagnant Lid Convection*](#) [#1749]

The transitional radius between roll and plume modes of stagnant lid convection will be discussed.

Michel N. Forni O.

[*The Role of Phase Transitions in the Martian Mantle*](#) [#1190]

In that work, we want to improve the study of phase transitions, adding the core cooling, the decay of radioactive elements, and a temperature and depth dependant viscosity to the two-dimensional numerical model, with two different sizes of the martian core.

Kohlstedt D. L. Schneider S. E.

[*Experimental Constraints on the Strength of the Lithospheres of Terrestrial Planets*](#) [#1846]

To better constrain the flow law used to describe deformation of the lithospheres of terrestrial planets, we have performed deformation experiments on crystals of San Carlos olivine at lower temperatures and higher stresses than previous studies.

Wagner R. J. Neukum G. Giese B. Roatsch T. Denk T. Wolf U. Porco C. C.

[*The Geology of Rhea: A First Look at the ISS Camera Data from Orbit 121 \(Nov. 21, 2009\) in Cassini's Extended Mission*](#) [#1672]

In orbit 121 of Cassini's Extended Mission, the ISS cameras aboard the spacecraft observed the trailing hemisphere of Saturn's icy satellite Rhea. In this paper we present a first look at geologic features in this area, especially of tectonic structures.

Singer K. N. McKinnon W. B. Schenk P. M.

[*Pits, Spots, Uplifts, and Small Chaos Regions on Europa: Evidence for Diapiric Upwelling from Morphology and Morphometry*](#) [#2195]

Feature size and topographic expression were determined for pits, uplifts, spots, and subcircular chaos on Europa in the ~200 m/px RegMaps. The results support a diapiric formation and place lower limits on ice shell thickness when features formed.

Rudolph M. L. Manga M.

[*Damage Mechanics Model for Making Ridges on Icy Satellites*](#) [#2087]

We apply a damage mechanics model to the problem of ridge formation. Preliminary results indicate that this model is capable of producing ridge-like topography.

Preuss L. J. Barr A. C.

[*Dominant Wavelength of Small-Scale Folds Between Enceladus' South Polar Tiger Stripes*](#) [#1487]

High-resolution images of Enceladus' south polar terrain reveal regions of small-scale folds between Damascus and Baghdad sulci. We will present the results of a systematic study of the folding wavelength using Fourier transform methods.

Olgin J. Smith-Konter B. R. Pappalardo R. T.

[*Investigating the Limits of Enceladus's Tidally Driven Tiger Stripe Failure Scenario: Exploration of Ice Shell Thickness, Coefficient of Friction, and Fault Depth*](#) [#2085]

We compute Coulomb failure conditions to assess likely failure criteria at Enceladus's tiger stripes, exploring a suite of model parameters (e.g., ice shell thickness, fault depth, frictional coefficient) that inhibit or promote shear fault failure.

Patterson G. W. Prockter L. M.

[*Investigating the Rigidity of Europa's Lithosphere by Modeling Plate Motion*](#) [#2183]

We are using plate motion modeling to determine the magnitude and extent of non-rigid behavior present within several plate systems on Europa.

Wasiak F. C. Hames H. Chevrier V. Blackburn D. G.

[*Characterizing the Stability of Titan's Northern Lakes Using Image Analysis and Mass Transfer Modeling*](#) [#1538]

We search for evidence of change in Titan's northern lake region utilizing Cassini data analyzed with GIS, and explore a new mass transfer model suitable for evaporation/sublimation of methane/ethane under Titan conditions.

Matson D. L. Johnson T. V. Lunine J. I. Castillo-Rogez J. C.

[*Enceladus' Interior: A Liquid Circulation Model*](#) [#1698]

We investigate a model for Enceladus' interior in which the requirements of supplying water, gas and dust, to the eruptive plumes and matching the observed heat flow are accomplished by a relatively deeply circulating brine solution.

Bunte M. K. McNamara A. K. Greeley R.

[*Investigating Ice Shell Convection with a Lower Boundary Defined by Changes in Phase and Composition: Implications for Europa*](#) [#2523]

We present thermochemical convection models of the ice shell of Europa. We investigate the ability of new ice to form at the lower boundary of the ice shell and examine the behavior of diapirs in relation to a highly viscous surface lid.

Castillo-Rogez J. Lunine J. I.

[*Titan's Core Structure Constrained by Cassini Observations*](#) [#2449]

We explore possible evolution models for Titan's core, constrained by Cassini observations, for different initial conditions on the nature of its silicate component.