Thursday, March 10, 2011
PLANETARY DYNAMICS AND TECTONICS
8:30 a.m. Waterway Ballroom 5

Chairs: **Robert Anderson**
Walter Kiefer

8:30 a.m. Monteux J. * Jellinek M. Johnson C. L.
Core Merging After the Martian Giant Impact **[#1665]**
We explore a possible link between the giant impact that formed the martian dichotomy and the initiation or modulation of a core dynamo. We characterize the dynamics of core merging and investigate how this process might influence the dynamo action.

8:45 a.m. Bierhaus M. * Wünnemann K. Elbeshausen D. Collins G. S.
Numerical Modeling of Basin Forming Impacts on Mars: Implications for the Heat Budget of Planetary Interior **[#2128]**
We present dynamic numerical models of giant collision events to quantify the amount of heat that is deposited into a planet by an impact process. We focus on scenarios for impacts forming Hellas-sized basins on a Mars-like planet.

9:00 a.m. Zhong S. J. *
A Critical Assessment of Models for Martian Crustal Dichotomy Based on Crustal Production and Re-Distribution and Crustal Magnetization **[#2563]**
To test giant impact and mantle flow models for the crustal dichotomy, I show that it is necessary to consider crustal redistribution processes including crustal flow and magnetic lineation and its relation to crustal production.

9:15 a.m. Grott M. * Wieczorek M. A.
Elastic Thickness, Paleo Heat Flow, and Curie Depth at the Tyrrhena Patera Highland Volcano **[#1750]**
Admittance modeling of the Tyrrhena Patera highland volcano indicates substantial surface heat flows between 26 and 82 mW/m^2 at the time of load emplacement, compatible with Curie depths of 9–29, 15–48, and 17–56 km for pyrrhotite, magnetite, and hematite, respectively.

9:30 a.m. Kiefer W. S. * Lillis R. J.
Geophysical Observations of Hadriaca Patera and Tyrrhena Patera, Mars: Implications for Magma Chamber Structure and for the End of the Martian Magnetic Dynamo **[#1662]**
Gravity and magnetic observations help constrain the structure and evolution of the magma chambers at these volcanos. The Mars magnetic dynamo may have survived at least briefly beyond the end of the impact basin bombardment era on Mars.

9:45 a.m. Grosfils E. B. *
New Mechanical Insights into Ring Fault Initiation and Caldera Formation on Terrestrial Planets **[#1170]**
Resolving a common flaw in numerical models of ring fault (hence caldera) formation (1) leads to a new understanding of where/why ring faults can form, and (2) reconciles long-standing differences between analogue and numerical model results.

10:00 a.m. Wyrick D. Y. * Morris A. P. Ferrill D. A.
Analog Modeling of Normal Fault Growth on Mars **[#1536]**
Physical analog modeling and analyses of martian fault systems support the interpretation that simple faults on Mars do not grow in a self-similar manner and that compound fault systems develop in a stepwise pattern in Dmax/L space.

10:15 a.m. Andrews-Hanna J. C. *
The Formation of Valles Marineris, Mars **[#2182]**
A sequence of events is proposed to explain the formation of Valles Marineris. A combination of volcanic loading, flexure, igneous intrusions, subsidence of super-isostatic blocks, and sedimentary loading explains the salient features of the troughs.

10:30 a.m. Yin A. *
Structural Analysis of the Southern Valles Marineris Trough Zones and Implications for Large-Scale Left-Slip Faulting on Mars **[#1529]**
Photogeologic mapping across Ius and Coprates Chasmata has revealed the wide occurrence of northwest-trending folds, east-striking left-slip faults, and northeast-trending joints and normal faults. This observation is consistent with left-slip motion on trough-bounding faults.

10:45 a.m. Anderson R. C. * Dohm J. M.
Unraveling the Complex History of Faulting for the Terra Sirenum Region; Mars **[#2221]**
Mapping the Terra Sirenum region is vital to understanding the geologic and tectonic histories of Mars. We are constructing a 1:5,000,000-scale geologic map of the region detailing the stratigraphic and crosscutting relations of units and structures.

11:00 a.m. Melosh H. J. * Nimmo F.
Long-Term Strength of Icy vs Silicate Planetary Bodies **[#2306]**
Topography on small planetary-scale bodies is supported by frictional strength, while on large planets it is limited by plastic yielding. The plastic, but not the frictional, strength of icy bodies is about 10× smaller than that of silicate planets.

11:15 a.m. Radebaugh J. * Schleiffarth K. Christiansen E. H.
Internal Stresses of Io are Revealed by Surface Lineations **[#2755]**
Lineations of mountains and paterae on Io indicate internal stress directions. The maxima in orientations at 45° and 135° indicate stresses that are parallel and perpendicular to these directions.

11:30 a.m. Bills B. G. * Newman W. I.
Influence of Tidal Dissipation upon Co-Precessing Spin and Orbit Poles **[#1151]**
Tidal energy dissipation has an influence upon the orientation of the spin pole of a satellite or planet, relative to its orbit pole. We examine several cases in which dissipation rates may be high enough to have measurable effect.