

Monday, March 14, 2005
MARS: INTERIOR PROCESSES
8:30 a.m. Salon C

Chairs: M. A. Wieczorek
L. T. Elkins-Tanton

- 8:30 a.m. Monders A. G. * Médard E. Grove T. L.
Primary Martian Basalts at Gusev Crater: Experimental Constraints [#2069]
 Experimentally determined high-pressure, high-temperature phase relations of the Gusev Crater basalts indicate that the basalts originated from high-degree shallow melting of a primitive Martian mantle and may be part of the primitive Martian crust.
- 8:45 a.m. Christensen P. R. * McSween H. Y. Jr. Bandfield J. L. Ruff S. W. Rogers A. D.
 Hamilton V. E. Gorelick N. Wyatt M. B. Jakosky B. M. Kieffer H. H.
 Malin M. C. Moersch J. E.
The Igneous Diversity of Mars: Evidence for Magmatic Evolution Analogous to Earth [#1273]
 THEMIS compositional mapping has revealed a diversity of igneous materials, from picritic basalts to dacite and granitoids that rivals the Earth. Olivine basalts are relatively common; local magma evolution has produced dacites and granitoids.
- 9:00 a.m. Agee C. B. * Draper D. S.
High Pressure Melting of H-Chondrite: A Match for the Martian Basalt Source Mantle [#1434]
 Experiments on H-chondrite (Mg# = 80) yield liquids that can simply evolve to close matches to potential shergottite parent liquids.
- 9:15 a.m. Médard E. * Grove T. L.
Early Irreversible Hydrous Melting and Degassing of the Martian Interior: An Experimental Study [#1744]
 Hydrous experiments on a primitive Martian composition suggest that an early hydrous melting event occurred during the accretion process. This event would have profoundly differentiated the Martian mantle and removed H₂O from the planet's interior.
- 9:30 a.m. Solomon S. C. * Aharonson O. Hauck S. A. II Jakosky B. M. Phillips R. J. Zuber M. T.
Why the Martian Mantle is (Mostly) "Wet" [#1689]
 On the basis of a synthesis of geophysical arguments, planetary formation simulations, and information from Martian meteorites, we argue that the bulk of the Martian mantle has been geophysically "wet" for most of Martian history.
- 9:45 a.m. Elkins-Tanton L. T. * Parmentier E. M.
The Fate of Water in the Martian Magma Ocean and the Formation of an Early Atmosphere [#1906]
 A chondritic martian magma ocean degasses during solidification to create an initial water atmosphere consistent with the planet's current water content, while the mantle retains sufficient water to reduce viscosity and encourage convection.
- 10:00 a.m. Parmentier E. M. * Zaranek S. E. Elkins-Tanton L. T.
A Mechanism for the Formation and Evolution of Tharsis as a Consequence of Mantle Overturn: Large Scale Lateral Heterogeneity in a Stably Stratified Mantle [#1768]
 Tharsis is considered a consequence of melting of a large scale mantle heterogeneity following mantle overturn after fractional magma ocean solidification. Long-lived volcanism does not require a long term heat flux from the core or magnetic field.

- 10:15 a.m. King S. D. * Redmond H. L.
The Crustal Dichotomy and Edge Driven Convection: A Mechanism for Tharsis Rise Volcanism? [#1960]
This work uses numerical modeling and analysis of the Martian areoid to assess the conditions underwhich edge driven convection could form Tharsis rise.
- 10:30 a.m. Dombard A. J. * Phillips R. J.
Tectonic Evidence for Crustal Underplating of the Tharsis Montes, Mars [#1878]
Thermomechanical finite element simulations including an underplate thermal anomaly predict large, sharply peaked stress distributions consistent with graben annuli around these large volcanoes, allowing a more precise estimate of regional heat flow.
- 10:45 a.m. Lillis R. J. * Manga M. Mitchell D. L. Lin R. P. Acuña M. H.
Evidence for a Second Martian Dynamo from Electron Reflection Magnetometry [#1578]
Using high-sensitivity electron reflection magnetometry, we present the magnetic signatures and crater ages of Martian volcanoes as evidence for two separate episodes of dynamo activity on early Mars.
- 11:00 a.m. Wenzel M. J. * Manga M. Lillis R. J.
Mantle Convection and Two Episodes of Martian Dynamo Activity [#1584]
We use a 2D numerical mantle convection model to explore parameter space. We evaluate conditions that might explain two episodes of martian dynamo activity.
- 11:15 a.m. Wieczorek M. A. * Greff-Lefftz M. Labrosse S. van Thienen P. Rouby H. Besse J. Feldman W. C.
The Case for a Martian Inertial Interchange True Polar Wander Event [#1679]
The initial formation of the Tharsis plume and subsequent volcanic construction likely have given rise to $\sim 90^\circ$ of true polar wander on Mars. We argue that two antipodal hydrogen deposits located at the equator are relicts of ancient polar caps.