Wednesday, March 17, 2004
MARS GEOPHYSICS
1:30 p.m. Salon C

Chairs: R. J. Phillips
W. B. Banerdt

1:30 p.m. Connerney J. E. P. * Acuña M. H. Ness N. F. Mitchell D. L. Lin R. P.
An Extraordinary Magnetic Field Map of Mars **[#1114]**
A new global map of the magnetic field of Mars, with an order of magnitude improved sensitivity to crustal magnetization, is derived from Mars Global Surveyor mapping orbit magnetic field data. With this comes greatly improved spatial resolution and geologic intrpretation.

1:45 p.m. Mitchell D. L. * Lillis R. Lin R. P. Connerney J. E. P. Acuña M. H.
Mapping Weak Crustal Magnetic Fields on Mars with Electron Reflectometry **[#2134]**
We present a map of weak crustal magnetic fields on Mars derived from electron reflectometry.

2:00 p.m. Ravat D. * Miller J.
Analytic Signal in the Interpretation of Mars Southern Highlands Magnetic Field **[#1047]**
We model bulk magnetizations associated with the prominent linear magnetic anomalies and one positive-negative anomaly pair in the southern highlands of Mars using Z-component variation (negative of Br-component) as well as its analytic signal field.

2:15 p.m. Hood L. L. * Young C. N. Richmond N. C.
Modeling of Major Martian Magnetic Anomalies: Further Evidence for Polar Reorientations During the Noachian **[#1108]**
Current data indicate a primary location for the Martian northern paleopole during the early Noachian (prior to the formation of Tharsis and the demagnetized major basins) near 210E, 40N with an error circle of approximately 30 degrees radius.

2:30 p.m. Zuber M. T. * Neumann G. A. McGovern P. J. Wieczorek M. A. Lemoine F. G. Smith D. E.
An Improved Model of the Crustal Structure of Mars **[#1827]**
The initial MGS model of Mars crustal structure used a preliminary gravity field. Gravity models now incorporate significantly more tracking data from MGS and Odyssey. We exploit advances in gravity modeling to present a refined crustal inversion, and also address Mars' thermal evolution.

2:45 p.m. Smrekar S. E. * McGill G. E. Raymond C. A. Dimitriou A. M.
Geologic Evolution of the Martian Dichotomy and Plains Magnetization in the Ismenius Area of Mars **[#2117]**
Analysis of the geologic history indicates that the 2.5 km of relief is a primary feature, and that the boundary may have experienced relaxation. Gravity and magnetic anomalies suggest the possible presence of fossil magmatic intrusions at depth.

3:00 p.m. Guest A. * Smrekar S. E.
Relaxation of the Martian Crustal Dichotomy Boundary in the Ismenius Region **[#1362]**
We present an elasto-visco-plastic finite-element model for the relaxation of the Martian dichotomy boundary. Our approach is to model the detailed geologic history of the Ismenius region of Mars, including slope, strain, and timing of faulting.

3:15 p.m. BREAK

3:30 p.m. Phillips R. J. * Johnson C. L. Dombard A. J.
Localized Tharsis Loading on Mars: Testing the Membrane Surface Hypothesis **[#1427]**
A new model for Tharsis localized loading satisfies the geoid everywhere and treats the planetary surface outside of Tharsis as a free membrane. The solution exhibits two distinct domains, characterized by crustal loading and by Tharsis loading.

3:45 p.m. Boroughs L. L. * Parmentier E. M.
Thermal Stresses and Tharsis Loading: Implications for Wrinkle Ridge Formation on Mars **[#1658]**
Our models predict compressional thermal stresses that are large compared to stresses due to the loading of Tharsis, offering a viable explanation for wrinkle ridges concentric to Tharsis which cannot be explained by Tharsis loading alone.

4:00 p.m. Belleguic V. * Wieczorek M. Lognonné P.
What Can be Learned About the Martian Lithosphere from Gravity and Topography Data? **[#1741]**
We calculate the localized spectral admittance of the large Martian volcanoes. We have found the densities of the Martian volcanoes to be much greater than those that have been reported in previous studies (i.e., ~3200 kg m^{-3} vs. 2900 kg m^{-3}).

4:15 p.m. Banerdt W. B. *
A Gravity Analysis of the Subsurface Structure of the Utopia Impact Basin **[#2043]**
The observed gravity and topography of Hellas and Utopia's huge geoid anomaly are used as a starting point for investigating the subsurface structure of Utopia. Flexure of ~10 km is predicted, with fill densities consistent with sedimentary rocks or a combination of rock and ice.

4:30 p.m. Searls M. L. * Phillips R. J.
Mechanics of Utopia Basin on Mars **[#1822]**
We use topography and geoid data to analyze the structure of the Utopia basin on Mars. With a spherical harmonic elastic shell analysis, we solve for basin fill geometry, flexure, and pre-fill topography under an assumption of pre-fill isostasy.

4:45 p.m. Dombard A. J. * Searls M. L. Phillips R. J.
Burying the "Buried Channels" on Mars: An Alternative Explanation **[#1082]**
Gravity troughs on Mars have been interpreted as buried channels; we propose the Tempe Terra trough arises from surface topography that is partially compensated at long wavelengths, an effect seen elsewhere on Mars.