Enigmatic Surface Features

Kreslavsky M. A.     Head J. W.
North-South Slope Asymmetry on Mars [#3010]
Asymmetry of slopes was mapped with MOLA data. In two bands in midlatitudes equator-facing slopes are steeper than pole-facing. This is probably caused by repeating summer-time melting of frozen ground on pole-facing slopes at high obliquity.

Kostama V.-P.     Kreslavsky M. A.     Head J. W.
Morphology of the High-Latitude Mantle in Northern Plains on Mars [#3011]
Northern plains above 55° latitude are covered with extremely homogeneous mantle with characteristic texture. We present results of a systematic survey of the textures and superposed and covered circular features basing on MOC NA images.

Raitala J.     Aittola M.     Kostama V.-P.     Lahtela H.     Öhman T.
Modified Impact Craters — Clues to Martian Geological Processes [#3016]
The details which make impact craters to deviate from their ideal symmetry, may well provide the insights required to trace and investigate the existence of certain bedrock characteristics or the course of geological processes within a studied area.

Nussbaumer J.     Jaumann R.     Hauber E.
Evidence for a Surging Ice-Sheet in Elysium Planitia, Mars [#3018]
High resolution Viking images show evidence for ancient glaciation in parts of southeastern Elysium Planitia. The previous ice sheet formed hummocky ground moraines, eskers, and pingos. This near equator glaciation in the comparably recent past of Mars bears important paleoclimatic implications.

Mangold N.     Allemand P.
Ductile Deformation in Hellas Floor: Salt Diapirs or Crustal Domes? [#3047]
The honeycomb terrains inside Hellas are enigmatic concentric landforms. The analysis of the deformation at the MOC scale shows a geometry typical of structural domes like those related to difference of densities in the Archean crust on Earth.

Hiesinger H.     Head J. W. III
Geology of the Syrtis Major/Isidis Region of Mars: New Results from MOLA, MOC, and THEMIS [#3061]
We characterize the Syrtis Major/Isidis region in terms of topography and morphology, investigate the origin of the geologic units and their morphologic features, study the geologic history and evolution of the region, and provide additional geologic context for the Beagle lander.

Payne M. C.     Farmer J. D.
Testing the Pseudocrater Hypothesis [#3070]
A field of coniform features observed in Olympia Planitia was hypothesized to be a pseudocrater field. We used a number of methods to test our hypothesis, as volcano-ice features located at the margin of a polar cap have significance for astrobiology.
Kereszturi A.

*Isidis, Argyre and Hellas: Subsurface Indicators of Climate Changes* [#3082]

With the GPR of Mars Express and future explorations the connection between the subsurface ice distribution and the topography of the surface could hint to the style of the last great climate change.

Farrand W. H.    Gaddis L. R.

*THEMIS Observations of Pitted Cones in Acidalia Planitia and Cydonia Mensae* [#3094]

The nature of enigmatic pitted cones in Acidalia Planitia and Cydonia Mensae is explored using THEMIS and other data sources. The cones are observed to have low apparent thermal inertias and this is found to be inconsistent with volcanic origins.

Kraal E. R.    Asphaug E. I.    Lorenz R. D.

*Can Shoreline Processes on Mars Constrain Its Past Climate?* [#3115]

We propose to model the geomorphic system of a crater lake on Mars and how it would respond to climate perturbations. Our goal is to understand how shorelines might preserve a quantitative record of martian climate.

Deal K. S.    Arvidson R. E.    Neumann G. A.

*The Surface Roughness of Terrains on Mars* [#3170]

Global RMS surface roughness data was examined in order to identify and characterize terrains in terms of morphology and geology as well as potential modes of emplacement and/or modification.

Salamuniccar G.    Selar-Gravocic D.


New visualization of quasi-circular-depressions was presented, developed for easier search for buried impact craters by humans and possibly by some automatic process in the future.

Salamuniccar G.    Nezic Z.

*Intriguing Dark Streaks on Mars: Can We Use Them for Formal Proof That We are Near the End of Large Climate Change on Mars?* [#3204]

The idea how dark streaks on Mars can be used for the formal proof of climate changes that are still active was presented, suggesting that rover should be sent on some place where we have some newly formed dark streaks.

Carlotto M. J.

*Enigmatic Landforms in Cydonia: Geospatial Anisotropies, Bilateral Symmetries, and Their Correlations* [#3208]

Geospatial terrain statistics and object symmetries in Cydonia are examined. The spatial autocorrelation structure of selected regions shows indications of rectilinear geometry and appears to correlate with the axis of symmetry of several enigmatic landforms in the area.

Williams K. K.

*Measurements of Dune Heights on Mars* [#3220]

Stereo MOC images are used to measure dune heights in Proctor crater. Heights range from 30 m for smaller barchan dunes to 100 m for larger, more complex dunes.

Plesko C. S.    Asphaug E.    Brumby S. P.    Gisler G. R.

*Automated Feature Extraction and Hydrocode Modeling of Impact Related Structures on Mars: Preliminary Report* [#3227]

A systematic, combined modeling and observation effort to correlate Martian impact structures — craters and their regional aftermaths — to the impactors, impact processes and target geologies responsible.
Perron J. T. Howard A. D. Dietrich W. E. 
*Viscous Flow of Ice-rich Crater Fill Deposits and Periodic Formation of Protalus Ramparts: A Climate Record* [3236]
Regularly-spaced ridges on crater floors appear to be relict protalus ramparts that have been advected across the crater floors. We estimate the time between rampart formation events by modeling the deformation of volatile-rich crater fill deposits.

Schultz P. H. 
*Impacts into Porous Volatile-rich Substrates on Mars* [3263]
Impacts in porous volatile-rich targets can result in unusually deep smaller craters but shallower than expected complex craters collapse. Trapped volatiles may play contribute to the formation of pedestal craters through mineral precipitation.

Fenton L. K. Richardson M. I. Toigo A. D. 
*Temporal Invariance of Wind Orientations as Recorded by Aeolian Features in Proctor Crater* [3267]
A mesoscale model is run over Proctor Crater to determine if aeolian features correlate to present-day winds.

Garvin J. B. Sakimoto S. E. H. Frawley J. J. 
*Craters on Mars: Global Geometric Properties from Gridded MOLA Topography* [3277]
This paper summarizes the key findings associated with a five year long survey of the three-dimensional properties of ~6000 martian impact craters using finely gridded MOLA topography.

Brumby S. P. Vaniman D. T. Bish D. 
*Emissivity Spectrum of a Large “Dark Streak” from THEMIS Infrared Imagery* [3278]
We present an infrared spectral emissivity spectrum of a large “dark streak” on the north western edge of Olympus Mons, using imagery from the THEMIS instrument on the Mars Odyssey 2001 spacecraft.