

Monday, March 7, 2011
SPECIAL SESSION:
CRYOSPHERES I: ICY INSIGHTS INTO MARS PALEOCLIMATE
8:30 a.m. Waterway Ballroom 1

Chairs: Patrick Russell
John Holt

- 8:30 a.m. Head J. W. * Mustard J. F. Kreslavsky M. A. Milliken R. E. Marchant D. R. Forget F. Schon S. C. Levy J. S.
[*Mars in the Current Glacial-Interglacial Cycle: Exploring an Anomalous Period in Mars Climate History*](#) [#1315]
 The extensive geological record of Mars' most recent ice age and the current interglacial period offer unprecedented and accessible opportunities to explore and characterize systematic effects of individual periods of spin-axis/orbital variation.
- 8:45 a.m. Feldman W. C. * Prettyman T. H. Maurice S. Lawrence D. J. Pathare A. Milliken R. E. Travis B. J.
[*Search for Remnant Water Ice from Past Glacial Climates on Mars: The Mars Odyssey Neutron Spectrometer*](#) [#2420]
 We find at least three likely target locations of presently existing deposits of buried "bulk" water ice that may be remnants of multiple episodes of dirty ice precipitation events at low to mid-martian latitudes driven by climate changes during the last 1 to 10 Ma.
- 9:00 a.m. Schaefer E. I. * Head J. W. Kadish S. J.
[*Vaduz, an Unusual Fresh Impact Crater on Mars: Evidence for Impact into a Recent Ice-Rich Mantle*](#) [#1199]
 We document a very fresh midlatitude impact crater, Vaduz, whose associated deposits provide insight into the nature, distribution, and timing of ice-rich mantles as well as the impact-related mechanisms for armoring these mantles.
- 9:15 a.m. Rutledge A. M. * Christensen P. R.
[*Hypsometric Analysis of Glacial Features in the East Hellas Basin Region, Mars: Implications for Past Climate Shifts*](#) [#2124]
 We apply hypsometric analysis to lobate debris aprons in eastern Hellas, Mars to complete a detailed areal inventory of the buried ice deposits. The resulting curves vary with latitude and elevation, indicating a potential past climate signal.
- 9:30 a.m. Souness C. J. * Hubbard B. Quincey D. J. Milliken R.
[*Geographical Controls on the Distribution of Glacier-Like Forms in Mars' Mid-Latitudes: Observations from a Survey of Mars Reconnaissance Orbiter Context Camera Data*](#) [#1021]
 This research finds that glacier-like forms (GLFs) on Mars formed simply through viscous creep of a pre-existing ice mass in response to local topography and not under the influence of a glacial mass-balance regime such as operates on Earth.
- 9:45 a.m. Kargel J. S. * Furfaro R. Wibben D. Berman D. C. Hubbard B. Milliken R. E. Pelletier J. Rodriguez J. A. P.
[*Melting a Martian Viscous Flow Feature: A Modern-Climate, Dust-Blanketed Glacier Model*](#) [#2266]
 Evidence points to glacial flow and melting of a landform in a crater east of Hellas, Mars. A thick blanket of insulating dust might allow melting under the present climate, thus offering an alternative to a modified, warmer recent climate.

- 10:00 a.m. Fastook J. L. * Head J. W. III Marchant D. R. Forget F. Madeleine J.-B.
[*A Warmer Atmosphere on Mars Near the Noachian-Hesperian Boundary: Evidence from Basal Melting of the South Polar Ice Cap \(Dorsa Argentea Formation\)*](#) [#1212]
Dorsa Argentea Formation (Noachian-Hesperian) eskers are evidence for basal melting. Ice-flow models show that the mean annual south polar temperature must be raised to -50° to -75°C , providing an independent estimate of elevated lower latitude surface temperature.
- 10:15 a.m. Lenferink H. J. * Durham W. B. Pathare A. V. Stern L. A. Stillman D. E.
[*Creep of Water Ice Plus Magnesium Perchlorate Hydrate*](#) [#1909]
Motivated by a Mars NPLD morphology that suggests a material of weaker rheology than ice, we deformed a polycrystalline sample of solid ice + magnesium perchlorate. The material is profoundly weaker than pure water ice at Mars polar cap temperatures.
- 10:30 a.m. Winebrenner D. P. * Stillman D. E. Grimm R. E.
[*Detectability by Radar of Salts in Martian Ice Deposits*](#) [#2532]
Salt in martian ice could have significant implications for ice-rheology near and above eutectic temperatures. Using laboratory data and dielectric modeling, we investigate detection of salts, including perchlorate salts, using radar attenuation.
- 10:45 a.m. Holt J. W. * Smith I. B. Christian S. Brothers T. C. Phillips R. J.
[*Radar Stratigraphy of Planum Boreum, Mars: A Rich History of Accumulation and Erosion Preserved by a Lack of Flow*](#) [#2664]
We find that SHARAD reveals complex internal stratigraphy within Planum Boreum, Mars, that can only be explained as resulting from deposition and erosional processes. There is no evidence in the stratigraphy for significant ice flow.
- 11:00 a.m. Smith I. B. * Holt J. W.
[*Temporal and Spatial Evolution of Spiral Troughs on Planum Boreum, Mars from Detailed Stratigraphic Mapping: Implications for Local Atmospheric Processes*](#) [#2742]
Continued mapping of troughs demonstrates local variations in migration indicating local processes compete in magnitude with both regional and cap-wide events.
- 11:15 a.m. Plaut J. J. *
[*Stratigraphy of the Upper Martian North Polar Layered Deposits from Radar, Visible and Topographic Data*](#) [#2653]
Data from the SHallow RADar sounder (SHARAD) are compared to visible images and topographic data, including stereo-derived DEMs, to tie the positions of radar reflectors to outcrops of layered deposits visible in high-resolution images.
- 11:30 a.m. Conway S. J. * Hovius N. Barnie T. D. Besserer J. Le Mouélic S. Reed N.
[*The Origin and Evolution of Ice Domes in the North Polar Region of Mars*](#) [#2030]
We have characterized the geological setting, morphology, stratigraphy and composition of 18 ice-domes inside craters between $70-85^{\circ}\text{N}$. We find that most of them were formed by atmospheric deposition separate from the polar cap.