

Wednesday, March 19, 2003
BABY, IT'S COLD (AND WINDY) OUTSIDE:
AEOLIAN AND GLACIAL PROCESSES ON MARS
8:30 a.m. Salon B

Chairs: N. T. Bridges
E. P. Turtle

Bridges N. T. * Greeley R. Eddlemon E. Laity J. E. Meyer C. Phoreman J. White B. R.
Martian and Terrestrial Rock Abrasion from Wind Tunnel and Field Studies [#1766]

Several important factors related to the rock abrasion processes on Earth and Mars are found: (1) Initial rock shape controls the rate of abrasion. (2) Irregular rocks abrade at greater rates than targets with smooth surfaces. (3) Rocks also abrade via slope retreat.

Bourke M. C. *

Gone but Not forgotten-The Aeolian Modification of Fluvial Surfaces on Mars: Preliminary Results from Central Australia [#1643]

An analogue study in central Australia shows how patterns in aeolian dunes can be used to detect buried fluvial features.

Wilson S. A. * Zimbelman J. R. Williams S. H.

Large Aeolian Ripples: Extrapolations from Earth to Mars [#1862]

Large aeolian ripples on Earth are potential analogs to ripple-like features on Mars. Extrapolation of terrestrial ripple and dune profiles may provide quantitative parameters for determining a ripple or dune origin for ripple-like features on Mars.

Schorghofer N. * Aharonson O. Gerstell M. F.

Slope-streak Formation and Dust Deposition Rates on Mars [#2012]

Slope streaks, common in dust-covered low thermal inertia regions, are a dynamic geologic feature on Mars. We study the rate of their formation and fading based on overlap images.

Diniega S. * Richardson M. I. Ewald S. P. Toigo A. D. Byrne S.

Martian Polar Wind Patterns Derived from Mapping of Seasonal Cap Dark Streaks [#2125]

Frost streaks identified in images taken by MOC/MGS were used to develop a map of the martian south pole's southern spring circulation patterns. The same region and season was then examined with a mesoscale atmospheric circulation modeling program.

Pathare A. V. * Paige D. A.

The Sublimation and Relaxation of Troughs and Scarps Within the Martian North Polar Layered Deposits [#2051]

Although the morphological evolution of the NPLD is widely presumed to result from surface ablation processes, we show that viscous relaxation of subsurface water ice is more consistent with the slope and depth distributions of NPLD troughs and scarps.

Aharonson O. * Zuber M. T. Smith D. E. Neumann G. A.

Depth and Distribution of CO₂ Snow on Mars [#1958]

Our results demonstrate that MOLA measurements can be effectively corrected, averaged and fitted, to yield sensitive measurements of the changes in polar surface height as a function of both latitude and longitude over the Martian seasonal cycles.

Kargel J. S. * Wessels R. Molnia B.

Environmental Conditions of Origin of Surface Morphologies of Martian Glacier-like Flows [#2092]

Martian lineated valley fill and lobate debris aprons share many of characteristics, and some different ones, of terrestrial debris-covered glaciers. Features indicate surface or shallow subsurface melting in some cases, but mostly sublimation.

Marchant D. R. * Head J. W.

Cold-based Glaciers in the Western Dry Valleys of Antarctica: Terrestrial Landforms and Martian Analogs [#1245]

Cold-based glaciers in Antarctica Dry Valleys are characterized by landforms (drop moraines, sublimation tills, rock glaciers) that are often different than temperate or wet-based glaciers; these features are similar to deposits on Mars and may offer clues to their origin.

Head J. W. * Marchant D. R.

Cold-based Mountain Glaciers on Mars: Western Arsia Mons Fan-shaped Deposits [#1247]

A lobate deposit on Western Arsia Mons is analogous to cold-based glacier deposits in the Dry Valleys of Antarctica (ridged facies and drop moraines; knobby facies and sublimation tills; smooth facies and rock glaciers).

Shean D. E. * Head J. W.

Pavonis Mons Fan-shaped Deposits — A Cold-based Glacial Model [#1153]

The Pavonis Mons fan-shaped deposits display several unusual features including a ridged facies, smooth facies, knobby facies, flow features and radial ridges. Here we discuss these features and propose a cold-based glacial model for their formation.

Arfstrom J. D. *

Protales Ramparts and Transverse Ridge Moraines on Mars: Indicators of Surface Ice Depositional Processes [#1050]

Ridges resembling terrestrial protales ramparts and transverse ridge moraines are associated with some gullies and alcoves on Mars. These ridges could be indicators of surface ice depositional processes related to seepage of water.

Turtle E. P. * Pathare A. V. Crown D. A. Hartmann W. K. Greenham J. C. Hartness N.

Modeling the Formation of Lobate Debris Aprons on Mars by Creep of Ice-rich Permafrost [#1891]

We are performing finite-element analysis of viscous creep of ice/rock mixtures under present Martian conditions to reproduce the characteristics of debris aprons observed in MOC and MOLA data of the region east of the Hellas impact basin.