

Tuesday, June 13, 2017

**MARS DUST: CHARACTERISTICS, COMPOSITION AND ELECTRIFICATION
Berkners D-F**

All participants, regardless of their assigned method of presentation, are encouraged to contribute during the breakout sessions, as all community input is essential to a positive outcome.

Moderators: Joel S. Levine
David W. Beaty
Recorder: Brandi Carrier

Zurek R. W. *

[*The Spatial and Temporal Distribution of Dust in the Atmosphere of Mars*](#) [#6019]

Dust is widely spread in the Mars atmosphere, but it varies spatially, seasonally, and from year-to-year. This presentation gives an overview of the dust distribution, with emphasis on the roles of local, regional and planet-encircling dust storms.

Ming D. W. * Morris R. V.

[*Chemical, Mineralogical, and Physical Properties of Martian Dust and Soil*](#) [#6027]

Chemical, mineralogical, and physical properties of martian dust and soil are reviewed from data returned by robotic landers and rovers.

McCoy J. T. * Ryder V. E. Lam C. W. Scully R. R. Romoser A. A.

[*Martian Dust Toxicity: Should We Believe the Headlines?*](#) [#6004]

Martian dust has received significant attention, and with good reason. However, it is important to keep toxicity in proper context, and to avoid overstating crew health risks. Are perchlorates and other stressors really martian show-stoppers?

Farrell W. M. *

[*Regarding Electrified Martian Dust Storms*](#) [#6020]

We examine the dynamic competition between dust devil/storm charging currents and dissipating atmospheric currents. A question: Can high-current lightning be a dissipation product of this competition? Most likely not but there are exceptions.

Kass D. M. * McCleese D. J. Kleinböhl A. Schofield J. T. Heavens N. G.

[*Mars Climate Sounder \(MCS\) Observations of Martian Dust--A Decade-Long Record*](#) [#6030]

We describe the Mars Climate Sounder (MCS) observations of atmospheric dust. The instrument acquires infrared observations to produce a 5.75 Mars Year (>10 earth year) climatology global of dust, including its vertical distribution.

Bell J. F. III * Wellington D. F.

[*Local, Regional, and Global Albedo Variations on Mars From Recent Space-Based Observations: Implications for Future Human Explorers*](#) [#6023]

We describe recent as well as historic albedo variations on Mars as observed by space-based telescopes, orbiters, and surface missions, and speculate that some regions might offer fewer dust-related problems for future human explorers than others.

Edgett K. S. * Newsom H. E.

[*Dust Deposited from Eolian Suspension on Natural and Spaceflight Hardware Surfaces in Gale Crater as Observed Using Curiosity's Mars Hand Lens Imager \(MAHLI\)*](#) [#6017]

MSL MAHLI images and other observations regarding particles deposited from eolian suspension and potential local dust sources (wind-eroded mudstone) at the Curiosity field site in Gale Crater, Mars.

Ogohara K. *

[*Regionality of Dust Haze Transport in the Mars Atmosphere Revealed by Ensemble Simulations*](#) [#6014]

Regionality of dust haze transport in the Mars atmosphere is investigated by ensemble simulations using a GCM. It is turned out that processes of dust haze dispersion by advection are categorized into a few cases.

Vincendon M. *

[*Observation of Interannual Variability of Dust Surface/Atmosphere Exchange on Mars*](#) [#6029]

Transfer of Mars dust between surface and atmosphere occurs on Mars with various timescales. Orbital observations of surface albedo change by OMEGA onboard Mars Express are used to assess the timing and extent of dust deposition and removal events.

Morozhenko A. V. Vidmachenko A. P. *

[*Optical parameters of Martian Dust and Its Influence on the Exploration of Mars*](#) [#6010]

Flight to Mars is dangerous because of large amount of toxic dust. During dust storm particle size was 1–20 μm ; at its highest activity - ~8–10 μm , at the end –1 μm ; real part of refractive index was 1.59, which corresponded to their silicate nature.

Montabone L. * Forget F.

[*Forecasting Dust Storms on Mars: A Short Review*](#) [#6032]

In this article we provide a short review focusing on the current and future capabilities of forecasting martian dust storms for robotic and human missions.

Wang A. * Yan Y. C. Wu Z. C.

[*Electrochemical Reaction at Surface Induced by Electrostatic Discharge During Mars Dust Storm and Dust Devils*](#) [#6012]

We present the instantaneous formations and high yield of NaClO_3 and NaClO_4 from NaCl through atmosphere-surface electrochemistry stimulated by Electrostatic Discharge (ESD) that could occur during martian dust storm and dust devils.

Kuroda T. * Kadowaki M.

[*Simulation of the Small-Scale Dust Activities and Their Mutual Interactions on the Atmospheric Dynamics Using a High-Resolution Mars General Circulation Model*](#) [#6015]

We show the simulation results of our high-resolution Mars general circulation model including the dust lifting processes for the investigations of the meteorological features which invoke dust storms and subsequent enhancement of small-scale waves.

Spry J. A. * Rummel J. D. Race M. S. Conley C. A.

[*Three Faces of Martian Dust: Dust for Cover, Dust to Breathe, and Dust Everywhere*](#) [#6035]

While detailed approaches are mature for robotic missions, only guidelines are available for how planetary protection might be implemented on human missions. More dust-related data is needed before adequate mitigations can be identified and deployed.

Levine J. S. *

[*Dust in the Atmosphere of Mars and Its Impact on Human Exploration: A Review of Earlier Studies*](#) [#6007]

The impact of Mars atmospheric dust on human exploration has been a concern for many years, e.g., NRC (2002) and MEPAG (2005). The impact of Mars atmospheric dust on human exploration is a multi-faceted problem and will be reviewed in this paper.

Wadhwa M. * Leshin L. Clark B. Jones S. Jurewicz A. McLennan S. Mischna M. Ruff S. Squyres S. Westphal A.

[*A Low-Cost, Low-Risk Mission Concept for the Return of Martian Atmospheric Dust: Relevance to Human Exploration of Mars*](#) [#6028]

We present a low-cost, low-risk mission concept for return of martian atmospheric dust. Such a mission would serve as a scientific, technological and operational pathfinder for future surface sample return and human exploration to Mars.