EPSC Abstracts,
Vol. 4, EPSC2009-77, 2009
European Planetary Science Congress,

Properties of the Martian Dust Aerosol

J. P. Merrison (1), M.B. Madsen (2), C. Holstein-Rathlou, H. P.Gunnlaugsson (1), P. Nornberg (1) and K.R. Rasmussen (1)

(1) Aarhus University, Mars Simulation Laboratory, Ny Munkegade 120, building 1520, DK-8000 Århus C, Denmark, (2) Niels Bohr Institute, University of Copenhagen, Denmark (merrison@phys.au.dk / Fax: +45-86120740)

Abstract

Mars is a test bed for the study of dust aerosols since, lacking the active circulation of water through the atmosphere as seen on earth, dust transport has become the dominant process for both atmospheric contamination and the dynamics of the surface.

The atmospheric dynamics on Mars is strongly affected by the presence of particulate aerosols which dominate the opacity and therefore heat transport.

Conversely particulate dust suspension (entrainment and transport) occurs through the interaction of the atmosphere with the planetary surface. This wind driven transport of material at the surface of Mars is being actively researched both in laboratory simulators and through surface and orbital probes. Convergence is only now being reached between observation, simulation and theory. Specifically processes are being quantified whereby dust particulates aggregate and become dispersed allowing abundant dust transport at the wind speeds (wind induced surface shear stress) observed, close to the threshold at which solid sand grains become mobilized [1].

Granular electrification plays a role here and is also being studied actively both under terrestrial and Martian conditions, though is still far from being well understood [2,3].

Observations by the NASA MER mission have revealed, for the first time, active transport of sand on the surface (saltation). It is becoming clear that, although such sand transport is periodic and at a low rate it may have a major impact on the surface as well as the dust aerosol.

Discussion will be made of recent laboratory simulations, observations from Mars and wind flow and dust sensing instrumentation [4,5]. .

Figure 1: Laboratory Simulation of the Mars dust aerosol using Salten Skov I Mars analogue dust material

References

[1] Merrison, J.P., et al. *Icarus*, (2007), 191, 568-580
[2] Merrison, J.P. et al. (2004). *Planet. Space. Sci.*, 52: 279-290
[3] Merrison, J.P. et al., *Planet. Space. Sci.*, (2008) 56, 426-437
[4] Merrison, J.P., et al., *Planet. Space. Sci.* (2006), 54, 1065-1072
[5] H. P. Gunnlaugsson, et al. J. Geophys. Res., (2008), 113, E00A04

.