



Decay of a Martian dust storm as observed by the Planetary Fourier Spectrometer on board of Mars Express

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This work presents the decay phase of a moderate dust storm in the Martian atmosphere as observed in the fields retrieved from the Planetary Fourier Spectrometer (PFS) data.

The instrument - included in the scientific payload of ESA Mars Express mission - acquires spectra in the range between 250 and 8200 cm^{-1} , with a sampling step of 1 cm^{-1} and an effective resolution of 2 cm^{-1} . Once properly calibrated, the observed radiance depends on several parameters of the atmosphere and surface of Mars. Among them, surface temperature, integrated content of dust and water ice suspended in the atmosphere, air temperature as a function of altitude (from surface up to 40 km) can be retrieved from individual calibrated spectra by means of appropriate numerical techniques (Grassi et al., 2005, in press on PSS).

The early MEX orbital passes took place documented the final stages of a mild dust storm. At the beginning of the mission (Ls 330-340°), the column-integrated dust opacity at 1000 cm^{-1} showed an indicative value of 0.12, while, after a period poorly covered by our measurement (around 0°), this value diminished down to 0.07 at Ls > 20°. Despite a bias season vs.local time in our data acquisitions, an e-folding time of 35° can be estimated in the latitude range [-20,20]. Quite similar figures are achieved for the latitude ranges [-40, -20] (e-folding ~25°) and [20, 40] (e-folding ~32°), suggesting a planet-wide process. Several other phenomena accompanied the dust settling: a decrease in air and surface temperatures and the formation of a thin water ice

cloud belt at the equatorial latitudes (with an integrated optical depth of 0.1 at 830 cm^{-1} around Ls 25°).

Our observations confirm qualitatively the picture presented by previous studies based on IRIS and TES data as well as the simulations by GCMs and provide a positive test of the monitoring capability of PFS.