



Publication Year	2016
Acceptance in OA	2020-07-14T10:09:51Z
Title	Modeling infrared thermal emissions on Mars during dust storm of MY28: PFS/MEX observation
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Handle	http://hdl.handle.net/20.500.12386/26442
Volume	41

Space Studies of the Upper Atmospheres of the Earth and Planets including Reference Atmospheres (C)

Planetary Upper Atmospheres, Ionospheres and Magnetospheres (C3.2)

MODELING INFRARED THERMAL EMISSIONS ON MARS DURING DUST STORM OF MY28: PFS/MEX OBSERVATION

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We have analysed thermal emission spectra obtained from Planetary Fourier Spectrometer (PFS) onboard Mars Express (MEX) for Martian Year (MY) 28 in presence and absence of dust storm at low latitude. A radiative transfer model for dusty atmosphere of Mars is developed to estimate the thermal emission spectra at latitude range 0-10oS, 10-20oS and 20-30oS. These calculations are made at $L_s=240^\circ$, 280° , 300° , and 320° between wave numbers 250-1400 cm^{-1} . We have also retrieved brightness temperatures from thermal emission spectra by inverting the Planck function. The model reproduces the observed features at wave numbers 600-750 cm^{-1} and 900-1200 cm^{-1} due to absorptions by CO_2 and dust respectively. In presence of dust storm thermal emission spectra and brightness temperature are reduced by a factor of 2 between wave numbers 900-1200 cm^{-1} . The altitude profiles of dust concentration are also estimated for different aerosol particles of sizes 0.2 to 3 μm . The best fit to the PFS measurements is obtained in presence of aerosol particle of size 0.2 μm .