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Water vapor in the middle atmosphere of Mars during the global dust storm in 2007

Anna Fedorova (1), Jean-Loup Bertaux (2), Franck Montmessin (2), Oleg Korablev (1), Ilya Dzuban (1), Luca Maltagliati (3), and John Clarke (4)

(1) Space Research Institute (IKI) RAS, Moscow, Russian Federation (fedorova@iki.rssi.ru), (2) LATMOS/CNRS, Guyancourt, France, (3) AIM/Cea-Saclay, France, (4) Center for Space Physics, Boston University, Boston, USA

Recent observations of the Martian hydrogen corona in the UV H Ly-α emission by Hubble Space Telescope (HST) [Clarke et al., 2014] and the SPICAM UV spectrometer on Mars Express [Chaffin et al., 2014] reported its rapid change an order of magnitude for the short period of a few months in 2007 (MY 28), which is inconsistent with the existing models. One proposed explanation of observed decrease in coronal emission is that during the global dust storm water vapor can be transported to higher altitudes where the rate of photodissociation by near-UV sunlight increases, providing an additional source of hydrogen for the upper atmosphere.
Since 2004 the SPICAM IR spectrometer on Mars-Express carries out measurements of the vertical distribution of water vapor in the 1.38 μm band and aerosol properties in the middle atmosphere of Mars by means of solar occultations. We presents here vertical profiles of water vapor at Ls = 250-310° during the dust storm of MY28. SPICAM observations confirm the increase of the H_2O content at 60 km from Ls=268° to Ls=285° an order of magnitude for the northern hemisphere and in 3-4 times for the southern hemisphere. Nevertheless, the photochemical modeling is required to estimate a contribution of observed water abundance to the hydrogen corona. The interannual variability of water vapor vertical distribution for the southern summer season will be also presented.