

A Study of the Martian Atmosphere Using OMEGA/Mars Express and Ground-Based Measurements

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Two sets of data have been used to map water vapor and hydrogen peroxide on Mars. First, the TEXES instrument mounted at the NASA Infrared Telescope Facility was used during two observing runs, in June 2003 and in November 2005, to obtain infrared spectral images of Mars around 8 microns, at high spatial and spectral resolution ($R = 77000$). The 2003 data led to the first mapping of hydrogen peroxide H_2O_2 (through the first identification of a dozen of individual transitions at 1227-1243 cm^{-1}) and to the simultaneous mapping of H_2O (from the study of an HDO transition at 1240 cm^{-1}) (Encrenaz et al., Icarus 170, 424, 2004. Icarus 179, 43, 2005a). New maps of these two species have been obtained during the 2005 run and will be compared with the previous results. The OMEGA imaging spectrometer aboard Mars Express has also been used to map water vapor over the seasonal cycle, using the 2.6 microns H_2O band. Two periods have been studied in particular: (1) $L_s = 330-40^\circ$, around the equinox and (2) $L_s = 93-126^\circ$, at the time of maximum water sublimation around the north pole (Encrenaz et al., Astron. Astrophys. 441, L9, 2005b ; Melchiorri et al., submitted to Plan. Space Sci., 2006). An extended coverage of the water vapor mapping will be shown, using more recent data. In addition, preliminary results on the CO abundance will be shown, from the analysis of the CO(2-0) band at 2.35 microns.