AOGS 2006

Microwave Observations of Martian Temperature and Wind Fields: Comparison with the Simulation by MAOAM

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Several mm and submm transitions of carbon monoxide have been observed in order to retrieve vertical temperature profiles of the Martian atmosphere from ground up to about 70 km (e.g. Clancy et al.1991, Gurwell et al., 2000, 2005 and own observations at the HHT 1996/1997). One important feature of microwave observations is that they are not sensitive to the dust distribution in the Martian atmosphere and that they are independent of the illumination of the Martian disk. Comparison with satellite data (e.g. Mariner 9, Viking, Pathfinder and Mars Global Surveyor) showed a good agreement. Additionally winds have been retrieved from Doppler shifts detected on the same carbon monoxide lines since the early nineties (Lellouch et al., 1991). This is a unique feature of millimeter and submilimeter wave measurements, i.e. it is possible to constrain forcing mechanisms in comparing winds derived from the temperature field with directly determined winds. In this presentation, we will review the microwave observations of Martian temperatures and winds, and show the comparisons with the simulated results by the General Circulation Model of the Martian Atmosphere (MAOAM) (Hartogh et al., 2005; Kuroda et al., 2006).