



Vertical thermal structure and winds in Venus' mesosphere from HHSMT

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The Venusian atmospheric dynamics is one of the fundamental questions in planetary sciences, and its mesosphere is poorly constrained. Two international missions recently joined efforts and carried out multi-point observations of the Venusian atmosphere on June 6 for several hours: NASA's MESSENGER spacecraft swung by Venus for a second time on 6 June 2007 at 23:10 UTC on its way to Mercury, and ESA's Venus Express is orbiting around Venus since 11 April 2006. Among the space-based observations, ground-based sub-millimeter line observations together with a description of the physics of the radiative transfer through the mesosphere, and with retrieval algorithms for planetary atmospheres provide a means to monitor the wind field and the thermal vertical structure in the middle atmosphere.

Within the framework of our observations of ^{12}CO $J = 2-1$ lines with the Heinrich Hertz Submillimeter Telescope in Arizona (Rengel, Hartogh Jarchow, 2008 PAAS submitted), we have retrieved the vertical thermal structure and zonal wind velocities in the Venusian mesosphere during several days in June 2007.

We report a temperature peak detection at 90-100 km which seems to support the newly found of the extensive layer of warm air detected by SPICAV onboard Venus Express (Bertaux et al., Nature 450, 2007). Day-to-night temperature variations and short-term (day-to-day) variations of winds and temperature are evident in our data.

These data are part of a coordinated observational campaign in support of the ESA Venus Express mission. Furthermore this study attempts to contribute to cross-calibrate space - and ground-based observations, to constrain radiative transfer and

retrieval algorithms for planetary atmospheres, and to a more thorough understanding of the global patterns of circulation of the Venusian atmosphere.