



Atmospheric winds on the cloud top level of Venus according to Venus Monitoring Camera images

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We present results of wind speed measurements at the cloud top level of Venus derived from manual and automated cloud tracking in the UV (365 nm) and IR (965 nm) channels of the Venus Monitoring Camera Experiment (VMC) [1] on board the Venus Express mission.

Cloud details have a maximal contrast in the UV range. More than 80 orbits have been processed. More than 27500 manual vectors were obtained. The period of the observations covers more than 4 venusian year. Zonal wind speed demonstrates the local solar time dependence. Possible diurnal and semidiurnal components are observed [2].

According to averaged latitude profile of winds at level of the upper clouds:

- The zonal speed is slightly increasing by absolute values from 90 on the equator to 105 m/s at latitudes —47 degrees;
- The period of zonal rotation has the maximum at the equator (~ 5 earth days). It has the minimum (~ 3 days) at altitudes —50 degrees. After minimum periods are slightly increasing toward the South pole;
- The meridional speed has a value ~ 0 on the equator, and then it is linear increasing up to ~ 10 m/s (by absolute value) at 50 degrees latitude. “-” denotes movement from the equator to the pole.

From 50 to 80 degrees the meridional speed is again decreasing by absolute value up to 0. IR (965+10 nm) day side images can be used for wind tracking. The obtained speed of the zonal wind in the low and middle latitudes are systematically less than the wind speed derived from the UV images. The average zonal speed obtained from IR day side images in the low and average latitudes is about 65-70 m/s. The given fact can be interpreted as observation of deeper layers of mesosphere in the IR range in comparison with UV.

References

- [1] Markiewicz W. J. et al. (2007) Planet. Space Sci. V55(12). P.1701-1711.
- [2] Moissl R., et al. (2008) J. Geophys. Res. 2008. doi:10.1029/2008JE003117. V.113.