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Variations of zonal wind speed at Venus cloud tops from Venus Monitoring Camera UV images

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7 years of continuous monitoring of Venus by ESA's Venus Express provided an opportunity to study dynamics of the atmosphere of Venus. Venus Monitoring Camera (VMC) [1] delivered the longest and the most complete so far set of UV images to study the cloud level circulation by tracking motion of the cloud features. We analyzed 130 orbits with manual cloud tracking and 600 orbits with digital correlation method. Here we present the latest update of our results. Total number of wind vectors derived in this work is approximately a half million. During Venus Express observations the mean zonal speed was in the range of 85-110 m/s. VMC observations indicated a long term trend for the zonal wind speed at low latitudes to increase. The origin of low frequency trend with a period about 3000 days is unclear. Fourier analysis [2-3] of revealed quasi-periodicities in the zonal circulation at low latitudes. Two groups of the periods were found. The first group is close to the period of superrotation at low latitudes (4.83$\pm$0.1 days) with the period 4.1-5.1 days and the amplitude ranging from $\pm$4.2 to $\pm$17.4 m/s. The amplitude and phase of oscillations demonstrates dependence from the latitude and also time variability with preserving stable parameters of oscillation during at least 70 days. Short term oscillations may be caused by wave processes in the mesosphere of Venus at the cloud top level. Wave number of the observed oscillations is 1. The second group is a long term periods caused by orbital motion of Venus (116 days, 224 days) and is related to the periodicity in VMC observations. Also VMC UV observations showed a clear diurnal pattern of the mean circulation. The zonal wind demonstrated semi-diurnal variations with minimum speed close to noon (11-14 h) and maxima in the morning (8-9 h) and in the evening (16-17 h). The meridional component clearly peaks in the early afternoon (13-15h) at latitudes near 50S. The minimum of the meridional wind is located at low latitudes in the morning (8-11h).

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