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Venus Atmosphere: Observations from VMC on Venus Express

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Venus Monitoring Camera (VMC) on Venus Express is continuing to return images of Venus. The camera performance has been nominal with only a slight decrease in the transmission of the 365 nm filter. The ultraviolet filter images provide the most contrast and document the day-to-day and longer term changes in the appearance of cloud cover and enable determinations of the global circulation at the cloud top level. Quasi periodic changes are present in the measurements, but not all variations may be indication of planetary scale waves.

A comparison of the measured cloud motions with the balanced flow determined from VIRTIS and VeRa experiments on Venus Express (Picialli et al., 2011) provide a means of estimating the level of the tracked features which is comparable to but not exactly the same as that derived from VIRTIS data (Ignatiev et al., 2009). The jet core structure at mid-latitude indicates that the tracked features are not at the level of the jet and a comparison provides two levels where the measured motions match the computed flow, similar to the Pioneer Venus results (Limaye, 1985). Further, vertical shear of the zonal flow indicated by the thermal structure suggests that that the observed short and long term variations of the averaged cloud motions may also be due to changes in the effective level of the measured features.

Good temporal imaging coverage of the southern hemisphere offered by Venus Express from its polar 24-hour orbit shows that while the basic hemispheric vortex organization (Limaye et al., is evident each day, the detailed cloud cover appearance shows a wide range which in the polar regions is believed to be due to dynamical instability, but causes for the variability in equatorial and mid-latitude regions are not yet apparent. Since the cloud motion measurements are dependent on the small scale detail in the images, any cause and effect relationship is not necessarily real as the details in the structure can be easily masked by an increase in the overlying haze.

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