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Temporal Variability of the UV Contrast on Venus as Observed by the Venus Monitoring Camera (VMC) onboard Venus Express

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The Venus clouds contain an unidentified ultraviolet (UV) absorber in the upper layer. Previous studies show that this UV absorber absorbs about half of the incoming solar radiance, and leads to a solar heating peak near the cloud top level [Crisp, 1986; Lee et al., in press]. A thermal tide caused by this solar heating may explain some atmospheric dynamical phenomena in the mesosphere, for example, the strong zonal winds (super rotation) and meridional winds [Takagi and Matsuda, 2005]. Sulfur photochemistry is related to the cloud, as this forms sulfuric acid aerosol particles in the cloud [Mills et al., 2007].

We analyze the Venus UV reflectivity at 365 nm as observed by Venus Monitoring Camera (VMC) on board Venus Express. The data covers over 2000 orbits. We performed photometric correction of global images of Venus. Our analysis of the corrected images reveals strong fluctuations in the reflectivity contrast between low and high latitude regions of up to 40%, that follow variations of the mesospheric SO_2 abundance above the cloud top [Marcq et al., 2013; Lee et al., submitted]. We suggest that these variations result from the meridional transport of SO_2, which forms sulfuric acid aerosol particles at high latitudes. Understanding the cause of this temporal variation requires further study.