

Estimation of wind at the cloud top of Venus

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A number of theories have been proposed to explain the formation of the super-rotation in the Venus atmosphere. Among them, we focused on the Gierasch mechanism. To validate the mechanism, it is required to investigate the horizontal momentum transport by eddies with an accuracy sufficient to resolve the eddies with scales smaller than several thousand kilometers. In this study, we used the ultraviolet images from Venus Monitoring Camera (VMC) onboard ESA's Venus Express. The VMC data have some random and coherent noises, so the simple cross-correlation methods used in previous studies do not necessarily provide an high accuracy. Here, we suggest a new and robust method to estimate wind velocity vectors accurately by using multiple images, thereby reducing the effect of noises. The accuracy of its results is estimated statistically. The results are also examined from the dynamical point of views. Contrary to conventional expectation, the magnitude of horizontal wind divergence has similar magnitude to its rotation on the horizontal scale of several thousand kilometers. It is discussed how the results are explained.

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