Comparative analysis of the the Rossby wave at the Venusian cloud top observed by Venus Express/VMC and Akatsuki/UVI

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Planetary-scale waves at the Venusian cloud-top cause periodic variations in both winds and ultraviolet (UV) brightness. The prominent planetary-scale UV features (sometimes called as the 'Y-feature') might be related to the prominence of these waves, and they hold an important clue to understanding the atmospheric dynamics of Venus.

We analyzed the periodicities in the 365-nm brightness and cloud-tracking winds observed by Akatsuki/UVI. From June to October in 2017, we found the continuous temporal change in the amplitude of 5-days periodical signals. It can be attributed to the temporal evolution of the Rossby wave (Imai et al., submitting), and the corresponding deformation of planetary-scale UV features was captured. The observed Rossby wave was accompanied by the equatorially symmetric planetary-scale vortices. The amplitude of winds amplified gradually over ~20 days and attenuated over ~50 days. Following the formation of the Rossby wave vortices, the brightness variation emerges to form rippling white cloud belts in the 45^o–60^o latitudes of both hemispheres.

Our next target is understanding the source mechanism of the Rossby wave observed at the cloud top. By using the Venusian atmospheric general circulation model, Sugimoto et al. (2014) analyzed the temporal evolution of kinetic energy of some wave modes associated with baroclinic instabilities, and they observed several tens of days amplification and longer attenuation. In order to investigate generalities in the temporal evolution of the Rossby wave, we have started to analyze the Venus Express/VMC images in which the prominent Rossby wave signal was reported by Kouyama et al. (2015). We have already captured a similar temporal change in the amplitude of 5-day mode from January to May 2008. In this presentation, we will show the comparative results of the Rossby wave event captured by Akatsuki and Venus Express.