U002-07 　　　　　　　　会場:国際会議室 　　　　　　　　時間: 5月27日14:15-14:45

金星大気力学の理解に向けて

Toward understanding of Venusian atmospheric dynamics

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Zonal retrograde superrotation of the entire Venus atmosphere is one of the most curious atmospheric phenomena. The wind velocity increases with height and reaches 100 m/s near the cloud top (about 70 km), though the solid part of Venus rotates very slowly with a period of 243 Earth days which corresponds to an equatorial rotation speed of 1.6 m/s.

Several theories have been proposed so far to explain how the superrotation is maintained. However, none of them has fully succeeded due to lack of observations on the atmospheric motions. Since the wind distributions obtained by the previous missions were restricted to dayside, it remains unclear whether the mean meridional circulation exists.

In order to solve the insufficiency of the previous observations, Akatsuki (Planet-C or Venus Climate Orbiter, VCO) has been planned to observe the three-dimensional (multi-level) of the cloud features on both dayside and nightside are observed by four cameras onboard. IR1 visualizes the distribution of clouds illuminated by sunlight at 50 km. IR2 brings us the global cloud height distributions at 50-55 km by utilizing the 2.02 um filter on dayside and the 1.735 um filter on nightside. In addition, LIR is able to take images of both dayside and nightside with equal quality and accuracy.

Tracking of the cloud features observed by these instruments enables us to infer the three-dimensional global wind distributions indispensable to understanding the Venus atmospheric dynamics. At first, we prepare images in the rectangular longitude-latitude coordinates. This is not straightforward because Venus in each image may not be an exact circle but an ellipse when the space-craft is near Venus. The images is transformed into rectangular coordinates with sufficient accuracy by the limb fitting technique. Then, we track the cloud features found on the images in longitude-latitude coordinate to obtain the distributions of horizontal wind. In the presentation, we also discuss potential scientific targets which are made possible by Akatsuki.

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