

1 金星年内で変化する惑星スケール紫外模様の伝搬周期 The cyclical nature of the propagation of planetary-scale UV feature changes within one Venus year

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Our ground-based Venus observations from mid-August 2013 to the end of June 2014 reveal that the periodical variation in the UV brightness changes within one Venus year and the traveling velocity is dominantly increased. Pioneer Venus spacecraft previously observed the periodical variation of UV brightness with the period 4-5 days, which caused by that the travel of planetary scale UV features [Del Genio and Rossow, 1982, 1990]. They suggested that the period of brightness variation corresponds to the propagation of planetary waves and it changes on a time scale of 5-10 years. Periodicity change can be argued as the vacillation of dynamical states and investigating the source of planetary waves is required to understand the Venus super-rotation.

Used instrument is an imager with 365 nm narrow-band filter installed on 1.6m Pirka telescope, which is operated by Hokkaido University, and we measured the UV brightness from equatorial to mid-latitude regions in both hemispheres. Our observations cover about one Venus year and have superiority for investigating the monthly change as compared to the Pioneer Venus observations.

We have two observational periods when the brightness has the prominent periodical variation. Latter season is considered to keep the periodicity for about two months. In August 2013, we detected about 5.2 days periodical brightness variation in equatorial and both northern and southern mid-latitude region. Bright and dark pattern had a prominent periodical and symmetric structure about the equator and we consider it is derived from a high contrast Y-feature such as previously observed by the Galileo spacecraft. On the other hand, after the mid-September 2013, there was no prominent and periodical brightness variation in the most of the observation time. In this season, the periodical and symmetric brightness structure has a cycle of being clear and unclear, and it suggests the Y-feature has a few weeks variation. From mid-September 2013 to the end of March 2014, periodical variation seems to be lost or one more accelerate and decelerate cycle should exist. In the last two months (from the beginning of May to the end of June 2014), however, it has 3.5 days period and perhaps last for about two months. Our study points out the possibility of the change of dynamical states occur in one Venus year.

Keywords: Venus, Pirka telescope, Super-rotation, UV feature