Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

PCG32-08 会場:A03 時間:5 月 25 日 17:15-17:30

地上観測による木星南極域に広がる波構造の時間変化
Time variation of wave structure in Jupiter's south polar region observed with ground-based telescope

合田 雄哉 [1*] ; 高橋 幸弘 [1] ; 渡辺 誠 [1]
GOUDA, Yuya[1*] ; TAKAHASHI, Yukihiro[1] ; WATANABE, Makoto[1]

[1] 北海道大学大学院理学院宇宙理学専攻
[1]Department of Cosmosciences, Graduate School of Science, Hokkaido University

A Rossby wave plays an important role in atmospheric phenomena on planets. For example, stratospheric sudden warming in the Earth is caused by a Rossby wave. The south polar wave at about 67^o S in Jupiter is considered as one of signatures of Rossby wave. Previous observations, such as by Cassini ISS in 2000 or the Hubble Space Telescope (HST) from 1994 to 1999 [*Barrado-Izagirre at al*., 2008], show that the polar region is covered by bright diffuse haze and its edge has a wavy structure spreading in longitudinal direction with wavenumber of 12 – 14 at 67^o S, which travels westward with a phase velocity of 0 – 10 m/s in System Ⅲ. These observations suggested that this wave structure is caused by a planetary Rossby wave. However, these observations had been carried out only every other year and the variance of short time scale (about month) is not clear.

We determine whether or not the wave observed at the edge of the stratospheric haze in south polar region is caused by Rossby wave. Using a methane absorption band filter at 889 nm installed at Multi-Spectral Imager (MSI) of the 1.6 m Pirka telescope, we investigated the meridional and vertical wavenumbers and phase velocity of the observed wave structure and zonal wind speed.

In this presentation, we introduce the results of analysis on the time variation of the wave structure in Jupiter's south polar region in 2011 to 2015 observed by the ground-based telescope. Each result is separated by two weeks to a few months in the periods that we can observe Jupiter. Our results show the wavy structure spreading in longitudinal direction at 67^o S. However, our results are different from previous studies in two points. First, we cannot detected an apparent longitudinal motion of the wave structure in our observation periods. Second, there always exist darker areas by about two percent than surrounding longitude in the period of 2011 – 2014. In particular, longitude of about 50^o and 130^o in System Ⅲ are always dark. These dark regions at 889 nm suggest that the cloud top altitude at 67^o S is lower than pressure altitude of 360 mbar. We think there are another atmospheric structures, such as a local eddy or cloud convection, in Jupiter's south polar region other than those caused by a Rossby wave at 67^o S. Our results may suggest that a combination of a planetary Rossby wave and local structure that is less than longitudinal width of 15^o exists at about 67^o S.

キーワード: 木星, ヘイズ, ロスビー波, 極域, 地上望遠鏡
Keywords: Jupiter, haze, Rossby wave, polar area, ground-based telescope