

## Time variation of wave structure in Jupiter's south polar region observed with ground-based telescope

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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  $67^{\circ}$  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 *et 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  $67^{\circ}$  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  $67^{\circ}$  S. However, our results are different from previous studies in two points. First, we cannot detect 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  $50^{\circ}$  and  $130^{\circ}$  in System III are always dark. These dark regions at 889 nm suggest that the cloud top altitude at  $67^{\circ}$  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  $67^{\circ}$  S. Our results may suggest that a combination of a planetary Rossby wave and local structure that is less than longitudinal width of  $15^{\circ}$  exists at about  $67^{\circ}$  S.

Keywords: Jupiter, haze, Rossby wave, polar area, ground-based telescope