

木星極域における成層圏のヘイズ波構造の観測
Observation of a wave structure of stratospheric haze in Jupiter's polar regions by the ground based telescope

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Stratospheric haze formed by aerosol particles covers both polar regions in Jupiter. It has been reported based on the imaging using a methane band filter at 889 nm that the stratospheric haze can be measured. They show bright cap structures covering polar regions and the edge of the cap shows a wave structure spreading in longitudinal direction. This structure can be seen more clearly in the Jupiter's south pole than the north pole, and wave is clear at a latitude of about 67 S [Sanchez-Lavega, 2008].

Jupiter's polar areas have been investigated by the Hubble Space Telescope (HST) from 1994 to 1999 and the Cassini ISS in 2000. This wave structure is known to exist for several years in Jupiter's both polar regions. These observations suggested that this wave structure is caused by planetary Rossby waves because this wave structure presents for a longer period and moves westward relative to the background flow. However, the origin and mechanism keeping to this wave structure, the vertical structure of the wave, change of the propagation velocity of the wave in the short time scale, and north-south asymmetry of the wave structure are unclear so far, because of lack of the observations in short time scale (monthly scale). We have carried out the monthly monitoring of Jupiter from 2011 to 2014 with the 1.6 m Pirka telescope of Hokkaido University.

In this paper, we show results of our observations of the wave structure in Jupiter's polar region. We found a north-south asymmetry of the wave structure in the polar areas. The wave structure at 67 N spread to 42 N in the northern hemisphere, however it does not so in the southern one. In addition, we found that the wave structure has varied in the vertical direction a bit between altitude of 361 mbar and 750 mbar.

Keywords: Jupiter, haze, ground-based observation, Rossby wave