AOGS 2005

Interferometric observations of the Venusian atmosphere with Nobeyama Millimeter Array

HIDEO SAGAWA[1,2], YOSHIMI KITAMURA[2] and MASATO NAKAMURA[1,2]
[1]*University of Tokyo*
[2]*Institute of Space Astronautical Science, JAXA*

We carried out the interferometric observations of Venus at the wavelength of 2.6 mm (115 GHz) with *Nobeyama Millimeter Array* in April, 2004. The angular diameter of Venus was 25 arcsec and the spatial resolution was about 5 arcsec. Two spectro-correlators were simultaneously utilized at our observations; a 32 MHz bandwidth correlator with a frequency resolution of 32 kHz, and a 512 MHz bandwidth one which was optimized for multi frequency observations with the upper (115 GHz) and the lower (103 GHz) side band. The scientific goal is to obtain the temperature structures, and the spatial distribution of H_2SO_4 vapor or SO_2 gas inside the cloud layers of 50–60 km altitude which is a key information in understanding the Venusian cloud formation and extinction[1], as well as the wind velocity and the mixing ratio profile of CO at the upper atmosphere of 80–95 km altitude which are usable to study the dynamics at the upper atmosphere. For this purpose, ^{12}CO (J = 1–0) absorption line superimposed on the continuum emission of the Venusian atmosphere was observed during 3 days. In this study, the preliminary results are presented.

In the preliminary results of the continuum imaging, the brightness temperature in the dayside, particularly at the equator, becomes darker by 30 K than that in the nightside. Assuming the horizontal uniformity of the atmosphere at the cloud level, this is likely due to the higher abundances of H_2SO_4 vapor or SO_2 gas, which behave as absorbers at these wavelengths. The brightness temperature distribution at the center frequency of the CO absorption line shows significant decrease at the nightside of Venus. This feature can be interpreted as the strong enhancement of CO mixing ratio at the night hemisphere.

Keywords: Planetary Atmosphere; Ground-based Observation; Interferometer; Venus.

References

[1] T. Imamura and G. L. Hashimoto, *JGR,* **103(E13)**, 31349 (1998).