Millimeter Interferometric Observations of the Venusian Atmosphere with Nobeyama Millimeter Array in Japan

H. Sagawa (1,2), Y. Kitamura (2), G. L. Hashimoto (3), T. Imamura (2) and M. Nakamura (2)

(1) University of Tokyo, Japan, (2) Institute of Space and Astronautical Science, JAXA, Japan, (3) Kobe University, Japan. (correspondence to: sagawa@stp.isas.jaxa.jp)

We present the results of our millimeter interferometric observations of the Venusian atmosphere with Nobeyama Millimeter Array in Japan. At the frequency of 100 GHz, the thermal emission emitted from the atmosphere at the altitude around 50 km is observed. In our imaging observations in April 2004, November and December 2005, we observed a hot spot where brightness temperature is 30-40K higher compared with the surroundings. This inhomogeneous feature will be interpreted as the horizontal variation in the opacity of sulfur dioxide and/or sulfuric acid, which are the dominant absorbers at these wavelengths since temperature at the sounding altitude is likely uniform. We also detected 12CO(J=1-0) absorption line at 115.27 GHz with a high dispersion spectro-correlator. This absorption line is an effective remote sensing tool to obtain a horizontal and vertical distribution of carbon monoxide around 100 km altitude, and its Doppler shift enables us to measure the line of sight wind velocity at that altitude. At the greatest elongation in April 2004, carbon monoxide was enriched in the night hemisphere with the maximum mixing ratio of 700 ppmv around the antisolar point, and the westward wind moving from the dayside to the nightside was observed.