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Millimeter Observations of the Venusian Atmosphere with Nobeyama Millimeter Array

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In this study, the results of our interferometric observations of the Venusian atmosphere with Nobeyama Millimeter Array are presented. At the wavelength of 2.6 mm, the absorption line of the carbon monoxide is superposed on the continuum emission emitted from the atmosphere at the main cloud deck. This absorption line is an effective remote sensing tool to obtain the horizontal and vertical distribution of the carbon monoxide in the upper atmosphere, and also it enables us to visualize the wind field through the use of the Doppler shift of the line center. In our observation in April 2004, the 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. In respect to the continuum emission, the nightside brightness temperature was brighter than that of the dayside by 30 K. This inhomogeneity can be interpreted as the horizontal variation in the abundance of the sulfur dioxide, which is one of the dominant absorbers at these wavelengths under the assumption that the horizontal temperature structure below the main cloud deck is quite uniform.