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Ground-based observations of the Venus Oxygen airglow distribution

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Several ground-based observations of the Venus 1.27-micron O₂airglow were carried out from 2002 to 2007. Spectral image cubes were taken with the Okayama Astrophysical Observatory/infrared imaging spectrometer (superOASIS), the Gunma Astronomical Observatory/Cassegrain Near-Infrared Camera and NASA's Infrared Telescope Facility/cryogenic echelle spectrograph (CSHELL). From 2005, 8-hour monitoring observations were conducted using CSHELL. The 0.5-arcsec slit of CSHELL provides a high spectral resolution of about 40,000 and it makes possible daytime observations. In all observations we obtained spatially resolved spectra by the "drift scan" method (Crisp et al., 1996; Ohtsuki et al., 2005). A spectral image cube, which has one spectral and two spatial dimensions, was compiled by letting Venus drift across a slit due to its orbital motion.

The brightest airglow features were found at around the anti-solar point, which is in agreement with previous studies. We derived the rotational temperature distributions on the nightside hemisphere from observed airglow spectra. In this presentation, we will show temporal variations of the airglow. And we will examine emitting process of the airglow using the temporal variation.

Keywords: Venus, airglow, rotational temperature, infrared, ground-based observation