

Ground-based observations of Oxygen night airglow

S. Ohtsuki¹

¹ Institute of Space and Astronautical Science, Japan Aerospace Exploration Agency

Several ground-based observations of the Venus 1.27-micron O₂ airglow were carried out from 2002 to 2007. Spatially resolved spectra 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 (IRTF) / cryogenic echelle spectrograph (CSHELL). In 2007, 8-hour monitoring observations were conducted using CSHELL/IRTF. The 0.5-arcsec slit of CSHELL provides a high spectral resolution of about 40,000 and it makes possible daytime observations. Spectral image cubes, which have one spectral and two spatial dimensions, were 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 in all data sets, which is in agreement with previous studies. On the other hand, smaller features changed in a day. In monitoring observations, its temporal variations were observed.

We also derived the rotational temperature distributions on the nightside hemisphere from observed airglow spectra. The temperature distributions have local enhancements at around the anti-solar point overlapping the bright region and show a weak positive correlation with the airglow intensity. It indicates the airglow is excited by the descending oxygen transported from the dayside. However, there are also some regions that have almost same intensities but different temperatures. Additionally the intensities tend to decrease from the anti-solar point to the terminator besides local features. These results indicate that there are local strong downward flows superimposed on the subsolar-to-antisolar circulation.

In this presentation, we will show temporal variations of the airglow. And we will examine emitting process of the airglow using the temporal variation.