

## Short and medium/long-term CO variations of the Venusian middle atmosphere observed by the SPART telescope

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For understanding the influence of the activities of central stars on the atmospheric environments of the surrounding terrestrial planets, it is essential to study how solar activities are currently affecting on the physical and chemical conditions of the Venusian and Martian middle atmospheres. For this purpose, with the 10m-telescope, SPART (Solar Planetary Atmosphere Research Telescope) we have carried out the monitoring observations of the absorption lines of carbon monoxide ( $^{12}\text{CO } J=1-0$  230.538 GHz,  $J=2-1$  115.2712018 GHz,  $^{13}\text{CO } J=2-1$  230.3986765 GHz) of the Mars and Venus. SPART employs highly sensitive 100 and 200 GHz double-side band superconducting SIS heterodyne detectors. This highly frequency-resolved spectroscopy is a powerful tool to trace the weak and narrow spectral lines of minor constituents in planetary middle/upper atmospheres.

The medium/long-term data observed in the last 8 years showed that the Venusian night-side averaged CO mixing ratios at an altitude of about 80 km were at low level of  $\sim 60$  ppmv. We also found the medium-term anti-correlation between the CO mixing ratio and the Solar ultraviolet radiation at 199.5 nm wavelength and short-term (several days/months) changes of the CO mixing ratio. These phenomena are considered to be induced by solar activities and the circulations of the chemical substances driven by the intrinsic dynamics of Venus.

In this conference we will present these results observed with SPART.

Keywords: Mm/submm-wave band heterodyne spectroscopy, Terrestrial planets, Atmospheric chemistry, Solar activity, Venus