

## **Temperature Measurements in Venus Upper Atmosphere between 2007 and 2015 from ground-based Infrared Heterodyne Spectroscopy**

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The structure of Venus atmosphere has been the target of intense studies in the past decade. Among manifold ground based observations, the recent space mission Venus Express in particular has shed light on many open questions concerning the thermal and the dynamical behavior of its atmosphere. A comprehensive understanding of this atmospheric region is still missing. Therefore, direct measurements of atmospheric parameters on various time scales and at different locations on the planet are essential for an understanding and for the validation of global circulation models.

Such observations are provided by the infrared heterodyne spectrometers THIS (University of Cologne), HIPWAC (NASA GSFC) and MILAHI (Tohoku University). These instruments fully resolve CO<sub>2</sub> non-LTE emission lines for Doppler-wind and temperature retrievals at an pressure level of 1 μbar (~110 km) by operating around 10 μm.

The Long- and short-term variability of daytime temperatures at the ~1 μbar level from ground-based observing campaigns between 2007 to 2015 shall be presented. The observations yield a large quantity of temperature measurements at different positions on the planetary disk which allows to map a good part of the dayside of Venus. In addition a detailed study of the interesting but not well understood and only poorly investigated area close to the terminator will be given. Investigations on the general behavior of the temperature and differences between the morning and evening terminators are accomplished. Ongoing analysis of thermal variability and comparison to other observing methods and model calculations are in progress and will be included in the presentation if already available.