



## **Imaging spectroscopy of Venus in the thermal infrared: daily variations of the thermal structure**

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Since 2012, we have been monitoring the lower mesosphere of Venus using high-resolution imaging spectroscopy with the Texas Echelon Cross Echelle Spectrograph (TEXES) at the Infrared Telescope Facility (IRTF) at Mauna Kea Observatory (Hawaii). Four campaigns took place in January and October 2012, then in February and July 2014. In January 2012, the evening terminator was observed, while the morning terminator was observed during the three following runs. The main objective of our study was a cartography of the abundances of SO<sub>2</sub> and H<sub>2</sub>O (through HDO) over the H<sub>2</sub>SO<sub>4</sub> cloud deck. High-resolution hyper-spectral maps of Venus were recorded at 7 μm (SO<sub>2</sub>, HDO, CO<sub>2</sub>), 19 μm (SO<sub>2</sub>, CO<sub>2</sub>) and in two CO<sub>2</sub> bands at 10.5 μm and 12.6 μm. Measuring CO<sub>2</sub> transitions of different intensities allows us to retrieve information about the thermal structure above the clouds as a function of latitude and local hour. At high latitudes (around 70° N and S), our data show the isothermal or inversion layer just above the cloud associated with the polar collar. This effect is clearly stronger around the morning terminator than at the evening terminator. In addition, data recorded in the CO<sub>2</sub> hot band at 10.5 μm show at the limb a non-thermal emission on the dayside, consistent with previous heterodyne spectroscopy observations at the same wavelength. We will present maps of the mesospheric temperature at different pressure levels above the cloud top. These data will be compared with other datasets obtained from Venus Express and from ground-based observations.