



Spectral inventory of the SOIR spectra onboard Venus Express

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The set of spectra recorded by the SOIR instrument on board Venus Express have been carefully studied from a spectroscopic point of view. The SOIR instrument combines an echelle spectrometer and an Acousto-Optical Tunable Filter for order selection. It performs solar occultation measurements in the IR region (2.2 - 4.4 μm) at a resolution of 0.10 - 0.24 cm^{-1} [1]. The wavelength range probed by SOIR allows a detailed chemical inventory of the Venus atmosphere above the cloud layer (65 to 180 km) with emphasis on the vertical distribution of gases (CO₂, CO, H₂O, HCl, HF, ...).

The sensitivity of the SOIR instrument and the high concentration of CO₂ on Venus, coupled with the long absorption paths sounded during solar occultations, enable us to detect weak absorption bands of rare CO₂ isotopologues [2, 3].

The spectra are analysed using ASIMAT, an in-house Matlab algorithm [4]. It is based on the Optimal Estimation Method [5] with the aim to deduce physical characteristics (densities, temperature) of the Venus atmosphere from the spectra recorded using SOIR.

The spectra were fitted using HITRAN 2008 [6]. A tool of automatic assignment was developed and applied to each spectrum leading to the creation of the wavenumber list of each line visible in the SOIR spectra.

The tools used to calibrate the spectra, to characterize the residuals and to produce the line list will be described extensively for a selected number of orbits.

References

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