Temperature and density vertical profiles from the SOIR measurements on board Venus Express

A. Mahieux[1], S. Robert[1], R. Drummond[1], V. Wilquet[1], A.C Vandaele[1] and J.-L. Bertaux[2,3]
[1]Belgian Institute for Space Aeronomy, Brussels, Belgium; [2]Service d'Aéronomie du CNRS, Verrières-le-Buisson, France; [3]IPSL, Université UVSQ, Guyancourt, France

The upper atmosphere of Venus is not well characterized, as only few systematic local measurements have been performed up to now. The SOIR instrument is designed to measure atmospheric transmission in the near-IR (2.2–4.3 μm) at high resolution (0.12 cm^{-1}) through solar occultation observations. It therefore allows the derivation of unique remote sensing information about the vertical structure and composition of the Venus mesosphere, with very good spatial resolution.

CO_2 is the major constituent of the Venus atmosphere and has been observed in almost all solar occultation observations, leading to a good latitudinal coverage. We will show that the SOIR instrument is able to provide CO_2 vertical profiles ranging typically from 80 to 140-150 km, on both morning and evening terminators, where the planet atmosphere dynamics are mostly unknown.

We will explain how temperature can be derived directly from the spectra, and show some temperature profiles obtained with this technique.