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CO measurements and climatology from SOIR measurements in the upper atmosphere of Venus

A. Mahieux (1), R. Drummond (1), V. Wilquet (1), A. C. Vandaele (1), A. Fedorova (2), E. Villard (3,4), F. Montmessin (3,4), J.-L. Bertaux (3,4)

(1) IASB, Atmosphere, Brussels, Belgium (arnaud.mahieux@aeronomie.be, +32 23730426), (2) Space Research Institute (IKI), Moscow, Russia, (3) Service d'Aéronomie du CNRS, Verrières-le-Buisson, France, (4) IPSL, Université UVSQ, Guyancourt, France

Previous measurements of the Venus atmosphere were performed essentially in the mesosphere below 100 km and below the clouds. Information about minor atmospheric constituents, their concentration, reactions, sources and sinks is incomplete, as for example only scarce measurements have been performed above 100 km altitude. SOIR is designed to measure the atmospheric transmission in the IR (2.2–4.3 μm) at high resolution (0.12 cm-1) using solar occultations. This technique allows for the derivation of unique information about the vertical structure and composition of the Venus mesosphere [1,2].

The primary source of CO in the atmosphere of Venus is the photodissociation of CO2 by solar UV at altitudes higher than 120 km. It was shown that CO exhibits a significant diurnal variation and strong year to year variations [3,4], but also latitudinal variations.

CO concentration and vmr between 70 and 125 km have been recently retrieved from SOIR data for both terminators. The solar occultations with a high vertical resolution are mainly located at latitudes comprised between 60° and 90° N, but the latitudinal coverage of CO measurements is more complete if we also consider occultations for which the vertical resolution is coarser.

We will present an overview of the CO measurements obtained by the SOIR instrument over the last 3 years in order to complete the climatology of CO above the clouds in the atmosphere of Venus. We will also discuss a puzzling strong minimum of the CO vmr in the 80-90 km region found by SOIR, which had escaped detection up to now.

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