



Analysis of new Absorption Bands of the Carbon Dioxide Isotopologues in Venus Spectra

Séverine Robert (1), Arnaud Mahieux (1), Valérie Wilquet (1), Rachel Drummond (1), Ann Carine Vandaele (1), Jean Vander Auwera (2), Yuri Borkov (3), Valery I. Perevalov (3), Sergei A. Tashkun (3), Jean-Loup Bertaux (4,5)

(1) IASB - BIRA, Atmosphere, Brussels, Belgium (arnaud.mahieux@aeronomie.be, +32 23730426), (2) Université Libre de Bruxelles, Service de Chimie Quantique et Photophysique, 50 Ave F.D. Roosevelt, CP 160/09, 1050 Brussels, Belgium, (3) Institute of Atmospheric Optics, Akademicheskii av., 1, 634055 Tomsk, Russia, (4) LATMOS, 11 Bd d'Alembert, 78280 Guyancourt, France, (5) IPSL, Université UVSQ, Guyancourt, France

We present our latest analyses concerning new absorption bands of carbon dioxide isotopologues detected by the SOIR instrument on board Venus Express. The SOIR instrument combines an echelle spectrometer and an Acousto-Optical Tunable Filter for the order selection. It performs solar occultation measurements in the IR region (2.2 – 4.3 μm) at a resolution of 0.12 – 0.18 cm^{-1} . The wavelength range probed by SOIR allows a detailed chemical inventory of the Venus atmosphere above the cloud layer (65 to 150 km) with an emphasis on vertical distribution of the gases.

The sensitivity of the SOIR instrument and the high concentration of CO_2 on Venus, coupled with the long absorption paths sounded during solar occultation, enable us to detect weak absorption bands of the rare CO_2 isotopologues in the Venus atmosphere. A systematic study of the recorded spectra is under way and first results will be presented.

The identification of the 20001 – 00001 band of $^{16}\text{O}^{13}\text{C}^{18}\text{O}$ isotopologue and the 21101 – 01101 band of $^{16}\text{O}^{12}\text{C}^{18}\text{O}$ isotopologue in the SOIR spectra lead to thorough analyses. Line intensities and positions were retrieved automatically from numerous spectra, using the ASIMAT code [1]. Rotational analyses were performed for these two new bands and also for the 01111 - 00001 band of $^{16}\text{O}^{12}\text{C}^{18}\text{O}$, already reported in [2]. Additional bands are under analysis as well.

1. Mahieux, A., et al., Densities and temperatures in the Venus mesosphere and lower thermosphere retrieved from SOIR on board Venus Express. Part I. Retrieval technique. *J. Geophys. Res.*, 2010. 115(E12014).

2. Wilquet, V., et al., Line parameters for the 01111-00001 band of $^{16}\text{O}^{12}\text{C}^{18}\text{O}$ from SOIR measurements of the Venus atmosphere. *Journal of Quantitative Spectroscopy and Radiative Transfer*, 2008. 109: p. 895-905.