

Japan Geoscience Union Meeting 2011

(May 22-27 2011 at Makuhari, Chiba, Japan)

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U003-20

Room:304

Time:May 27 15:00-15:15

SPICAV-SOIR on board Venus Express: an instrument to probe the neutral atmosphere of Venus

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The SOIR instrument performs solar occultation measurements in the IR region (2.2 - 4.3 μm) at a resolution of 0.12 cm^{-1} , the highest on board Venus Express. It combines an echelle spectrometer and an AOTF (Acousto-Optical Tunable Filter) for the order selection.

The wavelength range probed by SOIR allows a detailed chemical inventory of the Venus atmosphere at the terminators in the upper mesosphere and lower thermosphere (80 to 180 km) with an emphasis on vertical distribution of gases, such as CO_2 , H_2O , HCl , HF , CO , as well as their isotopologues, including HDO .

In particular, measurements of CO_2 density and rotational temperature vertical profiles have been routinely performed allowing a better description of the mesosphere and lower thermosphere. This moreover improves the understanding of the processes ? chemical and dynamical ? that occur at the terminators.

We will present the instrument and describe its capabilities in terms of measurements possibilities and accuracy. We will illustrate it with retrieval examples of various gases and show the high variability of the Venus atmosphere.

Keywords: Venus, mesosphere, thermosphere, atmospheric composition, temperature profile