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The SPICAV-SOIR instrument probing the atmosphere of Venus: an overview

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The Solar Occultation in the Infrared (SOIR) channel mounted on top of the SPICAV instrument of the ESA's Venus Express mission has observed the atmosphere of Venus during more than eight years. This IR spectrometer (2.2-4.3 μm) with a high spectral resolution (0.12 cm-1) combined an echelle grating with an acousto-optic tunable filter for order selection. SOIR performed more than 1500 solar occultation measurements leading to about two millions spectra.
The Royal Belgian Institute for Space Aeronomy (BIRA-IASB) was in charge of SOIR's development and operations as well as its data pipeline. BIRA-IASB carried out several studies on the composition of Venus mesosphere and lower thermosphere: carbon dioxide, carbon monoxide, hydrogen halide (HF, HCl, DF, DCl), sulfur dioxide, water (H_2O, HDO) as well as sulphuric acid aerosols in the upper haze of Venus. Density and temperature profiles of the upper atmosphere of Venus (60 km to 170 km) at the terminator have been retrieved from SOIR's spectra using different assumptions, wherein the hydrostatic equilibrium and the local thermodynamical equilibrium in the radiative transfer calculations. These results allow us to produce an Atmospheric model of Venus called Venus Atmosphere from SOIR measurements at the Terminator (VAST). Data obtained by SOIR will also contribute to update the Venus International Reference Atmosphere (VIRA).
Recently, the treatment of the raw data to transmittance has been optimized, and a new dataset of spectra has been produced. All raw spectra (PSA level 2) as well as calibrated spectra (PSA level 3) have been delivered to ESA's Planetary Science Archive (PDSPSA). Consequently the re-analysis of all spectra has been undergone.
We will briefly present the improvements implemented in the data pipeline. We will also show a compilation of results obtained by the instrument considering the complete mission duration.