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An overview of SPICAV results on the atmosphere of Venus from Venus Express mission.

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SPICAV is a suite of three spectrometers in the UV and IR range flying on ESA Venus Express orbiter, dedicated to the study of the atmosphere of Venus : UV (110-320 nm), Vis-Nir (0.65-1.65 micron), and mid IR (2.3-4.4 micron), from ground level to the outermost hydrogen corona at more than 40,000 km.

The UV spectrometer is working in the stellar and solar occultation mode, and nadir or limb viewing, day and night. It has mapped on the night side the gamma and delta bands of NO produced by recombination of O and N atoms coming from the dayside thermosphere. They indicate a maximum at 115 km altitude and around 02:00 LT (influence of super-rotation), while the O₂ emission mapped simultaneously by Virtis peaking at 95 km altitude (~10 km below NO emission) is centered at midnight, a puzzle for general circulation models. Vertical profiles of CO₂, temperature, SO₂, clouds and aerosols are obtained with star occultations and ozone was detected for the first time. Haze extends up to 104 km, where a layer of SO₂ and SO is detected in solar occultation. Day side observations allows to monitor the distribution of SO₂ at cloud top.

The SPICAV VIS-IR sensor (0.7-1.7 micron, resolution 0.5-1.2 nm) employs a pioneering technology: acousto-optical tunable filter (AOTF). Day side observations indicate a variable latitude distribution of cloud top altitude (decreasing toward the pole) and water vapor mixing ratio. Night side observations of the thermal ground emission allows to retrieve low altitude H₂O.

The mid IR (2.3-4.4 micron) spectrometer SOIR works in solar occultation. It achieves the highest spectral resolution $R > 20,000$ ever flown in a planetary mission. Vertical profiles of CO, HDO, H₂O, HCl, SO₂, CO₂ isotopes and temperature are regularly retrieved, as well as aerosols.

Keywords: Venus, atmosphere, Venus Express, SO₂, occultation