



Sulfur mono- and dioxides above Venus' clouds from SPICAV/SOIR solar occultations

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New measurements of sulfur dioxide (SO_2) and monoxide (SO) in the atmosphere of Venus by SPICAV/SOIR instrument onboard Venus Express orbiter provide powerful statistics to study the behavior of gases above Venus' clouds. The instrument (a set of 3 spectrometers) is capable to sound atmospheric structure above the clouds at several regimes of observations (nadir, solar and stellar occultations) either in UV or in near IR spectral ranges. We present results from solar occultations in the ranges of SO_2 absorption (190-230 nm, 4 μm) and SO (190-230 nm). The dioxide was detected by spectrometer SOIR at altitudes 65-80 km in the IR and by spectrometer SPICAV at 85-105 km in the UV. The monoxide's absorption was measured only by SPICAV UV at 85-105 km.

In the lower layer SO_2 (65-80 km) mixing ratio varies around 0.02-0.5 ppmv, and in the upper layer (85-105 km) it increases with altitude from 0.05 to 2 ppmv, while $[\text{SO}_2]/[\text{SO}]$ ratio is around 1 to 5. The presence of the SO_x abundance at high altitudes is analyzed on the basis of H_2SO_4 photodissociation and temperature conditions in Venus mesosphere. At levels 90-100 km the content of sulfur dioxide was found to increase with temperature from 0.1 ppmv at 165-170 K to 0.5-1 ppmv at 190-192 K. This behavior confirms a concept about SO_2 production in this altitude region by the evaporation of H_2SO_4 from droplets and its subsequent photolysis around 100 km.