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Results from VIRTIS on board Venus Express after five years in orbit

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After five years since the orbit insertion, VIRTIS aboard the Venus Express spacecraft has addressed a significant amount of the planned scientific objectives and also other unexpected results, from the surface up to the upper atmosphere, in terms of mapping, composition, structure and dynamics.

The VIRTIS instrument consists of two channels: VIRTIS-M, an imaging spectrometer with moderate spectral resolution in the range from 0.25 to 5.2 microns and VIRTIS-H, a high spectral resolution spectrometer in the range from 2 to 5 microns coaligned with the field of view of VIRTIS-M. The resolution of VIRTIS-M is 2 nm from 0.25 to 1 microns, and 10 nm from 1 to 5.2 microns. The resolution of VIRTIS-H is about 2 nm.

The atmosphere above the clouds is regularly observed both on day and night sides, in solar reflection and thermal emission in nadir geometry. Limb observations provide O₂, OH, NO, CO₂ and CO emissions, through nightglow and fluorescence observations. Spectroscopy of the 4-5 micron range gives access to the cloud structure in the 60-95 km altitude levels.

The deeper atmospheric windows, limited by CO₂ and H₂O bands are accessible only in thermal emission on the night side. The sounded levels at 1.7 and 2.3 microns are limited respectively to 30-20 km altitude, while at shorter wavelengths (1.18, 1.10, 1.01, 0.9 and 0.85 microns), the hot surface of Venus is seen through the scattering clouds.

Multiwavelength clouds tracking and thermal fields allow to study the wind fields and the global dynamics. Automatic wind tracking procedures permit to study in detail the polar vortex dynamics.

A brief description of the instrument and some selected results achieved by VIRTIS on Venus Express are reported in this talk.

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