

Compositional studies below the clouds from VIRTIS-H nightside spectra in the 2.3- μ m window.

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Since the discovery in the early 80s of the thermal emission of Venus which escapes from the thick CO₂ atmosphere in a few narrow spectral windows, only *Venus Express* has carried spectral imaging devices – such as *VIRTIS* – able to observe it. Among these spectral windows, the 2.3- μ m is of paramount interest, since it is one of the only investigation vector enabling the study of the composition of the atmosphere in the 30 – 40 km altitude range thanks to the spectral signatures of several key minor species (CO, OCS, H₂O, HDO, SO₂, HF). Local or temporal variations in the composition may be caused by global-scale dynamics (especially vertical circulation for CO and OCS because of their vertical mixing ratios gradients) and/or possible geological activity (expected enrichment H₂O and SO₂, as well as a local modification of water D/H ratio since recently outgassed water vapour would have an isotopic ratio much closer to the primordial value).

Since 2003, we have been developing analysis methods suited to medium resolution ($R \sim 2000$) spectra – using *SpeX/IRTF* as a benchmark – and have applied these methods to *VIRTIS-H* data from the first 300 orbits. The results confirm our preliminary ground-based findings from *SpeX*: we observe an enhancement in CO towards the high southern latitudes of about 25 % between 0° and 60°S, as well as a correlated depletion of OCS. Water vapour mixing ratio appears constant around 30 ± 5 ppmv at 35 km. Current studies include further analysis of these spectra (vertical gradient determinations for CO and OCS, D/H ratio of water vapour) as well as dynamical interpretation of the latitudinal variations of carbon monoxide and carbonyl sulfide.