# Water vapor distribution in the venusian mesosphere from SPICAV observations

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Water vapor is one of important gases in the Venus' atmosphere. The question why Venus is so much drier than Earth is crucial to understanding the evolution of the Venus atmosphere. $H_2O$ also play a significant role in the chemistry of the lower and middle atmosphere of Venus due to it involves in the sulfur oxidation cycle that produces $H_2SO_4$. Several in-situ experiments and ground-based observations allowed to measure water vapor abundance in the Venus atmosphere. The cloud-top $H_2O$ abundance has been observed by Pioneer Venus Orbiter Infrared Radiometer and Venera 15 Fourier Transform Spectrometer. The PV OIR instrument was found a substantial variation of H2O abundance in the equatorial cloud-top region shortly after the sub-solar point. Ground-based observations in micro-waves also indicate a substantial variability. On the Venus-Express spacecraft the VIRTIS and SPICAV/SOIR spectrometers have a capability to measure the water vapor above the clouds on the dayside. The presentation is dedicated to results of the SPICAV instrument.

SPICAV VIS-IR is a single pixel spectrometer for the spectral range of 0.65-1.7 μm based on AOTF (acousto-optical tunable filter) technology. Spectral resolution corresponds to 7.8 $cm^{-1}$ for the short wavelength channel (0.65-1.1 μm) and 5.1 $cm^{-1}$ for the long wavelength channel (1-1.7 μm). Resulting resolution power is ~1400 at 1.4 μm. The spectrometer sequentially measures spectra of reflected solar radiation from Venus on the dayside and the emitted Venus radiation in spectral "windows" on the night side. Based on 1.38 μm band, $H_2O$ abundance above the clouds has been routinely retrieved for the dataset from the middle 2006 to the end of 2009 (VEX orbits 23-1300) taking into account multiple-scattering in the cloudy atmosphere. Altitude of cloud top level (65-73 km) corresponding $\tau$=1 has been obtained from $CO_2$ bands in the range of 1.4-1.65 μm. Obtained $H_2O$ content varies inside 3-10 ppm and shows weak variations from orbit to orbit and with the latitude. In this report the local time and latitude distribution of H2O and long-term variability will be analyzed and main uncertainties will be discussed.