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SOIR/VEX observations of thermospheric CO on Venus

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The wavelength range probed by the SOIR instrument on board Venus Express - 2.2 to 4.4 μm - allows a detailed chemical inventory of the Venus atmosphere. In particular CO is measured together with CO_2 allowing the derivation of their vertical density profiles, which finally result in CO VMR profiles. Moreover, temperature and total density profiles are deduced from the CO_2 density profiles. The measurements all occur at the Venus terminator, both the morning and evening side, covering all latitudes from the North Pole to the South Pole. The vertical resolution is very good from the North Pole to 40° North (resolution between 100 and 500 m), and is poorer at southern latitudes (resolution between 1 and 2.5 km). The typical vertical extent of the CO vertical profiles ranges from 70 to 120 km (for CO_2 : from 70 to 170 km), with variations from orbit to orbit, encompassing thus the mesosphere and the lower thermosphere of the planet. The Venus atmospheric region probed by the SOIR instrument is very special as it acts as a transition region between two distinct dynamical regimes characterized by different flow patterns: the zonal retrograde flow below 70 km and the subsolar to antisolar circulation above 100 km. The study of CO, being mainly produced through the photodissociation of CO_2 at high altitudes by solar ultraviolet radiation, can lead to significant information on the dynamics taking place in this region. Results from SOIR observations of CO, together with CO_2 and temperature will be presented and discussed. We will report and analyze short and long term time variations. The latitudinal dependency will also be investigated.