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Impact of far wing model on the retrievals of thermal and aerosol profiles from VIRTIS observations of Venus nightside

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Thermal emission of Venus in the NIR transparency windows is known as unique source of information about hot and dense lower atmosphere of the planet available for remote sensing from the orbiter. In particular, mapping fine thermal variations as well as haze density beneath the main cloud deck would provide important insights into the dynamical and microphysical processes in the Venusian lower atmosphere and constrain theoretical assessment of those processes by general circulation models. However, the retrievals of such parameters from thermal emission spectra are concerned with complex and ambiguous inverse problem involving numerous inputs. One of the most important issues that determine the quality of retrievals is the radiative transfer in spectral ranges related to transparency windows, where the opacity is determined by absorption in far wings of CO_2 vibrational bands and pressure-induced continuum. Based on alternative theoretical approaches, involving far-wing theory and line mixing effect, as well as laboratory data, we present the retrievals of lower atmosphere properties from VIRTIS observations of Venus nightside. The analysis of uncertainties of the retrievals implies that the spectroscopy of the Venus transparency windows is the important input that has to be accounted for in routine mapping procedure.