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The Venus nitric oxide nightglow vertical distribution: update, new features and modelling

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Ultraviolet (UV) spectra of the δ (190-240 nm) and γ (225-270 nm) bands of the nitric oxide (NO) molecule have been measured in the atmosphere of the Venus night side with the Spectroscopy for Investigation of Characteristics of the Atmosphere of Venus (SPICAV) instrument on board Venus Express (VEX). Excited NO molecules on the night side of the planet find their source in the radiative recombinaison of O(^{3}P) and N(^{4}S) atoms produced on the dayside by Extreme Ultraviolet (EUV) solar photons that cause photodissociation of CO_2 and N_2 molecules.

We analyse with an improved statistics the behaviour of the vertical emission profile of the NO nightglow. We also present a method used to retrieve and analyse the volume emission rate. We describe the dependence of the vertical distribution with latitude and local time and its variability. New features in the vertical distribution of the NO emission such as double peaks are also exhibited. Furthermore, we use a one-dimensional chemical-diffusive model to compare the major features of the calculated O_2 1.27 μm and NO UV emissions profiles with those observed with SPICAV.