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Nightside atomic oxygen and nitrogen densities deduced from Venus and Mars Express airglow observations

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Spectral observations of the O_2 ($^1\Delta_g$) infrared nightglow and of the ultraviolet nitric oxide bands have been obtained respectively with VIRTIS and SPICAV on board Venus Express. These observations were collected in the northern hemisphere using the tangent limb mode, where the altitude distribution of the airglow is accurately determined. The $O_2(^1\Delta_g)$ emission results from three-body recombination of O atoms produced on the day side and transported to the night side by the global solar to antisolar circulation. It is variable in brightness and shows a peak between 95 and 100 km. The NO airglow is excited by N+O radiative recombination, with the N(^{4}S) atoms produced by photodissociation of N_2 and it shows a maximum intensity about 10-15 km higher . We use the observed brightness and altitude of theses two emissions in conjunction with a chemical-diffusive model to determine the concentration of O and N atoms on Venus' night side and its variability. Typical O densities at low and mid-latitudes are about 1-5x10^{11} cm^{-3} at 100 km, while the N(^{4}S) density is about 2 orders of magnitude smaller. These values will be compared with earlier models such as VIRA. It is shown that airglow observation is a valuable tool to remotely sense the distribution of these two constituents and improve atmospheric models. Similarly, SPICAM observations of the NO nightglow provide constraints on the [N]x[O] density product in the Martian atmosphere between 50 and 75 km, which constrain models of the night side composition in this region.