



A 0D model for the mesospheric nightglow.

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The mesospheric nightglow in the infrared region corresponds to the emission lines photochemically produced by OH radicals, O₂ and atomic oxygen. We develop a model with the intention to reproduce the climatology of the OH nightglow and perform comparisons with observational data. 25 species and more than 80 reactions are used describing most of the atmospheric chemical processes but also the photolysis of a few molecules. The different excited vibrational levels of OH are taken into consideration, as well as the excited state of O₂. A broad wavelength range with various widths allows an accurate expression of the photolysis coefficients. The first step is to validate a 0D photochemical model with most of the kinetic reactions updated. Sensitivity tests are performed to appreciate the importance of specific reactions. We also observe the nightglow response to density variations. A spectrum of the OH nightglow is developed using the concentrations calculated and is exploited to estimate the mesospheric temperature. The spectrum will also be propagated to the ground for comparisons with observations. The 0D nightglow model will be the basis of a global 3D model which will include the main dynamical processes and latitudinal variations.