

Electronic kinetics of molecular nitrogen and molecular oxygen in middle atmosphere during solar proton events

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Production and quenching processes of singlet a, a', w and triplet A, B, W, B', C states of nitrogen and singlet a, b, c and triplet A, A' states of oxygen in middle atmosphere during SPE have been considered. Electronic kinetics of the states at altitudes of stratosphere is related mainly with collisional molecular processes. Calculated according to Landau-Zener and Rosen-Zener approximations coefficients for intramolecular and intermolecular energy transfer processes between electronic states of N₂ and O₂ have been used in the study of functions of a distribution of the excited molecules in electronic states and vibrational levels. Special attention has been paid to the electronic excitation of O₂ in the a and b singlet states during SPE. The possible role of electronically excited O₂ in chemical balance of middle atmosphere is discussed.