



Evaluation of ability to use the atmospheric emission layer in the vicinity of solar terminator as a gravity wave detector

Mikhail Poluarshinov

Institute of Applied Geophysics, Moscow, Russian Federation (m.poluarshinov@gmail.com)

The represented photochemical estimations show that the bright narrow emission layer that emits in (0,0) band of atmospheric system O₂ (762±5 nm) at altitudes 80—95 km is formed in the vicinity of solar terminator. This emission is caused by the following photochemical mechanisms: (1) resonant scattering of sunlight on oxygen molecules, (2) photolysis of molecular oxygen in Schumann-Runge continuum, (3) photolysis of ozone molecules in Hartley band, and (4) night emission. An interest to this emission caused by the fact that the great value of scattering cross-section of molecular oxygen in this band is a very good shield for extraneous optical signal from Earth surface and underlying atmospheric layers. As a result it provides an effective way of atmospheric gravity waves mapping by space based airglow imager.

To consider a possibility of registration of atmospheric gravity waves, the optical signals produced by this emission layer modulated by the gravity waves with various wavelengths have been simulated. Numerical estimations have been performed for the simple case of spacecraft moving on circular orbit with orbital plane is perpendicular to solar terminator one. Results of numerical estimations show that relative values of wave perturbations may reach ten and more percents.