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Emission layers as gravity wave detectors

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It is considered optical effects and image processing method that can be assumed as a foundation for a space-based system to be responsible for gravity wave monitoring. These include optical effects caused by passing of gravity waves through atmospheric emission layers and a mathematical method developed to derive gravity wave characteristics from images of the emission layer.
The O_2 A (0,0) band (762 nm) is prioritized as a most promising atmospheric emission. The two types of this emission are considered: dayglow and nightglow. Under sunset/sunrise conditions this emission can be registered from space as a bright dayglow (a few hundred kR) originated by the sharp emission layer in the vicinity of the solar terminator plane. The sharpness of this emission layer allows consider it as an effective gravity wave detector. A similar interpretation can be made about the night emission layer of O_2 A (0-0) band with much less brightness (few kR).
It is given also a description of the mathematical method to infer the three-dimensional gravity wave characteristics from multi position airglow observations from space. The method is based on the Fredholm integral equation of the first kind, which describes the relation between the gravity wave spectrum and spatial structure of wave perturbations registered by an airglow imager. To retrieve the three-dimensional gravity wave characteristics from the airglow observations it is needed to obtain the set of images of a local emission layer area from different imager positions. Then this data must be processed using the developed mathematical technique.