ABSTRACT

Taking into account the existence of charged particles (ions and electrons) in the earth's conductive ionosphere the possibility of propagation of acoustic-gravity waves is investigated. The influence of Coriolis force is also taken into account. The weakly ionized ionospheric D, E and F layers are considered. The existence of inertial cut-off frequency at $2\Omega_o$ (Ω_o is the value of the angular velocity of the earth's rotation) is revealed. It is shown that the corresponding linear waves are damped owing to the Pederson conductivity. The damping rate is defined. When the acoustic-gravity waves are excited by the external forces (volcanic eruptions, earthquakes, lightning strikes, etc.) their amplitude can grow and the selforganization of these waves into nonlinear vortical solitary structures is admitted. Taking into account the interaction of induced in the ionosphere current with the geomagnetic field the corresponding nonlinear equations are obtained. The possibility of formation of dipole vortical solitary structures on low-frequency internal gravity waves for the stable stratified ionosphere is shown. The dynamic equation for the energy of such nonlinear structures is obtained. It is shown that nonlinear solitary vortical structures damp due to Joule losses.