



Electromagnetic effects in unstable near-equatorial plasma in the F region of the ionosphere with the spatial packet of acoustic-gravity waves of the lithospheric origin

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We propose that the observed [1] seismogenic excitations of electron concentration with the horizontal wavelength of order of 800 km in the equatorial F region could be connected with the excitation of the acoustic-gravity waves (AGW) by the lithospheric source and subsequent development of the Rayleigh-Taylor instability (RTI). The considerable distinctions of the theory developed in the present work from those presented in the previous papers are: (1) we took into account the driving force for the RTI connected not only with vertical, but also with horizontal component of the AGW velocity; the driving force connected with the horizontal velocity component exceeds the other components of the driving force; (2) we evaluated the development of the plasma instability in the presence of not a single harmonic AGW, but of a wave packet excited by the lithospheric source; (3) we have shown that the modes of AGW packet with the wavelength (~ 800 km), closed to the boundary between reactive and propagating modes are excited very effectively and increments of the corresponding plasma modes are rather considerable. Numerical calculations give excitations of electron concentration with spatial form similar to those observed after strong earthquakes. Relative change of electron concentration is few times larger than those of density of neutral atmosphere with AGW, in accordance with the results of observations.

[1] Fedorenko A.K., Lizunov G.V. Proceed. 4th. Ukr. Conf. on Perspective Space Researches. – Ponizovka, Crimea, Ukraine, 19-26 Sept. 2004, P.54.