

# **FORMATION OF LARGE-SCALE LATITUDINAL IRREGULARITIES OF ELECTRON DENSITY IN THE EARTH'S IONOSPHERE**

MAXIM KLIMENKO, Vladimir Klimenko

West Department of N.V. Pushkov Institute of Terrestrial Magnetism, Ionosphere and Radio Wave Propagation, Russian Academy of Sciences, Kaliningrad, Russia

In the global distribution of electron density at heights of F-region of the ionosphere the most known large-scale irregularities are day- and night-time equatorial anomaly, a night-time mid-latitude maximum and a main ionospheric trough. The mechanism of formation of the equatorial anomaly, connected with zonal component of the electric field, was named by a fountain-effect. Some mechanisms of the main ionospheric trough formation were offered due to: the area of stagnation; the incomplete filling of plasma tubes; the effect of a full shadow; the effects of a ring current. The formation of night-time mid-latitude maximum in electron density at heights of F-region is connected with meridional component of the thermospheric wind. We carried out the researches of the influence of electric fields and thermospheric wind on formation of all these large-scale irregularities with use of the model GSM TIP in which the composition and temperature of the neutral atmosphere was calculated with use of the model MSIS-90. The calculations have been carried out: without taking into account an electric field; with taking into account only dynamo field; with taking into account only meridional component of dynamo field; with taking into account the superposition of a dynamo field and electric field of magnetospheric convection without shielding, with shielding and with overshielding by electric field of the Alfvén layer; with and without taking into account the meridional component of the thermospheric wind. Modeling calculations have allowed describing the contribution of each of these mechanisms to formation of large-scale latitudinal irregularities of electron concentration at heights of F-region of the ionosphere.

equatorial anomaly, electric field, numerical modeling

Maxim Klimenko, West Department of IZMIRAN, Pobedy Av., 41, Kaliningrad, 236017, Russia, Tel./Fax. 7-4012-215606, e-mail: maksim.klimenko@mail.ru