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A theoretical study of dynamics of mean ionospheric trough

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The numerical model for ionosphere-plasmasphere coupling developed in the Institute of Solar-Terrestrial Physics was used to theoretical study of dynamic of the main ionospheric trough (MIT). This model is based on numerical solution of the system of nonstationary equations of the balance of particles and thermal plasma energy within closed geomagnetic field tubes, their bases being located at a height of 100 km. The global empirical thermospheric model MSIS-86 was used to describe space-time variations of the temperature and concentration of the neutral constituents. The velocities of the horizontal thermospheric wind were determined from the HWM-90 model. The values of the integral flux and mean energy of the precipitating electrons and the electric field of magnetospheric convection were taken from the global empirical models. There are presented the calculation of distribution of electron concentration (Ne) and temperature (Te) in the ionosphere of north hemisphere at altitude 300 km obtained for different UT, geomagnetic activity (Kp index) and IMF By and Bz. There is shown the MIT is continuous phenomenon, Ne in the trough and its structure depends on the local time, season, UT and the level of geomagnetic activity. The magnetospheric convection is of considerable importance in the formation of MIT. The production of MIT in the day sector is the result of UT variation. So there are presented calculations Ne and Te during the geomagnetic storm on April 5-6, 2004. There is shown the dynamics of MIT during the geomagnetic storm.