Coupling between the ionospheric convection and the thermospheric circulation disturbed by magnetic storm

V.E. Zakharov, N.M. Kaschenko, and D.V. Bekker *(Department of Physics, State University, Kaliningrad, 236041, Russia)*

The numerical model is developed to investigate how much the magnetospheric sources of energy and of momentum influence the ionosphere and the thermosphere during a magnetic storm. The geomagnetic conditions are given as for the magnetic storm of March, 6 1976. The experimental models for the parallel electric currents flowing between the magnetosphere and the ionosphere and for the fluxes of the auroral electrons precipitating from the magnetosphere into the ionosphere are used. The density of parallel electric current is supposed to be a sum of the given current source and of the calculated currents. The latter are caused by asymmetry of electrical conditions between the northern and southern ionospheres. Thus, electric coupling between the northern and southern ionospheres is taken into account self-consistently. Both the electric field and the thermospheric winds are calculated in the MHD approximation. The background values of the electron and neutral gas densities are given at ionospheric altitudes using the MSIS86 and IRI90 models. As shown numerically, the thermospheric circulation is changed after the beginning of magnetic storm with some time-delay with respect to the ionospheric convection. This delay is about (0.5 - 1) hours for the polar ionosphere and becomes greater with geomagnetic colatitude. The effects of disturbed ionospheric dynamo are most significant when the magnetic storm becomes weaker.