Geophysical Research Abstracts,
Vol. 10, EGU2008-A-07450, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-07450
EGU General Assembly 2008

Ionospheric vs. Magnetotail Activity Dependence on Driving Solar Wind Parameters

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A period of steady magnetospheric convection is examined using the Lyon-Fedder-Mobarry (LFM) global magnetohydrodynamic simulation. The simulation results were analyzed to quantify the electric field in the magnetosheath driving reconnection as well as activity in the inner part of the magnetotail (earthward of the tail neutral line) and in the ionosphere. In addition to driving the simulation with the observed solar wind and interplanetary magnetic field (IMF) parameters, three other simulations were performed: The IMF Bz, the solar wind speed, and the solar wind density were increased one at a time by 50% while other parameters were kept in original values. The two first runs increase the driving electric field (Ey =-VxBz), while the two latter runs increase the solar wind dynamic pressure (P=nmVˆ2).We compare and contrast the ionospheric and magnetotail response to the changes in the driver conditions in this period, which observationally remained quasi-stationary for several hours as well in the ionosphere as in the magnetotail.