AOGS 2005


# Theoretical Effects of Geomagnetic Activity on Low-latitude Ionospheric Electric Fields

C. M. HUANG[1], A. D. RICHMOND[2], and M. Q. CHEN[1]

[1]*Institute of Space Science, National Central University, Chung-Li, Taiwan*
[2]*High Altitude Observatory, National Center for Atmospheric Research, Boulder, Colorado*

The influence of geomagnetic activity on middle- and low-latitude thermospheric winds and ionospheric electric fields is investigated using model results from the National Center for Atmospheric Research Thermosphere-Ionosphere-Electrodynamics General Circulation Model. Model runs are made for different levels of geomagnetic activity. Model results show that the equatorward ionospheric currents produced by disturbance winds develop positive charge accumulation at low latitudes that maximizes in the premidnight sector. The local time of maximum electric potential perturbation depends significantly on universal time, so that the local time of reversal of the equatorial zonal perturbation electric field varies with longitude by two to three hours, depending on the intensity of geomagnetic activity. The westward perturbation electric field in the post-sunset period indicates that stronger geomagnetic activity will produce a lower driven height of the evening F region. After geomagnetic activity ceases, model results show that the zonal disturbance winds can last for many days in the post-recovery period, while the meridional disturbance winds decay more rapidly. The long-lasting zonal winds, through the Pedersen currents they drive, help maintain meridional disturbance potential drops that decay much more slowly than the zonal disturbance potential drops after the activity ceases