

The driven parameters of the NCAR/TIE-GCM at high latitudes assimilated with the occultation TEC during the storm time

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The Thermosphere-Ionosphere Electrodynamics General Circulation Model (TIE-GCM) are assimilated with the FORMOSAT-3 occultation total electron contents (OTEC) to optimize the model driven parameters that the simulation results could monitor the ionosphere during the magnetic storm time. The TIE-GCM was developed by NCAR/HAO is a self-consistently electrodynamic coupled thermosphere and ionosphere model. The model could be driven by a few parameters such as the y-component of Interplanetary Magnetic Field (IMF-By) and the Cross Polar Cap Potential (CPCP) that control the ion convection at high latitudes. We assimilated the OTEC data along the line of sight from GPS to LEO satellites measured by the FORMOSAT-3 with the TIE-GCM such that both the optimal IMF-By and CPCP could be obtained in the storm time. The 3-hours assimilation cycle are constructed to study the geo-magnetic storm in the day Sep. 09, 2011. The pre-3-hours OTEC data before the beginning of a time cycle are assimilated with TIE-GCM to optimize the parameters of IMF-By and CPCP that optimized the initial state of the cycle. The post-1-hour OTEC data after the initial state are assimilated with TIE-GCM to optimize the IMF-By and CPCP to monitor the ionosphere in forward 3-hours. The simulation results and the optimal IMF-By, CPCP could be compared with the observation data in the ionosphere and the values in the geophysical indices database (GPI).