

The Occultation TEC Assimilated to NCAR/TIE-GCM to Simulate the Ionosphere During the Storm Time

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We will construct a data assimilation model with the Thermosphere-Ionosphere Electrodynamics General Circulation Model (TIE-GCM) for the ionosphere by assimilating the FORMOSAT-3 occultation total electron contents (OTEC). The TIE-GCM was developed by NCAR/HAO is a self-consistently electrodynamics coupled thermosphere and ionosphere model subjected by a few parameters with the lower and upper boundary conditions to describe the dynamics of the ionosphere and the thermosphere. The measured occultation total electron contents (OTEC) along the light path from GPS to LEO satellites could be assimilated with the TIE-GCM as a realistic model for the space weather in the ionosphere. We assimilated the FORMOSAT-3 OTEC data with TIE-GCM to optimize the parameters for atmospheric tides at lower boundary used in the model that improved the simulation of the electron density distribution in geomagnetic quiet days. The assimilated OTEC data during the geomagnetic storm time will optimize the sensitive physical control parameters of the model such as hemispheric particle participation power (HP), polar cap potential drop (CP). We simulate the ionosphere in storm time in the day Sep. 09, 2011 with the assimilated data with 3 hours per cycle. The optimized time dependent parameters, HP and CP, used in TIE-GCM will be compared with the values in the geophysical indices database (GPI).