

The FORMOSAT-3/COSMIC Radio Occultation Data Assimilated to NCAR/TIE-GCM to study the horizontal winds in the ionosphere

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The NCAR Thermosphere-Ionosphere Electrodynamics General Circulation Model (TIE-GCM) is a self-consistently electrodynamic-coupled thermosphere and ionosphere model subjected by a few parameters and boundary conditions. The migrating tidal waves are parameterized with the amplitudes and phases of the diurnal and semidiurnal tidal waves (Hough modes) as the forcing sources to modulate the TIE-GCM at the lower boundary. We constructed a data assimilation method to assimilate the FORMOSAT-3/COSMIC (F3/C) occultation total electron content (OTEC) observations to the Model with the optimal parameters of the TIE-GCM. The assimilated OTEC of the F3/C data could modulate the ionospheric electron densities, the neutral winds and the temperatures in the TIE-GCM due to the optimal parameters of the Hough modes. The horizontal wind in the assimilated model will be compared with the observations with ground based and the space-borne instruments (TIDI data).

Keywords: ionosphere, thermosphere, FORMOSAT-3/COSMIC radio occultation data, data assimilation