

Assimilation of FORMOSAT-3/COSMIC radio occultation data with TIE-GCM

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In this study, some preliminary results of a 4-dimensional variational data assimilation (4DVAR) for TIE-GCM (thermosphere-ionosphere electrodynamics general circulation model) by using FORMOSAT-3 / COSMIC radio occultation data are presented. The TIE-GCM global circulation model is a self-consistently electrodynamic-coupled thermosphere and ionosphere model subjected by a few parameters and boundary conditions to describe the dynamic thermosphere and ionosphere. In an assimilation cycle, we optimize some of parameters used in TIE-GCM by minimizing the difference between FORMOSAT-3 / COSMIC occultation total electron content data and the model result. The optimized parameters are solar flux, O⁺ flux at upper boundary, and background ionization rates in quiet geomagnetic activity condition.

The simulation results of TIE-GCM will be compared with IRI model in the winter solstice.