



Toward storm-time ionosphere forecast using GNSS observations

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Previous theoretical simulations of the mid- and low-latitude ionospheric responses to space weather events have indicated general features of electron density disturbances. The magnetic storm produced penetration electric field and neutral wind disturbances lead to formation of various storm-time ionospheric electron density structures, such as super plasma fountain, equatorial electron density trough and F3 layer, as well as long-lasting global ionosphere suppression. We attempt to model these storm-related ionospheric electron density structures using the global assimilative ionospheric model that assimilates electron densities taken from FORMOSAT-3/COSMIC and TEC from ground-based GNSS receivers. Using the ensemble Kalman filter with consideration of ion densities, electric potential, thermospheric neutral wind and compositions as update variables, we study the performance and forecast capability of the assimilative model. The assimilative model could be utilized for ionosphere forecast in near future.