Assessment of the impact of FORMOSAT-7/COSMIC-2 GNSS RO observations on ionosphere specification and forecast using observing system simulation experiments

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The Formosa Satellite-7/Constellation Observing System for Meteorology, Ionosphere and Climate-2 (FORMOSAT-7/COSMIC-2) GNSS RO payload can provide global observations of slant total electron content (sTEC) with unprecedentedly high spatial temporal resolution. By using observing system simulation experiments, we can quantitatively assess the impact of FORMOSAT-7/COSMIC-2 GNSS RO data on ionospheric specification and forecast. For this purpose, a coupled model of the Global Ionosphere Plasmasphere and the Thermosphere Ionosphere Electrodynamics General Circulation Model is incorporated into the NOAA ensemble Kalman filter data assimilation system. In ensemble Kalman filtering, it is critical to minimize the effects of sampling errors on the ensemble-based estimation of the correlation between observations and model states, in order to obtain high quality assimilation analysis. This presentation will demonstrate how an auxiliary ensemble Kalman filtering technique designed specifically for the FORMOSAT-7/COSMIC-2 sTEC observations can enhance the impacts of FORMOSAT-7/COSMIC-2 GNSS RO data on ionospheric specification and forecast.