

## Space Weather Products of FORMOSAT-7/COSMIC-2: Global Ionospheric Specification and Aided Abel Electron Density Profile

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FORMOSAT-7/COSMIC-2 (F7/C2) satellite mission was launched on 25 June 2019 and 6 satellites will deploy to the different operational orbital planes with an inclination of 24 degree and 550 km altitude height. Six satellites can provide thousands radio occultation (RO) observation events per day to observe the ionosphere. This study demonstrates two space weather data products based on F7/C2 RO sounding: Global Ionospheric Specification (GIS) electron density structure and Ne-Aided Abel electron density profile. GIS is the ionospheric data assimilation product based on the Gauss-Markov Kalman filter to assimilate the slant total electron content observed from ground-based GPS receiving stations and space-based RO instrumentations into background model to provide the continuity ionospheric three-dimensional electron density distribution. With horizontal and vertical ionospheric information obtained from ground- and space-based measurement, this data product can study large-scale ionospheric structural variation. On the other hand, the Ne-aided Abel inversion implements three-dimensional time-dependent electron density based on the climatological maps constructed from previous RO observations, which has an advantage of providing altitudinal information on the horizontal asymmetry, can reduce the error of spherical symmetry assumption in Abel inversion. In this study, observing simulation system experiment is conducted to estimate the accuracy and validation with ionosonde observation is applied to prove reliability. Comparing with typical Abel electron density profile, the Ne-aided Abel inversion can mitigate the artificial plasma caves in the daytime E-region. Moreover, GIS is also used to reconstruct the ionospheric variation during the September 27, 2019 minor geomagnetic storm.

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