



## **A study of the Ionospheric electron density profile with FORMOSAT-3/COSMIC observation data**

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The GPS Occultation Experiment payload onboard FORMOSAT-3/COSMIC microsatellite constellation is capable of scanning the ionospheric structure by the radio occultation (RO) technique to retrieve precise electron density profiles since 2006. Due to the success of FORMOSAT-3/COSMIC, the follow-on mission, FORMOSAT-7/COSMIC-2, is to launch 12 microsatellites in 2016 and 2018, respectively, with [U+3000] the Global Navigation Satellite Systems (GNSS) RO instrument onboard for tracking GPS, Galileo and/or GLONASS satellite signals and to provide more than 8,000 RO soundings per day globally.

An overview of the validation of the FORMOSAT-3/COSMIC ionospheric profiling is given by means of the traditional Abel transform through bending angle and total electron content (TEC), while the ionospheric data assimilation is also applied, based on the Gauss-Markov Kalman filter with the International Reference Ionosphere model (IRI-2007) and global ionosphere map (GIM) as background model, to assimilate TEC observations from FORMOSAT-3/COSMIC. The results shows comparison of electron density profiles from Abel inversion and data assimilation.

Furthermore, an observing system simulation experiment is also applied to determine the impact of FORMOSAT-7/COSMIC-2 on ionospheric weather monitoring, which reveals an opportunity on advanced study of small spatial and temporal variations in the ionosphere.