

R005-37

Zoom meeting C : 11/2 PM1 (13:45-15:30)
13:45-14:00

Complementing regional ground GNSS-STECh computerized ionospheric tomography (CIT) with ionosonde data assimilation

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The accurate probing of the three-dimensional (3-D) structure of the ionosphere endures a unique set of challenges that include, for example, high campaign costs, poor distribution of instruments and collected data, and geometric limitations. To remedy these challenges, over the East-Asian sector (covering 110°-160° E and 10°-60° N, and extending from 80 to 20,000 km in altitude) a near-realtime regional 3-D computerized ionospheric tomography (CIT) technique has been developed using a plethora of GNSS (Global Navigation Satellite System) observations of total electron content. Prior to in-operation applications, studies validated the CIT results using ionosonde, middle-upper atmosphere radar and occultation data and found the technique to adequately reconstruct the regional ionosphere vertical structure, however, with room for improvement in estimating the peak height and avoiding physically unrealistic negative densities in the final solution. We present preliminary results from a technique that addresses these issues by incorporating CIT results into a data assimilation (DA) technique. The DA technique adds ionosonde bottomside measurements into CIT results, thereby improving the accuracy of the reconstructed bottomside 3-D structure. More specifically, on average CIT NmF2 and hmF2 get an above 60% improvement. Further, during analysis, ionosphere electron densities are assumed to be better described by probability log-normal distribution, which introduces the positivity constraint that is mandatory in ionospheric imaging.