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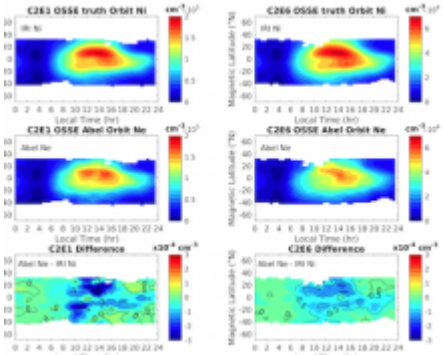
Poster
In this study, the comparison between the orbit electron and ion densities measured by payloads of Tri-GNSS Radio-Occultation System (TGRS) and Ion Velocity Meter (IVM) onboard the FORMOSAT-7/COMSIC2 (F7/C2) satellites is presented. The collocated TGRS and IVM observations for each of F7/C2 satellites above 700 km and below 550 km are compared by restricting both observations to have distance and time within 100 km and 1 sec during 2020.001-365. The comparison shows that the TGRS and IVM density observations have high correlation coefficients of 0.92-0.96 for each of the F7/C2 satellites. The mean differences are around -1.08x10^4-0.17x10^4 cm-3 with standard deviations ranging from ~0.85x10^4-2.16x10^4 cm-3, indicating that the TGRS and IVM observations have high accuracy and precision. Furthermore, the collocated observations are utilized to examine the global spatial and temporal variations of the topside ionosphere. The results show that the morphologies of topside ionosphere equatorial ionization anomaly (EIA) in TGRS orbit electron density are nearly identical to the EIA in IVM ion density, demonstrating that both F7/C2 payloads should be reliable to provide accurate topside ionosphere measurements. We found that the TGRS orbit electron density tends to be smaller than the IVM ion density at lower orbits (<500 km) and latitudes (|lat|<=20 degrees), but they are slightly greater than the IVM ion density at higher orbits (>700 km). These density differences could be related to the electron density retrieval errors caused by the Abel inversion. An observation system simulation experiment is further performed to evaluate the Abel inversion errors on TGRS orbit electron density retrieval.


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