SWARM Electron Density Measurements and Predictions by IRI and IRI-Real-Time

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Preliminary measurements by the SWARM Langmuir Probes will be compared with predictions by the International Reference Ionosphere (IRI) (D. Bilitza et al., *Journal of Space Weather and Space Climate*, **4**, 2014, A07(1-12)) involving both the standard IRI and the Real-Time IRI. The Real-Time IRI is based on the IRI Real-Time Assimilative Mapping (IRTAM) algorithm for the F2 peak density and height that was developed by I. Galkin et al. (*Radio Science*, **47**, 2012). IRTAM assimilates digisonde data from the Global Ionosphere Radio Observatory (GIRO) into the IRI-CCIR models for the F-peak density NmF2 and height hmF2. The assimilation for hmF2 is based on the model of Brunini et al. (*Advances in Space Research*, **51**, 2013, pp. 2322-2332) that applies the CCIR formalism directly to hmF2.

The goals of this study are twofold. On one hand our comparisons are intended to help and to support SWARM validation efforts for the electron density by highlighting areas of consistent and significant discrepancies. On the other hand our comparisons are intended to investigate how well the IRI Real-Time algorithm reproduces detailed spatial and temporal structures that are not included in the standard IRI. A special focus will be on the relative impact of the NmF2 and hmF2 IRTAM corrections on the density at the SWARM satellite altitude, especially in the region of the Equatorial Ionization Anomaly (EIA). We will include in our study all the different options provided by IRI for the F-peak and the topside profile and asses their performance quality in representing the relative shape of the EIA as observed by SWARM. The results will be a starting point for future inclusion of SWARM data into the assimilative Real-Time IRI process.