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The Ionosphere Real-Time Assimilative Model, IRTAM – A Status Report

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Ionospheric models are generally unable to correctly predict the effects of space weather events on the ionosphere. Taking advantage of today's real-time availability of measured electron density profiles of the bottomside ionosphere, we have developed a technique "IRTAM" to specify real-time foF2 and hmF2 global maps. The measured data arrive at the Lowell GIRO Data Center (LGDC) from some ∼70 ionosonde stations of the Global Ionosphere Radio Observatory (GIRO) [Reinisch and Galkin, 2011], usually at a 15 min cadence, and are ingested in LGDC's databases (http://ulcar.uml.edu/DIDBase/). We use the International Reference Ionosphere (IRI) electron density model [Bilitza et al., 2011] as the background model. It is an empirical monthly median model that critically depends on the correct values of the F2 layer peak height hmF2 and density NmF2 (or critical frequency foF2). The IRI model uses the so-called CCIR (or URSI) coefficients for the specification of the median foF2 and hmF2 maps. IRTAM assimilates the measured GIRO data in IRI by "adjusting" the CCIR coefficients on-the-fly. The updated maps of foF2 and hmF2 for the last 24 hours before now-time are continuously displayed on http://giro.uml.edu/RTAM [Galkin et al., 2012]. The "adjusted" bottomside profiles can be extended to the topside by using the new Vary-Chap topside profile model [Nsumei et al., 2012] which extends the profile from hmF2 to the plasmasphere.

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