

The Polar Ionosphere seen through Global Ionospheric Maps

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The polar ionosphere is being paid attention in perspective of theoretical studies and also practical applications like satellite communications and navigation systems. The scintillation and general variability, with a typical scarcity in the ionospheric measurements, are a challenge to be considered by the modellers as well.

In this general context the Global Ionospheric Maps (GIMs) are being generated from the dual-frequency Global Navigation Satellite System measurements, by several analysis centers of the International GNSS Service (IGS), since 1 June 1998 (Feltens 2003, Hernández-Pajares et al. 2009). The GIMs were not intended for polar ionospheric mapping, with a relatively small number of permanent GNSS receivers at high latitudes, and the relatively low spatial and temporal GIM resolutions, 5x2.5 deg in longitude and latitude, and one global VTEC map provided typically each 2 hours.

In this presentation we will summarize the results of a systematic study of both, the north and south polar ionospheres, after analyzing the Vertical Total Electron Content of corresponding regions from the UQRG GIMs, since 2001 to beginning of 2019, i.e. during about 1.5 solar cycles. The UQRG GIMs are computed each 15 minutes with rapid latencies, i.e. less than one day, applying a combined tomographic-kriging technique. And it is performing as one of the best behaving IGS GIMs (Hernández-Pajares et al. 2017, Roma-Dollase et al. 2018). This is the reason of selecting it for this study, jointly with the internal tomographic information obtained during the computations, in particular the electron content vertical distribution.

References

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