Canadian Association of Physicists
Association canadienne des physiciens et physiciennes

Contribution ID: **1966** Type: **Invited Speaker / Conférencier(ère) invité(e)**

Exploring the use of the Empirical Canadian High Arctic Ionospheric Model (E-CHAIM) and other empirical ionospheric electron density models at high latitudes (I)

Monday 11 June 2018 14:15 (30 minutes)

In this study, we begin by presenting an overview of the methodology behind existing empirical ionospheric electron density models, including the E-CHAIM and International Reference Ionosphere (IRI). Several limitations have been identified in the methodology used to parameterize the IRI (Themens et al., 2014, 2016, and 2017a), particularly in its application at high latitudes. Using these validation studies to inform the approach used in E-CHAIM, we managed to avoid several of the IRI's short comings and have demonstrated substantial quantitative improvements in performance over the IRI (Themens et al., 2017b, and 2018). We will here explore those improvements and examine the limits of empirical approaches in their ability to represent "weather-like"time scales. To this end, we have manual scaled a year of ionosonde data from several Canadian High Arctic Ionospheric Network (CHAIN) ionosondes and will assess the representativeness of climatologies at high latitudes. In so doing, we will demonstrate that, while empirical models struggle appreciably in the representation of smaller time scales (two hours or less), it is well within their capacity to capture variabilities on 2-7 day timescales using measured geomagnetic indices as drivers. We also demonstrate that in the absence of a storm-time correction, empirical models may exhibit biases in their representation of monthly median variability at high latitudes due to the dominance of negative storm responses in these regions.

Primary author: THEMENS, David (University of New Brunswick)

Co-authors: Dr JAYACHANDRAN, P.T. (University of New Brunswick); Mr REID, Ben (University of New Brunswick)

Presenter: THEMENS, David (University of New Brunswick)

Session Classification: M2-2 Theory, Modelling and Forecasting II (DASP) | Théorie, modélisation et prévisions II (DPAE)

Track Classification: Atmospheric and Space Physics / Physique atmosphérique et de l'espace (DASP-DPAE)