Toward the development of the Canadian High Arctic Ionospheric Model (CHAIM): Challenges and Data Handling

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The ionosphere is an important medium for high frequency (HF) radio communications, as well as a hindrance to the use of the Global Positioning System (GPS); thereby, these systems require accurate ionospheric models in order to function. While mid-latitude ionospheric variability can be thought of as dominated by photoionization by the Sun, the dynamics of the high-latitude ionosphere are complicated by Solar Wind Magnetosphere-Ionosphere (SWM-I) interactions and the action of the Earth’s magnetic field. This, combined with an extreme scarcity of data in the high-latitude region, has, in the past, made this area virtually impossible to model. With the recent explosion of ionospheric remote sensing instruments in the polar region, it has now become possible to monitor these regions with high spatial resolution. Today there exist no accurate ionosphere models specific to the high latitude region and de facto ionospheric models, such as the International Reference Ionosphere (IRI), have been shown to be inaccurate at high-latitudes.

The CHAIM project will attempt consolidate recently expanded ionospheric data from the polar regions to generate ionospheric models specific to the high latitude environment. The proposed model will be composed of three phases: 1) the development of an empirical, climatological model of the polar region ionospheric electron density, 2) the development of geostatistical maps of total electron content, and 3) the development of an assimilation model of the polar region electron density.

This presentation will outline the progress that has been made in the last year toward developing the CHAIM model and the challenges we face going forward.

Thursday, Jan. 28, 2016, 1:00--2:30 pm in P204
Colloquium tea in P203 beforehand