MODELING THE HALLOWEEN IONOSPHERIC STORM IMPACT AT MIDDLE LATITUDES

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Effects of the Halloween Storm of 2004 were observed by a number of instruments at the Utah State University (USU) Bear Lake Observatory (BLO), Utah and at the RP Consultants HF monitoring site in Klamath Falls, Oregon. The HF Investigation of D-Region Ionospheric Variation Experiment (HIDIVE) is a collection of passive HF monitors at BLO and Klamath Falls (KF) measuring signal strengths from WWV and WWVH HF beacons. These observations, described in detail in another paper at this meeting, are used to determine HF absorption characteristics of the D region in real time. These real time data are used to determine ionization drivers within the Data Driven D-Region (DDDR) model to generate weather-sensitive specifications of mid-latitude HF absorption characteristics.

The Data Drive D-Region (DDDR) and the Ionospheric Forecast Model (IFM) are combined to model the ionosphere electron density from 40 to 1600 km altitude for input into HF propagation codes. These models are combined with the HASEL ray-tracing code of C. J. Coleman (*Rep. No. SRL0131TR*, Defence Science and Technology Organisation, Australia, 1993) and HF absorption calculations described in Davies (*Ionospheric Radio*, Peter Peregrinus, Ltd. On behalf of IEE, London, 1990). The ionosphere models and HF propagation codes are combined as described by Eccles et al. (*Space Weather*, in press, 2004) to model the impacts of known drivers of ionization during the Halloween Storm days of 2004. These model results are compared to HIDIVE observations. Discrepancies between model and observations suggest the presence of other drivers such as hard particle precipitation and/or NO transport from high latitudes. This study examines methods of ingesting HF signal strength observations discrepancies to estimate ionization drivers to further enhance the weather-sensitive DDDR model.

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4. C - Contributed Paper, Program chair: Wilson and Mintner

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