FUV image (SSUSI) contribution to maps of ionospheric conductance

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Computations of near-instantaneous, hemispherical distributions of ionospheric electrodynamic parameters at high-latitudes from geomagnetic variations are critically dependent upon the distribution of Hall and Pedersen conductances used. Two such systems are routinely run at STEL in Toyokawa and NGDC in Boulder, Colorado (c.f. www.ngdc.noaa.gov/AMIE). These systems use either an empirical relationship of conductance or an average model derived from precipitating particle measurements along the satellite orbit and both methods have important limitations.

We present a method that should produce more accurate, near instantaneous maps of Hall and Pedersen conductance from data recorded on DMSP operational meteorological satellites. The polar distribution of the most probable spectra of precipitating particles organized by the equatorward boundary of the precipitation was built from SSJ/4 data recorded on DMSP satellites. The resulting Hall and Pedersen conductances are computed using the relation in Robinson et al., 1987.

In addition a new instrument, SSIES (Paxton et al., 1992), recording far ultraviolet emissions (FUV) is now providing images from the DMSP F-16 satellite. SSIES is very similar in design and operations to the GUVI instrument on the experimental TIMED satellite. The SSIES colors are selected to monitor the energy flux and average energy of precipitating particles (Paxton and Strickland, 1992), which are same parameters that are input to Robinson et al. Hecht et al and Knight et al presented initial SSUSI results at the Fall AGU meeting. A report on the Calibration and Validation of SSUSI images and derived parameters is in preparation (Straus et al.)

The method is to use the equatorward boundary derived from current SSJ/4 and SSJ/5 data to select the appropriate activity level for the most probable distribution of conductances into which are placed the image-derived conductances.