

Modeling the quiet time outflow solution in the polar cap

We use the Polar Wind Outflow Model (PWOM) to study the geomagnetically quiet conditions in the polar cap during solar maximum. The PWOM solves the gyrotropic transport equations for O^+ , H^+ , and He^+ along several magnetic field lines in the polar region in order to reconstruct the full 3D solution. We directly compare our simulation results to the data based empirical model of Kitamura et al. [2011] of electron density, which is based on 63 months of Akebono satellite observations. The modeled ion and electron temperatures are also compared with a statistical compilation of quiet time data obtained by the EISCAT Svalbard Radar (ESR) and Intercosmos Satellites (Kitamura et al. [2011]).

The data and model agree reasonably well. This study shows that photoelectrons play an important role in explaining the differences between sunlit and dark results, ion composition, as well as ion and electron temperatures of the quiet time polar wind solution. Moreover, these results provide validation of the PWOM's ability to model the quiet time "background" solution.