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Title: Visualizing the relative locations of the auroral oval and ion convection reversal in MATLAB using DMSP satellite data

Abstract:

Under normal conditions the high latitude ion velocity reverses direction from anti-sunward flow at the polar cap to sunward flow in the vicinity of the auroral oval. This switch marks the transition from open magnetospheric field lines (near the pole) to closed. The location of the convection reversal boundary (characterized by large ion velocities in opposite directions) relative to that of the auroral oval is a key factor in the determination of energy inputs into the ionosphere. To study this relationship, an existing MATLAB interface intended for the interpretation of DMSP 15 data from 2004/2005 was heavily modified to expand the range of dates, satellites, and ground-based data available for the user to visualize. A subset of the routines and auxiliary programs developed for this endeavor were used to create a more targeted tool which calculates the CRB and auroral parameters (peak flux and 1/e fall-off points) for each orbit with a wide range of available times and satellites. Preliminary studies using DMSP 13 show the capability of the tool, but more fine-tuning and analysis are still needed.