Statistical Study of SED Events During Magnetic Storms

A. Coster, M. Colerico, J. Foster, B. Rideout, F. Rich, H. C. Yeh
Outline

Review of what we don’t understand
Discussion of Statistical Results
Overview of Data Intercomparisons
Storm-time Electric Fields

- Cross-tail electric fields energize and inject particles into the inner magnetosphere forming the disturbance Ring Current

- Strong penetration eastward electric field uplifts equatorial ionosphere
  - Equatorial anomaly enhanced

- Radial/Poleward Polarization Jet Electric Fields form (Sub Auroral Polarization Stream). As the Polarization Stream overlaps the outer plasmasphere
  - Storm-Enhanced Density (SED)
  - Detached plasmas/plasma tails
Storm-time Electric Fields

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• Movement of Equatorial Anomaly Peaks during Geomagnetic Storms
• Florida “Hot Spot”
Plume Characterizations

Location and slope of the line fit to a plume
Mean and median TEC along that line
Mean and median TEC along nearby parallel lines
The number of points in the chain indicating that plume
The average gradient in the points indicating that plume
Plume Characterizations

Median Magnitude of TEC Plume

UT

TEC

Mar 31, 2001
Apr 11, 2001
May 29, 2003
Nov 20, 2003
Oct 29, 2003
Oct 30, 2003
Plume Characterizations
Horizontal DGPS Accuracies
30 Oct 2003

Total TEC Gradient at 23:00

Single Baseline DGPS (100-200 km baselines)

22:00 – 22:30 UT

23:00 – 23:30 UT