



University of Colorado
Boulder

Ionospheric Poynting Flux Binned in Auroral Boundary Coordinates

Talin Larson

University of Colorado Boulder

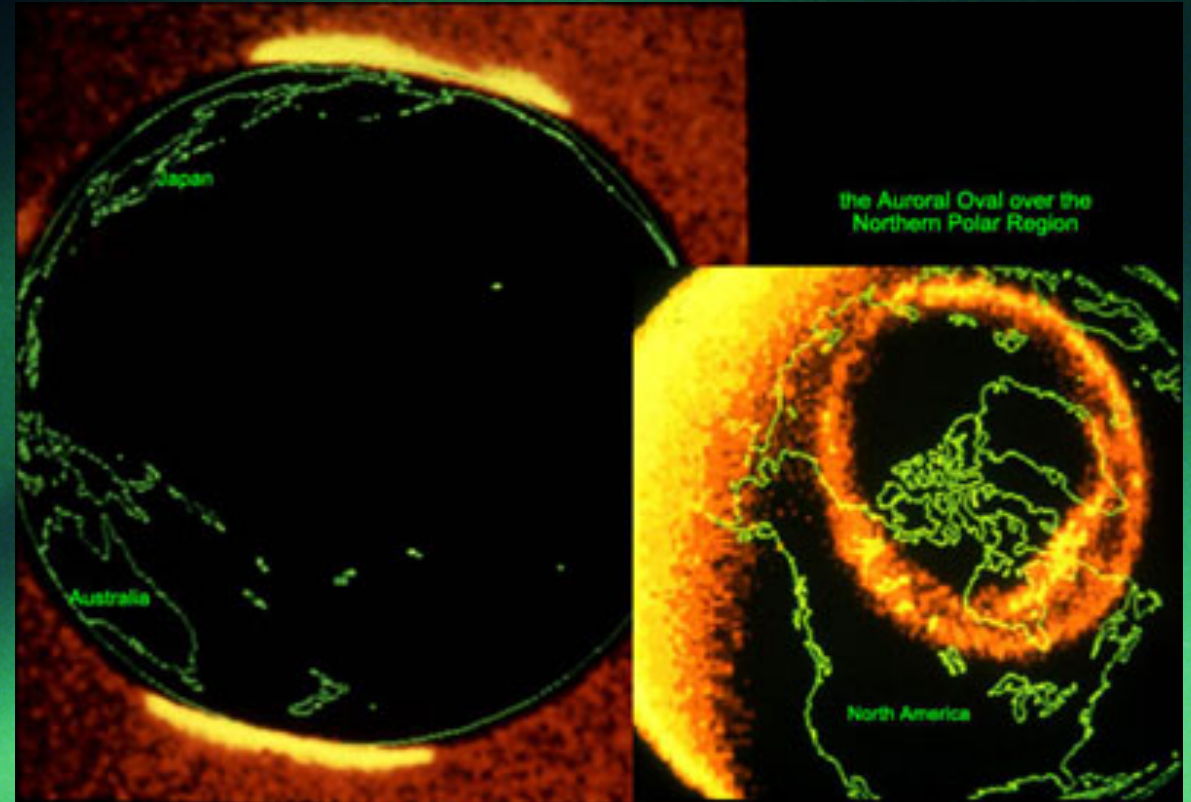
Department of Aerospace Sciences

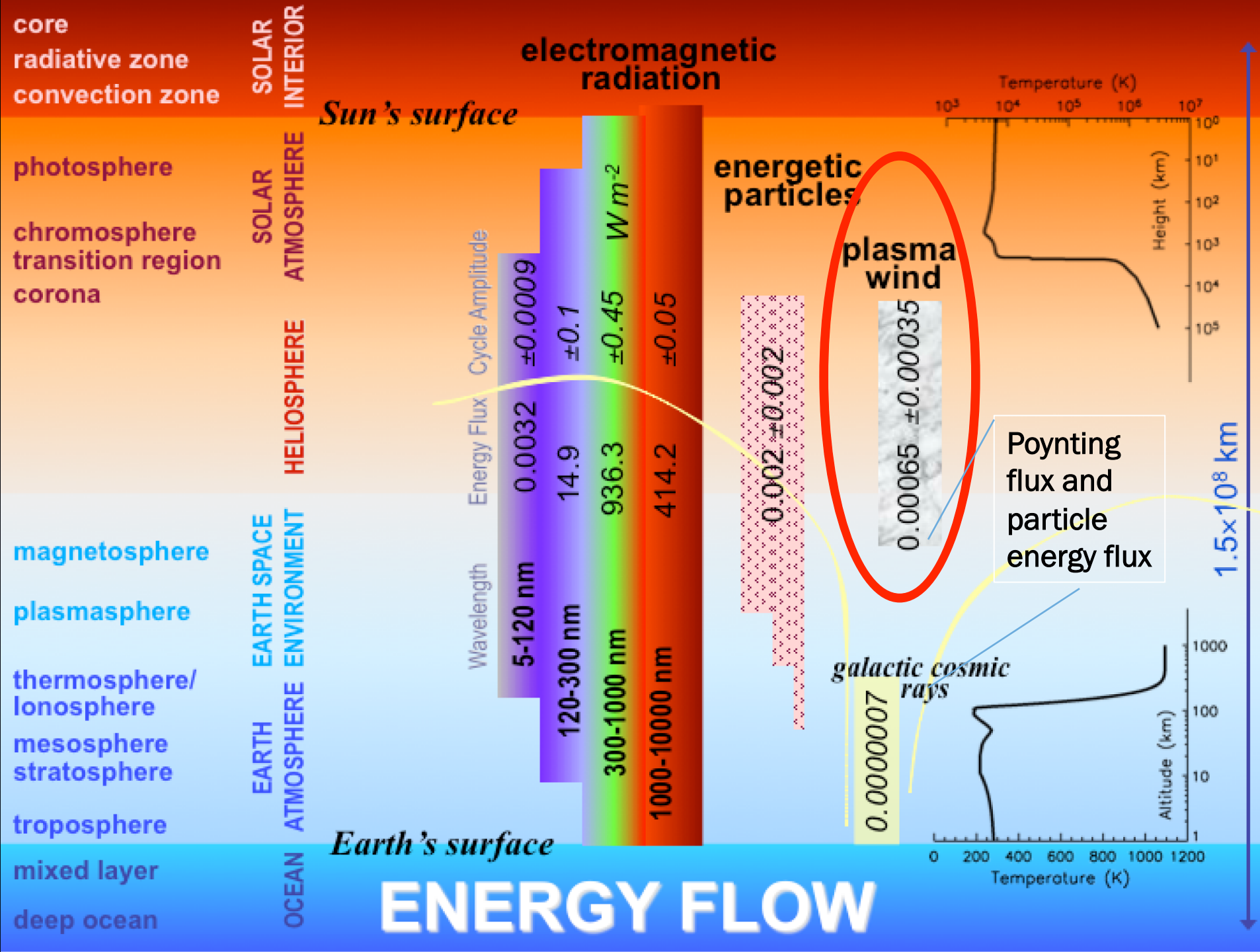
Space Environment Data Analysis Group (SEDA)

Delores Knipp, Liam Kilcommons

Project Overview

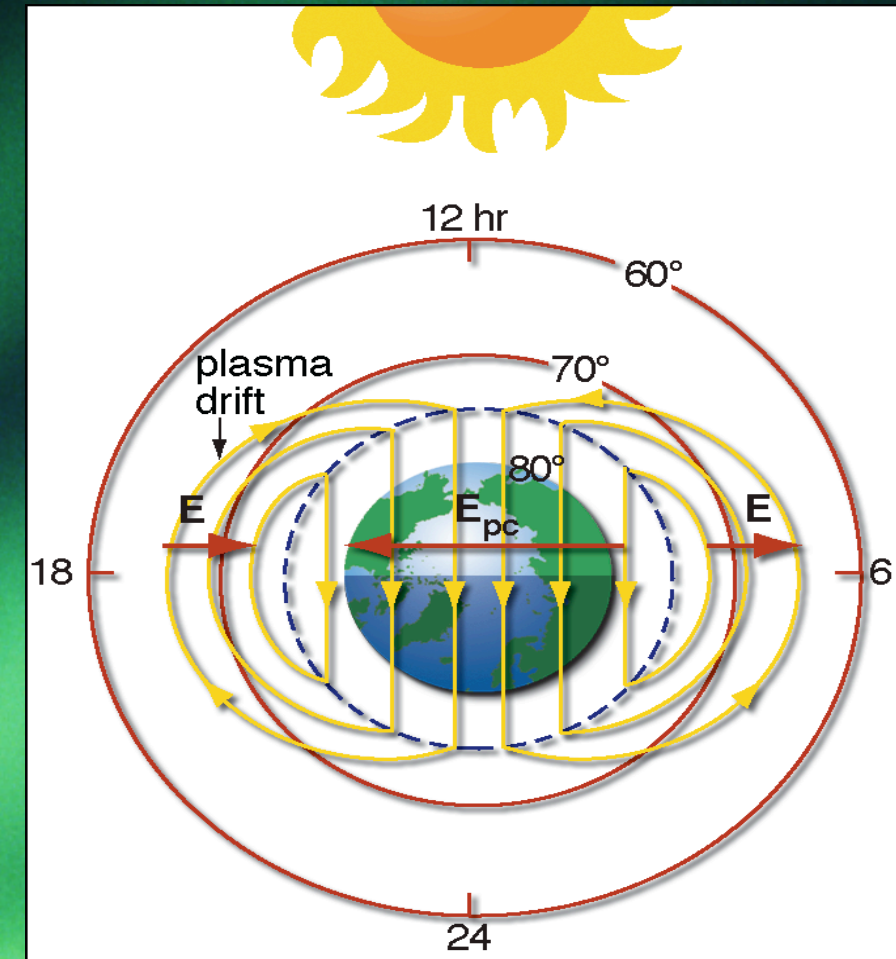
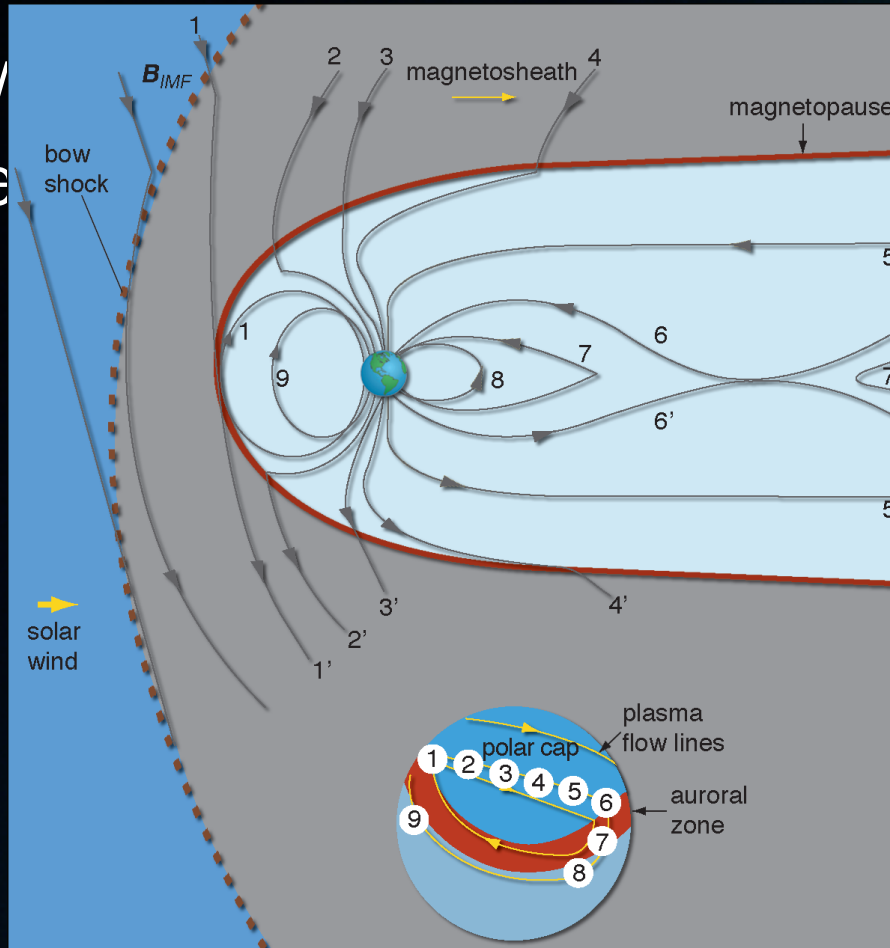
- Background
- Coordinate Corrections
- Velocity Corrections
- Poynting Flux Calculation
- Quality Flags and Uncertainty
- CDF Generation and Next Steps





Energy Deposition in Polar Region

- How
- Where



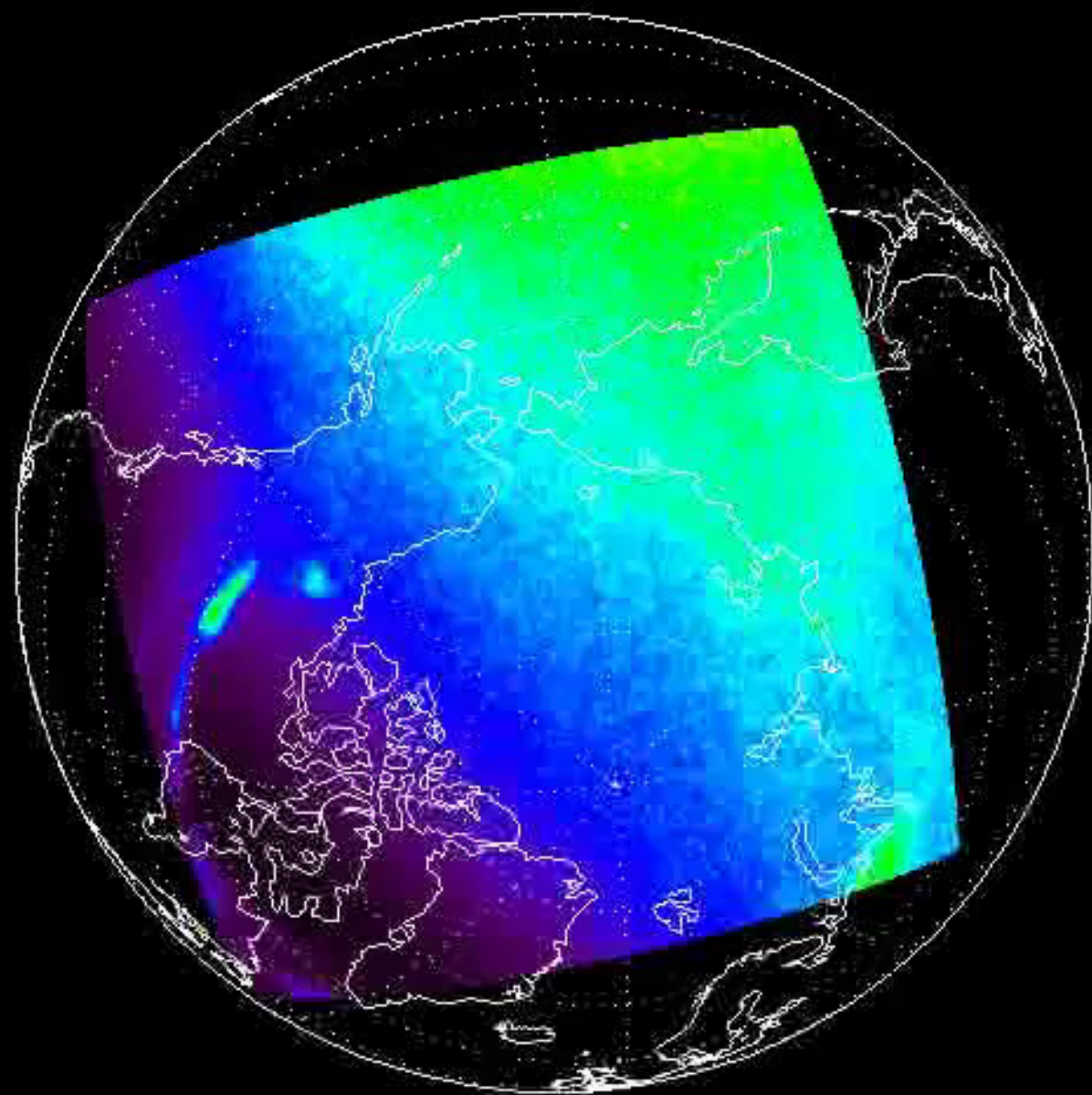


IMAGE-FUV-WIC, 2000-08-11-03:01:26

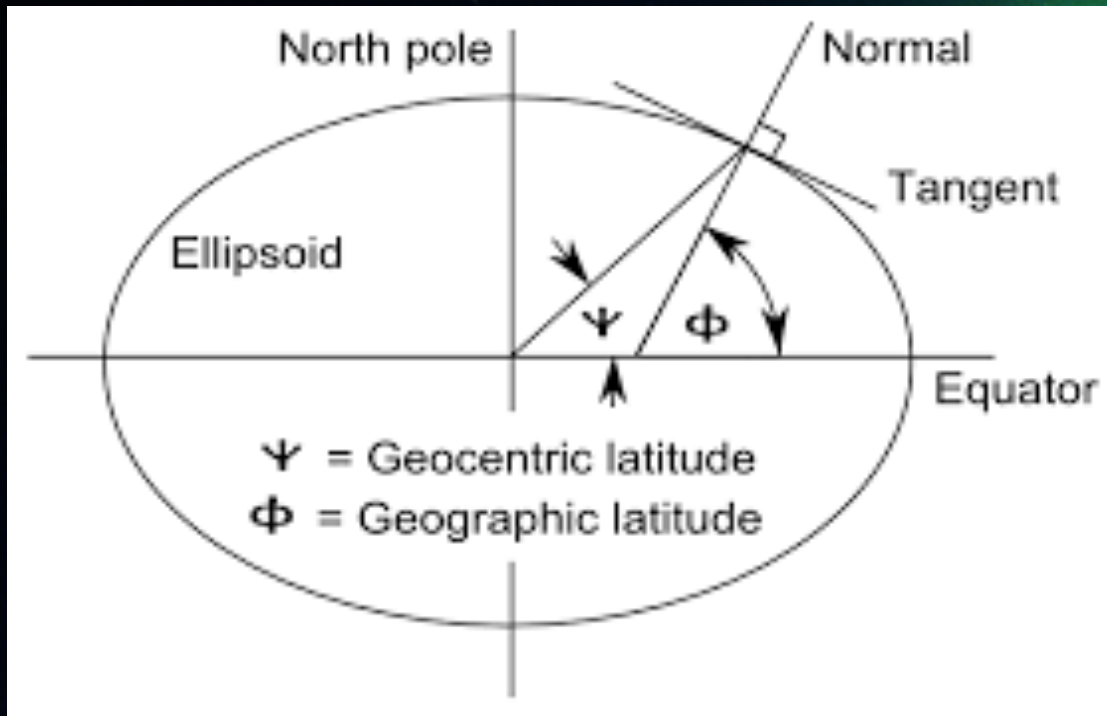
Defense Meteorological Satellite Program

- Run by Air Force Space and Missile Systems Center (SMC)
- 101 min, sun-synchronous, near-polar orbit at 830 km
- Special Sensors-Ions, Electrons, and Scintillation (SSIIES) thermal plasma package – IDM, RPA

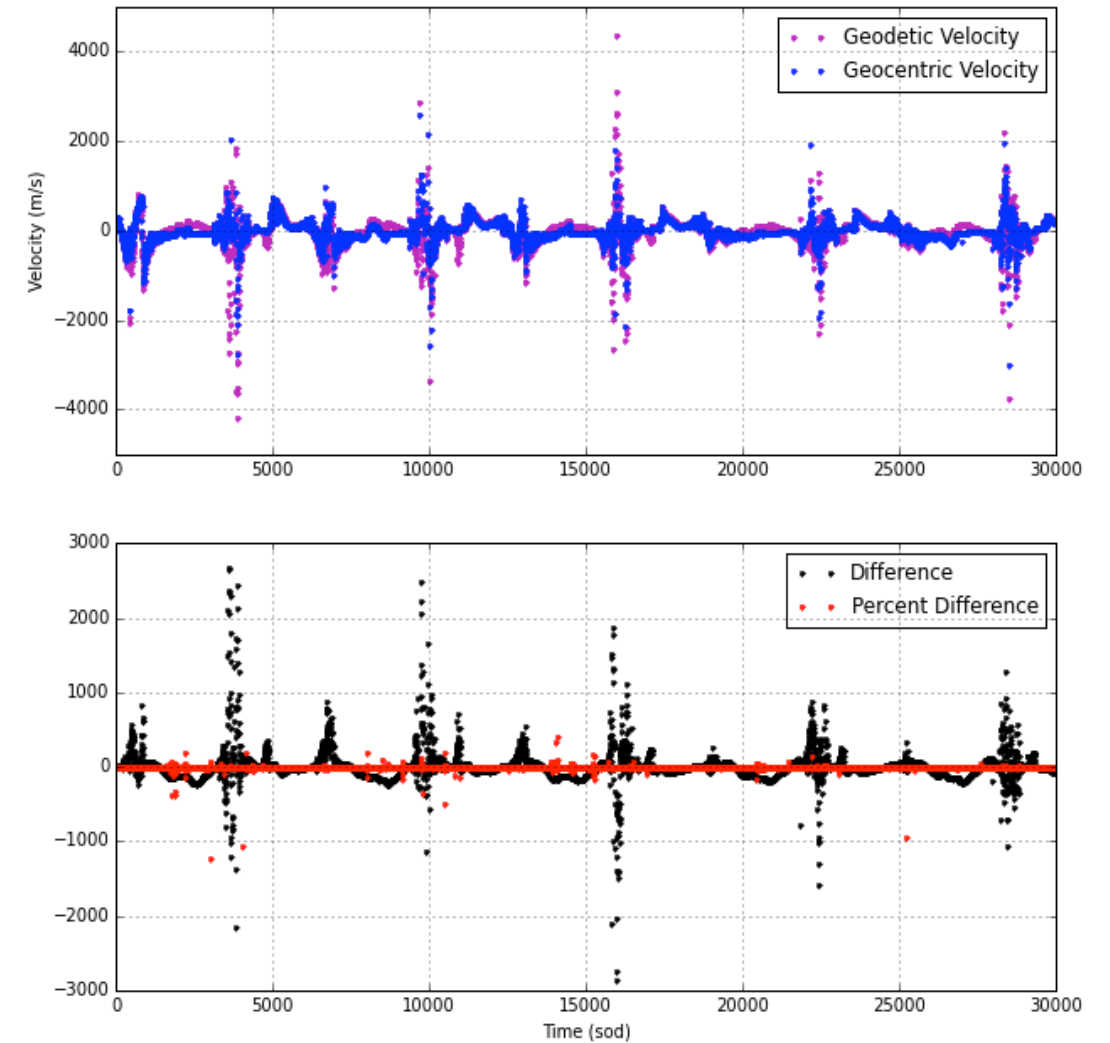


Geocentric vs. Geodetic

- Velocity calculations dependent on coordinate system

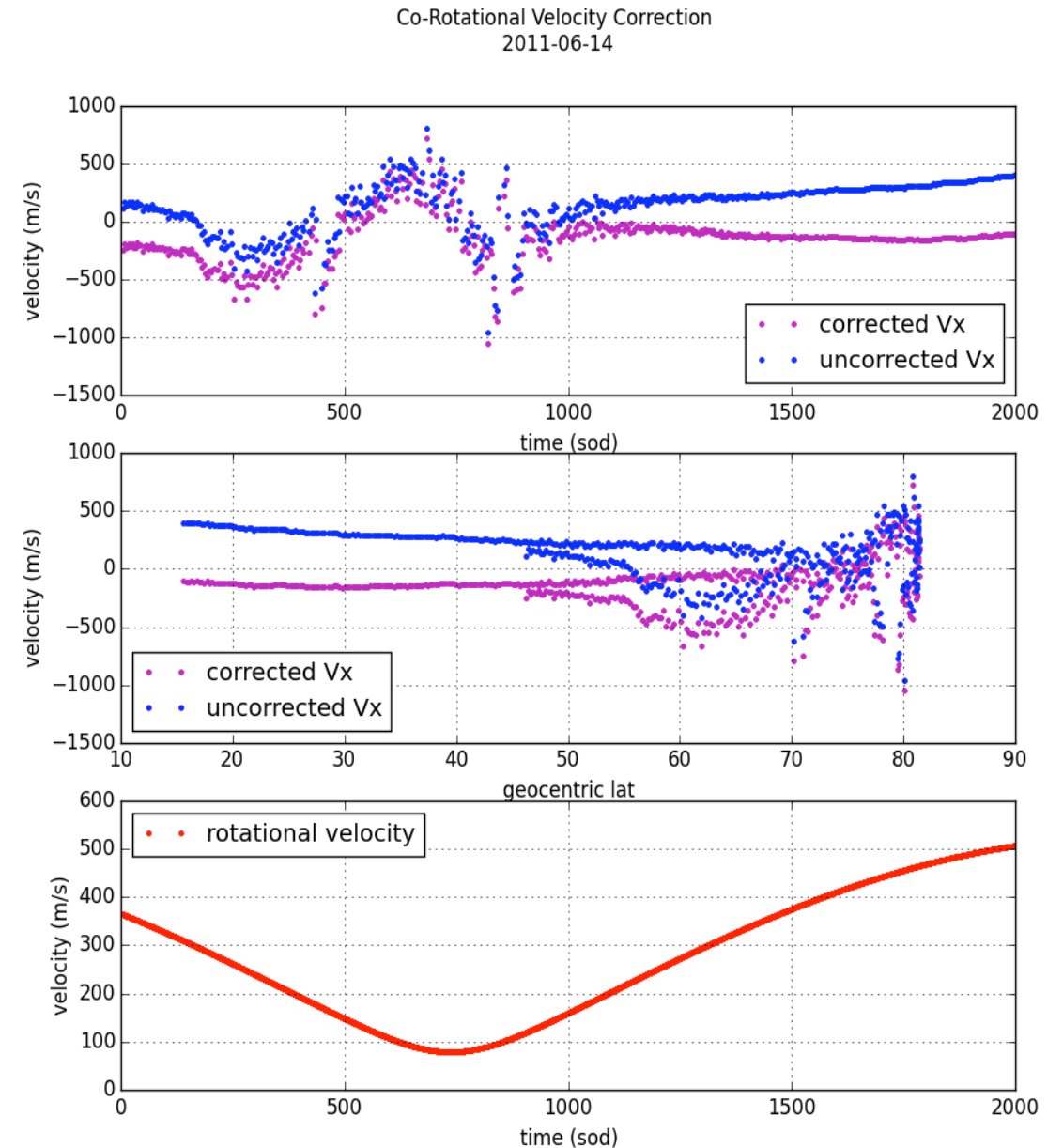


Geocentric and Geodetic Velocity Comparison

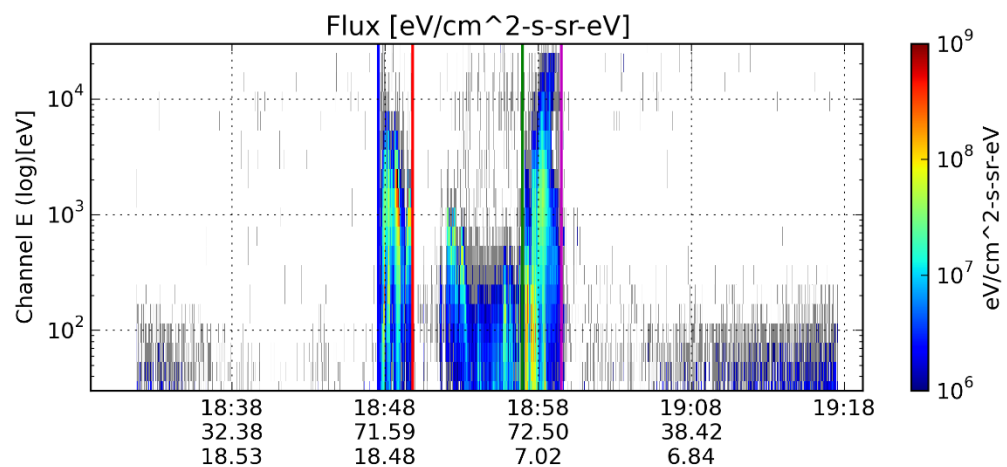
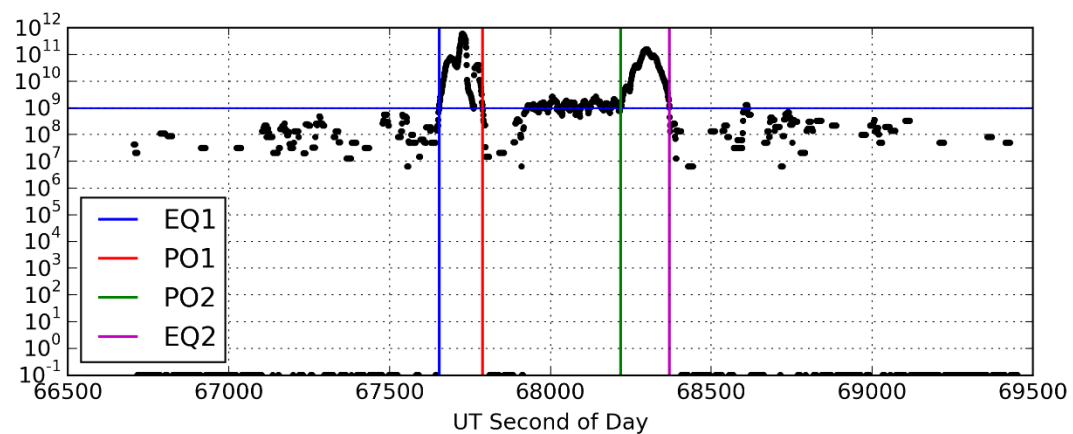
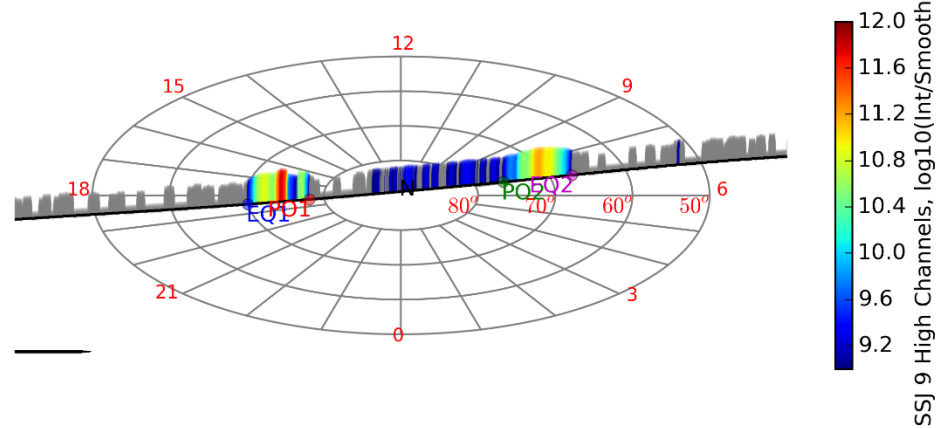


Co-Rotation Velocity

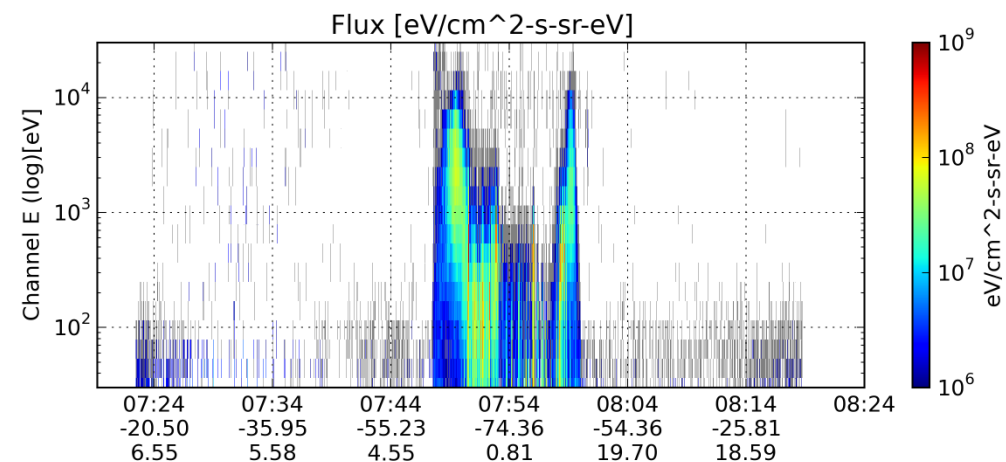
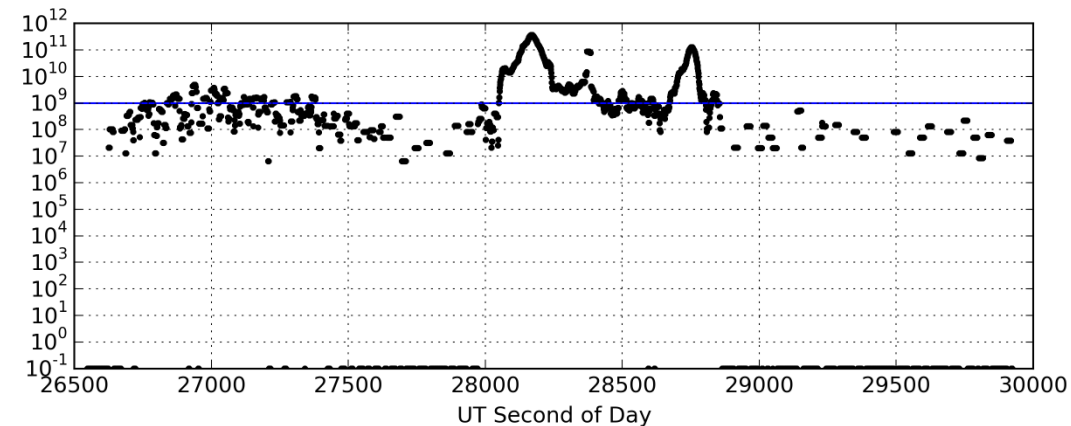
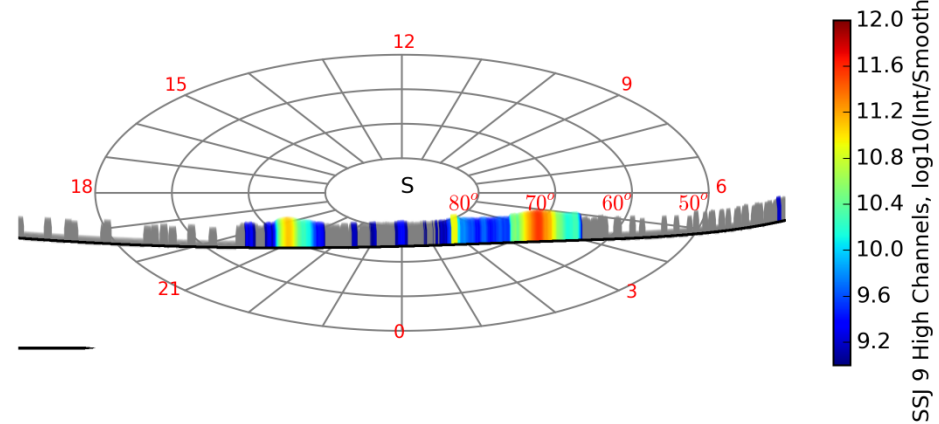
- Plasma “tied” to magnetic field lines
- Rotational movement not included in Poynting Flux calculations
- Relevance in Polar Region



dmsp-f16_ss_j_precipitating-electrons-ions_20110614_v1.1.1.cdf

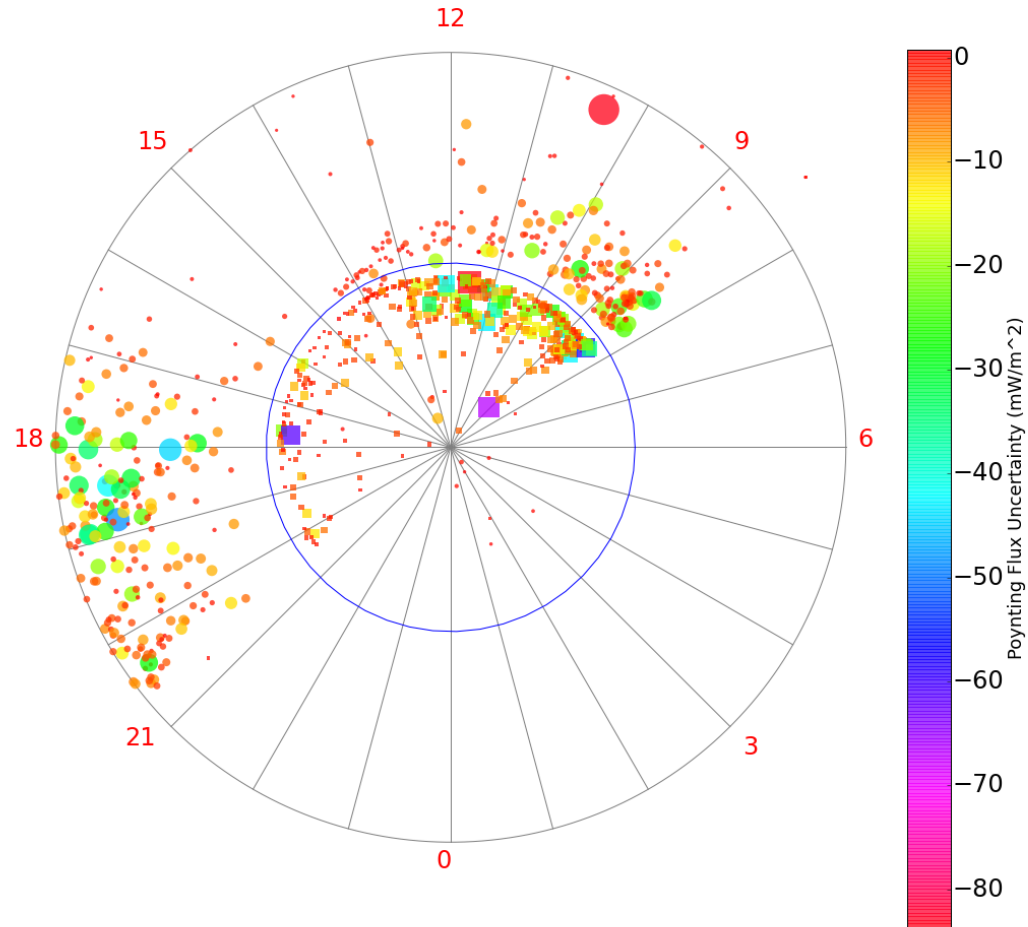


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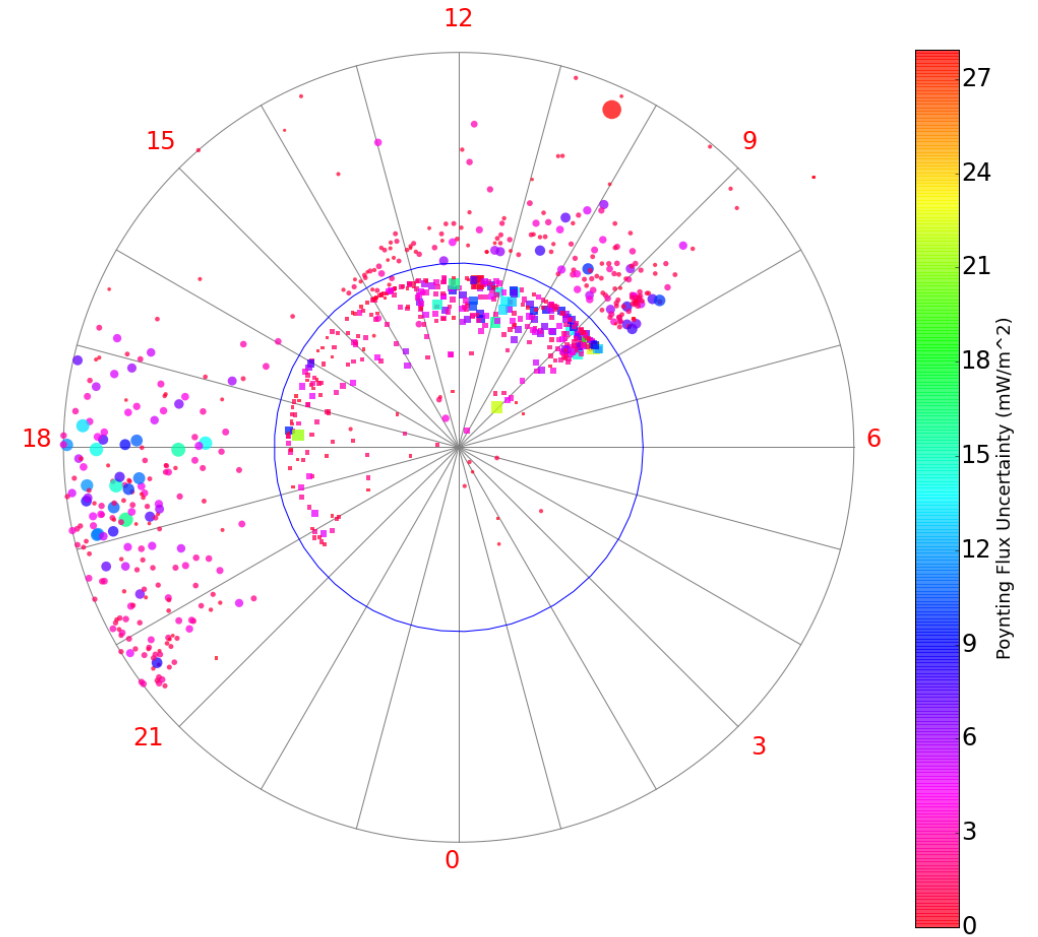


Behavior of Poynting Flux in Polar Region

Minimum (most negative) Poynting Flux
Northern Hemisphere 2006-04



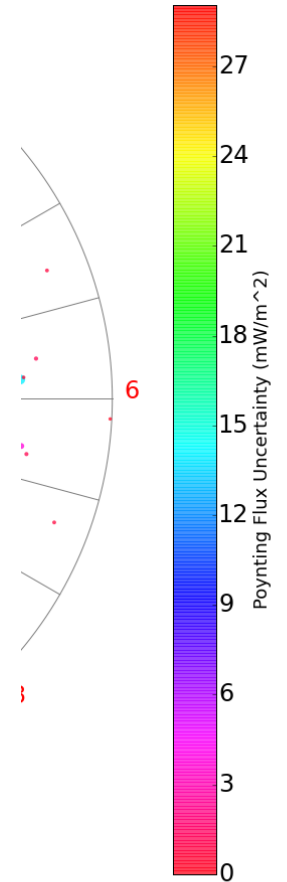
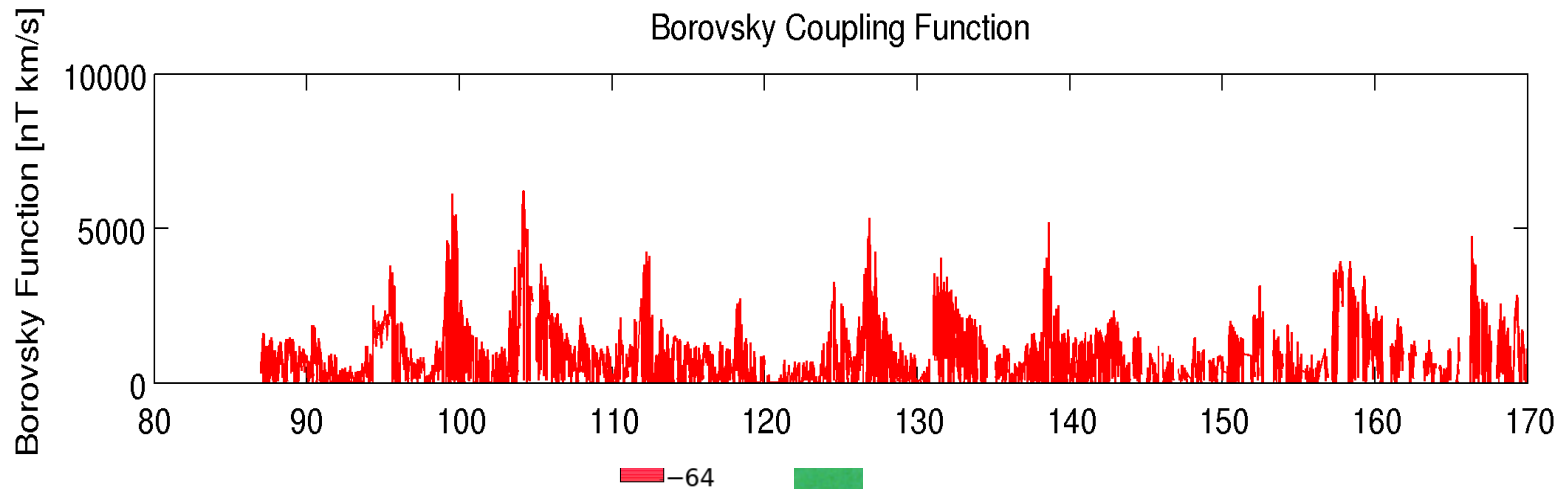
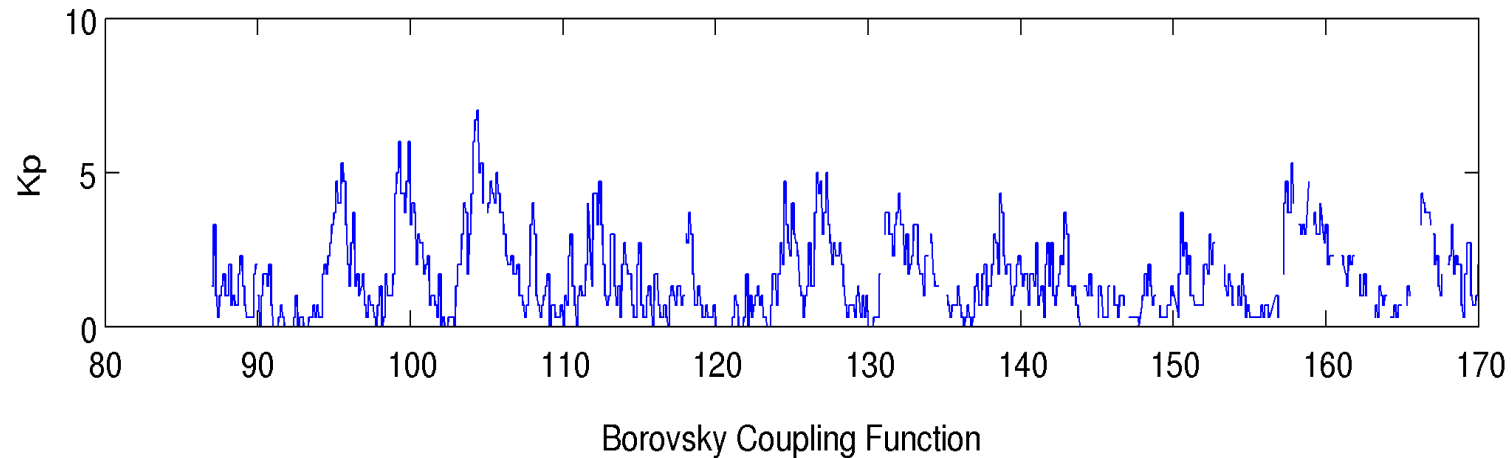
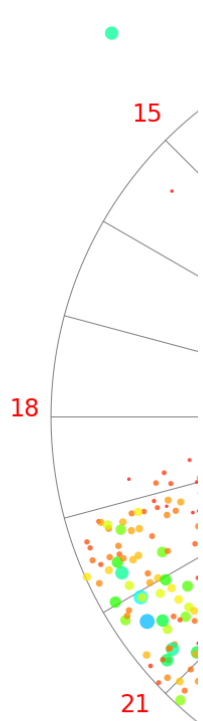
Uncertainty of Minimum (most negative) Poynting Flux
Northern Hemisphere 2006-04



Behavior of Poynting Flux in Polar Region

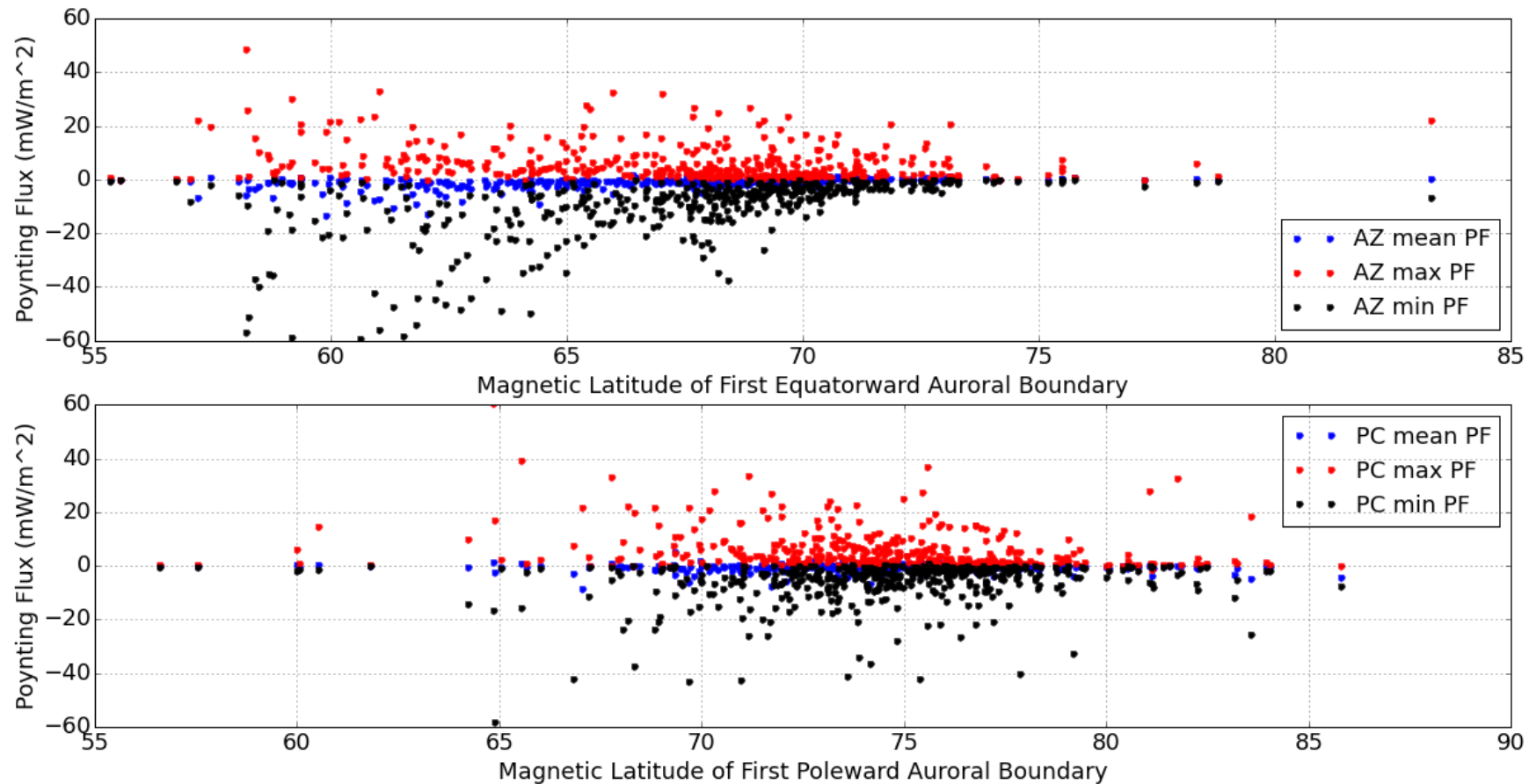
Minimum (most negative) Poynting Flux
Southern Hemisphere 2006-04

Uncertainty of Minimum (most negative) Poynting Flux
Southern Hemisphere 2006-04

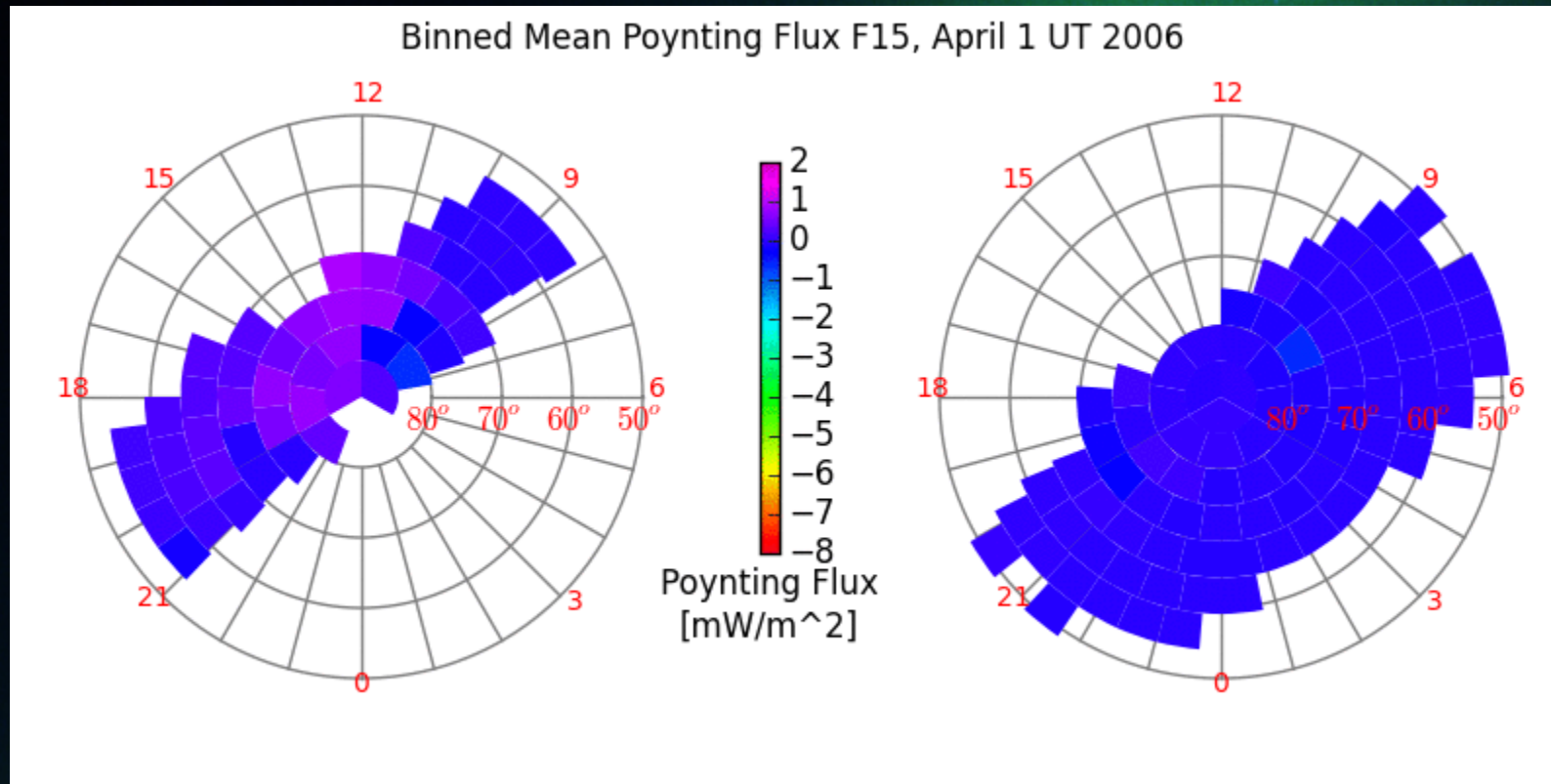


Behavior of Poynting Flux in Polar Region

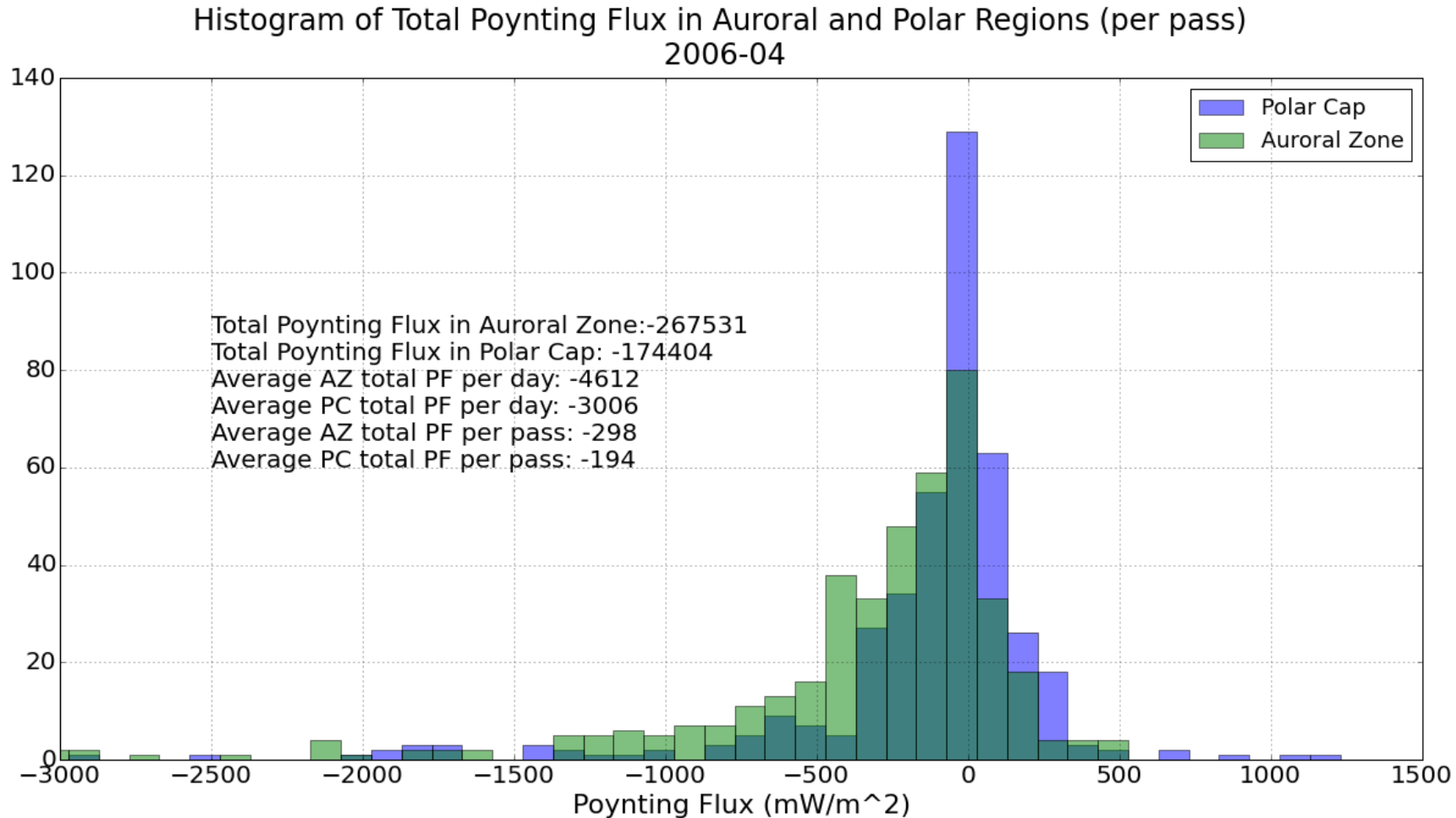
Poynting Flux in Northern Hemisphere Auroral Zone and Polar Cap 2006-04



Behavior of Poynting Flux in Polar Region



Behavior of Poynting Flux in Polar Region



Final Product

- Combination of SSIES raw data and Auroral Boundary code
- Includes (per pass over polar cap):
 - Poynting Flux mean, max, min, median, sum / Region
 - Corresponding magnetic local time, magnetic latitude
 - Corresponding uncertainty values
 - Boundary positions
- 894 passes ID'ed for 04/2006

Next Steps

- Statistical Analysis
 - How much Poynting flux comes into the polar region?
 - Where are the active regions?
 - How do active energy deposition regions relate to boundary locations?
- DMSP Usability
 - Cleaned and corrected data

A night sky photograph featuring a vibrant aurora borealis. The aurora displays bright red and green hues against a dark, star-filled sky. The Milky Way is visible as a faint, light-colored band across the upper portion of the image. In the bottom left corner, the dark silhouette of a tree and a portion of a building's roof are visible. The word "Questions?" is overlaid in white, bold, sans-serif font in the upper center of the image.

Questions?

Activity Level for April 2006

