

Observations of Poynting flux in the dayside cusp region at different altitudes

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Yang Lu¹, Yue Deng¹, Cheng Sheng², Liam Kilcommons³, Delores Knipps³, Quanqi Shi⁴, Xiaochen Gou⁴

1. University of Texas at Arlington

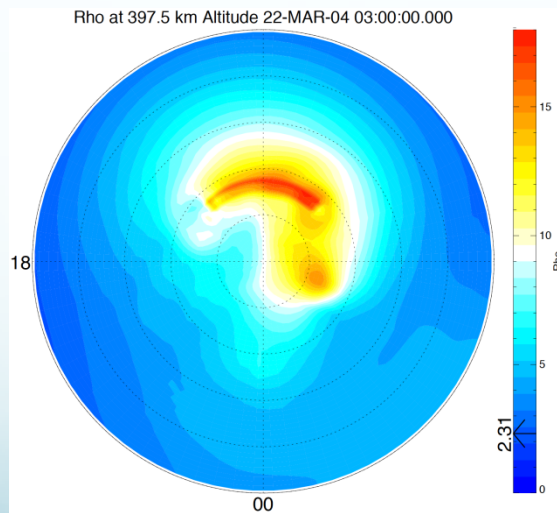
**2. High Altitude Observatory, National Center for Atmospheric Research,
Boulder, Colorado, USA**

**3. Colorado Center for Astrodynamics Research, University of Colorado
Boulder, USA 4. Shandong University, China**

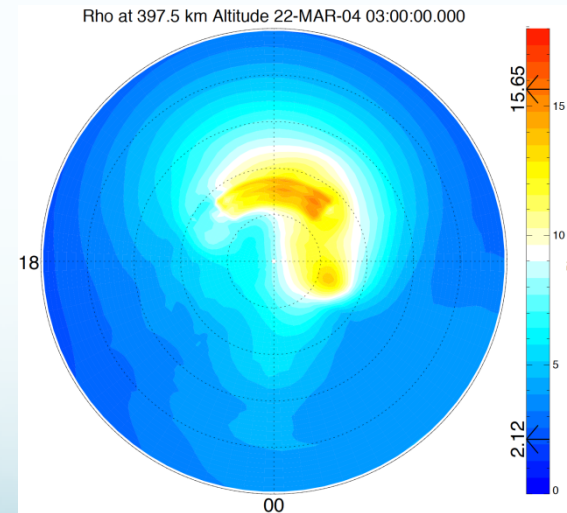
Motivation

- Correlation of Poynting flux(PF) and particle precipitation is very important at cusp region
- Influence on the thermosphere is different for different relative distributions of PF and particle precipitation

GITM simulation results



Matched



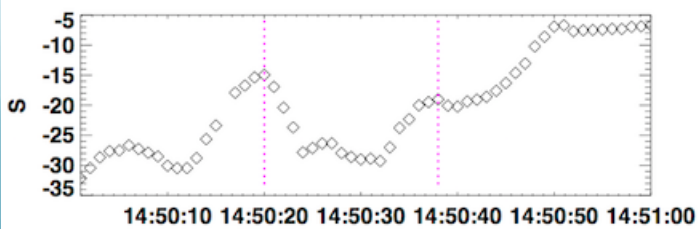
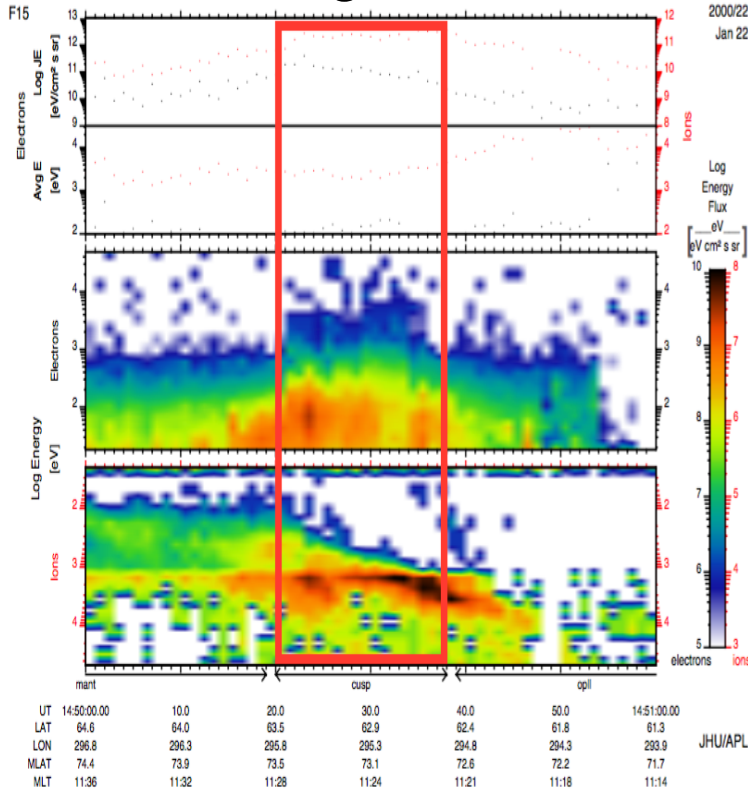
Non-matched

Methodology

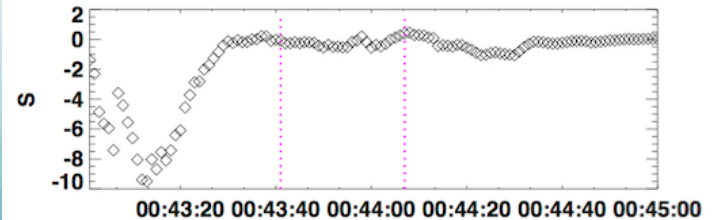
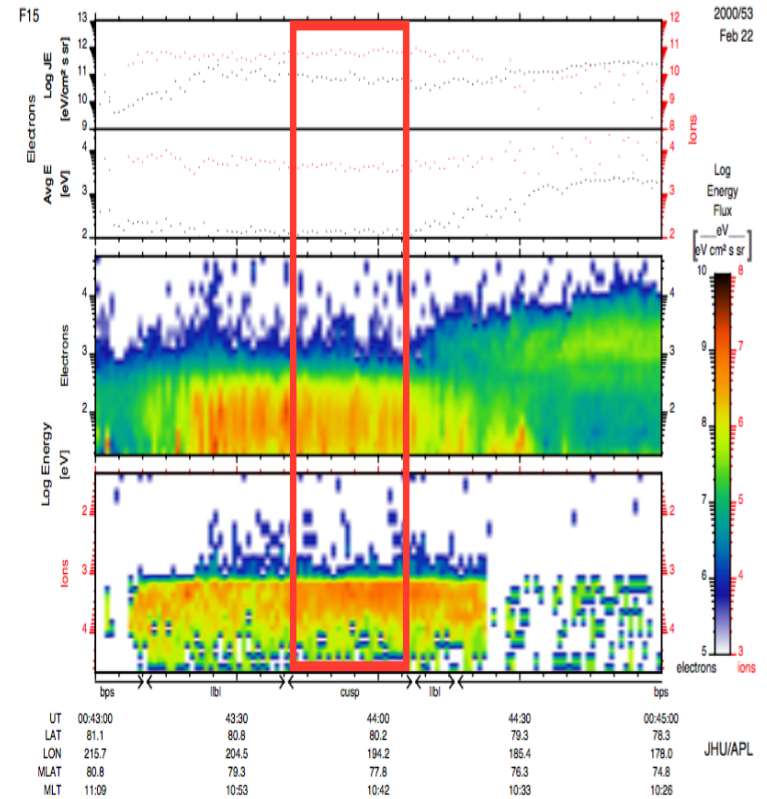
- Data:
- DMSP F15 2000-2004
- Cluster1 Aug-Oct. 2004
- $S = E \times dB / \mu_0$
- dB = measured magnetic field – background field
- Mapping: To get PF at 300km from Cluster altitudes
[**T. Zivkovic.2015**]

DMSP Results

With Significant PF



Without Clear PF



DMSP Results

Table 1

	cuspl	llbl
S>10	992	5636
3<S<10	692	6028
1<S<3	231	3364
S<1	84	2276

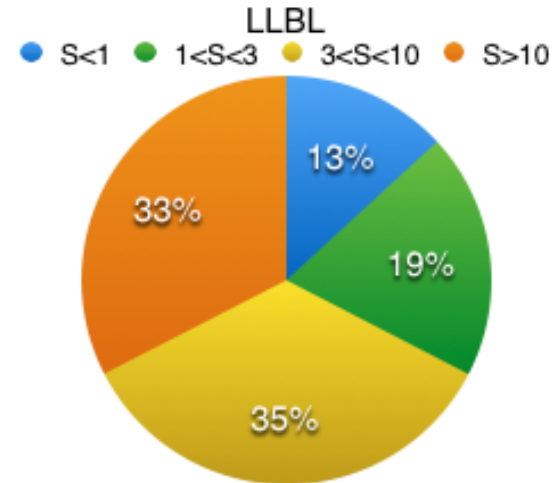
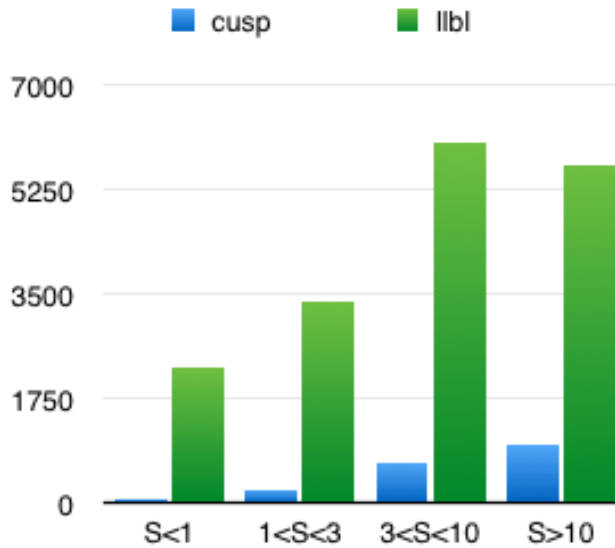
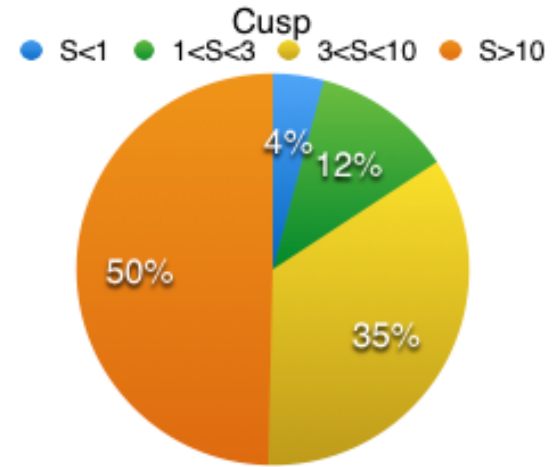
Significant



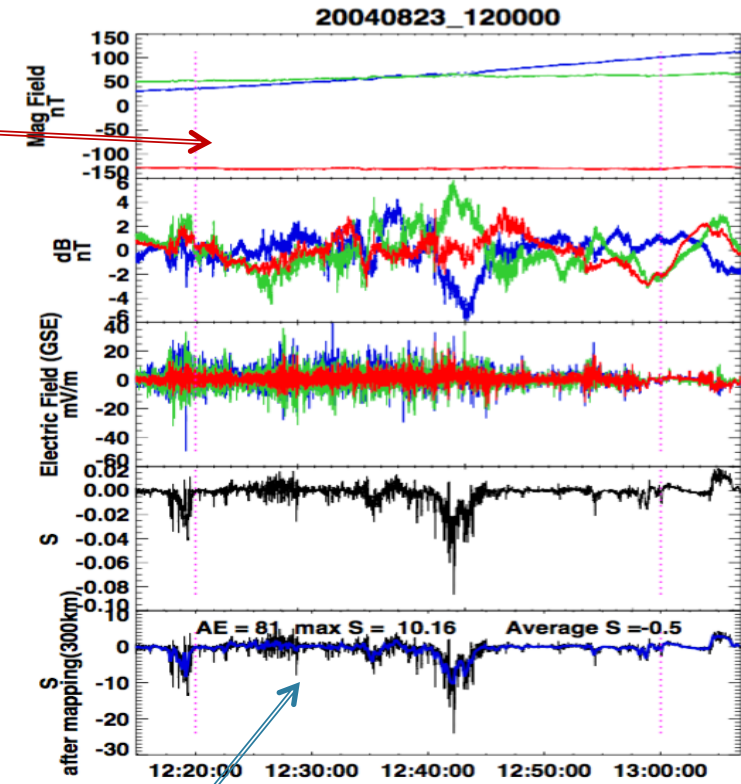
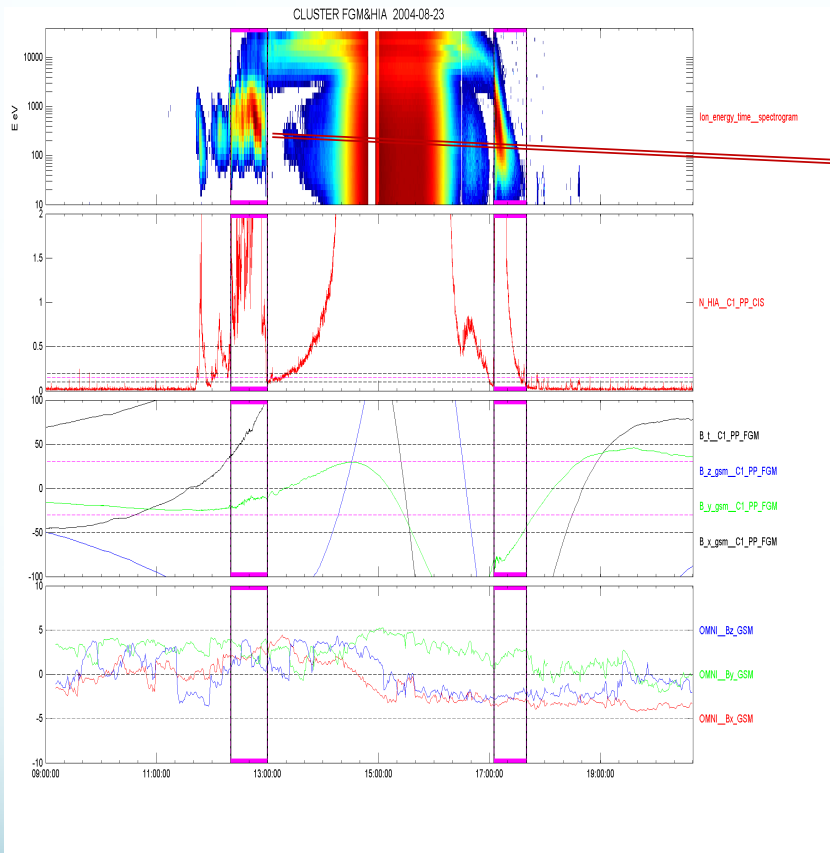
Clear



Without clear



Cluster Results

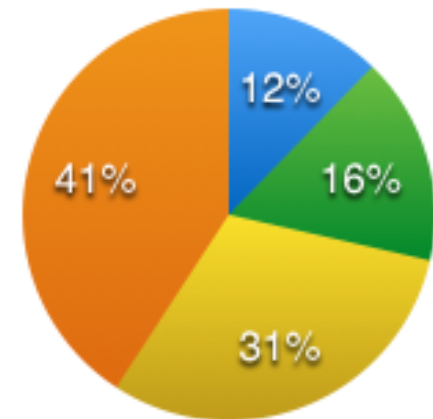


Blue line is 1s average

Cluster Results

	Numbers	Percentage
S>10	20	41%
3<S<10	15	31%
1<S<3	8	16%
S<1	6	12%

● S<1 ● 1<S<3 ● 3<S<10
● S>10



Conclusion

- At DMSP altitudes, half cases show a significant Poynting flux enhancement ($S > 10$) in the cusp region, 85% cases show a clear Poynting flux ($S > 3$) and only 4% case show no-clear Poynting flux ($S < 1$) in the cusp region
- At DMSP altitudes, the chance to observe significant Poynting flux in cusp region is higher than in LLBL region.
- It also has a higher chance to observe significant Poynting flux at DMSP altitudes than at Cluster altitudes.
- At Cluster altitudes ($4 \sim 8 R_E$), it also shows significant upward Poynting flux in the cusp region (52%), which has not been observed in the DMSP measurements.

Thank You!