RAM-SCB Dst Validation

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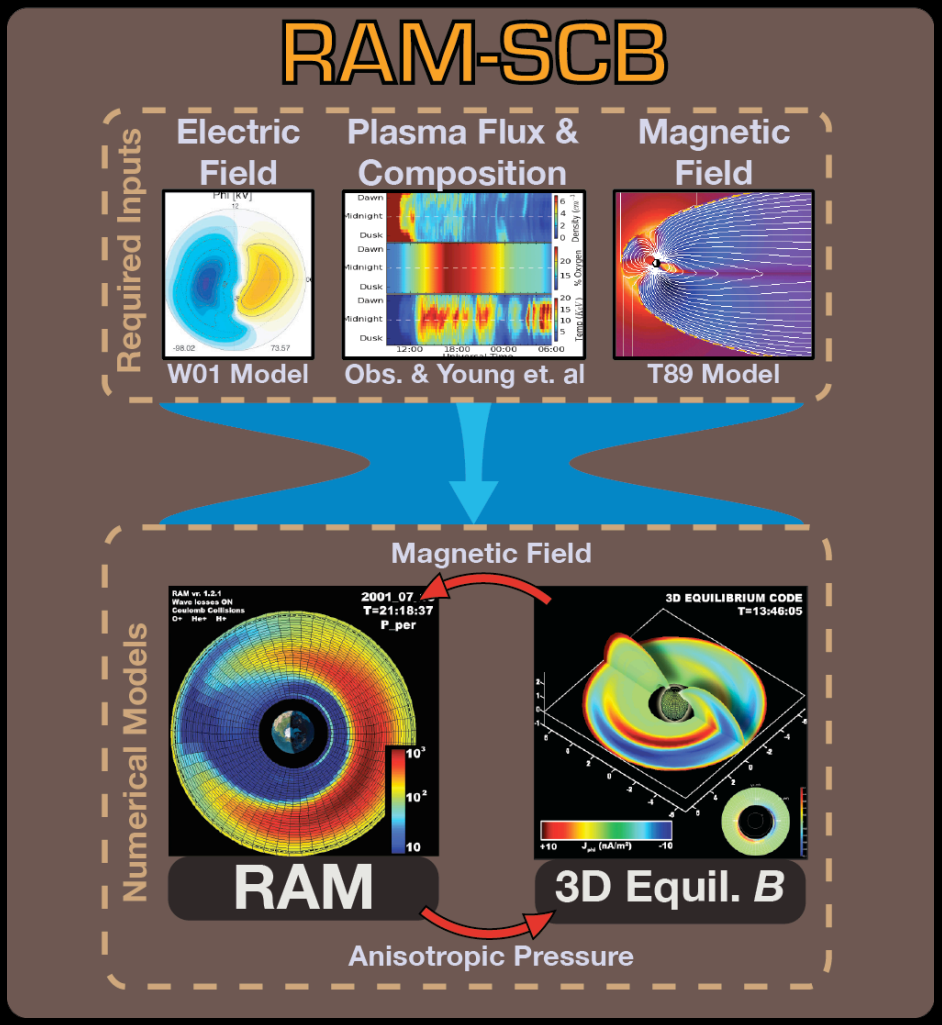

- RAM-SCB (**R**ing current **A**tmosphere interactions **M**odel with **S**elf **C**onsistent **B**Magnetic field) combines a kinetic ring current model with a force balanced 3D magnetic field model.
- RAM Dst is obtained through the Dessler-Parker-Sckopke relationship; does not include tail currents, etc.
- Metrics: PE, nRMSE, Pearson's r

$$nRMS = \sqrt{\frac{\sum_{i=1}^{n}(x_i - y_i)^2}{\sum_{i=1}^{n} x_i^2}}$$

$$PE = 1 - \frac{< x - y >}{\sigma_{Obs.}^2}$$

$$r = \frac{1}{n-1}\frac{\sum(x-\bar{x})(y-\bar{y})}{\sigma_x \sigma_y}$$

Raw Numbers

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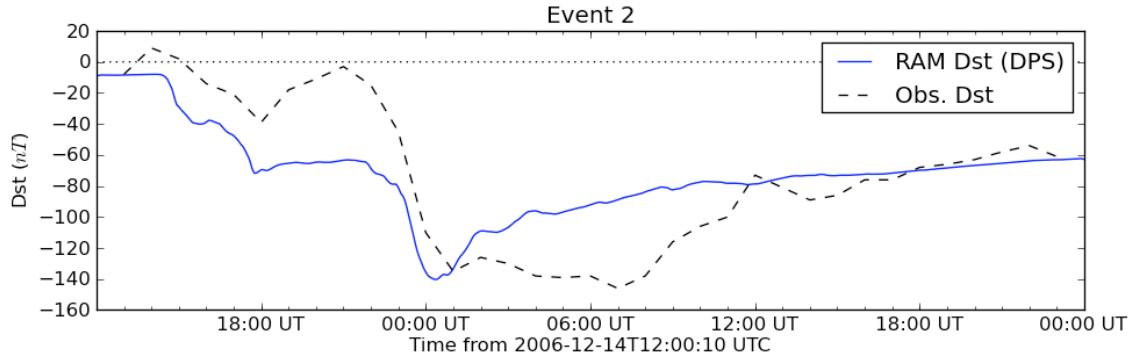
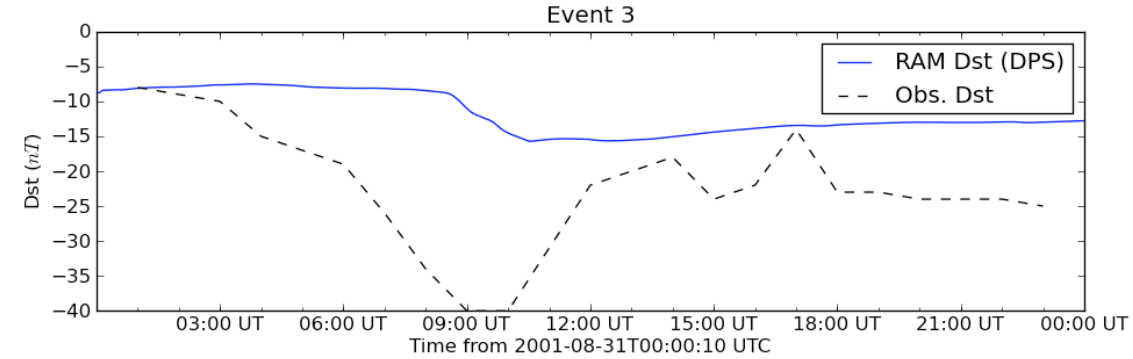
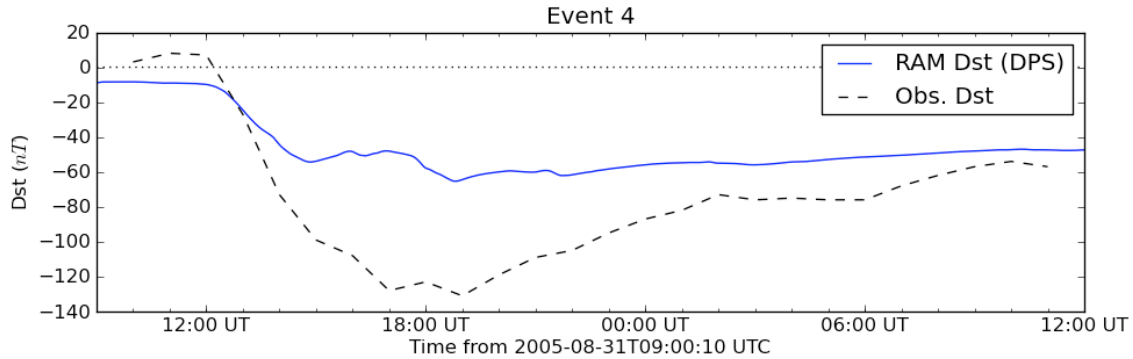
	Event 1	Event 2	Event 3	Event 4
P. E.	X	0.602	-1.215	0.056
nRMS	X	0.352	0.541	0.440
Pearson's r	X	0.806	0.401	0.885

Dst Comparisons







What Affects Dst?

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- Particle flux at outer boundary
  - Cold particles are easily captured.
  - Warm fluxes will grad-**B** drift out of the domain.
  - Quality of data and adequacy of coverage.
- Strength of convection **E**
- **B** shape at outer boundary
  - Stretched fields lead to weaker Dst.
  - Mapping of Ionospheric potential heavily dependent on magnetic field.

B and Dst

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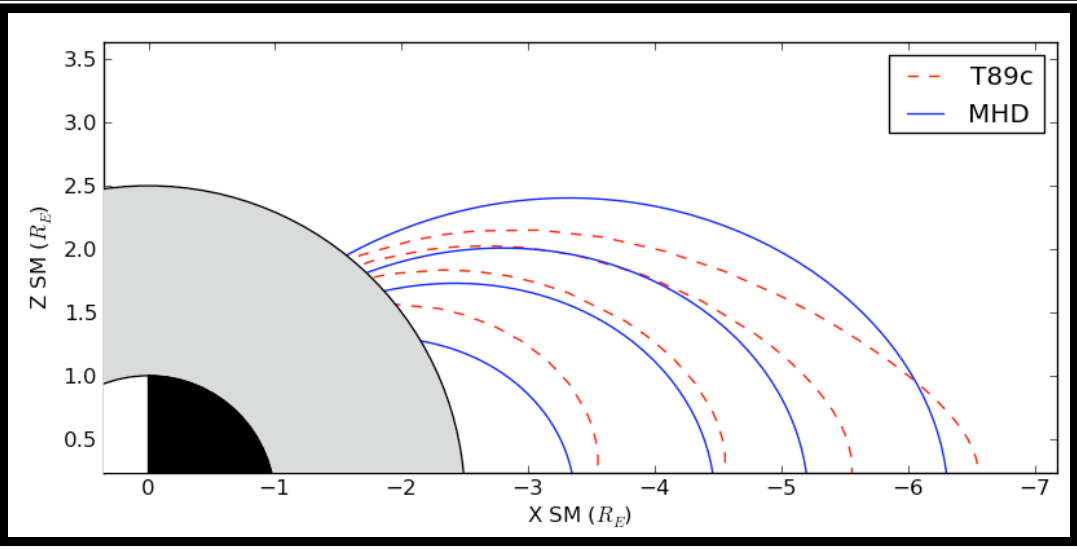
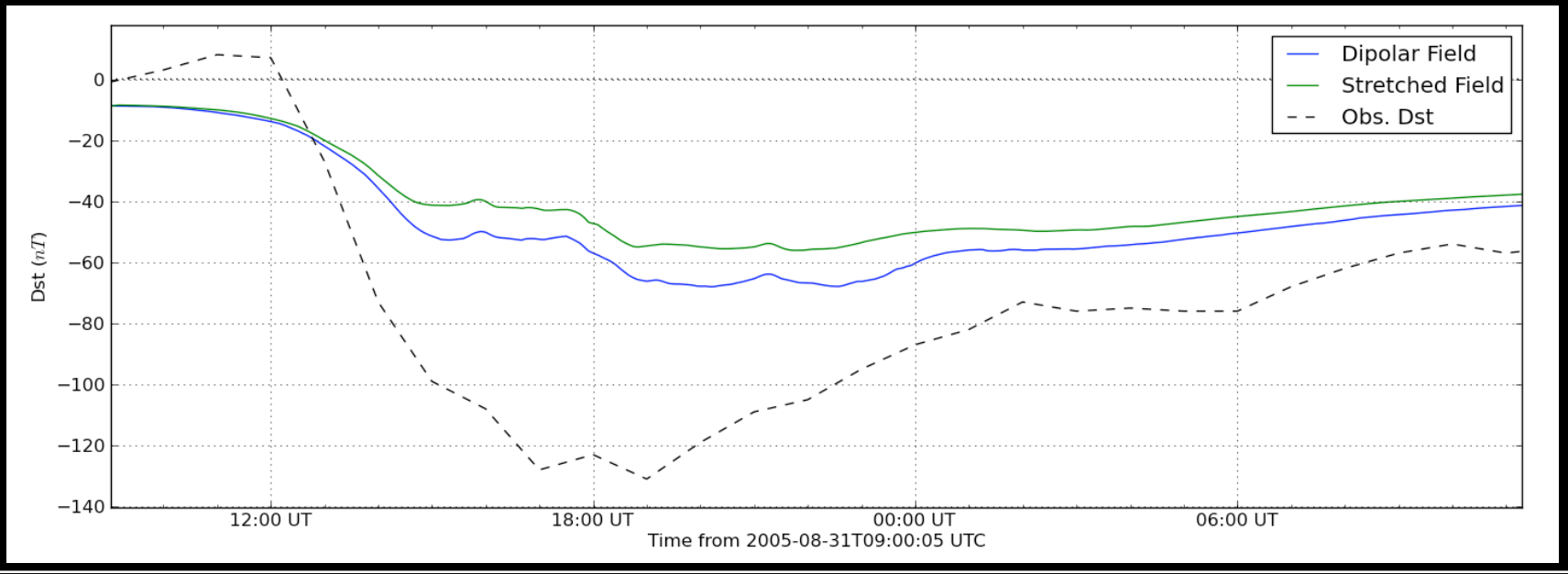
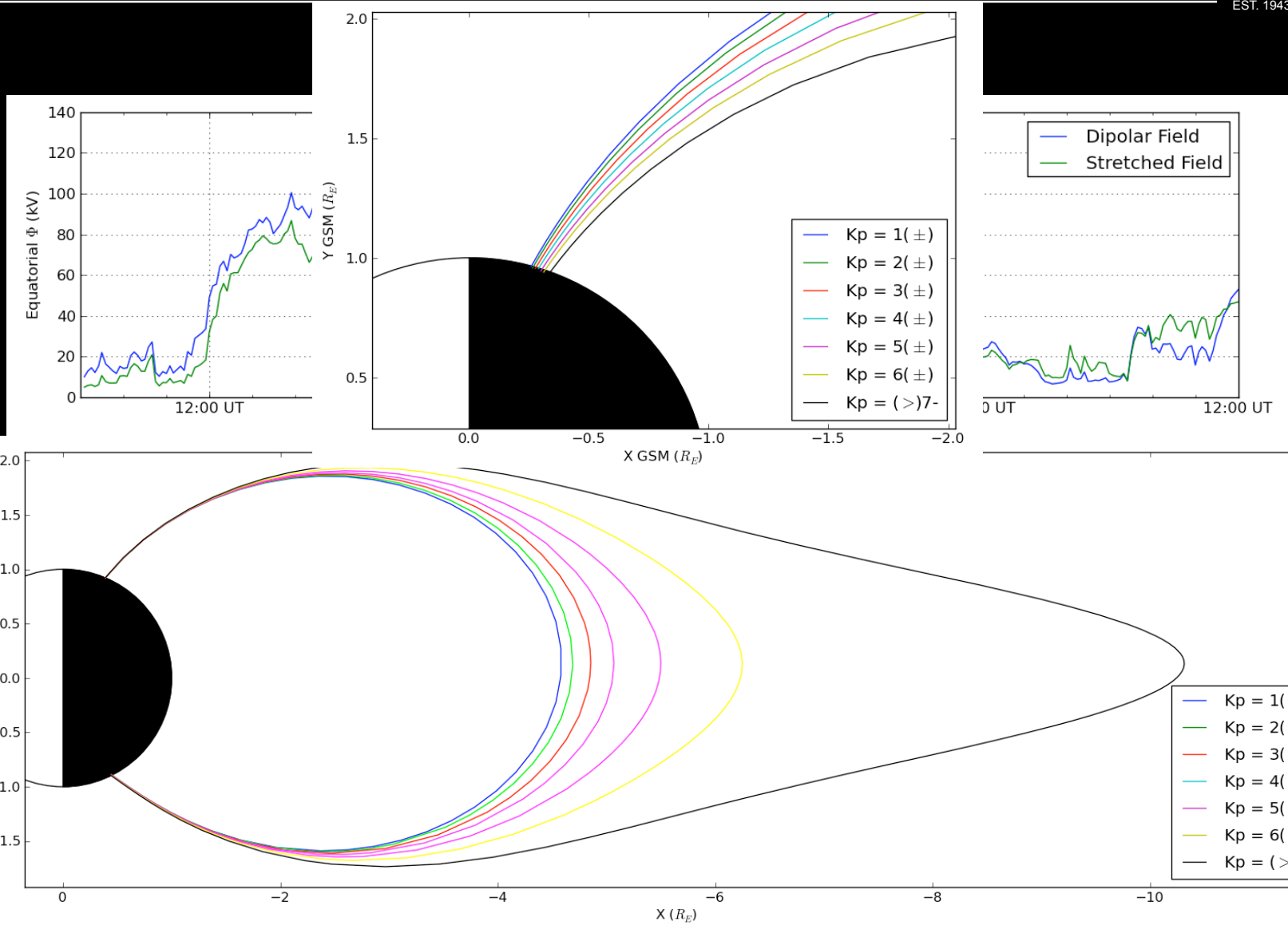
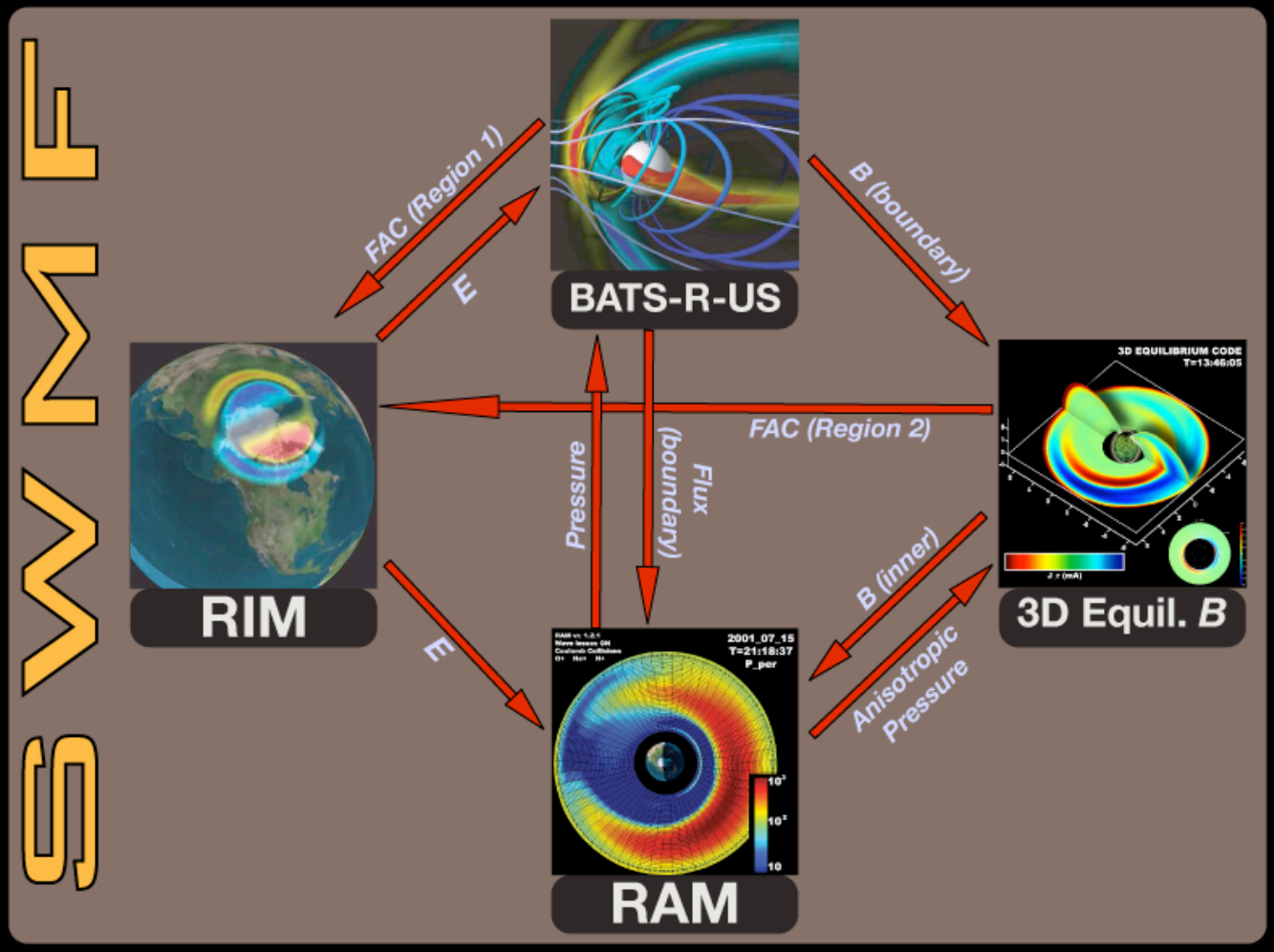




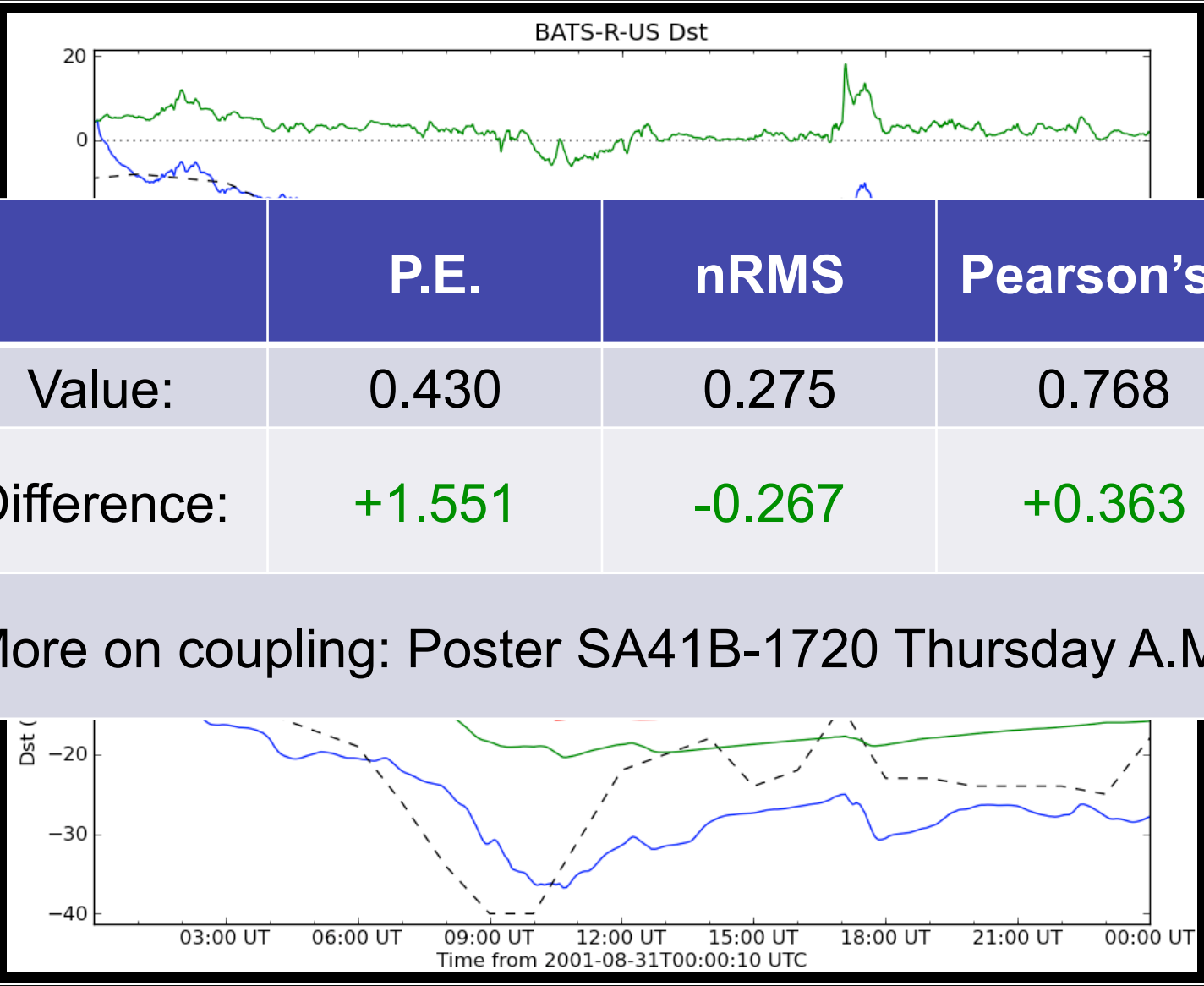
E, B, and Dst


Equatorial Φ (kV)
12:00 UT
Y GSM (R_E)
X GSM (R_E)
Kp = 1(±)
Kp = 2(±)
Kp = 3(±)
Kp = 4(±)
Kp = 5(±)
Kp = 6(±)
Kp = (>)7-
Dipolar Field
Stretched Field
12:00 UT
Z (R_E)
X (R_E)

Coupling to the SWMF



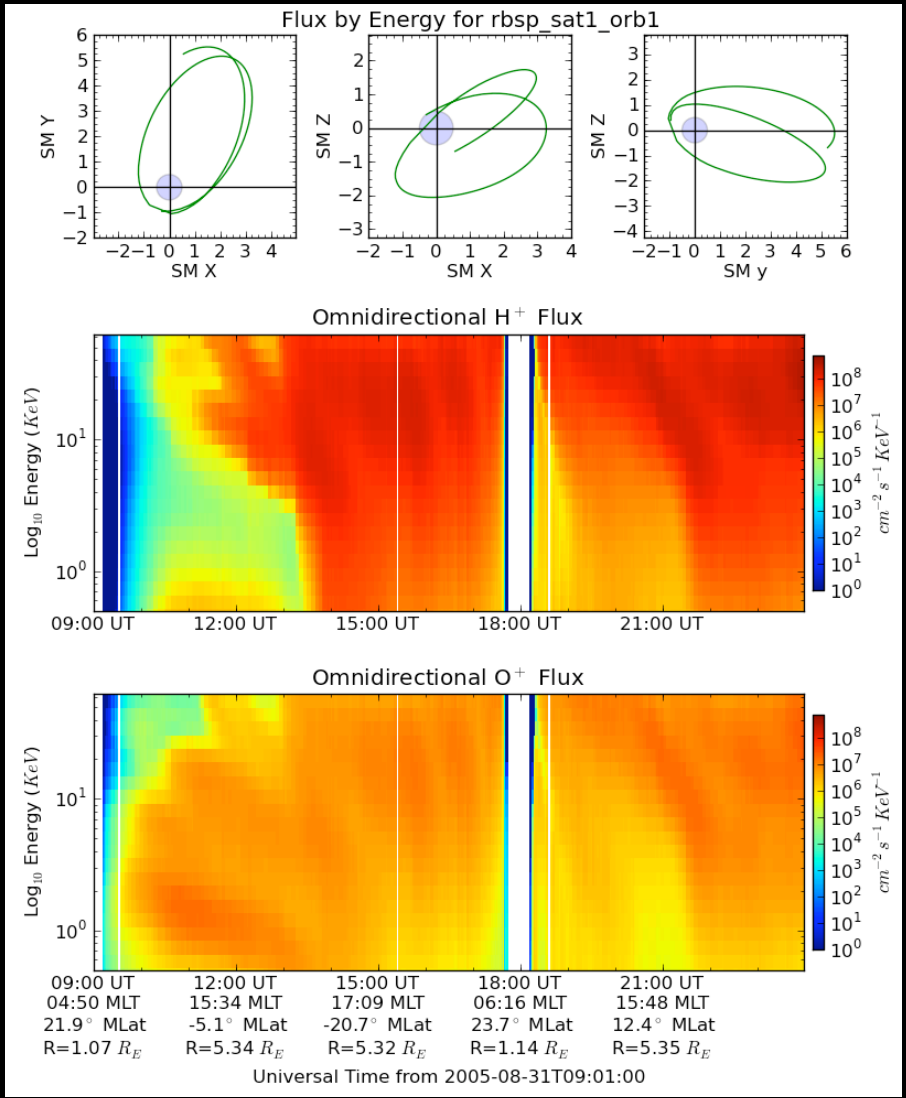
Improvements



	P.E.	nRMS	Pearson's r
Value:	0.430	0.275	0.768
Difference:	+1.551	-0.267	+0.363

More on coupling: Poster SA41B-1720 Thursday A.M.

Next Steps: Satellite Validation



- RAM-SCB virtual satellites record local B, E, and directional flux.
- Limited by RAM-SCB domain.
- Virtual satellites will allow us to investigate internal performance, not quality of drivers.