Early RAM-SCB Validation: Dst

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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.
- Validation has begun by comparing Dst index calculated from RAM to observed values.
- RAM Dst is obtained through the Dessler-Parker-Sckopke relationship; does not include tail currents, etc.
- Simulations of the August 31st, 2005 event have been performed.
- Metrics: PE, nRMSE, Pearson's r

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

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

$$r = \sqrt{\frac{\left(\sum xy - n\bar{x}\bar{y}\right)^2}{\left(\sum x^2 - n\bar{x}\right)\left(\sum y^2 - n\bar{y}\right)}}$$

Many Setups, One Event

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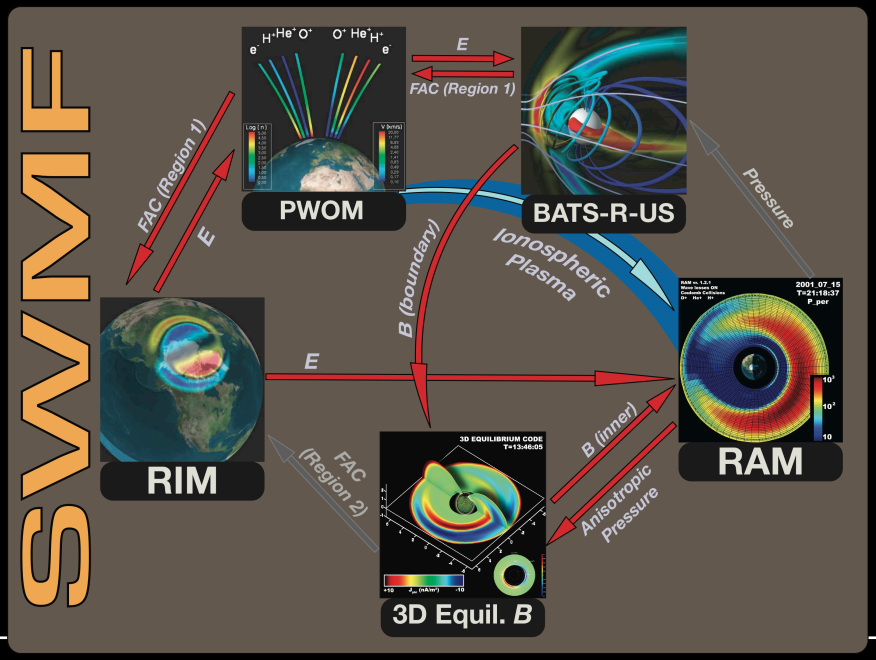
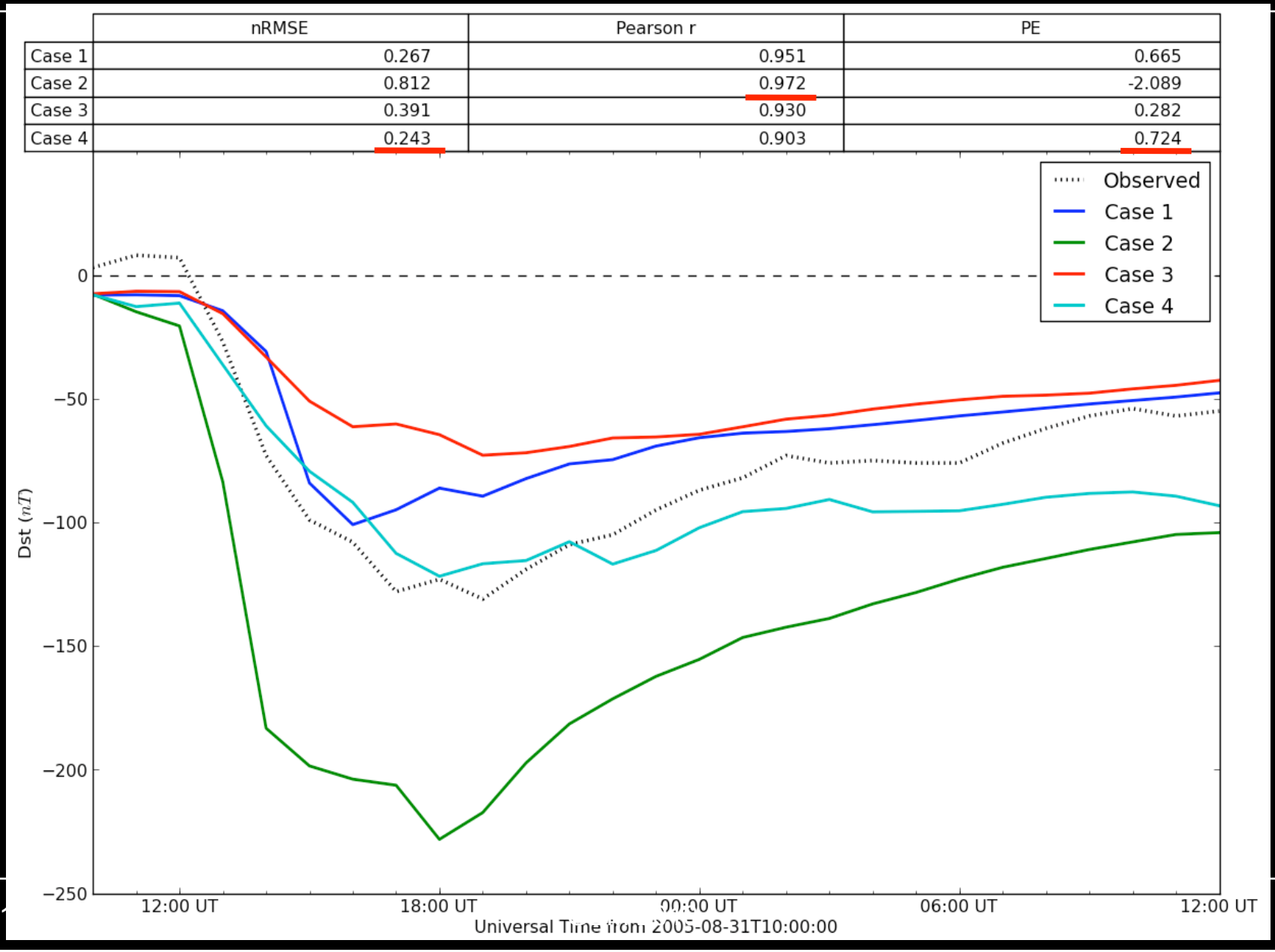
- Case 1: Driven by Weimer01, T04, and LANL geosynchronous observations.
- Case 2: Driven by SWMF (BATS and RIM)
- Case 3: Driven by SWMF- (…and PWOM)
- Case 4: Driven by SWMF- (BATS, RIM, AND RCM)



Results

	nRMSE	Pearson r	PE
Case 1	0.267	0.951	0.665
Case 2	0.812	0.972	-2.089
Case 3	0.391	0.930	0.282
Case 4	0.243	0.903	0.724



How to Get Big Differences

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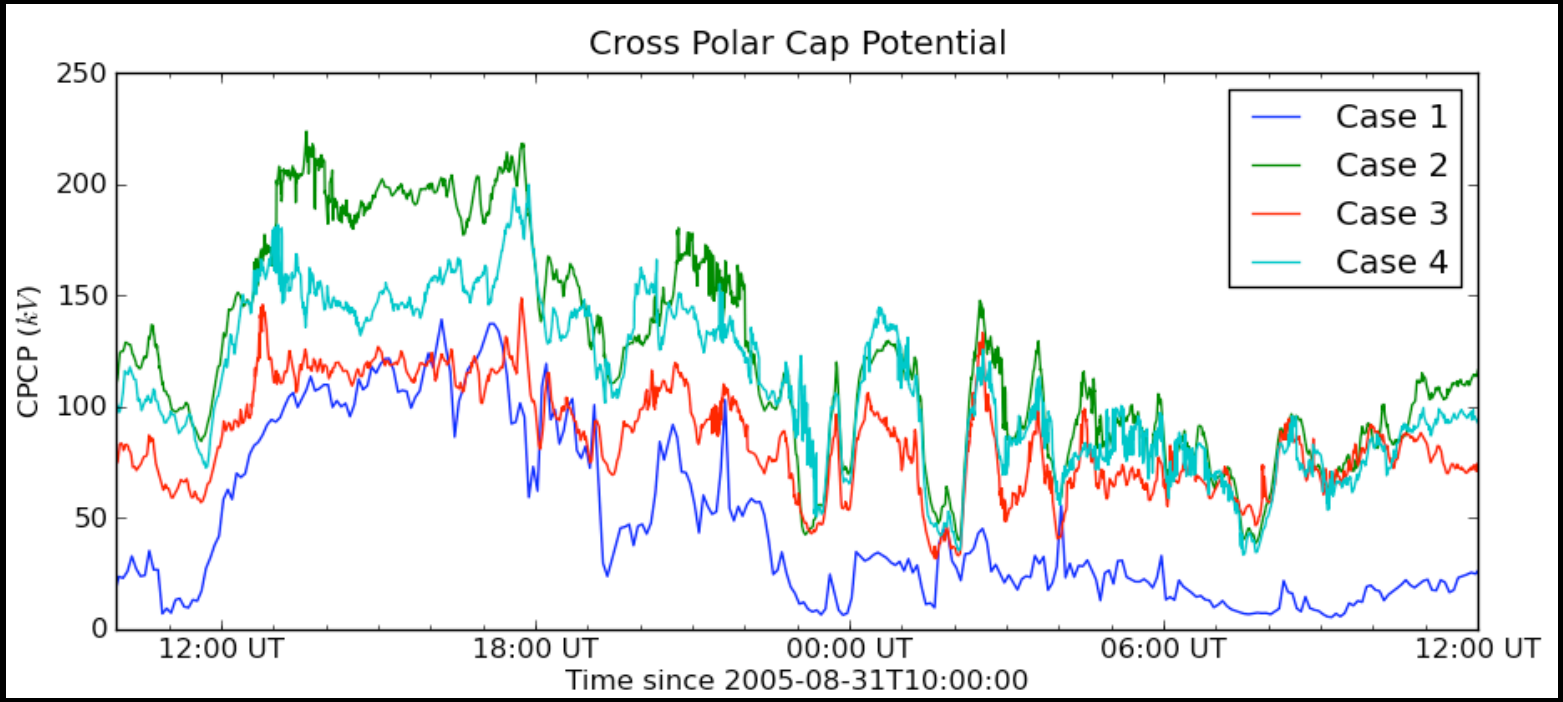
Boundary Conditions				
	Case 1	Case 2	Case 3	Case 4
Plasma	Data	Cold & Dense	Cold, less dense	Warmer, less dense
B-Field	T04	Dipolar	Dipolar	Stretched



5-minute Dst vs. Sym-H