# Opportunities
Evolution not Revolution

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- **Increase customer pull**
  - **CCMC statistics of magnetosphere simulation requests**
  - **Increase capability**
  - **Emphasize student involvement**
- ***Basic* science validation**
  - **Days of paranoia are over**
  - **Example of need for *Basic* science validation**
  - **Joint CCMC campaigns with GEM, SHINE, and CEDAR**

Magnetosphere runs on request growth
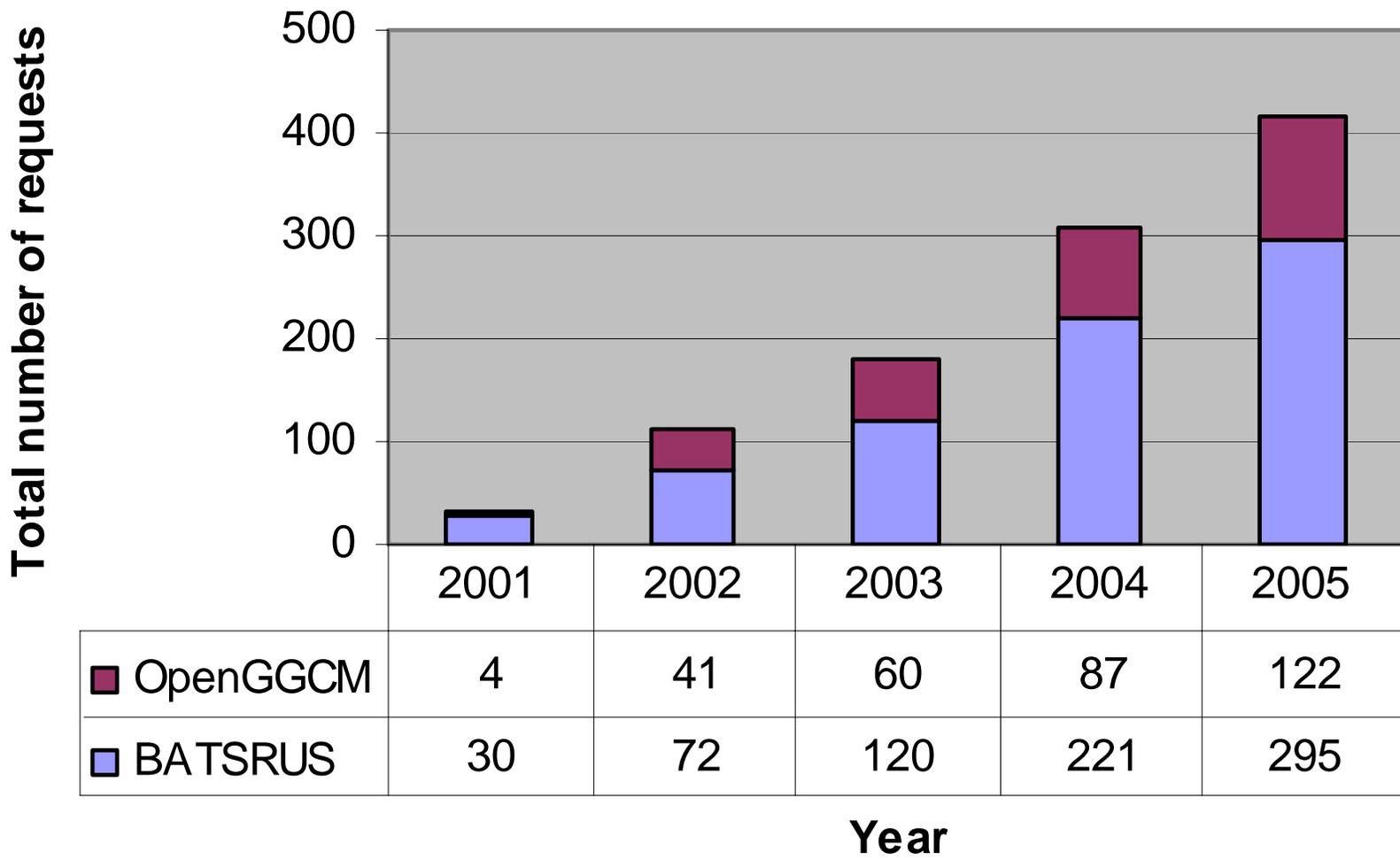
Year	2001	2002	2003	2004	2005
■ OpenGGCM	4	41	60	87	122
■ BATSRUS	30	72	120	221	295

Total number of requests

Year

■ BATSRUS ■ OpenGGCM

Real event runs vs Modeled conditions runs for BATSRUS and OpenGGCM

	BATSRUS	Open GGCM	Both models
Real Event Simulations	180	75	255
Simulation with Modeled Conditions	114	47	161

Modeled Conditions 39%

Real Event 61%
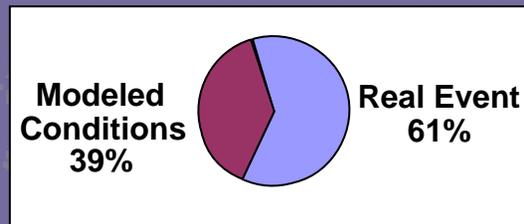
Simulations with fixed inflow boundary condition vs ones with time-dependant boundary conditions

	BATSRUS	Open GGCM	Both models
Fixed Inflow BCs	90	21	111
Variable Inflow BCs	204	101	305

Fixed 27%

Variable 73%
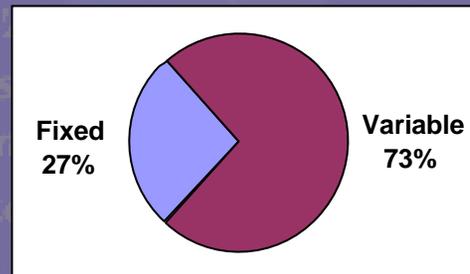
Increase Customer Pull

Increase Capability

- Actively evolve user interface
- At least two choices per model type (e.g., BATSRUS and openGGCM)
- Sponsor (perhaps jointly) model-focused workshops

Emphasize Student Involvement

- Encourage CCMC models used in class assignments
- CCMC summer school
- Establish library of standard runs for pedagogic use

Basic science validation
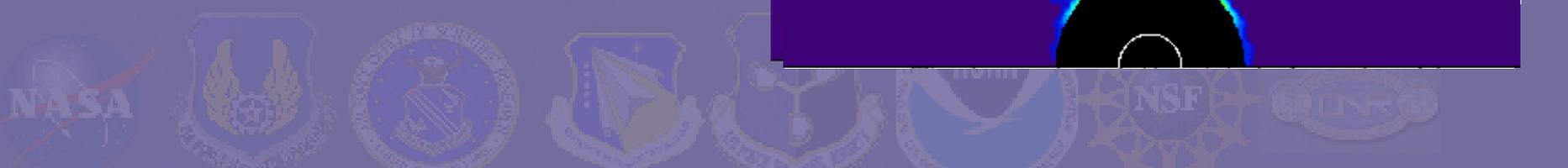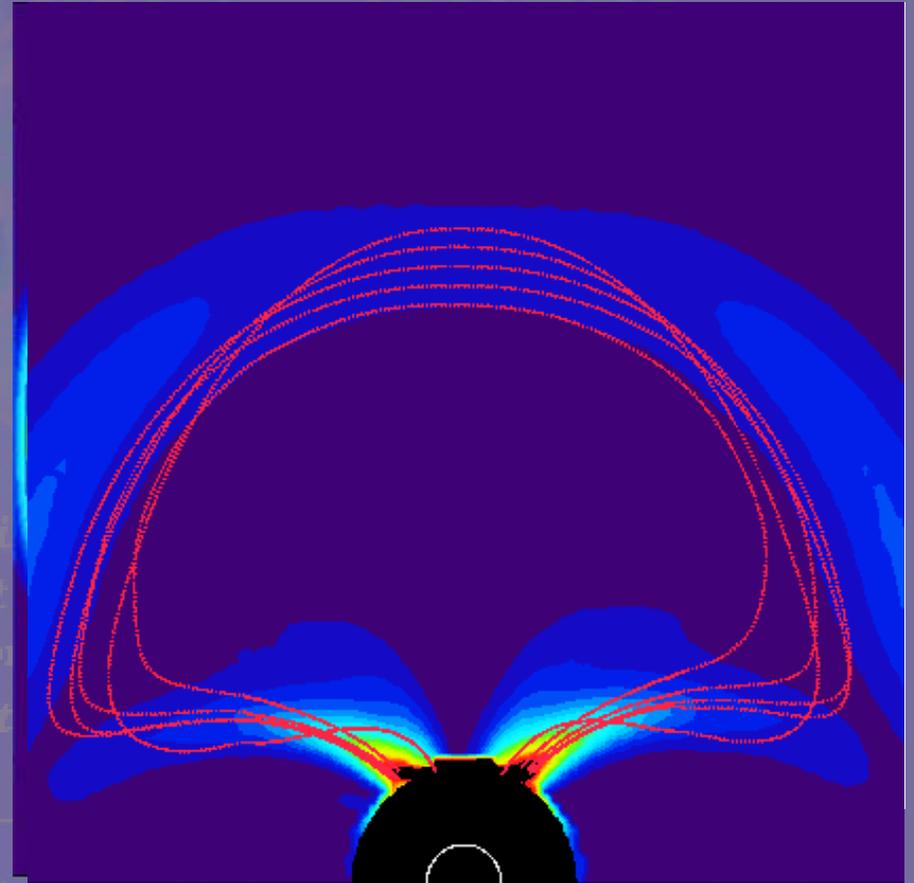
Days of paranoia are over

Early SWMIT model

Recent same

Global MHD simulation

Beautiful theory of plasma sheet

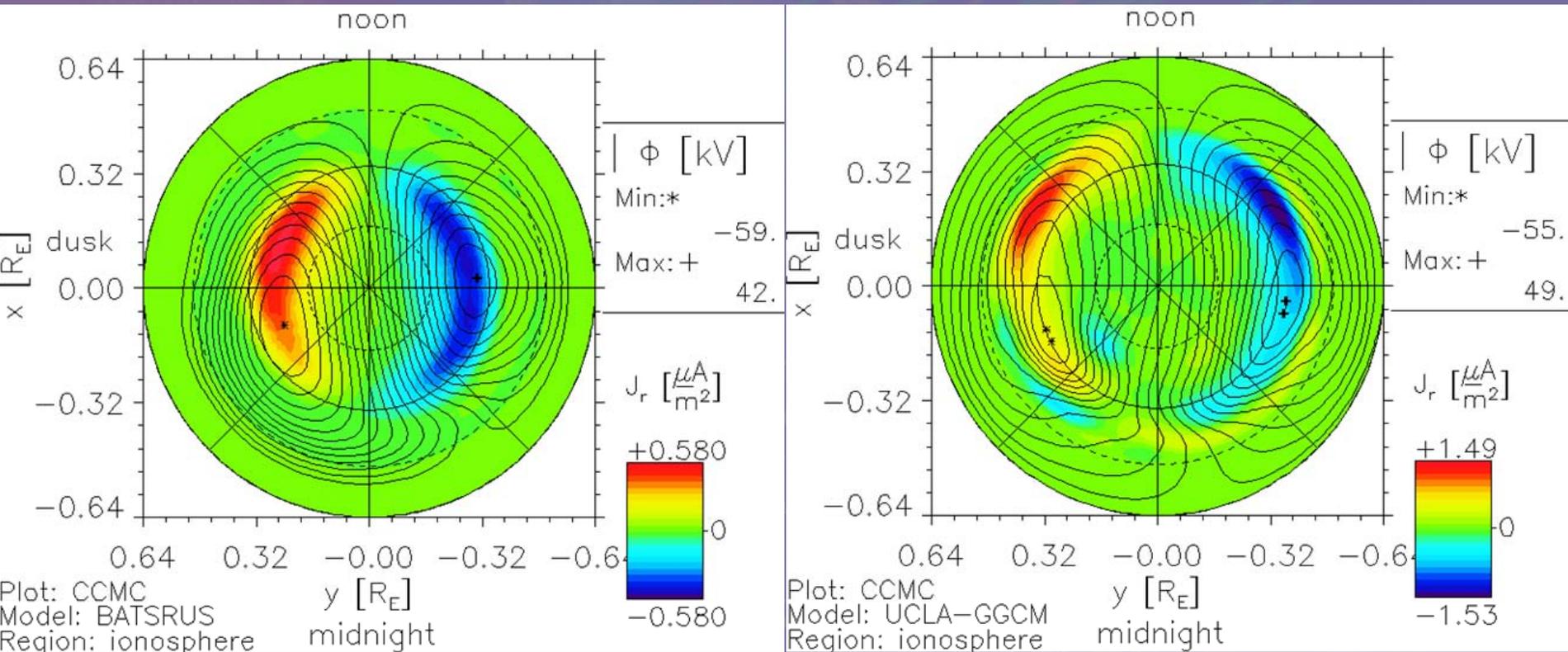**Global MHD simulation**

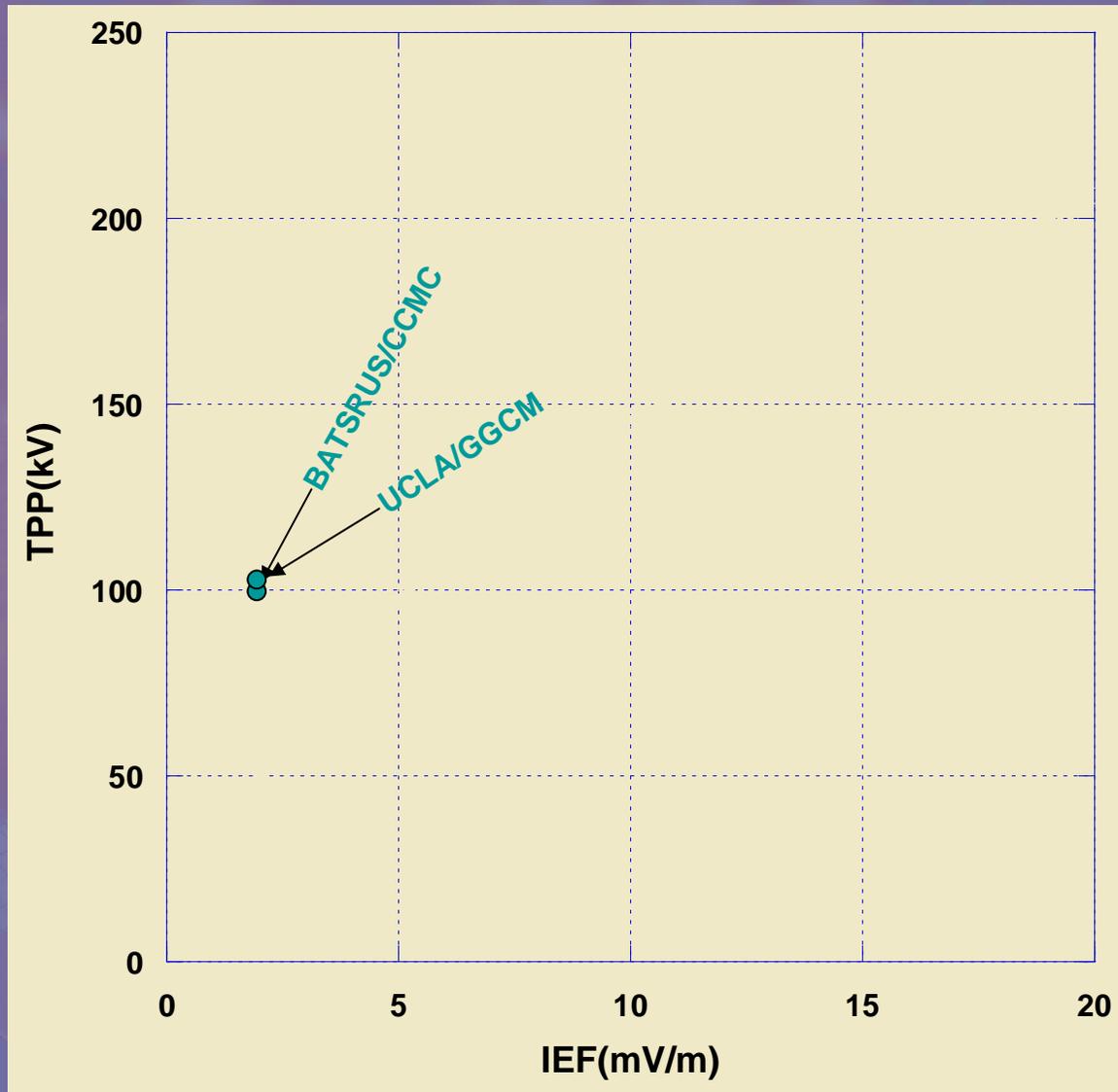**Beautiful region 1 current model**

Global MHD simulation

So now it is okay to look at places where the models need basic structural fixes to do new science. Here is an example.
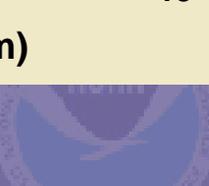
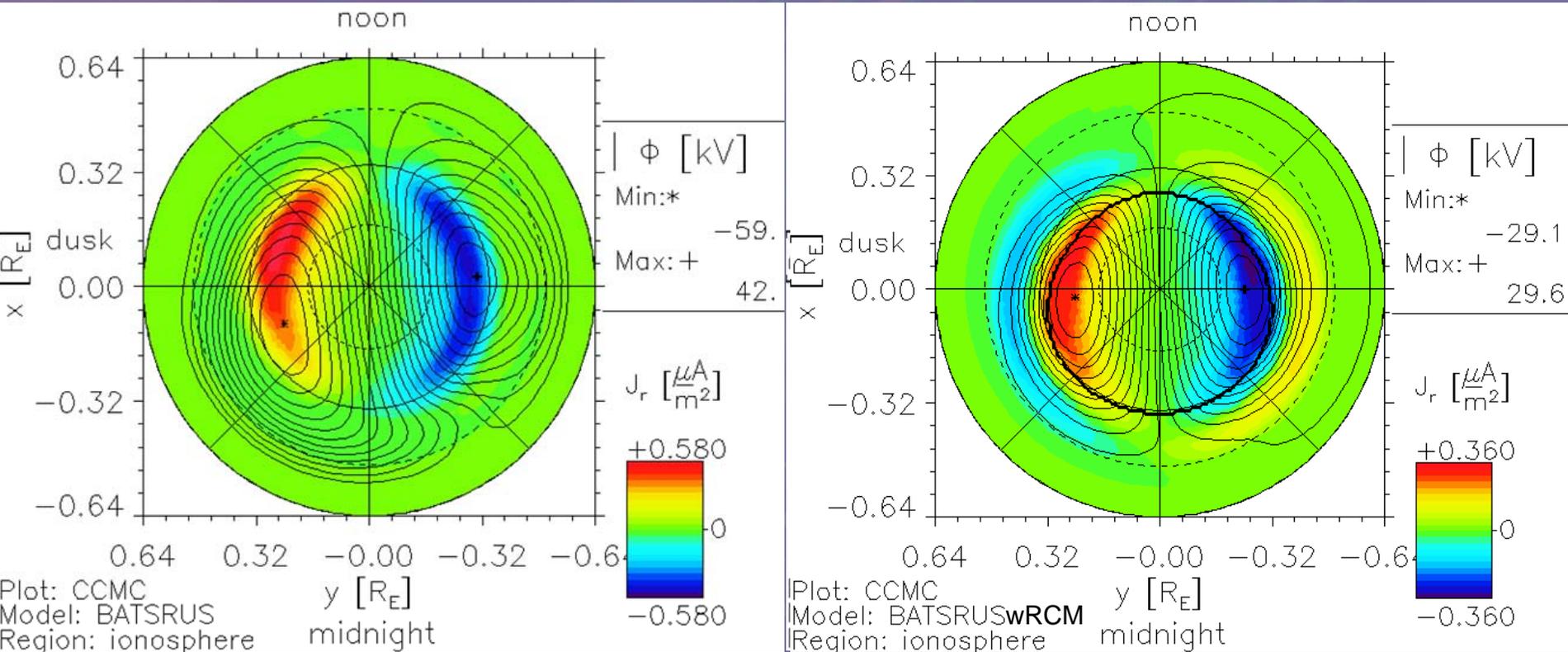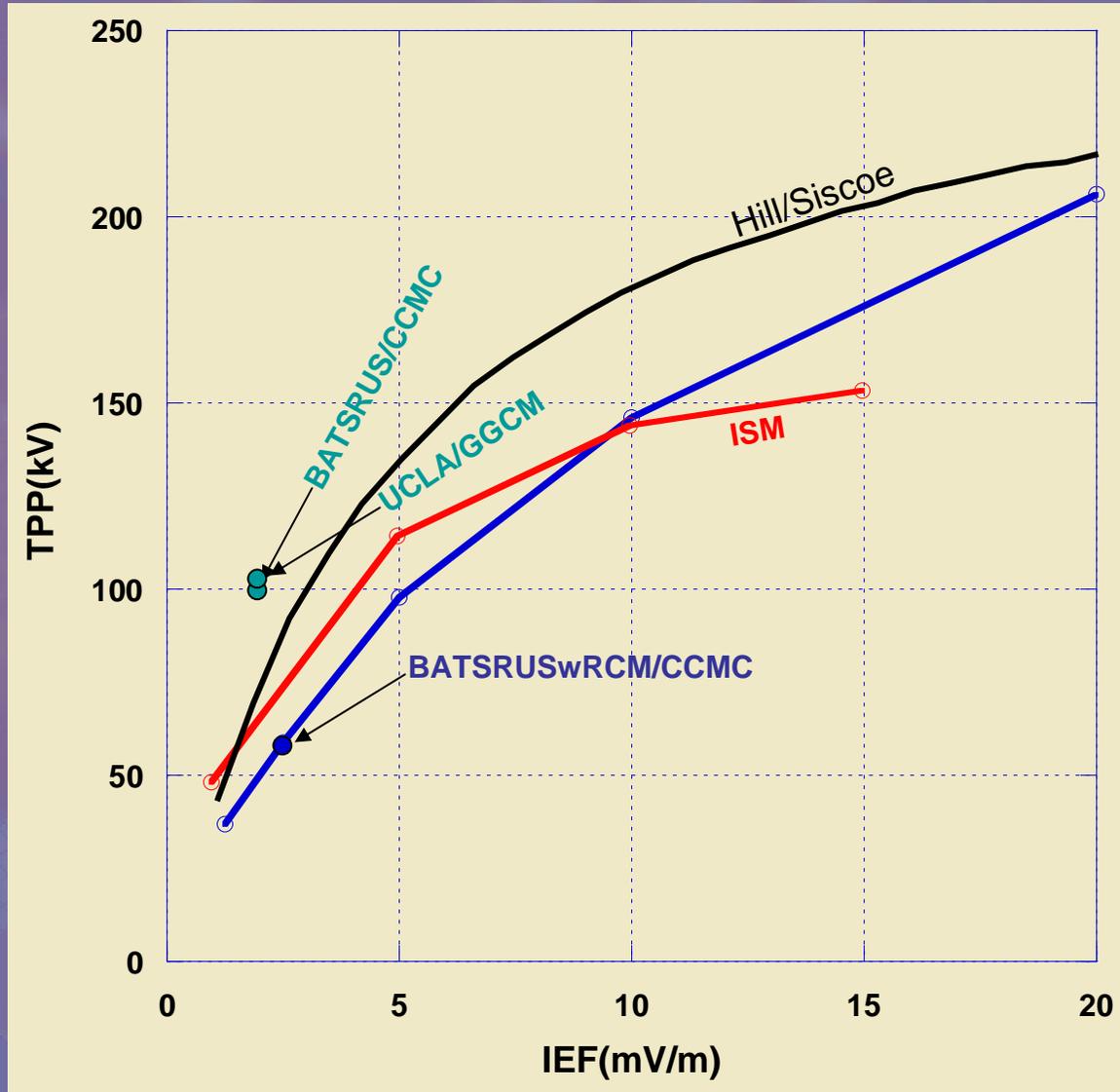## Magnetosphere-Ionosphere Coupling Electrodynamics

Plot the points

Add RCM to BATSRUS

Add to the plot

We don't understand this response to region 2 currents

Solstice Transpolar Potentials in Saturation Domain

Source	Ratio: Winter/Summer
MRC/ISM	1.39
CCMC/UCLA	1.44
CCMC/Mich.	1.83
AMIE: 14 Jan 88 Storm	0.68

The models are in wild disagreement with the observations.

Summary

- **Evolution not revolution**
- **Increase customer pull**
  - **CCMC statistics of magnetosphere simulation requests**
  - **Increase capability**
  - **Emphasize student involvement**
- ***Basic* science validation**
  - **Days of paranoia are over**
  - **Example: Parallel potentials in MHD simulations**
  - **Joint CCMC campaigns with GEM, SHINE, and CEDAR**

Summary

- **Evolution not revolution**

- **Increase customer pull**

- ***Basic* science validation.**

- **Examples illustrate that CCMC models give the community powerful tools with which to carry out such investigations.**