User's Feedback: Magnetospheric Models

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Everything I'm going to say will be positive.

CCMC: Magnetospheric Models

Two Global MHD Models to Choose from:

1) BATSRUS (University of Michigan team)
2) Open-GGCM (Jimmie Raeder, University of New Hampshire)

Two Inner-Magnetosphere Options

1) BATSRUS+RCM
2) Fok Ring Current

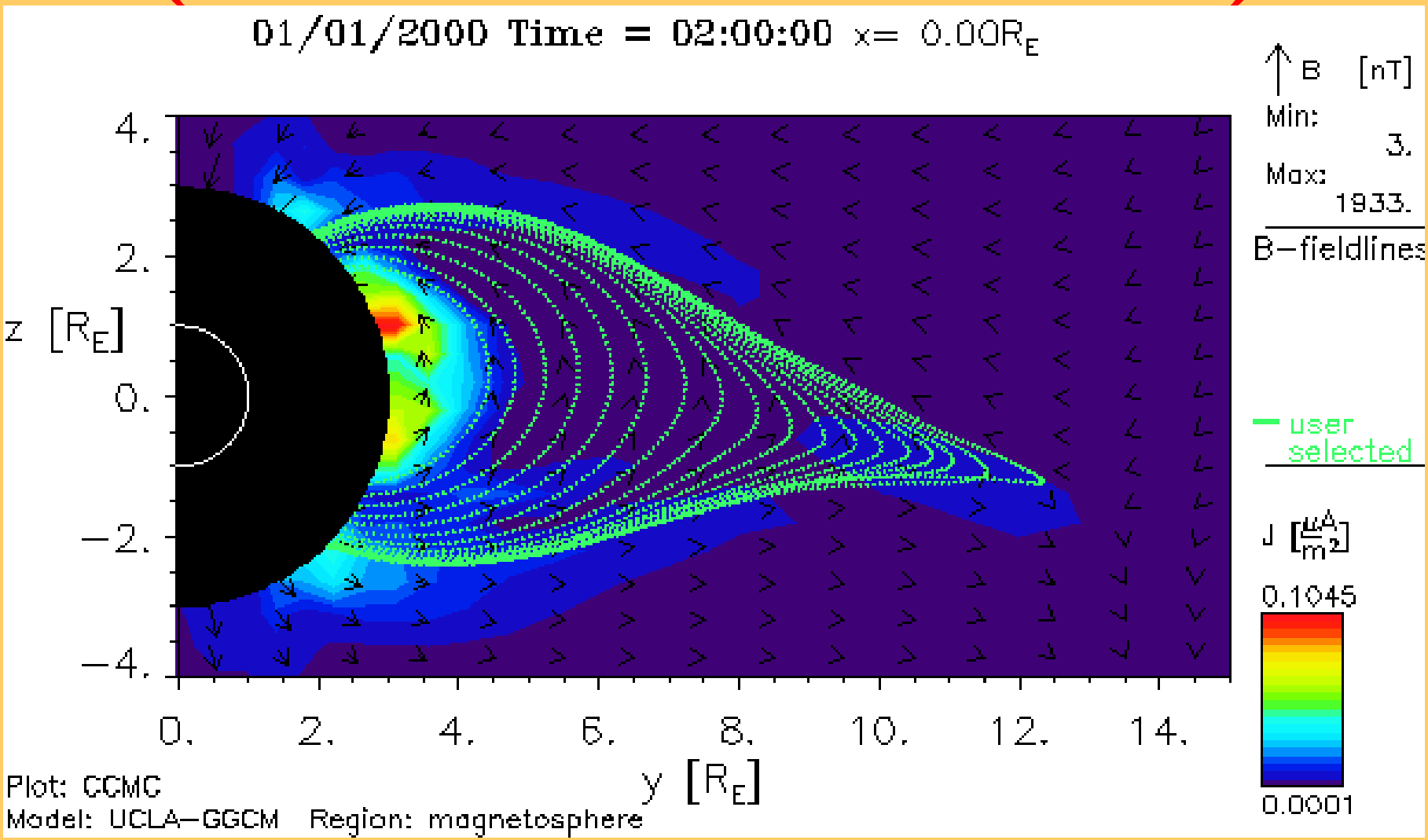
Web-based interface to run the models

- Select a model
- Select input parameters (may upload a simple file)
- Wait for results
- View/analyze simulation using web-based plotting tools

Notes:

- Your collaborators have easy access to your simulation results
- You can browse and analyze the full library of past simulation runs (934 runs in the library as of last week)

Stretching of the Dipole on the Dayside (Global Sawtooth Oscillations)



Result: **We now have insight that lobe pressure on the dayside flattens the dipole.**

First Comments

CCMC provides an important service to the community

- **Enables research**
- **Provides a powerful tool for education**

LANL example:

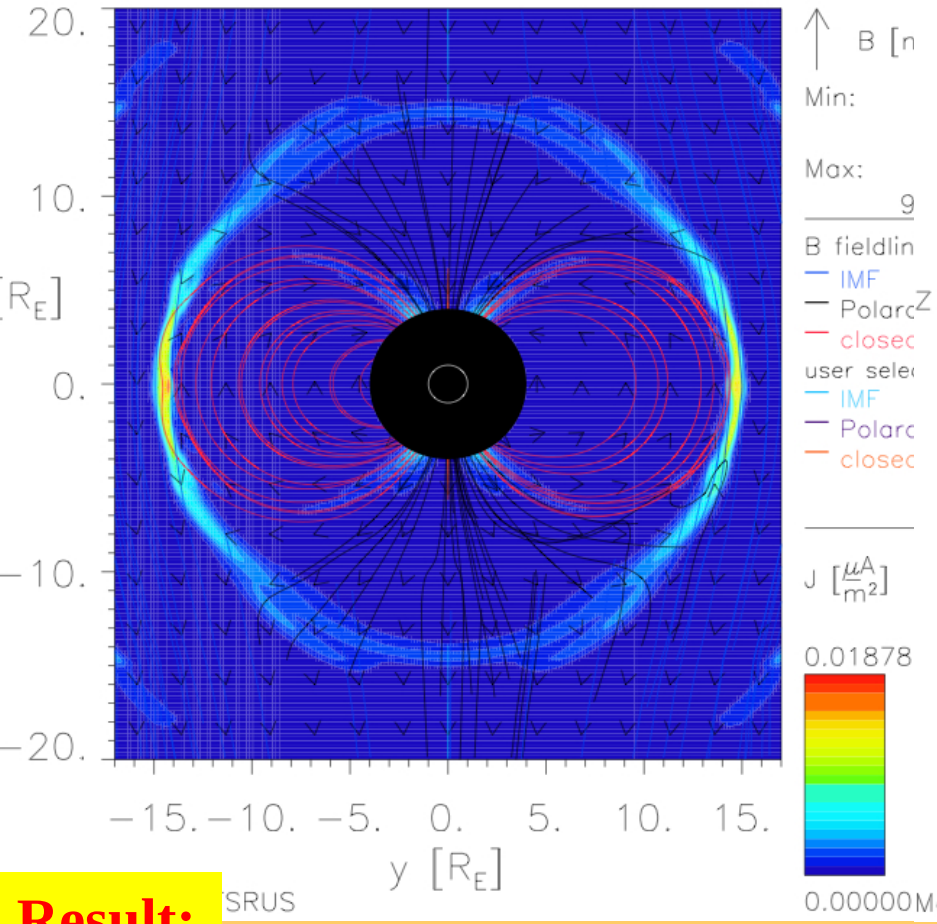
We are a large space-physics group -- 38 scientists.
But, we have no global-simulation capability!
Efforts to obtain this capability have failed.
Efforts to collaborate were cumbersome.
CCMC is filling this gap for us.
And it's cost effective for our NASA + NSF programs.

The scientific impact of CCMC is high:

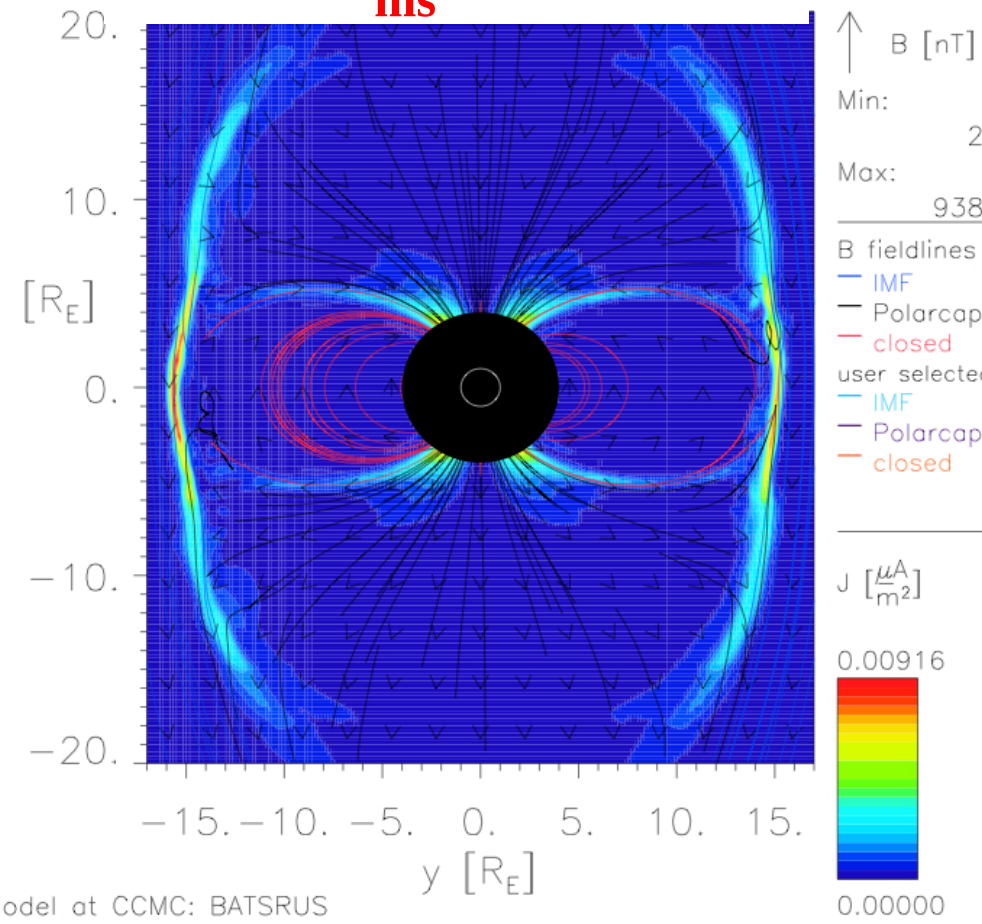
- **GEM Workshop**
- **AGU Meetings**
- **Space Weather Meetings**
- **International Conferences**

The Asymmetric Magnetosphere in Low-Mach-Number Solar Wind

M_{ms} = 7.5



M_{ms} = 1.9



Result:

We now think that magnetopause models are wrong at low Mach numbers.

Specific Comments

1) Model selection is excellent

2) Turnaround is fast

3) Ease of web-based graphics is surprising

4) Help with the models has been great

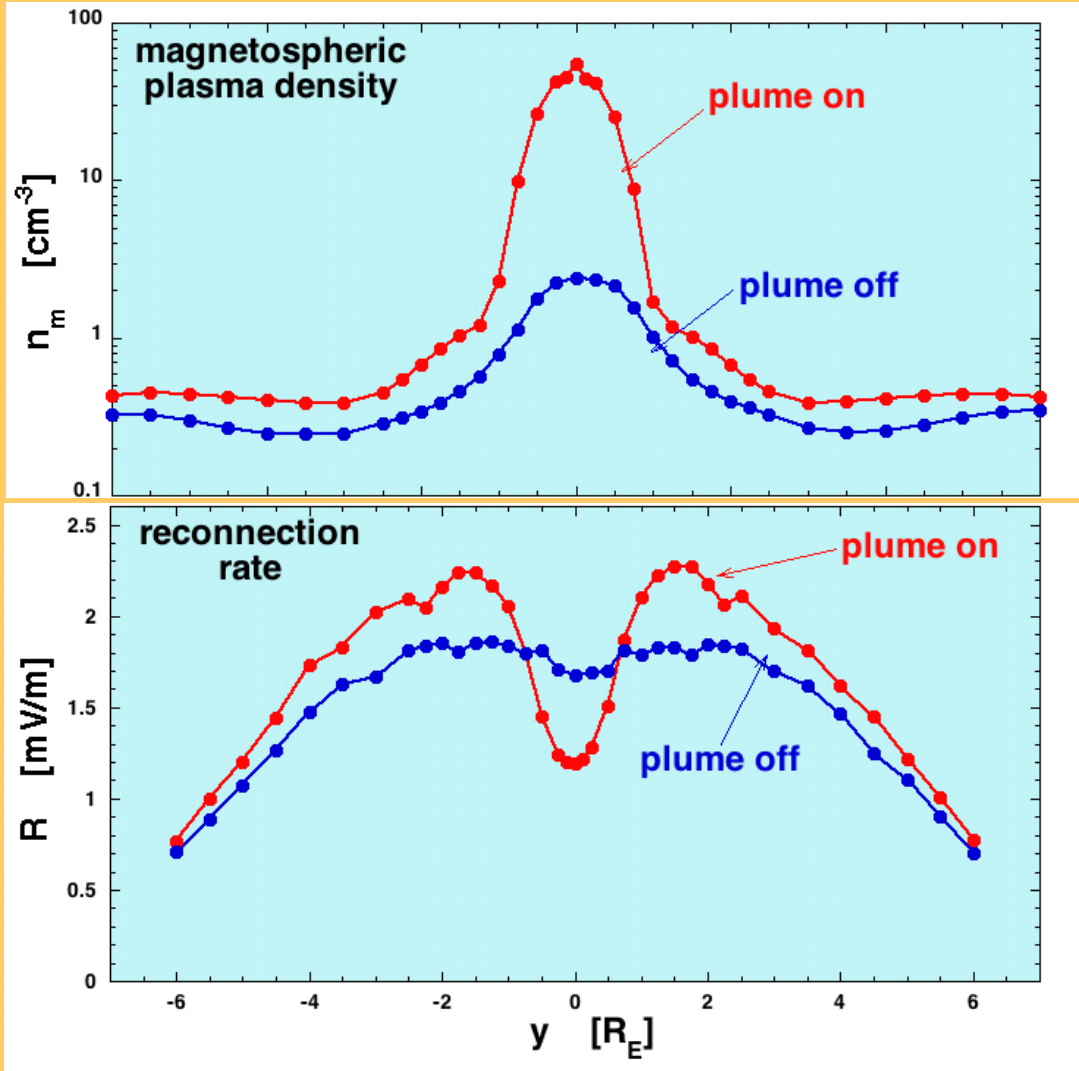
- **Help with understanding the numerics**
- **Interfacing with the code authors**

5) Response to special requests has been great

- **Supplementary graphic capabilities added by Lutz**
- **Special runs set up by Masha**

Dayside Reconnection Shut Down by Magnetospheric Cold-Plasma Plume

Where the plume flows into the magnetopause, the measured reconnection rate is reduced.



Measured from BATSRUS special run:

- **High resolution on dayside**
- **Localized high resistivity**

Result: This confirms the predicted "plasmasphere effect".

Specific Recommendations

More CPU for CCMC is desirable:

- **higher-resolution runs are superior**
- **faster turnaround during peak times**

Develop a movie capability

Summary

	Poor/Low	Acceptable	Good	Excellent/ High
Usefulness to community				√
State of the art				√
Selection of models				√
Turnaround time				√
Ease of use				√
Help with models				√
Flexibility for special runs				√
Impact				√

My Opinion

- **CCMC has an excellent track record.**
- **CCMC's usefulness is growing.**

⇒ Give them what they need for the future.

Comments from the Community

"The CCM is an extremely valuable resource that I use routinely in analyzing low altitude data from spacecraft such as FAST."

-- Bob Strangeway, UCLA

"This study would not be possible without the CCMC."

-- Haje Korth, APL

"This role will even more increase when the community will be actively involved in the research using the spacecraft systems like THEMIS, MMS etc."

-- Victor Sergeev, St. Petersburg State U.

"CCMC is great, I am just using it more and more…"

-- Benoit Lavraud, LANL + CNRS