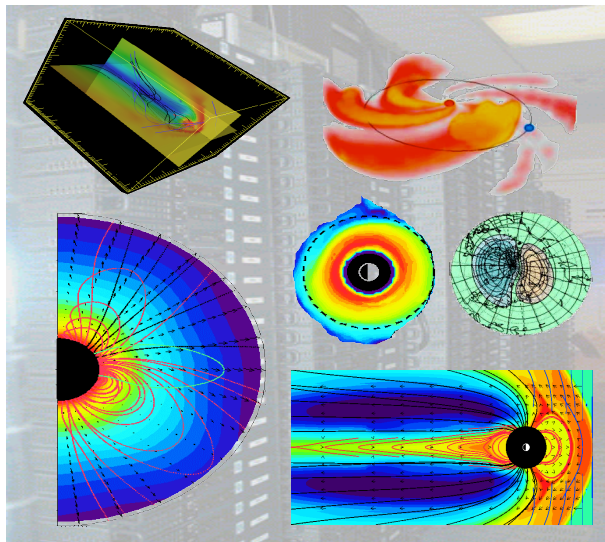
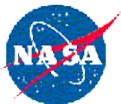


Joule Heating/Poynting Flux/ Model/Data Comparison. Very Preliminary Results



L. Rastaetter, M. Kuznetsova,
D. Knipp, L. Kilcommons,
A. Ridley, D. Weimer

<http://ccmc.gsfc.nasa.gov>





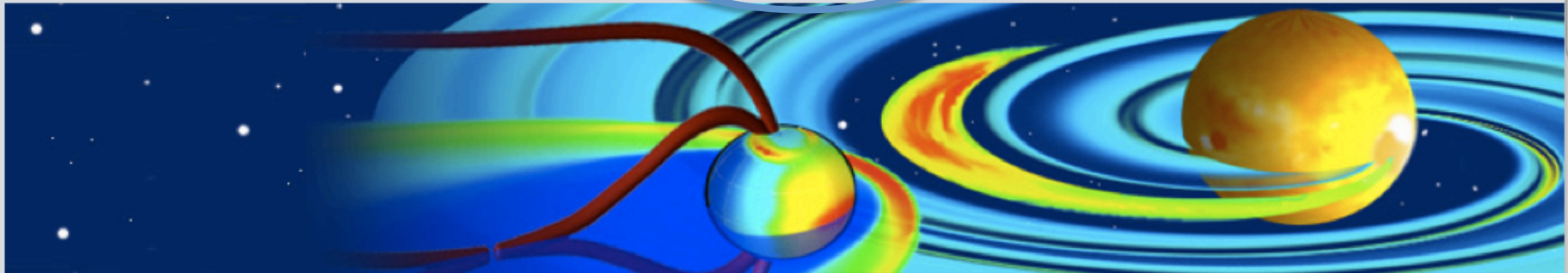
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CCMC Mission Statement

The CCMC is a multi-agency partnership to enable, support and perform the research and development for next-generation space science and space weather models.

CCMC Services

- We provide, to the scientific community, access to modern space research models
- We test and evaluate models
- We support Space Weather forecasters
- We support space science education

Latest Additions to the CCMC



GEM-CEDAR Challenge



GEM-CEDAR Challenge

Challenge Workshop status

Both CEDAR and GEM communities have recognized that due to the maturity and increasing complexity of state-of-the-art space weather models, there is a great need for a systematic and quantitative evaluation of different modeling approaches [>more](#)

GEM-CEDAR Metrics Suite

Simulation results submission interface:

- Prior to submission of your simulation results please review:
[Selected events](#) | [Physical parameters](#) | [Available measurements/stations/locations: for Ionosphere, for Magnetosphere](#) | [Model output file format](#)
- [Submit your simulation results >>](#)

Simulation results analysis tools:

- [Time series plotting tool \(ionosphere/thermosphere\)](#)
- [Time series plotting tool \(magnetosphere\)](#)
- [Runs for metric studies performed at the CCMC \(ionosphere\)](#)

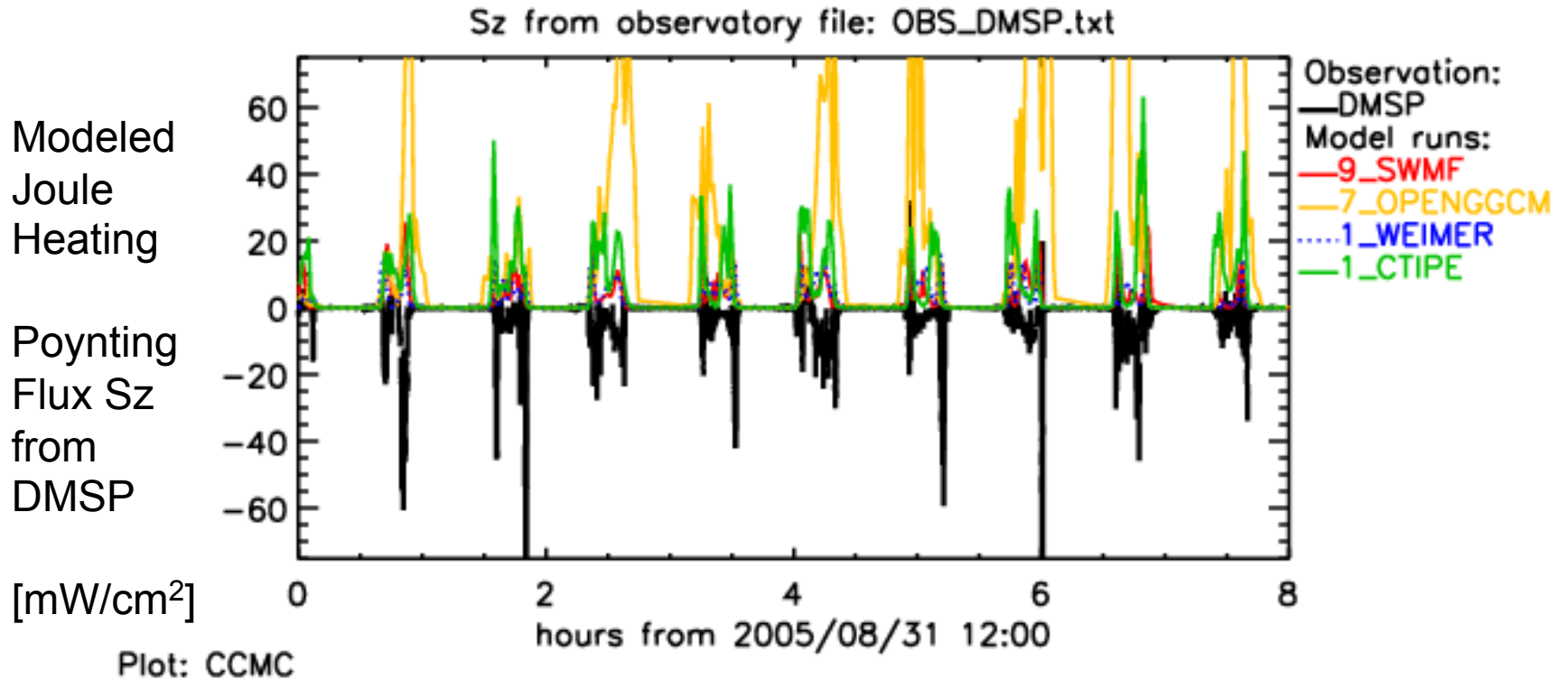
Time Series Plotting Tool

GEM-CEDAR Metrics (magnetosphere) results

Event	Magn. field at geosync. orbit	Ground magn. perturb's	DST	Auroral oval	Poynting flux
E.2006.348: 2006/12/14 (doy 348) 12:00 UT - 12/16 00:00 UT	GOES12 GOES11	FRN OTT IQA PBQ FRD YKC HRN ABK WNG FUR MEA NEW	KYOTO USGS	southern hemisphere northern hemisphere	
E.2001.243: 2001/08/31 (doy 243) 00:00 UT - 09/01 00:00 UT	GOES10 GOES08	PBQ FRN IQA OTT FRD YKC ABK WNG FUR MEA NEW	KYOTO USGS	southern hemisphere northern hemisphere	DMSP
E.2005.243: 2005/08/31 (doy 243) 10:00 UT - 09/01 12:00 UT	GOES12 GOES10	FRN PBQ OTT FRD YKC HRN ABK WNG FUR MEA NEW	KYOTO USGS	southern hemisphere northern hemisphere	DMSP
E.2005.135: 2005/05/15 (doy 135) 00:00 UT - 05/16 00:00 UT	GOES11 GOES12	NEW IQA FRN OTT YKC FRD HRN ABK WNG FUR MEA PBQ	KYOTO USGS	southern hemisphere northern hemisphere	DMSP

Time Series Plotting Tool

Several orbits of DMSP during 2005.243 (Event 4 of GEM 2008)



Start: Year: Month: Day: Hour: |
to End: Year: Month: Day: Hour:

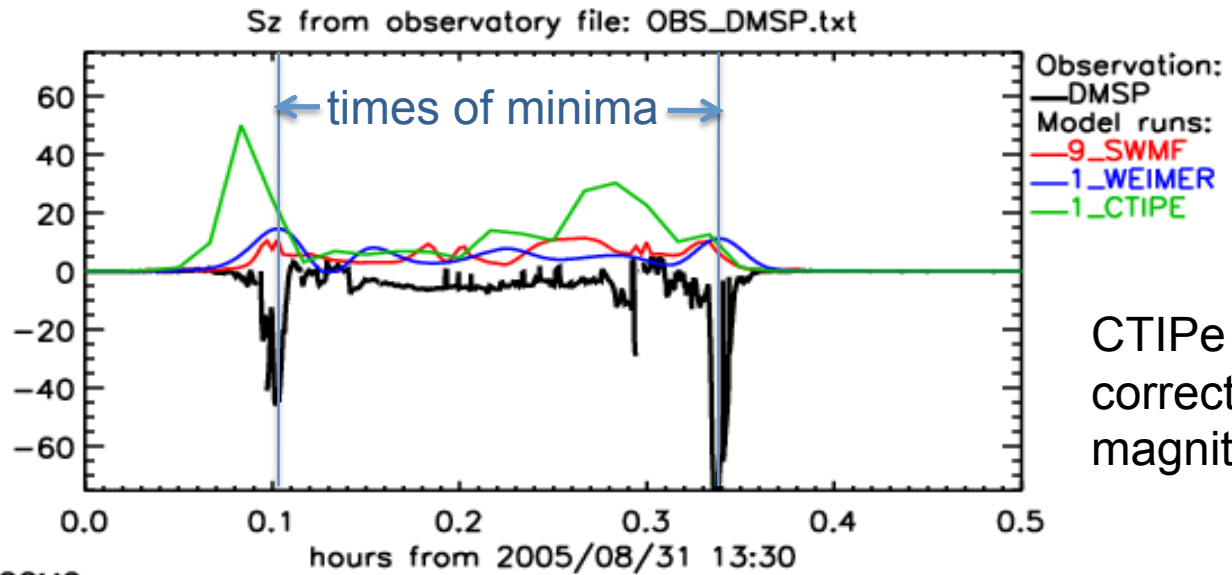
half-orbits

JH

Sz

[mW/m²]

Plot: CCMC



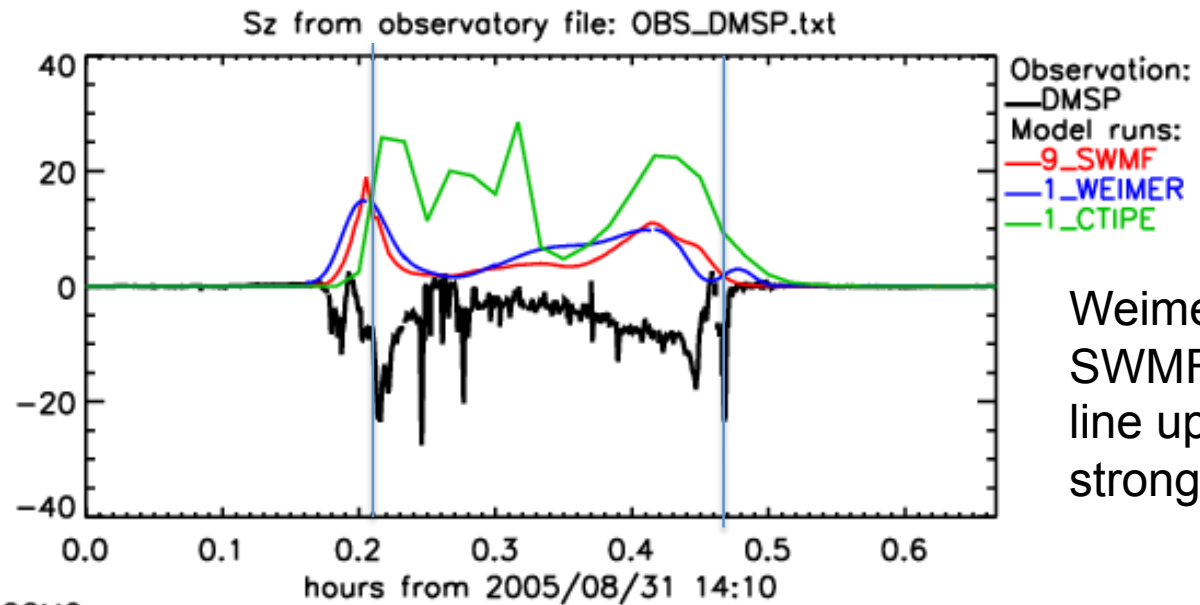
CTIPE shows correct magnitude

JH

Sz

[mW/m²]

Plot: CCMC



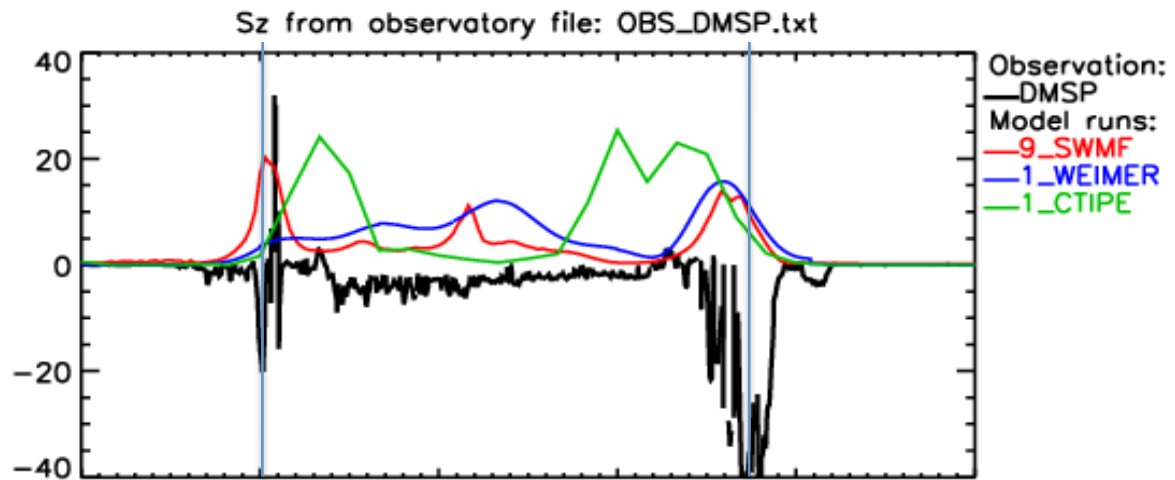
Weimer and SWMF often line up better with strongest fluxes

More
half-orbits

JH

Sz

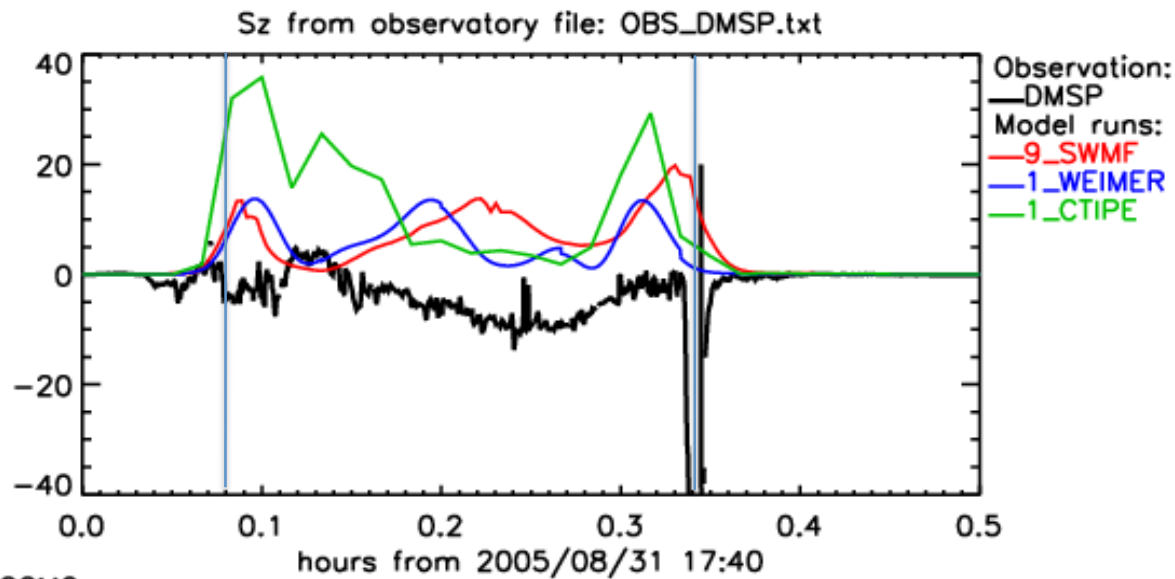
[mW/m²]



JH

Sz

[mW/m²]

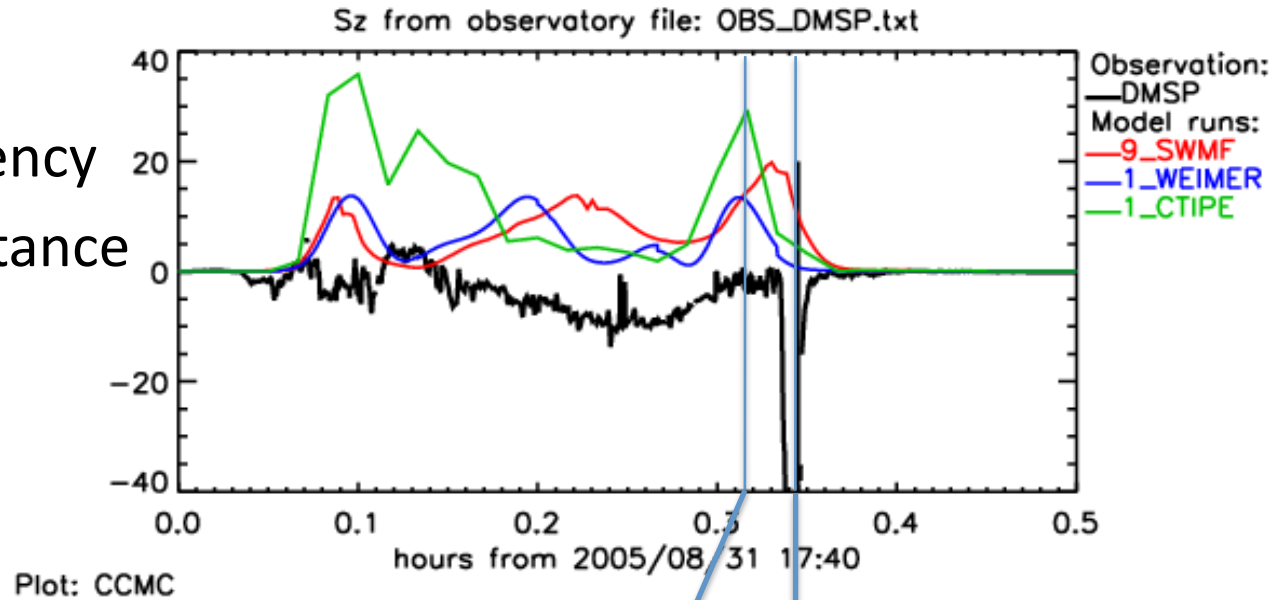


Plot: CCMC

Analysis of a single half-orbit

Skill scores:

- Prediction Efficiency
- Log-Spectral Distance
- Prediction Yield
- Correlation



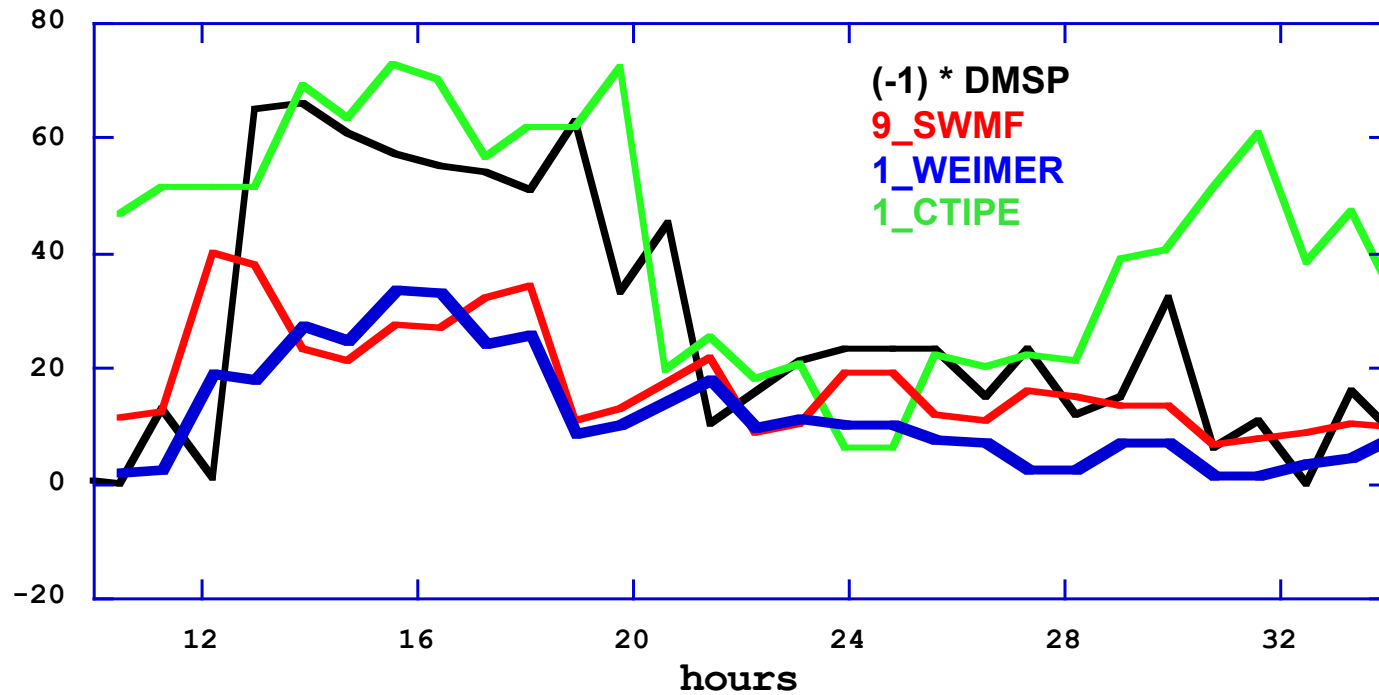
Variable: Sz Observation file: OBS_DMSP.txt

Model_Setting	PredEff	N_region	N_finite	LogSpecDist	nWin	PredYield	Correlation
9_SWMF	-4.323	181	175	0.398	9	0.360	-0.560
1_WEIMER	-2.618	181	175	0.309	9	0.251	-0.170
1_CTIPe	-8.159	181	175	0.780	9	0.654	0.043

To be added:

Timing Error (here for **CTIPe**)

Half-Orbit Averaged



CTIPe shows best average values

Weimer and SWMF very similar to each other

Conclusions

- First model results look promising
- Need to compute new skill scores:
 - Timing errors within each half-orbit
 - ...
- Need more model submissions.
- Compute Joule Heating from existing GEM-CEDAR runs.