

Initial Results from the Continuous HEIDI Simulations

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GEM-CEDAR Workshop

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What are we doing?

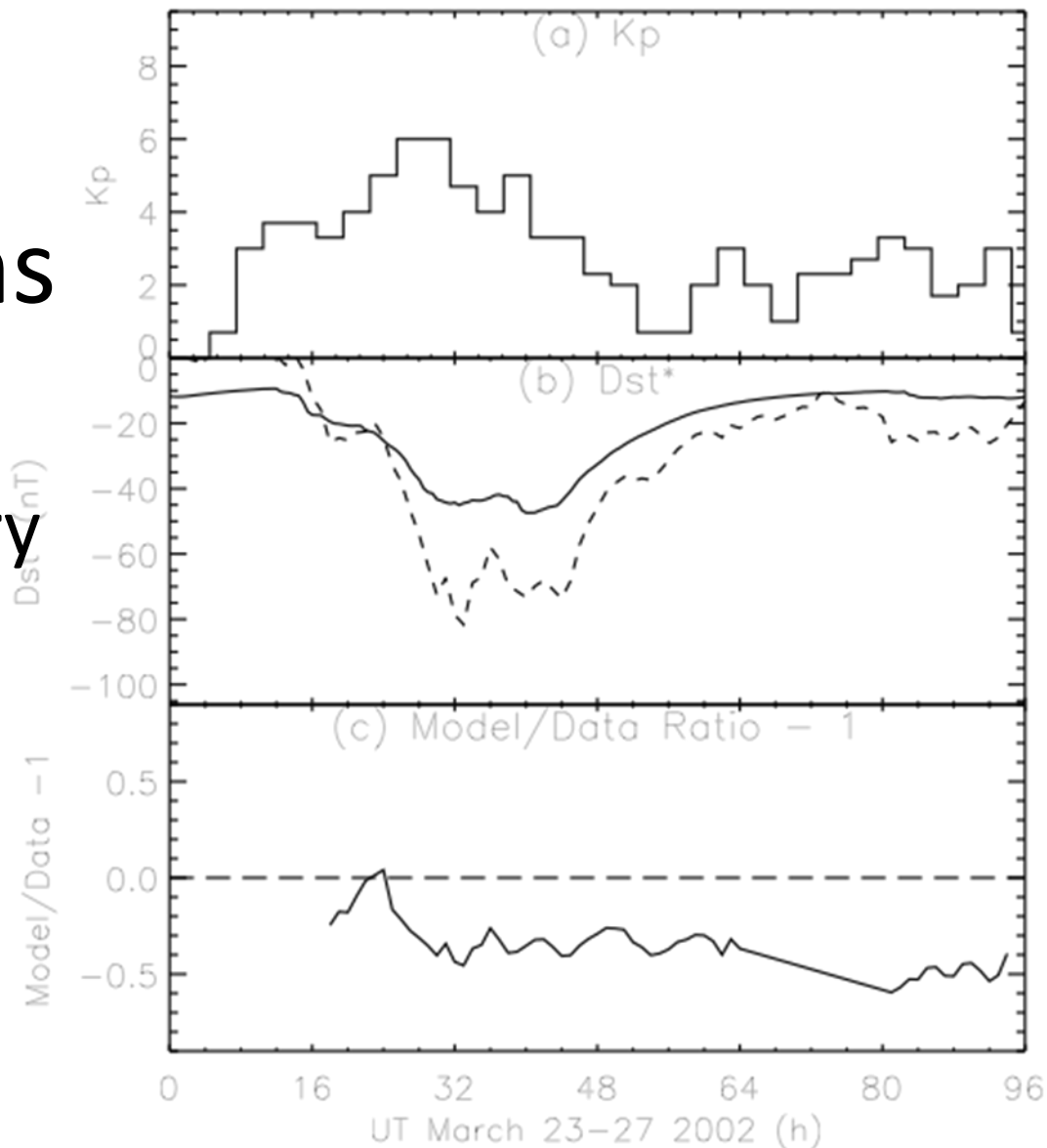
- Several year-long runs of HEIDI
 - HEIDI: Hot Electron and Ion Drift Integrator
 - A ring current model, coupled to a plasmasphere model
 - Specifically: 1998 and 2002
- Model settings:
 - O'Brien reanalysis MPA moments
 - SOPA flux measurements
 - Weimer-1996 high-lat electric potential
 - Self-consistent electric potential inside the domain
 - Dipolar magnetic field

Where are we?

- A few months of each run
 - We did it last summer, actually
 - Then the project lay dormant for the year
 - We are now picking it back up
- Plans for the near future:
 - Finish the runs we started earlier
 - Analyze the results
 - Do the same runs for other plasma BC and E-field

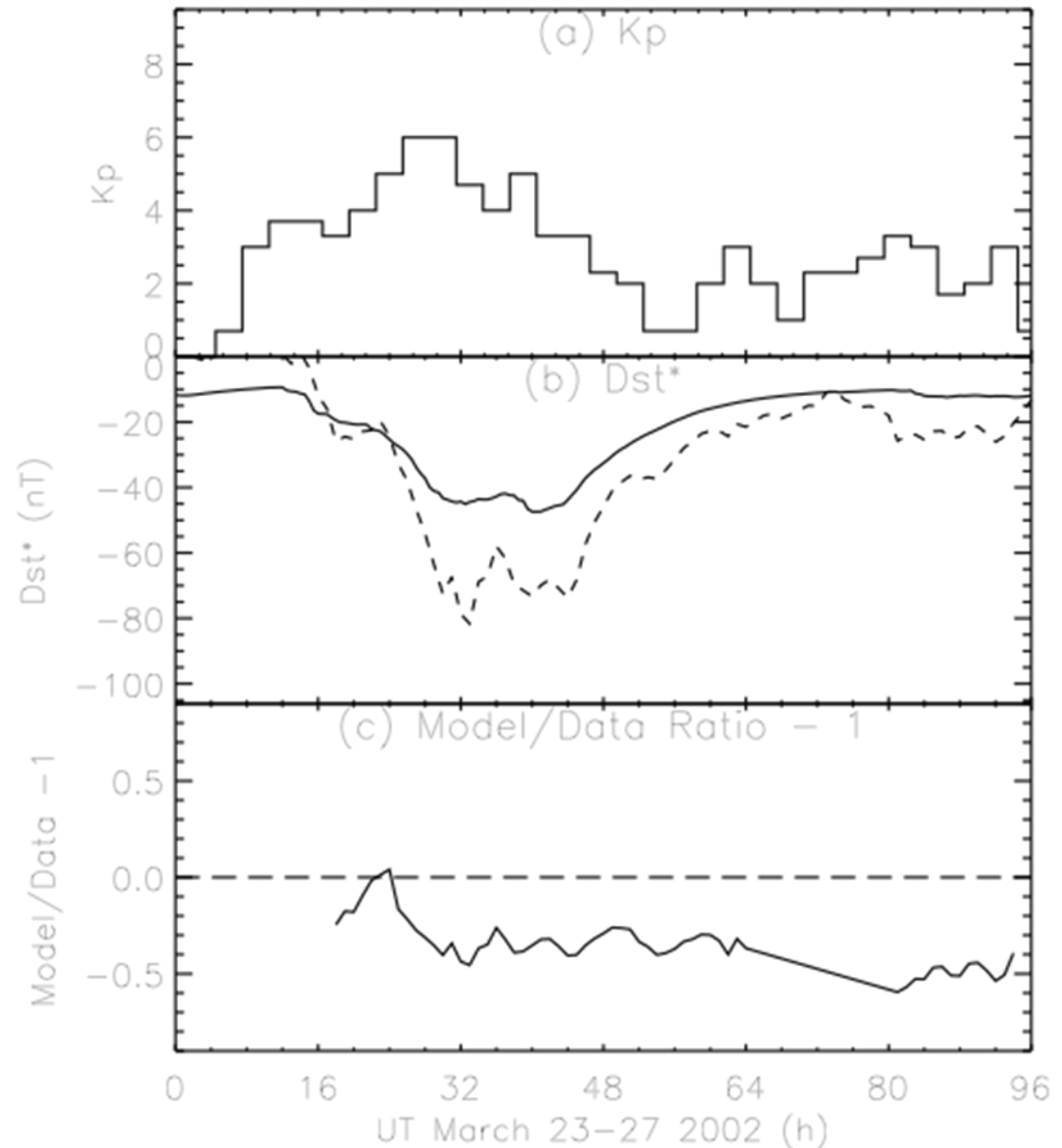
Some Dst Comparisons

- For a small storm in January 2002
- Worked pretty well!



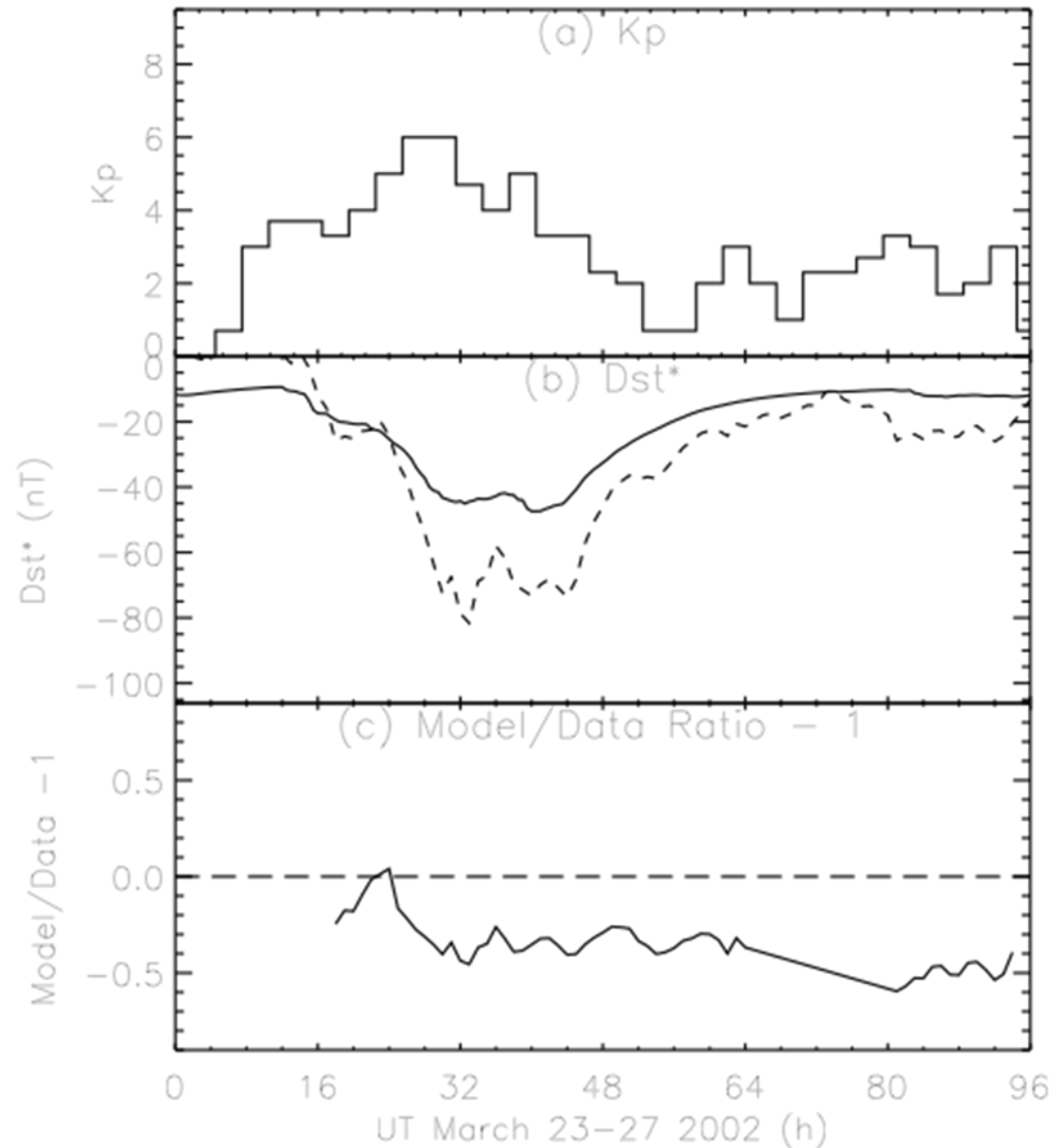
Another Dst Comparison

- For a quiet time in January 2002
- Simulation is smoother than the observed Dst, but close



More Dst Comparisons

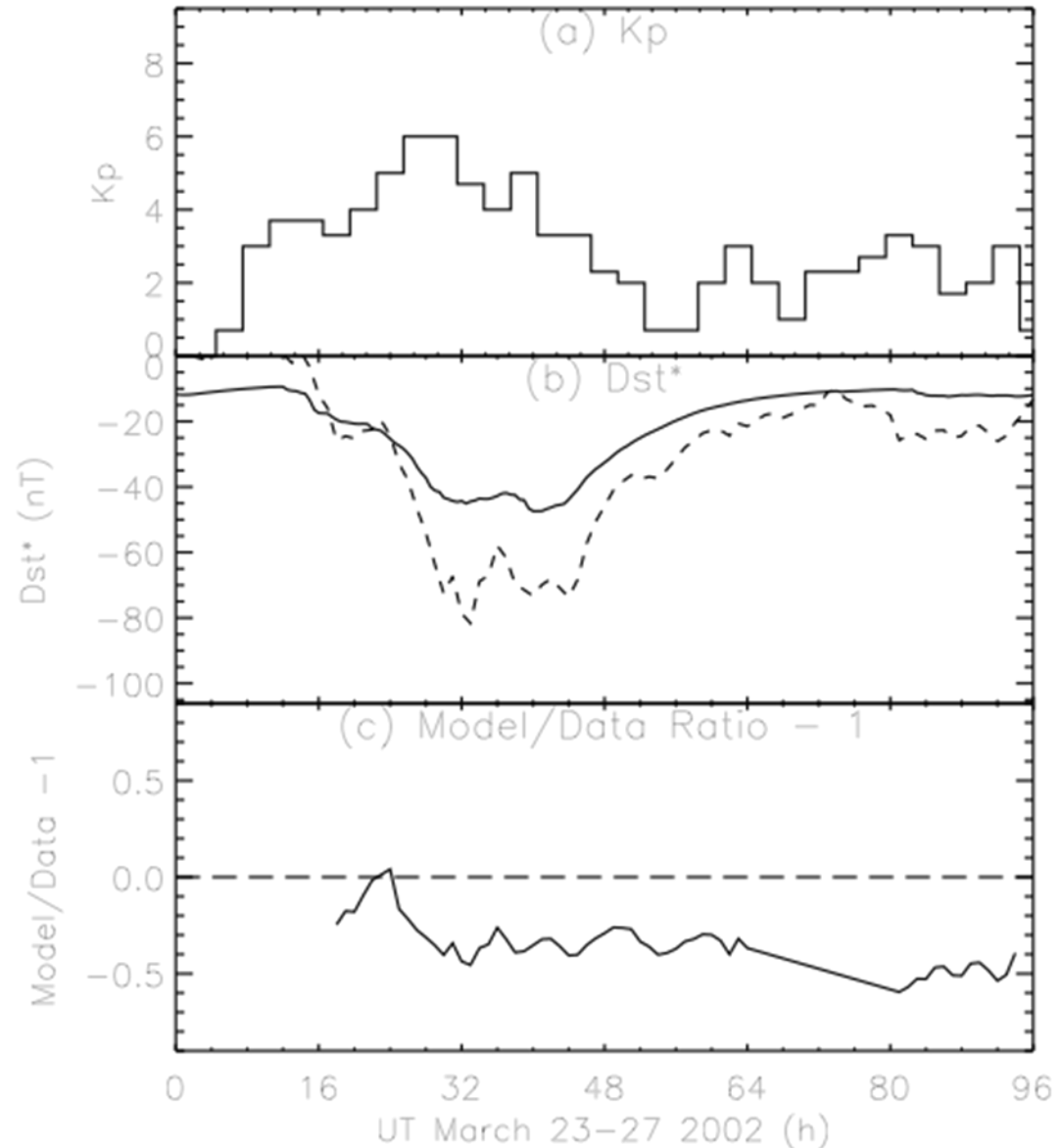
- For a moderate storm in January 2002
- Didn't capture the storm intensity



Same storm
from our

other sunset

- We've also done all of the 100 nT storms from solar cycle 23
- Same issue...so the problem wasn't pre-conditioning

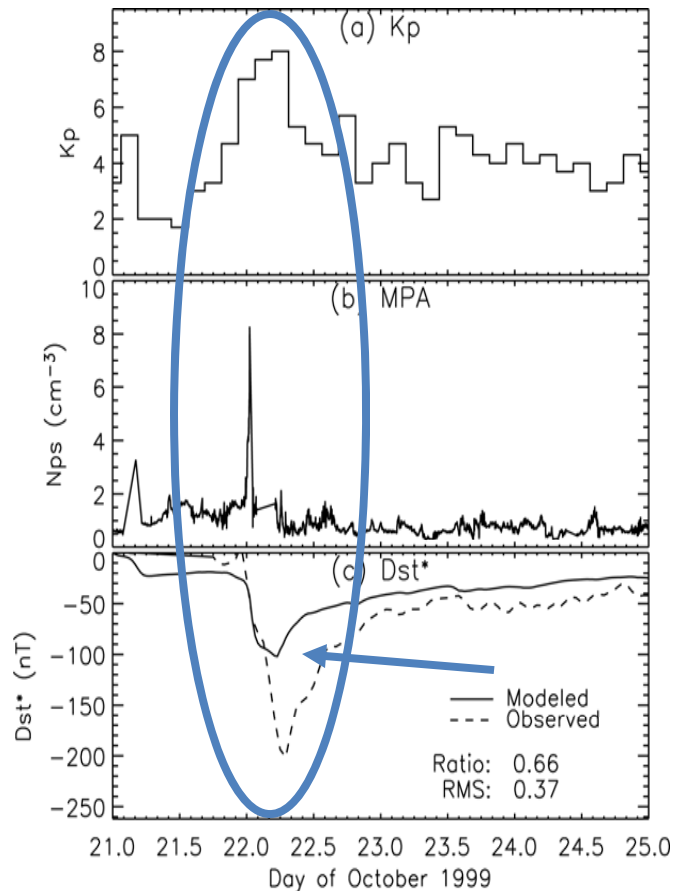


A Hit and a Miss

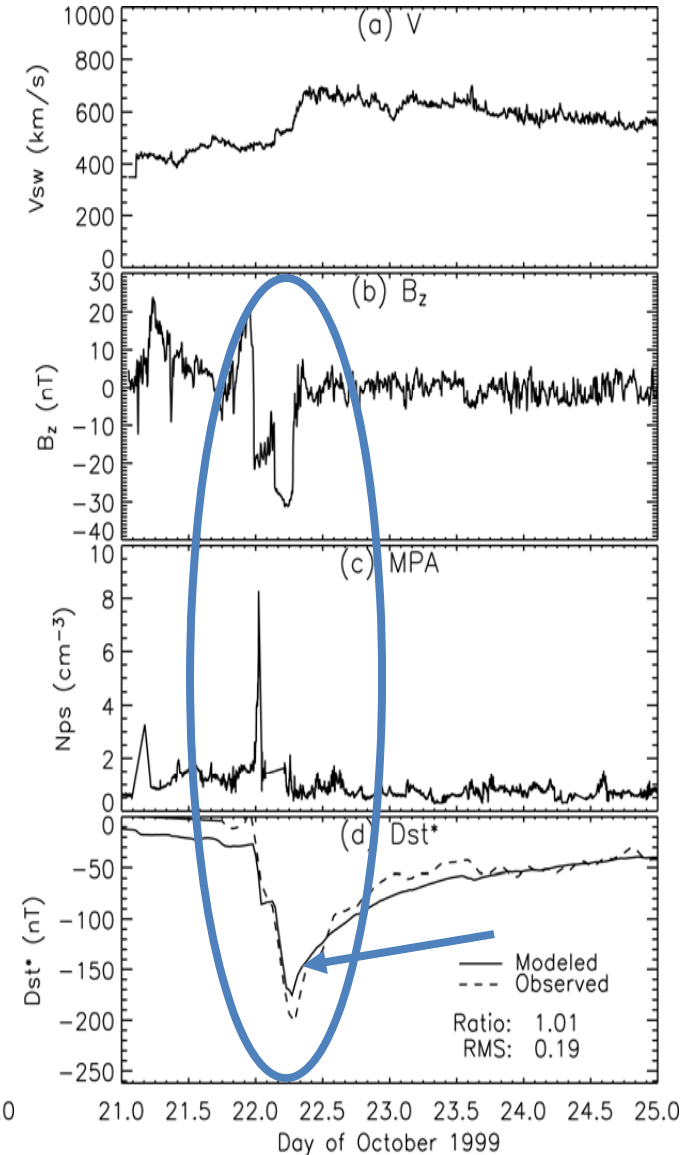
- Sometimes, very different results

- Example: October 22, 1999
- Sharp spike in LANL BC
- Continued convection
- Both start the same
- V-S run missed the peak

Volland-Stern Results



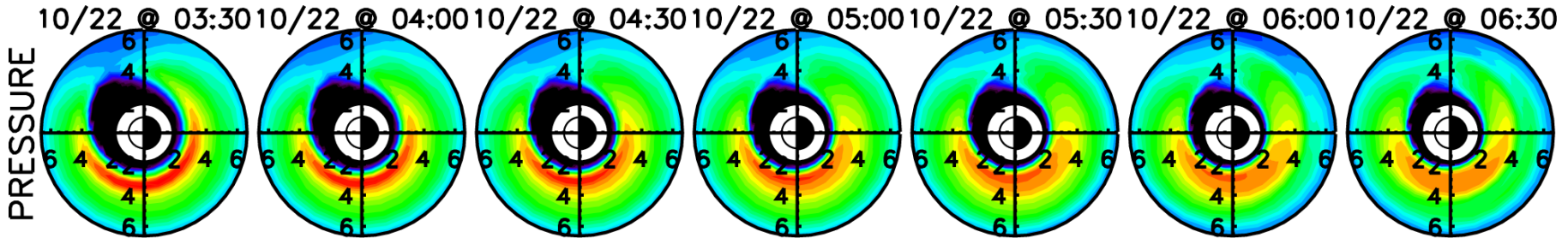
Self-Consistent Results



The Morphology Matters

- Different ring currents from the two setups
 - S-C E-field kept the peak on the nightside
 - Allowed 2nd convection interval to drive in first injection

Volland-Stern Run Results



Self-Consistent Run Results

