Initial Results from the Continuous HEIDI Simulations

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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 runset
• 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

Self-Consistent Results

Volland-Stern Results

![Graphs showing Kp, Bz, Nps, and Dst over the Day of October 1999]
The Morphology Matters

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