

Different Drivers for the TIEGCM for December 2006

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<http://ccmc.gsfc.nasa.gov/challenges/GEM-CEDAR/>

Different High-Latitude Driver Studies

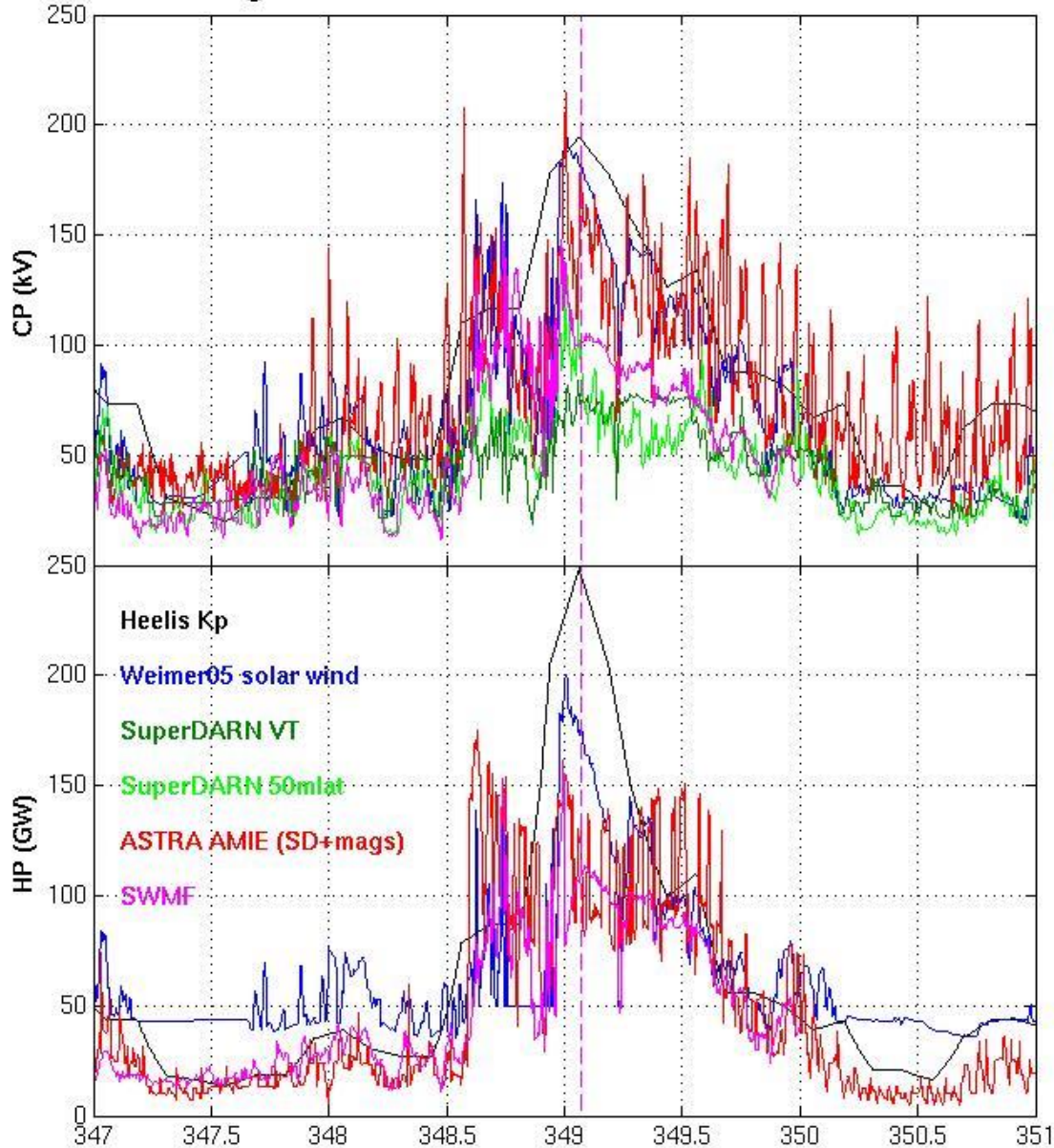
- First discussed at mini-GEM December 2011
- First results at CEDAR 2012 with further results at each successive meeting.
 - GITM (**U MI suite of routines** for U MI binary files) and
 - CCMC (**CCMC suite of kameleon routines and libraries** for .hdf files discussed by David Berrios)
 - Kameleon memory leak fixed in March 2014
- TIE-GCM has **HAO/NCAR suite of routines** for “AMIE-type” files (**HAO** binary, **U MI** binary, **ASTRA** ascii, **SuperDARN** ascii), **kameleon** .hdf files, and **CMIT inputs** (large code changes). All but CMIT in s/w tiegcm_superdarn branch.

8 HAO/NCAR December 2006 Drivers

- 1) CMIT/MIX-TIEGCM (not shown, is separate 2-way code, but could be 1-way input if read as “AMIE-type” or kameleon files)
- 2) Heelis Kp-driven convection and Kp aurora
- 3) Weimer 2005 solar wind convection and SW aurora
- 4) CCMC kameleon drivers: ASTRA AMIE, SWMF
- 5) AMIE-type: U MI AMIE (not shown), ASTRA AMIE, SuperDARN (Dartmouth (not shown) and VT to 50 mlat with Kp aurora)

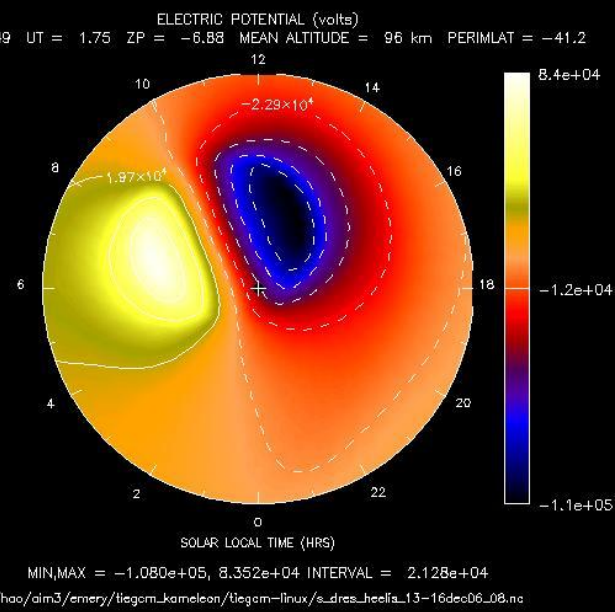
Show results on 2.5 deg grid for 5 drivers with 1 min time step (~40 min/day). CMIT and U MI AMIE on 5 deg grid.

High-Latitude Drivers for December 13-16, 2006

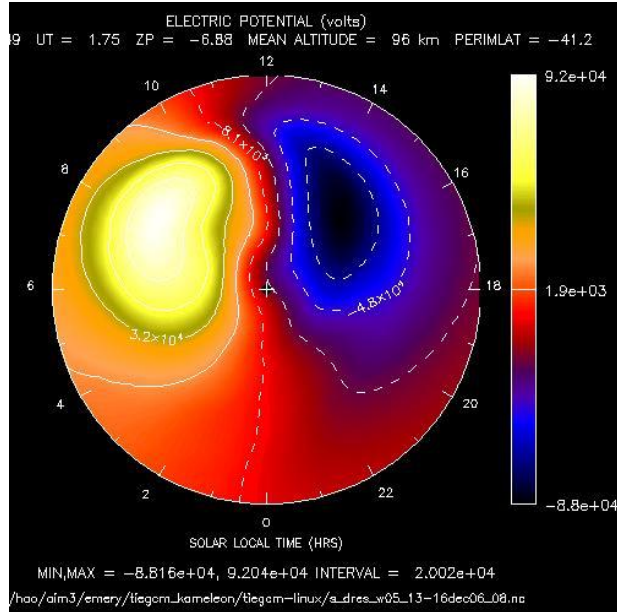


The most common runs are Heelis Kp, Weimer05 solar wind, and SuperDARN VT.

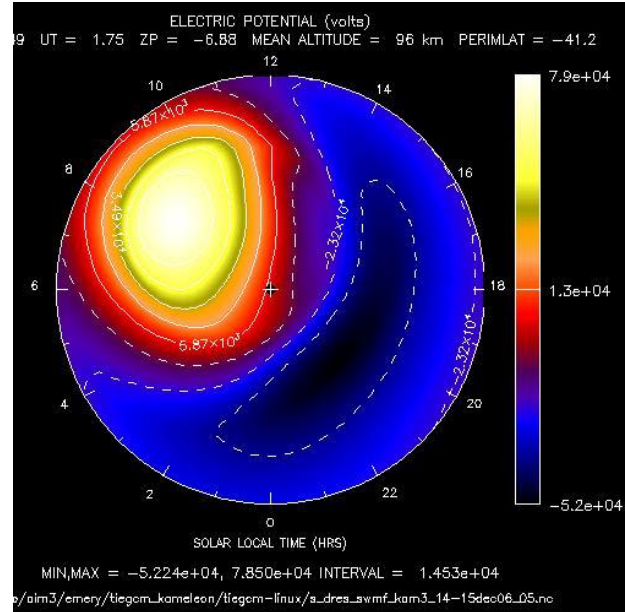
Daily data at <http://vt.superdarn.org/tiki-index.php?page=ASCIIData>



Heelis Kp 193kV



Weimer05 181kV



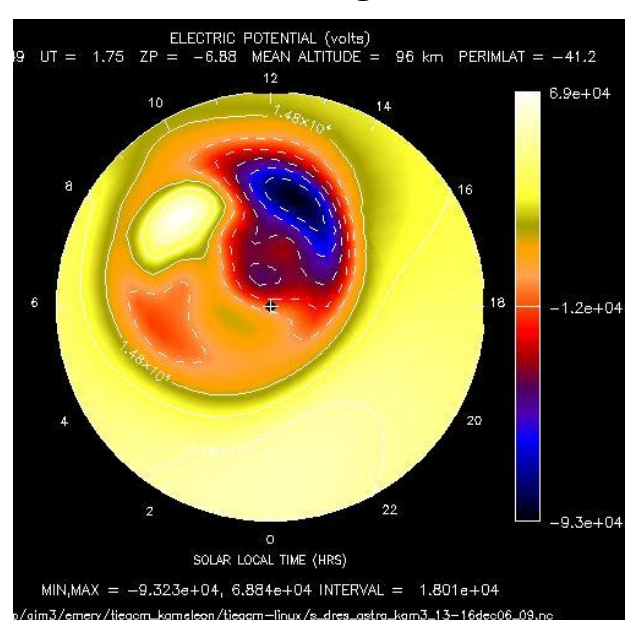
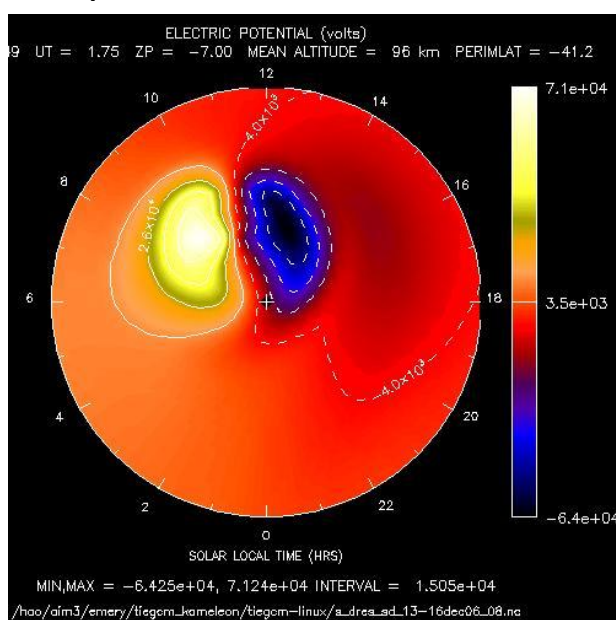
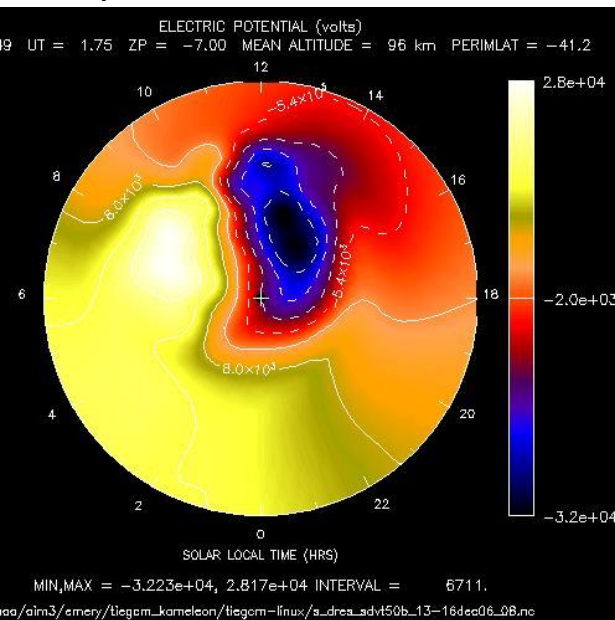
SWMF 100kV

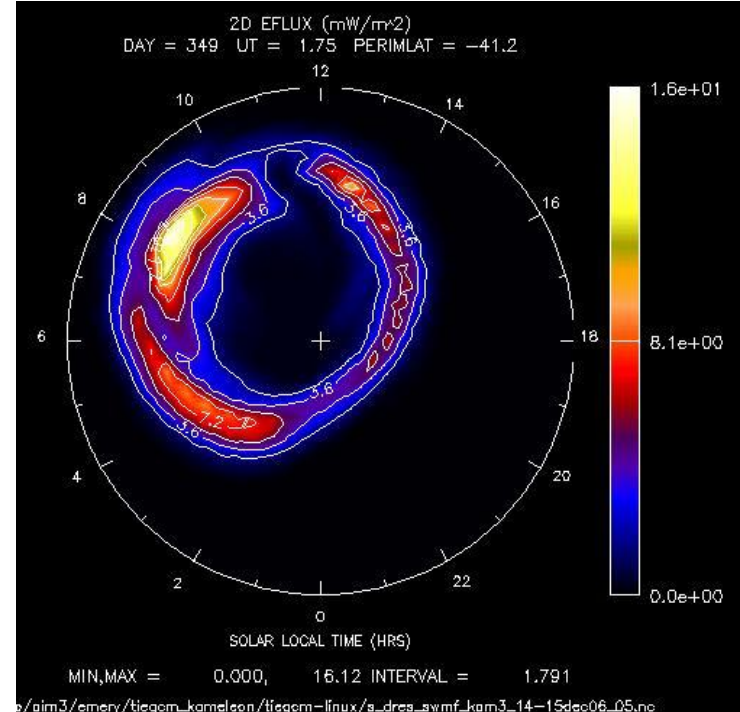
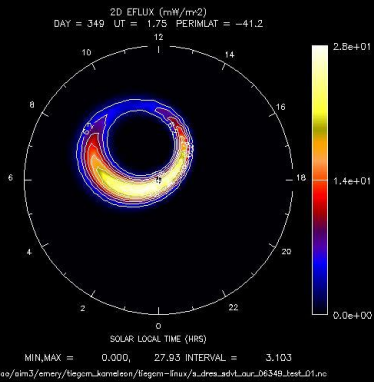
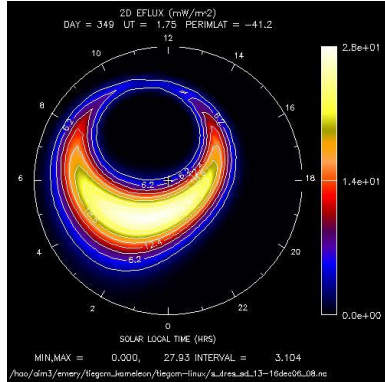
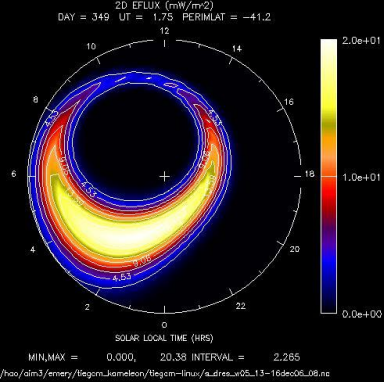
SH 06349 0145UT

SuperDARN VT 62kV

SuperDARN 50mlat 139kV

ASTRA AMIE SD+mags 186kV





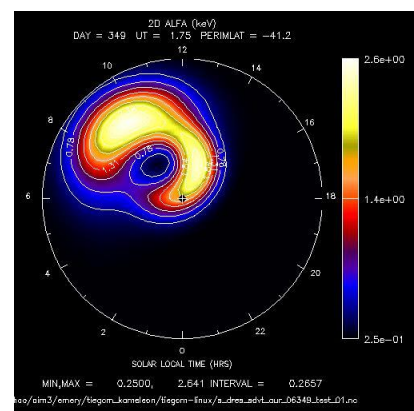
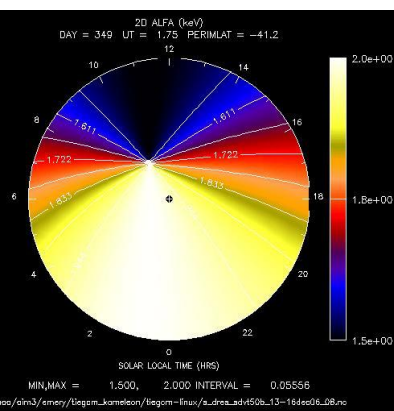
Vsw,Bz TIEGCM 176GW
 322GW 236GW NH

Kp 8- TIEGCM 245GW
 442GW SH, 354GW NH reg
 132GW S,N (SD VT smaller
 h2 and Ra=Rc+2)

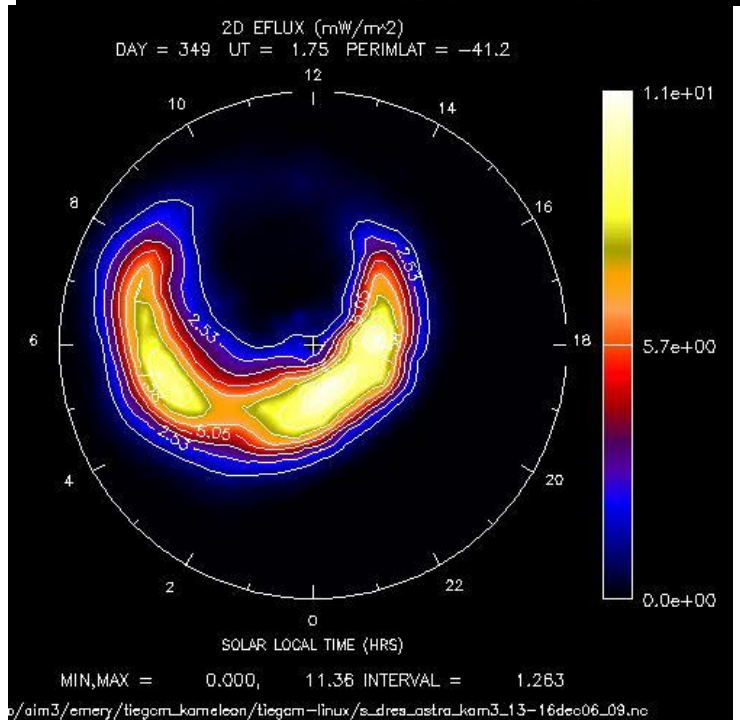
SWMF 115GW

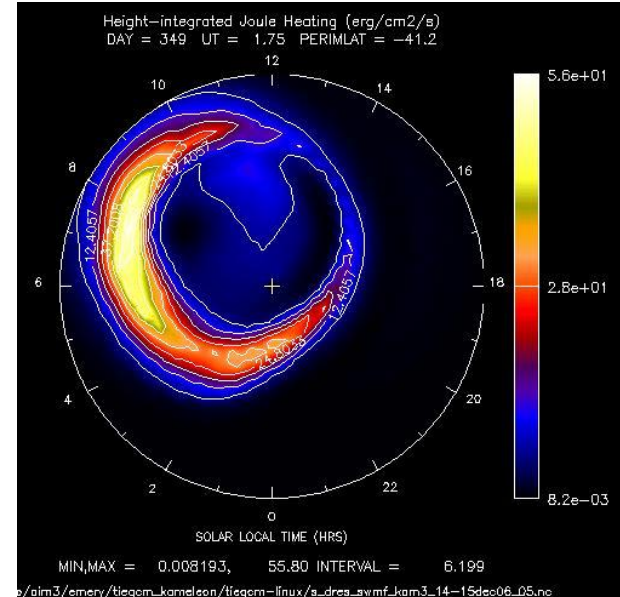
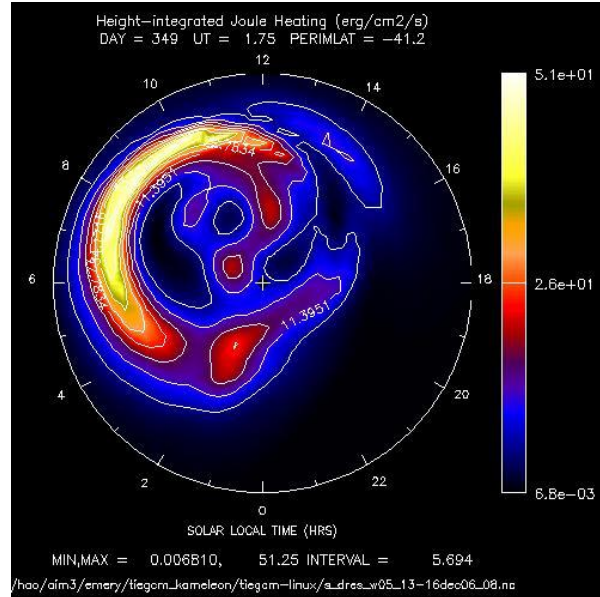
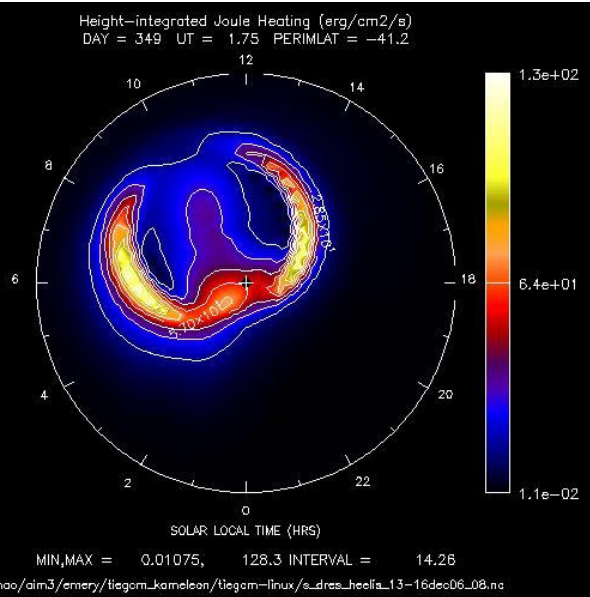
Eflux or HP in SH 06349 0145UT

Alfa is half the mean electron energy in keV
 regular TIEGCM param and from Emery et al [2012]



ASTRA AMIE
 (SD+mags)
 130GW





Heelis Kp 193kV,442GW

Weimer05 181kV, 176GW

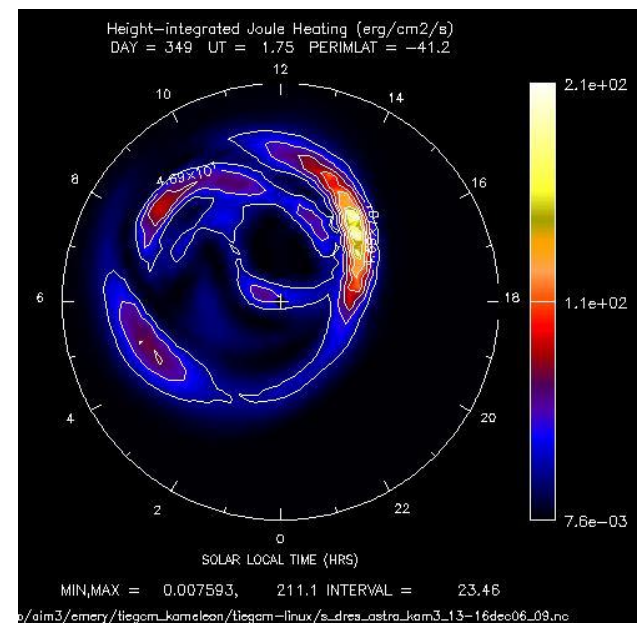
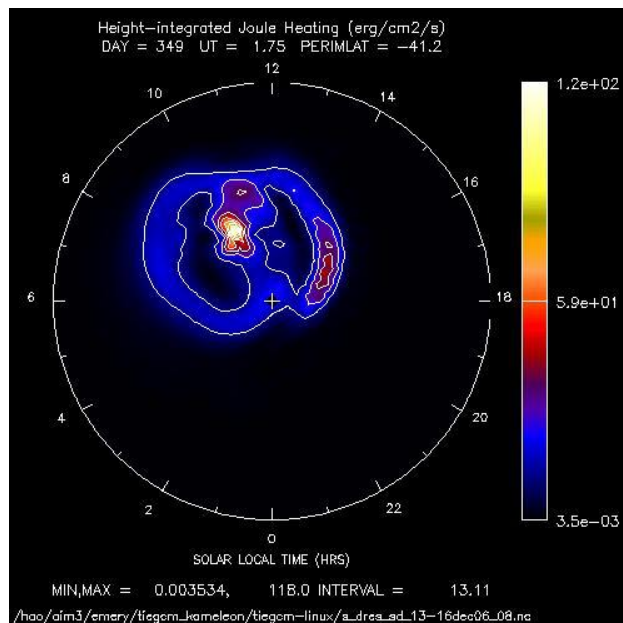
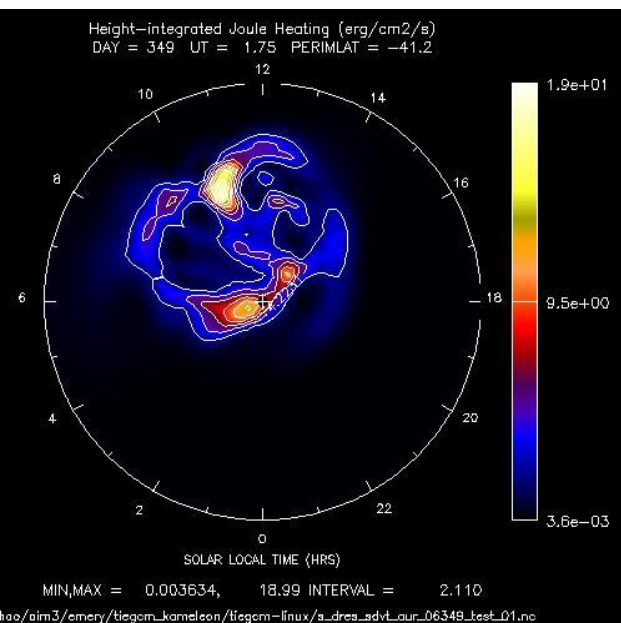
SWMF 100kV, 115GW

SH 06349 0145UT Peak QJ heating on AM or PM side or near cusp

SuperDARN VT 62kV, 132GW

SuperDARN DC 139kV,442GW

ASTRA AMIE 186kV, 130GW



Conclusions and Future

- CP more consistent among models than HP
- QJ from CP (Vi) and HP+EUV (SigPedersen) can peak anywhere on the oval in MLT
- SD VT data is easy to get (≥ 50 mlat and is improved with more mid-latitude stations) at <http://vt.superdarn.org/tiki-index.php?page=ASCIIData>
- tiegcm_superdarn branch is available via the HAO \$SVN repository via foster@ucar.edu (Ben) with a phone number to get a password.