Space Weather Observing Systems
NSF Perspectives

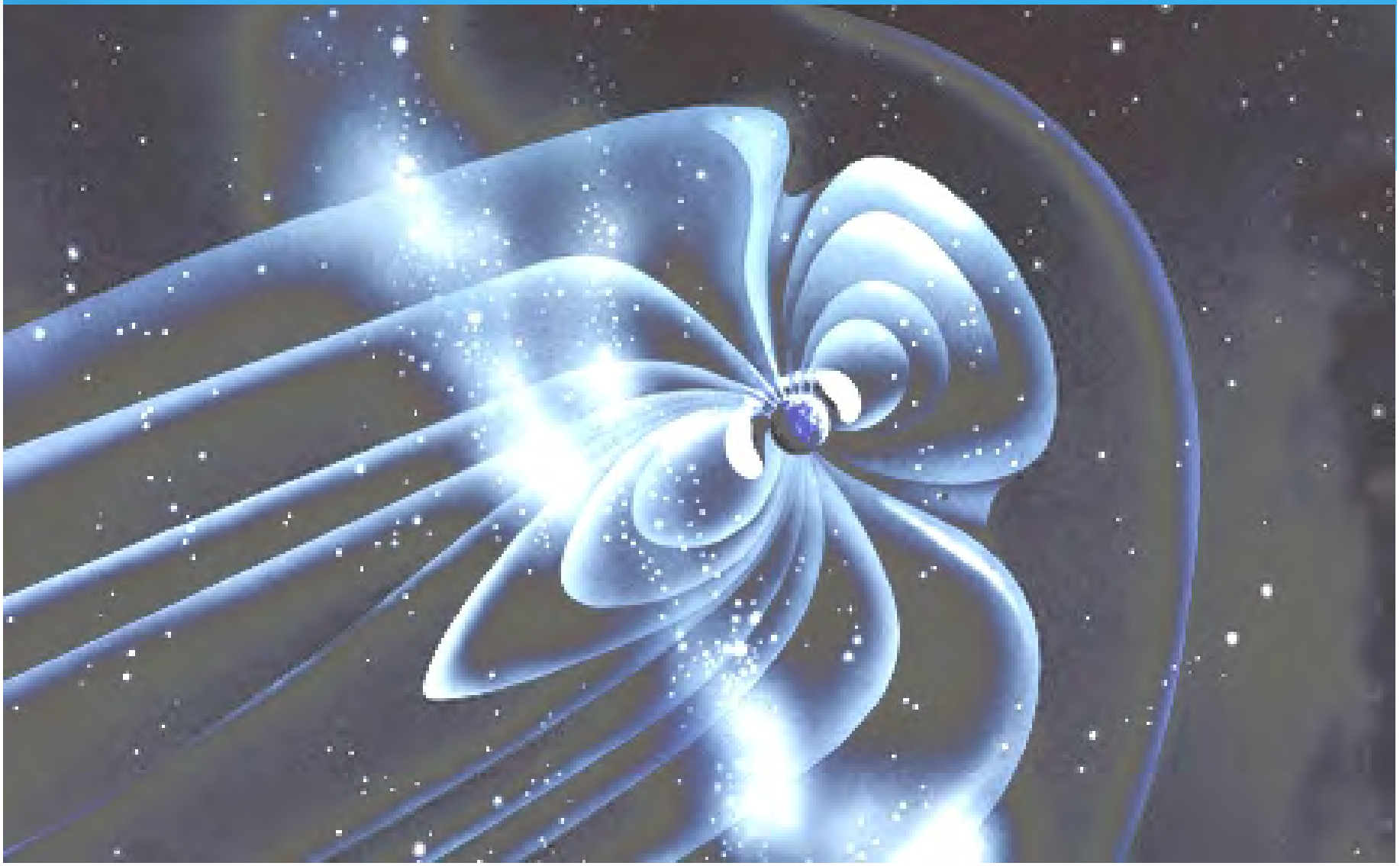
NSF is the only U.S. federal agency with a mission to support all fields of fundamental science and engineering, except medical sciences.

Unlike many other federal agencies, NSF does not hire researchers or directly operate its own laboratories or similar facilities. Instead, NSF supports scientists, engineers, and educators through their home institutions (typically universities and colleges).

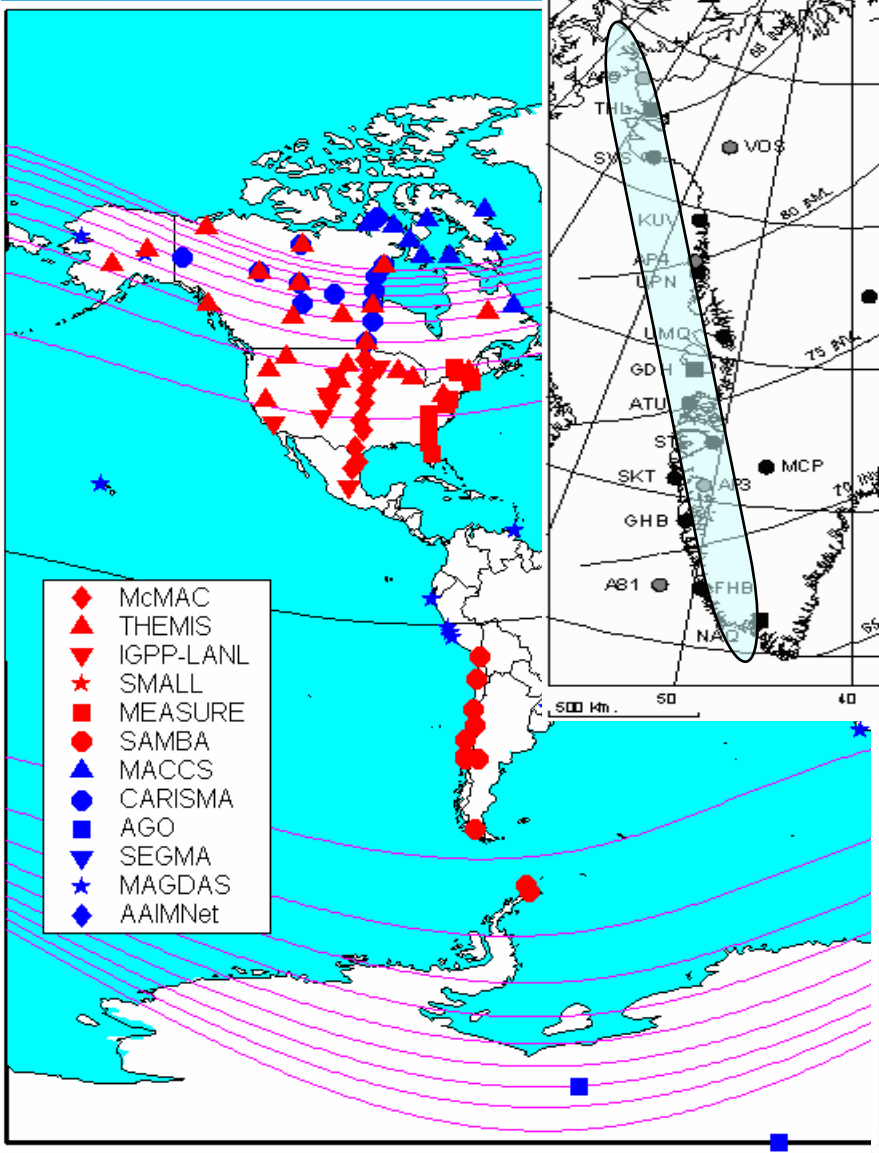
NSF works closely with other federal agencies (NASA, NOAA, DoE, USGS, etc.) determining science frontiers, identifying leading pioneers in these fields, and providing money and equipment to continue their research endeavor.

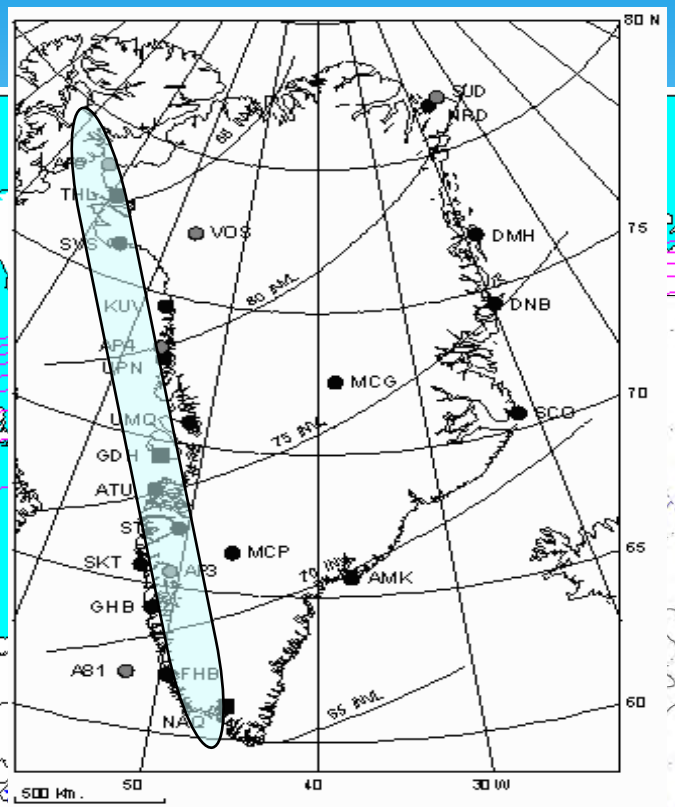
Dr. Vladimir Papitashvili
Antarctic Astrophysics and Geospace Sciences Program
National Science Foundation
(on behalf of NSF's Geospace SWORM team)

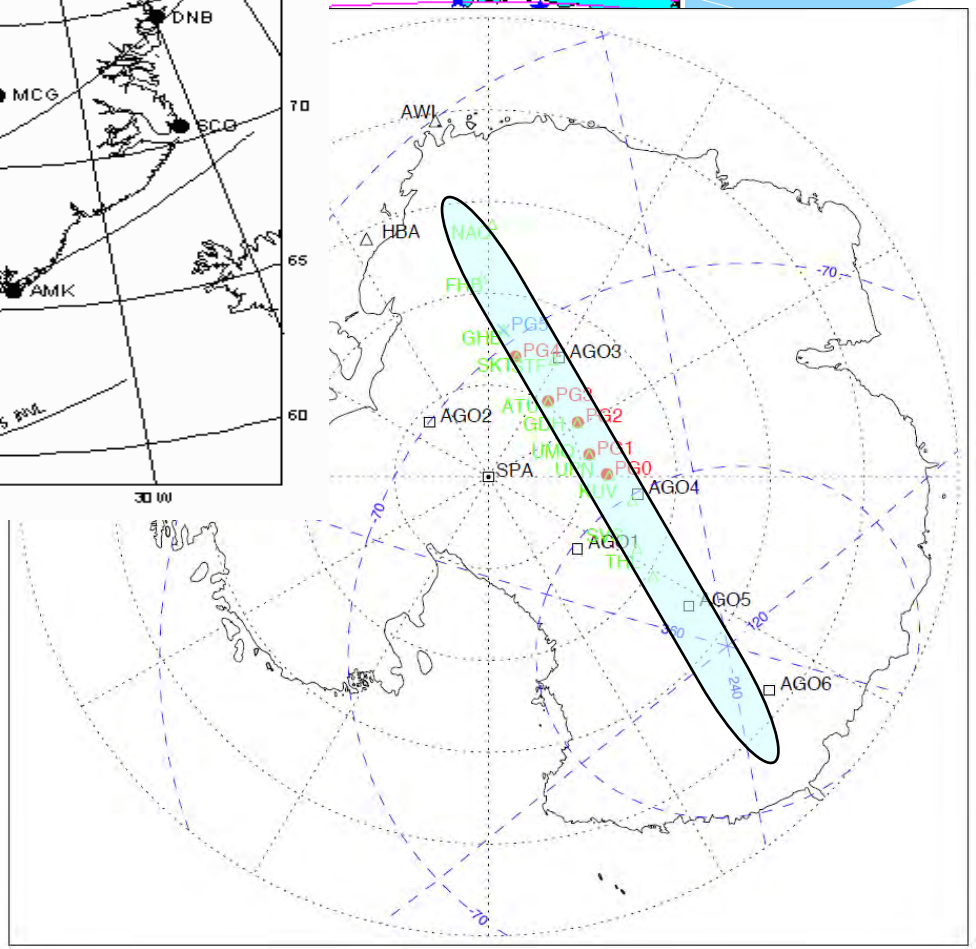
Earth's magnetopause projects over polar regions



Global / Conjugate Ground Magnetometer Networks







SuperMAG

Polar Plots

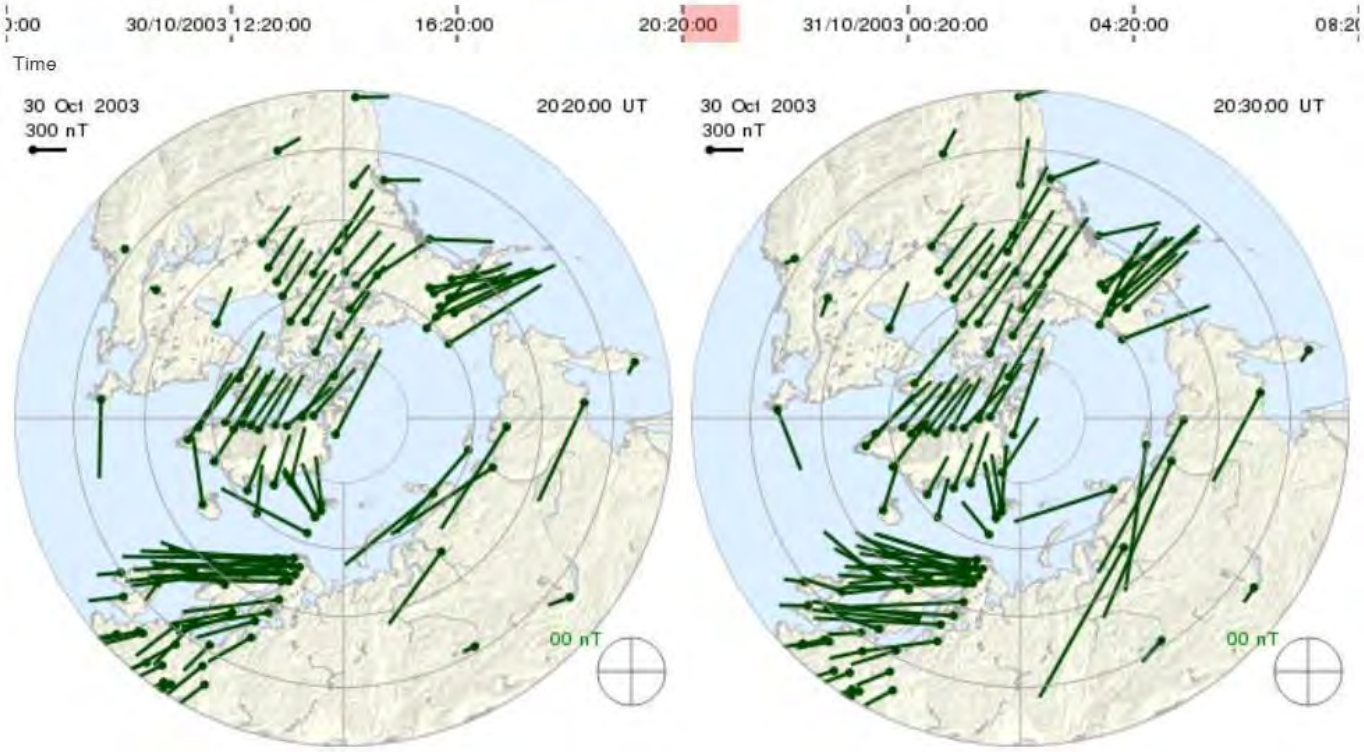
Small (2x3) | Large | Table | Download | About

Update | Previous | Next

Time
30 Oct 2003
20:20 (hh:mm)
Time Step: 10 Minutes

Projection
North South Both
Geomagnetic Geographic
Stereographic (40° min.lat)
Fixed Local Time 0

Magnetometer Vectors
on
Ground Magnetometer Vectors
Reference Vector



Virginia Tech Home
ECE Department
Space@VT
Calendar

SuperDARN
News
SD Working Groups
SD Pub List
SD Documents
SD Tech News
SD-Van Allen Probes
Space Weather Portal

VT SuperDARN
Personnel
Contact/Visit Us
Publications
Tutorials
Student Opportunities
Group Meetings

Radars
Maps/Tables/Links
Operating Schedule
Radar Coverage Tool
Conjugate FOV Tool
Radar Finder
Ray-Tracing Tool

Software

SuperDARN Data
Real Time Data (APL)
Daily Data Calendar
CPID Inventory
Data Access
Map Potential Data
Data Inventory

Quick Browse
Daily Multi-Radar Plots
Range-Time Plots
Convection Maps

CONVECTION MAP BROWSER

- Click here for historical convection maps (2000-2009)

This browser tool gives you access to plots of the ionospheric convection pattern determined from SuperDARN radar observations. Using the 'Option' menu, select to see (i) the pattern from application of the standard Map Potential algorithm (default), (ii) gridded line-of-sight velocities, or, (iii) the pattern from application of the SuperDARN Assimilative Mapping (SAM) algorithm. (What is SuperDARN Assimilative Mapping (SAM)?)

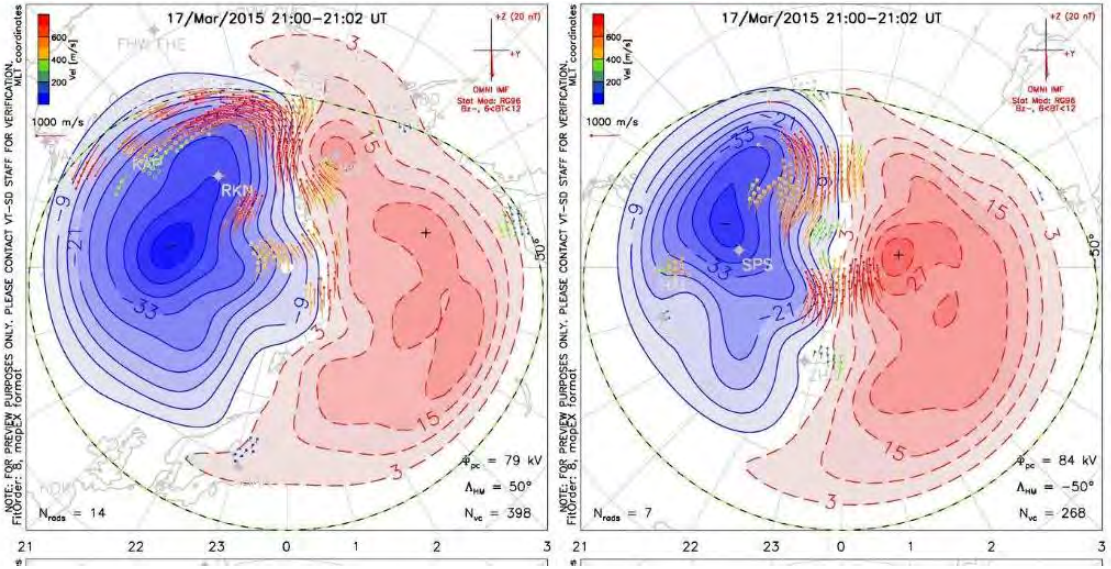
NOTE: The dates may not work correctly when using the Safari browser. It is recommended using Chrome or Firefox web browsers if you have a problem viewing certain dates.

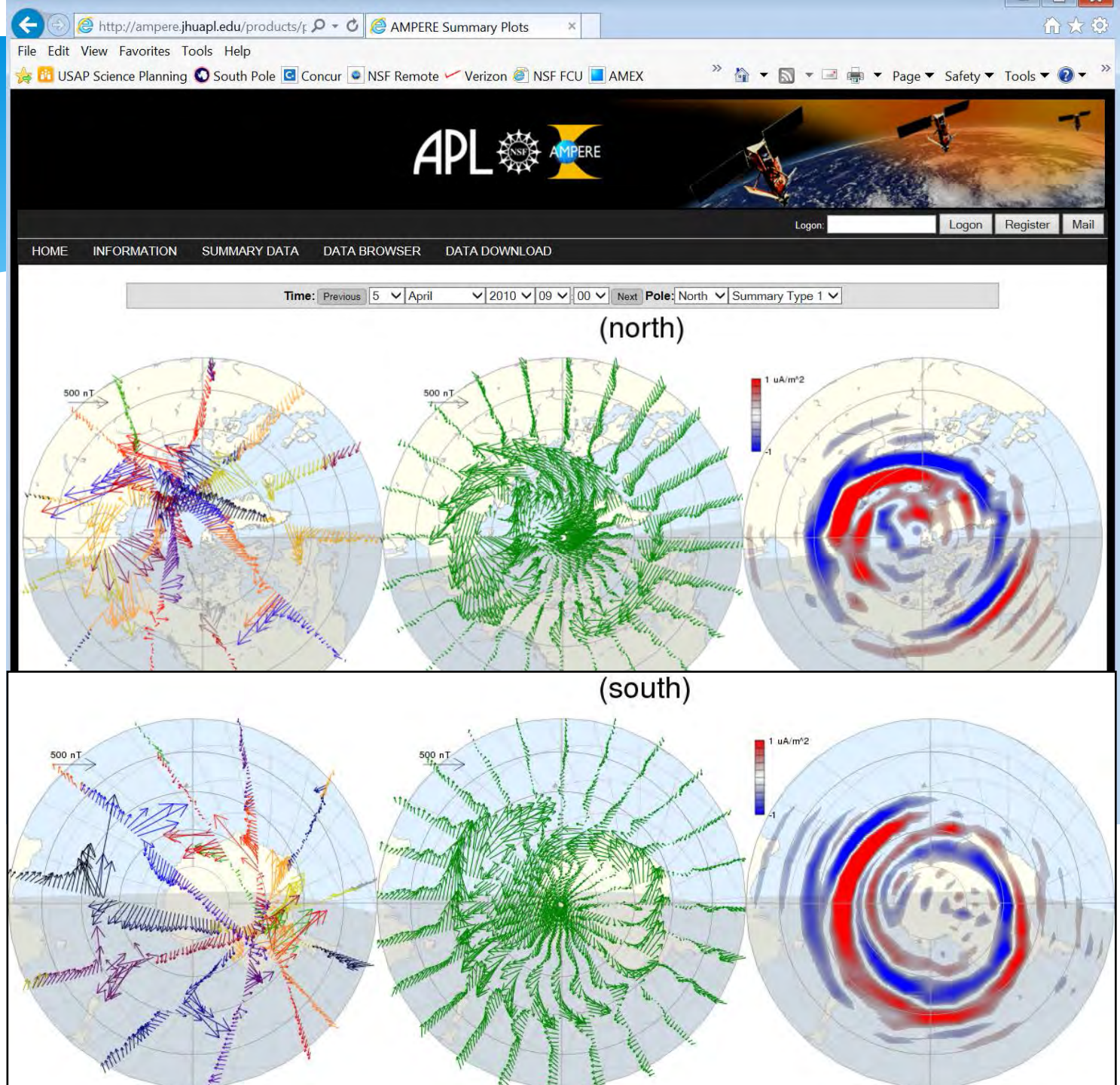
Quick Browse

2015 | Mar | 17 | 21 | 00 UT

Option: Map-Pot | Hemi: Both | Step: 1 hour

< Prev | Plot | Next >




http://ampere.jhuapl.edu/products/p
AMPERE Summary Plots
File Edit View Favorites Tools Help
USAP Science Planning South Pole Concur NSF Remote Verizon NSF FCU AMEX
Page Safety Tools
APL AMPERE
Logon: Logon Register Mail
HOME INFORMATION SUMMARY DATA DATA BROWSER DATA DOWNLOAD
Time: Previous 5 April 2010 09 00 Next Pole: North Summary Type 1
(north)
500 nT
500 nT
1 uA/m^2
-1
(south)
500 nT
500 nT
1 uA/m^2
-1

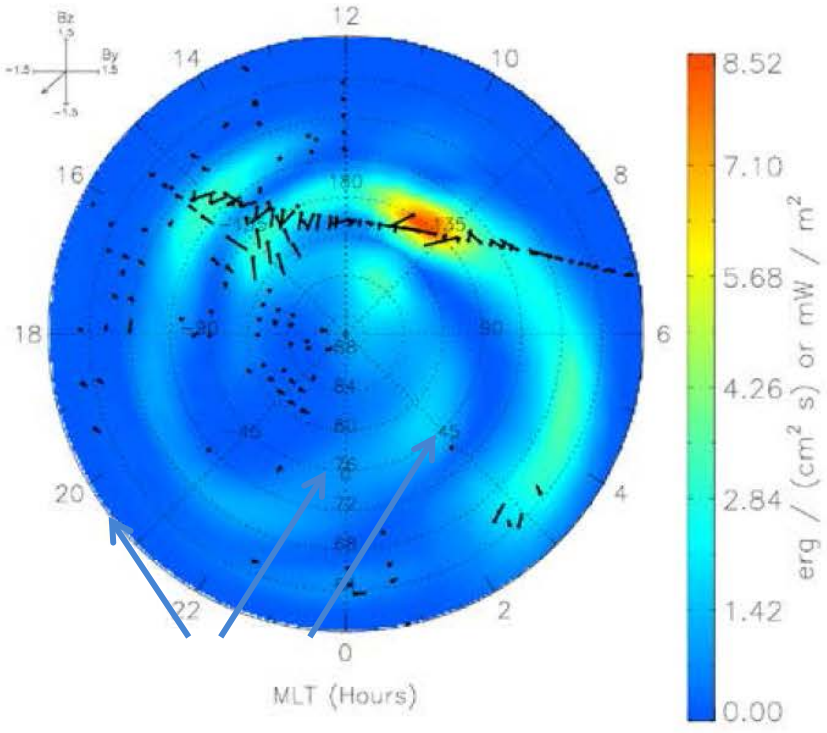
Ionospheric Electrodynamics

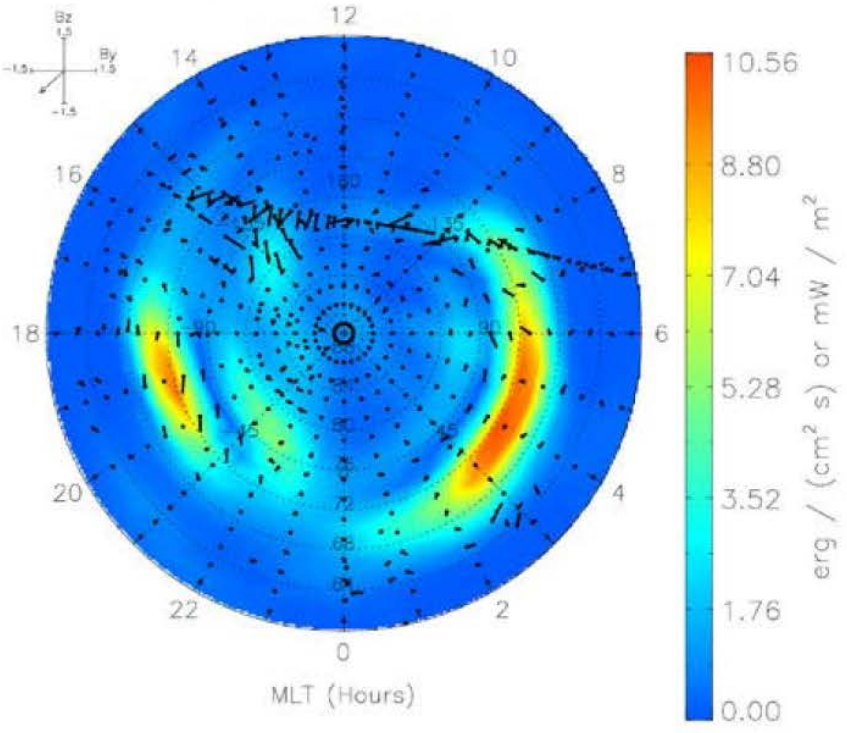
Ionospheric Integrated **Joule Heating** from NCAR-AMIE
00:30-00:40 UT 5 April 2010

Wilder et al., JGR, 2012

Ground magnetometers,
DMSP E-field, SuperDARN

AMPERE Data Included





Broad regions without data can be filled in with AMPERE observations

AMPERE Yields a Dramatic Change in Heating Distribution and Intensity

Space Weather Specification and Forecast

Connecting ftp.sec.noaa.gov ..... The last available ACE data (2015/09/21 1821 UT) :

IMF Bx= -4.60 nT, By= 0.40 nT, Bz= 1.10 nT Solar wind speed V= 508 km/sec, Proton density= 3.90 cm^{-3}

Time submitted : 2015-09-21 18:23 UT Starting calculation .....

http://mist.nianet.org/ Space Weather Forecast

File Edit View Favorites Tools Help

USAP Science Planning Page Safety Tools

Space Weather Specification and Forecast

Time submitted : 2015-09-21 18:18 UT

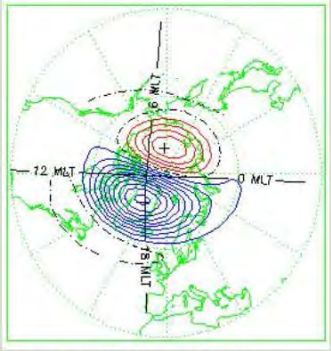
DICM - DMSP Ionospheric Convection Model

Northern Equinox and Southern Equinox

CURRENT

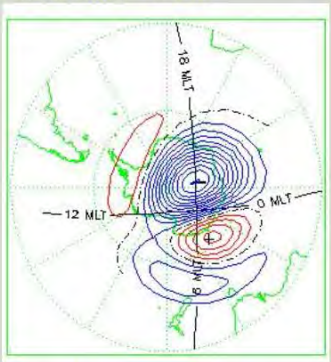
2015-09-21 18:18 UT used ΔT= 52 min

IMF (nT) Bx= -4.00 By= 0.20 Bz= 2.00



Max = 7.26 kV Min = -15.41 kV

Contour interval = 1.50 kV



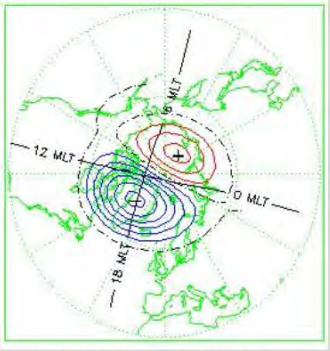
Max = 6.39 kV Min = -18.04 kV

Contour interval = 1.50 kV

FORECAST

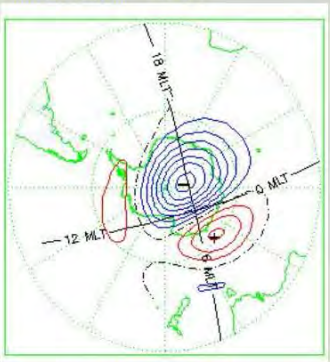
2015-09-21 19:05 UT used ΔT= 53 min

IMF (nT) Bx= -4.90 By= 0.10 Bz= 0.60



Max = 10.14 kV Min = -18.91 kV

Contour interval = 3.00 kV



Max = 9.40 kV Min = -22.25 kV

Contour interval = 3.00 kV

135%

http://mist.nianet.org/ Space Weather Forecast

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USAP Science Planning Page Safety Tools

Space Weather Specification and Forecast

Time submitted : 2015-09-21 18:20 UT

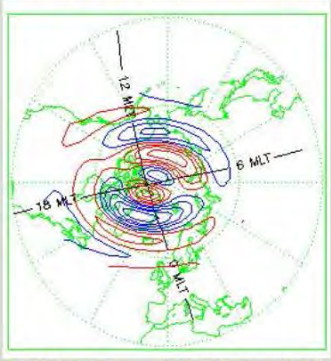
Ørsted/Magsat Field-Aligned Currents Model

Northern Equinox and Southern Equinox

CURRENT

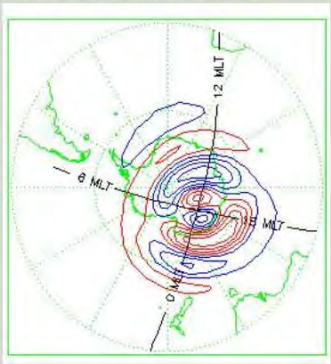
2015-09-21 18:20 UT used ΔT= 52 min

IMF (nT) Bx= -4.10 By= 0.30 Bz= 2.10



Total FAC: Down = 0.6 MA Up = -0.7 MA

Contour interval = 0.03 A/km^2



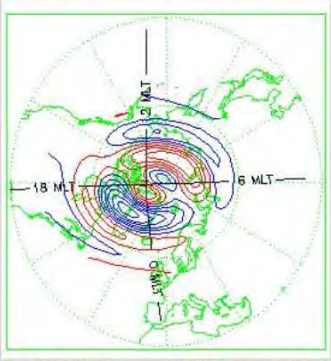
Total FAC: Down = 0.6 MA Up = -0.7 MA

Contour interval = 0.03 A/km^2

FORECAST

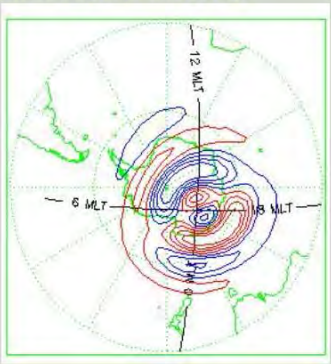
2015-09-21 19:05 UT used ΔT= 53 min

IMF (nT) Bx= -4.90 By= 0.10 Bz= 0.60



Total FAC: Down = 0.6 MA Up = -0.8 MA

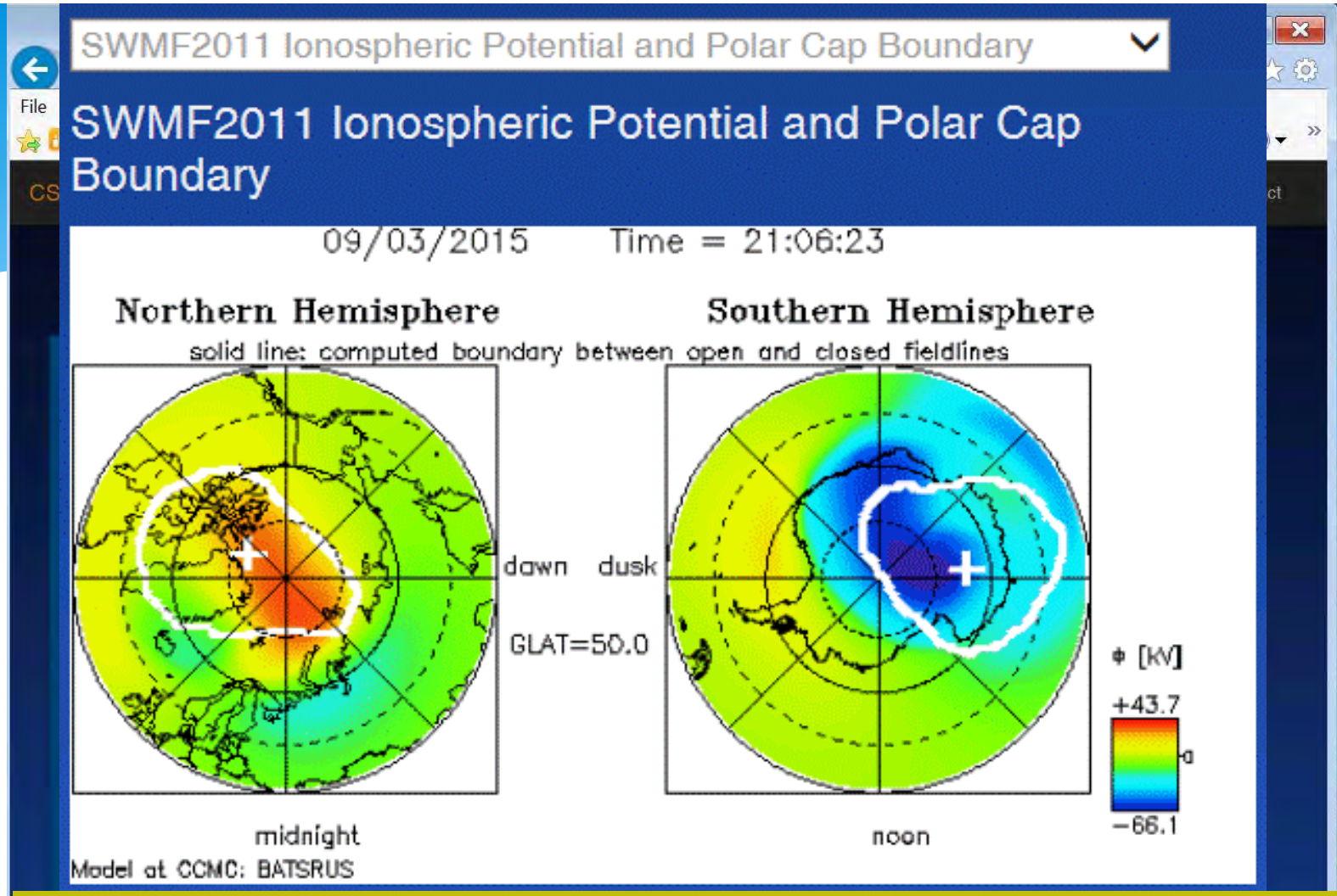
Contour interval = 0.03 A/km^2



Total FAC: Down = 0.7 MA Up = -0.7 MA

Contour interval = 0.03 A/km^2

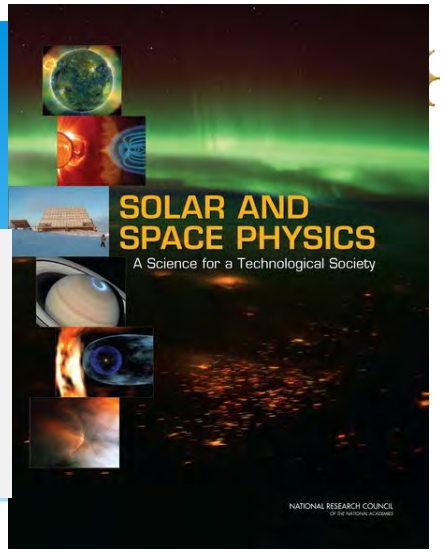
135%



The CCMC at NASA/GSFC regularly runs the SWMF code for real-time Geospace characterization. The code, designated with the BATS-R-US MHD model and an ionospheric electrodynamics solver, now has the RCM inner magnetospheric drift physics code.

The NOAA/SWPC currently tests SWMF aiming to make it “Space Weather Operational Framework”.

2013 Decadal Strategy for Solar & Space Physics (Heliophysics)



- **DRIVE would provide high leverage to current and future space science research investments.**
- **Five DRIVE components are "basic building blocks" in which NSF already invests… and will continue to invest!**

D
R
I
V
E

- **D**iversify observing platforms with microsatellites and midscale ground-based assets
- **R**ealize scientific potential by sufficiently funding operations and data analysis
- **I**ntegrate observing platforms and strengthen ties between agency disciplines
- **V**enture forward with science centers and instrument and technology development
- **E**ducate, empower, and inspire the next generation of space researchers