



The Virtual Model Repository (VMR)

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ASTRONUM
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Introduction

- The Heliophysics Data Environment provides essential infrastructure supporting NASA's Vision to understand "the Sun, the Heliosphere, and planetary environments as elements of a single interconnected system, one that contains dynamic space weather and evolves in response to solar, planetary, and interstellar conditions"

NASA Sun-Solar System Connection Science and Technology Roadmap 2005-2035.

HDMC

- Yes, we have a rich set of data, but it is in a wide variety of places and formats, and available through a varied collection of interfaces.
- Enter the Heliophysics Data and Model Consortium (HDMC), whose mission is to facilitate Heliophysics research by providing open, easy, uniform, scientifically meaningful access to relevant resources (data, models, tools, and documentation) as quickly and easily as possible.

- Some of the HDMC requirements include
 - Maintain a comprehensive inventory of data and related resources.
 - Provide discipline specific portals to Heliophysics resources (VxOs) that add value by providing easy-to-use interfaces and search tools based on events, positions, etc.
 - Maintain SPASE descriptions of the inventoried resources (SPASE - Space Physics Archive Search and Extract - is a data model that provides a robust description of data, facilitating discovery). The current estimate is that 25% of space-based data products have SPASE descriptions.

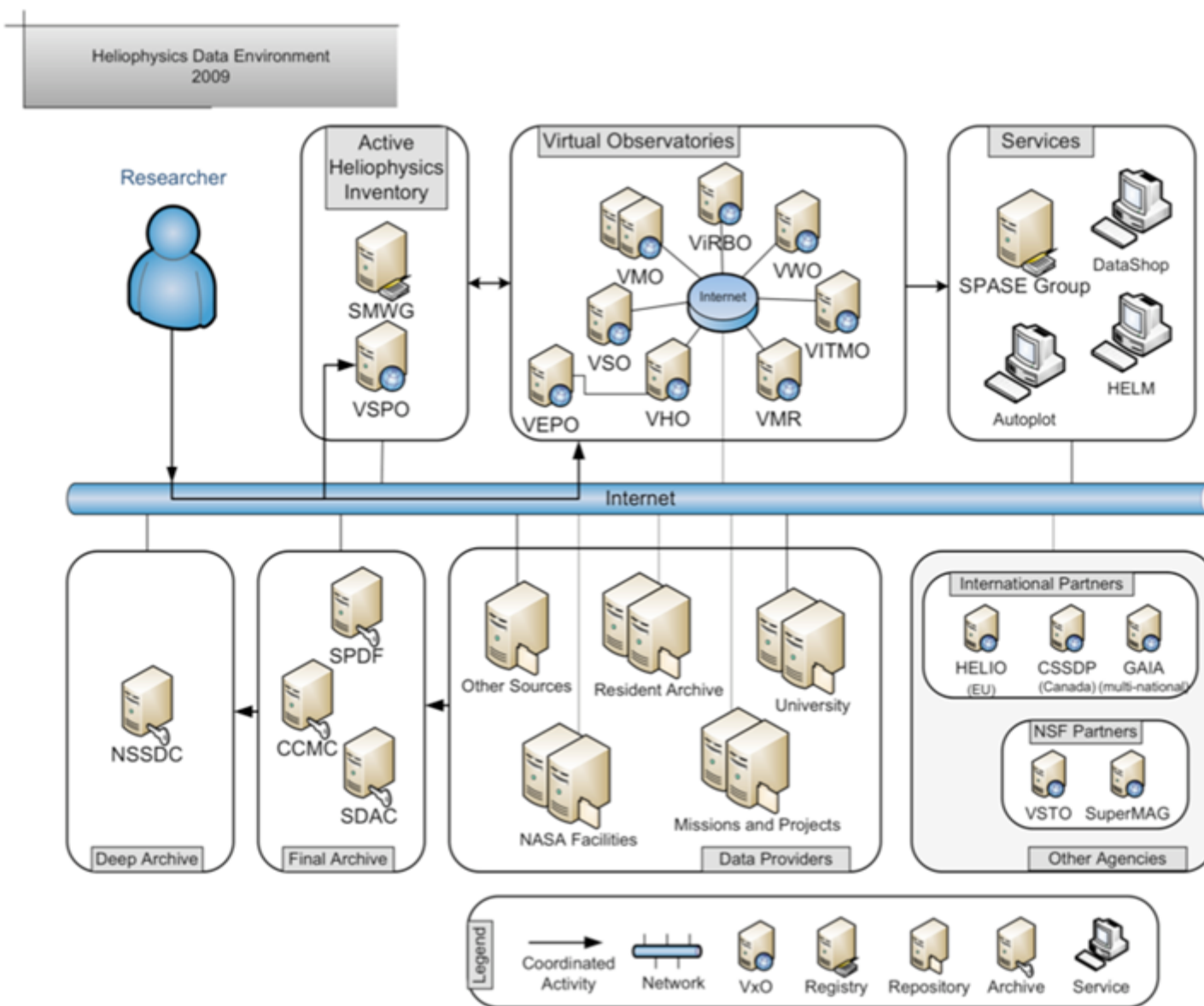
Virtual Observatories (VxOs)

- Discipline specific VxOs were formed by individual research proposals in response to a standard NASA Research Announcement.
- These include
 - VHO Virtual Heliospheric Observatory
 - VMO Virtual Magnetospheric Observatory
 - ViRBO Virtual Radiation Belt Observatory
 - ViTMO Virtual Ionosphere, Thermosphere, Mesosphere Observatory
 - VEPO Virtual Energetic Particle Observatory
 - VWO Virtual Wave Observatory
 - VMR Virtual Modeling Repository

Virtual Observatories (VxOs)

- The VxOs all provide a number of functions, most importantly discipline-specific expertise.
- The VxOs provide a means of assuring that data descriptions are complete, accurate, and useful.
 - All the VxOs are committed to providing a comprehensive set of SPASE descriptions of their relevant data.

Heliophysics Data Environment



Virtual Space Physics Observatory – Solar Space Physics Product Finder

[http://vsfo.gsfc.nasa.gov/websearch/dispatcher](#)

GODDARD SPACE FLIGHT CENTER
 Space Physics Data Facility

[+ Goddard Home](#)
[+ Visit NASA.gov](#)

SEARCH NASA
 + 60

Virtual Space Physics Observatory

SPASE
 inside

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[+ ACCESSING VSPO](#)
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[+ FEEDBACK](#)

Text Restriction
 [Add](#)

Time Span Restriction ⓘ
 YYYY-MM-dd or YYYY-DDD
 from:
 to: [Add](#)

Element Restriction ⓘ
[Resource type](#) ⓘ
[Measurement type](#) ⓘ
[Observatory Group](#) ⓘ
[Observatory](#) ⓘ
[Instrument](#) ⓘ
[Observed region](#) ⓘ
[Spectral range](#) ⓘ
[Cadence](#) ⓘ
[Repository Name](#) ⓘ
[Access rights](#) ⓘ
[Format](#) ⓘ

Current Product Restrictions
 No restrictions are currently set.


#	Product Name	Access Links
1	ACE 27-day Survey Plots	<ul style="list-style-type: none"> • Polar-Wind-Geotail 'gif-walk' site get data
2	ACE CRIS L2 1-day Z=3-28 flux data	<ul style="list-style-type: none"> • ACE Science Center • ACE/CRIS L2 data in HDF via ftp • CDAWeb • in CDF via ftp from CDAWeb get data
3	ACE CRIS L2 1-hr Z=3-28 flux data	<ul style="list-style-type: none"> • ACE Science Center • ACE/CRIS L2 data in HDF via ftp • CDAWeb • in CDF via ftp from CDAWeb get data
4	ACE Daily Survey Plots	<ul style="list-style-type: none"> • Polar-Wind-Geotail 'gif-walk' site get data
5	ACE EPAM L2 1-hour particle flux data	<ul style="list-style-type: none"> • ACE Science Center (ASC) • in HDF via ftp from ASC • CDAWeb • in CDF via ftp from CDAWeb get data
6	ACE EPAM L2 5-min particle flux data	<ul style="list-style-type: none"> • ACE Science Center (ASC) • in HDF via ftp from ASC • CDAWeb • in CDF via ftp from CDAWeb get data

Virtual Solar Observatory




http://sdac.virtualsolar.org/cgi-bin/search
Google

Search VSO Help or enter Cart Id:
Go


Search for Solar Physics Data Products:

If you're new to the VSO, see [How To Search](#), the [FAQ](#) or click the  icons for online help.

Please select which values you wish to use to search for data products:


- ☒ **Time**
 - Search by time interval.
 - [Derive time intervals from event catalogs](#)
- ☐ **Observable**
 - Search based on physical observables 
- ☐ **Instrument / Source / Provider**
 - Search based on instruments  or data archives 
 - ☐ Compact listing
 - ☐ Instrument / Source (not provider dependent)
 - ☐ Instrument Only (not source or provider dependent)
- ☐ **Spectral Range**
 - Search based on a spectral range
- ☐ **Nicknames**
 - Search based on common terms used to describe data products


Note: Nicknames generate an intersection with other search terms, so searching for a nickname, and a physical observable (or other parameter) when a nickname defines other



Virtual Solar Observatory

Virtual Heliospheric Observatory - Home


[A](#) [A](#) [+](#) <http://vho.gsfc.nasa.gov/>
[RSS](#) [Google](#)



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LATEST NEWS

- [Ulysses KET and ISEE3 HECR Data Added](#)
- [Ulysses HISCALE Rates Data Added](#)
- [Neutron Monitor Data Added](#)
- [IMP 8 CPME Data Added](#)
- [Vega 1 and 2 Data Products Added](#)

LATEST DATA UPDATES

- 16 Jun 2009: [ISEE 3 12-min Ephemeris](#) (7 files)
- 10 Jun 2009: [ISEE3 Elemental Abundance Ratios](#) (1 file)
- 10 Jun 2009: [ISEE3 Isotopic Abundance Ratios](#) (1 file)
- 10 Jun 2009: [ISEE3 Isotopic Fractions](#) (1 file)
- 4 Jun 2009: [Daily OMNI Data Set](#) (1 file)

Site search...

NEWSFLASH

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[Ulysses KET and ISEE3 HECR Data Added](#)

[Latest News](#)

Written by Tom Narock

Wednesday, 10 June 2009

Ulysses COSPIN/KET [Proton, Helium, and Electron Rates](#), [Proton, Helium, and Electron PHA Count Rates](#), and [COSPIN/High Flux Telescope](#), [Proton and heavier nuclei fluxes](#) have been added to VHO.

In addition, ISEE3 [Elemental Abundance Ratios](#), [Isotopic Abundance Ratios](#), and [Isotopic Fractions](#) data have

Virtual Magnetospheric Observatory

http://vmo.nasa.gov/ RSS Google

Open Control Panel

Virtual Magnetospheric Observatory

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Latest News

- ★ Prognoz 6, 7, and 9 Magnetic Field Data Added
- ★ Four New Geotail Data Sets Added
- ★ OMNI Data Sets Added
- ★ Four New THEMIS data products added
- ★ Three new data products added to VMO

Latest Data Updates

- ★ 8 Jun 2009: THEMIS-A ESA Electron/Ion Fluxes and Moments (788 files)
- ★ 8 Jun 2009: THEMIS-B ESA Electron/Ion Fluxes and Moments (741 files)
- ★ 8 Jun 2009: THEMIS-C ESA Electron/Ion Fluxes and Moments (505 files)
- ★ 8 Jun 2009: THEMIS-D ESA Electron/Ion Fluxes and Moments (183 files)
- ★ 8 Jun 2009: THEMIS-E ESA Electron/Ion Fluxes and Moments (183 files)

Other

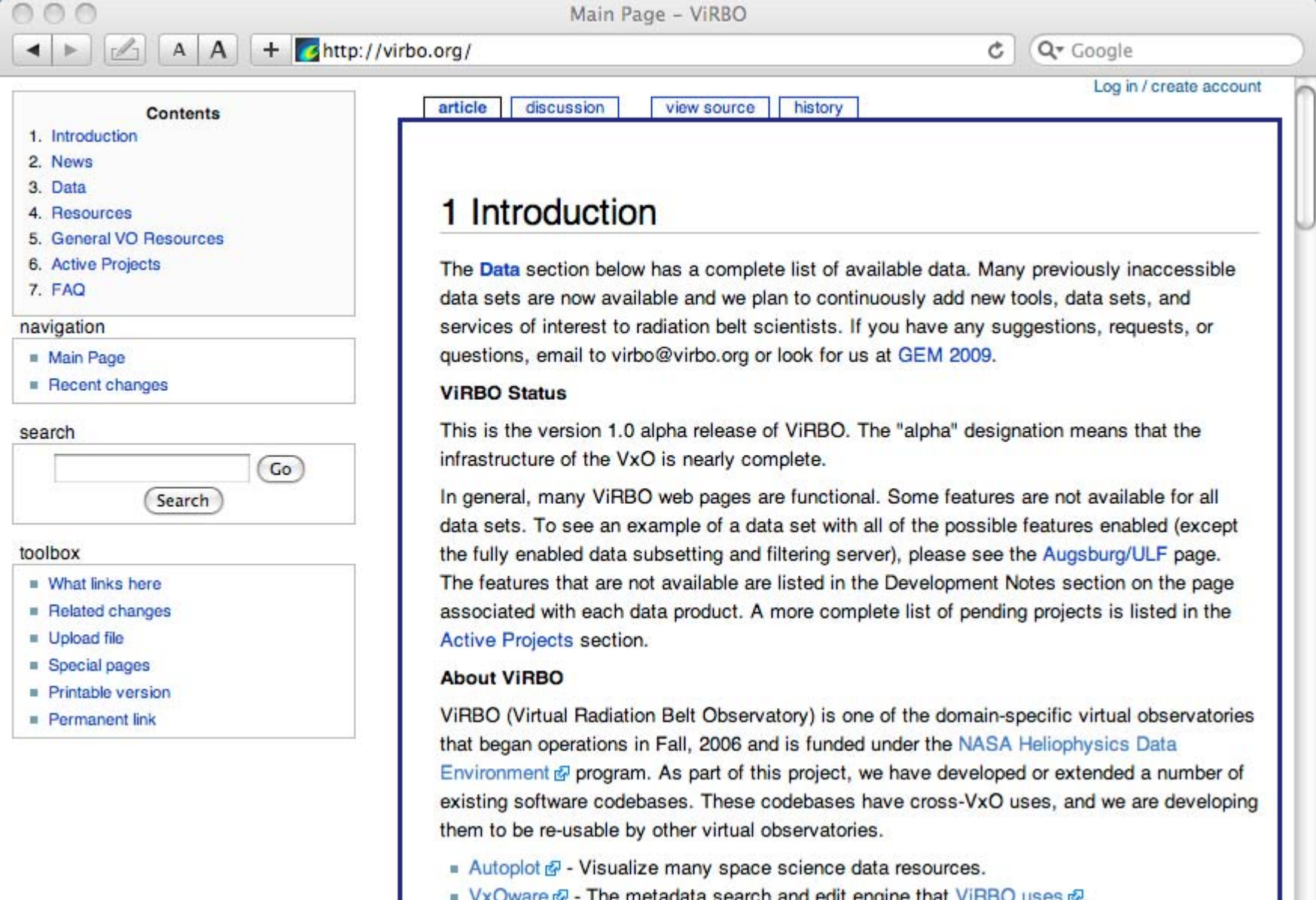
- Site Map
- Search


Prognoz 6, 7, and 9 Magnetic Field Data Added

Latest News


Written by Tom Narock

Monday, 20 April 2009





Virtual ITM Observatory



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- Latest News
- Products Currently Available Through VITMO
- Data sets Coming to VITMO
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- Presentations
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- Help

VITMO - A Data Discovery System for Ionosphere Thermosphere Mesosphere Data

Welcome to the Virtual Ionosphere Thermosphere Mesosphere Observatory, a data discovery system that allows the user to find previously unknown data sets as well as old familiar ones through a single, easy to use interface. Click on the button below to initiate a query of space physics data sets which integrate data, services and tools across many missions, data centers, agencies and countries and suggests related models to use with your data.

Search Space Science Data

The Virtual Observatory for the Ionosphere Thermosphere Mesosphere Community (VITMO) is being implemented at JHU/APL and provides data covering the Ionosphere Thermosphere Mesosphere (ITM). The ITM region is observed by ground based remote sensing instruments, satellite based remote sensing instruments, and in-situ satellite instruments. In addition, there are external drivers in solar radiation and the solar wind and magnetospheric particle inputs. A Virtual Observatory that covers the ITM region needs to deal with the large diversity of data types in the study of this region.

Some unique features about VITMO include the following:

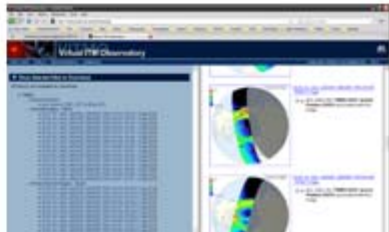
Latest News

Products previews now available without selecting products for downloading - March 23, 2009 [\[read more\]](#)

Products currently available through VITMO now supports **Get Information Buttons** - March 15, 2009 [\[read more\]](#)

VITMO now automatically supports multiple time intervals in CDAWeb products - January 8, 2009 [\[read more\]](#)

[View All News >](#)









VMR: Virtual Modeling Repository

<http://vmr.engin.umich.edu/>



- Make model results available to the general community in a consistent format
 - Allow visualization of any model results
 - Allow independent interpretation of published model results
- Seamless data-model comparisons
 - Get data from other VxOs
 - Get model results from Virtual Model Repository and CCMC
 - Can request a model run if no model results exist

VMR: ModelWeb Interface


Virtual Modeling Repository

http://vmr.engin.umich.edu/visualize/iridmsp/IRI/?setm=2&lat1=40.5&lc - Google

VMR - VIRTUAL MODELING REPOSITORY

Home Search & Visualize Other VxOs Publications & Presentations Help
> IRI/DMSP > CCMC Search

Run IRI



Select date for all run types: Year: 2000 Month: January Day: 01

1st location selected.
Latitude = 40.5 Longitude = 239.5 [Clear all values](#)

[Run IRI for single verticle profile](#)

2nd location selected.
Latitude = 9 Longitude = 278 [Clear 2nd values](#)

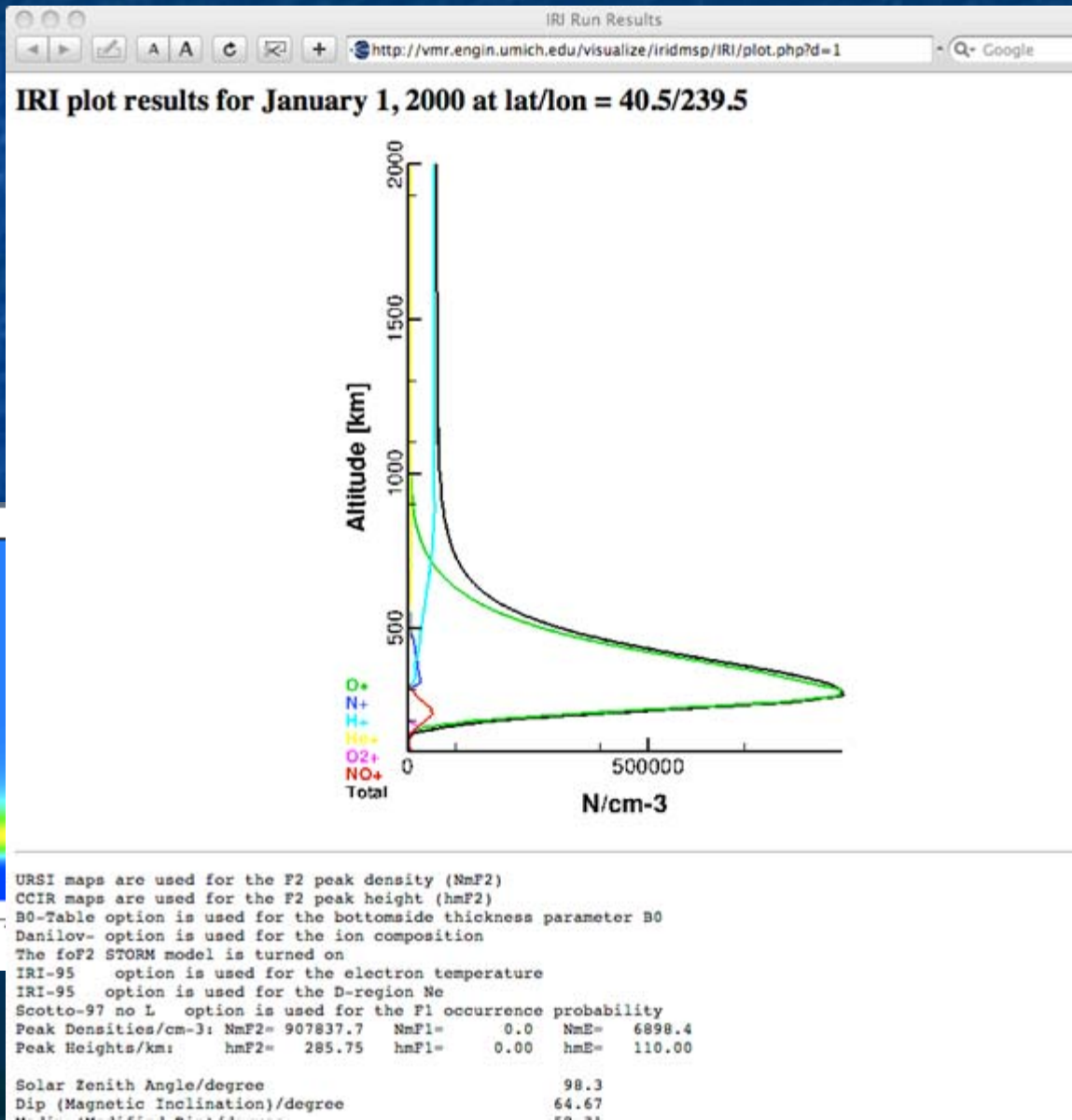
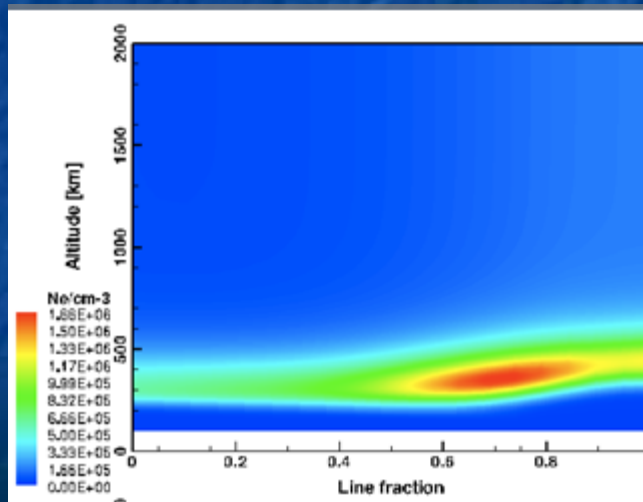
[Run IRI 2D sweep](#) with 20 steps.

The original IRI ModelWeb site can be found [here](#).

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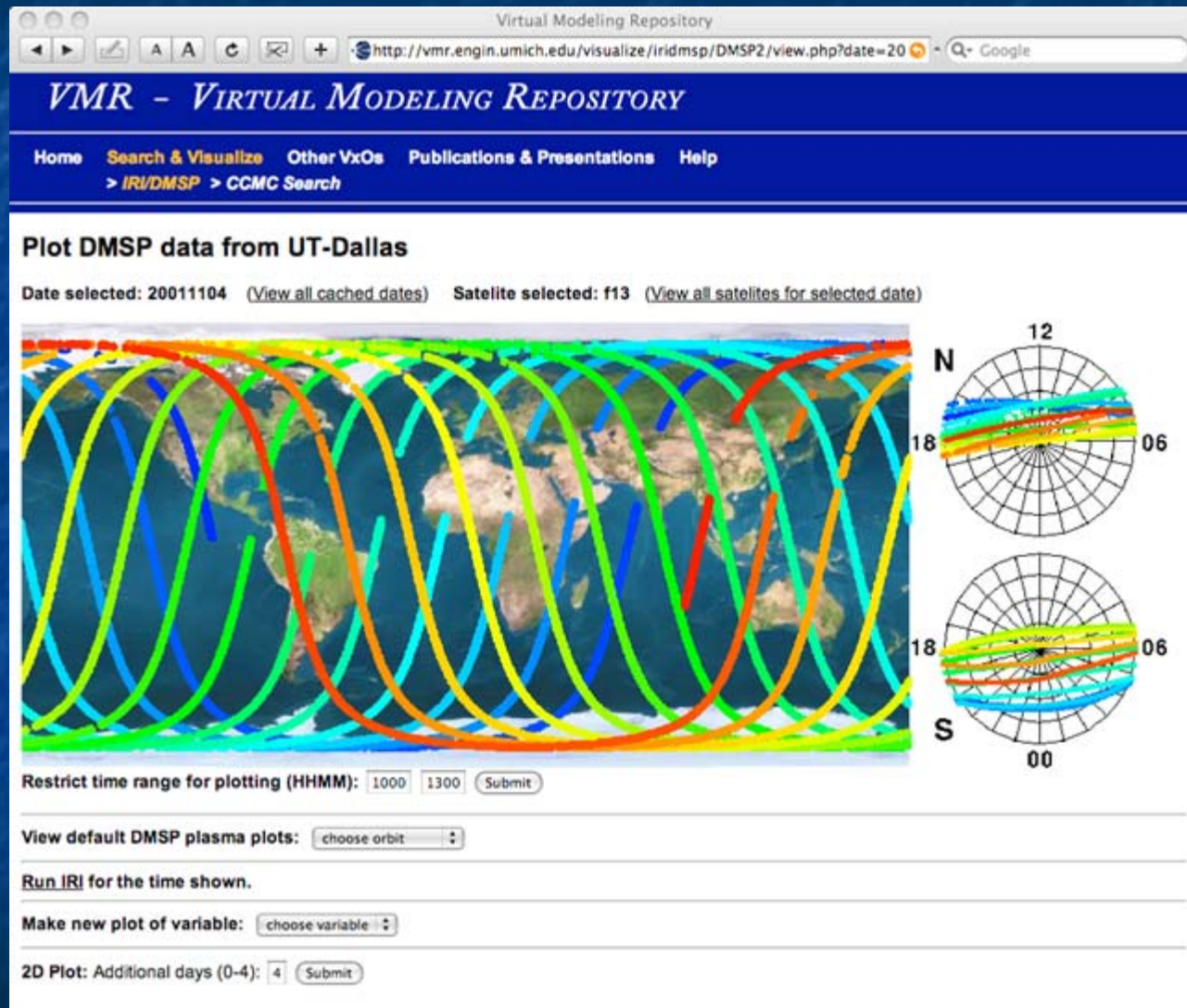
VMR: ModelWeb Interface (2)

- Web page is at UM
- Runs ModelWeb at NASA
- Gathers data at UM
- Create plots at UM



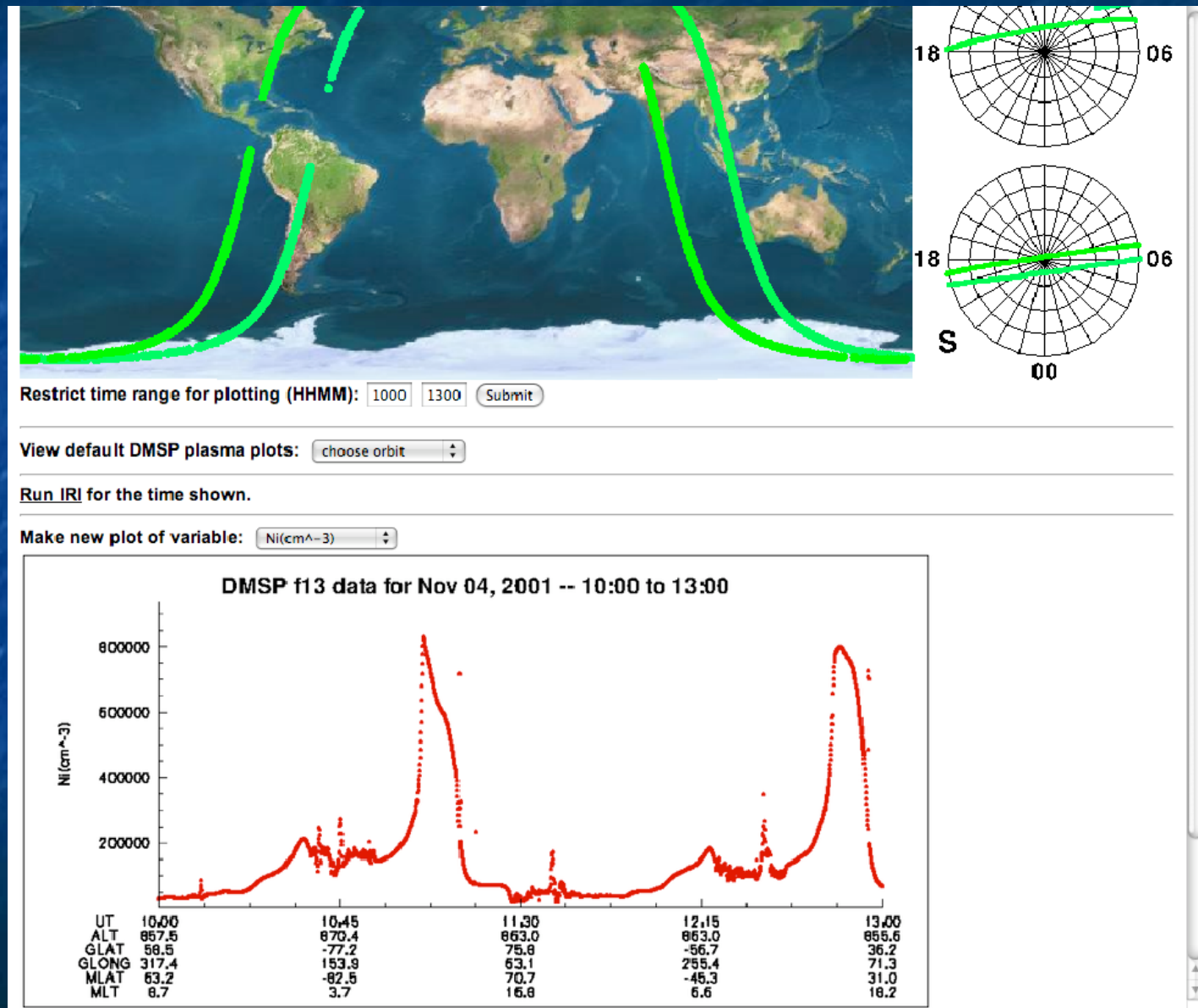
VMR: DMSP Data

- DMSP Data is available from University of Texas at Dallas.
- Want to make the web page a little more intuitive, for people who don't think in terms of orbit.
- Also want to compare data to ModelWeb IRI results.
- Created web page at UM to gather metadata at UTD about orbits, satellites, dates, etc.
- Choose date you want.
- Data downloaded from UTD (on the fly)



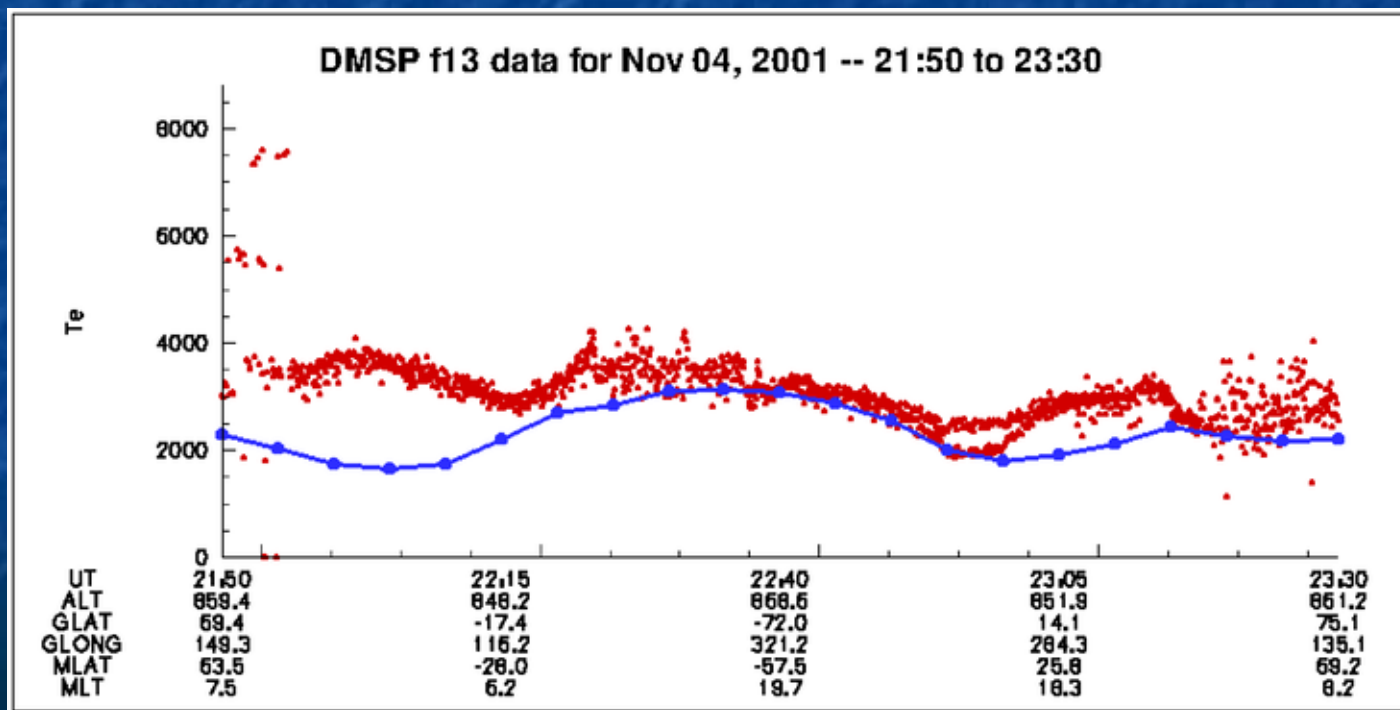
VMR: DMSP Data Plotter

- Once data is downloaded from UTD, can do many things:
- Choose portion of data to examine.
- Plot different variables available within the data files.
- Compare to ModelWeb IRI run.



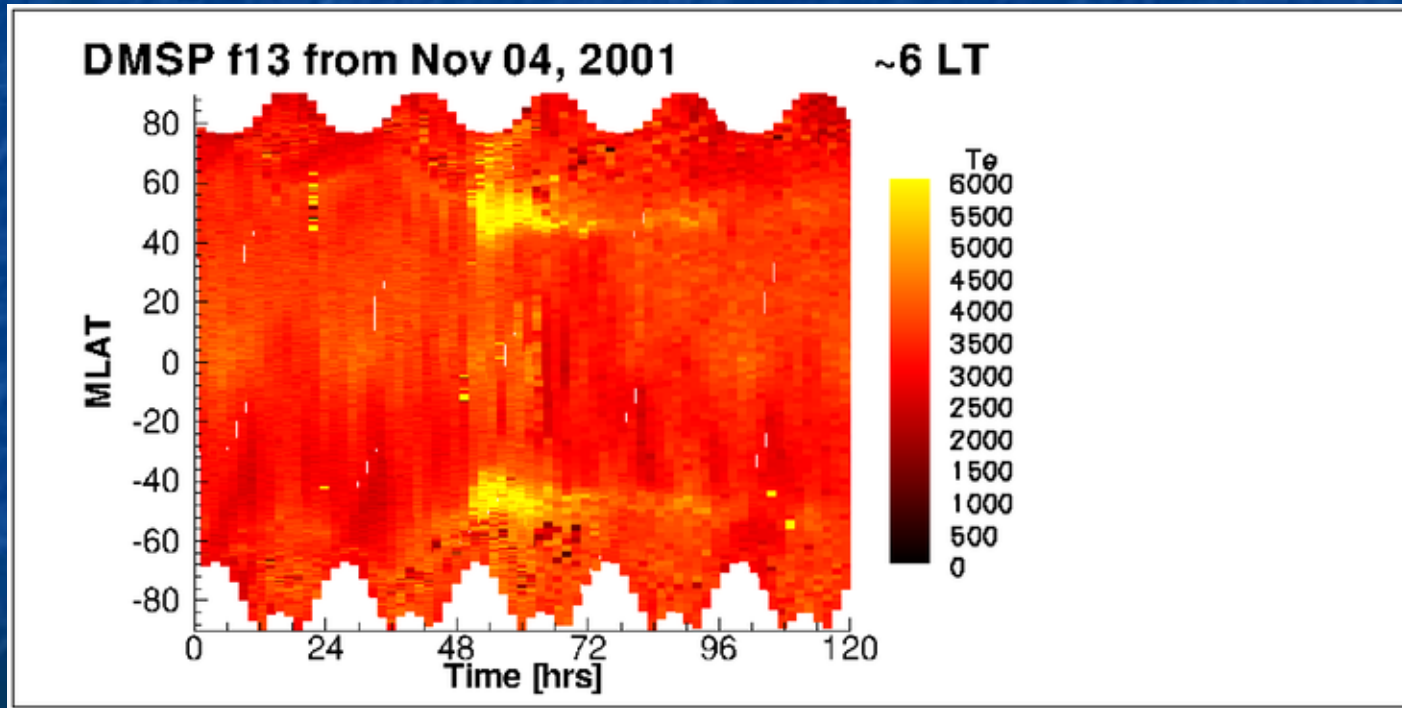
VMR: Data Comparison

- Plot of data downloaded from UTD (ANY TIME!)
- IRI run at ModelWeb site utilizing location and time of data.
- None of this is pre-loaded
 - Data is downloaded on the fly (and cached)
 - IRI is run when you select compare to IRI
 - Matches variables between IRI and DMSP



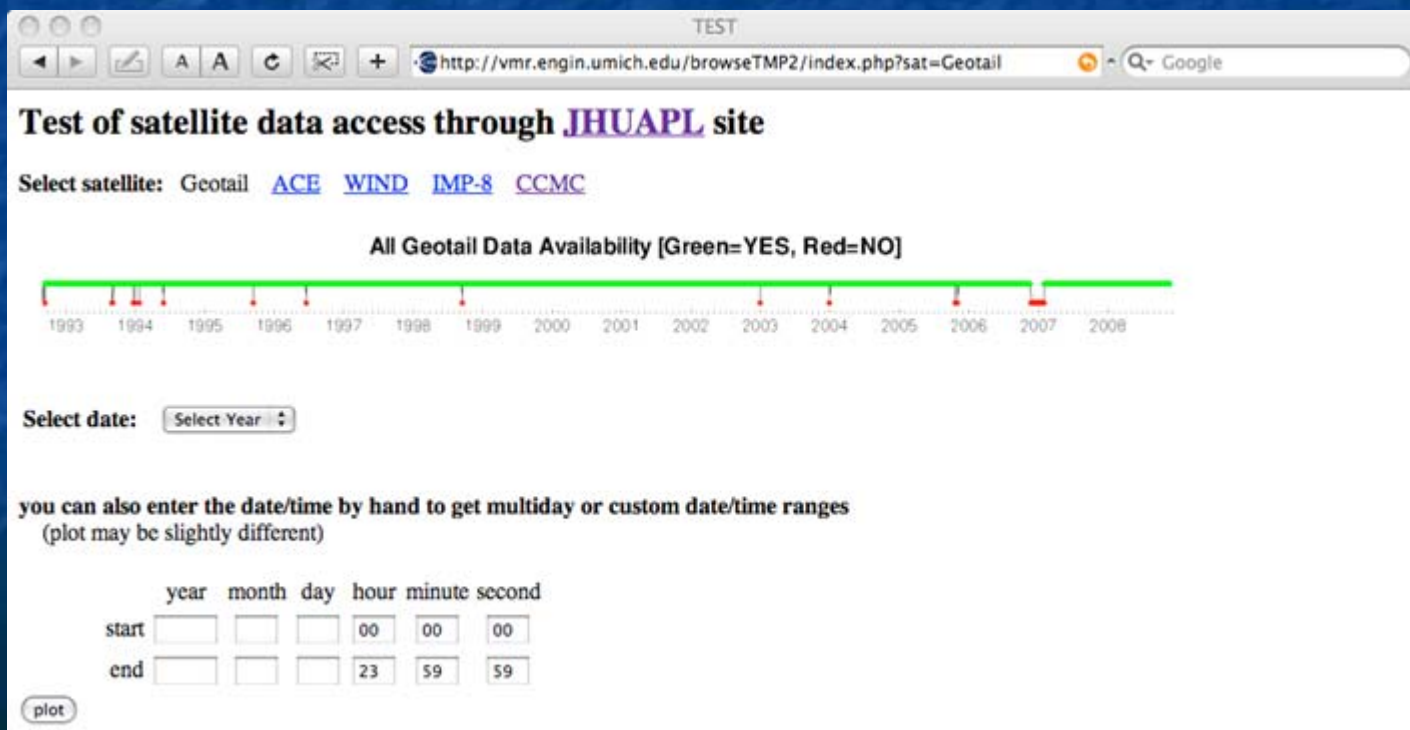
VMR: DMSP New Plots

- Multiple days can be combined together to create new plots types that enable further science insight.



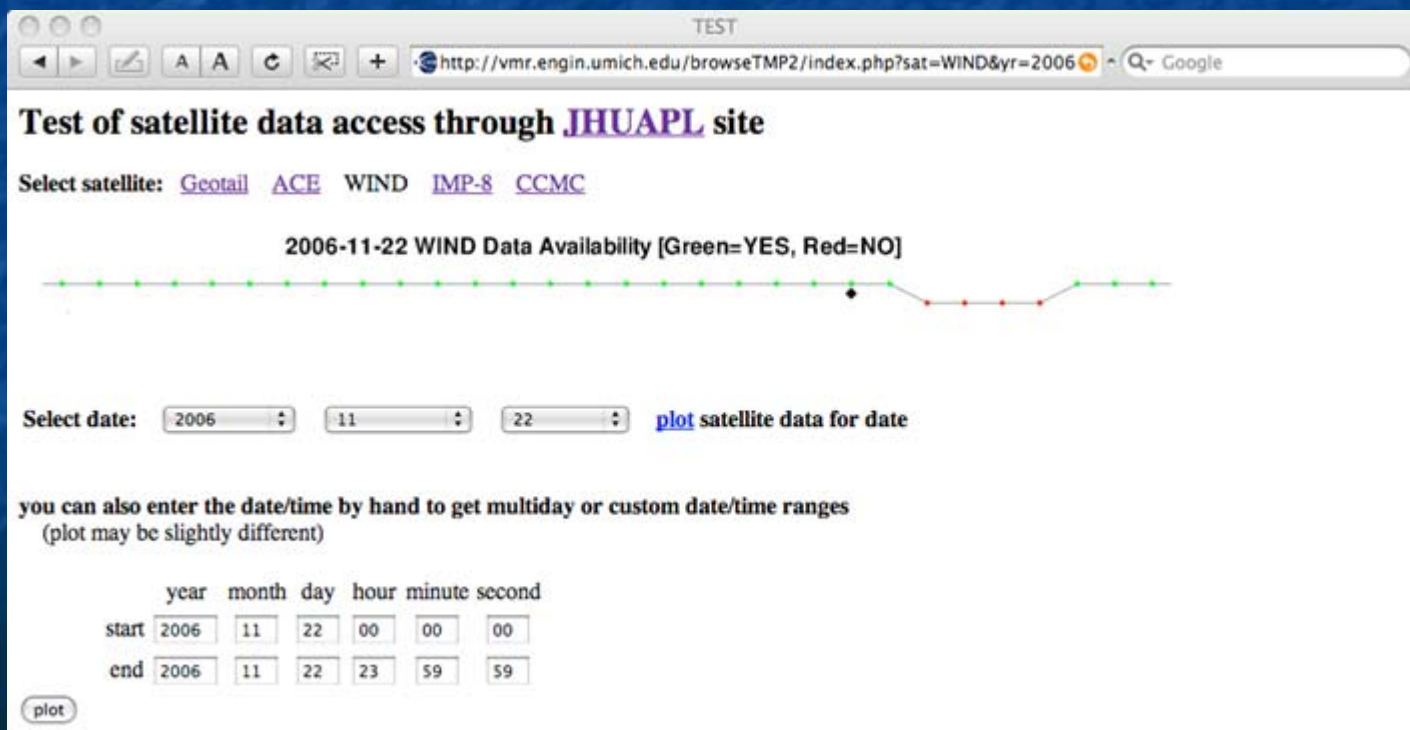
VMR: Coupling with other VxOs

- We have coupled to other VxOs, here to capture satellite data, with availability lists.



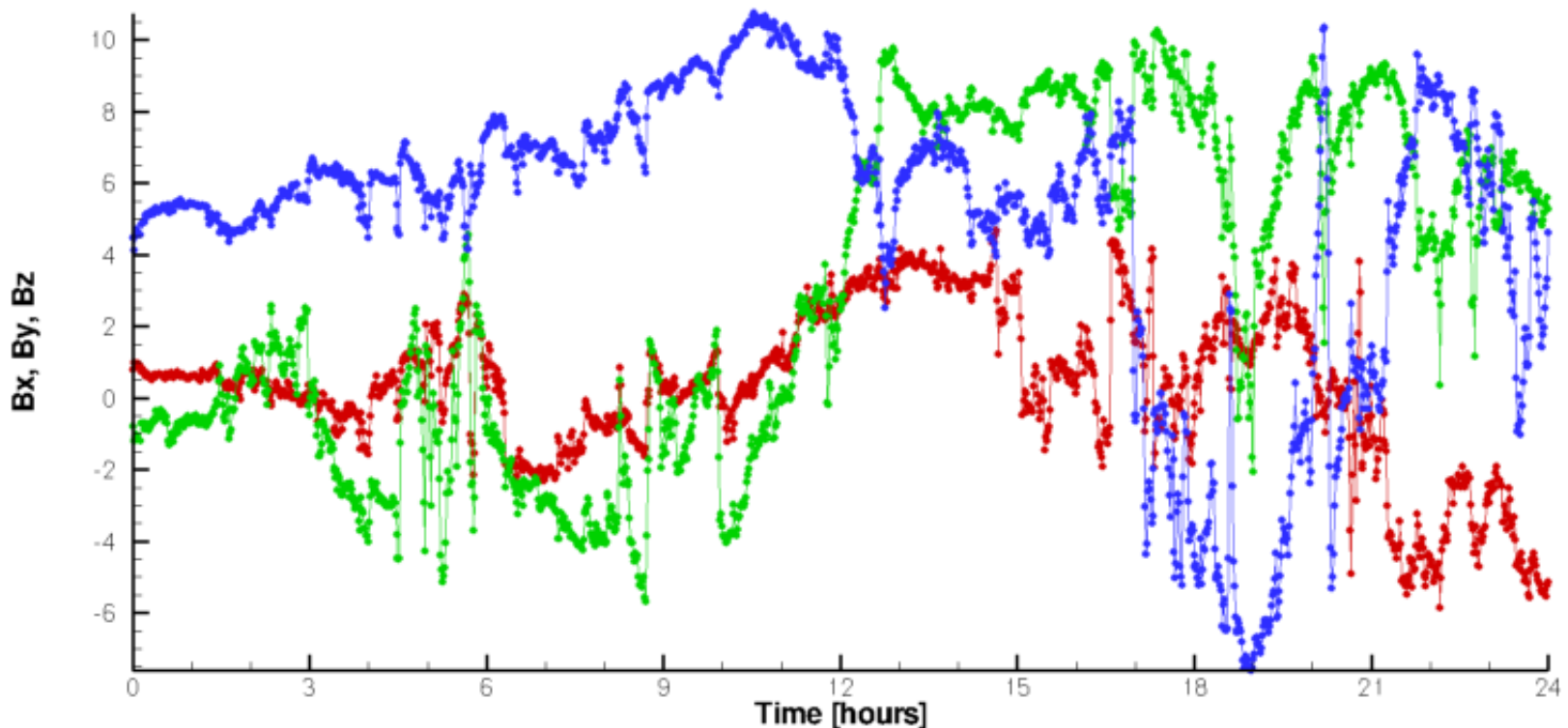
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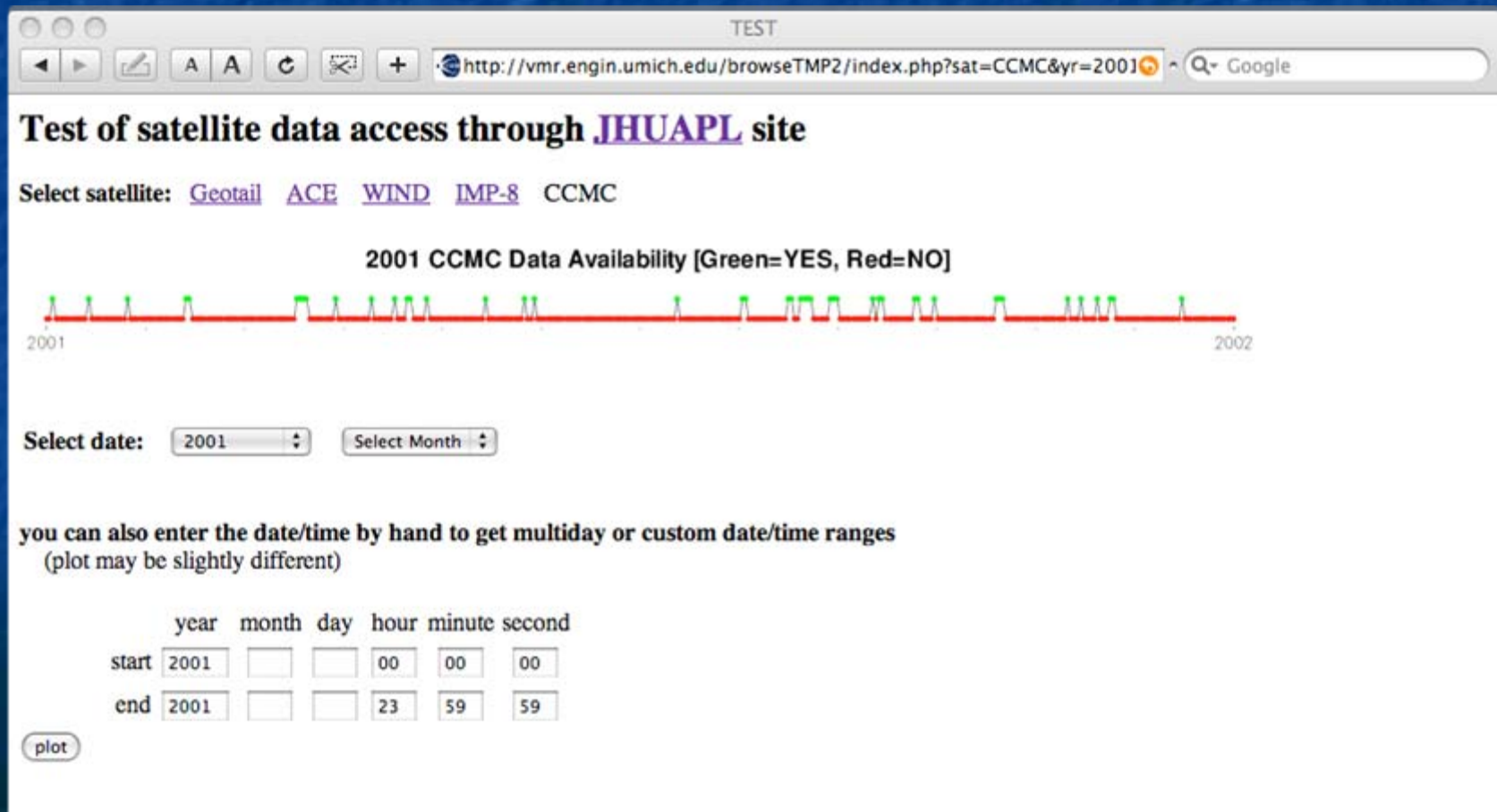
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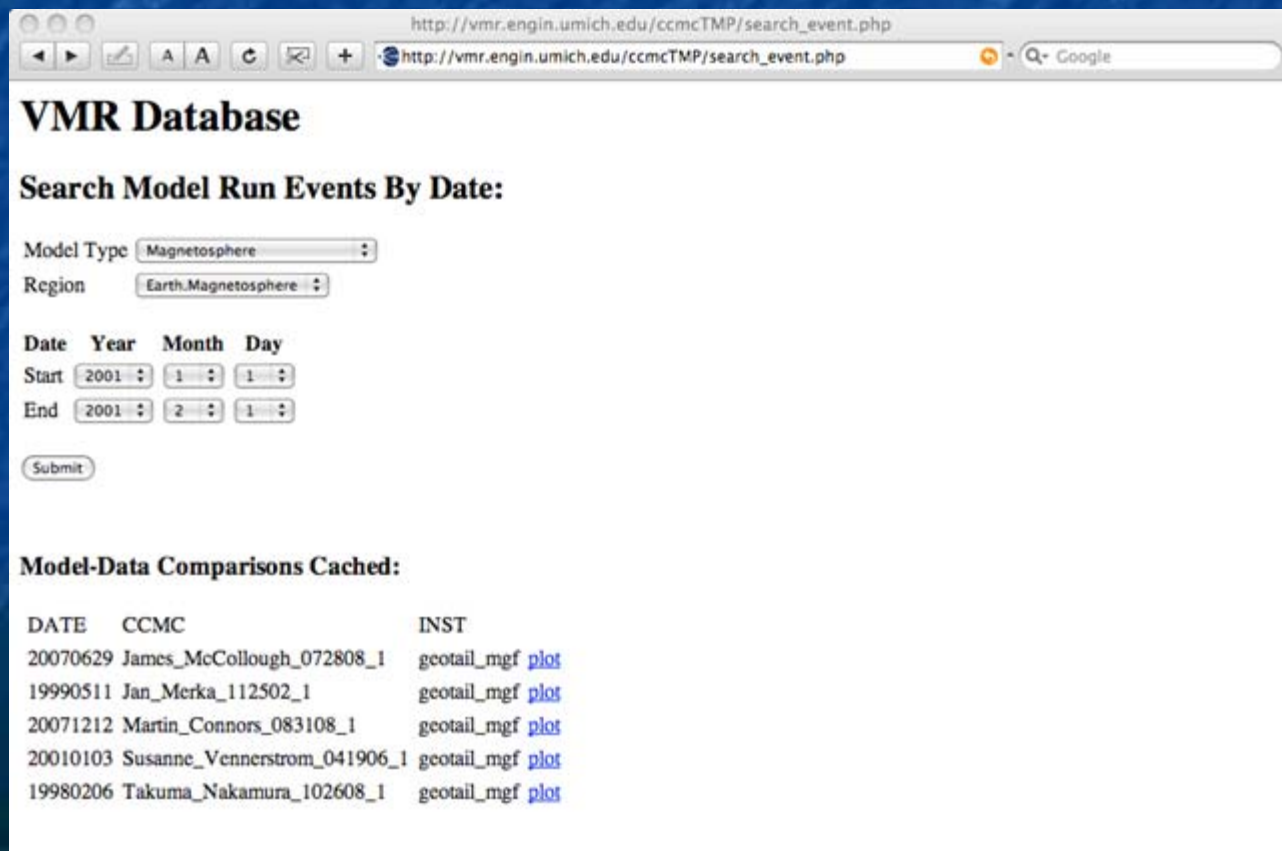
VMR: Coupling with CCMC

- Similarly, we can show availability of events run at the CCMC



VMR Data-Model DB Search

- We can search by event date and run type and plot comparisons with data, even if not created at runtime.

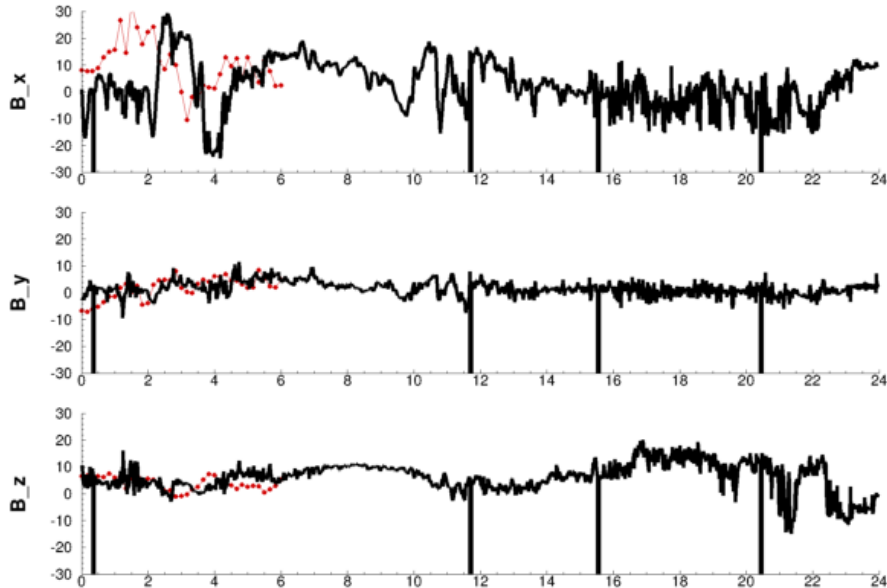
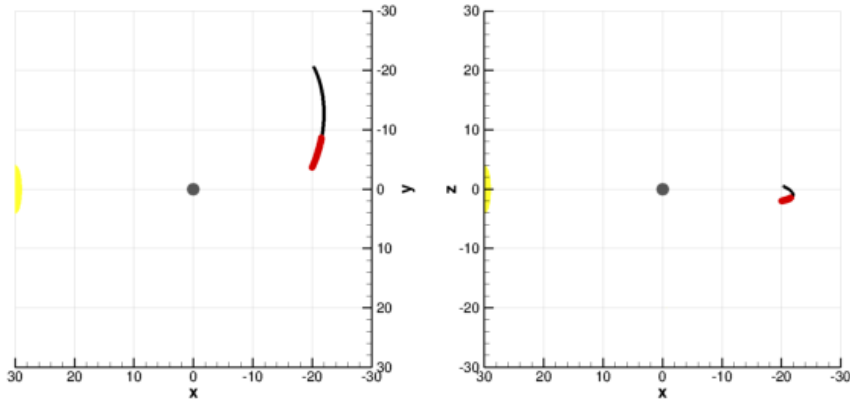


The screenshot shows a web browser window with the URL `http://vmr.engin.umich.edu/ccmcTMP/search_event.php`. The page title is "VMR Database". Below the title is a section "Search Model Run Events By Date:". This section contains a "Model Type" dropdown menu set to "Magnetosphere", a "Region" dropdown menu set to "Earth.Magnetosphere", and a date selection interface with "Start" and "End" rows, each having "Year", "Month", and "Day" dropdowns. The "Start" date is 2001-1-1 and the "End" date is 2001-2-1. A "Submit" button is located below the date selection. Below the search form is a section "Model-Data Comparisons Cached:" which displays a table of cached comparisons.

DATE	CCMC	INST
20070629	James_McCollough_072808_1	geotail_mgf plot
19990511	Jan_Merka_112502_1	geotail_mgf plot
20071212	Martin_Connors_083108_1	geotail_mgf plot
20010103	Susanne_Vennerstrom_041906_1	geotail_mgf plot
19980206	Takuma_Nakamura_102608_1	geotail_mgf plot

VMR Data-Model Plot

20010103: geotail_mgf <-> Susanne_Vennerstrom_041906_1



- Black is satellite data & trajectory
- Red is model run at CCMC
- Positions are taken from satellite cdf for model plot times, data at those positions are extracted, and comparison plot is made.

SWMF GUI: Visualization

SWMF GUI: Visualize Run Output

http://herot:8000/plot_results/plot.php?runname=default-tec-long&cmp

SPACE WEATHER MODELING FRAMEWORK

SWMF GUI: Create Plots for "default-tec-long"

COMPONENT **GM** IE

Select desired plot options and 'Update Plot'

Plotfile: T=Hour:Min:Sec N=Iterations (183 files found)

X: --not selected-- Y: --not selected--

Z: T=0001:00:00 N=0228254

Contour
Variable: V4: r [amu/cm³] Range: ☒ Min/Max ☐ Custom 0. 1.

Grid:
Plot grid? ☐ No ☒ Yes

View:
Center at: X= -8. Y= 0. with view width 48.

Vector Traces:
Plot fieldlines? ☒ No ☐ Yes Line Color: ☒ Black ☐ White

Body:
Plot circle at origin? ☐ No ☒ Yes with radius 2.7

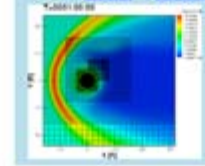
Text Label:
Label: \&(AUXZONE[1]:TIMESIM)

Update Plot (wait ~1 minute unless fieldlines plotted)

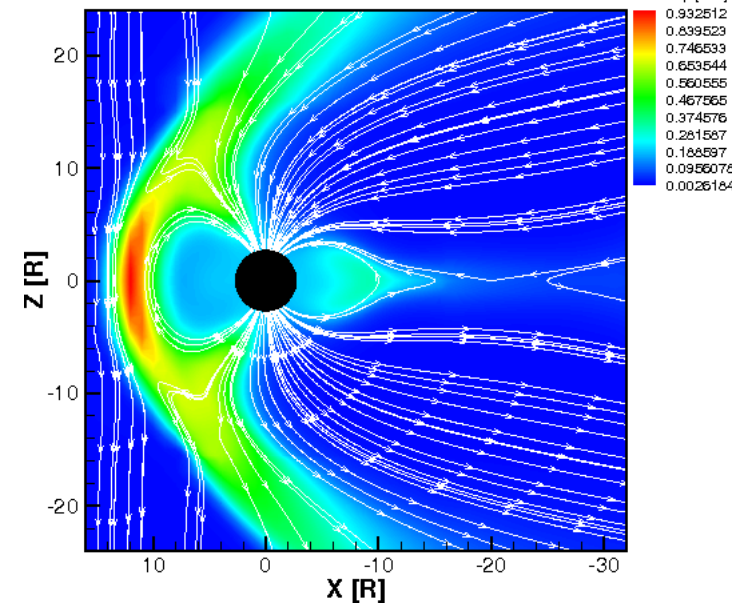
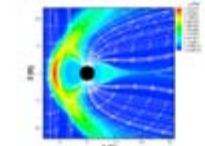
Copyright © 2006. All rights reserved.

Plottype: 2Dplt
GM Plot Styles

001 movie delete



002 movie delete





SWMF Component Visualization



[View movie](#)

VMR Plans

- We are currently working on a web portal that will organize our internal UM run library, help with setup and filing of new runs at the CCMC, pull visualization tools from the SWMF GUI and other visualization work, and interact with the VMR for public viewing.
- Enhanced data/model comparison will be provided.
- It will have public, authenticated, and admin sections.
- It is under development now, with a working prototype expected soon.