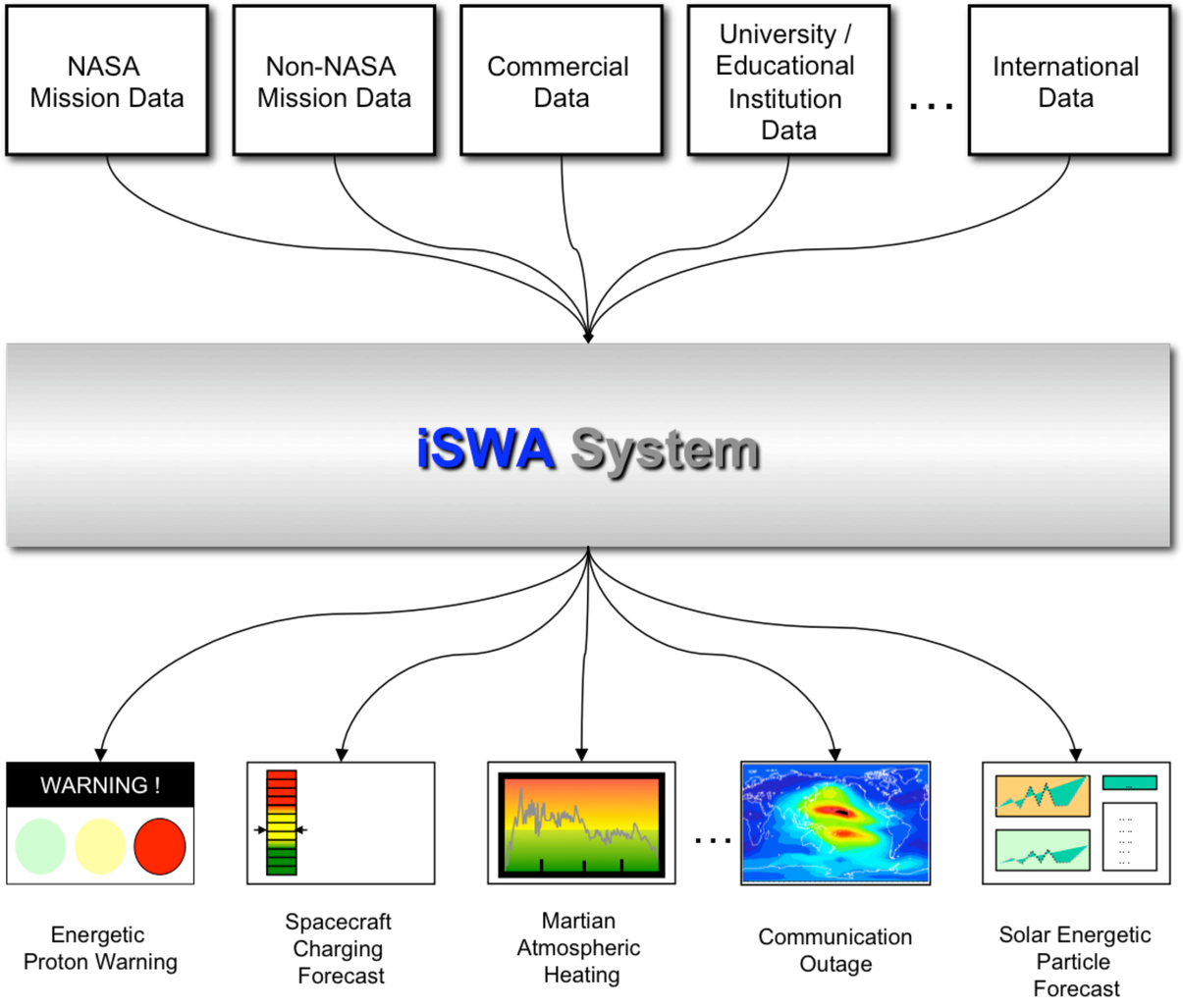
iSWA Web Services

Justin Boblitt, Richard Mullinix

iNTEGRATED SPACE WEATHER ANALYSIS SYSTEM

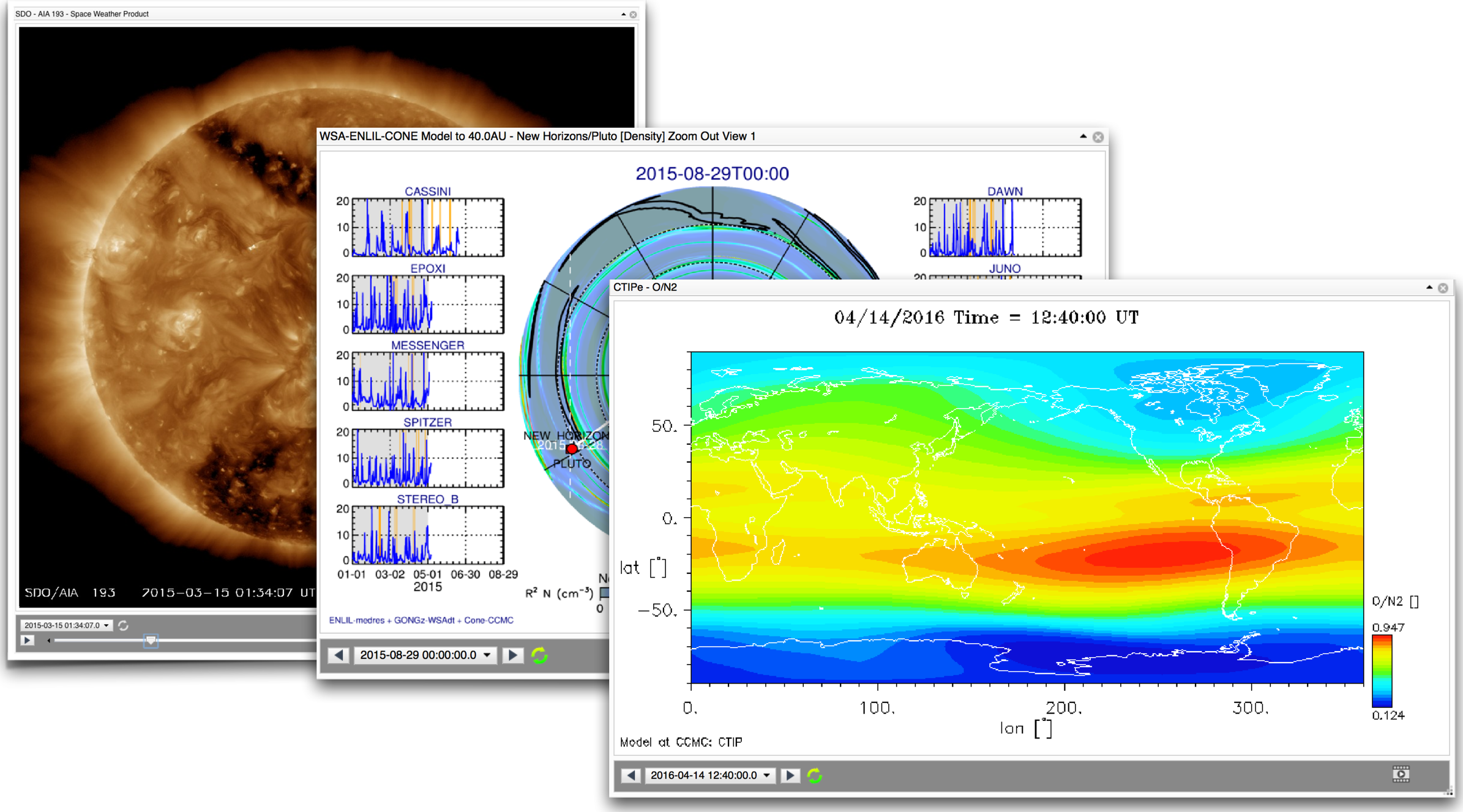


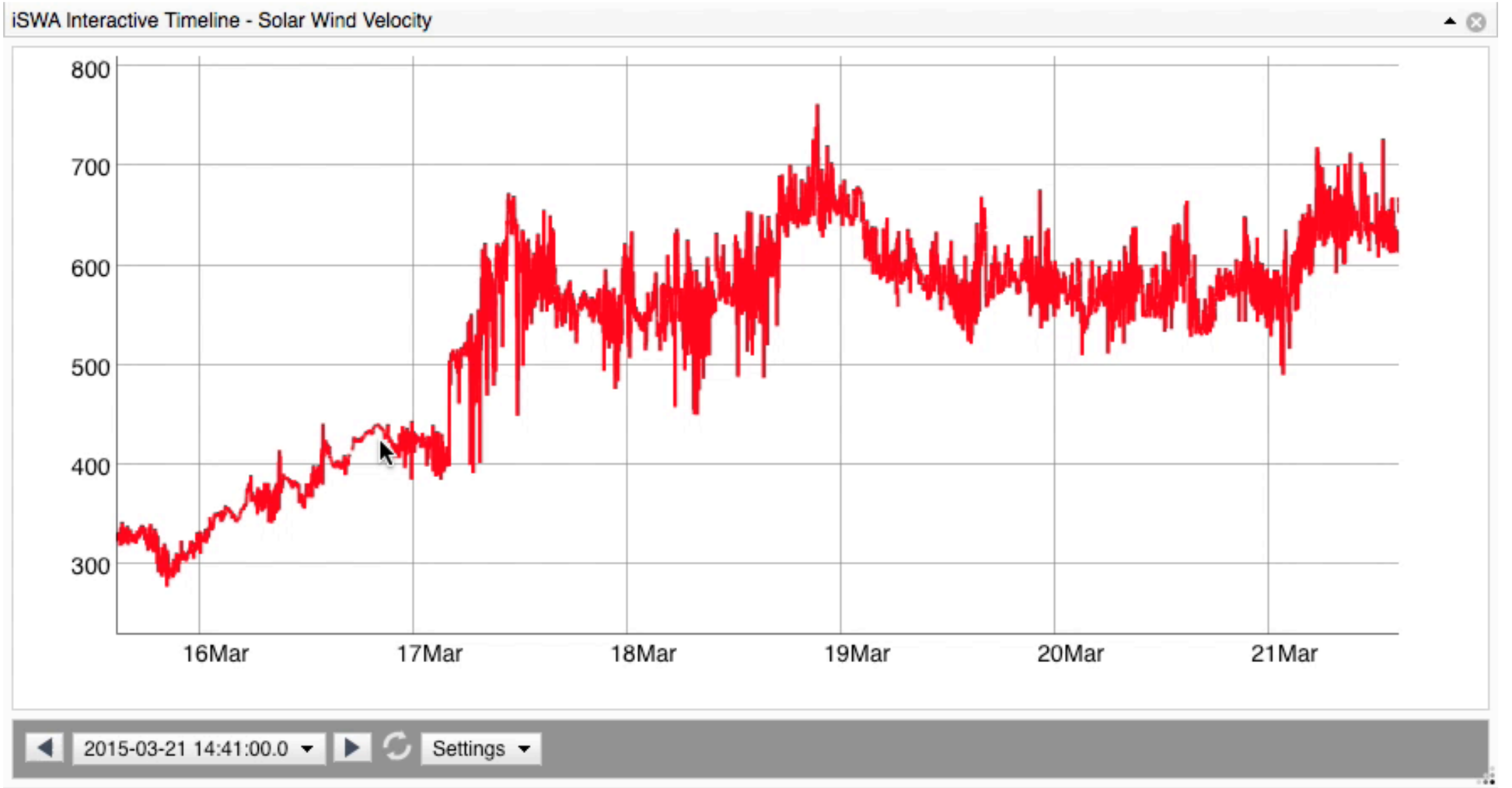
Highly diverse and distributed space weather data consisting of the latest observational data along with the most advanced space weather model simulation output.

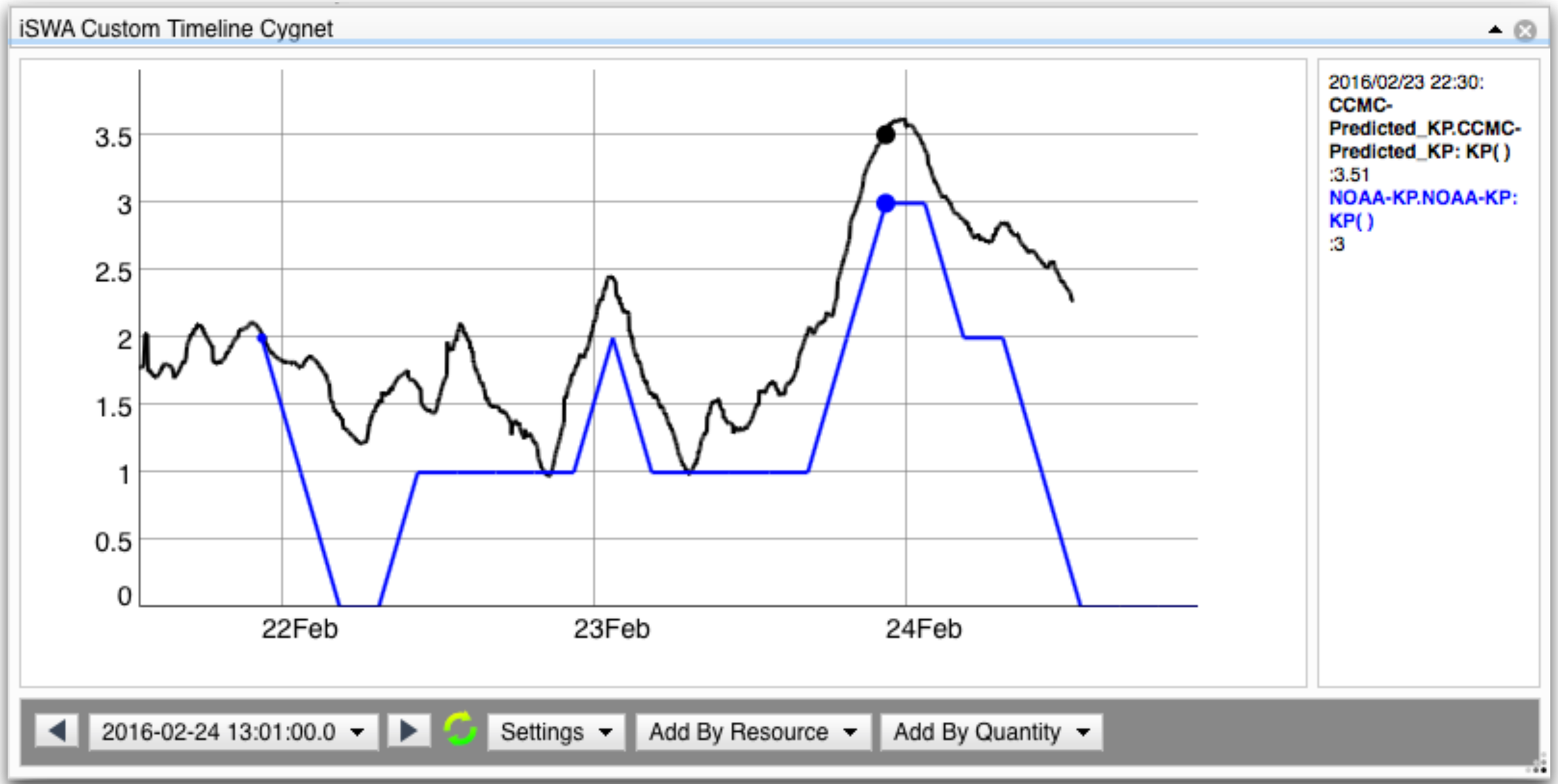
iSWA system collects data from a large and evolving list of sources. Data is sorted, characterized, and processed into 'mission decision supporting' products in response to individual user queries.

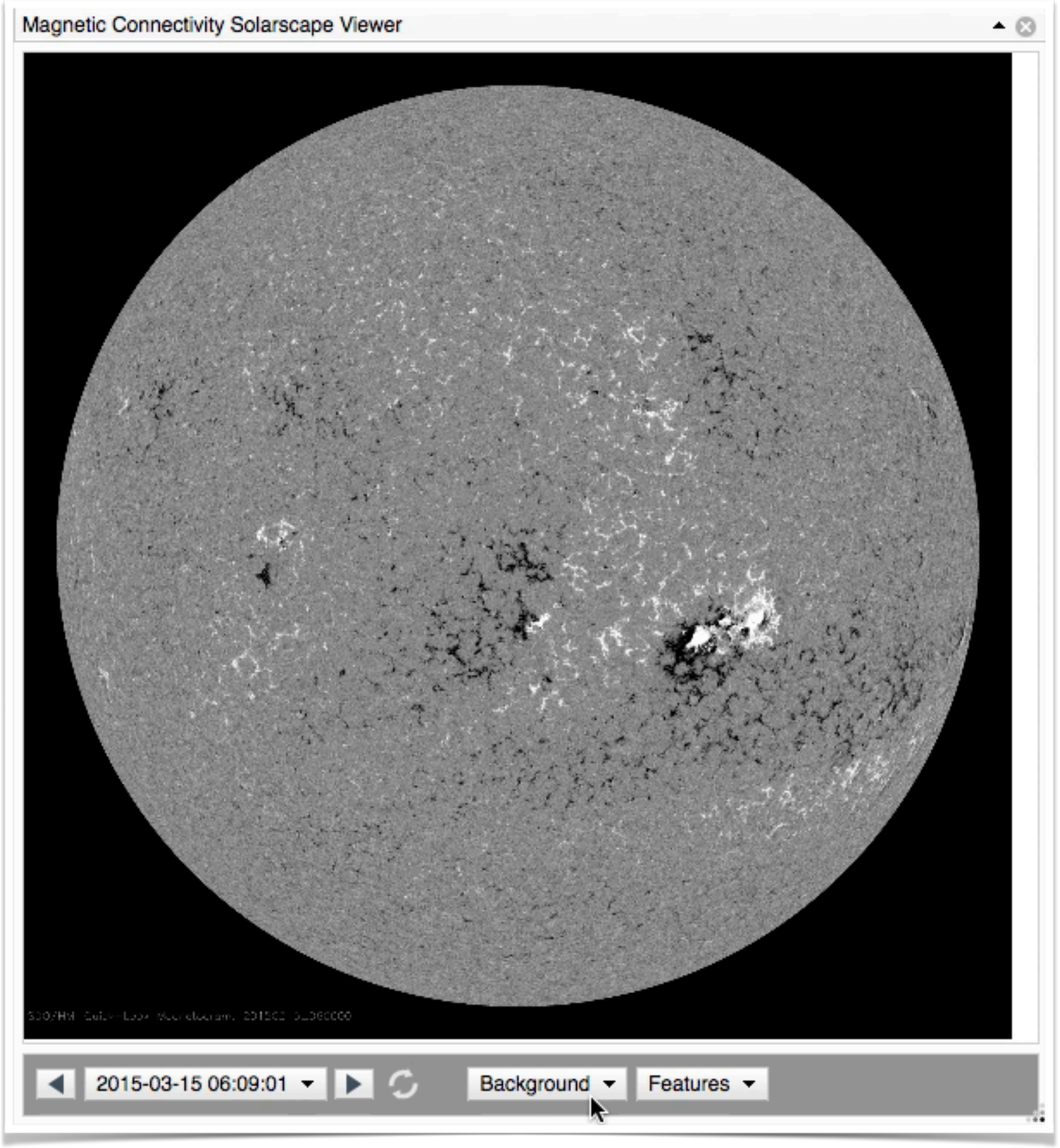
iSWA generates and provides a user-configurable display panel that can be accessed from a standard web browser. The end user can then customize their display to focus on specific products of interest.

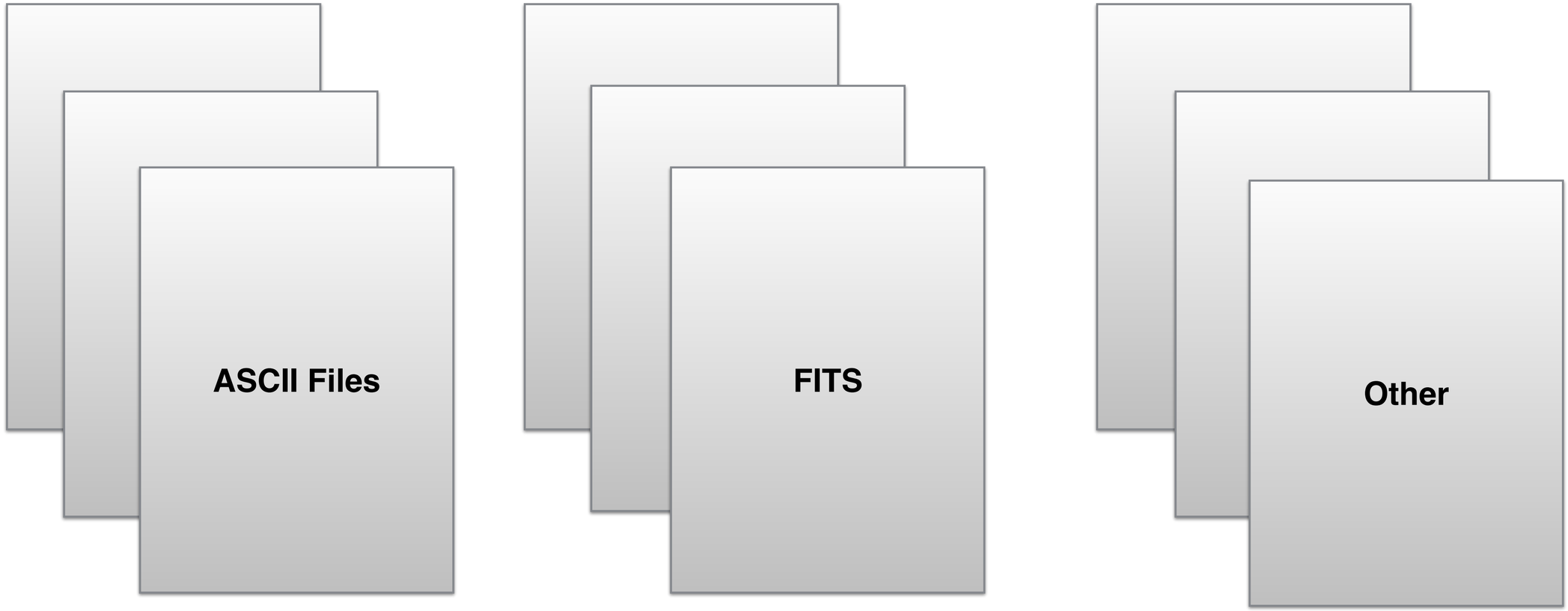
iNTEGRATED SPACE WEATHER ANALYSIS SYSTEM


SDO - AIA 193 - Space Weather Product
SDO/AIA 193 2015-03-15 01:34:07 UT
2015-03-15 01:34:07.0
WSA-ENLIL-CONE Model to 40.0AU - New Horizons/Pluto [Density] Zoom Out View 1
2015-08-29T00:00
CASSINI
EPOXI
MESSENGER
SPITZER
STEREO_B
DAWN
JUNO
01-01 03-02 05-01 06-30 08-29
2015
NEW HORIZON
PLUTO
R² N (cm⁻³)
ENLIL-medres + GONGz-WSAdt + Cone-CCMC
2015-08-29 00:00:00.0
CTIPe - O/N2
04/14/2016 Time = 12:40:00 UT
lat [°]
lon [°]
O/N2 []
0.947
0.124
Model at CCMC: CTIP
2016-04-14 12:40:00.0


iSWA Interactive Timeline - Solar Wind Velocity
800
700
600
500
400
300
16Mar
17Mar
18Mar
19Mar
20Mar
21Mar
2015-03-21 14:41:00.0
Settings


iSWA Custom Timeline Cygnet
3.5
3
2.5
2
1.5
1
0.5
0
22Feb
23Feb
24Feb
2016/02/23 22:30:
CCMC-Predicted_KP.CCMC-Predicted_KP: KP( )
:3.51
NOAA-KP.NOAA-KP: KP( )
:3
2016-02-24 13:01:00.0
Settings
Add By Resource
Add By Quantity


Magnetic Connectivity Solarscape Viewer
2015-03-15 06:09:01
Background
Features


ASCII Files
FITS
Other

http://iswa.gsfc.nasa.gov/iswa_data_tree/

iswa.gsfc.nasa.gov

Index of /iswa_data_tree/observation

Index of /iswa_data_tree/observation

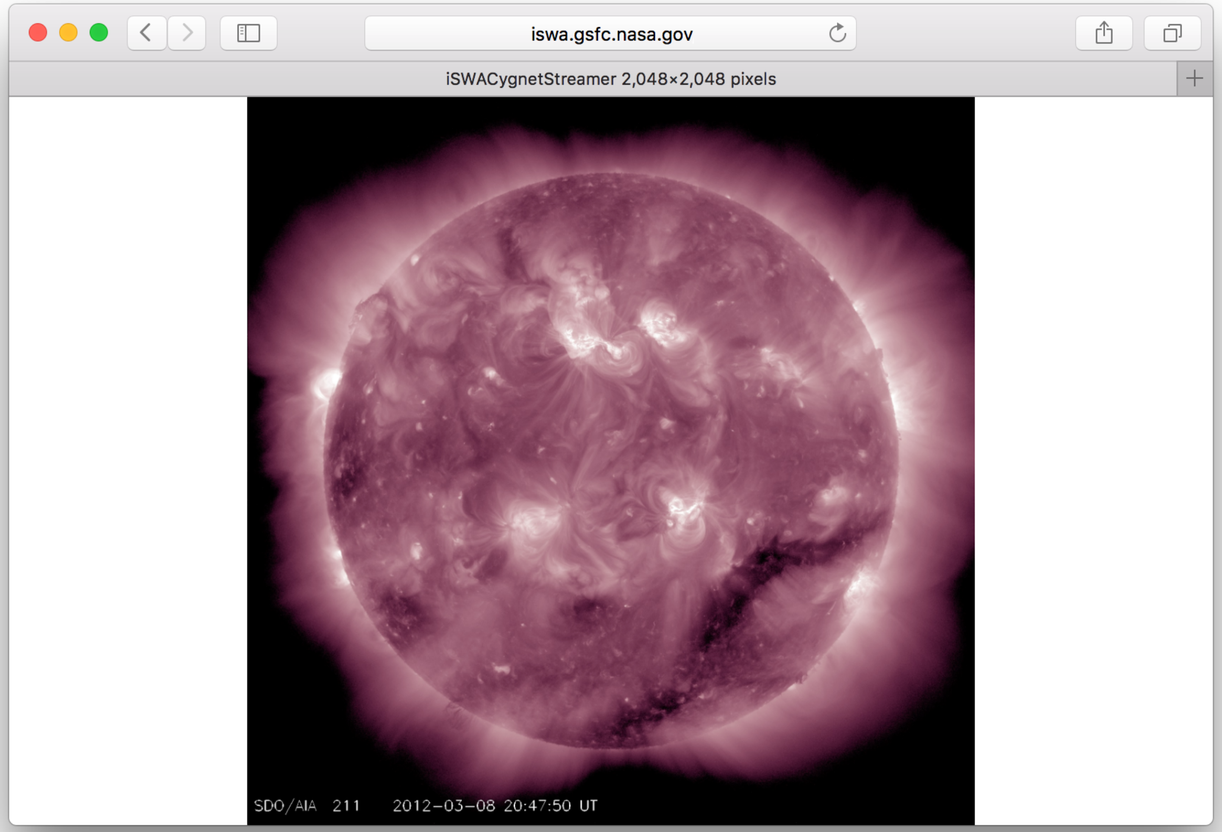
Name	Last modified	Size	Description
Parent Directory		-	
heliosphere/	05-Jan-2012 19:40	-	
ionosphere/	19-Jun-2013 20:26	-	
magnetosphere/	08-Nov-2013 18:44	-	
planetary/	12-Feb-2016 16:04	-	
solar/	09-Dec-2014 20:15	-	

iSWA Streaming

Image	iSWACygnetStreamer
Text	iSWADataStreamer
Numerical	DataStreamServlet

Streaming Image via Cygnet ID

http://iswa.gsfc.nasa.gov/IswaSystemWebApp/**iSWACygnetStreamer**?timestamp=2012-03-09%2000:00:00&window=-1&cygnetId=239



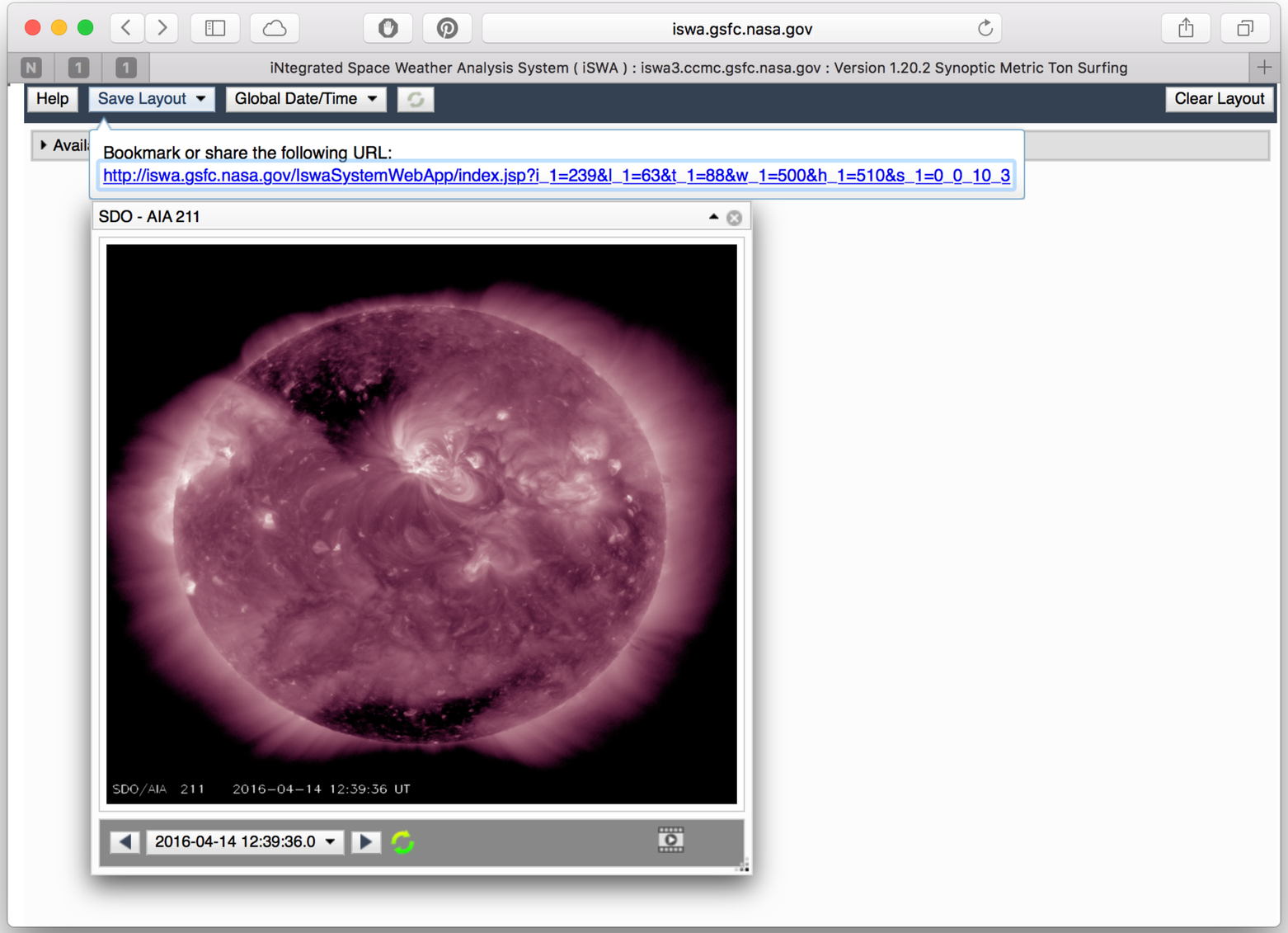
http://iswa.gsfc.nasa.gov/IswaSystemWebApp/iSWACygnetStreamer?**timestamp=2012-03-09**%20**00:00:00**&window=-1&cygnetId=239

- Timestamp in UTC
- %20 (space in URL) might not be needed
- Timestamp based on iSWA database

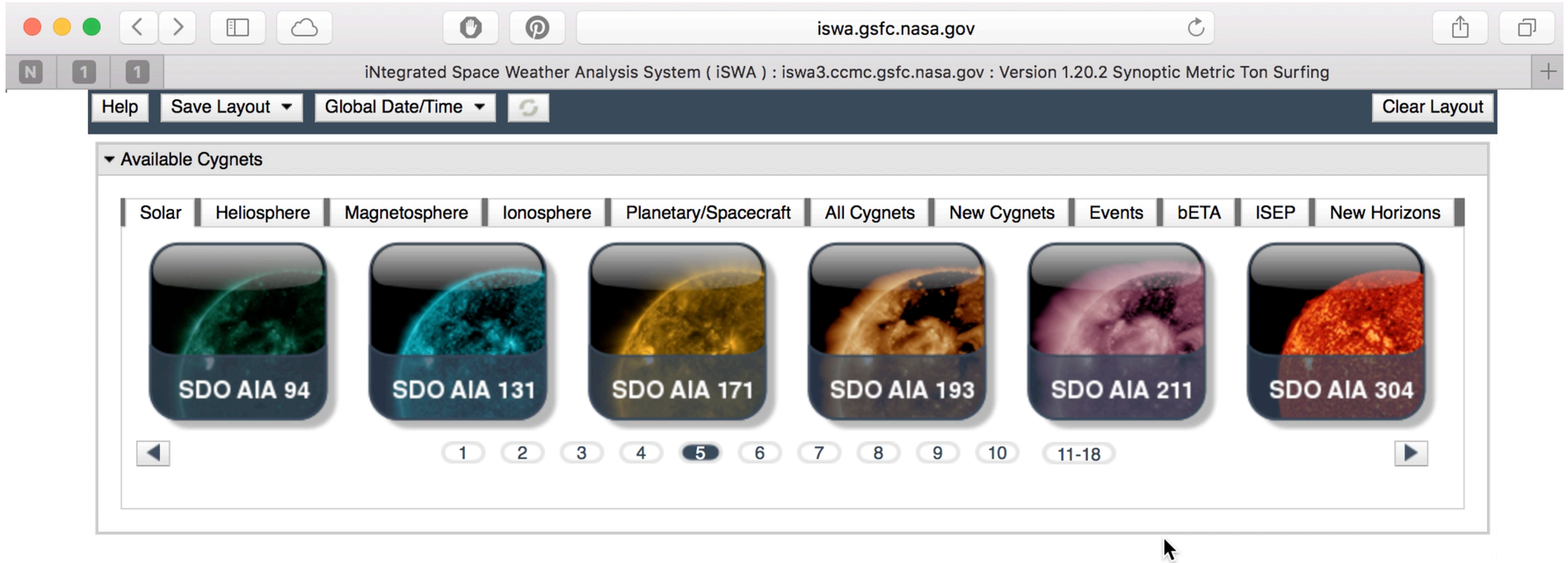
http://iswa.gsfc.nasa.gov/IswaSystemWebApp/iSWACygnetStreamer?timestamp=2012-03-09%2000:00:00&**window=-1**&cygnetId=239

- **window = -1**
  - Most recent data whose timestamp is LESS than specified timestamp
- **window = 0**
  - Only returns data that matches timestamp exactly

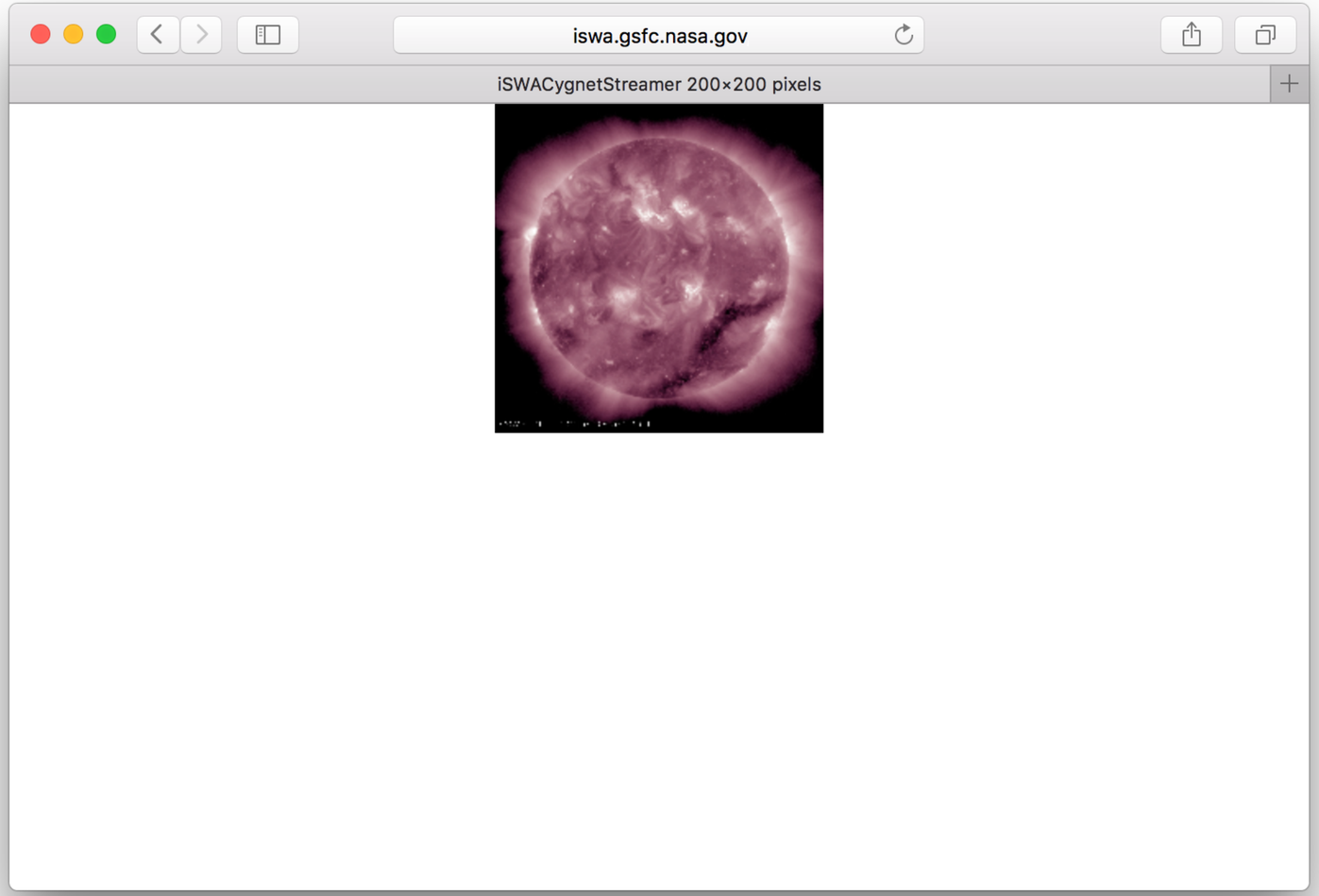
http://iswa.gsfc.nasa.gov/IswaSystemWebApp/iSWACygnetStreamer?timestamp=2012-03-09%2000:00:00&window=-1&**cygnetId=239**



http://iswa.gsfc.nasa.gov/IswaSystemWebApp/iSWACygnetStreamer?timestamp=2012-03-09%2000:00:00&window=-1&**cygnetId=239**



http://iswa.gsfc.nasa.gov/IswaSystemWebApp/iSWACygnetStreamer?timestamp=2012-03-09%2000:00:00&window=-1&cygnetId=239**&width=200&height=200**



Streaming ASCII via Data ID

http://iswa.gsfc.nasa.gov/IswaSystemWebApp/**iSWADataStreamer**?timestamp=2012-03-09%2000:00:00&window=-1&**dataId=2**

iswa.gsfc.nasa.gov

iswa.gsfc.nasa.gov/IswaSystemWebApp/iSWADataStreamer?timestamp=2012-03-09%2000:00:00&window=-1&dataId=2

```
 *Start header*
 Solar footpoint locations from wsa-enlil model combination
 Model versions : WSA_V2.2  ENLIL-2.7-ccmc
 Observatory gon
 Carrington Rotation 2121
 Magnetogram Carrington longitude     244.0000
 WSA R_outer =     21.50000      Rsun
 ENLIL:obs:gong
 ENLIL:grd:256x30x90
 ENLIL:x11:0.1
 *end header*
 Planet/Body    Coord1(lat deg from North Pole)   Coord2(carr. long)        Date
Mercury                  73.2     295.8    2012-03-04T07:53:00
Venus                   114.2     346.6    2012-03-04T07:53:00
Earth                    72.2      73.6    2012-03-04T07:53:00
Mars                    108.7     148.2    2012-03-04T07:53:00
Mercury                  73.1     295.5    2012-03-05T07:53:00
Venus                    73.5     296.4    2012-03-05T07:53:00
Earth                    72.4      68.4    2012-03-05T07:53:00
Mars                     81.2     125.8    2012-03-05T07:53:00
Mercury                  73.0     295.2    2012-03-06T07:53:00
Venus                    73.3     296.2    2012-03-06T07:53:00
Earth                    74.7      59.1    2012-03-06T07:53:00
Mars                     72.7      75.3    2012-03-06T07:53:00
Mercury                  72.8     295.1    2012-03-07T07:53:00
Venus                    73.2     295.8    2012-03-07T07:53:00
Earth                    99.5     359.5    2012-03-07T07:53:00
Mars                     72.2      73.6    2012-03-07T07:53:00
Mercury                  72.7     294.8    2012-03-08T07:53:00
Venus                    73.0     295.4    2012-03-08T07:53:00
Earth                   111.0     355.8    2012-03-08T07:53:00
```

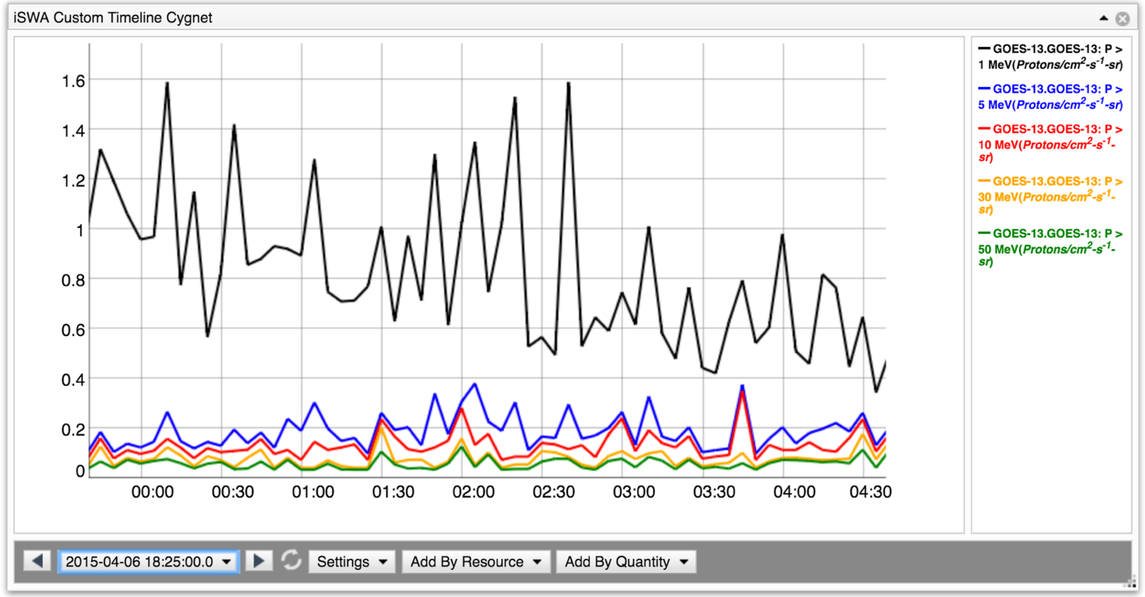
Numerical Data

http://iswa.gsfc.nasa.gov/IswaSystemWebApp/DataStreamServlet?format=**text**&quantity=**P1,P5,P10,P30,P50**&resource=**GOES-13**,GOES-13,GOES-13,GOES-13,GOES-13&resourceInstance=GOES-13,GOES-13,GOES-13,GOES-13,GOES-13&**begin-time=2015-04-03**%2000:00:00.0&**end-time=2016-04-03**%2000:00:00.0

iswa.gsfc.nasa.gov

iswa.gsfc.nasa.gov/IswaSystemWebApp/DataStreamServlet?format=text&quantity=P1,P5,P10,P30,P50&resource=GOES-13,GOES-13,GOES-13,...

Timestamp	P1	P5	P10	P30	P50
2015-04-03 16:55:00.0	4.9	0.154	0.116	0.0595	0.0515
2015-04-03 17:00:00.0	4.42	0.308	0.282	0.157	0.131
2015-04-03 17:05:00.0	4.42	0.142	0.116	0.0416	0.0336
2015-04-03 17:10:00.0	8.56	0.19	0.0979	0.0662	0.0582
2015-04-03 17:15:00.0	5.06	0.191	0.165	0.133	0.0997
2015-04-03 17:20:00.0	9.64	0.499	0.286	0.0854	0.0554
2015-04-03 17:25:00.0	6.62	0.179	0.0915	0.0496	0.0416
2015-04-03 17:30:00.0	6.03	0.193	0.109	0.0677	0.0596
2015-04-03 17:35:00.0	4.77	0.0984	0.0725	0.0416	0.0336
2015-04-03 17:40:00.0	4.97	0.12	0.094	0.0627	0.0416
2015-04-03 17:45:00.0	5.18	0.305	0.279	0.148	0.14
2015-04-03 17:50:00.0	7.26	0.107	0.081	0.0502	0.0422
2015-04-03 17:55:00.0	4.45	0.168	0.142	0.0768	0.0688
2015-04-03 18:00:00.0	6.04	0.129	0.103	0.0719	0.0638
2015-04-03 18:05:00.0	5.65	0.144	0.118	0.0567	0.0436
2015-04-03 18:10:00.0	5.38	0.133	0.107	0.0758	0.0678
2015-04-03 18:15:00.0	8.88	0.157	0.131	0.1	0.0923
2015-04-03 18:20:00.0	7.67	0.138	0.112	0.0801	0.0484
2015-04-03 18:25:00.0	9.33	0.303	0.267	0.139	0.106
2015-04-03 18:30:00.0	6.61	0.151	0.125	0.0587	0.0507
2015-04-03 18:35:00.0	7.56	0.165	0.14	0.069	0.061
2015-04-03 18:40:00.0	6.64	0.175	0.134	0.1	0.0924
2015-04-03 18:45:00.0	8.16	0.112	0.0859	0.0547	0.0366
2015-04-03 18:50:00.0	5.38	0.111	0.0854	0.0545	0.0465
2015-04-03 18:55:00.0	11.1	0.265	0.122	0.0416	0.0336
2015-04-03 19:00:00.0	5.48	0.187	0.16	0.043	0.0344
2015-04-03 19:05:00.0	9.08	0.227	0.107	0.0535	0.0449



Numerical 1-D Model Data

http://iswa2.ccmc.gsfc.nasa.gov:8080/IswaSystemWebApp/DataStreamServlet?format=text&resource=SWMF&resourceInstance=SWMF773atGOES10&quantity=B_x&**ccmcID=ccmc_ccmc_082208_1a**&**modelID=1_SWMF**&begin-time=2003-10-29%2000:00:00&end-time=2003-10-30%2006:00:00

iswa2.ccmc.gsfc.nasa.gov:8080/IswaSystemWebApp/DataStreamServlet?form...

Timestamp	B_x
2003-10-29 06:00:00.0	-19.399
2003-10-29 06:00:10.0	-19.549
2003-10-29 06:00:20.0	-19.765
2003-10-29 06:00:30.0	-20.81
2003-10-29 06:00:40.0	-20.147
2003-10-29 06:00:50.0	-19.945
2003-10-29 06:01:00.0	-20.032
2003-10-29 06:01:10.0	-20.135
2003-10-29 06:01:20.0	-20.267
2003-10-29 06:01:30.0	-20.386
2003-10-29 06:01:40.0	-20.496

Numerical 1-D Model Data

http://iswa2.ccmc.gsfc.nasa.gov:8080/IswaSystemWebApp/DataStreamServlet?format=text&resource=SWMF&resourceInstance=SWMF773atGOES10&quantity=B_x&**ccmcID=ccmc_ccmc_082208_1a**&**modelID=1_SWMF**&begin-time=2003-10-29%2000:00:00&end-time=2003-10-30%2006:00:00

iswa2.ccmc.gsfc.nasa.gov:8080/IswaSystemWebApp/DataStreamServlet?form...

Timestamp	B_x
2003-10-29 06:00:00.0	-19.399
2003-10-29 06:00:10.0	-19.549
2003-10-29 06:00:20.0	-19.765
2003-10-29 06:00:30.0	-20.81
2003-10-29 06:00:40.0	-20.147
2003-10-29 06:00:50.0	-19.945
2003-10-29 06:01:00.0	-20.032
2003-10-29 06:01:10.0	-20.135
2003-10-29 06:01:20.0	-20.267
2003-10-29 06:01:30.0	-20.386
2003-10-29 06:01:40.0	-20.496

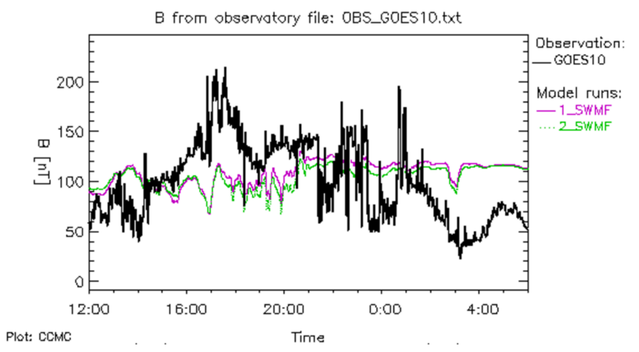


Figure: B from observatory GOES10 and model runs
Campaign: GEM2008
Metric study: Magnetic field at geosynchronous orbit
Event: October 29th, 2003 06 00 UT - October 30th, 06 00 UT

EPS image (117.58 KB)

Variable: B Observatory file: OBS_GOES10.txt

Model_Setting	PredEff	PredYield	Correlation	MinTimingError	MaxTimingError	RMS_Error	N_region	N_finite	LogSpecDist	nWin
1_SWMF	-0.237	0.3268	-0.1517	10.3167	3.0833	43.4011	1080	1080	1.8773	33
2_SWMF	-0.271	0.2857	-0.3120	10.3167	3.0833	43.9883	1080	1080	1.9034	33

Numerical 1-D Model Data

improved validation application

- No more file tree management
- Interactive graphs rather than static images
- User defined events (cross-event skill scores) and metrics

Future

- Impex metadata standard and apis
- Metadata header in numerical data servlet
- More datasets and customized web services

Documentation

http://ccmc.gsfc.nasa.gov/challenges/flareinfo/api.pdf