State of the Space Weather Prediction Center 2013

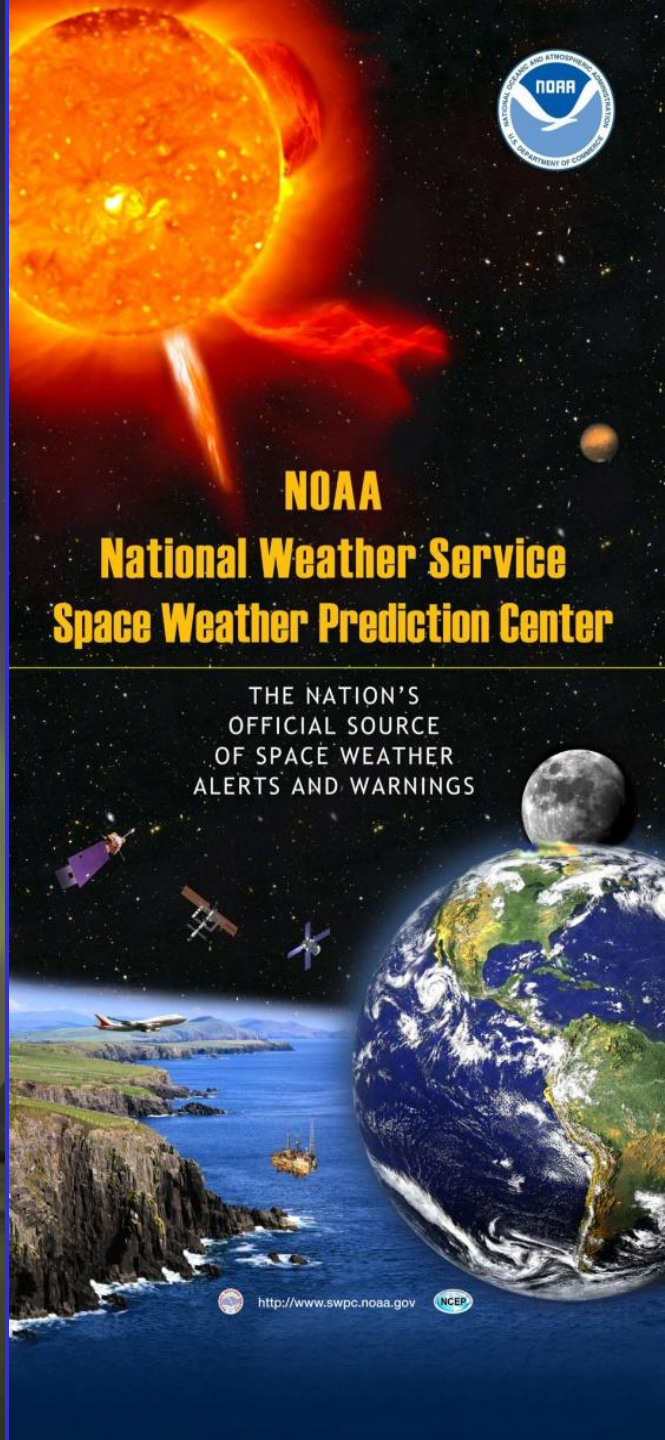
Brent Gordon

Acting Director

NOAA Space Weather Prediction Center

Space Weather Workshop

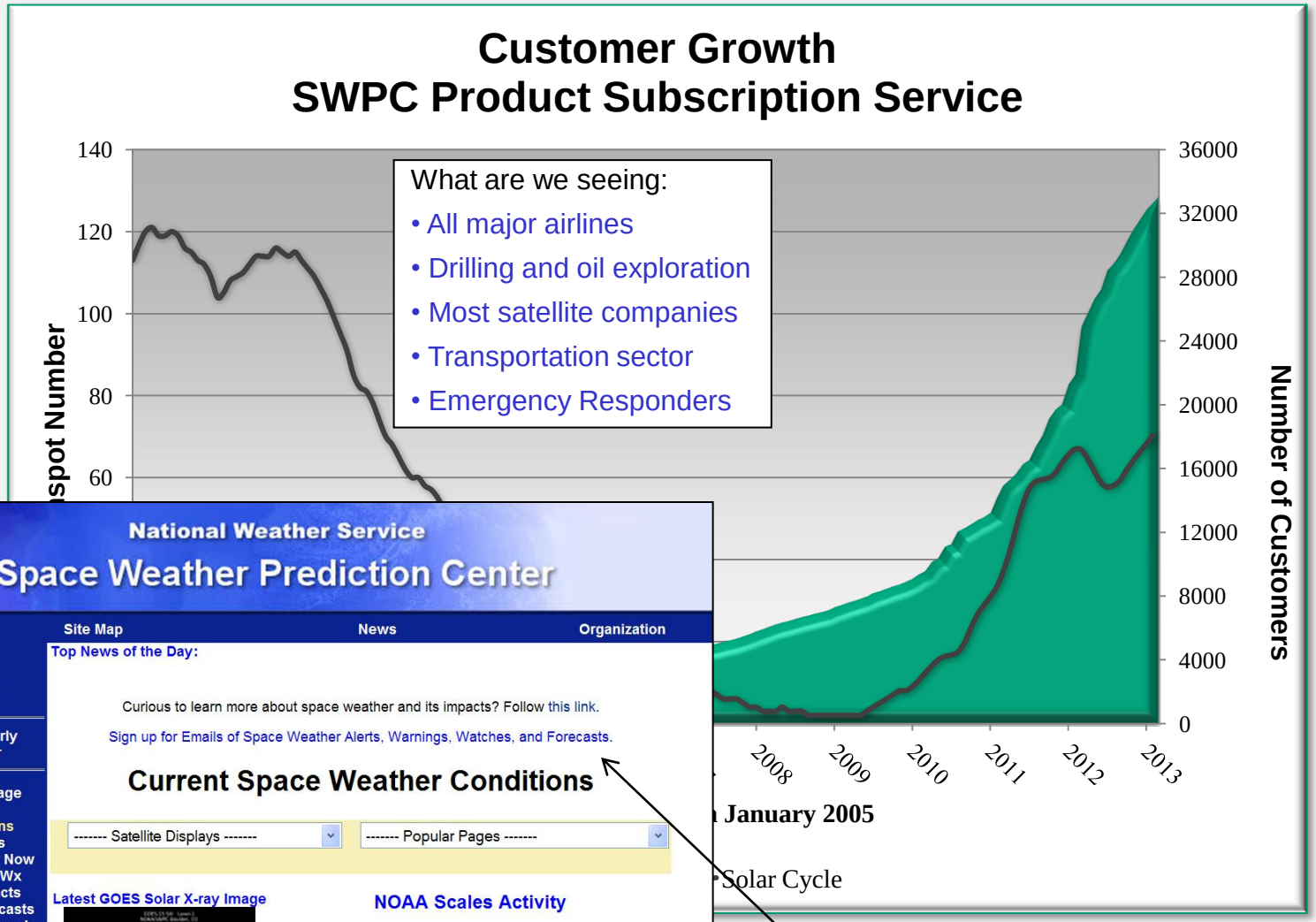
16 Apr 2013



Overview

- Customer Growth
- Space Weather Update
- SWPC Director Status
- SWPC Budget Situation
- New Forecast and Discussion Products
- AWIPS
- Satellites
- Testbed Status
- Small Business Innovative Research
- International Partnerships
- Web Page Update

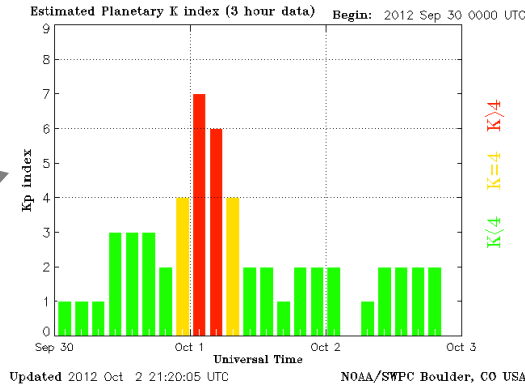
Customer Subscriptions Skyrocket…

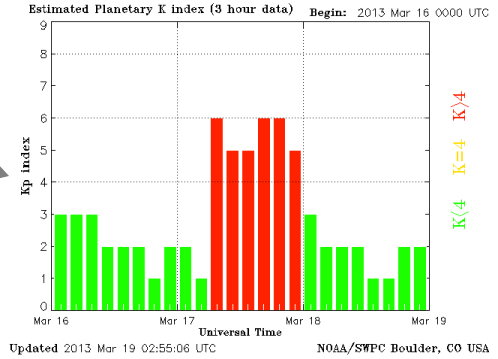


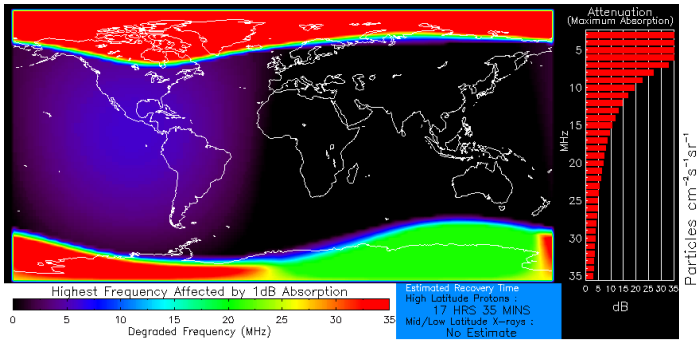
Sign up for alerts/warnings

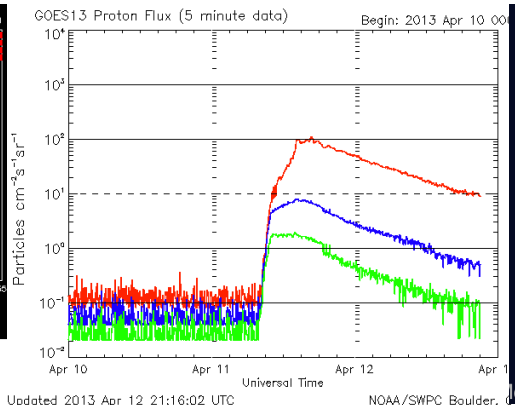
Space Weather Update

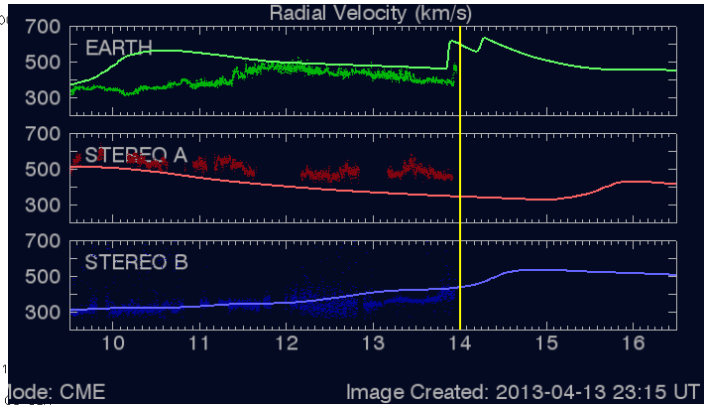
- Quiet start to solar max
- 27 Sept 2012 filament eruption/CME
- 15 March 2013 filament eruption/CME
- 11 April 2013 center disk CME





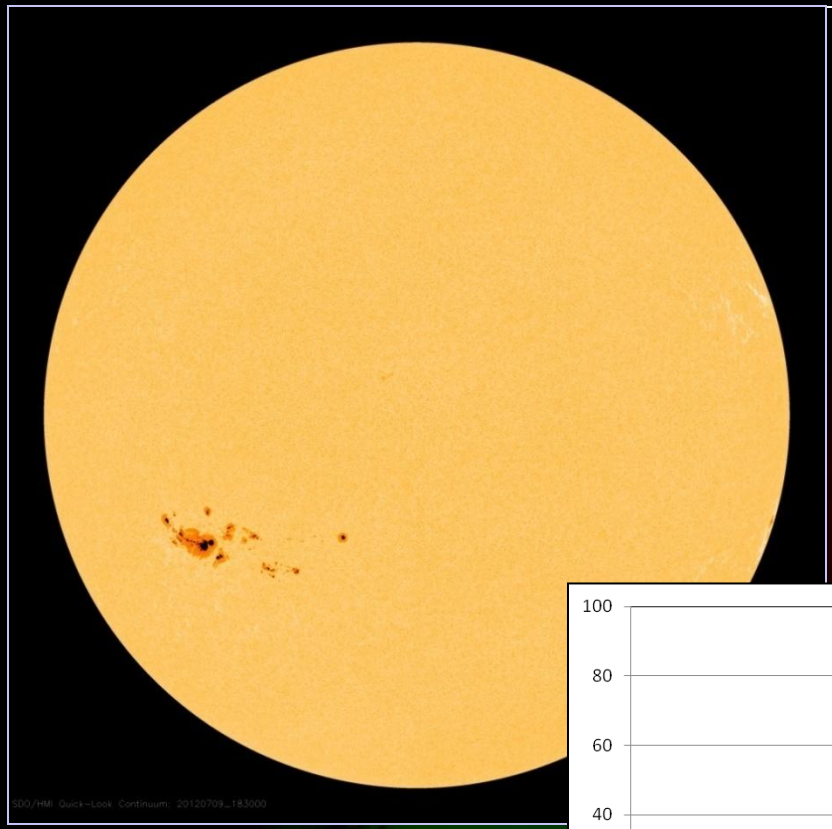




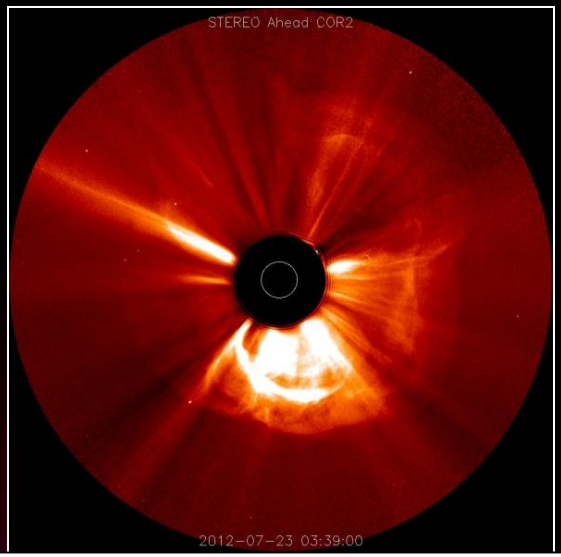


July 2012 Event

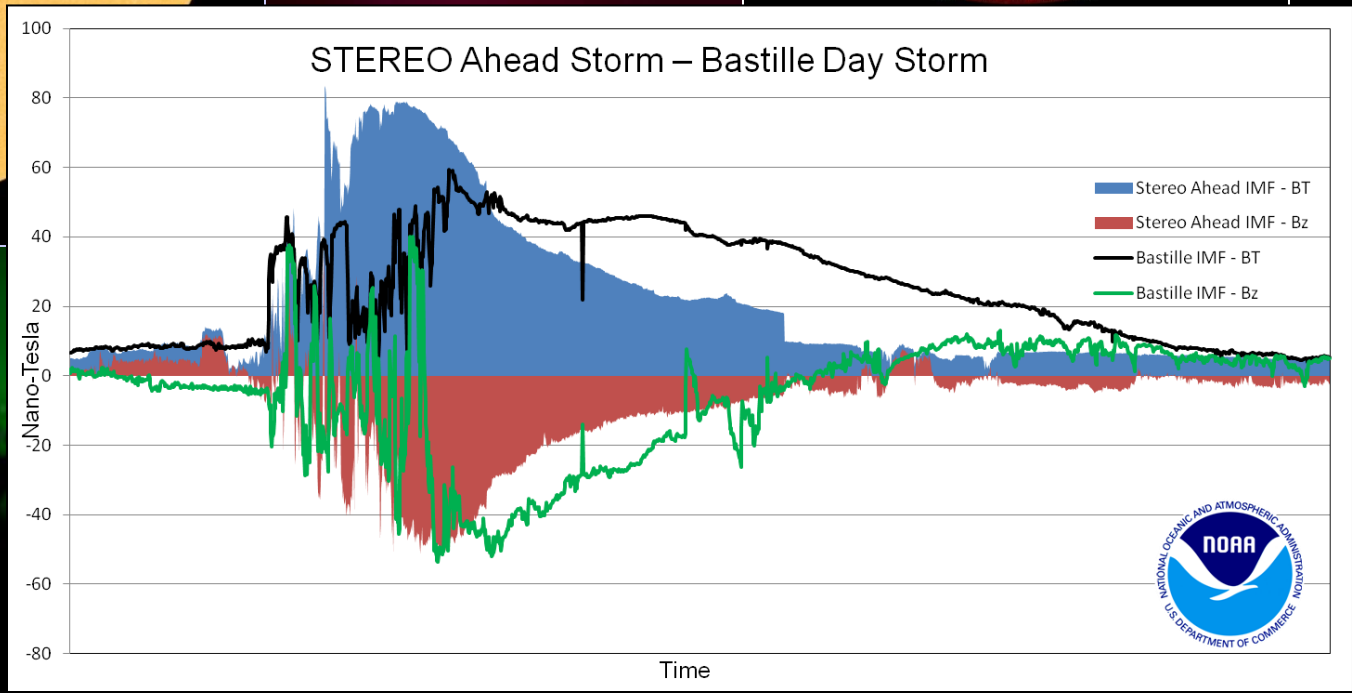
The Sun on July 11th



The Sun on July 23rd – STEREO AHEAD



Comparison to July 2000

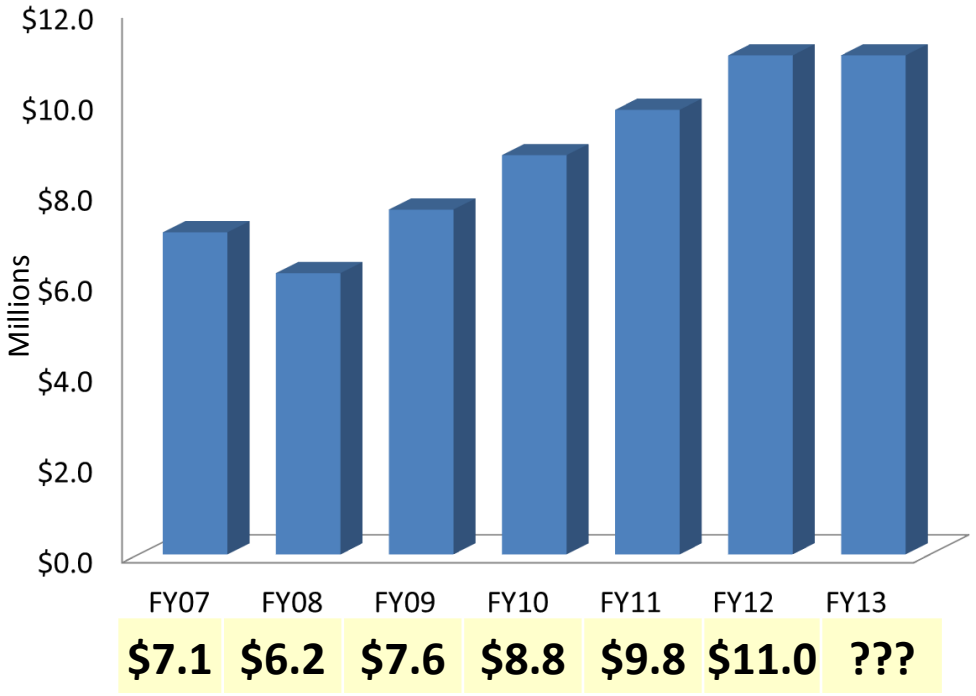


SWPC Director Status

- Two unsuccessful hiring attempts over the past year
- Dedicated staff at SWPC
  - Keeping the boat moving ahead smartly
- No permanent SWPC director in sight
  - NOAA-level Hiring Freeze
  - New director vacancy at SWPC's parent office

SWPC FY2013 Budget???

- A speed bump
  - After several years of hard work for growth
- Sequestration and rescissions
  - Left many in the US Gov't scrambling



- SWPC now fighting for limited budget with the rest of NOAA and NWS

New Forecast Products

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:Product: 3-Day Forecast
:Issued: 2013 Apr 12 1230 UTC
# Prepared by the U.S. Dept. of Commerce, N
#
A. NOAA Geomagnetic Activity Observation ar

The greatest observed 3 hr Kp over the past
Scale levels).
The greatest expected 3 hr Kp for Apr 12-Ap
G2).

NOAA Kp index breakdown Apr 12-Apr 14 2013

             Apr 12     Apr 13     Apr 14
00-03UT        2          2          6 (G2)
03-06UT        2          3          6 (G2)
06-09UT        1          3          6 (G2)
09-12UT        1          2          5 (G1)
12-15UT        1          2          4
15-18UT        1          4          3
18-21UT        1          5 (G1)     3
21-00UT        1          6 (G2)     3

Rationale: G1 (minor) to G2 (moderate) geomagnetic storms are expec
on days 2 and 3 (13-14 Apr) in response to a CME from 11 Apr.

B. NOAA Solar Radiation Activity Observation and Forecast

Solar radiation, as observed by NOAA GOES-13 over the past 24 hours
above S-scale storm level thresholds.

Solar Radiation Storm Forecast for Apr 12-Apr 14 2013

              Apr 12  Apr 13  Apr 14
S1 or greater   99%     30%     10%

Rationale: An S1 (Minor) solar radiation storms is expected on day
Apr).  There is a chance for an S1 event on day 2 (13 Apr).

C. NOAA Radio Blackout Activity and Forecast

No radio blackouts were observed over the past 24 hours.

Radio Blackout Forecast for Apr 12-Apr 14 2013

              Apr 12        Apr 13        Apr 14
R1-R2           50%           50%           50%
R3 or greater   15%           15%           15%

Rationale: There is a chance for an R1-R2 radio blackout all three
(12-14 Apr) of the forecast period.
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- Two new products available in December 2012
  - Plain Language Forecast
  - Forecast Discussion
- Available via SWPC Product Subscription Service
  - https://pss.swpc.noaa.gov

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:Product: Forecast Discussion
:Issued: 2013 Apr 12 1230 UTC
# Prepared by the U.S. Dept. of Commerce, NOAA, Space Weather Predictio
#
Solar Activity

.24 hr Summary...
Solar activity decreased to low levels. Region 1718 (N22W39,
Dkc/beta-gamma) was the most active region and produced three low-level
C-class flares. It showed gradual spot and penumbra development during
the period and maintained a beta-gamma magnetic configuration. Old
Region 1713 (N10, L=174), which crossed the west limb yesterday,
produced the largest flare of the day, a C4 at 11/2302 UTC. Region 1719
(N10W07, Eai/beta-gamma-delta) showed gradual spot and penumbra
development. A magnetic delta structure persisted in the southeast
quadrant of the region, but appeared to be weakening. Region 1721
(S19E13, Dao/beta-gamma) showed both a mix of polarities and minor spot
growth in its intermediate portion and maintained a beta-gamma magnetic
configuration. It produced two optical subflares late in the period.
There were no Earth-directed coronal mass ejections (CME) during the
period.

.Forecast...
Solar activity is expected to be low during the period (12 - 14 Apr)
with a chance for an M-class flare and a slight chance for an X-class
flare.


Energetic Particle

.24 hr Summary...
Proton events at greater than 100 MeV and greater than 10 MeV occurred
at geosynchronous orbit during the period. The events followed
yesterdays M6/3b flare. The greater than 100 MeV event began at 11/0940
UTC, reached a peak of 2 pfu at 11/1400 UTC, and ended at 11/1955 UTC.
The greater than 10 MeV proton flux reached the 10 pfu event threshold
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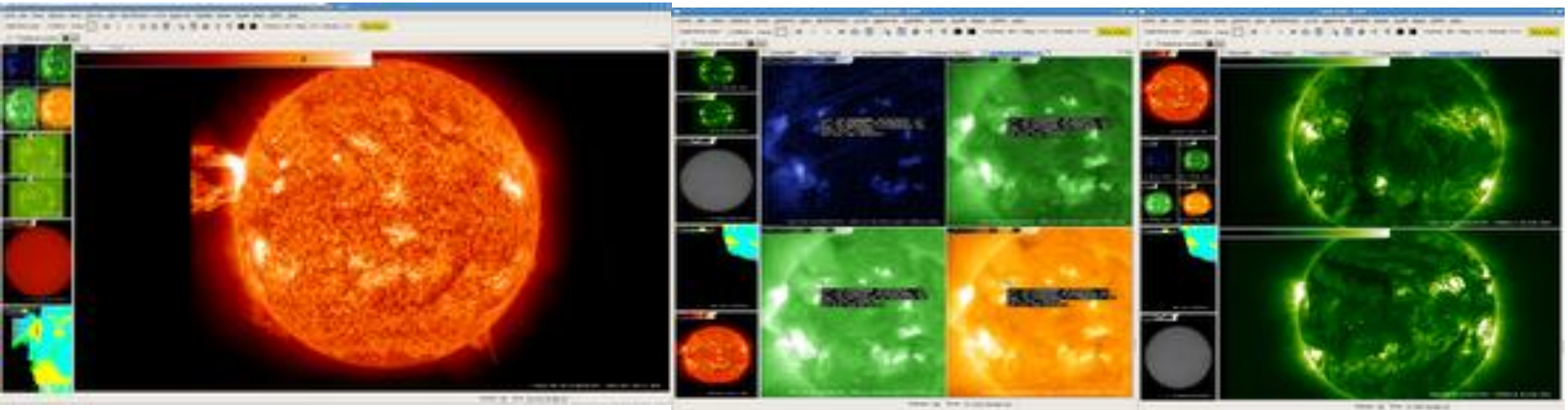
AWIPS2 – SWPC Forecast Office

- Software migration activities continue
- NWS enterprise solution will free resources to work on model transitions
- Summer 2013 – Initial capabilities available to SWPC forecasters
- Fall 2014 – Replacement of existing system
- UCAR/Unidata to make final software available
  - http://www.unidata.ucar.edu



Satellite News

- NOAA GOES
  - GOES 13&15 Operational for Space Weather
    - GOES 14 used during fall eclipse season
    - LASP SDO/EVE XRS Proxy used by SWPC during spring eclipse season
- DSCOVR
  - Launch Date – November 2014!!
  - SWPC now tasked with ground data acquisition and processing
- SunJammer
  - Closer than L1 solar sail demo mission
  - Currently co-manifested with DSCOVR Launch
  - NOAA & NASA worked with the UK to secure solar wind instruments
  - Magnetometer (Imperial College) - Plasma detector (University College London)

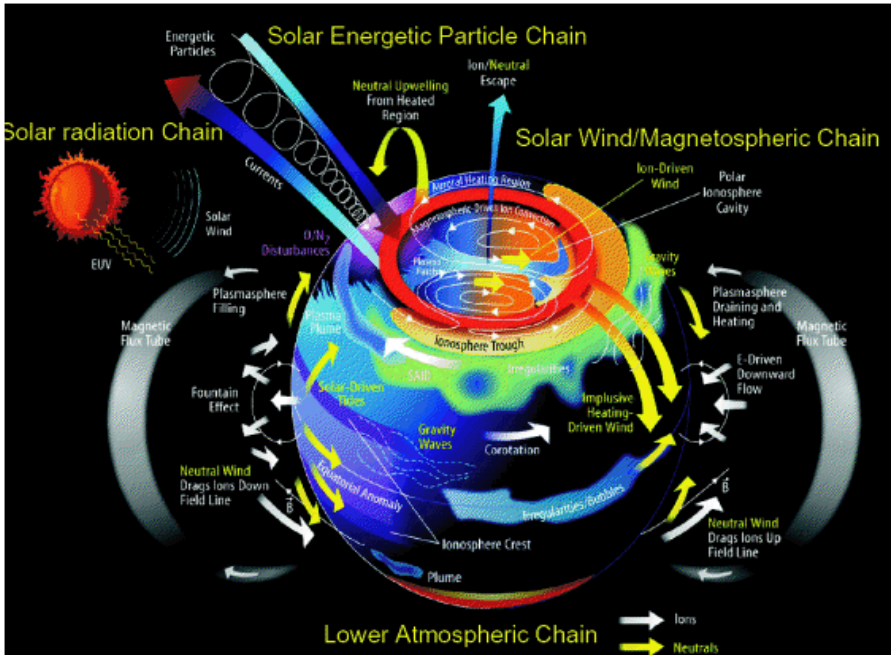
(More details on DSCOVR and SunJammer in later sessions)

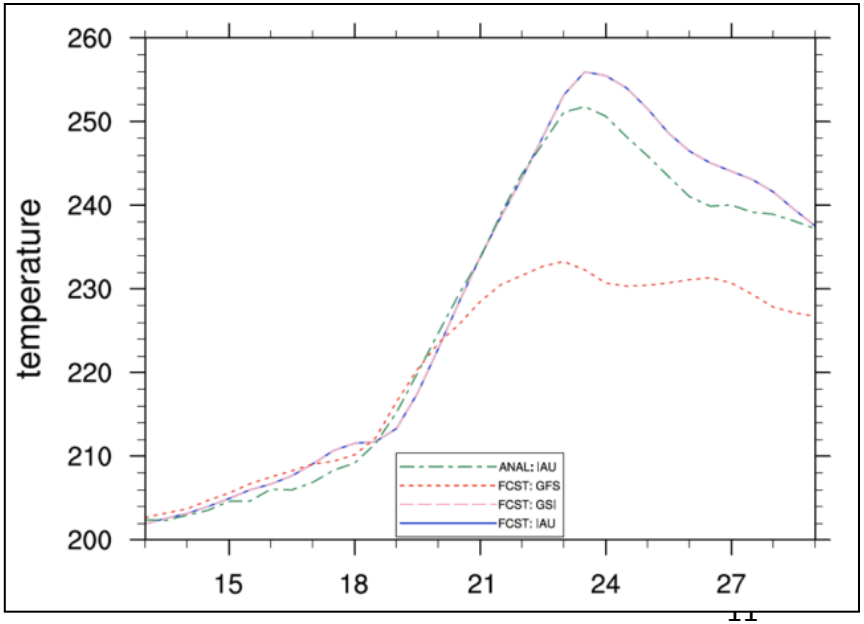
- Operational Coronagraph
  - NOAA funding studies for continued CCOR development in FY13&14
  - NOAA looking for “free ride” opportunities as well

SWPC Testbed Update

IDEA/WAM - Integrated Dynamics in Earth's Atmosphere / Whole Atmosphere Model

- Multiyear project to raise the top of the NCEP Global Model to 600km and introduce ionosphere/plasmasphere data assimilation
- Planned operational on NCEP supercomputers in FY17
- Work showing forecast improvements in terrestrial forecasts





SWPC Testbed Update

Geospace Model

- Coupling of magnetosphere to terrestrial atmosphere and solar wind
- Will allow for regional specification and forecasts of geomagnetic disturbances on Earth
- NASA/CCMC delivered preliminary report to SWPC on Dec 1, 2012
  - Final report due June 2013
  - SWPC to make model selection by Sept 2013
- Space allocated on new NCEP Supercomputers!

WSA-Enlil

- Operational in SWPC Forecast Office September 2013
- Software shared with UK, Korea, & Australia
  - Now working with them on an ensemble forecast

SEAESRT, North American TEC (NATEC), Ovation Aurora

- All expected in SWPC operations this coming fall
- Check our new web site for these models soon

NOAA SBIR

NOAA Small Business Innovation Research Program

- 2012 – SWPC fortunate to have one proposed topic funded
  - Propagation Research Associates, Inc. given Phase-I award in 2012 to investigate models to detect and now-cast scintillation
    - Presentation at SWW Thursday afternoon
  - Propagation Research Associates, Inc. now eligible to compete for a Phase-II award
- 2013 – SWPC topic chosen for consideration
  - Delivering a Solar Flare Forecast Model that Improves Flare Forecast (Timing and Magnitude) Accuracy by 25%

International Activities

UK-US Preparedness for Space Weather Hazards – 26 June 2012 – International Space Innovation Centre, Harwell Oxford – Sir John Beddington

International round-table on extreme space weather: Geomagnetic storms, GNSS disruptions and the impact on vital functions in society – September 2012, Stockholm

2nd Korea Space Weather Conference – Korean Radio Research Agency – Jeju, Korea

United Nations Committee on the Peaceful Uses of Outer Space (COPUOS)
Space weather is now a regular agenda item in the annual Science and Technology Assembly

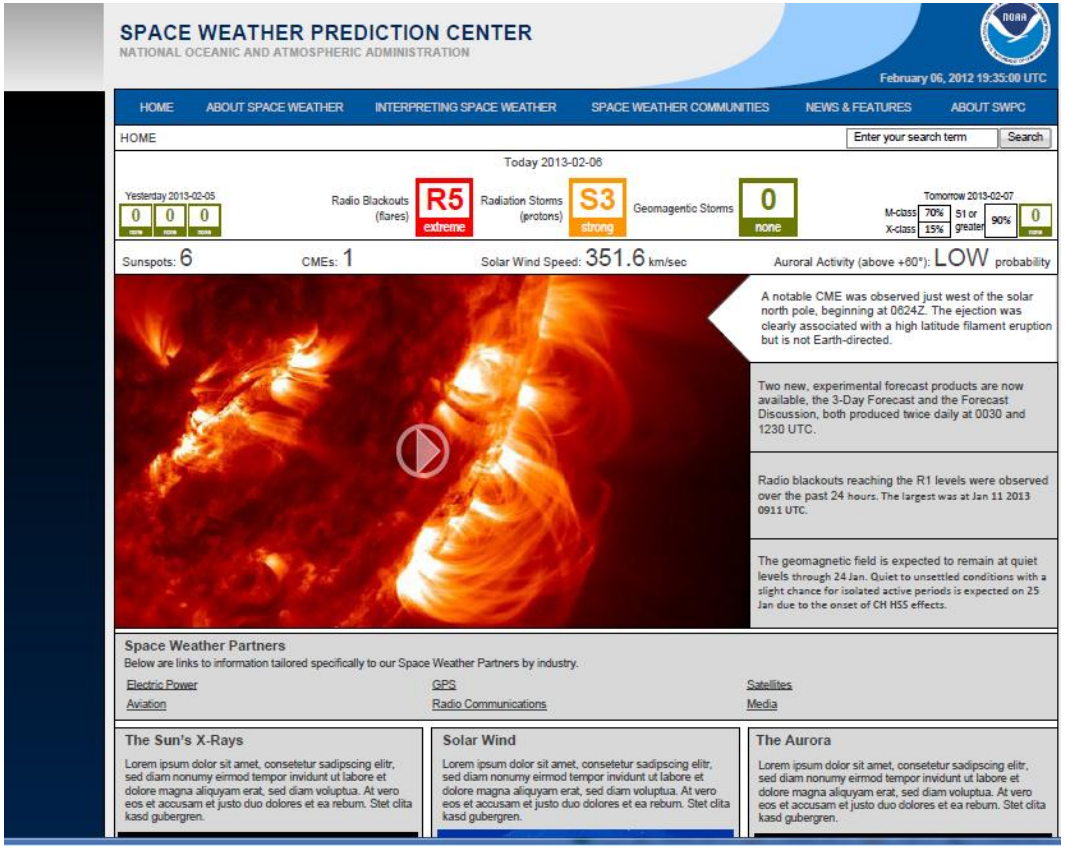
World Meteorological Organization's Inter-Programme Coordination Team on Space Weather 21 countries and 7 international organizations participating
- Space weather observations are integrated in the WMO's Implementation Plan for the Evolution of Global Observing Systems

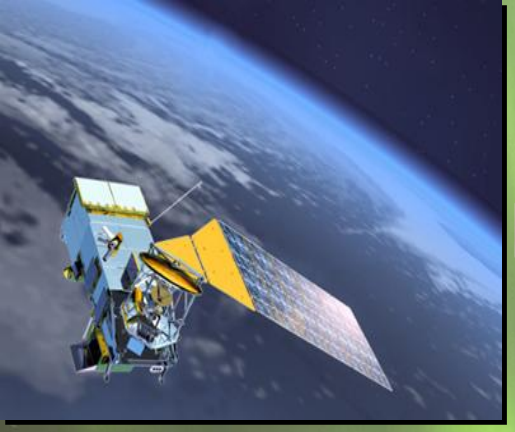
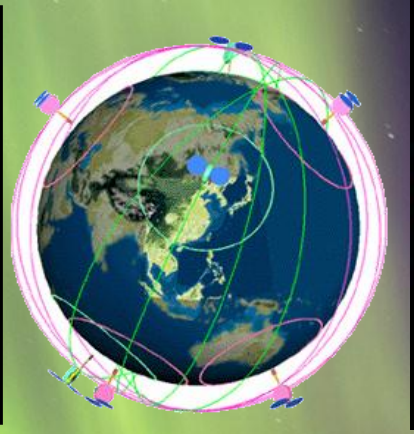
International Civil Aviation Organization (ICAO) – Working to develop space weather service requirements for civil aviation

Web Update

SWPC Web Update

- Major update of SWPC's web pages ongoing now
- Data driven services vs. static images
- Alpha version to be available in late May
- SWPC will be requesting user feedback at that time
- Final version for public review to be available late Summer 2013



Global Impact – Global Challenge – Global Response

Partnering with YOU to:

Provide the *right* information… in the *right* format...
at the *right* time… to the *right* people…
to make the *right* decisions!