

SATELLITE TECHNIQUES FOR MARINE, PRECIPITATION, AND HAZARDOUS WEATHER APPLICATIONS

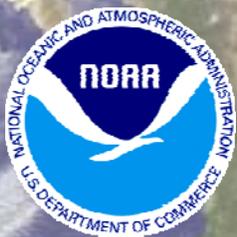
**Michael J. Folmer
(UMCP/ESSIC/CICS)**

Satellite Liaison at WPC/OPC/TAFB/SAB

Contributions from:

**Andrew Orrison (WPC), Dave Novak (WPC),
Joseph Sienkiewicz (OPC), Jamie Kibler (SAB), and Kathryn Mozer (ASRC)**

**NOAA Satellite Conference
04/11/13**



Presentation Outline

- ▣ The Weather Prediction Center (WPC)
 - Satellite use with current conditions
 - Atmospheric Rivers
 - Model Diagnostics
- ▣ The Ocean Prediction Center (OPC)
 - Non-convective High Wind Events
 - Convective Overshooting Tops
 - Super Rapid Scan Operations and Lightning
- ▣ The NESDIS Satellite Analysis Branch (SAB)
 - Satellite Precipitation Estimates
 - Fire and Dust
 - Tropical Classifications World-Wide

WPC GOES-R PROVING GROUND OPERATIONS

Broad variety of responsibilities



QPF



Winter Weather



Medium Range

NWS QPF GPRA

Day 0 – 7 forecast guidance



Surface Analysis



Model Diagnostics



Short Term Weather



Alaska Med. Range



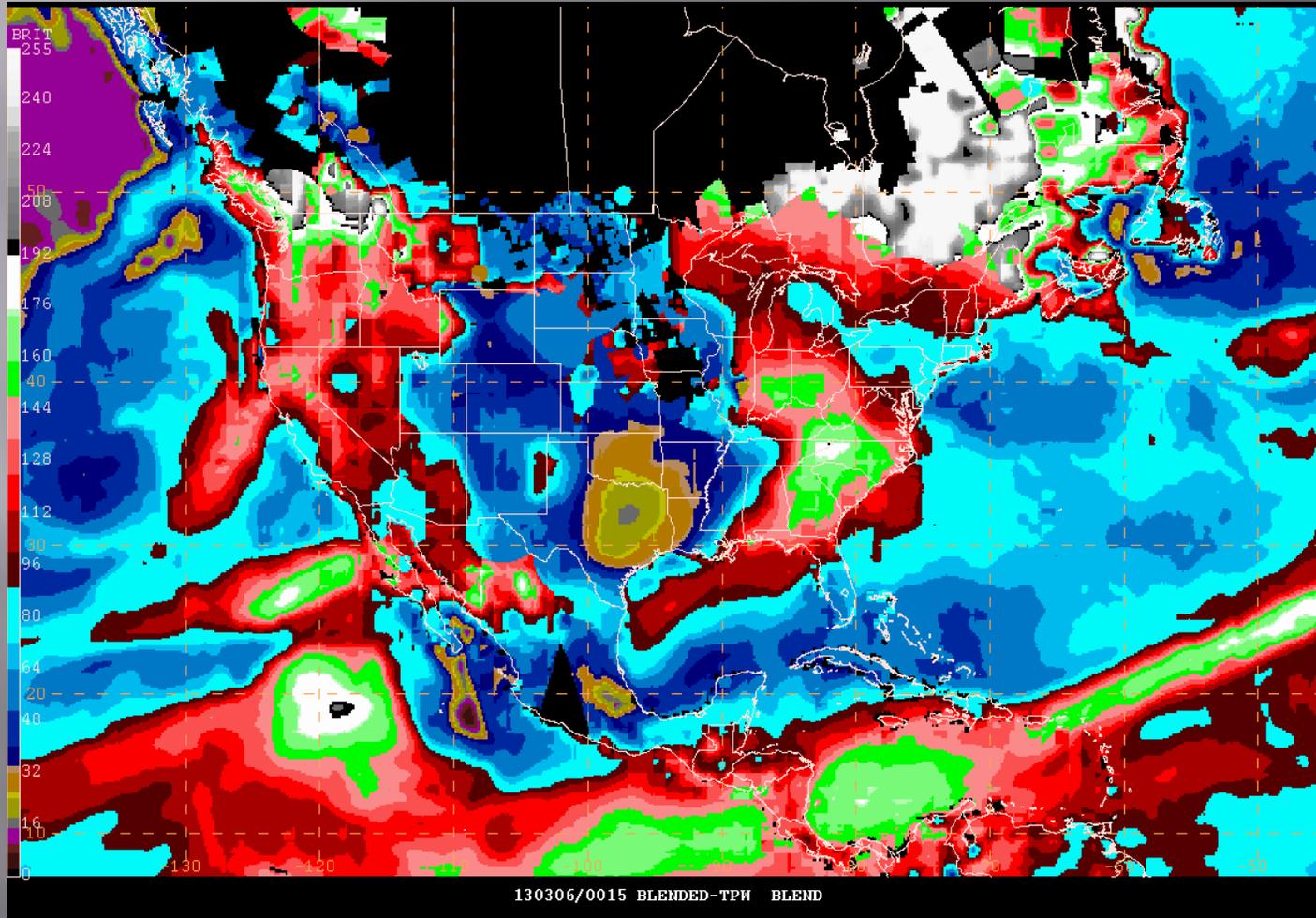
International



Tropical

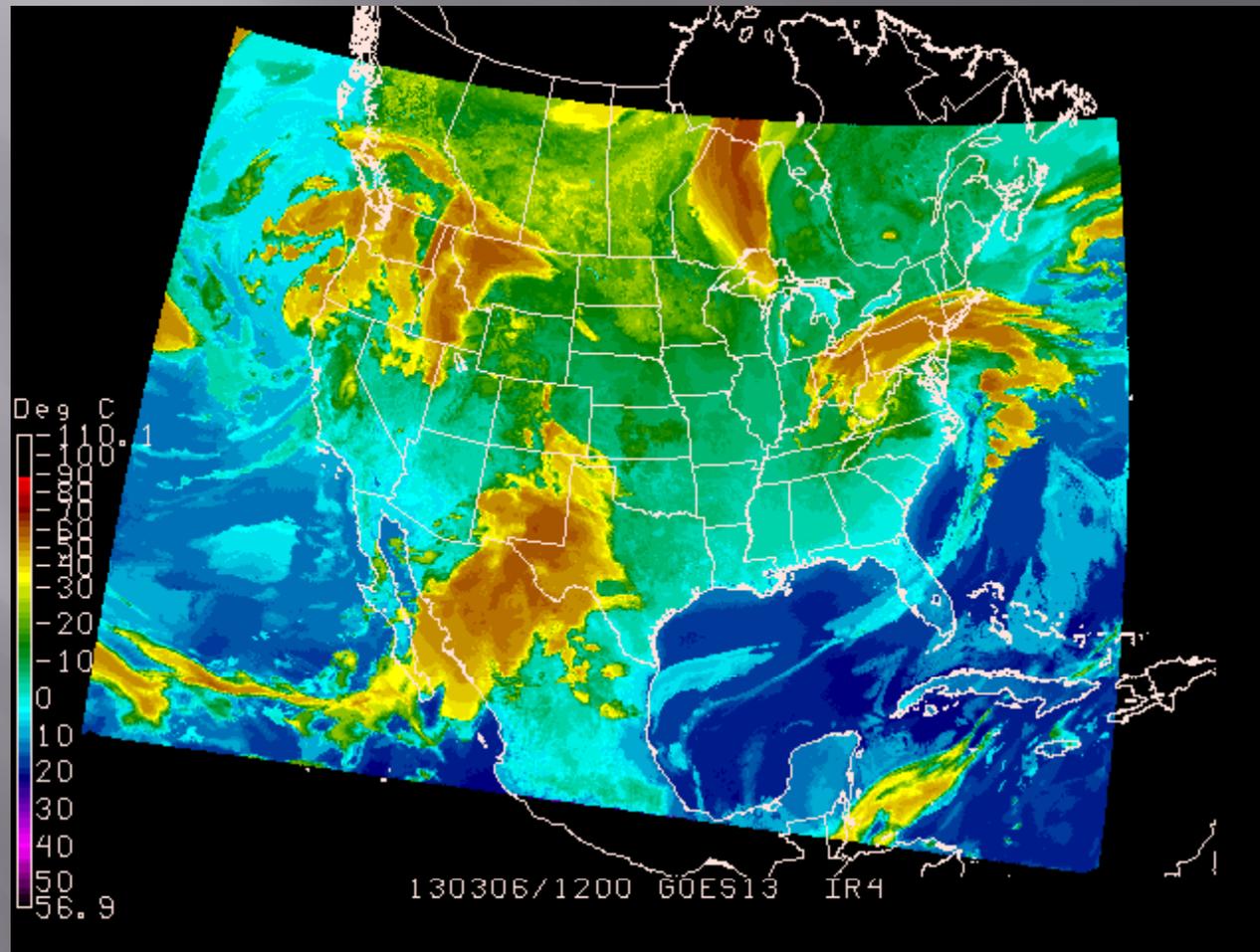
March 6 & 7, 2013 Nor'easter

Blended Total Precipitable Water Percent of Normal



New Visualizations of Model Simulated Satellite Imagery

NAM 4km Nest Simulated Infrared (10.7 μm)

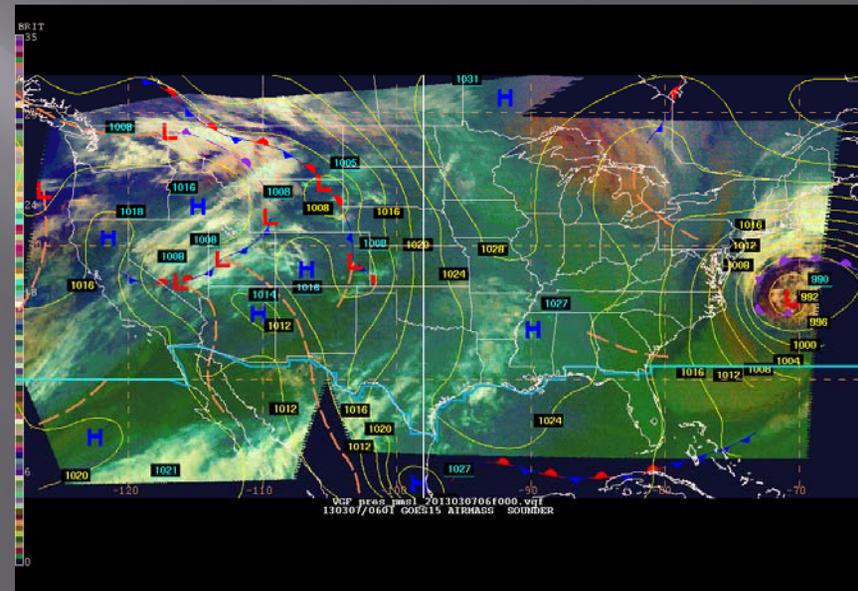
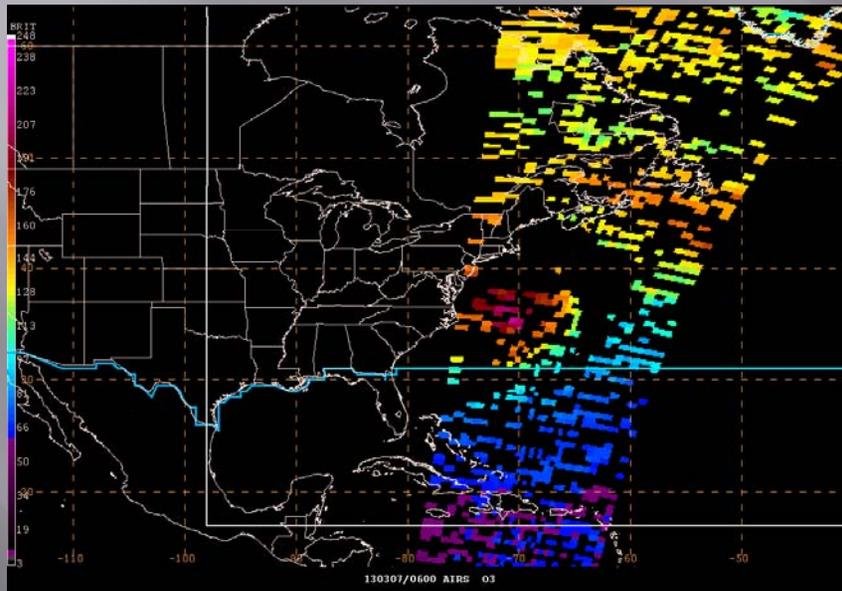


Potential Vorticity Analysis

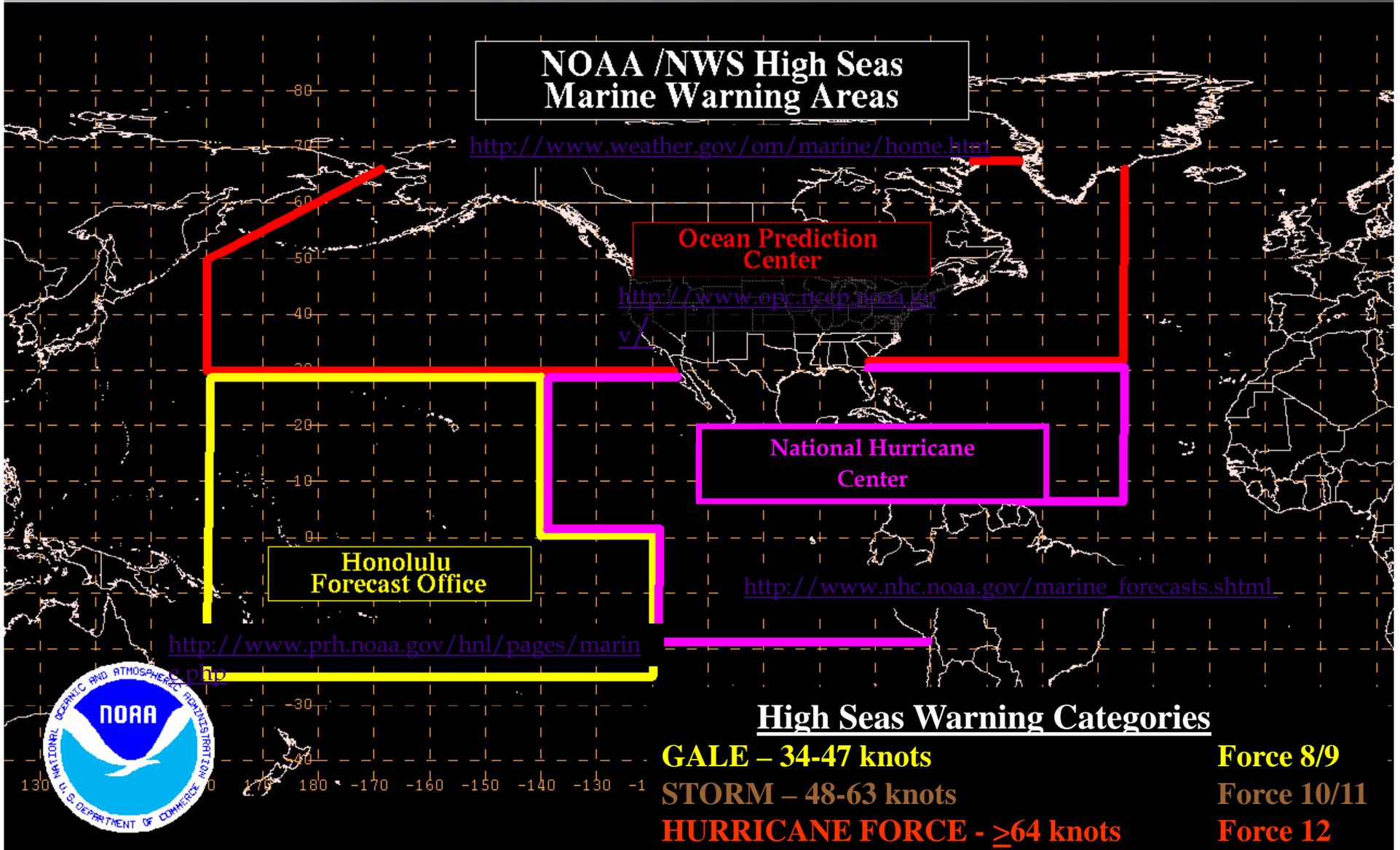
Total Column Ozone vs. RGB Air Mass

AIRS TOTAL COLUMN OZONE
VALID 06Z MAR 07, 2013

RGB AIR MASS W/ WPC SFC ANALYSIS
VALID 06Z MAR 07, 2013



OPC GOES-R Proving Ground NOAA Forecast Responsibility



OPC Forecast Functions



Atlantic High Seas

Pacific High Seas

Atlantic Offshore

Pacific Offshore

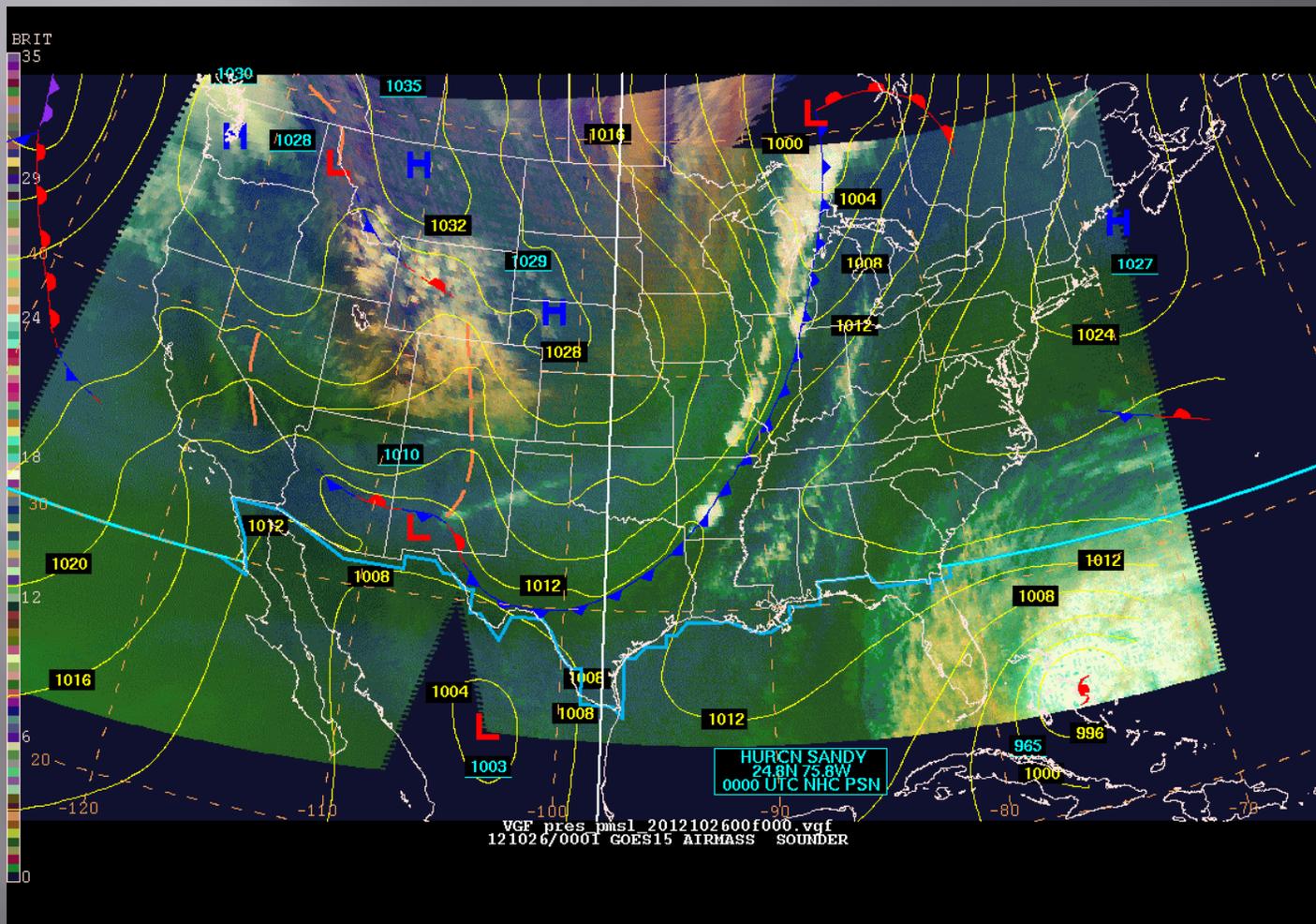
Outlook (Medium Range)

Special Project Support

- Antarctica NMFS
- USCG Arctic (with AR)
- Japan

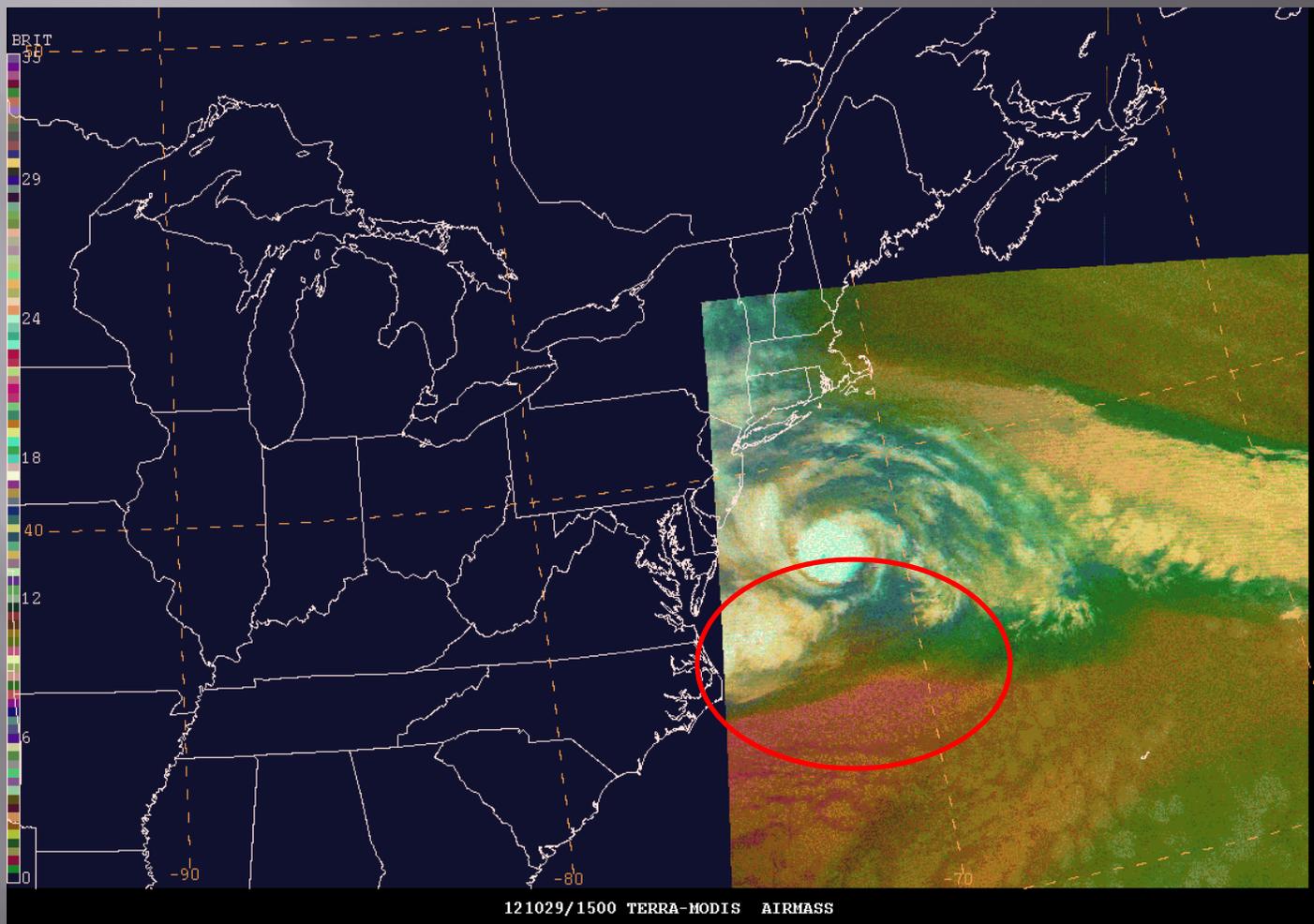
Hurricane/Superstorm Sandy

RGB AM with WPC sfc analysis



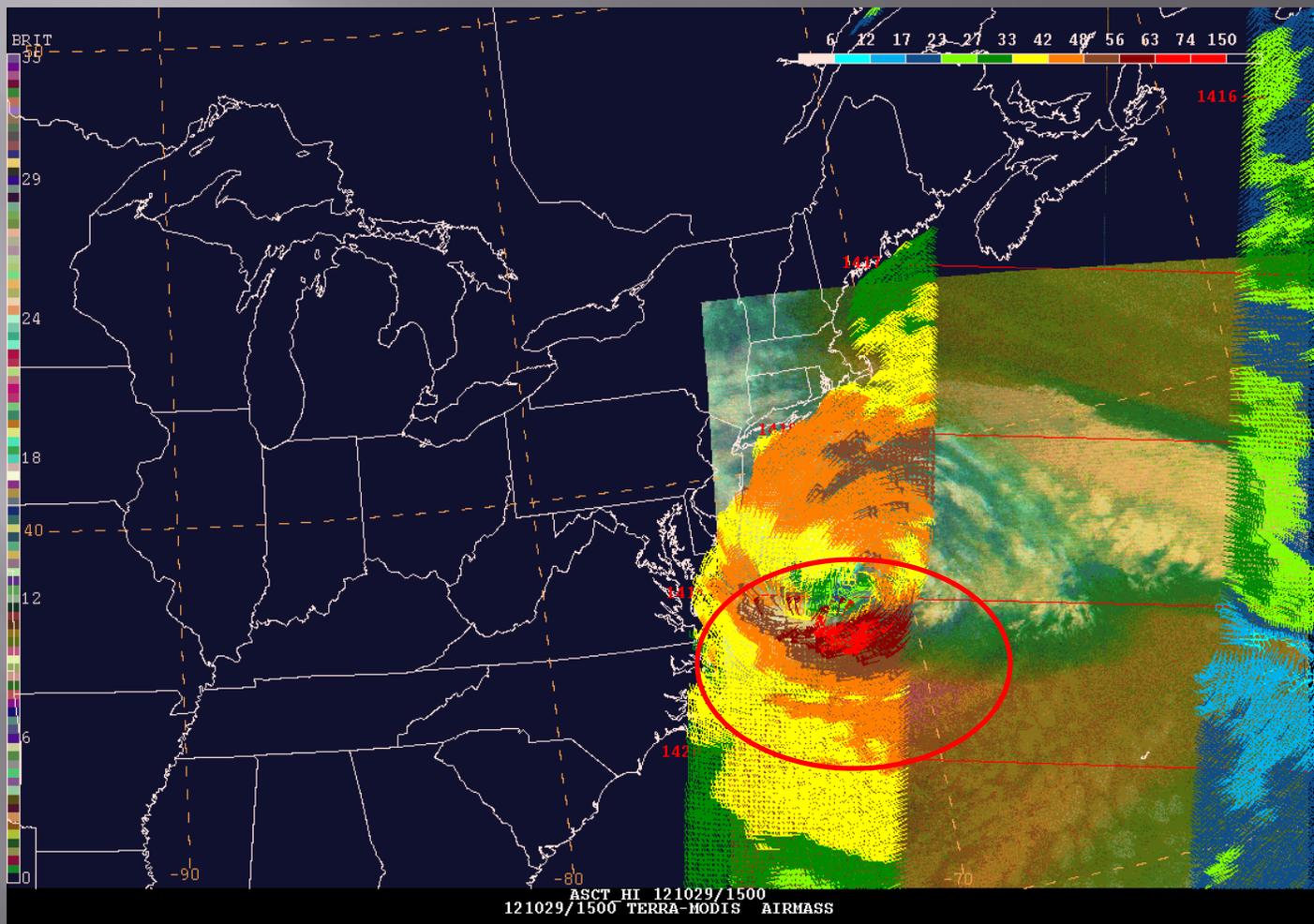
Superstorm Sandy

MODIS RGB Air Mass

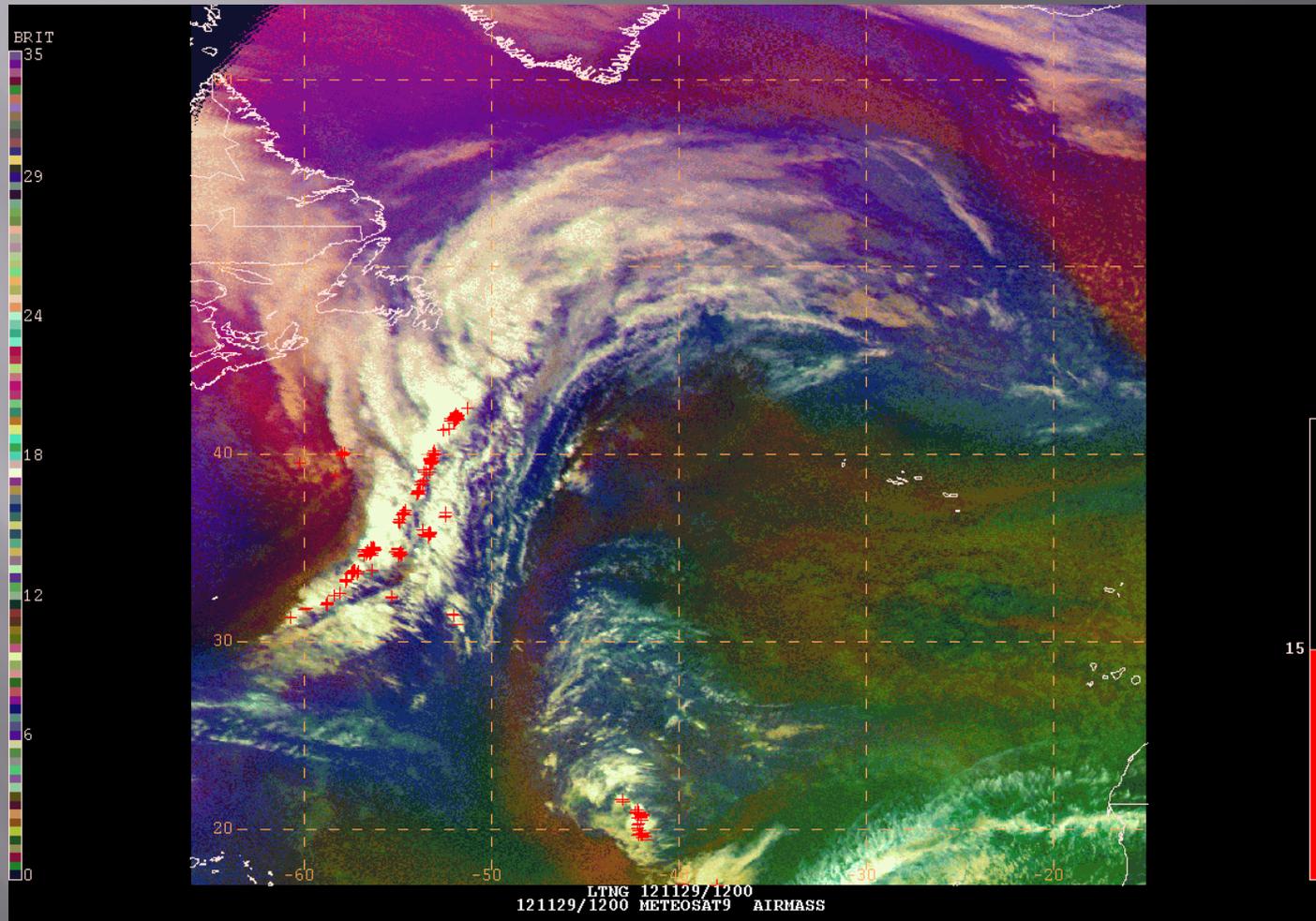


Superstorm Sandy

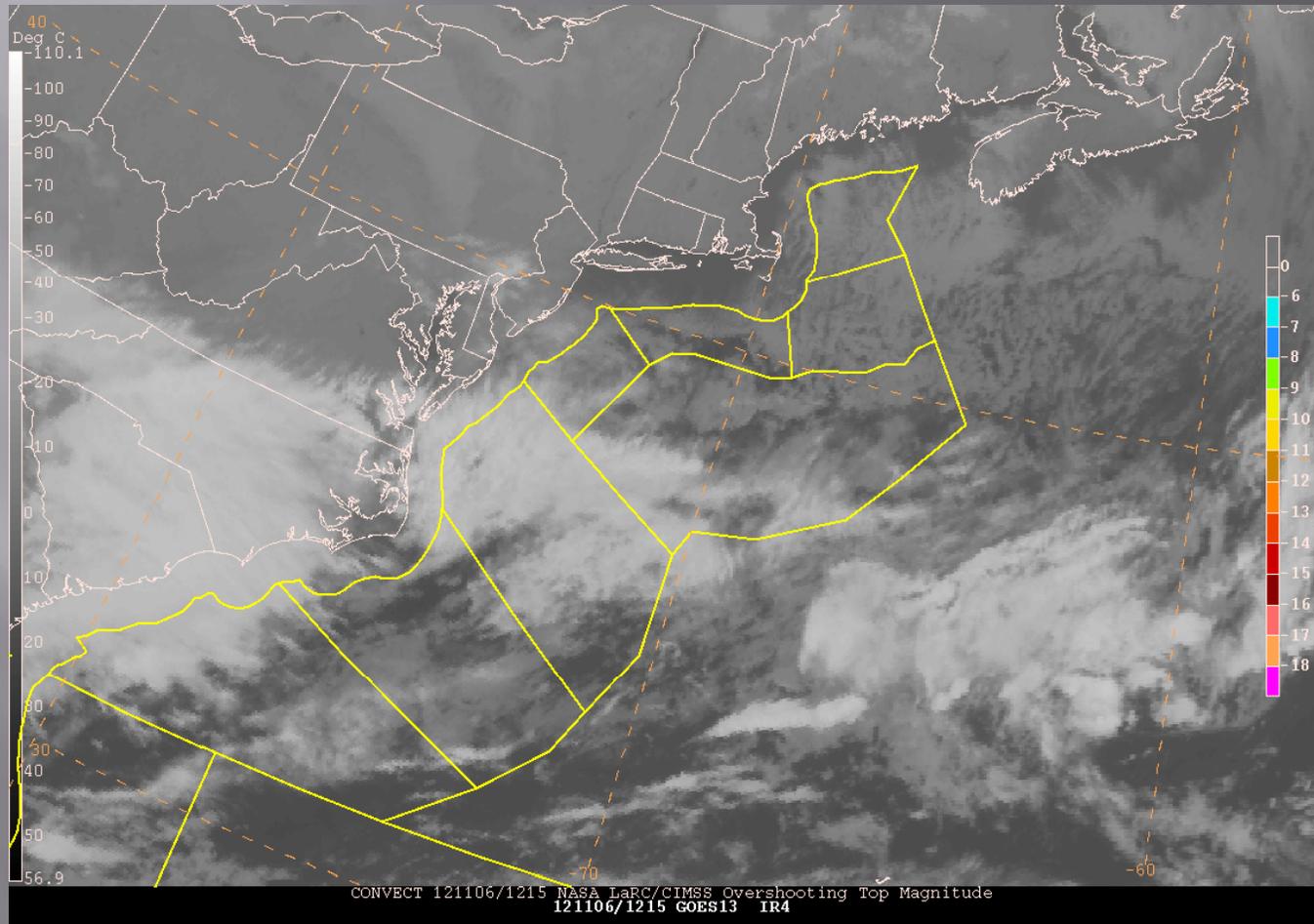
MODIS RGB Air Mass & High Res ASCAT



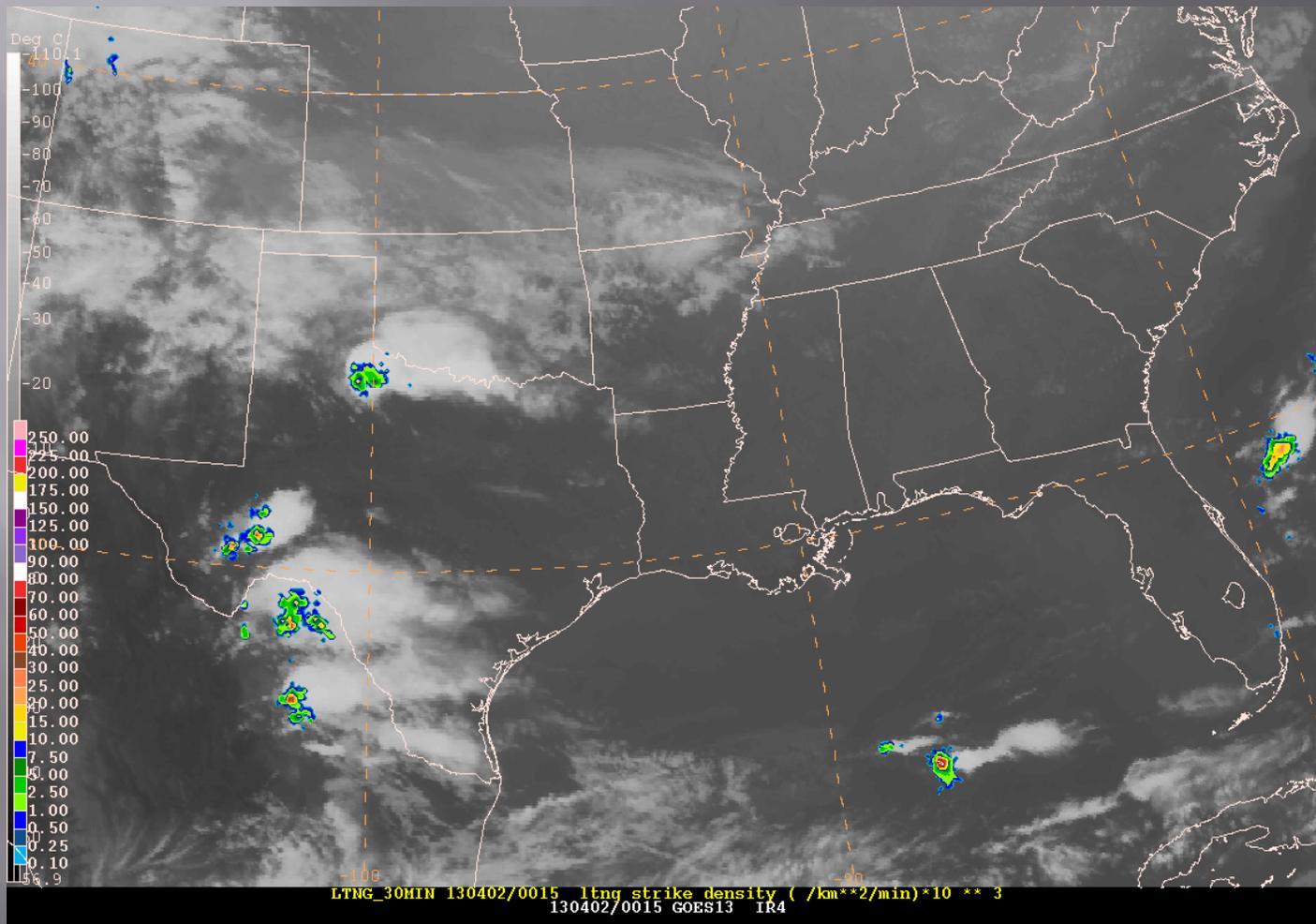
SEVIRI RGB Air Mass overlaid with the Vaisala GLD-360 Lightning Strikes Hurricane-force Extratropical Storm on 11/30/2012



GOES-13 Infrared overlaid with Overshooting Top Detection Nor'easter on 11/07/2012



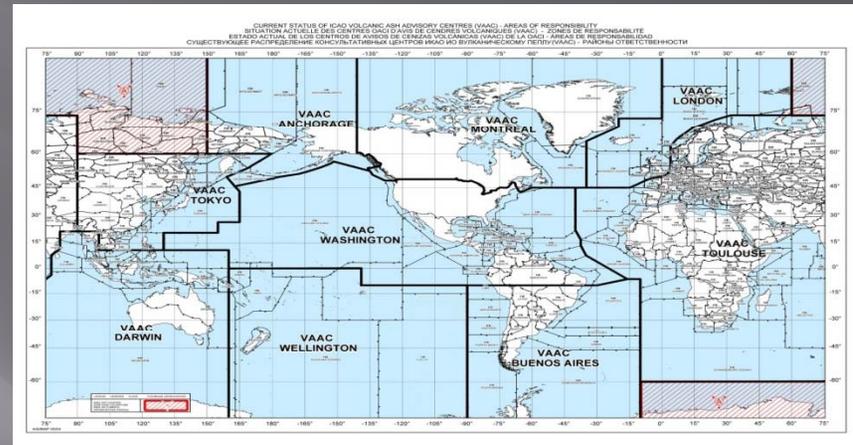
GOES-13 Infrared overlaid with Vaisala GLD-360 Lightning Density Large Mesoscale Convective Complex 04/02/13 - 04/03/13



SAB Volcanic Ash Program

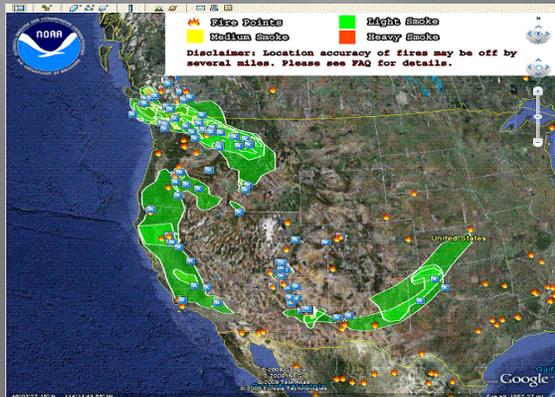
- Washington VAAC area of responsibility includes the continental US, southward through Central America, the Caribbean, to 10S in South America and the US controlled oceanic Flight Information Region (FIR).
- Washington is 1 of 9 VAACs that cover the globe. Other VAACs include Anchorage, Buenos Aires, Darwin, London, Montreal, Tokyo, Toulouse and the Wellington.
- Monitoring volcanoes 24 hours a day 365 days a year

<http://www.ssd.noaa.gov/VAAC/>

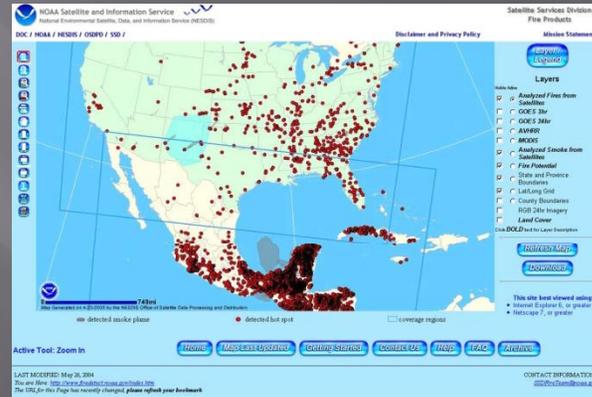


SAB Smoke, Fire and Air Quality Program

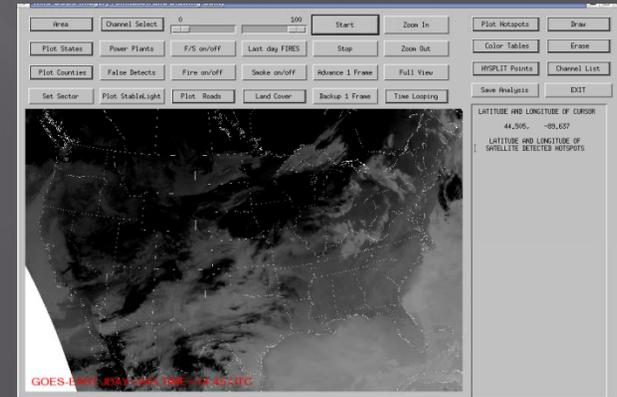
<http://www.ssd.noaa.gov/PS/FIRE/kml.html>



<http://www.firedetect.noaa.gov/viewer.htm>



The Hazard Mapping System



SAB Precipitation Program

24/7/365 monitoring of precipitation with emphasis on satellite analysis, short term trends and rainfall estimates

Supporting NWS WFO/RFCs

- heavy rainfall / flash flooding
- moderate to heavy winter precipitation

- West Coast winter storms
- Great Lake snows



Supporting NWS NCEP WPC

- excessive rainfall area
- Precipitation trends
- 0-6 hr rainfall guidance
- satellite rainfall estimates

<http://www.ssd.noaa.gov/PS/PCPN/>

SAB Tropical Program

Dvorak Infrared and Visible Satellite Technique

Areas
North Atlantic Ocean
Eastern North Pacific Ocean
Central Pacific Ocean

Western North Pacific
Arabian Sea
Bay of Bengal
South Indian Ocean
South Pacific Ocean

Users

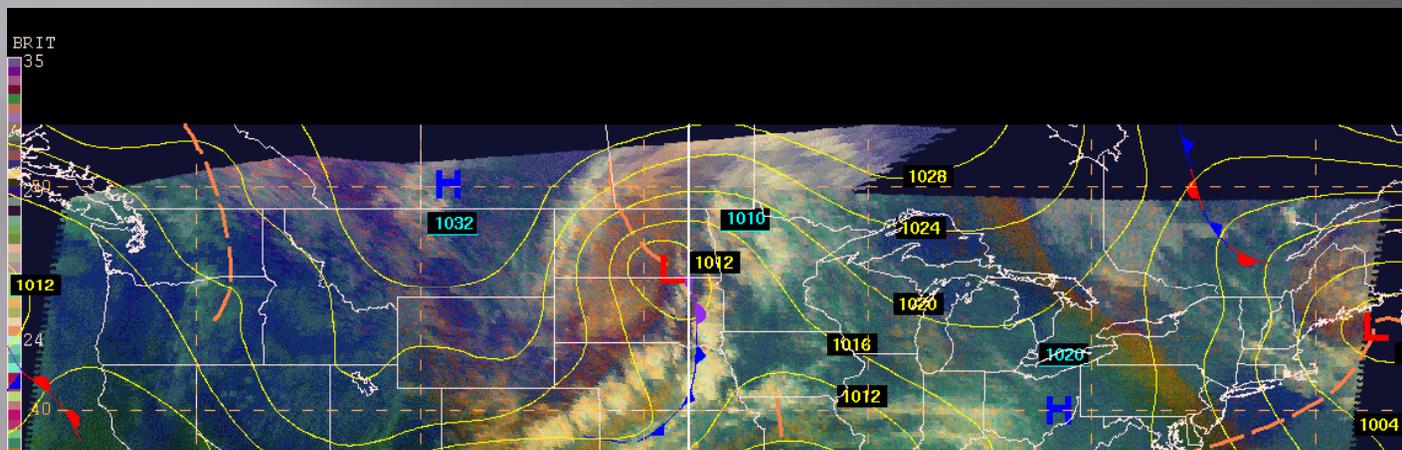
NOAA NHC/CPHC
US Military -JTWC

WMO Regional Specialized
Meteorological Centers (RSMC) in
Tokyo, New Delhi, Reunion,
Brisbane, Perth, Darwin, Fiji and
Wellington

Tropical Storms: Global Geostationary and Polar Orbiting microwave satellite data are monitored for the formation, movement, and intensity of tropical storms, hurricanes, and typhoons.

Routine analyses of these storms are relayed to the National Weather Service and many other international agencies such as the Regional Specialized Meteorological Centres (RSMC) forecast Tropical Cyclones.

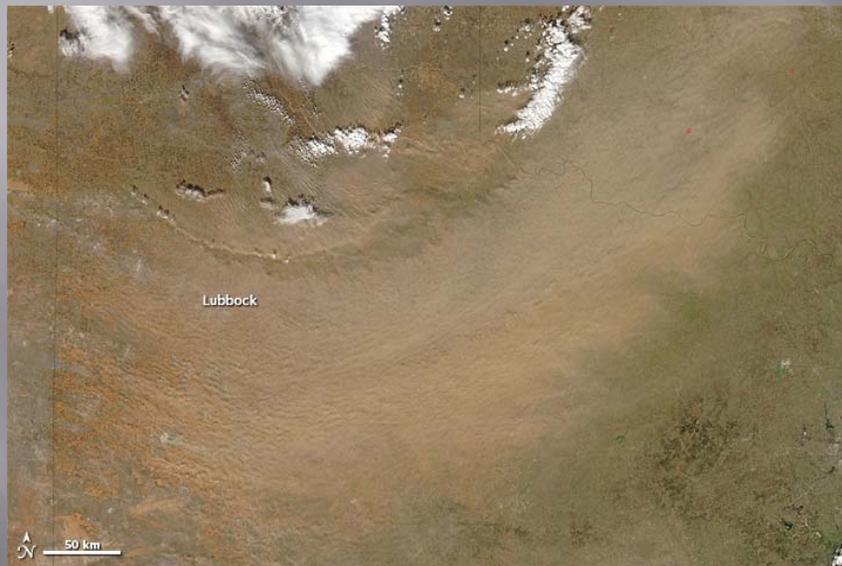
March 6 & 7, 2013 Nor'easter RGB AM with WPC sfc analysis



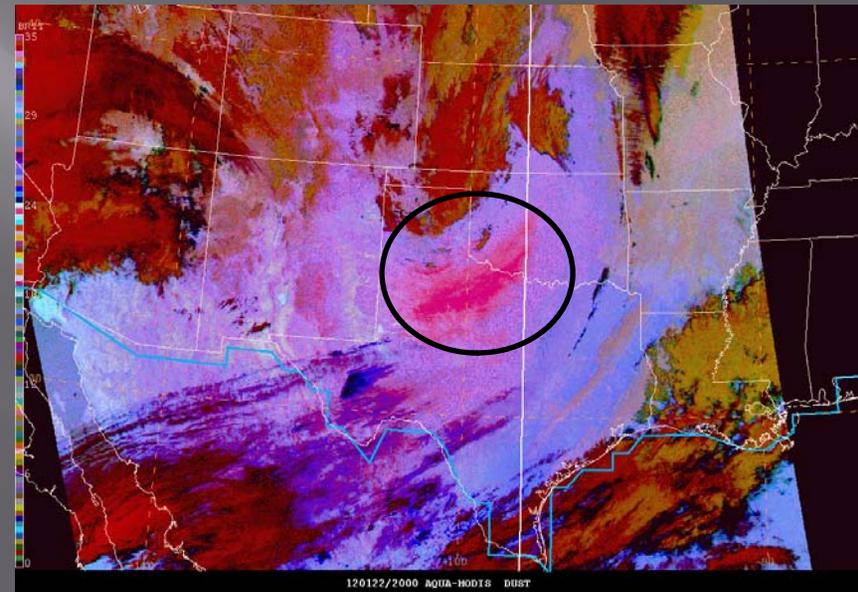
AIR MASS RGB PRODUCT SUGGESTING PV ANOMALY SWING AROUND THE BOTTOM OF THE LOW NOW AND COULD KEEP LOW ON ABOUT THE SAME PATH OR EAST REST OF THE MORNING. WITH UPPER HIGH HOLDING OVER EASTERN QUEBEC AND LITTLE VORT IN THE WESTERN ATLANTIC NEAR 39N/60W...THIS SHOULD KEEP DEFORMATION ZONE FROM MOVING ANY FURTHER NORTH THAN CURRENT POSITION ACROSS WESTERN VA TO C MD TO C PA AND PROBABLY ALLOW FOR MORE OF SHIFT NORTHEAST OR ENE REST OF THE MORNING INTO AFTERNOON.
~Sheldon Kusselson (SAB)

North TX / Southwest OK Dust Storm on 01/22/12

MODIS (TERRA) IMAGE
OF DUST STORM IN TX

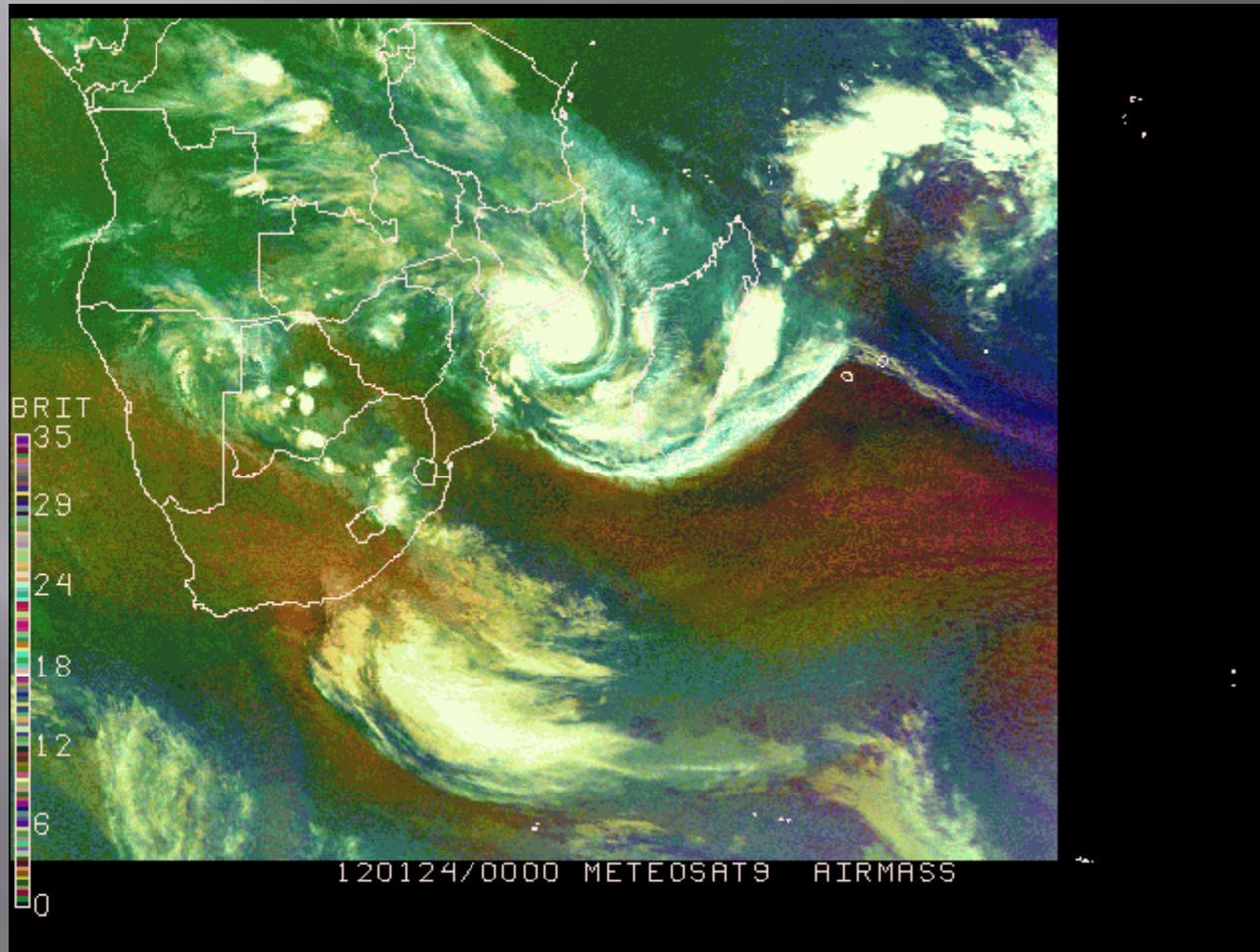


MODIS RGB DUST IMAGE
OF DUST STORM IN TX



Tropical Cyclone Funso

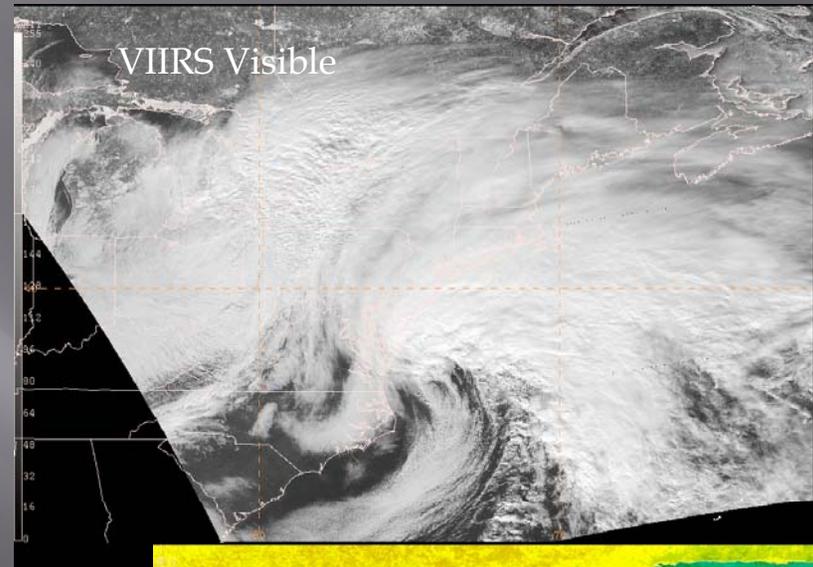
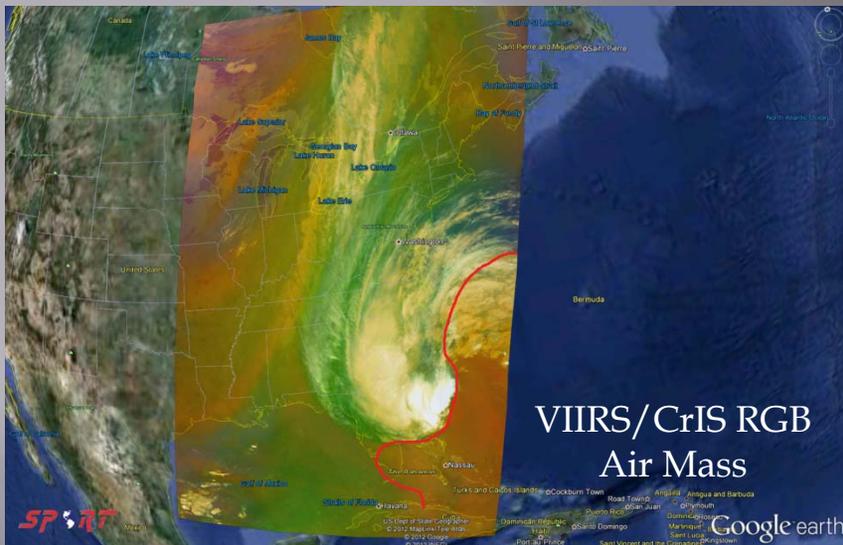
SEVIRI RGB Air Mass



Provided by CIRA/SPoRT

Suomi NPP VIIRS Imagery

Provided by CIMSS and NASA SPoRT



Conclusion

- ▣ The WPC, OPC, and SAB have progressed from using basic satellite channels to new satellite techniques with help from the Satellite Proving Ground.
- ▣ The main uses of satellite imagery at these centers is to compare current conditions with NWP initialization and current conditions.
- ▣ New GOES-R and JPSS satellite products are assisting current operations, well ahead of launch time.
- ▣ Future direction: Continue to explore new satellite techniques that will enhance operations and lessen forecast errors.

Questions?

The screenshot shows a web browser window displaying a WordPress blog. The browser's address bar shows the URL `goesnatcentperspective.wordpress.com`. The page title is "GOES-R and JPSS National Centers Perspective" with the subtitle "The future of weather satellites!". Below the title is a dark banner with the text "ABOUT THE GOES-R/JPSS NATIONAL CENTERS PERSPECTIVE BLOG". The main content area features a post titled "Spring's First Mesoscale Convective Complex" by "folmercast" on "April 4, 2013". The post text describes satellite proving ground at the NOAA Center for Weather and Climate Prediction (NCWCP) and the National Hurricane Center (NHC), mentioning products like NSSL WRF and NAM simulated satellite imagery, overshooting top detection, lightning density, and convective initiation. A satellite image of a convective complex is shown below the text. The right sidebar contains a search bar, "Recent Posts" (listing "Spring's First Mesoscale Convective Complex", "Early February Blizzard Part 2", "Meteor Impact Using RGBs", "An Active North Atlantic", and "Powerful West Pacific Storm"), "Archives" (listing months from April 2013 to August 2012), and "Categories". The Windows taskbar at the bottom shows the system clock as 4:42 PM on 4/5/2013.

GOES-R and JPSS National Centers Perspective
The future of weather satellites!

ABOUT THE GOES-R/JPSS NATIONAL CENTERS PERSPECTIVE BLOG

Posted by folmercast on April 4, 2013 | Edit This

Spring's First Mesoscale Convective Complex

Pasted in: Lightning | Leave a Comment

The Satellite Proving Ground at the NOAA Center for Weather and Climate Prediction (NCWCP) and the National Hurricane Center (NHC), has begun the next round of GOES-R proxy product demonstrations. The 2013 theme is on convective products that include the NSSL WRF and NAM simulated satellite imagery, the overshooting top detection, lightning density product, and convective initiation. The first wave of products will focus on the first two products, but I am testing and archiving the new lightning density product that has been developed by a collaborative effort with the Ocean Prediction Center (OPC), the Cooperative Institute for Climate and Satellites (CICS), and NESDIS STAR using the Vaisala GLD-360 lightning feed at the NCWCP.

Recent Posts

- Spring's First Mesoscale Convective Complex
- Early February Blizzard Part 2
- Meteor Impact Using RGBs
- An Active North Atlantic
- Powerful West Pacific Storm

Archives

- April 2013
- March 2013
- February 2013
- January 2013
- December 2012
- November 2012
- October 2012
- September 2012
- August 2012

Categories