

# GOES-R/JPSS Program



## CIMSS/ASPB Participation GOES-R/JPSS Proving Ground Status

Wayne Feltz, Mike Pavolonis, Tim Schmit, Andy Heidinger, Jordan Gerth, Scott Bachmeier, Scott Lindstrom, Justin Sieglaff, Lee Counce, Robert Aune, Gary Wade, Brad Pierce, Kaba Bah, Will Straka, Jason Otkin, Sarah Monette, Chris Velden, Ralph Petersen, Russ Dengel

September 10, 2012





- Demonstration of Satellite PG applications at National Center Testbeds/Demonstrations and NWS WFO
- JPSS Proving Ground Activities
- AWIPS-2 status
- GOES-14 1-minute mode
- Upcoming meetings/conferences



## Satellite Liaison: Chris Siewert

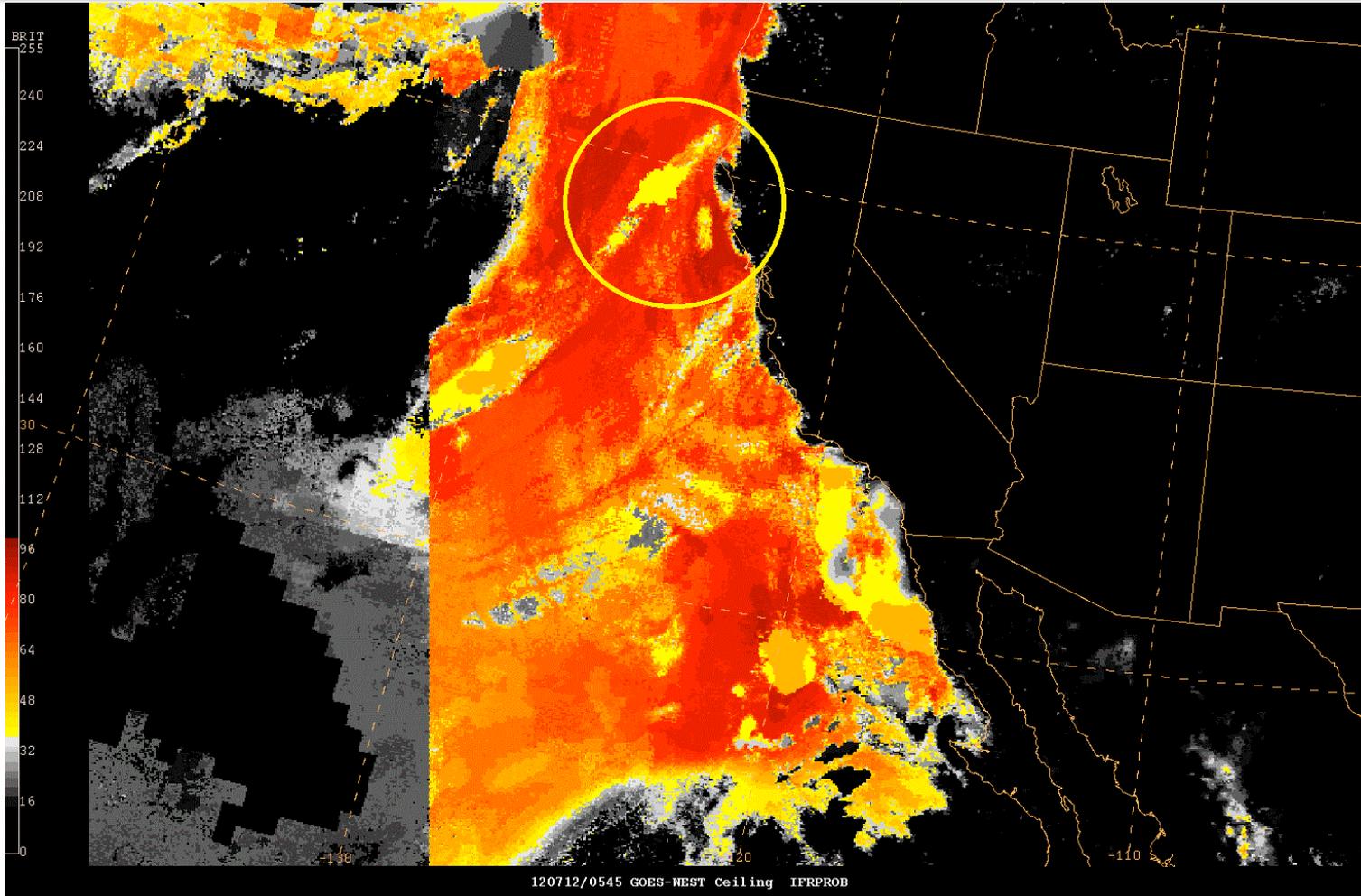
- Provided feedback regarding HWT 2012 Final report
  - Six CIMSS Scientists/Researchers participated, Nearcasting, UW-Cloud top cooling,
- Continue distribution of GOES-R Proxy for Nearcasting, UW-CTC, WRF synthetic imagery, Fire intensity detection
- Continue streamlining formats for AWIPS-2
- Plan for HWT 2013 collaborations
- **UW-CIMSS satellite applications “Boot Camp” delayed until August 2013**



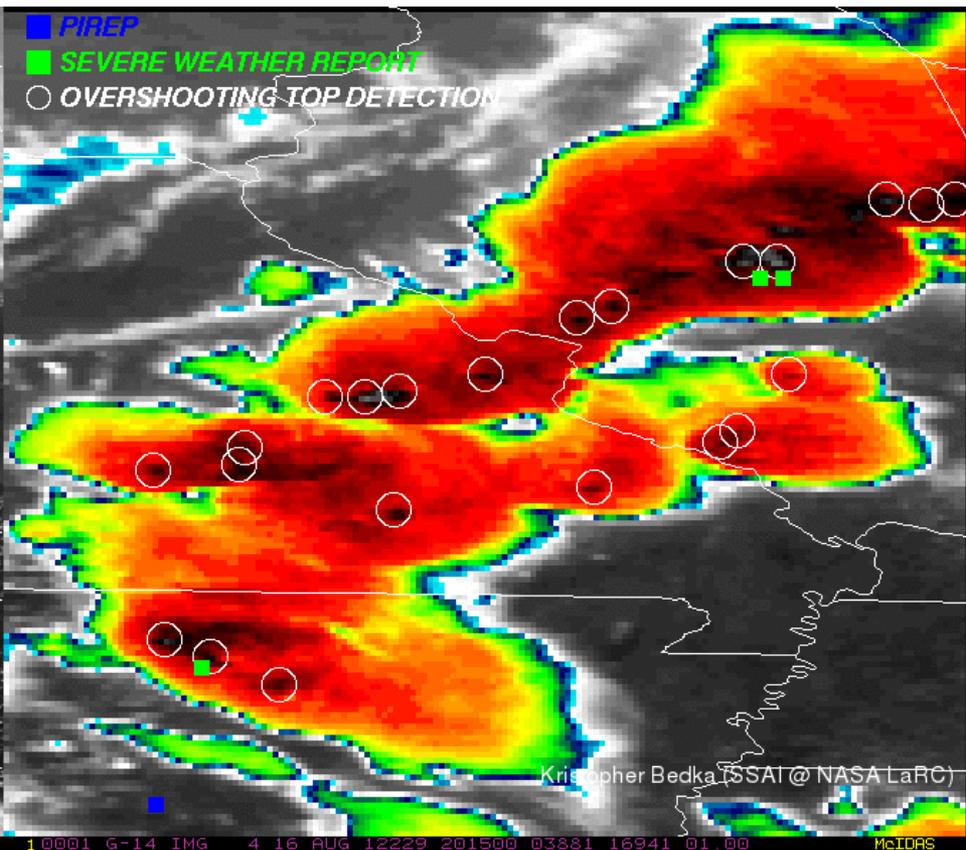
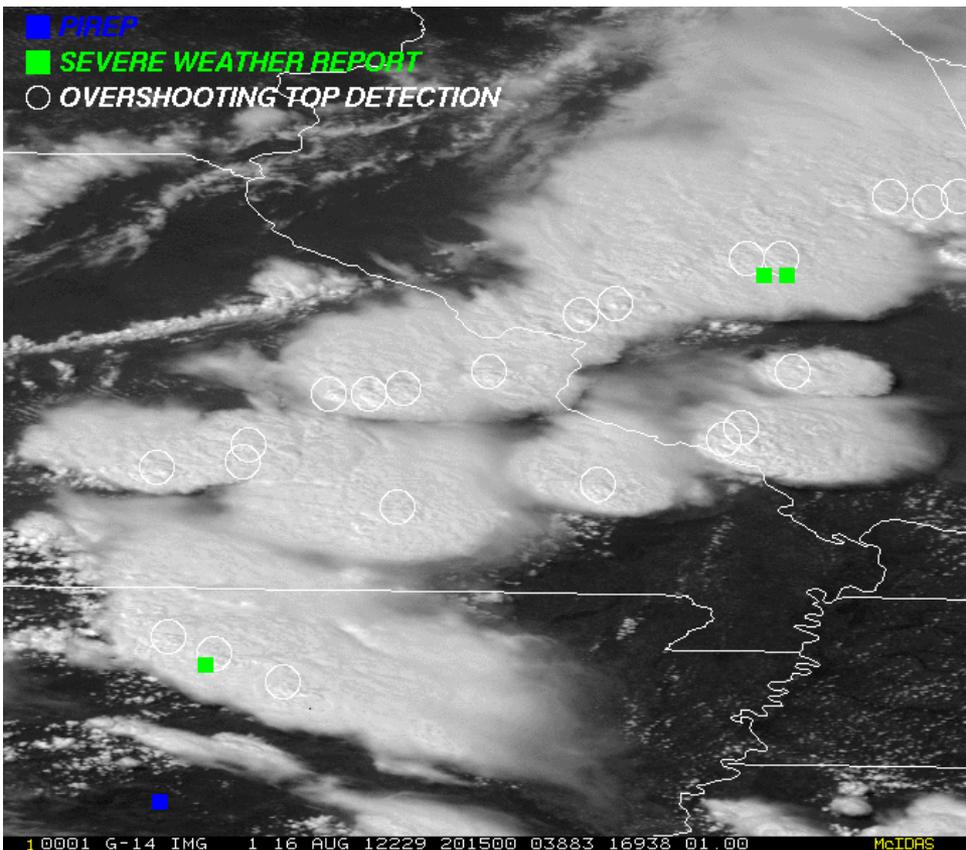
### Satellite Liaison: Amanda Terborg

- UW-CTC, Overshooting-tops, Fog/low cloud, cloud phase, cloud height, and WRF simulated ABI radiance products are available via LDM and can be viewed in N-AWIPS, these products are being evaluated:
- Collaborating with Bill Smith Jr regarding availability of icing product to AWC
- Provided guidance regarding GOES-R PG research topics for Amanda to explore
- Coordination is occurring with regard to providing turbulence/icing for next testbed demonstration
- GOES-14 one-minute mode support to AWC

**UW-CIMSS satellite applications “Boot Camp” delayed until August 2013**



<http://goesrawt.blogspot.com/>



## Satellite Liaison: Chad Gravelle

- **Provided guidance/updates regarding formalized low cloud/fog Central/Eastern region NWS WFO PG distribution**
  - 9 NWS WFO have agreed to formally evaluate using PG infrastructure feedback forms
- **Exploring convective Cloud Top Cooling WFO PG dissemination as next product**
- **CIMSS is aware of need to demonstrate products within AWIPS-2, we are working on getting all PG products into AWIPS-2 compatible formats**
- **GOES-14 one minute mode support**

**UW-CIMSS satellite applications “Boot Camp” delayed until August 2013**





# GOES-R FLS Products Used by PHI

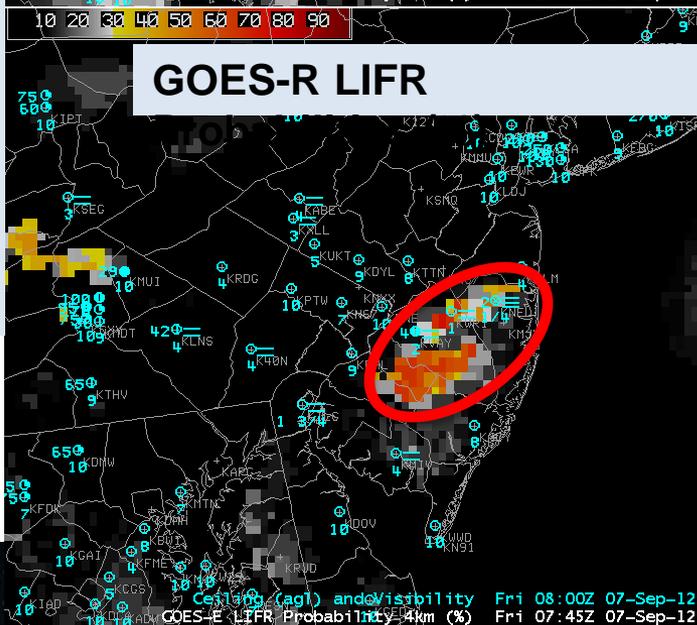
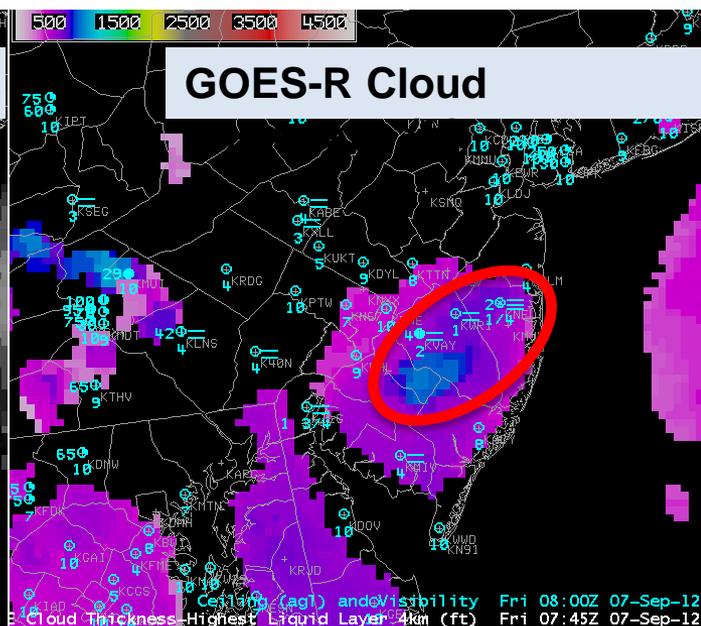
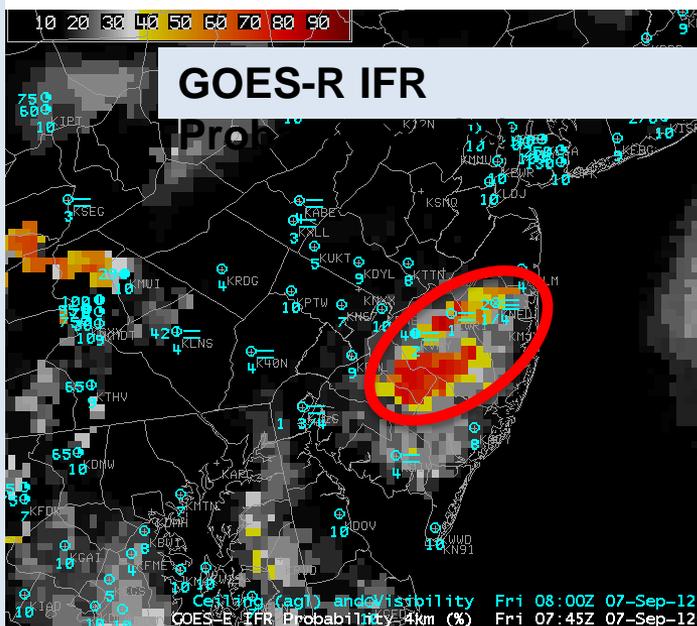


## AREA FORECAST

## DISCUSSION

NWS MOUNT HOLLY NJ  
347 AM EDT (7:47 GMT) THU  
SEP 7 2012

**.NEAR TERM /UNTIL 6 PM THIS EVENING/...**  
WORTHWHILE FOG HAS NOT BEEN DEVELOPING OVERNIGHT. STEPPING OUTSIDE WHILE IT IS CONSIDERABLY MURKIER THAN LAST NIGHT, ITS AS IF THE DEW DEPOSITION (WHICH IS QUITE HEAVIER) IS TAKING AWAY FROM THE FOG. **GEOCAT IFR PROBS REMAIN LOW.** WE STILL HAVE A COUPLE OF MORE HOURS TO GO, WE WILL JUST KEEP THE MENTION OF SOME PATCHY/AREAS OF FOG IN THE GRIDS, BUT STOP THERE.



**The GOES-R AWG(GEOCAT) products were used to determine that widespread fog was not developing as**



originally expected

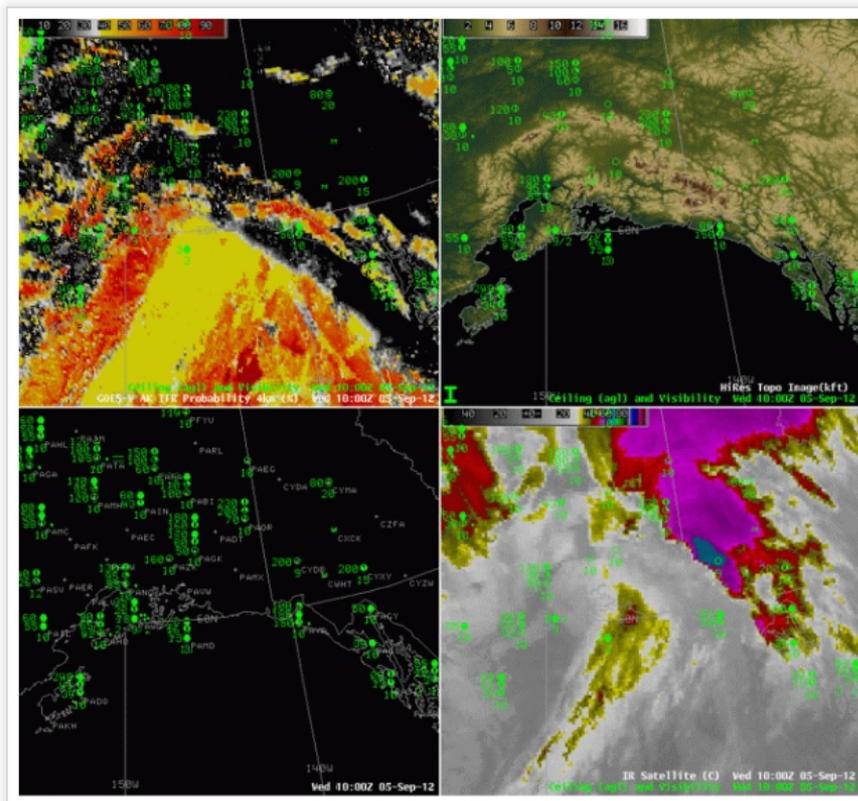


## GOES-R Fog Product Examples

SEP

5

## IFR Probabilities during an extratropical cyclone in the Gulf of Alaska



GOES-R IFR Probabilities (Upper left), Color-enhanced Topography (Upper right), Surface Observations and ceilings (Lower Left), Enhanced 10.7 imagery (Lower right)

Oceanic storms will generate IFR conditions, and the GOES-R IFR Probability fields, a fused product that blends satellite and model information, provides an indication of how and when visibilities decrease. The animation above, at hourly intervals, shows the steady advance of higher IFR probabilities eastward through the Gulf of Alaska. Note how the observations at Middleton Island (PAMD) and at Yalutai (PAYA) both transition to IFR conditions as the 'front' of higher probabilities passes -- around 0700 UTC at PAMD and around 1300 UTC at PAYA.

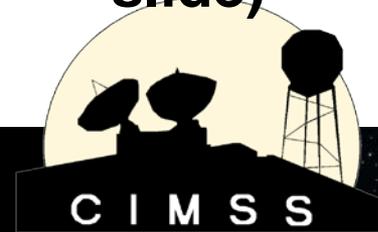
New blog for GOES-R Fog/Lo  
Stratus training:

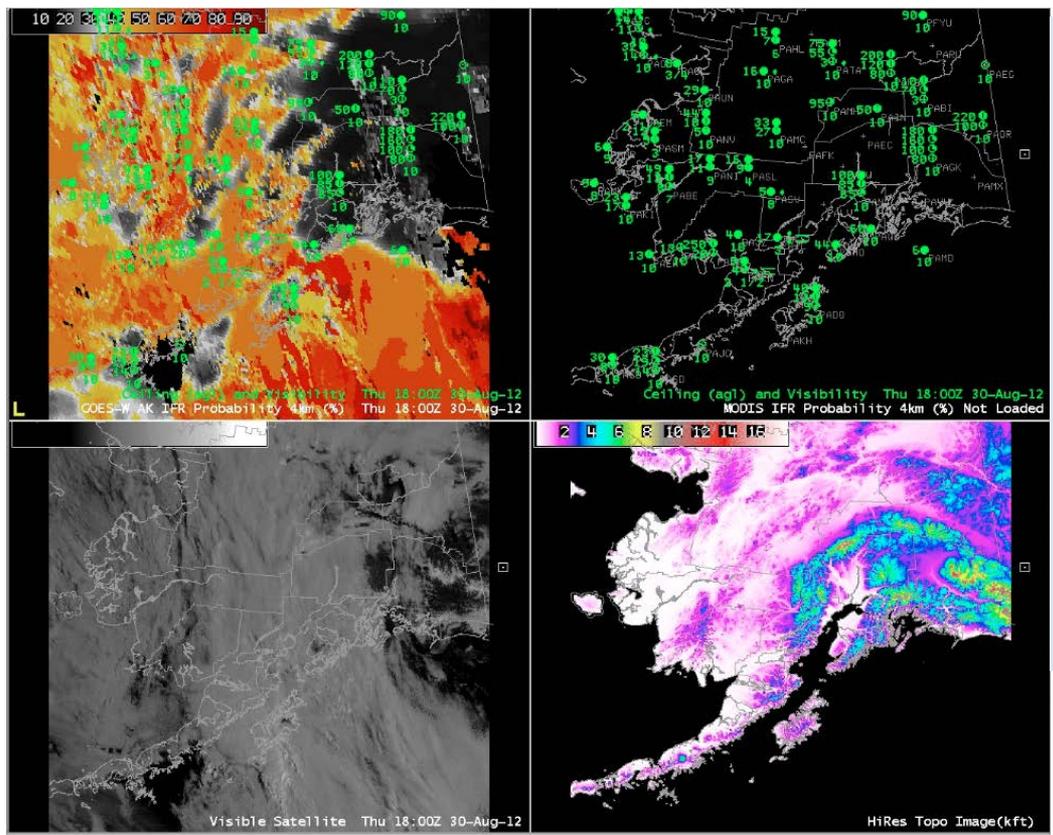
<http://fusedfog.blogspot.com>

Started 7/11/2012  
3500 page views  
41 posts

## 4) Alaska/AAWU/High Latitude Testbed

- **Volcanic ash, SO<sub>2</sub>, Fog/low cloud, Cloud top phase, Cloud type products have been available in AWIPS at all WFO's in AK and at the AAWU since January 2011**
- **Automated ash cloud alerts from AVHRR and MODIS will be provided to the VAAC and CWSU later this summer.**
- **GOES-R Volcanic Ash product feedback continues as events warrant—including brief 19-20 June 2012 Cleveland eruption.**
- **VIIRS NetCDF files verified to be AWIPSII compatible**
- **VIIRS VISIT NWS training module under development**
- **Polar2grid tool being expanded for GEOCAT AK products**
- **Mike Pavolonis and Corey Calvert currently in Alaska (next slide)**





- An updated fog/low cloud training module in PowerPoint and VisitView formats is now available
- A live training session with the NWS Central Region was conducted (July 24, 2012)
- WFO's from every region (sans Pacific) are currently evaluating the products
- Rapid Refresh (11 km) data are now being used over Alaska.

- M. Pavolonis and C. Calvert will conduct in-person forecaster training from 9/10 – 9/14 in Fairbanks and Anchorage
- Training will cover GOES-R AWG fog/low cloud products and AWG volcanic ash products



## Satellite Liaison: Roy Huff

- **UW-CTC, Morphed Total Precipitable Water, and Overshooting-top decision support products are now available at NWS Honolulu AWIPS platforms**
- **Jordan Gerth visited U of Hawaii, Honolulu NWS, and Pacific Region offices from July 23 – August 3 to integrate Roy's ADAM computer and ready infrastructure for new DB Antenna installation**
- **DB antenna was installed 9 August 2012**
- **Volcanic ash and SO<sub>2</sub> (from MODIS) will be made available Jan – Mar 2013**
- **UW-CIMSS satellite applications “Boot Camp” delayed until August 2013**



## Satellite Liaison: Michael Folmer

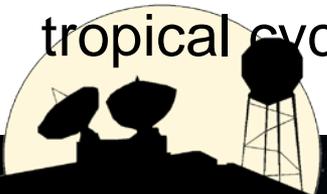
- **UW-CIMSS providing Overshooting-Top/Enhanced-V products (same methods as SPC delivery), N-AWIPS displayed at OPC**
- **Request for Nearcasting product for evaluation**
- **Cloud top height, phase, and temperature from GOES imager are in progress for display within N-AWIPS and AWIPS**
- **Most of the tasks above are driven by NCEP move to new building according the Mike Folmer**
- **GOES-14 one minute mode**



- **Overarching Goal:** Demonstrate selected GOES-R surrogate tropical products in real-time to identified users/forecasters and receive feedback
- **Who:** -- National Hurricane Center (NHC)  
-- Tropical Analysis and Forecast Branch (TAFB) -- Ocean Prediction Center/Hydrometeorological Prediction Center/Satellite Analysis Branch (OPC/HPC/SAB)
- **When:** -- August 1 - November 30, 2012  
-- On-site (NHC) training to be provided July 31
- **What:** 3 sat products provided by CIMSS (Atlantic basin), GOES-14 one-minute



- ***Hurricane Intensity Estimate (HIE) Algorithm***  
Calculates tropical cyclone intensity (MSLP and max surface wind) objectively from proxy ABI IR-window channel imagery.
- ***Tropical Overshooting Tops (TOTs)***  
Employs IR-window channel imagery to identify convective protrusions above cumulonimbus anvils associated with very strong tropical convection updrafts, which can be related to tropical cyclone formation and intensification. Could also be important for marine and aviation applications.
- ***Saharan Air Layer (SAL) Product***  
Uses a split window (10.8 and 12.0  $\mu\text{m}$ ) algorithm to identify and track dusty dry air masses (SAL), which can negatively impact tropical cyclone activity.





# NHC Feedback

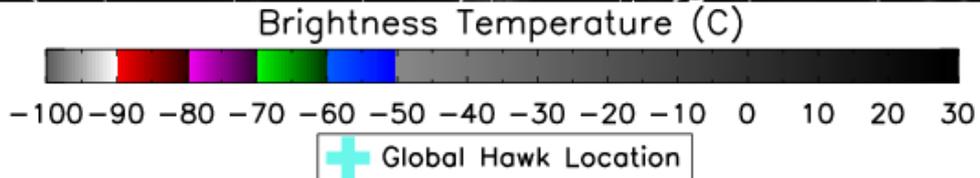
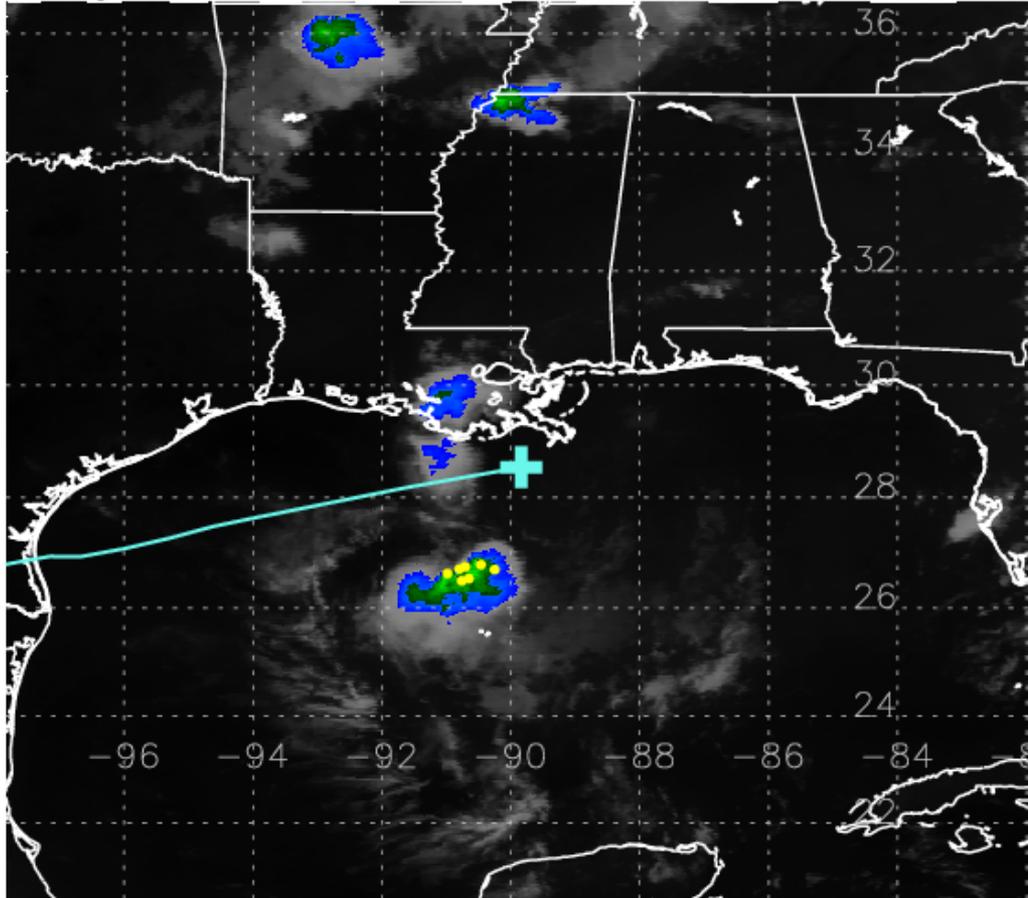


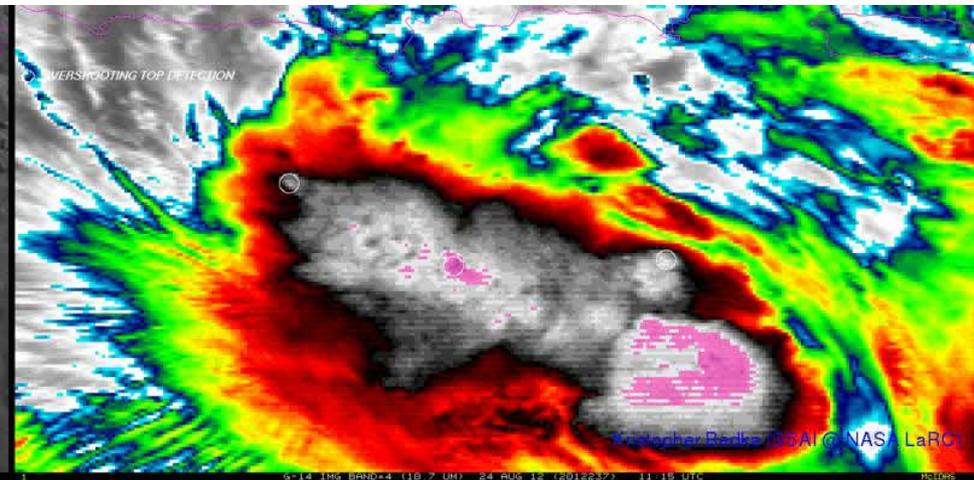
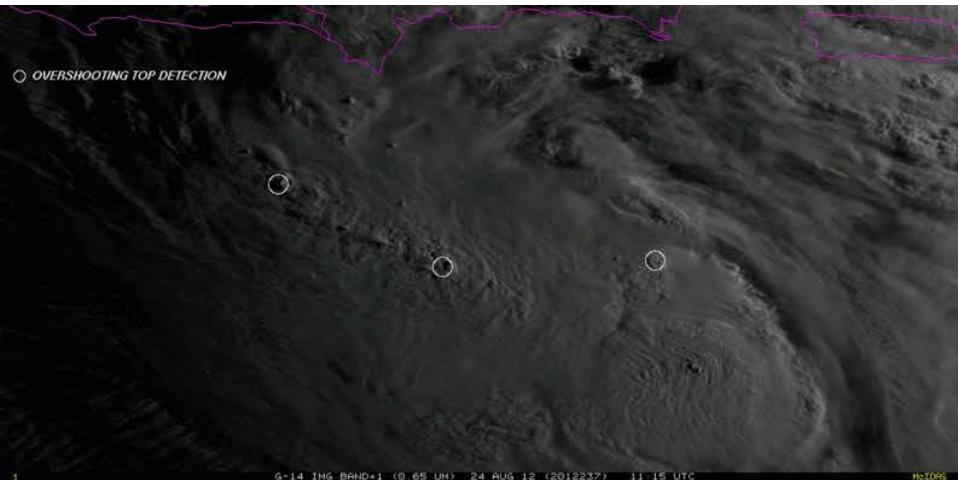
**HURRICANE MICHAEL DISCUSSION NUMBER 13  
NWS NATIONAL HURRICANE CENTER MIAMI FL AL132012  
500 AM AST THU SEP 06 2012**

**MICHAEL HAS CONTINUED TO INTENSIFY OVER THE PAST SEVERAL HOURS WITH THE EYE BECOMING WARMER AND THE EYEWALL CONVECTION STAYING STRONG. WHILE SUBJECTIVE SATELLITE ESTIMATES WERE NEAR 90 KT AT 0600 UTC...OBJECTIVE ESTIMATES FROM ADT AND THE *GOES-R HIE* PRODUCT HAVE RECENTLY BEEN BETWEEN 107 AND 110 KT. A BLEND OF THESE DATA GIVE AN INITIAL WIND SPEED OF 100 KT...MAKING MICHAEL THE FIRST MAJOR HURRICANE...CATEGORY THREE OR HIGHER...OF THE SEASON.**



IR Image and 3-h TOTs for Global Hawk: 20120907 at 0215 UTC







## 8) NWS WFO Demonstrations



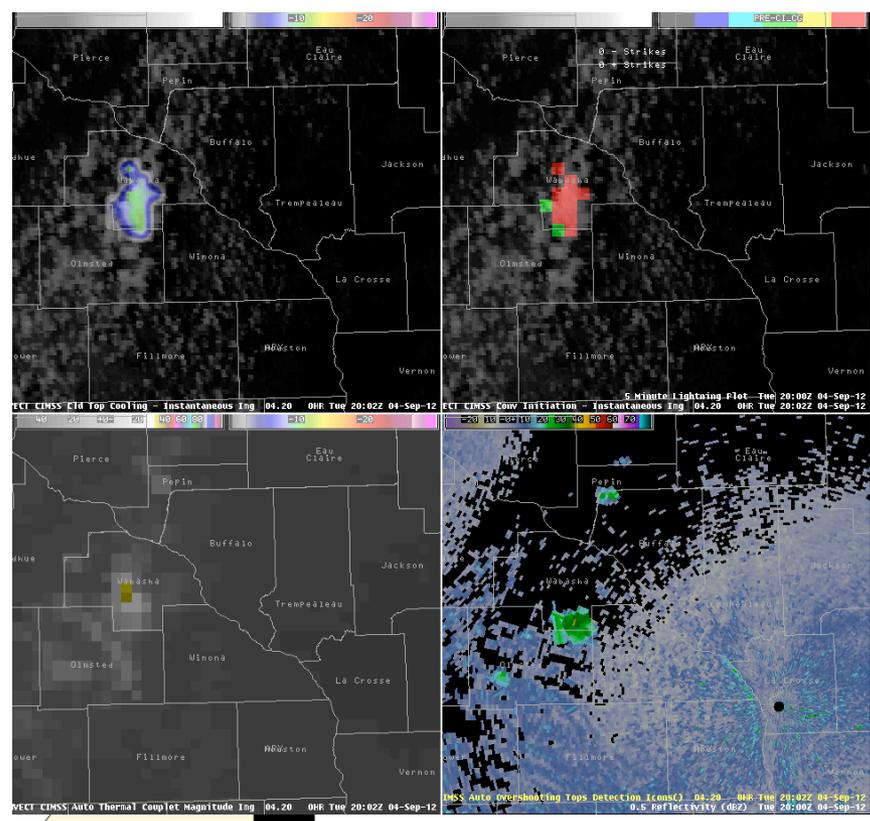
- **Third year!**
- **CIMSS GOES-R Local Area Demonstration with MKX in progress (began mid June and will continue through mid November)**
- **CIMSS staff are participating approximately every other Tuesday**
- **VIIRS Night-Day band has been made available for evaluation**
- **Forecasters are evaluating: UW-CTCR improvements, Nearcasting, Low Cloud/Fog, VIIRS imagery, and WRF Synthetic ABI bands**
- **Evaluation is recorded through posts on GOES-R HWT blog site**
- **Scott Lindstrom provided CTC and Fog/Low Stratus products training forecasters at State College, PA NWS office**



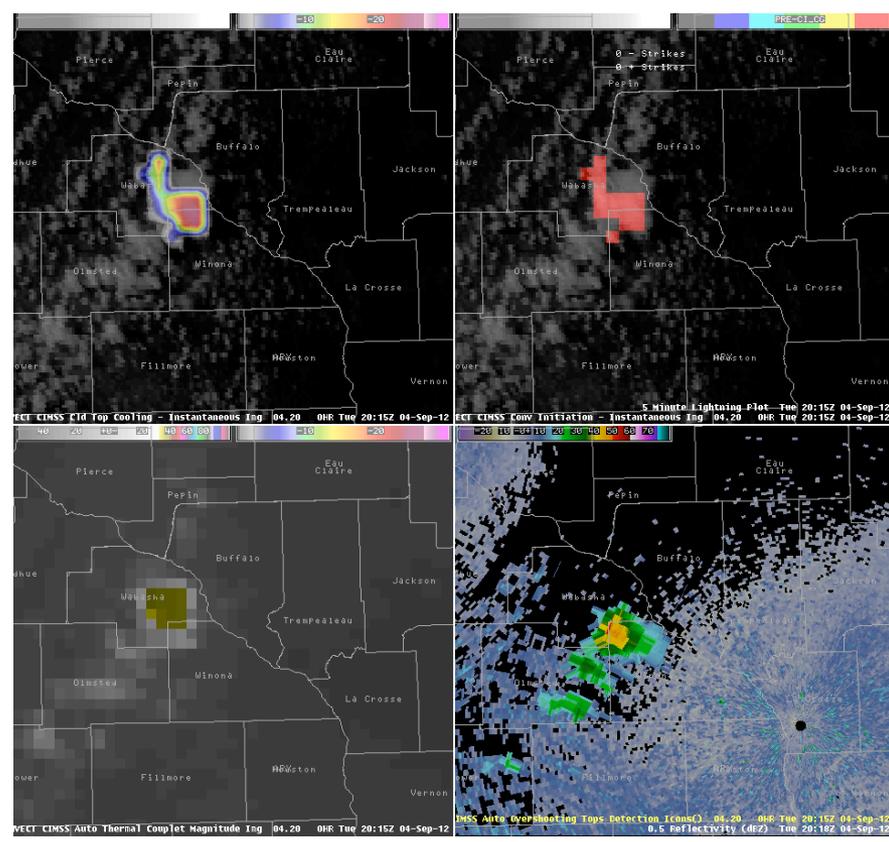
## Last week's KMKX evaluation of UW-CTC

- "Today's severe thunderstorm warnings were preceded by cloud top cooling rates of around 30 degrees Celsius per 15 minutes -- around 30 minutes before warnings were actually issued!"
- "It was exciting to see the performance of this algorithm in real-time." - J.J. Wood, General Forecaster, Milwaukee/Sullivan WFO

### 20:00 UTC S. Minnesota



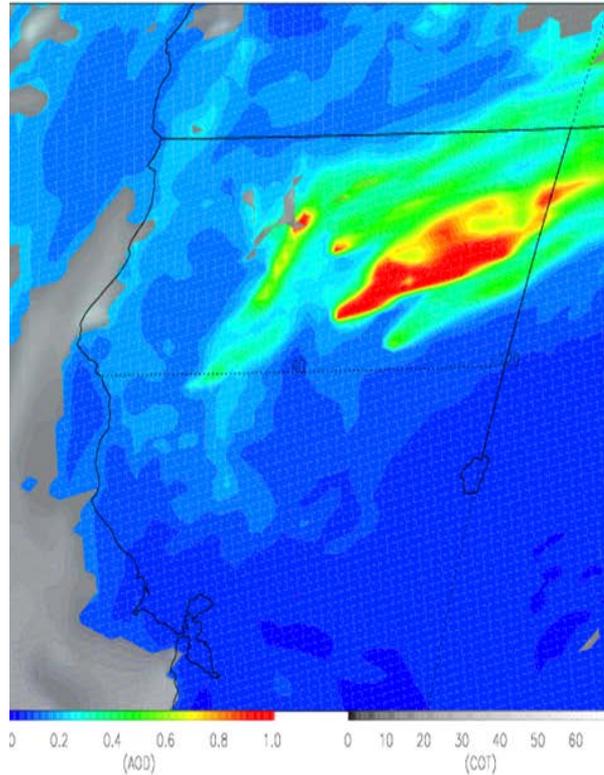
### 20:15 UTC



## Real-time Proxy Framework Support: WRF-Chem/RAQMS Component

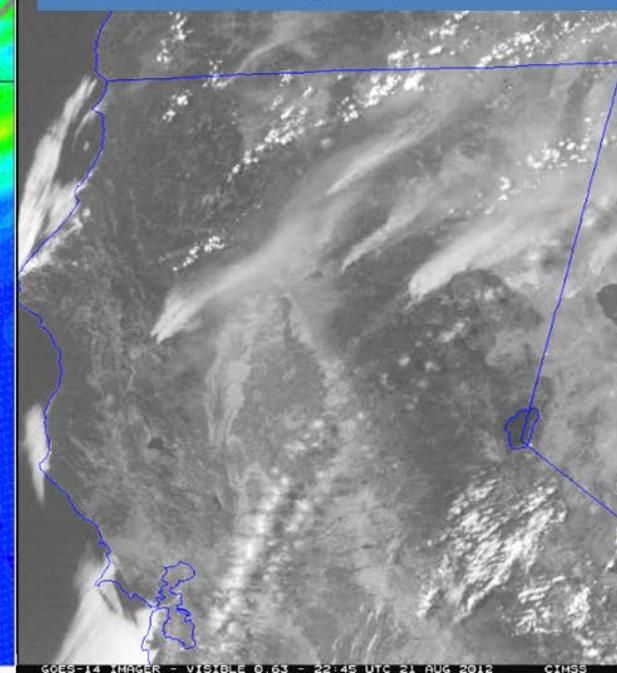
- Nested RAQMS/WRF-CHEM aerosol simulations are now being produced in real-time to support GOES-R Proxy Framework
- GOES-R Proxy aerosol optical depth (AOD) simulation captures observed smoke due to wildfires in Northern California

RAQMS/WRF-CHEM 8km Real-time GOES-R AWG Proxy simulation 23Z August 21, 2012



Real-time Proxy AOD/COT (left) and GOES-14 visible image (right) of August 21, 2012 Northern California Wildfires

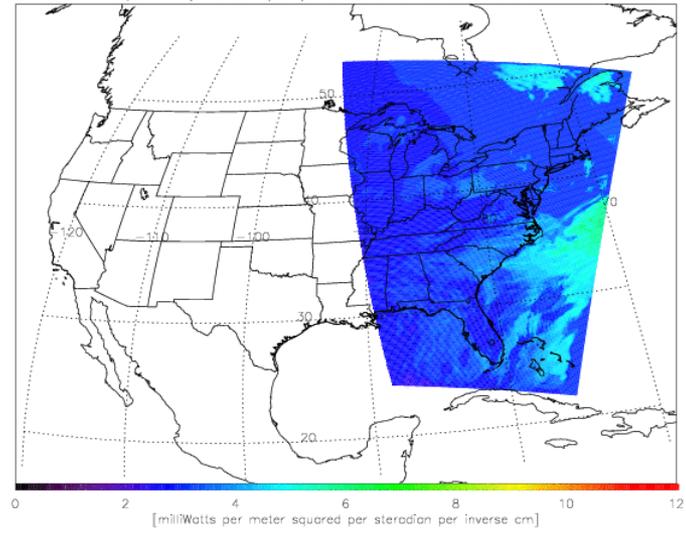
McIDAS images of GOES-14 1-minute interval Super Rapid Scan Operations for GOES-R (SRSOR) 0.63micron 22:45Z August 21, 2012



GOES-14 IMAGER - VISIBLE 0.63 - 22:45 UTC 21 AUG 2012 CIMSS

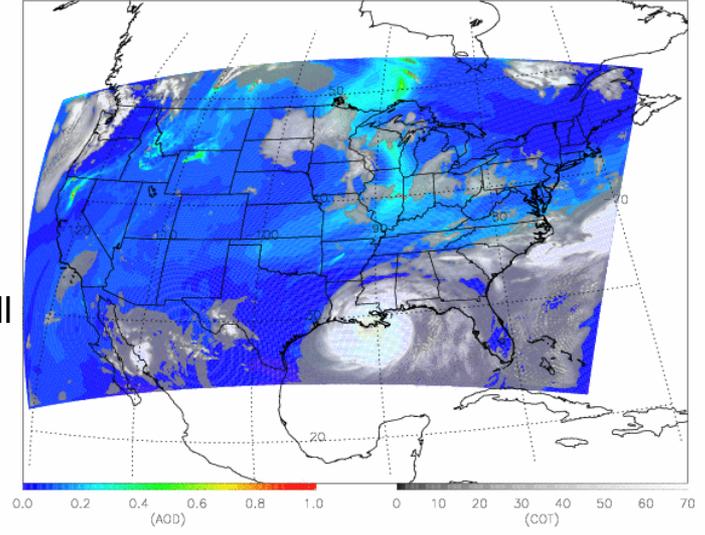
**GOES-R Proxy Framework supports GOES-R ABI pre-launch activities by providing real-time GOES Rebroadcast (GRB) files containing synthetic ABI radiances that will be distributed to AIT and Proving Ground partners for testing GOES-R algorithms and data systems in real-time.**

CIMSS 8km WRF-CHEM/CRTM (RAQMS IC/BC) ABI\_radiance\_band\_01 2012.08.29.120000\_CRTM\_V2.04



Real-time Proxy  
AOD/COT (right) and  
Simulated ABI Band 01  
Radiance (left) for  
August 29-30, 2012  
Hurricane Isaac Landfall

CIMSS 8km WRF-CHEM (RAQMS IC/BC) AOD 2012-08-29\_12:00:00

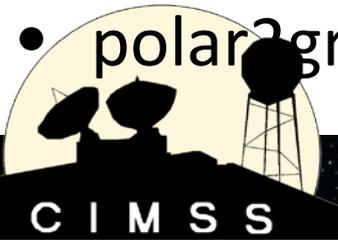


## Real-time Proxy Framework Support: Real-time Proxy Framework Support: CRTM and Validation Component

- CRTM is being used to produce all ABI Bands in real-time to support GOES-R Proxy Framework
- Real-time geophysical validation using MODIS AOD/COT is currently being tested.
- Real-time radiance validation using GOES visible and IR bands is currently under development

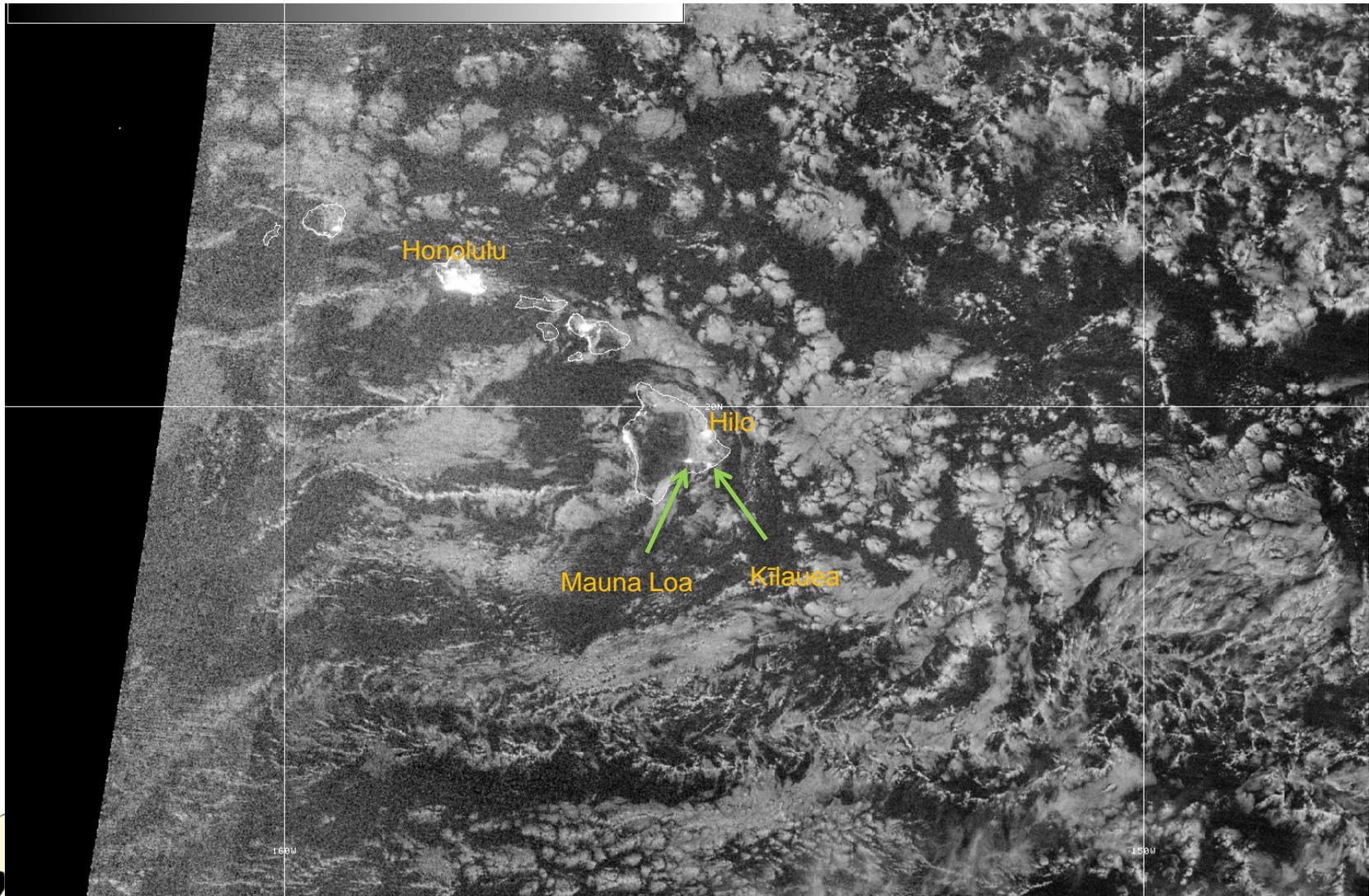
**GOES-R Proxy Framework supports GOES-R ABI pre-launch activities by providing real-time GOES Rebroadcast (GRB) files containing synthetic ABI radiances that will be distributed to AIT and Proving Ground partners for testing GOES-R algorithms and data systems in real-time.**

- CIMSS installed Community Satellite Processing Package (CSPP) software in Hawaii to process DB data to SDRs
- VIIRS Hawaii DB data converted to NetCDF files using polar2grid tool for AWIPS display
- Forecasters in Hawaii now receiving VIIRS imagery in near-real time
- SSEC also providing VIIRS in AWIPS to MKX WFO and Central Region
- VIIRS NetCDF files verified to be AWIPSII compatible
- VIIRS VISIT NWS training module under development
- polar2grid tool being expanded for GEOCAT AK products



# Hawaii VIIRS data in AWIPS

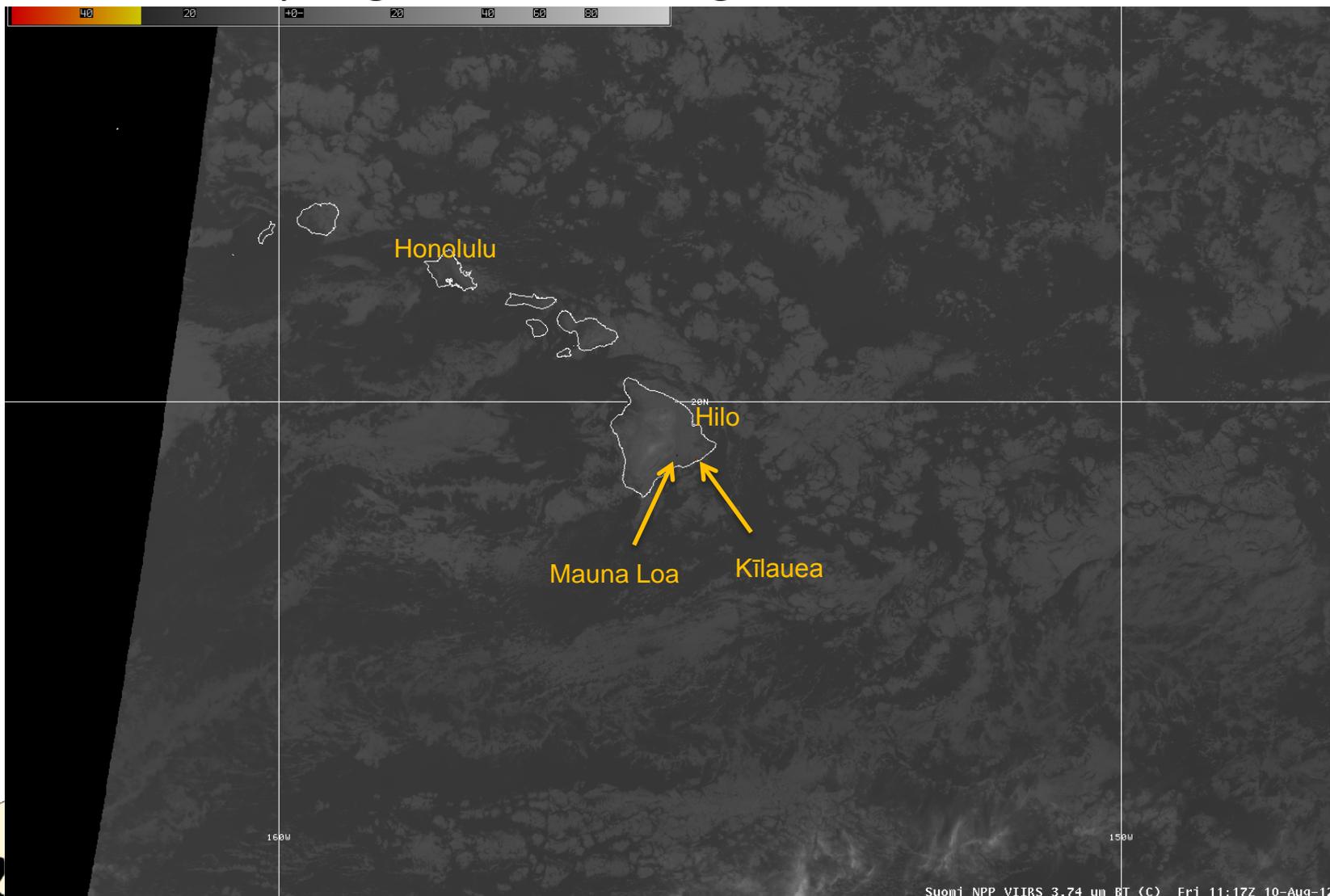
Day/Night Band 10 August 2012 11:17 UTC



Lunar illumination means you can see all cloud levels at night at high spatial resolution. Emitting city lights and lava can also be seen.

# Hawaii VIIRS data in AWIPS

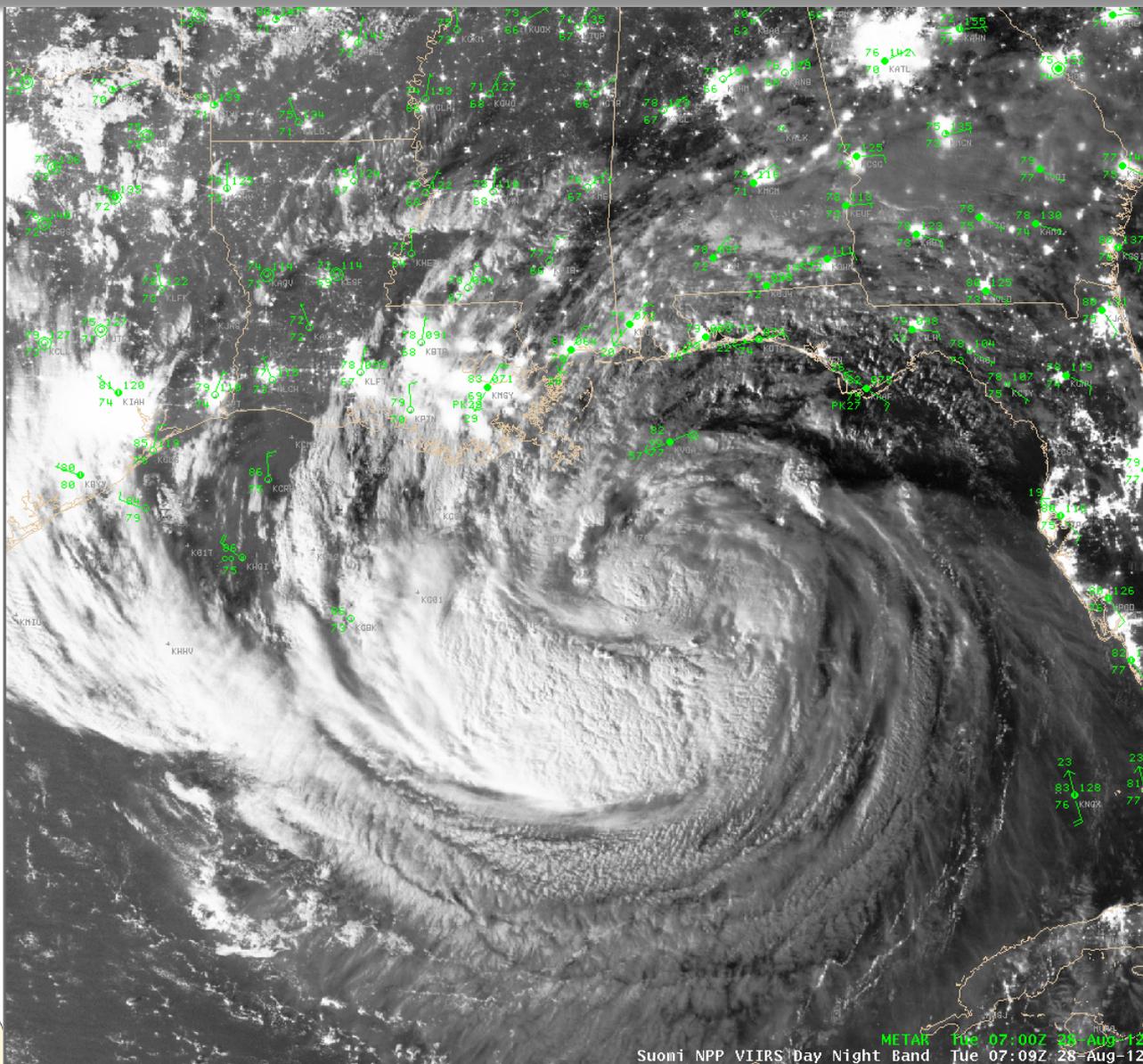
Day/Night Band 10 August 2012 11:17 UTC



Suomi NPP VIIRS 3.74 um BT (C) Fri 11:17Z 10-Aug-12

Small hot spots can be readily identified in the 4 micron imagery.

VIIRS  
Day/Night  
Band view  
of Hurricane  
Isaac in



A unique  
visible  
look at a  
Hurricane  
at night

07:09 UTC  
28 Aug 2012

Data captured and  
processed in  
real-time at the  
University of  
Wisconsin-Madison  
Space Science and  
Engineering Center  
using CSPP  
Software



- **Recent Work:**

- Continued to use git repository for troubleshooting code issues but recent commits do not fully compile
- Worked with Eric Lau (PBP) to submit multiple tickets related to default satellite and map display behavior on Pacific Region scales during July visit
- Ticket related to memory error involving Hawaii National Mercator sector polar imagery on 1 km grid has been resolved by Raytheon but heap space memory issues remain and high-resolution satellite ingest capabilities continue to be limited
- Modified textlightning exchange plug-in for Pacific Region to display additional lightning information from WWLLN
- Installed AWIPS II and LDM on Roy's ADAM, fed with subset of operational data due to low bandwidth at SBN ingest site in Ewa Beach



- **Short-term priorities**
  - **Document FLS and CTCR ingest and display for WFO sites**
    - **FLS on hold due to OB12.9 Raytheon code change which introduced error into netCDF3 plug-in, inhibiting ingest into data store**
    - **PBP attempted code fix which failed; test cannot be conducted at CIMSS because fully built OB12.9/12.10 release unavailable from NWS OST**
  - **Expand suite of Hawaii DB antenna products into AWIPS II at HFO**
    - **Expect to coordinate December visit with Eric and Roy**
  - **Continue to work on resolving AWIPS II issues with NWS Sullivan**
    - **AWIPS II will likely not be used operationally there until 2013**

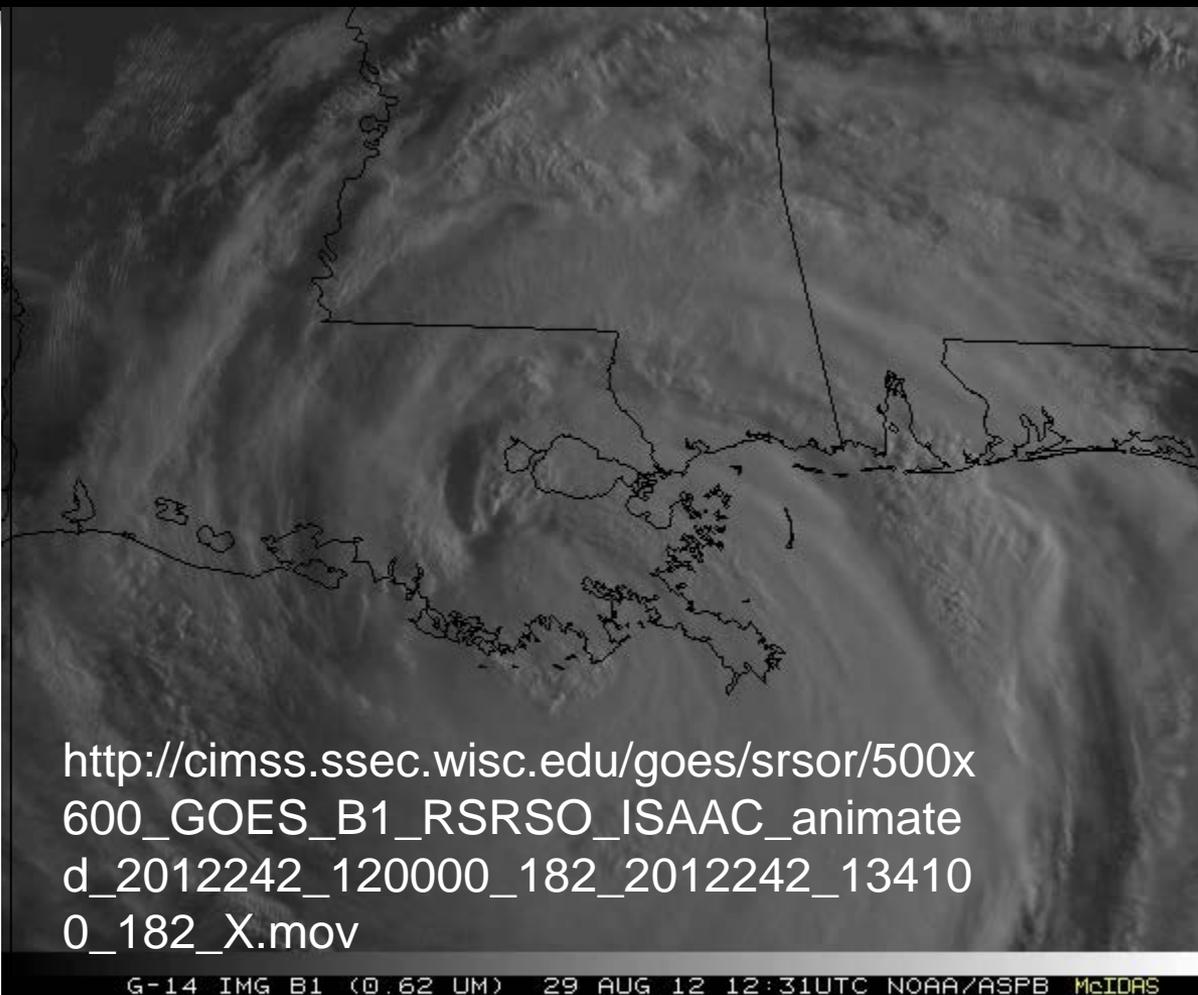




# GOES-14 in Special Rapid Scan mode



- Operating GOES-14 while out of storage.
- Worked with OSPO to define schedules
- Deciding on daily location for scanning between mid-August and end of October
- Posting many animations
- [http://cimss.ssec.wisc.edu/goes/srsor/GOES-14\\_SRSOR.html](http://cimss.ssec.wisc.edu/goes/srsor/GOES-14_SRSOR.html)
- Many phenomena were observed: convection, hurricanes, fires, smoke, etc.,
- Data to many groups HPC, OPC, AWC, SPC, etc.



*Animation from GOES-14 Imager water at 1-min time resolution.  
(click to loop)*

**GOES-14 is now providing very unique information and offers a glimpse into the possibilities that will be provided by the ABI on GOES-R.**

- **2012**

- NWA 6-12 October Madison, WI
- AGU (Geo Satellite) 3-7 December San Francisco, CA

- **2013**

- AMS Annual Meeting 6–10 January Austin, TX
- High Impact WX 6-8 February Norman, OK
- Virtual Science Week 17-23 March Telcon
- DRC/GUC 8-12 April College Park, MD
- O-CONUS 17-21 June Fairbanks, Alaska
- EUMETSAT/AMS 16-20 Sept Vienna, Austria
  - [http://www.eumetsat.int/Home/Main/News/Conferences\\_and\\_Events/820209?l=en](http://www.eumetsat.int/Home/Main/News/Conferences_and_Events/820209?l=en)