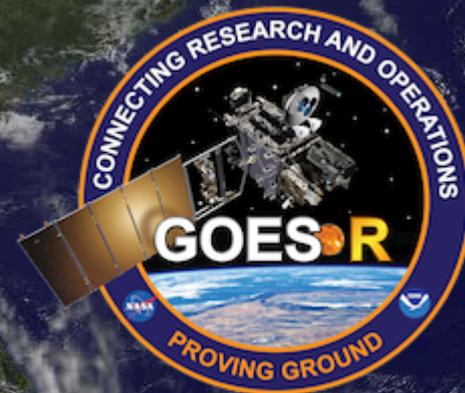


# GOES-R/JPSS Program



## 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 and Chris Schmidt

September 9, 2013





- Demonstration of Satellite PG applications at National Center Testbeds/Demonstrations and NWS WFO
- AWIPS-2 status
- Training
- SRSOR from GOES-14
- Upcoming meetings/conferences



## Satellite Liaison: Bill Line

- **HWT Products:**
  - Simulated Cloud and Moisture Imagery (Otkin/Sieglaff/Lindsey – CIMSS/CIRA)
  - NearCast Model (Petersen/Line - CIMSS)
  - Cloud Top Cooling (Sieglaff/Feltz – CIMSS)
- **Product demonstrations in SPC are starting. SPC Products:**
  - NearCast Model
  - Cloud Top Cooling
  - Overshooting Tops
  - SRSOR (in August)
- **Continue streamlining formats for AWIPS-2**
- **Future planning will be coordinated with new liaison**
  - Spring 2014 HWT plans
  - Hydrological/Fire Testbed in future?
- **UW-Madison satellite applications “Boot Camp” was held 8-19 July 2013: Bill Line, Amanda Terborg, Chad Gravelle, and Michael Folmer were present**

### Satellite Liaison: Amanda Terborg

- **Aviation Weather Testbed Summer Demo: August 12 – 23, 2013**

- WRF Simulated ABI Imagery
- GOES Cloud Top Cooling
- GOES(-R) Overshooting Top and Tropical Overshooting Top
- Thermodynamic NearCasting
- GOES-14 imager SRSO one minute mode imagery, CTC, and OT were available for testbed
- GOES-R proxy cloud top heights/temperature (ACHA) for GOES East/West

- **CIMSS participants**

- 12-16 August Justin Sieglaff
- 19-21 August Wayne Feltz
- Forecaster feedback/examples are available

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



**GOES-14 SRSOR (1-min data)**

**GOES-14 using routine GOES-E scans**

**UW-Cloud Top Cooling algorithm output using 1-min GOES-14 data**

- **UW-CTC signal begins sooner using 1-min data versus GOES-E routine scanning pattern (RO)**
- **Most intense UW-CTC signal is always captured using 1-min data compared to GOES-E RO**
- **Near-real time processing kept up with 1-min GOES data rates**





# 3) NWS Operations PG and WFO Interactions



## Satellite Liaison: Chad Gravelle

- Continued coordination of GOES-R Fog/Low Stratus products into operations (West Coast evaluation with SEW, EKA, LOX, and MTR ends October 1).
- Central Region NWS Fog and Low Stratus report approved by SDEB.
- Convective Cloud-Top Cooling (part of “convective-initiation toolbox”) evaluation with CR (12 WFOs) and ER (2 WFOs) began in June.
- Assisted in distributing VIIRS bands (including DNB) to local WFO, Monterey and Louisville, and now available to MKX, MTR, LMK, and the AK WFOs.
- Began process of streamlining AWIPS 1 and 2 product instructions for WFOs.
- Working with NWS Operations PG regarding GOES-R products and how they relate to ongoing GOES-R PG activities.
- Presentations at NWA in Charleston: Tampa Bay FLS Case and Using GOES-R Products to Bridge the Gap Between Convective Watches and Warnings



- **Automated ash cloud alerts from AVHRR and MODIS will be provided to the VAAC and CWSU soon (training needs to be updated first).**
- **VIIRS NetCDF files verified to be AWIPSII compatible**
- **VIIRS VISIT NWS training module under development**
- **Polar2grid tool expansion for GEOCAT AK/CONUS nearly complete – testing soon**
- **Participated in OCONUS meeting 17-21 June 2013:**
  - **CIMSS: Wayne Feltz, Jordan Gerth, Ralph Petersen, Liam Gumley**
  - **NOAA ASPB: Jeff Key and Mike Pavolonis**



# 5) Pacific Region/Hawaii Demonstrations



- Liam Gumley, Kathy Strabala and Jordan Gerth taught a MODIS/VIIRS direct broadcast application workshop at the University of Hawaii - Manoa Campus 20-23 August 2013.
- 20+ students attended including NWS and JTWC personnel as well as UH graduate students
- Course consisted of morning lectures and hands-on afternoon labs, culminating in student presentations on the last day
- Goal of the course is to:
  - Make users aware of the products that are available from the MODIS/VIIRS direct broadcast data from the NOAA HCC antenna
  - Teach users about the instruments, spectral bands as well as principles of remote sensing
  - Give examples of specific MODIS and VIIRS Hawaii environmental applications
  - Foster the use of satellite data for local real-time applications





**Students working on a lab during the Hawaii VIIRS/MODIS direct broadcast application**





# 5) Pacific Region/Hawaii Demonstrations



- Jordan Gerth conducted other activities related to the GOES-R Proving Ground in Pacific Region after the workshop, including:
  - Identifying an alternate route to transmit data between Honolulu Community College and HFO once new NOAA security regulations require traffic to pass through a TIC node
  - Investigating interference in the Terra DB receiving frequency at the Honolulu Community College antenna site; FCC identifying government/military users in this band
  - Localizing/troubleshooting AWIPS at HFO to ingest/display MODIS imagery and products, lightning psuedo-reflectivity, and SPoRT QPE
  - Coordinating an N-Wave connection between IRC at Ford Island and Wisconsin





# Tropical Storm Flossie



TROPICAL STORM FLOSSIE DISCUSSION NUMBER 19

NWS CENTRAL PACIFIC HURRICANE CENTER HONOLULU HI EP062013

500 AM HST MON JUL 29 2013

THE CENTER OF FLOSSIE WAS HIDDEN BY HIGH CLOUDS MOST OF THE NIGHT BEFORE **VIRS NIGHTTIME VISUAL SATELLITE IMAGERY REVEALED AN EXPOSED LOW LEVEL CIRCULATION CENTER FARTHER NORTH THAN EXPECTED. WE RE-BESTED THE 0600 UTC POSITION BASED ON THE VISIBLE DATA.**

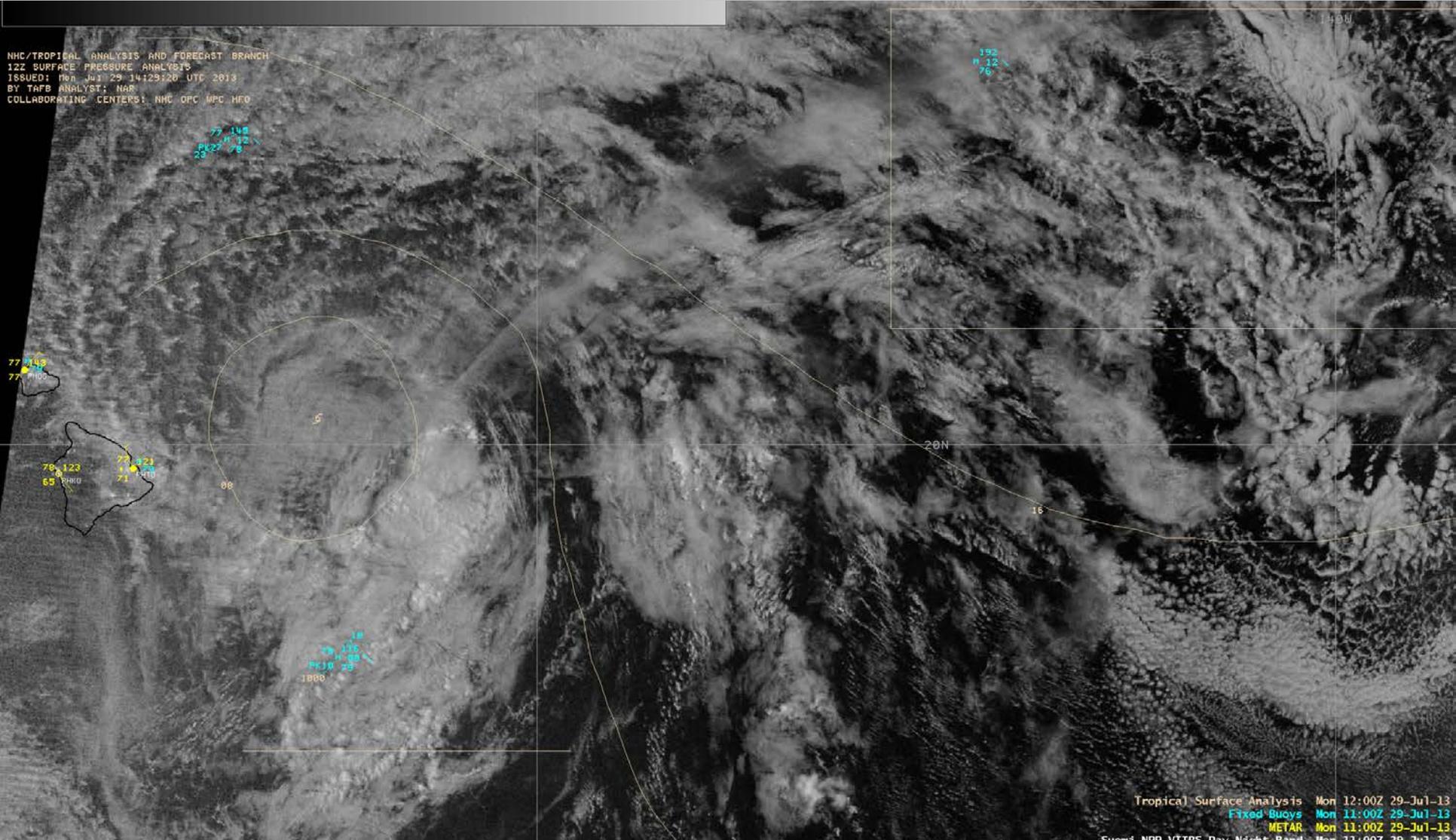
SUBJECTIVE DVORAK ANALYSES CONTINUED SHOW CURRENT INTENSITIES OF 3.0 BUT SATELLITE LOOPS SUGGEST A RAPID WEAKENING TREND WITH THE LOW LEVEL CENTER PULLING AWAY FROM A SMALL AREA OF CONVECTION SOUTHEAST OF THE CENTER. IT IS LIKELY THAT CONTINUED NORTHWEST SHEAR WILL MAINTAIN THIS WEAKENING TREND.

**THE TRACK HAS BEEN SHIFTED NORTH TO REFLECT THE RE-LOCATED CENTER.** THE TRACK GUIDANCE SHIFTED FOLLOWING THE TRACK CHANGE AND WAS CONSISTENT WITH A NEW TRACK FARTHER TO THE NORTH. THE TRACK NOW SHOWS FLOSSIE PASSING OVER MAUI TODAY...OVER OAHU TONIGHT...THEN PASSING SOUTH OF KAUAI EARLY TUESDAY MORNING. WE EXPECT FLOSSIE TO WEAKEN STEADILY AS IT TRACKS WEST NORTHWEST AND DISSIPATE WITHIN 96 HOURS.



# Tropical Storm Flossie

NHC/TROPICAL ANALYSIS AND FORECAST BRANCH  
12Z SURFACE PRESSURE ANALYSIS  
ISSUED: Mon Jul 29 14:29:20 UTC 2013  
BY TAFB ANALYST: NAR  
COLLABORATING CENTERS: NHC OPC MPC HFD



Tropical Surface Analysis Mon 12:00Z 29-Jul-13  
Fixed Buys Mon 11:00Z 29-Jul-13  
METAR Mon 11:00Z 29-Jul-13  
Suom1 NPP VIIRS Day Night Band Mon 11:00Z 29-Jul-13

AWIPS images of VIIRS IR and Day/Night Band

(Image credit: Scott Bachmeier)





# 6) Satellite Proving Ground for Marine, Precipitation, and Hazardous Weather Applications



## Satellite Liaison: Michael Folmer

- UW-CIMSS providing Overshooting-Top/Enhanced-V products (same methods as SPC delivery), N-AWIPS displayed at OPC, WPC, and SAB.
- Cloud top height and temperature from GOES imager are in progress for display within N-AWIPS and AWIPS
- Coordinated CIMSS GOES-R PG collaborations with 2013-2014 Satellite Proving Ground for Marine, Precipitation, and Hazardous Weather Applications demonstrations
- Other GOES-R PG decision support products requested within plan available once approved by NOAT governance process





# 7) NHC Proving Ground



- **UW-CIMSS Participants: C. Velden, S. Monette**
- **Also underway at same time is the NASA HS-3 (Global Hawks>>hurricane recon)**
- **UW-CIMSS is providing real-time observations from updated versions of the Hurricane Intensity Estimate (HIE) and Tropical Overshooting Tops (TOTs) products to both exercises.**
- **Also making extensive use of the GOES-R ACHA Cloud Top Height (CTH) estimation algorithm as part of hazard avoidance guidance in the HS3 field campaign.**



- **Tropical Overshooting (TOTs)**

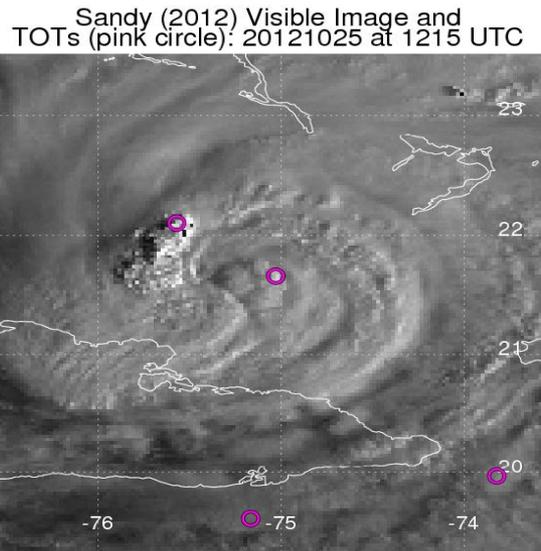
- Objectively identifies TOT locations using cold IR pixels relative to neighbors, and is tuned to isolate and quantify vigorous tropical convection, especially for tropical cyclone (TC) applications.

- Employs IR-W imagery from GOES and Meteosat.

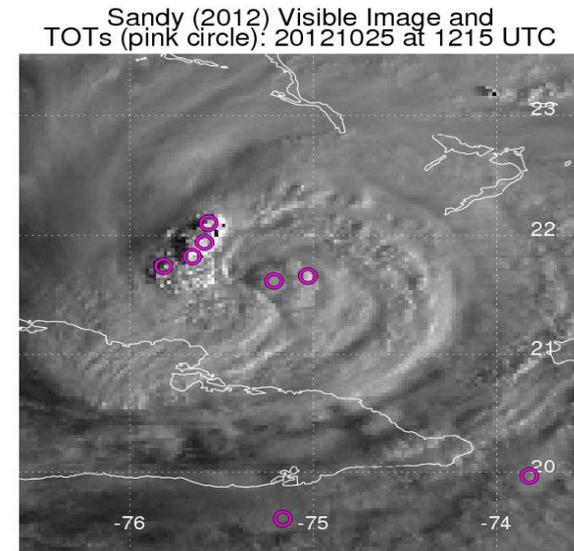
- **Algorithm updates based on feedback from 2012**

- Removal of false-alarm TOTs in TC cirrus outflow.
- Better identify TOTs in TC Central Dense Overcast (CDO). >>>

- Training was provided to NHC/TAFB in April to increase familiarity with the TOTs products.



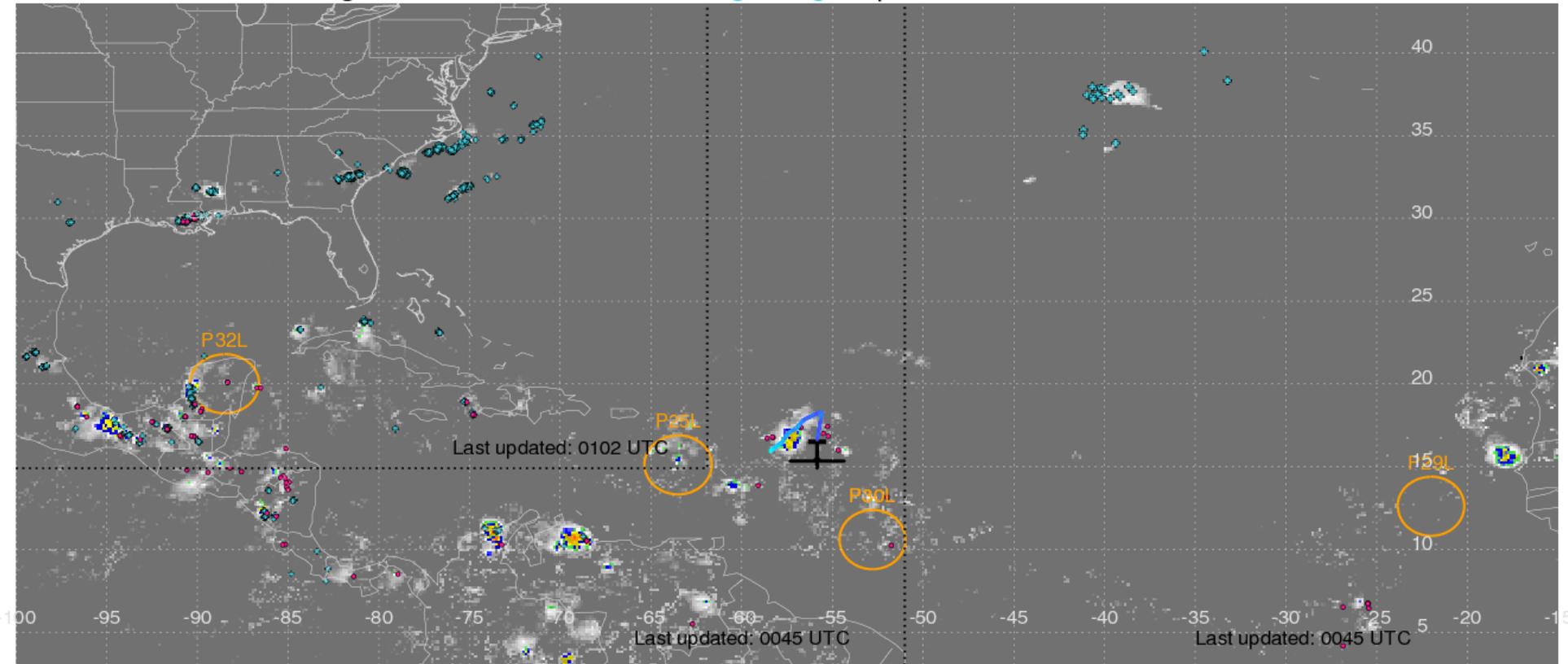
Original algorithm



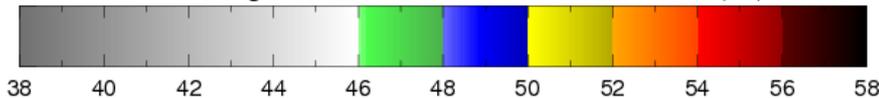
Updated algorithm

## Full Basin, Real-time GOES-R Proxy Cloud Top Heights, Tropical Overshooting Tops, and 15-min Lightning

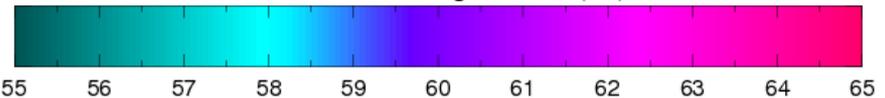
CTH Image, 1-h TOTS, and 15-min Lightning : Updated on 20130904 at 0114 UTC



Cloud Height in Pressure Altitude Coordinates (kft)



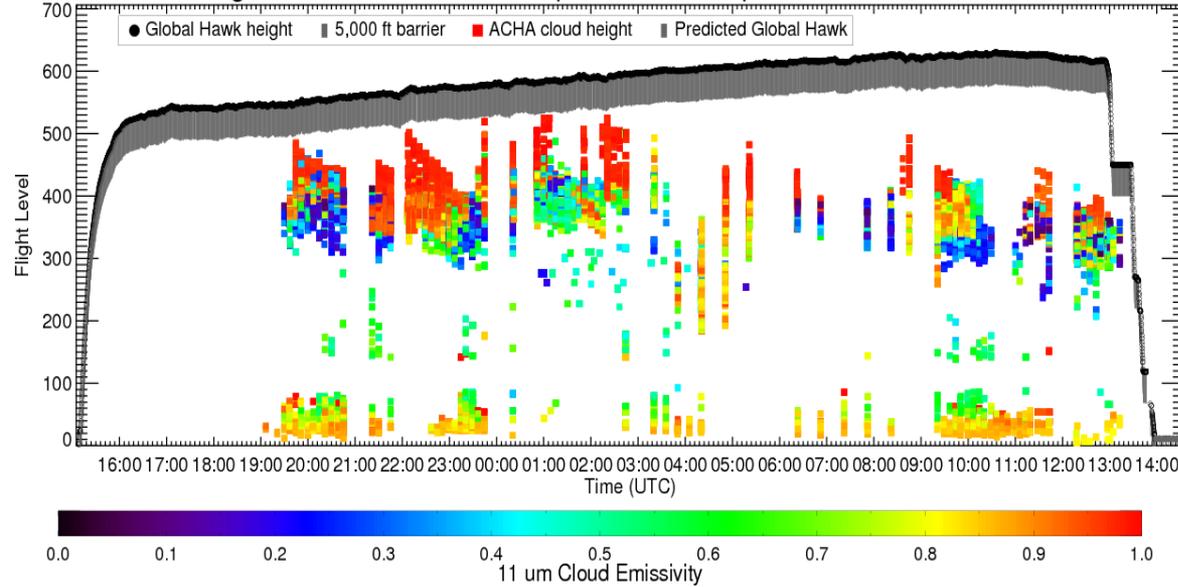
Global Hawk Flight Level (kft)



## Real-time hazard avoidance guidance for the Global Hawk missions

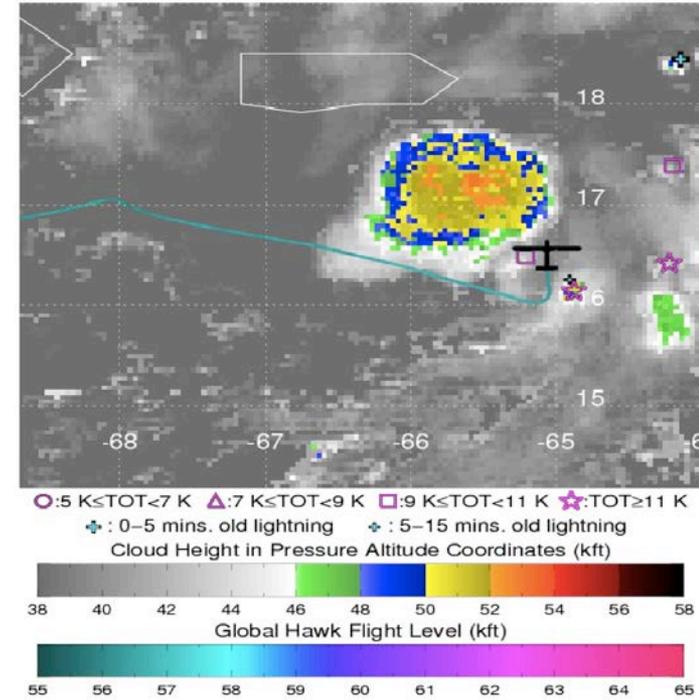
Global Hawks must clear “active” cloud tops with a 5,000 foot cushion.

ACHA cloud height and AV-6 altitude comparison: Last updated at 1514 UTC on 20130905



GOES-R Proxy Cloud Top Heights and emissivity along the Global Hawk current and predicted path, provided in real-time to NASA mission scientists and GH pilots.

Lightning & Global Hawk on 20130904 at 2152 UTC  
ACHA CTH & TOTs on 20130904 at 2140 UTC



Real-time CTH, Tots and lightning overlay displays are updated every 2 mins. and used to identify potential hazards.





# CIMSS/ASPB GOES-R ABI Real-time Proxy



## 2013 GOES-R PG Proxy activities (September 2013)

- 1. Provided forecasting support for airborne SNPP/METOP-B cal/val field mission (May 10-31, 2013). The primary objective of the mission was to collect cloud free radiance measurements from remote sensing instruments onboard the NASA ER2 during SNPP and METOP-B satellite overpasses in the vicinity of the Gulf of California.**
- 2. Investigating ways of getting our simulated ABI products into AWIPS II: short term goal will be to write IDL code and utilize the ms2gt subroutines for remapping our products into AWIPS II NetCDF files.**
- 3. Preparing data for a WES case focusing on 2013 Oklahoma tornado events: 6 products, including the RGB air-mass product, and the synthetic radiance/reflectance imagery, for the period of 20-29 May, 2013.**
- 4. Continuing validation of proxy ABI RGB air-mass product using RGB air-mass images generated from co-located GOES-E Sounder brightness temperatures.**



## Real-time Proxy

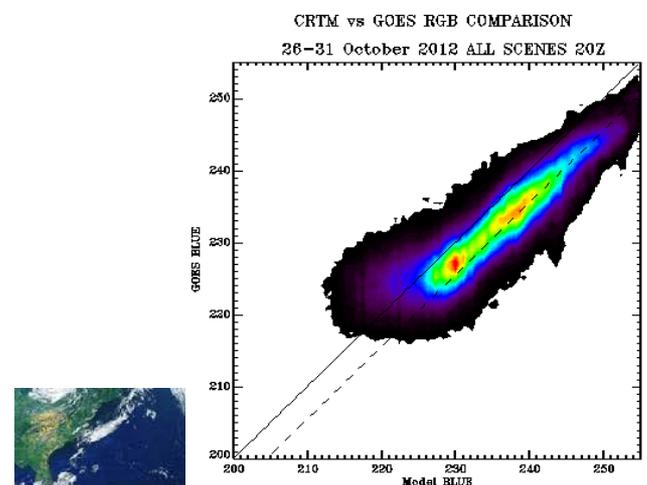
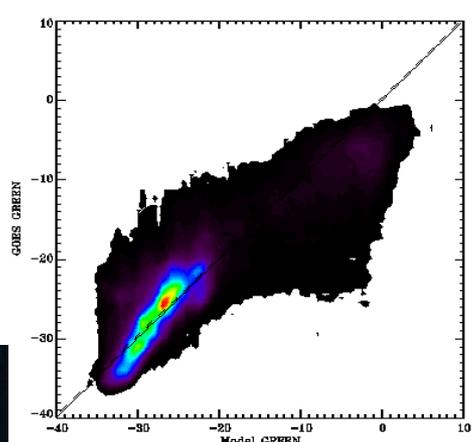
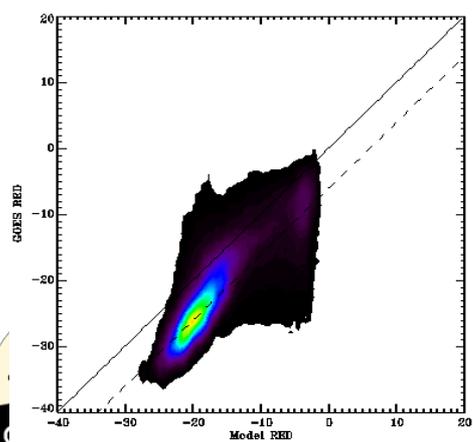
### Calculation

SSEC/CIMSS  
WRF-CHEM/CRTM ABI Airmass RGB 2012/10/30 20:00 UTC

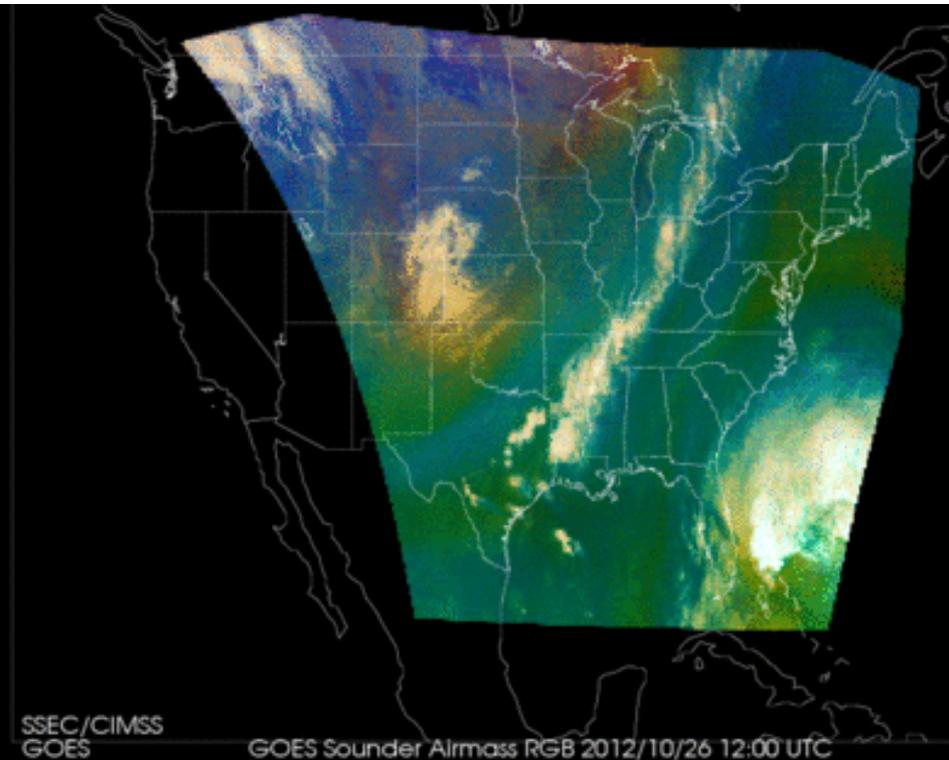
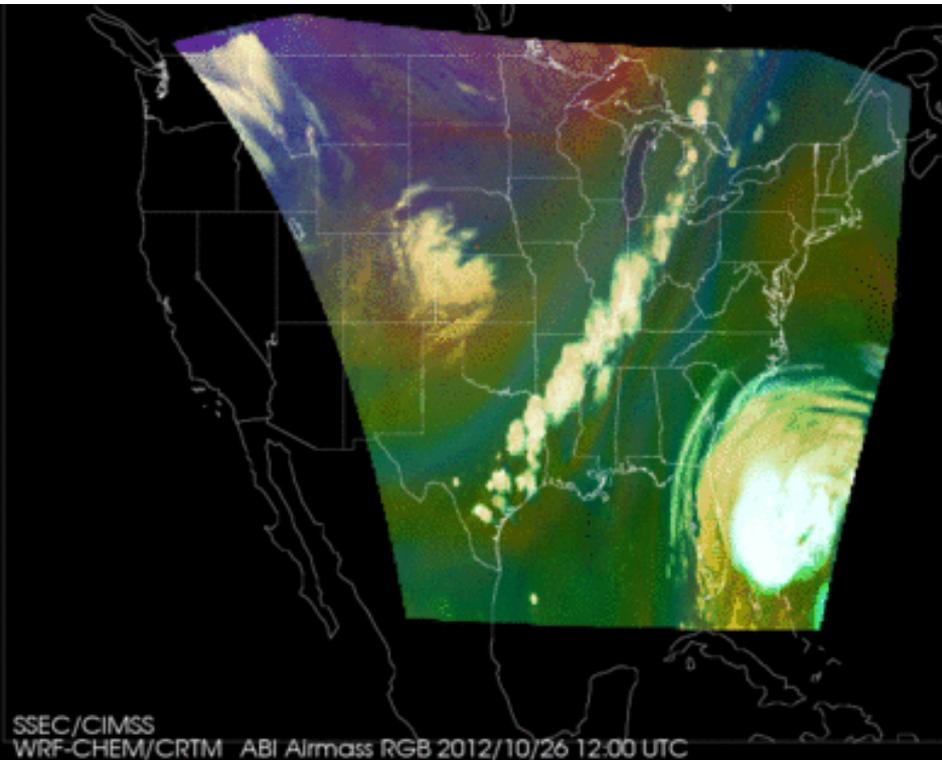
### Observation

SSEC/CIMSS  
GOES  
GOES Sounder Airmass RGB 2012/10/30 20:00 UTC

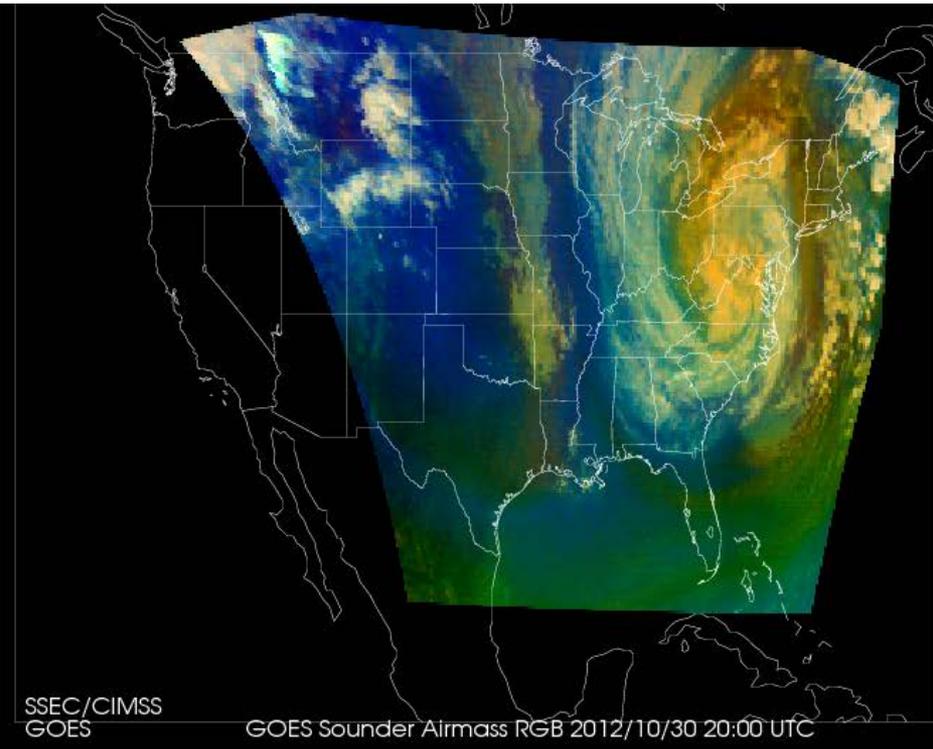
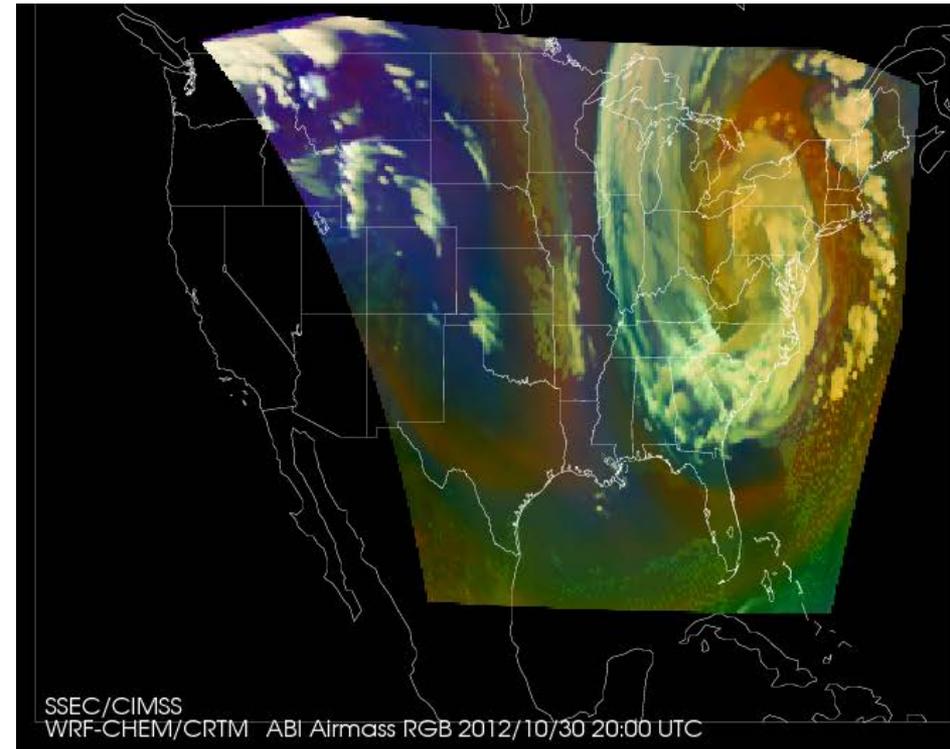
## Validation of proxy ABI RGB air-mass vs Observed:



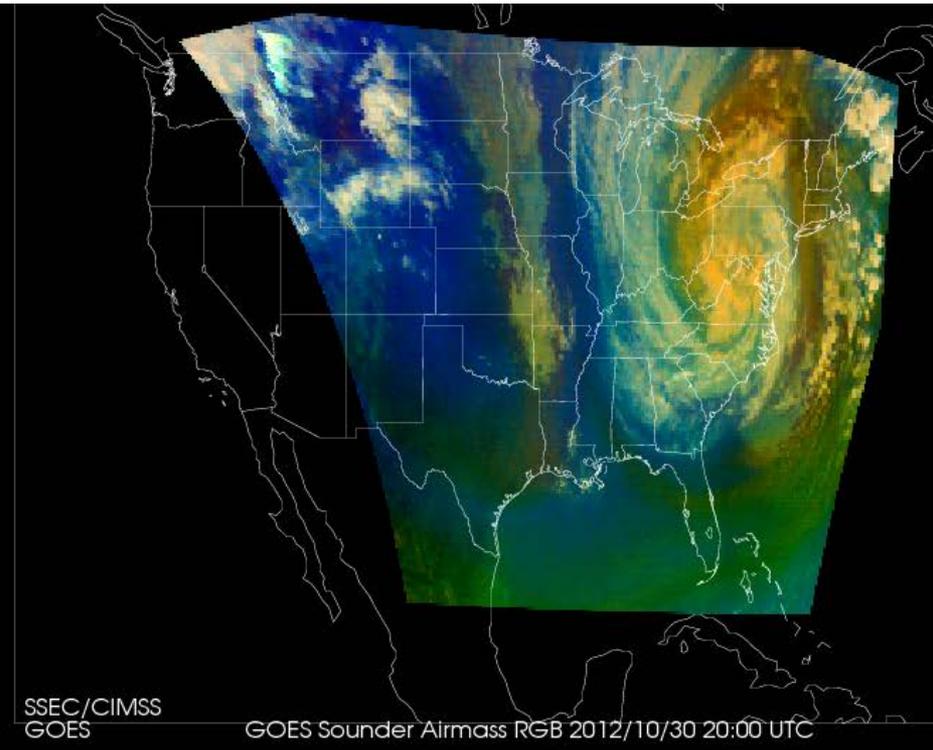
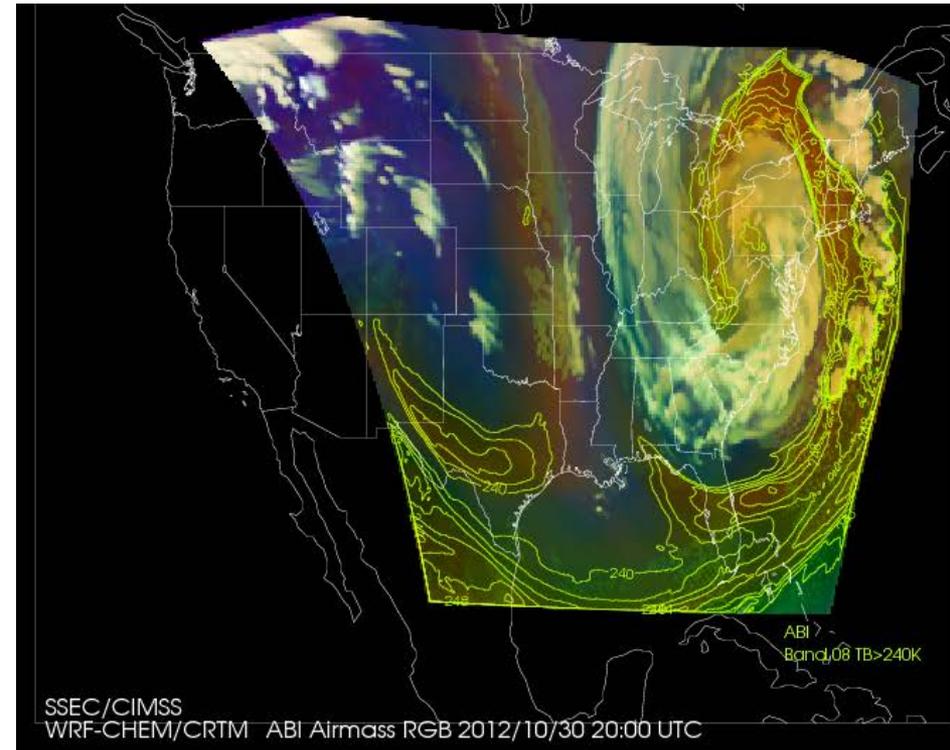
CRTM vs GOES RGB COMPARISON  
26-31 October 2012 ALL SCENES 20Z



CIMSS WRF-CHEM Proxy simulation animation:  
Calculations vis Observations on October 26, 2012.



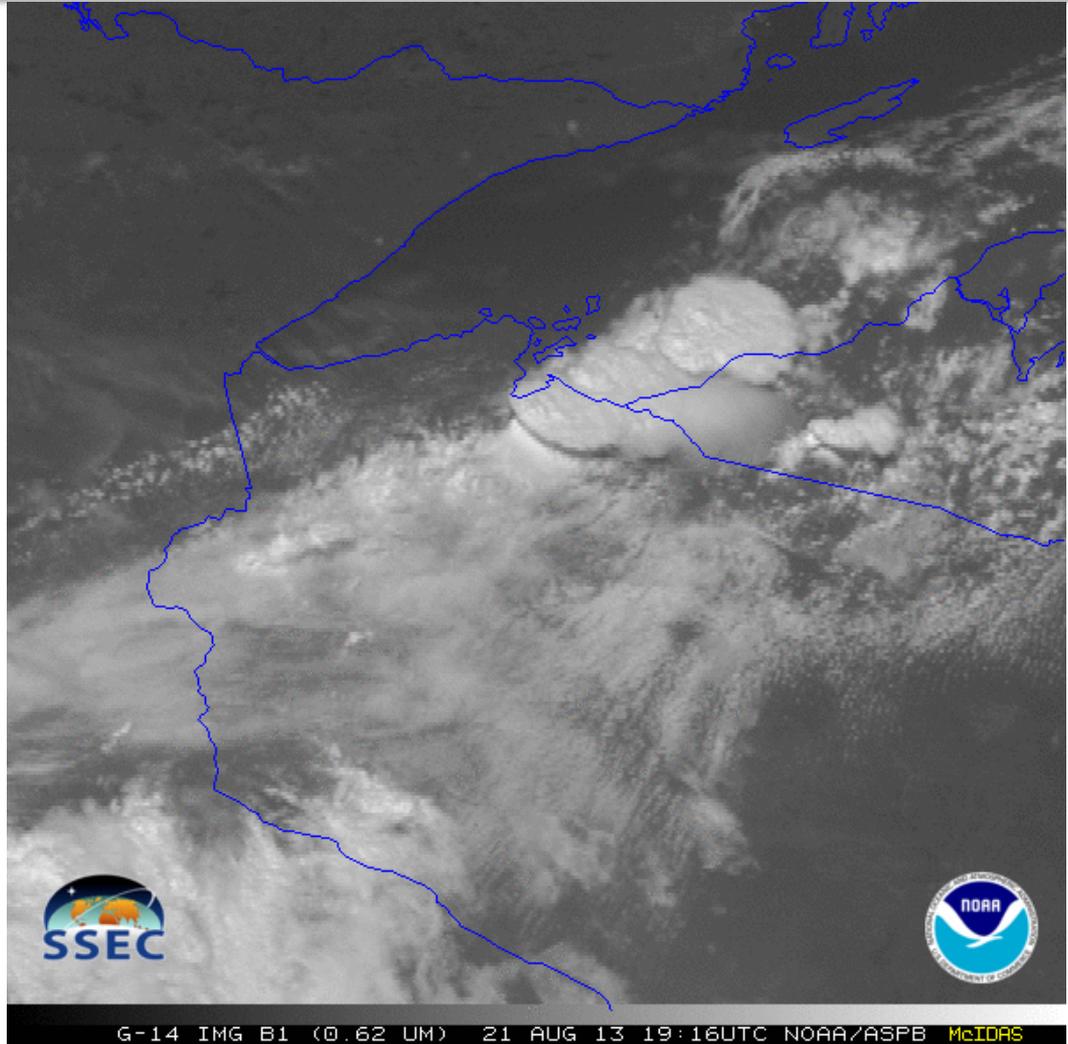
## CIMSS WRF-CHEM Proxy simulation



CIMSS WRF-CHEM Proxy simulation: now with quantitative over-plot (TBB). Another parameters could be moisture, ozone, etc.

- Actively attending AWIPS II developers' forum conference calls and remote meetings of the EPDT
- Testing of locally-produced netCDF4 files containing VIIRS imagery ongoing
- Remote access to NHDA and other AWIPS WAN sites now available (still must have account to login to remote site)
  - This will greatly assist in troubleshooting issues with CIMSS products without a need to be on site
- Installed OB13.4 at CIMSS
- Demonstrated AWIPS II to JTWC forecasters
- Assisting JTWC with ingesting satellite imagery into AWIPS II on their local system
- Troubleshooting AWIPS II issues related to satellite imagery ingest, storage, and purging at PRH

- SRSOR (Super Rapid Scan Operations for GOES-R) from GOES-14 imager
- Data between mid-August and September 24<sup>th</sup> and late October 2012; and two days in June and 12 days in mid-August, 2013.
- [http://cimss.ssec.wisc.edu/goes/srsor/GOES-14\\_SRSOR.html](http://cimss.ssec.wisc.edu/goes/srsor/GOES-14_SRSOR.html) and [http://cimss.ssec.wisc.edu/goes/srsor2013/GOES-14\\_SRSOR.html](http://cimss.ssec.wisc.edu/goes/srsor2013/GOES-14_SRSOR.html)
- Many phenomena were observed: convection, hurricanes, fires, smoke, ...
- Data to many groups HPC, OPC, AWC, SPC, SAB, several regions, etc.

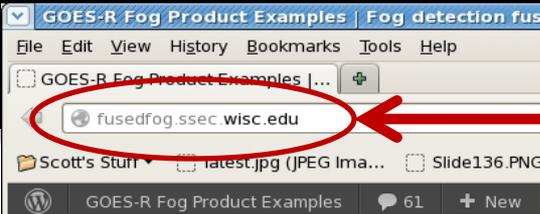


*Animation from GOES-14 Imager visible image at 1-min time resolution.*

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



- Many CIMSS satellite blog posts:
  - <http://cimss.ssec.wisc.edu/goes/blog/>
- Short Articulate Presenter modules developed for HWT on CTC and NearCast
  - [http://www.ssec.wisc.edu/~scottl/NearCast\\_HWT\\_Training\\_2013/player.html](http://www.ssec.wisc.edu/~scottl/NearCast_HWT_Training_2013/player.html)
  - [http://www.ssec.wisc.edu/~scottl/UWCTC\\_HWT\\_Training\\_2013/player.html](http://www.ssec.wisc.edu/~scottl/UWCTC_HWT_Training_2013/player.html)
- ‘Fog blog’ at <http://fusedfog.blogspot.com>
  - 129 separate entries
  - >21000 hits ; ~100 hits per day.
  - 1-3 new entries per week.



## Fused Fog Blog:

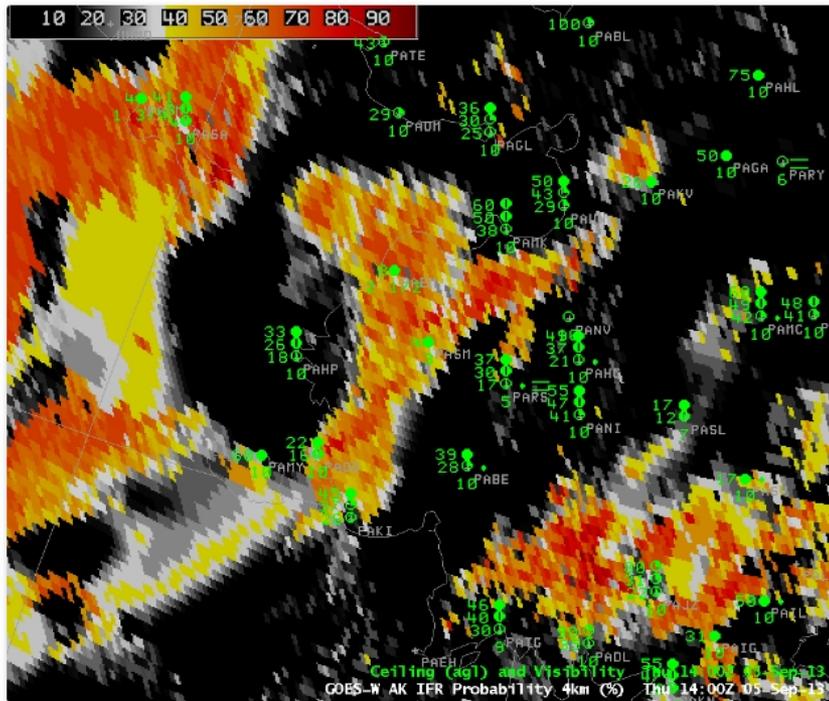
- New hosting site (ssec.wisc.edu)
- Old site at 28000 hits
- All old posts exported to new site
  - 166 total posts
- Emails to SOOs when case is posted
- Searchable by dates and categories

### GOES-R Fog Product Examples

Fog detection fusing GOES, Terra/Aqua or Suomi/NPP Satel

HOME

### IFR Conditions over southwest Alaska



GOES-R IFR Probability computed from GOES-West (click image to play animation)

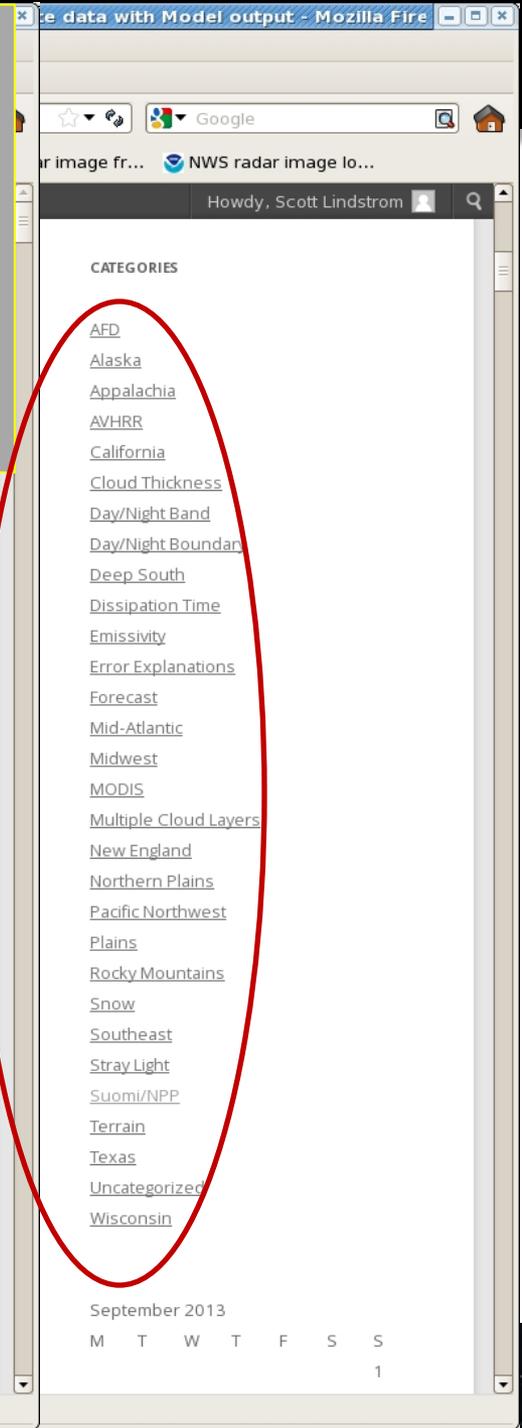
#### RECENT POSTS

- [IFR Conditions over southwest Alaska](#)
- [Fog over southern New England](#)
- [Northern Indiana Fog Event](#)
- [Fog on Cape Cod](#)
- [Valley Fog in Pennsylvania](#)

#### RECENT COMMENTS

#### ARCHIVES

- [September 2013](#)
- [August 2013](#)
- [July 2013](#)
- [June 2013](#)
- [May 2013](#)
- [April 2013](#)
- [March 2013](#)
- [February 2013](#)
- [January 2013](#)
- [December 2012](#)



#### CATEGORIES

- [AFD](#)
- [Alaska](#)
- [Appalachia](#)
- [AVHRR](#)
- [California](#)
- [Cloud Thickness](#)
- [Day/Night Band](#)
- [Day/Night Boundary](#)
- [Deep South](#)
- [Dissipation Time](#)
- [Emissivity](#)
- [Error Explanations](#)
- [Forecast](#)
- [Mid-Atlantic](#)
- [Midwest](#)
- [MODIS](#)
- [Multiple Cloud Layers](#)
- [New England](#)
- [Northern Plains](#)
- [Pacific Northwest](#)
- [Plains](#)
- [Rocky Mountains](#)
- [Snow](#)
- [Southeast](#)
- [Stray Light](#)
- [Suomi/NPP](#)
- [Terrain](#)
- [Texas](#)
- [Uncategorized](#)
- [Wisconsin](#)

September 2013

M T W T F S S

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## 2013

- 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)
- NWA                                      12-17 Oct                      Charleston, SC  
– <http://www.nwas.org/meetings/nwa2013/>

## 2014

- AMS Annual meeting              2-6 Feb                      Atlanta, GA
- Virtual Meeting Satellite Week      10-14 March              Madison, WI
- Training meeting                      May                      Boulder, CO, or Kansas City, MO
- OCONUS PG                              TBA                      Honolulu, HI