

STAR Center for Satellite
Applications and Research
formerly ORA — Office of Research and Applications



University of Wisconsin – CIMSS GOES-R Proving Ground Participation

Wayne F. Feltz (POC), Tim Schmit, Jordan Gerth, Michael Pavolonis,
Justin Sieglaff, Lee Counce, Andy Hiedinger, Cory Calvert, Kaba Bah,
Kathy Strabala, William Straka and numerous other UW-CIMSS
contributors

GOES-R Aviation AWG Co-Chair and UW-CIMSS GOES-R PG PI

GOES-R PG Review 2011

Boulder, Colorado

UW-CIMSS and ASPB GOES-R Products Baseline & Option 2

Clouds (Chair: Andy Heidinger, NOAA)		
Product	Lead Developer	Testbed
Cloud Mask	Andy Heidinger (NOAA)	AAWU/HLT
Cloud Layers/Heights and Thickness/Temp	Andy Heidinger (NOAA)	AAWU/HLT/OPC
Cloud Phase and Type	Mike Pavolonis (NOAA)	AAWU/HLT/OPC
Land (Chair: Bob Yu, NOAA)		
Product	Lead Developer	
Fire	Chris Schmidt (CIMSS)	HWT
Soundings (Chair: Tim Schmit, NOAA)		
Product	Lead Developer	
Moisture/Temperature Profile/TPW	Jun Li (CIMSS)	HWT/PR
Winds (Chair: Jaime Daniels, NOAA)		
Product	Lead Developer	
Hurricane Intensity	Tim Olander (CIMSS) and Chris Velden (CIMSS)	NHC/PR
Aviation (Chairs: Ken Pryor, NOAA and Wayne Feltz, CIMSS)		
Product	Lead Developer	
Volcanic Ash	Mike Pavolonis (NOAA)	AWC/AAWU/HLT/PR
Turbulence	Tony Wimmers (CIMSS)	AWC
Low Cloud and Fog	Mike Pavolonis (NOAA)	AWC/AAWU/HLT
SO2 Detection	Mike Pavolonis (NOAA)	AWC/AAWU/HLT/PR
Icing	Bill Smith Jr (NASA) - CIMSS provide N-AWIPS	AWC/HLT/AAWU
Convective Initiation	John Mecikalski (UAH), UWCI (CIMSS) used u	HWT/AWC/PR/AAWU
Overshooting Top Detection	Kris Bedka (NASA contractor)/Jason Brunner (OPC/HWT/NHC
Imagery (Chair: Tim Schmit, NOAA)		
Product	Lead Developer	
Imagery	Tim Schmit (NOAA)	HWT/OPC/HPC

(10 GOES-R Proxy datasets of 34 UW-CIMSS AWG algorithms being demonstrated)

UW-CIMSS and ASPB GOES-R Products

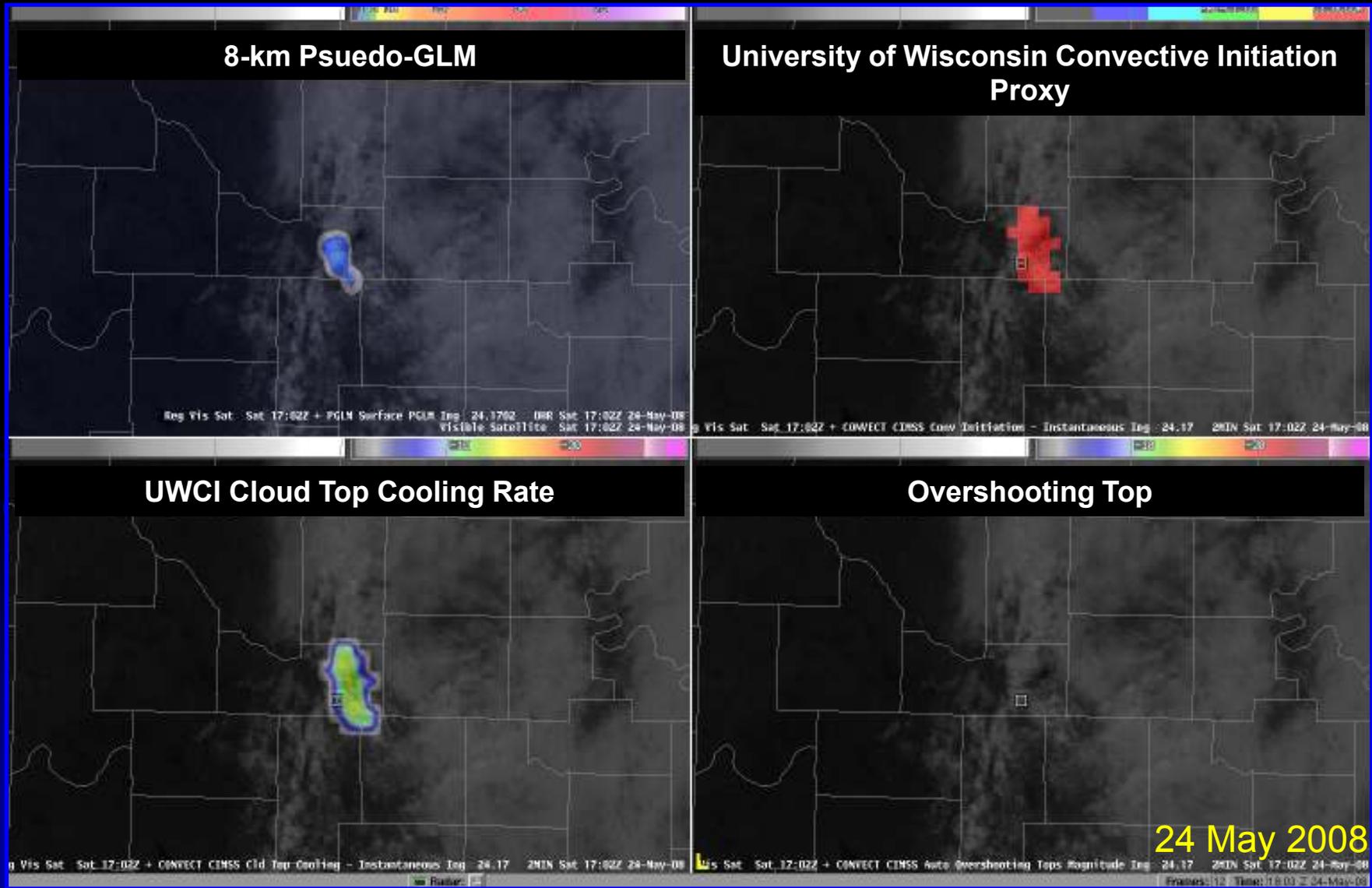
Baseline & Option 2

Demonstration Product (contacts)	Category	PG Testbed Activity
Cloud and Moisture Imagery (WRF ARW simulated) (Schmit/Feltz) - 2010	Baseline	HWT, OPC, HPC - Added visible channel - Alaska and Hawaii domains in future?
UW Convective Initiation (Sieglaff/Feltz) - 2009	Option 2 GIMPAP funded proxy -> UAH CI	HWT, AWC, PAC-Hawaii - GOES-W now available - Ice mask (no CI detection possible)
Overshooting-Top/Enhanced-V (Bedka/Feltz) - 2010	Option 2	HWT, OPC, AWC - Optimal in RSO but limited
Hurricane Intensity Estimate (Velden/Olander) - 2010	Baseline	NHC
Fire Detection (Schmidt) - 2010	Baseline	HWT - New intensity field

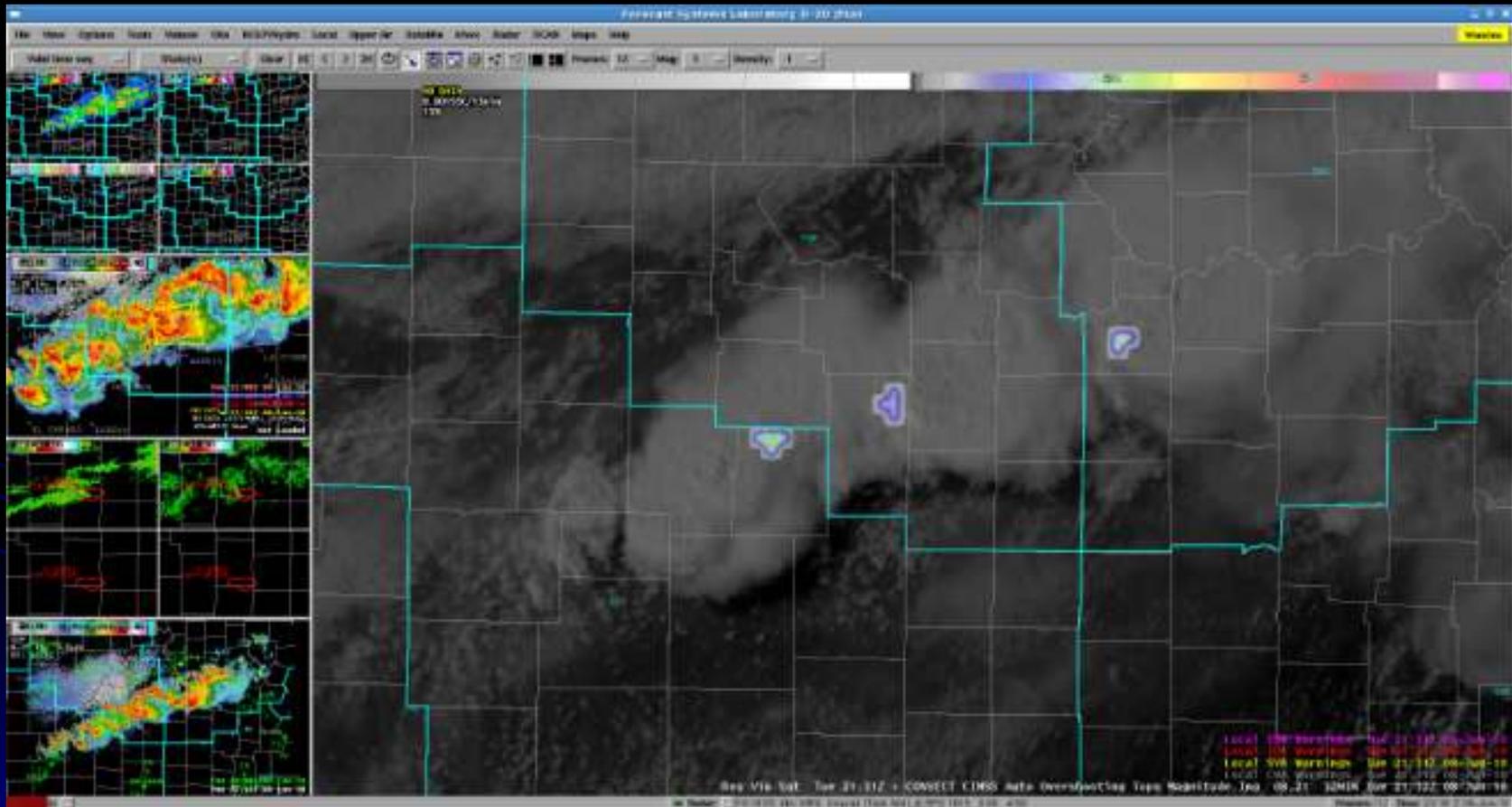
UW-CIMSS and ASPB GOES-R Products Baseline & Option 2

Demonstration Product (contacts)	Category	PG Testbed Activity
Volcanic Ash location/height/loading (Pavolonis) - 2010	Baseline	HLT-Alaska/AAWU, AWC, PAC-Hawaii - MODIS/AVHRR derived
SO₂ (Pavolonis) – 2011	Option 2	HLT-Alaska, AAWU/AAWU, AWC, PAC-Hawaii - MODIS/AVHRR derived
Low cloud/Fog (Pavolonis) - 2011	Option 2	HLT-Alaska/AAWU, AWC - GOES/MODIS/AVHRR
Cloud phase/typing (Pavolonis) - 2011	Baseline	OPC, HLT-Alaska/AAWU - GOES/MODIS/AVHRR
Cloud Height/temperature/mask (Heidinger) – 2011	Baseline	OPC, HLT-Alaska/AAWU - GOES/MODIS/AVHRR
Total Precipitable water/Atmospheric Stability (Schmit) - 2012	Baseline	OPC, PAC, HWT (delayed until 2012)

Convective Initiation and Overshooting-top demonstration at NOAA HWT 2010



GOES Objective Overshooting-top Detection

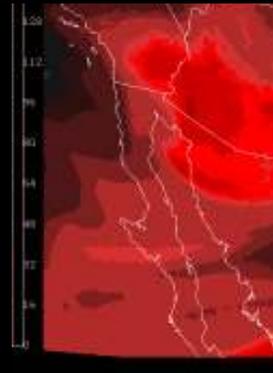
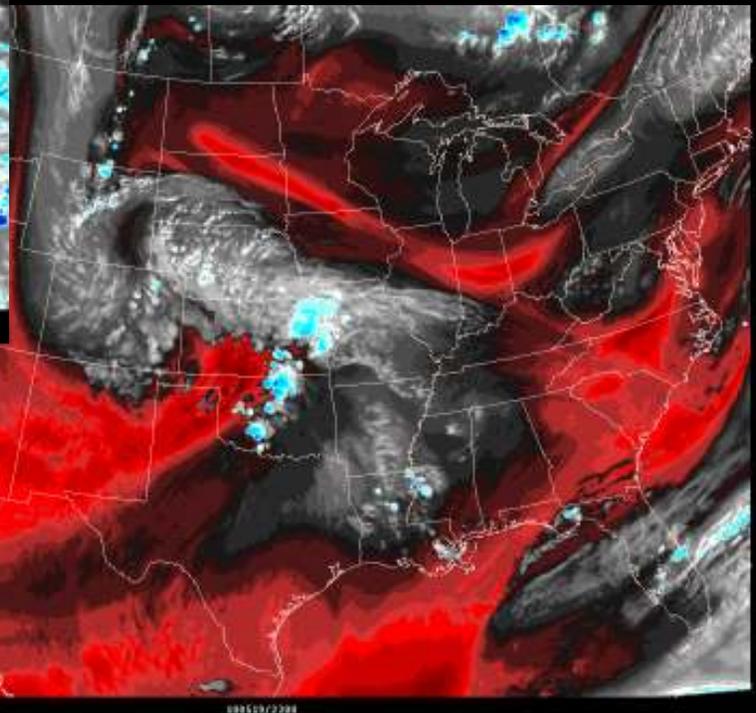


Simulated

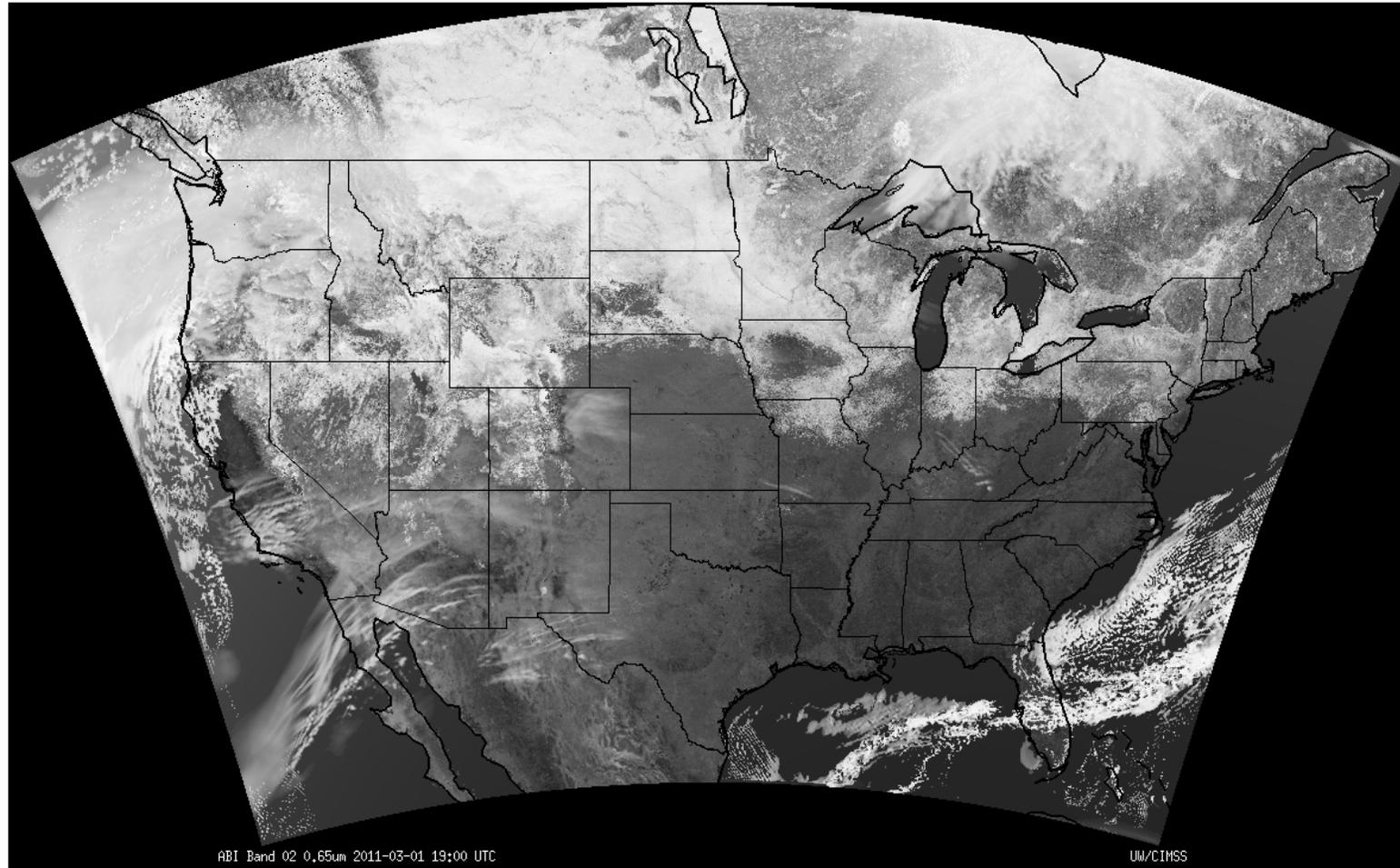
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GOES-13 Observed



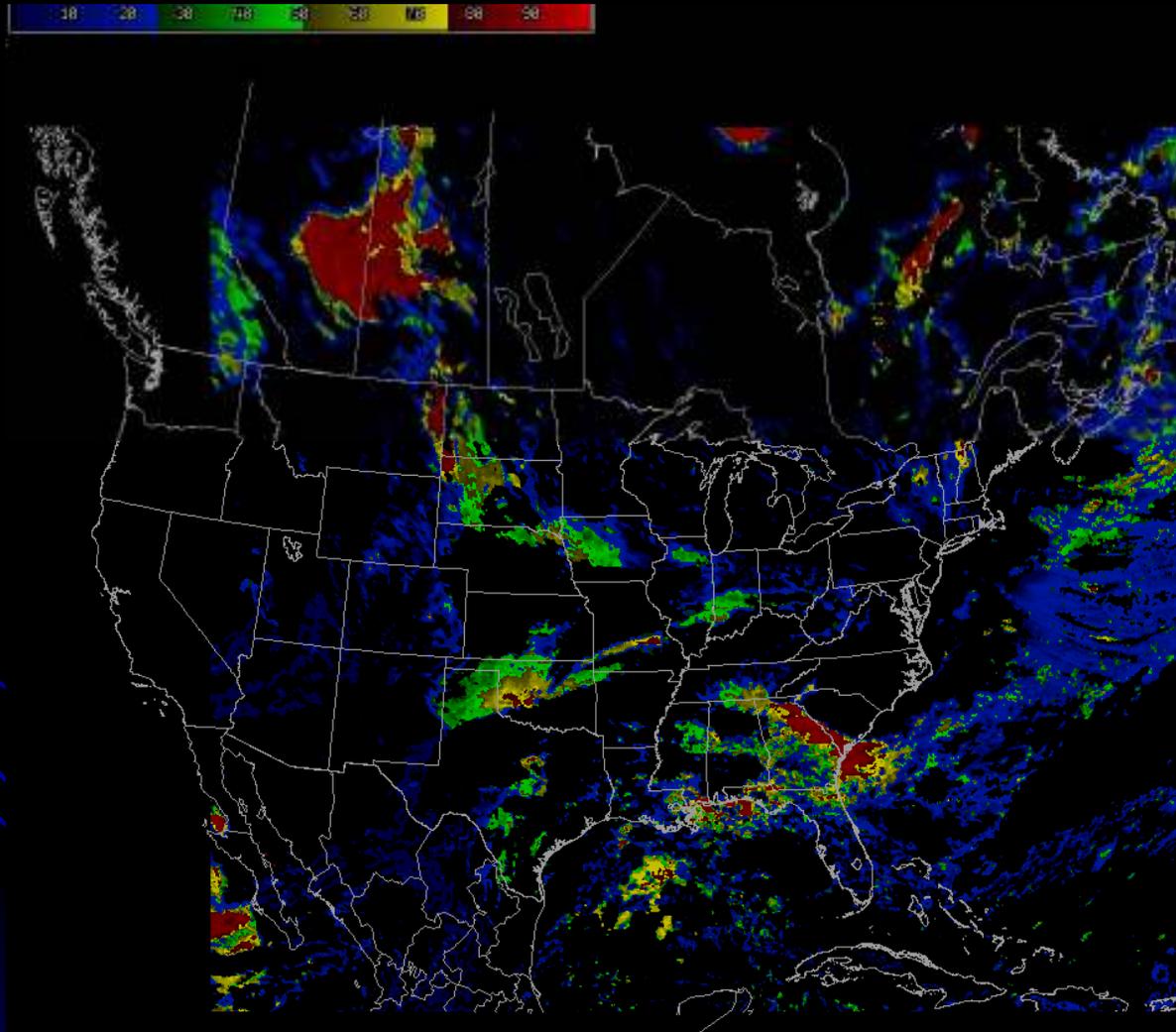
New near real-time visible channel simulation (HWT 2011)



http://cimss.ssec.wisc.edu/goes_r/proving-ground/nssl_abi/animations/abi_band02.html

NSSL WRF ABI Band 2 Simulated by UW/CIMSS using 'fast' solar RTM
1900 UTC -- 01 March 2011

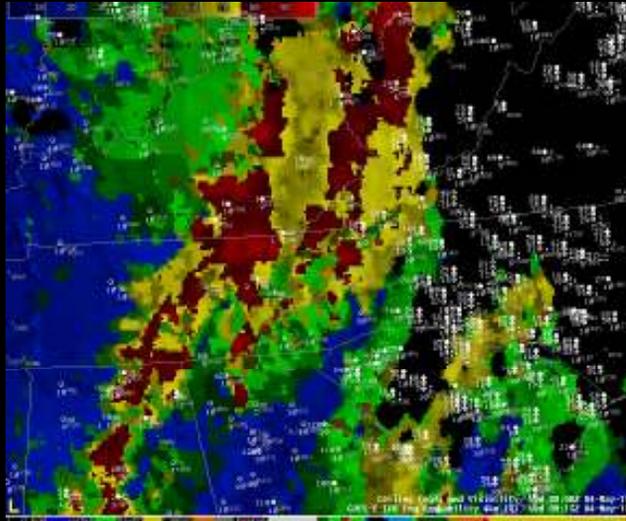
AWIPS GOES-EAST MVFR Fog Probability at 1845 UTC 29 March 2011



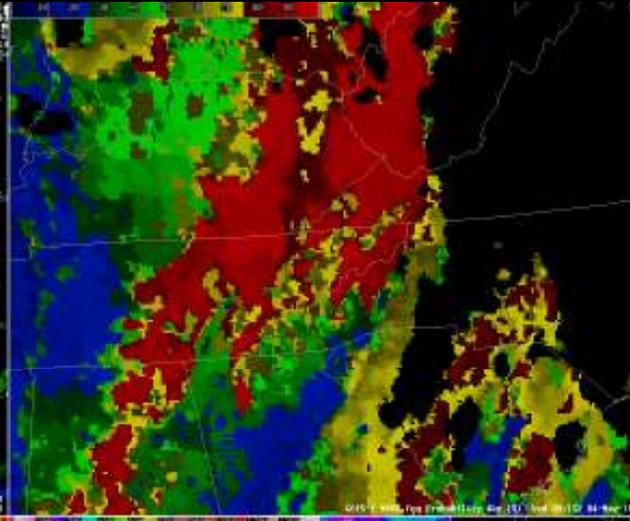
GOES-E MVFR Fog Probability 4km (%) Tue 18:45Z 29-Mar-11

GOES-East Fog/low cloud and type (AWIPS) -> AWC

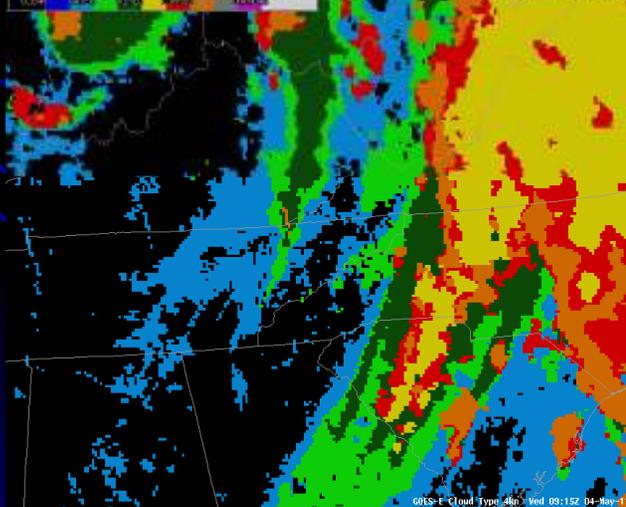
IFR Fog probability



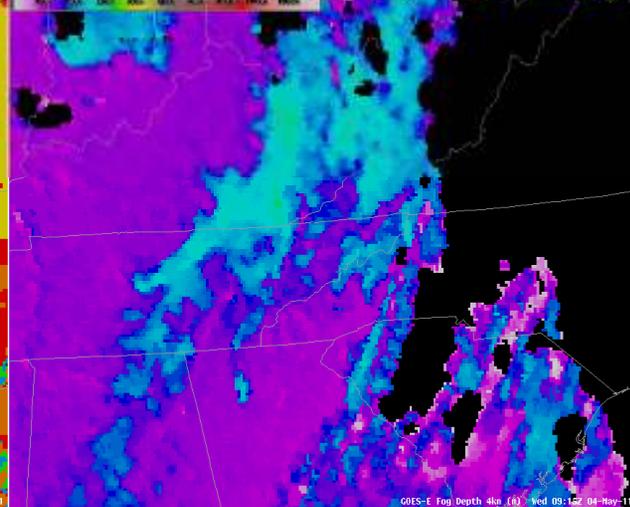
MVFR Fog probability



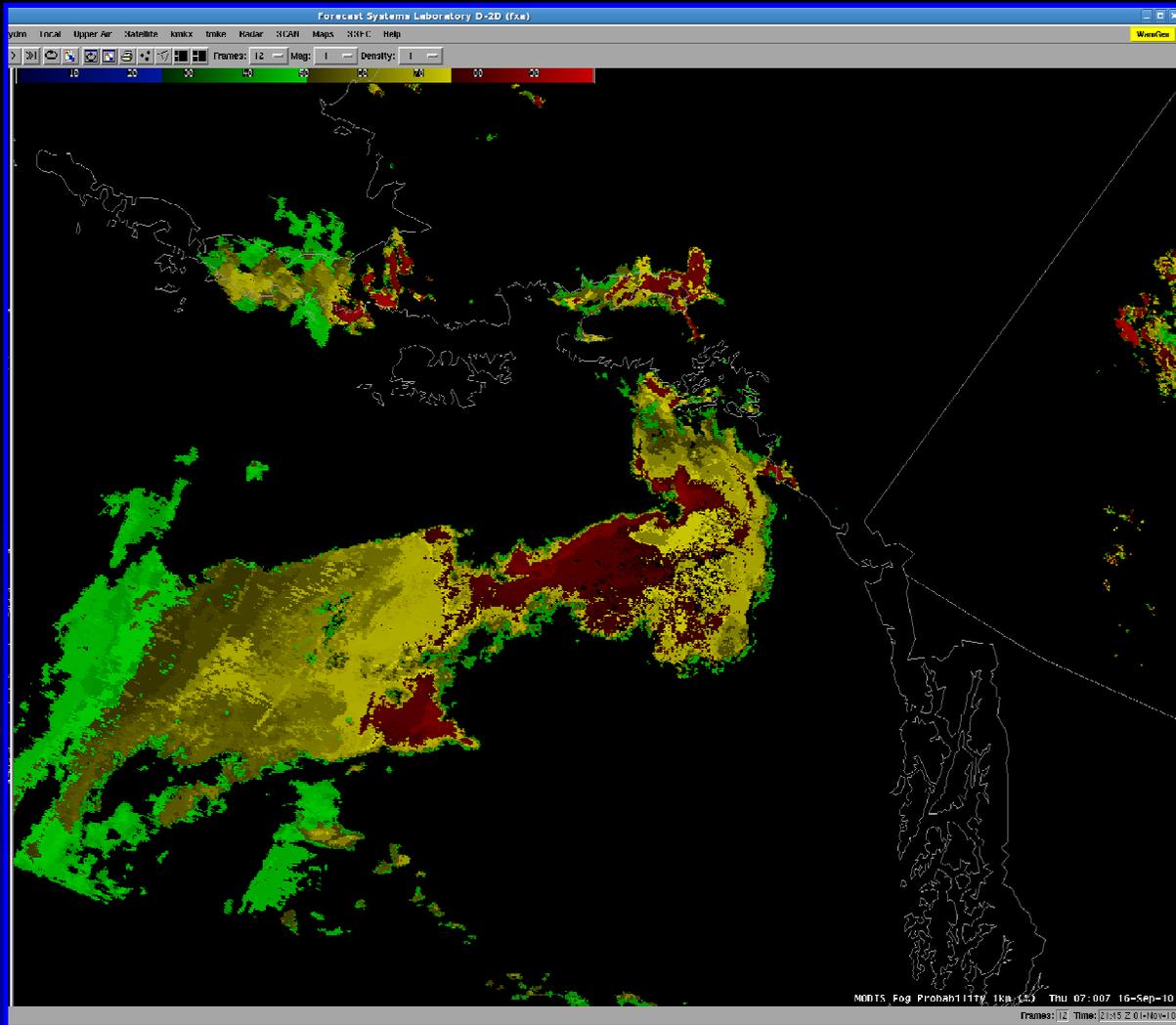
Cloud type



Fog Depth Estimate

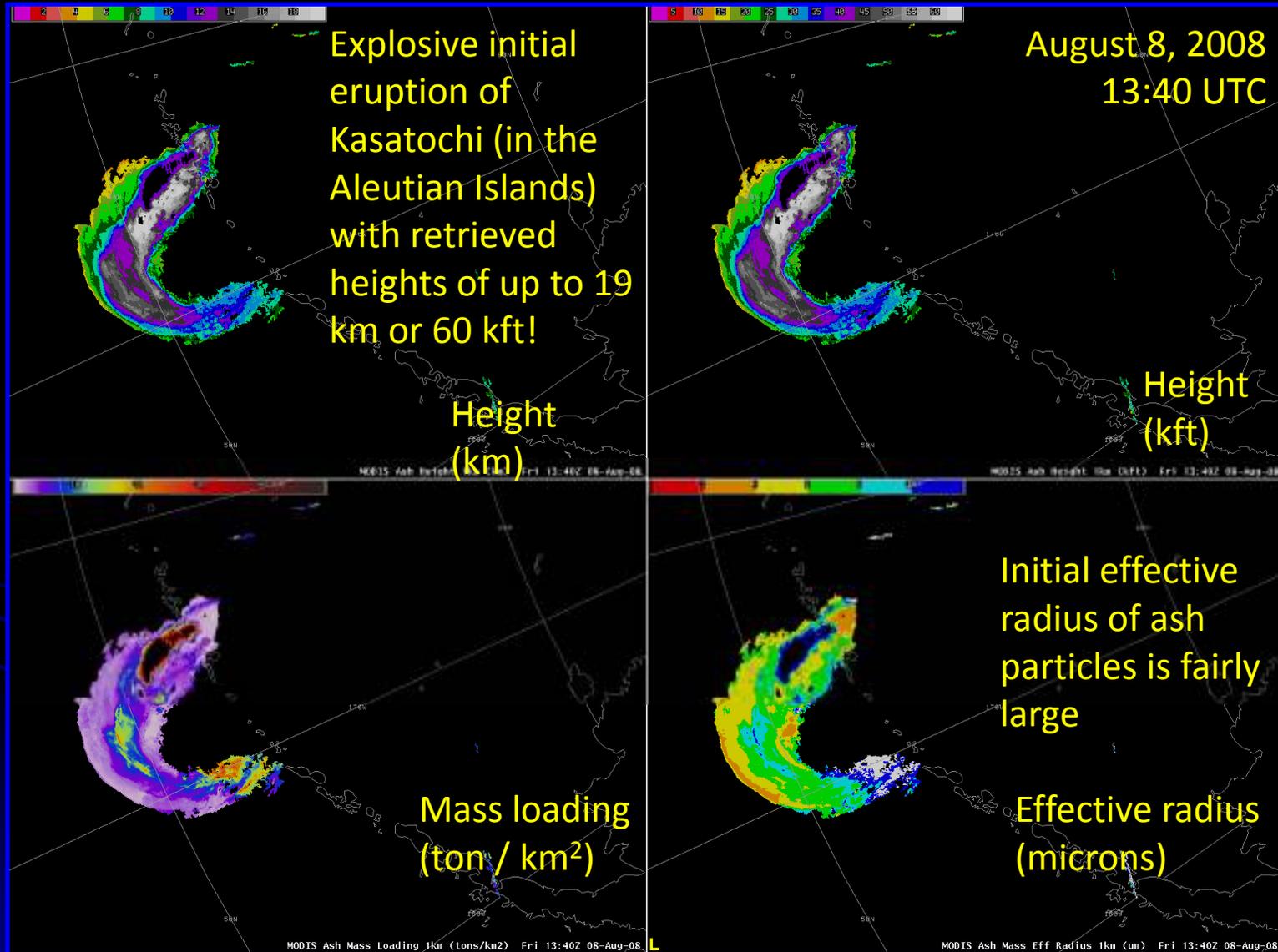


High Latitude Testbed/AK Example Fog Probability (MODIS)



GOES-R (MODIS
Proxy) Fog
Probability Product
in AWIPS
September 16, 2010
– 07:00 UTC

GOES-R (MODIS Proxy) Volcanic Ash



UW-CIMSS and ASPB GOES-R Products R3 and Decision Aids

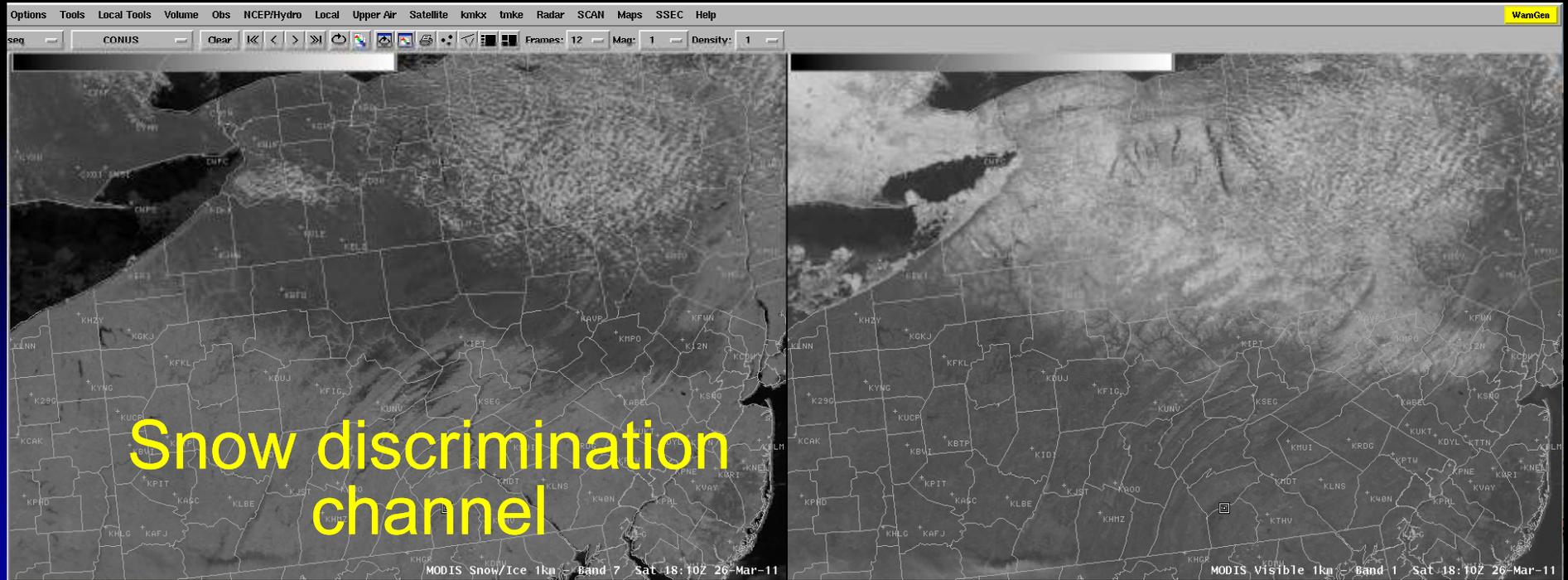
Demonstration Product (contacts)	Category	PG Testbed Activity
Nearcasting (Petersen) - 2010	R3	HWT and AWC
MIMIC TPW - 2010	Decision Aids	PAC-Hawaii
MODIS - 2007	Decision Aids	Local WFO

Support for Short Term Forecasts

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE STATE COLLEGE PA
442 AM EDT SUN MAR 27 2011

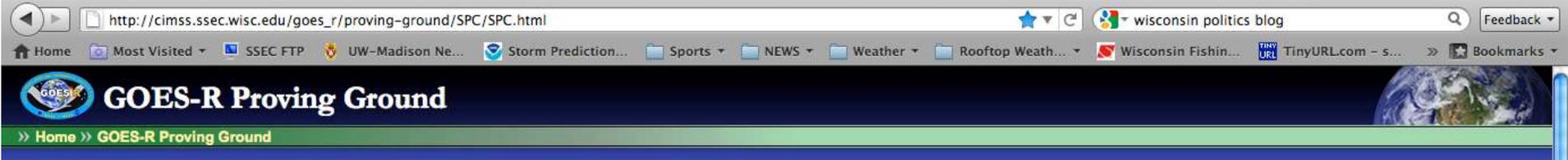


.SHORT TERM /6 PM THIS EVENING THROUGH 6 PM MONDAY/...ANOTHER VERY CHILLY NIGHT IN STORE FOR THE REGION WITH MINS ARND 15F BLW NORMAL. RIDGE OF HIGH PRESSURE WILL PROVIDE THE CLEARSKIES...**LGT WINDS AND DRY AIR TO ALLOW FOR GOOD RADIATIONAL COOLING. LOWS SHOULD RANGE FROM THE SINGLE DIGITS ACROSS THE SNOW COVERED N MTNS /MODIS BAND 7 IMAGERY SHOWS EXTENT OF SNOW COVER BEAUTIFULLY/...TO ARND 20F IN THE SOUTH.**



CIMSS Proving Ground Data Portal

http://cimss.ssec.wisc.edu/goes_r/proving-ground/SPC/SPC.html



Resources

- Proving Ground Products List (Table)
- [CIMSS NOAA Testbed Support Products](#)
- [CIRA Products](#)
- [SPoRT Products](#)
- [CIMSS "MODIS Imagery in D-2D"](#)

Meetings and Presentations
Teleconferences

NWS Collaborative Site Visits
Proving Ground Timeline

Proving Ground Partners

- [Two-Page PPF](#)
- [Two-Page PDF](#)
- [Page 1 PNG](#)
- [Page 2 PNG](#)

GOES-R Advanced Baseline Imager (ABI) Bands
GOES-R ABI Sample Product Table
GOES-R ABI Weighting Function Examples

Related Links

- [Proving Ground Overview](#)
- [GOES-R "101" VISITview lesson](#)
- [COMET GOES-R: Benefits of Next Generation Environmental Monitoring Module](#)

UW/CIMSS [NOAA](#) Proving Ground Testbed Decision Support Products

Description	Contact	Training	Quicklooks	Validation	Satellite Platform	Testbed	Product Type	AWIPS Setup
Convective Initiation(UWCI)	Wayne Feltz	UWCI (Visit) UWCI (ppt)	Convective Decision Support	Convective Initiation Products	GOES Imager	HWT, AWC, PR	Product Variant	Instructions
Overshooting Top (OTTC) and Enhanced-V	Wayne Feltz	OTTC (PPT)			GOES Imager, MODIS/AVHRR	HWT, HLT	AWG Proxy	
WRF Simulated Radiances (ABI Simulated Radiances)	Justin Sieglaff	WRF (PDF)	WRF			HWT	Risk Reduction	
WildFire ABBA (WFABBA)	Chris Schmidt				GOES Imager	HWT	AWG Proxy	
NearCast	Ralph Petersen	UW NearCasting (VISIT)	NearCast		GOES Imager, GOES Sounder	HWT	Risk Reduction	Instructions
Volcanic Ash	Mike Pavolonis	TBD			MODIS, SEVIRI	AAWU, AWC, HLT, PR	AWG Proxy	See Contact
Low Clouds/Fog	Mike Pavolonis	TBD			MODIS-Alaska, GOES-CONUS	AAWU, AWC, HLT	AWG Proxy	See Contact
Cloud Type	Mike Pavolonis	TBD			MODIS-Alaska, GOES-CONUS	AAWU, HLT, OPC	AWG Proxy	See Contact
SO₂	Mike Pavolonis	TBD			MODIS	AAWU, AWC	AWG Proxy	See Contact

Testbed Legend

HWT-Hazardous Weather Testbed
AWC-Aviation Weather Center
HPC-Hydrological Prediction Center

AAWU-Alaskan Aviation Weather Unit
HLT-High Latitude Testbed-Alaska
NHC-National Hurricane Center

PR-Pacific Region
OPC-Ocean Prediction Center

Updated as material available:
Training not posted until developers signs off

Instructions Available Online

<http://cimss.ssec.wisc.edu/~jordang/awips-modis/>

MODIS Imagery in D-2D - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Refresh Home Search Favorites

http://www.ssec.wisc.edu/~jordang/awips-modis/

MODIS Imagery in D-2D

Instructions for AWIPS Installation

Space and Science Engineering Center
University of Wisconsin - Madison
Released July 10, 2006
Version 1.11 (September 8, 2006)



Project members: Scott Barkman, Russ Deibel, Jordan Gerth, Scott Lindstrom, Jerrald Robanek, Kathy Strabala, Steve Wanzong

Phase One (Flagship)

Schedule

- June 5, 2006: Phase initiated
- June 7, 2006: Release of scripts for internal review
- June 15, 2006: Add screenshots below
- June 23, 2006: Assure data feed to CRH approved, running
- June 27, 2006: Final preparation of installation scripts
- June 30, 2006: Milwaukee/Sullivan Installation - Part I
- July 7, 2006: Milwaukee/Sullivan Installation - Part II

Install team: Jordan Gerth (SSEC), Steve Wanzong (SSEC), Kim Licitar (NWS)

[Screen Captures](#), [Photographs](#)

- July 10, 2006: Official release of Version 1.0
- July 17, 2006: Version 1.0 testing finished
- August 1, 2006: Version 1.1 released (Mandatory)
- August 4, 2006: Deployment deadline for Version 1.1
- September 8, 2006: Version 1.11 upgrade released (Optional)
- September 8, 2006: Special memo about CRAS (V1.0,1.1 only)

Offices are strongly encouraged to register with the Local Applications Database (LAD).

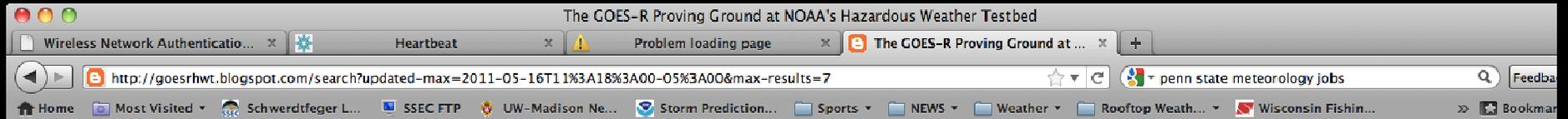
The Space Science and Engineering is not staffed around the clock. Consequently, data outages and processing issues may result. **These images should be considered non-operational.**

Any site which wishes to download this package should be aware that the files and scripts are considered final, but the images pulled from the LDM are non-operational. Weather Forecast Offices which wish to be test sites for future upgrades and phases should contact [Jordan Gerth](#).

- Files and Scripts ([MODISpack.tar.gz](#), 17939 bytes)
- Documentation ([MODISinstall.pdf](#), 2134020 bytes)

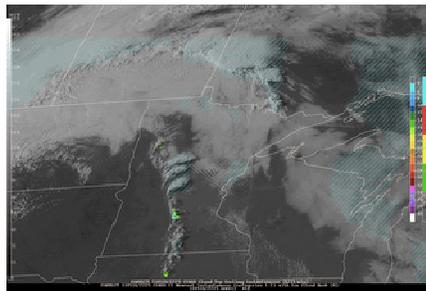
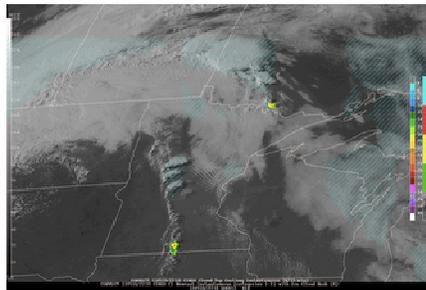
Done Internet

GOES-R HWT BLOG

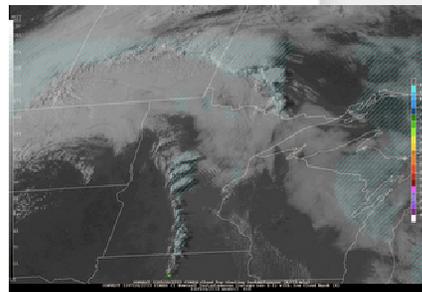


UW-Madison CIMSS convective initiation, overshooting-top, and nearcasting update

GOES-R proxy University of Wisconsin convective initiation (UWCI), overshooting-top/enhanced-V, WRF ARW simulated data and nearcasting fields have been flowing in a smooth manner into the EFP via N-AWIPS for forecast discussion integration. UWCI did indicated individual cells developing along north-south boundary in MN yesterday afternoon (10 May 2011).



20110511 below:



24-hour UWCI indications, overshooting-tops, and NLDN lightning data from 12 UTC 20110510 - 12 UTC

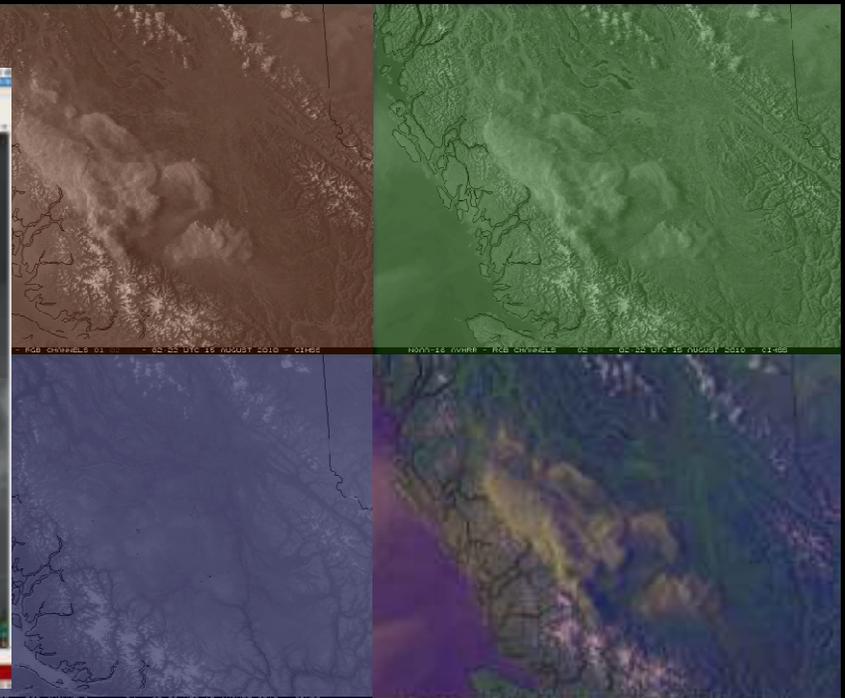
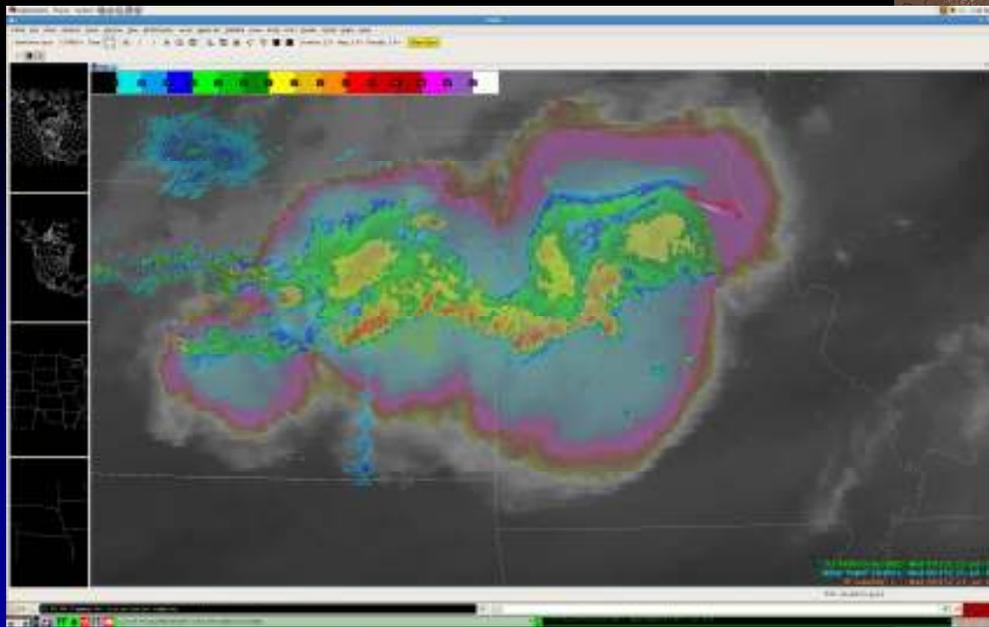
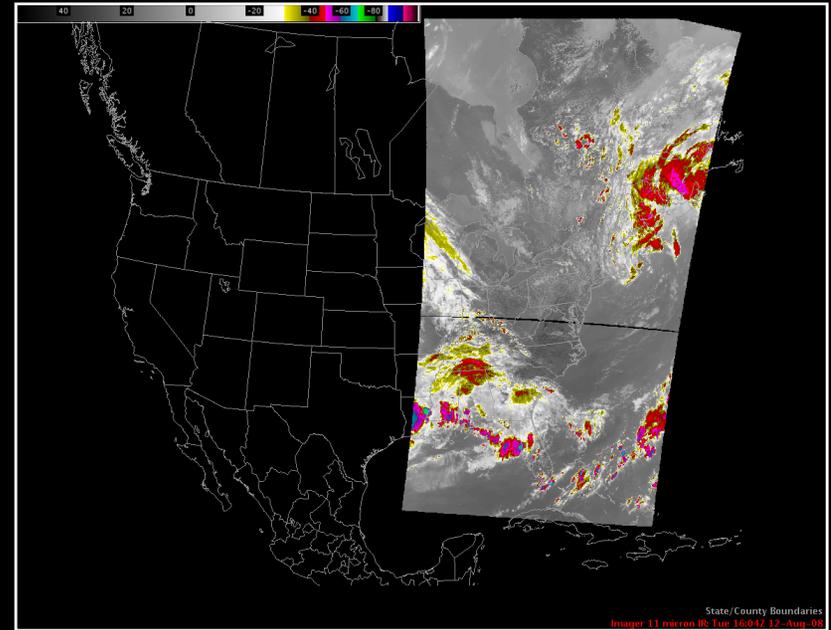
<http://goesrhw.blogspot.com/>

PG Data/AWIPS/WES 2011 Demonstration Activities

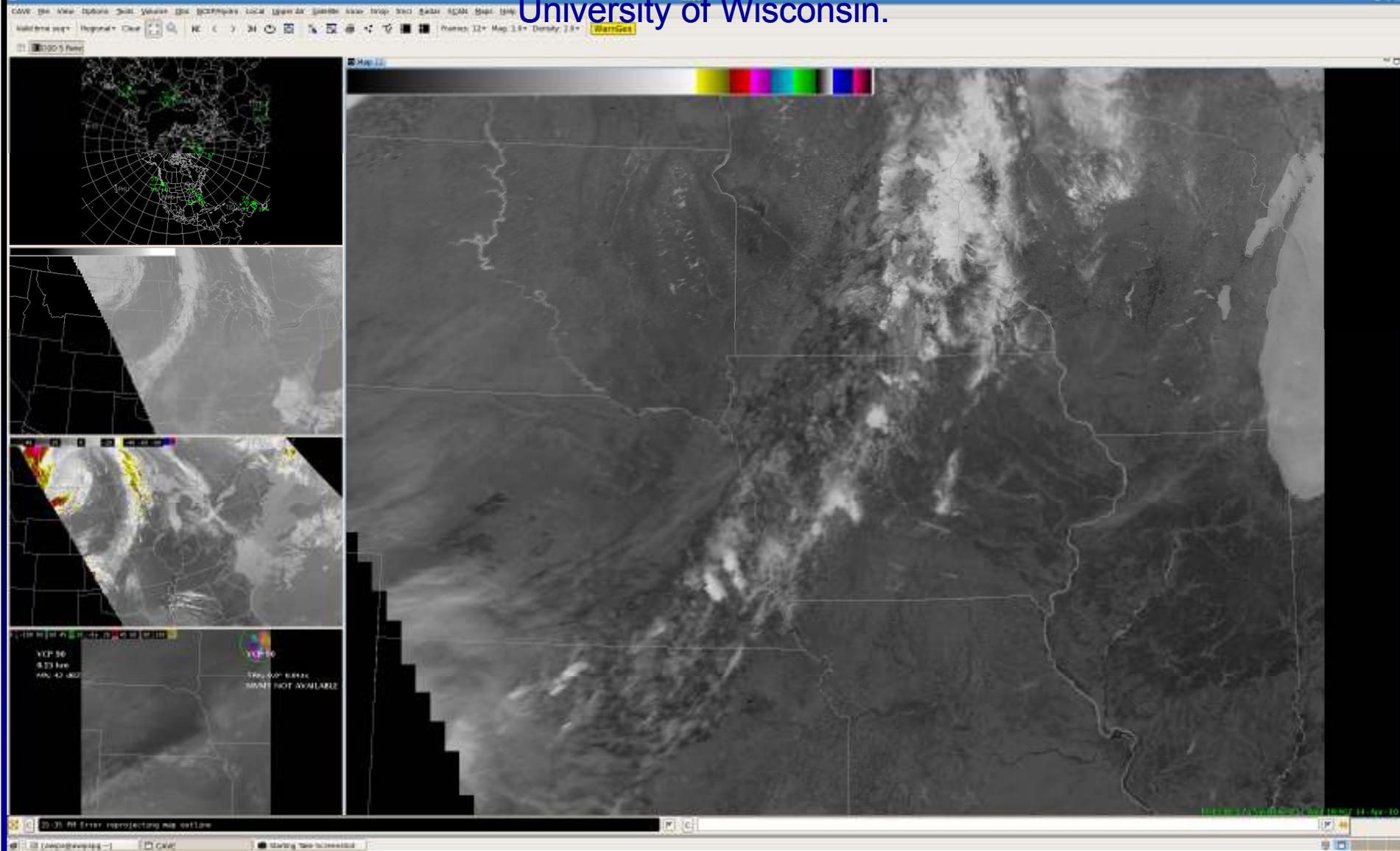
- AWIPS, N-AWIPS and AWIPS-2 progress
- Format conversion to GRIB2, AWIPS-netcdf, GEMPAK, McIDAS area
- Unconventional satellite data insertion into N-AWIPS
 - Volcanic ash loading for example (0-255 scaling)
- National center N-AWIPS vs CIMSS N-AWIPS
- CONUS WES case
- Hurricane Katrina WES case
- Pacific Region WES case
- Local testbed specific WES cases (HWT and HLT) ¹⁹

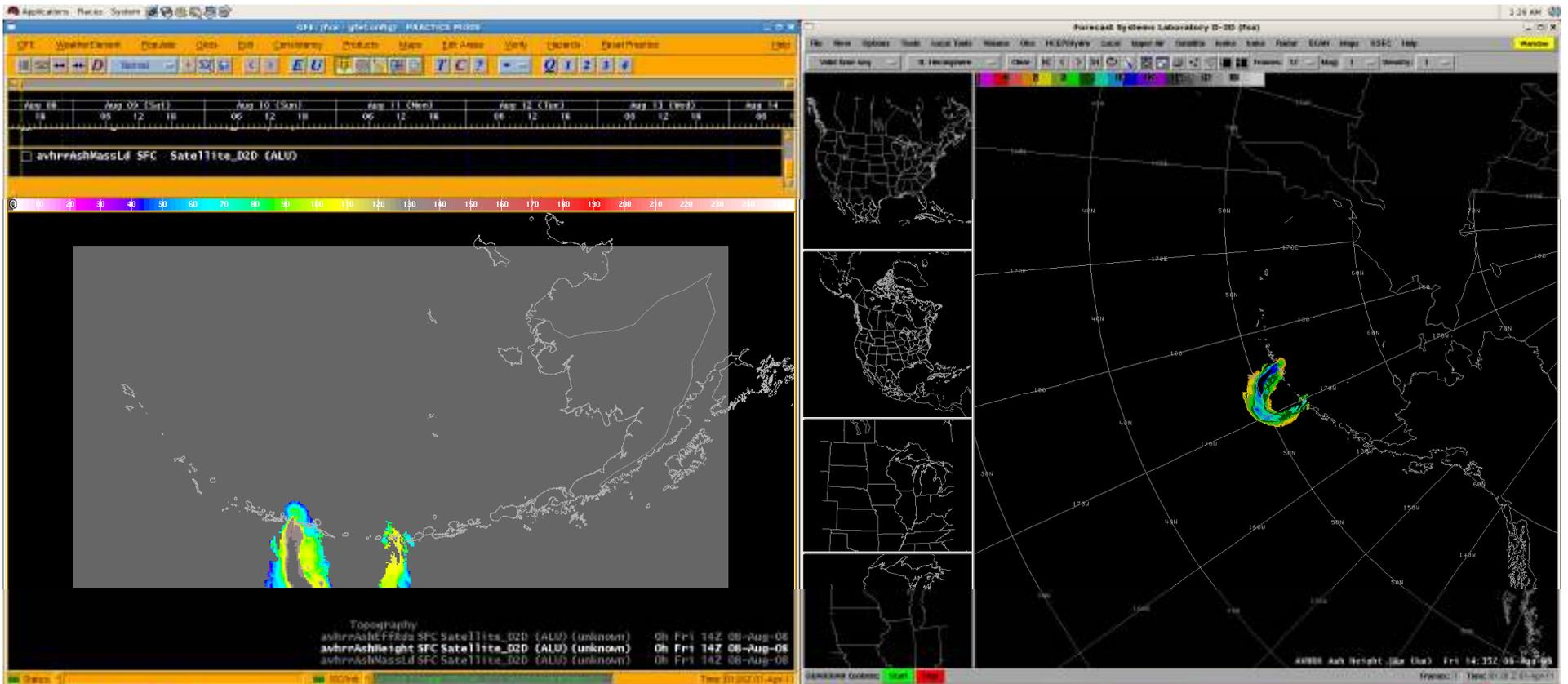
CIMSS Development with AWIPS II

- Actively transitioning from AWIPS I to II
- Successfully prototyped implementation of MODIS imagery into the software
- Developing a 24/32-bit capability leveraging multiple-layering to provide for integrated analysis products (IAPs), which allow meteorologists to address specific forecast challenges without individually loading multiple products



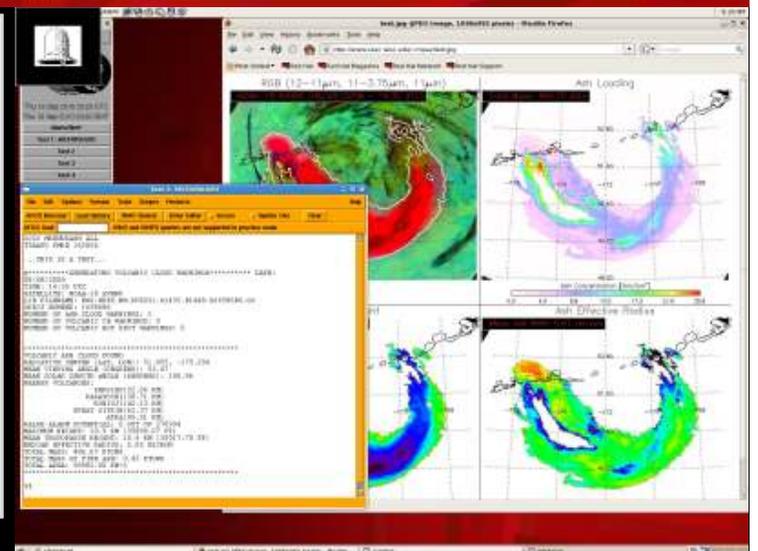
There was an insufficient amount of bandwidth between NESDIS and the Network Control Facility (NCF), so in 2009, CIMSS worked with NESDIS to obtain the code for adequately formatting the POES/AVHRR imagery into the standard distributable GINI format (AWIPS I/II decoder compliant), and adapting it to run in real-time at the University of Wisconsin.



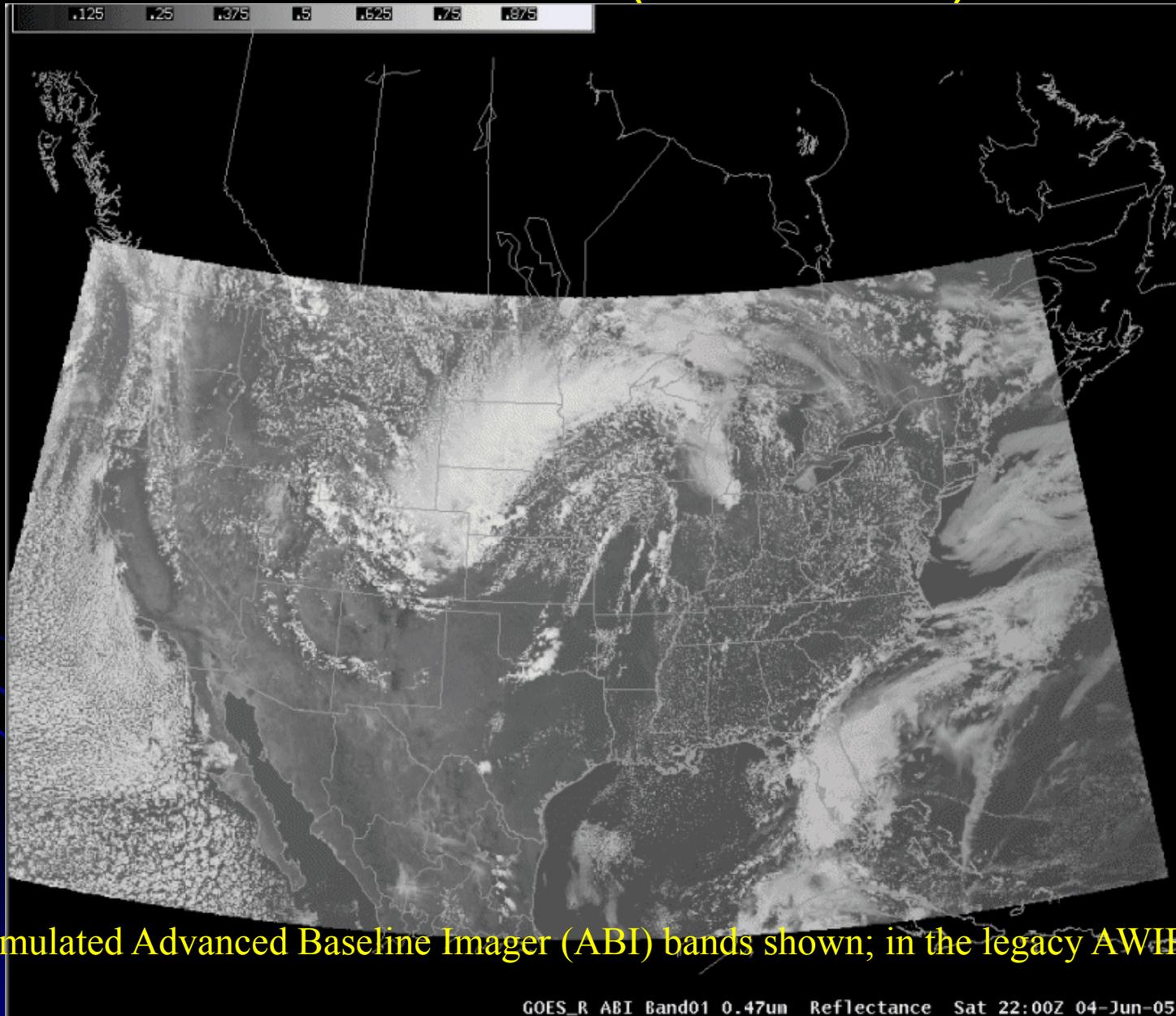


CIMSS Development with GFE/IC4D

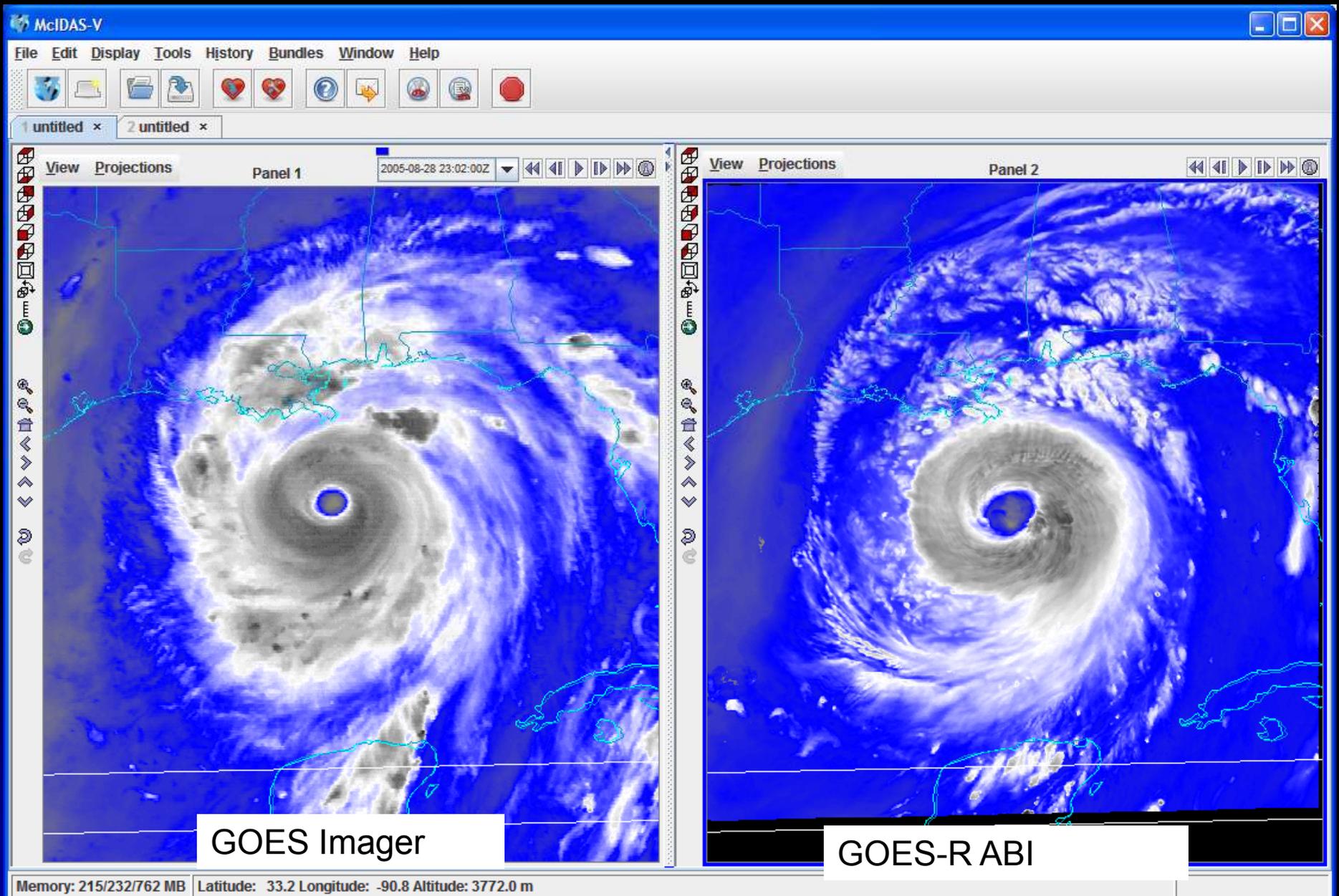
- Integrating GOES-R algorithm volcanic ash products (Mike Pavolonis) into GFE/IC4D via AWIPS to support the Alaska Aviation Weather Unit (AAWU)
- Considering how to make cloud/flight levels efficiently editable and further extend software for development of new low cloud and fog products



ABI in AWIPS (via netCDF)

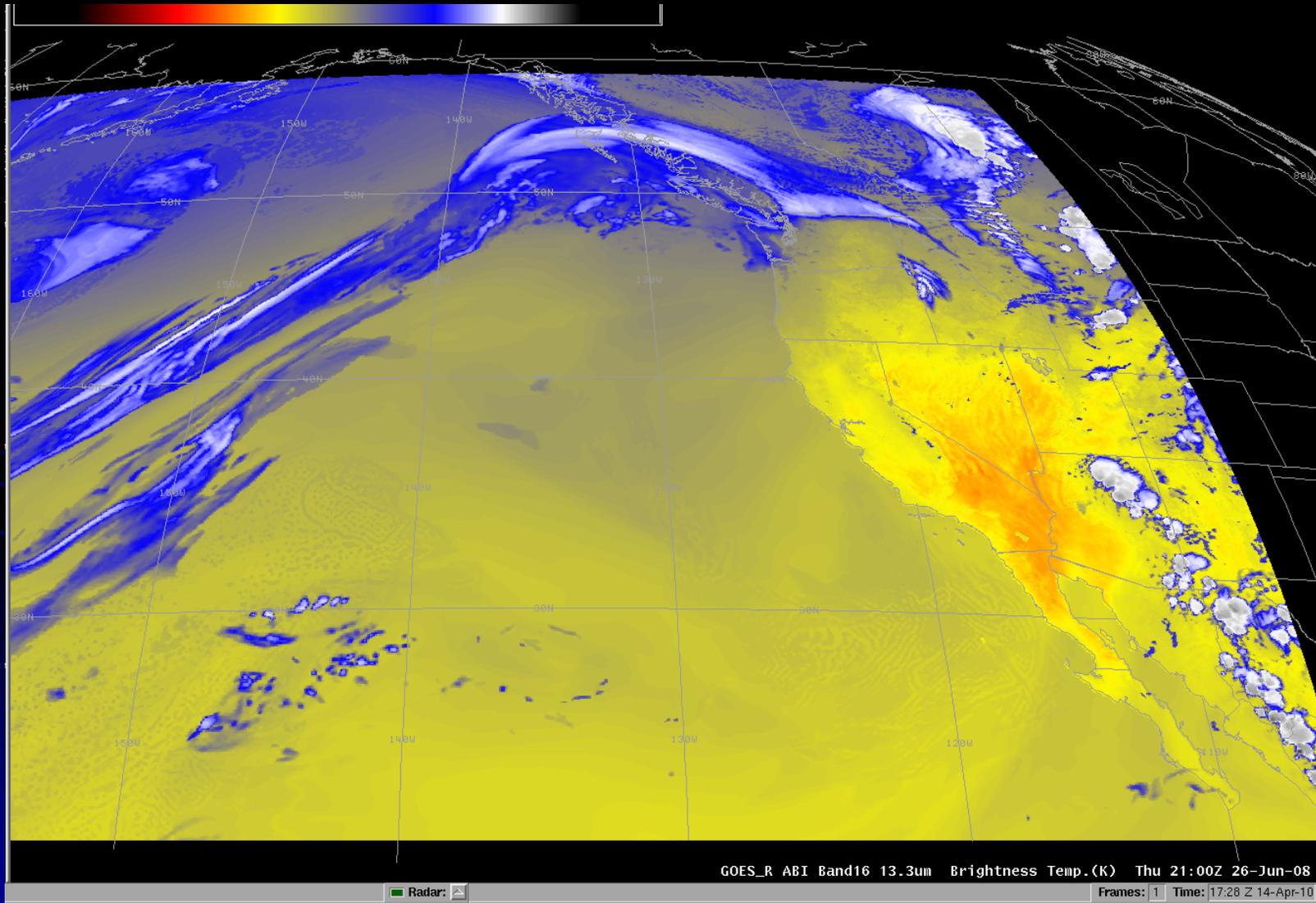


Simulated Advanced Baseline Imager (ABI) bands shown; in the legacy AWIPS.



One image is simulated, the other observed from current GOES Imager. Shown in McIDAS-V.

ABI WES case: Added a set of ABI simulated images from 21Z on Jun 26, 2008



2011 UW-CIMSS PG Testbed Demonstrations

- HWT Spring Experiment at SPC/NSSL (May-June 2011)
- Local NWS WFO testbed (MKX, June – Sept 2011)
- Aviation Weather Center (June – November 2011)
 - Low cloud/fog, convective initiation, nearcasting, Volcanic ash, SO₂, icing
- Ocean Prediction Center/Hydrological Prediction Center and NESDIS Satellite Analysis Branch (August 2011 – February 2012)
 - Cloud top temperature/phase/height, overshooting top, imagery

2011-2012 PG Testbed Demonstrations (cont)

- Pacific Region Demonstration (2011-2012, UH)
 - Convective initiation, TPW, volcanic ash, SO₂
- Hurricane testbed (July – September 2011)
 - Hurricane Intensity Estimate and overshooting-top
- High Latitude Testbed and Alaska Region (2011)
 - Cloud/Snow discrimination, cloud phase, volcanic ash, SO₂, and low cloud/fog using MODIS/AVHRR
- NWS Operational Testbed (TBD, John Ogren)
- Future field campaigns (DC3, Brazil, possible elevated convection focus)

WFO Evaluation Partner – and - Provider Agreement

To be considered a GOES-R Proving Ground “Evaluation Partner”, please document the following:

1. WFO Name: Milwaukee/Sullivan (MKX)
2. Provider POC: Wayne Feltz
3. WFO POC: Jeff Craven, SOO
4. Training:
 - a. Provider POC: Jordan Gerth
 - b. WFO POC: Marcia Cronce
5. GOES-R product information (for each product):
 - a. Product Name: NSSL WRF Synthetic Water Vapor
 - b. WFO Application: Thunderstorm/precipitation forecasting
 - c. Product Name: GOES Cloud Phase product
 - d. WFO Application: Precipitation type, convective initiation
 - e. Product Name: GOES Low Cloud and Fog product
 - f. WFO Application: Short term (0-6 hour) cloud and aviation forecasts
6. Date product(s) to be delivered to WFO: May 17 2011
7. Date product(s) to be integrated/tested within AWIPS (NAWIPS or AWIPS II):
June 7th 2011
8. Date of training: May 23rd 2011
9. Resources required: One MKX operational forecaster and one CIMSS developer for 6-8 hours one day per week, normally Tuesdays. CIMSS developer would travel to WFO MKX to work a special CIMSS GOES R shift with an operational forecaster, who will be devoted to this one-on-one interaction and evaluation
10. WFO POC Jeff Craven will provide a 20 minute invited oral presentation on Thursday October 20th at joint NWA Annual Meeting and 7th GOES Users' Conference (subject to availability of funding via GOES R Program).
11. Dates of demonstration: June 1st through October 31st 2011
12. Final Report delivery date: Dec 15th 2011

Signatures include:

MIC/SOO _____

SSD Chief: _____

PG Provider POC: _____

Problems/Issues/Discussion (after three years)

- PG still needs some **flexibility** to address user needs on a timely basis (e.g., customer responsiveness).
 - should be able to supply requested products to users without having to wait for the next years plan.
- Single satellite POC at each testbed to make sure intergration is successful (this works -> HWT), take advantage of product integration and lessons learned
- CIMSS is not 24/7 operational and there will be hiccups with testbed feeds. Helps confirm if forecasters are actually looking at the data though.
- AWIPS-2 risk reduction/training, HWT tried but not stable, take advantage of testbed opportunities for additional shake down
- Formalizing WFO feedback via regional headquarters without saturating Cooperative Institutes

Problems/Issues/Discussion

- Training should be mandatory prior to intense operational testbed period so forecasters understand context, but it does take “months” to develop and adequately train (developers working with Visitview experts, beta testing in front of select forecasters, then publishing), we train the future trainers
- Face-to-face collaborations provide most opportunity for success (developers sitting with operational staff)
- With CIMSS responsibility for over a dozen GOES-R PG proxy products and 6 new testbeds in spin up mode, there will be new challenges so patience, patience, patience...
- Testbed developers should think outside of box when interacting with relatively new option 2 products (example: OTTC for tropical genesis)