



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

The GOES-R Proving Ground

Jim Gurka

NOAA/NESDIS/GOES-R Program Office

Timothy J. Schmit

NOAA/NESDIS/Satellite Applications and Research

Advanced Satellite Products Branch (ASPB)

Mark DeMaria

NOAA/NESDIS/Satellite Applications and Research

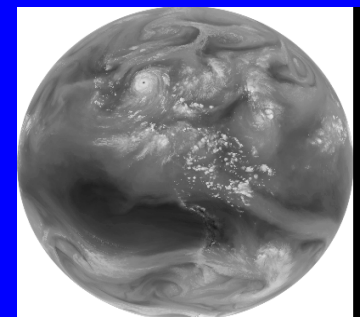
Regional and Mesoscale Meteorology Branch (RAMMB)

Tony Mostek

NOAA/NWS/OCWWS/Training Vision

SATB

**Camp Springs, MD
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Outline

- GOES-R Proving Ground – what it is and what it's not.
- Proving Ground -- current examples
- Plans

Overview

- GOES-R Proving Ground – forecaster/AWIPS focused, to prepare for the GOES-R information. Get real-world experience by leveraging existing resources to prepare for the GOES-R era. Product tailoring. Coordinate with the NWS. Connections with NOAA operational offices are critical!
- What it is not – another algorithm development testbed, basic research, researcher-focused, product algorithm development, science fair, etc.

NOAA Developmental Test Beds

- NOAA Hazardous Weather Test Bed (HWT)
- National Wx Radar Test Bed (NWRT) <http://www.nssl.noaa.gov/hwt/>
- NOAA Hydrometeorological Test Bed (HMT) <http://hmt.noaa.gov/>
- NOAA, Navy, NASA (USWRP) Joint Hurricane Test Bed (JHT)
<http://www.nhc.noaa.gov/jht/index.shtml>
- NOAA Climate Test Bed - www.cpc.noaa.gov/products/ctb/
- NOAA Aviation Weather Test Bed <http://aviationweather.noaa.gov/testbed/>
- NOAA/NCAR Development Test Center (DTC-WRF)
<http://www.dtcenter.org/index.php>
- NOAA Joint Center for Satellite Data Assimilation (JCSDA)
<http://www.jcsda.noaa.gov/>
- NOAA High Impact Weather Test Bed (HIWT)
- NOAA/USAF Space Weather Test Bed
- NPOESS Aircraft Sounder Test Bed
- NOAA Unmanned Aircraft Systems Test Bed
- NOAA/NCAR/DOD NWP Test Bed, Boulder, CO

Proving Ground Concept for GOES-R

- The GPO funded CI nearby NWS forecast offices
- FY 08 – 16
- Locations:
 - Ft. Collins (CIRA)/BOU and CYS
 - Madison (CIMSS)/LaCrosse, Sullivan WFOs
 - Leverage existing Testbeds – Norman, Boulder, Huntsville (SPoRT)



Recommendations from GUC-4:

–Proving Ground/ Testbed Concept

- Proving Ground is ultimate program to provide tools to ensure user readiness
 - Use proxy and simulated data sets to test and validate processing and distribution systems
 - Validate new or improved products
 - Validate/ optimize decision aids
 - Optimize product display techniques
 - Environmental event simulator for user education
- Venue for direct user input
- Proven successful in NEXRAD program



Background (CIMSS w/ STAR)

- Under separate (limited) funding, CIMSS has already initiated a number of activities that serve as a “*Satellite Proving Ground*” for new satellite products that are not yet operationally available in the National Weather Service (NWS) Advanced Weather Interactive Processing System (AWIPS) environment and possibly other NOAA operational systems.
- Allows interested NWS forecast offices to become involved in the early evaluation of these new satellite products by adding them to their local AWIPS workstations. The new satellite products that are not available in AWIPS can potentially be added to AWIPS (via Unidata Local Data Manager subscription).
- The success of this preliminary work has been confirmed by NWS staff survey results showing that 70% of forecasters believe MODIS products are useful in operations, and the fact that MODIS data and products have been mentioned in over 40 different NWS Area Forecast Discussions (AFDs) to date.

Background (CIMSS w/ STAR)

- Currently at least 15 NWS sites are using MODIS data from CIMSS.

Milwaukee/Sullivan, Wisconsin

La Crosse, Wisconsin

Indianapolis, Indiana

Springfield, Missouri

Wichita, Kansas

Spokane, Washington

Des Moines, Iowa

Spaceflight Meteorology Group, Johnson Space Flight Center

Riverton, Wyoming

Davenport, Iowa (Quad Cities)

Billings, Montana

Aberdeen, South Dakota

Reno, Nevada

Green Bay, Wisconsin

Duluth, Minnesota

- The suite of UW satellite products currently being prepared for dissemination in AWIPS include:

MODIS imagery and products (select radiances, SST, cloud information, TPW and the fog product),

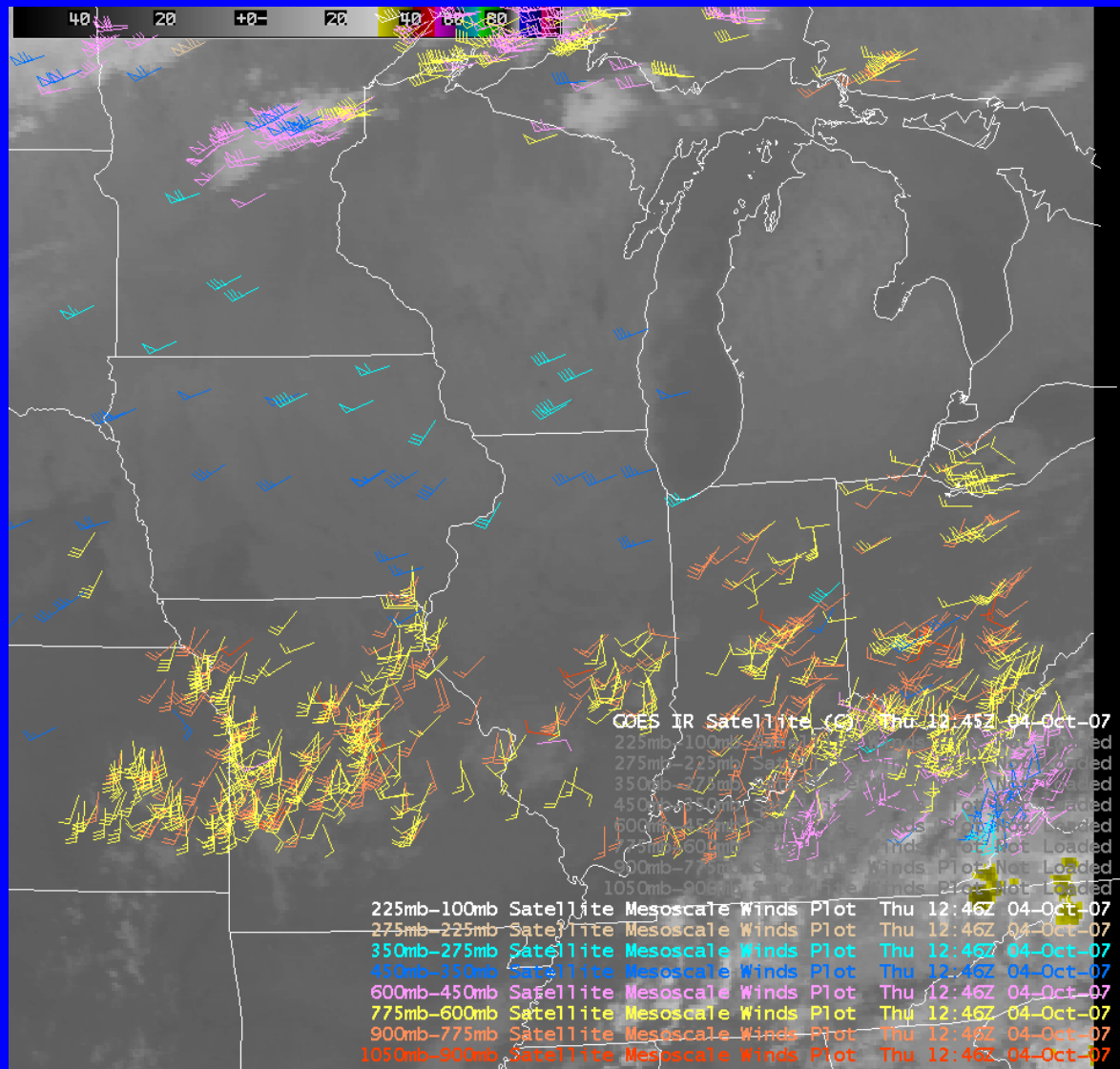
experimental GOES sounder derived product imagery,

GOES imager mesoscale winds, and

CRAS regional forecast synthetic satellite imagery.

CIMSS proposes to broaden (a combination of more offices and/or more products) the current activities in order to develop a comprehensive Proving Ground for GOES-R products.

CIMSS “Satellite Proving Ground” - NOAA’s Cooperative Institute for Meteorological Satellite Studies (CIMSS) is engaging in activities that serve as a “Satellite Proving Ground” for new satellite products that are not yet operationally available in the National Weather Service (NWS) (AWIPS) environment.



A comparison of the experimental GOES “mesoscale winds” and the corresponding operational GOES “high density winds” that were available in AWIPS during that same 90-minute time period showed a notable improvement in satellite-derived atmospheric motion vector coverage (both spatially and temporally) using the CIMSS mesoscale winds.

Transitioning Satellite Imagery from Research to Operations

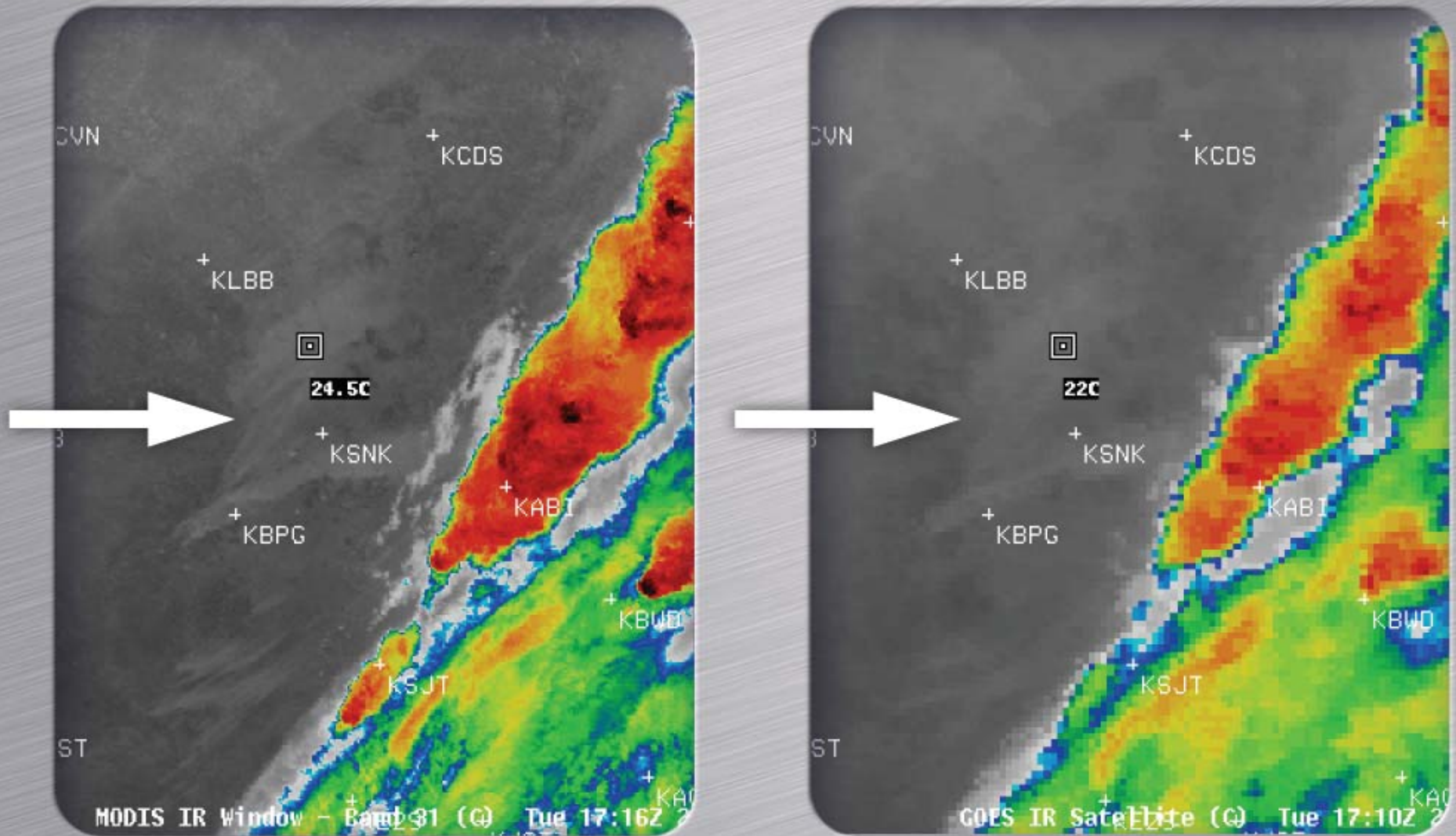
Jordan Joel Gerth

Undergraduate Atmospheric and Oceanic Sciences Student
University of Wisconsin – Madison

National Weather Association Annual Meeting
Wednesday, October 17, 2007

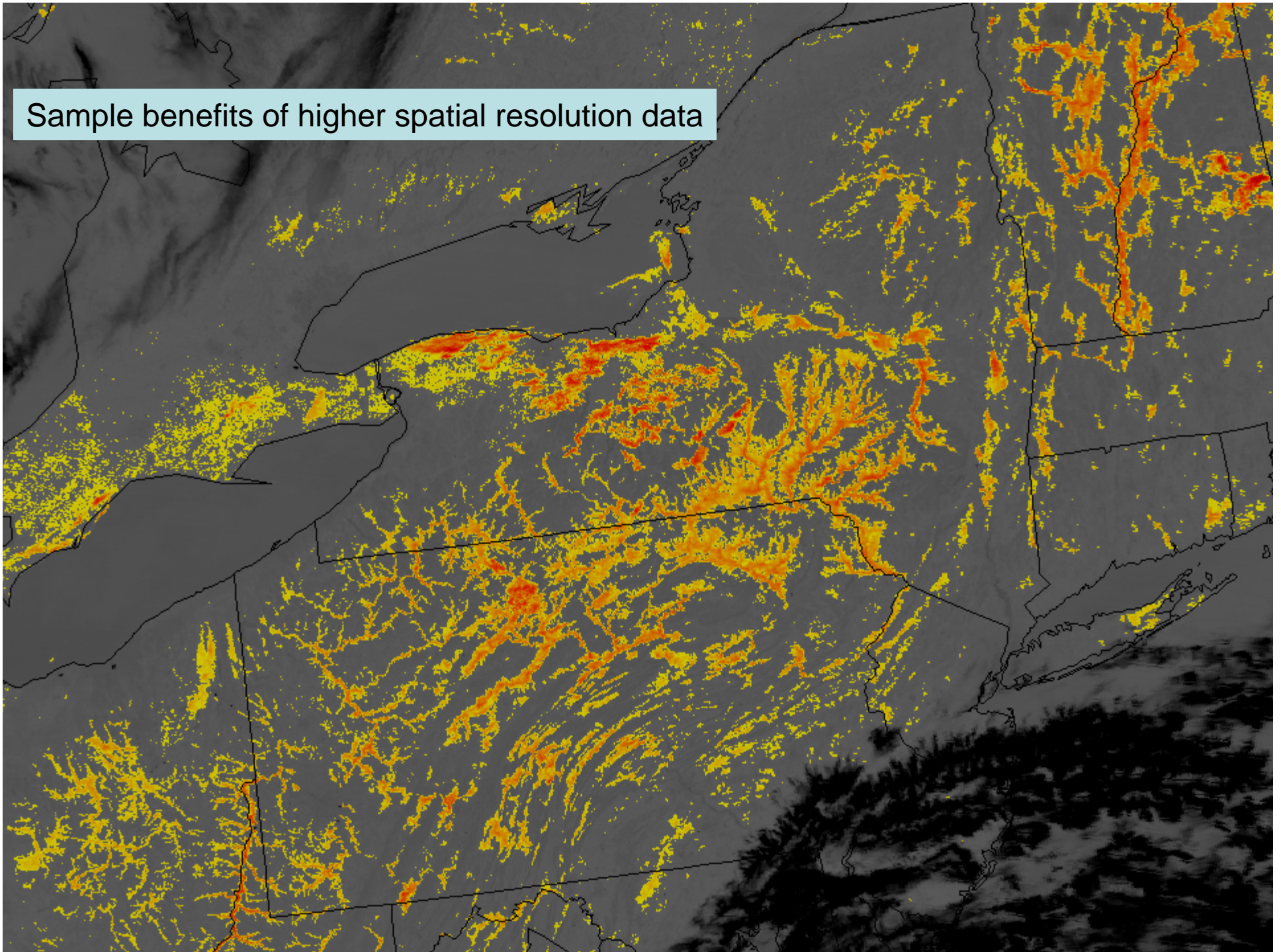
MODIS Imagery in AWIPS

MODIS vs GOES IR Window Channel

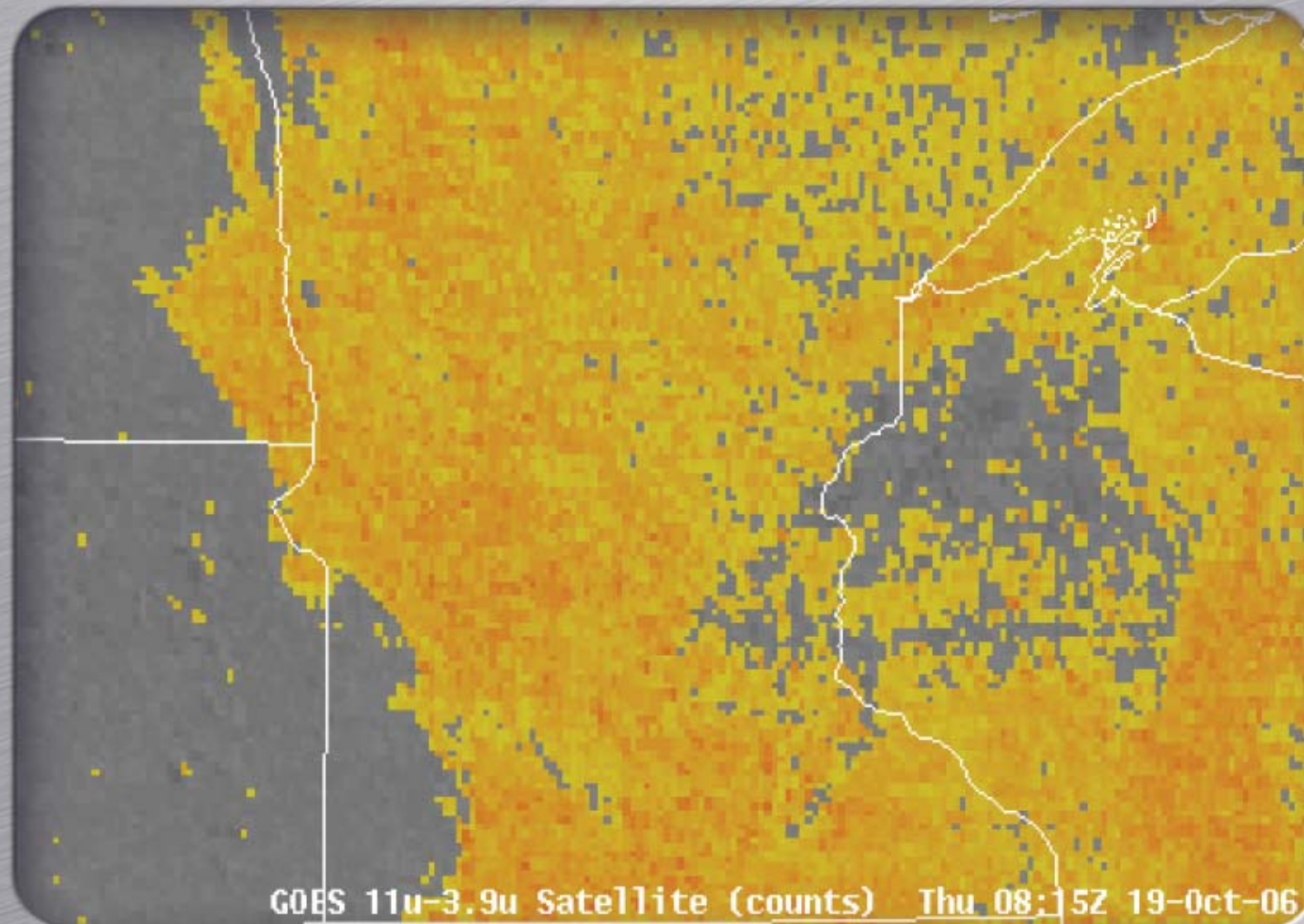


Improved detection of soil moisture gradients

Sample benefits of higher spatial resolution data

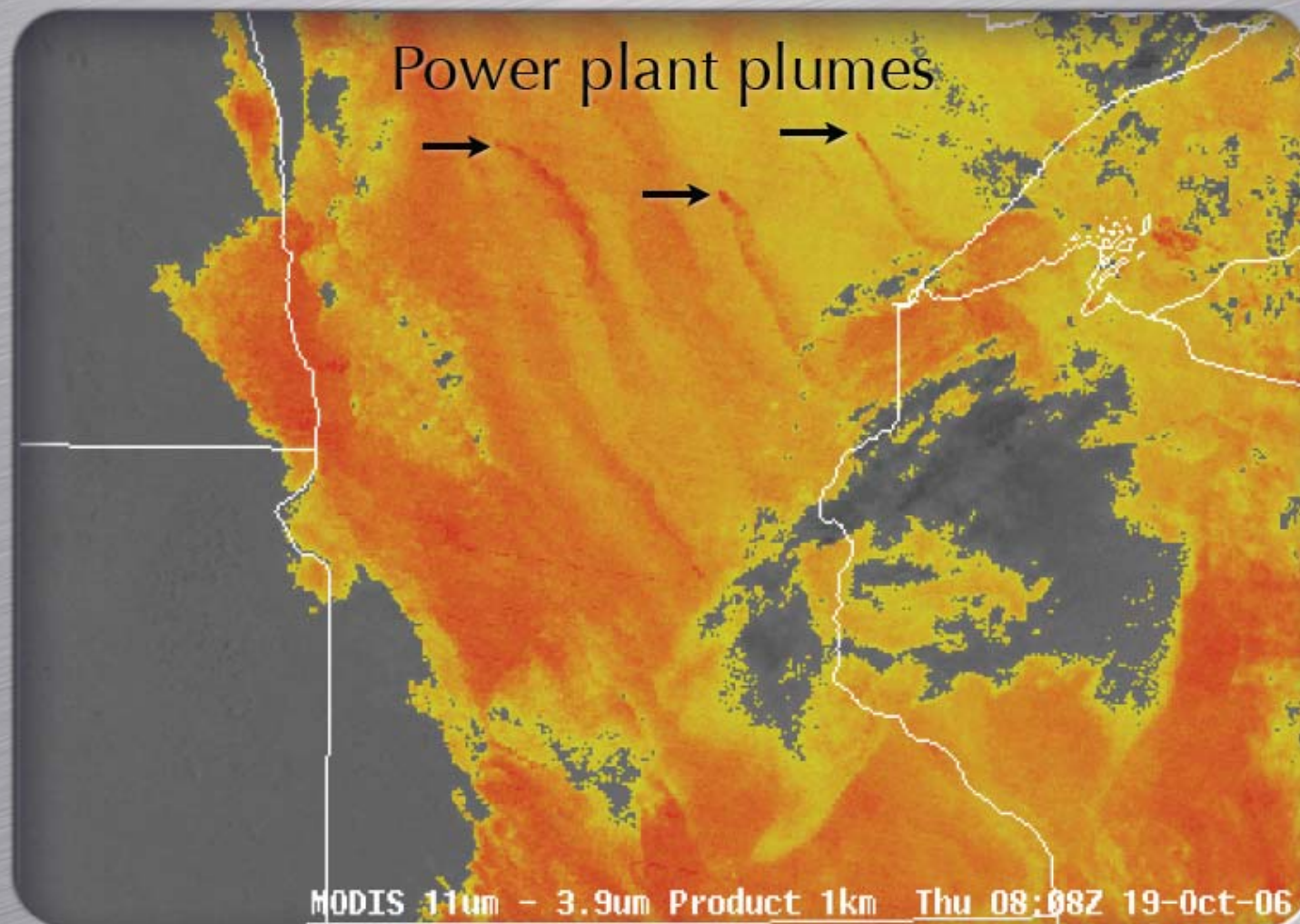


MODIS Imagery in AWIPS



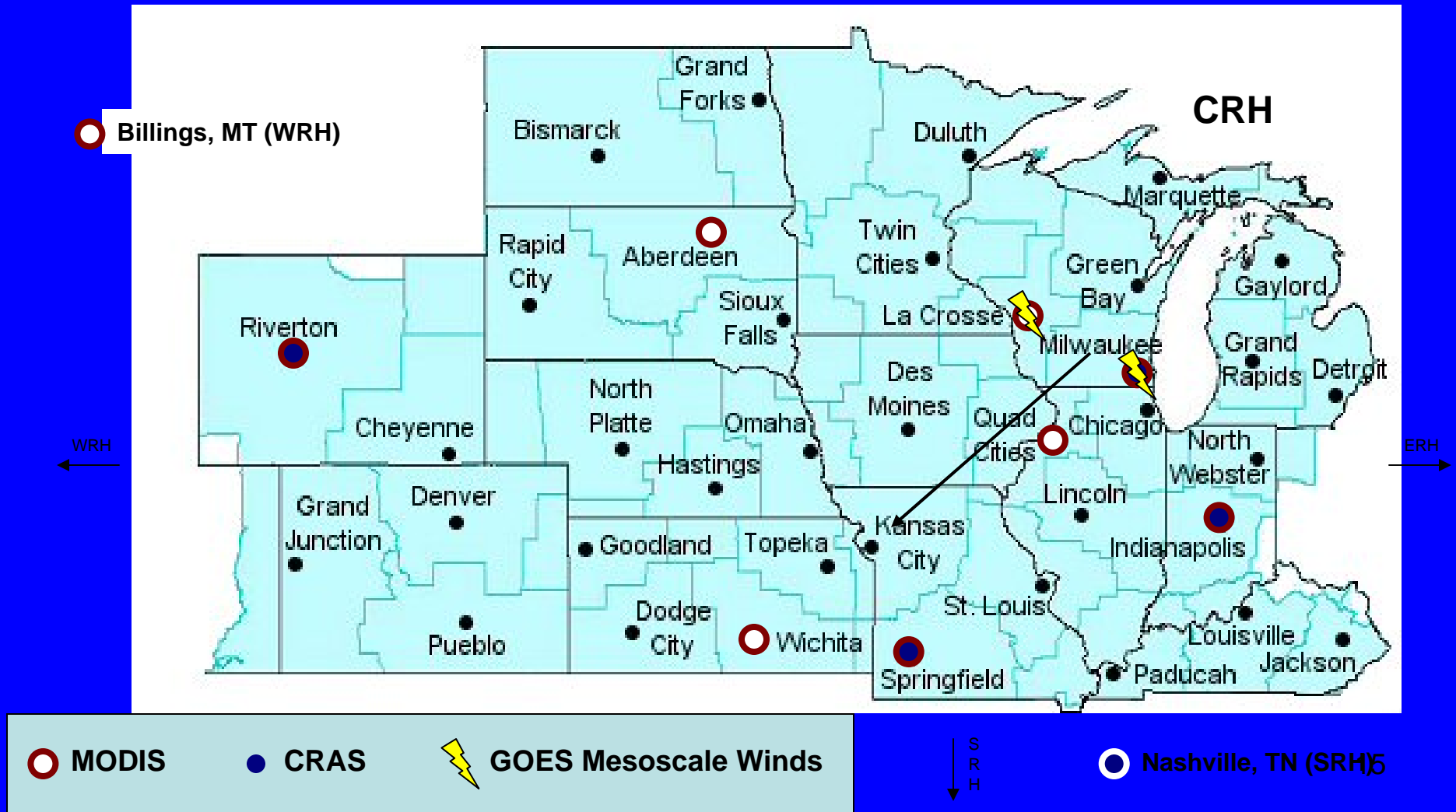
Fog/stratus product: Improved stratus edge detection

MODIS Imagery in AWIPS



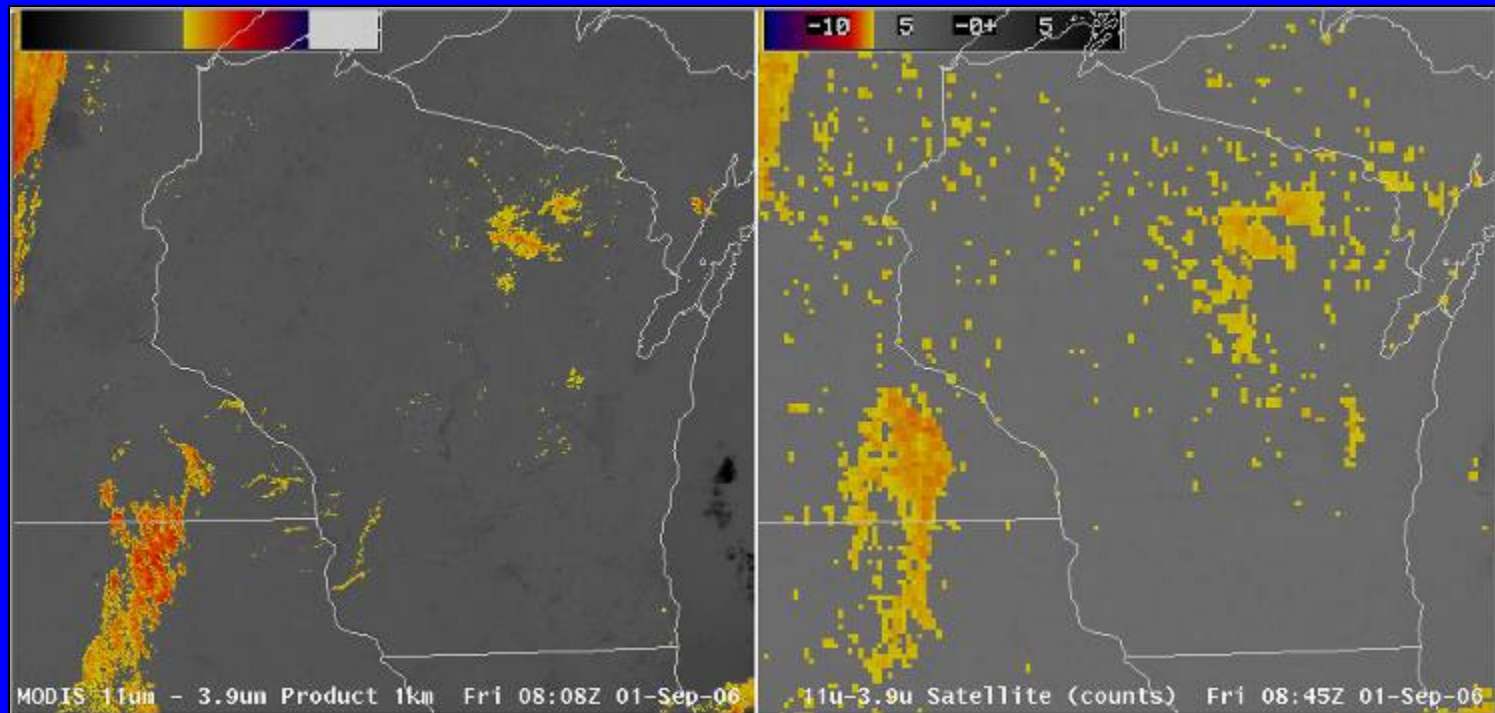
Fog/stratus product: Improved stratus edge detection

CIMSS/SSEC Imagery Distribution Network



Area Forecast Discussion

MAIN SHORT TERM FORECAST PROBLEM IS EAST FLOW AND MARINE LAYER INFLUENCE OVER EASTERN WISCONSIN...AND DENSE FOG POTENTIAL IN THE WEST. THINK MOST OF THE DENSE FOG WOULD BE IN THE RIVER VALLEYS...WITH A TENDENCY FOR PATCHY FOG AND SOME STRATUS AGAIN IN THE EAST WITH MORE OF A GRADIENT. MODIS 1 KM IMAGERY LAST NIGHT SHOWED THE DENSE FOG IN LONE ROCK AND BOSCOBEL WAS CONFINED TO THE IMMEDIATE WISCONSIN RIVER VALLEY...IMPORTANT INFORMATION. THE LOCAL RIVER VALLEY DENSE FOG IS NOT SEEN IN THE NORMAL 2 KM [4 km] GOES. (HENTZ/MKX)



Plans (CIMSS w/ STAR)

1. Use high-spectral resolution IASI to simulate the ABI spectral bands. Use IASI and possibly AIRS to produce DPI in near real time over CONUS in the same format as the current GOES Sounder and put into AWIPS. Products would include (at least) TPW, LI, and K-Index.
2. Extend the number of MODIS products available through AWIPS, including the addition of additional stability indices and adding more true color image accessibility.
3. Expand interaction with and feedback from the NWS, including the addition of more participating offices, more forecaster product utility surveys and NWS office site visits. In addition, this work will be presented at relevant meetings.
4. Acquire additional forecaster comments. Develop and implement an evaluation technique with the NWS. Adjust algorithms/displays according to feedback. Document findings.
5. Investigate/test AWIPS-II early access and product demonstration. We have been asked to be part of the AWIPS-II evaluation team, but have not done so to date.
6. Investigate how the Normalized Difference Vegetation Index (NDVI) and Land Surface Temperature (LST) can be used for forecasting applications. Investigate and implement methods to improve image quality.

Plans (w/ STAR CIMSS)

Additional proposed CIMSS activities for a GOES R Proving Ground in FY2008

1. Develop imagery and data showing time trends with polar-orbiting data in the Alaska region. Establish product demonstration, training and feedback relationship with Anchorage and Fairbanks NWSFOs.
2. Create simulated (synthetic) GOES-R datasets, including forecast images of ABI bands using a regional model, such as WRF. This would build upon the forecast image capability demonstrated with the CRAS.
3. *Environmental event simulator for user education* Use historical simulated ABI synthetic data sets to build case studies demonstrating the utility of the ABI data. This leverages the WES (Weather Event Simulators) and GOES-R AWG proxy efforts.

Background (CIRA w/ STAR)

- CIRA already established In-house AWIPS
 - NOAAPort data ingest
 - AWIPS D2D
 - Weather Events Simulator (WES)
- Variety of experimental GOES-R products being developed under GOES-R3 project
 - Hazards (fog, smoke, fires volcanic ash)
 - Severe weather
 - Tropical cyclones
 - Winter weather
 - Cloud climatologies
- CIRA has many on-going NWS Forecast Office and NCEP collaborations
 - VISIT, SHyMet and COMET training programs
 - GIMPAP program
 - Joint Hurricane Testbed
 - NCEP Storm Prediction Center Severe Weather Testbed
 - Interaction with OAR/ESRL on AWIPS development
- Proving ground will increase interaction with neighboring offices
 - Boulder, Cheyenne
- Develop distributed interactions
 - NCEP TPC, HPC, SPC, OPC, SWPC
 - Additional NWS forecast offices
 - River Forecast Centers offices

Plans (CIRA w/ STAR)

1. FY08 – Initial establishment of Proving Ground
 - Equipment purchases for more robust product development
 - Initial site visits to Boulder, Cheyenne offices
 - Coordination with CIMSS for training on moving products to NWS AWIPS
 - Support for computer, meteorologist and program management personnel
 - Develop initial set of prototype products
 - GOES-R RAMSDIS On-Line
 - NRL NextSat products
 - CIMSS MODIS products
 - Additional products from other proxy data (IASI, AVHRR, etc)
 - Initial development of training materials
2. FY09 and beyond
 - Expansion to distributed proving ground
 - Workshops for participants
 - Feedback from participants
 - NPP proxy data
 - Interaction with NWS on AWIPS-II

CIRA and NRL Experimental Product Web Pages

NexSat
NRL/NPOESS Next-Generation Weather Satellite Demonstration Project

Region/Sector
/Full/Overview
Pass_Predictor

Headlines: Pacific Rainstorms Archived: articles.
IMPORTANT! before bookmarking any page select "Latest" otherwise you will return to an old image.

Products
[Visible](#)
[Infrared](#)
[Vapor](#)
[True Color](#)
[GEO-Color](#)
[Cloud Tops](#)
[Cloud Layers](#)
[Cirrus](#)
[Snow Cover](#)
[Rain Rates](#)
[Rain Totals](#)
[Contrails](#)
[BioMass](#)
[CloudSat](#)
[Winds](#)
[Low Cloud](#)
[Model Overlays](#)
[Night Visible](#)
[tpw_anomaly](#)

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Simulated-ABI Experimental Products from GOES-R

20080122 - RAMSDIS Online will not be updating for several weeks while our building undergoes renovations.

Below are experimental products that are being developed for application to the **GOES-R Advanced Baseline Imager (ABI)**. Some of these products use ABI-equivalent spectral bands from Meteosat Second Generation (MSG) over Europe or Africa, others use spectral bands available on current GOES (either GOES-west/12 or GOES-east/11) over the U.S.. For any of the products, a click on the "Loop" or "Latest Image" words next to the product being up either a loop of several images of the product (for the last few hours), or a larger current image of the product, respectively.

Simulated GOES-R Fog/Stratus Product

[Loop](#)
[Latest Image](#)
[Download Loop](#)

The fog/stratus product (above) is a 3-color product that employs spectral bands at 0.6 um, 1.6 um, and the shortwave albedo (derived from the 3.9 and 10.8 um bands), for the red, green, and blue components respectively. Snow-covered ground is red; high-level cirrus/ice clouds are orange; lower-to-middle-level stratus/water clouds are white with a blue tint; fog (on or near the ground) is white with a yellow tint, and most land surfaces are green. At night, when the visible images are dark, the product reverts to the shortwave albedo, with fog and stratus (water droplet clouds) displayed as white or lighter shades and cirrus (ice clouds) displayed as darker shades. Weather symbols are plotted on the images as available at surface observation locations.

Simulated GOES-R Dust Product

[Loop](#)
[Latest Image](#)
[Download Loop](#)

The blowing dust product (above) is a MSG longwave split-window (10.8 minus 12.0 um) difference product that employs a special color enhancement to emphasize the negative temperature differences associated with blowing dust. Clouds are masked out of the image (in white) and positive temperature differences are not colored (in gray). Negative temperature differences from 0 K to -1 K are yellow; from -1 K to -2 K are orange; and from -2 K to -3 K are red. **Yellow** areas have the potential for dust, but **blowing dust** is generally noted by **orange** and **red** colors.

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Currently Active Tropical Cyclones

Last Updated 0 Minutes Ago

Atlantic	Eastern Pacific	Central Pacific	Southern Hemisphere
No Currently Active Cyclones	No Currently Active Cyclones	No Currently Active Cyclones	No Currently Active Cyclones
Western Pacific	North Indian Ocean		
No Currently Active Cyclones	No Currently Active Cyclones		

SH152008 - Tropical Cyclone GENE

SH162008 - Tropical Cyclone NONAME

Summary

- The Satellite Proving Ground concept has started
- This effort will allow for the research-to-operations process to become more widespread, effective and longer-term.
- The views, opinions, and findings contained in this presentation are those of the authors and should not be construed as an official NOAA (National Oceanic and Atmospheric Administration) or U.S. Government position, policy, or decision.

