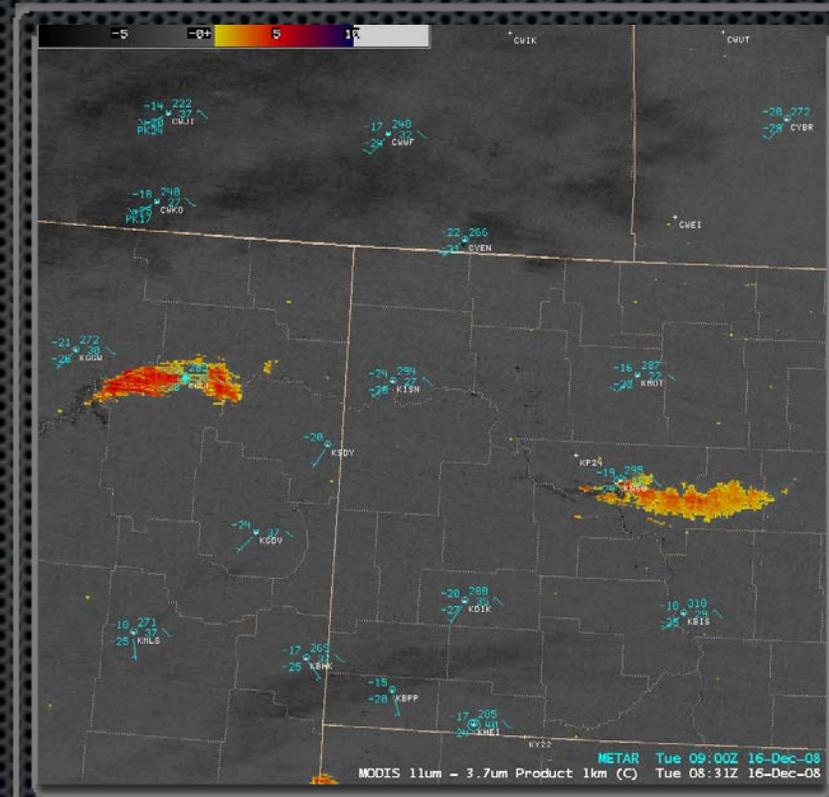
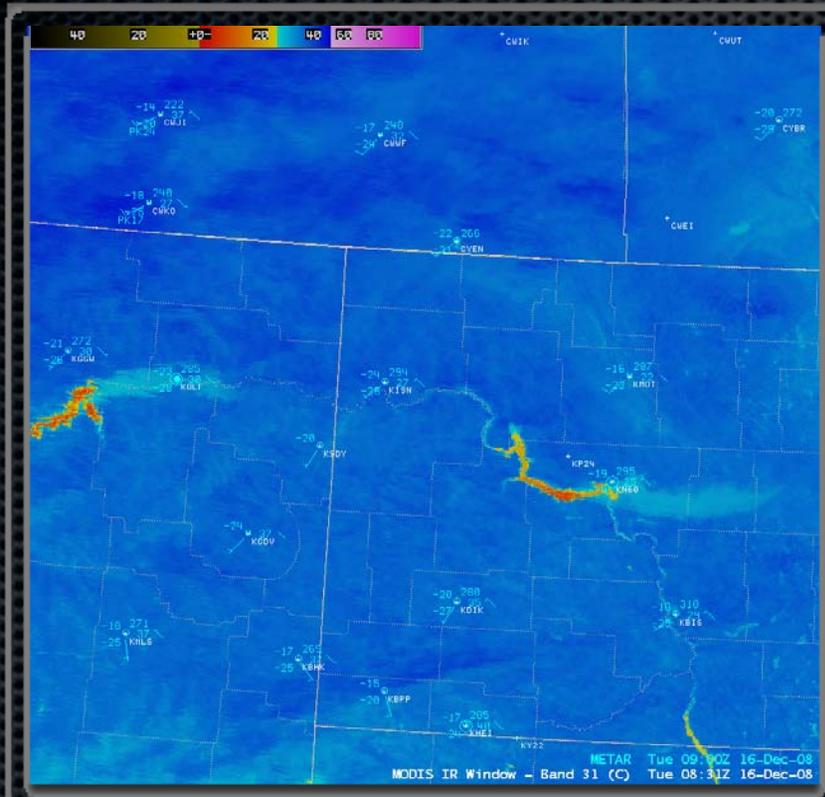


Satellite Training Activities at CIMSS: Helping to Prepare Forecasters for the GOES-R and NPOESS Era

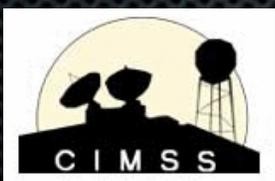
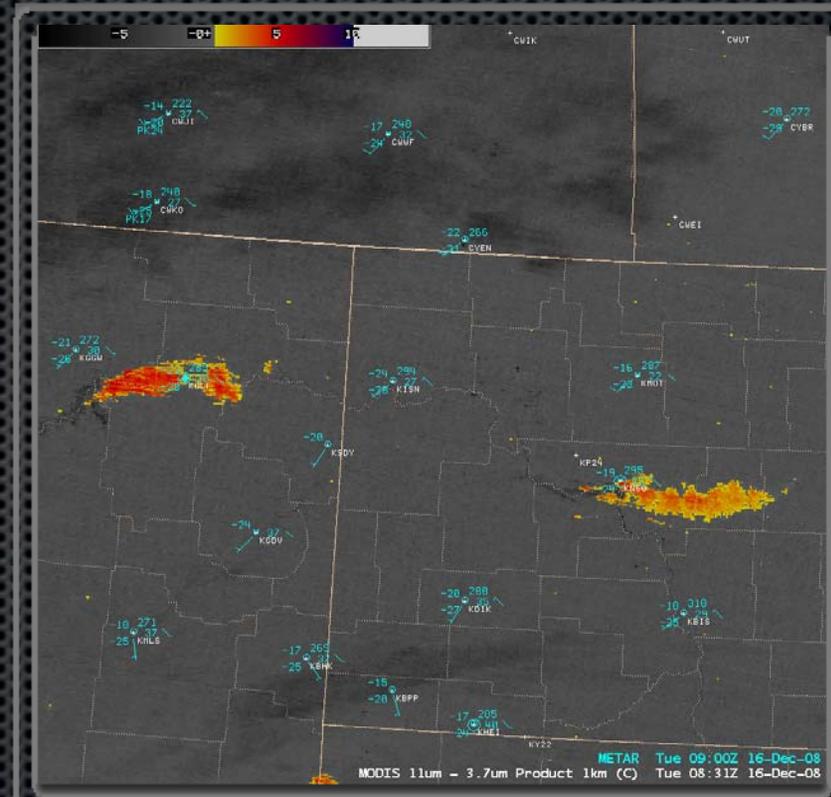
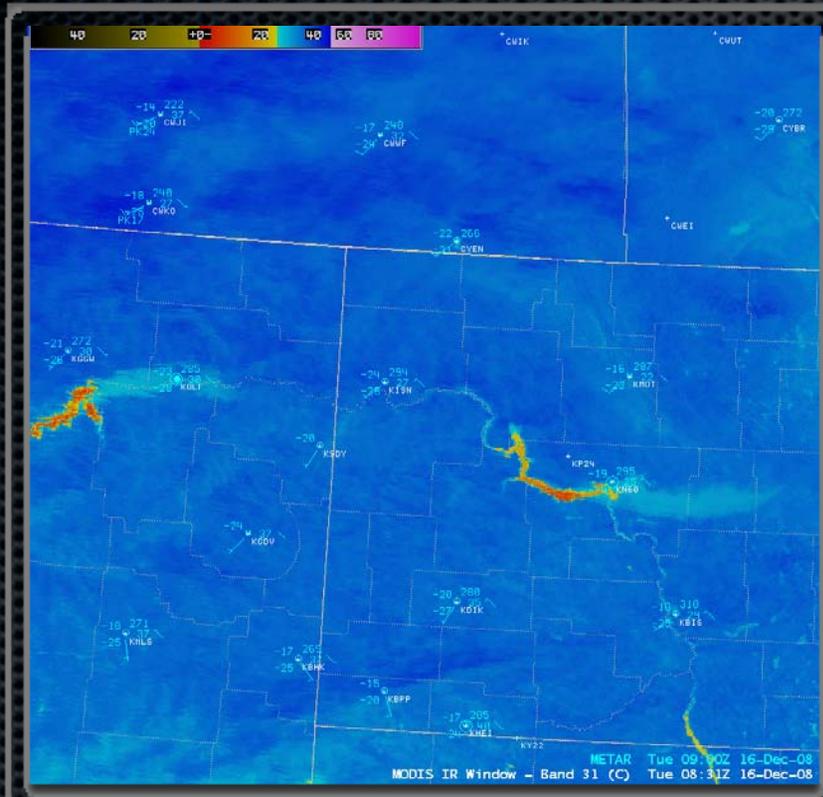


Scott Bachmeier, Jordan Gerth

Cooperative Institute for Meteorological Satellite Studies
Space Science and Engineering Center
University of Wisconsin - Madison



Satellite Training Activities at CIMSS: Helping to Prepare Forecasters for the GOES-R and NPOESS Era



CIMSS “Satellite Proving Ground” Activities

(1) Distribution of CIMSS Satellite products into AWIPS:

- MODIS images and products
- GOES Sounder products
- GOES Mesoscale Winds
- CRAS model synthetic (forecast) satellite imagery
- Convective Initiation product suite

CIMSS "Satellite Proving Ground" Activities

(2) Hosting "GOES-R Proving Ground" site

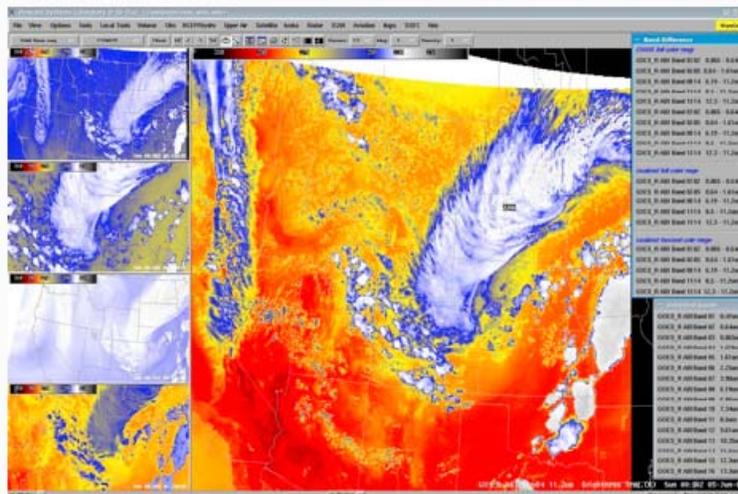
cimss.ssec.wisc.edu/goes_r/proving-ground.html



GOES-R Proving Ground



[» Home](#) [» GOES-R Proving Ground](#)



Simulated GOES-R ABI imagery in AWIPS

GOES-R Satellite Proving Ground Mission Statement

The Geostationary Operational Environmental Satellite ([GOES-R](#)) Satellite Proving Ground project engages the National Weather Service (NWS) forecast and warning community in pre-operational demonstrations of selected capabilities anticipated from the next generation of National Oceanic and Atmospheric Administration (NOAA) geostationary earth observing systems.

The Proving Ground project objective is to bridge the gap between research to operations by:

- Utilizing current systems (satellite, terrestrial, or model/synthetic) to emulate various aspects of future GOES-R capabilities
- Infusing GOES-R products and techniques into the NWS operational environment, with emphasis on the Advanced Weather Information Processing System (AWIPS) and transitioning to AWIPS-II.

Resources

- [CIMSS "MODIS Imagery in D-2D"](#)
- [CIMSS Proving Ground Products](#)
- [CIRA Proving Ground Products](#)
- [SPoRT Proving Ground Products](#)

- [NWS Collaborative Site Visits](#)

- [GOES-R ABI Bands](#)

- [GOES-R ABI Weighting Function Examples](#)

Real-time GOES-13 data

- [GOES-13 Image Browser](#)

- [GOES-13 \("GOES-Central"\) Sounder DPI](#)

- [GOES-13 Visible Imagery](#)

CIMSS “Satellite Proving Ground” Activities

(3) Preparation of two AWIPS Weather Event Simulator (WES) cases

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

16th Conference on Satellite Meteorology:
Poster— GOES-R Proving Ground Plans for a Weather Event Simulator
Tim Schmit, Justin Sieglaff, Kaba Bah, Jordan Gerth, Jason Otkin , Wayne Feltz, James Gurka

- As part of the Proving Ground, CIMSS will prepare two Weather Event Simulator (WES) cases.
 - Leveraging AWG Proxy data.
- CONUS simulations for a convective outbreak (June 4-5, 2005) and also Hurricane Katrina (August 28, 2005) will be used.
 - Combination of NWP data and advanced radiative transfer models to simulate all ABI bands.

GOES-R ABI band 6 2.25 mic reflectance Sat 21:02:28 Aug-05

Katrina ABI simulation in AWIPS (ABI band 6 at 2.25 micrometers)

AMS 2009

CIMSS “Satellite Proving Ground” Activities

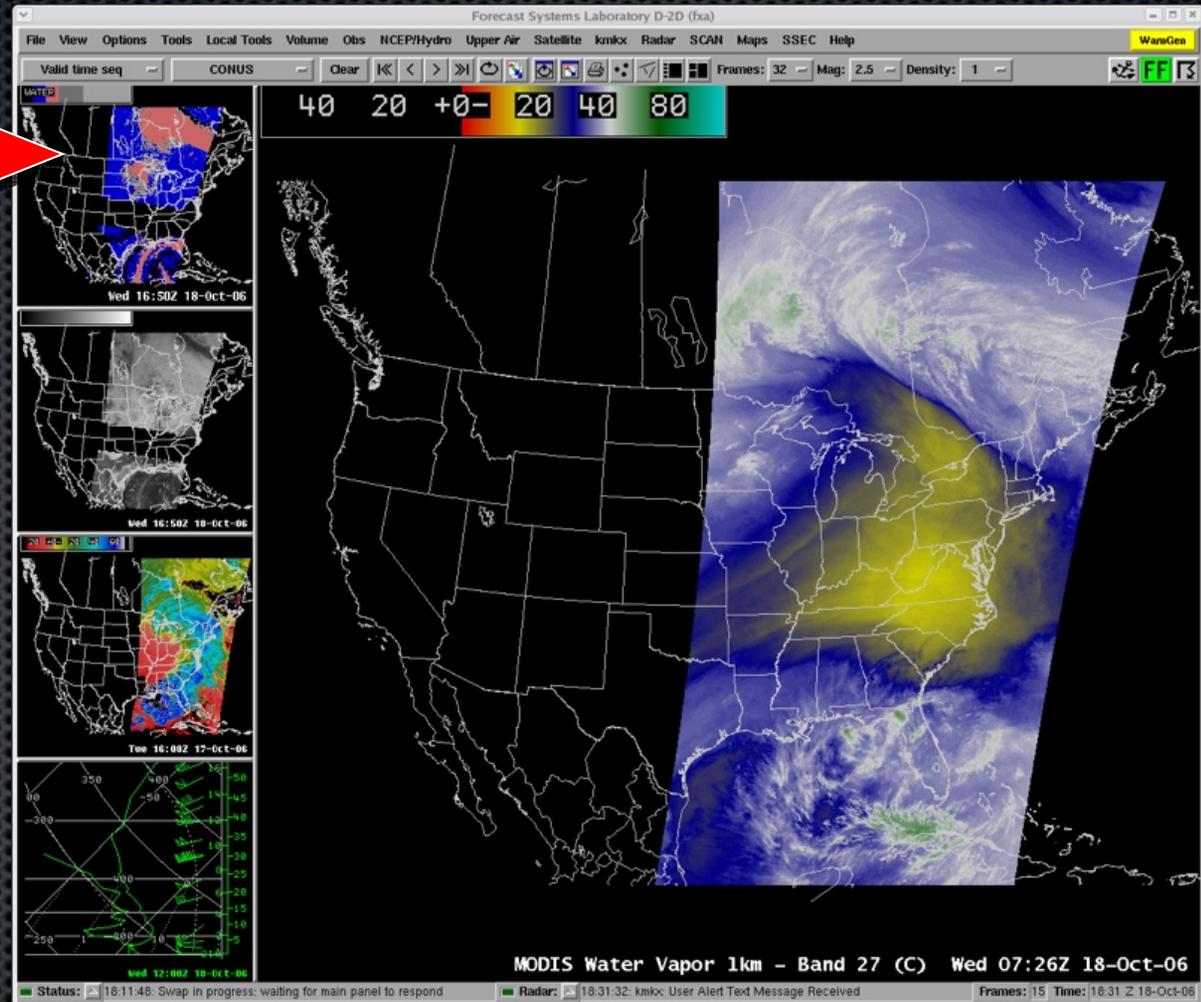
(1) Distribution of CIMSS Satellite products into AWIPS:

- ✦ MODIS images and products
- ✦ GOES Sounder products
- ✦ GOES Mesoscale Winds
- ✦ CRAS model synthetic (forecast) satellite imagery
- ✦ Convective Initiation product suite

MODIS in AWIPS Project



MODIS direct broadcast ground station at SSEC



MODIS imagery and products in AWIPS (since July 2006)

SSEC → NWS Regional Headquarters → LDM subscription at WFO

MODIS 1-km Imagery and Products in AWIPS

- Band 1 - (0.6 μ m) - **Visible**
- Band 7 - (2.1 μ m) - **Snow/Ice**
- Band 20 - (3.7 μ m) - **Shortwave IR**
- Band 26 - (1.3 μ m) – **Cirrus**
- Band 27 - (6.7 μ m) - **Water Vapor**
- Band 31 - (11.0 μ m) - **IR Window**
- 11 μ m - 3.7 μ m - **Fog/Stratus Product**
- **Land Surface Temperature**
- **Normalized Difference Vegetation Index**

AWIPS “SSEC” menu

The screenshot displays the AWIPS SSEC menu interface. The menu is organized into several sections, each with a blue header:

- MODIS Products**: Includes options for 1km and 4km resolution in East and West directions, and East/West combined. A small red map is visible in the background.
- CRAS Prediction**: Includes Eastern CONUS, Western CONUS, and Combination CONUS. A small map of the CONUS region is visible.
- GOES Sounder Extras**: Includes Eastern CONUS, Western CONUS, and Combination CONUS. A small map of the CONUS region is visible.
- Convective Initiation**: Includes Alabama Sector, Wisconsin Sector, High Density Winds, and Upper Air Plots. A small map of the CONUS region is visible.
- MODIS Experimental GOES Winds**: Includes GOES 1h High Density Winds. A small map of the CONUS region is visible.

On the right side of the menu, there is a list of selected products with their corresponding bands and resolutions:

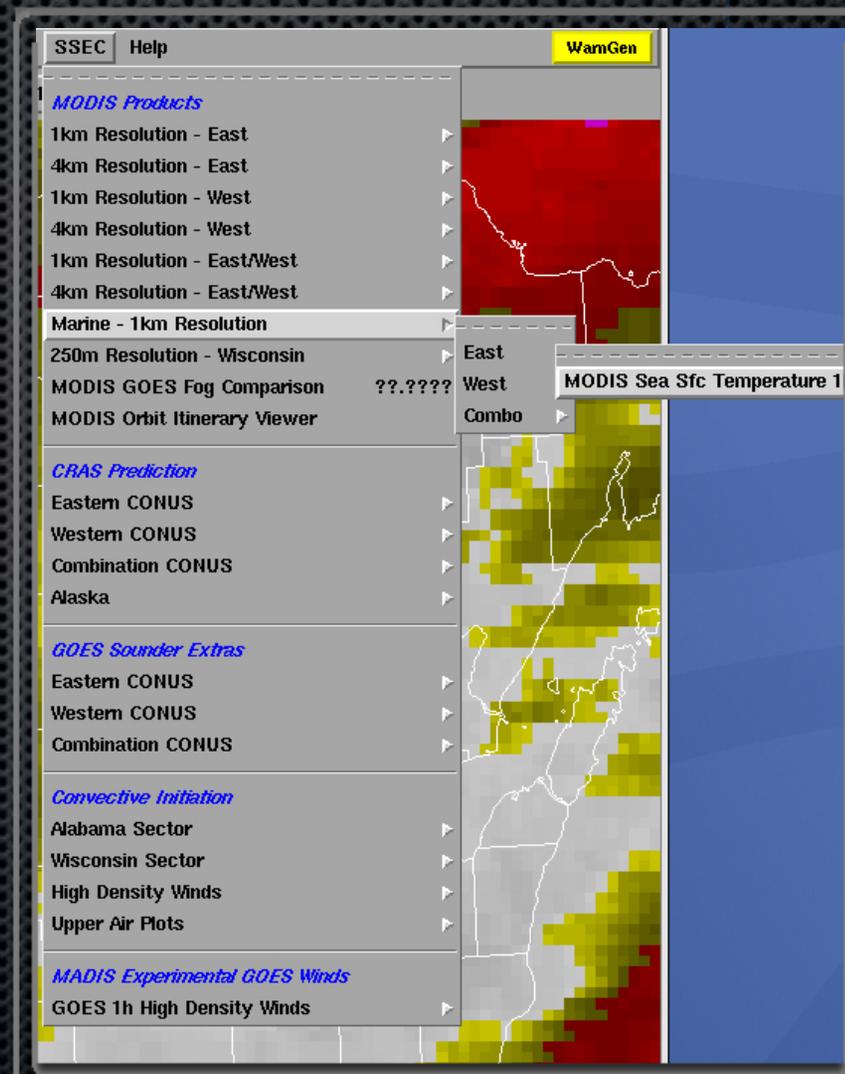
- MODIS Visible 1km - Band 1
- MODIS Snow/Ice 1km - Band 7
- MODIS Cirrus 1km - Band 26
- MODIS 3.7um 1km - Band 20 (C)
- MODIS Water Vapor 1km - Band 27 (C)
- MODIS IR Window - Band 31 (C)
- MODIS 11um - 3.7um Product 1km (C)
- MODIS Land Sfc Temperature 1km (F)
- MODIS Norm Diff Vegetation Idx 1km

The interface also includes a 'WamGen' button in the top right corner and a 'Help' button in the top left corner.

MODIS 1-km Imagery and Products in AWIPS

AWIPS "SSEC" menu

- **Sea Surface Temperature (SST)**



MODIS 4-km Products in AWIPS

AWIPS "SSEC" menu

- **Total Precipitable Water (TPW)**
- **Cloud Phase**
- **Cloud Top Temperature**

The screenshot displays the 'SSEC' menu in the AWIPS interface. The menu is organized into several sections, each with a blue header:

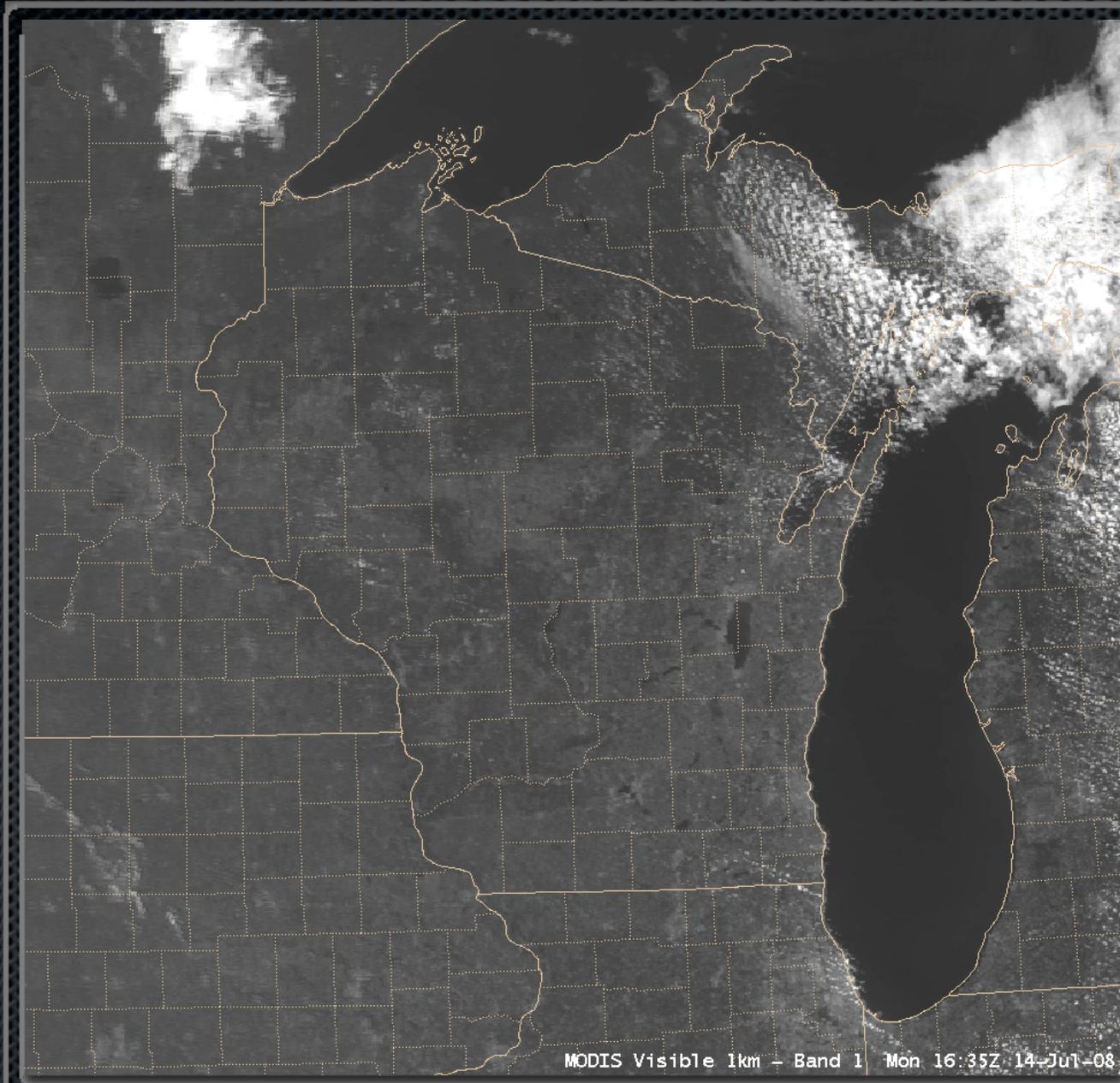
- MODIS Products**:
 - 1km Resolution - East
 - 4km Resolution - East
 - 1km Resolution - West
 - 4km Resolution - West
 - 1km Resolution - East/West
 - 4km Resolution - East/West
- Marine - 1km Resolution**:
 - 250m Resolution - Wisconsin
 - MODIS GOES Fog Comparison
 - MODIS Orbit Itinerary Viewer
- CRAS Prediction**:
 - Eastern CONUS
 - Western CONUS
 - Combination CONUS
 - Alaska
- GOES Sounder Extras**:
 - Eastern CONUS
 - Western CONUS
 - Combination CONUS
- Convective Initiation**:
 - Alabama Sector
 - Wisconsin Sector
 - High Density Winds
 - Upper Air Plots
- MADIS Experimental GOES Winds**:
 - GOES 1h High Density Winds

On the right side of the menu, there are three preview windows:

- The top window shows a red map of the United States, likely representing a precipitation or cloud product.
- The middle window is titled 'MODIS TPW 4km (mm)' and shows a yellow-green map of the United States, representing Total Precipitable Water.
- The bottom window is titled 'MODIS Cloud Phase 4km' and shows a yellow-green map of the United States, representing cloud phase information.

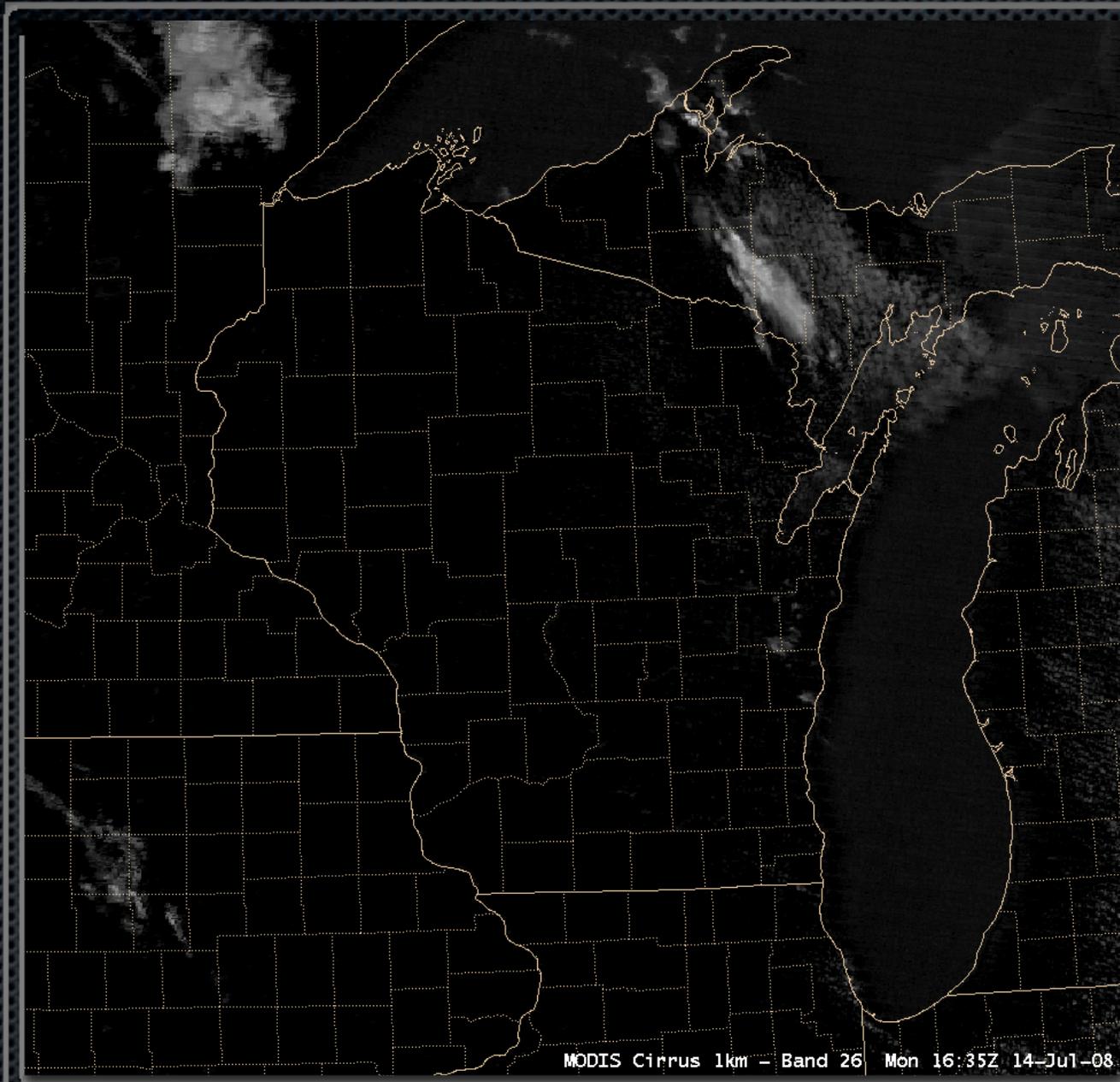
At the top right of the menu, there is a 'WamGen' button. The menu also includes 'SSEC' and 'Help' tabs at the top left.

MODIS Products in AWIPS



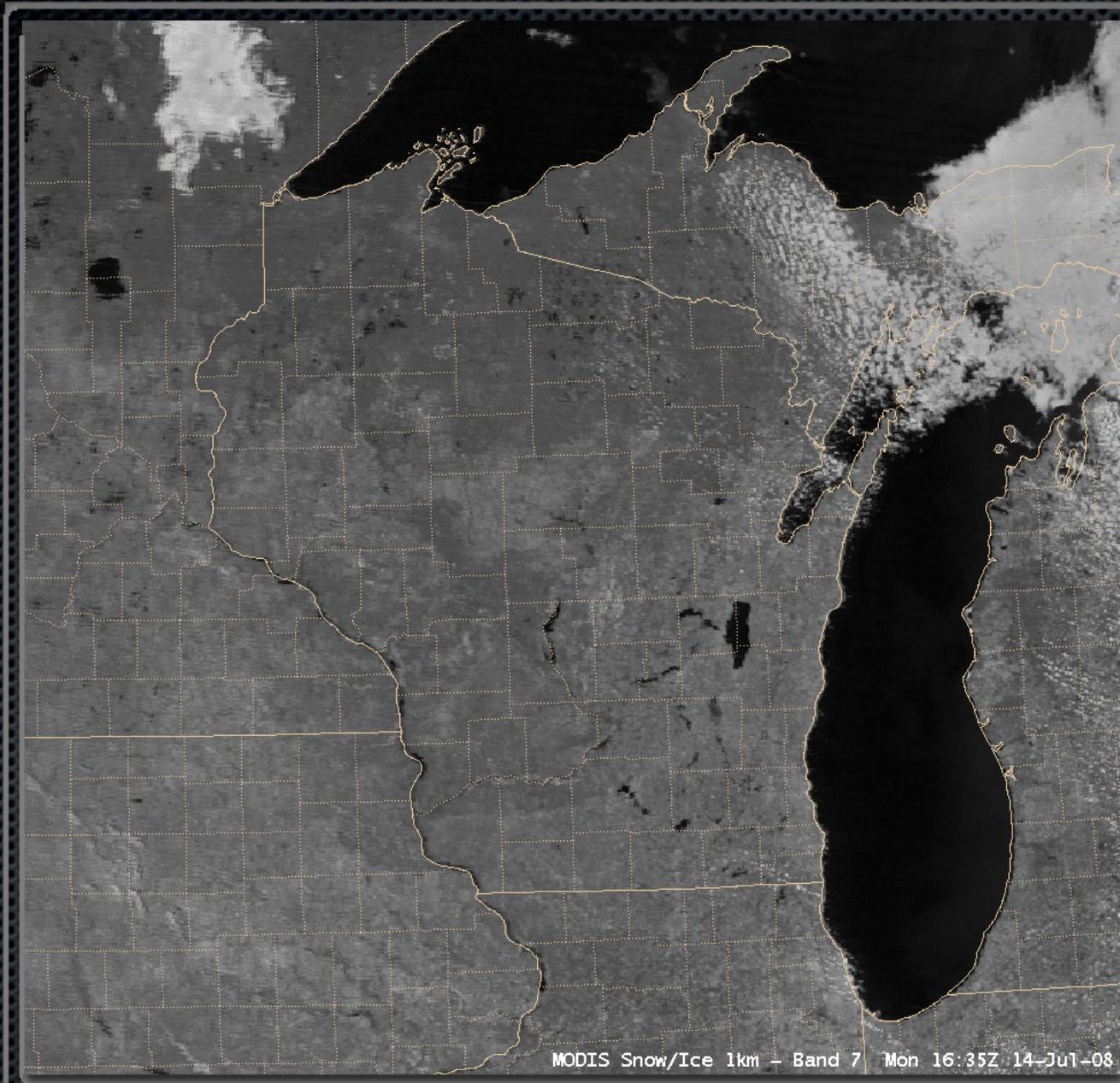
Visible (0.65 μm): 1-km resolution

MODIS Products in AWIPS



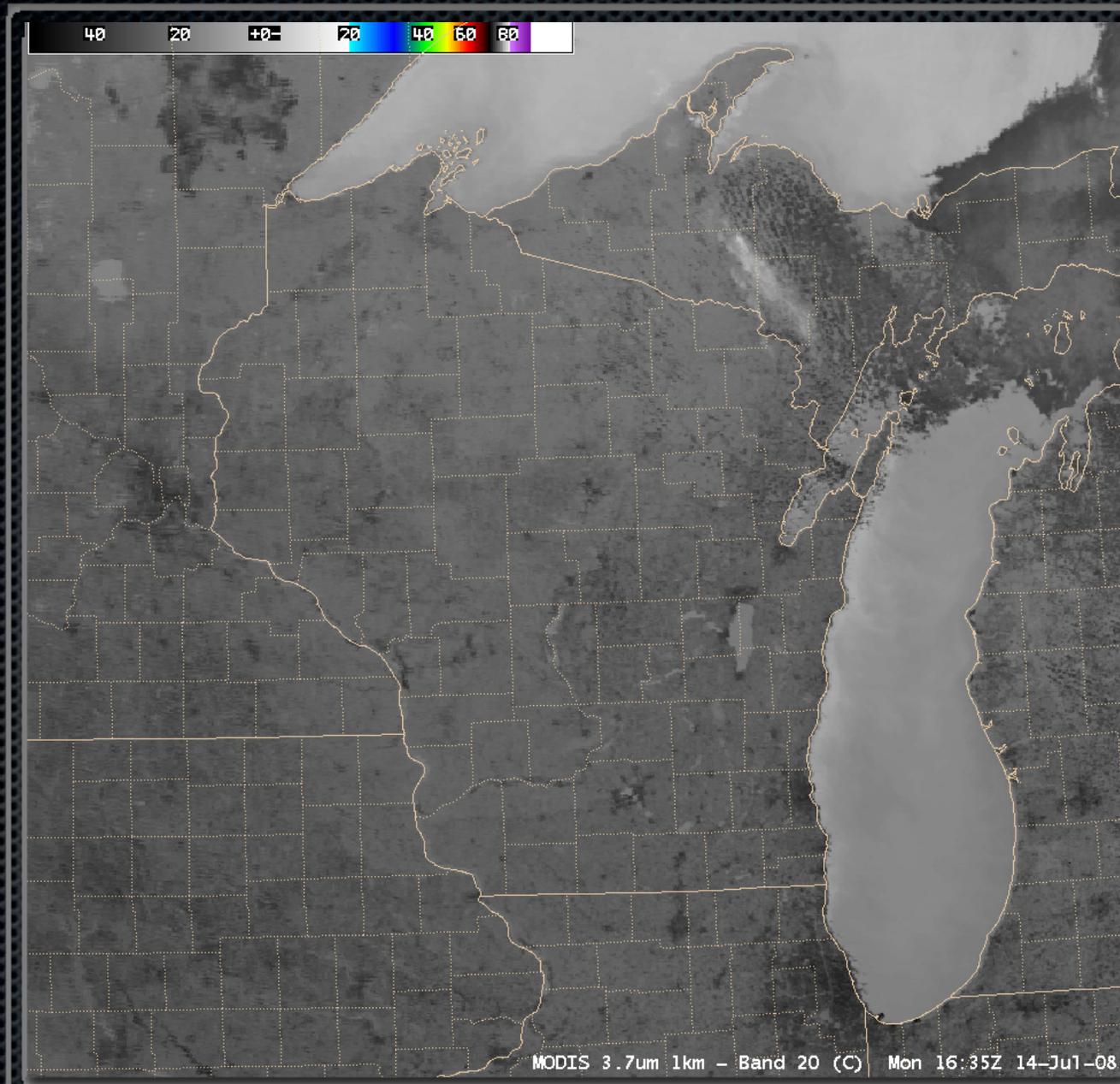
Cirrus detection ($1.3 \mu\text{m}$): 1-km resolution

MODIS Products in AWIPS



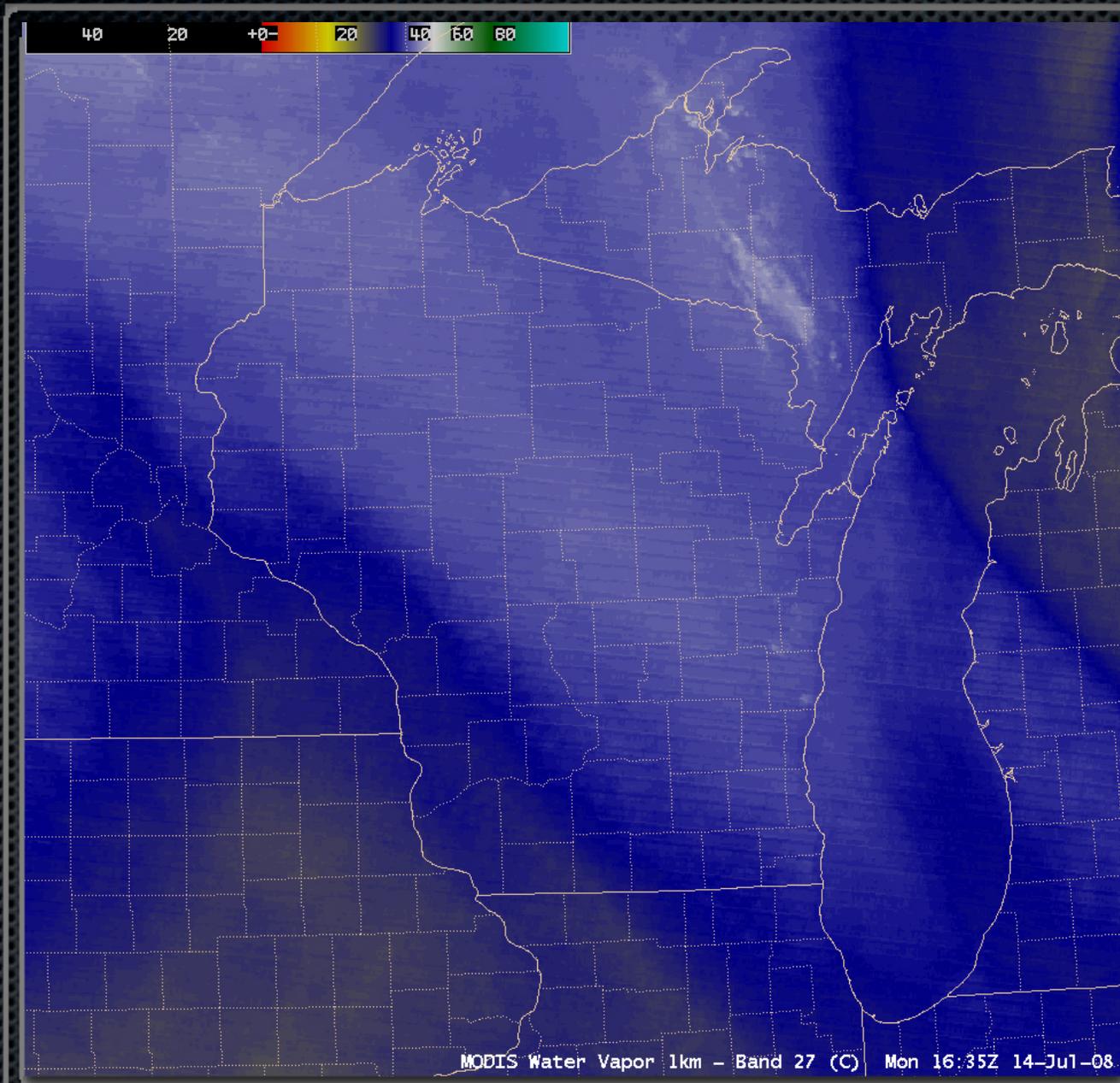
Snow/ice discrimination ($2.1 \mu\text{m}$): 1-km resolution

MODIS Products in AWIPS



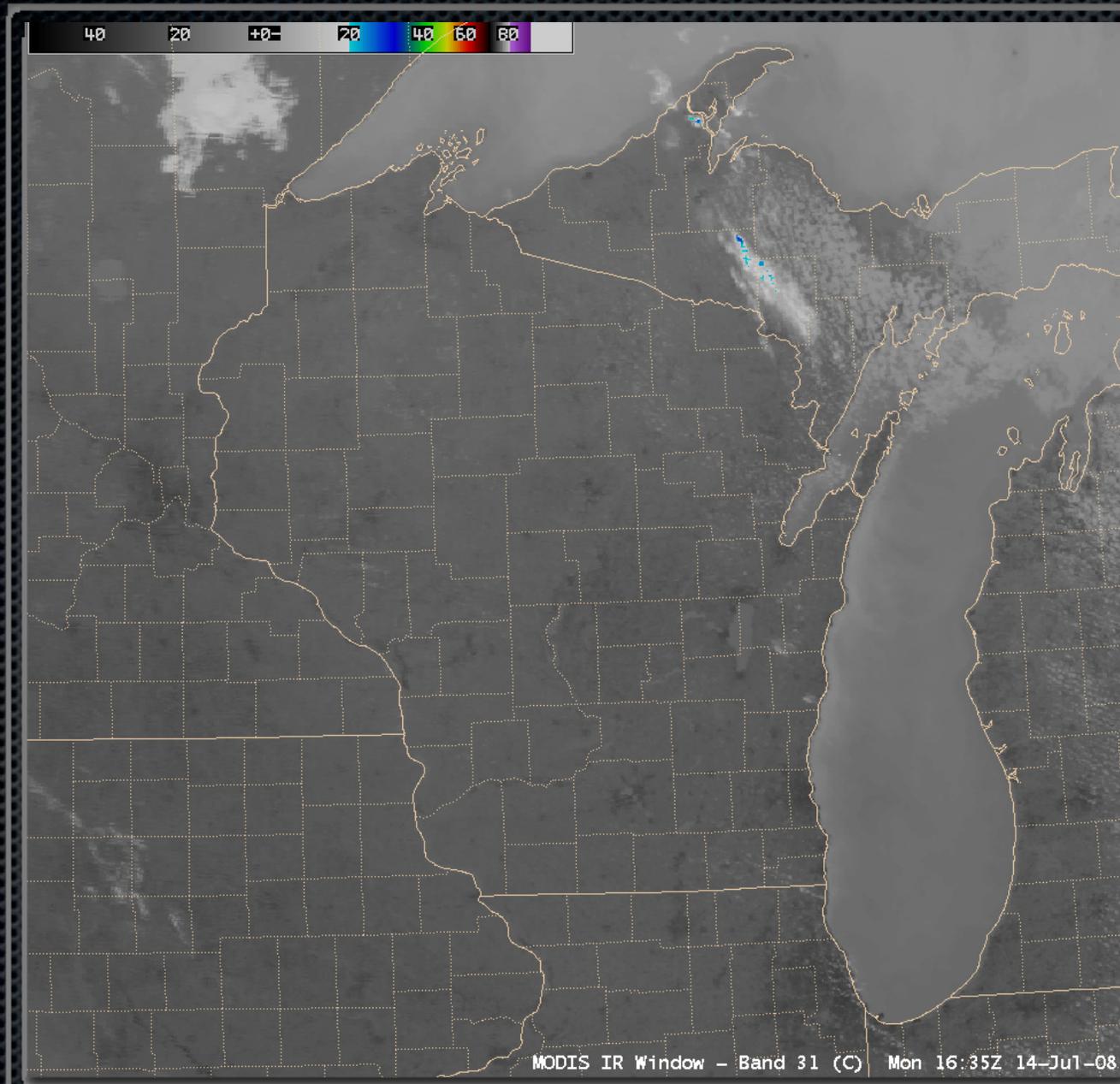
Shortwave IR (3.7 μm): 1-km resolution

MODIS Products in AWIPS



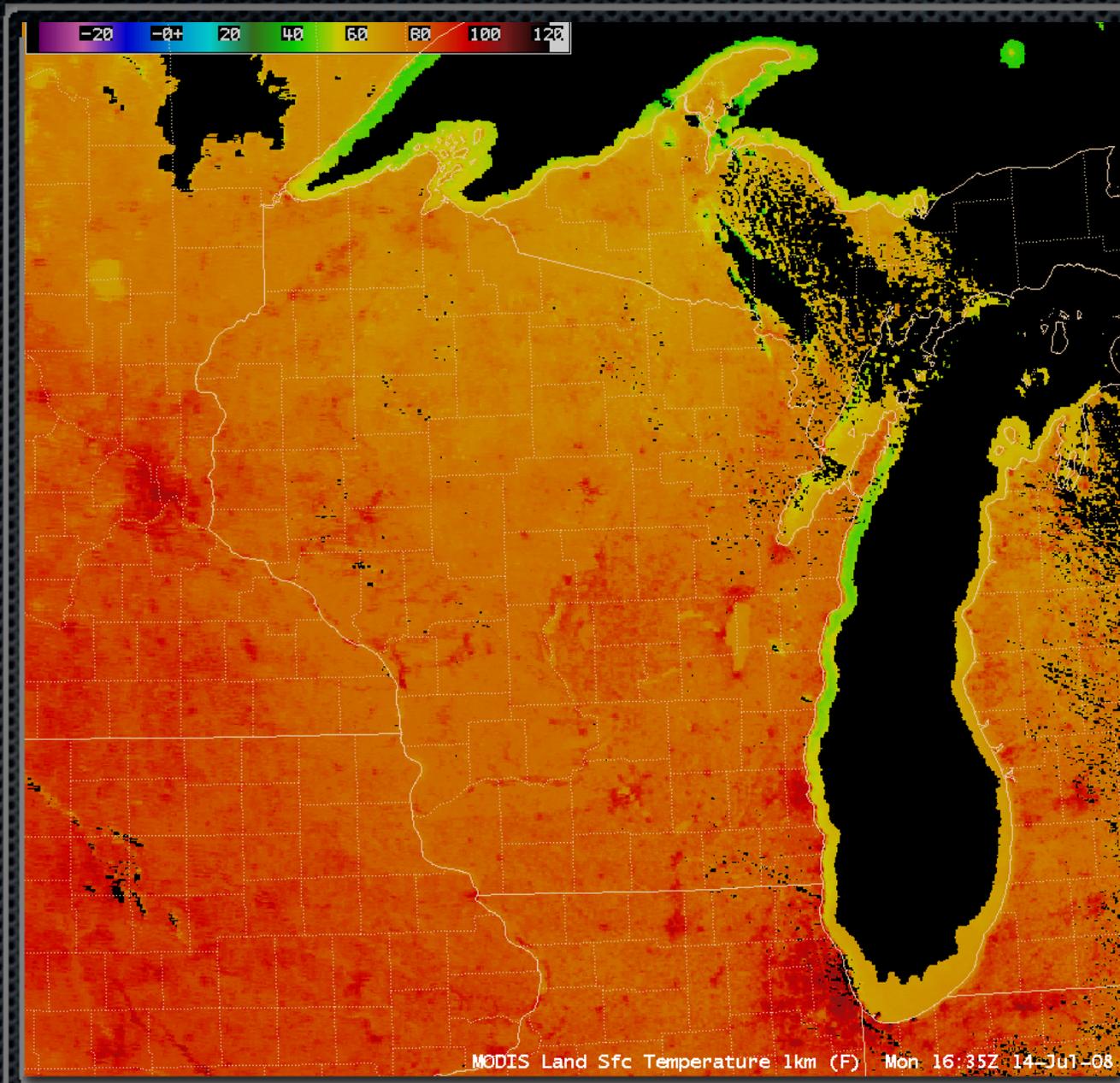
Water vapor (6.7 μm): 1-km resolution

MODIS Products in AWIPS



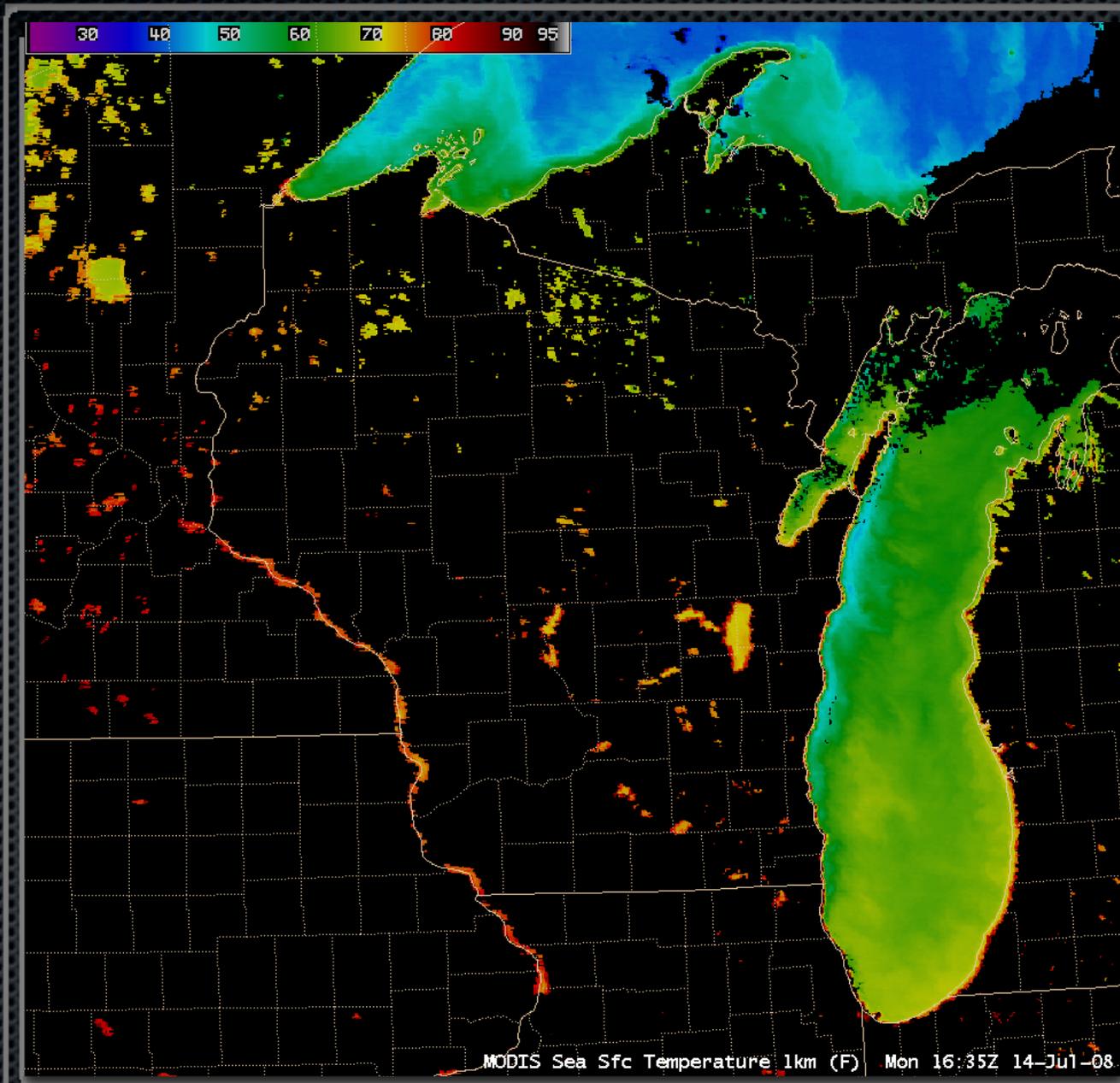
IR window (11.0 μm): 1-km resolution

MODIS Products in AWIPS



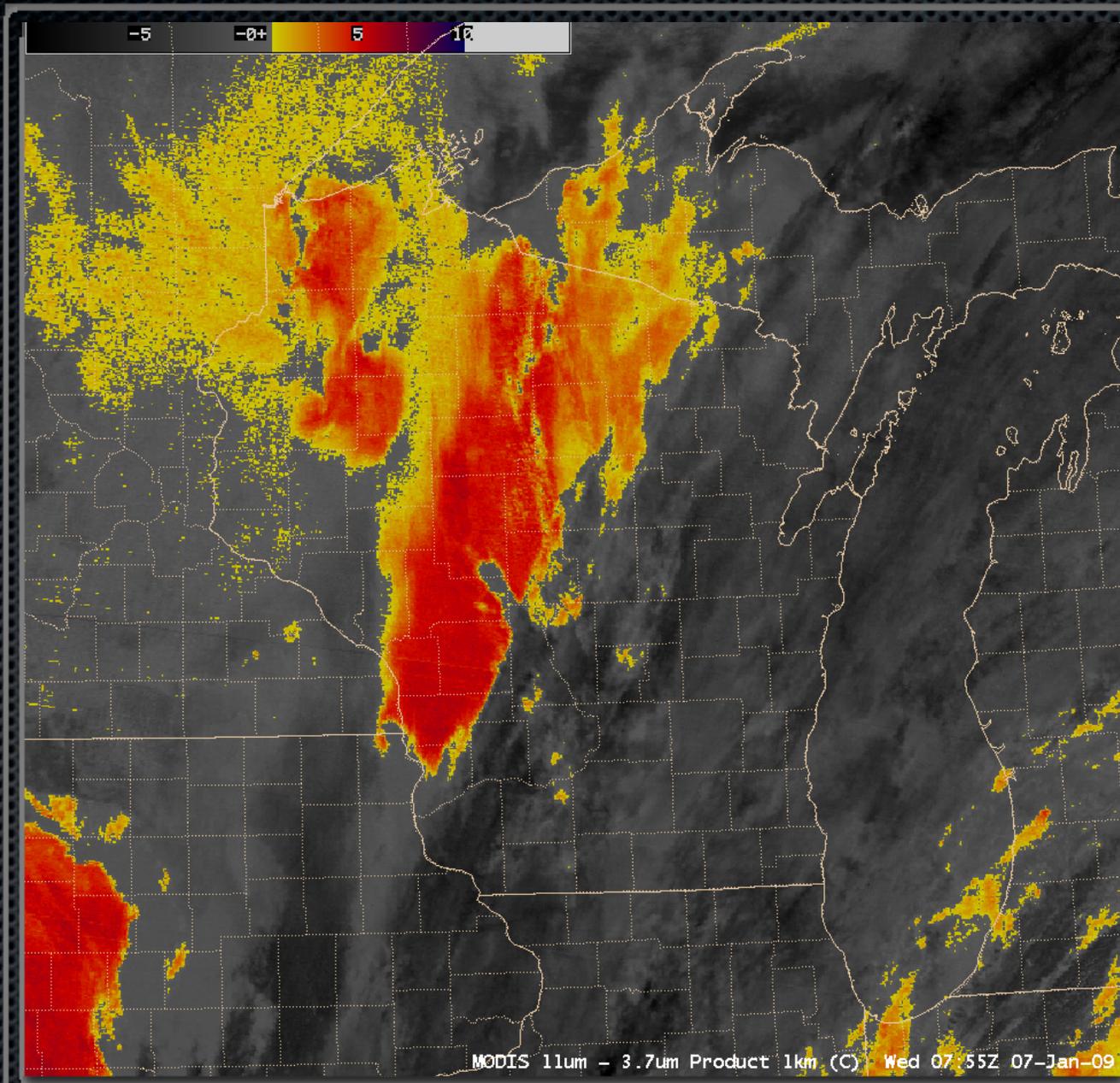
Land Surface Temperature: 1-km resolution

MODIS Products in AWIPS



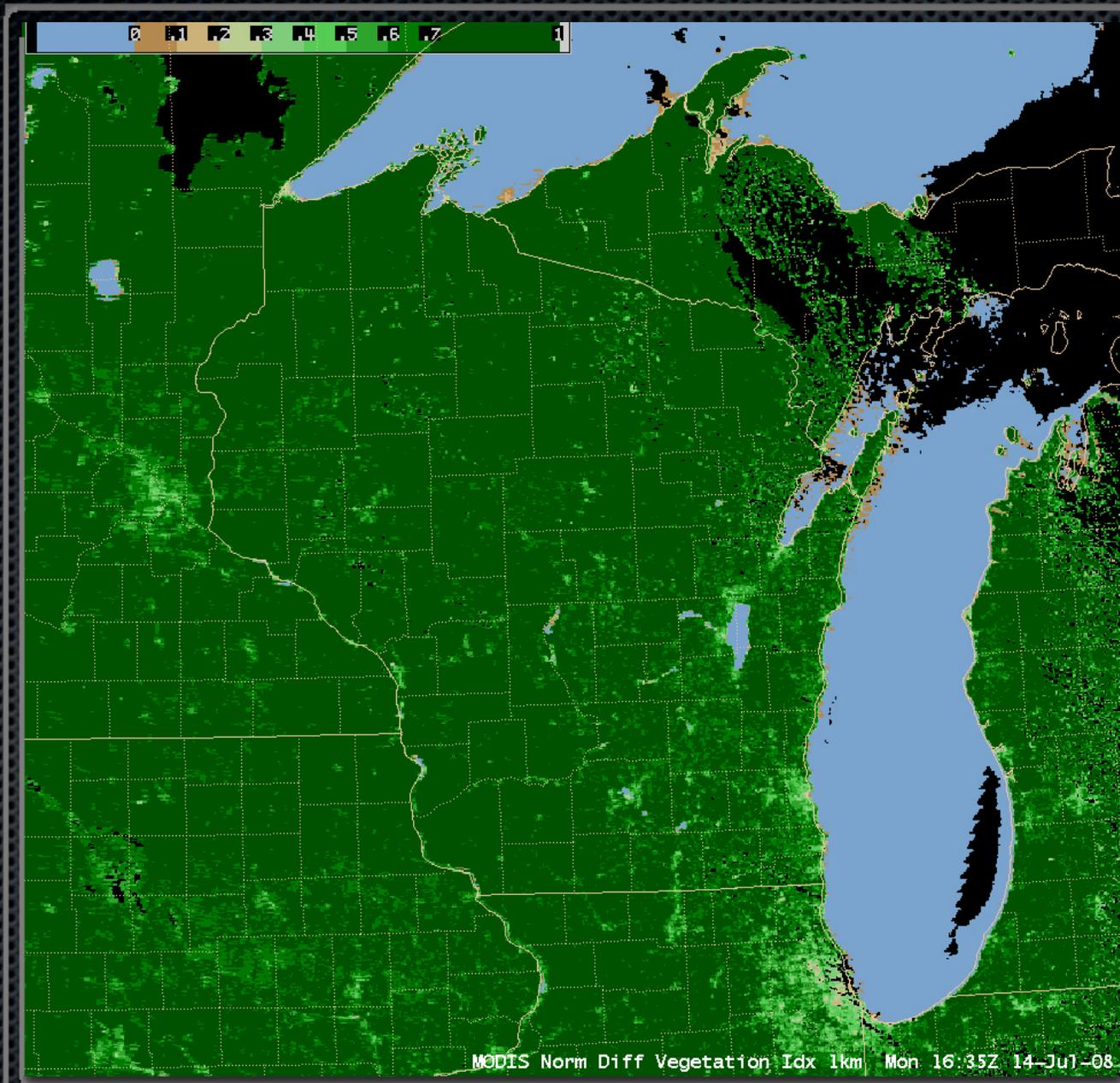
Sea Surface Temperature: 1-km resolution

MODIS Products in AWIPS



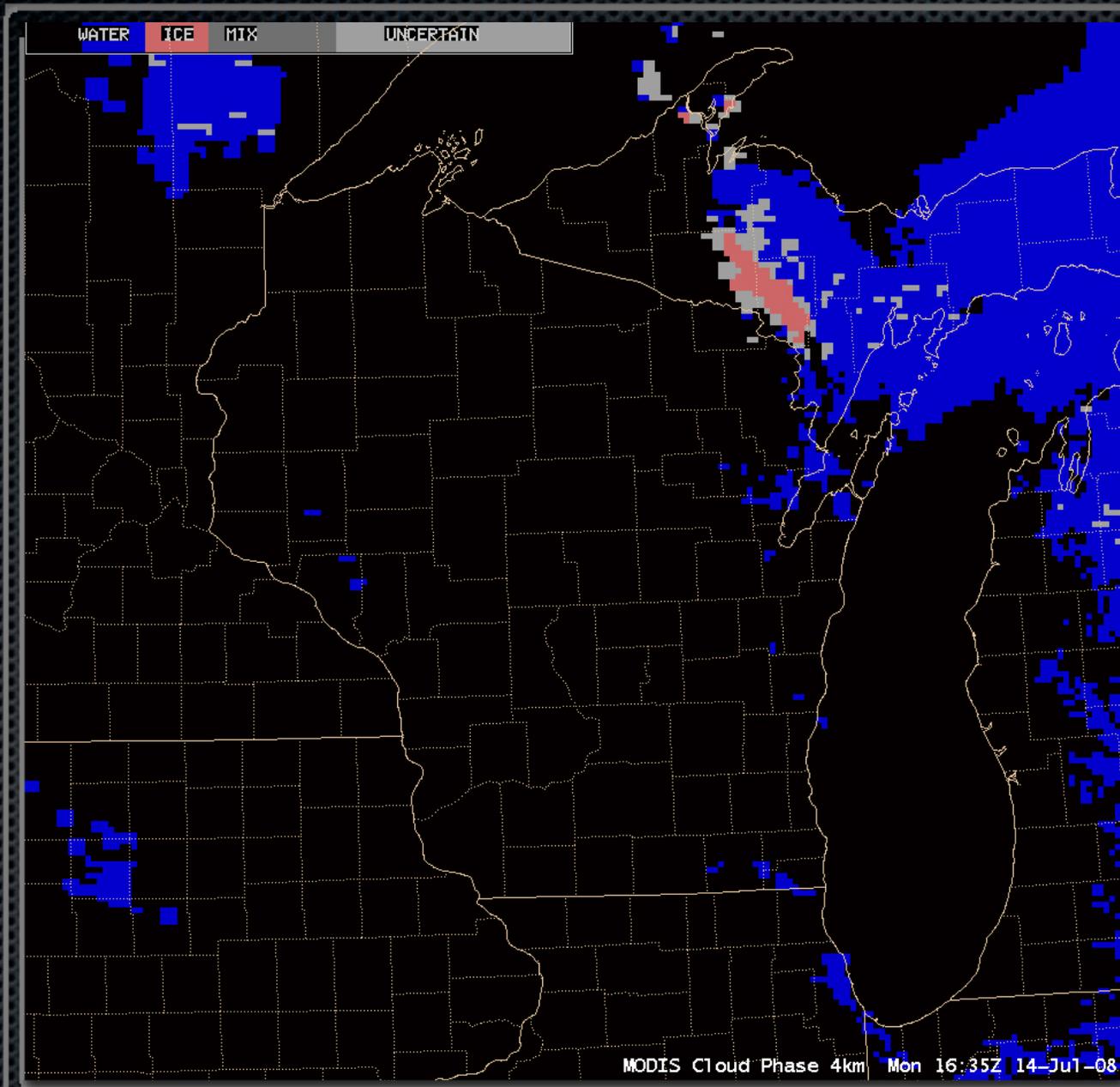
Fog/stratus product: 1-km resolution

MODIS Products in AWIPS



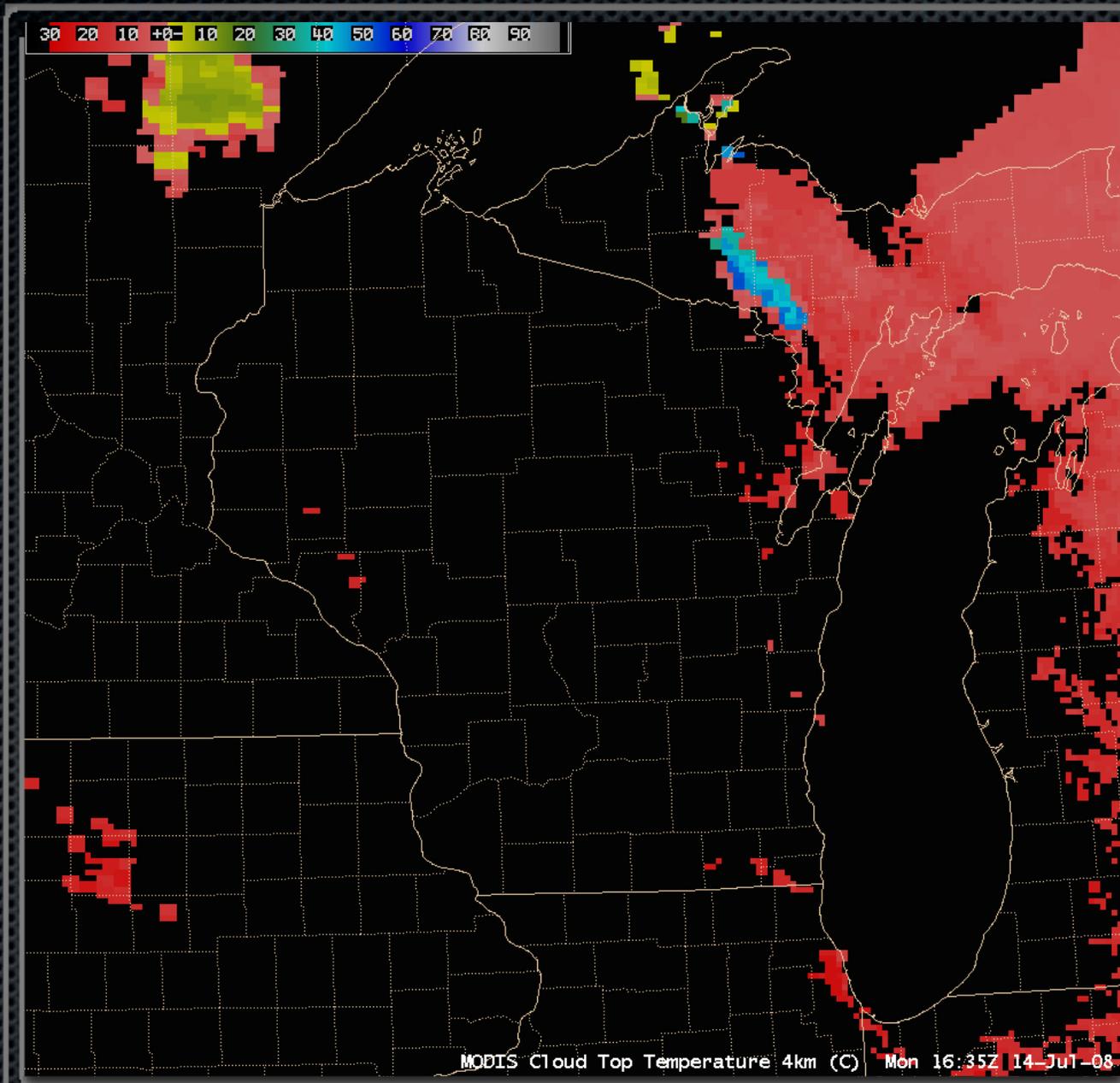
Normalized Difference Vegetation Index: 1-km

MODIS Products in AWIPS



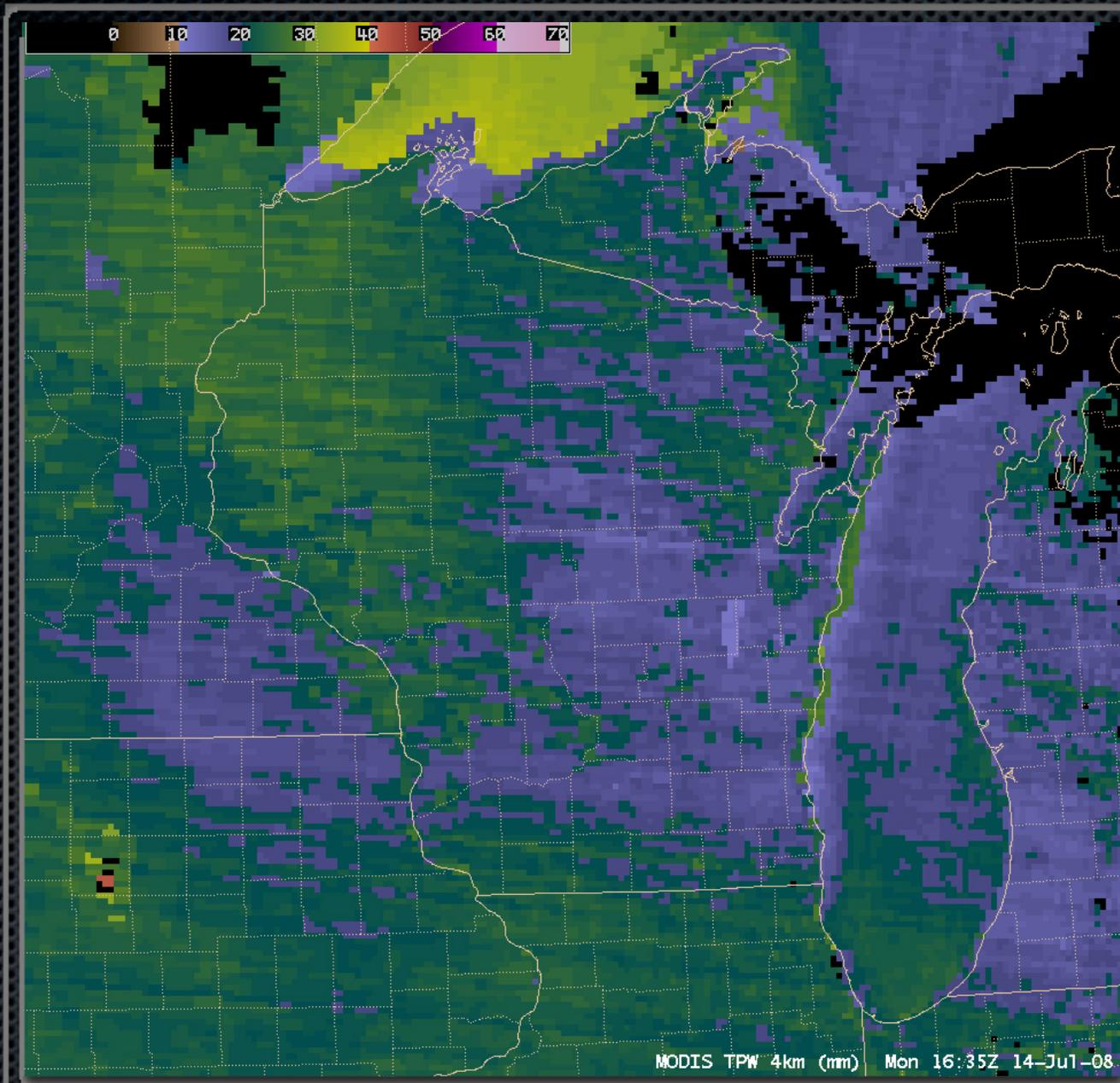
Cloud Phase: 4-km resolution

MODIS Products in AWIPS



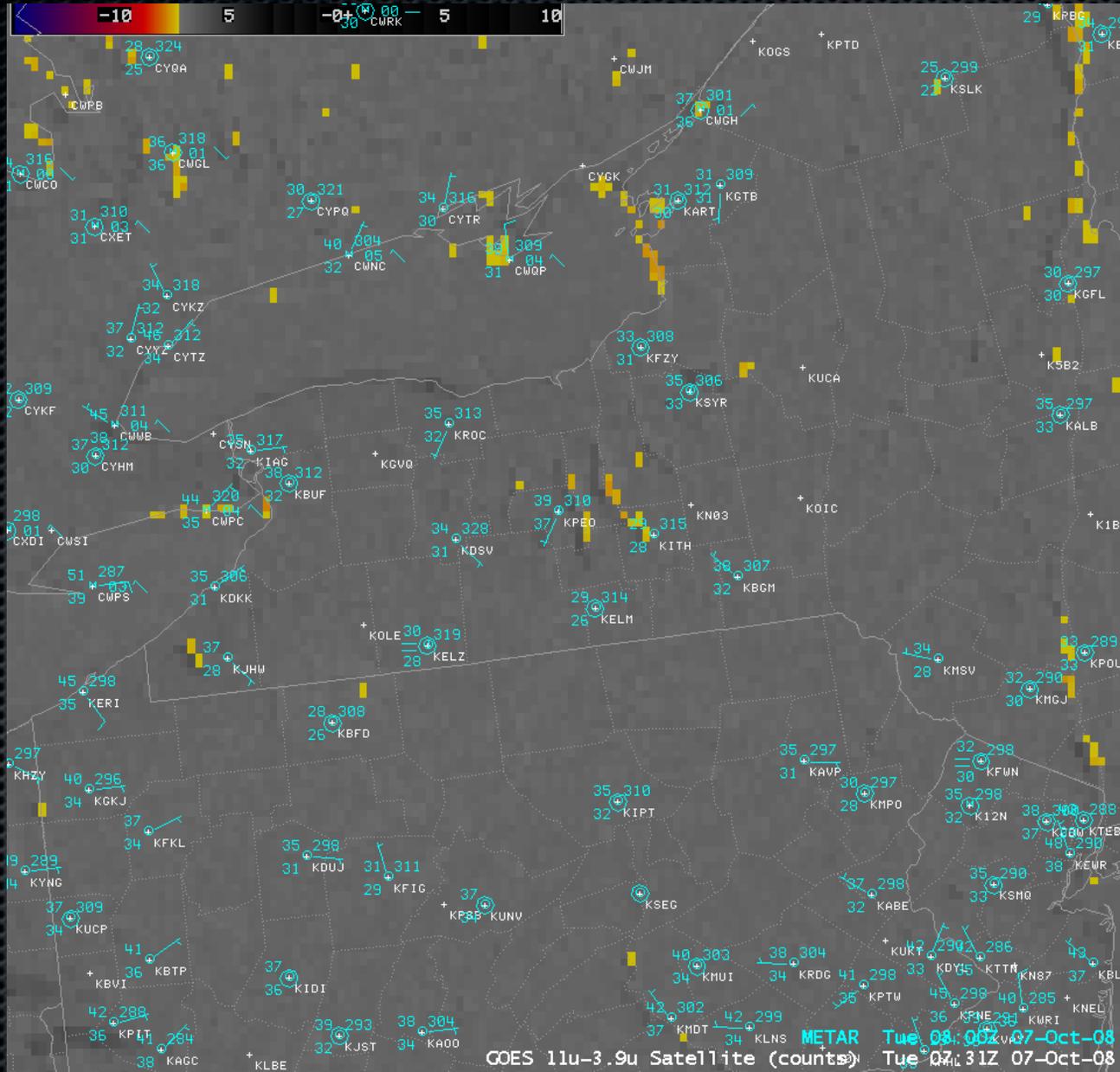
Cloud Top Temperature: 4-km resolution

MODIS Products in AWIPS



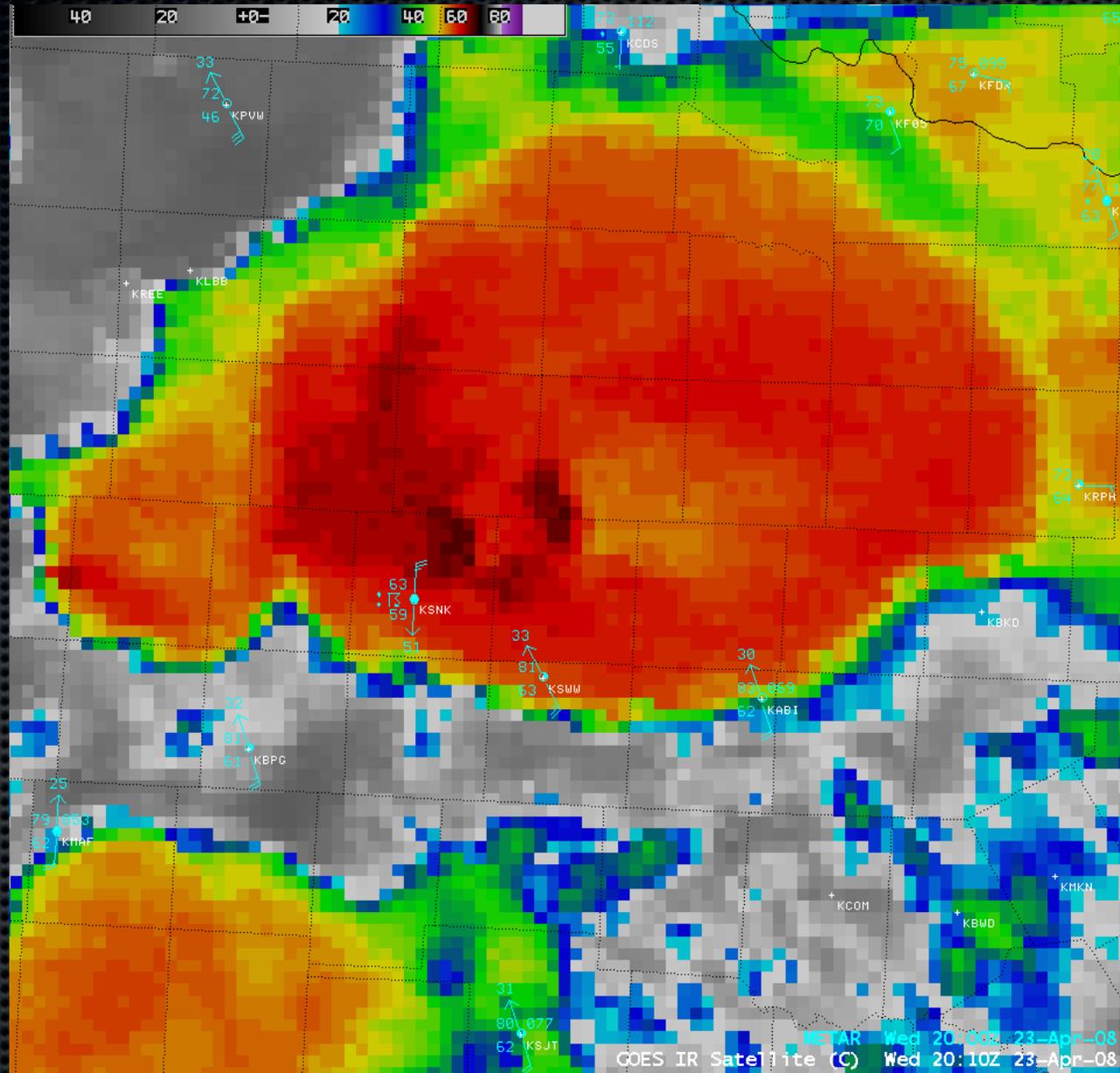
Total Precipitable Water: 4-km resolution

MODIS Products in AWIPS



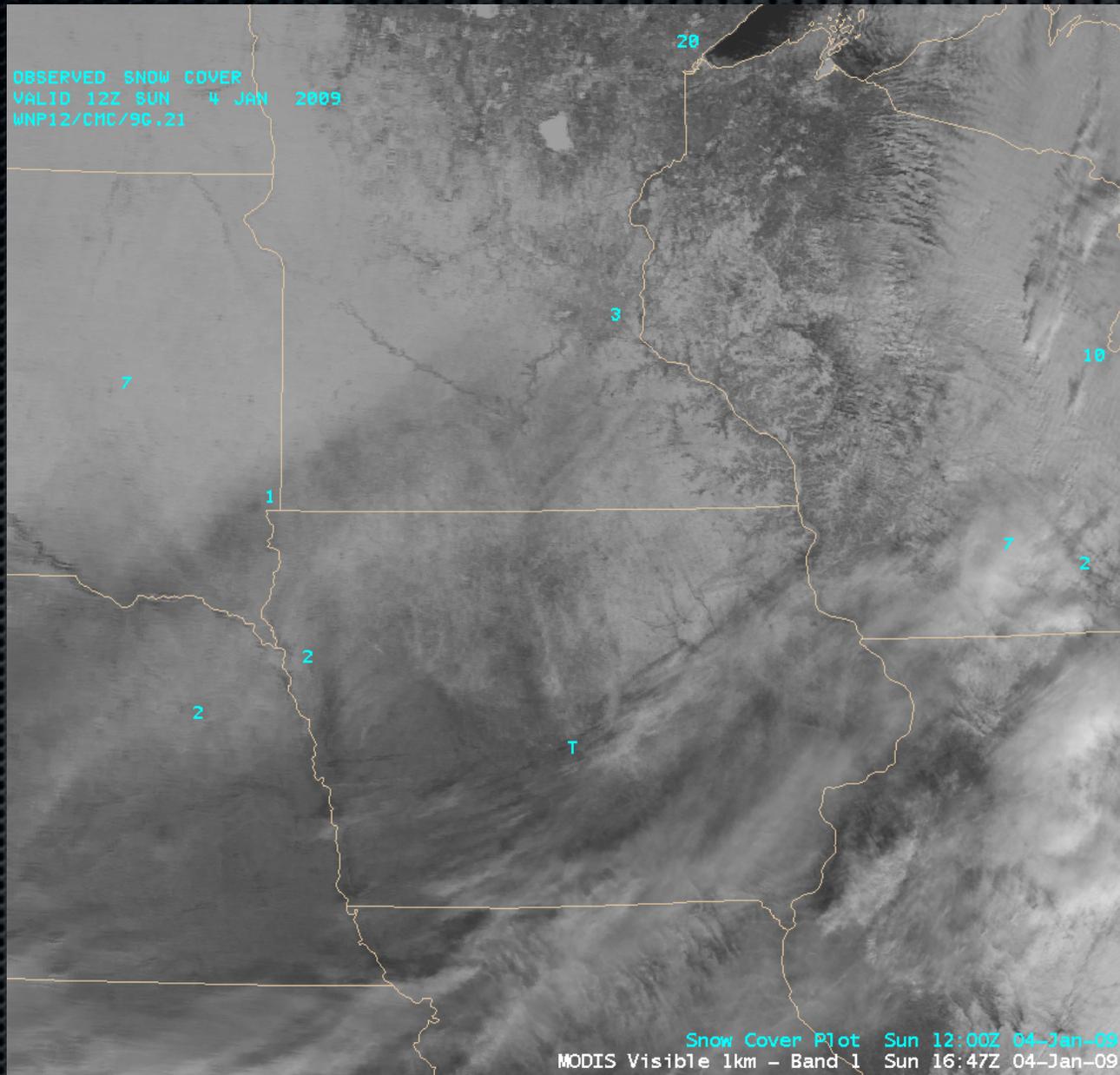
Fog/stratus product: 1-km MODIS vs 4-km GOES

MODIS Products in AWIPS



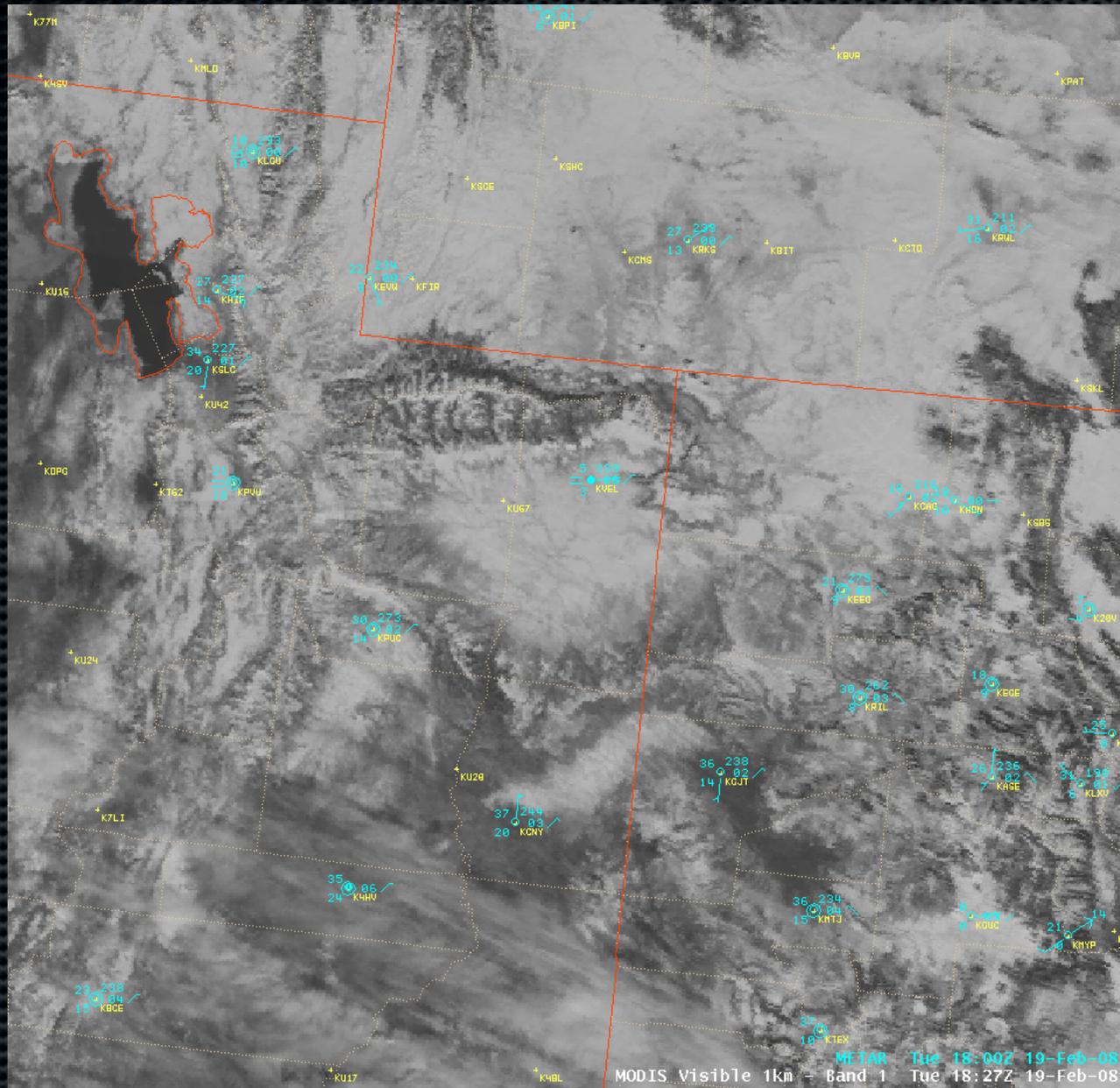
MODIS 1-km IR window + GOES 4-km IR window

MODIS Products in AWIPS



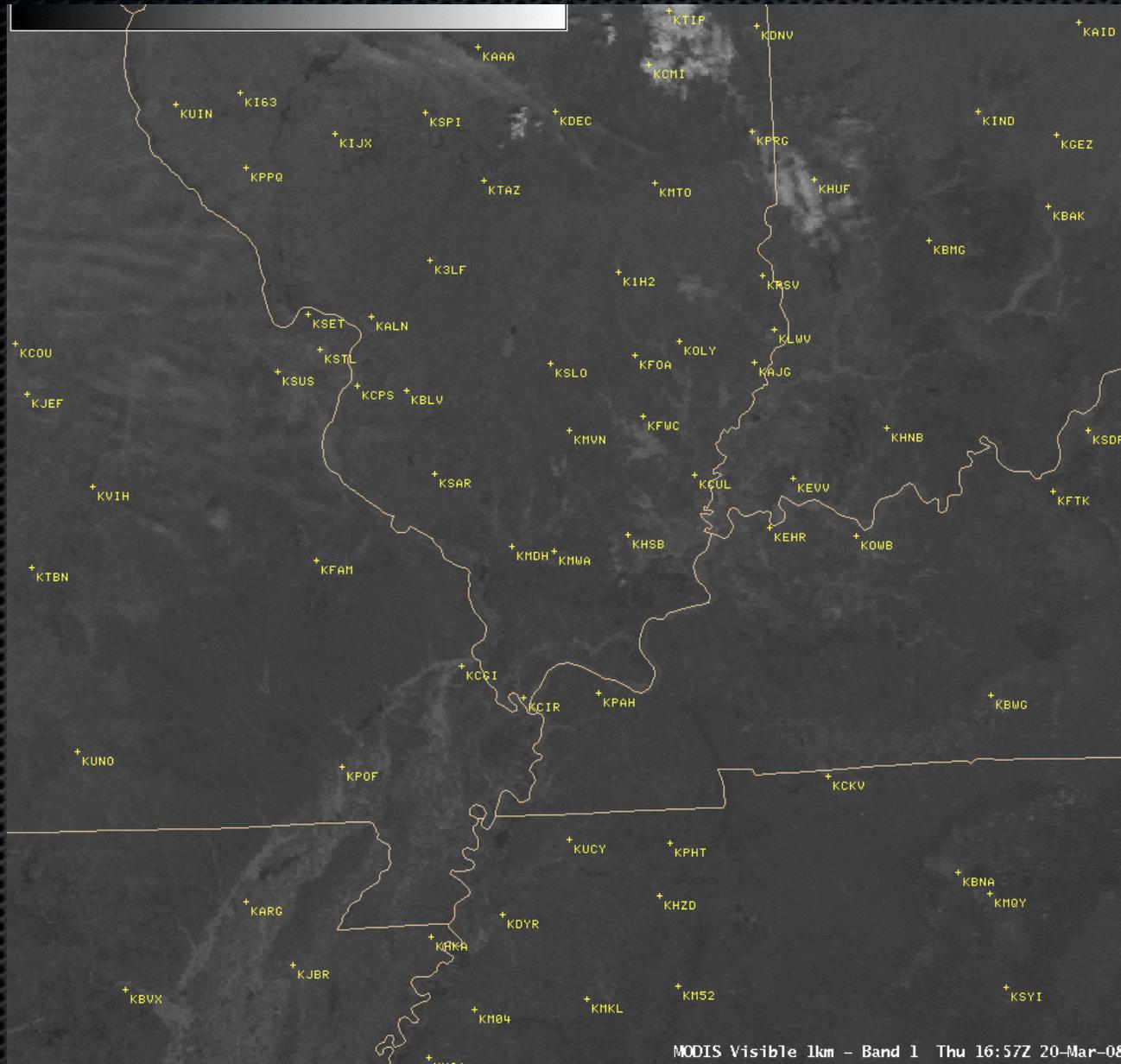
Visible + "Snow/Ice" channel images

MODIS Products in AWIPS



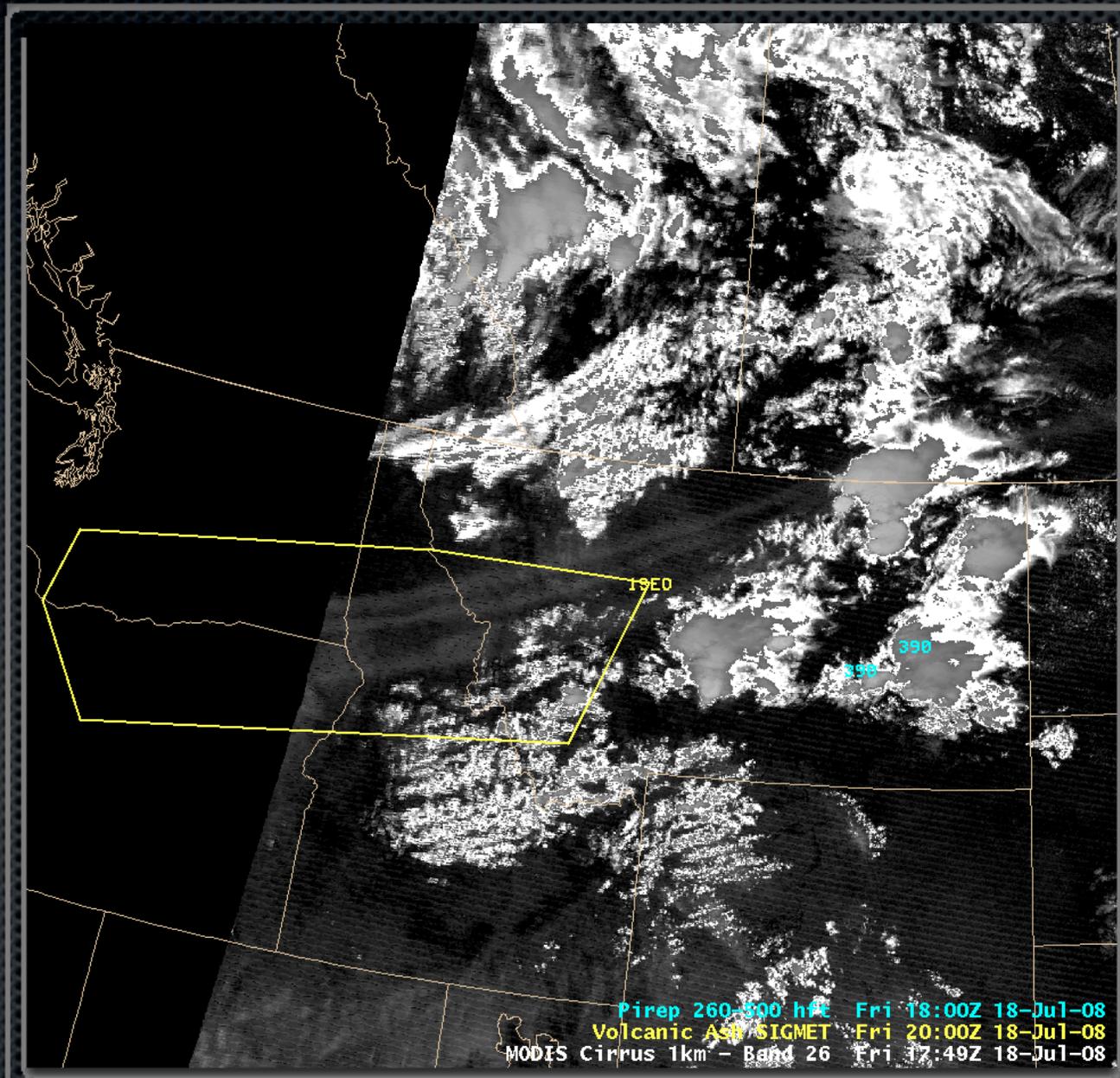
Visible + “Snow/Ice” + IR window channel images

MODIS Products in AWIPS



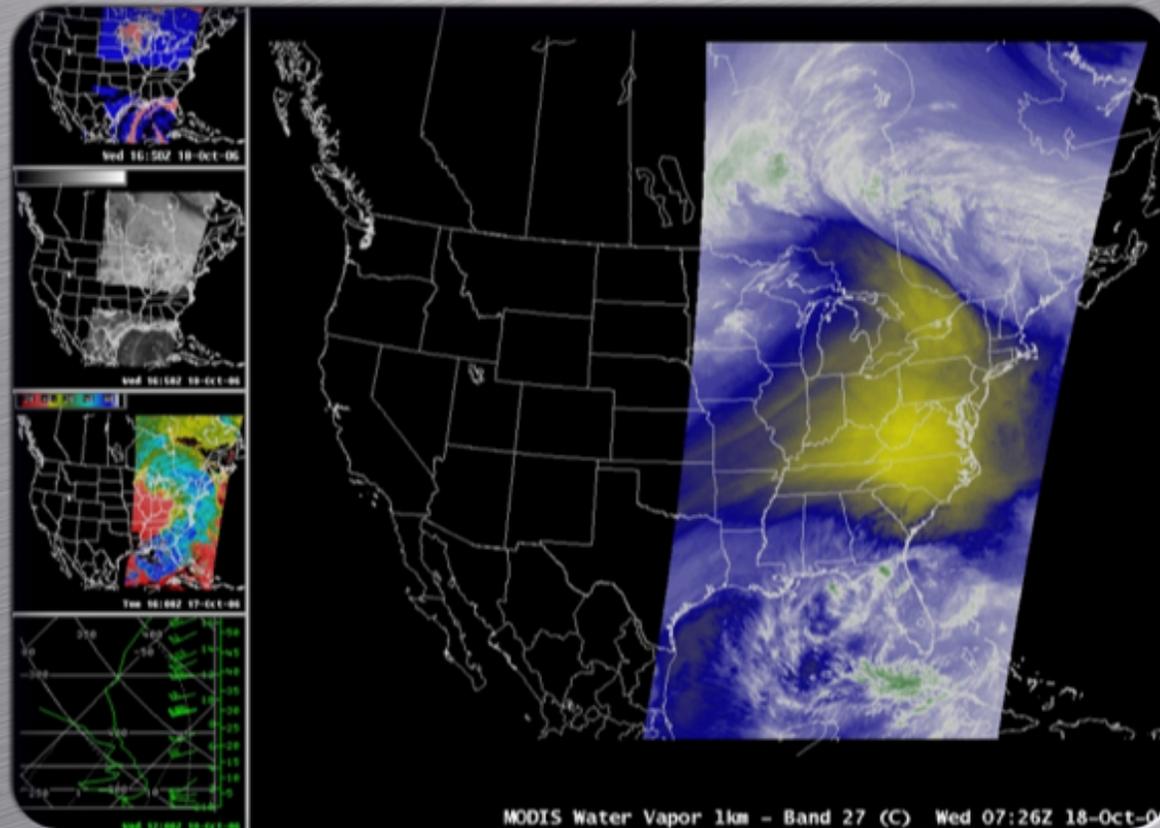
Visible + “Snow/ice” channel images

MODIS Products in AWIPS



MODIS Cirrus channel: locating volcanic plumes

MODIS Products in AWIPS



National Weather Service • Integrated Sensor Training Professional Development Series
Virtual Institute for Satellite Integration Training

Virtual Institute for Satellite Integration Training
(VISIT) lesson - offered since October 2006

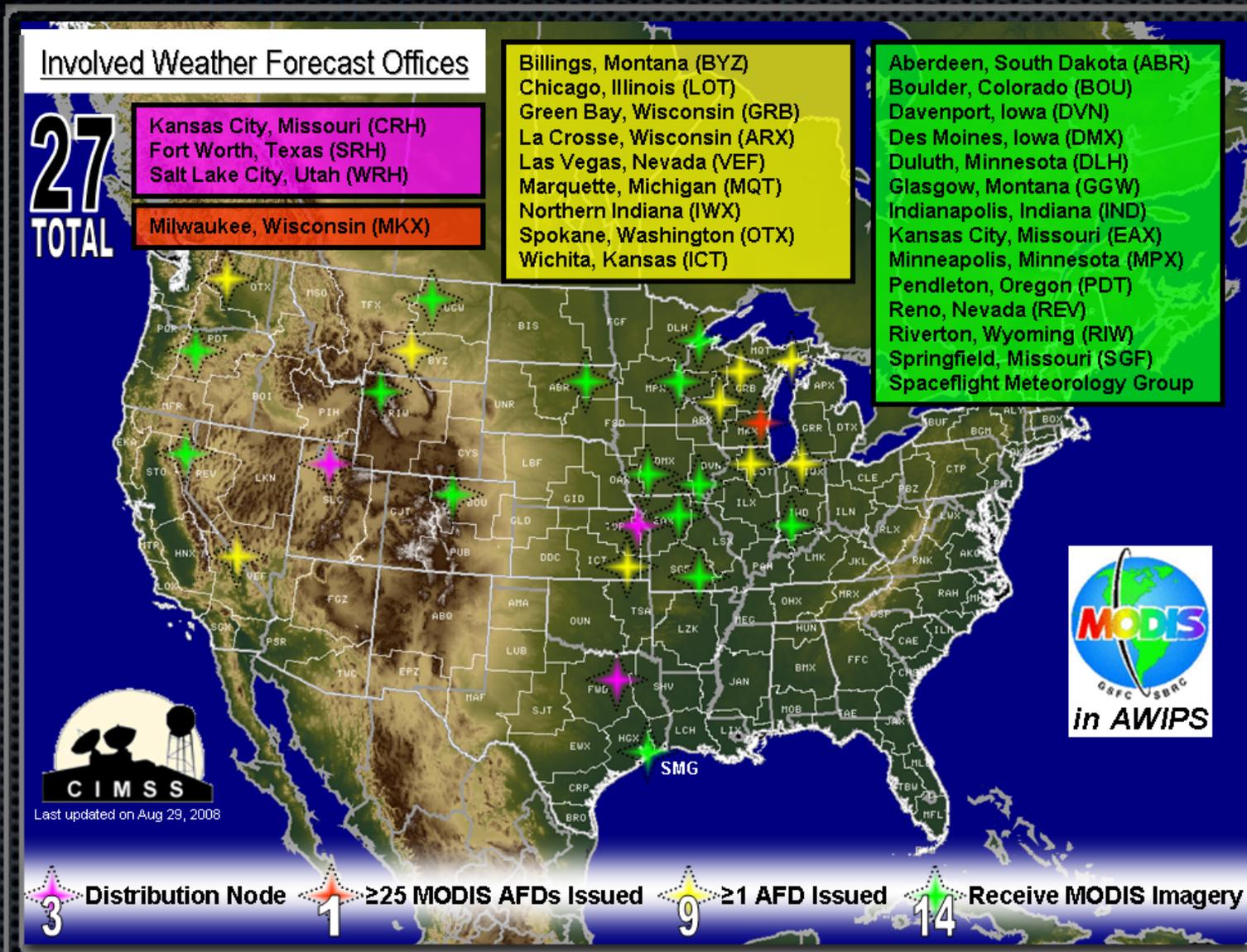
MODIS Products in AWIPS



“MODIS Products in AWIPS” VISIT Lesson Participation
(October 2006 - December 2008)

52 NWS forecast offices participating so far

MODIS Products in AWIPS



27 NWS forecast offices have added CIMSS MODIS imagery to their local AWIPS

MODIS Products in AWIPS

AREA FORECAST DISCUSSION

NATIONAL WEATHER SERVICE MILWAUKEE / SULLIVAN WI

436 AM CDT WED JUL 16 2008

WEAK BOUNDARY VCNTY OF KMTW EXPCD TO SAG SLOWLY SOUTHWARD THIS MORNING WITH LIGHT SOUTHWEST WINDS BECOMING NORTHEAST AND THEN SOUTHEAST. WIND SPEEDS SHOULD BE MOSTLY LIGHT...LESS THAN 10 KNOTS...HOWEVER BRIEF GUSTINESS POSSIBLE AS BOUNDARY MOVES THROUGH. PER LATEST MODIS SST IMAGES...NEARSHORE HAS WARMED SEVERAL DEGREES FROM EARLIER UPWELLING EPISODE...NOW GENERALLY IN THE LOWER TO MIDDLE 50S. WITH INLAND DEWPOINTS IN THE MIDDLE 60S...WILL NEED TO WATCH FOR PATCHY FOG AS WINDS TURN ONSHORE.

MODIS has been mentioned in 70 NWS
Area Forecast Discussions so far

MODIS Products in AWIPS

AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE **SPOKANE WA**
249 AM PST WED FEB 20 2008

MAIN FORECAST PROBLEM FOR TODAY WILL BE WHAT TO MAKE OF FOG. THUS FAR...FOG FORMATION HAS BEEN SOMEWHAT MINIMAL...AT LEAST ACCORDING TO THE CONVENTIONAL 4KM FOG PRODUCT. FORTUNATELY THE **1KM FOG PRODUCT FROM THE MODIS POLAR ORBITER DEPICTED A MUCH NICER PICTURE WITH AREAS OF FOG OVER THE VALLEYS** IN NORTH IDAHO EAST OF COEUR D'ALENE AS WELL AS SOME BY PRIEST LAKE AND NORTH OF DEER PARK. THERE WAS ALSO ANOTHER POCKET OF FOG BETWEEN RITZVILLE AND SPRAGUE IN THE EASTERN COLUMBIA BASIN.

**MODIS has been mentioned in 70 NWS
Area Forecast Discussions so far**

MODIS Products in AWIPS

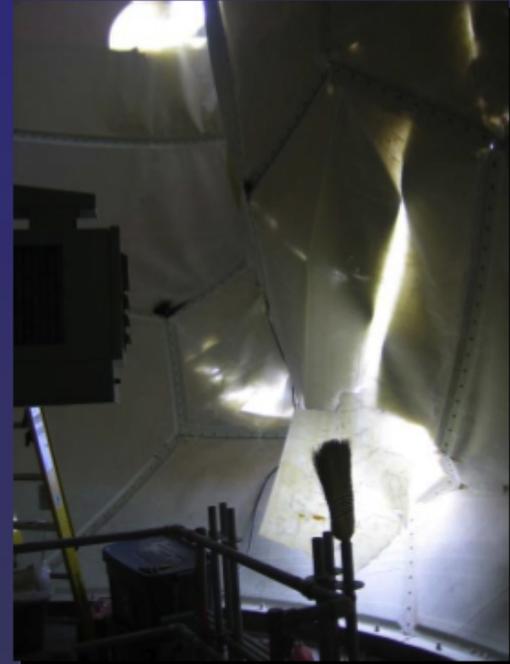
AREA FORECAST DISCUSSION
NATIONAL WEATHER SERVICE **RENO NV**
337 AM PST TUE NOV 4 2008

ANOTHER BIG STORY WITH THIS LOW HAS BEEN THE WINDS WITH MANY LOCATIONS REMAINING QUITE WINDY OVERNIGHT AS THE COLD FRONT PASSED. **HIGH RES MODIS WATER VAPOR IMAGERY SHOWS GOOD MOUNTAIN WAVE ACTIVITY ALONG THE SIERRA AS THE SUPPRESSED TROPOPAUSE MOVED THROUGH OVERNIGHT.** THIS UPPER FEATURE LIKELY HELPED TO DUCT STRONGER WINDS ALOFT DOWN TO THE SURFACE IN THE STABLE PRE-FRONTAL ENVIRONMENT SOUTH OF THE RENO AND TAHOE AREAS.

**MODIS has been mentioned in 70 NWS
Area Forecast Discussions so far**

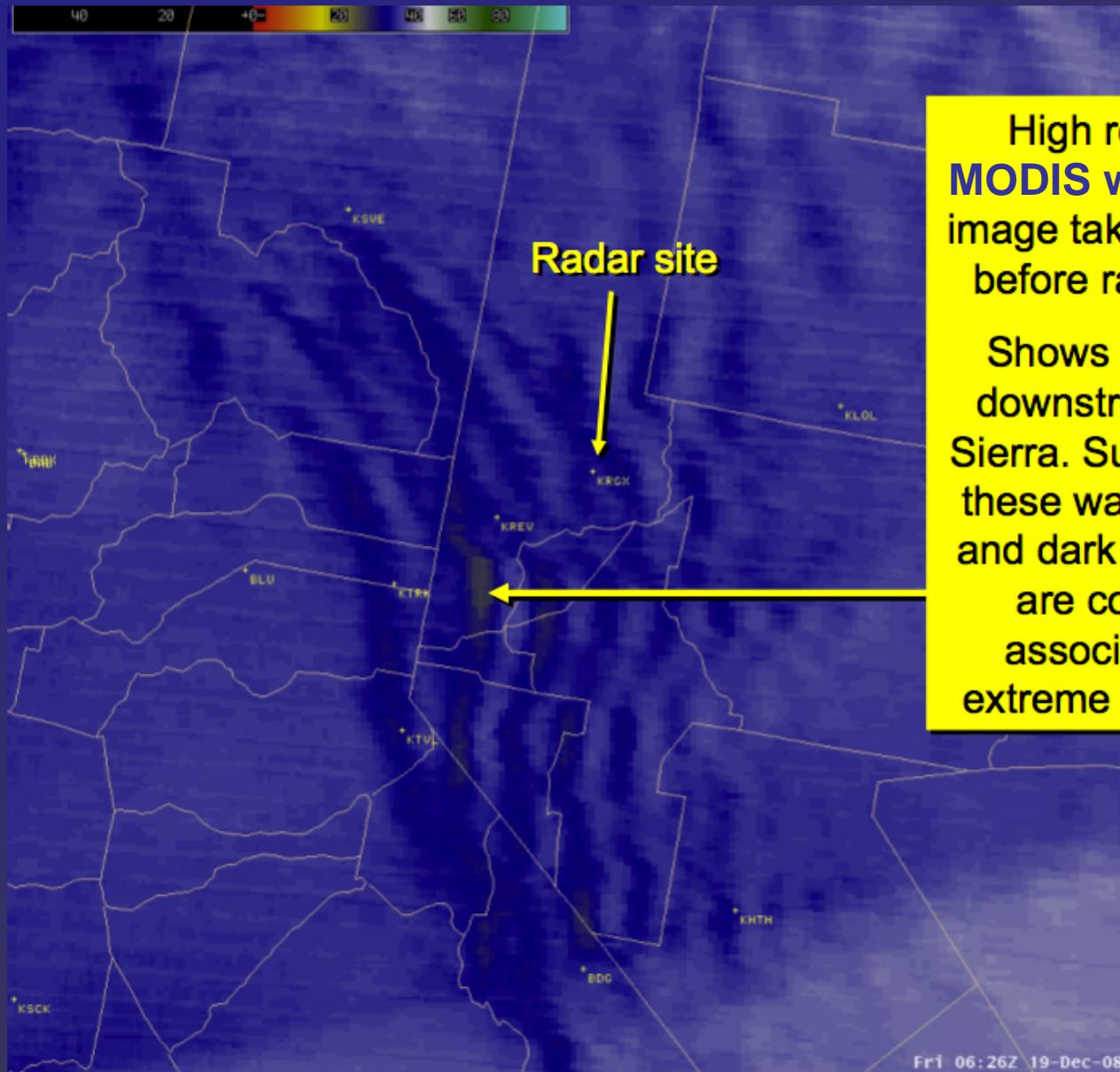
Photos

Photos taken by NWS Reno electronics team, on first visit to radar after dome failure (19 Dec.).



(credit: NWS forecast office, Reno NV)

Lee Waves



High resolution
MODIS water vapor
image taken ~4 hours
before radar failed.

Shows lee waves
downstream of the
Sierra. Subsidence in
these waves (yellow
and dark blue areas)
are commonly
associated with
extreme wind gusts.

(credit: NWS forecast office, Reno NV)

CIMSS Satellite Blog

The screenshot shows a web browser window with the address bar displaying <http://cimss.ssec.wisc.edu/goes/blog/page/3>. The page features a blue header with the CIMSS logo and the text "CIMSS Satellite Blog" and "A weblog of meteorological satellite imagery relevant to current weather events". Below the header is a search bar and a "Search" button. The main content area displays a post titled "Advection fog in Oklahoma" dated "January 2nd, 2009". The post includes a satellite image of the GOES-13 fog/stratus product, showing a plume of advection fog curling northwestward across southern Oklahoma. The image is labeled "GOES-13 fog/stratus product". Below the image is a paragraph of text explaining the fog event, mentioning station identifiers KADM and KSWO. A second, smaller satellite image is visible at the bottom of the post. On the right side of the page, there are sections for "Pages", "Archives", and "Categories".

CIMSS Satellite Blog
A weblog of meteorological satellite imagery relevant to current weather events

Advection fog in Oklahoma

January 2nd, 2009

GOES-13 fog/stratus product

AWIPS images of the GOES-13 fog/stratus product (*above*) showed a plume of advection fog curling northwestward across southern Oklahoma on 02 January 2009. A relatively moist low-level air mass with dew points in the 40s F was flowing from northeastern Texas into southeastern Oklahoma (where radiational cooling was allowing surface air temperatures to drop into the upper 30s F). Once the fog moved in, the surface visibility was restricted to 1/4 mile at Ardmore (station identifier KADM) and Stillwater (station identifier KSWO) in Oklahoma.

Pages

- » About this site
- » CIMSS "Satellite Proving Ground"
- » Contact us
- » Mobile users
- » SatePedia

Archives

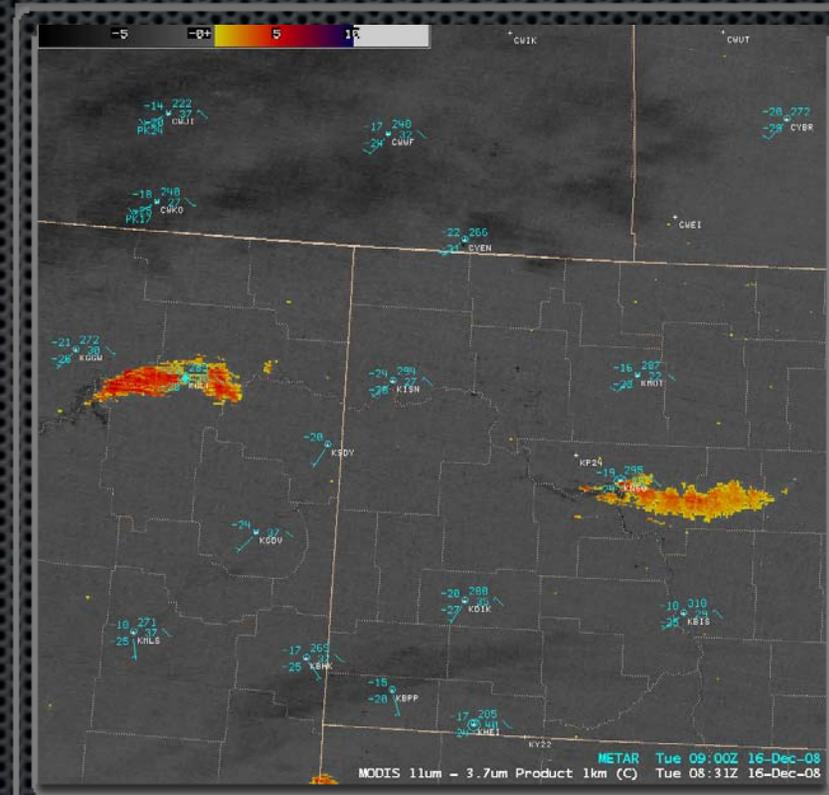
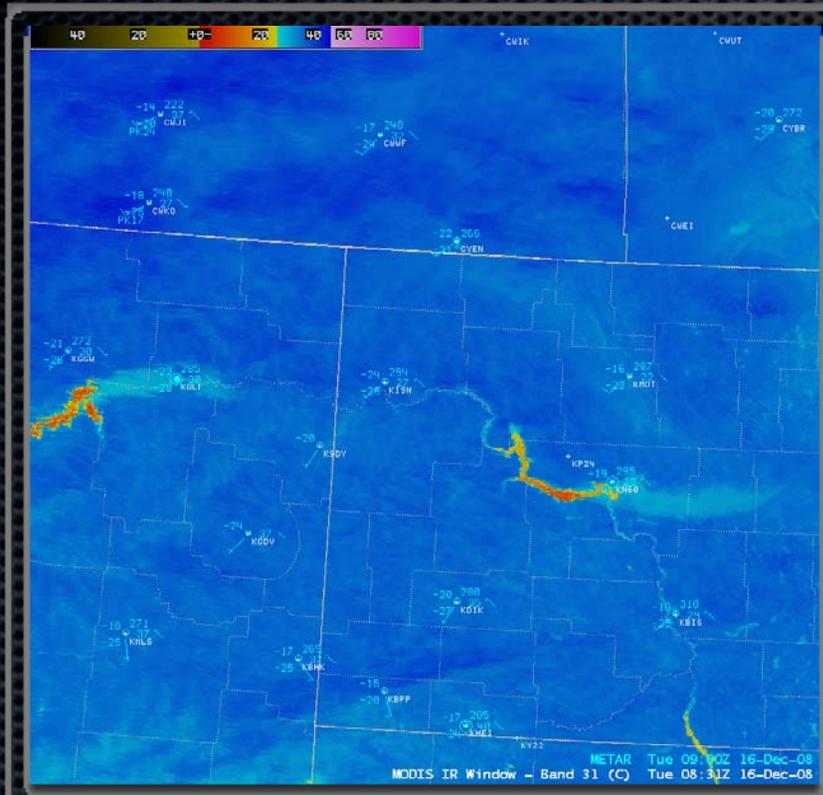
- » January 2009
- » December 2008
- » November 2008
- » October 2008
- » September 2008
- » August 2008
- » July 2008
- » June 2008
- » May 2008
- » April 2008
- » March 2008
- » February 2008
- » January 2008
- » December 2007
- » November 2007
- » October 2007
- » September 2007
- » August 2007
- » July 2007
- » June 2007
- » May 2007
- » April 2007
- » March 2007
- » February 2007
- » January 2007
- » December 2006
- » November 2006
- » October 2006
- » September 2006
- » August 2006
- » October 2005

Categories

- » Air quality (38)
- » Antarctic (2)
- » Arctic (6)

cimss.ssec.wisc.edu/goes/blog

Satellite Training Activities at CIMSS: Helping to Prepare Forecasters for the GOES-R and NPOESS Era



Scott Bachmeier
scott.bachmeier@ssec.wisc.edu

