

Evaluation of NASA/SPoRT Transitioned Satellite Products

Deirdre Kann

Brian Guyer

National Weather Service Albuquerque

**GOES R Satellite Proving Ground and
User Readiness Meeting**

May 18, 2011

Project Summary

- The opportunity to receive experimental satellite products from NASA SPO-RT was first offered in 2007 with the goal of SPO-RT “to transition research capabilities to operations to improve short-term forecasts”
- Several months later, in January 2008, ingest of these products began
- The list of products to be distributed was compiled based on local forecast challenges
- The operational use of the SPO-RT transitioned products has enhanced the decision making process by supplementing data void areas and enhancing our current satellite analysis techniques

Dish: Success Recipe Serves: WFO

1. A coherent support team

2. "Buy in" from the local staff

3. Support from SPoRT

Coherent Support Team

- NASA SPoRT Staff
- Local AWIPS Focal Point
- Local WFO “Satellite/SPoRT” Focal Point

“Buy In” from the Local Staff

- Share examples of success stories with the staff
- Share AWIPS Procedures
- Set up examples on the WES

SPoRT Support

■ NASA SPoRT Blog

The screenshot shows the NASA SPoRT blog homepage. At the top, there are navigation links for "Home" and "Mission Statement", and a search bar. The main heading is "THE WIDE WORLD OF SPoRT" with the tagline "Fostering interaction between product developers and end users". Below this is a large banner image of Earth from space with the SPoRT logo overlaid. The logo text reads "The Wide World of SPoRT" and "Fostering interaction between product developers and end users". To the right of the banner, there are social media links for "Feeds: Posts" and "Comments". Below the banner, there are two article teasers: "« Total Lightning Data in AWIPS II" and "Experimenting with RGB Color Enhancements in AWIPS »". The main article featured is "Record Precipitable Water and New Mexico Heavy Rain Event" by dmkann, dated September 28, 2010. On the right side, there is a "CATEGORIES" section listing various satellite and data products like AIRS, AMSR-E, AWIPS II, CALIPSO, CIRA Products, and CloudSat.

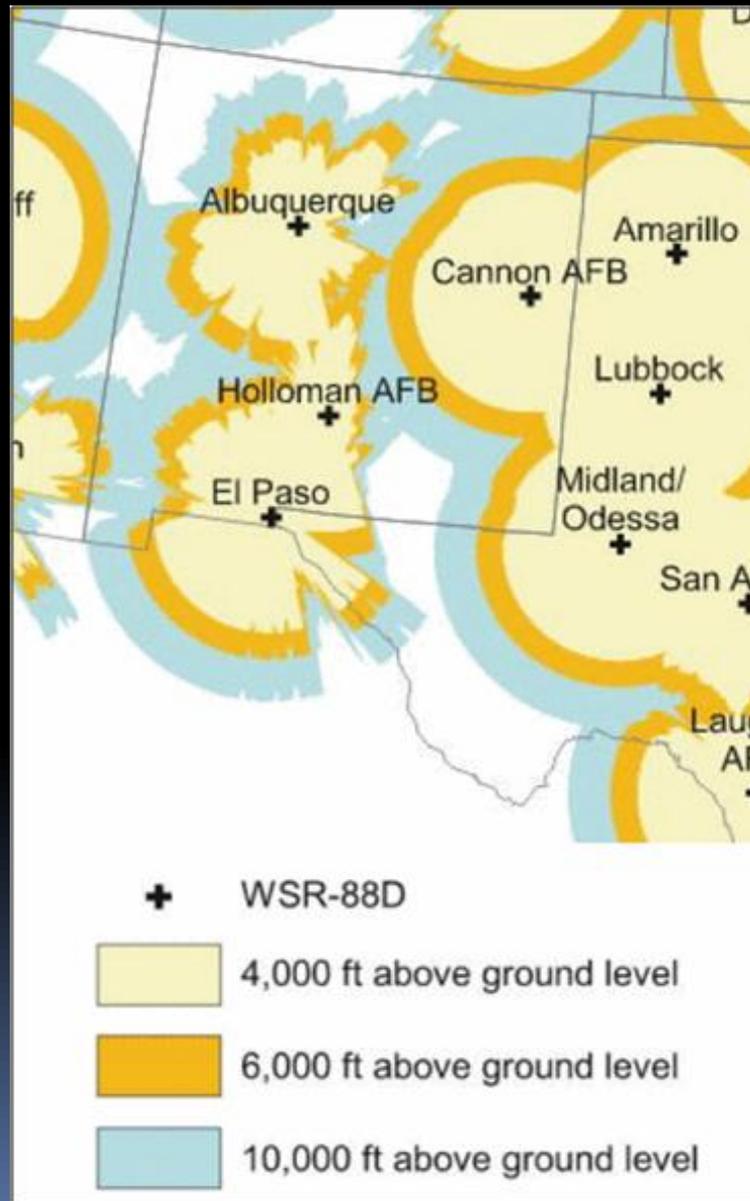
■ Training Modules

The screenshot shows a training module slide titled "NASA SPoRT Hybrid PG Imagery Intro (04/04/11:09)". The slide features the SPoRT logo and a profile picture of Kevin Fuell, a Research Scientist at the University of Alabama Huntsville. A table of contents is visible on the left, listing 13 topics. The main content area shows an "Example of future GOES-R Imagery" with a satellite image of clouds. The image is annotated with yellow dashed boxes labeled "Hybrid" and "GOES", and blue circles highlighting specific cloud features. A list of bullet points describes the hybrid imagery: "Near real-time proxy to future ABI on GOES-R to detect:", "outflow boundary", "convective clouds", and "wave-like clouds from topographic and pressure-induced forcing". It also notes that "MODIS imagery used in hybrid is remapped to match the ABI resolution of 2 km (IR, SW, WV) and 0.5 km (Visible)". A caption at the bottom of the image reads: "Alternating hybrid and GOES visible imagery for 13-March-11 at 1845 UTC over north-AL & GA and southern TN (WFO borders in yellow)". The slide is presented in an Articulate software interface, showing "SLIDE 5 OF 13" and "PAUSED" status.

Forecasting Challenges in New Mexico

- **Large County Warning Area**
- **Diverse terrain**
- **Relatively few surface observations**
- **Poor radar coverage**

Poor Radar Coverage



Products Evaluated And Successes

GOES Imager

Use

Low Cloud Base

Locations of IFR Ceilings

Fog Depth

Fog, Low Clouds, and their depth

Icing and Cloud Top Height

Detection of supercooled clouds

CIRA (Blended) Products

Use

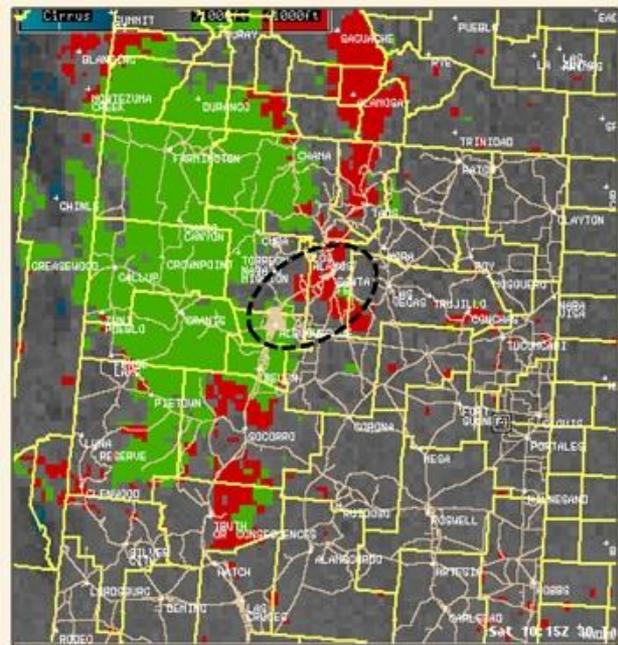
AMSU/SSMI Blended TPW

Multi-source 6 hourly TPW

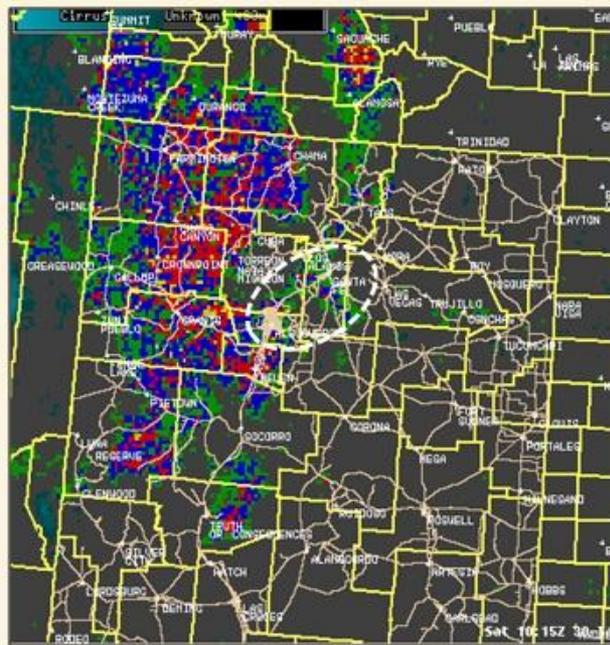
TPW Percent of Normal

Extreme values or gradients of TPW

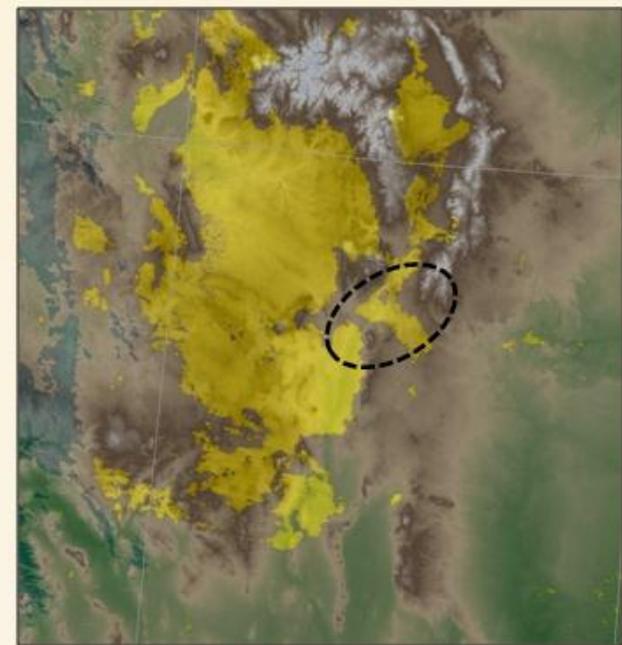
Low Clouds and Fog



1015Z Low Cloud Base Product



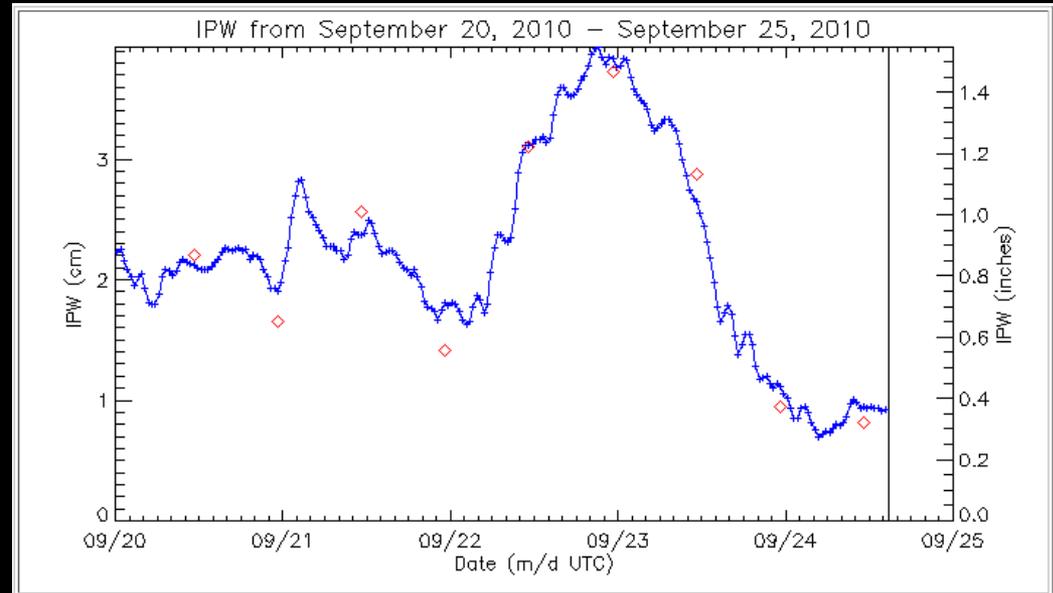
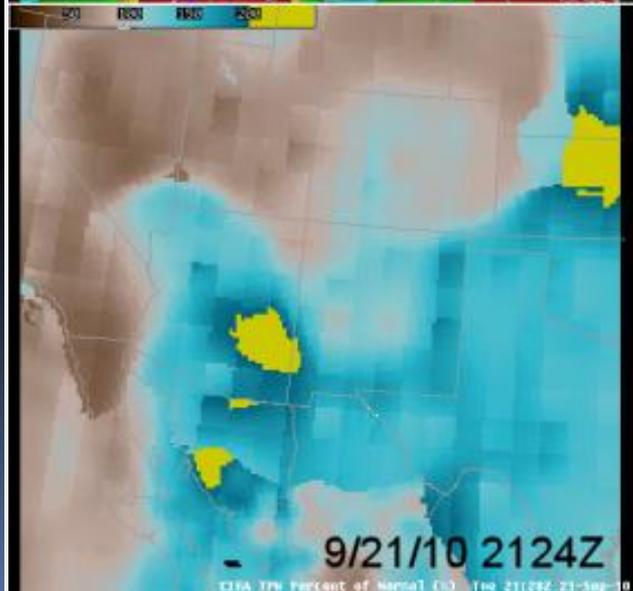
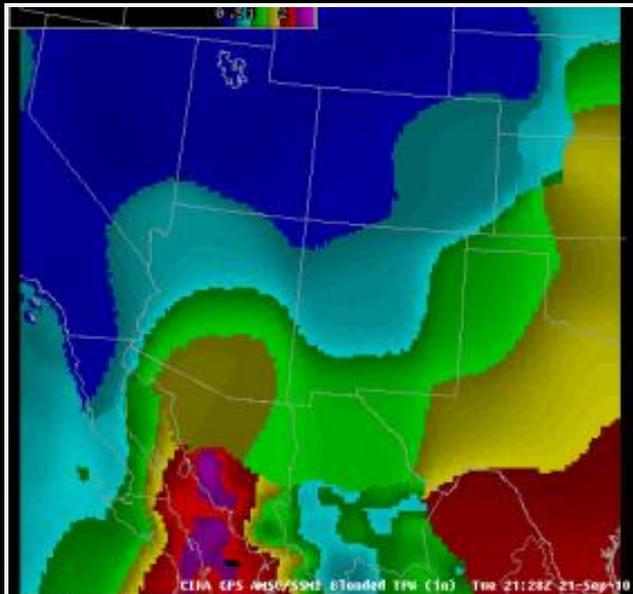
1015Z Combined Fog Product



1015Z MODIS 11-3.9um Product

29 Jan 2010 – Snowmelt, clear skies, calm winds lead to widespread low clouds and fog

CIRA Blended TPW and PON TPW

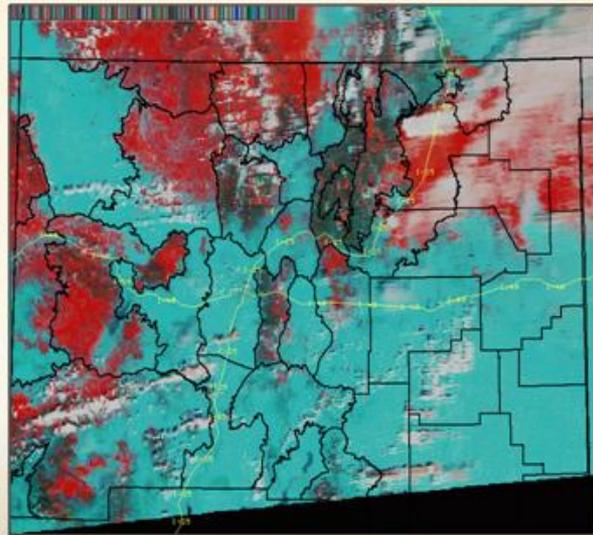


Location	Amount (inches)
Gladstone	6.42
House	3.51
Clayton	3.20
Espanola	3.20
Tesuque 2 W	2.63
Albuquerque - Candelaria & Tramway	2.35
Santa Fe	2.00
Albuquerque Sunport	1.86
Rio Rancho 2 S	1.94
Fort Sumner	1.40

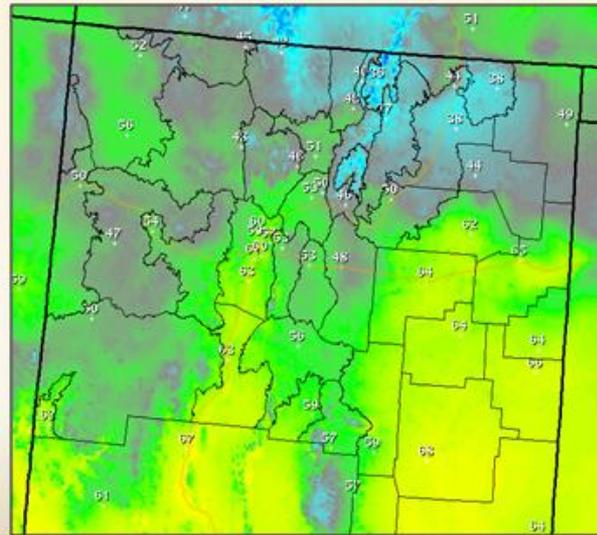
Products Evaluated And Successes

MODIS (1km and 4km)	Use
Visible, IR, WV	Higher resolution, GOES-R preview
False Color Composite	Identify regions of snow/ice
Natural Color	True color visible
3.9 μm	Fire hot spots
11-3.9 μm	Spectral difference fog depiction
Lifted Index	Stability at cloud free pixels
Cloud Phase	Define state of the water in cloud

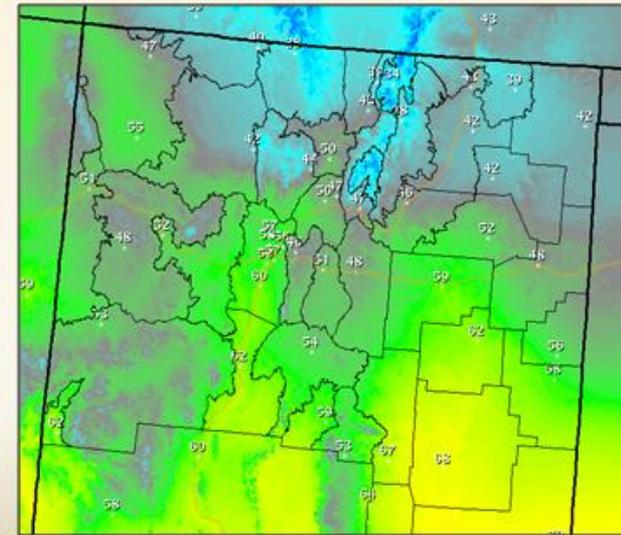
Products Evaluated And Successes: MODIS



MODIS 1km False Color
01/18/10 2049Z



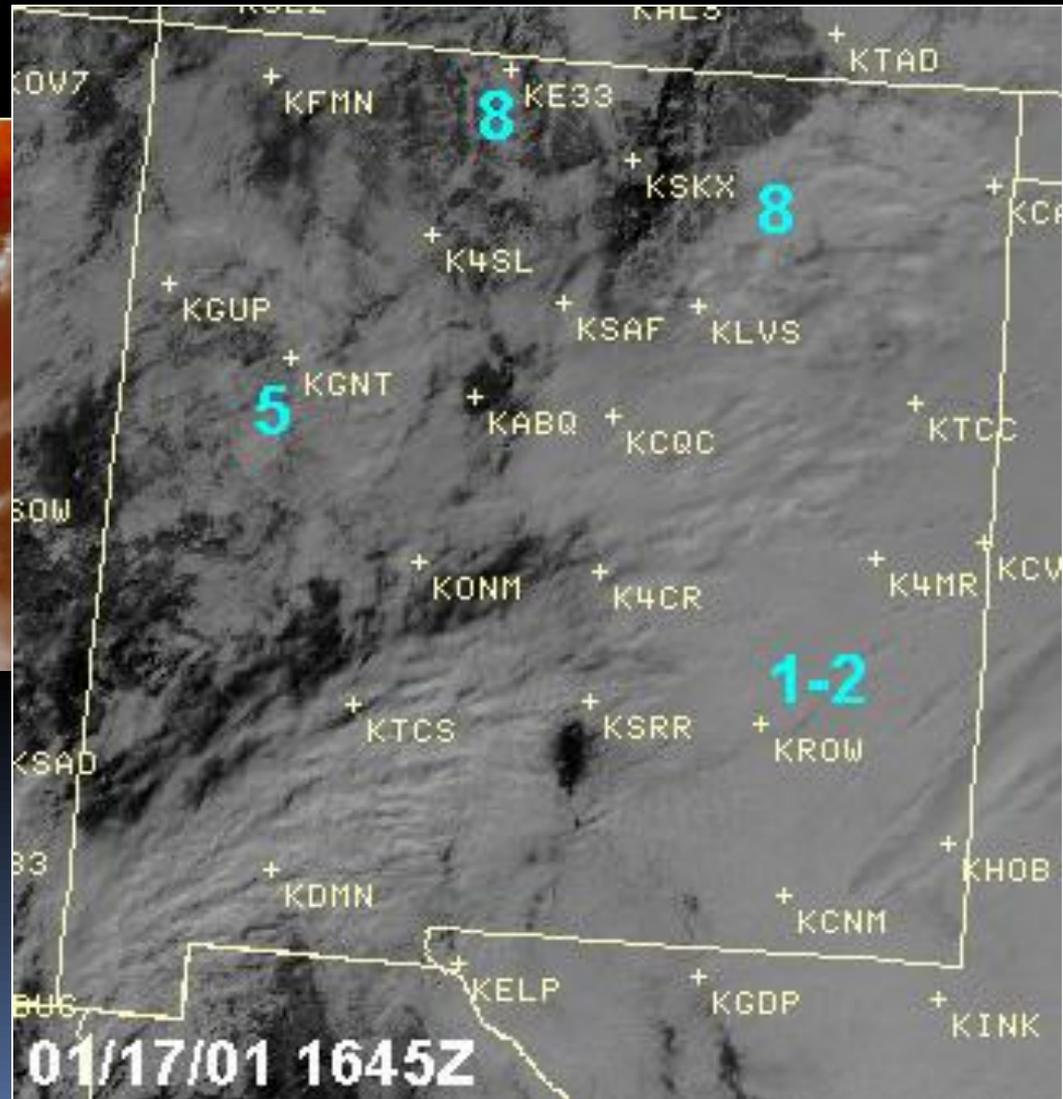
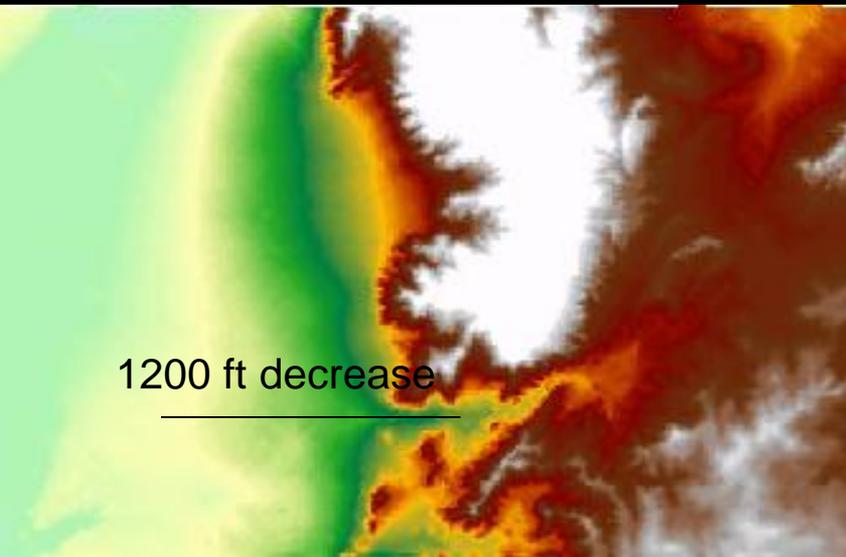
Max Temperature Observation Grid
01/18/10



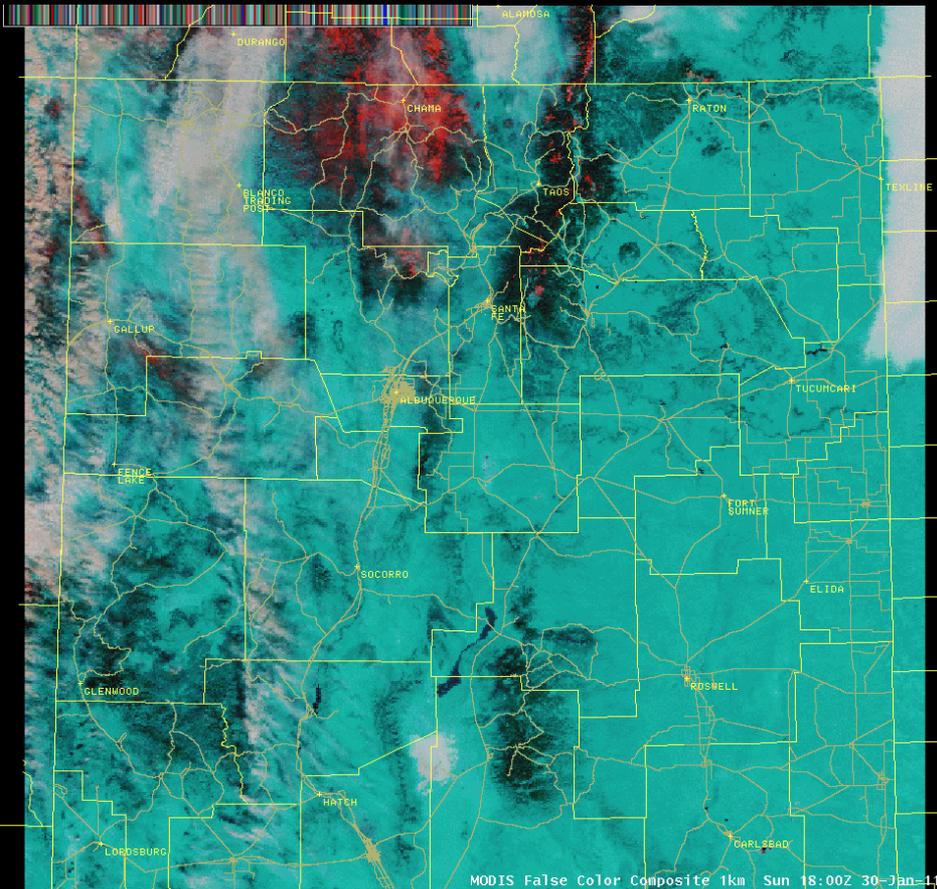
Max Temperature Forecast Grid
01/19/10

January 2010 – Snow cover resulting in a sharp gradient in max T temperatures

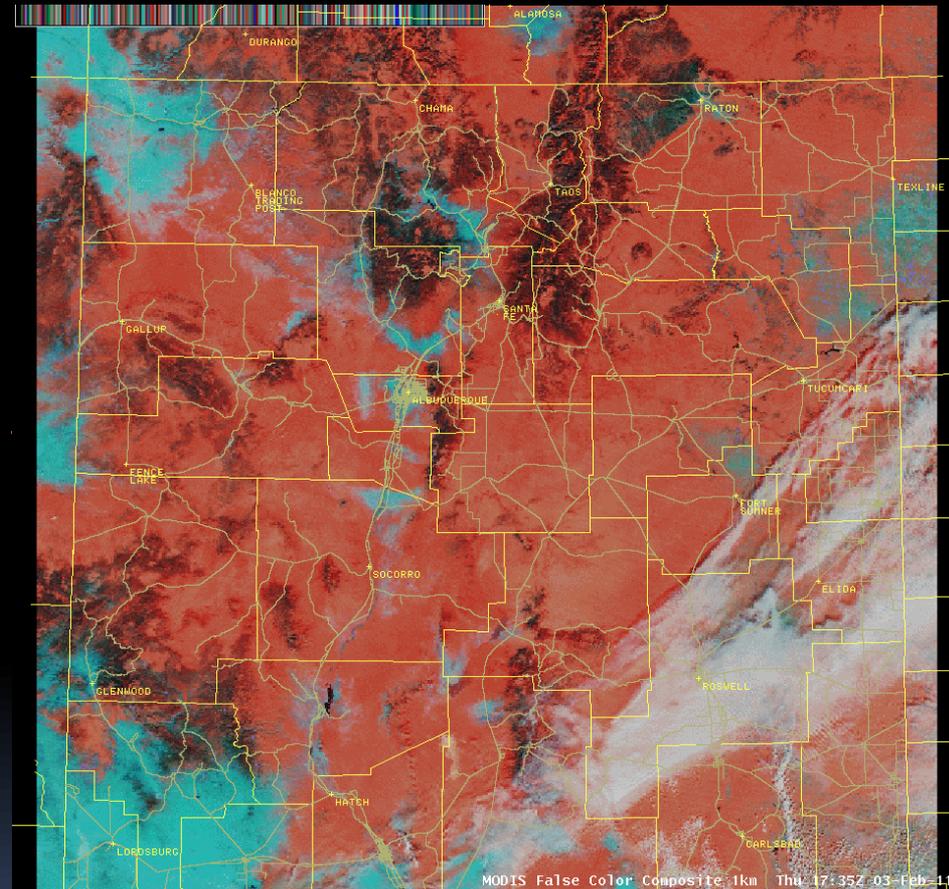
Products Evaluated And Successes: MODIS



Products Evaluated And Successes: MODIS



30 Jan 2011

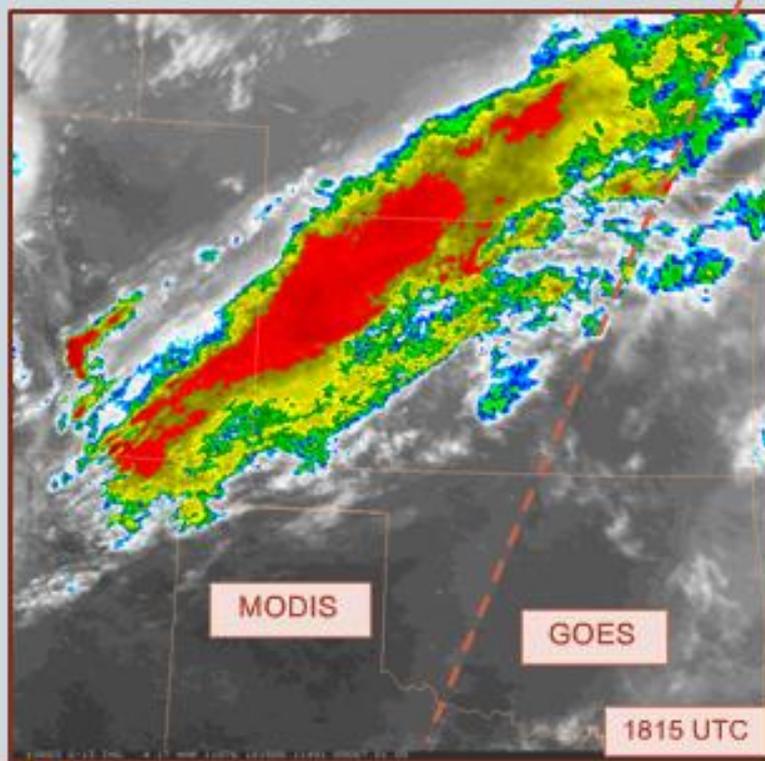


3 Feb 2011

Note the snow free areas associated with downslope gap winds

Products Evaluated And Successes

MODIS-GOES Hybrid Imagery



- Combination of high-resolution imagery from MODIS and standard GOES.
- MODIS swath replaces GOES whenever it is available while GOES fills time periods between MODIS overpasses.
- Four hybrid channels (MODIS/GOES):
 - Longwave IR (11 micron)
 - Shortwave IR (3.9 micron)
 - Water Vapor (6.7 micron)
 - Visible (0.6 micron)

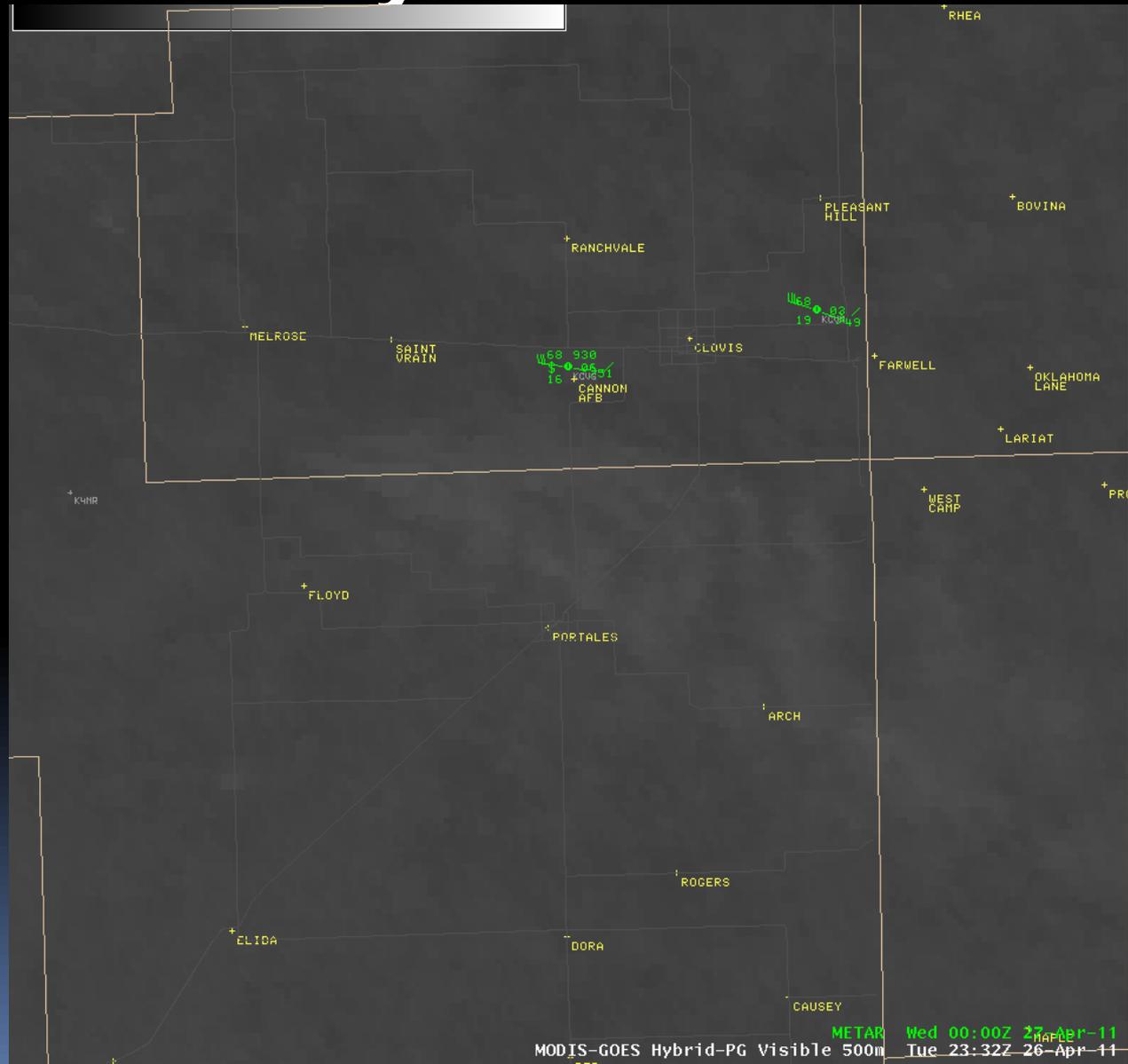


Products Evaluated And Successes: GOES Hybrid

■ 17 April 2011 – tire blow out starts a large fire in eastern New Mexico

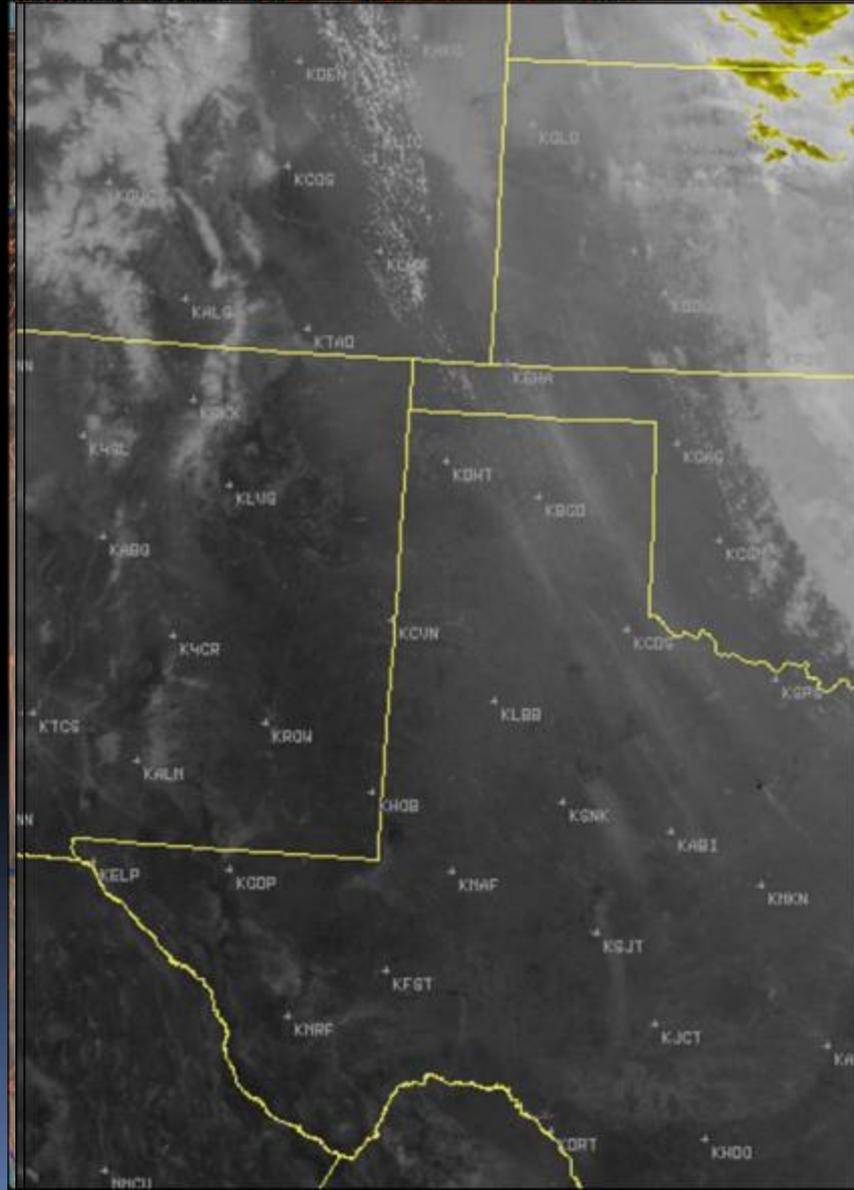
■ One week later, the burn scar is visible on 1km MODIS IR

■ Strong winds on 26 April 2011 show the burn scar as a source of blowing dust, reducing visibilities to 1-3 miles

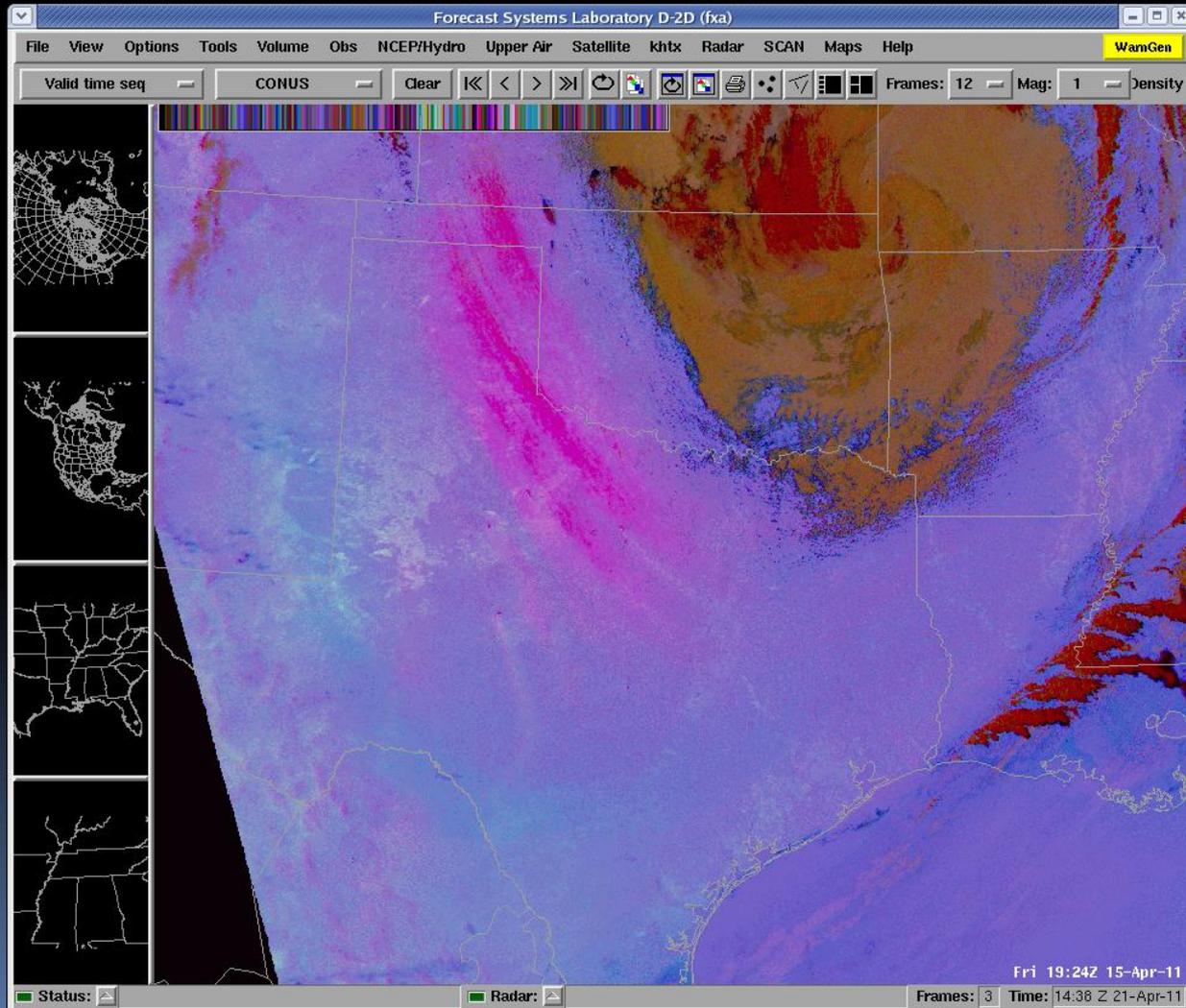


Products Evaluated And Successes: GOES Hybrid

- 15 April 2011 – dry north winds and unstable air result in dust plumes in West Texas, visible on 1 km color composite
- At 1732Z, GOES image depicts the hot spots and dust
- AT 1745Z, GOES-R ABQ proxy shows sharper edges on dust plumes, clearer hot spots, and a clearer CO cloud field.



Blog Post Prompts Information on New Product: MODIS RGB Dust



Project Summary

- The operational use of the SPoRT transitioned products has enhanced the decision making process by supplementing data void areas and enhancing our current satellite analysis techniques
- We look forward to testing additional products, including the GLM (Geostationary Lightning Mapper). Due to our limited radar coverage, the application of GLM total lightning data may improve our warning times even more so than at a typical central or eastern WFO.