

# An Overview of NASA SPoRT GOES-R & JPSS Proving Ground Testbed Activities



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## Mission

The Short-term Prediction Research and Transition (SPoRT) Center is funded by NASA's Earth Science Division and NOAA's JPSS and GOES-R Proving Grounds to transition satellite products and capabilities to the NWS to improve short-term (0-48h) forecasts on a regional and local scale. SPoRT currently collaborates with 30+ NWS WFOs (at least one in each NWS region) and 5 National Centers/Testbeds.

## Method

SPoRT matches user-identified forecast challenges to specific products, providing access to these data in AWIPS through new plug-in development, and generating applications-based training to use the products for their needs (R2O). Upon transition, SPoRT collaborates with the user to assess the product impact in a real-world environment for feedback to product developers (O2R) and to benefit their peers.

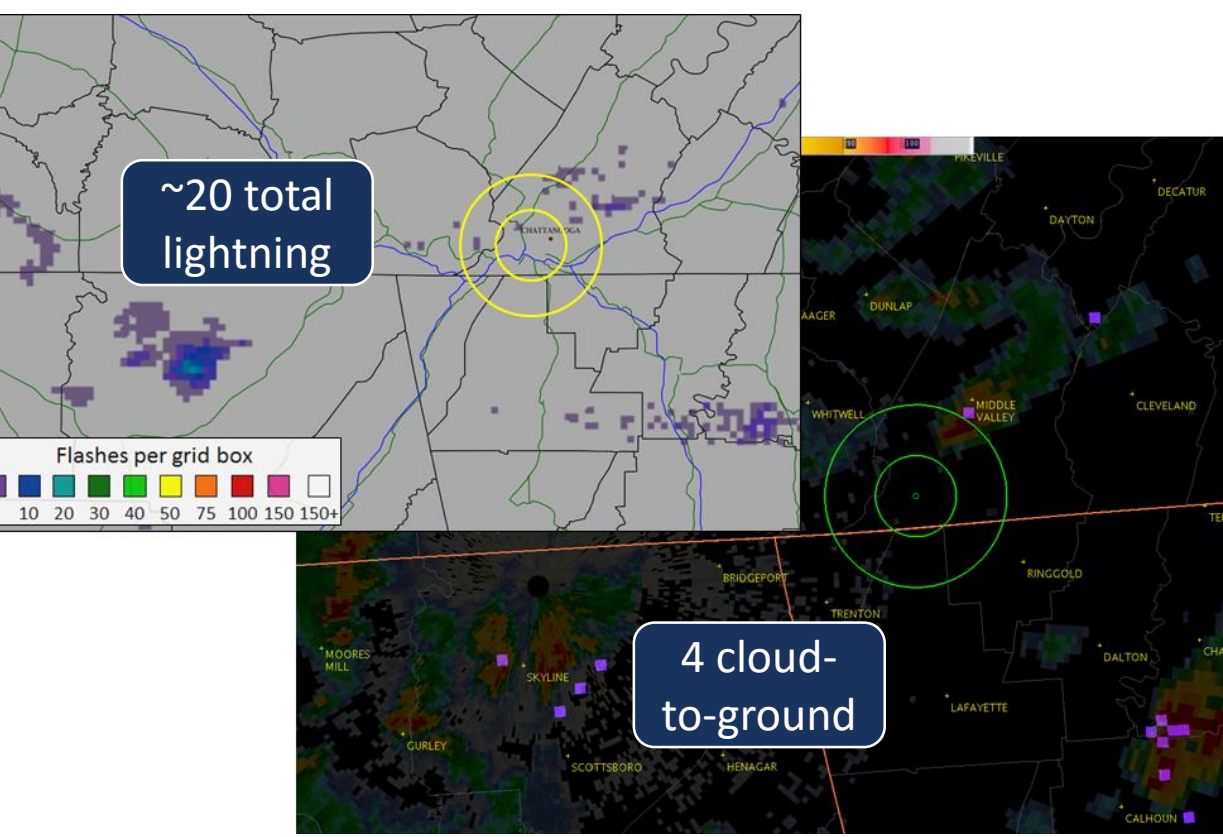
## Metrics

Assessments are conducted to test the application of current products in operations and to ready users for Day-1 utility of new capabilities. Feedback from assessments leads to improved understanding of product capabilities and use for situational awareness. Assessment results are communicated in the form of reports, conference presentations, and journal publications.

## 2016 Highlights

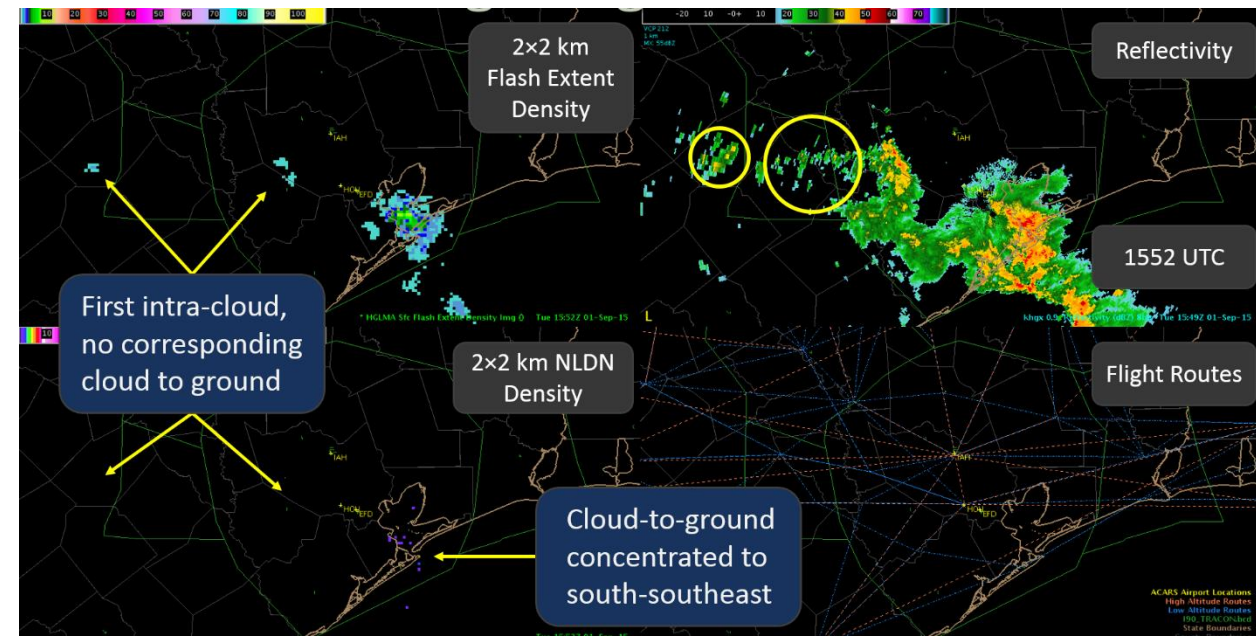
### Summer '16: Lightning Pseudo GLM

- HWT; Aviation (CWSU Houston); Emergency Managers
- Continued use of the SPoRT pseudo-GLM flash density
- Demonstrating capabilities of GLM with ground-based LMAs
- Positive reviews from multiple users with varying purposes
- Opportunity to compare with super-rapid scan GOES
- Traditional use of lightning jumps for severe weather decision support
- CWSU demonstrated utility to monitor initiation and trends of convection to aid briefings on TRACON gate closures
- Emergency managers use for lightning safety of events



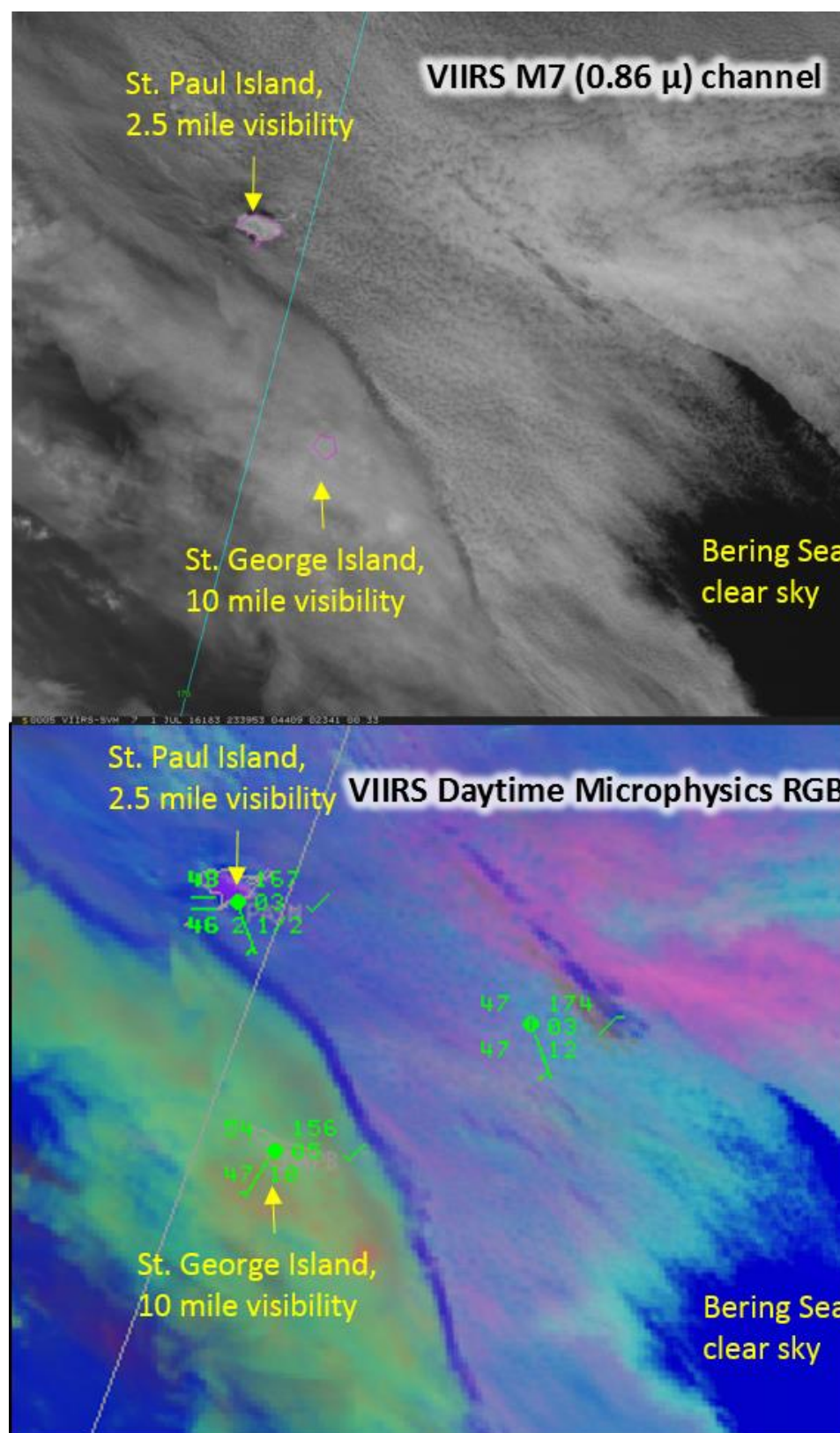
Event review (left): "PGLM directly aided decision to delay U.S. Women's soccer match for safety."

Event review (right): "Total lightning valuable in identifying storms that would later close TRACON gates."



### Fall '16: Low Clouds and Fog: Multispectral Imagery

- AFG (Scotty Berg); AFC (Michael Lawson); AJK (Ed Liske)
- Daytime Microphysics multispectral (i.e., RGB) imagery useful for public and aviation forecasts
- Optimal for use in Alaska summer when Nighttime Microphysics RGB has limited use

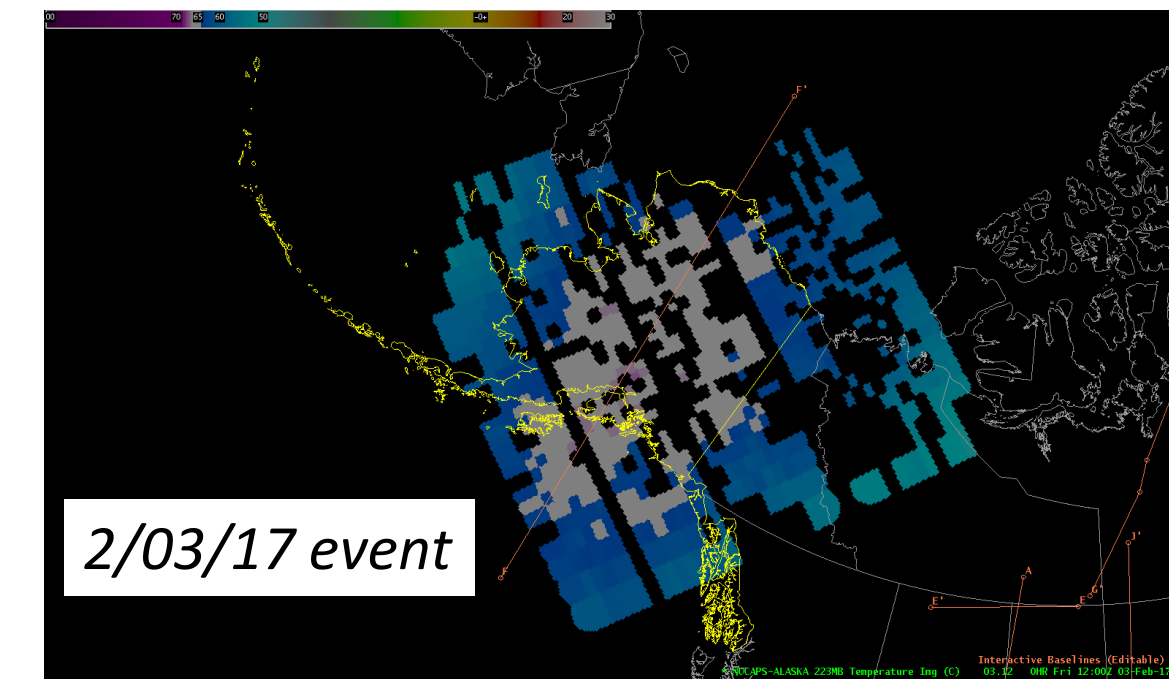


"The product gave great confidence in combination with model data and surface observations to continue to forecast reduced visibility over the Pribilof Islands, both in the public forecast and PASN (St. Paul) TAF. - Forecaster 7/1/16 event"

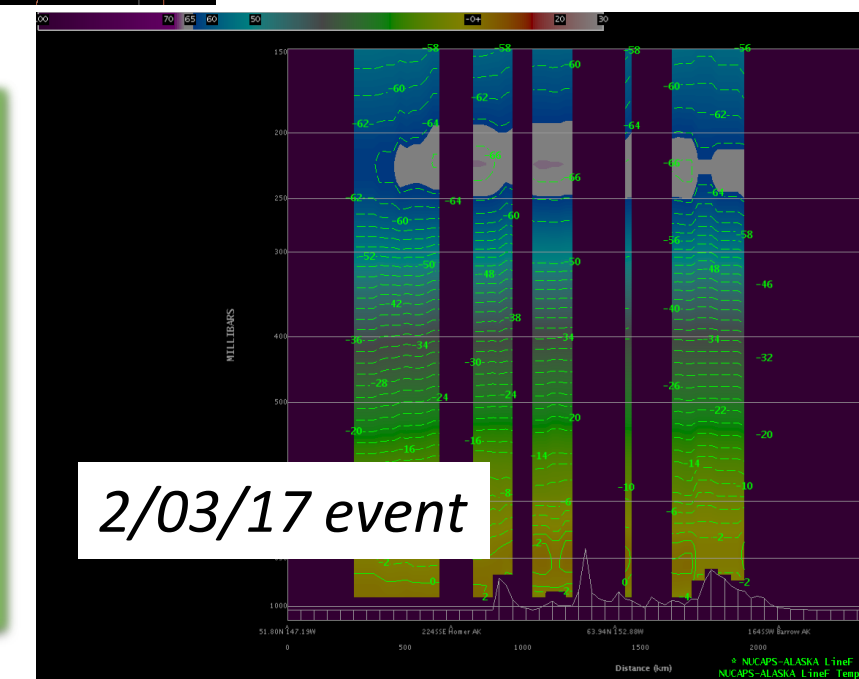
- The Daytime Microphysics RGB shows thick mid-level stratus in bright greenish tones with some tan coloring while the blues/pinks represent low-level stratus of varying thickness.
- Forecasters frequently commented that the efficient depiction of cloud features aided TAF forecasts
- Forecasters found Daytime Microphysics RGB has similar utility of Nighttime Microphysics for anticipating aviation hazards.

### Winter '17 Cold Air Aloft: Gridded NUCAPS

- Anchorage CWSU (Kristen Nelson, Gail Weaver, Carrie Haisley, Chris Waterhouse, Raymond McLeod)
- Joint effort between SPoRT, CIMSS, CIRA, GINA, and STC to provide plan view display of NUCAPS temperature to identify the cold temperatures hazardous to aviation
- Product captures Cold Air Aloft events ( $\leq 65^{\circ}\text{C}$ ) under which airliner fuel can freeze
- Use of satellite observations over the vast, data sparse arctic domain allows forecasters to observe the 3D extent of the cold air and increase confidence in issuing Meteorological Impact Statements



"The Gridded NUCAPS data performed better than the GFS data today. The NUCAPS CAA levels were a much better match to actual sounding data vs. the GFS model depictions. - Gail Weaver 2/22/17 event"

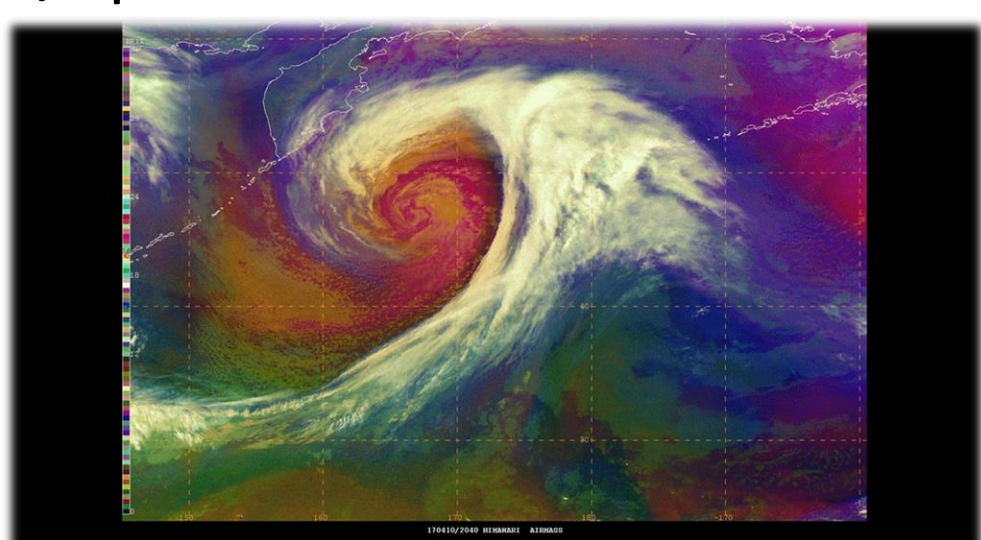


- Imagery (as shown here) available in AWIPS for display on 52 levels
- CIRA developed a web visualization also used by the forecasters

## All 2016 Activities

### Spring '16: Multispectral Imagery

- OPC/WPC; OPG
- OPC regularly uses the Air Mass RGB imagery to analyze and monitor cyclone development and anticipate high winds
- First formal evaluation of GOES-R ABI RGB capabilities performed at OPG in March/April 2016



### Summer '16: Convection: Gridded NUCAPS

- HWT - Experimental Warning Program
- Extension of Cold Air Aloft work funded by JPSS PG/RR
- Gridded NUCAPS Temperature and Mixing Ratio were available on plan view and cross section fields to diagnose the pre-convective environment.

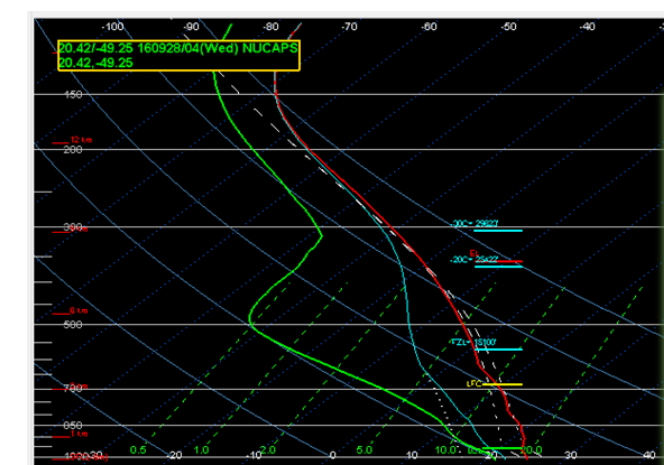
"We took a look at a NUCAPS plan view image of mid-level moisture (754 mb mixing ratio) from 19Z. Image shown below..."

...Areas of higher moisture were apparent over south-central Missouri in our SGF CWA, and over the St. Louis metro area. - JP"



### Fall '16: Hurricanes: CrIS/ATMS NUCAPS

- National Hurricane Center
- JPSS funded project to explore the utility of NUCAPS Soundings and Ozone products to diagnose extratropical transition
- Forecasters participated in post analysis review of Hurricane Matthew



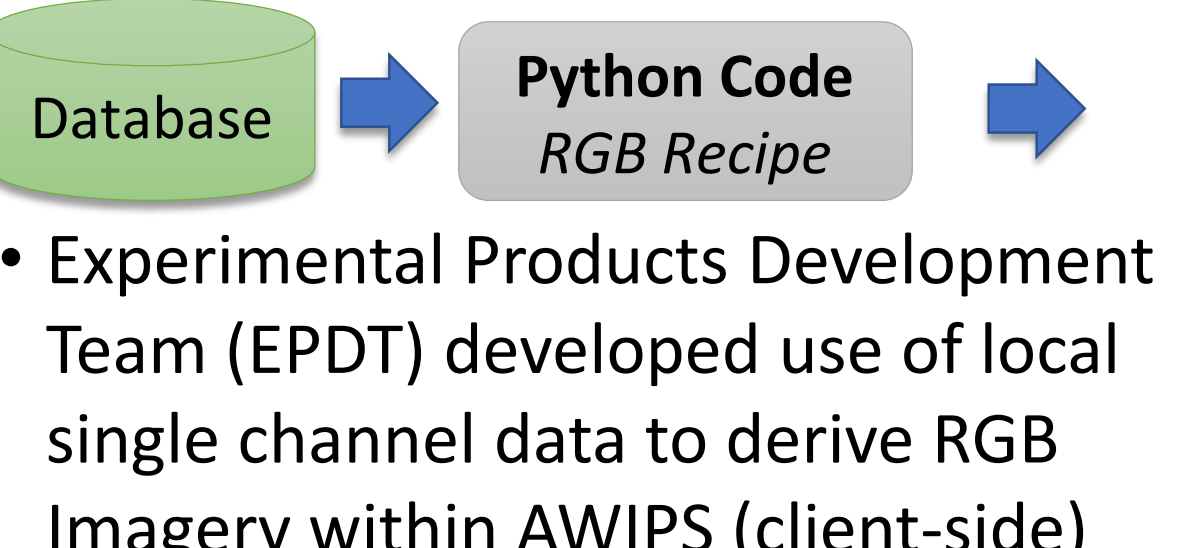
"I would also be interested in something similar for Hurricane Nicole right before it strengthened. Both of these TCs intensified, one of them very rapidly, in fairly high shear environments... - MD"

### Fall '16 Rainfall Rates: GPM and IMERG

- Alaska WFOs and APRFC, ABQ WFO
- Funded by NASA to test applications of research PMW rain rate algorithm derived from GMI, ATMS, SSMIS, etc. in operational forecasting
- Follow-up of 2015 assessment to evaluate new algorithm updates

"[The swaths] showed a good depiction of the storm structure over the gulf with heavy rain near a few lightning strikes along with very cold cloud tops. When there was a swath over the inner channels [...] there was good agreement of coverage of precip falling and looking at a few stations the swath amounts matched well with the amounts from the station."

### Fall '16 AWIPS Development: Client-Side RGBs



- Experimental Products Development Team (EPDT) developed use of local single channel data to derive RGB Imagery within AWIPS (client-side)
- Actively working with GINA and Alaska Region to implement client-side VIIRS RGB imagery at Alaska WFOs
- Transitioned capability to TOWR-S to disseminate AWIPS configurations for all WFOs to have the ability to view GOES-16 client side RGB imagery

### Winter '17 Training: Applications Library and AWIPS Integrated Reference (AIR)

- SPoRT RGB Quick Guides are operationally available in the AIR tool
- Allows region-specific application examples submitted by developers and/or forecasters to be organized and displayed
- SPoRT is developing 1-minute, regional application examples through collaborations with NWS forecasters for use in the AIR tool
- Visit the [SPoRT Applications Library](#) for more examples

Application Library: Dust RGB  
Transportation and Decision Support Services

Contributed by: Brian Geyer  
Region: CONUS West/Southwest  
Office: NWS Albuquerque, NM (ABQ)  
Date: 11 March 2014  
Product(s): Dust RGB  
Application Area: Public Event Decision Support  
Feature: Dust, Mid-level clouds  
Instrument(s): GLM, MODIS, VIIRS  
Works well with: Ceiling and visibility observations  
Related Links: [Dust RGB Quick Guide \(2 pages\)](#), [SPoRT](#), [Dust RGB Interactive Quick Guide](#), [SPoRT](#)

**Event Description:** A potent storm system departing the Front Range forced a strong cold front southward across Colorado and New Mexico. As the front passed it produced high winds, blowing dust, low visibility, and ceilings at several airport observations sites.

**Product Impact:** The Dust RGB imagery (Fig. 1) confirmed the low visibility was due to dust rather than low clouds reported from the surrounding cold front. The Dust RGB was also able to distinguish mid-level clouds which could be mistaken for dust in the GOES visible image. Application of the RGB resulted in improved forecasting of the visibility and spatial extent of the dust plume leading into northeastern New Mexico. Forecasters were able to confidently establish the timing and location of impacts along the I-40 corridor and communicate this via graphics to state officials and the public with a 3 hour lead time (Fig. 2). At 1:50 PM local as Tucson (KTCC) visibility was reduced to 1/4 statute miles, verifying the graphics. Radar detection of the dust plume was limited due to overloading of the beam, thus, the satellite imagery provided valuable remote sensing of the event.

Figure 1. Dust RGB product valid 1801 UTC 11 March 2014 with aviation station plots overlaid.

## Upcoming 2017 Activities

- HWT: Gridded NUCAPS
- Alaska CWSU: Gridded NUCAPS
- WFOs/CWSUs and Emergency Managers: GLM operational assessment
- GOES-16: Multispectral Imagery
- Alaska WFOs: VIIRS Multispectral Imagery and Cloud Property products
- Alaska WFOs and RFC: revisit merged IMERG/HQprecip product