

GOES-R Program



CIMSS/ASPB Participation GOES-R Proving Ground Status

Wayne Feltz, Mike Pavolonis, Tim Schmit, Andy Heidinger, Jordan Gerth, Scott Bachmeier, Scott Lindstrom, Justin Sieglaff, Lee Counce, Robert Aune, Gary Wade, Brad Pierce, Kaba Bah, Will Straka, Jason Otkin, Sarah Monette, Chris Velden, Ralph Petersen, Russ Dengel, Joleen Feltz, Dan Hartung

January 9, 2012



- Demonstration of GOES-R PG applications at National Center Testbeds and NWS WFOs
- AWIPS Weather Event Simulator (WES) for the GOES-R ABI.
- AWIPS-2 status
- GOES-15 Update
- AMS Annual Meeting Participation

The following list of products offers the opportunity for near-real time Warning-Related utility: **Now Available – Blue** / **Near Future - Orange**

Baseline Products:

- Volcanic Ash: Detection & Height - Alaska, Pacific, and AWC
- Cloud Top Phase / Cloud Type – Alaska, AWC, and OPC/HPC
- Cloud Top Height - AWC
- Cloud and Moisture Imagery – All testbeds
- Hurricane Intensity – NHC
- Total Precipitable Water – Pacific, HWT, OPC
- Fire / Hot Spot Characterization – HWT (Hydrologic and Fire, WRH)

Future Satellite Capabilities:

- Aircraft Icing Threat - NASA LaRC, Bill Smith Jr
- Turbulence - AWC
- Convective Initiation (UWCI used where SATCAST not automated yet)
- “Enhanced-V” / Overshooting Top Detection – HWT and HPC
- Low Cloud and Fog – AWC and Alaska
- SO₂ Detection – Alaska, AWC, and Pacific
- Nearcasting – AWC, HWT, HPC



- Planning on 2012 Hazardous Weather Testbed (HWT) participation with distribution of WRF simulated radiances, Nearcasting
 - SFOV GOES Sounder TPW
 - CTC within thin cirrus
- Continue distribution of GOES-R Fire Hotspot and Intensity proxy products (GOES imager based) to SPC for Fire Weather Testbed (now AWIPS/N-AWIPS)
- Participation in Regional OSSE/High Impact Weather meeting in February (Petersen/Schmit/Li/Otkin)



- AWC GOES-R Research-to-Operations position advertised again; candidate pool is now being evaluated
- NWSTC position: Chad Gravelle was in MSN from 14 Nov – 10 Dec for initial training/orientation, and then stationed in Kansas City in mid-Dec
- UWCI, OTTC, Fog/low cloud, and Cloud top phase/Cloud type products are available within N-AWIPS for evaluation; Chad is working to get volcanic ash distribution to AWC
- Volcanic ash and SO₂ pending until GOES-R R-to-O expert in place; we will work with Chad as a possible solution in mean time
- UW-CIMSS satellite applications “Boot Camp” delayed until spring 2012, more to come



- Volcanic ash, SO₂, Fog/low cloud, Cloud top phase, Cloud type products have been available in AWIPS at all WFO's in AK and at the AAWU since January 2011
- Live training sessions were conducted, and a volcanic ash VISITview module is now available. Updated training for fog and cloud phase will be made available in the next month or so
- A volcanic ash WES case is nearly complete
- Automated ash cloud alerts from AVHRR and MODIS will be provided to the VAAC and CWSU in the coming months. These alerts are already being distributed to the USGS in Alaska and successfully detected the eruption of Cleveland on December 29 2011. Cleveland is a seismically unmonitored volcano in the Aleutians.
- At the request of the Anchorage VAAC and CWSU, we are working on GOES-R like products for GOES-15





From: Mike Pavolonis <mpav@ssec.wisc.edu>
 Subject: **VOLCANIC CLOUD ALERT**
 Date: December 29, 2011 8:34:03 AM CST
 To: Mike Pavolonis <mpav@ssec.wisc.edu> , Justin Sieglaff , NOAAAshAlarm@usgs.gov

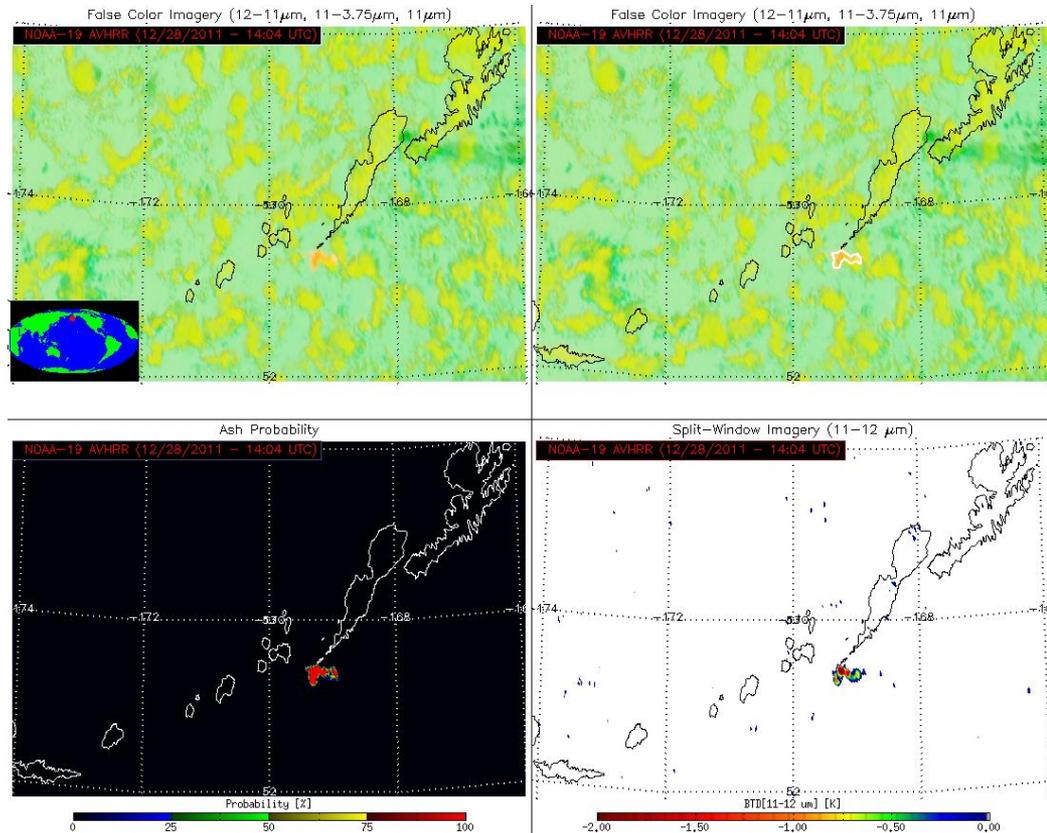
@*****GENERATING VOLCANIC CLOUD WARNINGS*****

DATE: 12/29/2011
 TIME: 14:04 UTC
 SATELLITE: NOAA-19 AVHRR
 L1B FILENAME: NSS.HRPT.NP.D11363.S1404.E1418.B1489494.GC
 ORBIT NUMBER: 1489494
 NUMBER OF ASH CLOUD WARNINGS: 1
 NUMBER OF VOLCANIC Cb WARNINGS: 0
 NUMBER OF VOLCANIC HOT SPOT WARNINGS: 0

 VOLCANIC ASH CLOUD FOUND
 Radiative Center (Lat, Lon): 52.681, -169.109
 Mean Viewing Angle (degrees): 41.83
 Mean Solar Zenith Angle (degrees): 135.49
 Nearby Volcanoes:

- Tana(47.54 km)
- Kagamil(52.48 km)
- Vsevidof(57.21 km)
- Cleveland(58.51 km)
- Uliaga(61.66 km)

False Alarm Potential: 0 out of 276994
 Maximum Height: 3.5 km (11567.35 ft)
 Mean Tropopause Height: 8.5 km (27831.94 ft)
 Median Effective Radius: 5.06 micron
 Total Mass: 0.84 ktons
 Total Mass of Fine Ash: 0.00 ktons
 Total Area: 173.00 km^2



- Coordinating with Mark DeMaria and Steve Businger
- Roy Huff will visit UW-CIMSS after attending AMS Jan 30 – Feb 3
- Jordan Gerth and Wayne Feltz will visit U of Hawaii and Honolulu NWS February 13 – 17 to transition Convective Initiation, Overshooting-Top, Morphed TPW (MIMIC TPW) products
- Volcanic ash and SO_2 (from MODIS) were added to the plan, preliminary transition will also be attempted on visit
- DB antenna proposal is under construction (Liam Gumley/ Steve Businger)
- GOES Sounder SFOV TPW next year still needs formal request from NWS for complete coverage over Hawaii

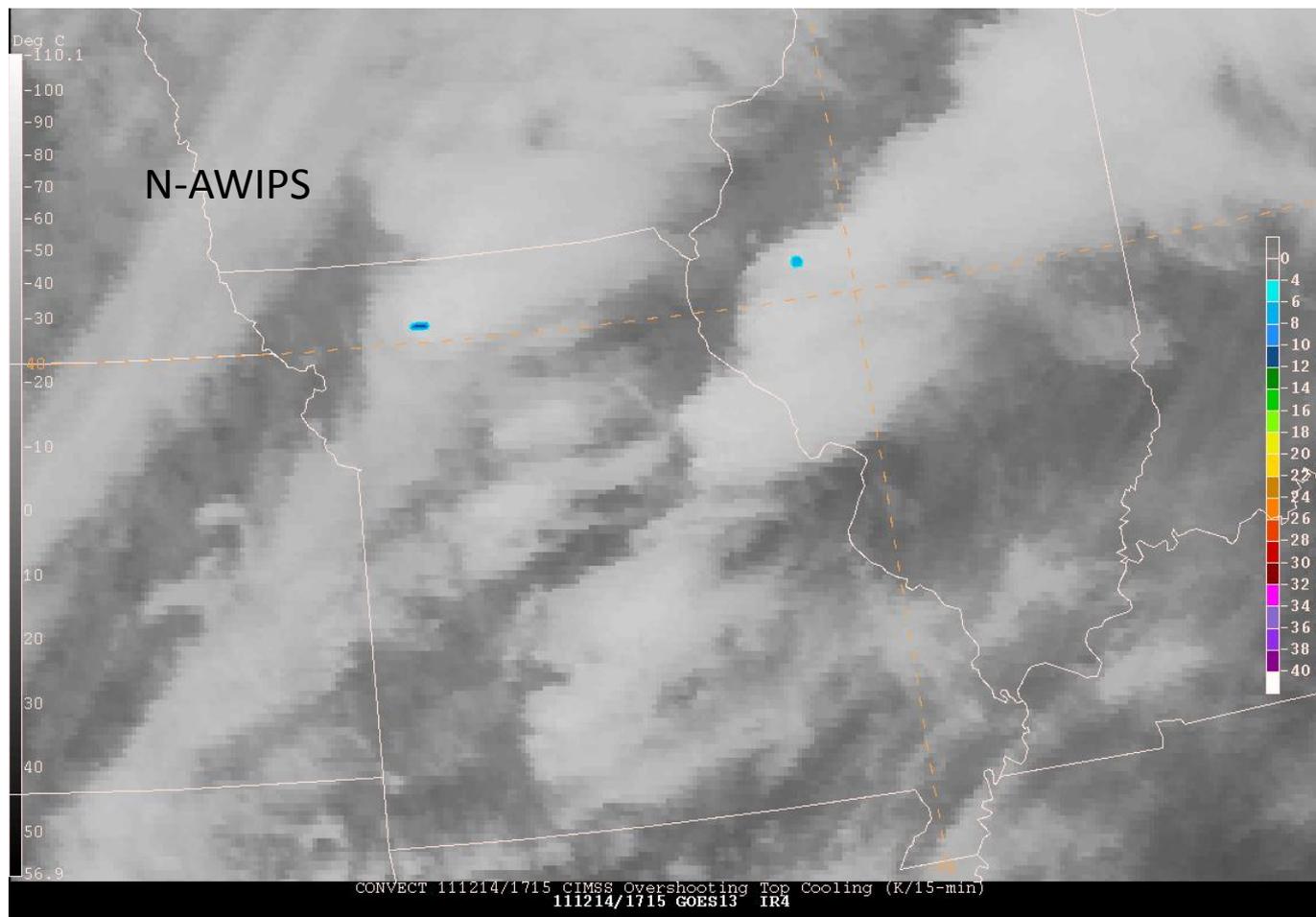


- Simulated ABI Imagery (bands 8-16) over the CONUS
- Hourly ABI IR Bands using NSSL WRF
- Request for Nearcasting product for evaluation

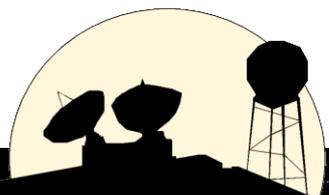


- Simulated ABI Imagery (bands 8-16) over the CONUS, follow HPC/SPC methodology for delivery (N-AWIPS preferred); SAB wanted McIDAS format - sent ADDE server info to Jamie K.
- UW-CIMSS providing Overshooting-Top/Enhanced-V products (same methods as SPC delivery), N-AWIPS displayed at OPC
- Cloud top height, phase, and temperature from GOES imager are in progress for display within N-AWIPS and AWIPS
- Volcanic Ash due for integration
- Derived stability indexes (using GOES Sounder SFOV) delayed until 2012





Credit: Michael Folmer

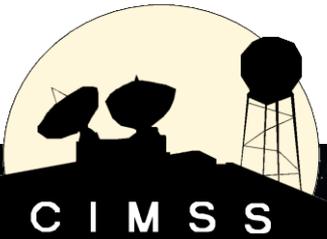


CIMSS



Overshooting Tops (OTs)

- Visualization at the National Hurricane Center
 - OTs were tracked within 200 km of 5 tropical cyclones (TC) centers
 - 4 TCs featured 15-minute temporal resolution and were confined to east of 55° W.
 - 1 TC featured 30-minute temporal resolution
 - METEOSAT imagery with 15-minute temporal resolution became available beginning June 1
 - On October 11, full Atlantic Basin imagery became available at 30-minute temporal resolution
 - METEOSAT and GOES CONUS imagery available at 15-minute data
- Rapid Intensification (RI) Forecasting
 - RI forecasted for each TC during the 2011 Atlantic Hurricane Season based on analysis from S. Monette's Master's thesis
 - RI forecasting paper submitted to the Journal of Applied Meteorology and Climatology
 - RI and genesis forecasting will continue for 2012 using updated parameters from 2011 Testbed

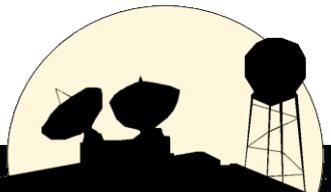
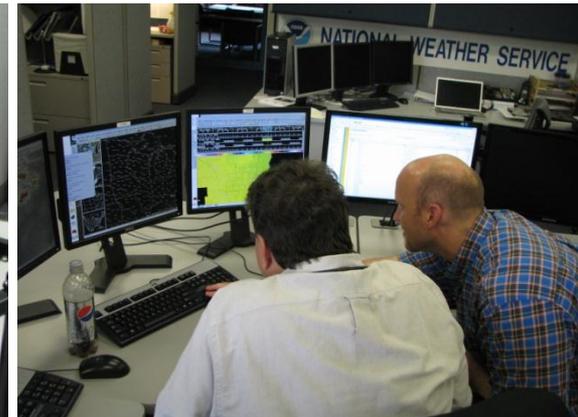




2011 CIMSS/MKX GOES-R Proving Ground



- August 2011 to October 2011; Final report delivered
- Emphasis was on GOES Low Cloud/Fog probabilities (MVFR/IFR probabilities) and Synthetic GOES-R imagery
- Developers trained on how the products are derived, and how they should be used in the forecast process
- Products viewed using AWIPS and/or Internet sites
- Forecaster feedback: blog entries

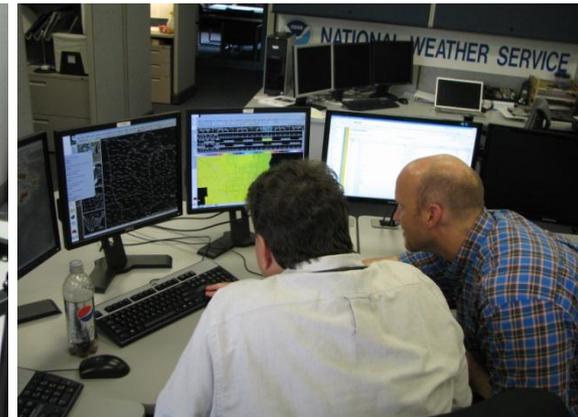


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Final Remarks:

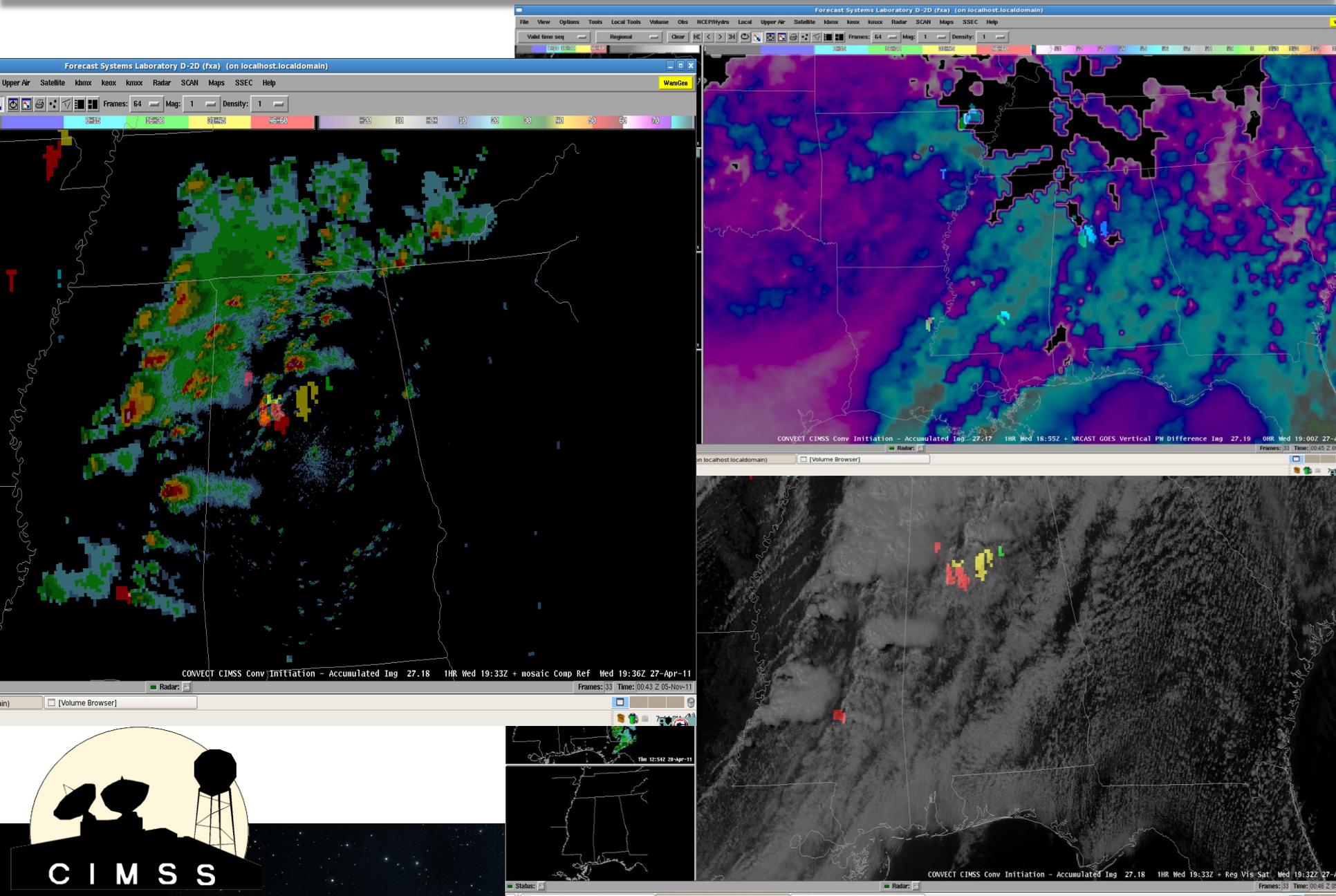
- These researcher/forecaster interactions are critical to best understand how and when to use a given product
- Adjustments to current products and development of new products have already resulted from these valuable interactions
- This iterative process works well with a continuous process of improvement on the GOES-R product suite



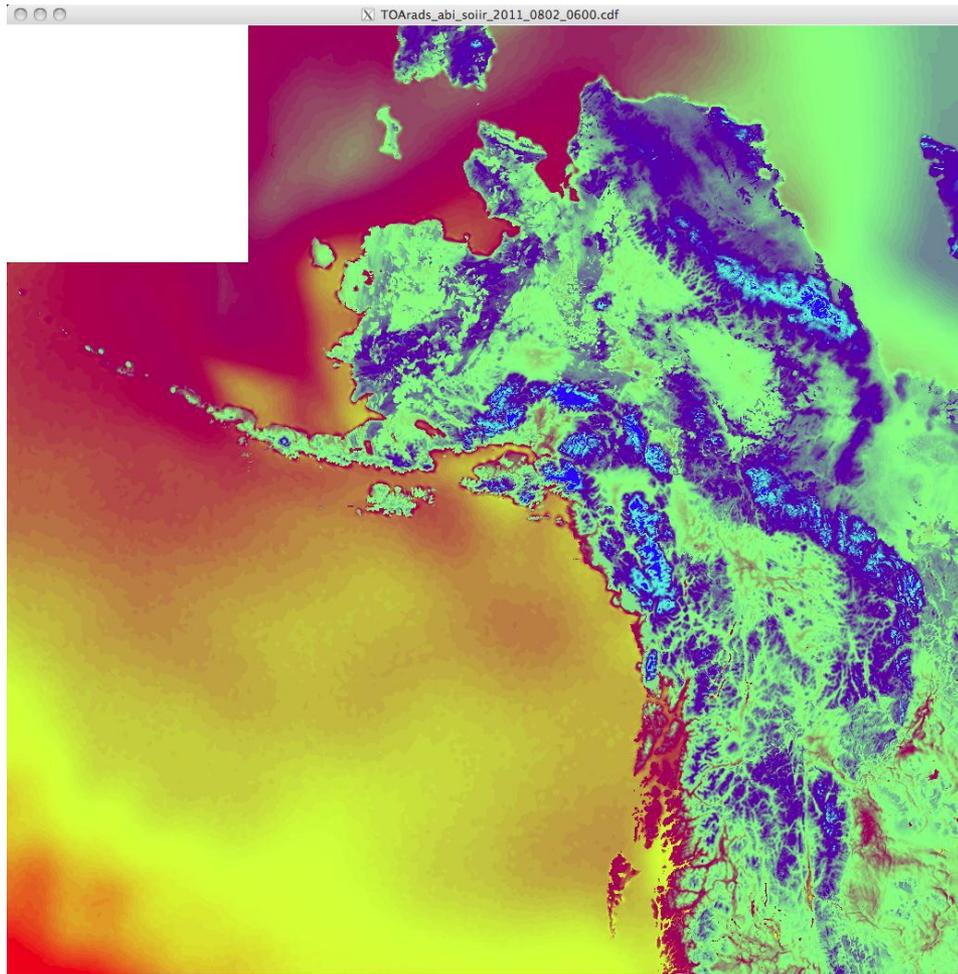
- April 27, 2011 WES case example
- Working on Alaska Volcanic WES case
- WRF – ABI WES case over Alaska domain



April 27, 2011 WES Case



Alaska WES domain



WRF-ARW Alaska Domain – Courtesy Don Morton



- **Modified existing plug-ins**

- GINI Satellite: To display GOES-15 Imagery and Products

- McIDAS AREA: To display NSSL-WRF Simulated ABI Imagery, MVFR/IFR Probabilities

- McIDAS AREA: Demonstrated derived parameters to support future data fusion

- GRIB2: Display convective initiation, nearcasting, and other model output

- **Tools to analyze and display data in AWIPS II**

- Interactive RGB image creation from multiple bands

- VIIRS imagery ingest via netCDF4-CF

- Geospatial functionality to handle native navigation of polar satellite imagery in McIDAS AREA

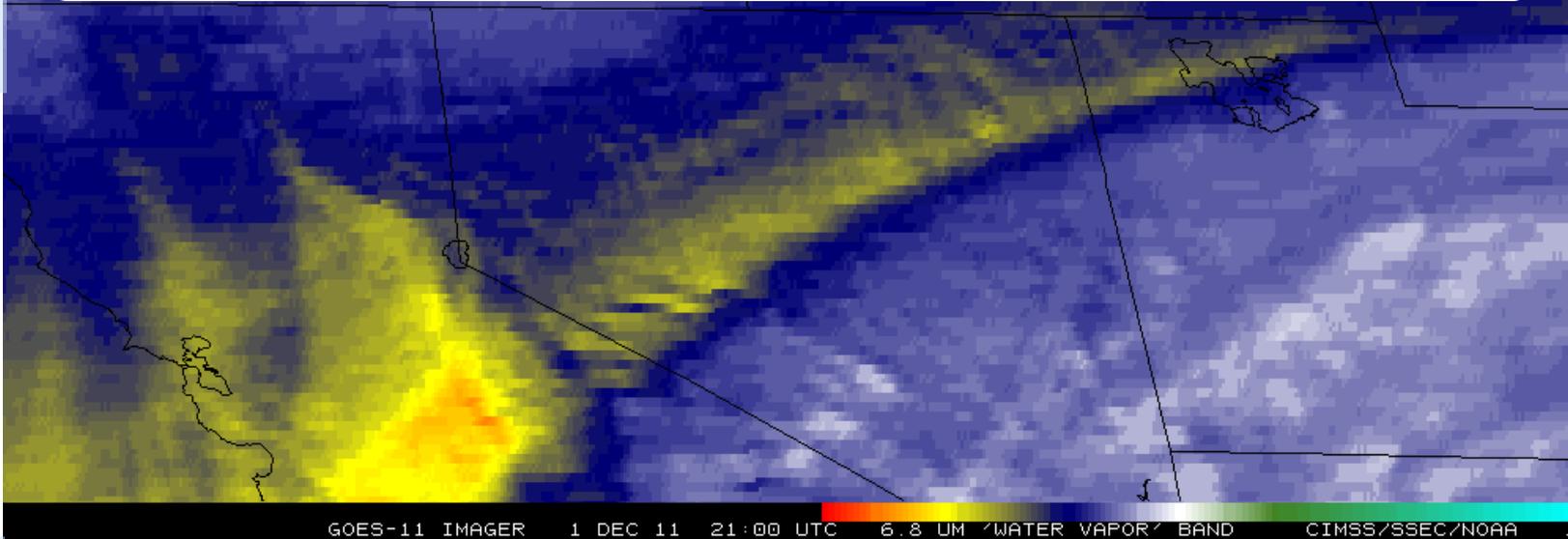


GOES-15 is Now Operational!

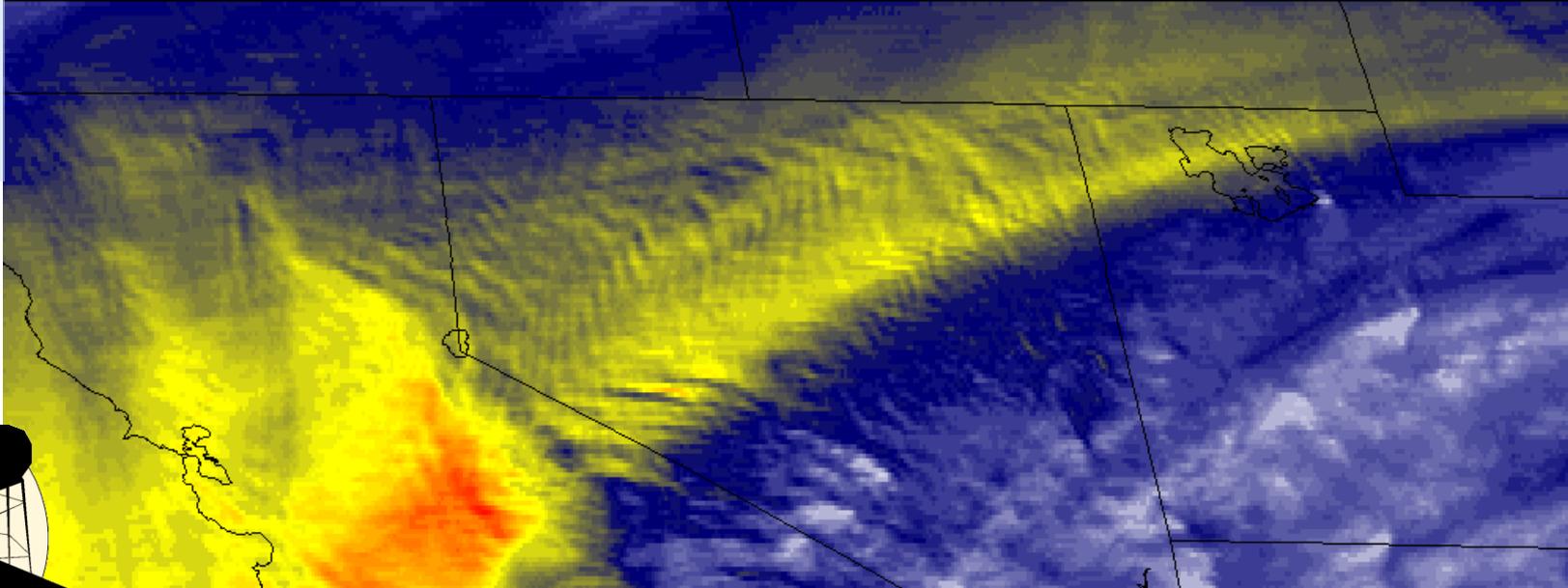


GOES-11
(8-km res)

More info: <http://cimss.ssec.wisc.edu/goes/blog/archives/9307>

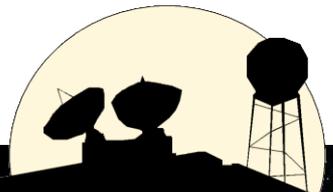
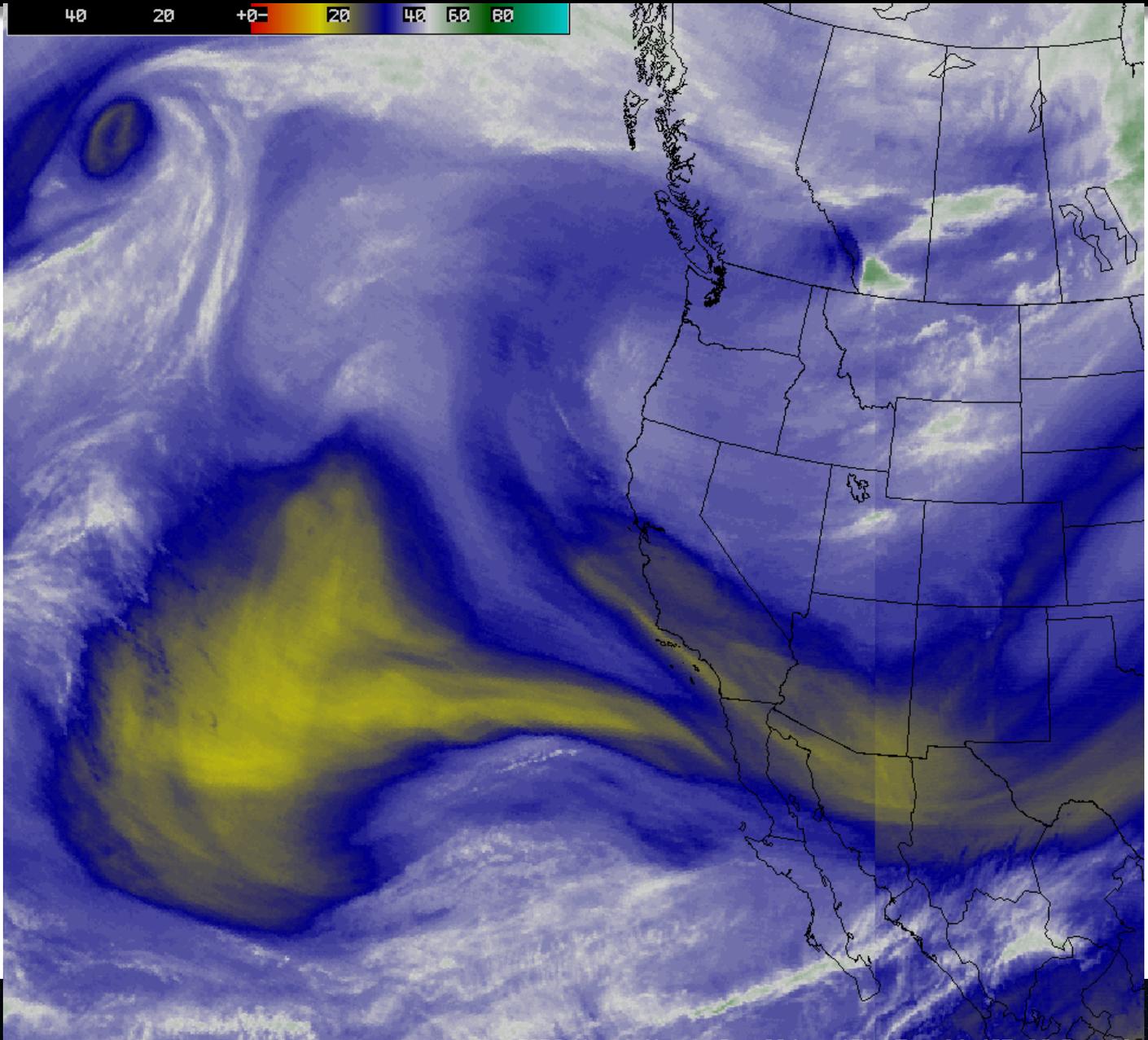


GOES-15
(4-km res)





ABI is next operational GOES-West!



CIMSS

- **2012**

- AMS Annual Meeting 22-26 Jan. New Orleans, LA
- Regional OSSE/HIW 07-09 Feb. Norman, OK
- TOVS 21-27 Mar. Toulouse, France
- AWG/PG/RR 30 Apr. – 4 May Kansas City, KS
- No O-CONUS -
- WMO Nowcasting 06-10 Aug Rio, Brazil
- EUMETSAT 03-07 Sept. Sopot, Poland
- NWA 6-12 October Madison, WI

- **2013**

- AMS Annual Meeting 6–10 January Austin, TX
- DRC/GUC 8-12 April Miami, FL
- O-CONUS (near Solstice) Alaska
- PG/AWG (between Solstice and Equinox)? Madison, WI
- EUMETSAT/AMS Sept Vienna, Austria



AMS Annual Meeting Participation in MSY

- **Jason A. Otkin**, CIMSS/Univ. of Wisconsin, Madison, WI; and D. Bikos, J. Sieglaff, D. T. Lindsey, L. Grasso, C. W. Siewert, R. Rabin, J. S. Kain, and S. R. Dembek: Using Synthetic Satellite Imagery to Evaluate Real-Time Model Forecast Performance During the Hazardous Weather Testbed Spring Experiment
- **James A. Jung**, CIMSS/Univ. of Wisconsin, Camp Springs, MD; and J. F. LeMarshall: Tropospheric Impacts of Assimilating Infrared Water Vapor Radiances in the NCEP GFS
- **Christopher C. Schmidt**, CIMSS/Univ. of Wisconsin, Madison, WI; and E. M. Prins, E. Hyer, J. P. Hoffman, J. Brunner, and J. S. Reid: The Global Geostationary Wildfire ABBA: Current Implementation and Future Plans
- **Andi Walther**, CIMSS/Univ. of Wisconsin, Madison, WI; and A. Heidinger: The Daytime Cloud Optical and Microphysical Properties (DCOMP) Algorithm <http://www.goes-r.gov/users/past-GUC7.html>
- **Tom Greenwald**, CIMSS/Univ. of Wisconsin, Madison, WI; and Y. K. Lee and A. Huang: Validation of Cirrus Infrared Scattering Properties Used in the Production of Simulated GOES-R ABI Proxy Data



AMS Annual Meeting Participation (con't)

- **Corey G. Calvert**, CIMSS/Univ. of Wisconsin, Madison, WI; and M. J. Pavolonis: A Quantitative Fog/Low Stratus Detection Algorithm for GOES-R
- **Hong Zhang**, CIMSS/Univ. of Wisconsin, Madison, WI; and M. Gunshor, W. Straka, G. Martin, S. Wanzong, E. Schiffer, R. Garcia, and A. Huang: GRAFIIR – An Efficient End-to-End Semi Automated GOES-R ABI Algorithm Performance Analysis and Implementation Verification System
- **Kaba Bah**, CIMSS/Univ. of Wisconsin, Madison, WI; and T. Achtor, T. D. Rink, T. J. Schmit, J. Otkin, and J. Gerth: Preparation for Use of the GOES-R Advanced Baseline Imager (ABI)
- **William C. Straka III**, Space Science and Engineering Center/Univ. of Wisconsin, Madison, WI; and T. D. Rink, T. H. Achtor, T. J. Schmit, and K. Bah: McIDAS-V, Visualization and Data Analysis for GOES-R
- **Yong-Keun Lee**, CIMSS/Univ. of Wisconsin, Madison, WI; and Z. Li and J. Li: Validation of GOES-R LAP Algorithm with GOES-13 Sounder
- **Yong Zhang**, CIMSS/Univ. of Wisconsin, NSMC/China Meteorological Administration, Madison, WI; and Z. Li, J. Li, and T. J. Schmit: Sea Surface Emissivity Retrieval in Gulf of Mexico Using GOES Sounder Measurements



AMS Annual Meeting Participation (con't)

- **Timothy J. Schmit**, NOAA/NESDIS/STAR, Madison, WI; and J. Gurka, M. Gunshor, and K. Bah: The ABI (Advanced Baseline Imager) on the GOES-R Series
- **Michael J. Pavolonis**, NOAA/NESDIS, Madison, WI; and C. G. Calvert and J. Sieglaff: New Quantitative Volcanic Cloud and Fog Products for GOES-R
- **Michael J. Pavolonis**, NOAA/NESDIS, Madison, WI; and J. Sieglaff: Satellite Retrievals of Eyjafjallajökull, Grimsvötn, and Puyehue-Cordón Caulle Volcanic Ash Cloud Properties: Evaluation of near Real-Time Results and Suggestions for Improving Operational Satellite Products)
- **Jun Li**, CIMSS/Univ. of Wisconsin, Madison, WI; and M. D. Goldberg, J. Li, H. Liu, J. Zheng, T. J. Schmit, C. D. Barnet, L. Zhou, and A. Huang: Evaluation and Application of JPSS Products Through Assimilation in Regional NWP Models
- **Patrick W. Heck**, CIMSS/Univ. of Wisconsin, Madison, WI; and P. Minnis, S. T. Bedka, C. R. Yost, and J. K. Ayers: Retrieval of Nighttime Cloud Optical and Microphysical Properties for GOES-R
- **Anthony Wimmers**, CIMSS/Univ. of Wisconsin, Madison, WI; and W. F. Feltz: The GOES-R Tropopause Folding Turbulence Product: Finding Clear-Air Turbulence in GOES Water Vapor Imagery



AMS Annual Meeting Participation (con't)

- **Jason C. Brunner**, CIMSS/Univ. of Wisconsin, Madison, WI; and C. C. Schmidt, E. M. Prins, J. P. Hoffman, W. Schroeder, and I. Csiszar: Western Hemisphere Diurnal Fire Activity 1995-2011: Description and Initial Fire Trend Analysis of the GOES-East Version 6.5 WF_ABBA Data Archive
- **Justin Sieglaff**, CIMSS/Univ. of Wisconsin, Madison, WI; and M. J. Pavolonis and D. C. Hartung: Probabilistic Nowcasting of Severe Convection Using the Temporal Evolution of Satellite-Derived Deep Convective Cloud Properties
- **Joleen M. Feltz**, CIMSS/Univ. of Wisconsin, Madison, WI; and K. Bah and T. Achtor: GOES-R Proving Ground Aviation Weather Products Displayed in McIDAS-V
- **Hung-Lung Allen Huang**, Univ. of Wisconsin, Madison, WI; and B. Huang and M. D. Goldberg: Progress and Plan for the Development of a Research-to-Operation High-Performance and Low-Cost GPU-Based Satellite Data Processing and Application Enabling Technology



AMS Annual Meeting Participation (con't)

- **William Straka III**, CIMSS/Univ. of Wisconsin, Madison, WI; and T. H. Achtor, T. D. Rink, A. K. Heidinger, T. J. Schmit, and T. Jasmin: Routine Satellite Derived Product Monitoring and Validation From GOES, JPSS and GOES-R
- **Richard Dworak**, CIMSS/Univ. of Wisconsin, Madison, WI; and K. Bedka, J. Brunner, and W. Feltz: Comparison Between GOES-12 Overshooting Top Detections, WSR-88D Radar Reflectivity and Severe Storm Report
- **Steve Wanzong**, CIMSS/Univ. of Wisconsin, Madison, WI; and W. Bresky, C. S. Velden, J. M. Daniels, and T. D. Rink: GOES-R AWG Atmospheric Motion Vectors: Validation Activities
- **Jordan J. Gerth**, CIMSS/Univ. of Wisconsin, Madison, WI: How AWIPS II Is a Tool to Further R2O in the GOES-R Era
- **Daniel C. Hartung**, CIMSS/Univ. of Wisconsin, Madison, WI; and J. Seiglauff, L. M. Counce, and W. F. Feltz: Development and Application of a Satellite-Based Cloud Object-Tracking Methodology



AMS Annual Meeting Participation (con't)

- **Jason A. Otkin**, CIMSS/Univ. of Wisconsin, Madison, WI: Assessing the Impact of the Horizontal Covariance Localization Radius Used During the Assimilation of Infrared Brightness Temperature Observations
- **Timothy Olander**, CIMSS/Univ. of Wisconsin, Madison, WI; and C. Velden: The Advanced Dvorak Technique (ADT) - Current Status and Latest Advancements
- **Jason C. Brunner**, CIMSS/Univ. of Wisconsin, Madison, WI; and K. Bedka, R. Dworak, W. F. Feltz, and L. M. Cronic : GOES-R Overshooting Top and Enhanced-V Signature Detection Product Objective Validation Efforts

