

# GOES-R/JPSS Program



## CIMSS/ASPB Participation GOES-R/JPSS 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 and Chris Schmidt

July 1, 2013





- Demonstration of Satellite PG applications at National Center Testbeds/Demonstrations and NWS WFO
- New simulated WRF-Chem Proxy ABI products
- AWIPS-2 status
- Training
- SRSOR from GOES-14
- Upcoming meetings/conferences



## Satellite Liaison: Bill Line

- **HWT Products:**

- Simulated Cloud and Moisture Imagery (Otkin/Sieglaff/Lindsey – CIMSS/CIRA)
- Legacy Temperature and Moisture Profiles (Petersen/Line - CIMSS)
- Cloud Top Cooling (Sieglaff/Feltz – CIMSS)

- **Continue streamlining formats for AWIPS-2**

- **NOAA HWT 2013** – Participants: Lee Cronic, Jordan Gerth, Wayne Feltz, and Jason Otkin

- **Future planning will be coordinated with new liaison**

- **UW-Madison satellite applications “Boot Camp” will be held 8-19 July 2013: Bill Line, Amanda Terborg, Chad Gravelle, and Michael Folmer will be present**

### Satellite Liaison: Amanda Terborg

- **Aviation Weather Testbed Summer Demo: August 12 – 23, 2013**
  - WRF Simulated ABI Imagery
  - GOES Cloud Top Cooling
  - GOES(-R) Overshooting Top
  - Thermodynamic NearCasting
  - GOES(-R) Cloud Top Height and Cloud Top Temperature
- **CIMSS participants**
  - 12-16 August Justin Sieglaff
  - 12-14 August Wayne Feltz
  - 19-23 August Jordan Gerth
- **VIIRS data now available for AWC but not tested in operations yet**



# 3) NWS Operations PG and WFO Interactions



## Satellite Liaison: Chad Gravelle

- Continued coordination of GOES-R Fog/Low Stratus products into operations (West Coast evaluation began in May with SEW, EKA, LOX, and MTR).
- Convective Cloud-Top Cooling (part of “convective-initiation toolbox”) evaluation with CR (12 WFOs) and ER (2 WFOs) began in June, intermountain West WFO evaluation possibly in July.
- Assisted in distributing VIIRS bands (including DNB) to local WFO, Monterey and Louisville, and now available to MKX, MTR, LMK, and the AK WFOs
- Assisted CRH and ERH with successful display of Fog/Low Stratus products in AWIPS 2.
- Working with NWS Operations PG regarding GOES-R products and how they relate to ongoing GOES-R PG activities.



- **Automated ash cloud alerts from AVHRR and MODIS will be provided to the VAAC and CWSU soon (training needs to be updated first).**
- **VIIRS NetCDF files verified to be AWIPSII compatible**
- **VIIRS VISIT NWS training module under development**
- **Polar2grid tool being expanded for GEOCAT AK products**
- **Participated in OCONUS meeting 17-21 June 2013:**
  - **CIMSS: Wayne Feltz, Jordan Gerth, Ralph Petersen, Liam Gumley**
  - **NOAA ASPB: Jeff Key and Mike Pavolonis**



# 5) Pacific Region/Hawaii Demonstrations



- Roy Huff is no longer affiliated with the GOES-R Proving Ground
- Bill Ward (administrative) and Eric Lau (technical) are proper points of contact related to the GOES-R Proving Ground in Pacific Region
- More information about the visiting scientist program will be forthcoming from Bill Ward; invited scientists will be scheduled according to product priority and seasonal relevance (e.g., cloud top cooling in winter months)
- Welcome packet will be sent via e-mail to participants as scheduled
  - Contains hotel and other logistical information
- Kathy Strabala (VIIRS) and Mark DeMaria (tropical cyclones) are scheduled to visit during the summer
- New automated and manual monitoring of L/X-band antenna equipment will help ensure maximum uptime





# 5) Pacific Region/Hawaii Demonstrations





# 5) Pacific Region/Hawaii Demonstrations



- Jordan has returned from Pago Pago, American Samoa
  - Forecasters at the Weather Service Office rely heavily on satellite imagery online for observational information (no weather radar)
  - Jordan shared information about relevant GOES-R Proving Ground activities and new interpretation techniques
  - Poor bandwidth on the island cannot support L/X-band antenna without significant (likely costly) upgrade
- Satellite system (L/X-band antenna) data science training (Liam Gumley, Kathy Strabala, Jordan Gerth) scheduled for August 20 through August 23 at the University of Hawaii at Manoa
  - Syllabus developed and under review
- Transition to AWIPS II at NWS Honolulu not expected until early 2015





# 6) Satellite Proving Ground for Marine, Precipitation, and Hazardous Weather Applications



## Satellite Liaison: Michael Folmer

- **UW-CIMSS providing Overshooting-Top/Enhanced-V products (same methods as SPC delivery), N-AWIPS displayed at OPC, WPC, and SAB. Will be working with TAFB to get the product down there (Trip in late May)**
- **Cloud top height, phase, and temperature from GOES imager are in progress for display within N-AWIPS and AWIPS**
- **The Washington VAAC is now receiving SEVIRI based GOES-R volcanic ash products via a McIDAS ADDE server and automated alerts will soon be distributed**
- **GOES sounder total precipitable water and stability indexes (new operational version) now available via NESDIS**
- **Coordinated CIMSS GOES-R PG collaborations with 2013-2014 Satellite Proving Ground for Marine, Precipitation, and Hazardous Weather Applications demonstrations**
- **Other GOES-R PG decision support products requested within plan available once approved by NOAT governance process**





# 7) NHC Proving Ground



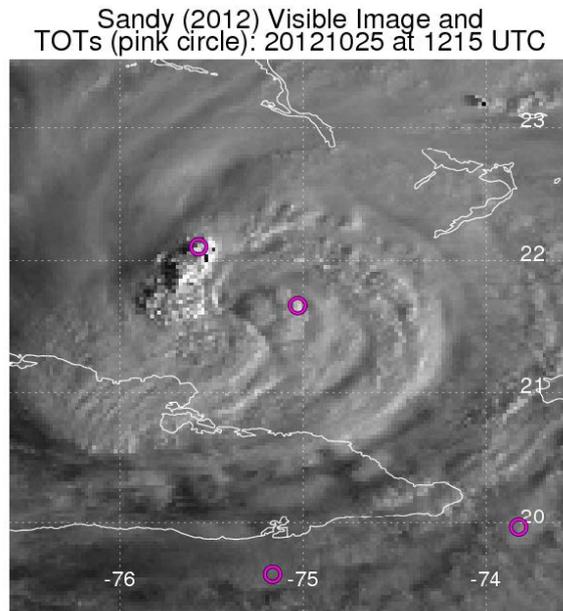
- Begins August 1
- CIMSS will provide updated versions of the Hurricane Intensity Estimate (HIE) and Tropical Overshooting Tops (TOTs).
- *Hurricane Intensity Estimate*
  - provides TC analysts with a completely objective and operationally-proven tool to estimate TC intensity using GOES-R ABI IR imagery.
  - As proxy data for GOES-R, the HIE employs 15-minute IR imagery from Meteosat-10 and GOES-East (CONUS sector).
  - Helped to upgrade Michael (2012) to major hurricane

HURRICANE MICHAEL DISCUSSION NUMBER 13  
NWS NATIONAL HURRICANE CENTER MIAMI FL AL132012  
...WHILE SUBJECTIVE ESTIMATES WERE NEAR 90 KT AT 0600 UTC...OBJECTIVE ESTIMATES FROM ADT **AND THE GOES-R HIE PRODUCT** HAVE RECENTLY BEEN BETWEEN 107 AND 110 KT. A BLEND OF THESE DATA GIVE AN INITIAL WIND SPEED OF 100 KT...MAKING MICHAEL THE FIRST MAJOR HURRICANE OF THE SEASON.

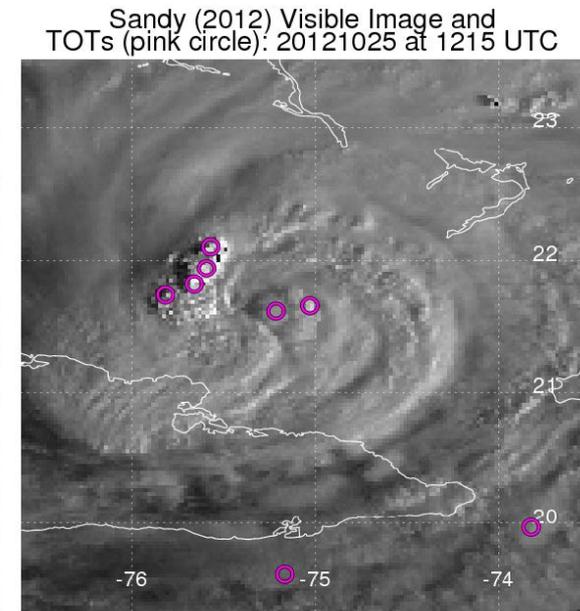


- *Tropical Overshooting TOTs*

- Objectively identifies TOT locations using cold IR pixels relative to neighbors, to isolate and quantify active vigorous convection.
- Employs IR imagery from Meteosat-10 and GOES-East.
- Algorithm updates based on feedback from 2012
  - Removal of false “TOTs” in cirrus.
  - Identify TOTs in the CDO.
- Training provided to NHC and TAFB in April to increase familiarity with TOTs.



Original algorithm



Updated algorithm

**NWS Milwaukee focal point: Steve Davis**

- **CIMSS GOES-R Local Area Demonstration with MKX will continue again this summer and fall (anticipated to begin in June after MKX has transitioned to AWIPS II)**
- **2013 activities plan in progress**
- **Anticipated GOES-R products to be demonstrated in 2013 include:**
  - **Convective Cloud Top Cooling (coordinated with Chad Gravelle)**
  - **Nearcasting**
  - **Sky Cover (Extension of Cloud and Moisture Imagery)**
- **Anticipated JPSS products to be demonstrated in 2013 include:**
  - **Day/Night Band**





# CIMSS/ASPB GOES-R ABI Real-time Proxy



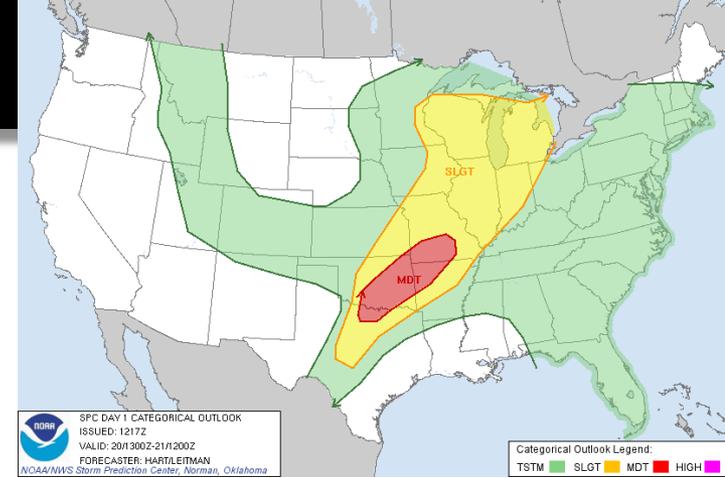
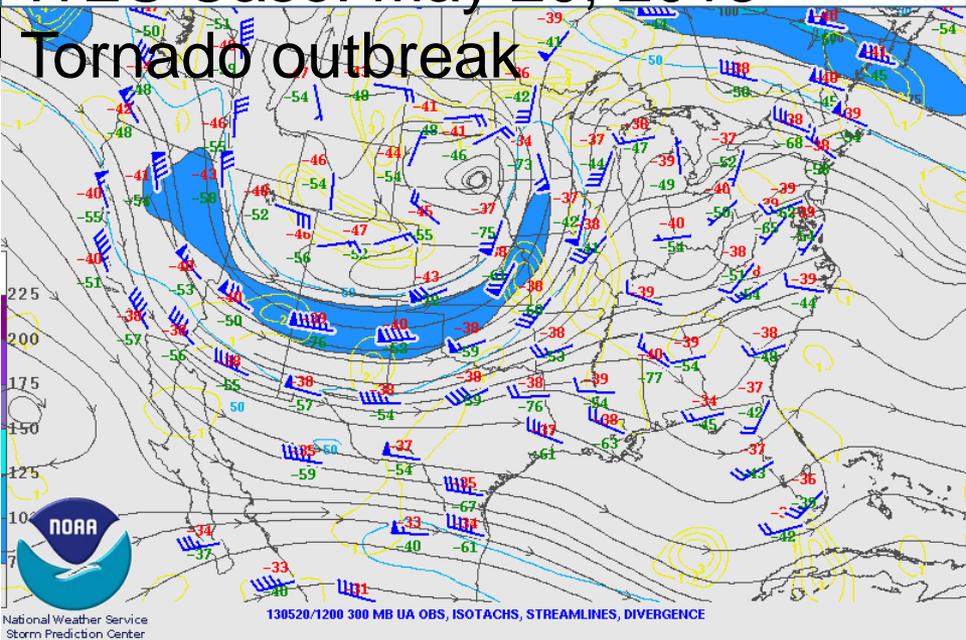
## 2013 GOES-R PG Proxy activities (June 2013)

- 1. Provided forecasting support for airborne SNPP/METOP-B cal/val field mission (May 10-31, 2013). The primary objective of the mission was to collect cloud free radiance measurements from remote sensing instruments onboard the NASA ER2 during SNPP and METOP-B satellite overpasses in the vicinity of the Gulf of California.**
- 2. Investigating ways of getting our simulated ABI products into AWIPS II: short term goal will be to write IDL code and utilize the ms2gt subroutines for remapping our products into AWIPS II NetCDF files.**
- 3. Preparing data for a WES case focusing on 2013 Oklahoma tornado events: 6 products, including the RGB air-mass product, and the synthetic radiance/reflectance imagery, for the period of 20-29 May, 2013.**
- 4. Beginning validation of proxy ABI RGB air-mass product using RGB air-mass images generated from co-located GOES-E Sounder brightness temperatures.**



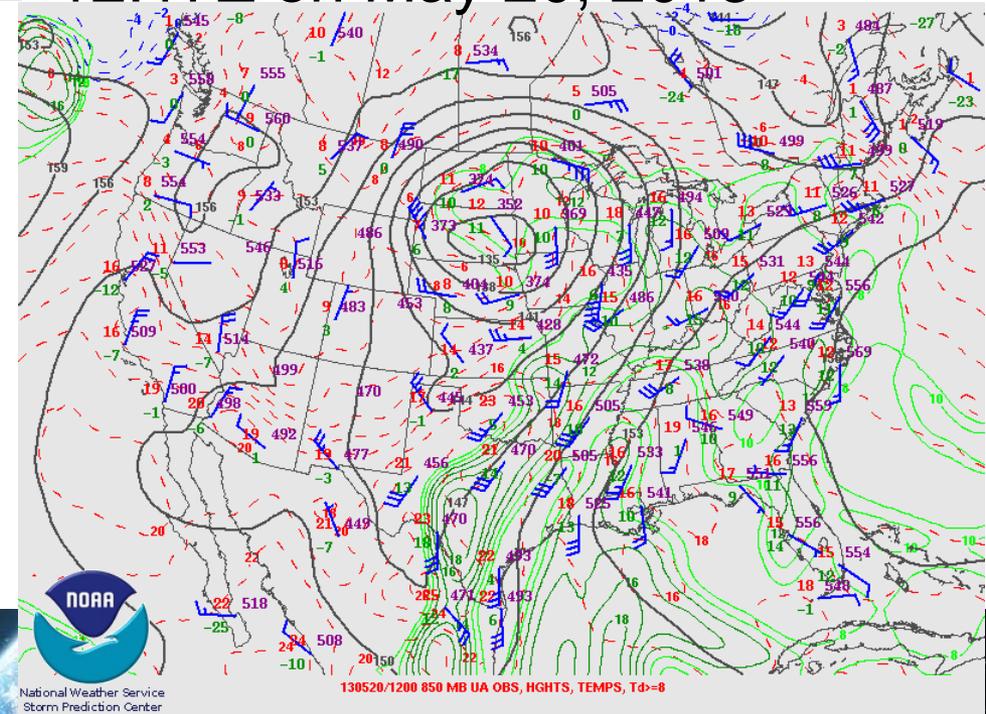
# WES Case: May 20, 2013

## Tornado outbreak



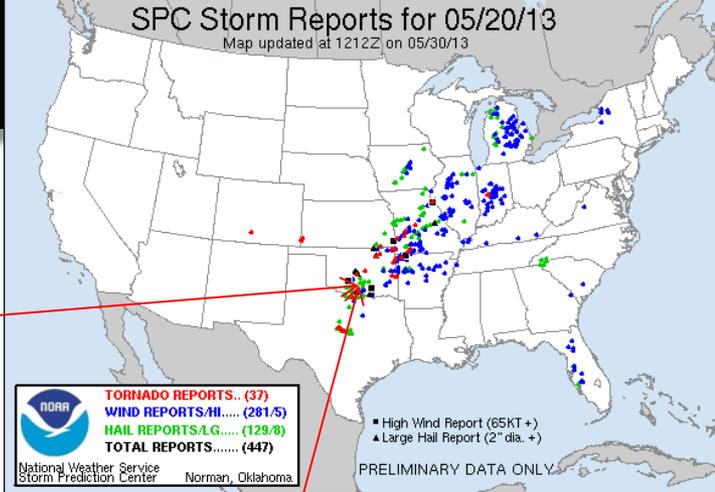
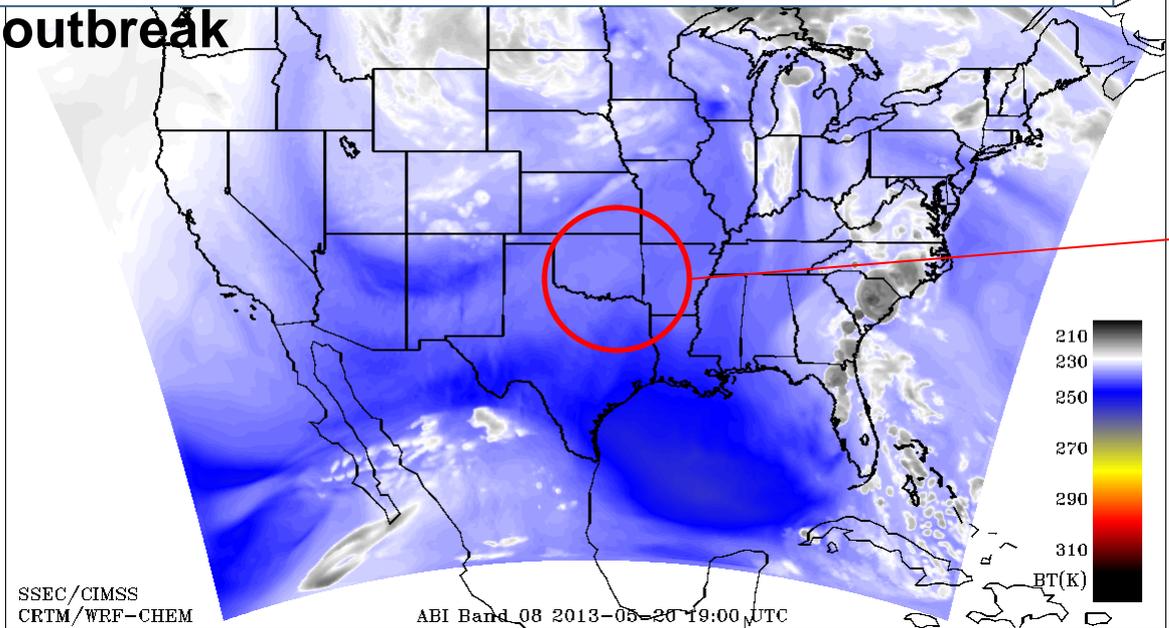
SPC issued a moderate risk of severe thunderstorms at 12:17Z on May 20, 2013

12Z May 20, 2013 SPC analyses show wind-shear and high dewpoints associated with upper-level trough



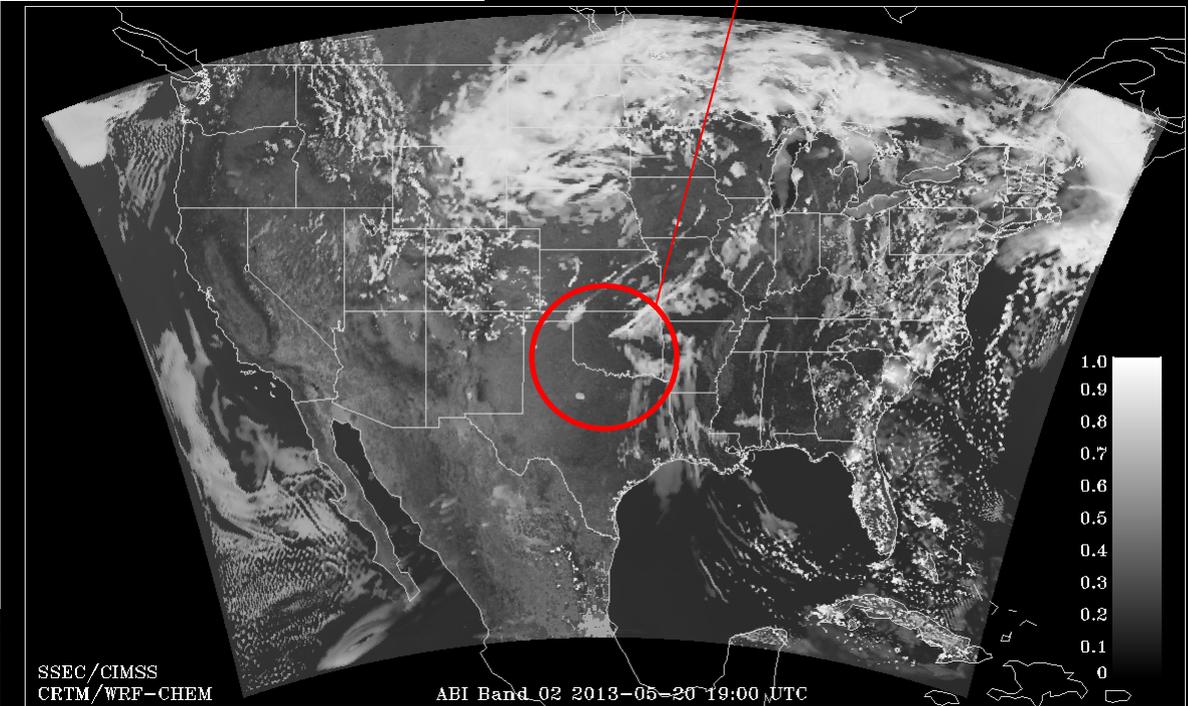
# WES Case: May 20, 2013 Tornado outbreak

## outbreak

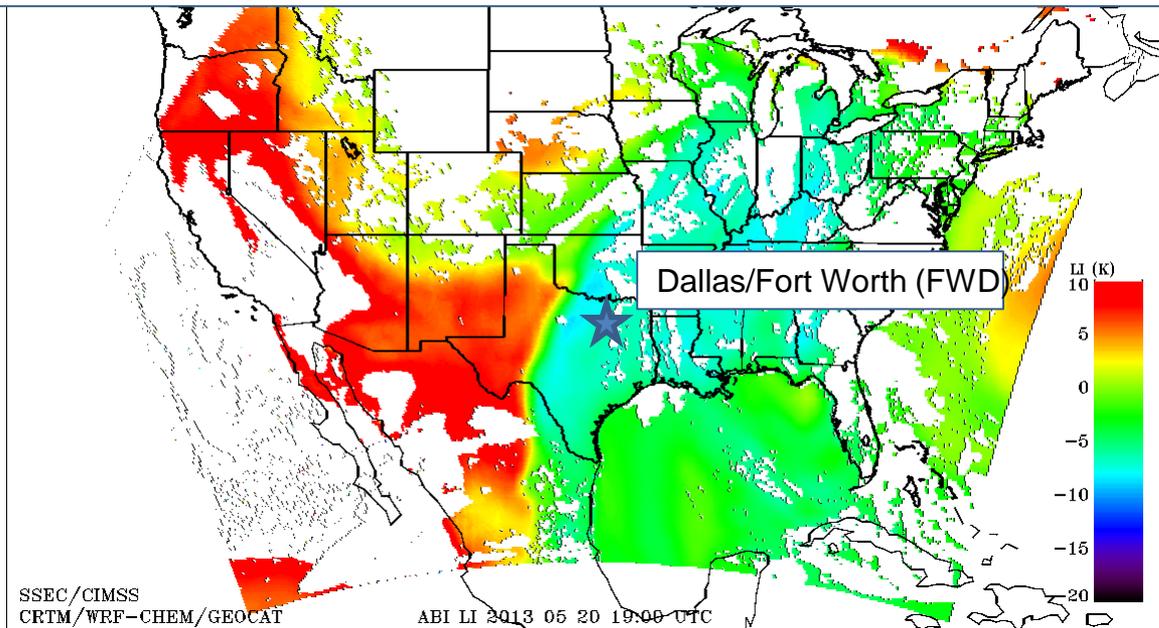
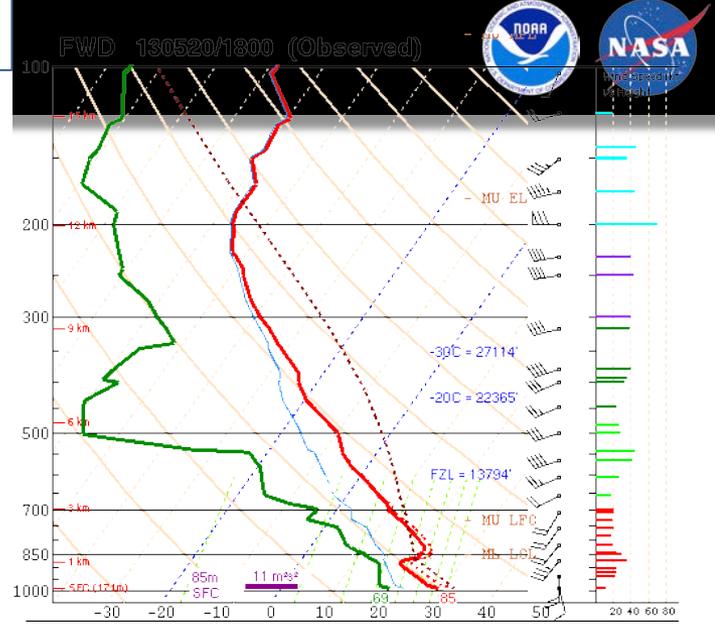


## Tornado warning issued 2:40 p.m. CDT (19:40Z)

CIMSS WRF-CHEM  
Proxy simulation  
captures onset of  
severe Wx that led to  
May 20, 2013 Tornado  
outbreak



# WES Case: May 20, 2013 Tornado outbreak



**GOES-R ABI LI and CAPE retrievals are in reasonable agreement with 18Z Dallas/Fort Worth, TX sounding prior to May 20, 2013 Tornado outbreak**

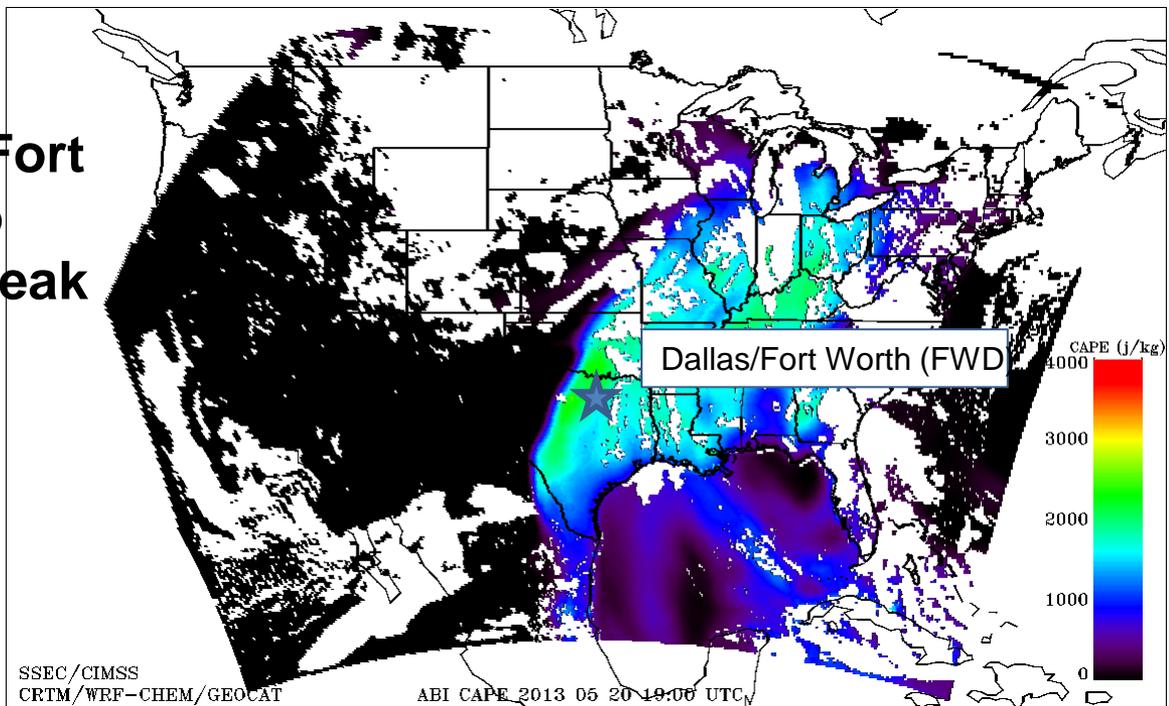
PARCEL	CAPE	CINH	LCL	LI	LFC	EL
SURFACE	3258	-104	1165m	-8	2572m	41797'
MIXED LAYER	1651	-265	1312m	-4	3355m	39426'
FCST SURFACE	2067	-193	1563m	-5	3028m	40013'
MU (986 mb)	3258	-104	1165m	-8	2572m	41797'

PW = 1.19 in	3CAPE = 0 J/kg	WBZ = 10628'	WNDG = 0.0
K = 29	DCAPE = 1451 J/kg	FZL = 13794'	ESP = 0.0
MidRH = 34%	DownT = 59 F	ConvT = 98F	MMP = 0.85
LowRH = 59%	MeanW = 13.1 g/kg	MaxT = 86F	
SigSevere = 25726 m3/s3			

5fc-3km Aql Lapse Rate = 7.3 C/km	<b>Supercell = 0.5</b>
3-6km Aql Lapse Rate = 7.6 C/km	<b>Left Supercell = 0.4</b>
850-500mb Lapse Rate = 7.5 C/km	<b>Sig Tor (CIN) = 0.0</b>
700-500mb Lapse Rate = 7.4 C/km	<b>Sig Tor (fixed) = 1.7</b>
	<b>Sig Hail = 1.2</b>

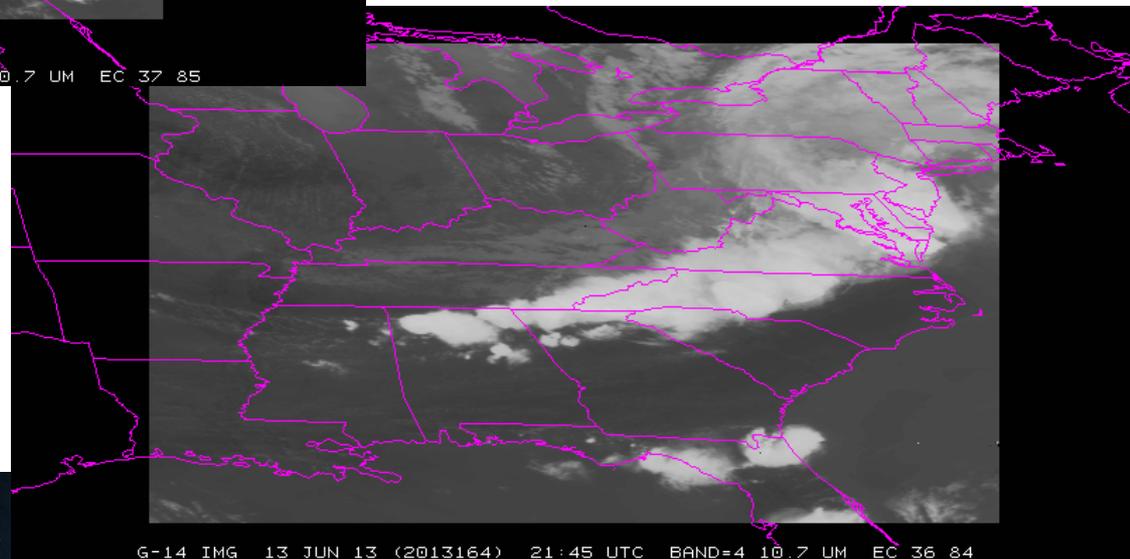
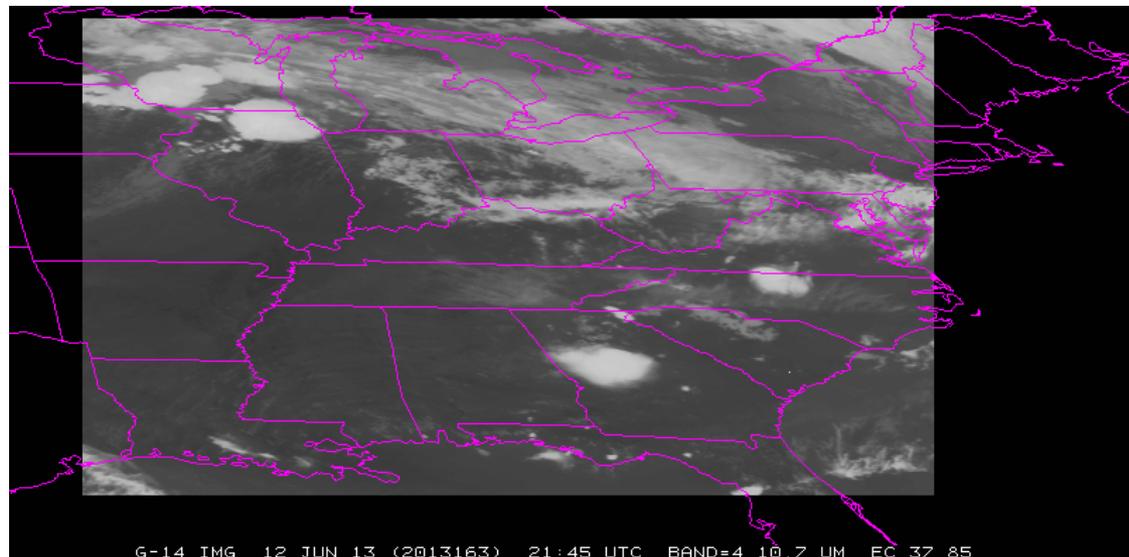


- CIMSS actively attending AWIPS II developers' forum conference calls and remote meetings of the EPDT
- Testing of locally-produced netCDF4 files containing VIIRS imagery ongoing
- Investigating performance of regionalsat plug-in
  - Memory issue appears resolved in latest build of OB13.4
- Enhancement written for configurable of scaling byte array to real numbers via XML
  - Allows piecewise linear scaling with interpolation between defined points
  - Committed to official code repository (Dimensions) for deployment as part of OB13.5 (available in approximately two months)
  - Necessary for displaying and sampling satellite products such as the Fog and Low Stratus (FLS) suite
- Operational use of AWIPS II at NWS Milwaukee delayed

- Many CIMSS satellite blog posts:
  - <http://cimss.ssec.wisc.edu/goes/blog/>
- Short Articulate Presenter modules developed for HWT on CTC and NearCast
  - [http://www.ssec.wisc.edu/~scottl/NearCast\\_HWT\\_Training\\_2013/player.html](http://www.ssec.wisc.edu/~scottl/NearCast_HWT_Training_2013/player.html)
  - [http://www.ssec.wisc.edu/~scottl/UWCTC\\_HWT\\_Training\\_2013/player.html](http://www.ssec.wisc.edu/~scottl/UWCTC_HWT_Training_2013/player.html)
- ‘Fog blog’ at <http://fusedfog.blogspot.com>
  - 129 separate entries
  - >21000 hits ; ~100 hits per day.
  - 1-3 new entries per week.

# 2 days of SRSOR from GOES-14

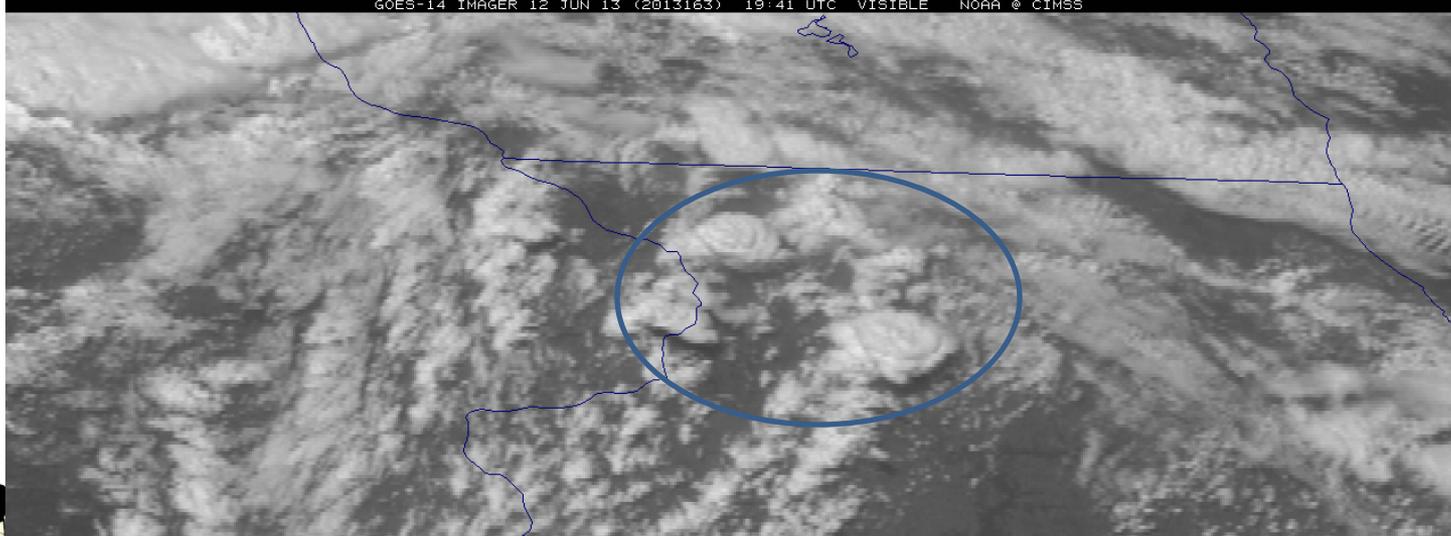
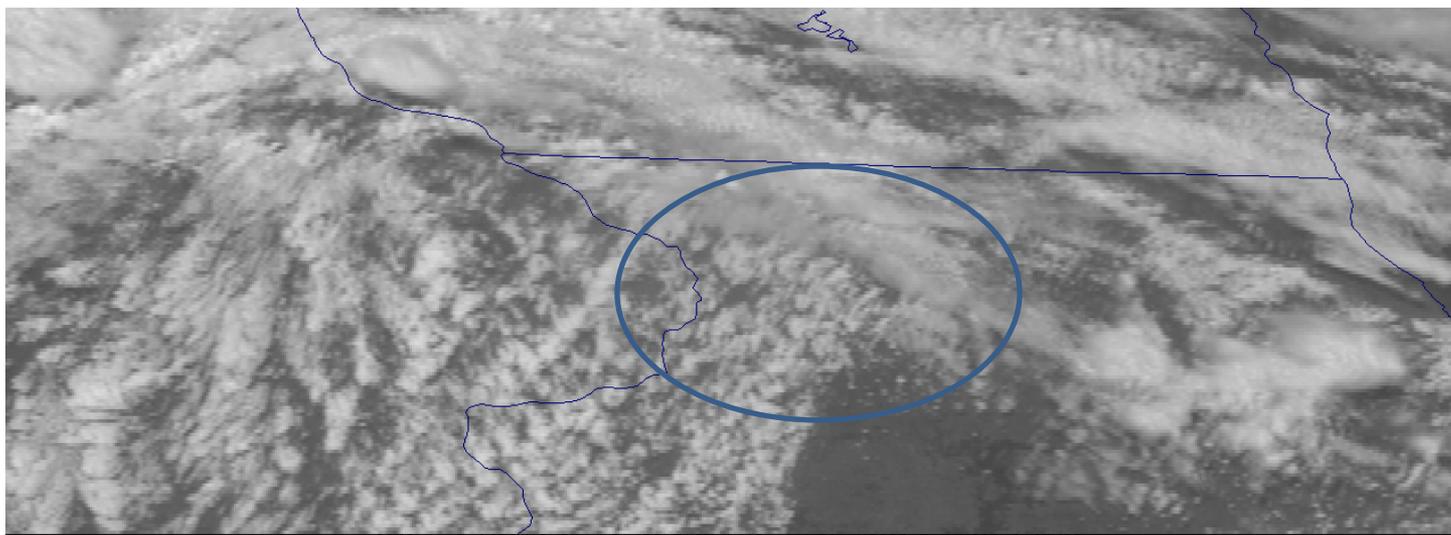
- Two days (June 12 – June 14) of SRSOR over the eastern US, before the instruments were turned off.



- Two days (June 12 – June 14) of SRSOR over the eastern US, before the instruments were turned off.
- [http://cimss.ssec.wisc.edu/goes/srsor2013/GOES-14\\_SRSOR.html](http://cimss.ssec.wisc.edu/goes/srsor2013/GOES-14_SRSOR.html)
  - <http://www.youtube.com/watch?v=EFOffqMk7nE>
- <http://cimss.ssec.wisc.edu/goes/blog/archives/13256>
- <http://cimss.ssec.wisc.edu/goes/blog/archives/13264>
- <http://cimss.ssec.wisc.edu/goes/blog/archives/13001>
- [http://youtu.be/9vVh5V2h\\_sg](http://youtu.be/9vVh5V2h_sg) (From Scott Rudlosky)
- Also had RSO from GOES-15 imager (Dan Lindsey)

# GOES-14 Imager SRSOR special imagery

showing rapid development during a data gap associated with a Full Disk scan on 12 June 2013. (Or, 'what can happen during one Full Disk scan?')



- More days of SRSOR expected in mid-August.
- [http://cimss.ssec.wisc.edu/goes/srsor2013/GOES-14\\_SRSOR.html](http://cimss.ssec.wisc.edu/goes/srsor2013/GOES-14_SRSOR.html)



## GOES-14 Imager 2013 1-min imagery (SRSOR)

(Super Rapid Scan Operations for GOES-R)

GOES-14 Imager provided special 1-min data June 12th to the 14th, 2013. Also, GOES-14 will supply 1-min imagery during parts of mid-August, 2013. These test dates are slated to start on 20 August 2013, and end on August 28, 2013. These would be to support Global Hawk flights (or other targets of opportunity, similar to the SRSOR experiment in 2012). Dry run days are expected to be August 13-16. GOES-14 will be located near 105 degrees West. GOES-14 will return to storage mode on August 29, 2013.

SRSO for GOES-R Experiment [Plan](#).

### GOES-14-relevant SRSOR links:

SSEC: [All bands at full coverage/resolutions](#) [With roam and zoom. Allows access to past days.]

SSEC Data Center kml files of Imager: [bands 1 and 4](#)

CIMSS [Satellite Blog](#)

CIRA loop of the [visible](#) and [infrared window](#) and [water vapor](#) [Note that the number at the end of the URL can be changed to show a different number of images.]

NSL loop of the [visible](#) and [infrared window](#)

### GOES-14 SRSOR

SRSOR information from [2012](#)

The [SRSOR schedule](#) allows for 26 1-min images most 30 minute periods. Other [GOES schedules](#).

### Daily Implementation of GOES-14 SRSOR Schedules

Starting Date [Julian Day] (Day of Week)	Test Schedule Name	Duration	Center Point (coverage)	Comments	Links (large files)
June 12 [163] (Wednesday)	SRSOR	163/ 16:14:30 UTC - 164/ 11:44:30 UTC	<a href="#">37N 85W</a>	Moderate Risk over IL, IN, OH	<a href="#">IL</a> <a href="#">IL (HD)</a> <a href="#">MidWest (YouTube)</a> <a href="#">GA</a> <a href="#">GA (HD)</a> <a href="#">Blog: IL</a>
June 13 [164] (Thursday)	SRSOR	164/ 11:44:30 UTC - 165/ 12:14:30 UTC	<a href="#">36N 84W</a>	Moderate Risk over MD, DE, etc	<a href="#">KY</a> <a href="#">VA</a> <a href="#">MidAtlantic (YouTube)</a> <a href="#">Blog: Eastern US</a>
August 13 [225] (Tuesday)	Dry run	225/ ??:14:30 UTC - 226/ ??:44:30 UTC	<a href="#">??N ??W</a>	-	-
August 14 [226] (Wednesday)	Dry run	226/ ??:14:30 UTC - 227/ ??:44:30 UTC	<a href="#">??N ??W</a>	-	-
August 15 [227] (Thursday)	Dry run	227/ ??:14:30 UTC - 228/ ??:44:30 UTC	<a href="#">??N ??W</a>	-	-
August 16 [228] (Friday)	Dry run	228/ ??:14:30 UTC - 229/ ??:44:30 UTC	<a href="#">??N ??W</a>	-	-
August 20 [232] (Tuesday)	SRSOR?	232/ ??:14:30 UTC - 233/ ??:44:30 UTC	<a href="#">??N ??W</a>	-	-
August 21 [233] (Wednesday)	SRSOR?	233/ ??:14:30 UTC - 234/ ??:44:30 UTC	<a href="#">??N ??W</a>	-	-
August 22 [234] (Thursday)	SRSOR?	234/ ??:14:30 UTC - 235/ ??:44:30 UTC	<a href="#">??N ??W</a>	-	-
August 23 [235] (Friday)	SRSOR?	235/ ??:14:30 UTC - 236/ ??:44:30 UTC	<a href="#">??N ??W</a>	-	-



## 2013

- EUMETSAT/AMS                      16-20 Sept                      Vienna, Austria
  - [http://www.eumetsat.int/Home/Main/News/Conferences\\_and\\_Events/820209?l=en](http://www.eumetsat.int/Home/Main/News/Conferences_and_Events/820209?l=en)
- NWA                                      12-17 Oct                      Charleston, SC
  - <http://www.nwas.org/meetings/nwa2013/>
  - Submit abstracts for oral and poster presentations by 1 July – this is an extension from earlier deadlines.

## 2014

- AMS Annual meeting              2-6 Feb                      Atlanta, GA
  - Abstracts 'due' August 1<sup>st</sup>
  - <https://ams.confex.com/ams/94Annual/oasys.epl>
  - <http://ams.confex.com/ams/94Annual/10goesrjps/papers/index.cgi>
- Virtual Meeting Satellite Week      ?-? May                      “Madison, WI”



- AMS annual meetings

- Second Symposium on Prediction of the Madden-Julian Oscillation: Impacts on Weather and Climate Extremes
- Second Symposium on the Joint Center for Satellite Data Assimilation
- Superstorm Sandy and the Built Environment: New Perspectives, Opportunities, and Tools
- Stanley A. Changnon Symposium
- Edward S. Epstein Symposium
- Donald R. Johnson Symposium
- 30th Conference on Environmental Information Processing Technologies
- 28th Conference on Hydrology
- 26th Conference on Climate Variability and Change
- 26th Conference on Weather Analysis and Forecasting / 22nd Conference on Numerical Weather Prediction
- 23rd Symposium on Education
- 22nd Conference on Probability and Statistics in the Atmospheric Sciences
- 18th Joint Conference on the Applications of Air Pollution Meteorology with the A&WMA
- 18th Conference on Integrated Observing and Assimilation Systems for the Atmosphere, Oceans, and Land Surface (IOAS-AOLS)
- 16th Conference on Atmospheric Chemistry
- 13th Annual Student Conference
- 12th Conference on Artificial and Computational Intelligence and its Applications to the Environmental Sciences
- 12th History Symposium
- 12th Symposium on the Coastal Environment
- 11th Conference on Space Weather
- 11th Symposium on the Urban Environment
- Tenth Annual Symposium on New Generation Operational Environmental Satellite Systems
- Ninth Symposium on Policy and Socio-Economic Research
- Seventh Annual CCM Forum: Certified Consulting Meteorologists
- Sixth Symposium on Aerosol-Cloud-Climate Interactions
- Fifth Conference on Weather, Climate, and the New Energy Economy
- Fifth Conference on Environment and Health
- Fourth Aviation, Range, and Aerospace Meteorology Special Symposium
- Fourth Conference on Transition of Research to Operations
- Fourth Symposium on Advances in Modeling and Analysis Using Python
- Second Symposium on the Weather and Climate Enterprise
- Second Symposium on Building a Weather-Ready Nation: Enhancing Our Nation's Readiness, Responsiveness, and Resilience to High Impact Weather Events
- Major Weather Events and Societal Impacts of 2013
- Special Symposium on Severe Local Storms: The Current State of the Science and Understanding Impacts

