



The WPC MetWatch Desk: Using GOES-R Proxy Products



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Outline



- What is the WPC MetWatch desk?
- MetWatch desk background and the GOES-R Proving Ground
- A look back at 2013 on the MetWatch desk:
 - Case Study: August 14th
 - Case Study: October 30th-31st
- Forecaster assessment of GOES-R proxy products
- Conclusions



What is the MetWatch Desk?

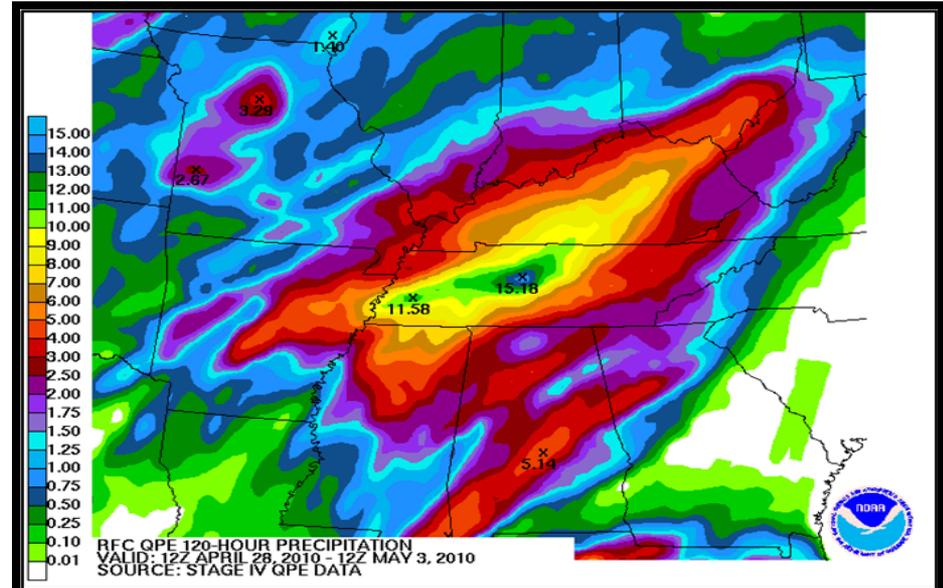
- NCEP was asked to provide a product similar to SPC Mesoscale Convective Discussions (MCD) focusing on heavy rainfall
 - Central Region requested NCEP provide this product
 - SPC and NESDIS/SAB supported this initiative
- Support for product emerged during WPC's strategic planning process
 - » Better positions WPC to support the NWS's Weather-Ready Nation initiative

WPC's Mesoscale Precipitation Discussion (MPD) is designed to enhance NWS flash flood warning services by providing enhanced situational awareness of potential flash flood events.

MetWatch Motivation

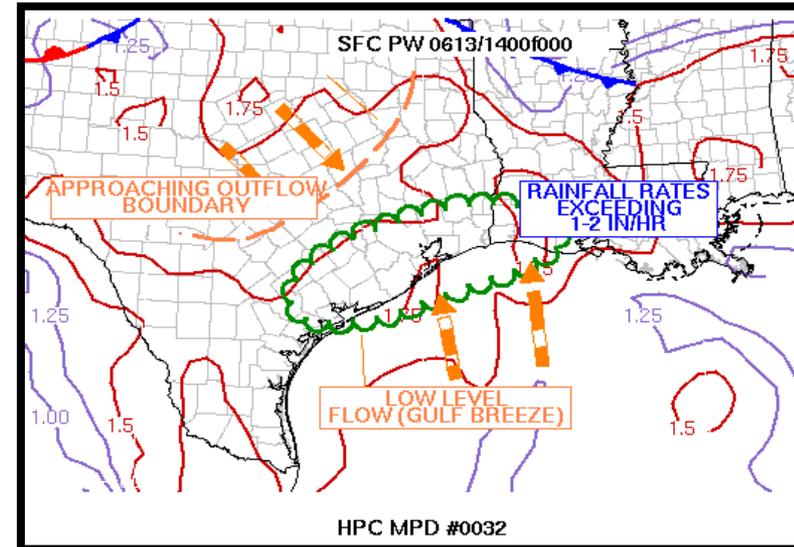
Can we anticipate an event like this in the short-range time period? Or provide value as an event is ongoing?

Given the goal of the MetWatch desk to provide enhanced situational awareness of potential flash flood events, how can the GOES-R program help?



MetWatch Background

- WPC prototyped the MetWatch desk in 2012.
- Desk went experimental on April 9th, 2013. WPC assumed issuance responsibility for heavy rainfall discussions from SPC.
- 296 MPDs issued for the 2013 season.
- *GOES-R Proving Ground activities have aided the MetWatch desk through illustration and training of convective products.*
- *GOES-R proxy products have already enhanced forecaster awareness of convective trends with impending or ongoing heavy rainfall events.*



MESOSCALE PRECIPITATION DISCUSSION 0032
NWS HYDROMETEOROLOGICAL PREDICTION CENTER CAMP SPRINGS MD
1216 PM EDT WED JUN 13 2012

AREAS AFFECTED...SOUTHEAST TEXAS...SOUTHWEST LOUISIANA

CONCERNING...HEAVY RAINFALL...FLASH FLOODING POSSIBLE

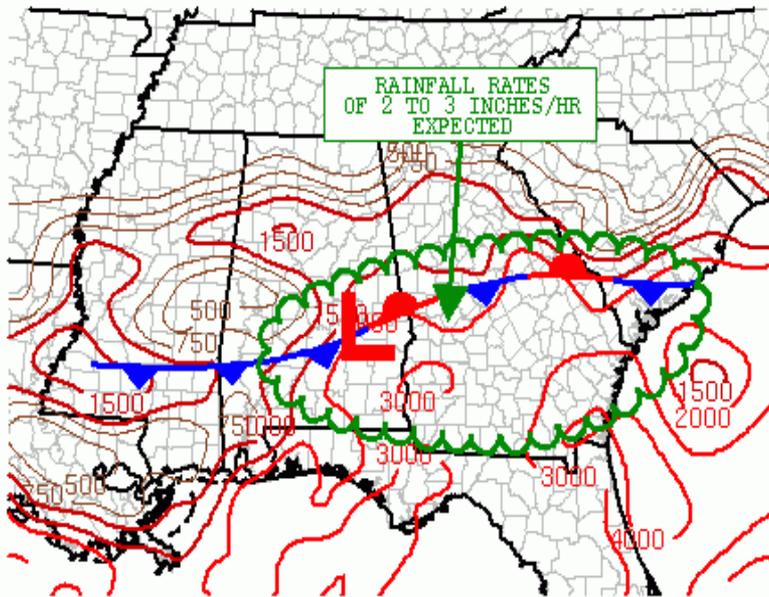
VALID 131600Z - 132000Z

...SLOW MOVING CONVECTION WITH POTENTIALLY EXCESSIVE RAINFALL AMOUNTS ACROSS COASTAL AREAS IN SOUTHEAST TEXAS AND WESTERN LOUISIANA...

COMPOSITE RADAR LOOPS SHOW REGENERATING CONVECTIVE CLUSTERS ALONG THE GULF BREEZE BOUNDARY ACROSS COASTAL PORTIONS OF SOUTHEAST TEXAS...EAST OF VICTORIA...AND SOUTHWEST LOUISIANA. THESE CELLS ARE AIDED BY THE STRENGTHENING DIURNAL DESTABILIZATION...WITH THE LATEST SPC MESOANALYSIS INDICATING SURFACE-BASED CAPES BETWEEN 3,000-4,000 J/KG...COINCIDENT WITH THE RICH...DEEP MOIST ENVIRONMENT WITH SURFACE DEWPOINTS IN THE MID 70S...K INDICES IN THE MID TO UPPER 30S...AND PWATS BETWEEN 1.75 AND 2.00 PER THE LATEST GPS AND 12Z UPPER AIR ANALYSIS.

...HURLEY.. 06/13/2012

- Case Study #1: Southeast U.S., August 14th
 - 1 MPD issued, relatively minor flash flood event



BEST CAPE 130814/1800f000
WPC MPD #0216

MESOSCALE PRECIPITATION DISCUSSION 0216
NWS WEATHER PREDICTION CENTER COLLEGE PARK MD
339 PM EDT WED AUG 14 2013

AREAS AFFECTED...CENTRAL AND SOUTHERN AL...CENTRAL AND SOUTHERN GA...SOUTHERN SC
CONCERNING...HEAVY RAINFALL...FLASH FLOODING POSSIBLE

VALID 141935Z - 150000Z

SUMMARY...SLOW-MOVING CONVECTION SHOULD TEND TO EXPAND IN COVERAGE OVER THE NEXT FEW HOURS WHILE PRODUCING SOME VERY HEAVY RAINFALL RATES. EXPECTED AT LEAST SOME POTENTIAL FOR FLASH FLOODING.

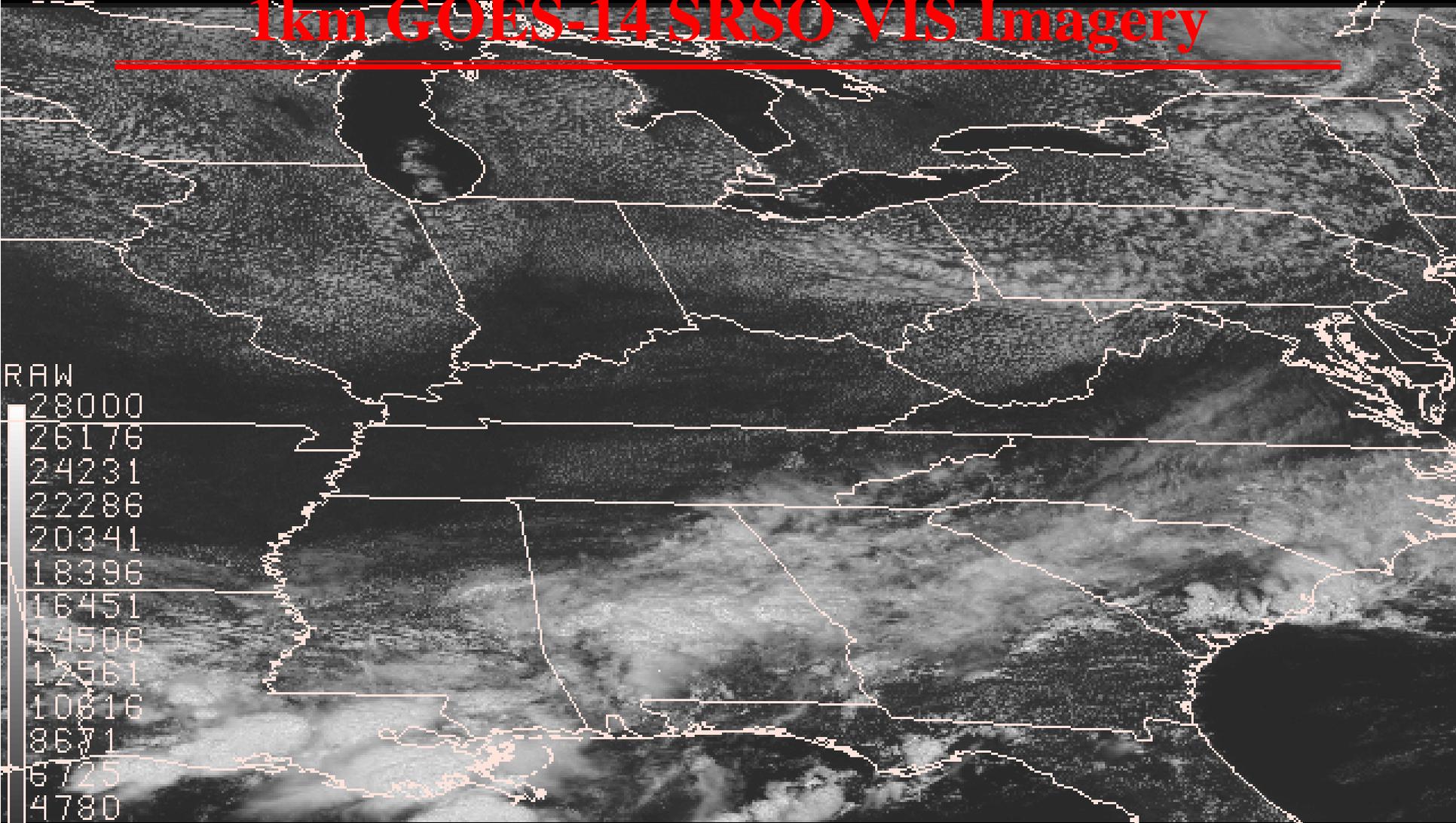
DISCUSSION...THE LATEST IR SATELLITE IMAGERY SHOWS GRADUALLY COOLING CLOUD TOPS IN ASSOC WITH A BROKEN CLUSTER OF SHWRS/TSTMS OVER CNTRL AL. THIS ACTIVITY IS ASSOC'D WITH A WEAK AREA OF LOW PRESSURE MOVING VERY SLOWLY EASTWARD ALONG A FRONT THAT IS NOW DRAPED ACROSS THE GULF COAST STATES. WV IMAGERY IS SUGGESTING INCREASINGLY DIV FLOW ALOFT AS SHORTWAVE ENERGY DIGS ACROSS THE THE LWR MS VLY. THIS WILL BE HELPING TO ENHANCE LARGE SCALE ASCENT...AND THIS COUPLED WITH STRONG DIURNALLY DRIVEN INSTABILITY SHOULD ALLOW FOR AN EXPANSION IN CONVECTIVE COVERAGE THE NEXT FEW HOURS. PWATS OF 2 TO 2.25 INCHES AS PER LATEST GOES-SOUNDER AND GPS DATA AND THE THREAT FOR CELL MERGERS WILL BE SUPPORTIVE OF RAINFALL RATES OF 2 TO 3 INCHES/HR. THIS COUPLED WITH VERY SLOW EASTWARD PROGRESSION WILL SUPPORT LOCALLY VERY HVY RAINFALL TOTALS...THAT COULD LOCALLY EXCEED 5 INCHES THROUGH THE EVENING. DESPITE RATHER HIGH FFG VALUES...THE INTENSE SHORT-TERM RAINFALL RATES WILL INCREASE THE POTENTIAL FOR FLASH FLOODING. WILL CONTINUE TO MONITOR.

ORRISON

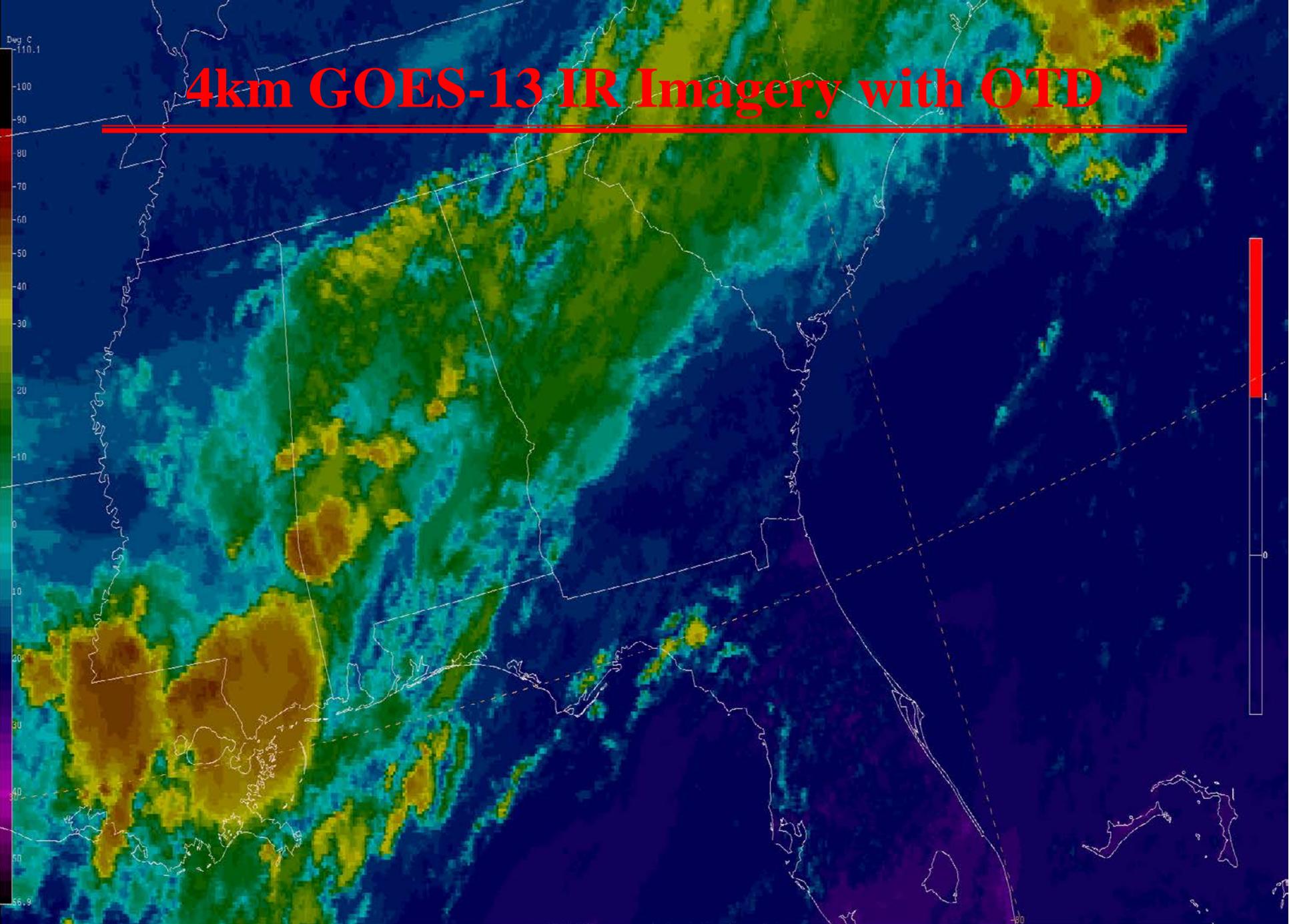
1km GOES-14 SRSO VIS Imagery

RAW
28000
26176
24231
22286
20341
18396
16451
14506
12561
10616
8671
6725
4780
2835
890
-1055
-3000

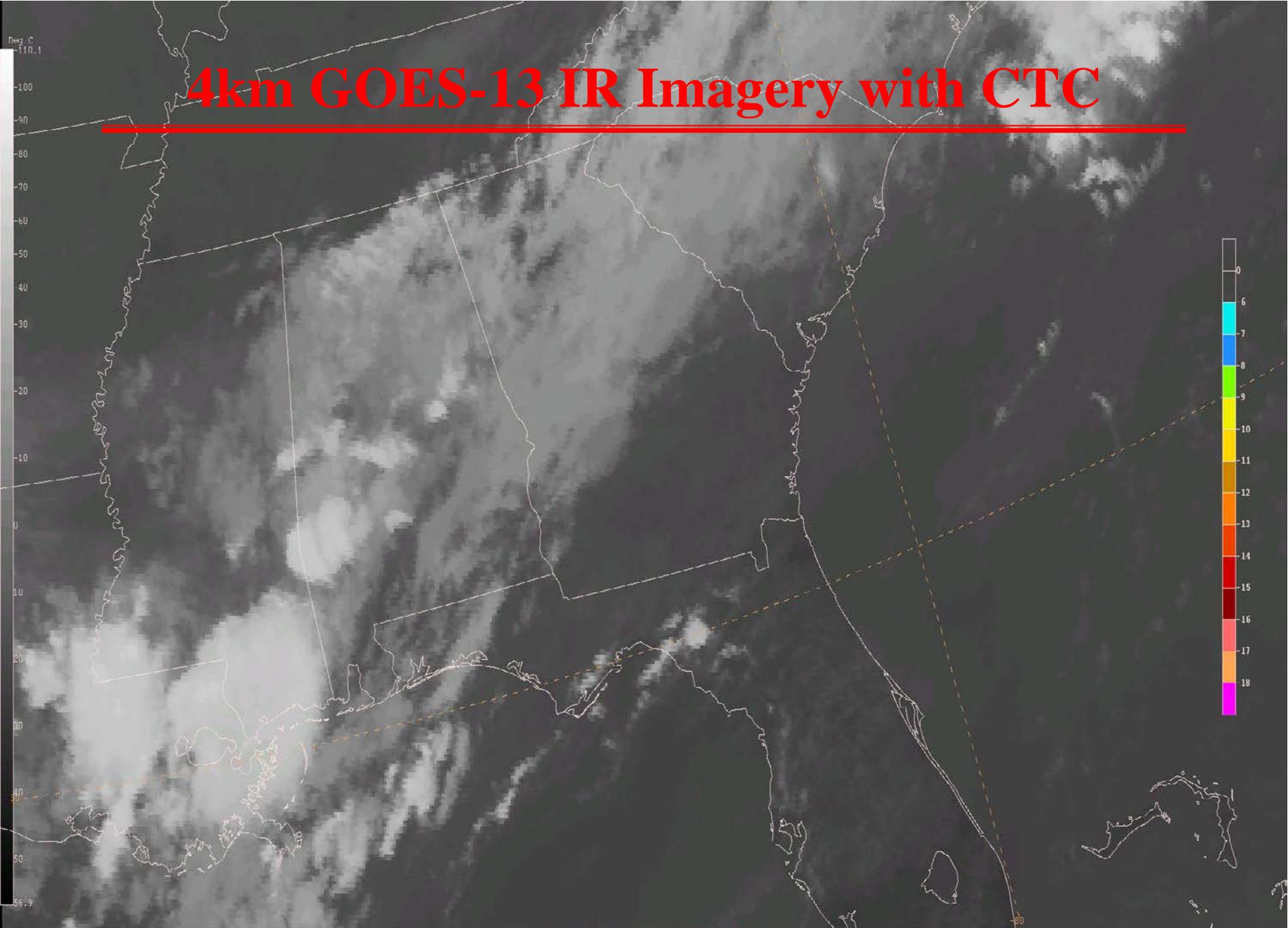
130814/1801 GOES14 VIS



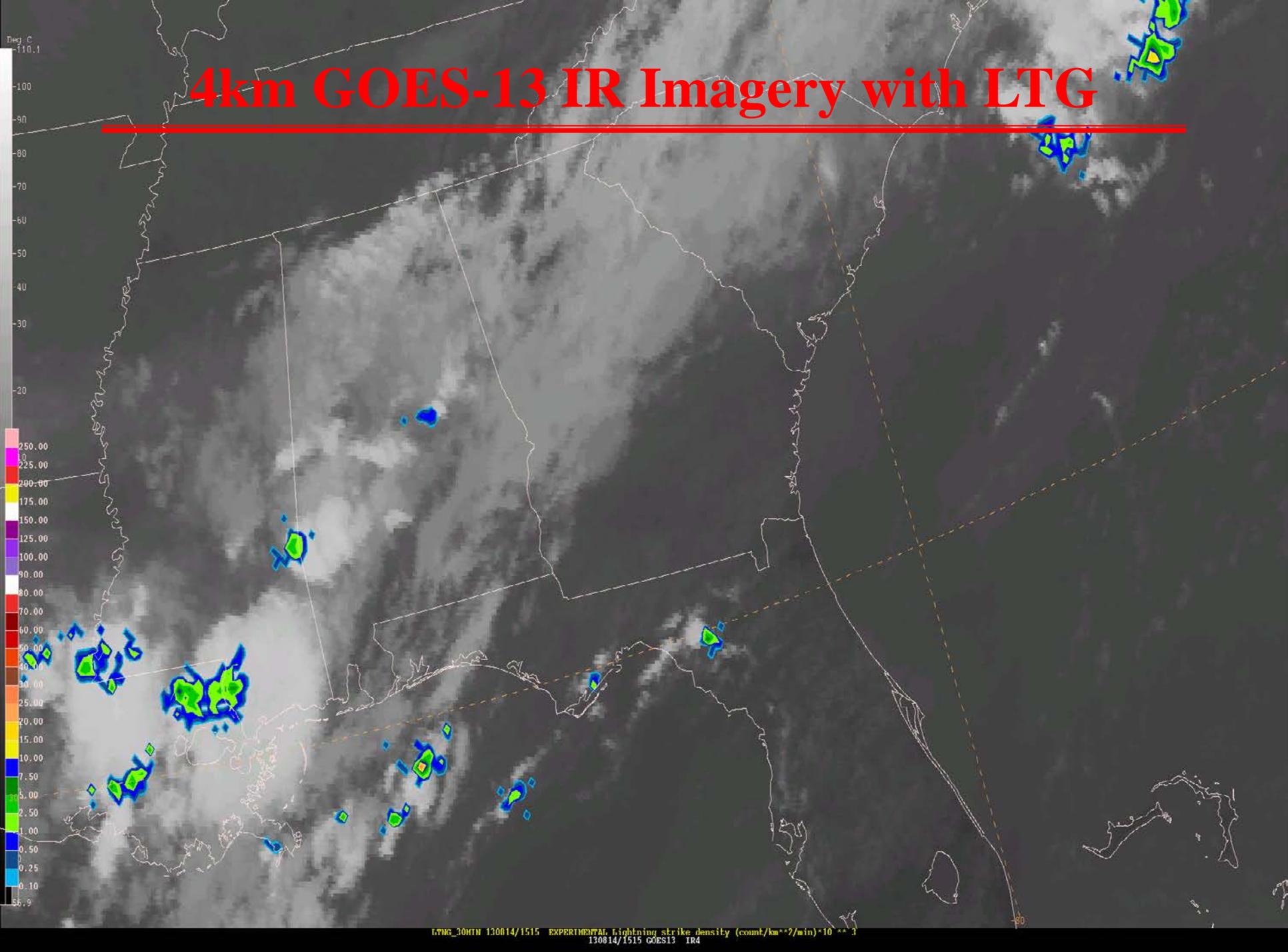
4km GOES-13 IR Imagery with OTD



4km GOES-13 IR Imagery with CTC



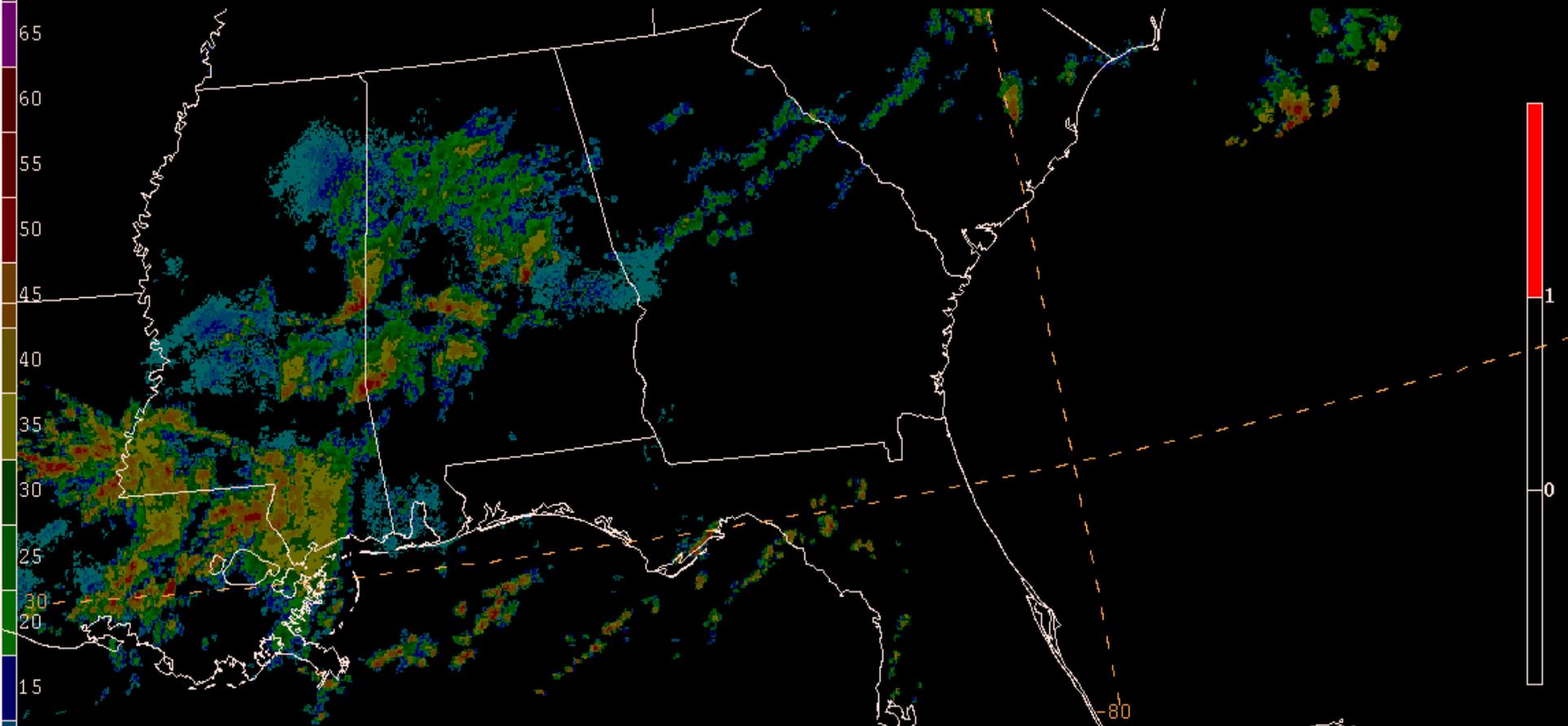
4km GOES-13 IR Imagery with LTG



Radar Composite Imagery with OTD

DBZ

75
70
65
60
55
50
45
40
35
30
25
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15
10
5
ND

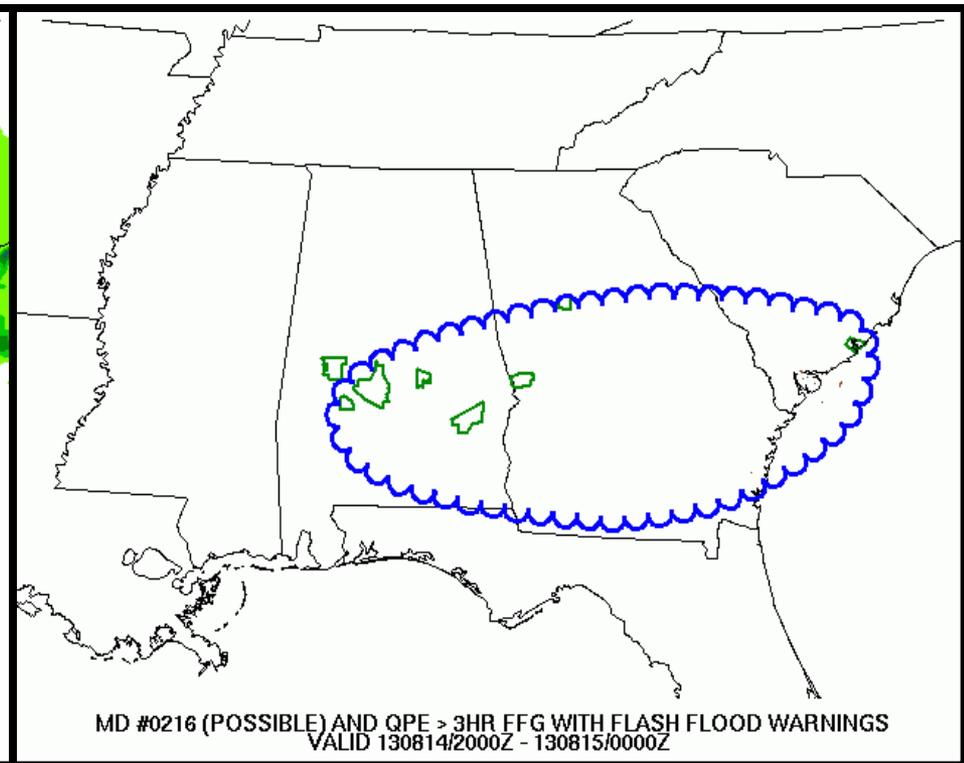
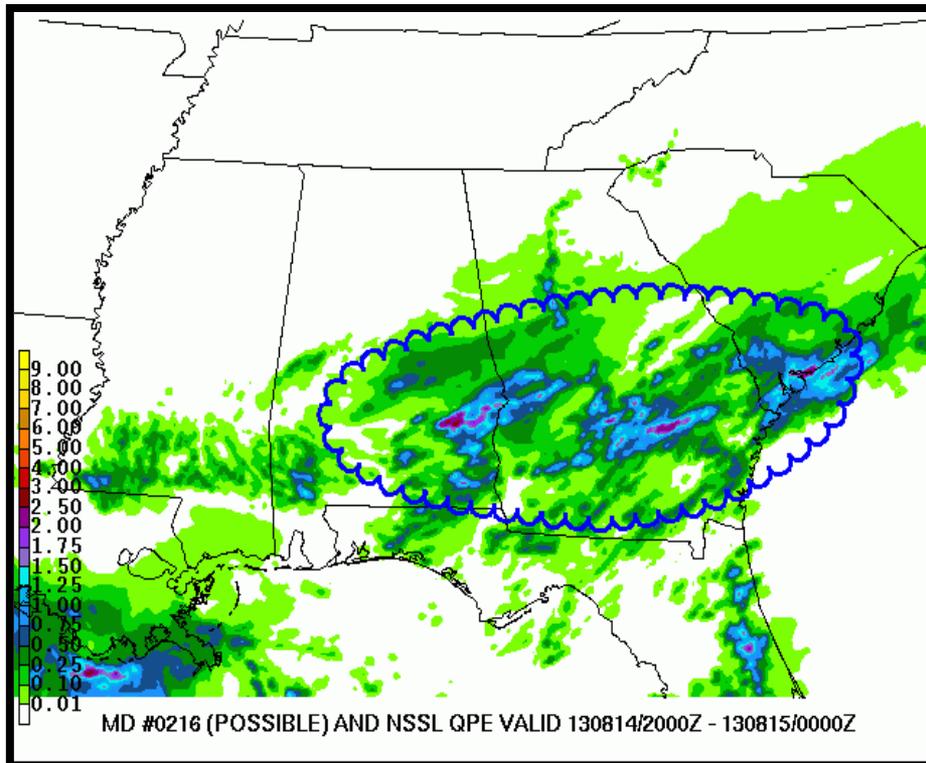


CONVECT 130814/1515 CIMSS Overshoot Detection (1=yes 0=no)
130814/1504 NATIONAL 2 KM BASE REFLECT 0.00 DEG

80

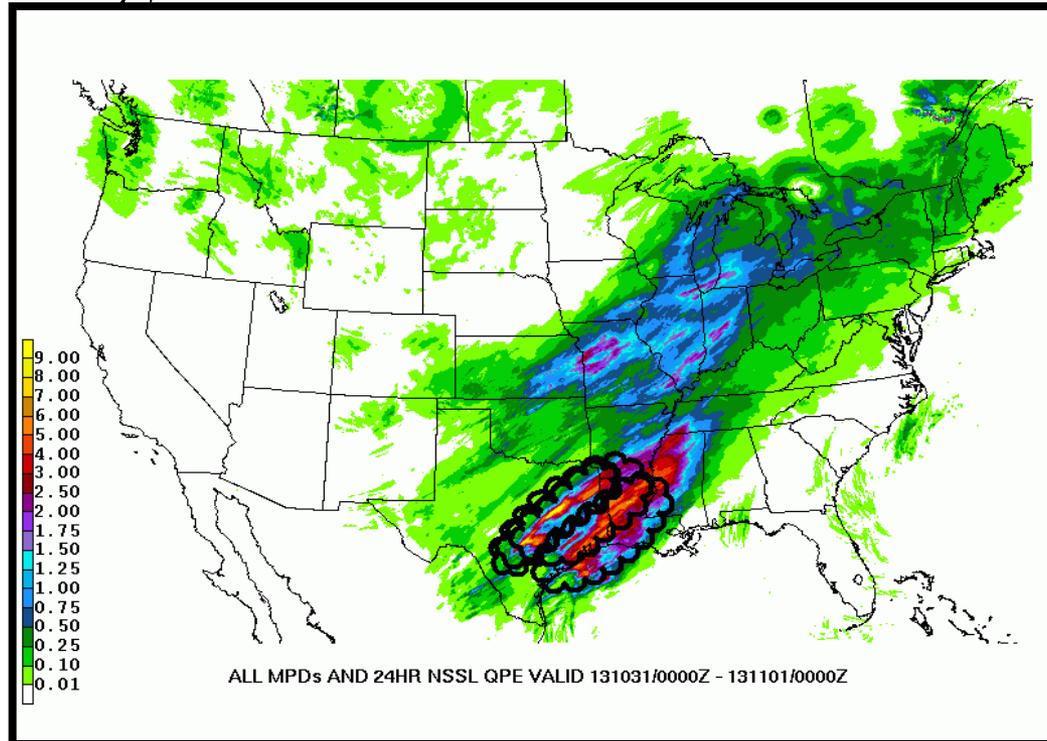
The MetWatch desk in 2013

- Case Study #1: Southeast U.S., August 14th
 - 1 MPD issued, relatively minor flash flood event



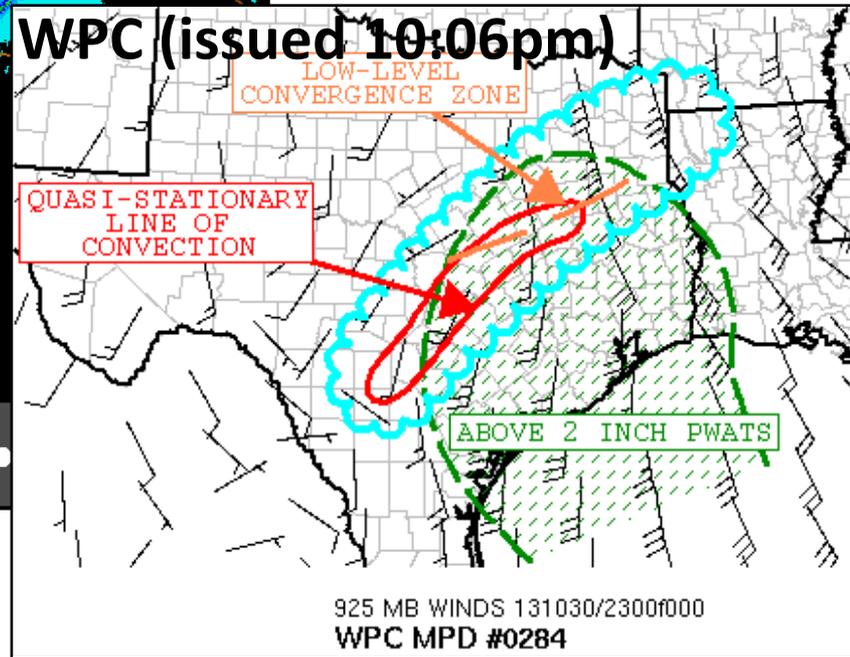
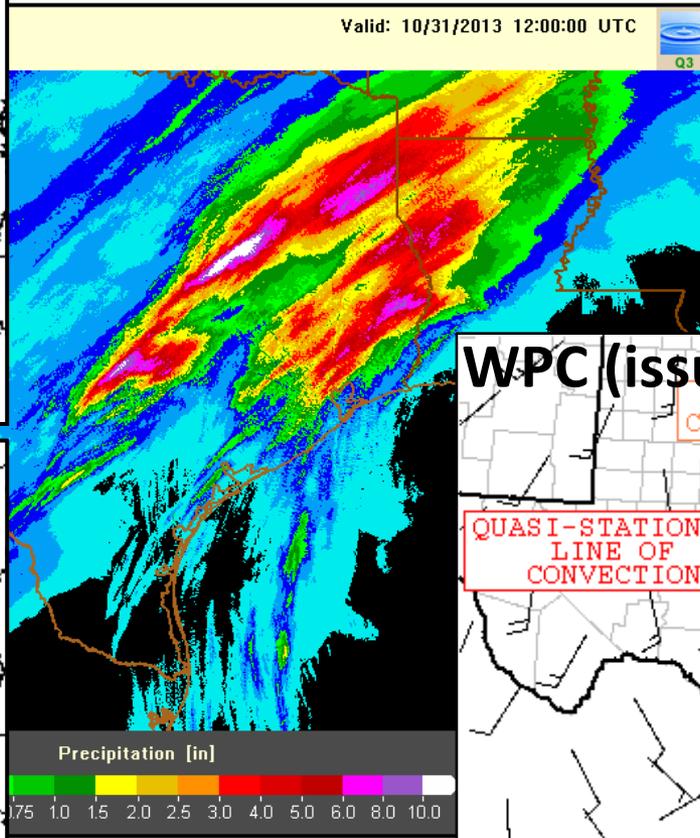
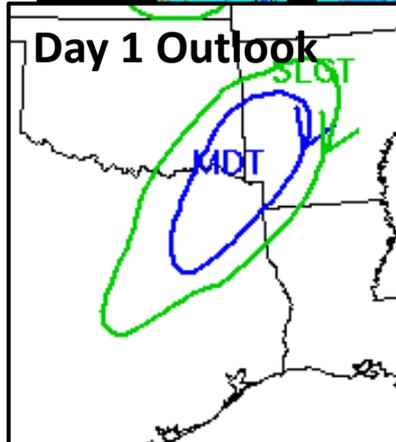
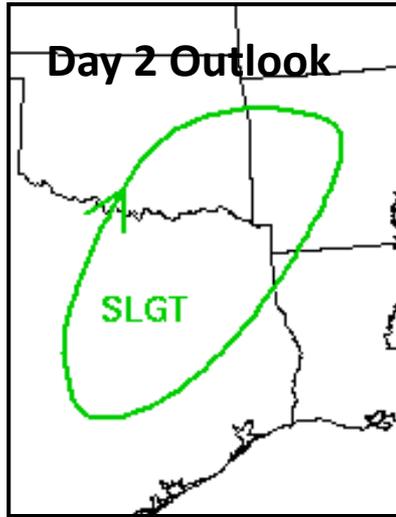
The MetWatch desk in 2013

- Case Study #2: Southeast Texas and Louisiana, October 30th - 31st
 - 4 MPDs issued, a high impact flash flood event spanning over 12 hours

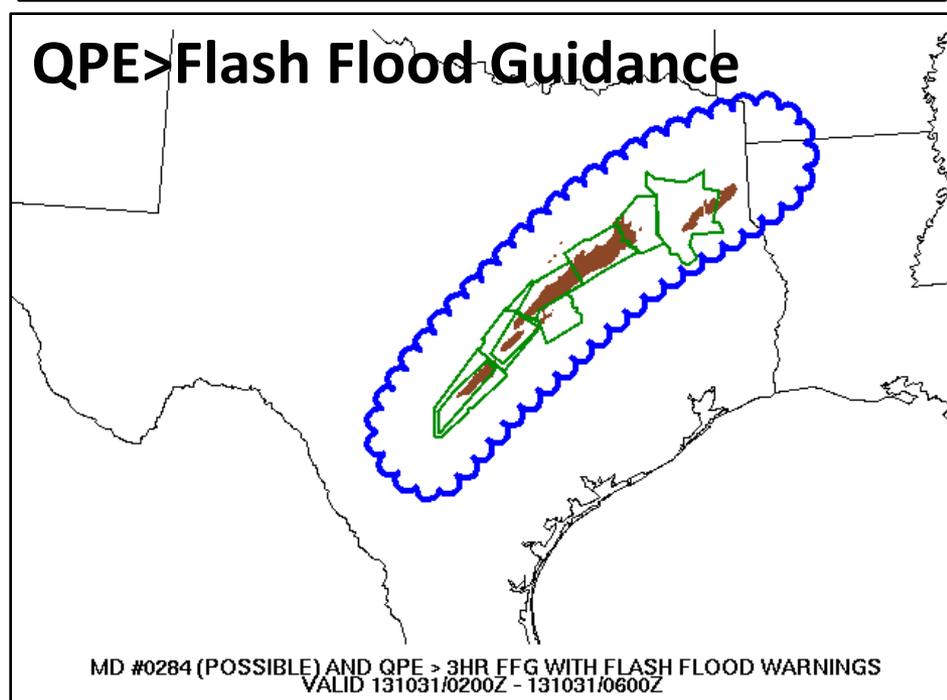
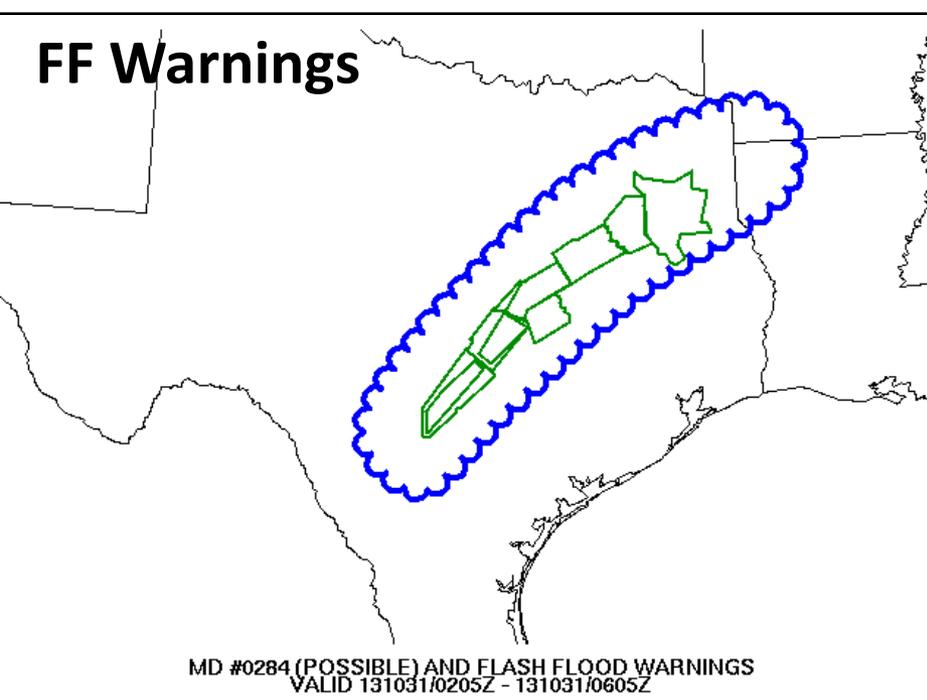
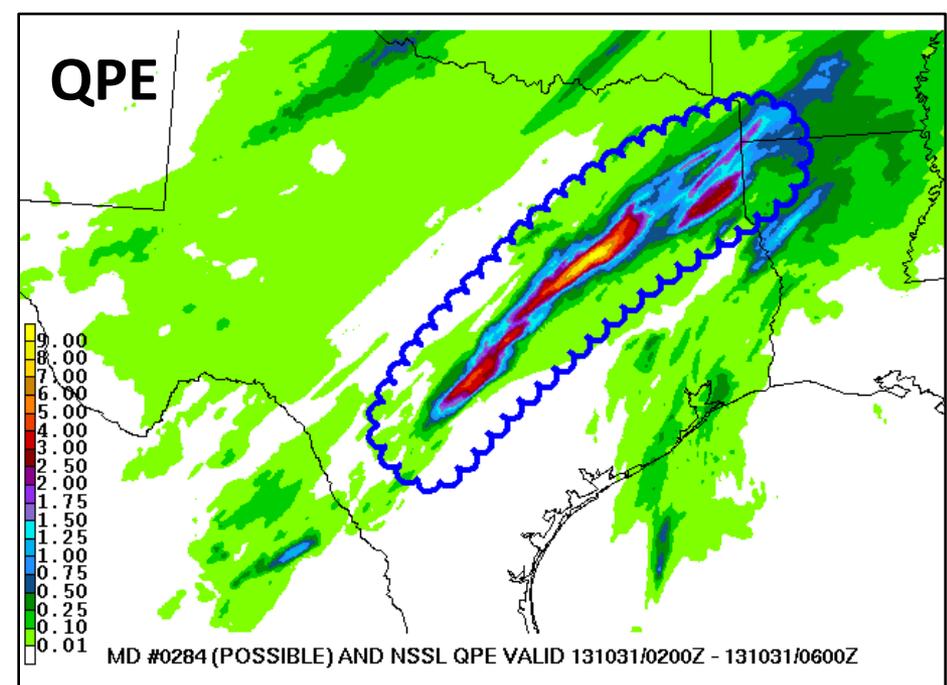
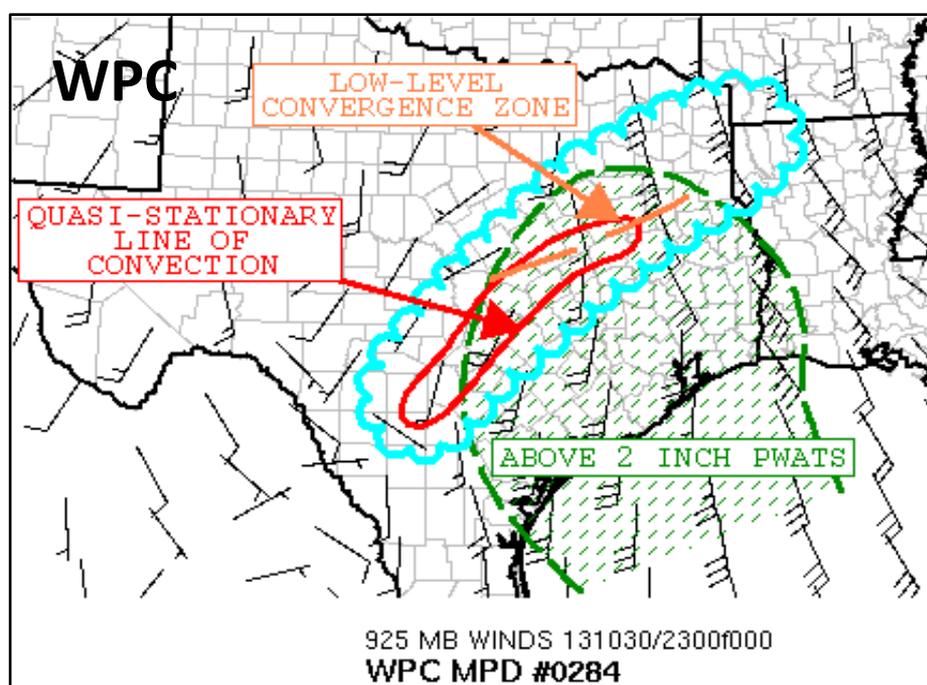


Southeast Texas Floods

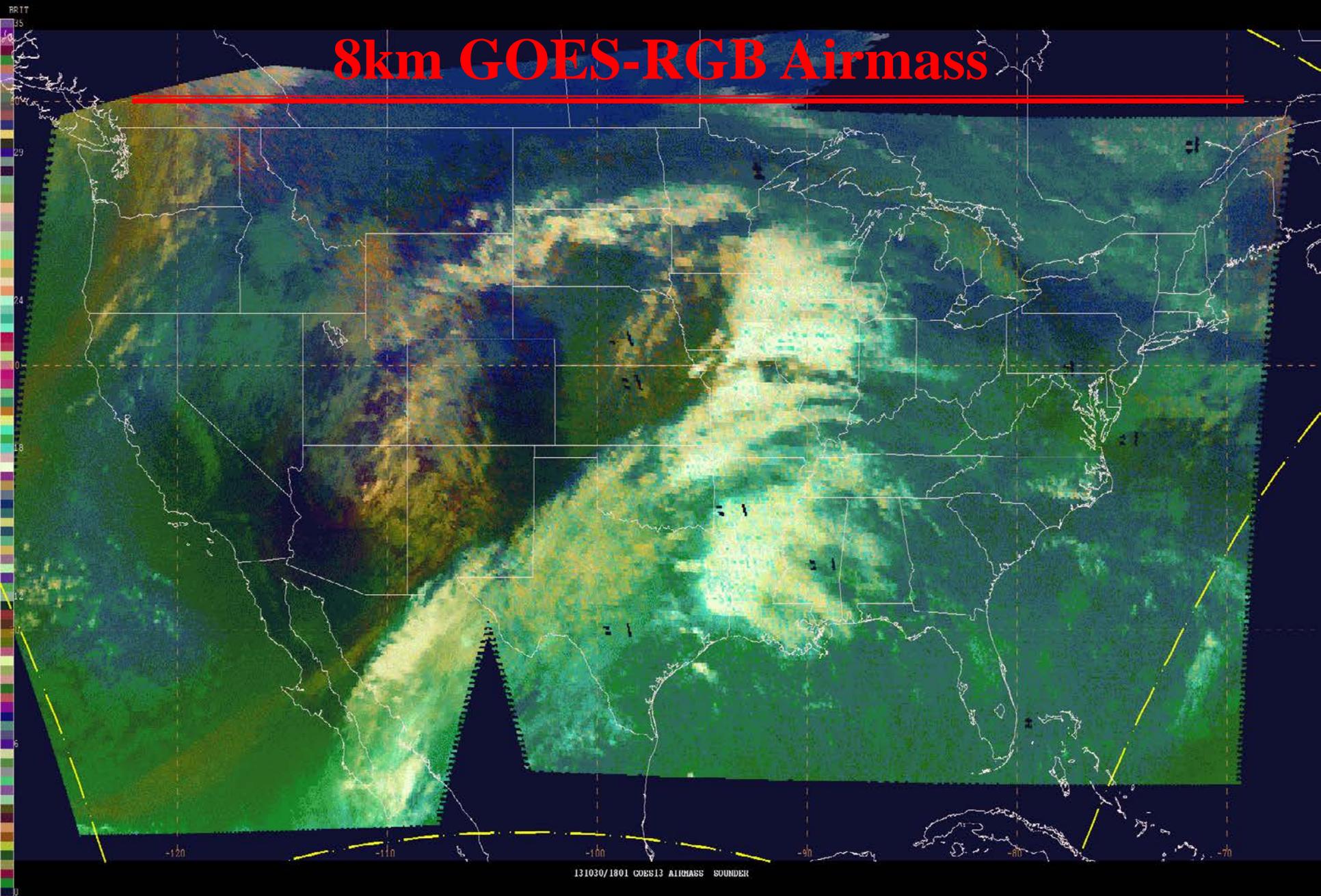
Oct 30th – Oct 31st



- >10" rainfall on Oct 30th – 31st
- Flooding threat highlighted two days in advance
- Upgraded to moderate risk on Day 1
- Mesoscale discussion issued prior to onset of flash flooding

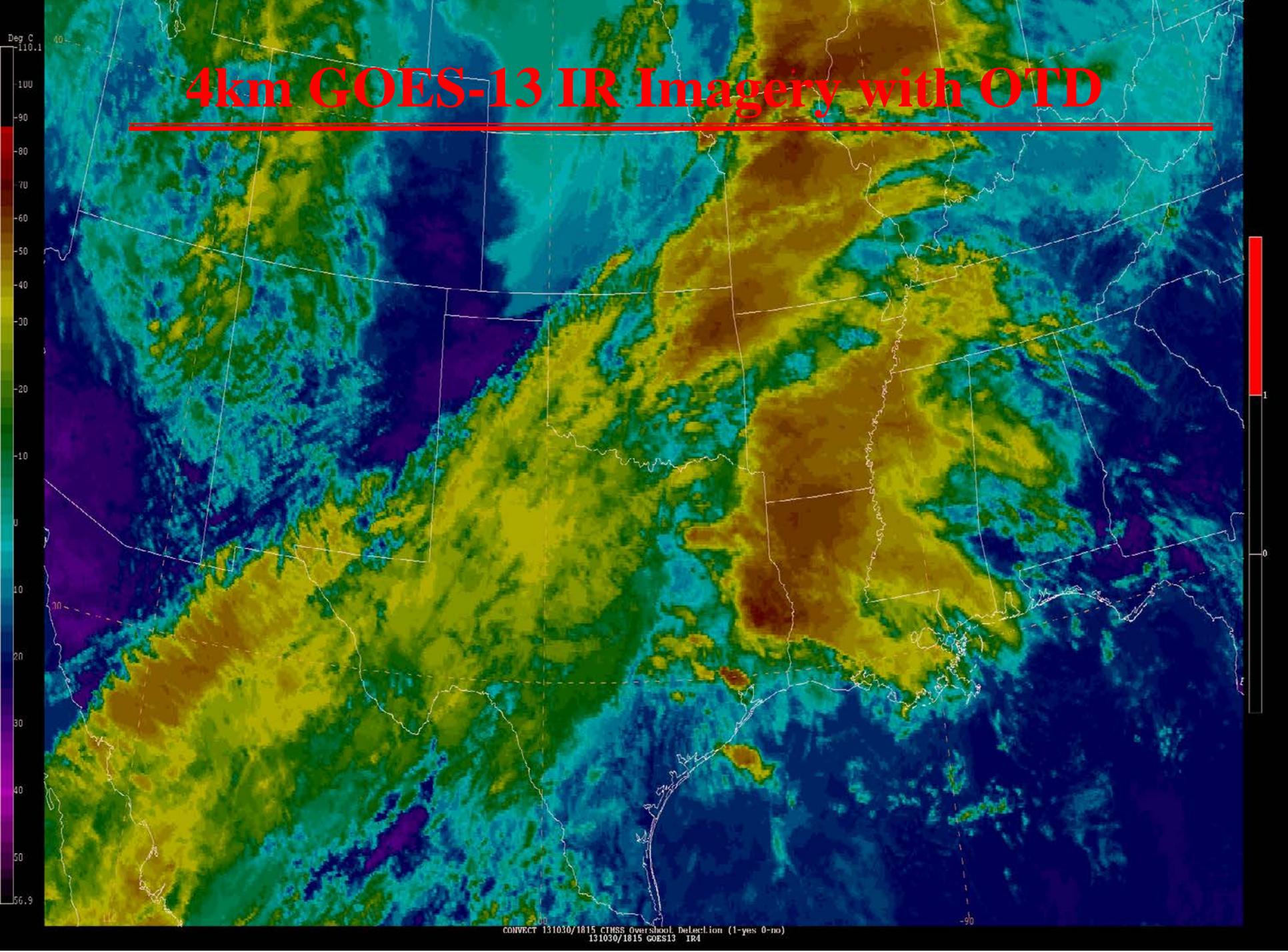


8km GOES-RGB Airmass



131030/1801 GOES13 AIRMASS SOUNDER

4km GOES-13 IR Imagery with OTD

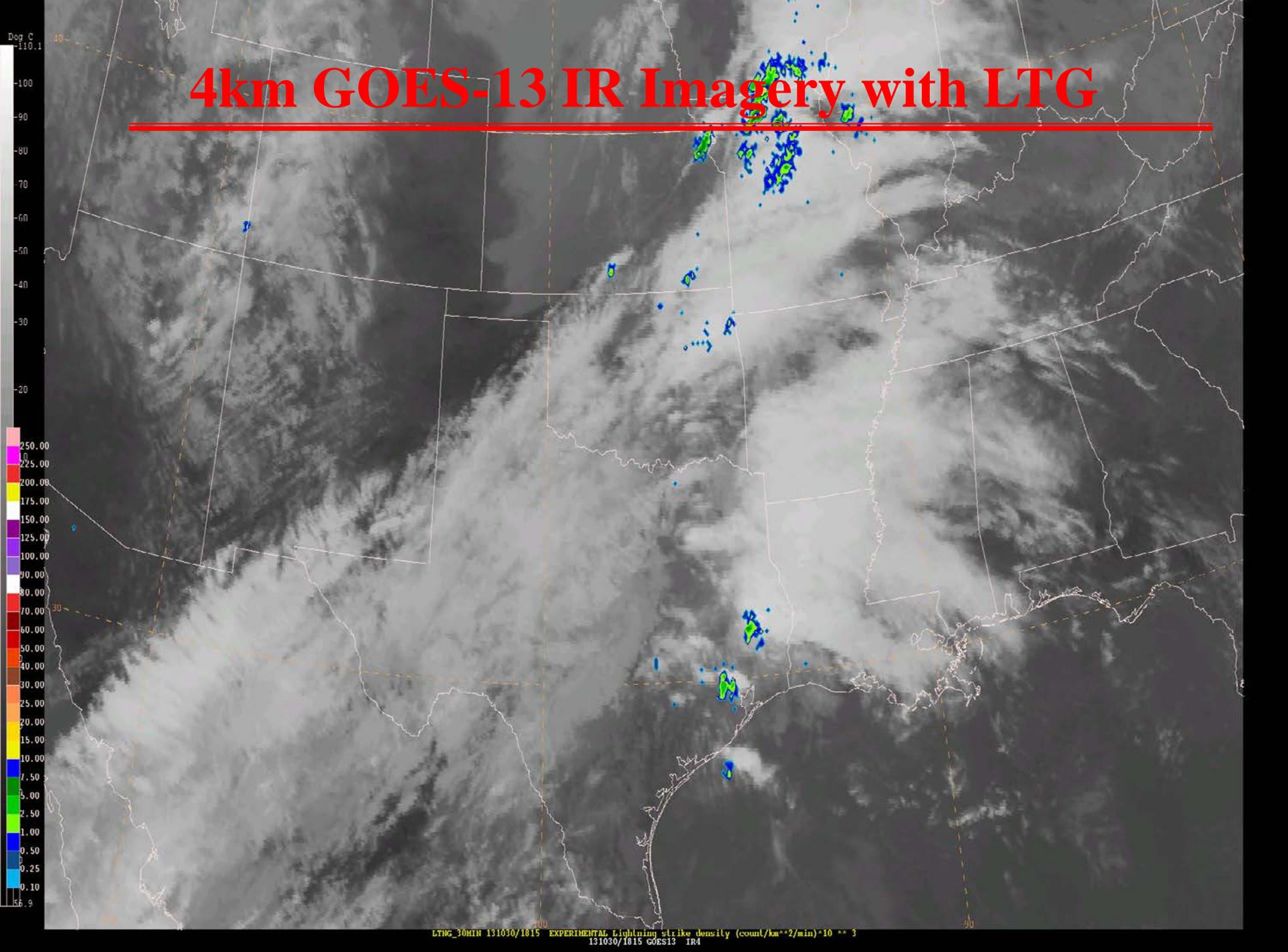


CONVERT 131030/1815 CIMSS Oversight Detection (1=yes 0=no)
131030/1815 GOES13 IR4

4km GOES-13 IR Imagery with CTC



4km GOES-13 IR Imagery with LTG



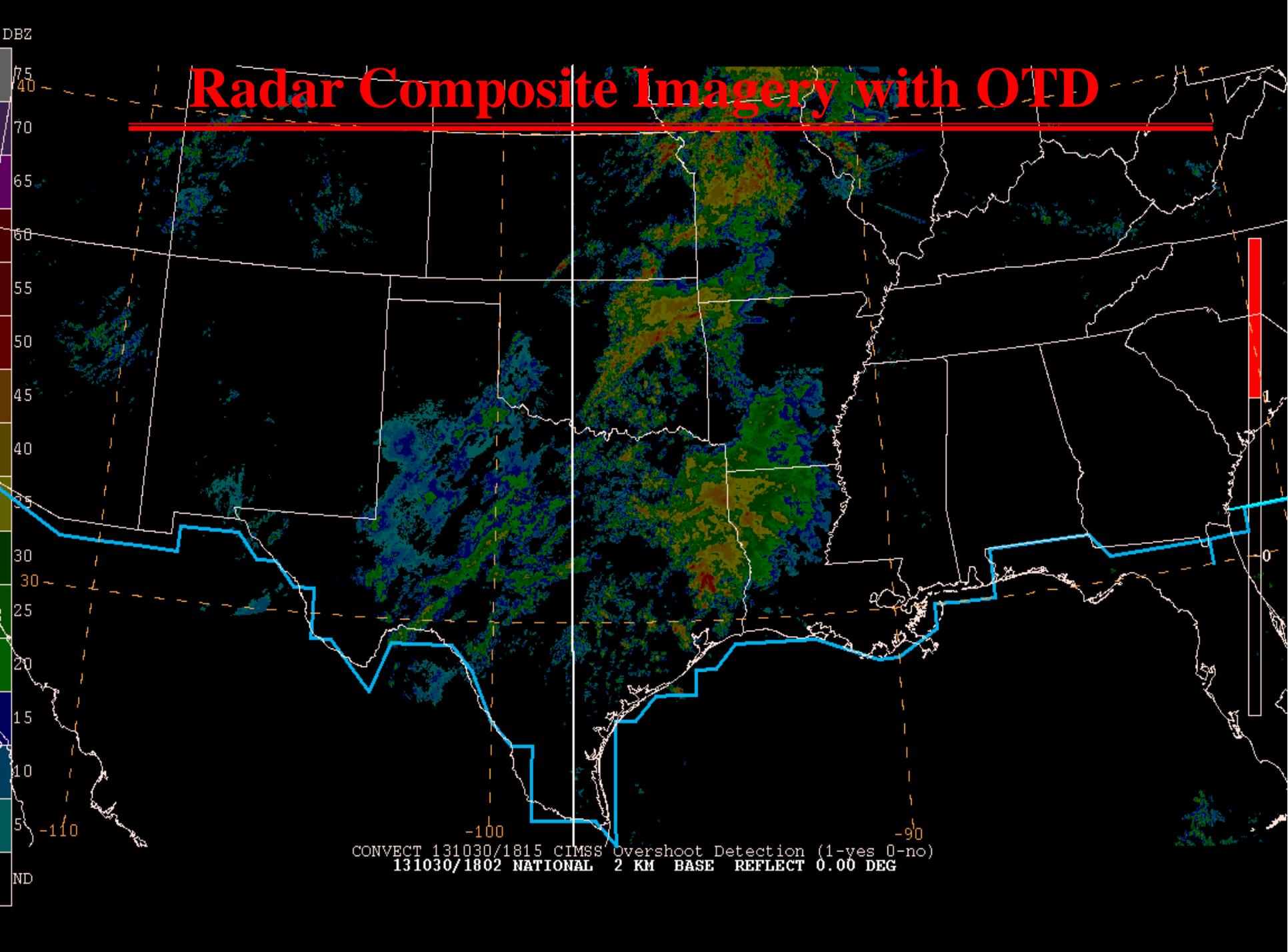
Radar Composite Imagery with OTD

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CONVECT 131030/1815 CIMSS Overshoot Detection (1=yes 0=no)
131030/1802 NATIONAL 2 KM BASE REFLECT 0.00 DEG





Forecaster Assessment of GOES-R Proxy Products



- GOES-RGB airmass product appears very useful in identifying forcing mechanisms by identifying PV anomalies, upper level jet streaks, and associated absolutely vorticity centers.
 - Should be compared to gridded model data to help identify model initialization or forecast errors.
- Assessing “trends” of the OTD, CTC, LTG convective products allow the forecaster to determine trends in forcing and/or instability. Can provide signals as to where the heaviest rainfall is occurring and through extrapolation where it is heading.
 - Should be used in conjunction with conventional satellite and radar imagery.
- SRSO imagery has been identified as a powerful way to monitor convective initiation and is a great way to assess instability trends. Given its very high spatial and temporal resolution, it is possible it can provide more useful information than conventional radar imagery, and should be used exclusively when radar is not available.
 - Should be used with OTD, CTC and LTG products whenever possible



Conclusions



- **The WPC MetWatch Desk is relatively new, and given the challenge of short-range flash flood forecasting, forecasters are looking for new satellite products and tools that can provide value to the mission.**
- **GOES-R proxy products have already been proven to help the WPC forecaster in NOWCASTing flash flood events across the nation, and with varying degrees of convective organization.**
- **The next phase of the MetWatch desk moving into the 2014 convective season will be to focus on more GOES-R proxy product integration and training.**
- **WPC forecasters find the evolution of GOES-R product algorithms as being a key to providing value, and we are excited about the future of the GOES-R era.**



Thank You!
Comments or Questions?

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“Where America’s Climate, Weather, Ocean, and Space Weather Services Begin”