A satellite is shown in space, with the Earth visible in the background. The satellite has a large solar panel and various instruments. The Earth shows the Americas and parts of Europe and Africa. The background is a dark blue space filled with stars.

# Satellite Proving Ground at the Storm Prediction Center and Hazardous Weather Testbed

**William Line**

University of Oklahoma - CIMMS and  
NOAA/NWS/Storm Prediction Center, Norman, OK

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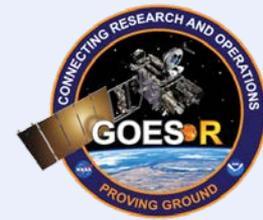
# Background of SPC/HWT Satellite Liaison



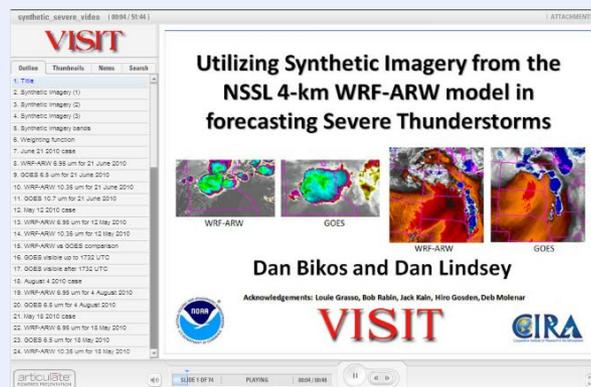
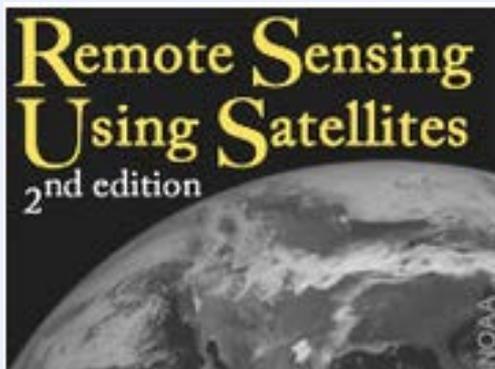
- Office Location: Storm Prediction Center, National Weather Center, Norman, Oklahoma
- Started: May 22, 2013
- NWS Forecasters I work with:
  - SPC Forecasters (22, 3 vacant)
  - Hazardous Weather Testbed
    - SPC Forecasters
    - WFO Forecasters
    - CWSU Forecasters



# Training Received by Satellite Liaison



- Satellite Boot Camp – Madison, WI - July, 2013
- SPC shadow shifts
- Various COMET, VISIT, EUMETRIN Modules



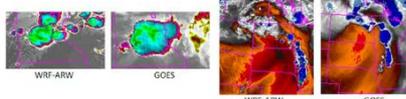
synthetic\_severe\_video (8094/5144)

**VISIT**

Outline Thumbnails Notes Search

1. Title
2. Synthetic imagery (1)
3. Synthetic imagery (2)
4. Synthetic imagery (3)
5. Synthetic imagery bands
6. Imaging function
7. June 21 2010 case
8. WRF-ARW 6.95 um for 21 June 2010
9. GOES 6.5 um for 21 June 2010
10. WRF-ARW 10.35 um for 21 June 2010
11. GOES 10.7 um for 21 June 2010
12. May 12 2010 case
13. WRF-ARW 6.36 um for 12 May 2010
14. WRF-ARW 10.35 um for 12 May 2010
15. WRF-ARW vs GOES comparison
16. GOES visible up to 1732 UTC
17. GOES visible after 1732 UTC
18. August 4 2010 case
19. WRF-ARW 6.95 um for 4 August 2010
20. GOES 6.5 um for 4 August 2010
21. May 15 2010 case
22. WRF-ARW 6.95 um for 15 May 2010
23. GOES 6.5 um for 15 May 2010
24. WRF-ARW 10.35 um for 15 May 2010

**Utilizing Synthetic Imagery from the  
NSSL 4-km WRF-ARW model in  
forecasting Severe Thunderstorms**



WRF-ARW GOES WRF-ARW GOES

**Dan Bikos and Dan Lindsey**

Acknowledgments: Louie Grasso, Bob Rabbs, Jack Kahn, Hiro Godson, Deb Molnar



NOAA VISIT CIRA

article8ister  
document presentation

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24





# Training Prepared by Satellite Liaison - SPC



- SPC Demonstrations
  - In-person, year-round, one-on-one training in ops
    - Products chosen that have potential to benefit SPC forecasters, based on initial liaison assessments and forecaster feedback
    - I'll spend time in ops monitoring and discussing the satellite products with forecasters in real-time
    - My consistent presence in ops to serve as SME and familiarize forecasters is very important
    - Allows for more comprehensive evaluation over variety of seasons, weather regimes, etc.
  - Product quick-guides
  - Internal webpage with examples, resources
  - ❖ In person training, feedback collection has worked best
  - ❖ Relying on email, PP, etc. is not reliable



# Training Prepared by Satellite Liaison - HWT



- HWT Demonstrations
  - Developers create Articulate training, quick-guides
  - In the past, WES case
    - Will likely utilize when available and working in AWIPS-II
  - I develop HWT GOES-R operations plan, serve as focal point for all satellite products
  - First day product spin-up
    - Hands-on, one-on-one training
    - Participants are learning throughout the whole week
  - This year in EWP: 4 weeks, 12 NWS (WFO and CWSU) forecasters, 4 broadcast mets, various scientists each week

# Preparing the User Community

- Satellite liaison/SME located at national centers should continue to train/prepare Center forecasters in-person, year-round, in real-time pre- and post-launch (PLT)
  - Preparing forecasters at field offices has additional challenges
    - HWT continues to be an effective avenue to enlighten, train forecasters
      - Experimental simulated operations environment using RT events
      - Opportunity for developers to interact with users (R2O/O2R)
      - Feedback collected has been vital for continued product development
      - Chance to enlighten/inform participants about next gen satellites systems
      - Participants are eager to share new knowledge with home office.
    - Training Modules for field, esp. SOO's
- ❖ It is vital we get the imagery and products in front of the forecasters once GOES-R launches and the real data start flowing

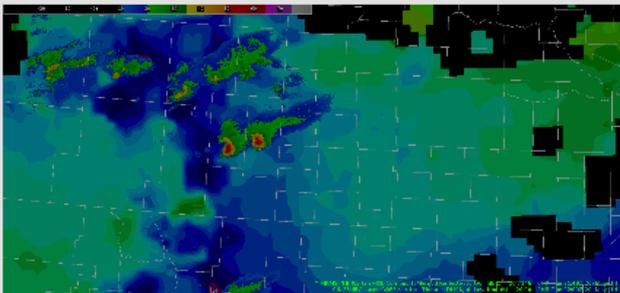


# Collaborating with Developers

- Technical interchange meetings with SPoRT, CIMSS and CIRA
- Developer visits to HWT
- Work with developer when setting up new product in SPC or HWT, planning demonstration, preparing training (R2O)
- Telling the developers what the forecasters want (O2R)
- Relay feedback to developers through blog posts, emails, presentations and final reports
- <http://www.goesrhwat.blogspot.com/> and <http://satelliteliaisonblog.wordpress.com/>

## NearCast Supports Weakening

The gradient of theta-e difference remains in eastern WY. Storms have developed and moved east across this convective instability gradient producing marginally severe hail. Throughout the day the NearCast model indicated the convective instability weakens across the NEb panhandle. Below is an email with two supercell moving across the convective instability axis. The lead supercell is currently weakening and also moving out of the instability axis.

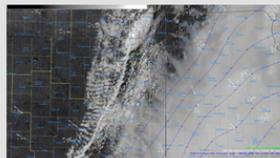


## 1 Minute Satellite Feed

Today the GOES-14 SR50R is updating at one minute intervals. This provides an excellent opportunity to see how quickly cloud tops develop, even well before the radar updates. In the first image you can see the void in the circled area. This general area is the same area in which clouds have already developed and are beginning to can upper level winds.

Update: Showers and thunderstorms have initiated in the same area that satellite feed was showing the high tops. The one minute feed gave great lead time in this instance.

Jared Maples

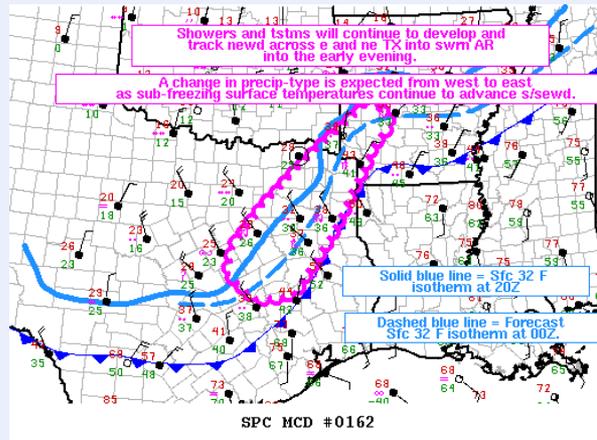


## Using Probability of Severe to help issue Warnings



It has been a very active day with storms over our warning area. The Prob. of Severe tool really helped me focus in on the storms that were more intense and then I was able to use Dual-Pol info to help verify and issue the warnings. I was able to observe that the Prob of Severe as it followed the strengthening and thus weakening of the individual storms. As you can see from above...when they turned the hot pink color...is normally when I was issuing the warning and actually allowed the warnings to expire when they started to drop down to the gray color. This also verified with storm spotter data so I find this tool very useful and I really like it. ~Vollmar

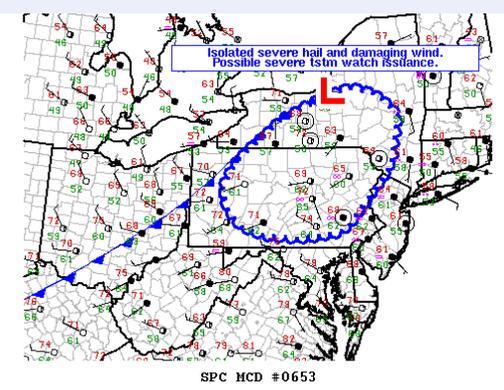
- Integrated 1-minute imagery (when available), CTC, OTD and NearCast into SPC operations (at least 11 MD's).
  - Forecasters have used these products in their decision-making, and have provided me with operational examples.



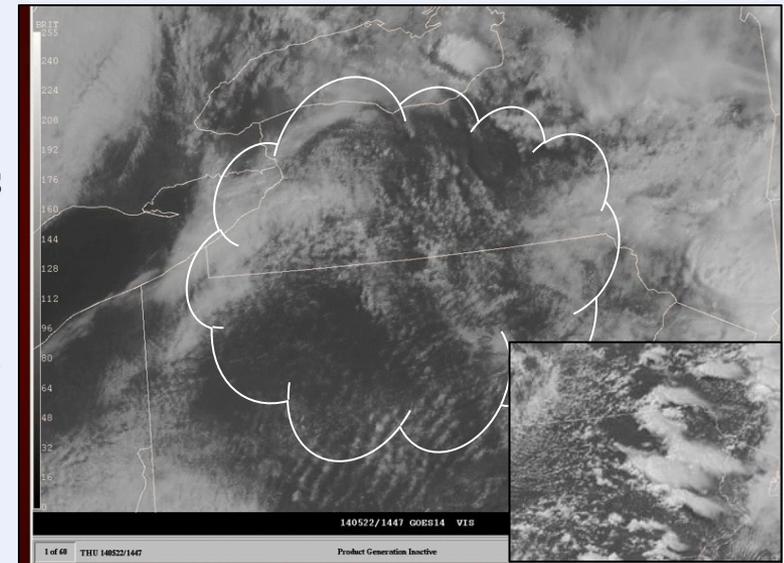
"DISCUSSION...TRENDS IN REGIONAL RADAR IMAGERY...LIGHTNING DATA...AND CIMSS GOES-R CLOUD TOP COOLING AND OVERSHOOTING TOP PRODUCTS INDICATED CONVECTION AND EMBEDDED TSTMS CONTINUING TO INCREASE IN COVERAGE AND INTENSITY SINCE 1930Z ACROSS NORTHEAST TX TO SWRN AR."

# 1-minute Imagery in SPC

- Feedback from SPC forecasters and HWT participants has been helpful in starting to identify the operational significance of raw 1-minute imagery.



DISCUSSION...1-MIN  
RESOLUTION VISIBLE  
SATELLITE IMAGERY DEPICTS  
DEEPENING CU AND SMALL  
CBS FORMING ALONG/JUST  
AHEAD OF A COLD FRONT  
STRETCHING FROM AROUND 25  
S ROC TO ZZV...WITH THE  
GREATEST CLUMPING NEAR  
THE NY/PA BORDER.



- “Using cloud character and trends to diagnose boundary locations and motion...”
- “... allowed for careful analysis of overshooting and collapsing thunderstorm tops, the character of storm anvils (ie. the health of the storm) and the identification of convectively generated outflows.”
- “Satellite imagery at 1-minute resolution needs to become the new standard for severe weather operations.”

# Biggest Challenge



- Water cannon of data
  - Not just satellite (radar, NWP, etc)
  - Must display data in an understandable manner so forecasters can more easily assimilate it into their decision-making process
  - Must identify satellite products that add information not already available to the forecaster
  - Consistent presence of liaison in operations is a must
- Plans to incorporate JPSS and other polar data into SPC operations
  - Blend with geostationary satellite data



# Vision of Satellite Liaison Position



- Valuable assets to the satellite meteorological community
  - Facilitates increasing use and knowledge of satellite technology across the NWS community and beyond
  - In Norman, important to have a satellite focal point in a traditionally radar-focused research community
- Permanent Satellite Liaison (SME) Positions?
  - Ensures a satellite liaison/SME at National Centers, RHQ's?, etc. beyond the launch of GOES-R
    - The need for a liaison will exist especially after launch when we are working with actual data from GOES-R for real-time data-utilization and continued assessment and development.
    - We have expert knowledge of our unique customers/partners, GOES-R/JPSS products and capabilities
  - Unique knowledge can be leveraged for future training development