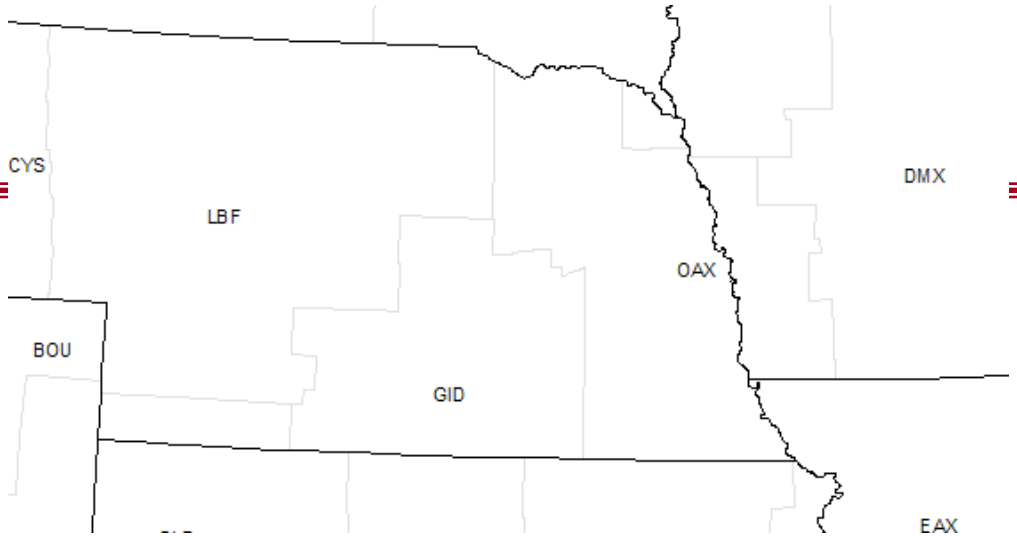


AWIPSII in the WFO

Daniel Nietfeld
Science and Operations Officer
NOAA NWS WFO Omaha/Valley, Nebraska (OAX)

NOAA Satellite Science Week May 3, 2012

Outline

- Background on WFO OAX and AWIPSII
  (how did we get here)

- What makes a WFO Unique

- Current Status and Functionality at WFO OAX
  - Imagery
  - Soundings

- WFO OAX R&D System

- Take Aways / Wish List / Future

Current AWIPSII Status at WFO OAX

- November 28, 2011: WFO OAX installed 11.9.0-6 and switched back to AWIPSII (last day on AWIPS1)

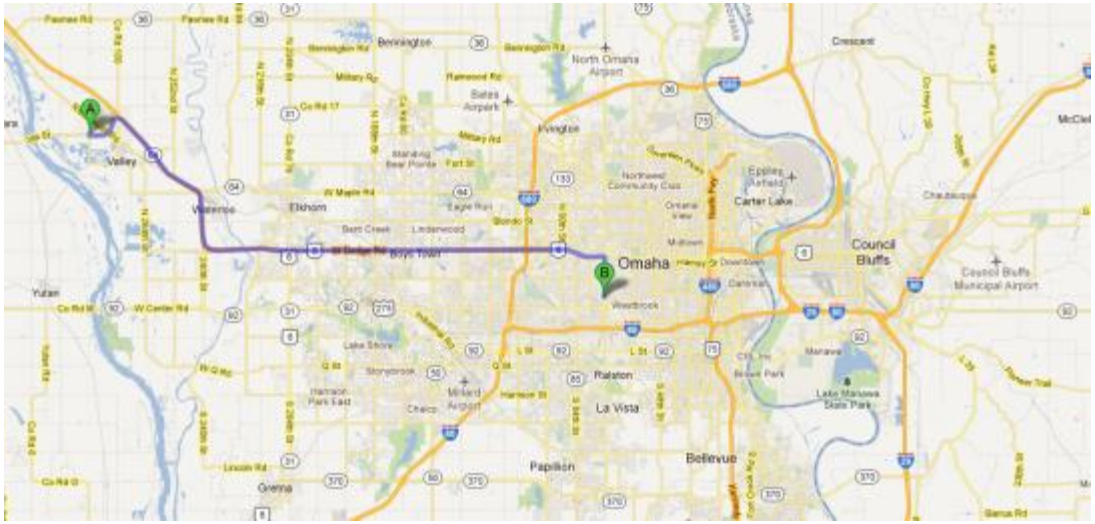
- November 29, 2011: WFO OAX remained on AWIPSII without service backup in place

- Officially Started Field OT&E at WFO OAX on Dec. 8th, 2011

- Current Build: OB 12.4.1 as of April 26th
  (64 bit installed on one workstation on May 1st)

Why WFO Omaha ?

- Raytheon Omaha Division developed AWIPS2
  - First visit from Raytheon to WFO OAX was October, 2006
  - Periodic visits from Raytheon developers to WFO OAX and vice versa ever since (first name basis)
  - Very good exchanges of information in both directions
  - Raytheon is 25 minutes east of the WFO OAX



Other Operational AWIPS2 WFOs:

-Norman
-Houston

Not quite as stable as OAX

Broad AWIPS 2 Testing Plans/Activities

- ***FIT sessions:***
  - AWIPS2 systems set up off line in KC and Silver Spring (Oct 2009 in KC)
  - **Canned datasets** were fed into these "early" AWIPS2 systems
  - Forecasters & Hydrologists spent 1-2 weeks testing AWIPS2 in this "simulated" environment
  - ***Hundreds*** of issues identified and fixed

- ***Perfect World:*** Software mature enough for WFO installation and live operations
  AWIPS2 installed and turned on…AWIPS1 turned off

- ***Real World:*** FIT scenarios unable to simulate all situations…
  - Software was not maturing rapidly enough
  - Discrepancy Reports (DRs) still too numerous

- By May 2011, OS&T identified a need to have both AWIPS1 and AWIPS2 available at a WFO to test in a real-world, operational environment

Concept of “Dual Operations”

- 2 Separate AWIPS systems in WFO OAX
  - Existing AWIPS1 system
  - Additional system with 3 workstations provided by OS&T, installed July 19

- Both had live SBN feeds

- Only one had a live WAN/LDAD/RPG (88D) feed

- Only one had live transmission out capabilities

Both of these Could be “toggled” (~ 30 minutes)

A LOT of side-by-side comparisons between AWIPS1 and AWIPS2:

- **Displays**
- **Calculations**
- ***Thousands* of Volume Browser parameters compared**

  Units, calculations, etc…

Human Resources

- ***Forecast Staffing:***
  - One set of Forecasters to create and transmit “real” products with one system
  - One set of Forecasters to create (but not transmit) with the other system

- ***Visiting Staff:***
  - 30 visiting Forecasters
  - 9 visiting ITOs
  - 3 visiting Service Hydrologists
  - 1 visiting SOO
  - 1 visiting HMT (OPL)
  - 3 Regional HQ IT Support / Sys Admins
  - 8 NWSHQ AWIPS Program Management Support
  - 2 NOAA/OAR/ESRI/GSD Development Support
  - ~15 Raytheon Programmers / Test Engineers

- ***All people in/out of WFO OAX (including OAX Staff) = 95***

Dual Ops in August 2011

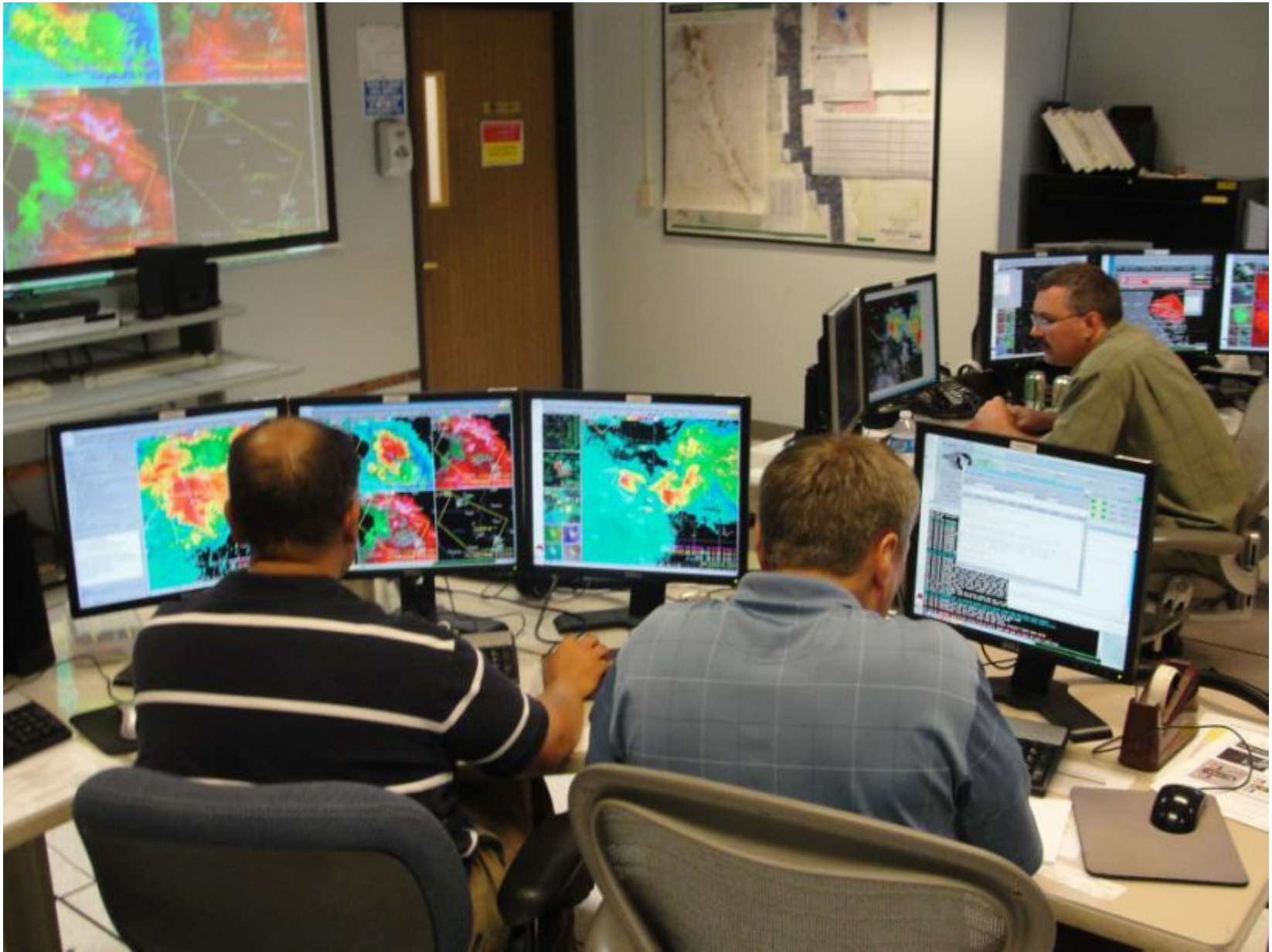
- Initial Plan: 2 week period during the first 2 weeks of August, 2011
- First two weeks were eye-opening… AWIPS2 was a “long” way from being ready
- 2nd two-week period (Aug. 15-29) was active:
  - 55 total convective short-fused warnings issued over a ~12 hour period
    - 7 Tornado Warnings
    - 5 Flash Flood Warnings
    - 43 Severe Thunderstorm Warnings
  - 34 total people involved on-site:
    - 19 OAX staff
    - 6 visiting Forecasters
    - 1 visiting Hydrologist
    - 1 visiting ITO
    - 3 Raytheon Developers
    - 2-4 Raytheon Management
    - 1 NWSHQ (Ronla Henry)
    - 1 NWS CRH (Bill Gery)

Quote from visiting Forecaster: *“I’m never working in a central plains WFO !!”*

August 18, 2011

AWIPS 1 “Live” Warning Operations

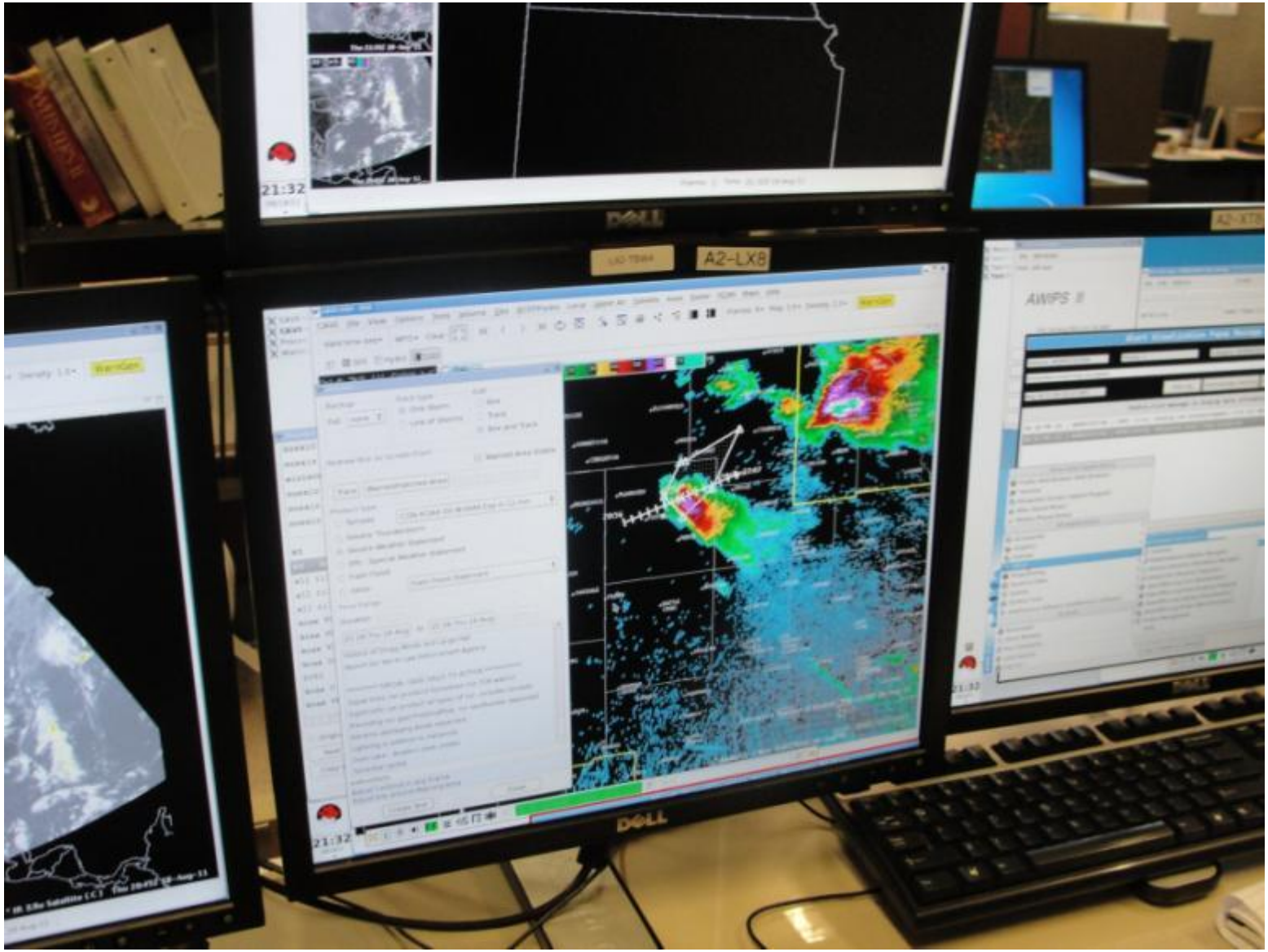
AWIPS1 WarnGen – Issuing Warnings



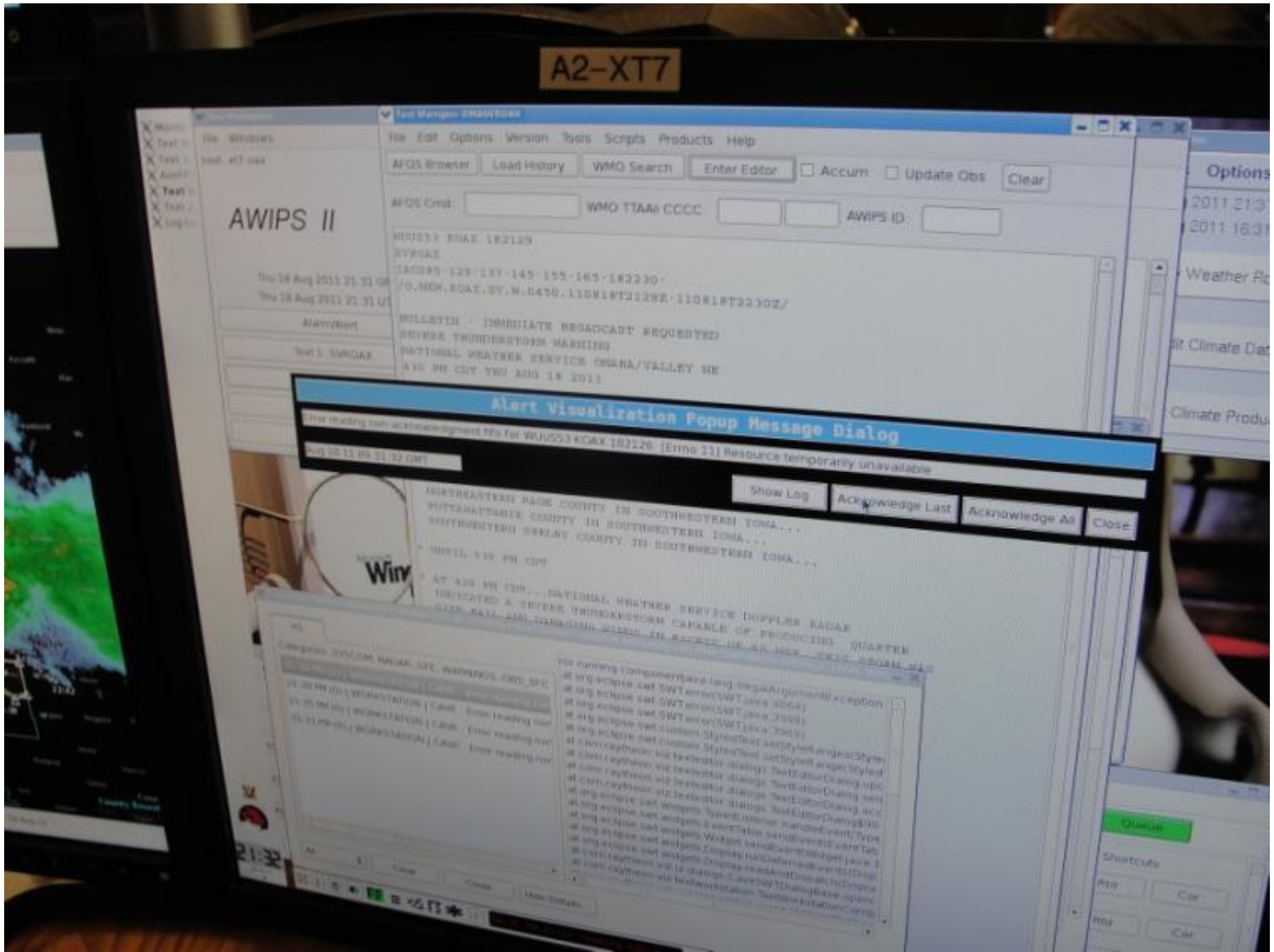
AWIPS2 “Non-Live” Warning Operations

AWIPS2 on the Left…AWIPS1 on the Right

AWIPS2 Warnings



AWIPS2 and Severe Weather on August 18



Raytheon Developer Investigating Errors

Hydrologic Operations

- Record, Massive Flooding on Missouri River summer 2011
- Levee Breaks, etc…
- All Hydro software was tested extensively

Photo courtesy:
moravings.blogspot.com

Continued Evolution of the Dual Operations Concept

- Additional visiting staff through October
  - Testing of Raytheon fixes
  - New builds installed every Wednesday
  - GFE Smart Tool migration / modifications / etc…
  - Volume Browser parameters overhaul / etc…

- Reached a point where we felt we could scale back the additional staff and start trying "live tests" with our own staff or ***minimal*** extra staff

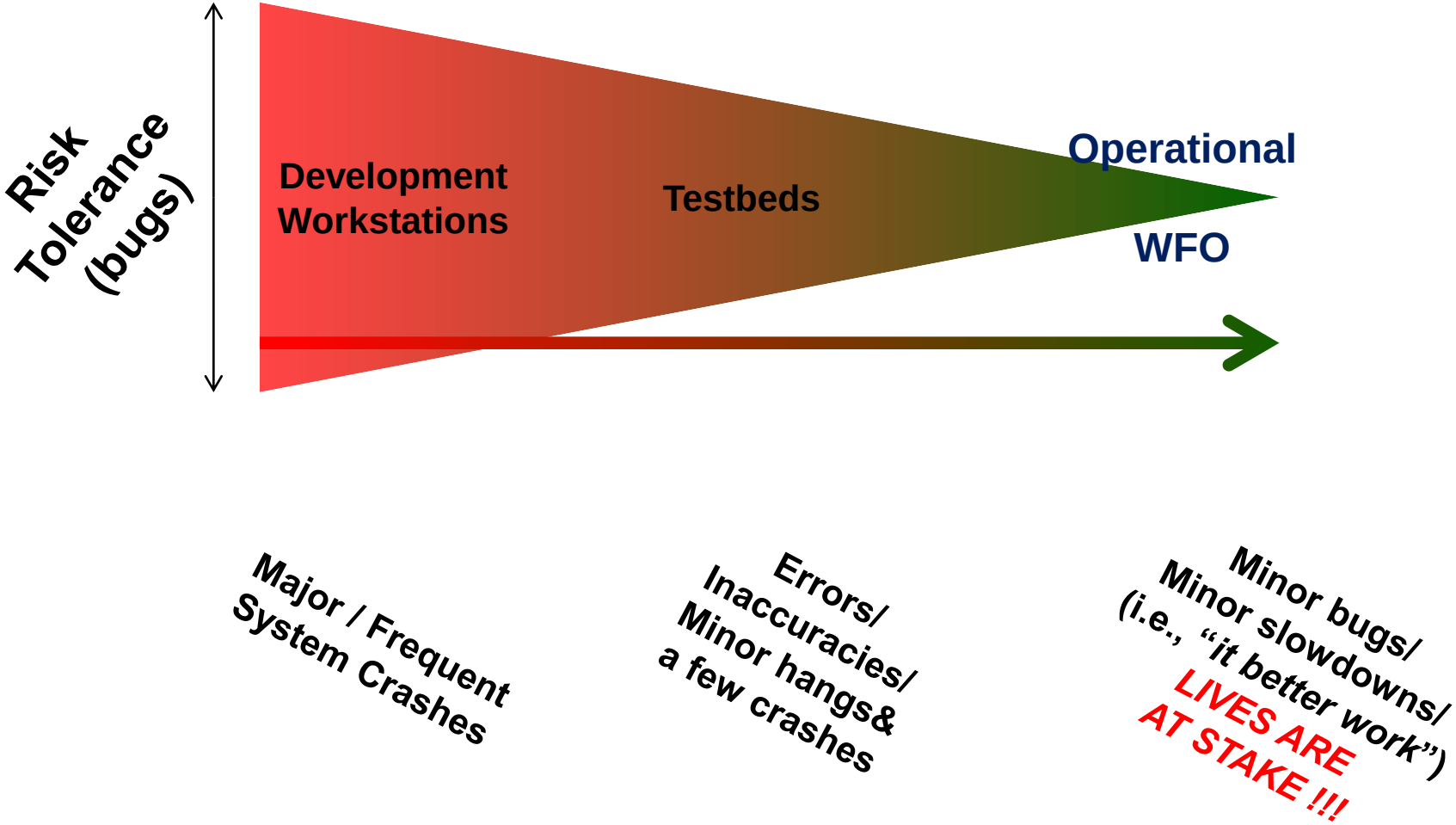
- Moved to concept of "Temporary Live Tests"
  - 8 hrs → 24 hrs → 48 hrs → 72 hrs

What We Learned as a Result…

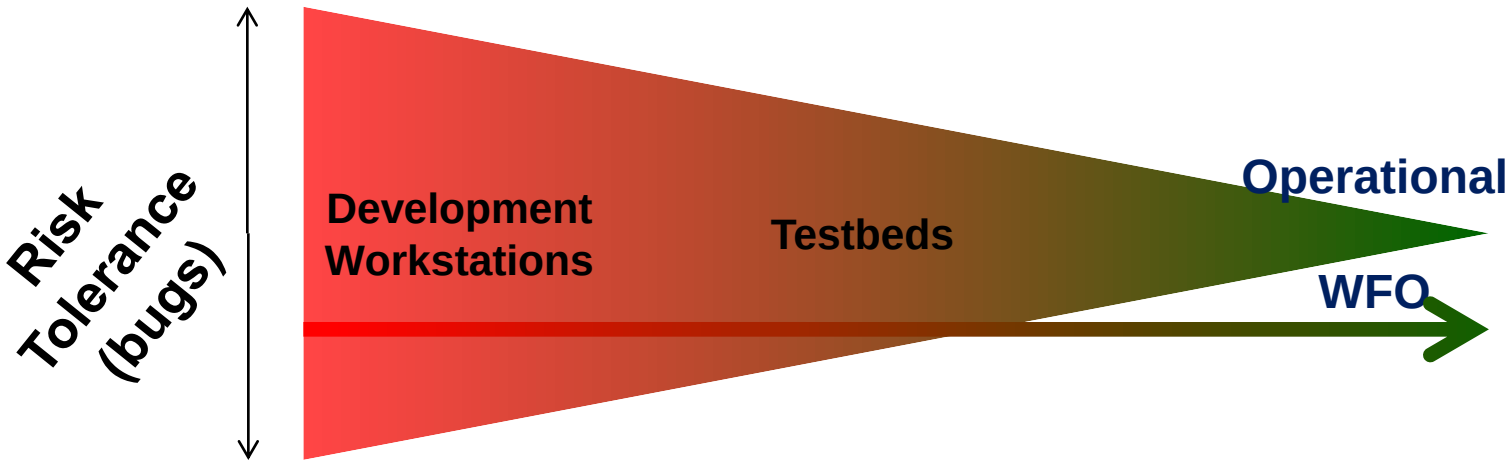
- Iterative, “safety net” process was necessary

- A few examples of issues discovered that would not have been discovered without this process of having a live connection to the outside world / “real” operations:
  - Sending forecast output to the NWS “Point and Click” web pages
  - Problems posting information to the AHPS web pages
  - Flash Flood Monitoring and Prediction (FFMP) processes
  - Service Backup issues
  - Various unique forecaster preferences / procedures / configurations
  - Many, many more

Significant Difference Between an Operational WFO and a Testbed



Significant Difference Between an Operational WFO and a Testbed



Key Conclusions from Dual Operations

- August: "AWIPS2 was a "long" way from being ready…"
- November: "We don't want to go back to AWIPS 1 …"

- 4 Months: ~400 problems were found and fixed at WFO OAX by ~95 people who dedicated their mission to this cause

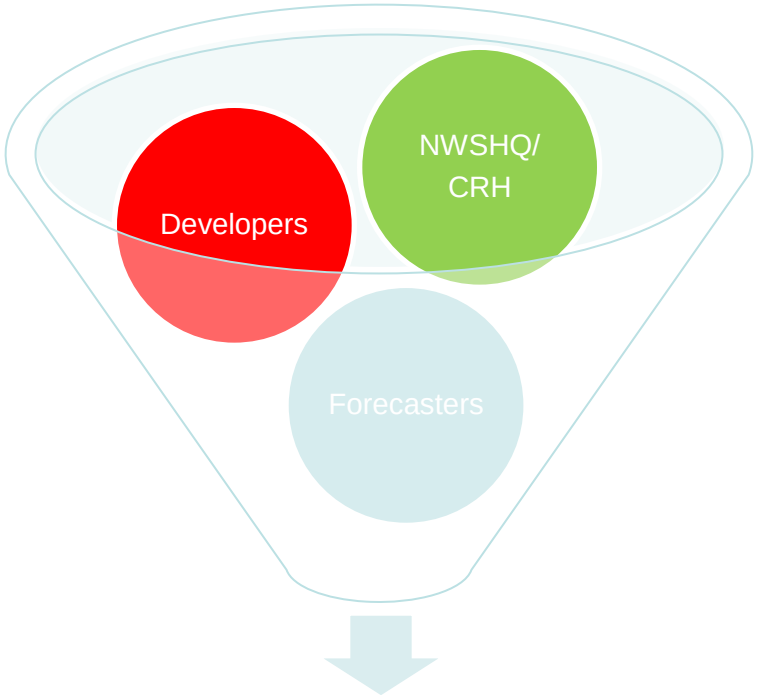
- Sustained Forecast products / services:
  - We accomplished this without missing any significant products or services
  - We are proud of our products and services, and we risked our ability to provide them

Take Aways…

- WFO OAX was always told from the highest level that we would not be pushed into using a system that was not ready for operations, or that we were not comfortable using to do our job.
- The WFO OAX Forecasters felt like they controlled when this system was ready for a green light
- Eventually, the WFO OAX Forecasters decided they were ready to cross the bridge into operational AWIPS2,
  - and they would ***own*** the decision…
  - and they would ***own*** the future steps to do whatever was needed to stay on AWIPS2.
- This sense of ownership was fostered at the:
  - local WFO Management level,
  - the Regional HQ level,
  - as well as at the National HQ level –
  - ***ownership was transferred*** from a "Program" to the Forecasters who use the system. This was ***instrumental*** in moving AWIPS2 forward.

Collaboration at its Finest

No walls:



Functional AWIPSII

Functional AWIPSII at WFO OAX

- Since FOT&E started, OAX has issued:
  - 8 Tornado Warnings
  - 51 Severe Thunderstorm Warnings
  - 6 Flash Flood Warnings
  - 110 Severe Weather Statements
  - Numerous Long-fused Watches/Warnings/Advisories
- All Forecast products
- Dissemination methods all work, etc…

(Don't believe everything you hear…)

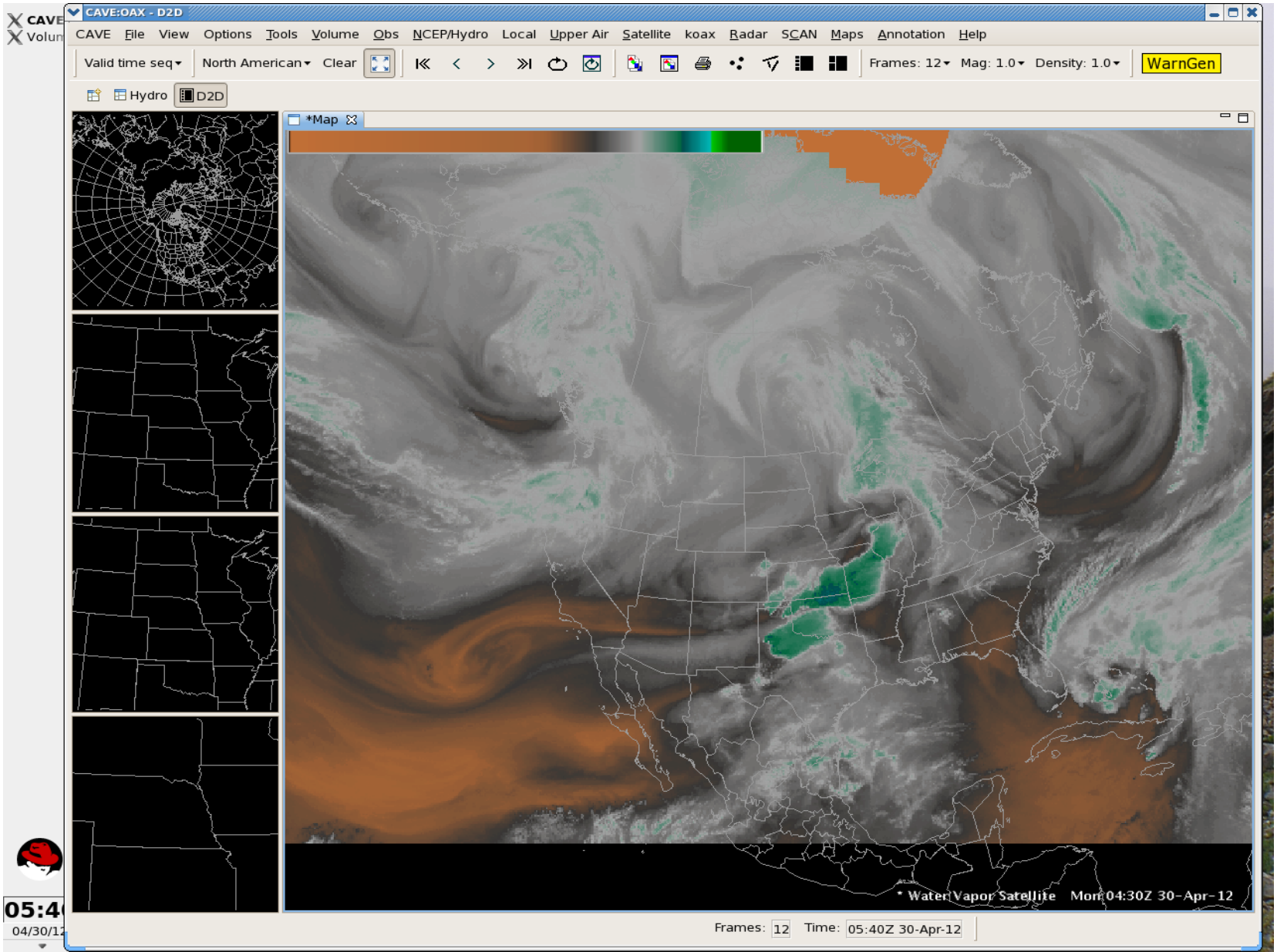
Current/On-Going Issues & Problems

- Continue to have occasional problems with the Gridded Forecast Editor (GFE)

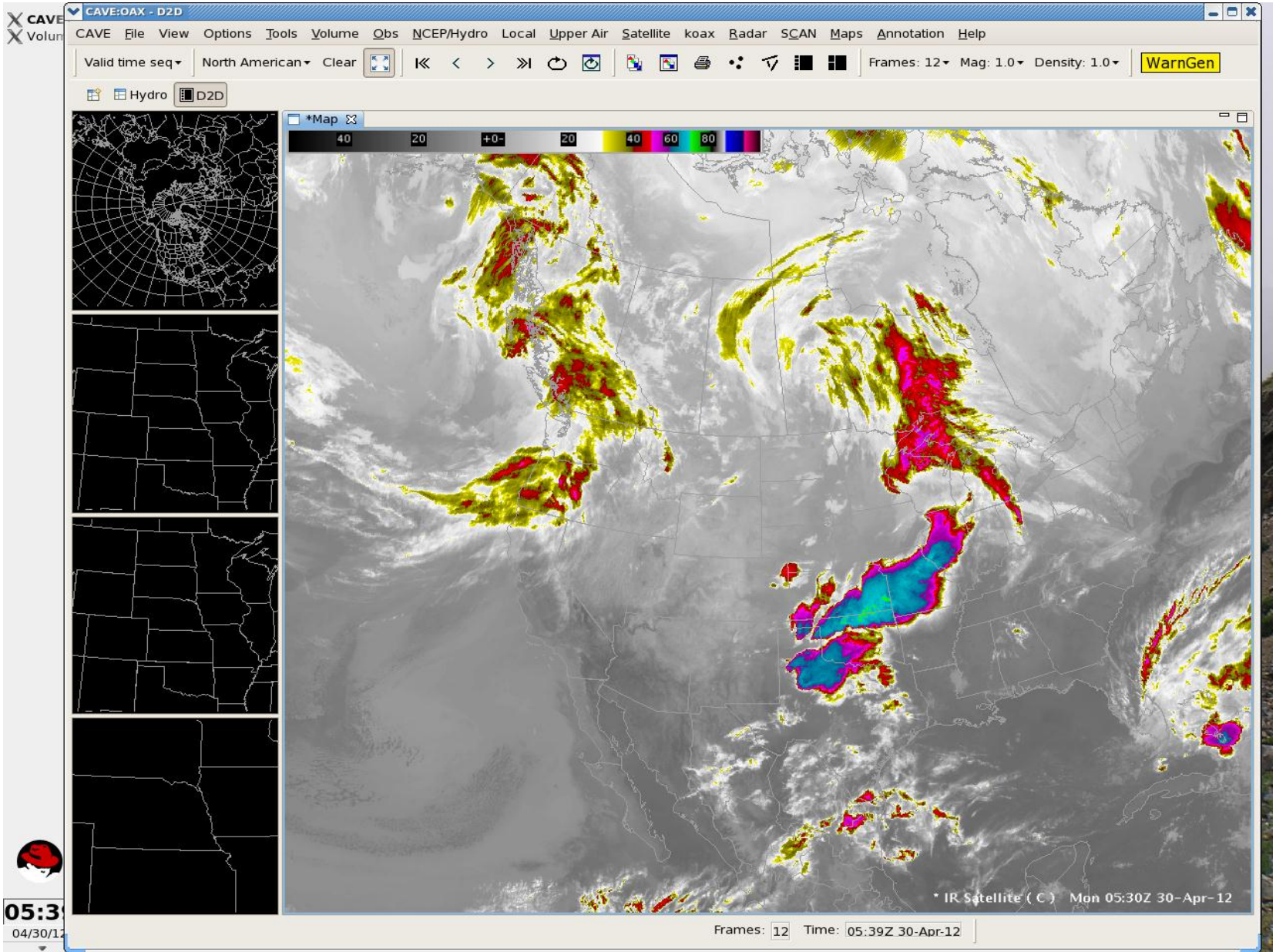
- Continue to have occasional problems with the Flash Flood Monitoring and Prediction (FFMP) program

- We are still in OT&E and are therefore still dealing with problems, but none of them are “mission-stopping”

Legacy Water Vapor



Legacy IR


CAVE:OAX - D2D
CAVE File View Options Tools Volume Obs NCEP/Hydro Local Upper Air Satellite koax Radar SCAN Maps Annotation Help
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Frames: 12
Mag: 1.0
Density: 1.0
WarnGen
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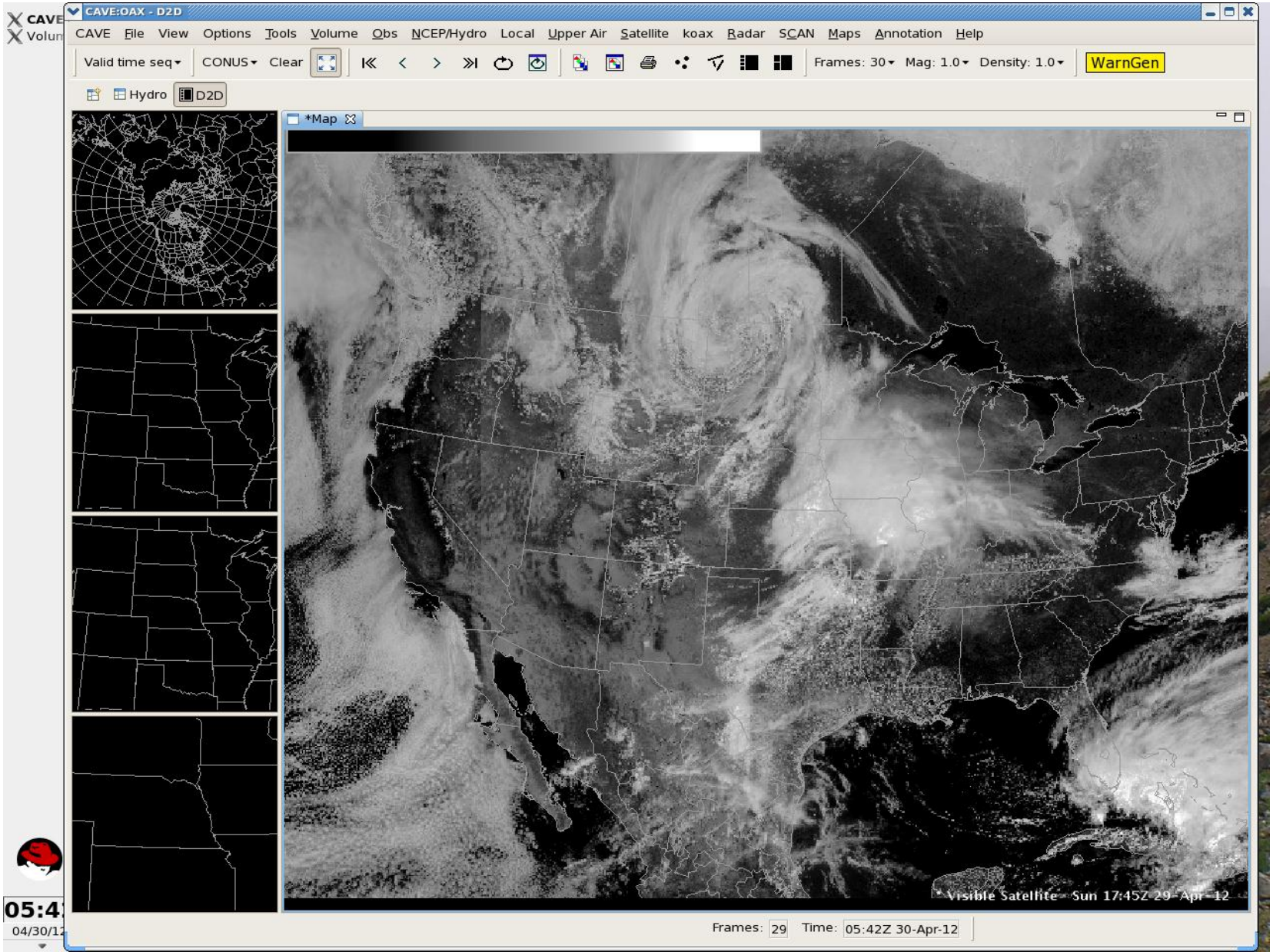
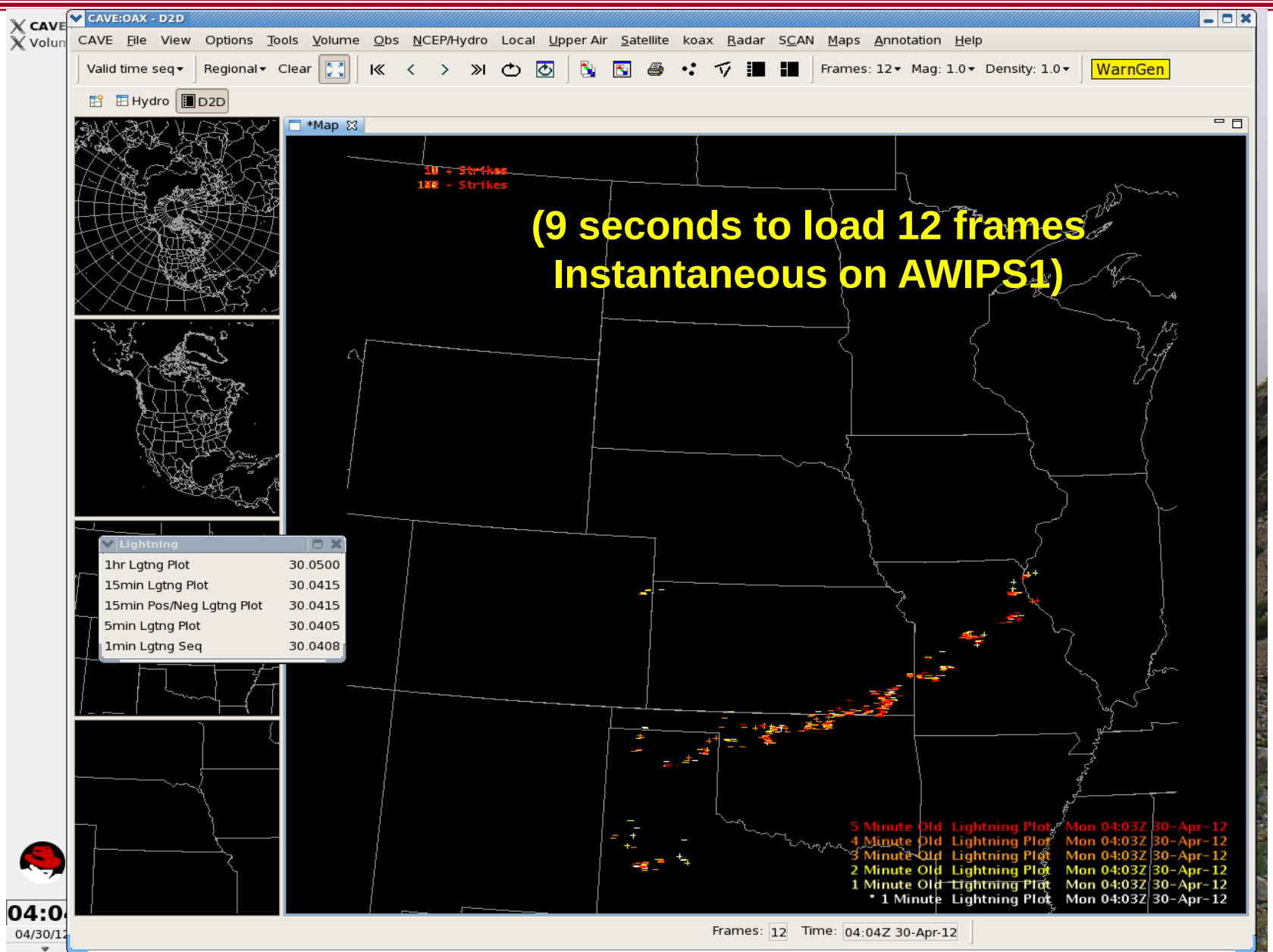
*Map
40 20 +0- 20 40 60 80
* IR Satellite (C) Mon 05:30Z 30-Apr-12
Frames: 12
Time: 05:39Z 30-Apr-12
04/30/12

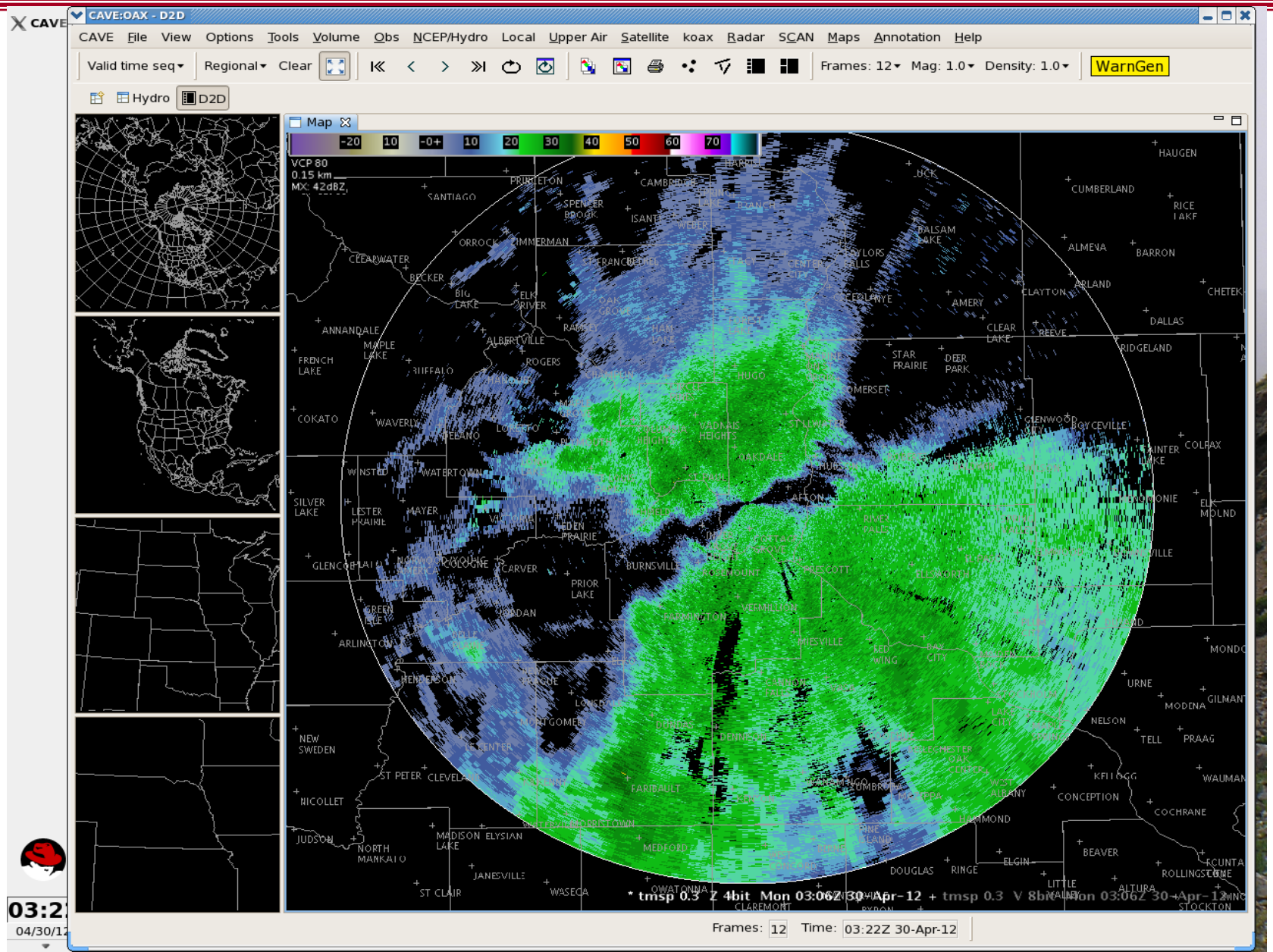
Legacy Visible (slight seam)



Legacy Lightning



TDWR (TMSP)


CAVE:OAX - D2D
CAVE File View Options Tools Volume Obs NCEP/Hydro Local Upper Air Satellite koax Radar SCAN Maps Annotation Help
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Mag: 1.0
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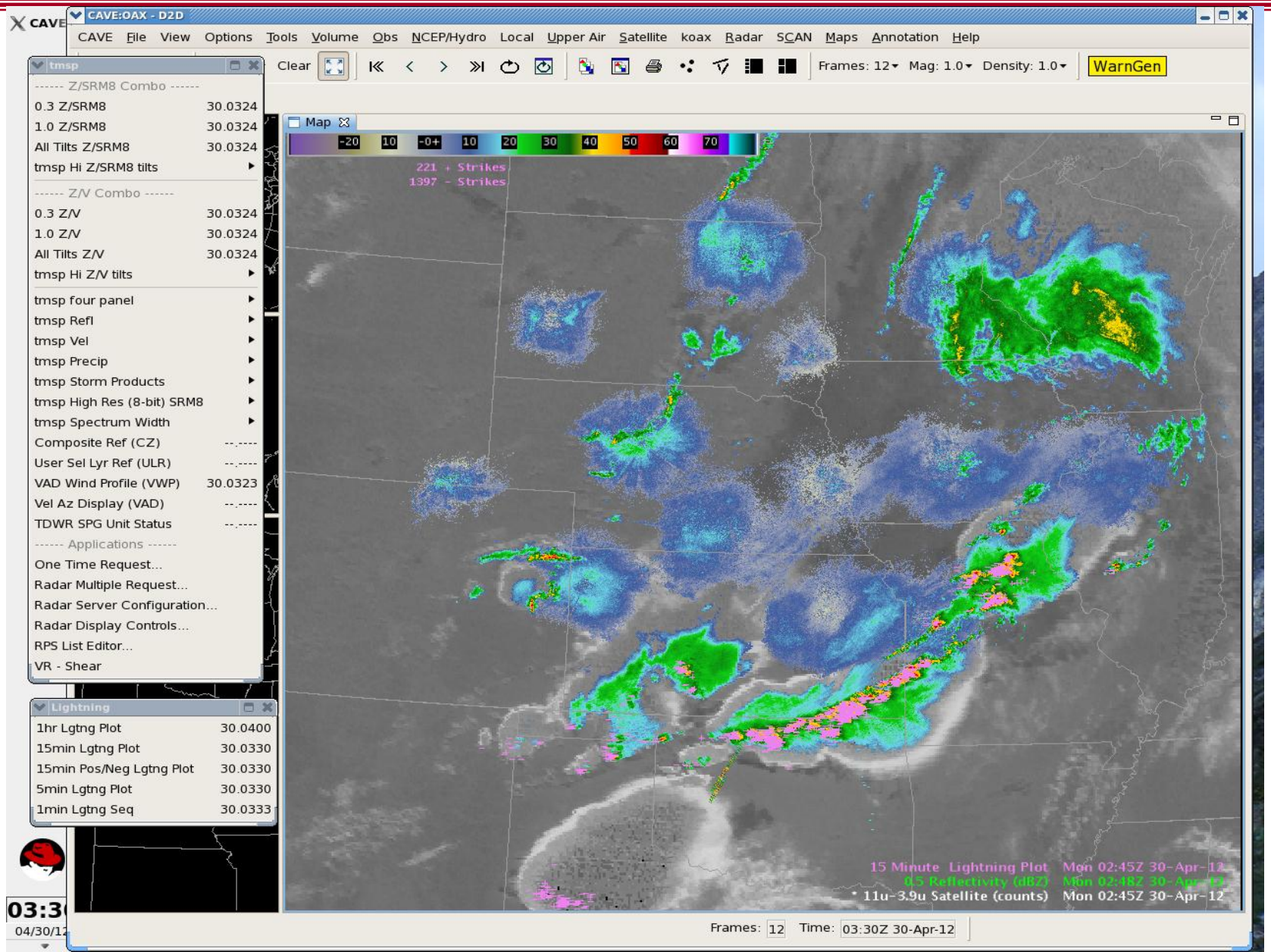
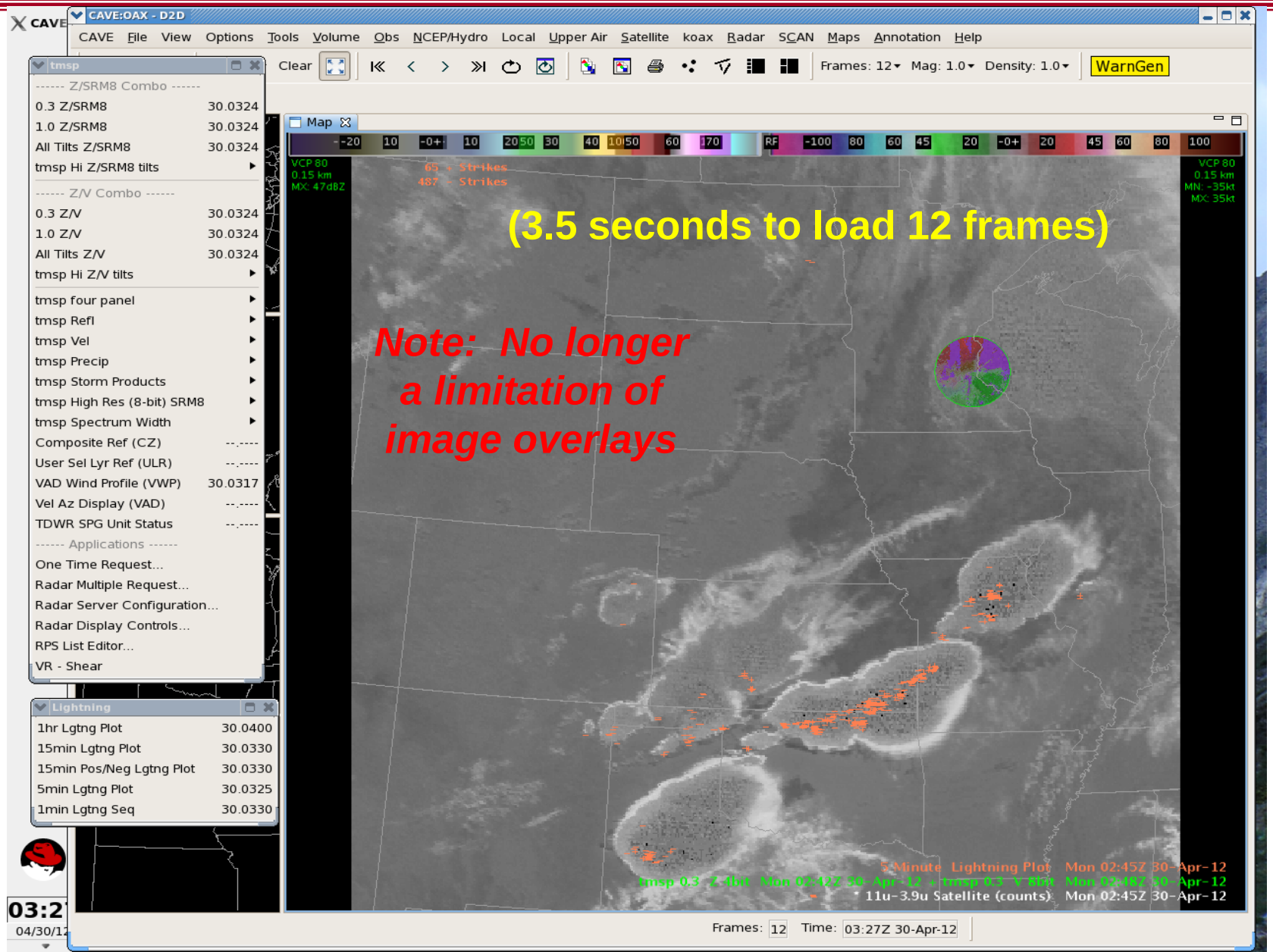
Frames: 12
Time: 03:22Z 30-Apr-12
03:2
04/30/12

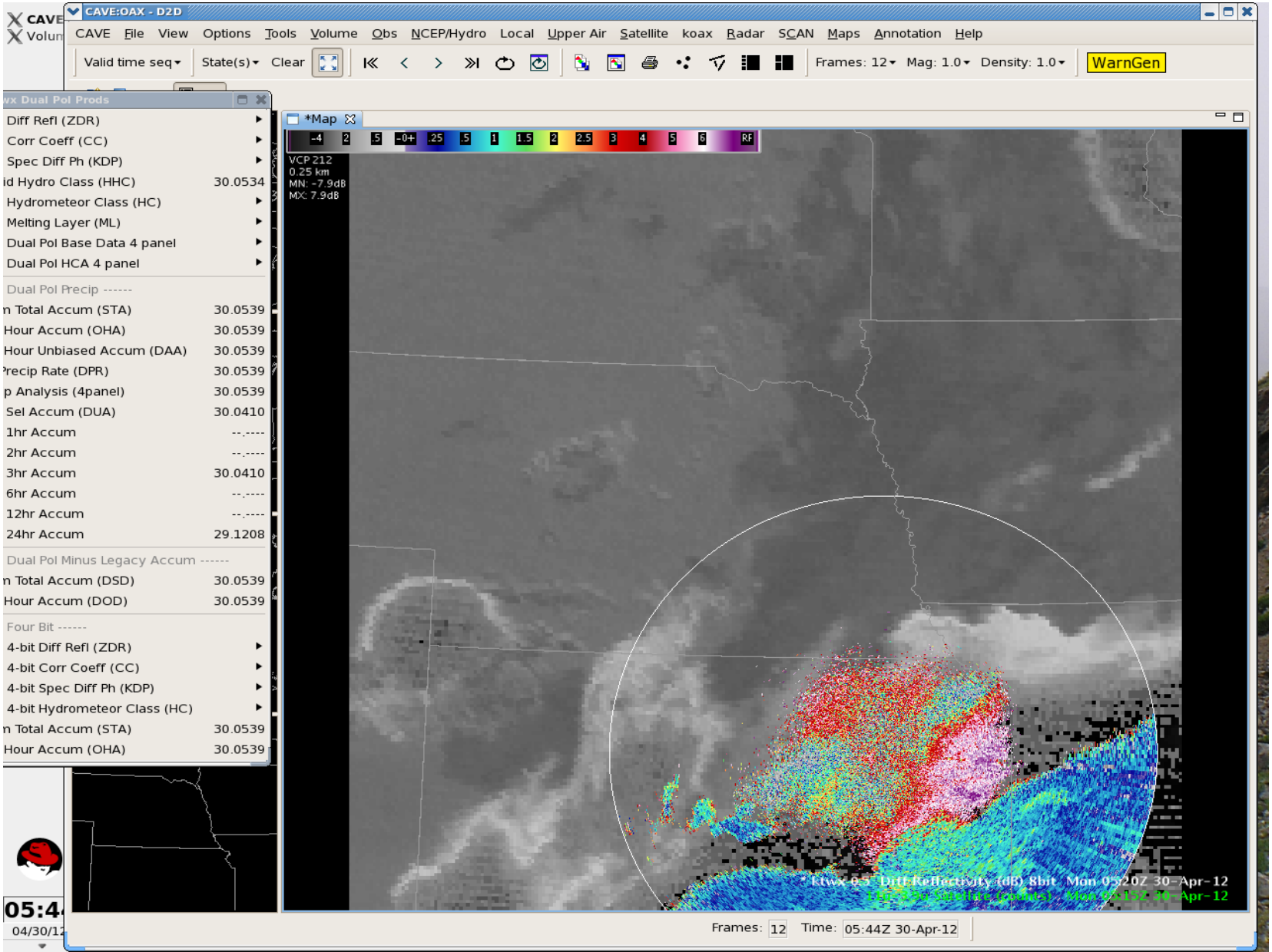
11-3.9 IR, Radar Refl. Mosaic, Ltg



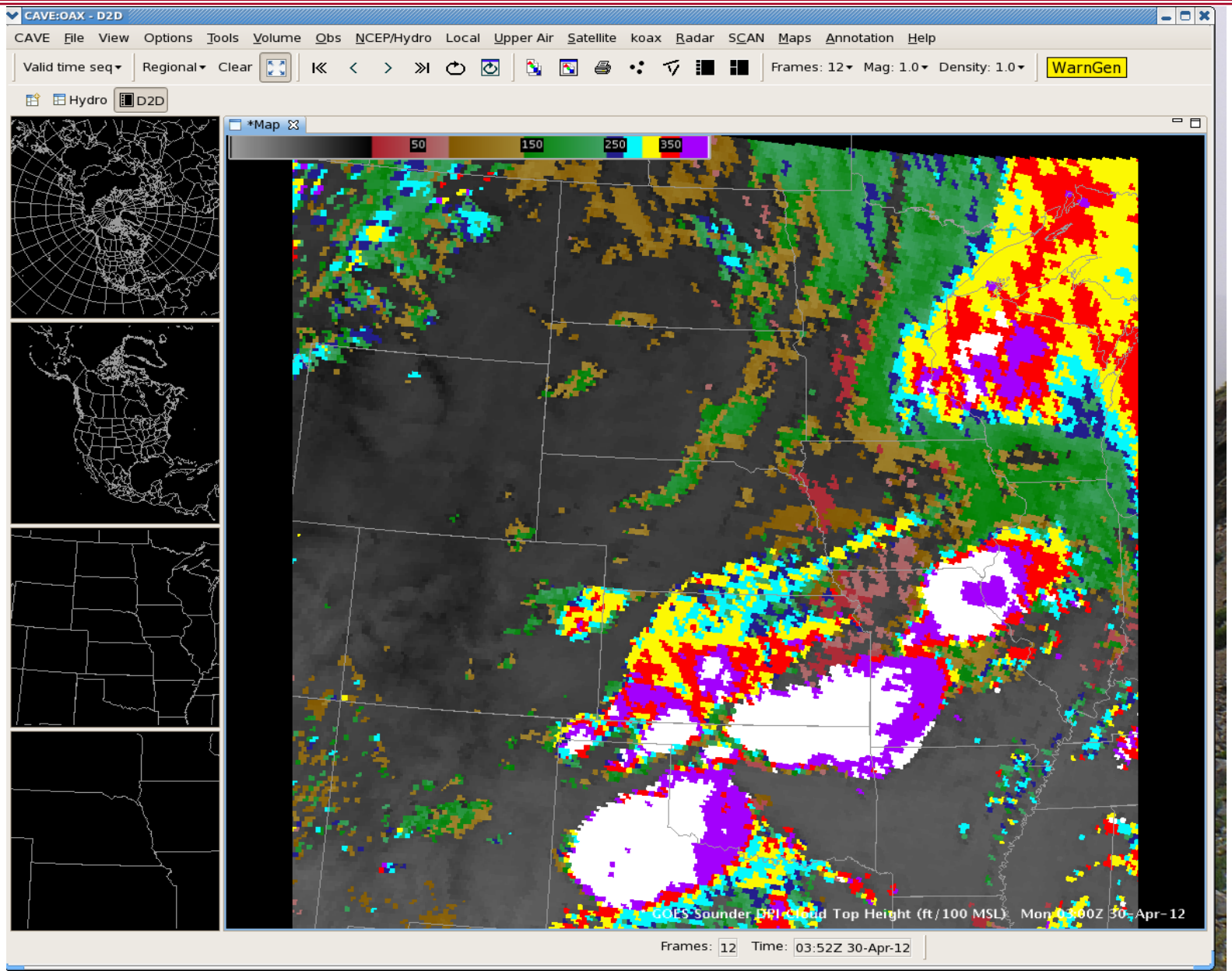
TDWR, 11-3.9 IR, Lightning



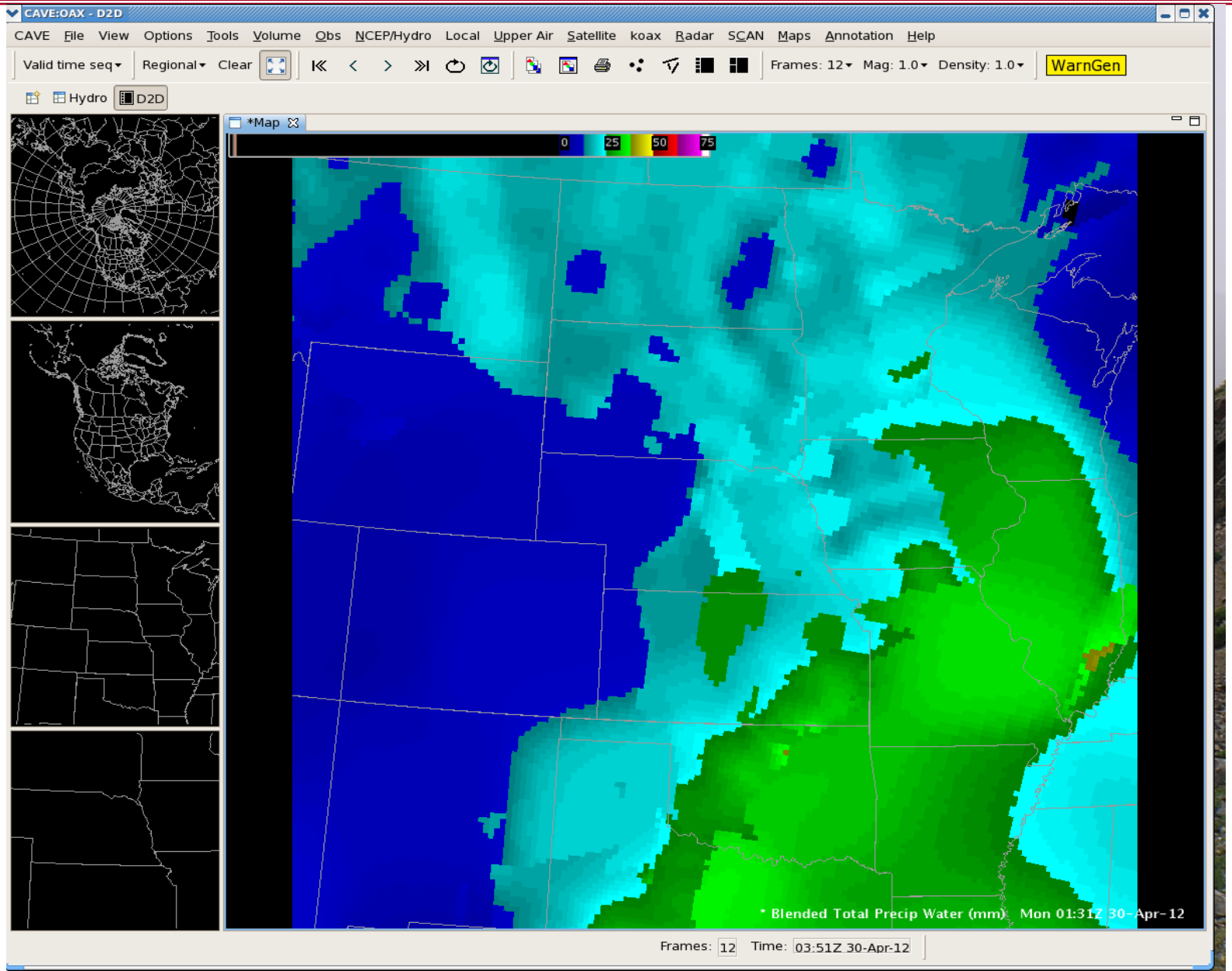
11-3.9 IR, KTWX Dual-Pol ZDR



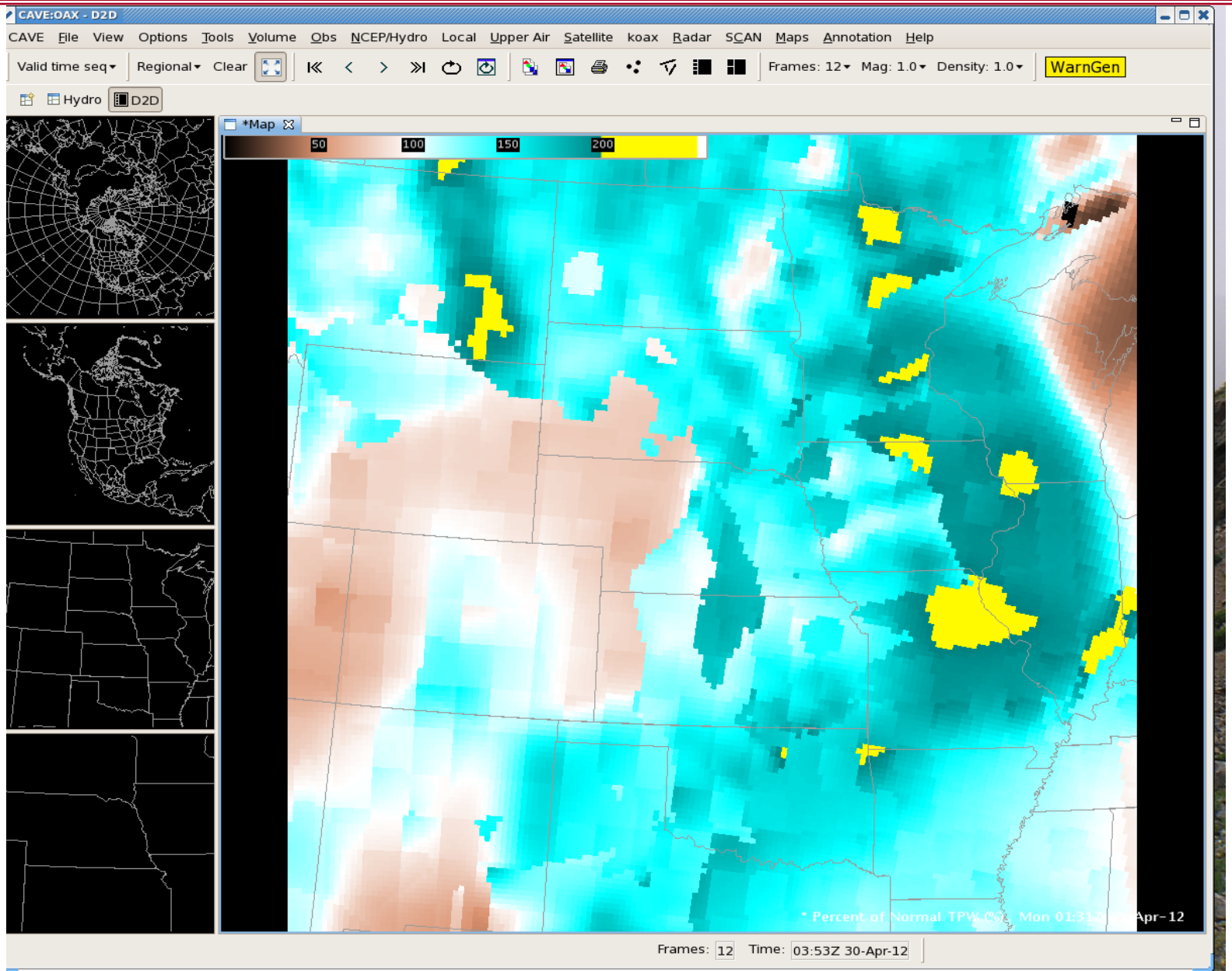
GOES Sounder Cloud Top Height



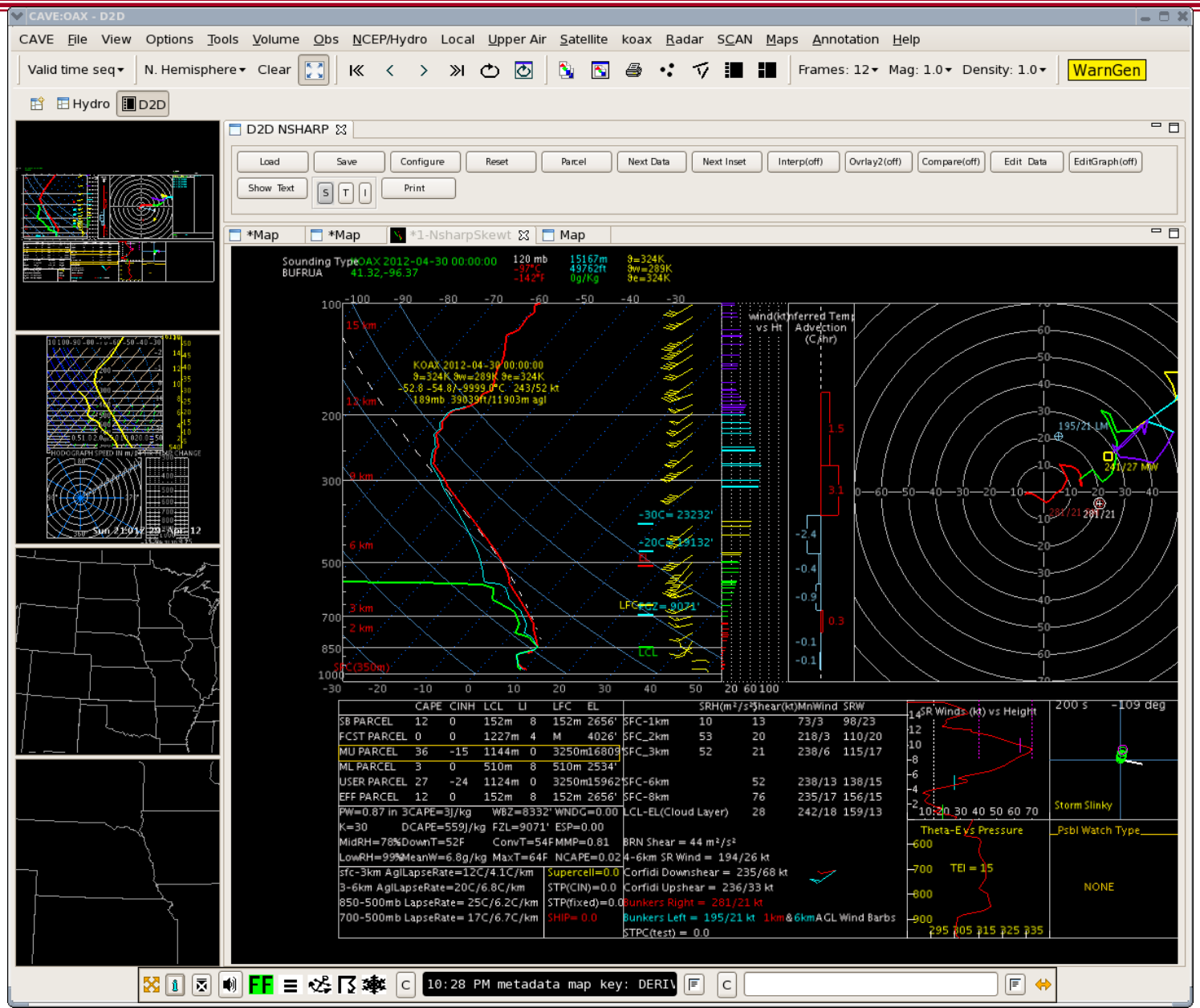
Blended Total PW



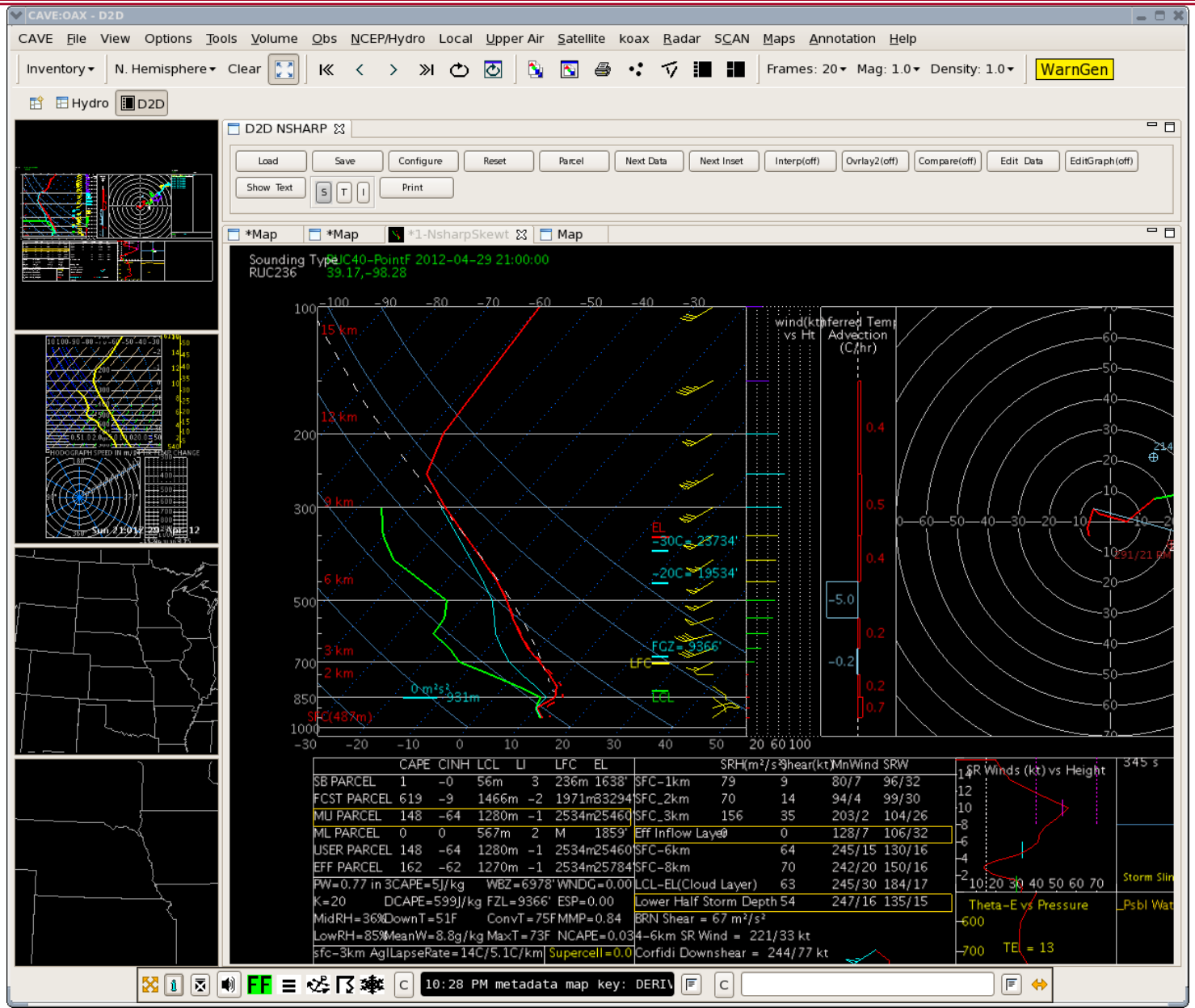
Percent of Normal



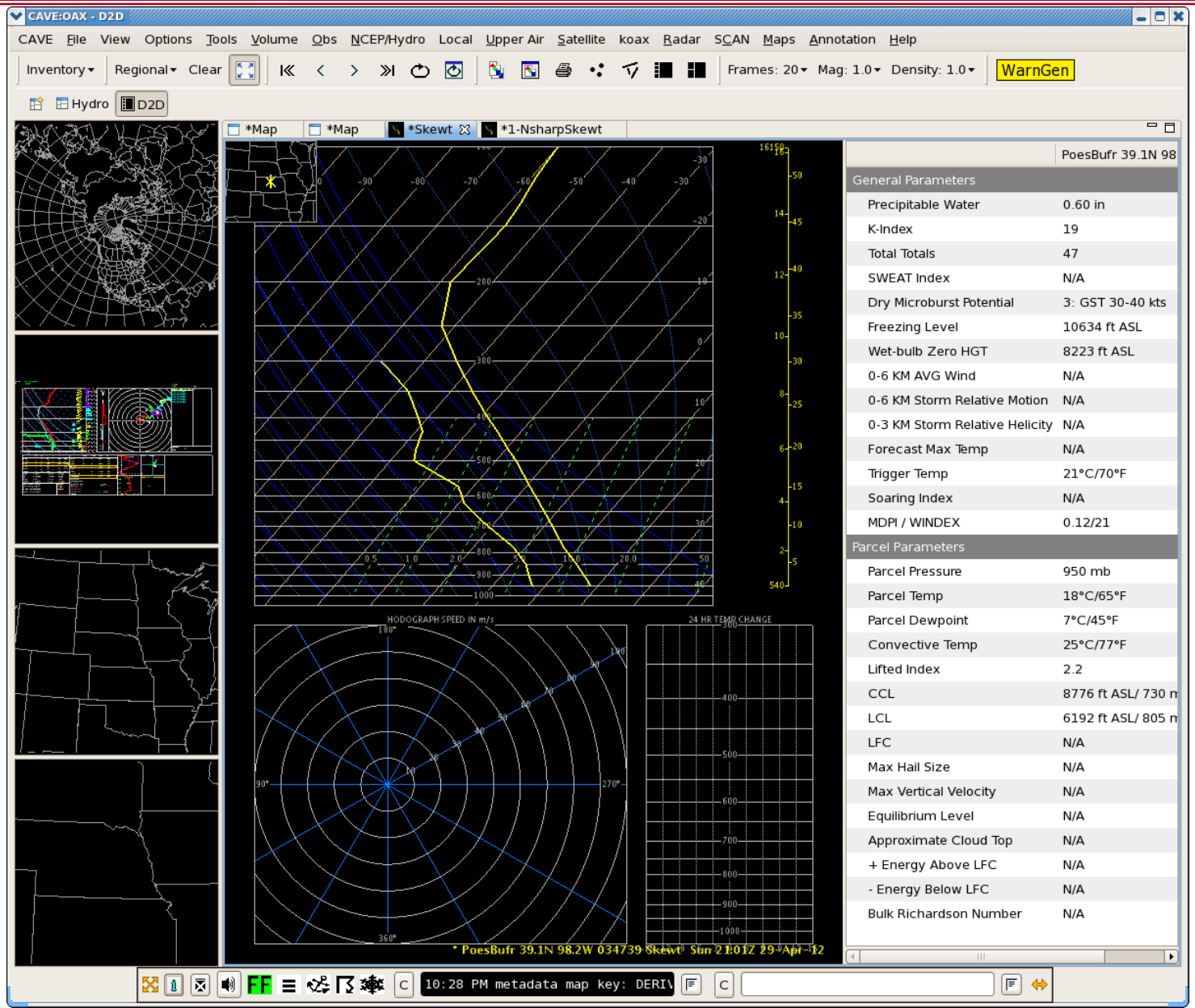
KOAX Sounding - NSHARP



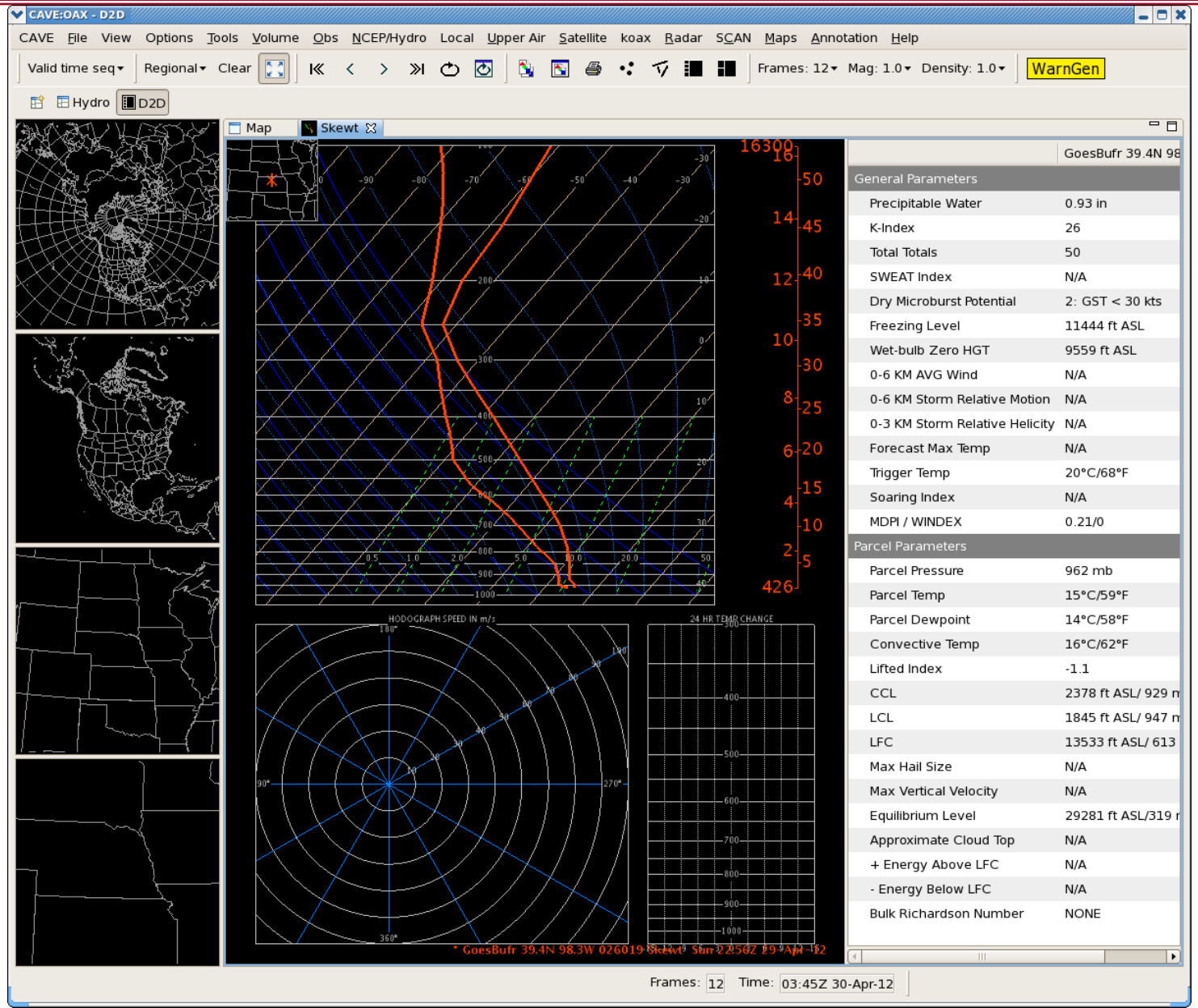
RUC Sounding over KS - NSHARP



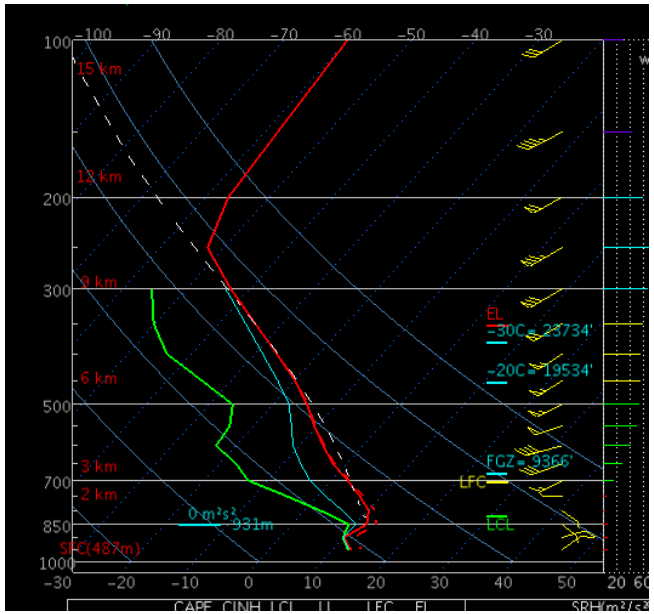
POES Sounding over KS – SkewT

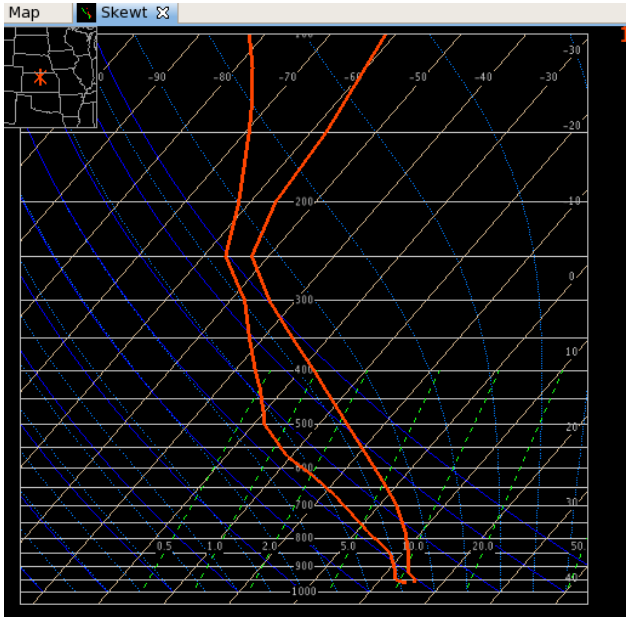


GOES Sounding over KS - SkewT



2 Different Sounding Programs





Miscellaneous Tidbits:

- No WES or Archive capabilities (ouch – pain)
- Sometimes use the “Product Browser” as opposed to attempting to configure the “Volume Browser”
- NSHARP is (and will be) a major adjustment for the Forecasters:
  - “Clunky”
  - OAX is getting used to it
  - Difficulty with validating calculations, etc…
  - Can’t overlay a GOES/POES sounding with a RAOB or a model sounding

BIG Theme at this Workshop:

"…need to take advantage of getting the Proving Ground products into operations and evaluated…"

OK !!

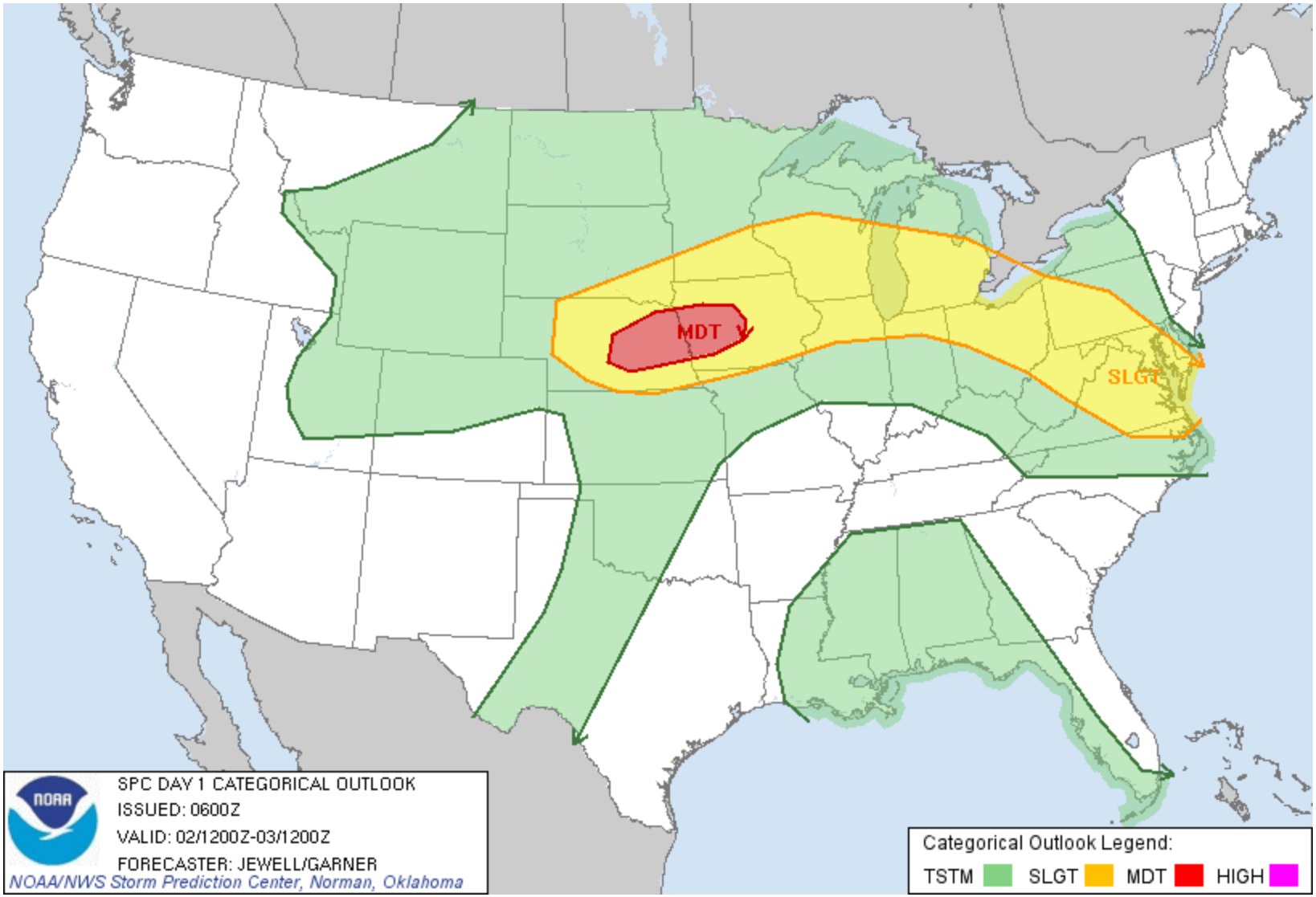
BIG Theme at this Workshop:

- We are ready to have our PG products back !!!
  - CIMSS CI, Cloud Top Cooling, OT
  - CIRA Low Cloud/Fog and Geocolor

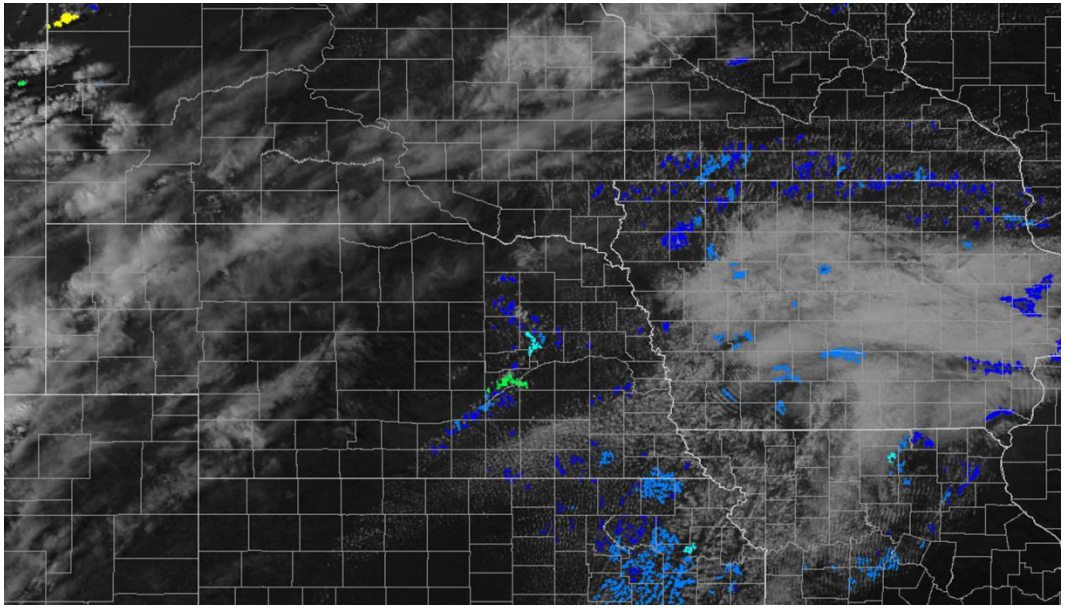
  2010 & 2011
  - Forecasters were getting used to them in A1
  - LDAD feed on AWIPS1
  - Very happy to hear they are “on the way”

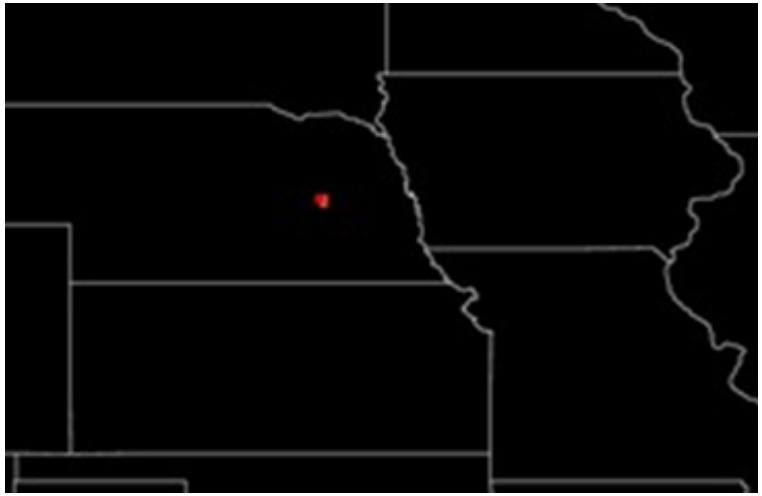
- New COMET COOP Project with University of Nebraska Lincoln
  - Exploring data fusion and Convective Init.
  - Evaluating CI products

SPC Day 1 Outlook for Wed

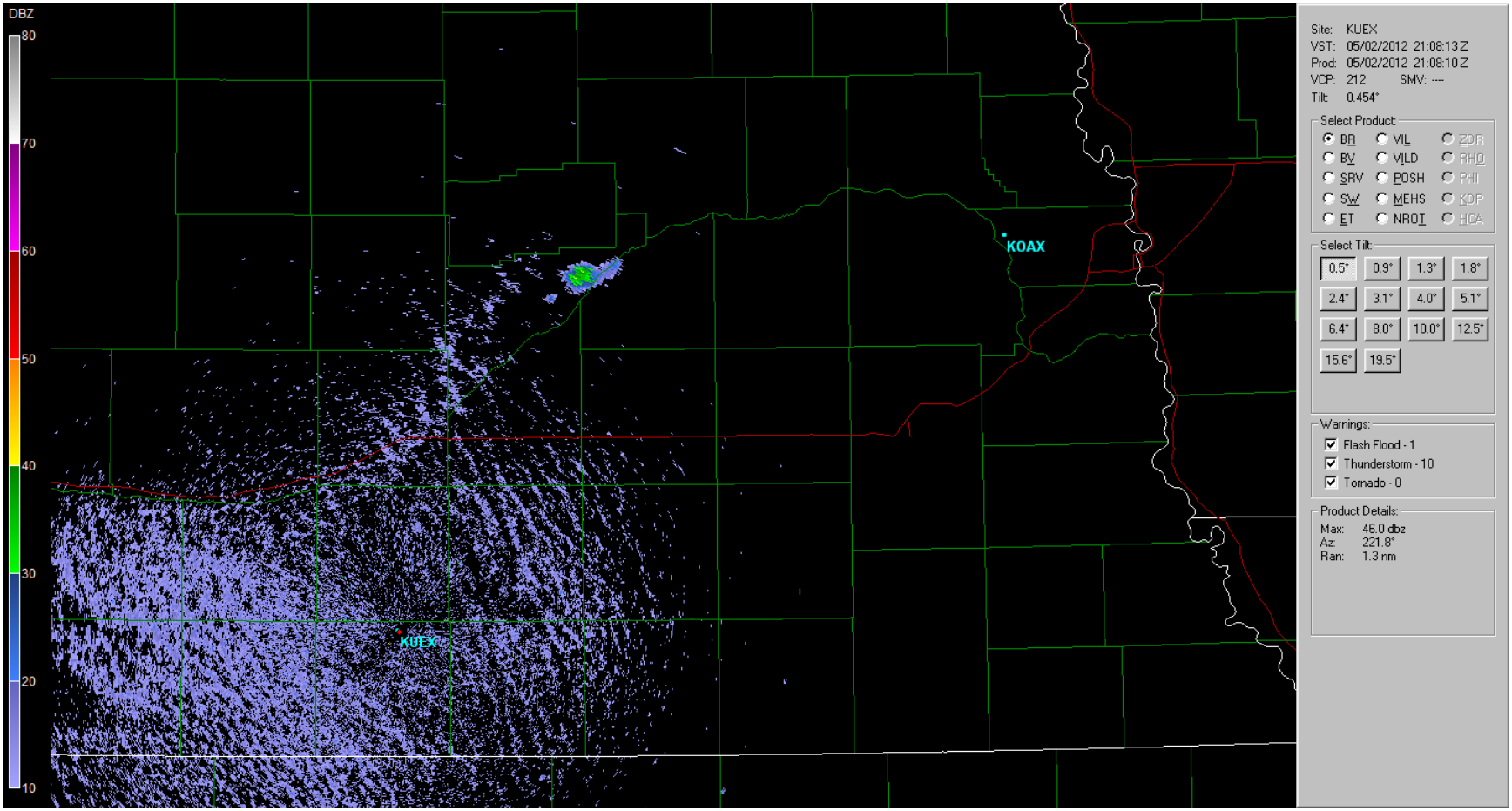


UAH SATCAST and UW CTCR





40 dbz echo


DBZ
80
70
60
50
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30
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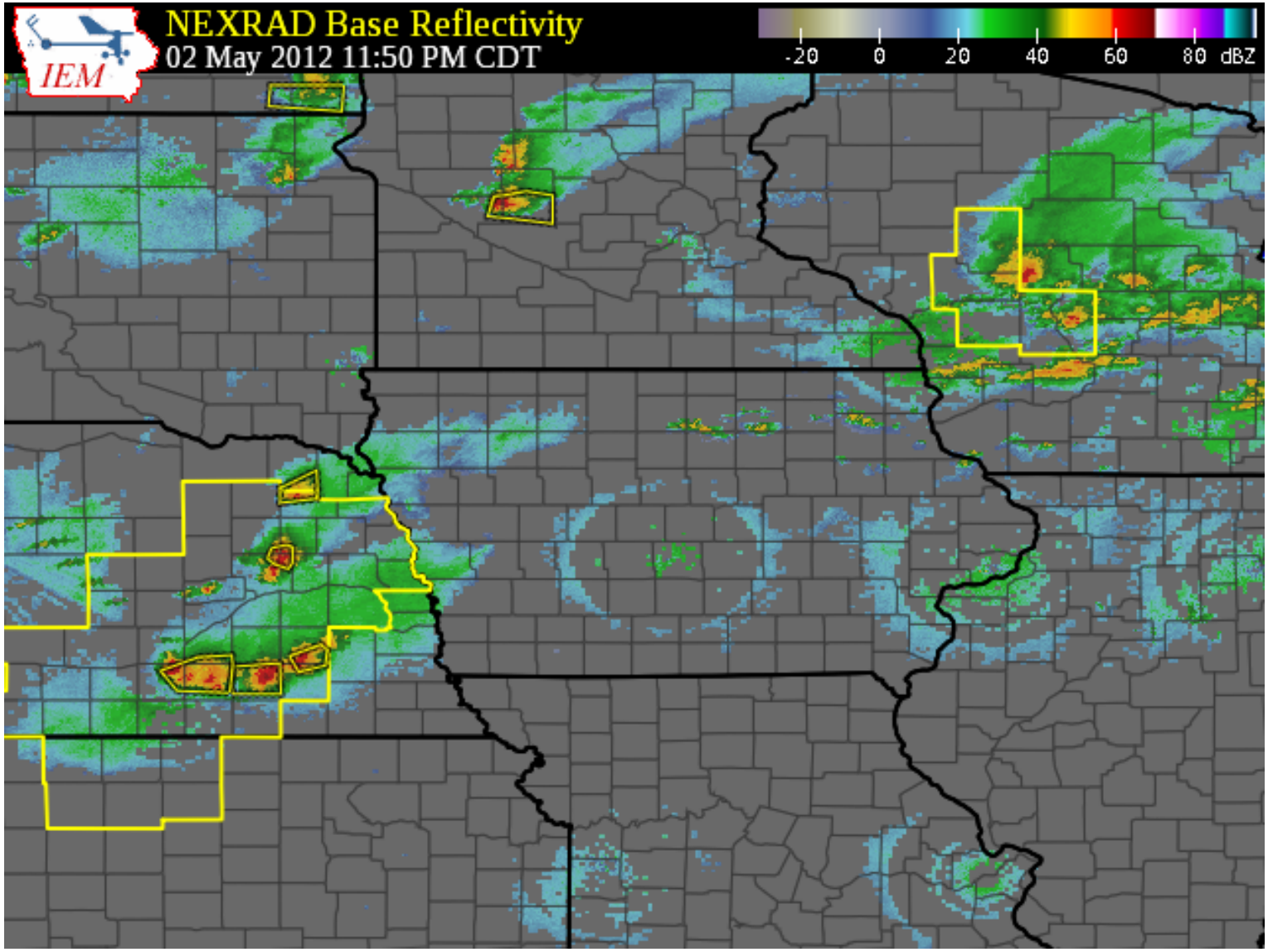
10
KOAX
KUEX
Site: KUEX
VST: 05/02/2012 21:08:13Z
Prod: 05/02/2012 21:08:10Z
VCP: 212 SMV: ----
Tilt: 0.454°
Select Product:
BR VIL ZDR
BV VILD RHO
SRV POSH PHI
SW MEHS KDP
ET NROI HCA
Select Tilt:
0.5° 0.9° 1.3° 1.8°
2.4° 3.1° 4.0° 5.1°
6.4° 8.0° 10.0° 12.5°
15.6° 19.5°
Warnings:
Flash Flood - 1
Thunderstorm - 10
Tornado - 0
Product Details:
Max: 46.0 dbz
Az: 221.8°
Ran: 1.3 nm


NEXRAD Base Reflectivity
02 May 2012 11:50 PM CDT
IEM
-20
0
20
40
60
80
dBZ

Brief OAX Wishlist (Satellite-Related)

- Convective Initiation
  - UW Cloud Top Cooling Rate
  - UAH SATCAST
- NearCast Products
- Low Cloud / Fog products
- NPP data:
  - VIIRS (Day/Night band + others??)
  - Soundings

Wishlist for “Push/Pull”

- Relatively easy, intuitive method for controlling data/product flow through LDAD

<u>Examples</u>:

  – “Turn on” Low Cloud / Fog under a surface high in October at 1 am… “Turn off” at noon

  – “Turn on” CI products on at 10 am in May

WFO OAX R&D AWIPSII System

- Plans for our other AWIPS system:
  - A second, separate AWIPSII Platform
  - Pure R&D, evaluations, etc…
    - No transmission
    - Plug-in and Product evaluating (apps, data, etc…)
    - Any / All PG Partner products, plug-ins, etc…
    - AWIPS2 Enhanced Capability evaluating
- INSIDE a WFO with ***Forecasters*** who are proficient with AWIPS2
- Raytheon just down the road – good synergy established
- Rapid, on-site feedback to Developers
- Cloud Computing Experimental site

Please CONTINUE to keep Forecasters in the Process!

Steve Weiss Quotes:

- **New tools should not be tested for operational potential *in isolation***
- **Understand the *real-world environment* forecasters work in, including operational requirements and constraints**

We WANT to Help You!

We're excited to move the new furniture into the new house!

AWIPSII in the WFO

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Science and Operations Officer
NOAA NWS WFO Omaha/Valley, Nebraska (OAX)

NOAA Satellite Science Week May 3, 2012