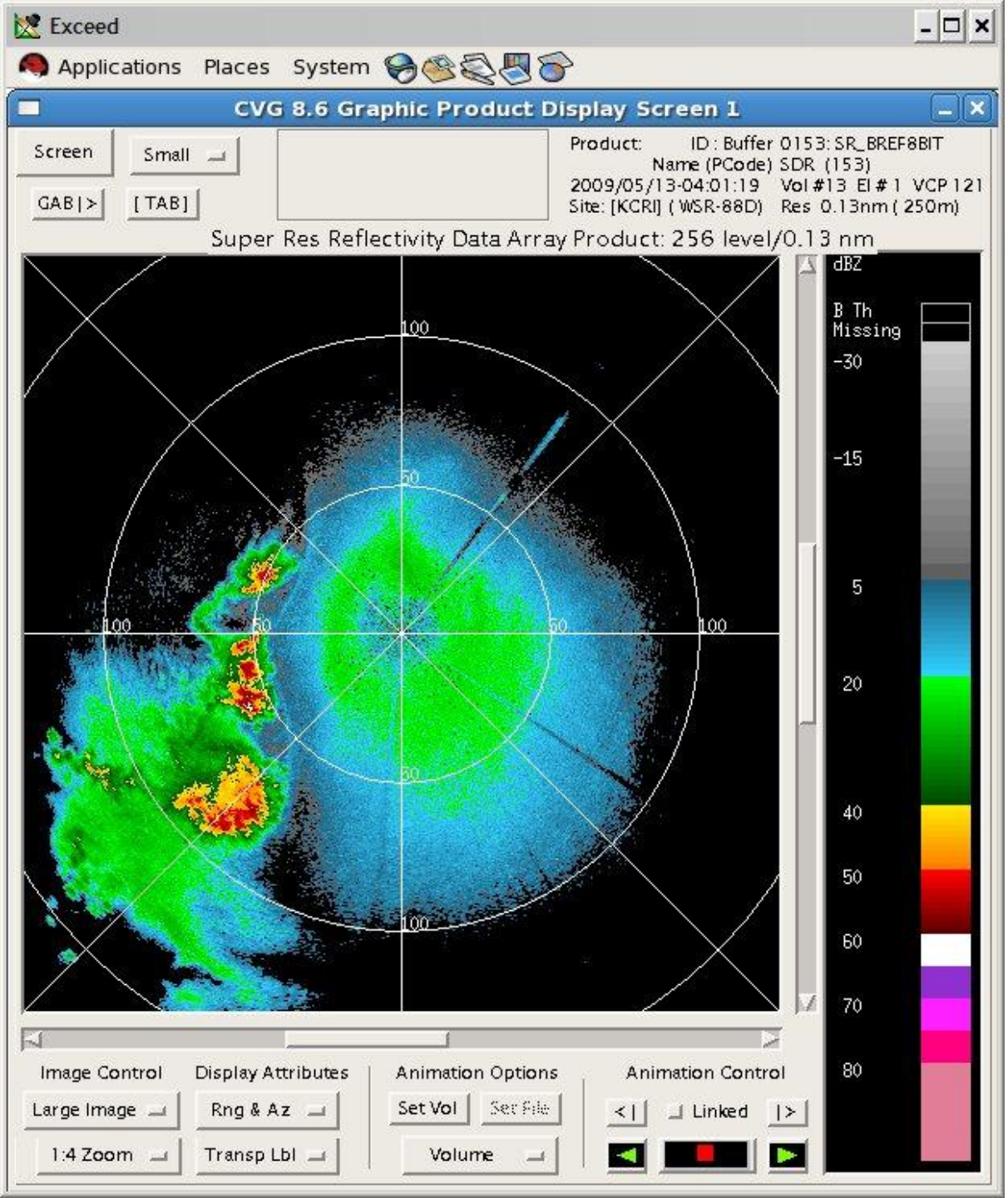
DUAL-POLARIZATION DATA QUALITY UPDATE

18 November 2009

Outline

- KOUN vs. KCRI: Spring/Summer 09
- KOUN vs. KCRI: After DP Conversion
- Quantitative Analysis of DP Coverage/Sensitivity
- Dual Pol Variable Evaluation
- Summary

KOUN VS. KCRI
Spring-Summer 09



KCRI

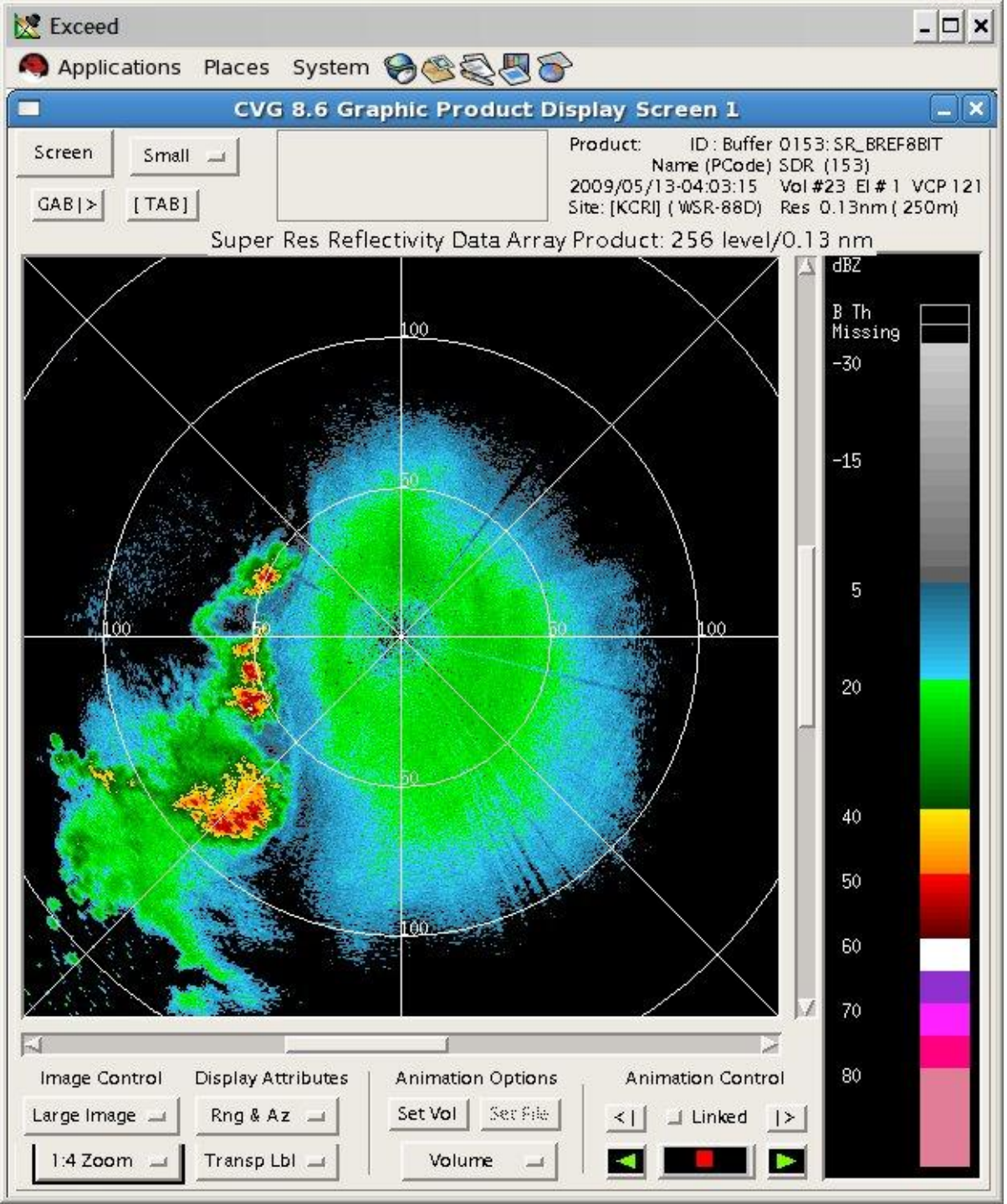
NOP4B11

VCP 121 T1

0401Z

13 May 09

Clear Air w/storms west to southwest Super Res



KOUN

NOP4B11

VCP 121 T1

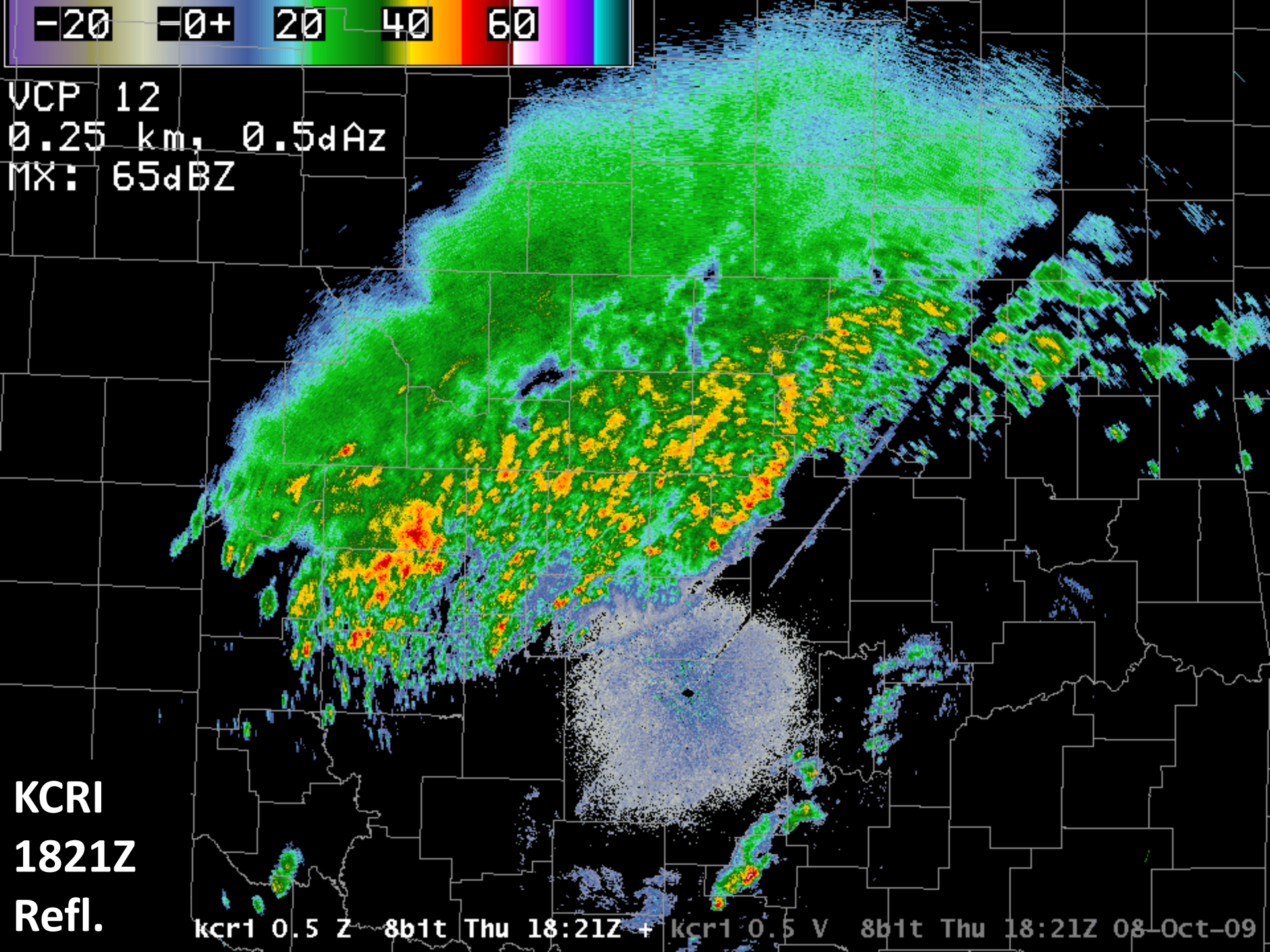
0401Z

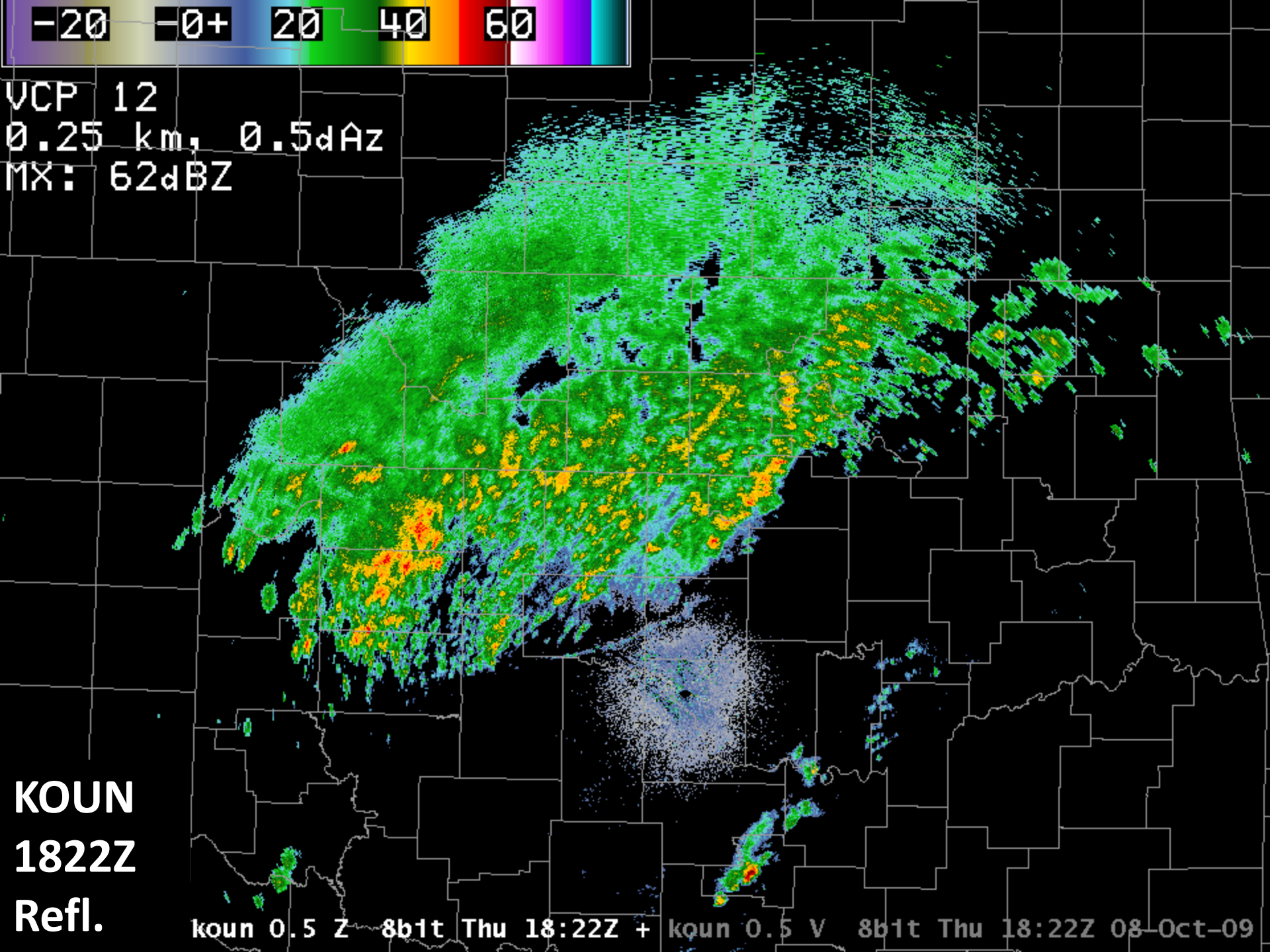
13 May 09

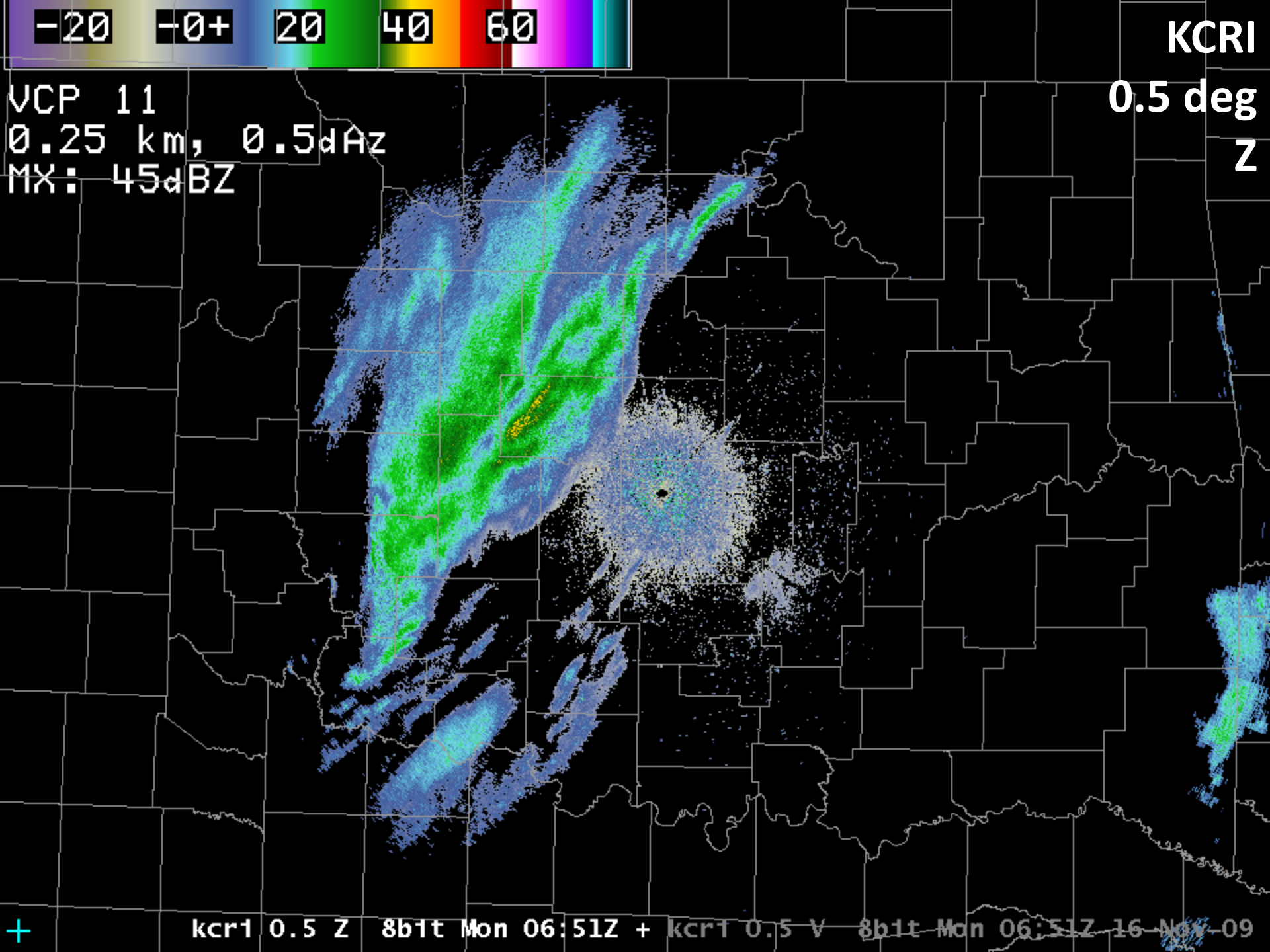
Clear Air w/storms west to southwest Super Res

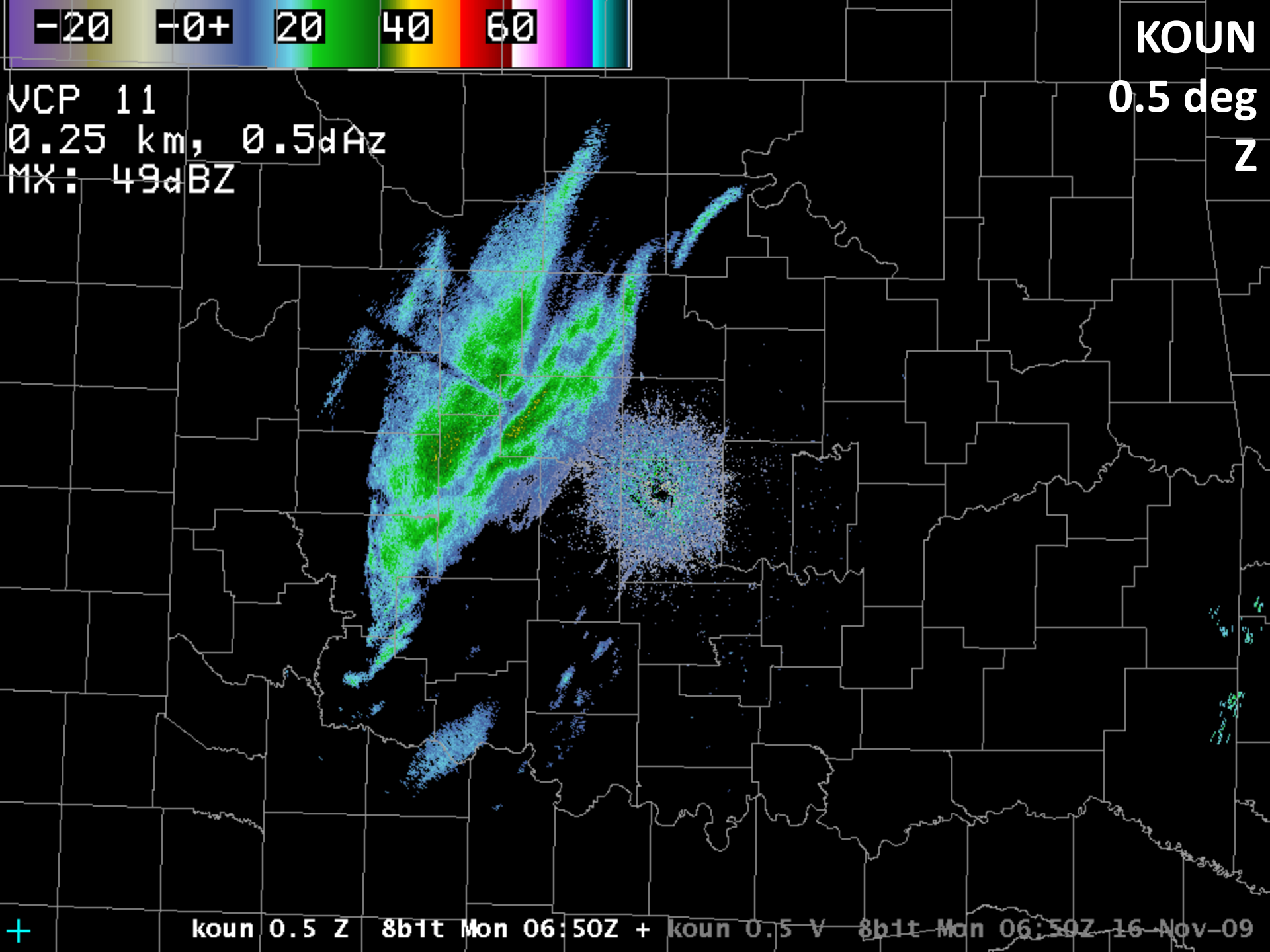
Remember we noted cases this month w/KOUN greener in clear air

KOUN VS. KCRI
After Dual-Pol Conversion


-20 -0+ 20 40 60
VCP 12
0.25 km, 0.5dAz
MX: 65dBZ
KCRI
1821Z
Refl.
kcri 0.5 Z 8bit Thu 18:21Z + kcri 0.5 V 8bit Thu 18:21Z 08-Oct-09


-20 -0+ 20 40 60
VCP 12
0.25 km, 0.5dAz
MX: 62dBZ
KOUN
1822Z
Refl.
koun 0.5 Z 8bit Thu 18:22Z + koun 0.5 V 8bit Thu 18:22Z 08-Oct-09

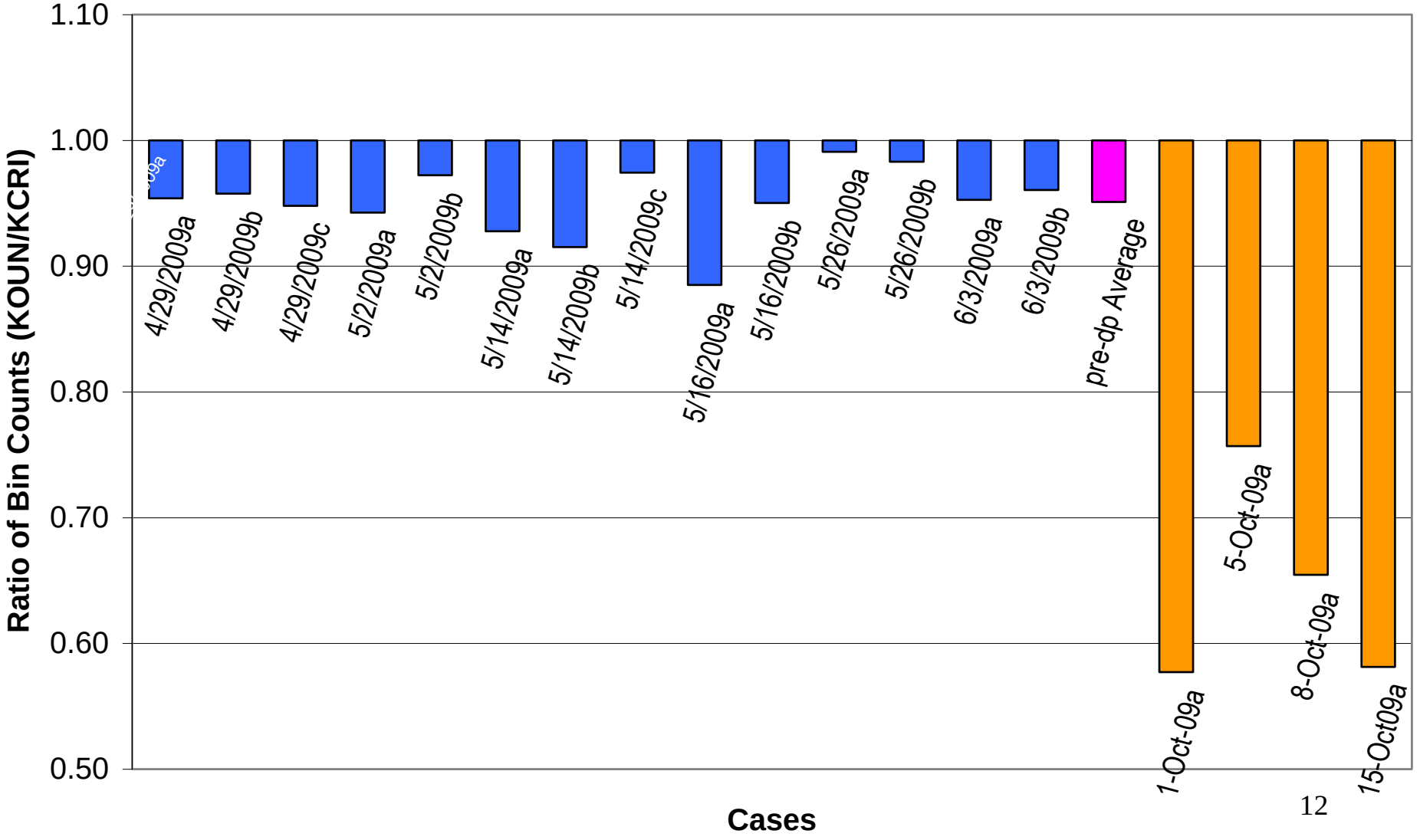

-20 -0+ 20 40 60
VCP 11
0.25 km, 0.5dAz
MX: 45dBZ
KCRI
0.5 deg
Z
kcr1 0.5 Z 8bit Mon 06:51Z + kcr1 0.5 V 8bit Mon 06:51Z 16-Nov-09


-20 -0+ 20 40 60
VCP 11
0.25 km, 0.5dAz
MX: 49dBZ
KOUN
0.5 deg
Z
koun 0.5 Z 8bit Mon 06:50Z + koun 0.5 V 8bit Mon 06:50Z 16-Nov-09

Quantitative Analysis of Coverage / Sensitivity Before and After Dual Pol Conversion

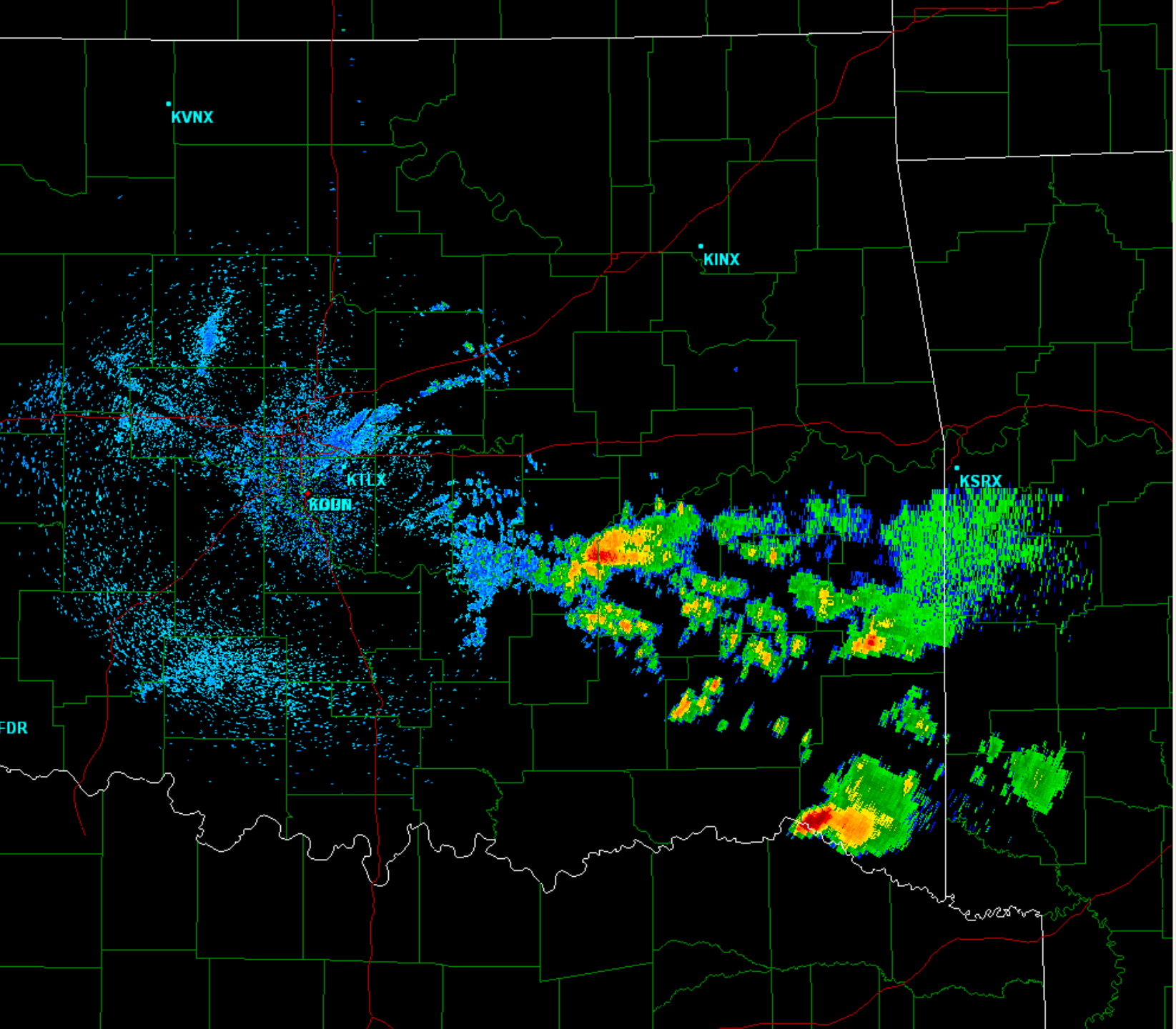
KOUN vs KCRI E1 Bin Count Ratios

14 pre-dp Samples from 7 Cases; 4 post-dp Cases



Quantify the Coverage Difference Between KOUN and KCRI

- Recorded Level II data on KOUN/KCRI
  - provided KOUN data for comparison
- Recorded Level I data on KCRI
- Played the KCRI Level I data back
  - Adjusted the VCP defined SNR thresholds with each playback
    - +0 dB, +3 dB, +6 dB, +8 dB
- Compared played back data with KOUN



Site: KOUN
VST: 10/15/2009 08:32:06 UT
Prod: 10/15/2009 08:32:05 UT
VCP: 211
Tilt: 0.527°

Select Sweep:

- (•) Base Reflectivity
- ( ) Base Velocity
- ( ) Storm Relative
- ( ) Spectrum Width

Select Tilt:

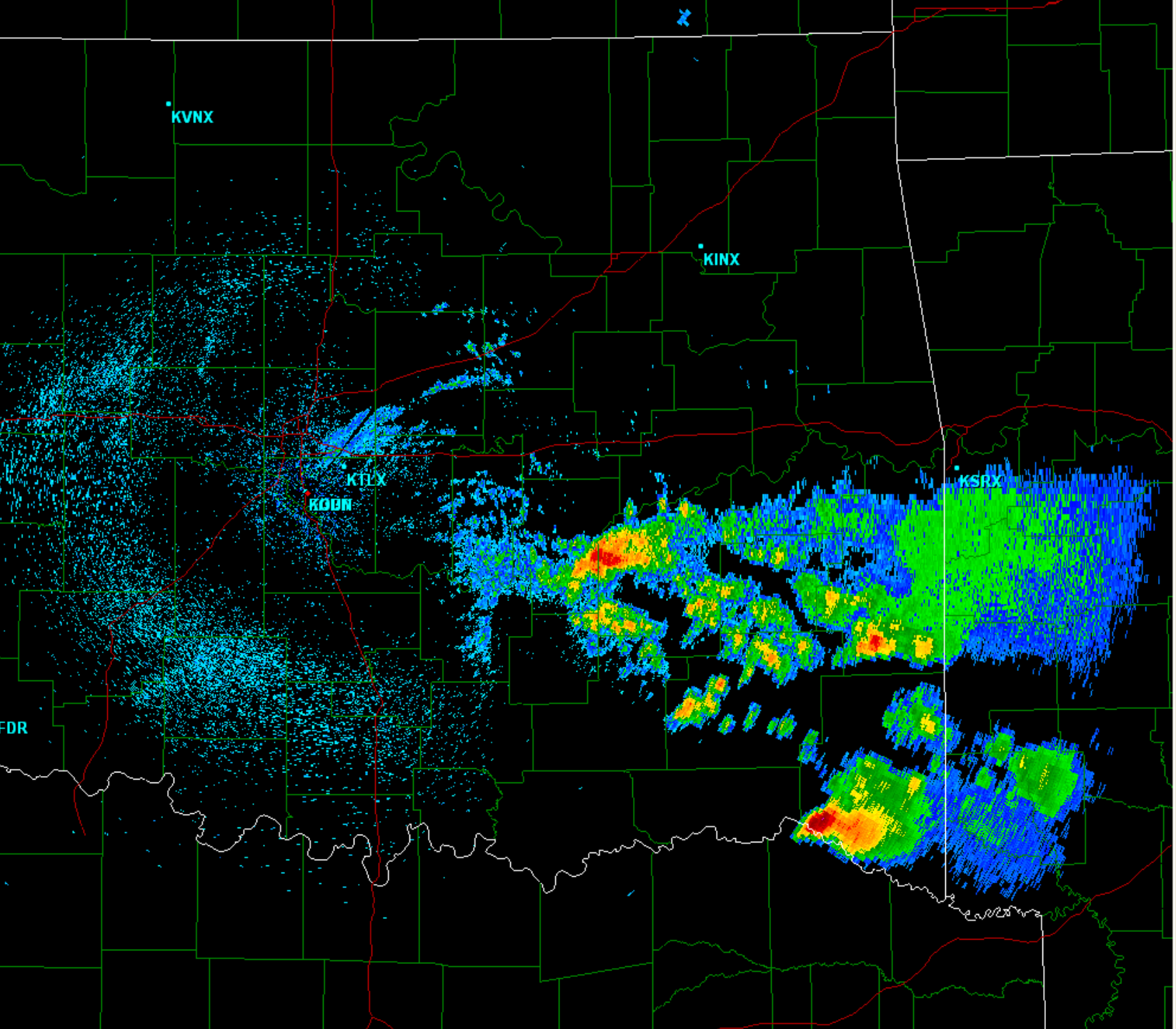
0.5°	0.5°	1.5°	1.5
2.5°	3.4°	4.4°	5.3
6.3°	7.5°	8.7°	10.
12.0°	14.1°	16.7°	19.

Warnings:

- [ ] Flash Flood
- [x] Severe Thunderstorm
- [x] Tornado

- [ ] Smoothing
- [ ] Dealias

KOUN



Site: KCRI
VST: 10/15/2009 13:46:18 UT
Prod: 10/15/2009 08:34:05 UT
VCP: 211
Tilt: 0.527°

Select Sweep:
- (•) Base Reflectivity
- ( ) Base Velocity
- ( ) Storm Relative
- ( ) Spectrum Width

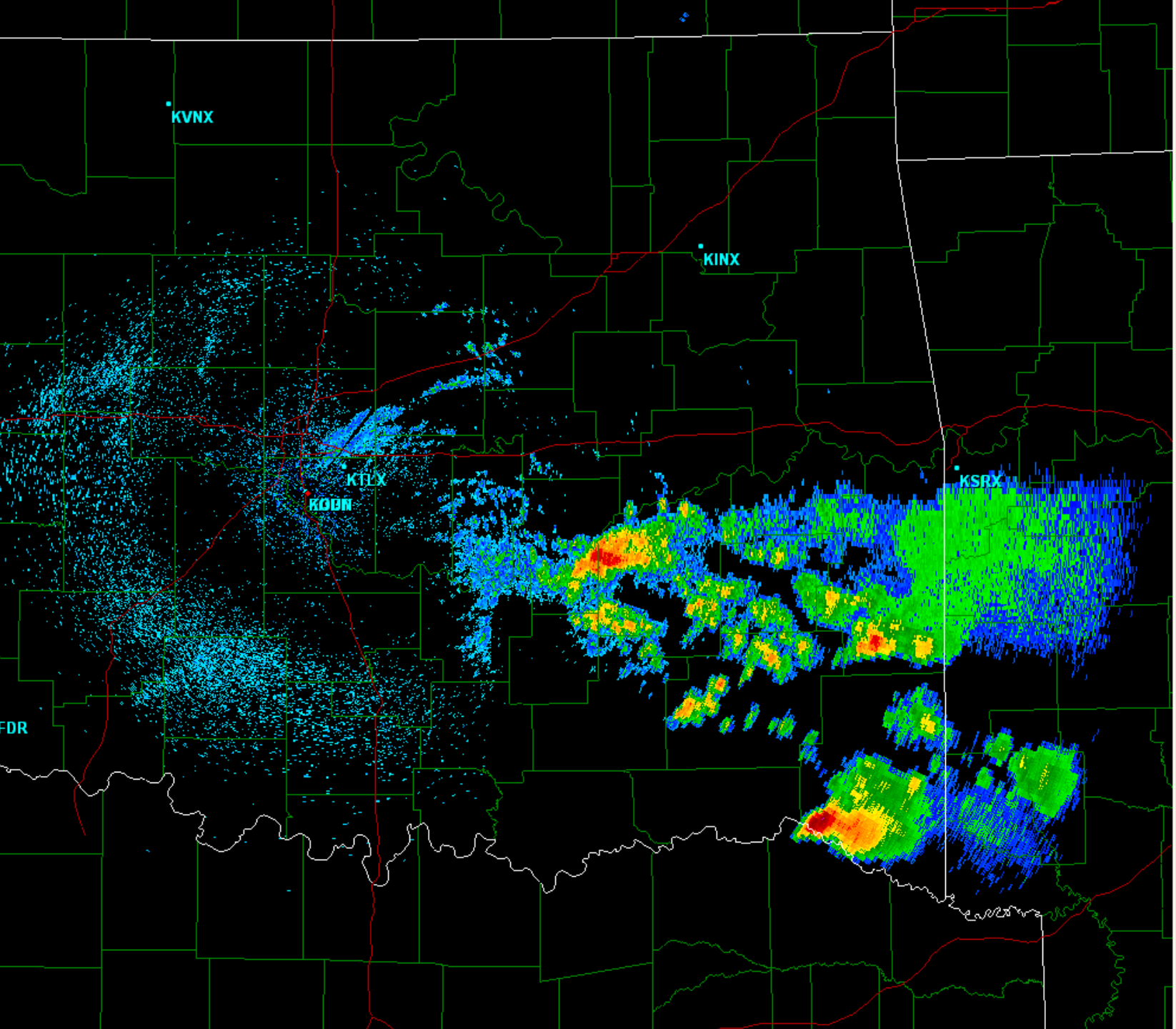
Select Tilt:

0.5°	0.5°	1.4°	1.5
2.5°	3.4°	4.4°	5.3
6.2°	7.5°	8.7°	10.
12.0°	14.0°	16.7°	19.

Warnings:
- [ ] Flash Flood
- [x] Severe Thunderstorm
- [x] Tornado

- [ ] Smoothing
- [ ] Dealias

KCRI
Th + 0dB



Site: KCRI
VST: 10/15/2009 13:51:22 UT
Prod: 10/15/2009 08:34:05 UT
VCP: 211
Tilt: 0.527°

Select Sweep:
- (•) Base Reflectivity
- ( ) Base Velocity
- ( ) Storm Relative
- ( ) Spectrum Width

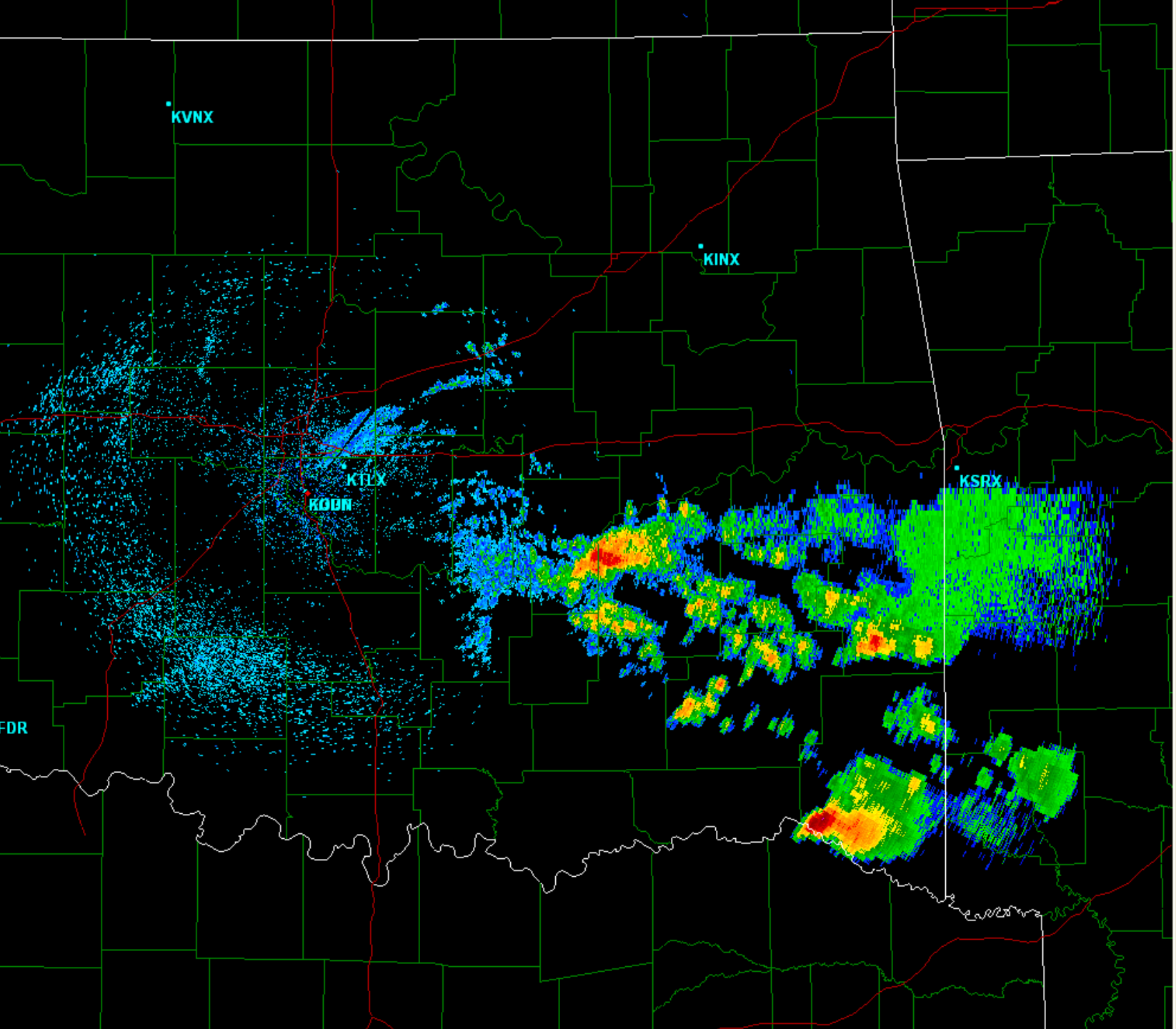
Select Tilt:

0.5°	0.5°	1.4°	1.5
2.5°	3.4°	4.4°	5.3
6.2°	7.5°	8.7°	10.
12.0°	14.0°	16.7°	19.

Warnings:
- [ ] Flash Flood
- [x] Severe Thunderstorm
- [x] Tornado

- [ ] Smoothing
- [ ] Dealias

KCRI
Th + 3dB



Site: KCRI
VST: 10/15/2009 13:57:08 UT
Prod: 10/15/2009 08:34:05 UT
VCP: 211
Tilt: 0.527°

Select Sweep:
- (•) Base Reflectivity
- ( ) Base Velocity
- ( ) Storm Relative
- ( ) Spectrum Width

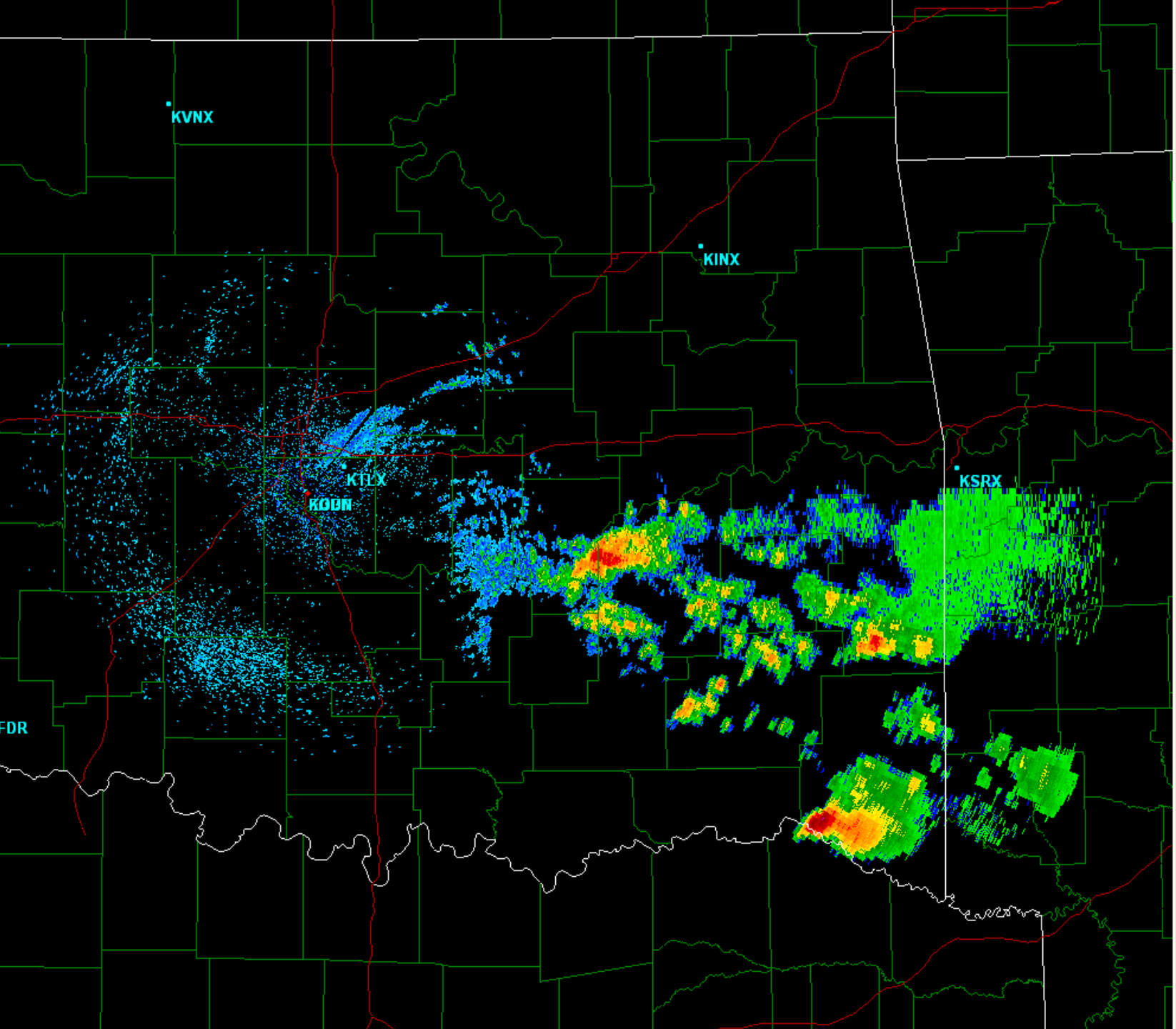
Select Tilt:

0.5°	0.5°	1.4°	1.5
2.5°	3.4°	4.4°	5.3
6.2°	7.5°	8.7°	10.
12.0°	14.0°	16.7°	19.

Warnings:
- [ ] Flash Flood
- [x] Severe Thunderstorm
- [x] Tornado

- [ ] Smoothing
- [ ] Dealias

KCRI
Th + 6dB



Site: KCRI
VST: 10/15/2009 16:39:51 UT
Prod: 10/15/2009 08:34:05 UT
VCP: 211
Tilt: 0.527°

Select Sweep:
- (•) Base Reflectivity
- ( ) Base Velocity
- ( ) Storm Relative
- ( ) Spectrum Width

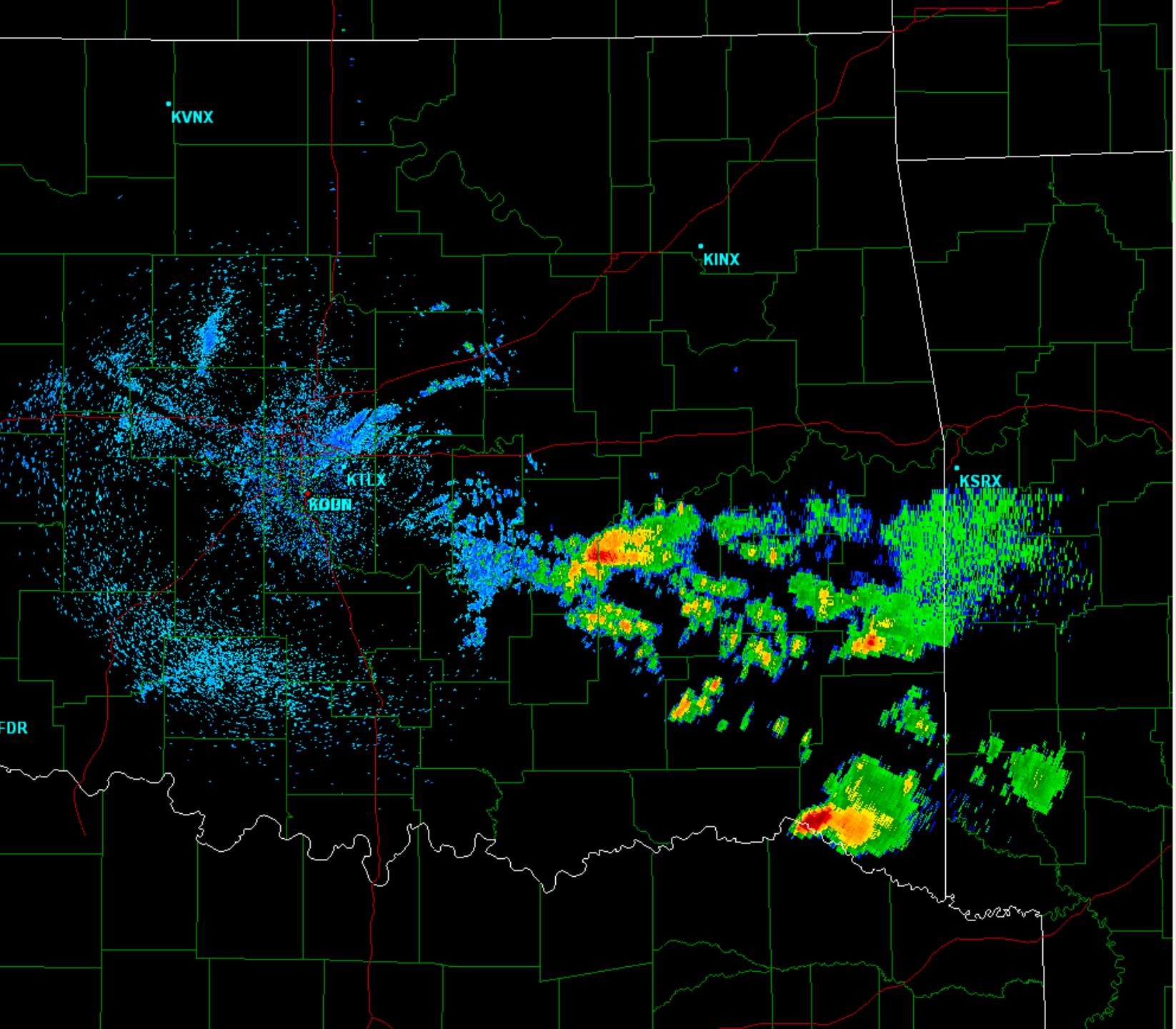
Select Tilt:

0.5°	0.5°	1.4°	1.5
2.5°	3.4°	4.4°	5.3
6.2°	7.5°	8.7°	10.
12.0°	14.0°	16.7°	19.

Warnings:
- [ ] Flash Flood
- [x] Severe Thunderstorm
- [x] Tornado

- [ ] Smoothing
- [ ] Dealias

KCRI
Th + 8dB



Site: KOUN
VST: 10/15/2009 08:32:06 UT
Prod: 10/15/2009 08:32:05 UT
VCP: 211
Tilt: 0.527°

Select Sweep:

- (•) Base Reflectivity
- ( ) Base Velocity
- ( ) Storm Relative
- ( ) Spectrum Width

Select Tilt:

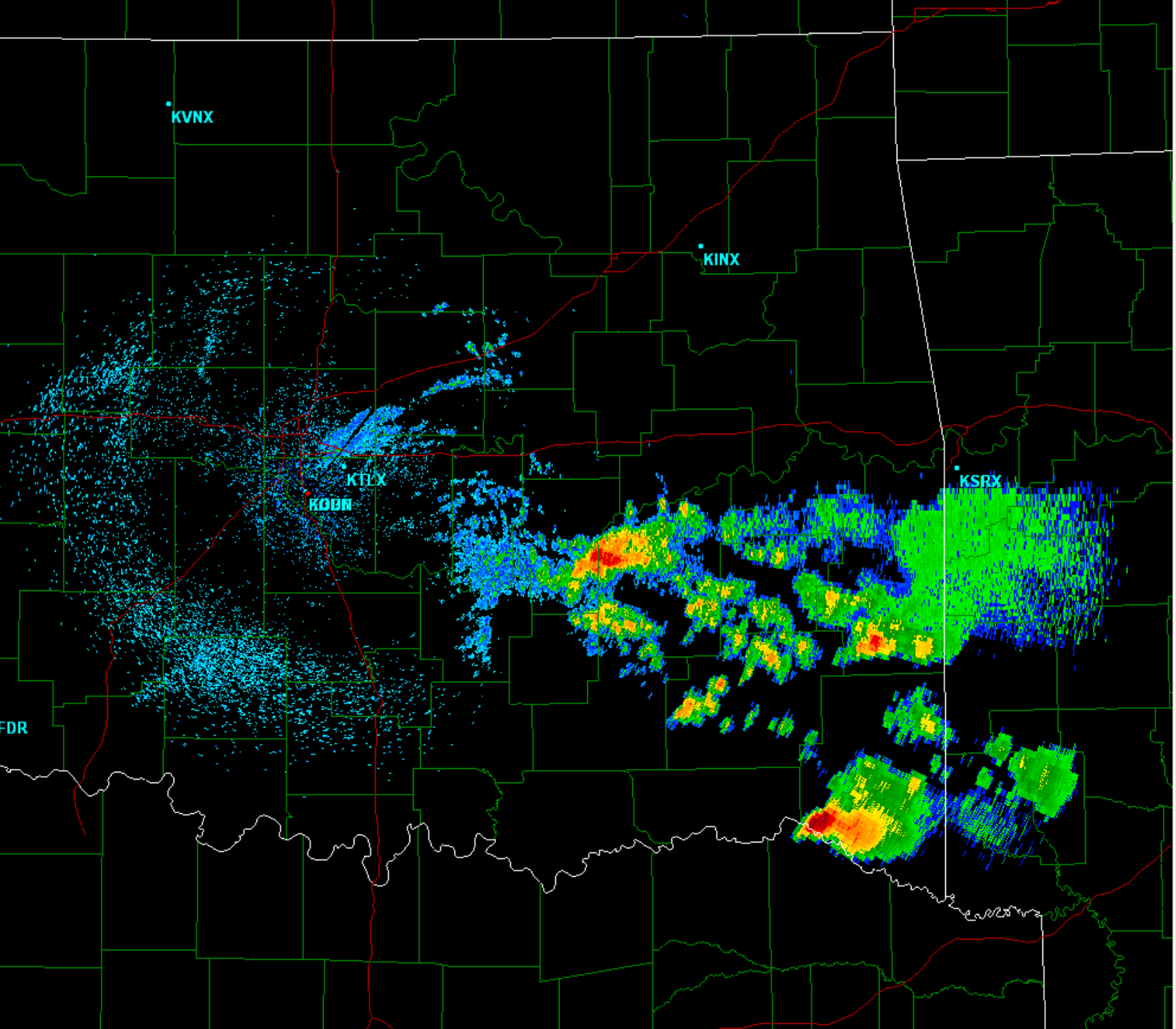
0.5°	0.5°	1.5°	1.
2.5°	3.4°	4.4°	5.
6.3°	7.5°	8.7°	10.
12.0°	14.1°	16.7°	19.

Warnings:

- [ ] Flash Flood
- [x] Severe Thunderstorm
- [x] Tornado

- [ ] Smoothing
- [ ] Dealias

KOUN



Site: KCRI
VST: 10/15/2009 13:57:08 UT
Prod: 10/15/2009 08:34:05 UT
VCP: 211
Tilt: 0.527°

Select Sweep:
- (•) Base Reflectivity
- ( ) Base Velocity
- ( ) Storm Relative
- ( ) Spectrum Width

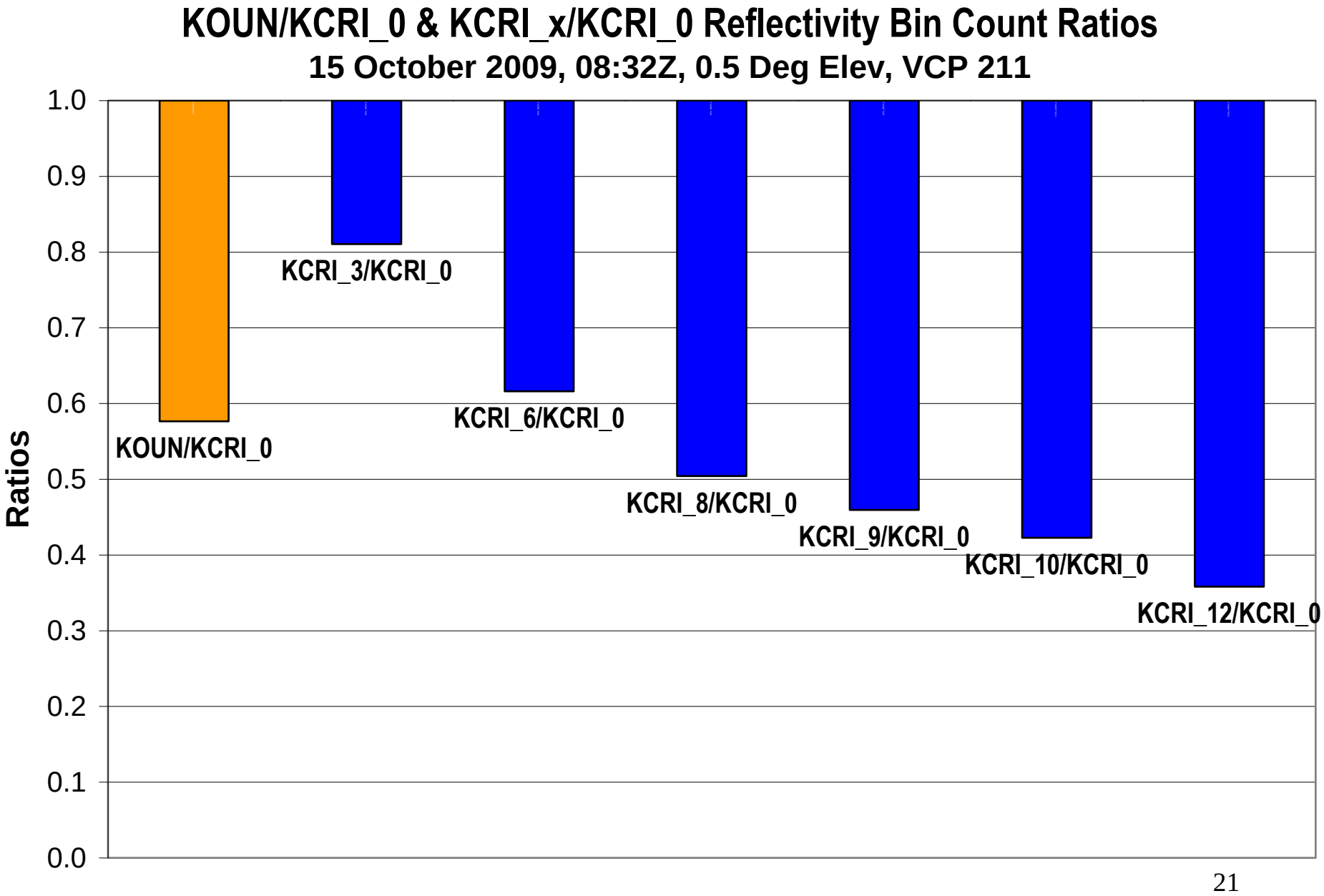
Select Tilt:

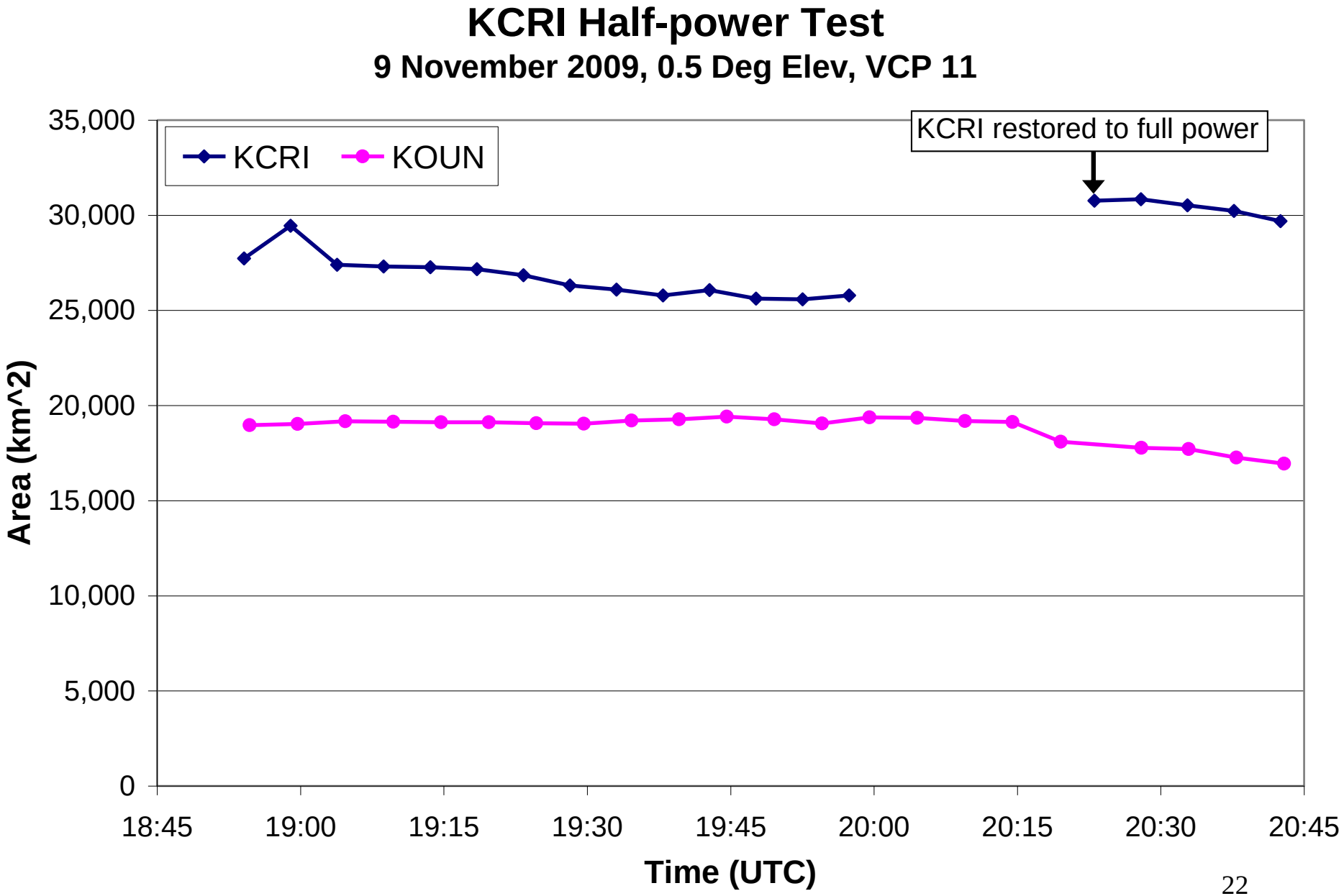
0.5°	0.5°	1.4°	1.5
2.5°	3.4°	4.4°	5.3
6.2°	7.5°	8.7°	10.
12.0°	14.0°	16.7°	19.

Warnings:
- [ ] Flash Flood
- [x] Severe Thunderstorm
- [x] Tornado

- [ ] Smoothing
- [ ] Dealias

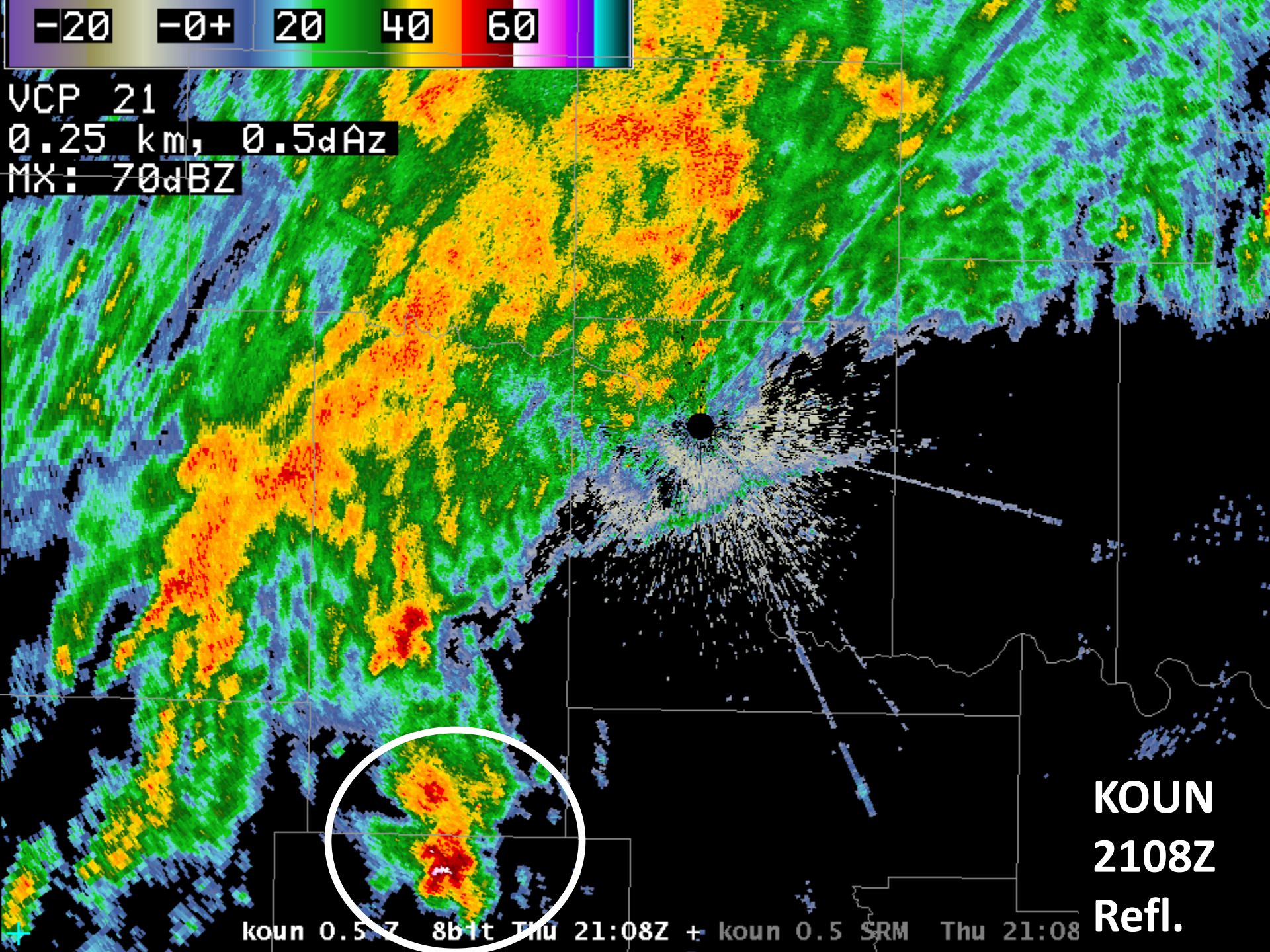
KCRI
Th + 6dB


KOUN/KCRI_0 & KCRI_x/KCRI_0 Reflectivity Bin Count Ratios
15 October 2009, 08:32Z, 0.5 Deg Elev, VCP 211
Ratios
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
KOUN/KCRI_0
KCRI_3/KCRI_0
KCRI_6/KCRI_0
KCRI_8/KCRI_0
KCRI_9/KCRI_0
KCRI_10/KCRI_0
KCRI_12/KCRI_0


KCRI Half-power Test
9 November 2009, 0.5 Deg Elev, VCP 11
KCRI
KOUN
KCRI restored to full power
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Area (km^2)
18:45
19:00
19:15
19:30
19:45
20:00
20:15
20:30
20:45
Time (UTC)

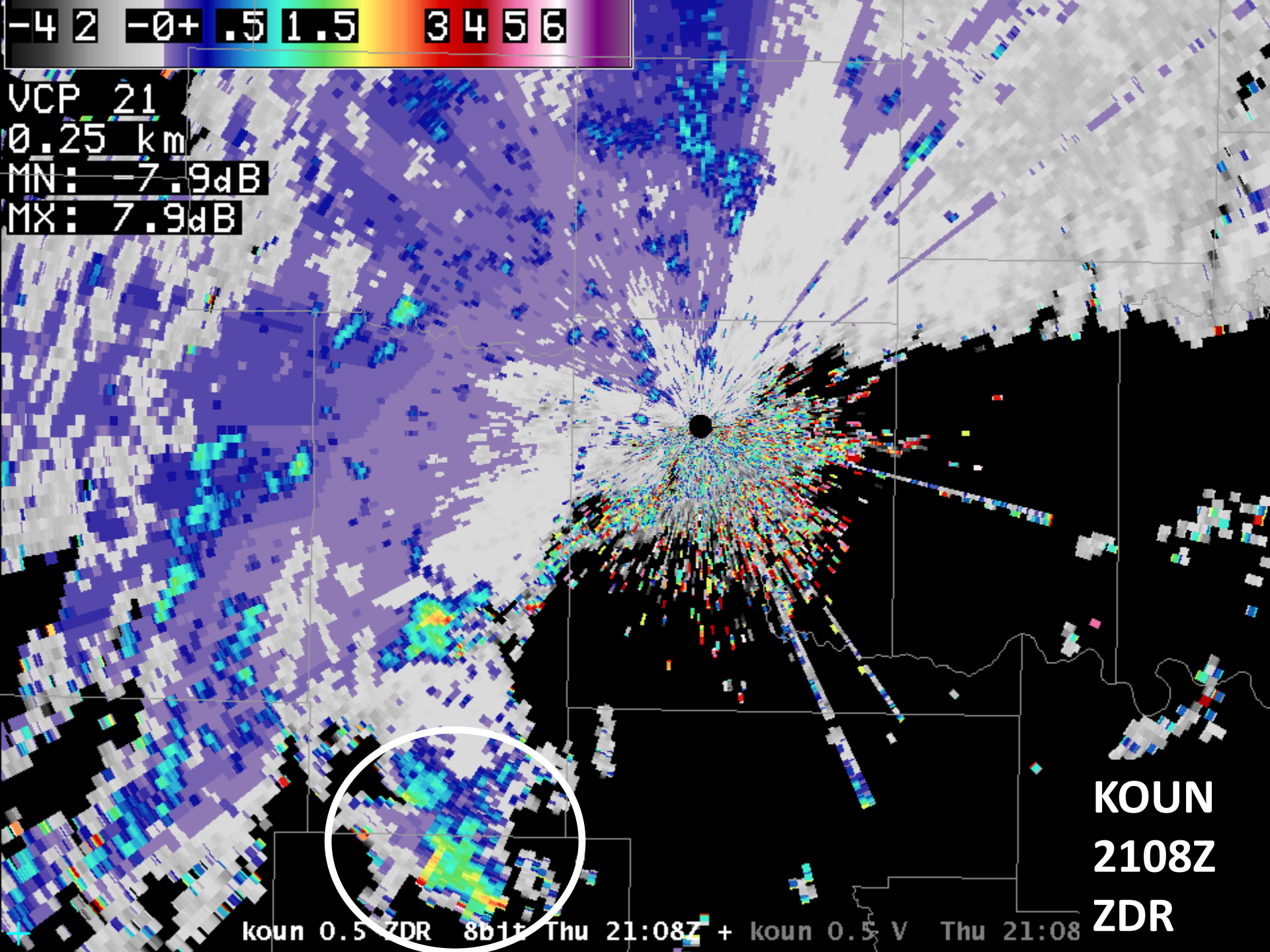
KOUN Dual-Pol Evaluation

- 2108 UTC 10/8/2009
- KOUN: VCP 21
- Severe Convection, Heavy Rain, light rain (stratiform), TBSS


-20 -0+ 20 40 60
VCP 21
0.25 km, 0.5dAz
MX: 70dBZ
koun 0.5 Z 8bit Thu 21:08Z + koun 0.5 SRM Thu 21:08
KOUN
2108Z
Refl.

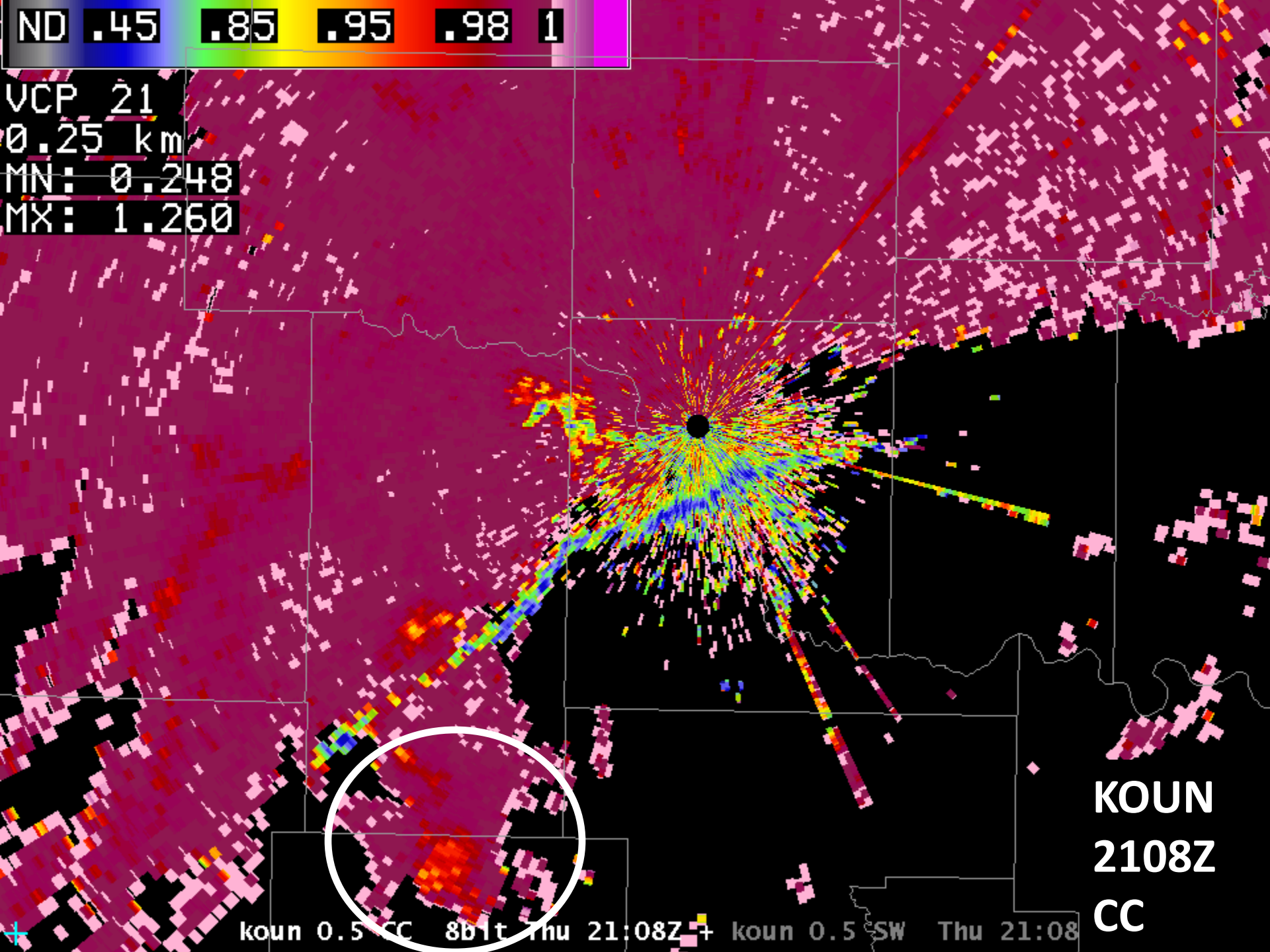
ZDR Assessment

- Problems Observed:
  - ZDR has a slight negative bias
  - Negative values above the melting layer where there should be positive values
  - Extremely inconsistent
- The trend is toward better (more correct) values
  - Larger ZDR values correctly appear in melting layer
  - Overall structure looks correct
- Following image was among the best we've seen, the rest of the time we've seen even larger negative bias


-4 2 -0+ .5 1.5 3 4 5 6
VCP 21
0.25 km
MN: -7.9dB
MX: 7.9dB
koun 0.5 ZDR 8bit Thu 21:08Z + koun 0.5 V Thu 21:08
KOUN
2108Z
ZDR

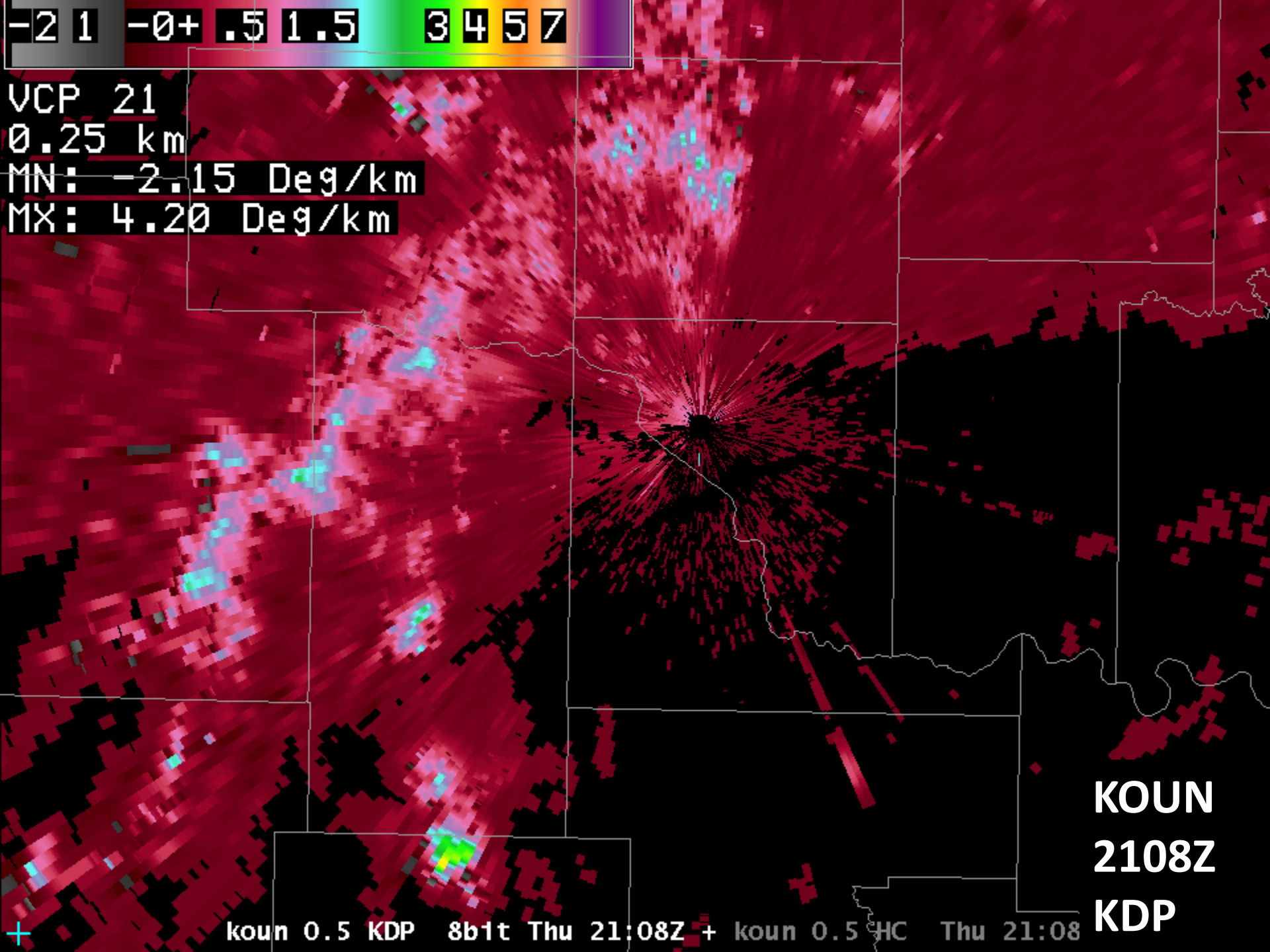
CC Assessment

- Problems Observed:
  - All values increase in weaker SNR, majority of values in weak SNR should decrease
    - They are overcorrecting for noise in the CC products
  - Batch cuts unreliable (intermittent noise)
- The trend is toward better (more correct) values
  - Correctly shows lower values in melting layer
  - Overall structure looks correct with the exception of the fringes


ND .45 .85 .95 .98 1
VCP 21
0.25 km
MN: 0.248
MX: 1.260
koun 0.5 CC 8bit Thu 21:08Z
koun 0.5 SW Thu 21:08
KOUN
2108Z
CC

KDP Assessment

- From a subjective look, data look reasonable


-2 1 -0+ .5 1.5 3 4 5 7
VCP 21
0.25 km
MN: -2.15 Deg/km
MX: 4.20 Deg/km
KOUN
2108Z
KDP
koun 0.5 KDP 8bit Thu 21:08Z + koun 0.5 HC Thu 21:08

DQ Summary

- Coverage for all 3 base moments; R, V, and W is ~6-8 Db lower than KCRI
  - Trend in imagery has not shown significant improvement
- KOUN reflectivity values still lower in cores
- V and W values look good
- Dual-Pol variables are improving and showing more appropriate structure
  - However, data is still inconsistent & at times unreliable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Questions?