

October 19, 2011 Frost/Freeze Bust

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October 19, 2011

What happened?

- **A Freeze Warning that was issued for the far west Texas and west Oklahoma Panhandles did not verify on the morning of October 19 as a result of surface temperatures staying above freezing.**
- **A Frost Advisory that was issued for the rest of the Panhandles except Collingsworth county, marginally verified due to some locations having lows 33 to 36°F. However, not sure much, if any, frost developed because of dry air near the surface and very dry soils.**

MAV/MET/CCF Comparison to Actual Low

10/18

12z Guidance
21z CCF

10/18

00z Guidance
09z CCF

10/17

12z Guidance
21z CCF

10/19

Morning
Low

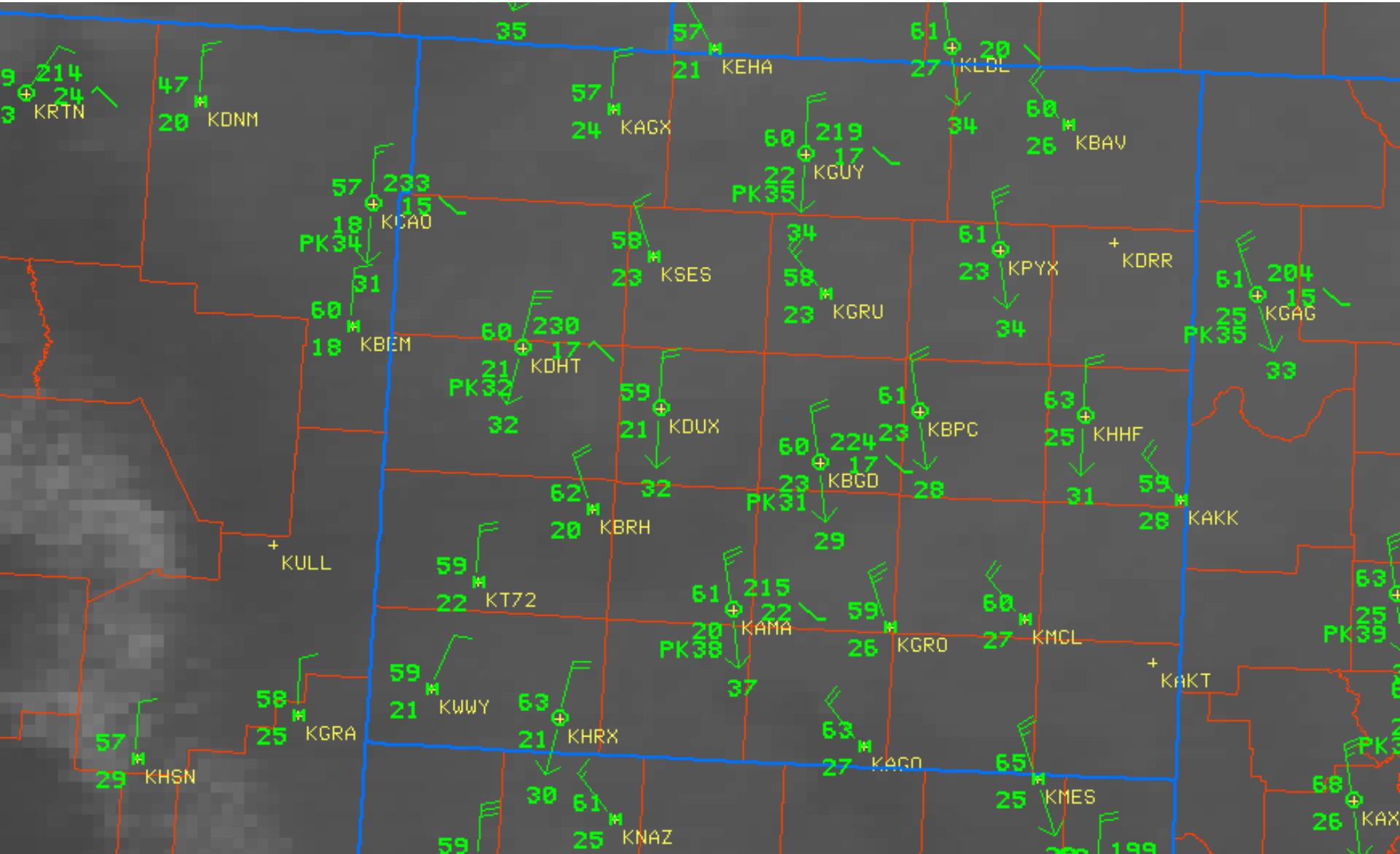
	19/LO MAV/MET/FWC	CCF
AMA		
TEMPS	34/ 33/-99	33
POP12	0/ 2/-99	
DHT		
TEMPS	30/ 30/-99	29
POP12	0/ 2/-99	
BGD		
TEMPS	38/ 37/-99	36
POP12	0/ 2/-99	
GUY		
TEMPS	34/ 29/-99	32
POP12	0/ 2/-99	

	19/LO MAV/MET/FWC	CCF
AMA		
TEMPS	35/ 33/-99	35
POP12	0/ 3/-99	
DHT		
TEMPS	30/ 30/-99	30
POP12	0/ 3/-99	
BGD		
TEMPS	39/ 37/-99	38
POP12	0/ 3/-99	
GUY		
TEMPS	33/ 32/-99	32
POP12	0/ 3/-99	

	19/LO MAV/MET/FWC	CCF
AMA		
TEMPS	35/ 33/-99	34
POP12	1/ 3/-99	
DHT		
TEMPS	30/ 32/-99	30
POP12	1/ 3/-99	
BGD		
TEMPS	38/ 37/-99	37
POP12	1/ 3/-99	
GUY		
TEMPS	33/ 31/-99	33
POP12	1/ 3/-99	

Actual
36
37
40
39

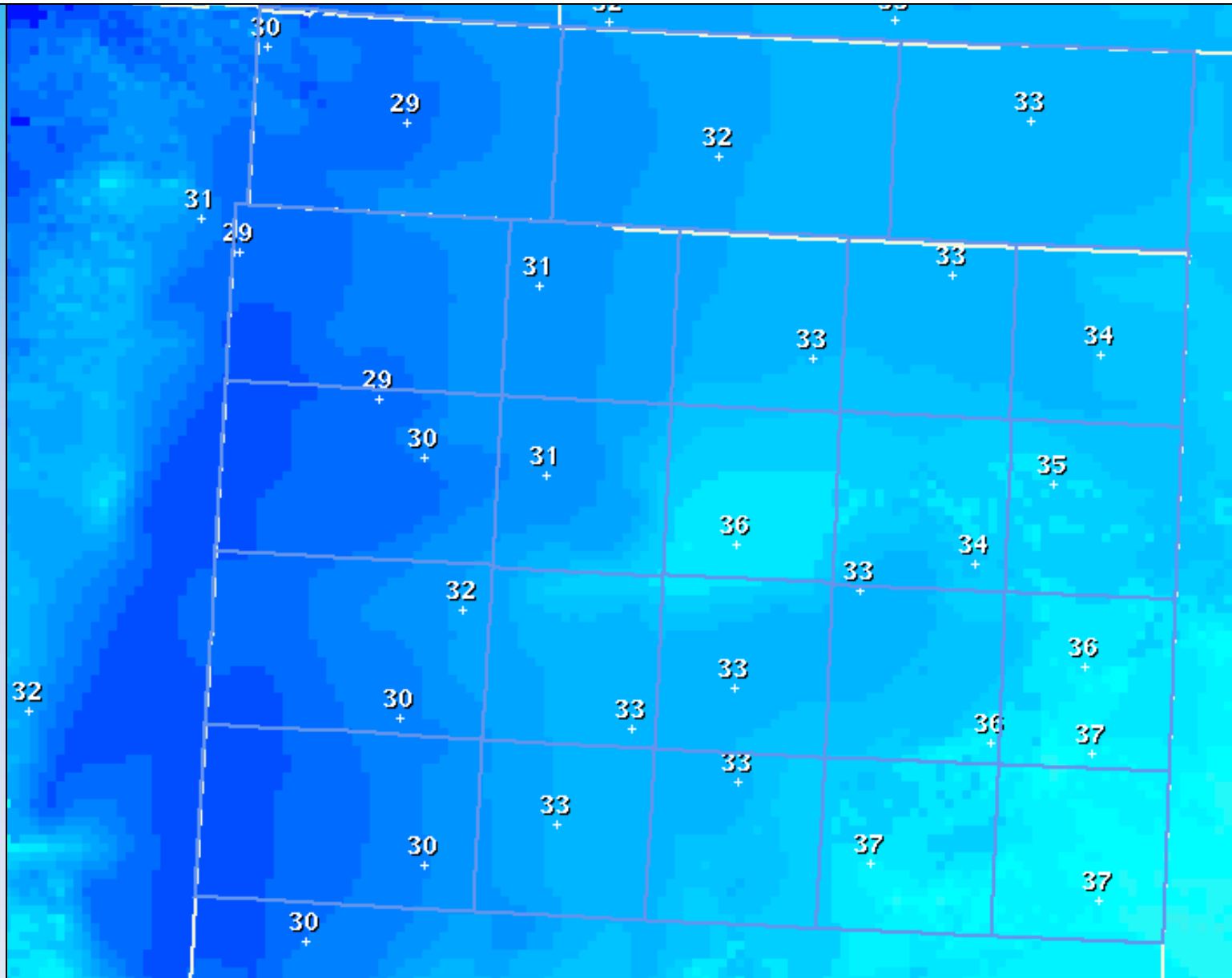
With surface dewpoints in the 20s at 21z on October 18 and a surface high moving in, frost/freeze headlines are needed for the upcoming night, right???



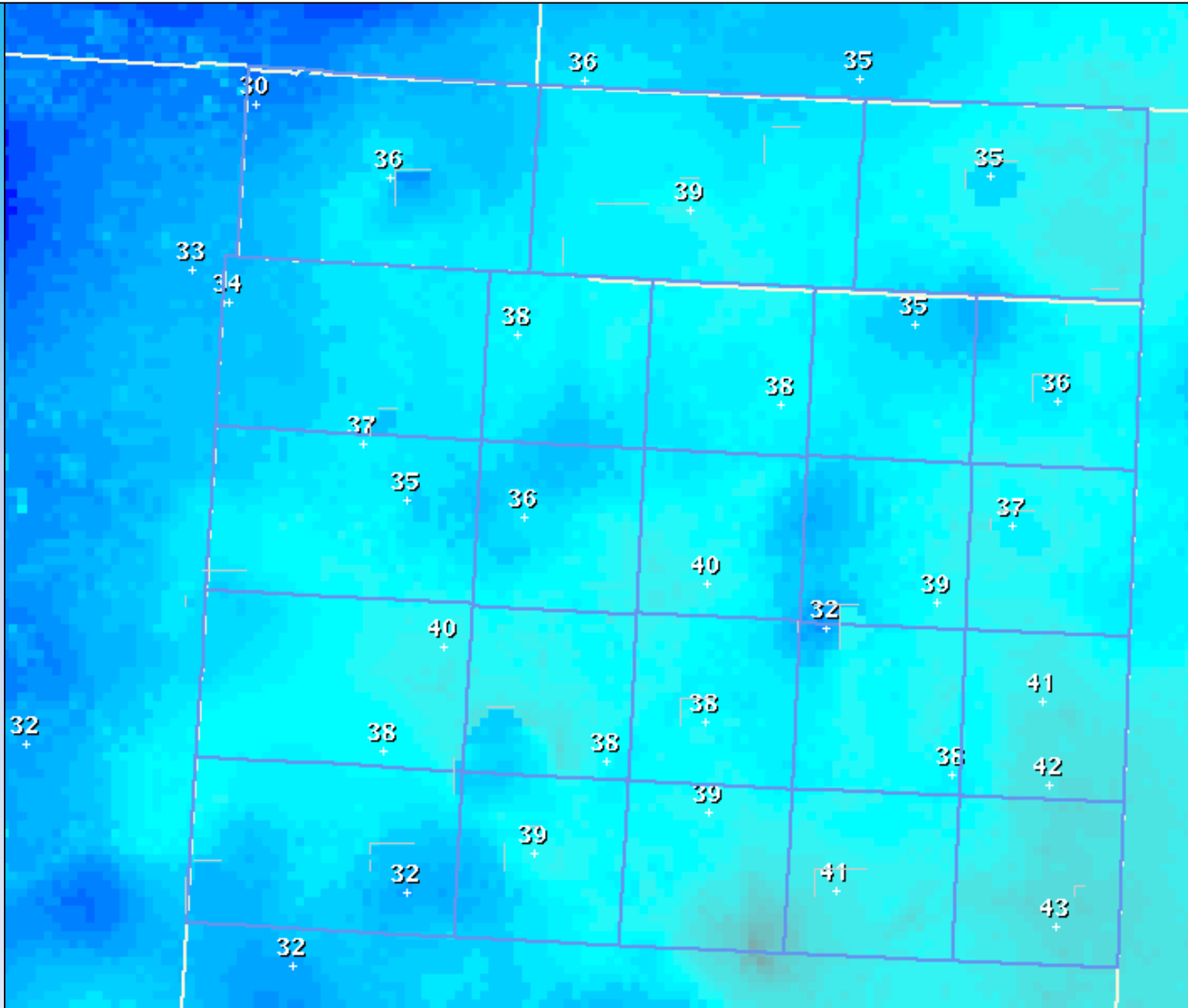
Not so fast,
my friend!



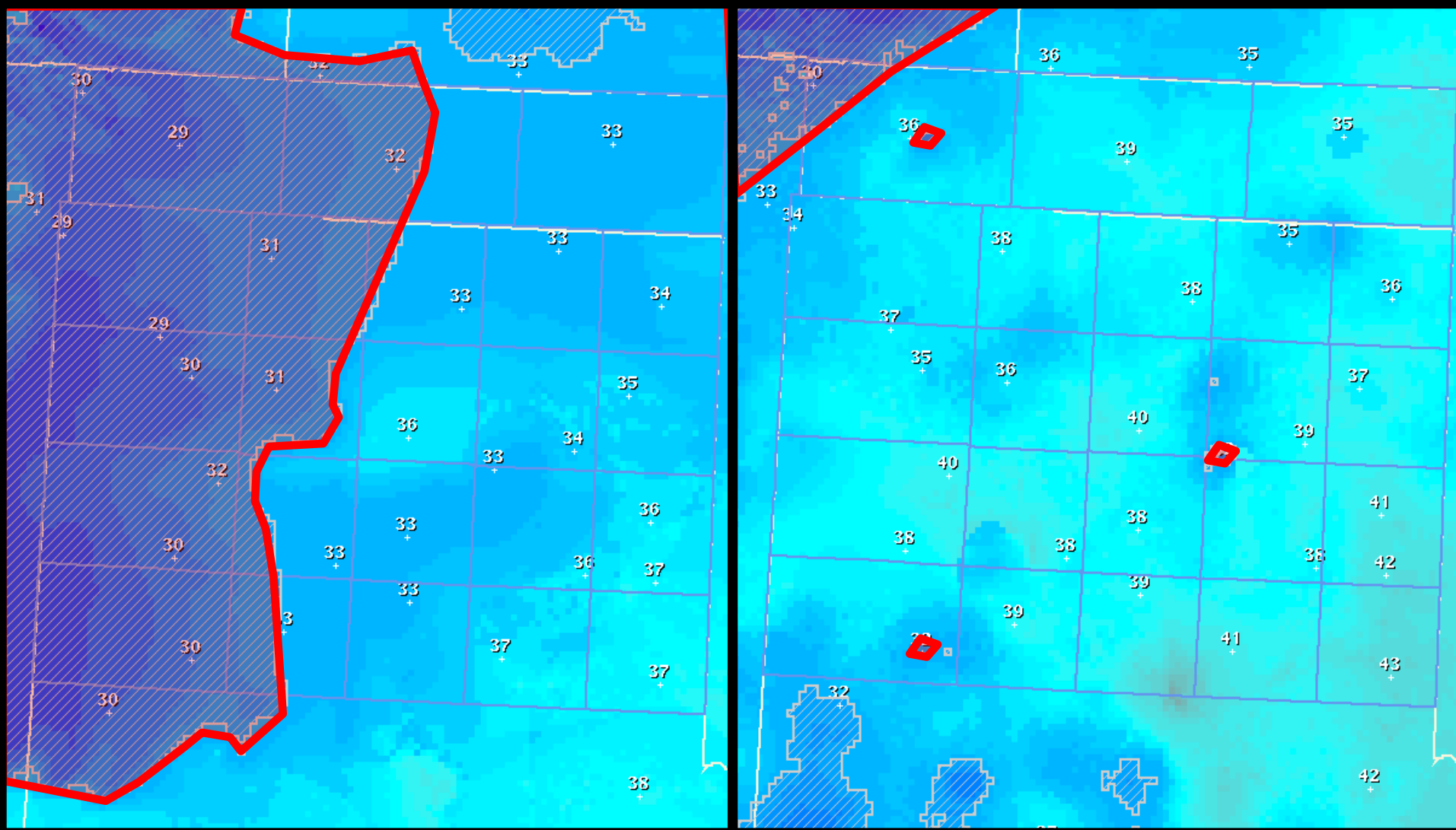
October 18 4 pm CDT Forecast Lows for the Morning of October 19



Observed Lows on the Morning of October 19

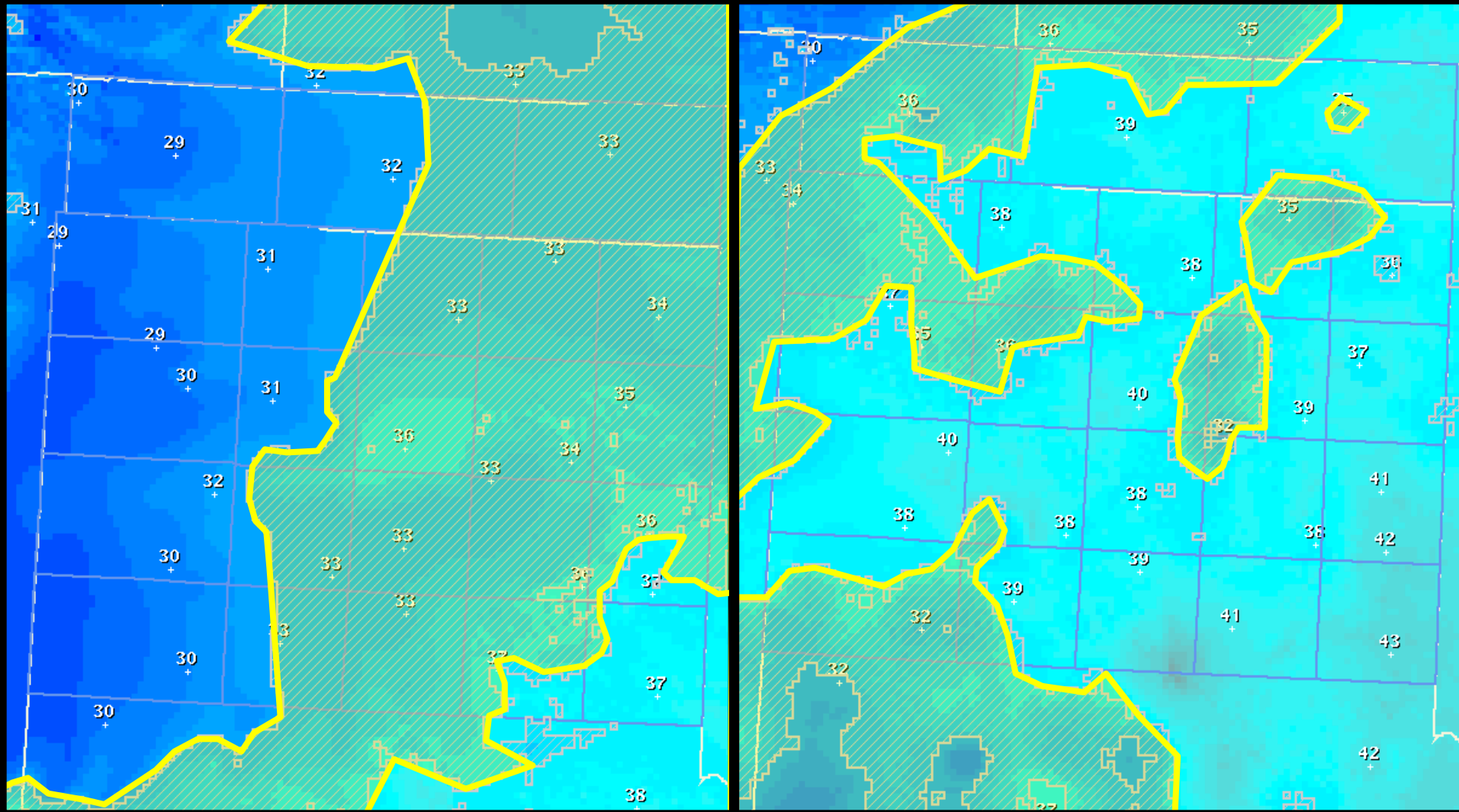


10/18 4 pm Forecast Vs. Observed 10/19 Morning Lows



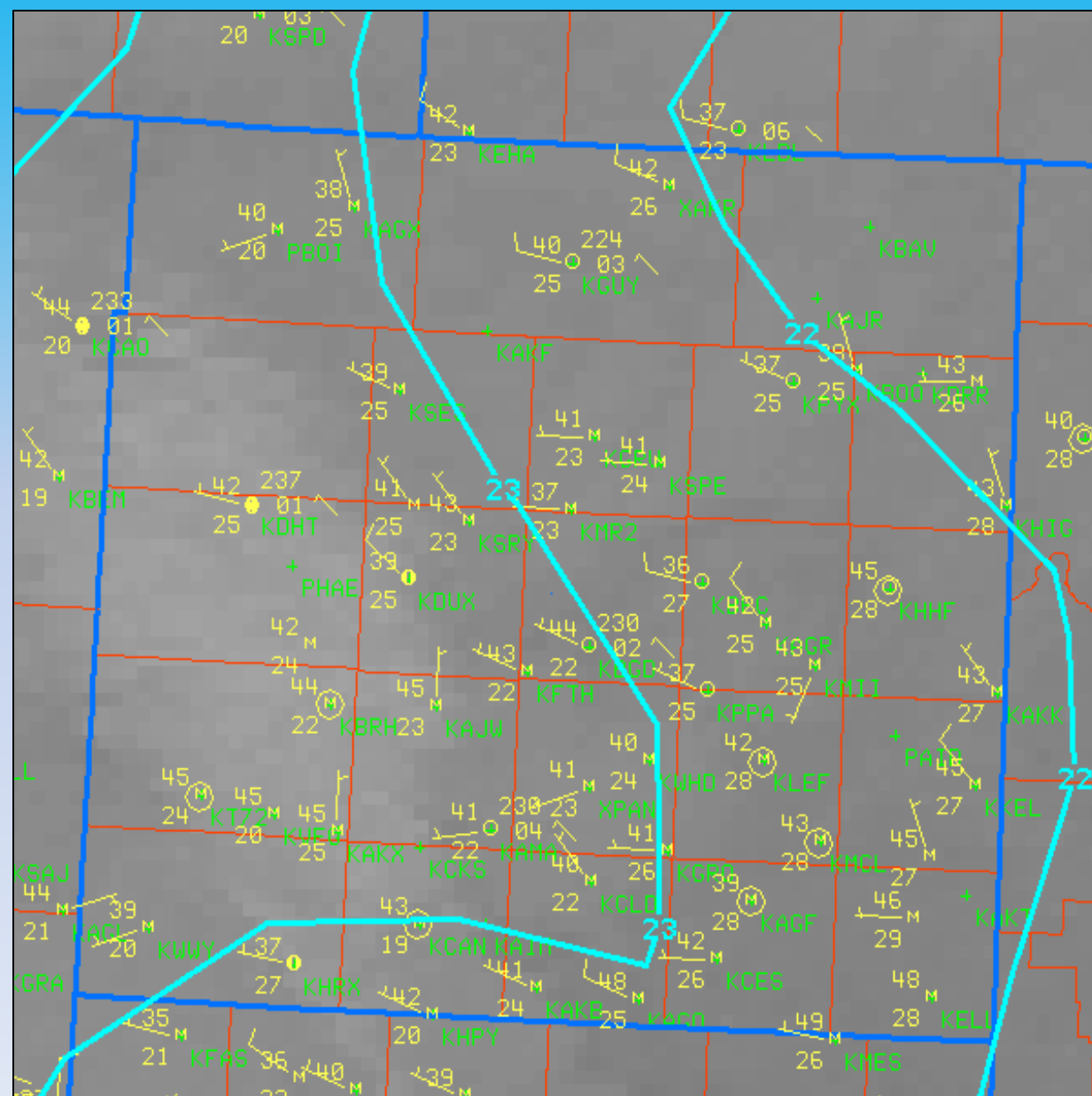
Hatched area includes **Freeze** area ($T \leq 32^{\circ}\text{F}$).

10/18 4 pm Forecast Vs. Observed 10/19 Morning Lows



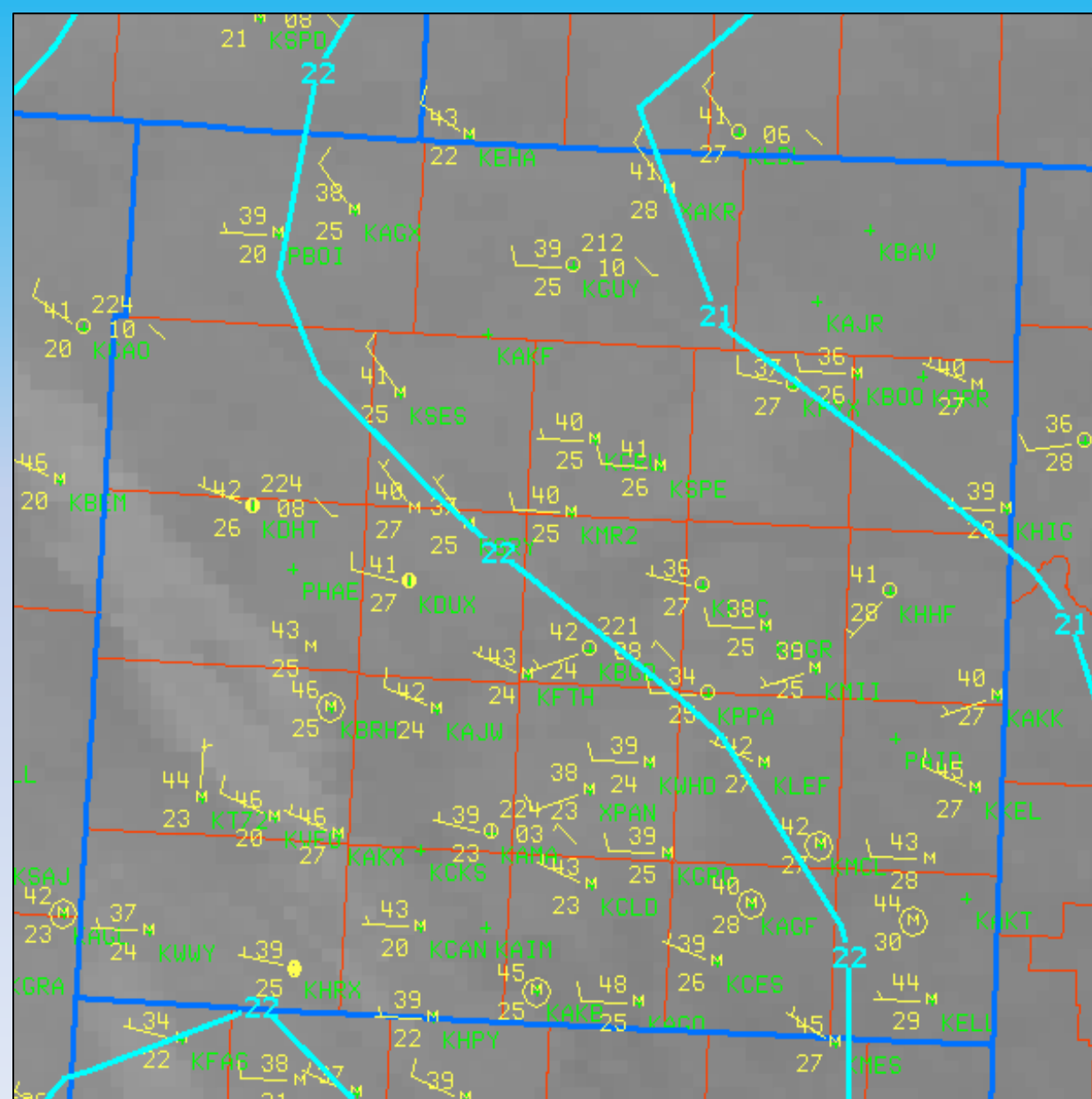
Hatched area includes **Frost** area ($32^{\circ}\text{F} < T \leq 36^{\circ}\text{F}$)

06z Observations on October 19



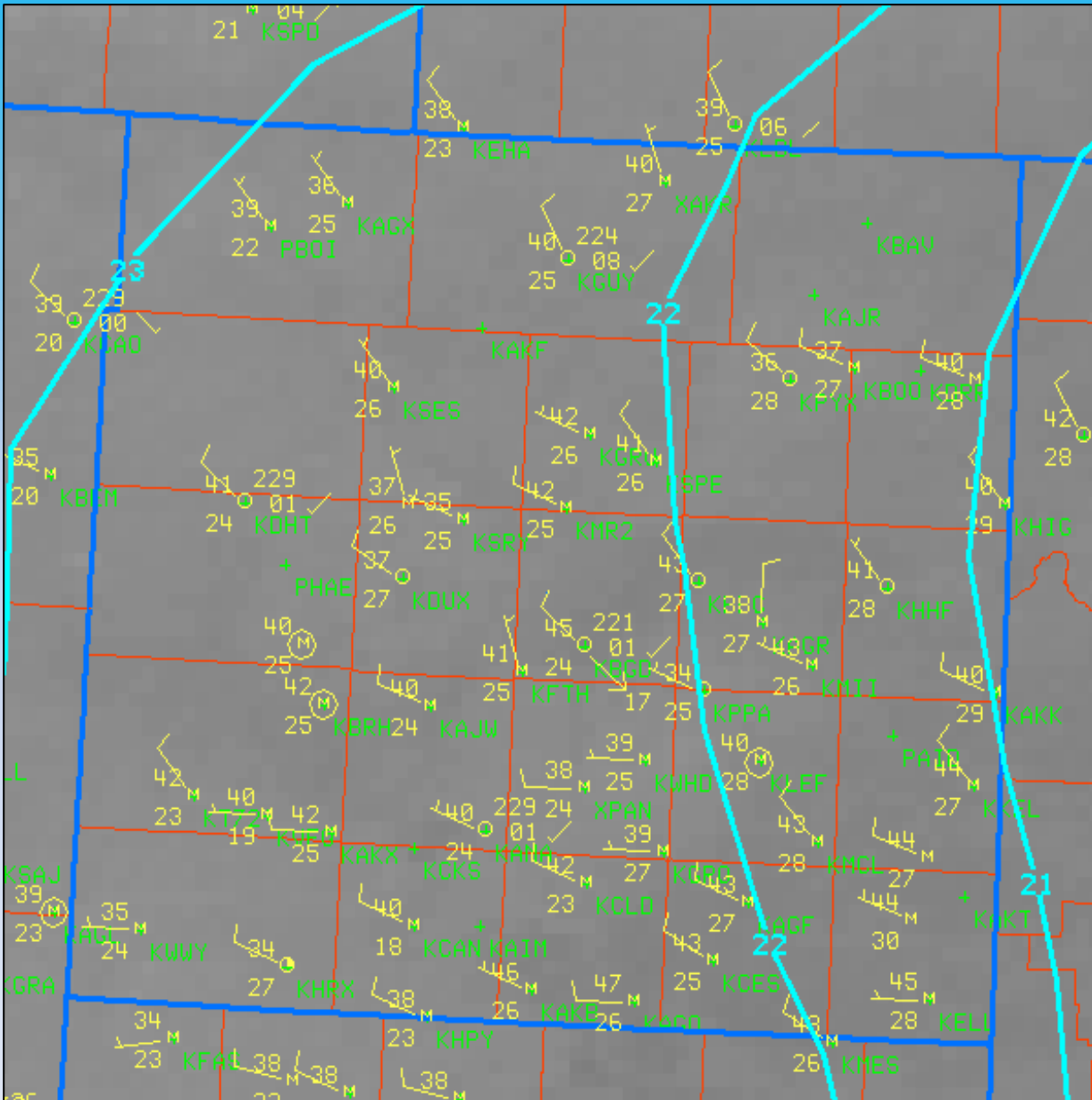
- A mid level deck of clouds around 9500 ft AGL developed over the west Panhandles while clear skies were occurring elsewhere.
- Surface winds were generally W/NW 5-10 kt.
- All locations in the CWA were above 36°F.

09z Observations on October 19



- Temperatures did not change much from 06z.
- Surface SLPs dropped slightly perhaps due to a weak mid/upper level short wave approaching the area.
- The mid level deck of clouds was eroding across the west Panhandles.

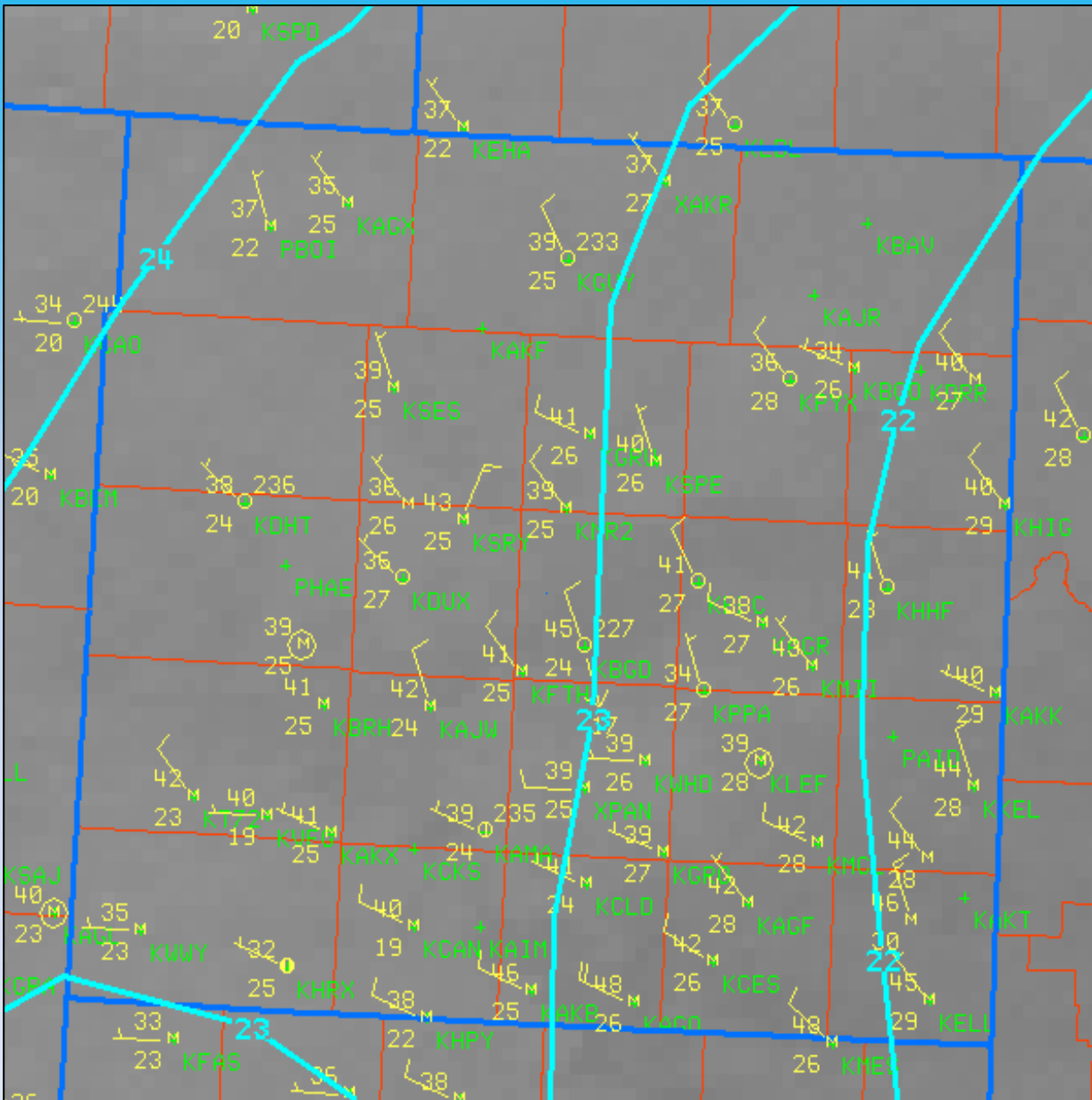
12z Observations on October 19



- Temperatures generally changed very little.
- Surface winds increased slightly and turned to the NW likely due to the passage of the weak short wave.
- SLPs increased as well possibly indicating that a weak short wave moved through the area.

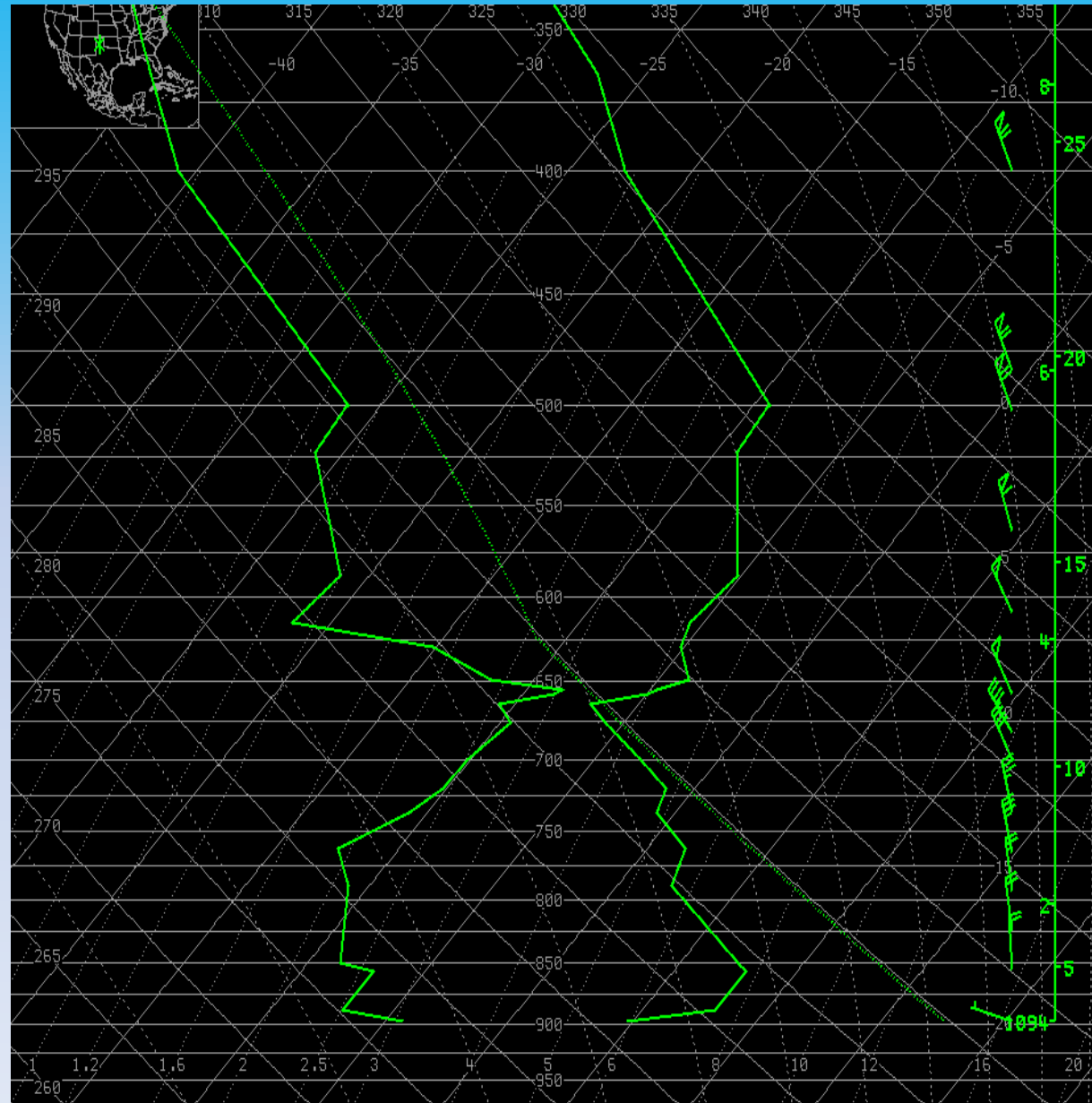
13z Observations on October 19

- Only Hereford was reporting 32°F in the entire CWA.
- A few locations were 33-36°F but most locations remained above 36°F.
- Skies were clear across the entire CWA with the surface high centered just NW of the area.



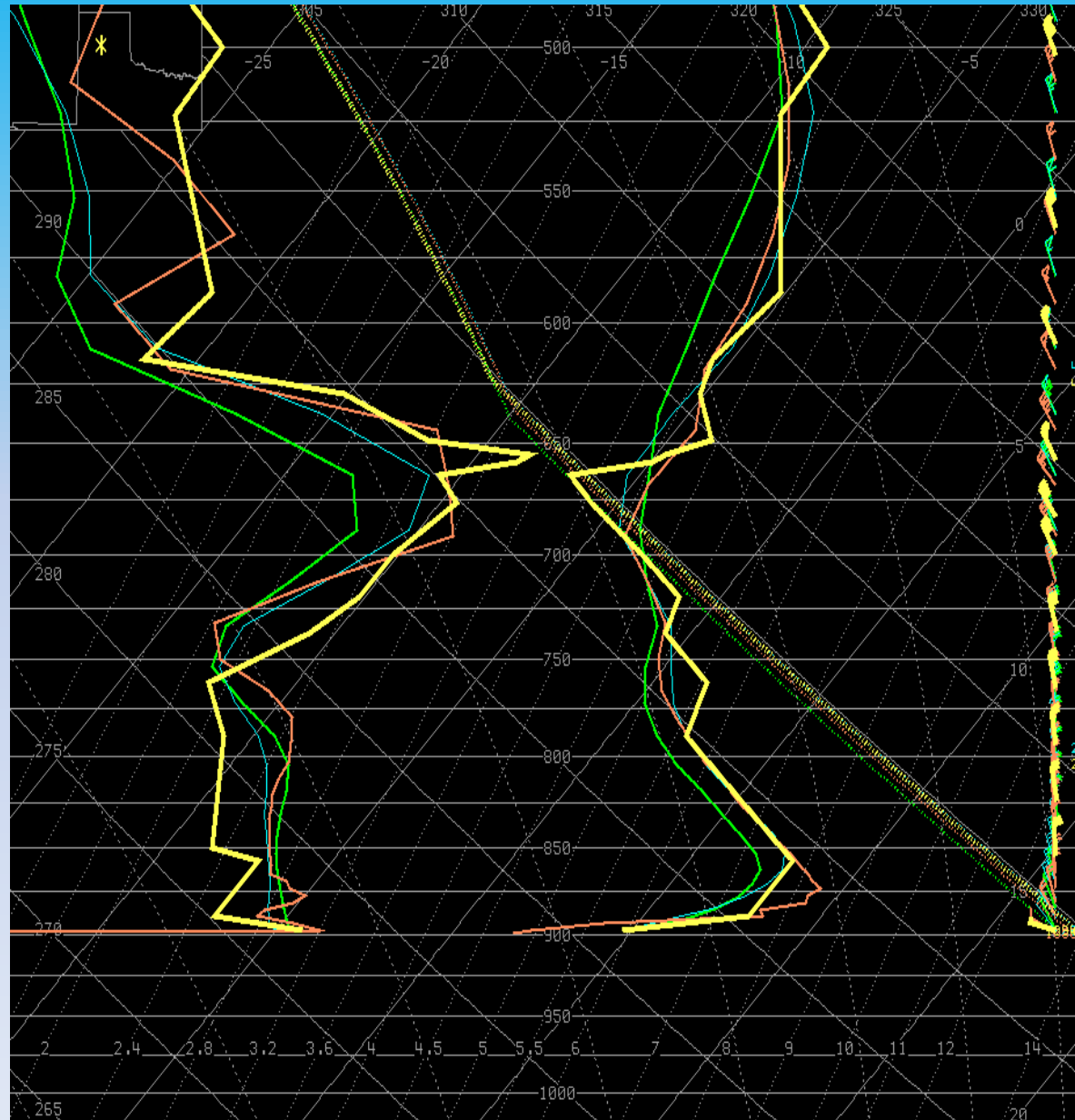
12z KAMA RAOB on October 19

- Notice the steep low level inversion with a surface temperature of 41°F and a temperature of 46°F about 200-1200 ft AGL.
- The 850 mb winds about 1400 ft AGL were around 20 kt.
- An area of deeper moisture existed around 660 mb.



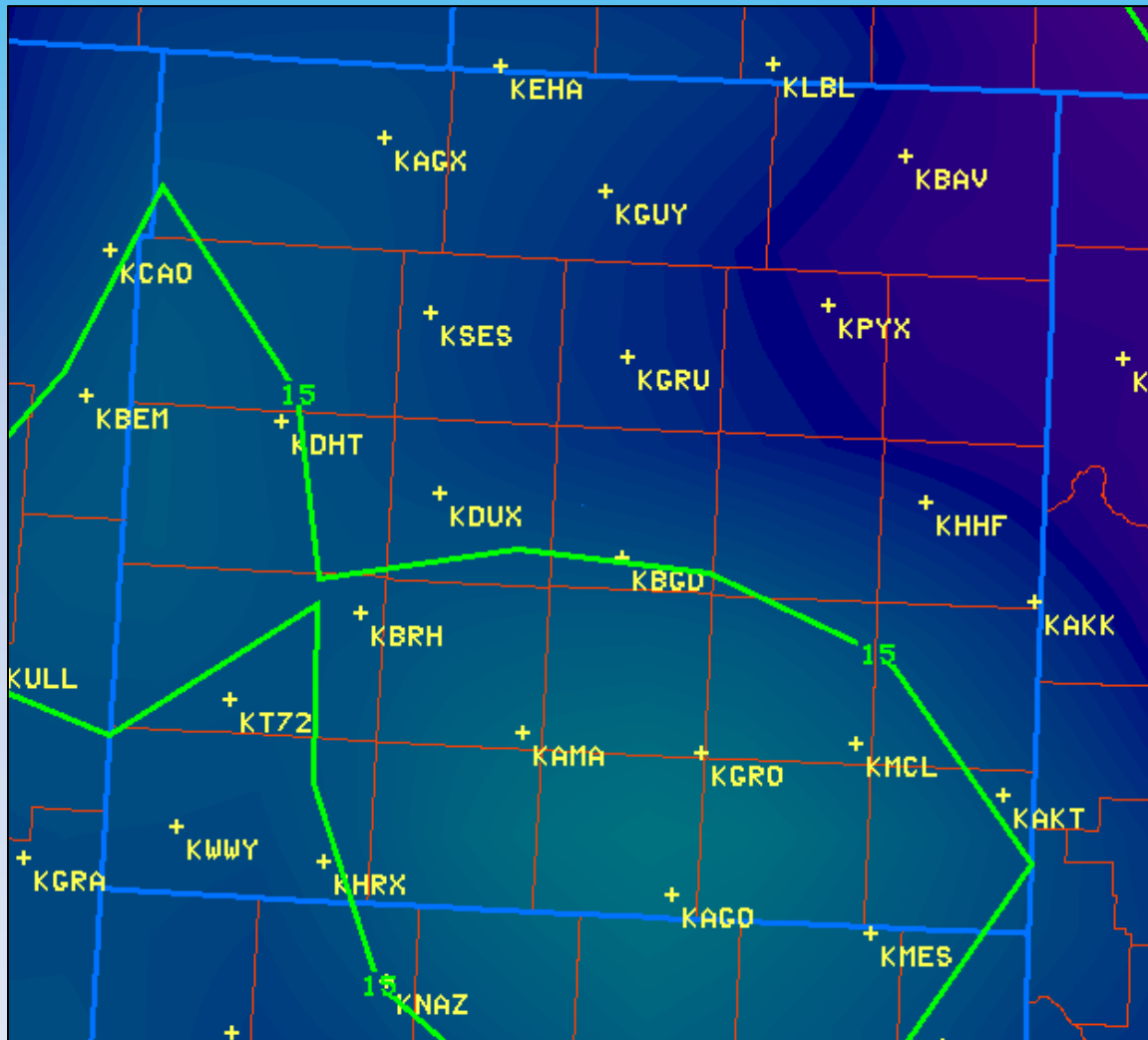
12z Model/RAOB Comparison at KAMA

- The model soundings (18/06z and 18/12z GFSBUFR as well as the 18/12z NAMBUFR) and KAMA RAOB were in general good agreement.
- The 12z NAMBUFR sounding in red depicted a stronger low level inversion and was about 7°F too cold at the surface.



**Did Frost Develop Where
Temperatures Dropped
Below 36F???**

12z MSAS Surface Dewpoint Depression



- They ranged from 12°F in Beaver county to 18°F across the south Texas Panhandle.
- With dry conditions and lack of ground moisture, doubt frost formed across the Panhandles.

Overview

- **A freeze warning and frost advisory did not verify too well on the morning of October 19, 2011 because:**
 - **Surface temperatures were too warm since:**
 1. a strong inversion with temperatures around 45°F just 200 ft AGL may have limited the amount of radiational cooling.
 2. weak downsloping northwest winds 5-10 kt may have caused enough compressional warming to offset radiational cooling.
 3. the passage of a weak mid/upper short wave may have caused surface winds to increase just before sunrise and keep the air near the surface slightly mixed .
 - **Frost likely did not develop as the air near the ground was too dry with lack of significant recent rainfall and surface dewpoint depressions greater than 10°F.**

Lessons Learned

- **A shallow strong low level inversion very close the ground (less than 500 ft AGL) may limit the amount of radiational cooling.**
- **Any light west component to the surface winds may cause weak compressional warming and offset radiational cooling.**
- **We may want to reconsider Frost Advisory criteria to take account of ground or low level moisture.**