October 19, 2011
Frost/Freeze Bust

Michael Scotten
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

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Guidance</th>
<th>CCF</th>
<th>Actual</th>
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<tr>
<td>10/18</td>
<td>12z</td>
<td>21z CCF</td>
<td>33</td>
<td>36</td>
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<tr>
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<td>09z CCF</td>
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<td>10/17</td>
<td>12z</td>
<td>21z CCF</td>
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<tr>
<td>10/19</td>
<td>Morning</td>
<td>Low</td>
<td>33</td>
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### MAV/MET/CCF

<table>
<thead>
<tr>
<th>Variable</th>
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<th>Actual</th>
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<tr>
<td>AMA</td>
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<tr>
<td>TEMPS</td>
<td>34/33/-99</td>
<td>33</td>
<td>36</td>
</tr>
<tr>
<td>POP12</td>
<td>0/2/-99</td>
<td>33</td>
<td>36</td>
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<tr>
<td>DHT</td>
<td>30/30/-99</td>
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<td>37</td>
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<tr>
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<tr>
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<td>POP12</td>
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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
Hatched area includes **Freeze** area (T <= 32°F).
10/18 4 pm Forecast Vs. Observed 10/19 Morning Lows

Hatched area includes **Frost** area \((32^\circ F < T \leq 36^\circ F)\)
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.
• 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.
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.
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°C too cold at the surface.
Did Frost Develop Where Temperatures Dropped Below 36F???
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.