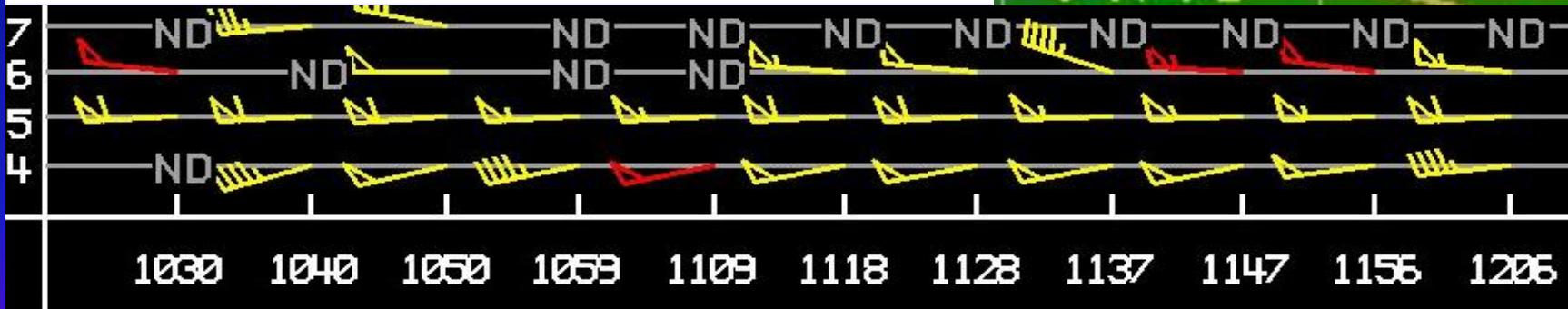


Unusual Nighttime December 20, 2010 Wind Event

AVIATION WEATHER WARNING
NATIONAL WEATHER SERVICE AMARILLO TX
412 AM CST MON DEC 20 2010

AN AVIATION WEATHER WARNING HAS BEEN ISSUED FOR RICK HUSBAND INTERNATIONAL AIRPORT AND TRADEWIND AIRPORT FROM 4 AM UNTIL 8 AM MONDAY.

AN AREA OF LOW PRESSURE OVER EASTERN NEW MEXICO AND COLORADO HAS RESULTED IN SOUTHWEST WINDS TO INCREASE TO 30 KNOTS WITH GUSTS TO 40 KNOTS EARLY THIS MORNING. GUSTY WEST TO SOUTHWEST WINDS ARE EXPECTED TODAY...BUT SPEEDS SHOULD BE UNDER 40 KTS.



METAR KAMA 201153Z 25027G40KT 10SM CLR 14/02 A2963 RMK AO2 PK WND
25043/1117 SLP003 T01440017 10156 20050 56003 \$

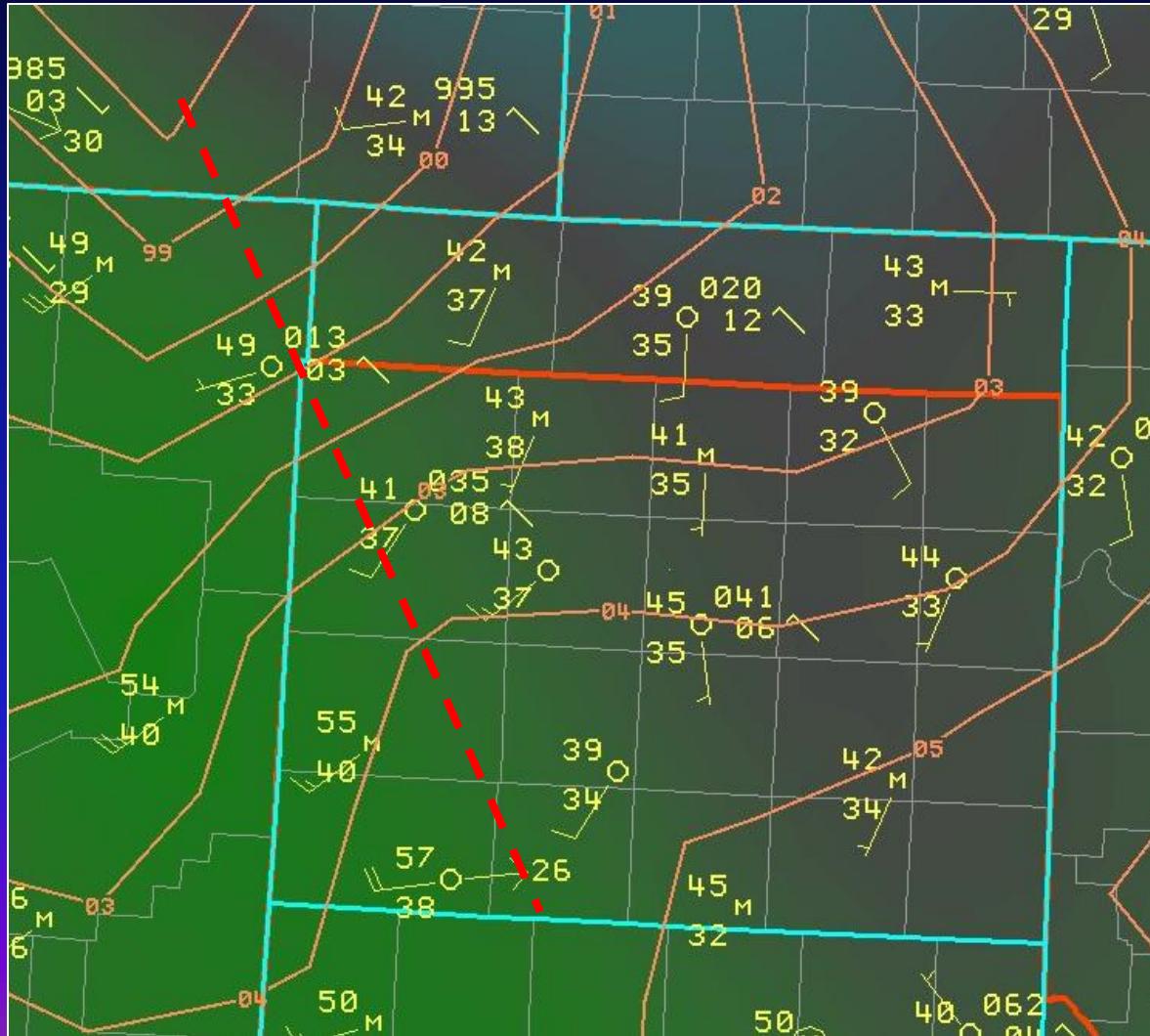


Michael Scotten

What happened?

- Strong non-convective downsloping winds began during the early morning hours on 12/20/2010 across the southern Texas Panhandle then slowly diminished during the late morning and early afternoon hours.
- KAMA had peak wind gusts of 43 kts (49 mph) at 424 and 517 am CST. These winds warranted the issuance of an Airport Weather Warning.

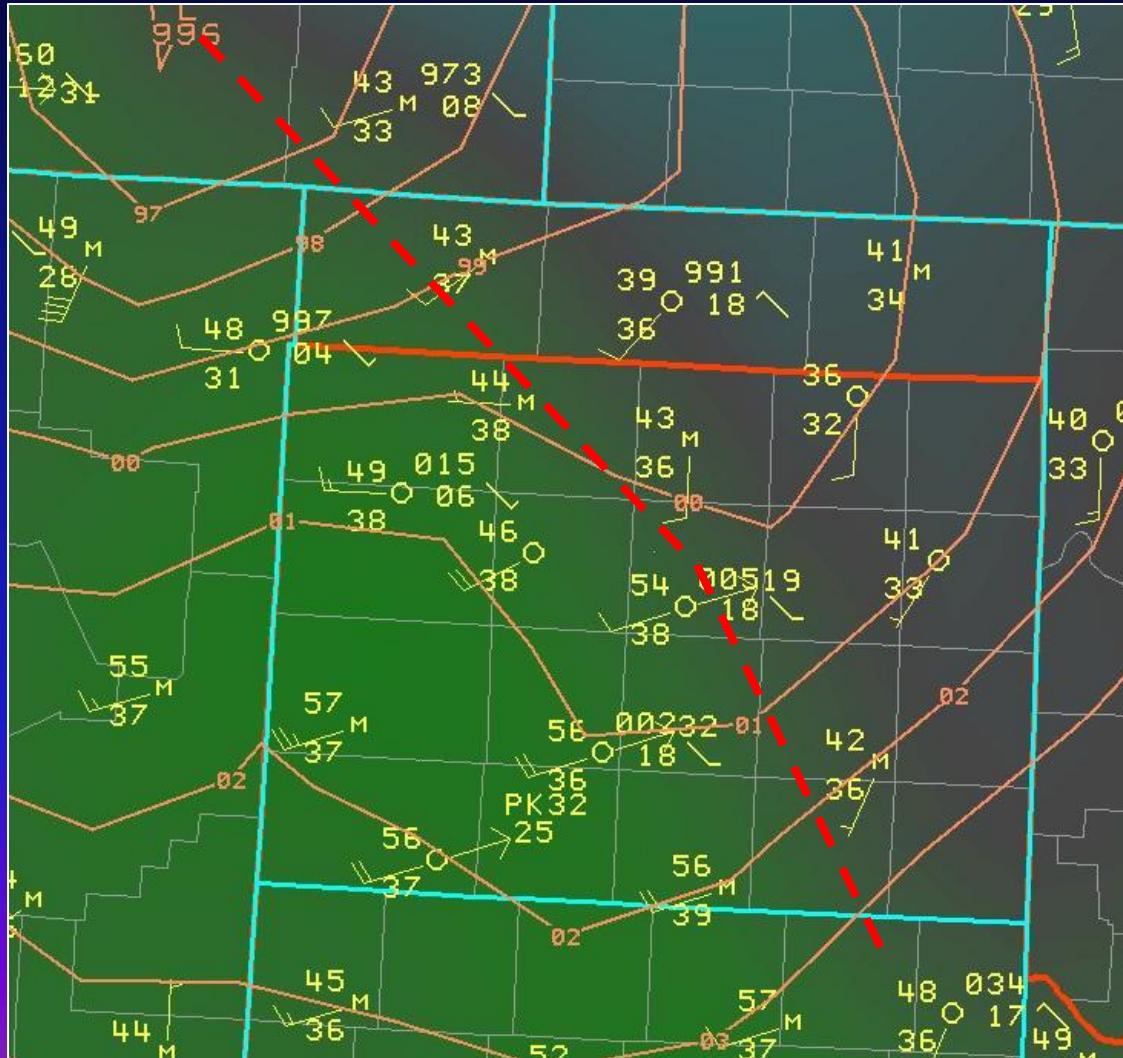
06z Obs/MSLP/Temp



- Lee surface low was centered over southeast Colorado with surface trough extending southeast as depicted in dashed line.

- Behind surface trough, warmer temps, better vertical mixing, and stronger winds were occurring.

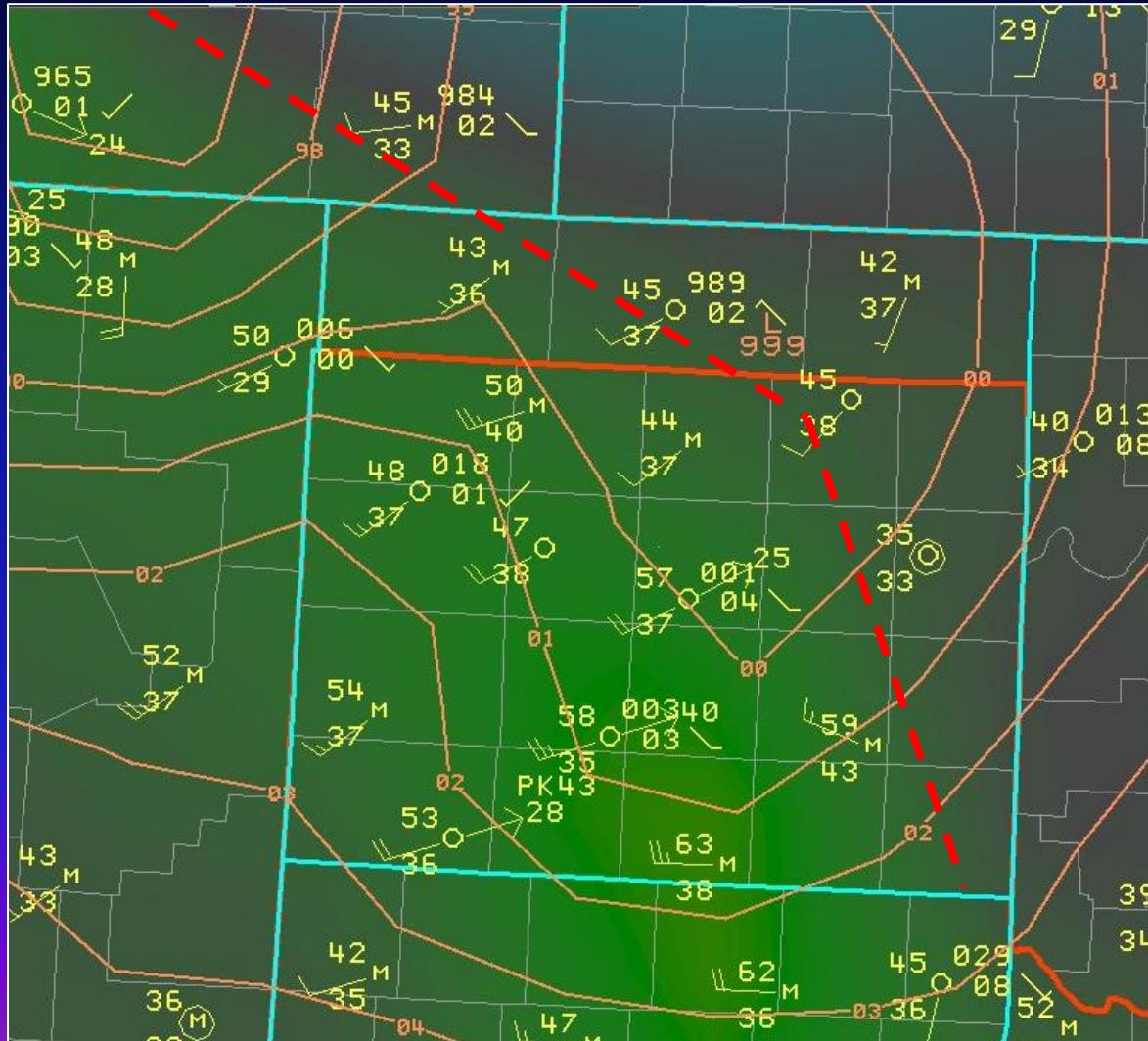
09z Obs/MSLP/Temp



- KAMA reported a wind shift and significant increase in wind speed and temp.

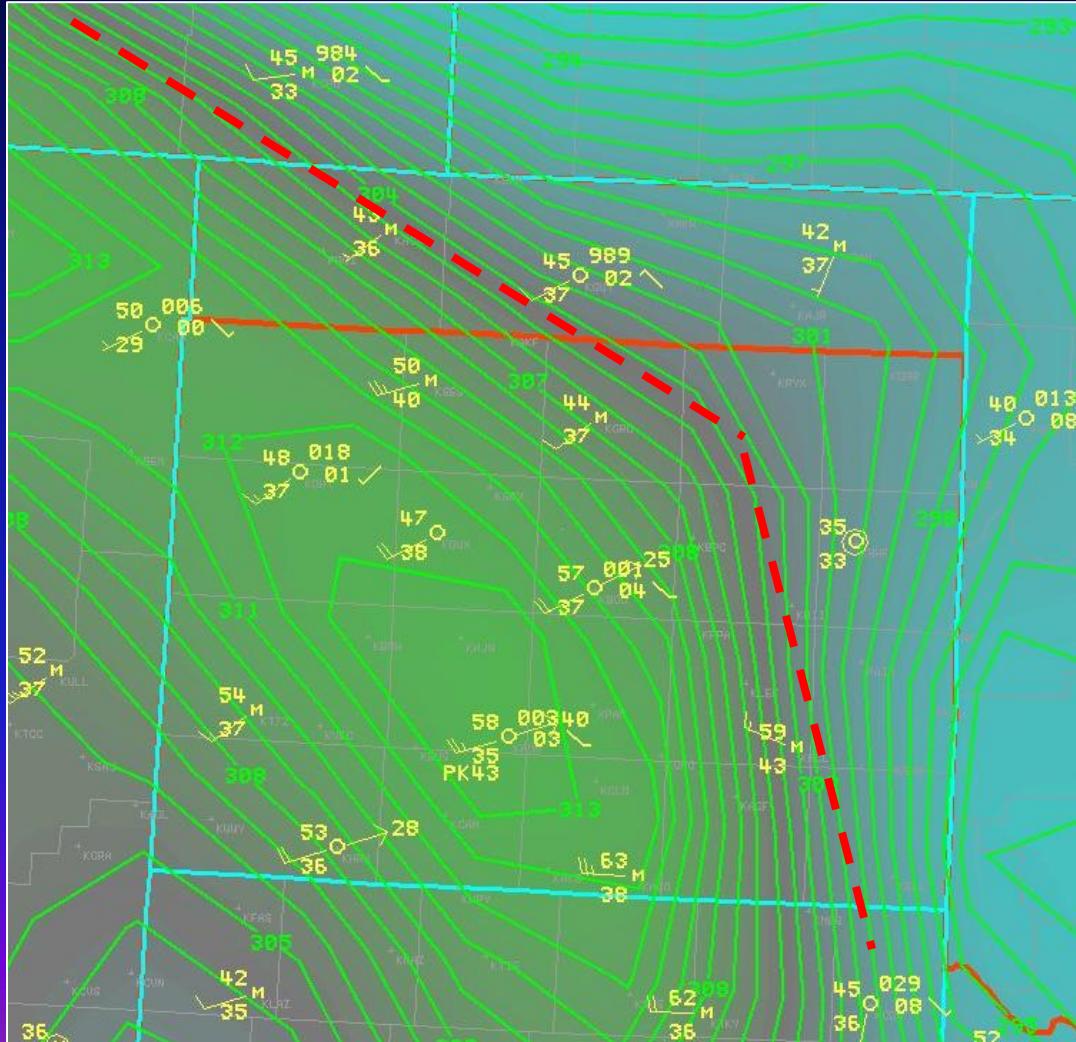
- KBGD reported similar results though less increase in wind speed and temp. Also, this site reported a 3 hour MSLP fall of 3.6 mb.

12z Obs/MSLP/Temp



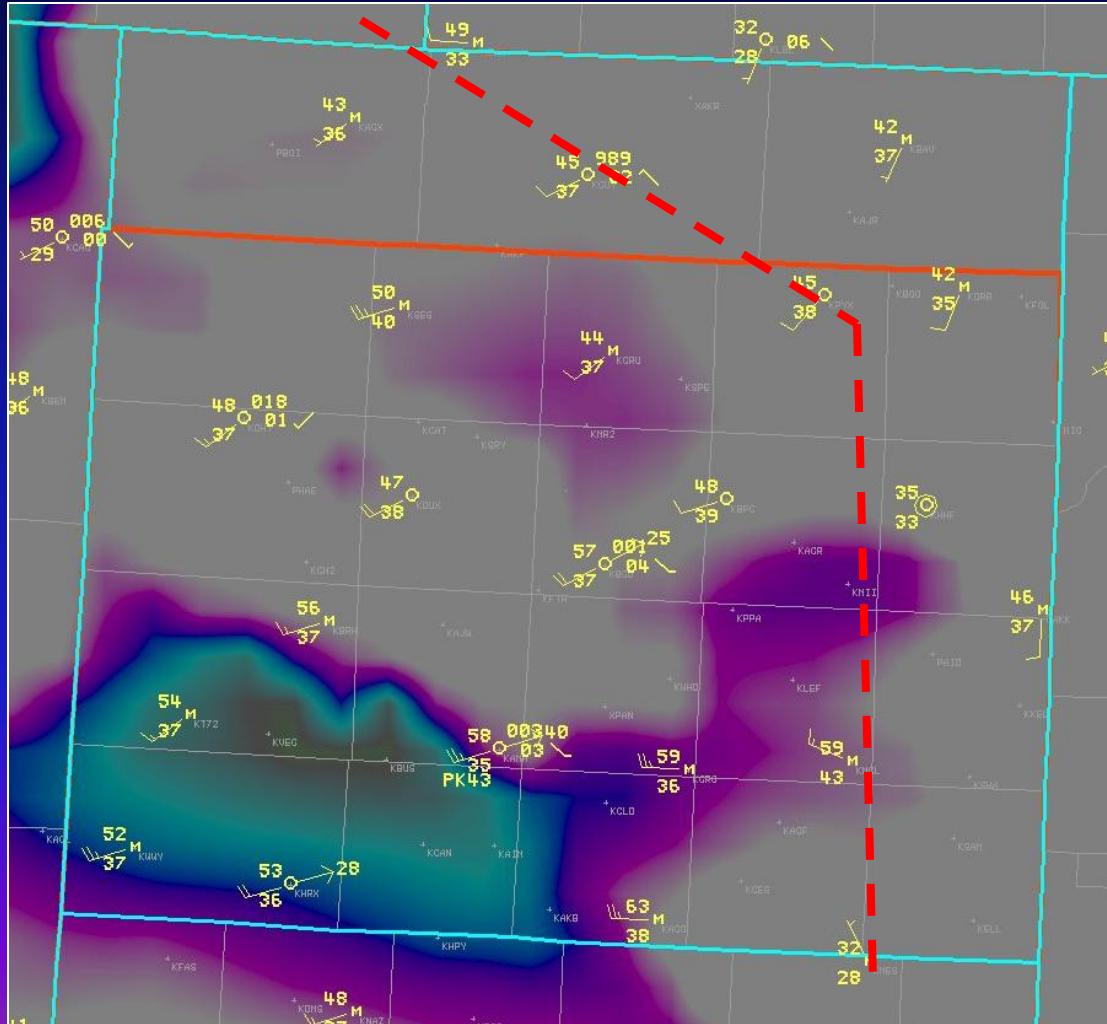
- KAMA reported strong winds with gusts to 43 kts (49 mph) along with unseasonably warm temps for so early in the morning.
 - Strong downsloping winds adiabatically warmed the air near the surface behind the trough.

12z RUC Obs and Theta E



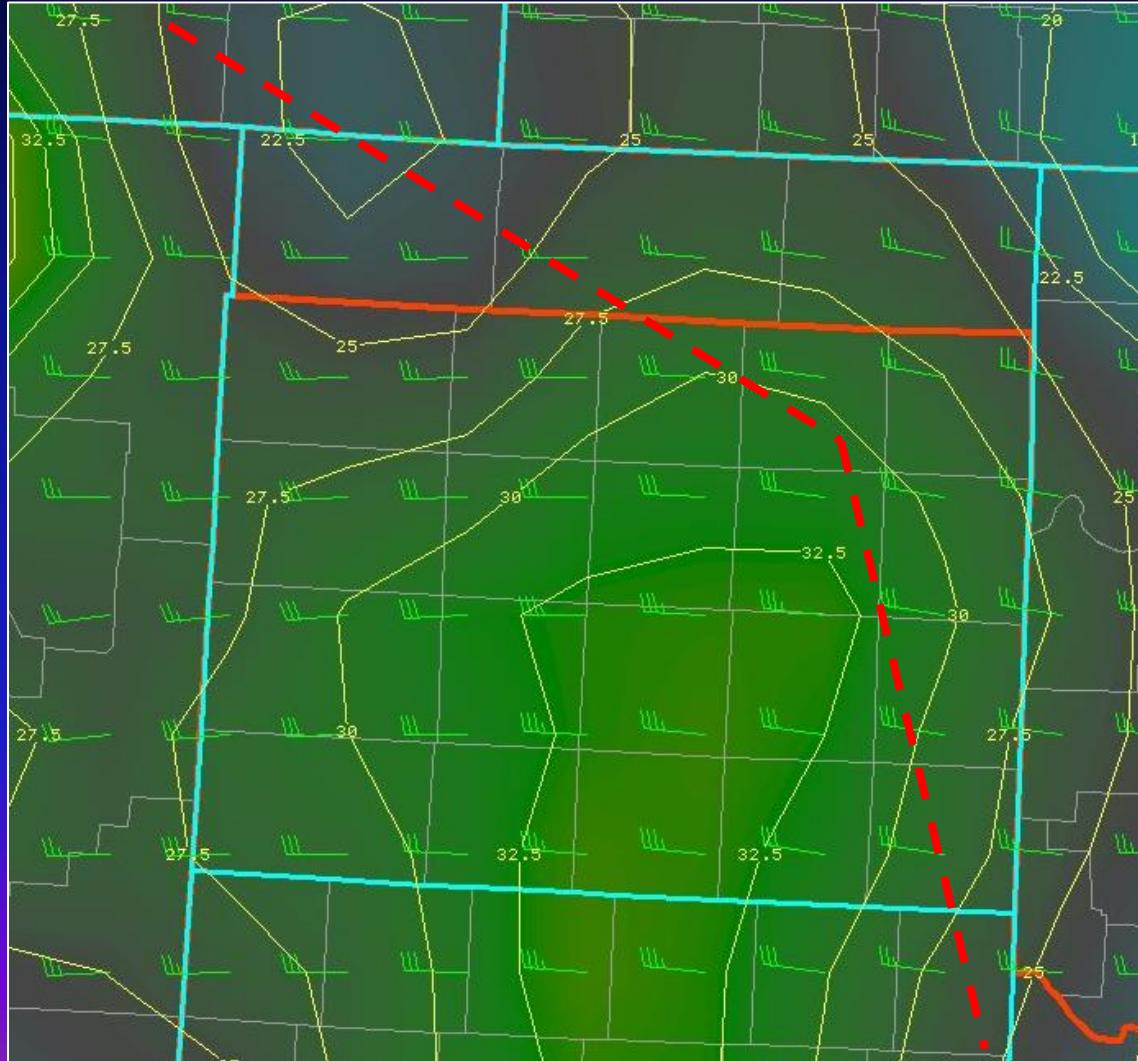
- Highest winds and warmest temps occurred behind the surface trough in Theta E maximum axis from near KDHT to KAMA.

RUC 12z 0-1 km AGL Lapse Rates



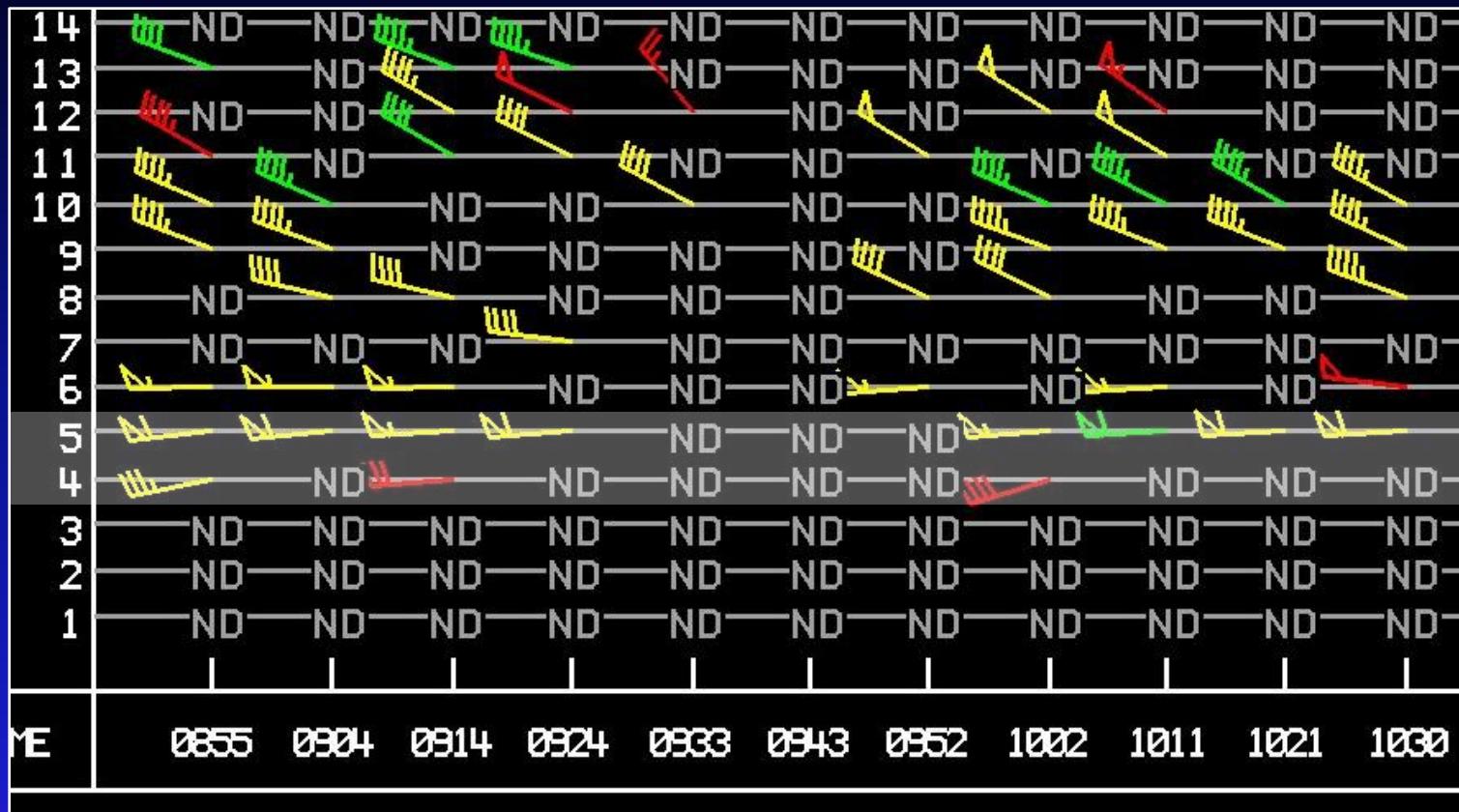
- Best 0-1 km AGL Lapse Rates were over the southwest Texas Panhandle where best mixing and highest winds occurred.
- Snow cover and weaker lapse rates likely stabilized the air near the surface and caused weaker winds over the north Texas Panhandle and Oklahoma Panhandle.

12z SREF 0-1 km AGL Wind



- Strongest 0-1 km AGL jet of 30-35 kts was forecast over the south Texas Panhandle, where the strongest surface winds occurred.

KAMA VWP 0855-1030z



- Winds at 5000 ft MSL were around 260 degrees at 60 kts. At 4000 ft MSL, they were 30-40 kts around 250 degrees, which were able to mix down to surface near KAMA and much of the south Texas Panhandle on the Caprock.

KAMA VWP 1030-1206z



- Winds at 4000 ft MSL increased to 40-50 kts at 250/260 degrees which were able to mix down to surface near KAMA. Peak gusts of 43 kts at KAMA occurred at 1024z and 1117z.

KAMA Obs 06-19z

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METAR KAMA 201853Z 26022G30KT 10SM CLR 20/M01 A2969 RMK AO2 PK WND  
26034/1827 SLP021 T02001011  
METAR KAMA 201753Z 25023G29KT 10SM CLR 18/00 A2970 RMK AO2 PK WND  
25036/1659 SLP032 T01830000 10183 20133 50006  
METAR KAMA 201653Z 25022G30KT 10SM CLR 16/01 A2971 RMK AO2 PK WND  
24033/1555 SLP038 T01610011  
METAR KAMA 201553Z 25022G33KT 10SM CLR 14/01 A2970 RMK AO2 PK WND  
25034/1503 SLP037 T01440011  
METAR KAMA 201453Z 25023G31KT 10SM CLR 13/01 A2968 RMK AO2 PK WND  
25034/1359 SLP029 T01330011 53015  
METAR KAMA 201353Z 25024G34KT 10SM CLR 14/02 A2966 RMK AO2 PK WND  
25038/1325 SLP021 T01390017  
METAR KAMA 201253Z 26024G36KT 10SM CLR 14/02 A2964 RMK AO2 PK WND  
25038/1207 SLP014 T01440017 $  
METAR KAMA 201153Z 25027G40KT 10SM CLR 14/02 A2963 RMK AO2 PK WND  
25043/1117 SLP003 T01440017 10156 20050 56003 $  
METAR KAMA 201053Z AUTO 25024G35KT 10SM CLR 14/02 A2964 RMK AO2 PK WND  
25043/1024 SLP003 T01440022 $  
METAR KAMA 200953Z AUTO 25027G41KT 10SM CLR 15/02 A2962 RMK AO2 PK WND  
24041/0953 SLP993 T01500017 $  
METAR KAMA 200853Z AUTO 25021G32KT 10SM CLR 13/02 A2964 RMK AO2 PK WND  
25032/0850 SLP002 T01330022 56019 $  
METAR KAMA 200753Z AUTO 25020G25KT 10SM CLR 13/03 A2965 RMK AO2 SLP009  
T01280028 $  
METAR KAMA 200653Z AUTO 22005KT 10SM CLR 08/03 A2968 RMK AO2 SLP023  
T00830028 $  
METAR KAMA 200553Z COR 21009KT 10SM CLR 04/01 A2970 RMK AO2 SLP039  
T00440011 10128 20039 401781050 58006 $
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- Surface trough passage occurred 07-08z.
- Gusts 40 kts or more occurred 0950-12z.

Overview

- Strong non-convective downsloping winds began during the early morning hours on 12/20/2010 then continued through the afternoon hours, slowly diminishing throughout the day across the southern Texas Panhandle.
- A surface trough with unusually low SLP (996-1006 mb) moved through the area.
- The strongest winds were over the southern Texas Panhandle near KAMA where best low level lapse rates and core of 0-1km jet/850 mb were located.
- Weaker lapse rates and snow cover likely limited vertical mixing farther north. As a result, surface winds were weaker.

Lessons Learned For Forecasting Future Nighttime Strong Wind Events

- Strong downsloping winds can reach advisory/AWW criteria and perhaps even high wind warning criteria at night in some rare situations.
- Look for:
 1. 0-1 km AGL jet of 30 kts or greater 240-280 degrees
 2. 850 mb winds 50 kts or greater 240-280 degrees
 3. low SLPs (1010 mb or lower)