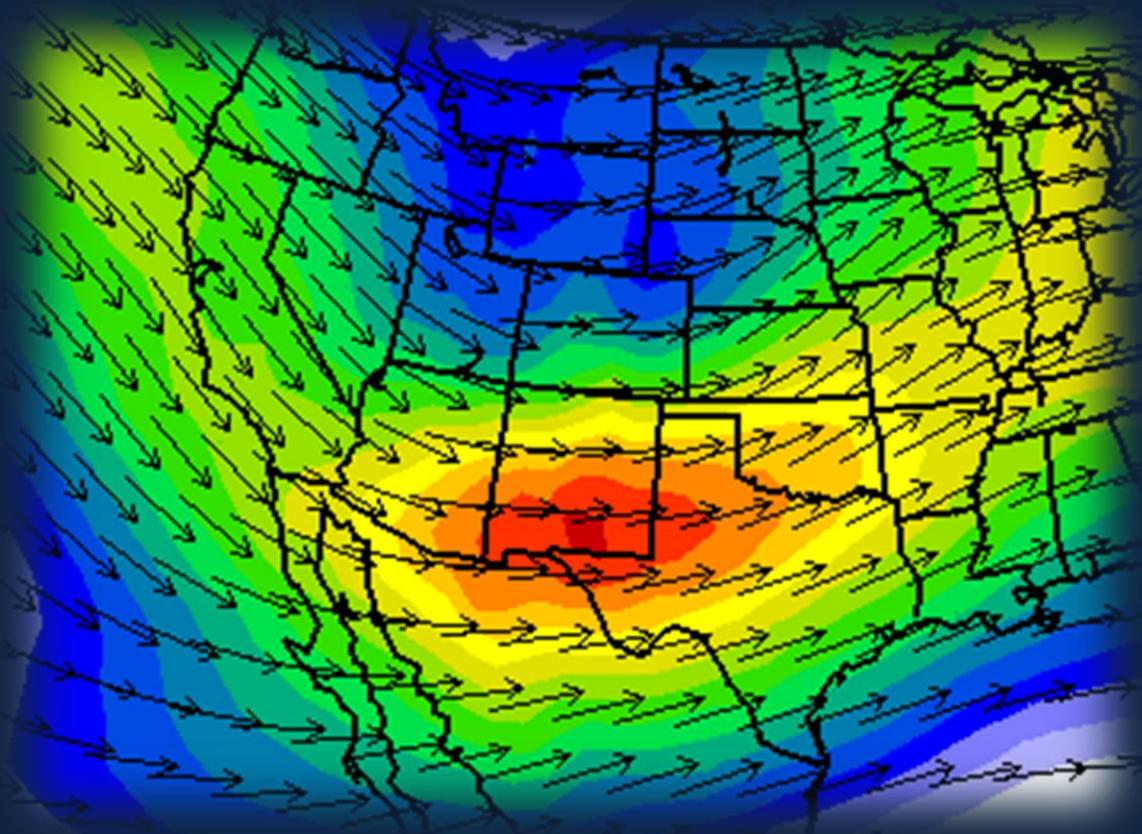


# Operational Guidelines for Forecasting Synoptic Wind Events in the Panhandles



Justyn Jackson

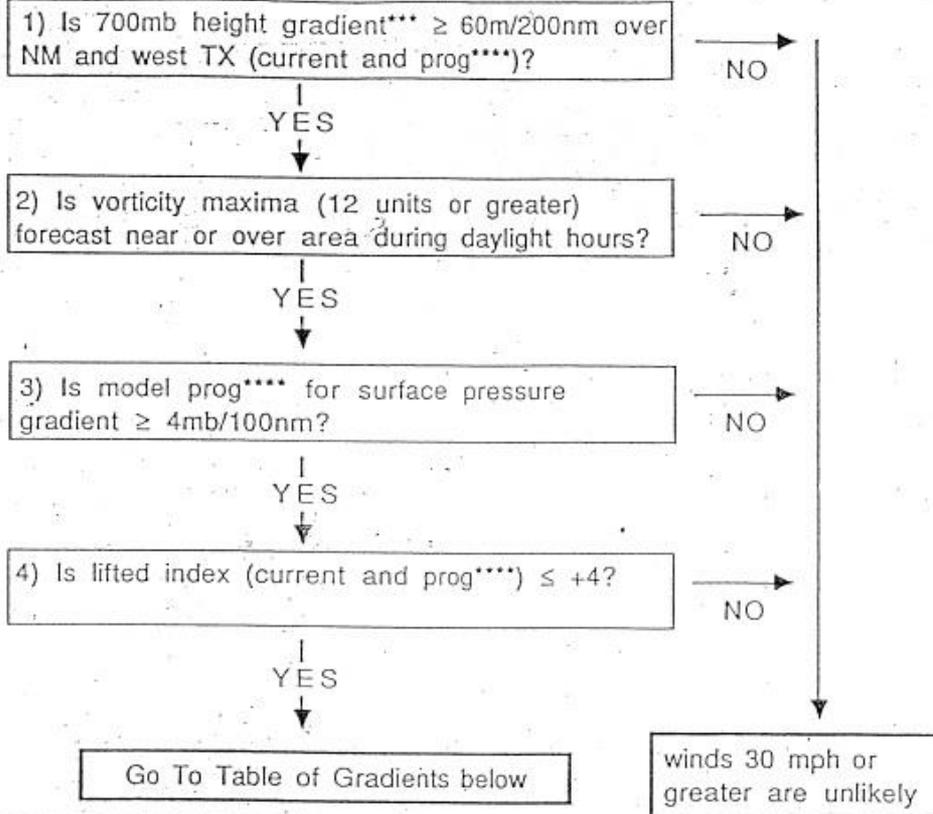
Todd Beal



# Strengths & Limitations

- **This study will:**
  - Help you recognize and anticipate synoptic wind events vs. null events
  - Improve wind verification scores, if applied
- **This study won't:**
  - Help you forecast frontal passage wind events
  - Result in perfect verification scores

DECISION TREE FOR HIGH WINDS (sustained westerly component of 30 mph or greater) IN THE NORTHERN PART OF WEST TEXAS (mainly winter and spring for the first 12 and 24 hour fcst periods)

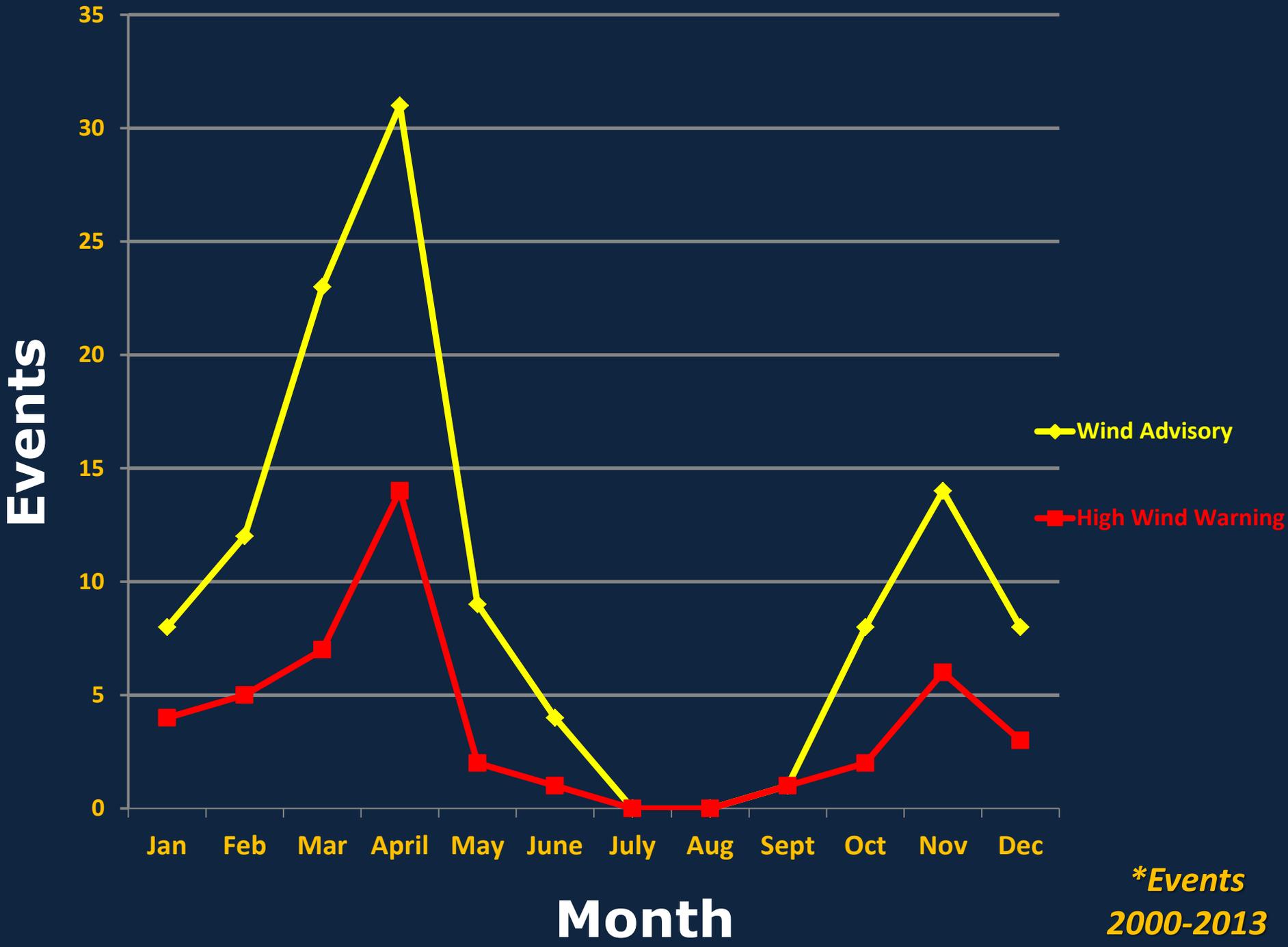


**\*\*\*700 mb Gradient Method**

200nm gradient	Best wind fcst	200nm gradient	Best wind fcst
less than 20M	5 to 15 mph	50-59M	(1)20 to 30 mph
20-29M	10 to 20 mph	**60-69M	(1)25 to 35 mph (g* 40)
30-34M	12 to 22 mph	**70-79M	(2)30 to 40 mph (g* 50)
35-39M	14 to 24 mph	**80-89M	(3)35 to 40 mph (g* 55)
40-49M	(1)15 to 25 mph	**90-99M	(3)40 to 50 mph (g*60+)

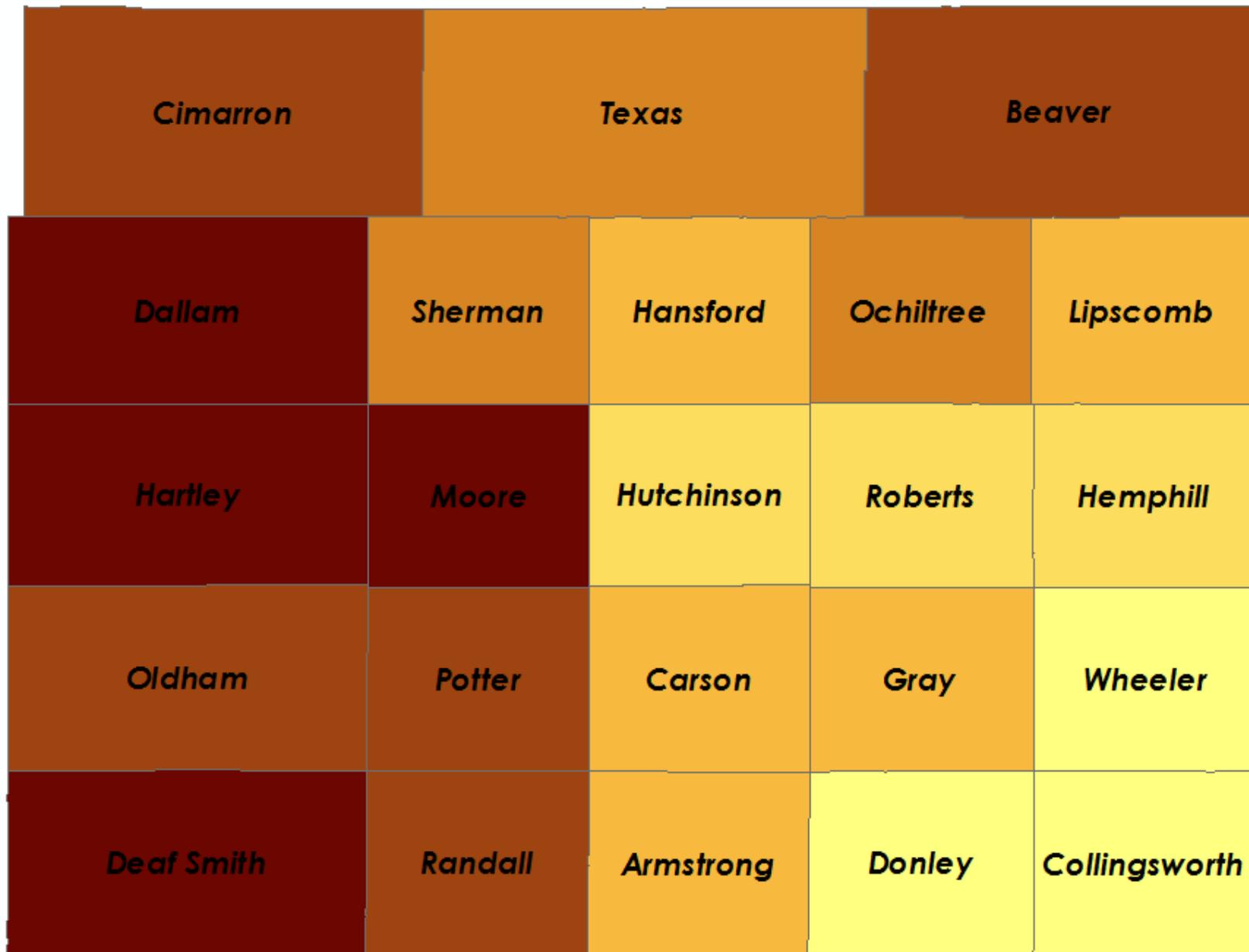
(1) lake wind advisories (2) consider high wind warning (3) high wind warning probable

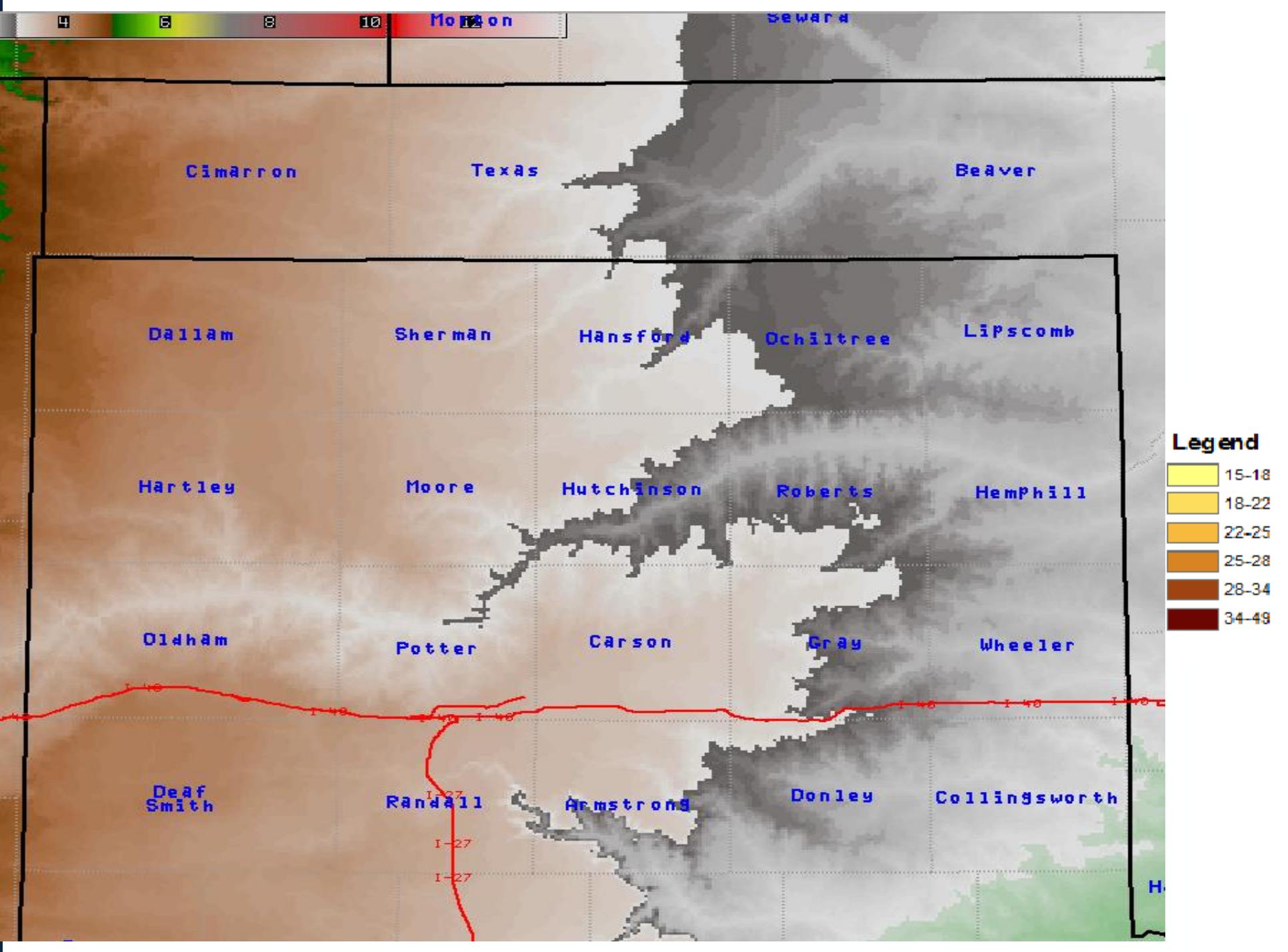
\*occasional gusts to speed shown  
 \*\* these extreme cases usually involve a strong, deepening cyclone moving through the area with no thick clouds and low lifted index values ( ≤ +4). Good idea to think "dust storm" under dry conds.  
 \*\*\* use NCM

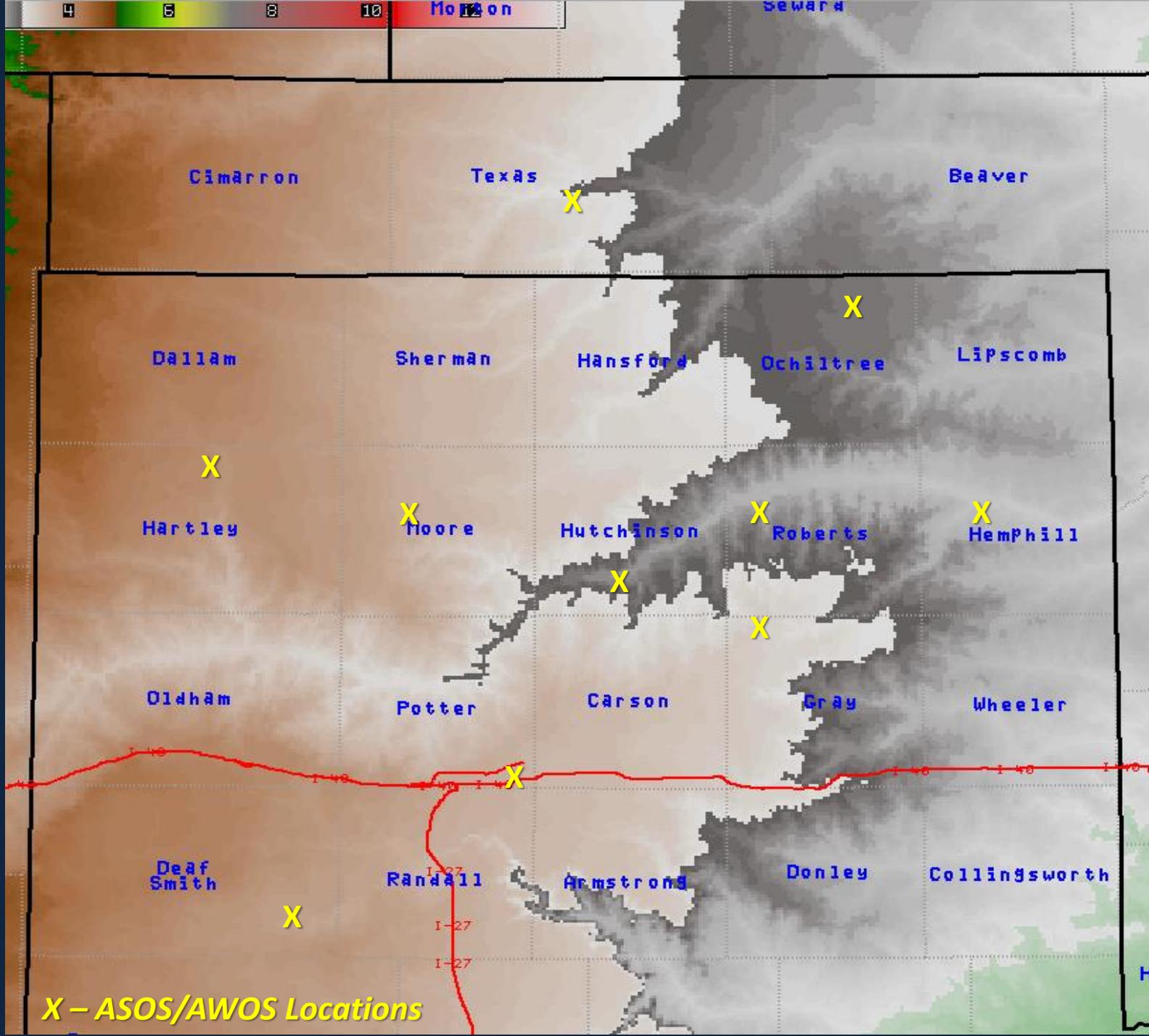


*\*Events  
2000-2013*

# WIND ADVISORIES

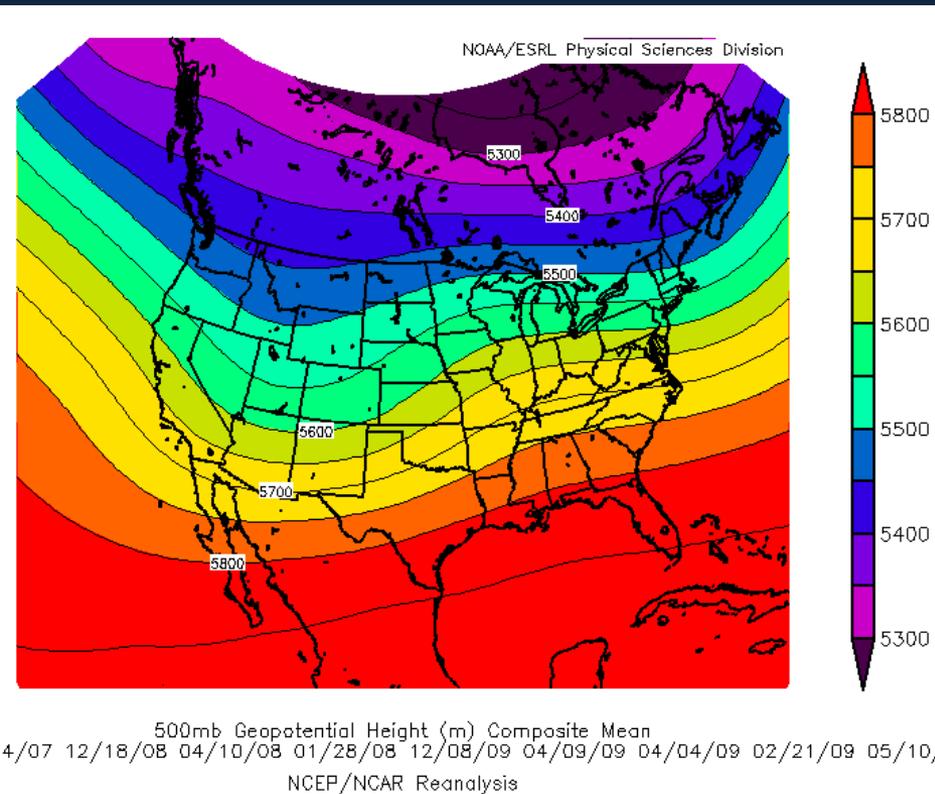




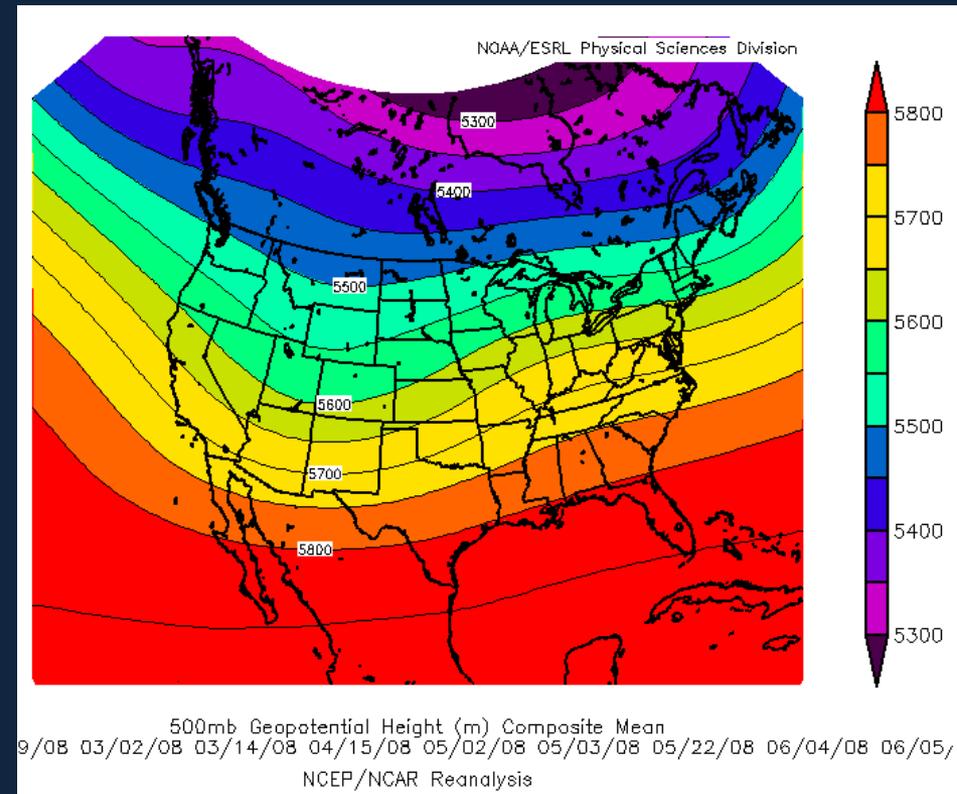


X - ASOS/AWOS Locations

# 500 hPa Height (m) Composite Means

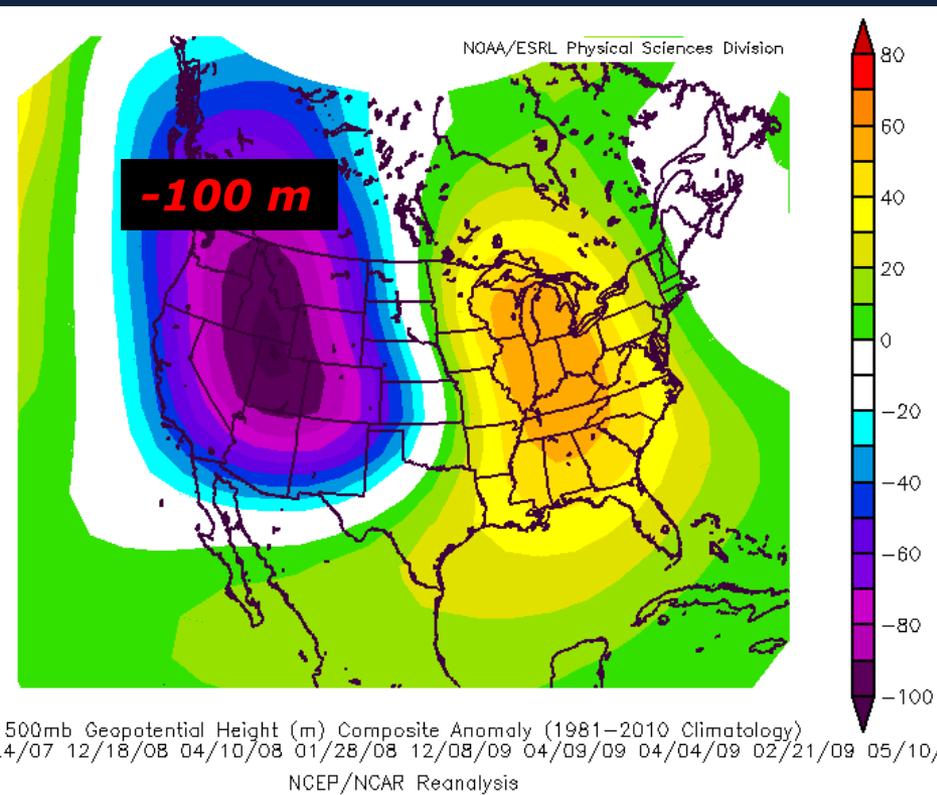


**High Wind**

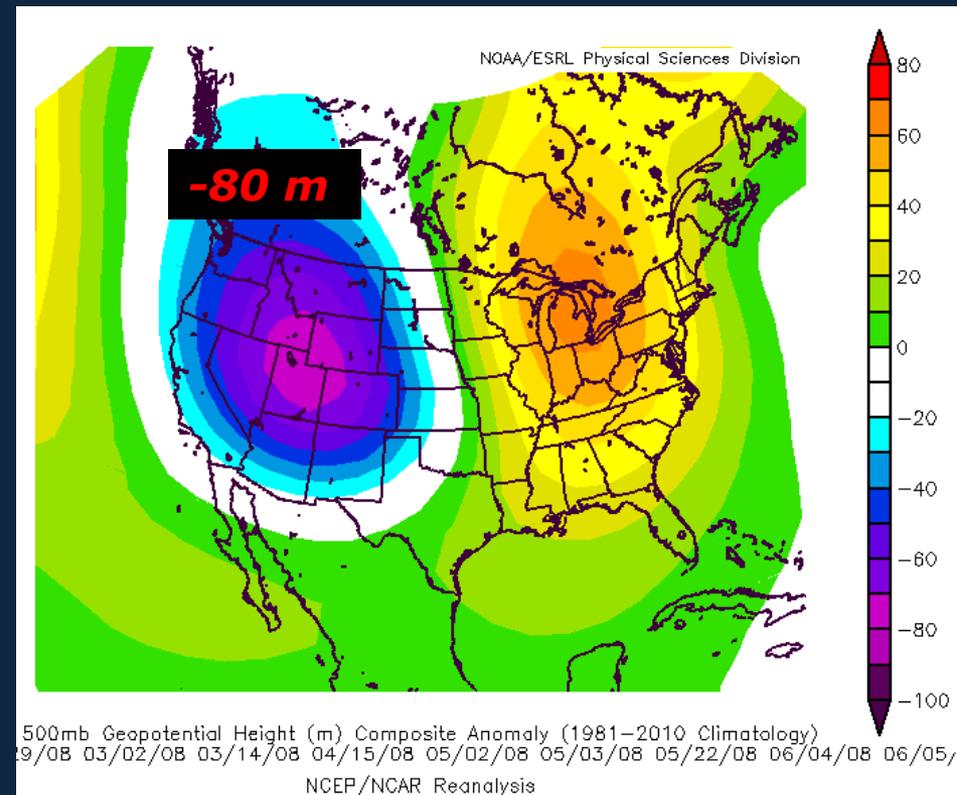


**Wind Advisory**

# 500 hPa Height (m) Composite Anomalies

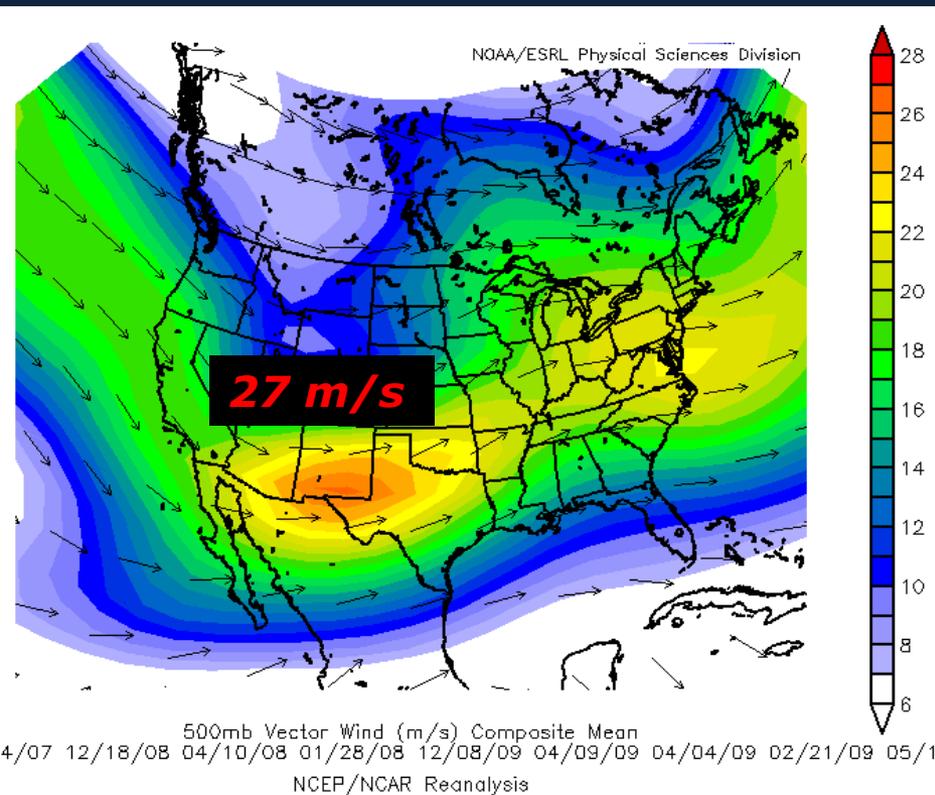


**High Wind**

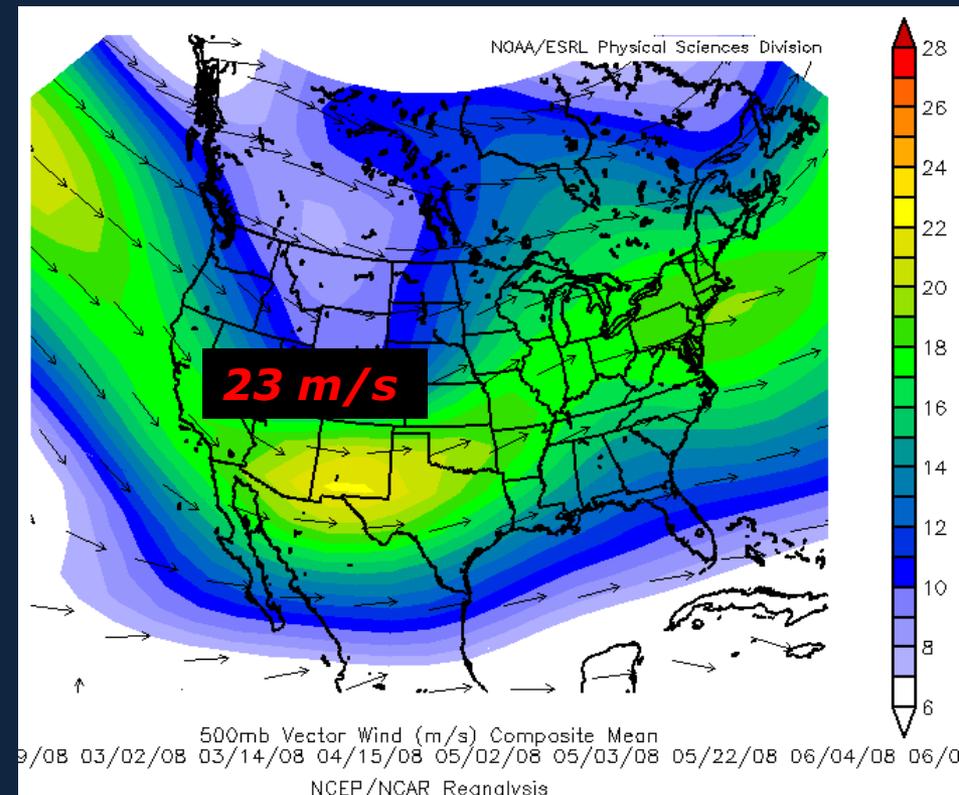


**Wind Advisory**

# 500 hPa Vector (m/s) Composite Means

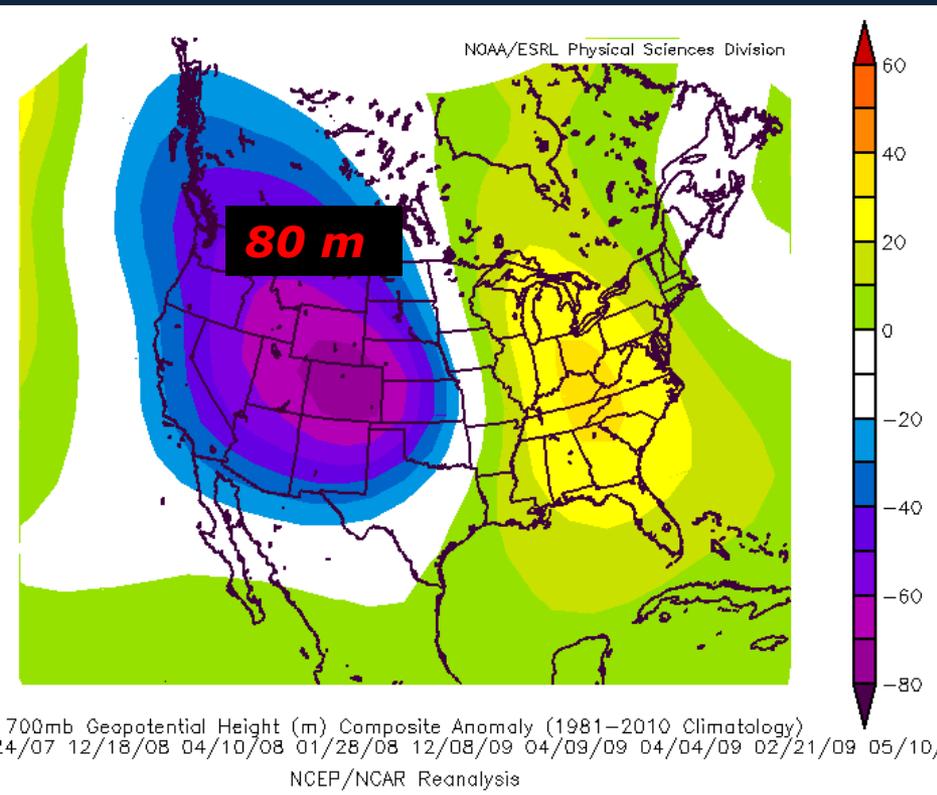


**High Wind**

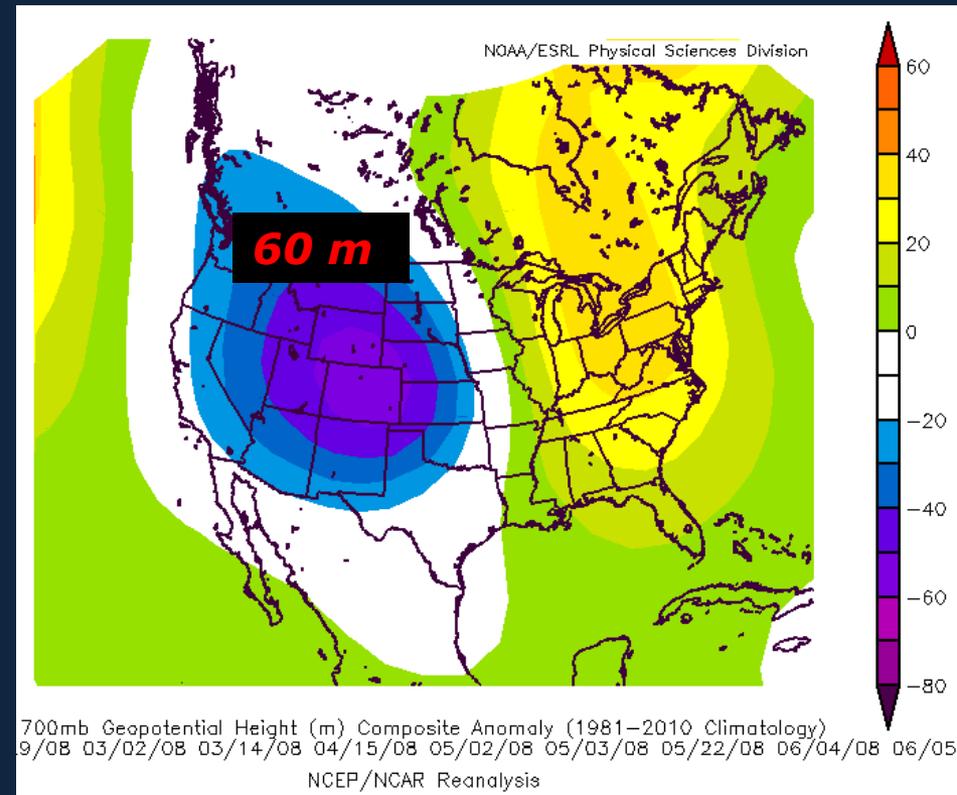


**Wind Advisory**

# 700 hPa Height (m) Composite Anomalies

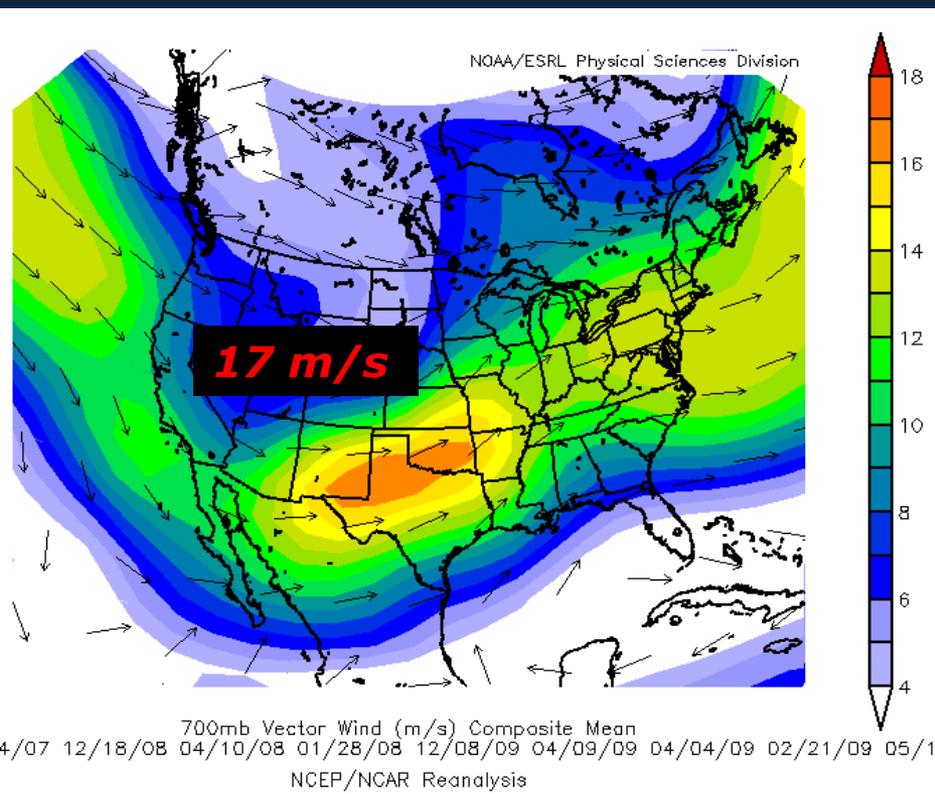


**High Wind**

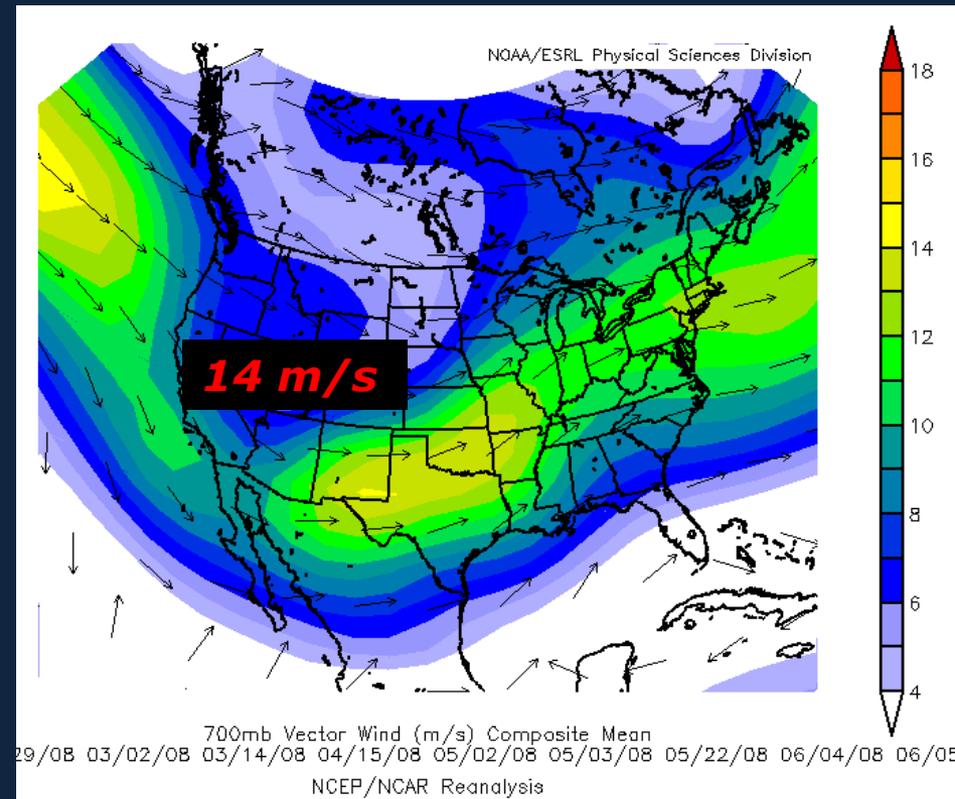


**Wind Advisory**

# 700 hPa Vector (m/s) Composite Means

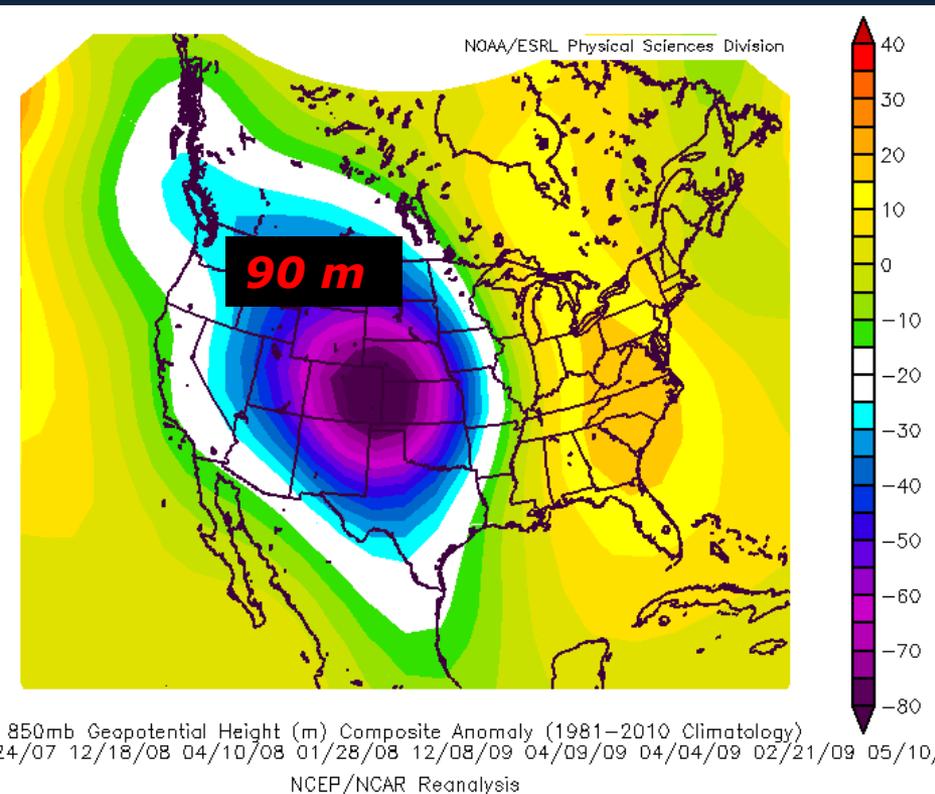


**High Wind**

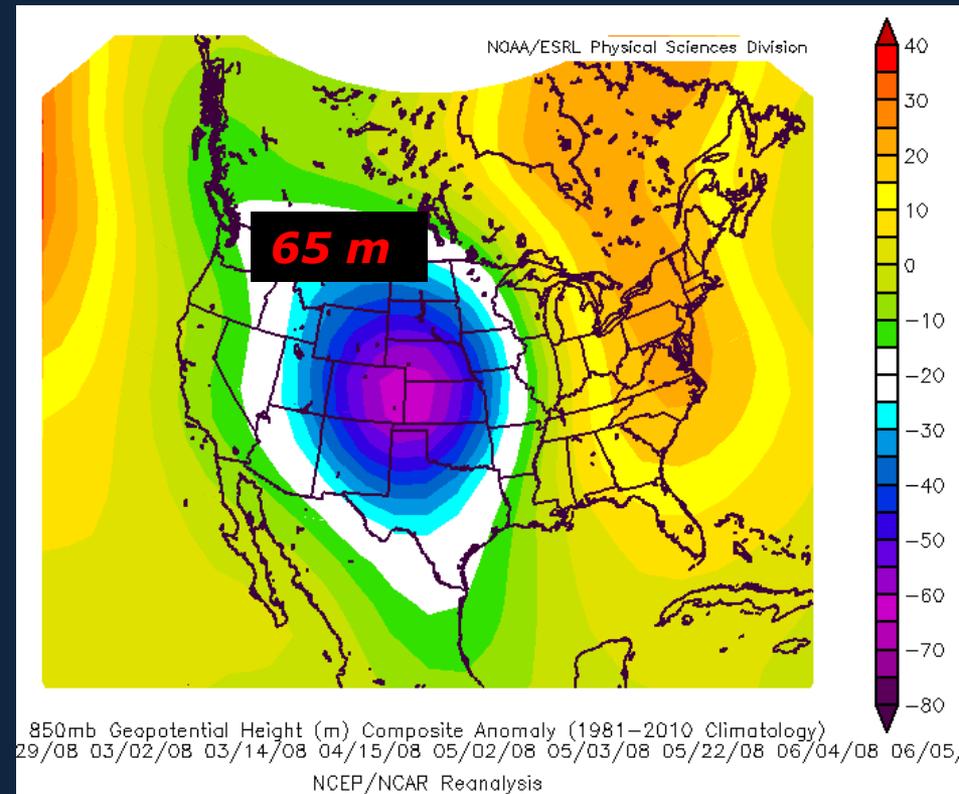


**Wind Advisory**

# 850 hPa Height (m) Composite Anomalies

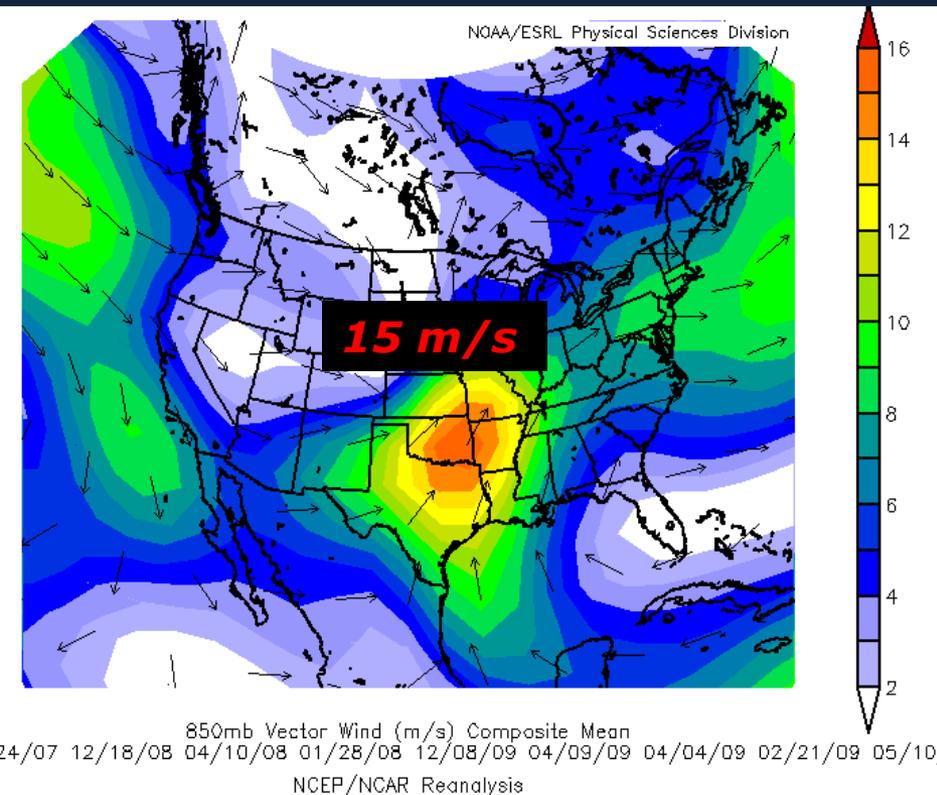


**High Wind**

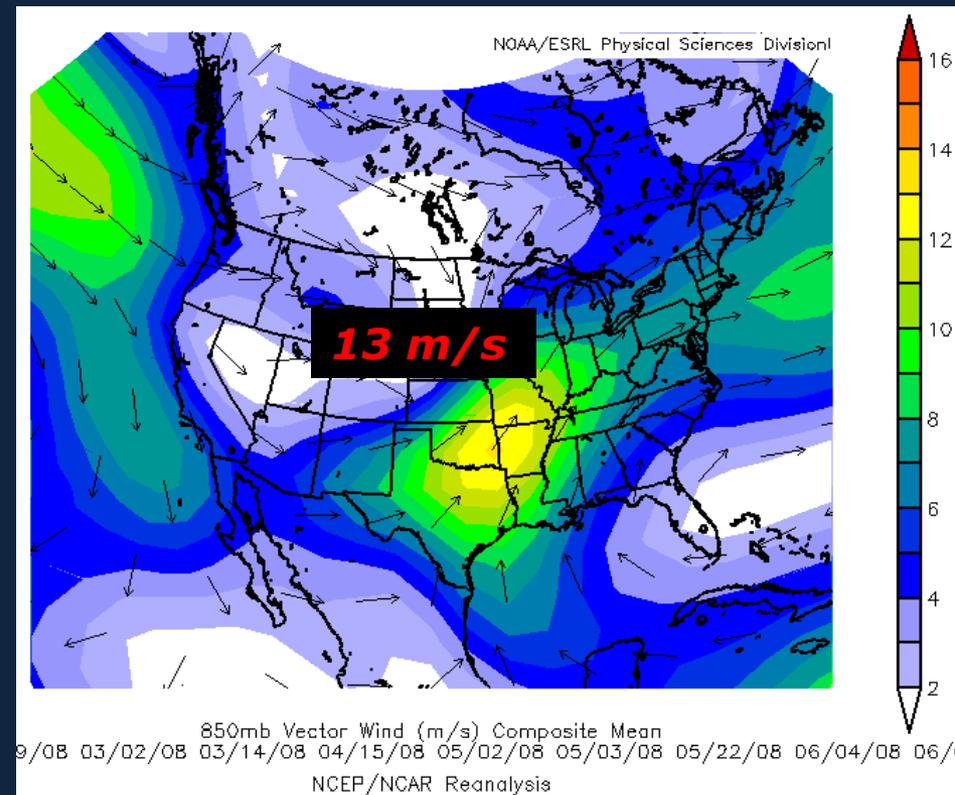


**Wind Advisory**

# 850 hPa Vector (m/s) Composite Anomalies

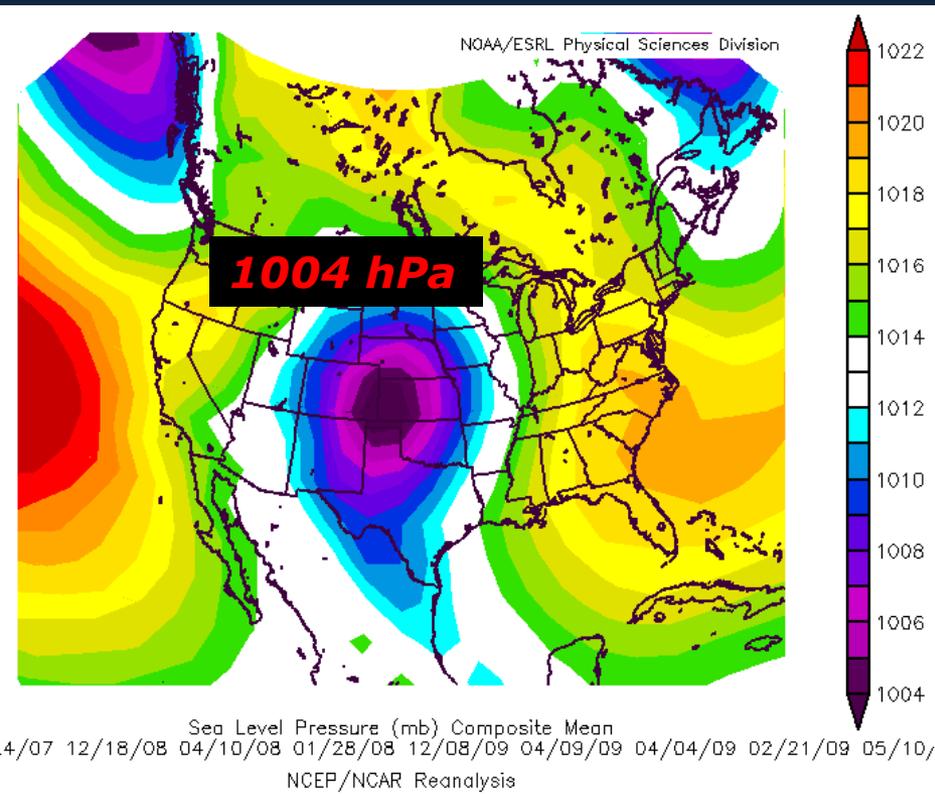


**High Wind**

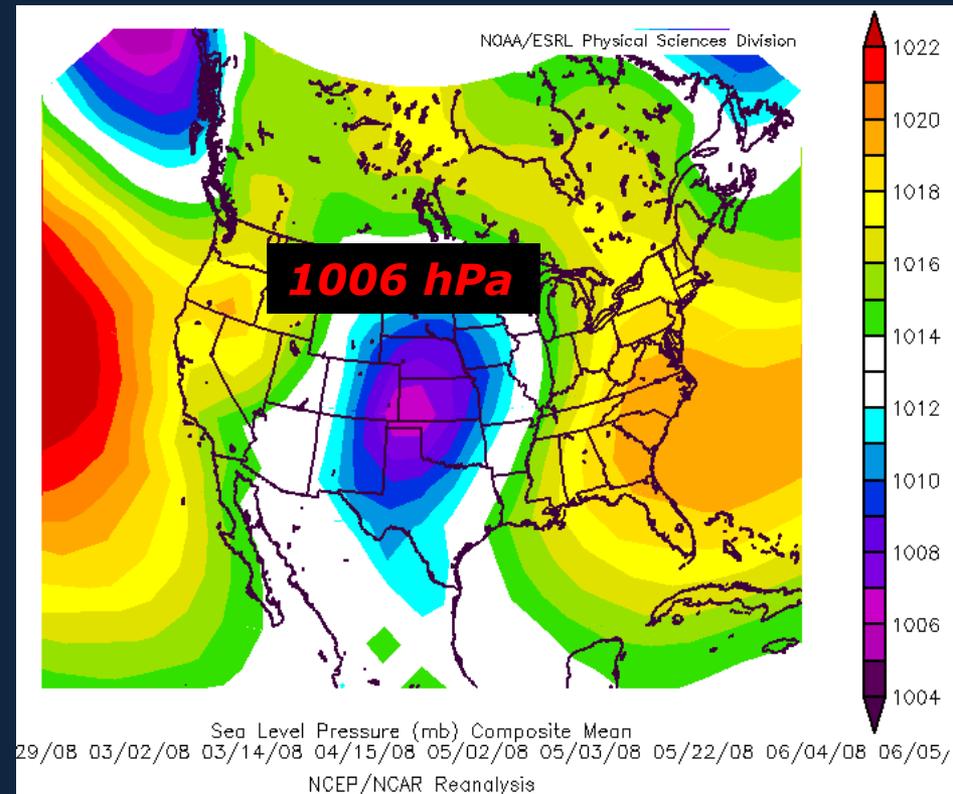


**Wind Advisory**

# Surface Pressure (hPa) Composite Means

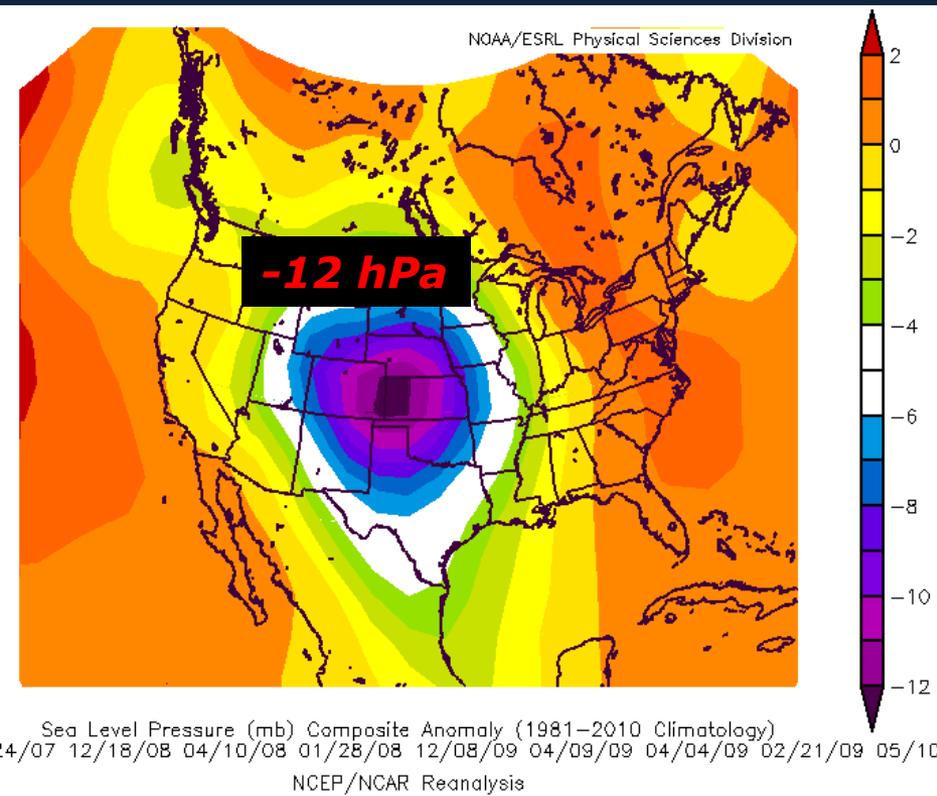


**High Wind**

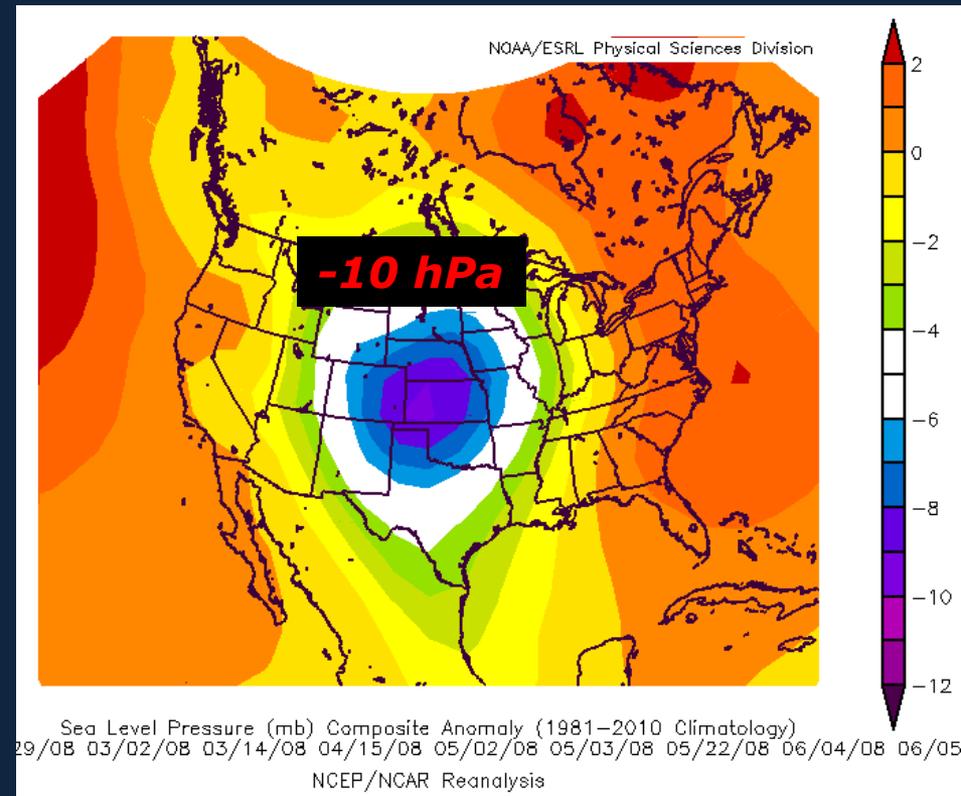


**Wind Advisory**

# Surface Pressure (hPa) Composite Anomalies

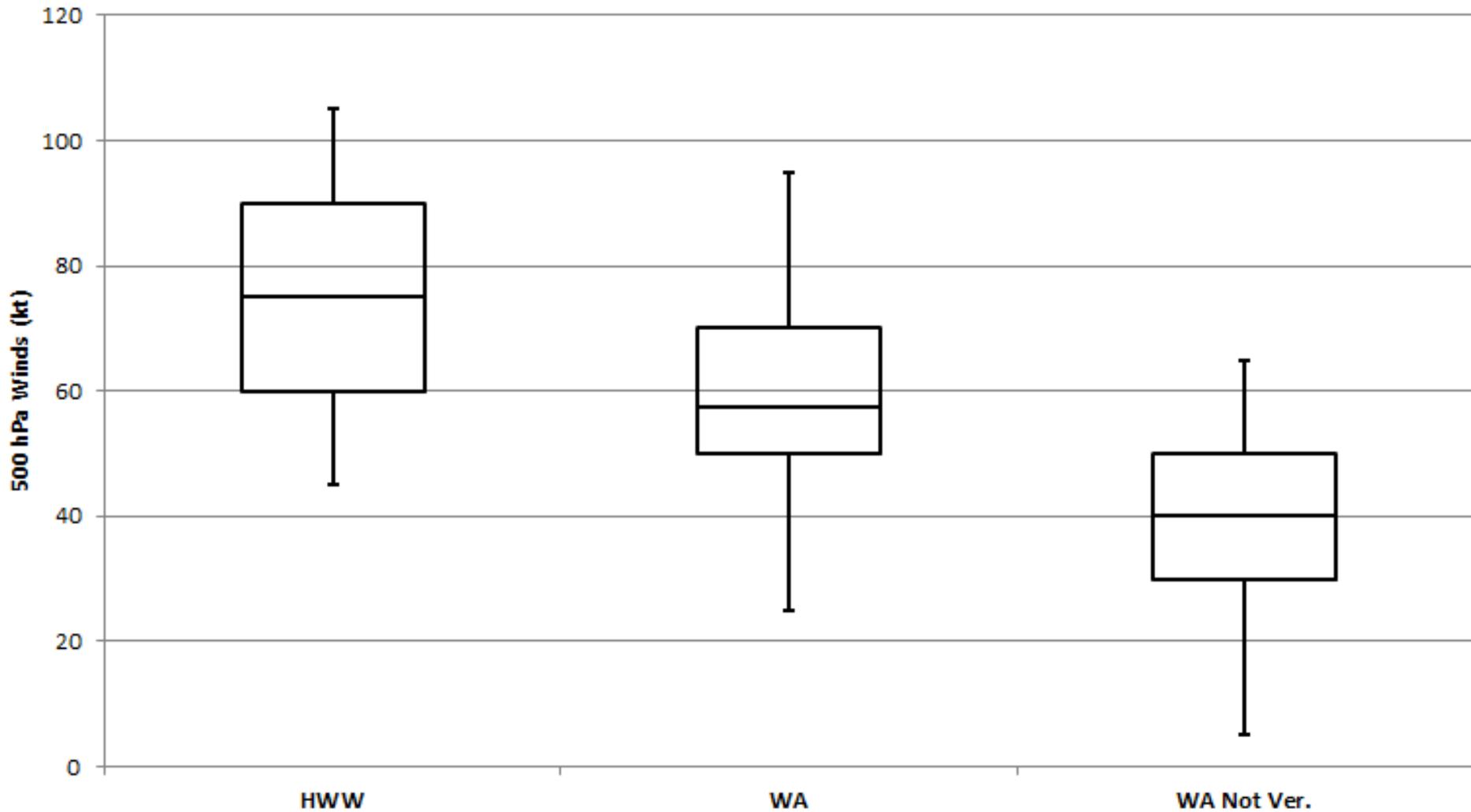


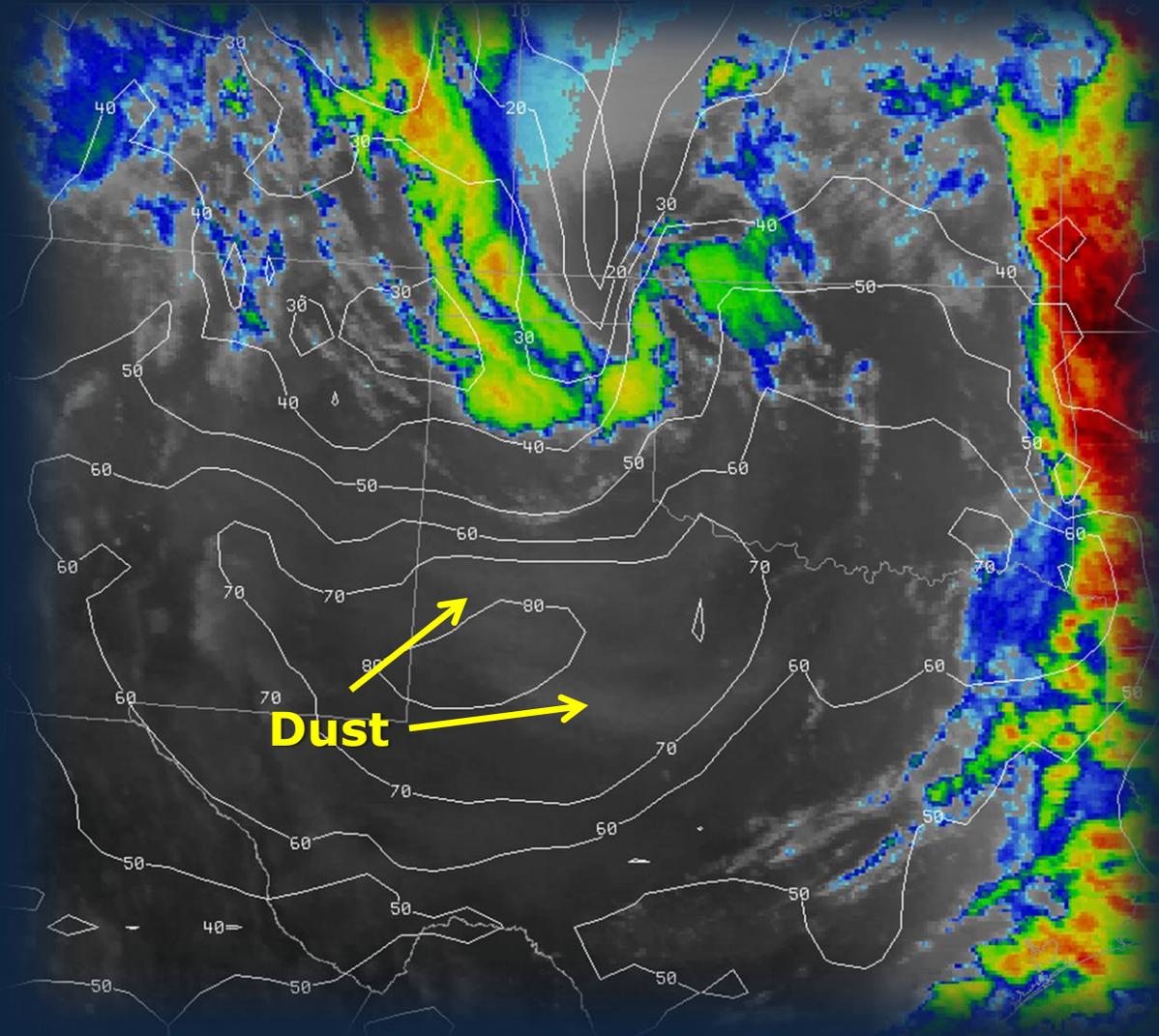
**High Wind**



**Wind Advisory**

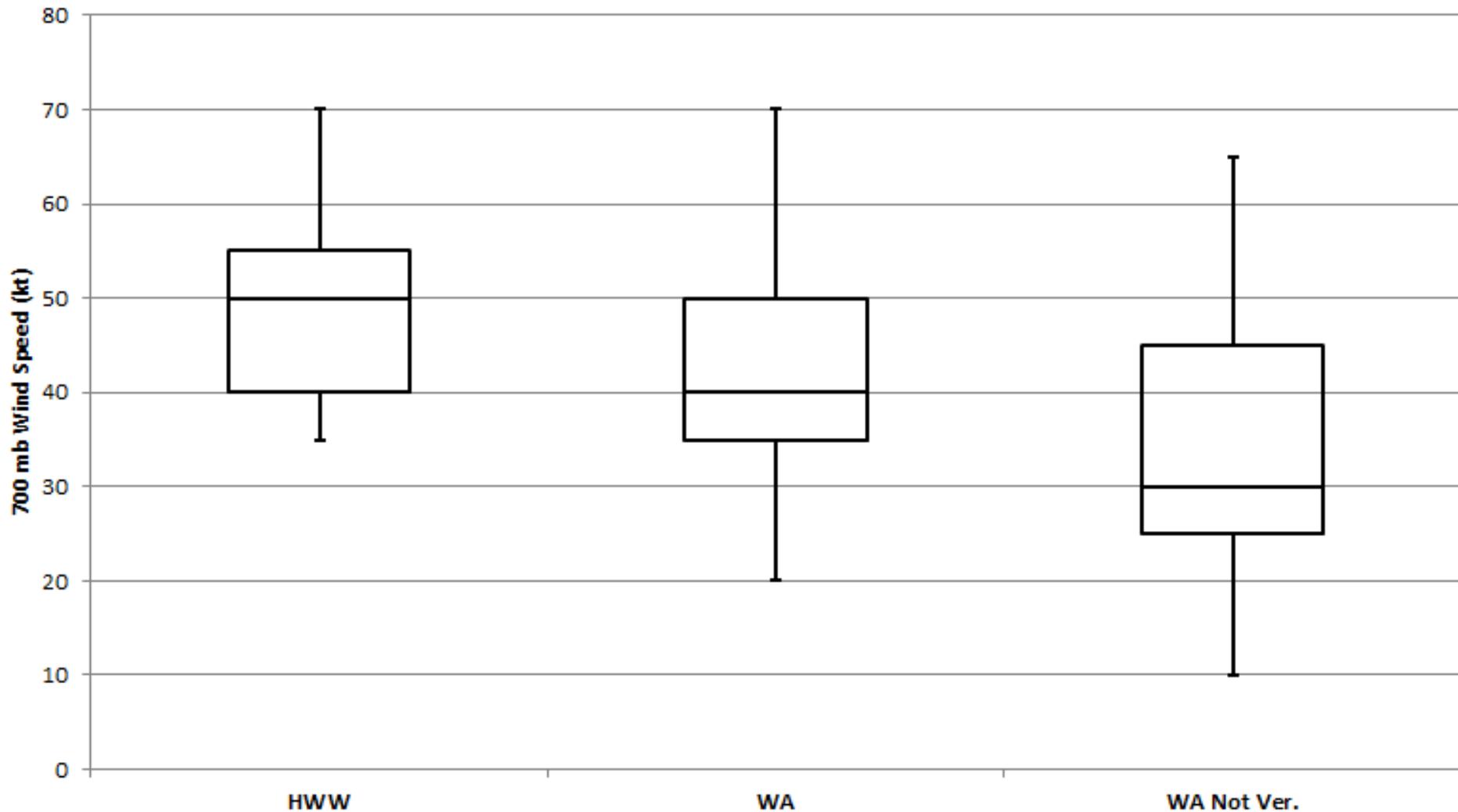
# 500 hPa Wind



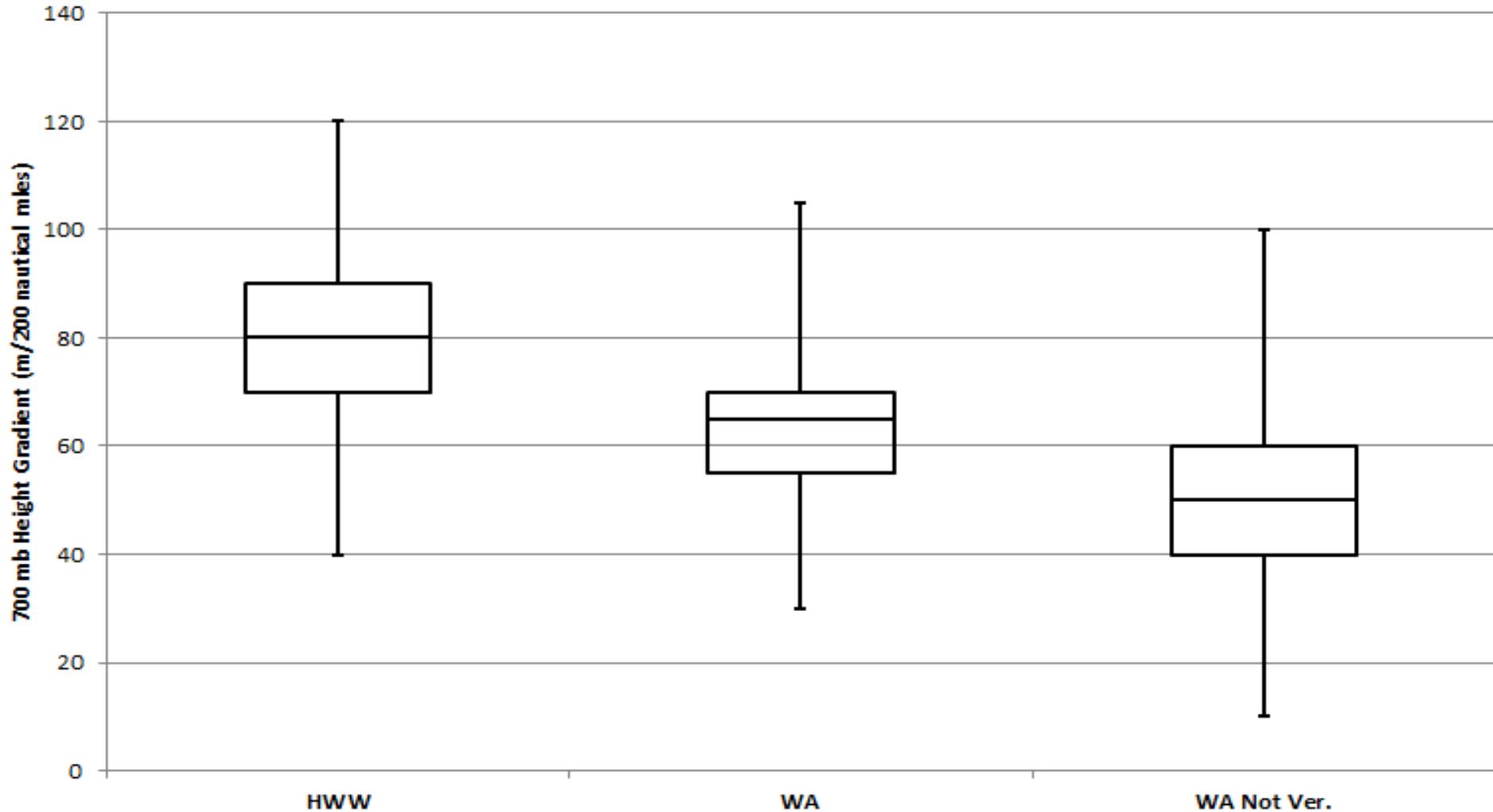


**Most concentrated dust plumes closely associated with 500 hPa speed max**

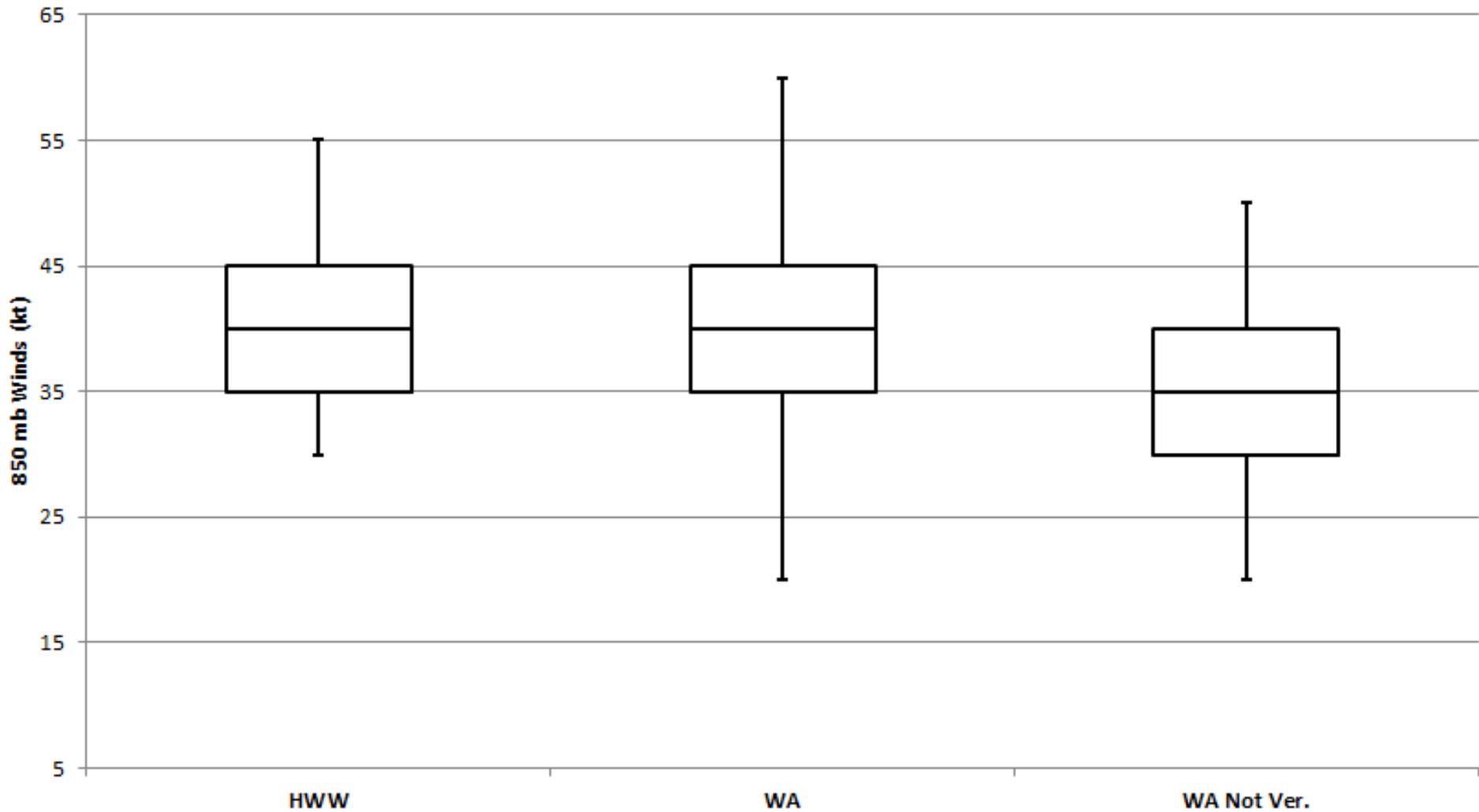
# 700 hPa Wind



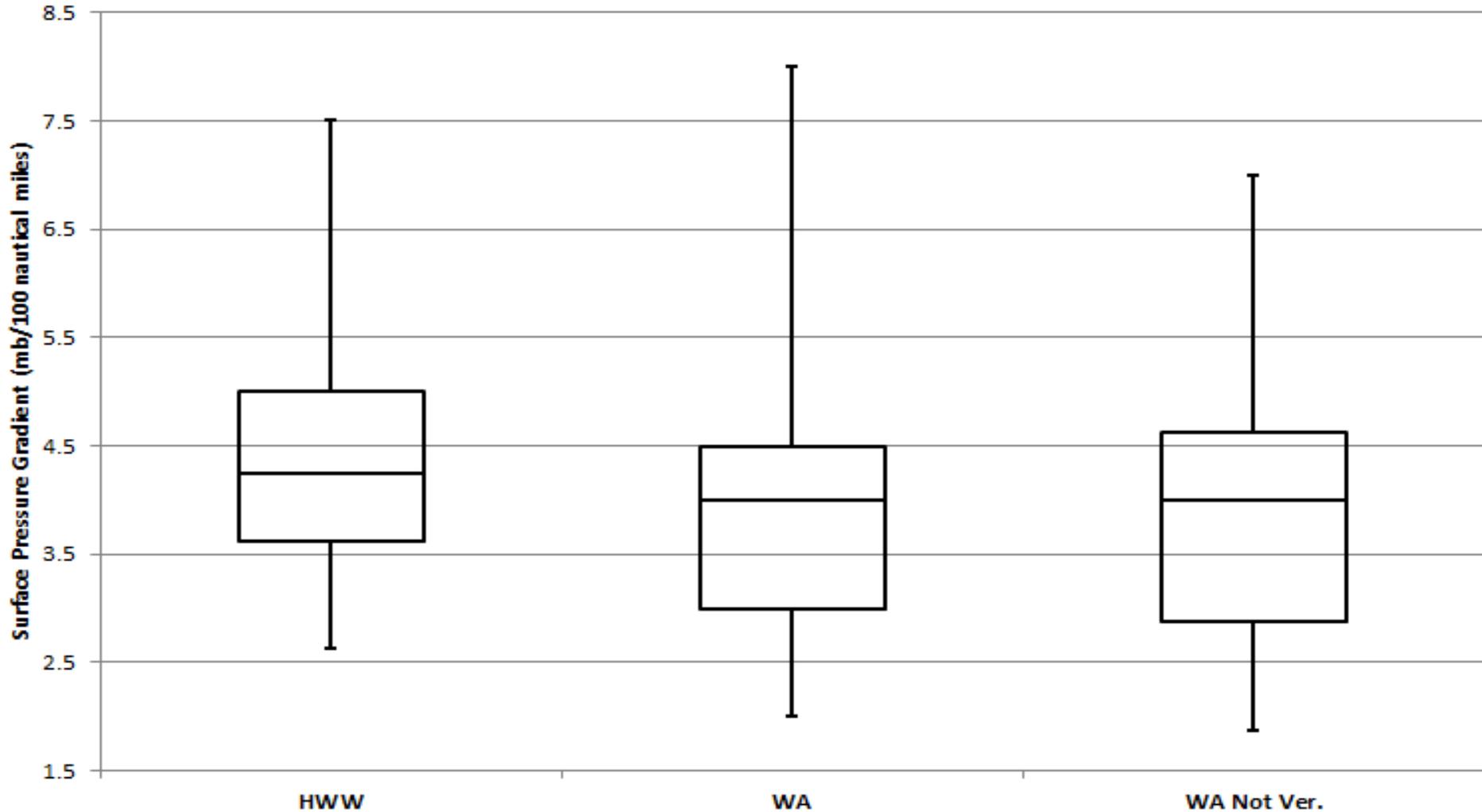
# 700 hPa Height Gradient



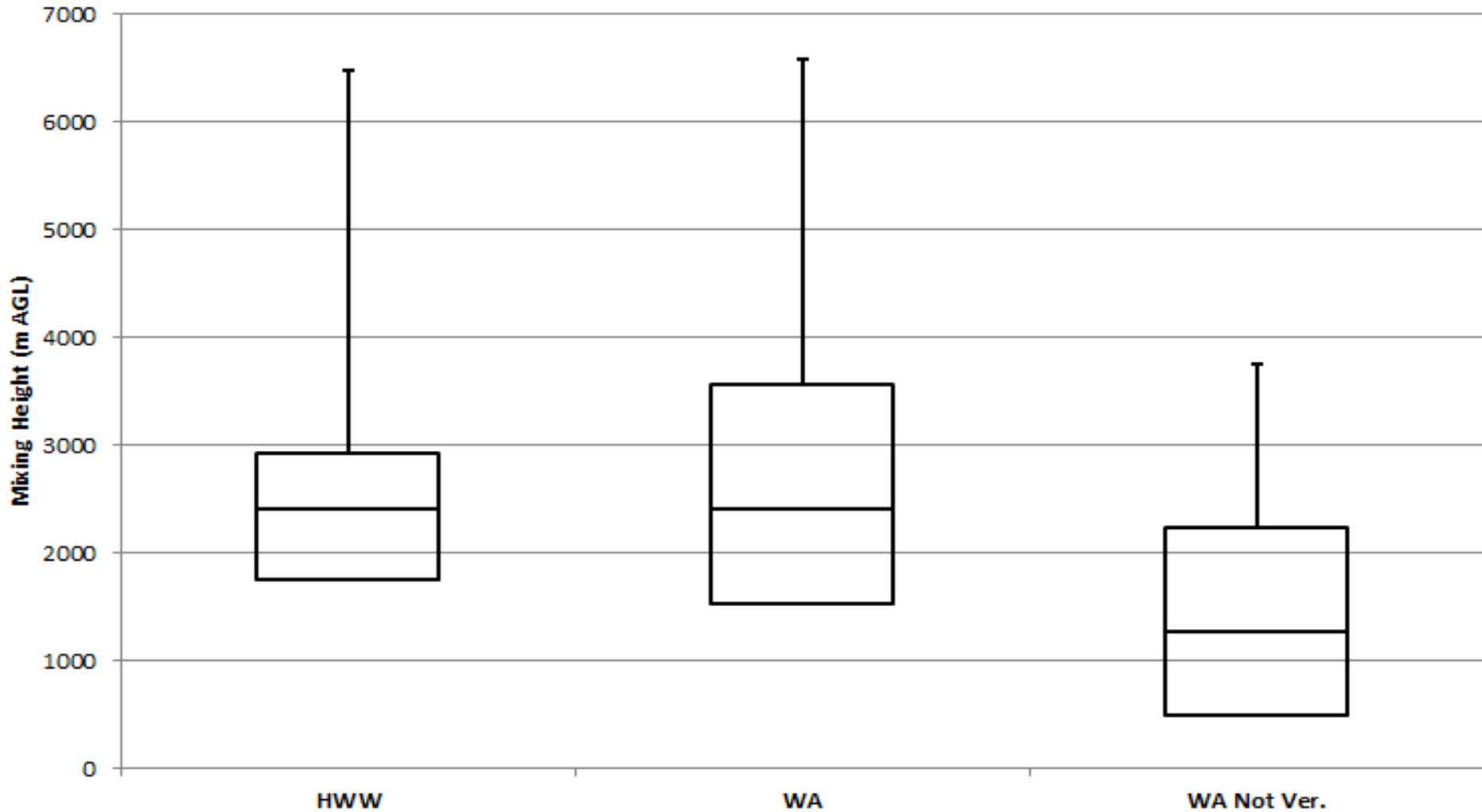
# 850 hPa Wind



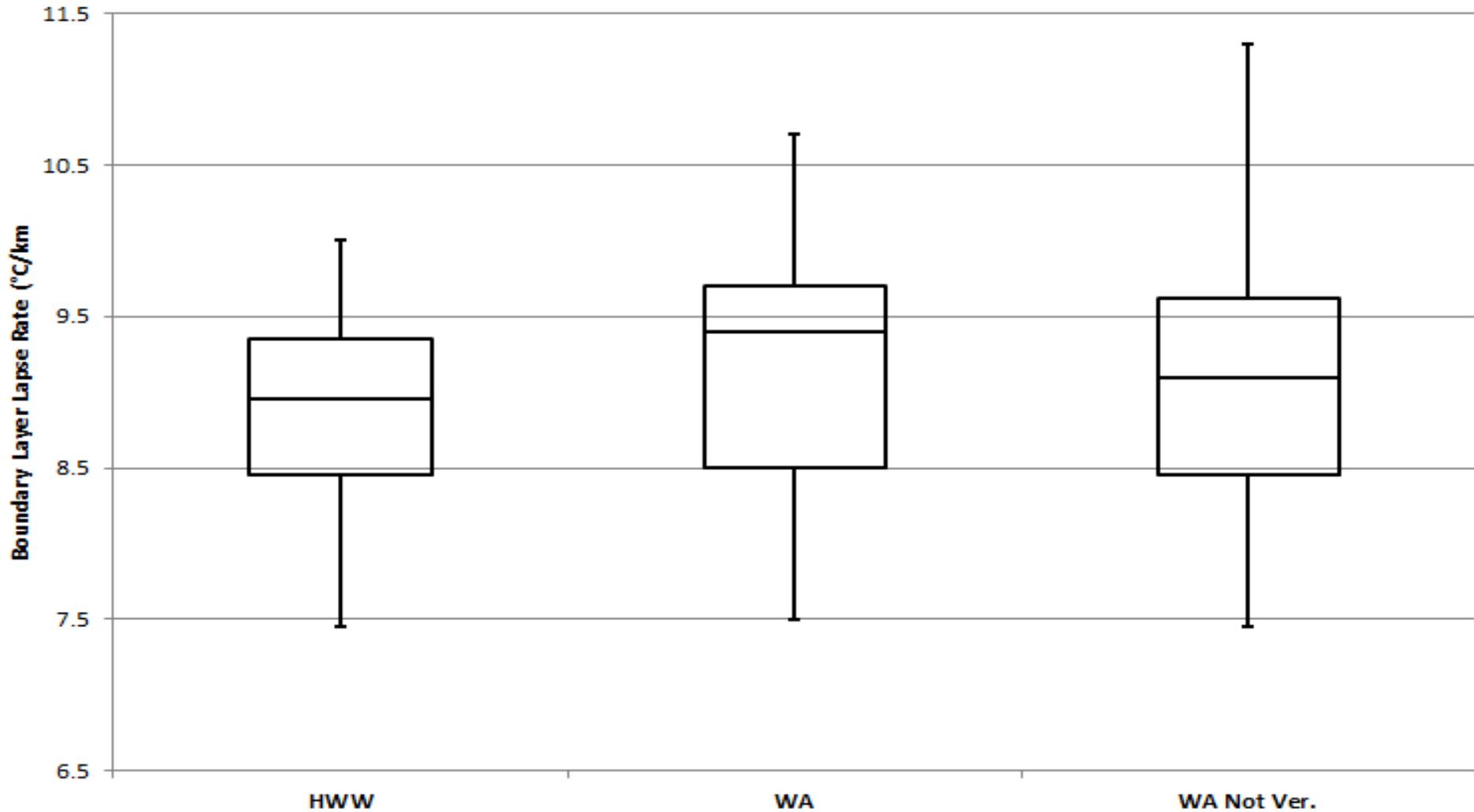
# Surface Pressure Gradient



# Mixing Height



# Boundary Layer Lapse Rate



# How Do We Forecast Better?

- Know your temporal/spatial climatology
- Anomalously strong/deep surface and upper-level pattern and mass fields
- 500 hPa winds  $> 50$  kt\*
- 700 hPa winds  $> 40$  kt\*
- 700 hPa height gradient  $> 55$  m/200 nm\*
- 850 hPa winds  $> 40$  kt
- Surface pressure gradient  $> 4$  mb/100 nm

*\*Highest statistical significance ( $p$ -value  $< 0.10$ ) and largest offset in box plots*

# Caveats

- **Watch out for extensive cloud cover!**
- **There's not a cookbook method**
- **One or two extreme factors can compensate for a setup that doesn't appear supportive of a wind event**