Operational Guidelines for Forecasting Synoptic Wind Events in the Panhandles

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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 fest periods)

1) Is 700mb height gradient*** ≥ 60m/200nm over NM and west TX (current and prog*?)?
   YES

2) Is vorticity maxima (12 units or greater) forecast near or over area during daylight hours?
   YES
   NO

3) Is model prog*** for surface pressure gradient ≥ 4mb/100nm?
   YES
   NO

4) Is lifted index (current and prog*?) ≥ +4?
   YES
   NO
   Go To Table of Gradients below
   winds 30 mph or greater are unlikely

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### 700 mb Gradient Method

<table>
<thead>
<tr>
<th>200nm gradient</th>
<th>Best wind fest</th>
<th>200nm gradient</th>
<th>Best wind fest</th>
</tr>
</thead>
<tbody>
<tr>
<td>less than 20M</td>
<td>5 to 15 mph</td>
<td>50-59M</td>
<td>(1) 20 to 30 mph</td>
</tr>
<tr>
<td>20-29M</td>
<td>10 to 20 mph</td>
<td><strong>60-69M</strong></td>
<td>(1) 25 to 35 mph (g* 40)</td>
</tr>
<tr>
<td>30-34M</td>
<td>12 to 22 mph</td>
<td><strong>70-79M</strong></td>
<td>(2) 30 to 40 mph (g* 50)</td>
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<tr>
<td>35-39M</td>
<td>14 to 24 mph</td>
<td><strong>60-69M</strong></td>
<td>(3) 35 to 40 mph (g* 55)</td>
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<tr>
<td>40-49M</td>
<td>15 to 25 mph</td>
<td><strong>90-99M</strong></td>
<td>(3) 40 to 50 mph (g*60+)</td>
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</tbody>
</table>

(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 NGM
# WIND ADVISORIES

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</table>

**Legend**

- **44-47**
- **47-52**
- **52-64**
- **64-69**
- **69-73**
- **73-78**
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

17 m/s

Wind Advisory

14 m/s
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

1004 hPa

1006 hPa
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

Boxplots showing the distribution of 850 mb Winds (kt) for different categories: HWW, WA, and WA Not Ver.
Surface Pressure Gradient

The box plots show the distribution of Surface Pressure Gradient for different categories: HWW, WA, and WA Not Ver.
Mixing Height

[Box plot showing mixing height for different categories: HWW, WA, WA Not Ver.]
Boundary Layer Lapse Rate
How Do We Forecast Better?

- Know your temporal/spatial climatology
- Anomally 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