## Checklist parameter thresholds for significant storm types in the WFO BGM CWA

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# Outline

- Background
- Defining and identifying significant storm types
- Results
- Alerts added to the checklist

### Background

- The WFO BGM severe weather checklist keys on various sounding-based parameters to help forecasters anticipate storm types and event severity.
- Questions: How appropriate is this methodology? Can the parameters in the checklist be used to generate alerts for specific types of major events?



From our historical data base, 3 prevalent majorevent-producing events types were identied

- Warm season severe convective lines Major convective lines occurring from May 15 – September 15. At least 15 wind reports.
- Tornadic supercells Isolated supercells producing at least one tornado.
- Cool season severe convective lines Major convective lines occurring from September 15 – May 15. At least 15 wind reports.

### Warm season major convective lines







## MLCAPE and DCAPE values

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## Shear values



## 12-hr 500 mb height fall values



## Other flow-based parameters



## Warm season major convective lines – key findings / implied thresholds

- These are high CAPE events values generally over 2000 J/kg.
- Shear is strong, particularly in the 0-3 km layer which is typically greater than 30 kts. 0-6 km shear is often similar in magnitude to the 0-3 km shear.
- Height falls are typically not very large.
- Equilibrium level storm relative flow is typically less than 40 kts.
- Mean flow is often westerly, or west-northwest (not shown).

### Tornadic, isolated supercells















### **MLCAPE** values



### Shear values



## 0-1 km helicity values



## 12-hr 500 mb height values



Isolated, tornadic supercells – key findings / implied thresholds

- MLCAPE values for these events were mostly moderate, and were generally somewhat less than for the severe convective lines. Values mainly from 800 to 2500 J/kg.
- Shear values were larger than for the severe convective lines in the 0-1 (greater than 20 kt) and 0-6 km (greater than 40 kt) layers, and were about the same in the 0-3 km (greater than 30 kt) layer.

### Cool season major convective lines

















### **MLCAPE** values



## Shear values



## 12-hr 500 mb height falls

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### Lapse rate values



## Cool season major convective lines – key findings / implied thresholds

- These are low CAPE events, with values generally less than 600 J/kg.
- Shear is very strong with these events, 0-1 km shear is usually greater than 30 kt, 0-3 km shear is usually greater than 40 kt, and 0-6 km shear is usually greater than 50 kt.
- Dynamical forcing is often strong. These events were all associated with cold fronts, 12-hr 500 mb height falls were mostly greater than 40 m.
- Despite being cool season events, surface-700 mb lapse rates were fairly steep, mostly at least 6.5 degrees C per km.

# Summary / Conclusions

- Parameters from our local severe weather data base appear to indicate some useful thresholds for major severe weather events when the events are segregated by type.
- These thresholds are being used to generate alerts on the checklist when a combination of inputed parameter values exceed the thresholds.