National Weather Service
Severe Weather Forecasting and Data Collection

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NOAA/NWS Storm Prediction Center
What is a Severe Thunderstorm?

- **Tornado**
  - ≥ 1 inch diameter

- **Hail**
  - ≥ 1 inch diameter

- **Lightning**
  - ≥ 58 mph gusts

- **Wind**
  - ≥ 58 mph gusts

- ** Flooding**

Understanding **Severe Weather Hazards**

James Hobbs
POLL

QUESTION
Severe Products Across Time And Space

- Outlooks (Storm Prediction Center)
  - Forecasts begin “Day 8”
  - Coverage within 25 miles of a point

<table>
<thead>
<tr>
<th>THUNDERSTORMS</th>
<th>1 - MARGINAL (MRGL)</th>
<th>2 - SLIGHT (SLGT)</th>
<th>3 - ENHANCED (ENH)</th>
<th>4 - MODERATE (MDT)</th>
<th>5 - HIGH (HIGH)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(no label)</td>
<td></td>
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<tr>
<td>No severe* thunderstorms expected</td>
<td>Isolated severe thunderstorms possible</td>
<td>Scattered severe storms possible</td>
<td>Numerous severe storms possible</td>
<td>Widespread severe storms likely</td>
<td>Widespread severe storms expected</td>
</tr>
<tr>
<td>Lightning/flooding threats exist with all thunderstorms</td>
<td>Limited in duration and/or coverage and/or intensity</td>
<td>Short-lived and/or not widespread, isolated intense storms possible</td>
<td>More persistent and/or widespread, a few intense</td>
<td>Long-lived, widespread and intense</td>
<td>Long-lived, very widespread and particularly intense</td>
</tr>
</tbody>
</table>

[Images of severe weather phenomena]
Severe Products Across Time And Space

- **Outlooks (Storm Prediction Center)**
  - Forecasts begin “Day 8”
  - Coverage within 25 miles of a point

- **Watches (Storm Prediction Center)**
  - Conditions favorable within an area
  - ~State-sized, 6 hours

- **Warnings (Local Forecast Office)**
  - Storm is severe (or will be)
  - ~300 sq mi., 45 minutes

- **Reports/Verification (Local Forecast Office)**
Outlook: Day 1

SPC DAY 1 WIND OUTLOOK
ISSUED: 1621Z 11/04/2022
VALID: 1630Z Fri 11/04 - 1200Z Sat 11/05
FORECASTER: HARTMOORE
NOAA/NWS Storm Prediction Center, Norman, Oklahoma

Wind Probability Legend (in %):
5  15  30  45  60  Sig
Tornado Emergency

Valid Until
7:15 PM CDT Friday
November 4, 2022

Threat Information

TORNADO
Damaging Tornado

HAIL
Two Inch
Sized Possible

Potential Exposure

Population: 23,972
Schools: 19
Hospitals: 1

This is a life threatening situation. Seek shelter now!
POLL

QUESTION
Data Collection at Local Forecast Offices

122 local forecast offices collect report data from:

- County, State, Federal EMs
- Local LEOs
- Media
- Social Media
- Skywarn Spotters
- NWS Damage Surveys
- Newspaper Articles
- Insurance Industry

With 122 offices there are some office-to-office inconsistencies.

Not every instance of severe weather is reported to the NWS!
Episode vs Event

Episode
- Entire storm system
- Can contain many events

Event
- Individual type of storm event (e.g., hail, tornado)
Preliminary LSR vs Final Reports

Preliminary

- Available in real-time
- Little QC

https://www.spc.noaa.gov/climo/online/

Final (Storm Data)

- ~75 days after end of month
- QC’ed

https://www.ncdc.noaa.gov/stormevents/

Please use Final Data instead of the Preliminary Reports for scientific papers!
Storm Data Tornadoes vs SPC OneTor Data

Storm Data tornadoes are segmented by county

Storm Data overestimates tornado count

Use SPC OneTor for tornado counts

SPC OneTor Database
https://www.spc.noaa.gov/wcm/#data
NWS Damage Assessment Toolkit (DAT)

https://apps.dat.noaa.gov/stormdamage/damageviewer/

- Data collected in real-time during NWS Post-Event Damage Surveys
- Data is QC’ed…but is still preliminary
- Not standardized at all local forecast offices
- Not all tornadoes entered
Hail Reports

Which one of these hail sizes is reported the most?

1.00”  1.25”  1.50”  1.75”  2.00”
Hail Reports

Hail Reports ≤ 2 Inches (2010 - 2021)

Inconsistent reporting < 1”
Severe Wind Reports

Plains
Measured > Damage

East
Damage > Measured

Important
Some significant (≥ 74 mph) wind reports may only appear in the Final Data!
Quantitative Impact Decision Support Services

Severe Weather
27 April 2011