

# Storytelling with Storms and Storm Prediction

**Greg Carbin and Russell Schneider, NOAA/NWS/SPC**

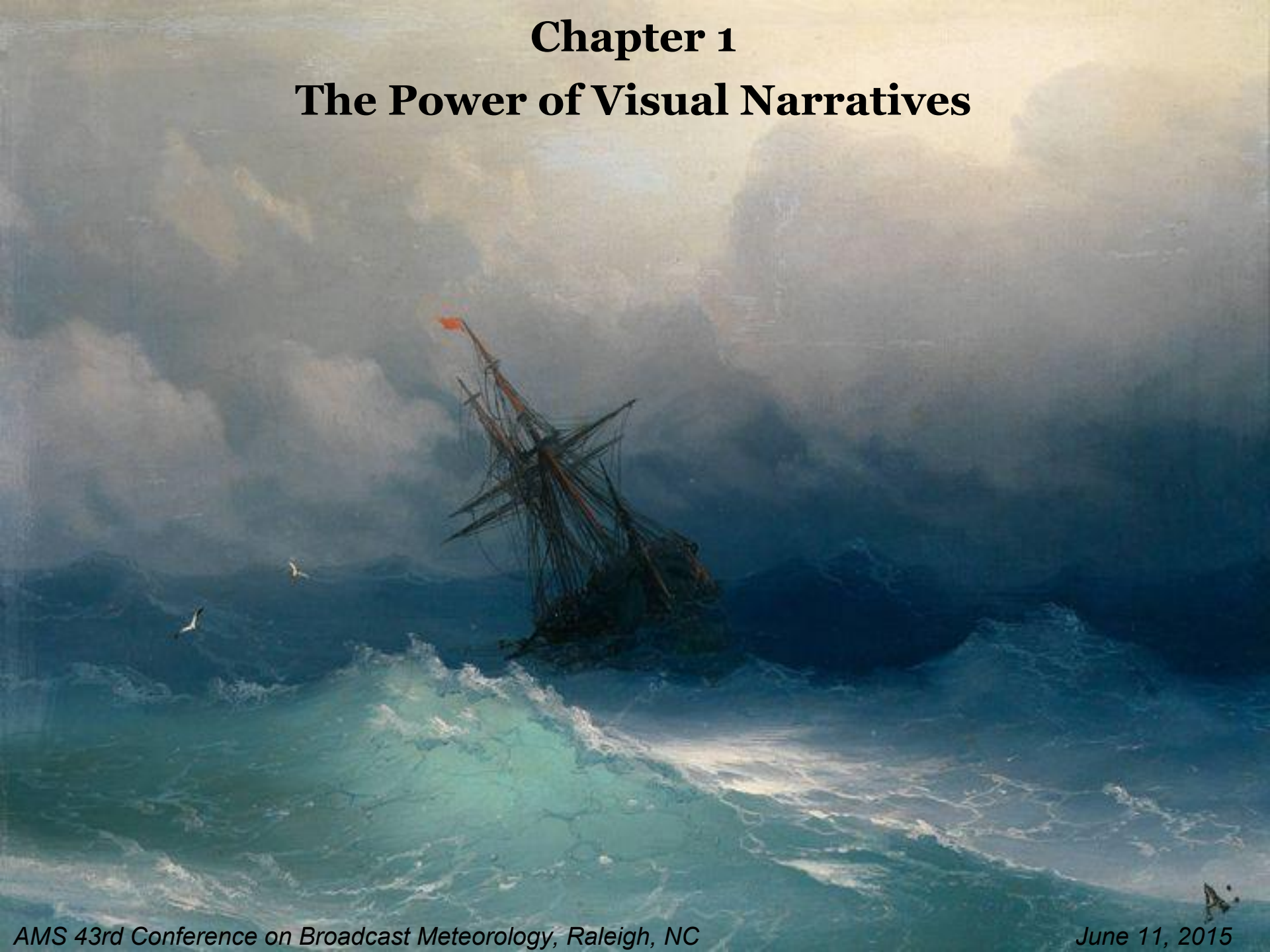
**Susan Jasko, California Univ. of Pennsylvania**





# Chapter 1

## The Power of Visual Narratives





# SPC introduced two new risk categories in 2014

Google **spc outlook categories** gregory.carbin@noaa.gov

Web **Images** Shopping News Videos More Search tools Safe Search

Day 1 Outlook Probability	TORN	H2O	HAIL
2%	MGL	Not Issued	Not Issued
5%	SLGT	MGL	MGL
30%	ENH	Not Issued	Not Issued
10% with Significant Severe	ENH	Not Issued	Not Issued
15%	ENH	SLGT	SLGT
15% with Significant Severe	ENH	SLGT	SLGT
30%	ENH	ENH	ENH
30% with Significant Severe	ENH	ENH	ENH
45%	ENH	ENH	ENH
45% with Significant Severe	ENH	ENH	ENH
60%	ENH	ENH	ENH
60% with Significant Severe	ENH	ENH	ENH

SPC Severe Weather Outlook Probability-to-Categorical Description Tables

Day 1 Outlook Probability	TORN	H2O	HAIL
2%	MGL	Not Issued	Not Issued
5%	SLGT	MGL	MGL
30%	ENH	Not Issued	Not Issued
10% with Significant Severe	ENH	Not Issued	Not Issued
15%	ENH	SLGT	SLGT
15% with Significant Severe	ENH	SLGT	SLGT
30%	ENH	ENH	ENH
30% with Significant Severe	ENH	ENH	ENH
45%	ENH	ENH	ENH
45% with Significant Severe	ENH	ENH	ENH
60%	ENH	ENH	ENH
60% with Significant Severe	ENH	ENH	ENH

Day 3 Outlook Probability	Combined TOR, H2O, HAIL
5%	MGL
15%	SLGT
15% with Significant Severe	SLGT
30%	ENH
30% with Significant Severe	ENH
45%	ENH
45% with Significant Severe	ENH

## SPC Outlook Classification System

OLD	NEW	MWN Scale
General	General	0
	Marginal	1
Slight	Slight	2
	Enhanced	3
Moderate	Moderate	4
High	High	5

## Understanding Severe Thunderstorm Risk Categories

THUNDERSTORMS (no label)	1-MARGINAL (MGL)	2-SLIGHT (SLGT)	3-ENHANCED (ENH)	4-MODERATE (MOD)	5-HIGH (HGH)
No severe thunderstorms expected	Isolated severe thunderstorms possible	Scattered severe storms possible	Numerous severe storms possible	Widespread severe storms likely	Widespread severe storms expected
Lightning/roofing damage with all thunderstorms	Lightning/roofing damage with all thunderstorms	Lightning/roofing damage with all thunderstorms	Lightning/roofing damage with all thunderstorms	Lightning/roofing damage with all thunderstorms	Lightning/roofing damage with all thunderstorms

SPC Severe Weather Outlook Probability-to-Categorical Description Tables (2014)

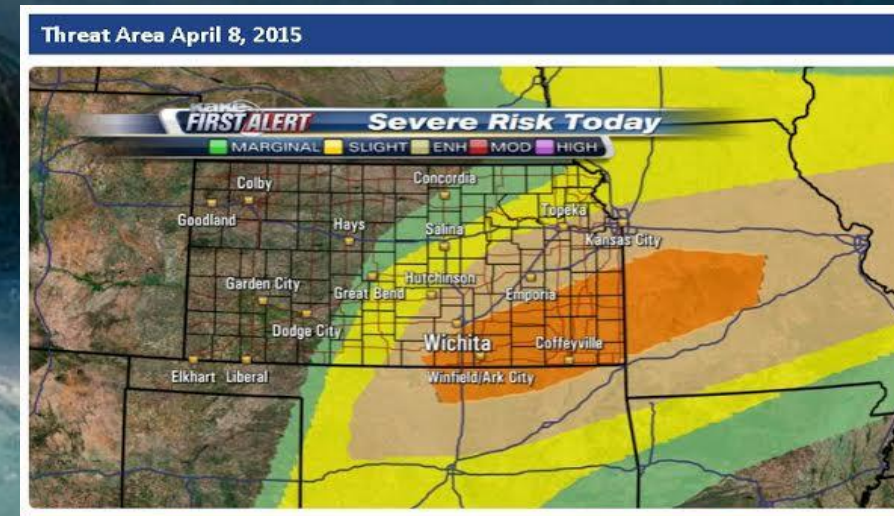
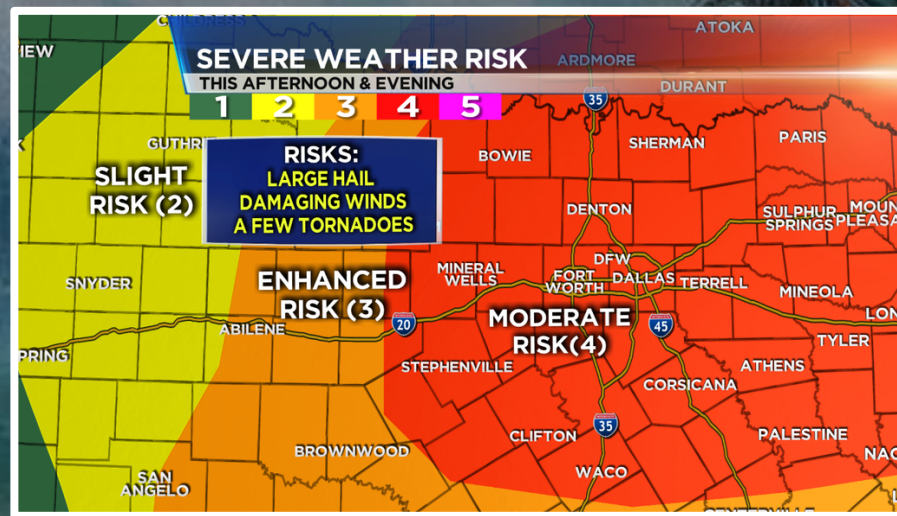
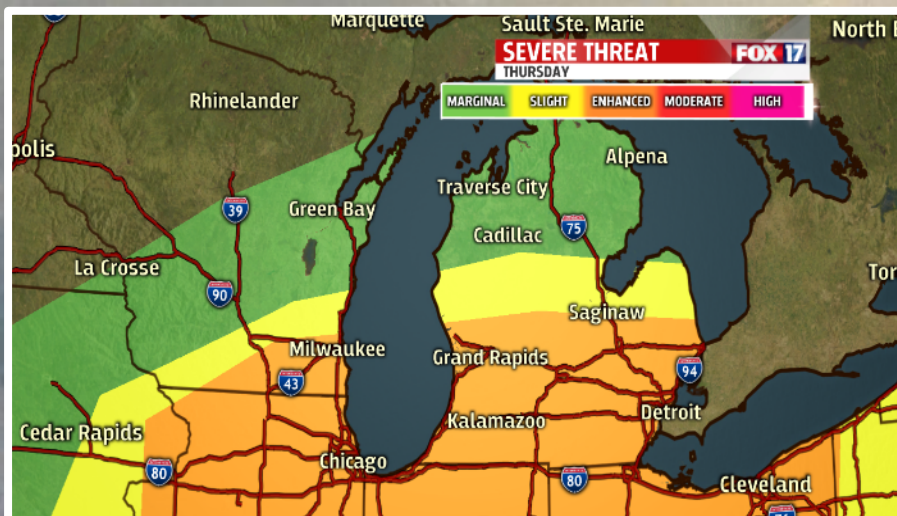
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45% with Significant Severe	ENH	ENH	ENH
60%	ENH	ENH	ENH
60% with Significant Severe	ENH	ENH	ENH

## SPC Outlook Classification System

Previous	2014
General	General
	Marginal
Slight	Slight
	Enhanced
Moderate	Moderate
High	High

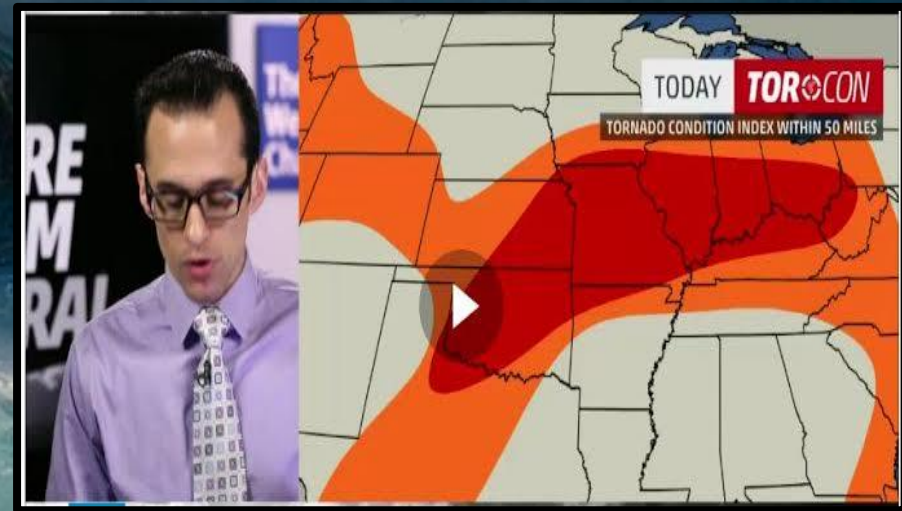
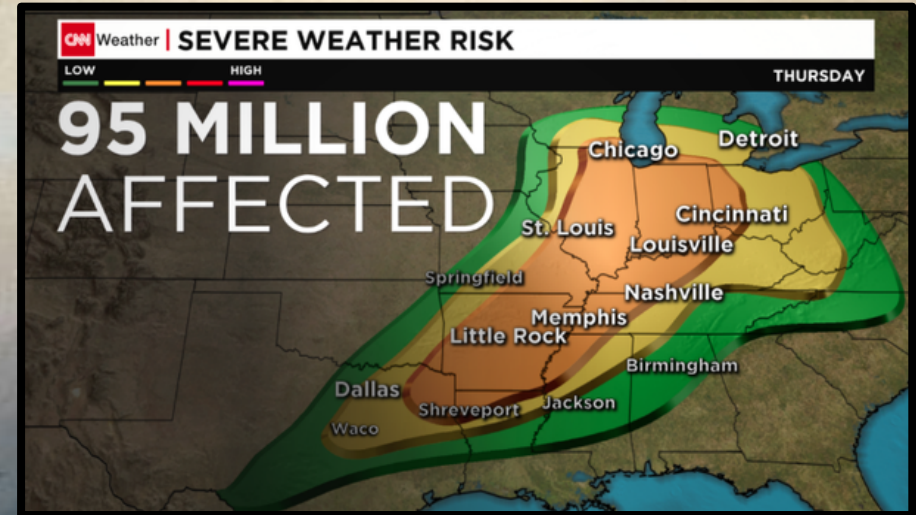
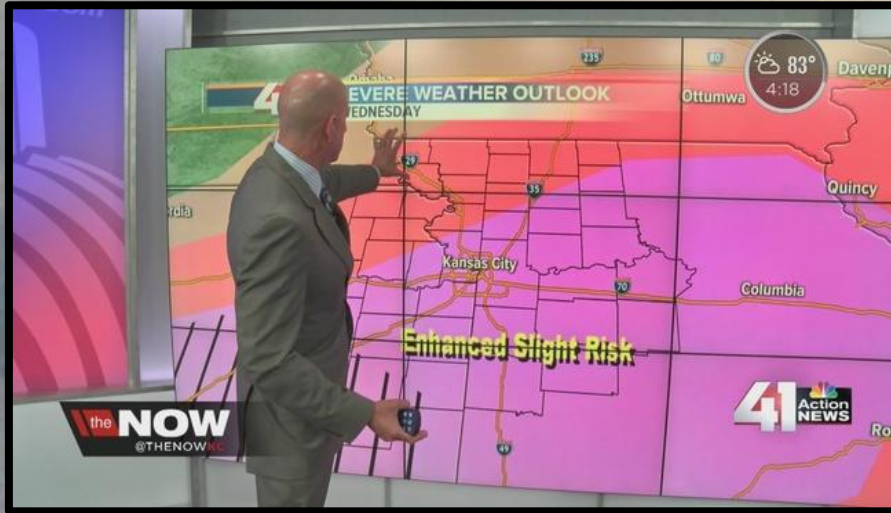


# Were changes embraced by broadcast meteorology?



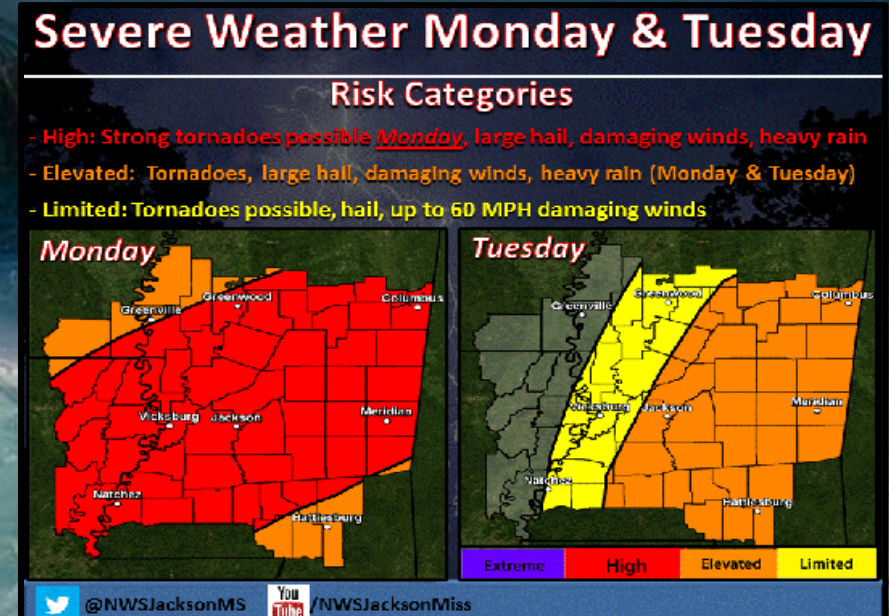
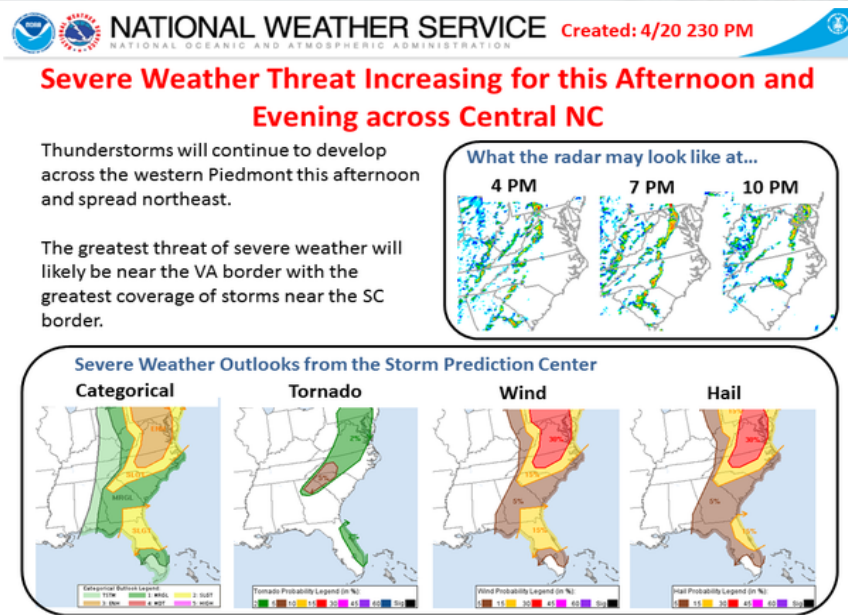
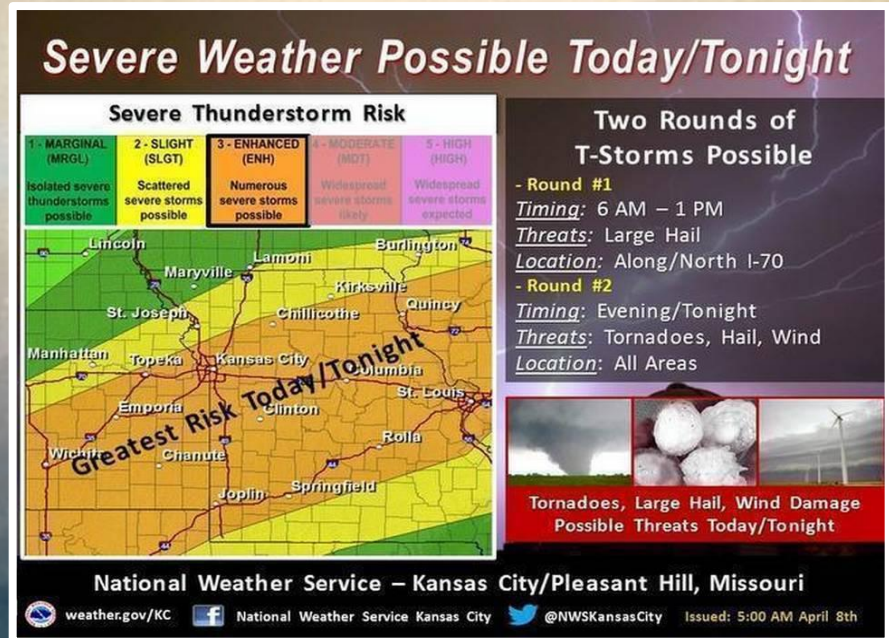
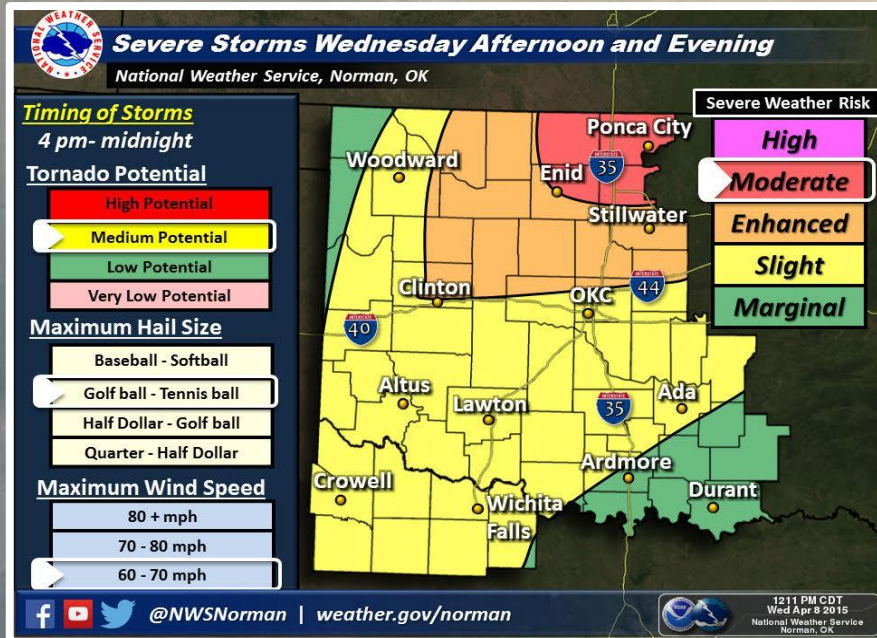


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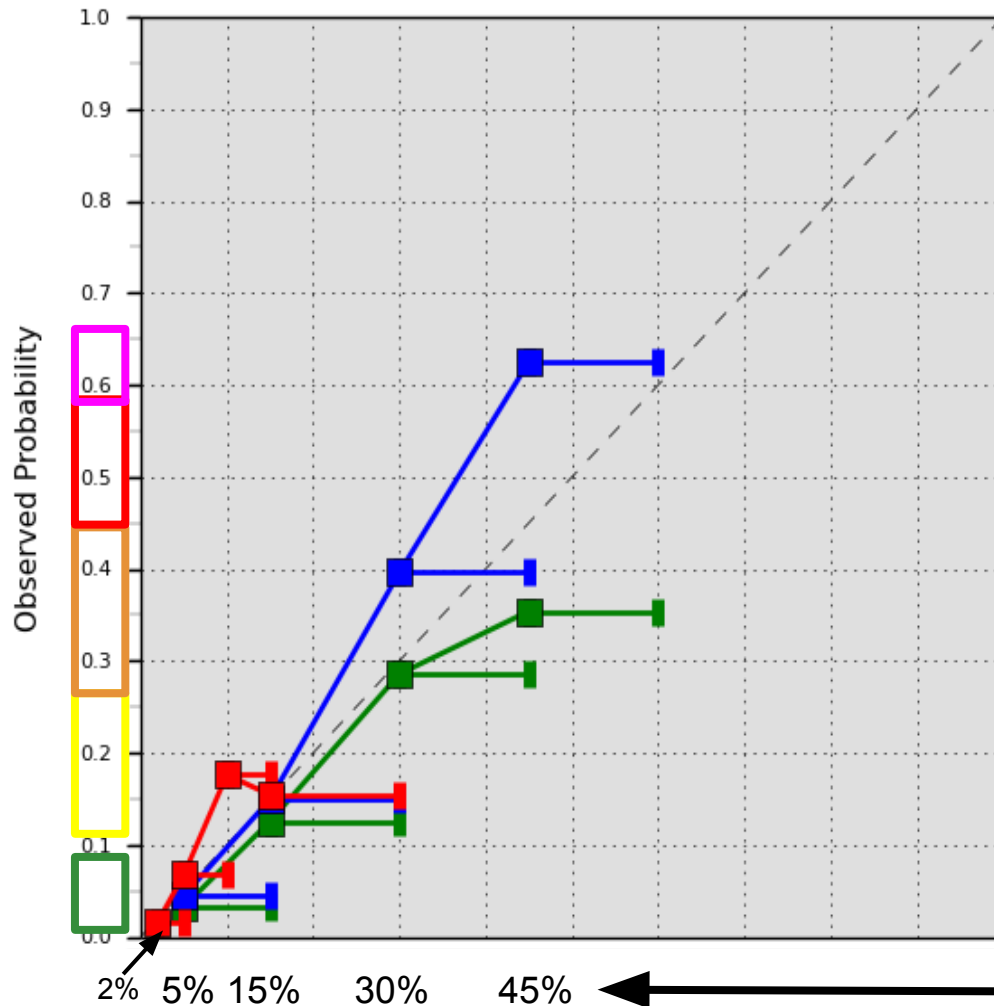
# Were changes embraced by NWS?





# Were changes embraced by SPC?

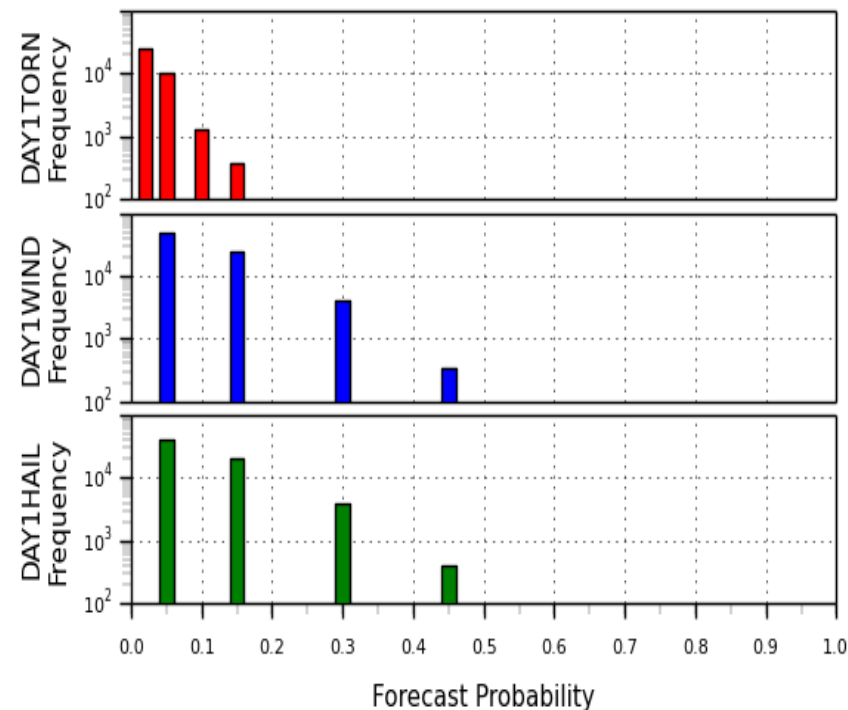
Forecaster: SPC



Reliability of 1,240 SPC Day 1 Severe Weather Outlooks since Oct. 2014.

Note! Forecast probabilities did not change!

HAIL WIND TORN



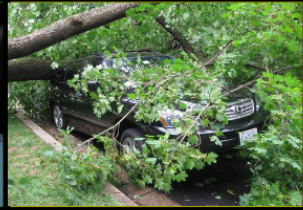





Dean, Carbin, Cohen, Melick



# The power of visual narratives ...

## Understanding Severe Thunderstorm Risk Categories

THUNDERSTORMS (no label)	1 - MARGINAL (MRGL)	2 - SLIGHT (SLGT)	3 - ENHANCED (ENH)	4 - MODERATE (MDT)	5 - HIGH (HIGH)
<b>No severe* thunderstorms expected</b>	<b>Isolated severe thunderstorms possible</b>	<b>Scattered severe storms possible</b>	<b>Numerous severe storms possible</b>	<b>Widespread severe storms likely</b>	<b>Widespread severe storms expected</b>
Lightning/flooding threats exist with <u>all</u> thunderstorms	Limited in duration and/or coverage and/or intensity	Short-lived and/or not widespread, isolated intense storms possible	More persistent and/or widespread, a few intense	Long-lived, widespread and intense	Long-lived, very widespread and particularly intense
					
<ul style="list-style-type: none"> <li>• Winds to 40 mph</li> <li>• Small hail</li> </ul>	<ul style="list-style-type: none"> <li>• Winds 40-60 mph</li> <li>• Hail up to 1"</li> <li>• Low tornado risk</li> </ul>	<ul style="list-style-type: none"> <li>• One or two tornadoes</li> <li>• Reports of strong winds/wind damage</li> <li>• Hail ~1", isolated 2"</li> </ul>	<ul style="list-style-type: none"> <li>• A few tornadoes</li> <li>• Several reports of wind damage</li> <li>• Damaging hail, 1 - 2"</li> </ul>	<ul style="list-style-type: none"> <li>• Strong tornadoes</li> <li>• Widespread wind damage</li> <li>• Destructive hail, 2" +</li> </ul>	<ul style="list-style-type: none"> <li>• Tornado outbreak</li> <li>• Derecho</li> </ul>

\* NWS defines a severe thunderstorm as measured wind gusts to at least 58 mph, and/or hail to at least one inch in diameter, and/or a tornado. All thunderstorm categories imply lightning and the potential for flooding. Categories are also tied to the probability of a severe weather event within 25 miles of your location.



National Weather Service

[www.spc.noaa.gov](http://www.spc.noaa.gov)





# ... and social media metrics



## NOAA NWS Storm Prediction Center

Published by Greg Carbin [?] · April 6 ·

In preparation for an increase in severe weather this week, the SPC has worked closely with NWS offices, social scientists, communication specialists, FEMA, forecasters, and the general public, to arrive at this description of Severe Thunderstorm Risk Categories. We are especially thankful to the NWS Forecast Office in Pleasant Hill/Kansas City, for getting the ball rolling and working with us to better describe and define the words we use in official NWS Severe Weather Outlooks. More details are available here:

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Please share widely!

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22,161 Likes, Comments & Shares

12,018

Likes

2,123

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On Shares

1,560

Comments

139

On Post

1,421

On Shares

8,583

Shares

8,359

On Post

224

On Shares

70,303 Post Clicks

31,785

Photo Views

1,118

Link Clicks

37,400

Other Clicks 

#### NEGATIVE FEEDBACK

126 Hide Post

27 Hide All Posts

0 Report as Spam

13 Unlike Page



# ... and social media metrics



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Like · Comment · Share · 2,123 81 8,359



961,024 People Reached

22,161 Likes, Comments & Shares

12,018

Likes

2,123

On Post

9,895

On Shares

1,560

Comments

139

On Post

1,421

On Shares

8,583

Shares

8,359

On Post

224

On Shares

70,303 Post Clicks

31,785

Photo Views

1,118

Link Clicks

37,400

Other Clicks

NEGATIVE FEEDBACK

126 Hide Post

27 Hide All Posts

0 Report as Spam

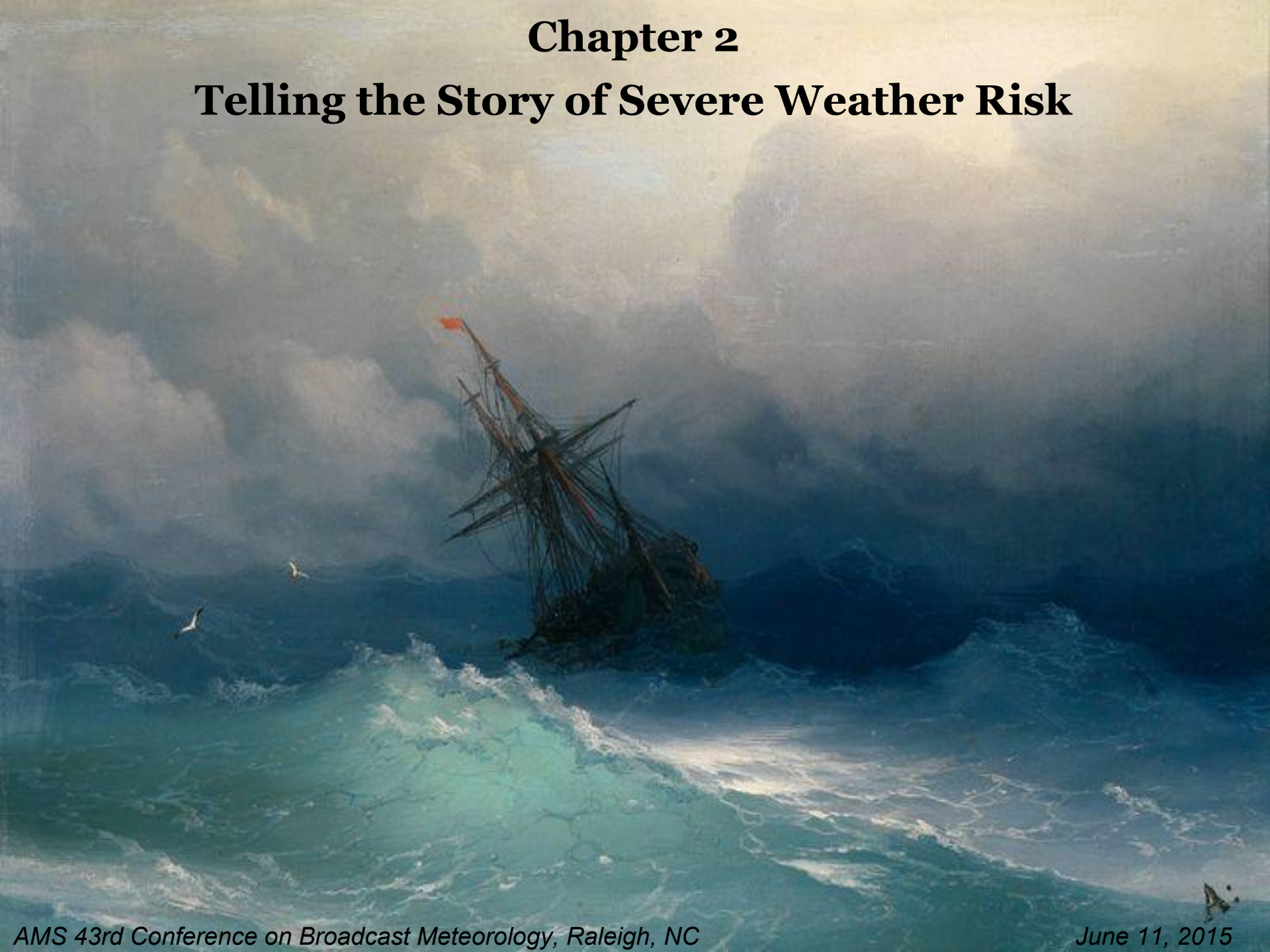
13 Unlike Page

Greatest "reach" on SPC  
FB account since  
inception (Summer 2012)



# **Chapter 2**

## **Telling the Story of Severe Weather Risk**

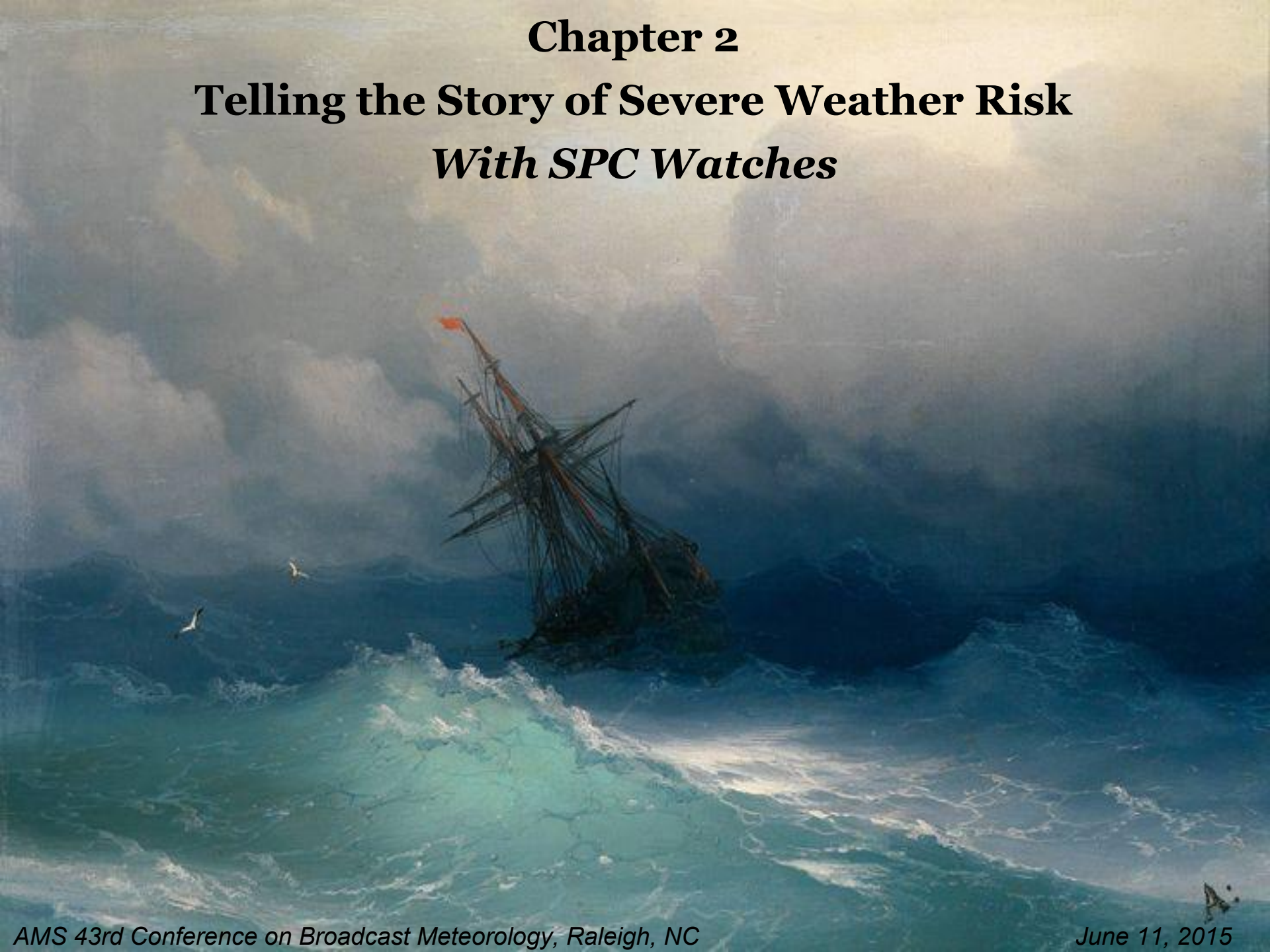




# **Chapter 2**

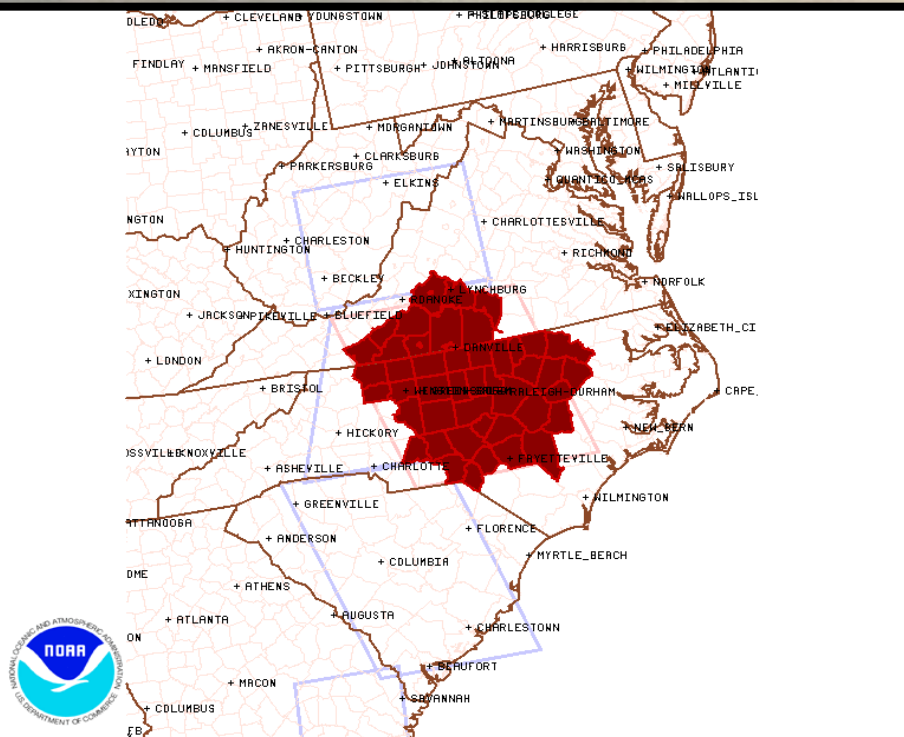
## **Telling the Story of Severe Weather Risk**

### ***With SPC Watches***





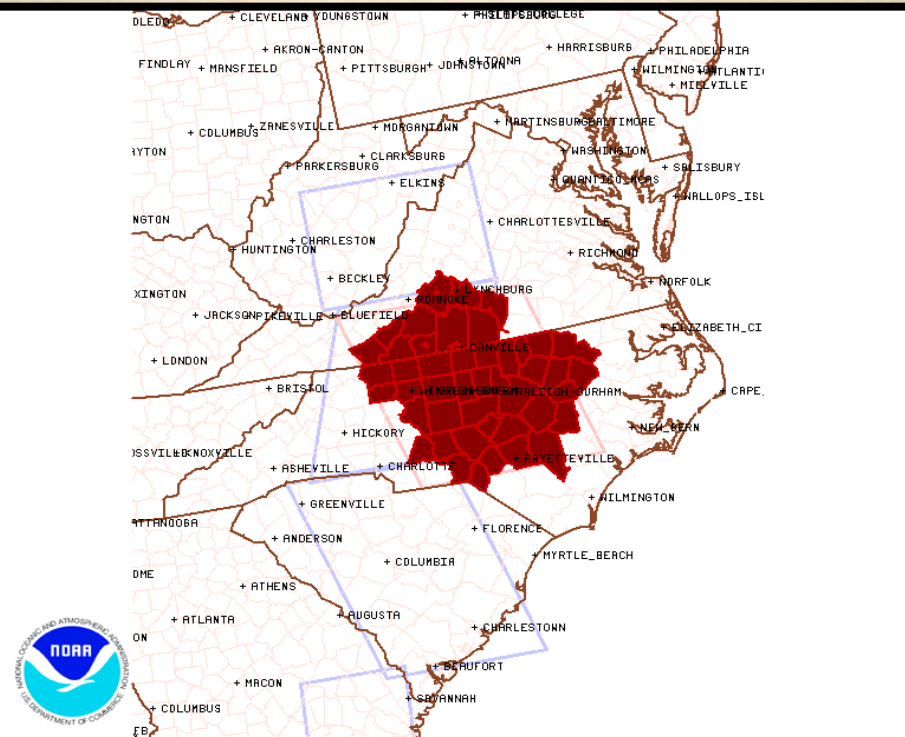
# The tale of two watches



**Tornado Watch # 108 - Valid from 335 PM until 1100 PM EDT**

NOAA/NWS/Storm Prediction Center

Updated: 20120324/1936 UTC



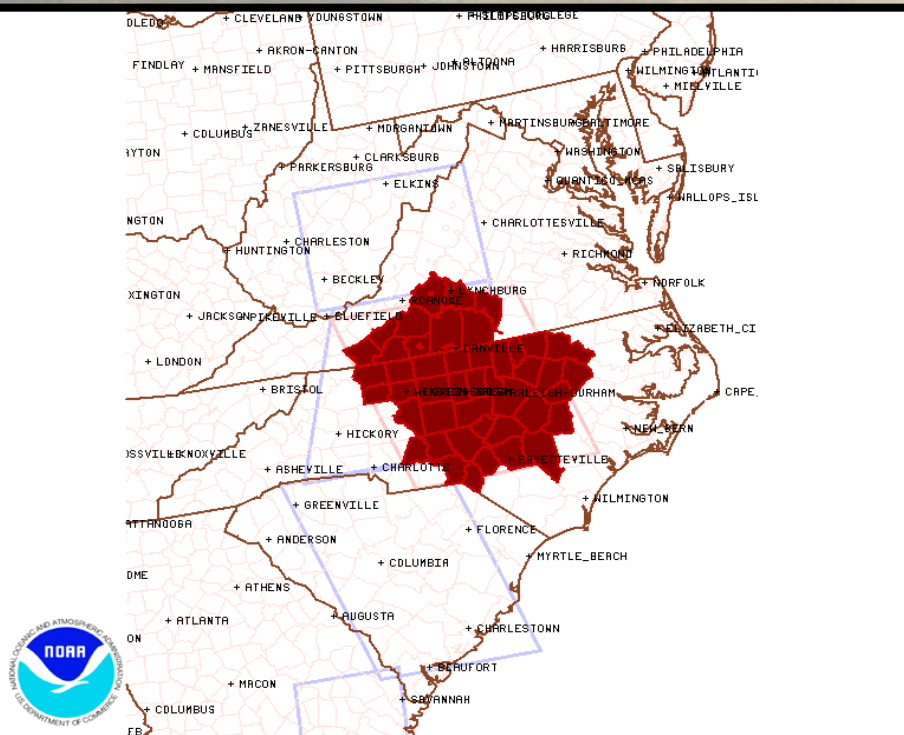
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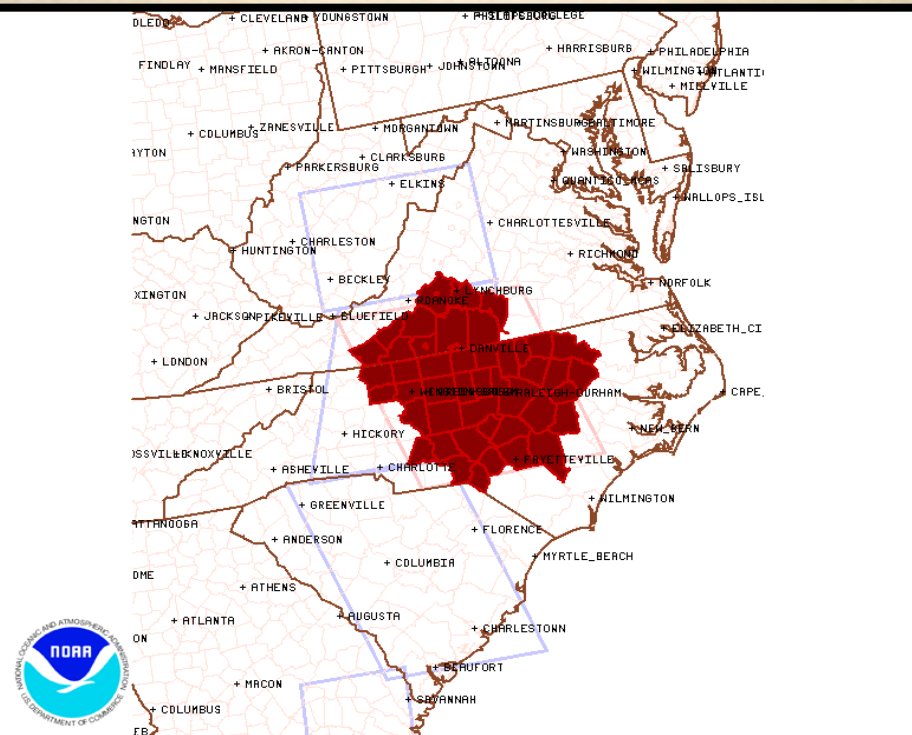
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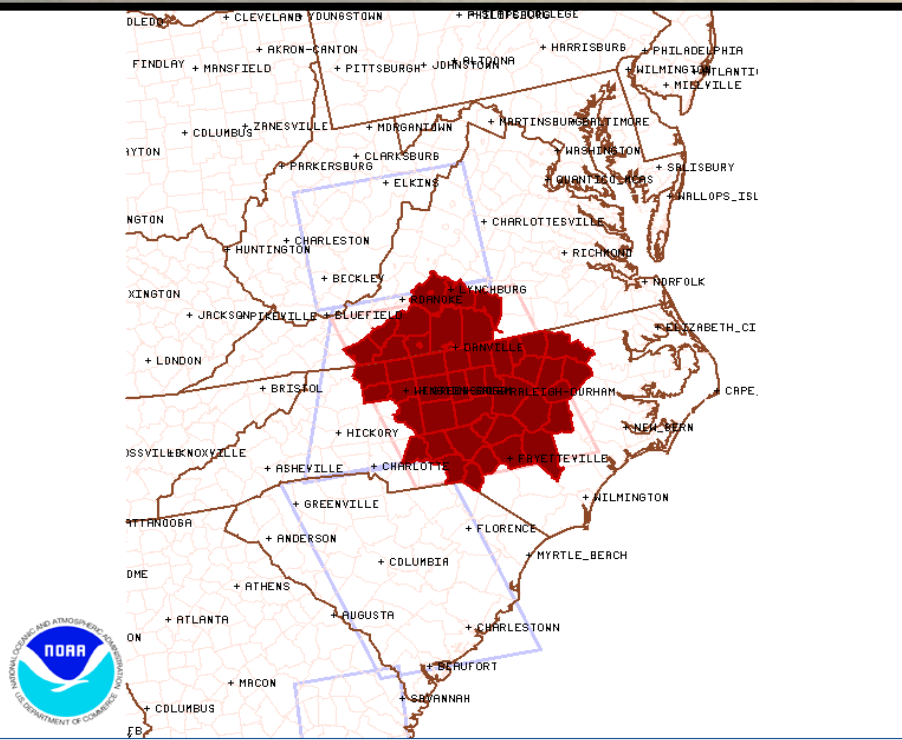
NOAA/NWS/Storm Prediction Center

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## Not all watches are created equal!



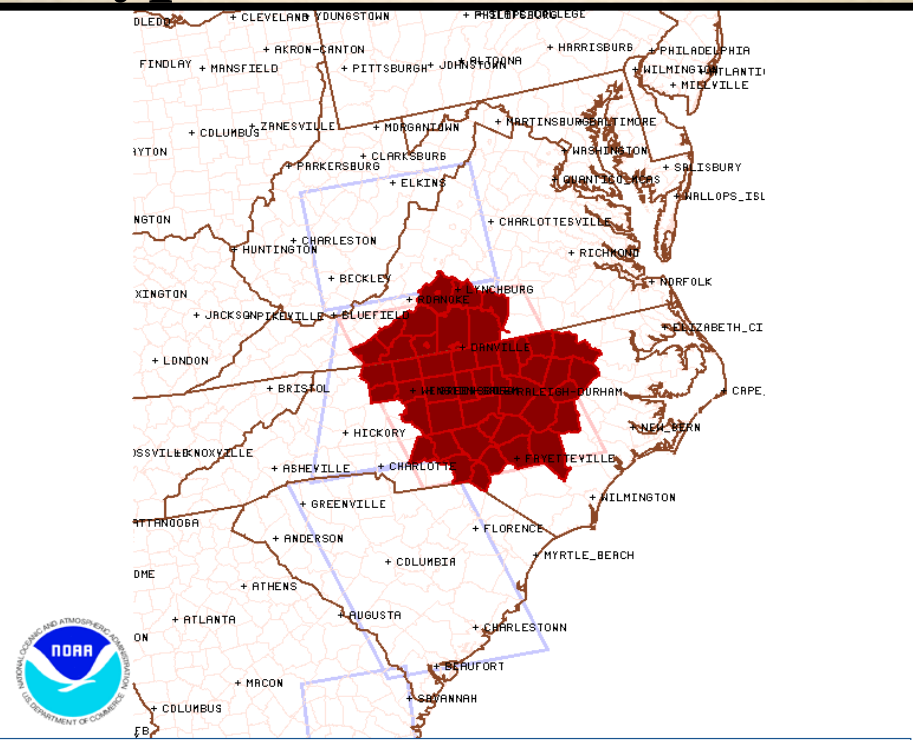
# Typical Tornado Watch



**Tornado Watch # 108 - Valid from 335 PM until 1100 PM EDT**

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## Tornadoes

Probability of 2 or more tornadoes	Mod (40%)
Probability of 1 or more strong (F2-F5) tornadoes	Low (20%)

## Wind

Probability of 10 or more severe wind events	Mod (30%)
Probability of 1 or more wind events > 65 knots	Mod (30%)

## Hail

Probability of 10 or more severe hail events	Mod (40%)
Probability of 1 or more hailstones > 2 inches	Mod (30%)

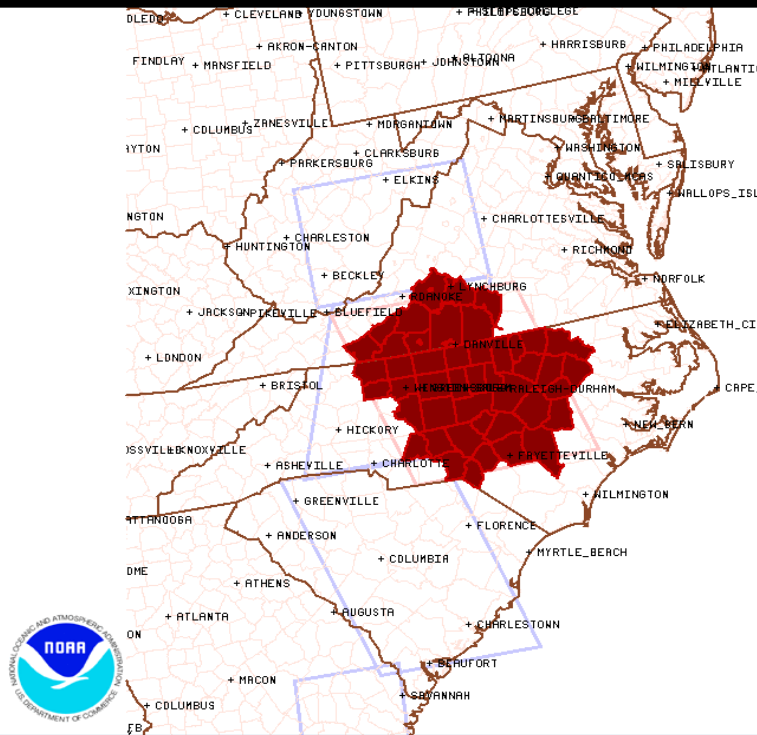
## Combined Severe Hail/Wind

Probability of 6 or more combined severe hail/wind events	High (70%)
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# Rare Tornado Watch!

# Typical Tornado Watch



## Tornadoes

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# Typical Tornado Watch



URGENT - IMMEDIATE BROADCAST REQUESTED  
TORNADO WATCH NUMBER 108  
NWS STORM PREDICTION CENTER NORMAN OK  
335 PM EDT SAT MAR 24 2012

THE NWS STORM PREDICTION CENTER HAS ISSUED A

- TORNADO WATCH FOR PORTIONS OF  
CENTRAL NORTH CAROLINA  
SOUTHERN VIRGINIA
- EFFECTIVE SATURDAY AFTERNOON AND EVENING FROM 335 PM  
UNTIL 1100 PM EDT.
- PRIMARY THREATS INCLUDE...
  - **A COUPLE TORNADOES POSSIBLE**
  - **ISOLATED SIGNIFICANT DAMAGING WIND GUSTS  
TO 70 MPH POSSIBLE**
  - **SCATTERED LARGE HAIL AND ISOLATED VERY  
LARGE HAIL TO 2 INCHES IN DIAMETER**

## Tornadoes

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...THIS IS A PARTICULARLY DANGEROUS SITUATION...

- PRIMARY THREATS INCLUDE...
  - NUMEROUS TORNADOES AND SEVERAL INTENSE  
TORNADOES EXPECTED
  - WIDESPREAD DAMAGING WINDS AND SCATTERED  
SIGNIFICANT GUSTS TO 90 MPH EXPECTED

URGENT - IMMEDIATE BROADCAST REQUESTED  
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# Use descriptive narratives proportional to risk

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Probability of 1 or more hailstones > 2 inches	Mod (30%)

## Combined Severe Hail/Wind

Probability of 6 or more combined severe hail/wind events	High (70%)
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# The End



# Thank you!

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Ivan Konstantinovich Aivazovsky (1858).



