

Spotter Training 2010



**National Weather Service
Lincoln, IL**



Spotter Training Outline



Image by Roger Hill

- **Spotter Resources**
- **T-storm Basics**
- **T-storm Types**
- **Severe Weather**
- **Tornadoes & other rotations**
- **Look Alikes**
- **Spotter Safety**
- **Spotter Reports**



Why we **NEED** spotters...

- **Vital ground truth information**
- **Real-time reports:**
 - **Help with NWS warning decisions**
 - **Improve the public response**
- **Spotters are a line of defense for their community**





National Weather Service
Lincoln, IL



SEVERE WEATHER RESOURCES FOR SPOTTERS



www.weather.gov/Lincoln

Top News of the Day

- Hazardous Weather threats
- Storm Summaries

National Weather Service Weather Forecast Office
Central Illinois

Home Site Map News Organization

Local forecast by "City, St" or Zip Code
City, St Go

Top News of the Day

- Hot and Humid Weather Expected This Weekend
- Major Severe Weather Event on August 4
- Summer Newsletter Now Available (PDF, 1.1 MB)

Watches & Warnings Observations Forecast Graphics Rivers & Lakes Climate Radar

Click on the map below for the latest forecast.

Last map update: Fri, Aug. 7, 2009 at 11:50:41 am CDT

Read watches, warnings & advisories

- Flood Warning
- Heat Advisory
- Special Weather Statement
- Hazardous Weather Outlook
- Short Term Forecast

NOAA

Current Hazards
Watches/Warnings
Outlooks
Submit Report

Current Conditions
Observations
Radar
Satellite
Observed Precip

Forecasts
Forecast Discussion
Local Area
Activity Planner
Aviation Weather
Fire Weather
Severe Weather
Hurricane Center

Hydrology
Rivers & Lakes

Climate
Local
National
Drought



www.weather.gov/Lincoln

Top News of the Day

- Hazardous Weather threats
- Storm Summaries
- **Multimedia Briefings**



National Weather Service - Central Illinois Multimedia Briefing

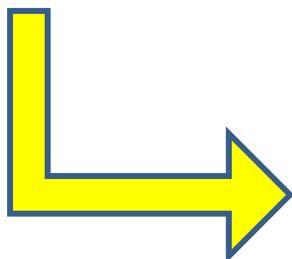
The Multimedia Briefing is a product that is primarily designed to keep you informed of upcoming hazardous weather over the next 7 days. The briefing will be updated as needed. However, it will be suspended during times of severe, convective weather. During those times, you are urged to consult our [severe weather summary page](#) for the most timely information.





www.weather.gov/Lincoln

Outlook page



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- [Short Term Forecast](#)

Current Hazards
 Watches/Warnings
Outlooks
 Submit Report

Current Conditions
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 Aviation Weather
 Fire Weather
 Severe Weather
 Hurricane Center

Hydrology
 Rivers & Lakes

Climate
 Local
 National
 Drought



www.weather.gov/Lincoln

Outlook page – Severe Weather

Severe Weather

[Latest Local Hazardous Weather Outlook](#)

• Local HWO

• SPC Outlooks

• Other SPC Resources



Day 1



Day 2



Day 3



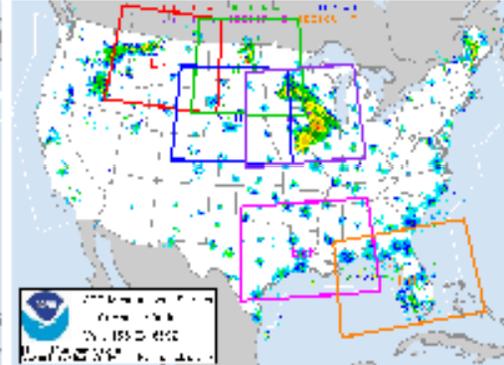
Mesoscale Discussion



SPC Activity Chart



SPC Mesoanalysis Chart



Showing a 1 hour radar loop, the current Day 1 convective outlook, and all active watches.

Click on the image for a detailed look at severe weather parameters for various sectors across the county.



Hazardous Weather Outlook

**Also available on
weather radio:**

First 12 - 24 hours



Next 2 - 7 Days



**Spotter
Activation**



...WIND ADVISORY IN EFFECT UNTIL MIDNIGHT CST TONIGHT...
...FLASH FLOOD WATCH IN EFFECT THROUGH THIS EVENING...

THIS HAZARDOUS WEATHER OUTLOOK IS FOR PORTIONS OF EAST CENTRAL ILLINOIS.

.DAY ONE...TODAY AND TONIGHT

VERY STRONG SOUTHERLY WINDS OF 30 TO 40 MPH ARE EXPECTED INTO TONIGHT. DRIVING MAY BECOME DIFFICULT FOR HIGH PROFILE VEHICLES...ESPECIALLY ON EAST-WEST ROADS. WINDS WILL TURN WESTERLY THIS EVENING BEHIND THE COLD FRONT...AND BECOME STRONG AGAIN. THE WIND ADVISORY IS IN EFFECT UNTIL MIDNIGHT AS A RESULT.

SOME STRONG TO SEVERE STORMS WILL BE POSSIBLE WITH DAMAGING WINDS AND A FEW TORNADOES POSSIBLE. LOCALLY HEAVY RAINFALL IS EXPECTED THIS AFTERNOON AND EVENING...WITH 1 TO 2 INCHES OF RAINFALL POSSIBLE. A FLASH FLOOD WATCH IS IN EFFECT THROUGH MIDNIGHT THIS EVENING.

THE FROZEN GROUND WILL FORCE MOST OF THE WATER TO RUNOFF. HEAVY RAINS AND POSSIBLE CLOGGED STREET DRAINS MAY LEAD TO FLASH FLOODING TODAY. BASEMENTS WILL LIKELY SEE WATER SEEPAGE AS WELL.

.DAYS TWO THROUGH SEVEN...SUNDAY THROUGH FRIDAY

NO HAZARDOUS WEATHER IS EXPECTED AT THIS TIME.

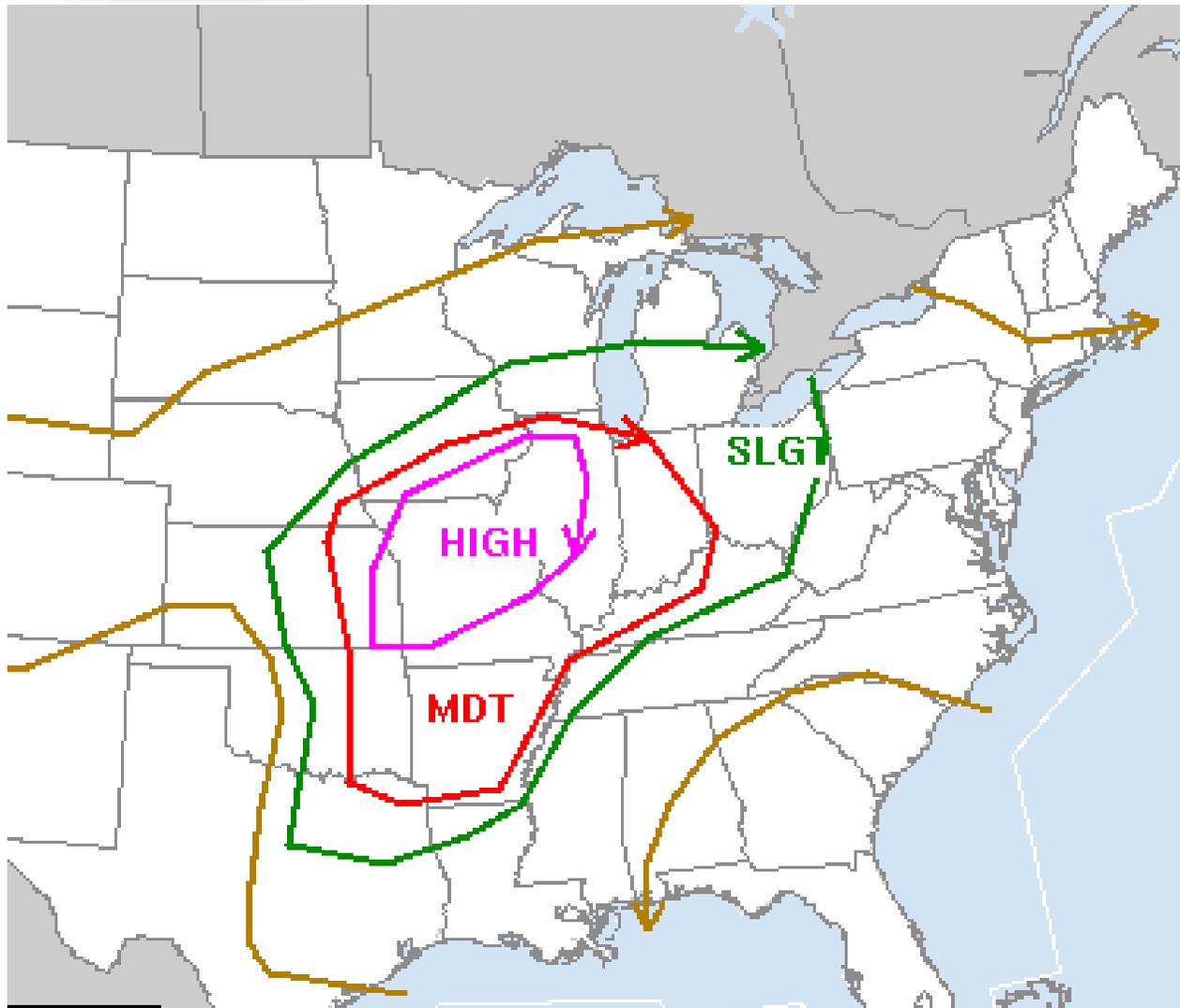
.SPOTTER INFORMATION STATEMENT...

SPOTTER ACTIVATION MAY BE NEEDED THIS AFTERNOON...MAINLY AFTER 3 PM.

\$\$



Levels of Severe Risk

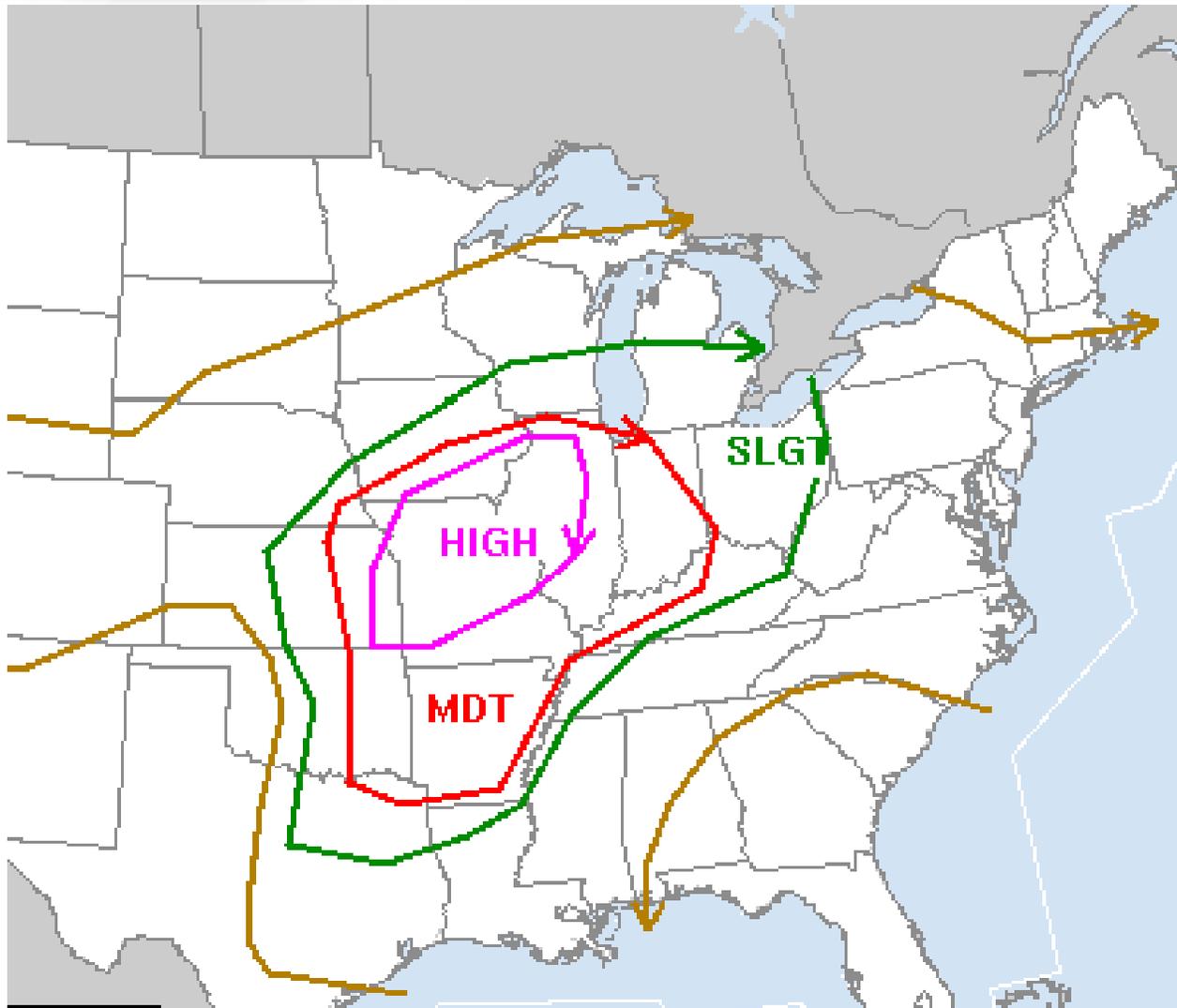


General =

Thunderstorms are anticipated, but they are not expected to become strong or severe.



Levels of Severe Risk

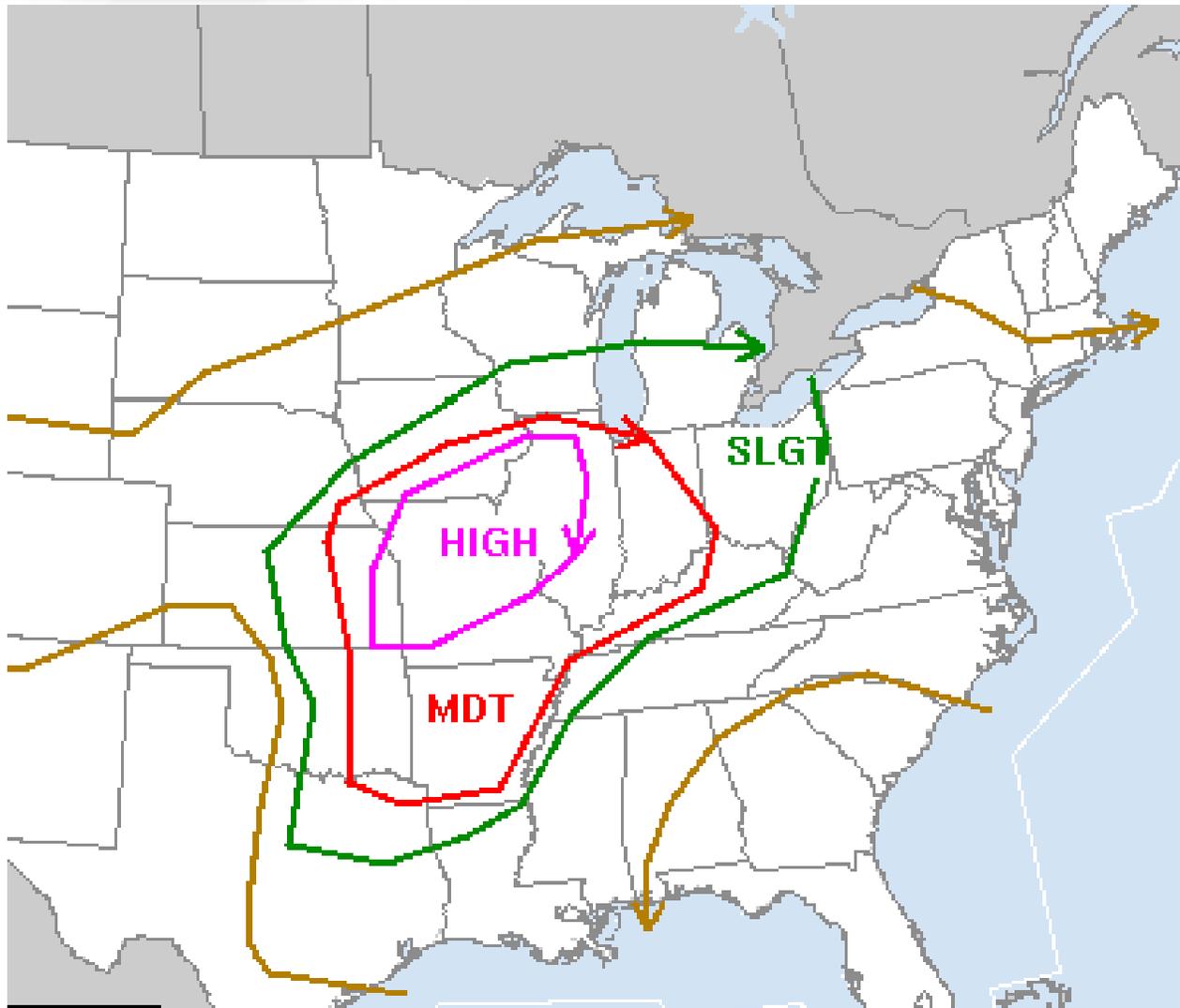


SLGT

Slight = Well organized severe thunderstorms are expected, but in a relatively small areal coverage.



Levels of Severe Risk

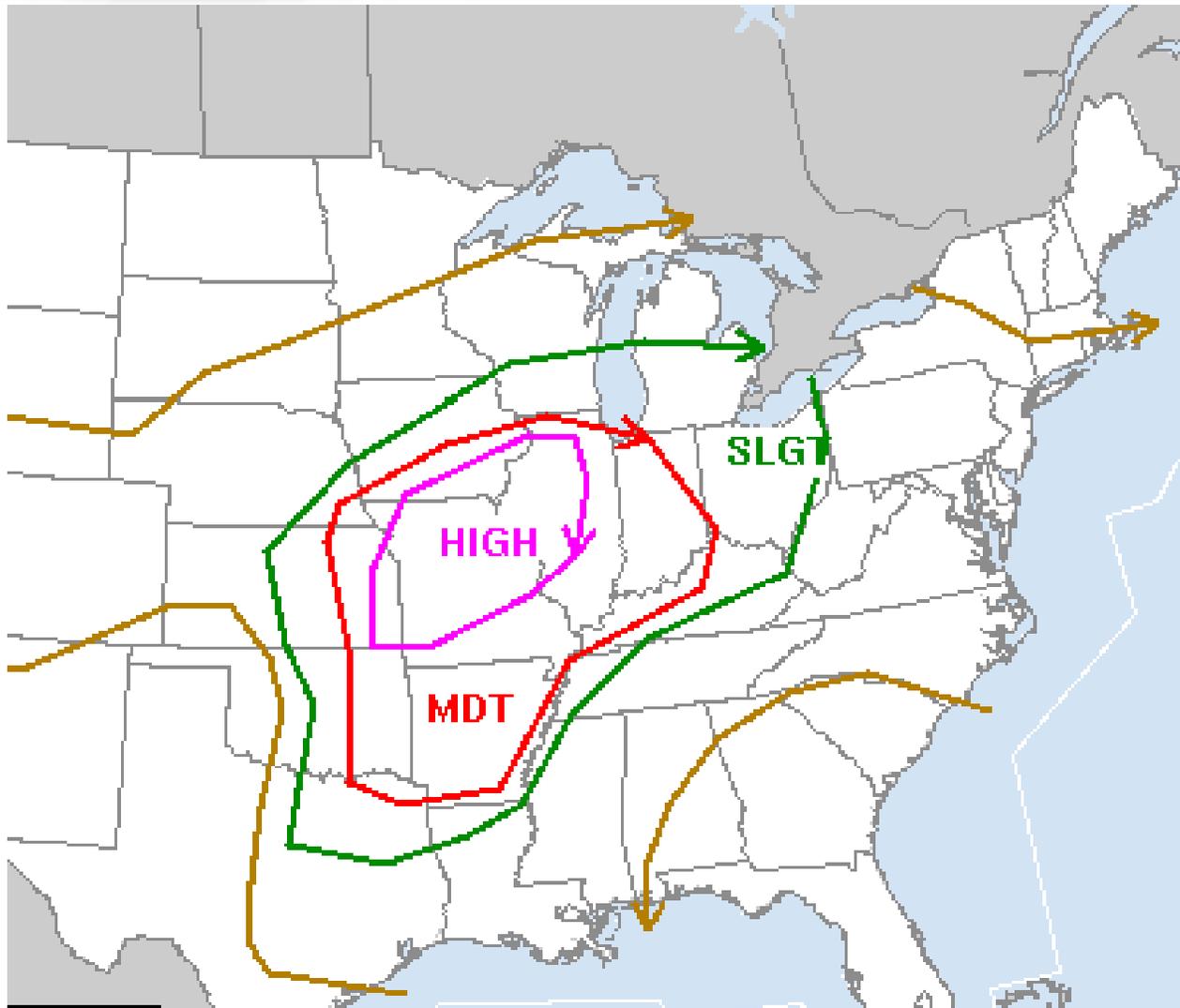


MDT

Moderate = greater concentration of severe t-storms & of greater magnitude.



Levels of Severe Risk



HIGH

High Risk means that a major severe weather outbreak is expected



www.weather.gov/Lincoln

Outlook page – Rainfall

Rainfall

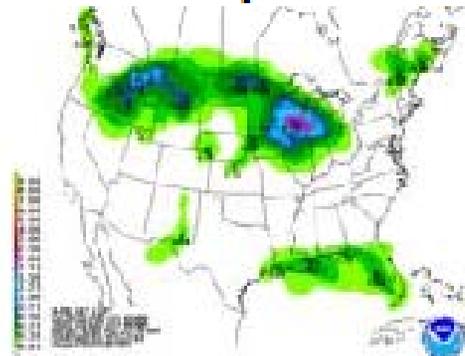
- Latest Local Hydrologic Outlook
- Days 1-3
- Excessive rainfall

• Rainfall →
Discussions

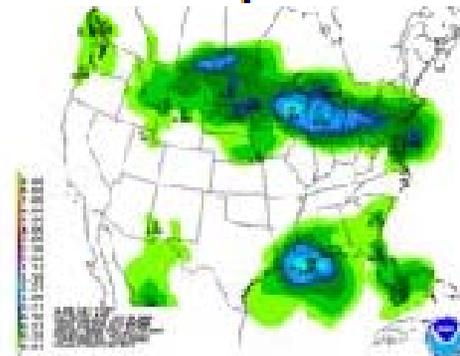
• HPC Rainfall
Outlooks



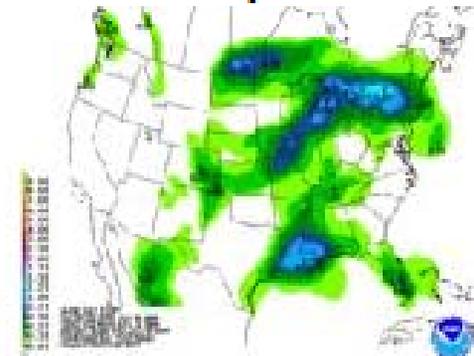
Day 1



Day 2



Day 3



Day 4-5



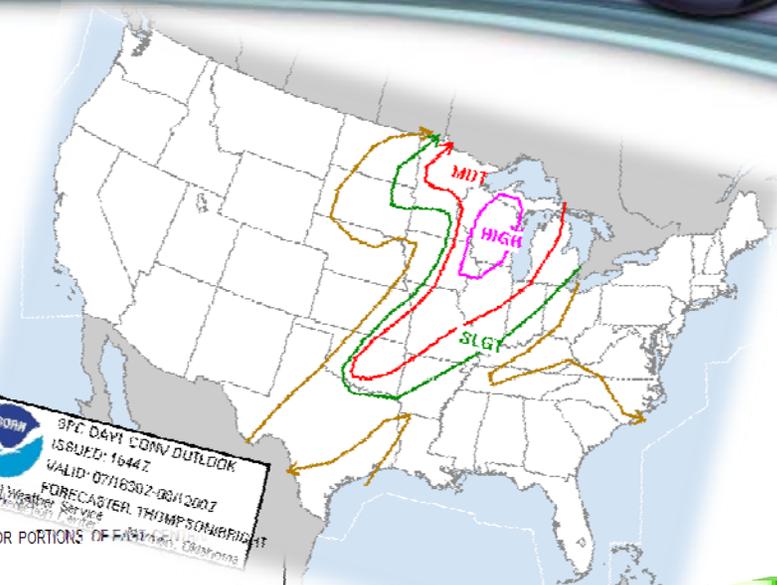
Excessive Rainfall





What to do...

- **With Outlook Info:**
 - Complete preparedness
 - Plan for the event
 - **Notify spotters, first responders, & other officials**
 - **Be prepared to activate**



SFC DAY1 CONV OUTLOOK
 ISSUED: 1644Z
 VALID: 071620Z-081200Z
 FORECASTER: THOMPSON/RRP
 ILLINOIS

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 ...FLASH FLOOD WATCH IN EFFECT THROUGH MIDNIGHT...
 THIS HAZARDOUS WEATHER OUTLOOK IS FOR PORTIONS OF ILLINOIS.

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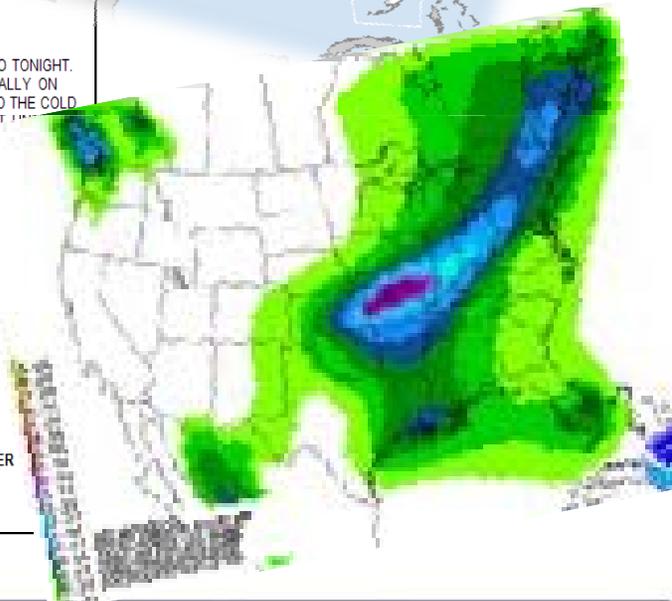
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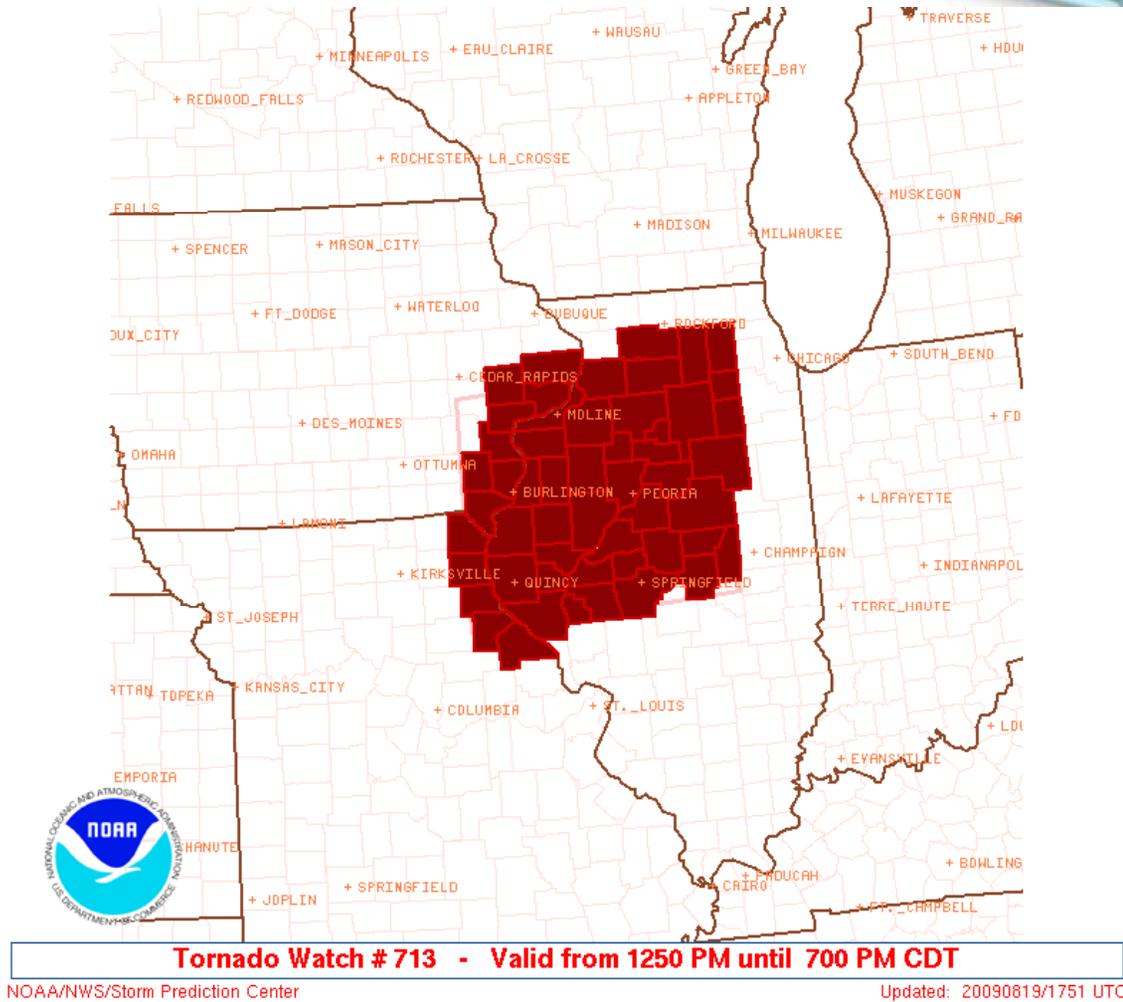
SS





Watches

- **Potential** for severe t-storms, tornadoes, or flooding to develop
- **Watch** for rapidly changing conditions
- Typically 6 to 8 hours in length





What to do...

- **When a Watch is issued:**
 - Activate as the storms approach
 - Use the 2 county rule: When storms/warnings are 2 counties away – call out spotters
 - Check our web page for the latest info





Warnings

- **Tornado Warning:**
 - Tornado reported or about to develop
 - May also contain large hail and downbursts
- **Severe Thunderstorm Warning:**
 - Wind damage or gusts 58 mph or higher
 - Hail 1" or larger (size of a Quarter)
- **Flash Flood Warning:**
 - Rapid flood of creeks, streams or small rivers
 - Streets / roads with more than 6" flowing water

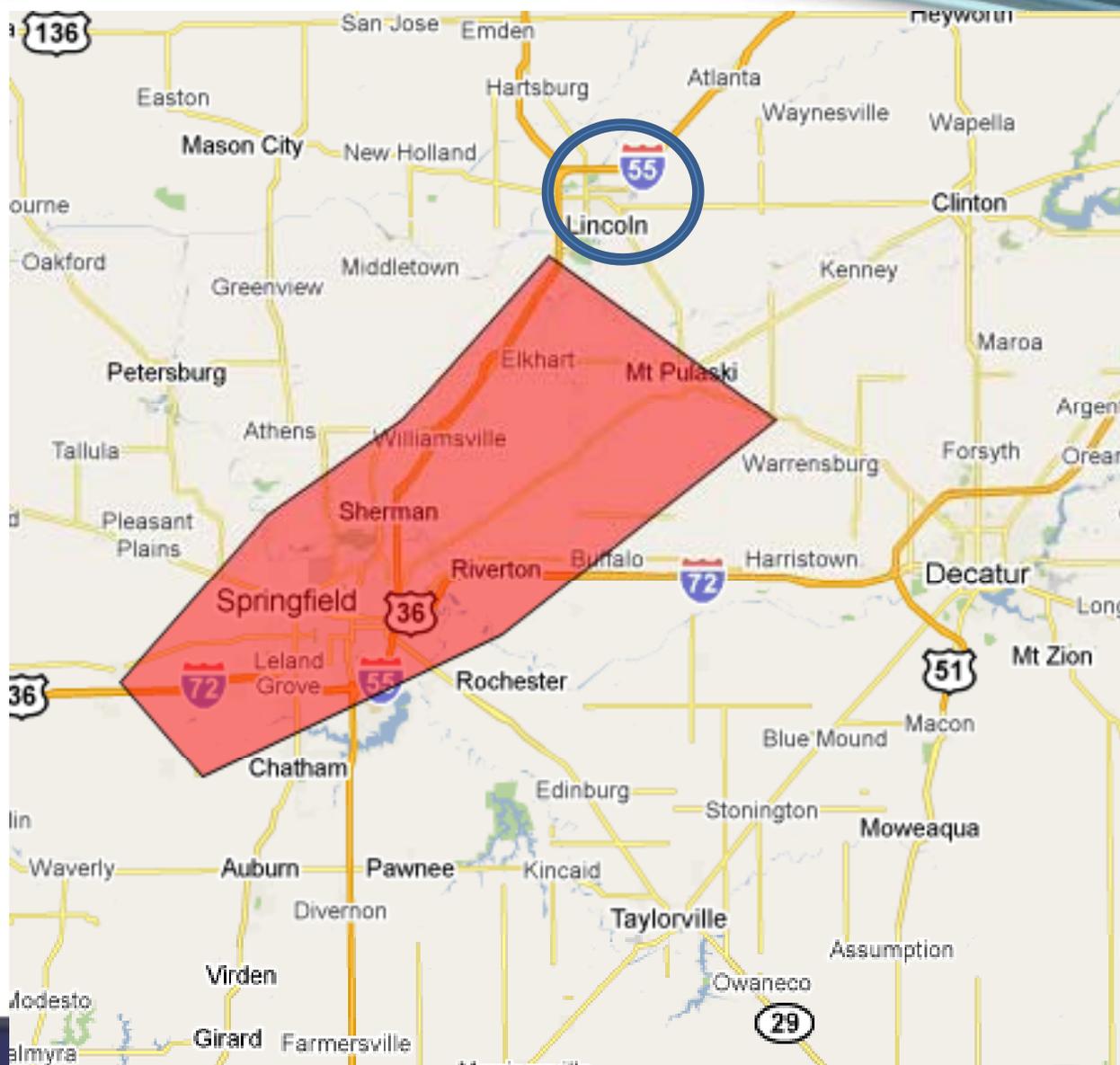


Warning Exercise - Map

**Is Lincoln in the
warning ??**

**It is MUCH easier
to determine the
coverage of the
warning by using
an image !!**

**You can access
images on our
web page...**





www.weather.gov/Lincoln

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Local forecast by "City, St" or Zip Code
City, St Go

Current Hazards Watches/Warnings

Outlooks
Submit Report
Current Conditions
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Fire Weather
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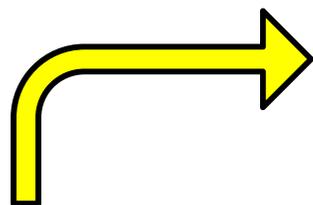
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Last map update: Fri, Aug. 7, 2009 at 11:50:41 am CDT

Read watches, warnings & advisories

Zoom Out

- Flood Warning
- Heat Advisory
- Special Weather Statement
- Hazardous Weather Outlook
- Short Term Forecast



**Latest
Watches
&
Warnings**



National Weather Service Central Illinois

Severe Weather Summary Page

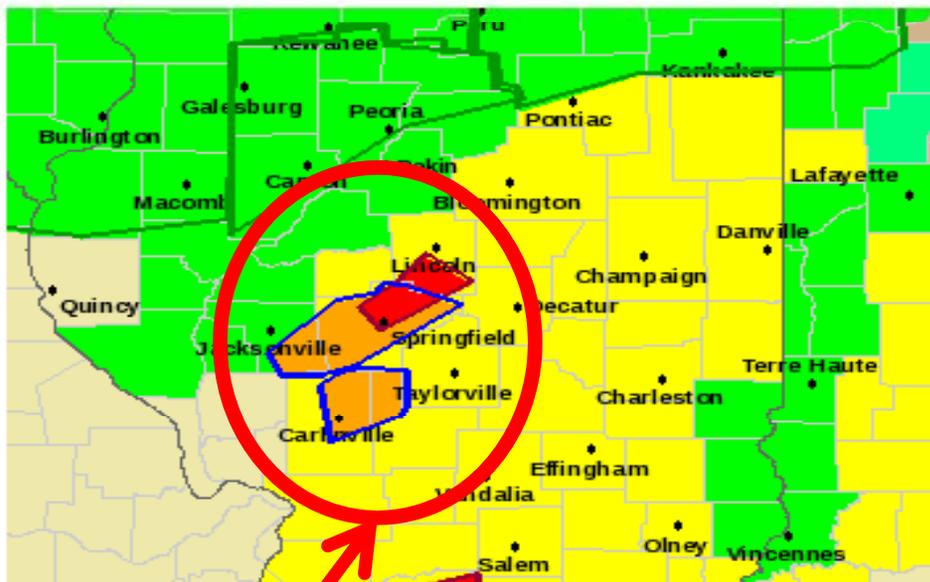
[Home](#)

[Site Map](#)

[News](#)

[Organization](#)

Watches, Warnings, Advisories (Click to zoom)



Last map update: Sun, Mar. 8, 2009 at 11:58:54 am CDT

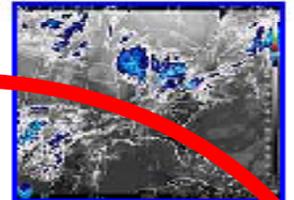
Warning Polygons

Read watches, warnings & advisories



- Tornado Warning
- Severe Thunderstorm Warning
- Flood Warning
- Tornado Watch
- Flash Flood Watch
- Severe Weather Statement
- Flood Advisory
- Wind Advisory
- Flood Watch
- Special Weather Statement
- Hazardous Weather Outlook
- Short Term Forecast

Radar and Satellite (Click for larger image)



- Tornado Warning(s)**
all or portions of the following counties, In Illinois: Logan, Sangamon, Washington
- Severe Thunderstorm Warning(s)**
all or portions of the following counties, In Illinois: Macoupin, Montgomery, Morgan, Sangamon
- Flash Flood Warning(s)**
None

Click the name of the county you want

Local Links

Hazardous Weather Outlook	Local Storm Reports
Rivers & Lakes (AHPS)	E-Spotter
Office Home	

Region - National

Convective Outlooks	Mesoscale Discussions
Current Watches	Storm Reports
Excessive Rainfall	Flood Outlook
U.S. Hazards	Weather Safety
Quantitative Precipitation Forecasts (QPF)	



National Weather Service Central Illinois

Severe Weather Summary Page

[Home](#) [Site Map](#) [News](#) [Organization](#)

Sangamon County (March 8, 2009 12:05pm CDT)

[Text](#) | [Zoom Out](#)

Warning Polygons



Warnings & Follow-Up Statements

Tornado Warning (#0002 issued at 11:40am)
 Statement (issued at 11:46am)
 Statement (issued at 11:53am)
 Statement (issued at 12:04pm)

Other Products

Tornado Watch (#0049 - until March 8 4:00pm CDT)
 Hazardous Weather Outlook
 Wind Advisory

Radar



Local

Hazardous Weather Outlook	Local Storm Reports
Rivers & Lakes (AHPS)	E-Spotter
Office Home	

Regional-National

Convective Outlooks	Mesoscale Discussions
Current Watches	Storm Reports
Excessive Rainfall	Flood Outlook
U.S. Hazards	Weather Safety
Quantitative Precipitation Forecasts (QPF)	



What to do...

- **When a Warning is issued:**
 - **Be alert and spot safely !!**
 - **Seek reports and relay them as quickly as possible !**



THE NATIONAL WEATHER SERVICE IN LINCOLN HAS ISSUED A TORNADO WARNING FOR...

**NORTHERN SANGAMON COUNTY...
SOUTHERN LOGAN COUNTY...**

UNTIL 1215 PM CDT.

AT 1140 AM CDT...NATIONAL WEATHER SERVICE METEOROLOGISTS DETECTED A SEVERE THUNDERSTORM CAPABLE OF PRODUCING A TORNADO 11 MILES SOUTHWEST OF SPRINGFIELD...MOVING NORTHEAST AT 60 MPH.

**LOCATIONS IMPACTED
INCLUDE...SPRINGFIELD...SHERMAN...
RIVERTON...WILLIAMSVILLE... CORNLAND...
ELKHART... MOUNT PULASKI...**



National Weather Service
Lincoln, IL

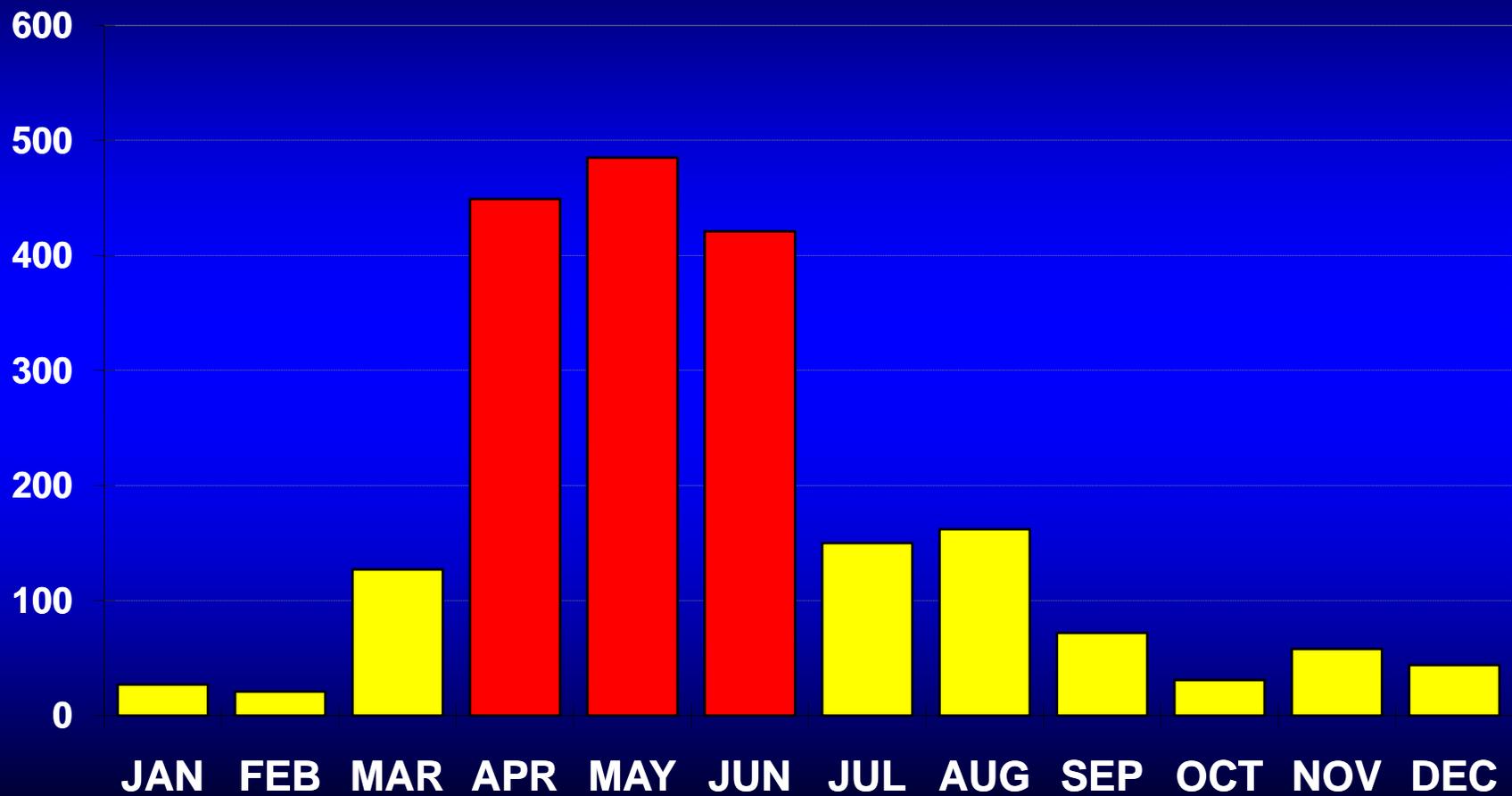


THUNDERSTORM BASICS



Tornadoes: Monthly

Illinois Tornadoes (1950-2009)





Thunderstorm Ingredients

1.Lift

2.Moisture

3.Instability



Video courtesy of Iowa State Univ.



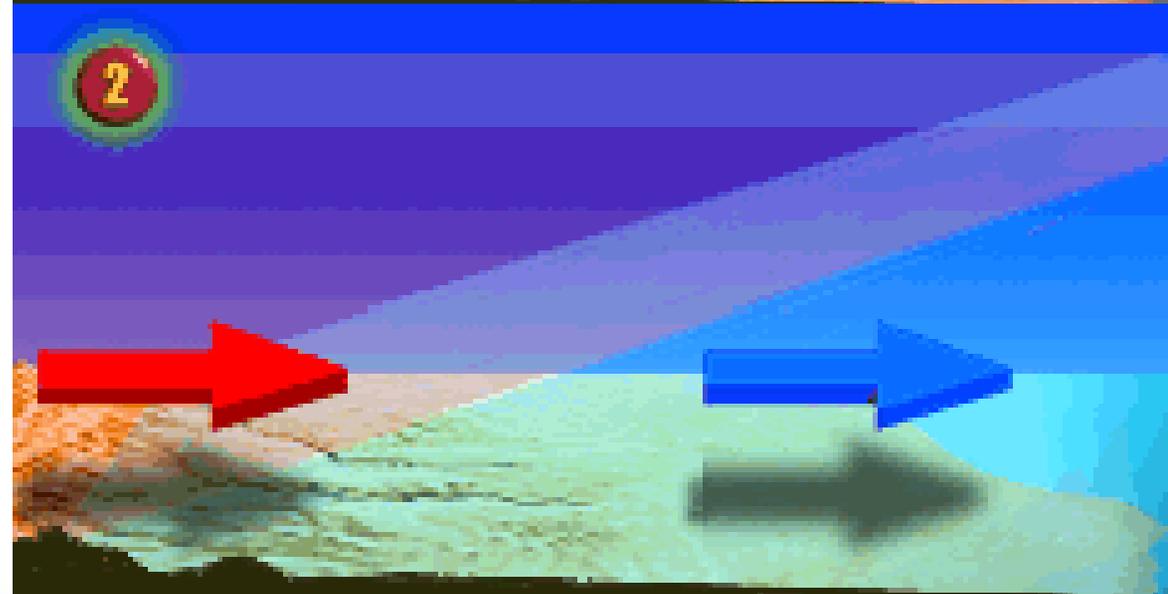
Thunderstorm Ingredients

1. Lift

a. Cold Front



b. Warm Front





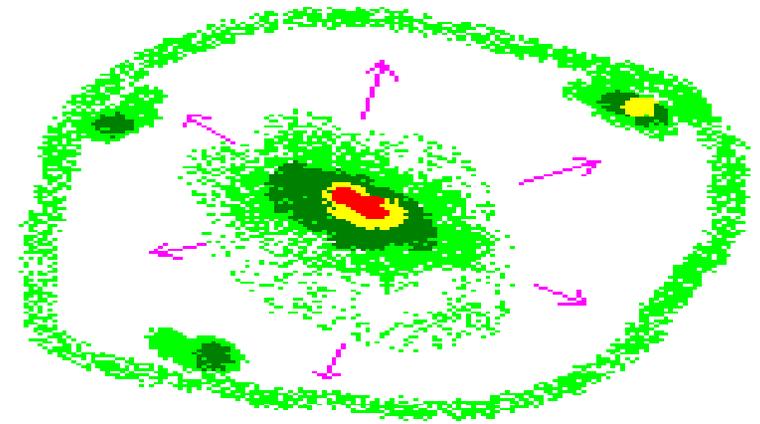
Thunderstorm Ingredients

1. Lift

c. Heating of the earth (Convection)



d. Cold outflow from nearby storms





Thunderstorm Ingredients

2. Moisture

- a. Gulf of Mexico
- b. Local Vegetation





Thunderstorm Ingredients

3. Instability

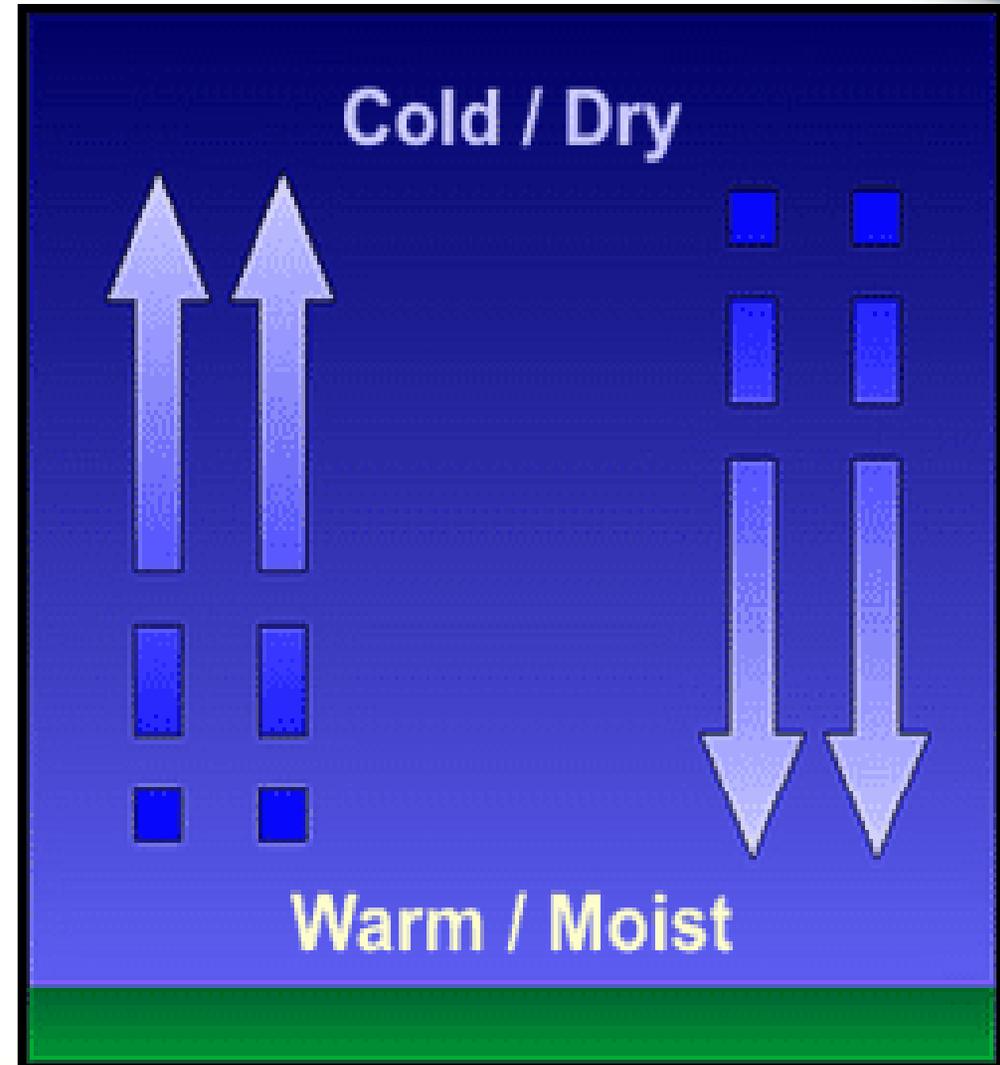
**Warm, moist air
near the ground**

+

cold, dry air aloft

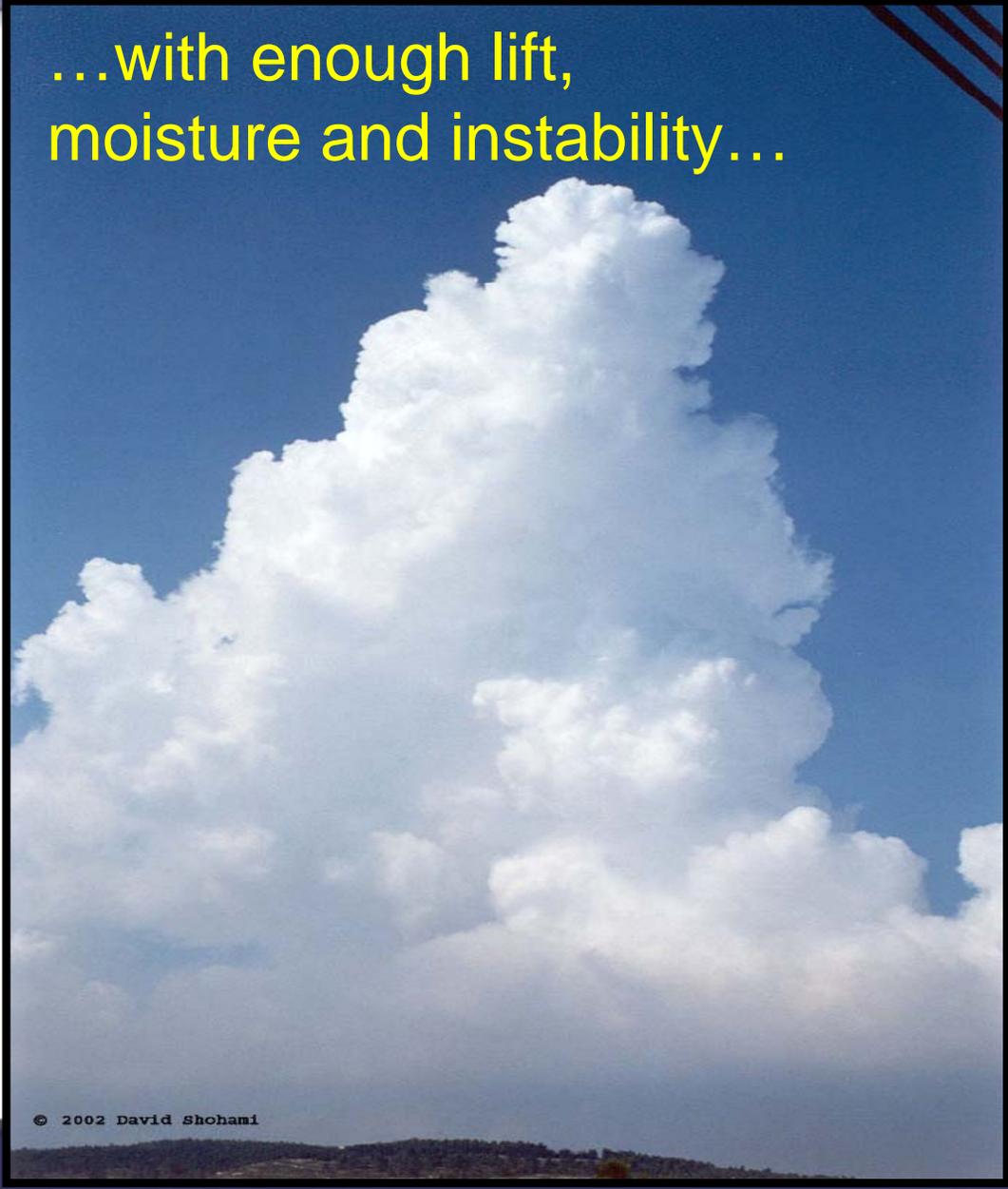
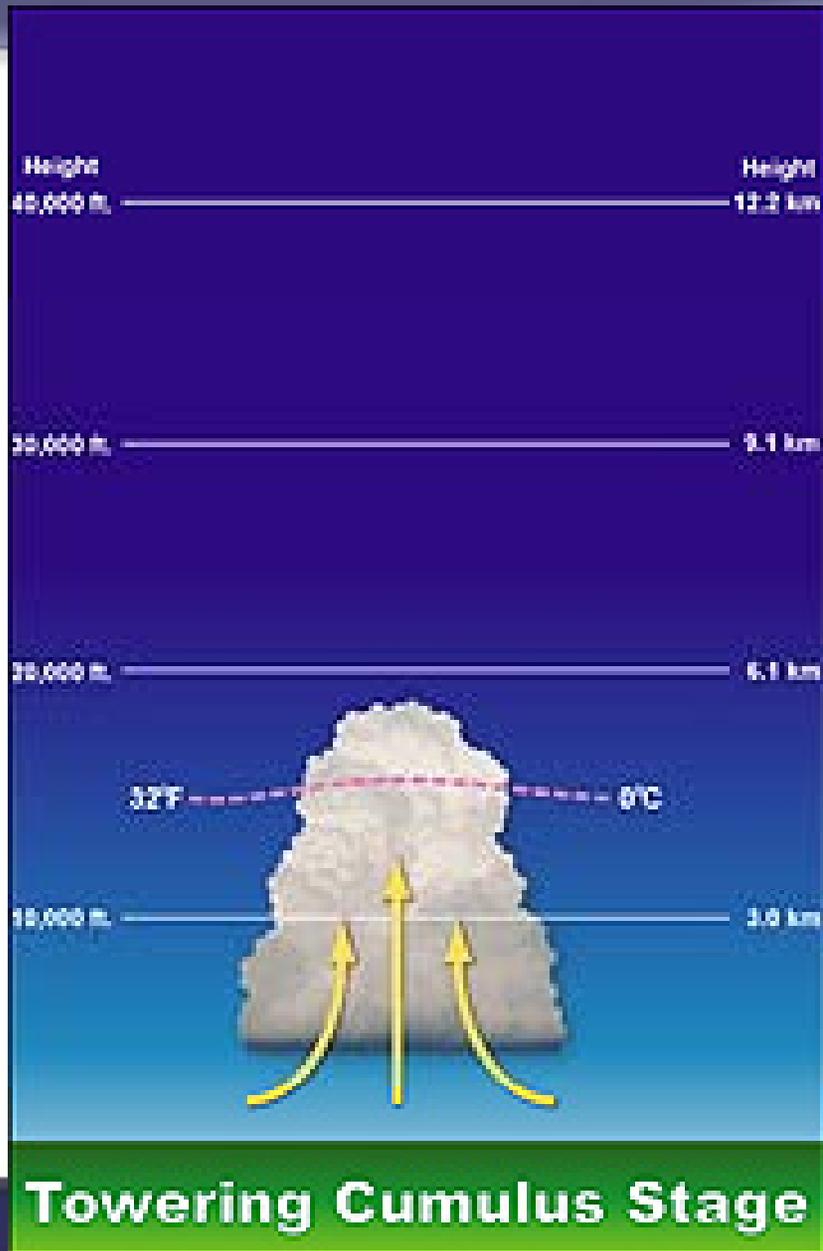
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Instability



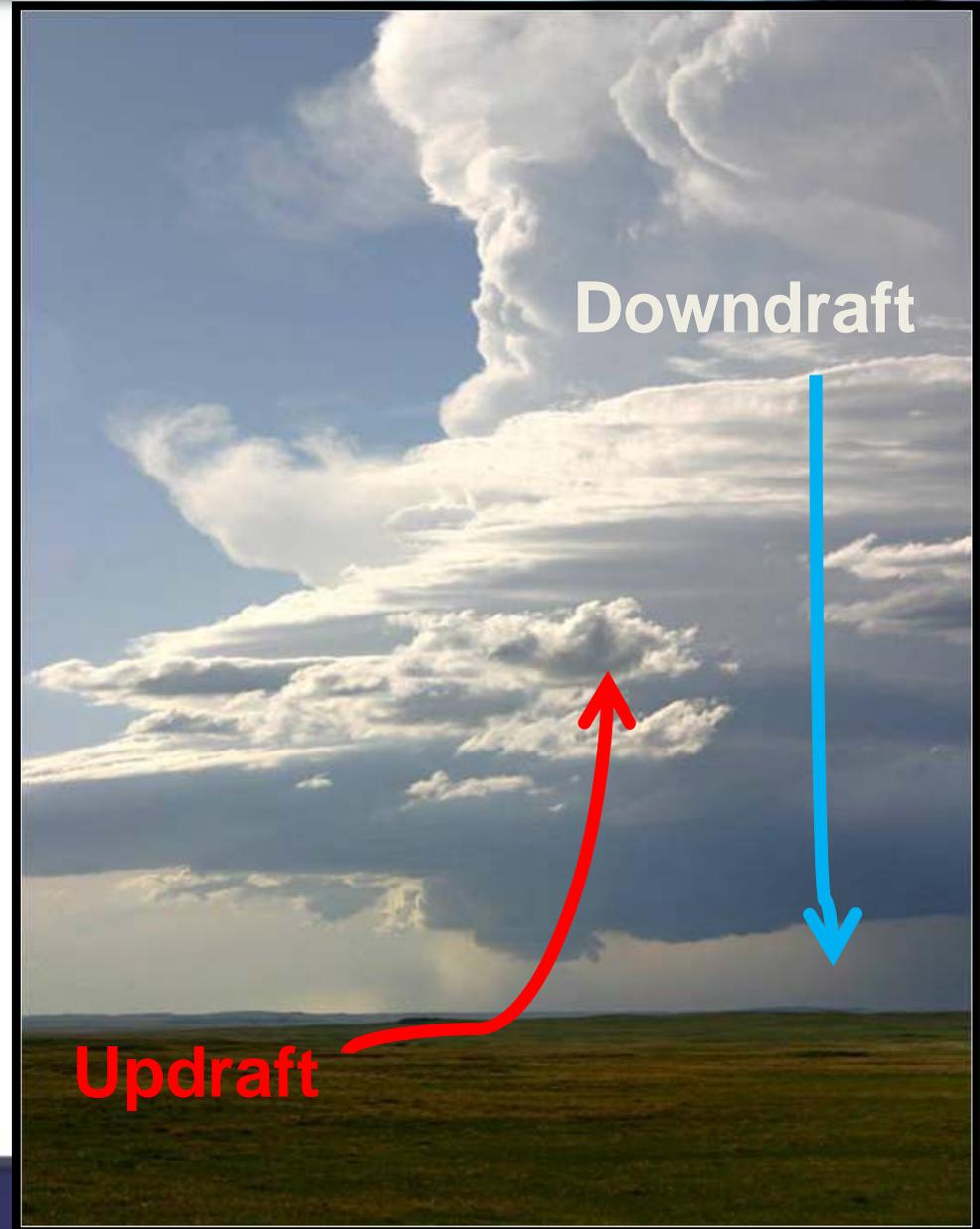
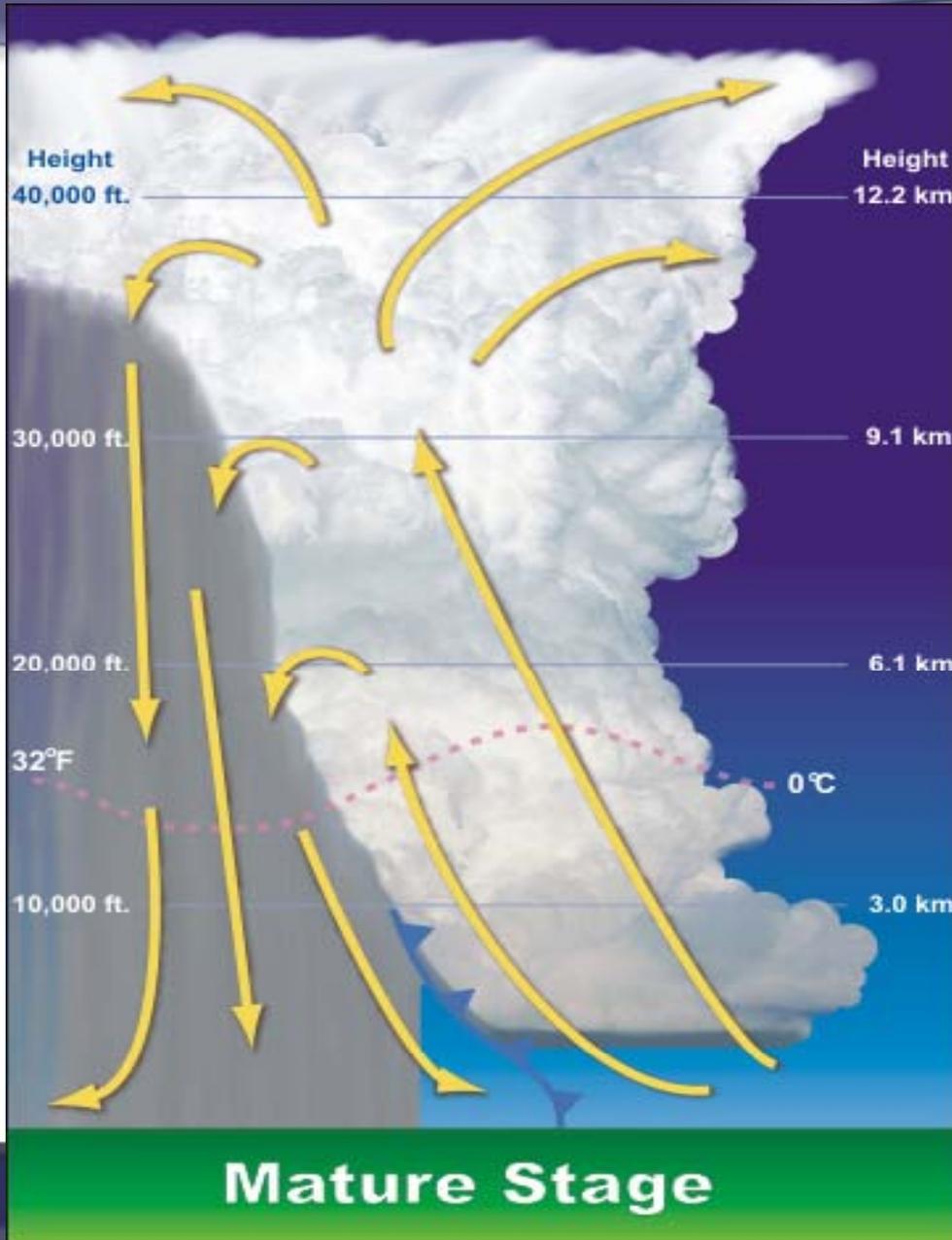


Thunderstorm Life Cycle



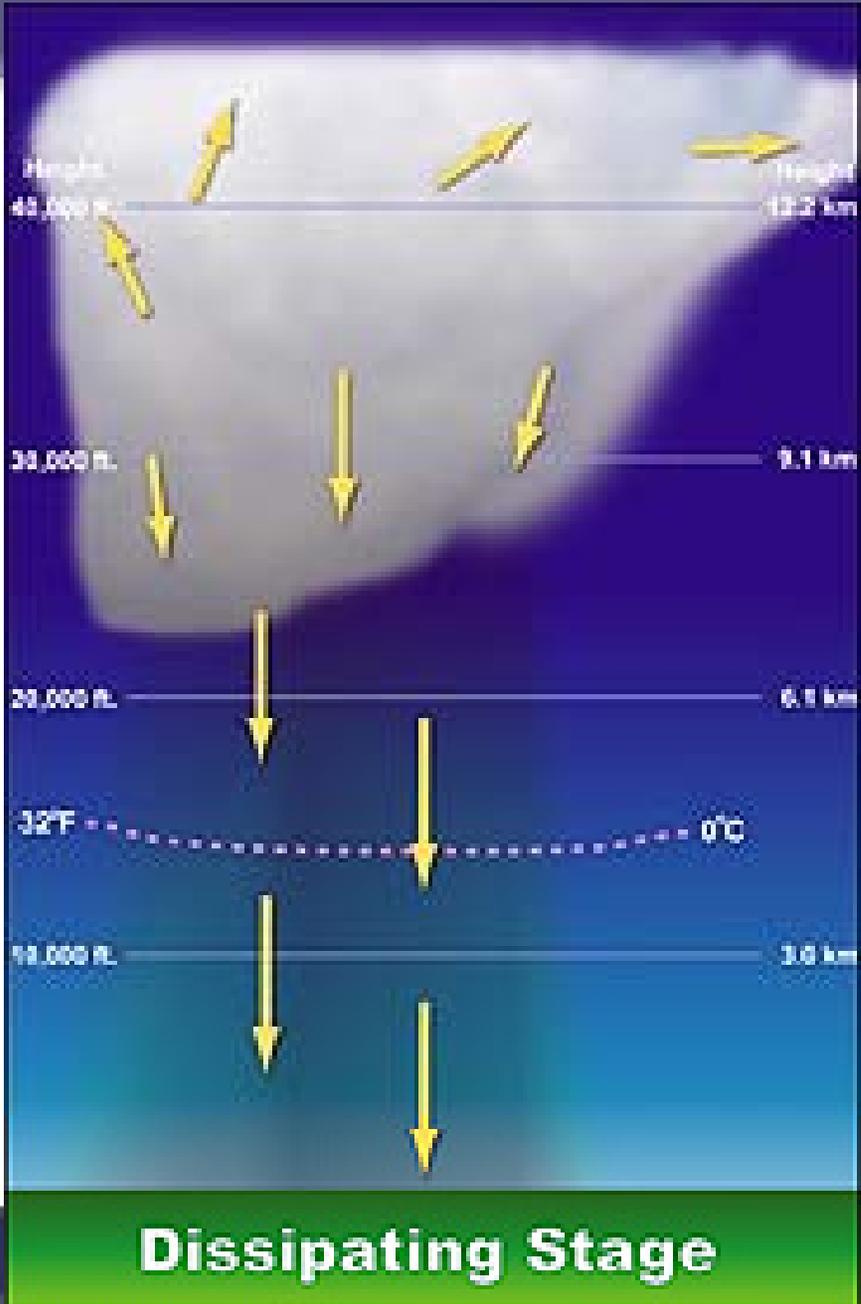


Thunderstorm Life Cycle



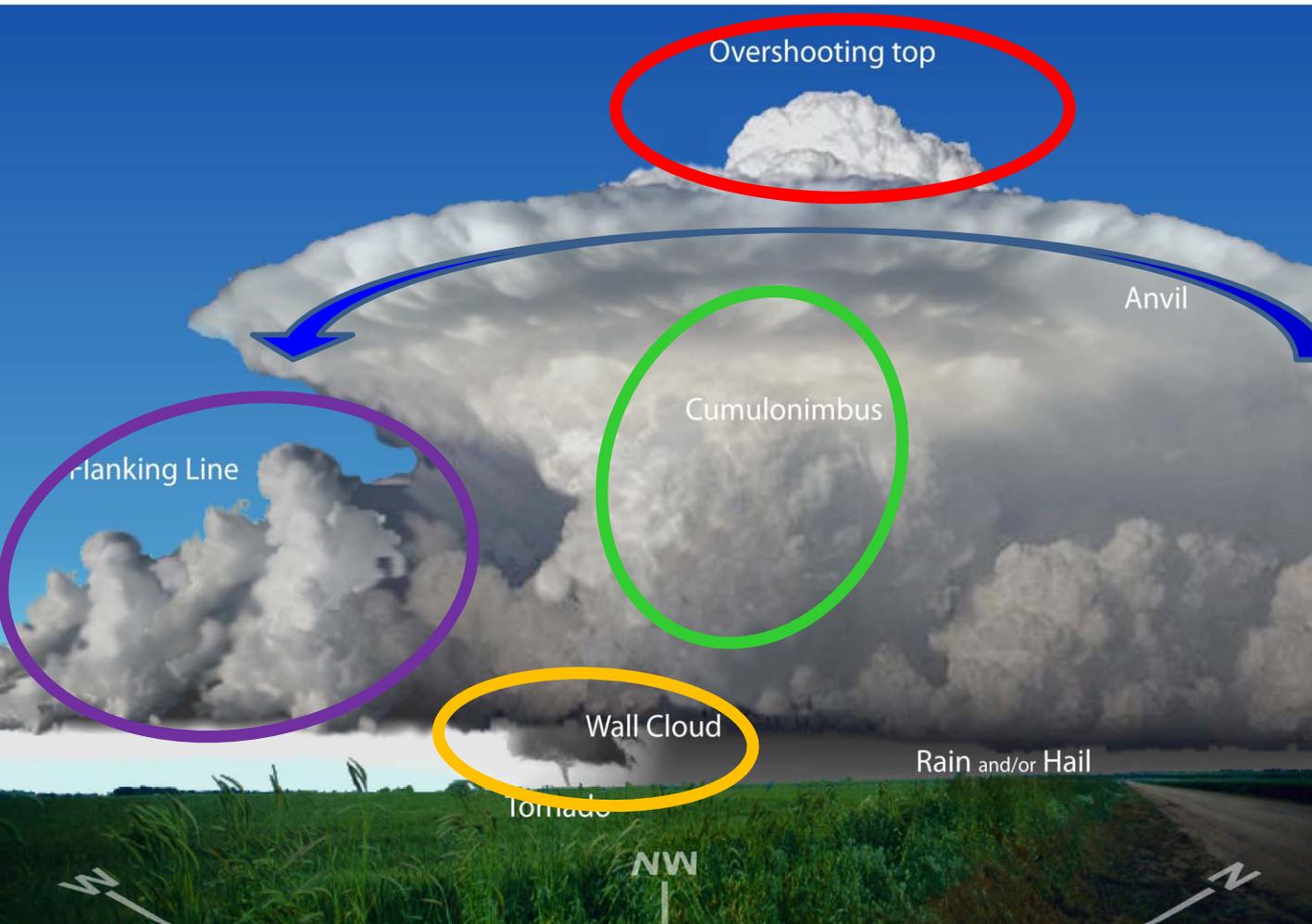


Thunderstorm Life Cycle





Strong & Severe Storm Features



ANVIL

**OVERSHOOTING
TOP**

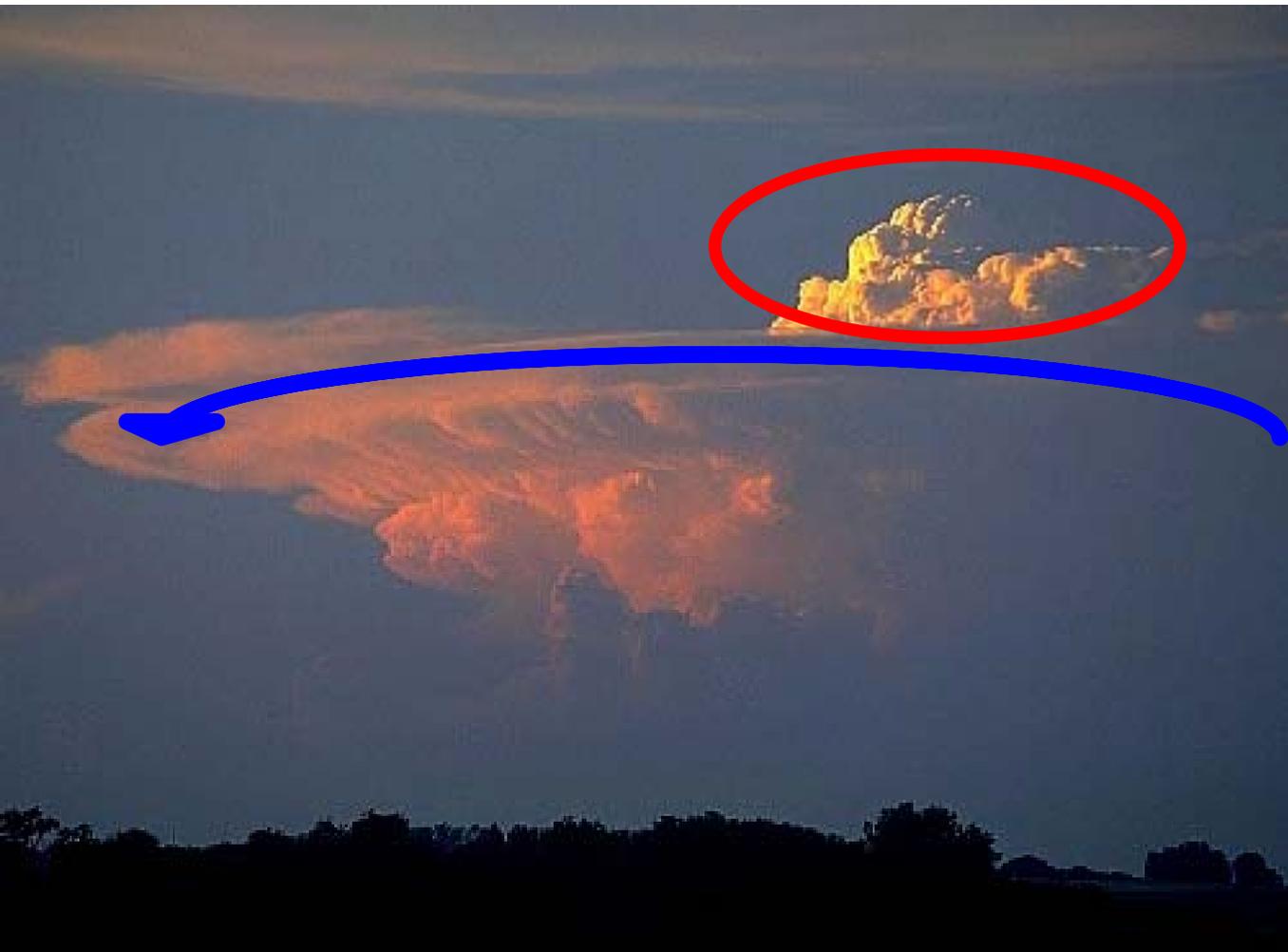
STORM TOWER

FLANKING LINE

**RAIN-FREE BASE
& WALL CLOUD**



Strong & Severe Storm Features



ANVIL: Solid,
sharp edges

**OVERSHOOTING
TOP:** Indicates a
VERY strong
updraft, especially
if it is persistent

Photo by Gene Rhoden



Strong & Severe Storm Features

Photo by Matt Ziebell



Flanking Line: Indicates the storm will intensify, or sustain itself for quite some time



Strong & Severe Storm Features

STORM TOWER: Sharp, bulging edges – visible updraft of storm

Rain-Free Base and Wall Cloud: Indicates a strong updraft – heavy rain can not penetrate it.

There is a higher potential for a tornado with a rotating wall cloud

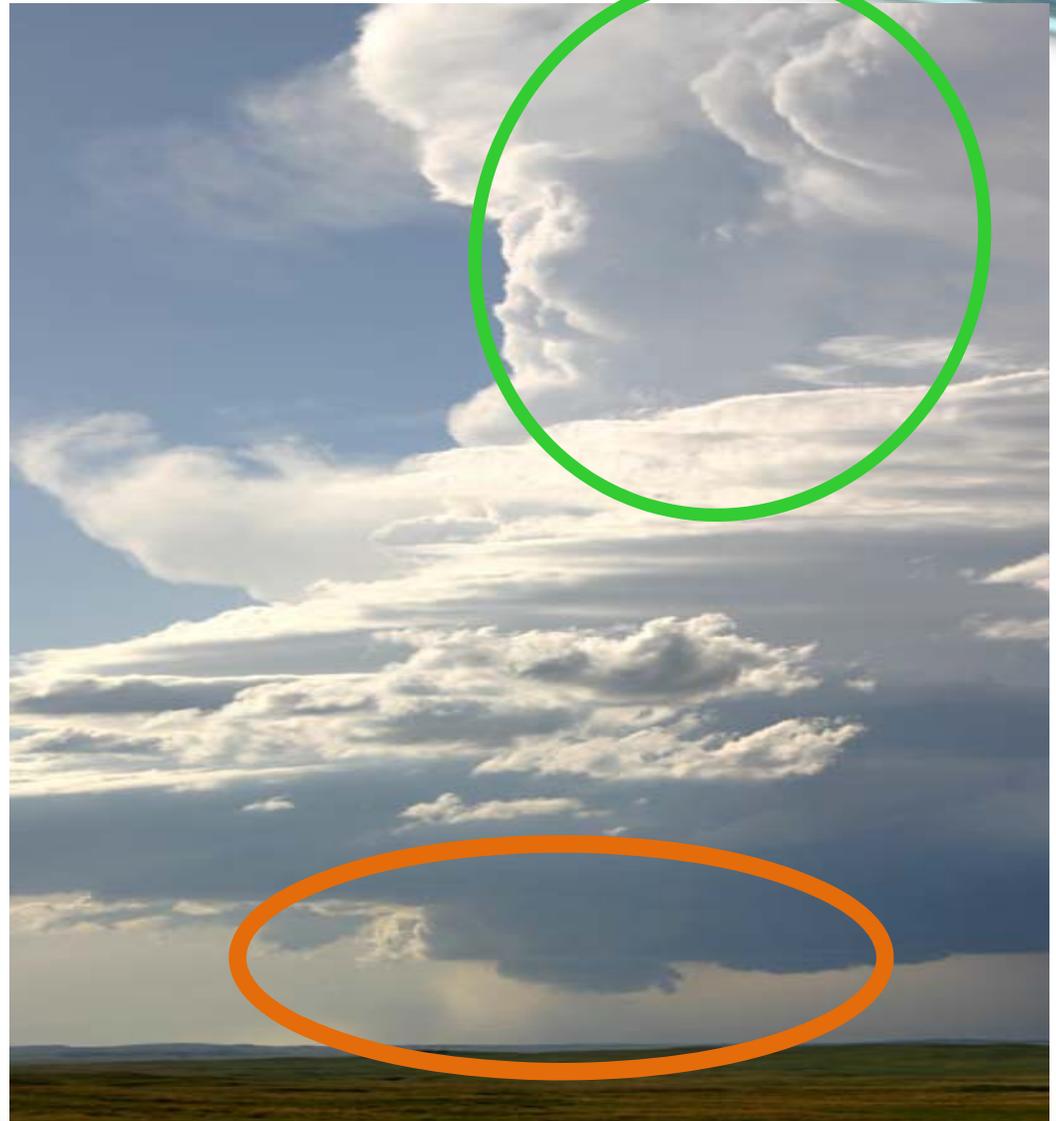


Photo by Brian Morganti



National Weather Service
Lincoln, IL



THUNDERSTORM TYPES



Single Cell Storms

- **Most common in summer**
- **Short lived – less than 1 hour**
- **Severe Weather:**
 - **Small Hail**
 - **Downpours**
 - **Gusty Wind (less than 40-50 mph)**





Single Cell Storms



**Single
Cell Storm
Life Cycle**
(Mature to
Dissipating
Stage)

**Photos
are about
5 minutes
apart**



Multicell Cluster Storms

- Most common type of thunderstorm
- The “cluster” is a group of storms which moves as one unit
- Occasionally “Supercell” storms form in the cluster



Looking NORTH

Photo by Gary Woodall



Multicell Cluster Storms

- “New” cells form on the W-SW edge
- “Dissipating” cells weaken on NE-E edge
- Severe weather:
 - Heavy Rain / Hail
 - Downburst Winds
 - Weak Tornadoes



Looking NORTH

Photo by Gary Woodall



Multicell Cluster Storms

© Paul M. Hadfield

**Oldest / weakening
thunderstorms**



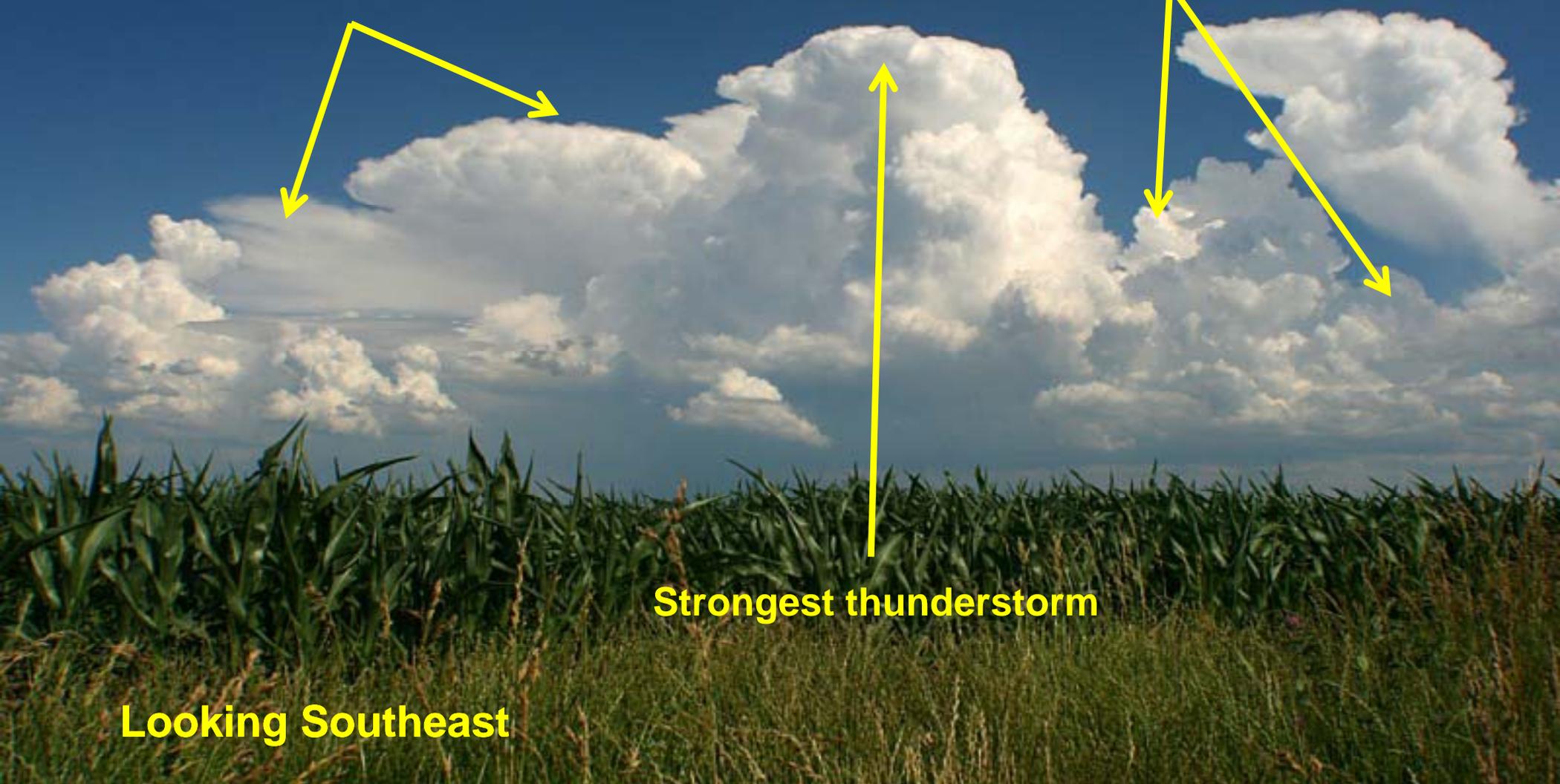
**Towering Cumulus
(new growth)**



Strongest thunderstorm



Looking Southeast





Squall Line

- Long line of separate storms
- Lines are often oriented N-S or NE-SW
- “Supercells” may be embedded in the line (especially near breaks in the line, or on the southern end)





Squall Line

- **Cool “outflows”** from each storm create a “gust front” – with heavy rain and high wind
- **Often, a shelf cloud or roll cloud will be seen along the “gust front”**



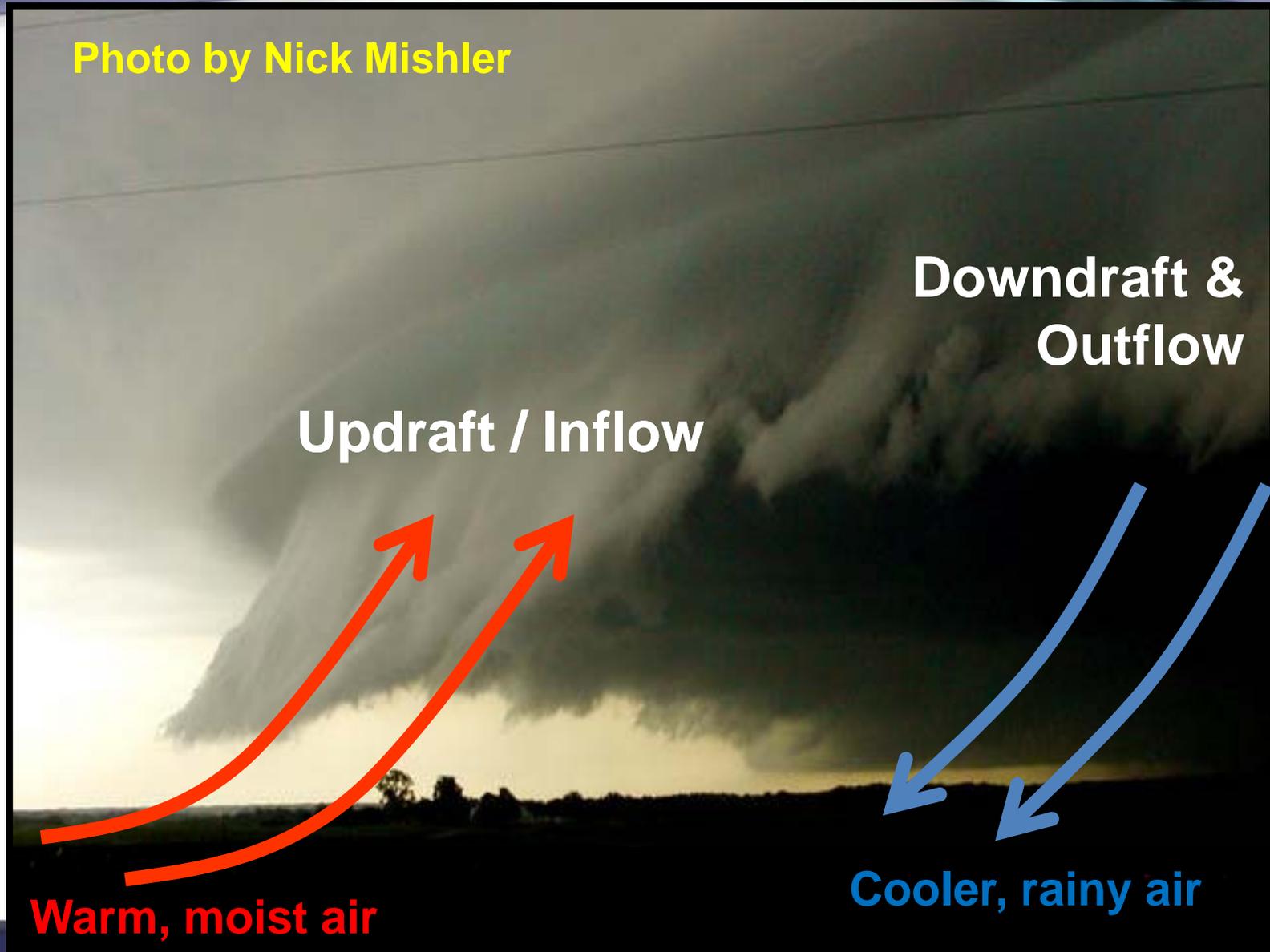


Squall Line – Shelf Cloud

Shelf Cloud

Photo by Nick Mishler

Where the
Warm
Updraft &
Cool
Downdraft
Meet





National Weather Service
Lincoln, IL



Severe Squall Line: Shelf Cloud



Photo by Doug Raflik

65 to 80 mph wind



Squall Line

- **Severe Weather:**
 - **Potential for high winds / damage**
 - **Occasional Tornadoes**
 - **Heavy Rain**
 - **Hail (dime to golf ball sized)**



*Photo by Roger Look
08/04/09*

*60-70 mph wind
Widespread tree damage*



Supercell Thunderstorms

- **Highly organized storms**
- **Pose a HIGH threat to life & property**
- **Updrafts rotate and rise > 100 mph**
- **Rear Flank Downdraft (RFD) can produce high wind / damage**

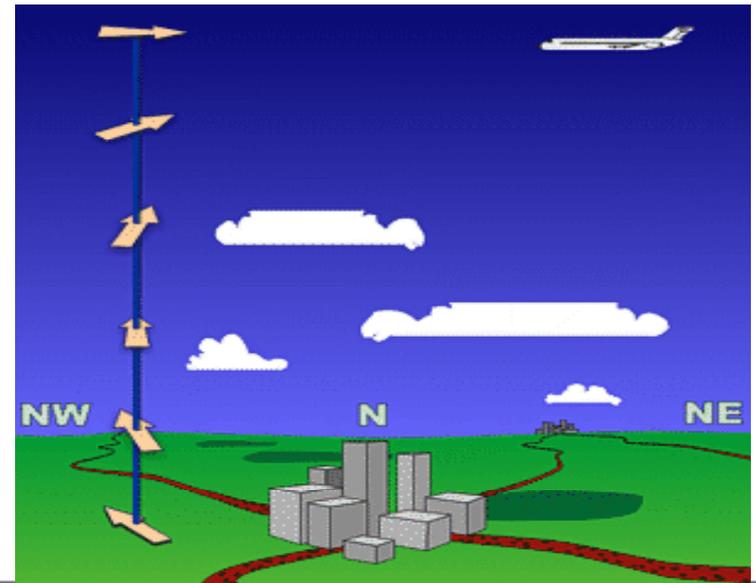
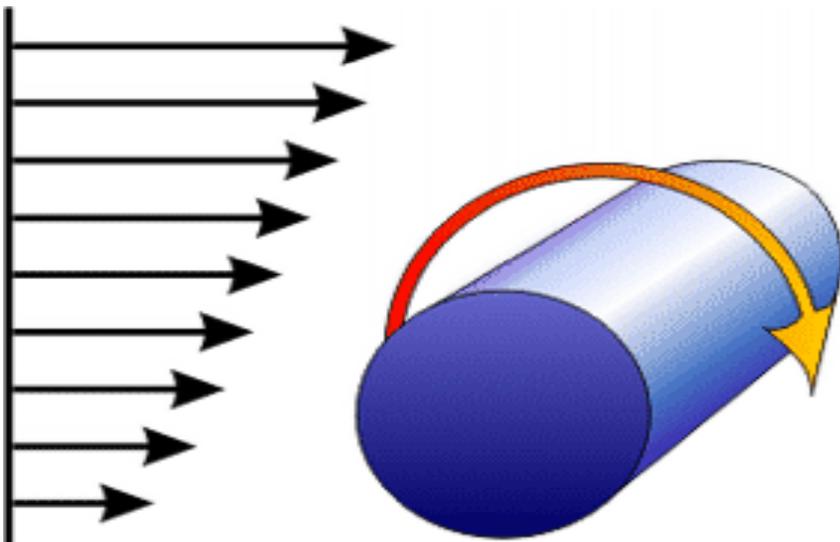


Photo by Mark Sefried



Supercell Characteristic #1

- **Strong, Rotating, Tilted Updraft (“Meso”):**
 - A Meso causes supercells to persist for hours, resulting in an enhanced threat of tornadoes, damaging wind & large hail
 - A Meso forms when there is wind shear



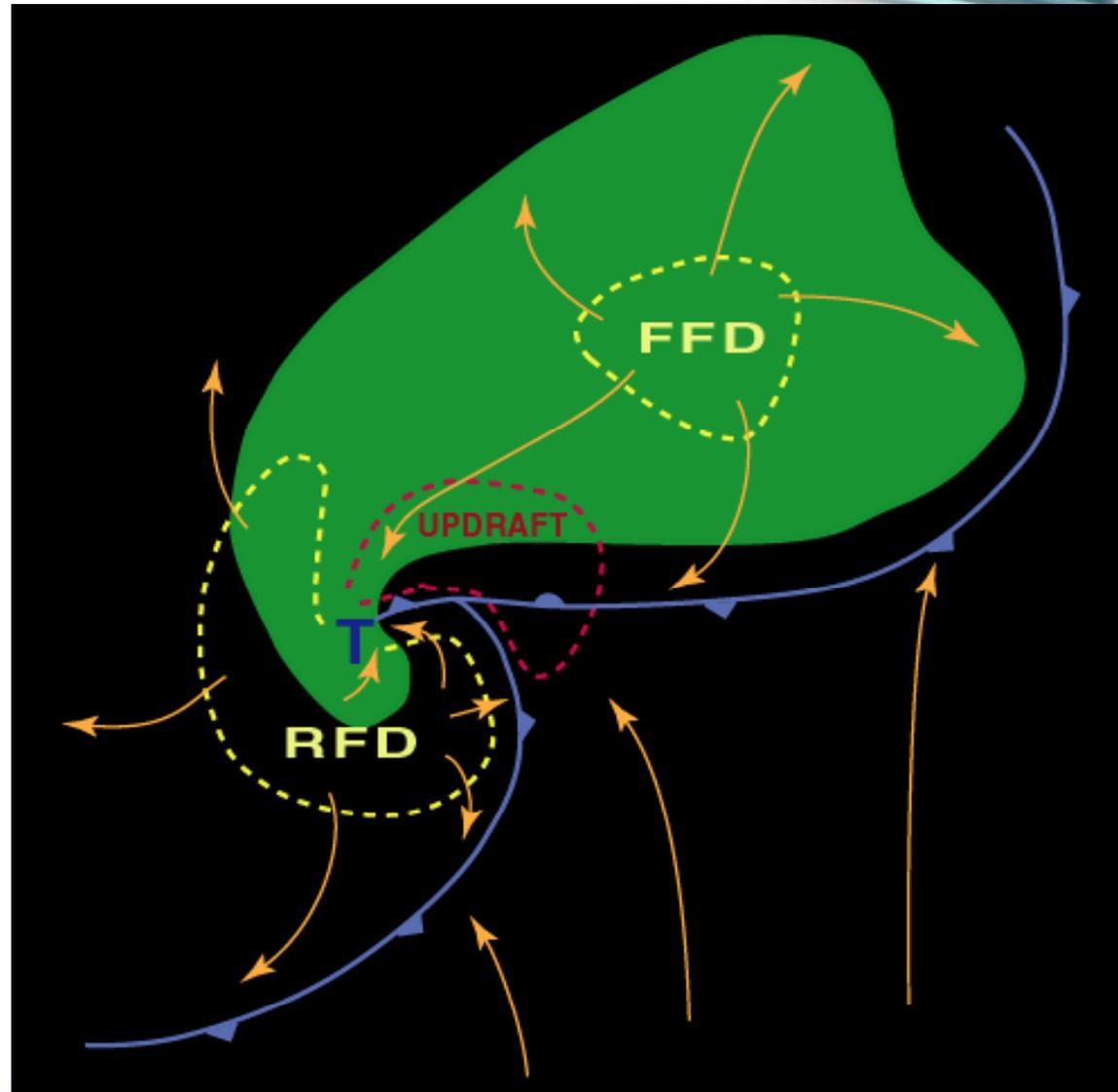
Increase in Wind Speed with height

Change in Wind Direction with height



Supercell Characteristic #2

- **Rear Flank Downdraft (“RFD”):**
 - The “downdraft” portion of the meso / updraft
 - Crucial to tornado development
 - Can produce wind > 100 mph





Supercells

- **Severe Weather:**
 - **High winds / damage**
 - **Tornadoes** (higher potential for strong or violent)
 - **Large Hail** (bigger than a golf ball)
 - **Heavy Rain & Flash Flooding**





National Weather Service
Lincoln, IL



Visual Clues of Supercells

Rotating Updraft / Meso



Spiral bands and striations in updraft tower are clues that the updraft is rotating



Visual Clues of Supercells

Wall Cloud



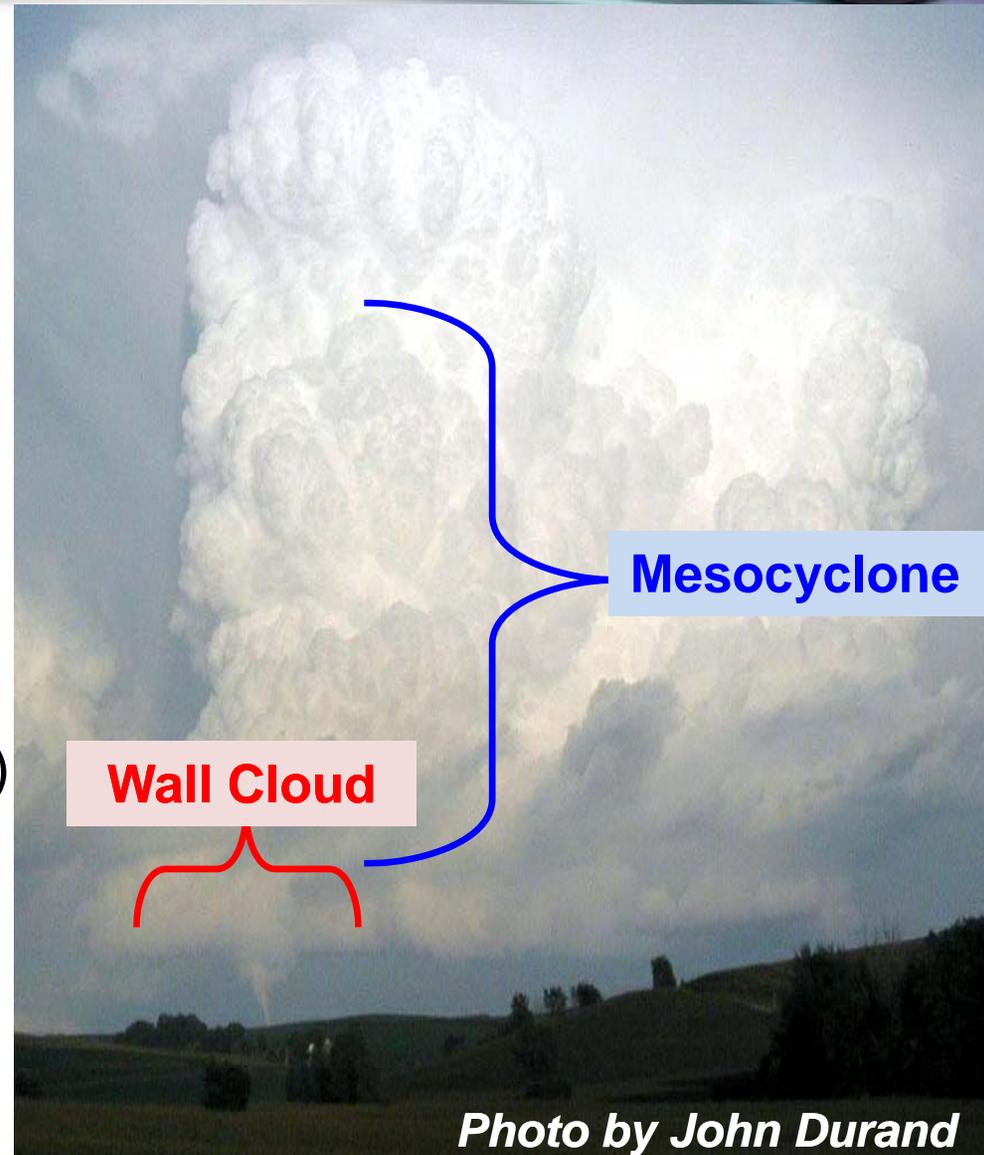
Photo by Mark Sefried

- Persistent lowering of the rain-free base
- Usually long lived, most rotate
- Upward vertical motion often present
- May contain a “tail cloud” which points toward the rainy air



Review: Supercell Characteristics & Visual Clues

- **Unique to supercells:**
 - Wind shear creates a rotating updraft
 - There are 2 downdrafts; the RFD is critical for tornado formation
- **Supercell Visual Clues**
 - **Mesocyclone** (rotating updraft)
 - **Wall Cloud**
 - Watch for lowering & rotation
 - Often create large hail





High Precipitation (HP) Supercell

- Updraft on the front side of storm
- Rain nearly surrounds the updraft / wall cloud
 - Rotation is **VERY** difficult to see
- Tornado is usually wrapped in rain
 - **VERY** Dangerous for spotters !!





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Lincoln, IL

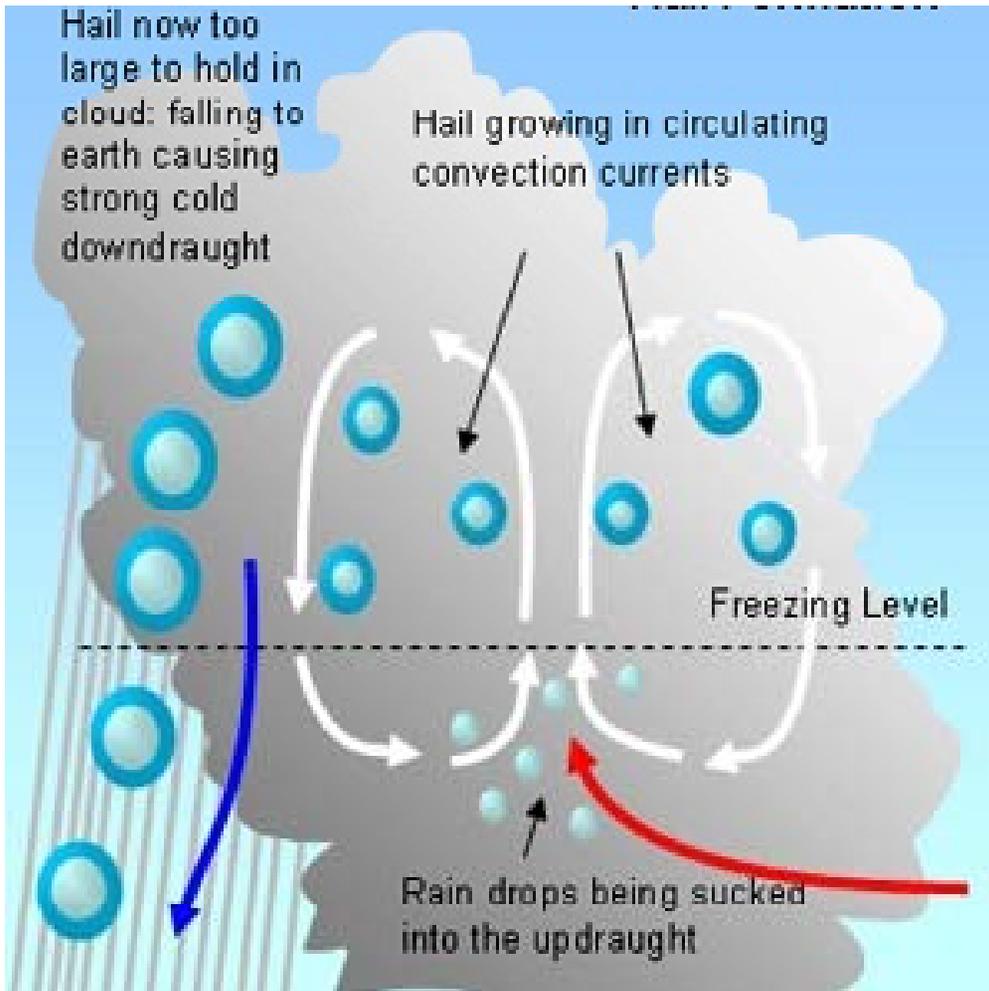


TYPES OF SEVERE WEATHER



Hail

Hail Formation



Large Hail *image by Roger Hill*





Hail

- NWS issues warnings for hail 1" or larger – **BUT** report hail of all sizes
- Keep in mind – VERY strong updrafts produce the largest hail

Descriptor	Size
Pea	1/4"
	1/2"
Penny	3/4"
Nickel	7/8"
Quarter	1"
Half Dollar	1 1/4"
Walnut	1 1/2"
Golf Ball	1 3/4"
Tennis Ball	2 1/2"
Baseball	2 3/4"
Grapefruit	4"
Softball	4 1/2"



Flash Flood

- A flood where the water rises & falls rapidly
 - Can occur in any area, especially if the ground is moist or frozen
 - Usually caused by heavy rain (1.00" or more per hour)
 - Can also be caused by ice jam or dam break





Flash Flood

- Water flowing over roads – 6” deep or more
- Water flowing over a bridge
- Ponding 12” or deeper
- Rapid rises in creeks or streams





Damaging Wind

- The NWS issues a **Severe Thunderstorm Warning** when:
 - Wind is **58 MPH (50 Knots) or higher**
 - Thunderstorm wind causes damage



*Downburst wind damaged hundreds of trees and small buildings in Yates City and Elmwood, IL 6/18/09
Photos by David Zalaznik (PJS)*



Damaging Wind: Causes

- **“Straight-line” Wind**

- Wind blows mostly horizontal

- Squall Line
- Bow Echo



- **Downburst**

- Wind comes from above, rapidly descending

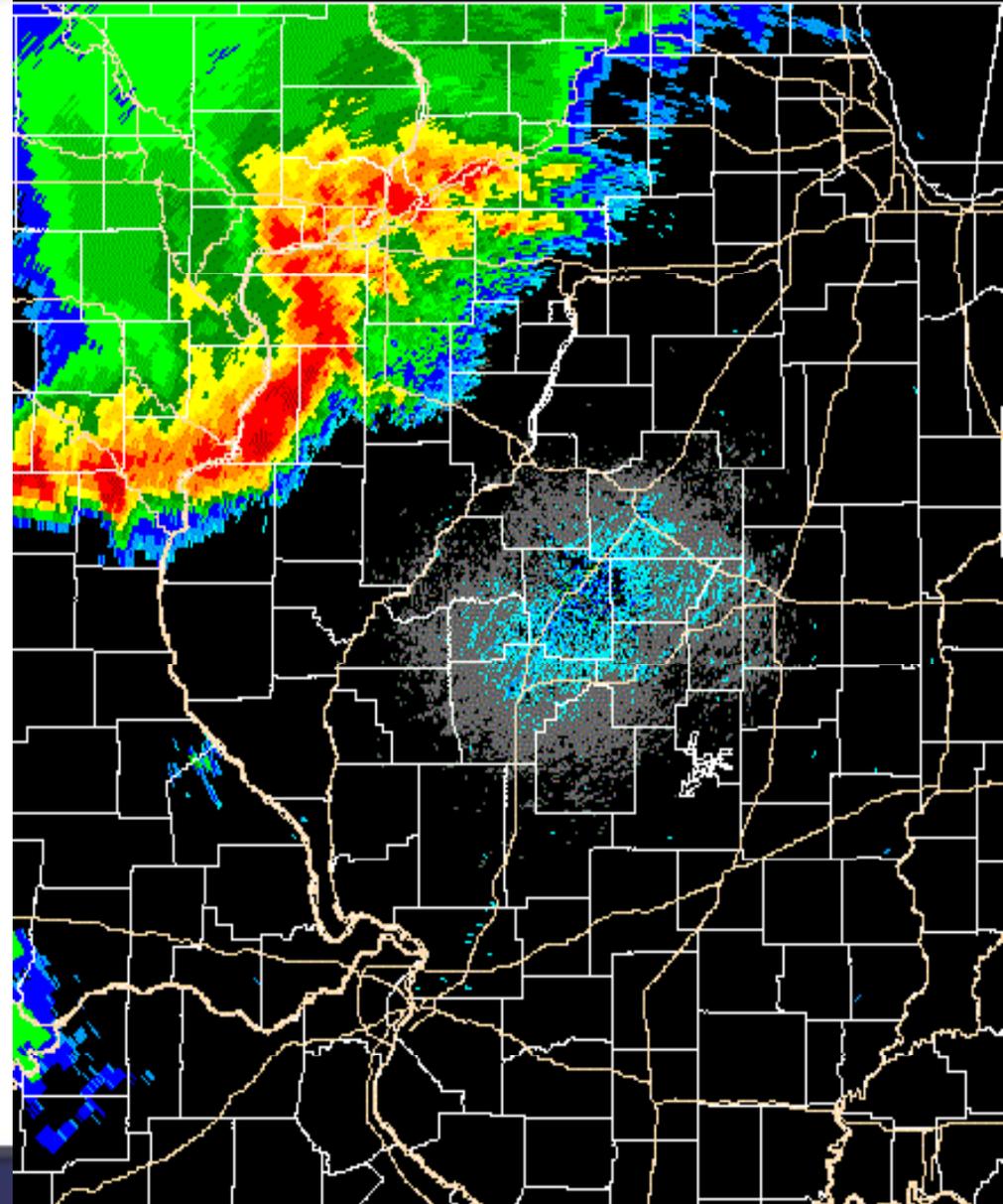
- Macroburst, Microburst
- Rear Flank Downdraft





Straight-line Wind

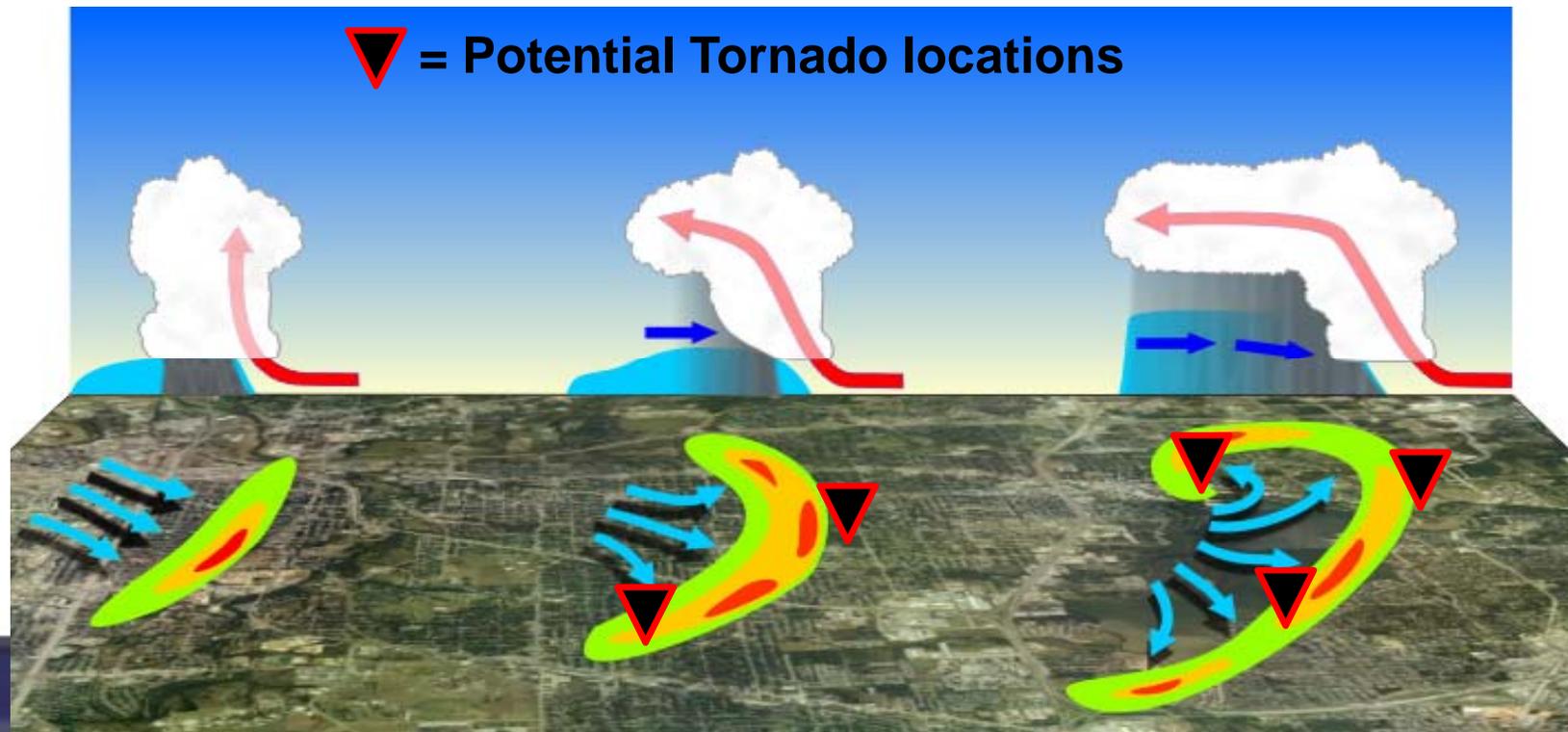
- **Squall Line**
 - Visual clue is deep, wavy shelf cloud on the front side
 - Squall lines are best seen on radar





Straight-line Wind

- **Squall Line**
 - A severe squall line is also called a “Bow Echo”
 - Produces a large swath of wind damage and small tornadoes





Downburst

- Rapidly descending rain, cooled air
- Rain-foot indicates strongest winds
- Wind speeds:
 - Can reach 150 mph
 - Damage will be the SAME as what an EF0 – EF3 tornado produces





TORNADOES

- 1. Classic Supercell**
- 2. HP Supercell**
- 3. Other Tornadoes & Rotations**



Classic Supercell Tornado

- **Visual Clues of Tornado Formation:**
 1. **Large, rounded rain-free base**
 2. **Persistent wall cloud, with increasing rotation**





Classic Supercell Tornado

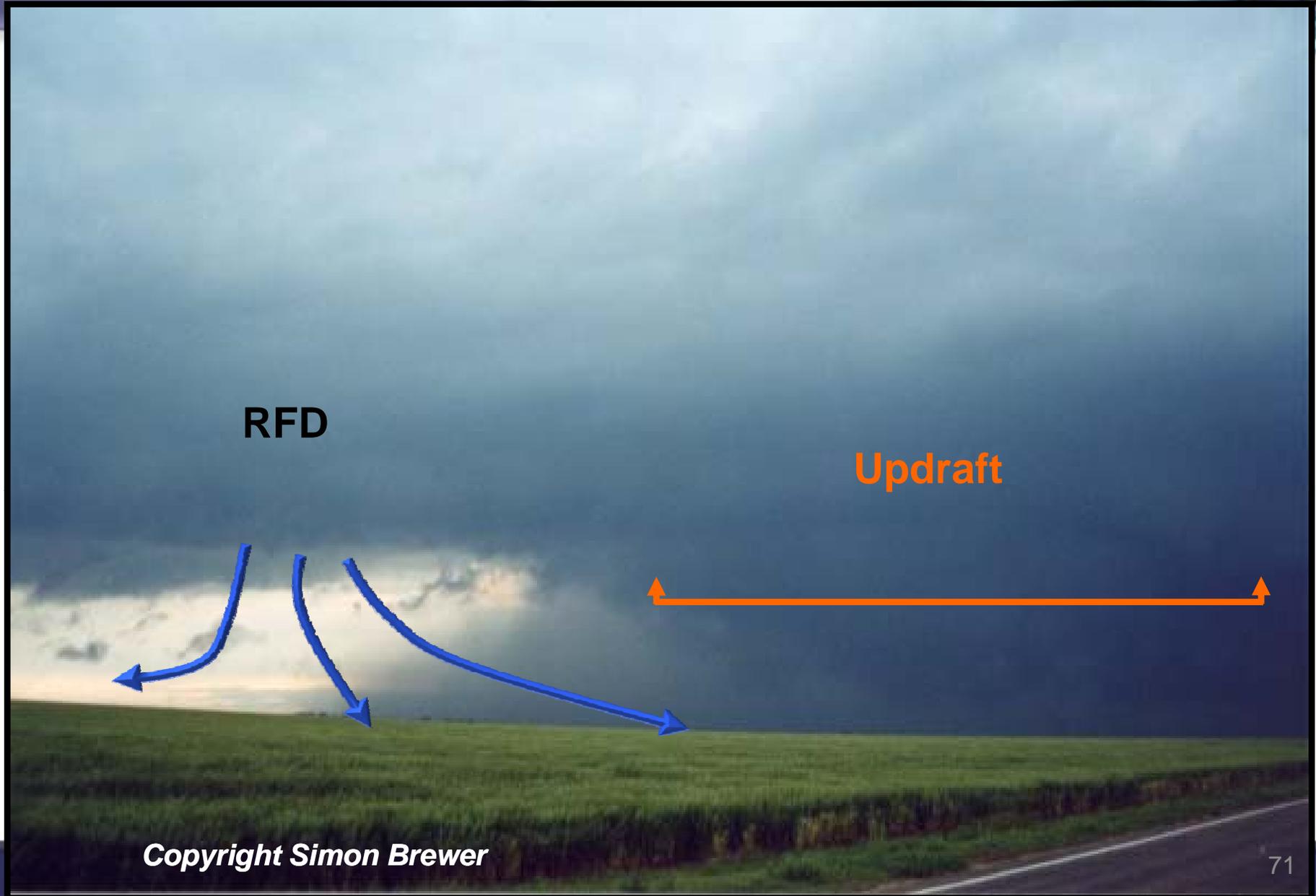
- **Visual Clues of Tornado Formation:**
 3. **Development of a funnel cloud, in or near the wall cloud**
 4. **Formation of the RFD or “Clear Slot”**
(bright, cloud-free notch in the rain-free base)



Photo by John Farley



Rear Flank Downdraft





Classic Supercell Tornado

- **Visual Clues of Tornado Formation:**
 5. **Rapid up & down motions**
 - **Scud clouds drawn up into the wall cloud**



(c) Keenan D. Campbell
May 30th, 2003
15 miles ESE of PawPaw, IL



Classic Supercell Tornado

Life Cycle

1. Developing Stage



Photo by Mike Umsheid



Photo by Mike Umsheid

Watch for: Rotation, RFD/Clear Slot, Dust whirl at the ground – connection to wall cloud or funnel



Classic Supercell Tornado

Life Cycle

2. Mature Stage



Photo by Mike Umsheid

**Watch for: RFD wrapping around S & E side
Lifting tornado? Careful, it may still be there...**



Classic Supercell Tornado

Life Cycle

3. Dissipating (Rope) Stage



Photo by KCBD-TV



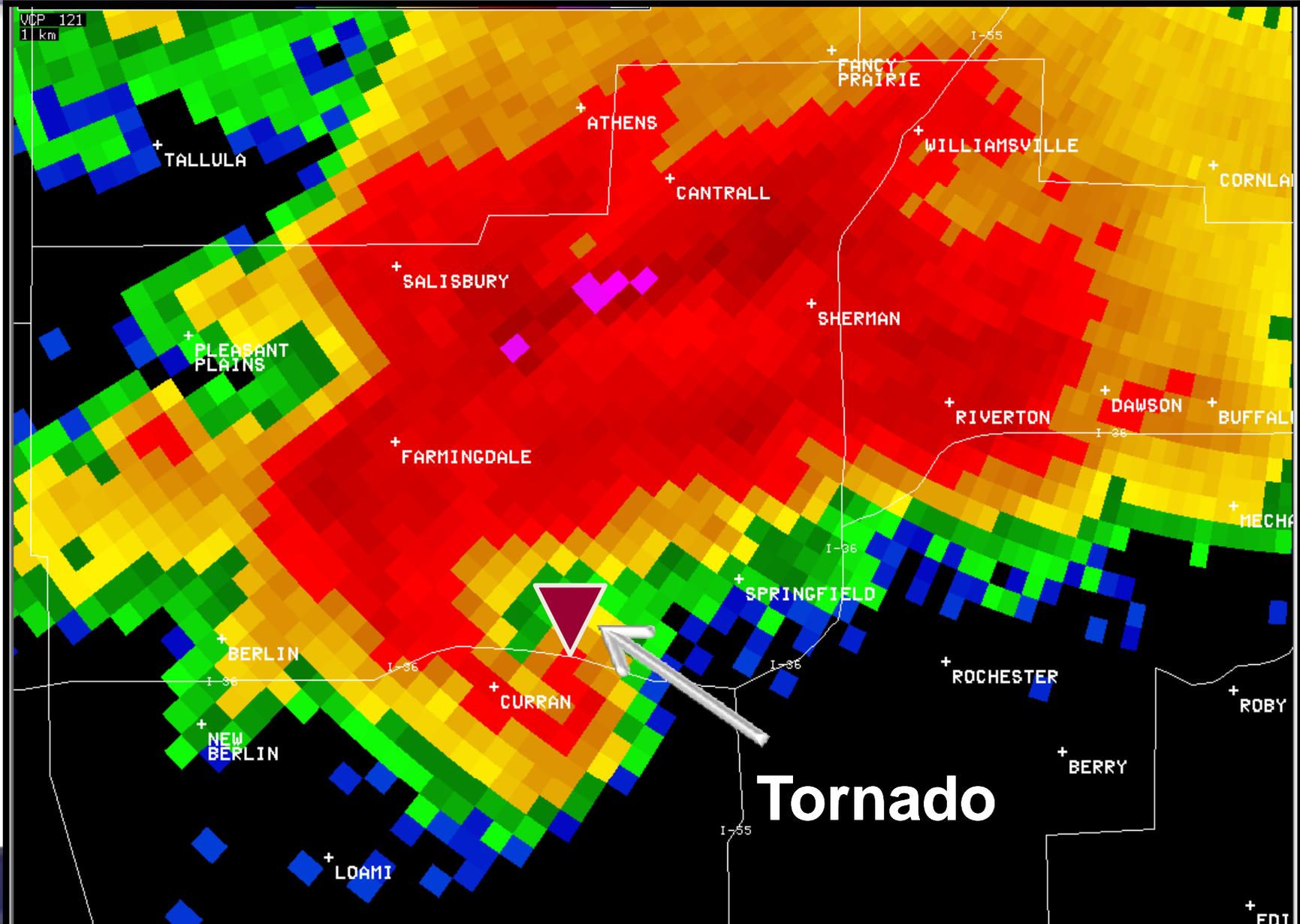
Photo by Mike Umsheid

Watch for: **RFD/Clear Slot** wrapping all around tornado, shrinking it – its still dangerous though!



Classic Supercell Tornado

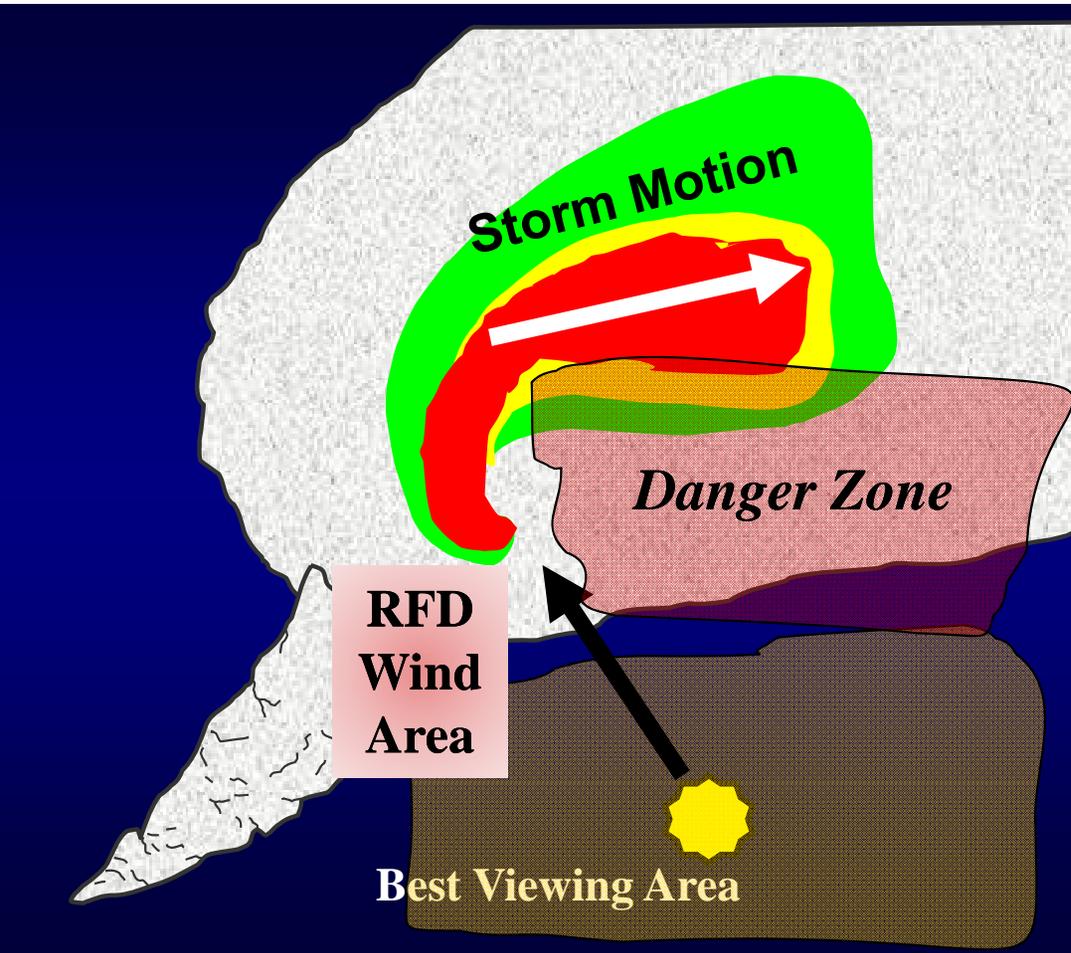
Radar View





Classic Supercell Tornado

Spotter Positioning



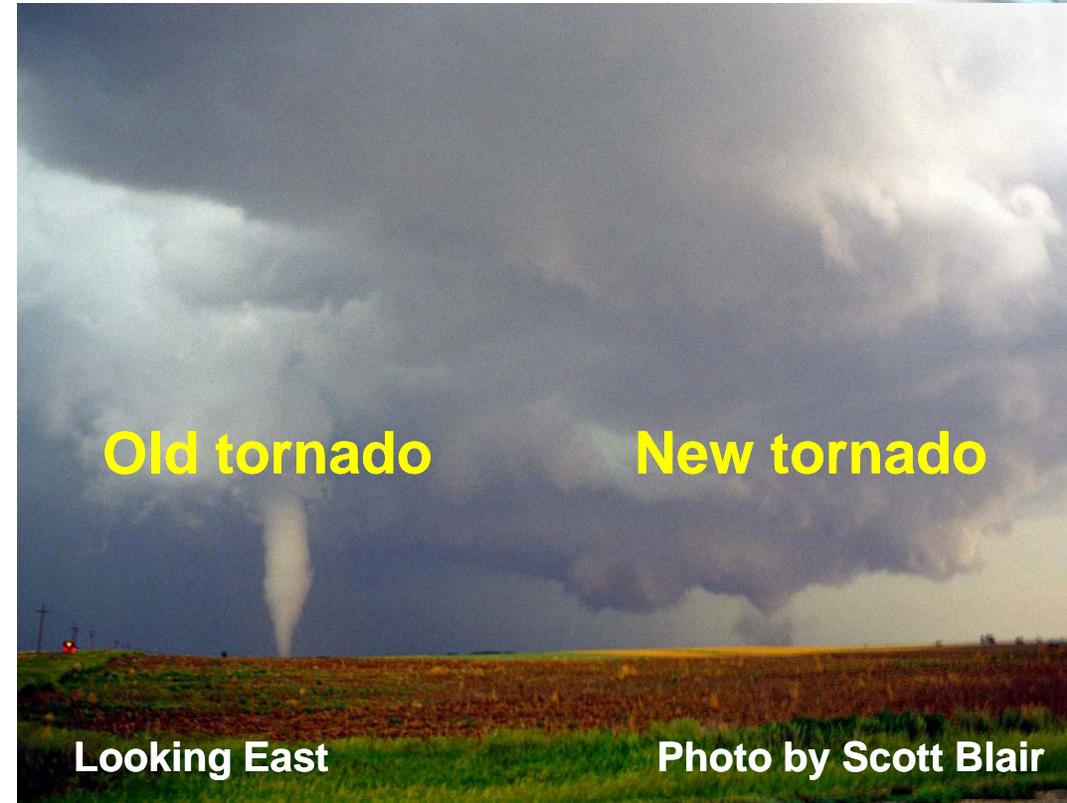
Looking North-northwest

**Stay to the SE
to S of the
updraft / wall cloud**



Cyclic Supercell Tornadoes

- **Favored area:**
E to SE of a
dissipating tornado
- **The new wall cloud
and funnel cloud
will be the dominant
part of the storm**
- **Watch this area very carefully for a NEW
tornado to develop**

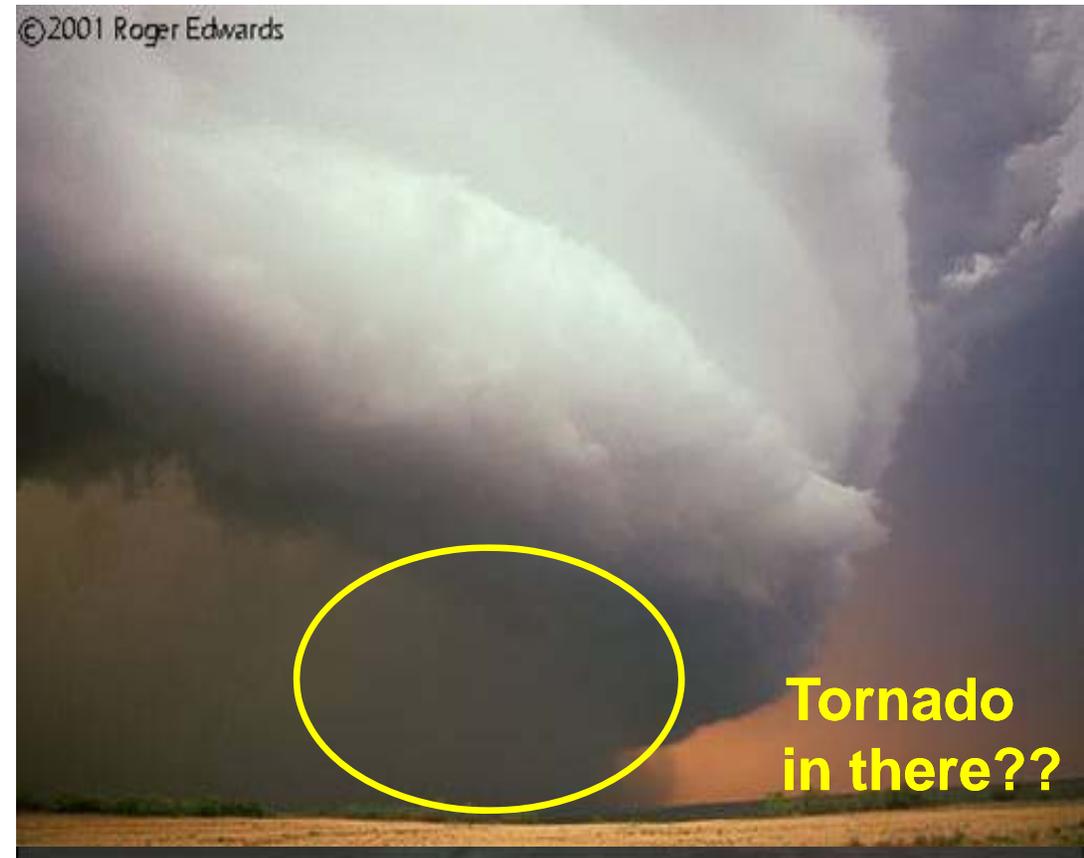




HP Supercell Tornado

Life Cycle

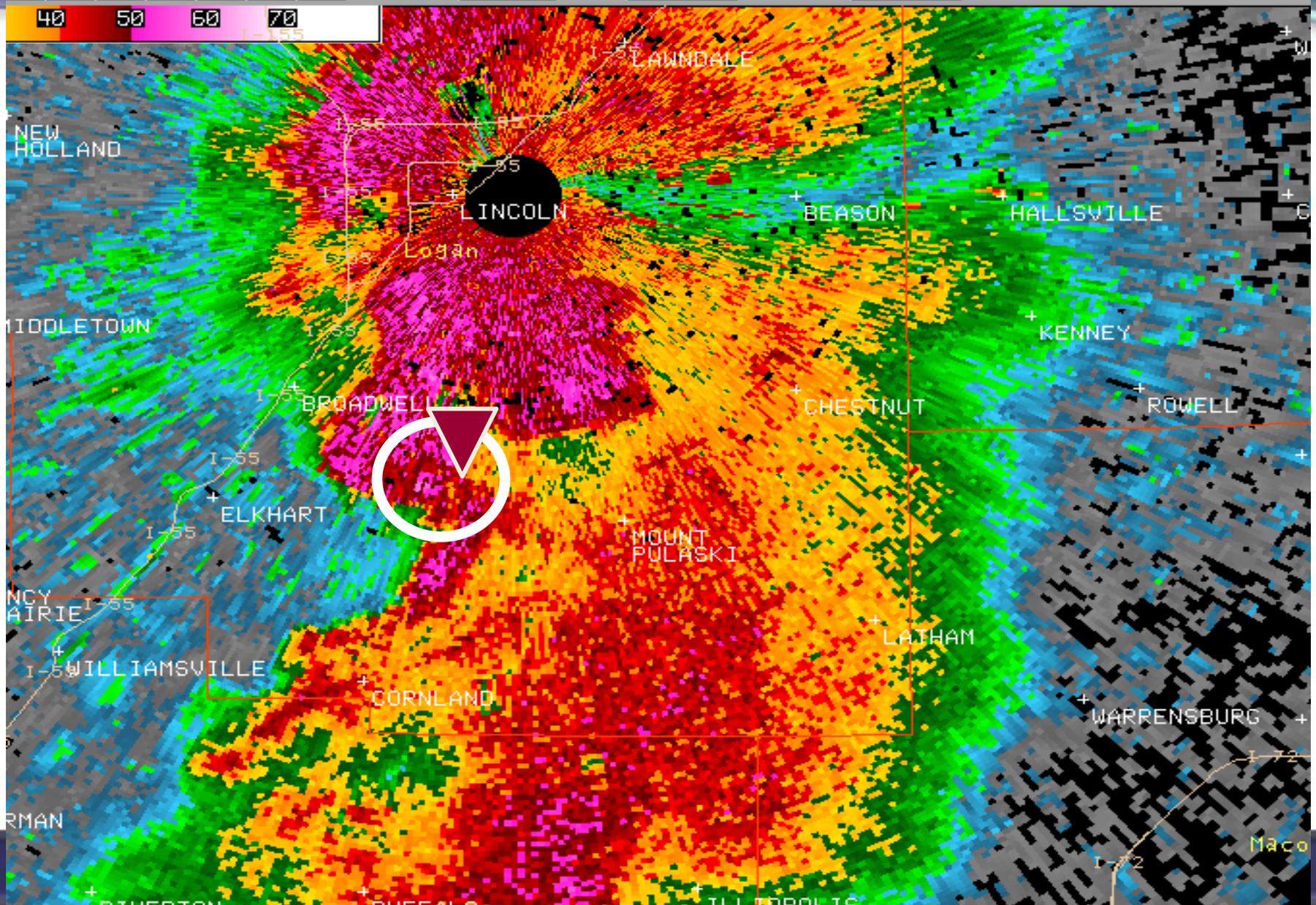
- The developing, mature, and dissipating stages usually apply to HP Supercells also
- However... it is very difficult and **DANGEROUS** for spotters to see these





HP Supercell Tornado

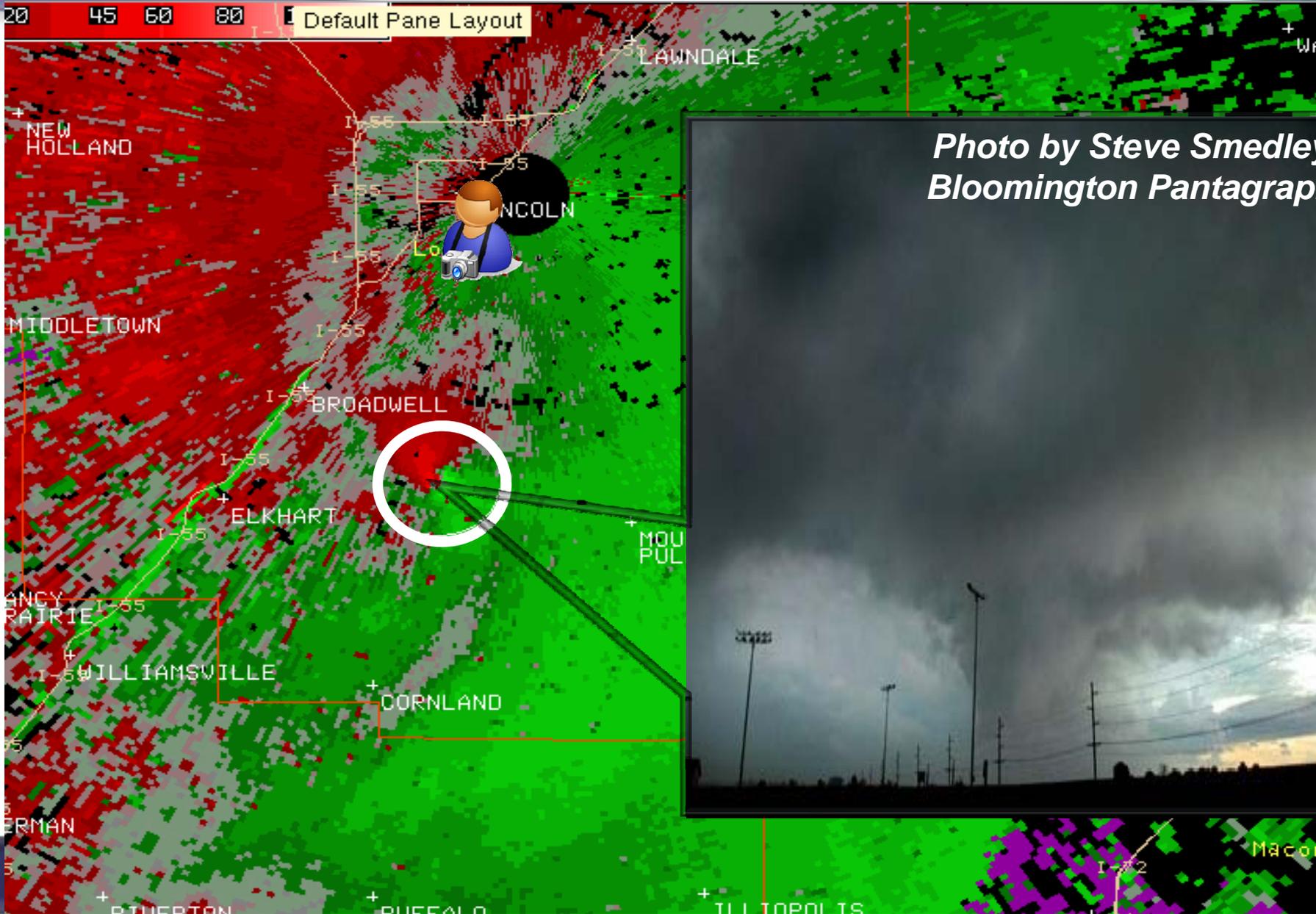
Radar View





HP Supercell Tornado

Radar View



*Photo by Steve Smedley
Bloomington Pantagraph*





Review: Visual Clues of Supercell Tornado Formation

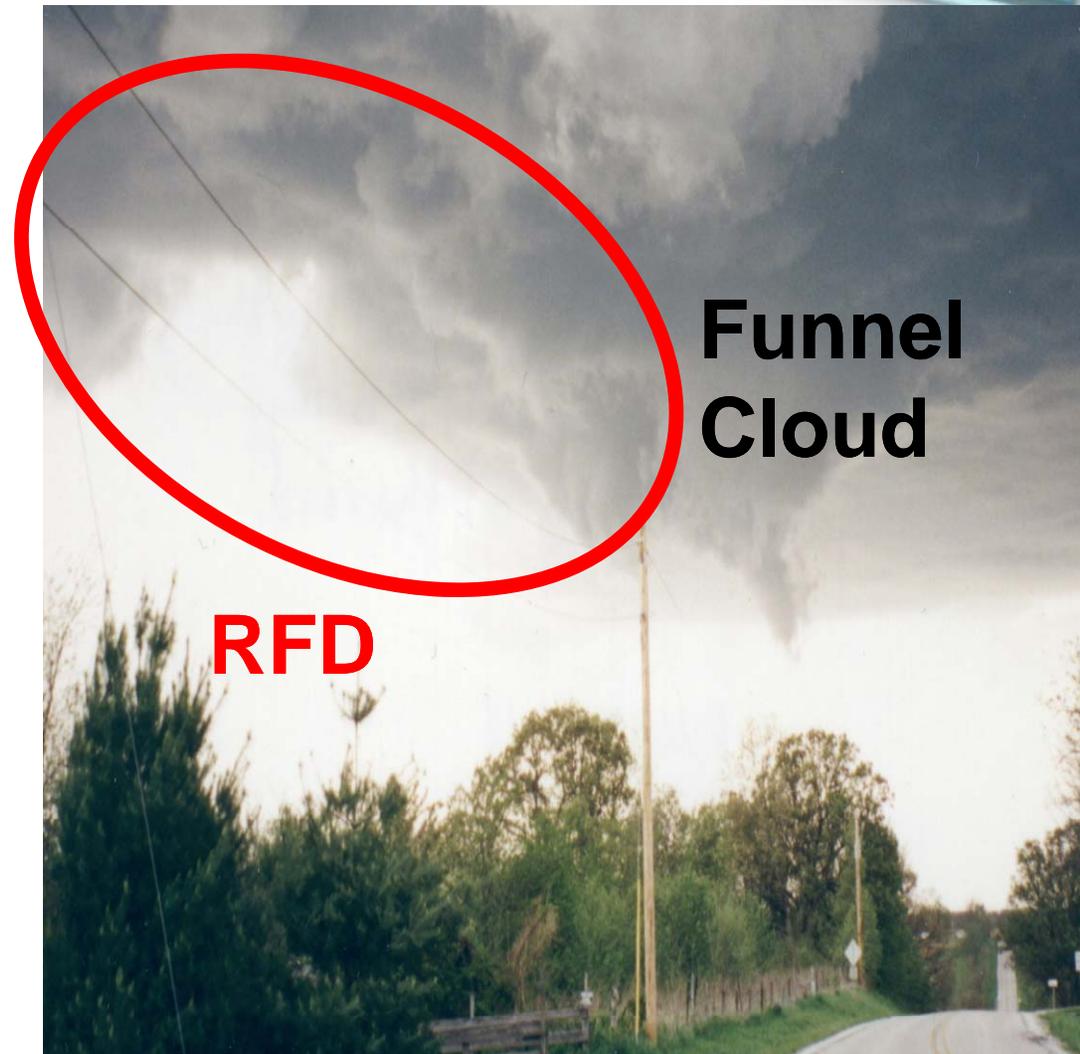
- Lowering of rain-free base / wall cloud
 - Watch for persistence and rotation





Review: Visual Clues of Supercell Tornado Formation

- Lowering of rain-free base / wall cloud
 - Watch for persistence and rotation
- **Funnel cloud formation near wall cloud**
 - **Rapid up & down motion**
- **Just prior to tornado:**
 - **Clear slot / RFD** OR
 - **Heavy rain/hail burst to west of wall cloud**





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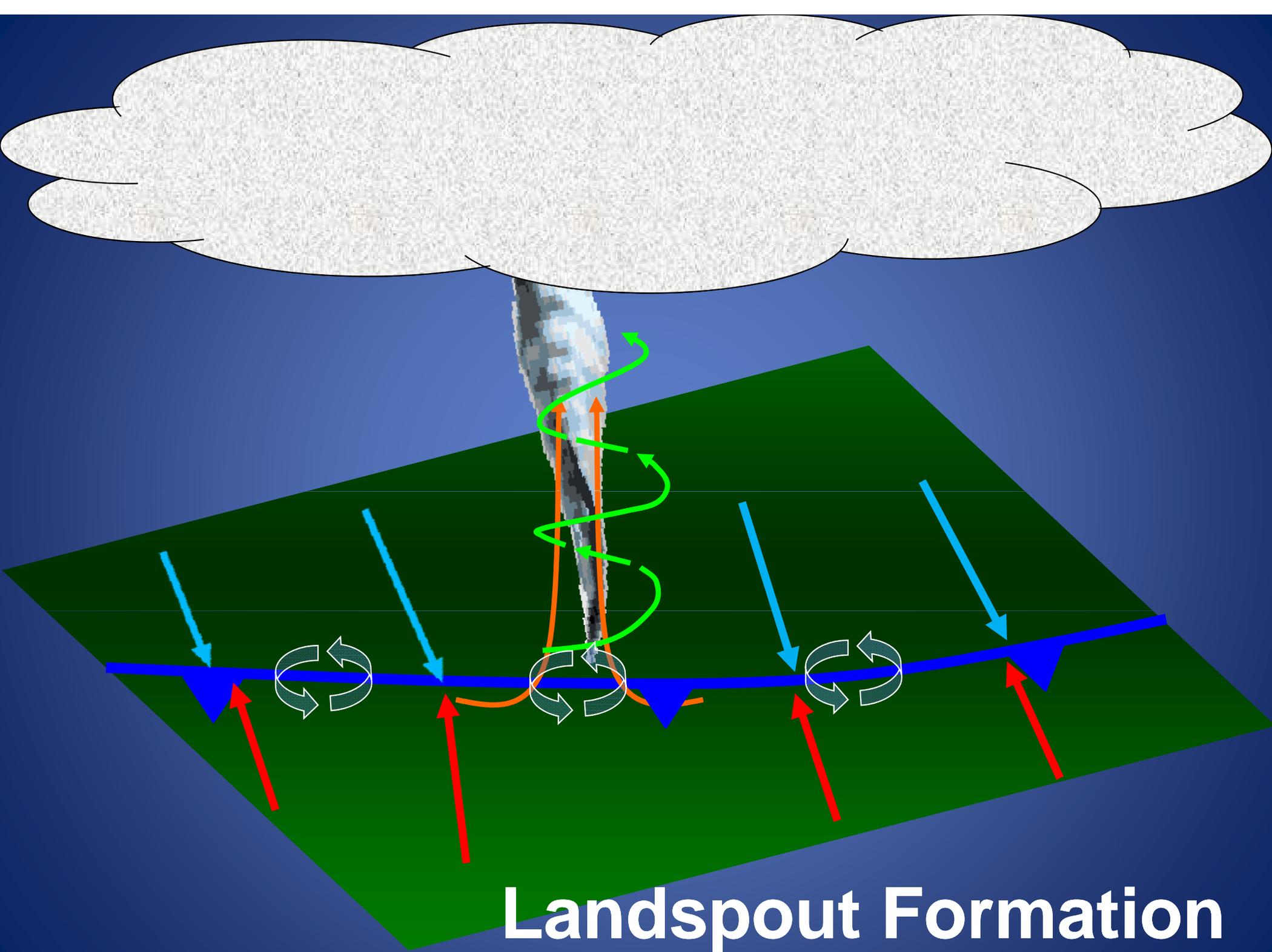
OTHER TORNADOES & ROTATIONS



Landspout Tornado

- **No “organized” storm scale rotation**
 - **No wall cloud**
 - **No rotation on radar**
- **Often curved and nearly transparent**
- **Form near an E-W front, on SW edge of multicell clusters**





Landspout Formation

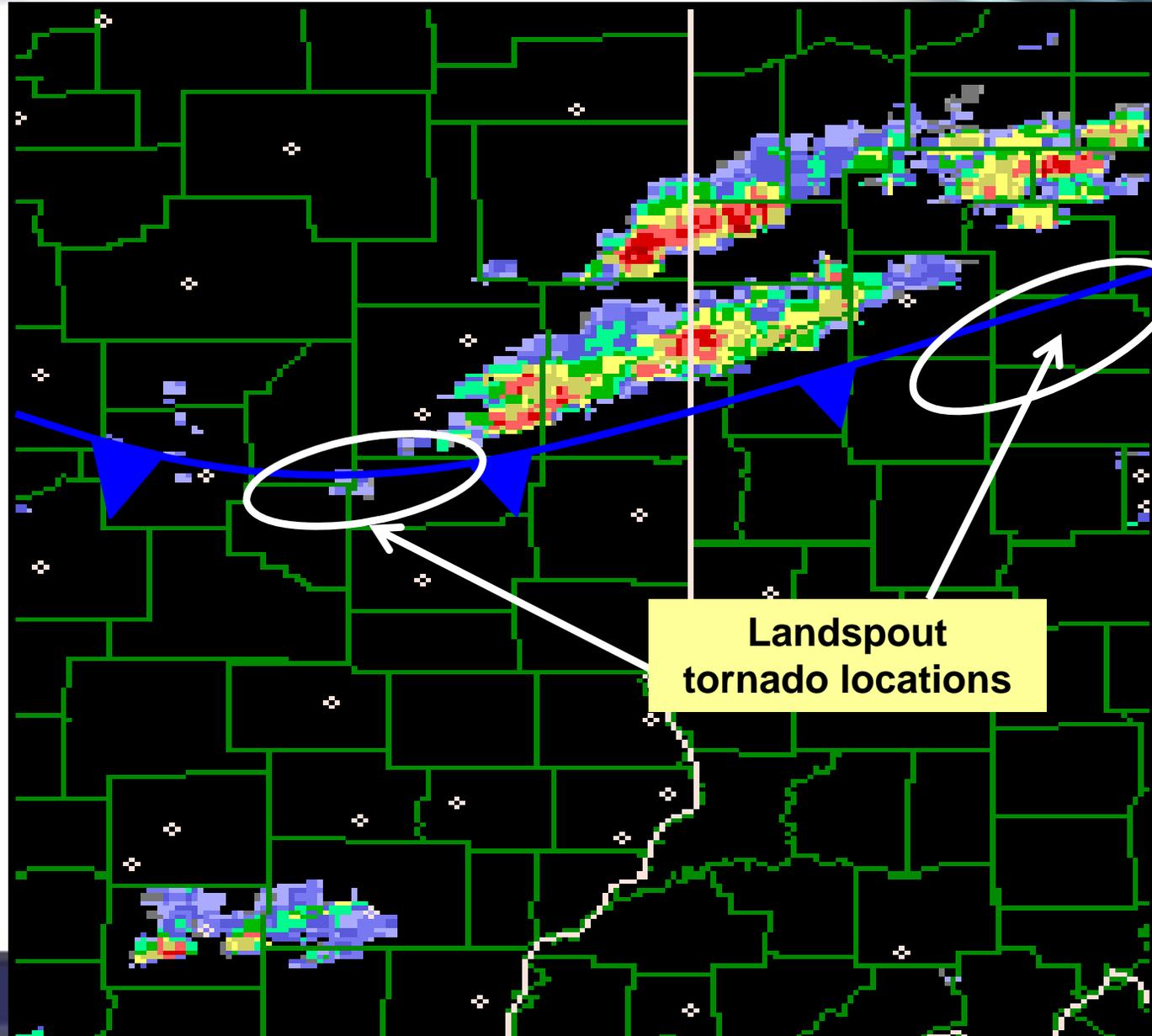


Landspout Tornado

May 31, 2006

9 Landspouts developed in east central IL from 2:20 to 2:43 PM

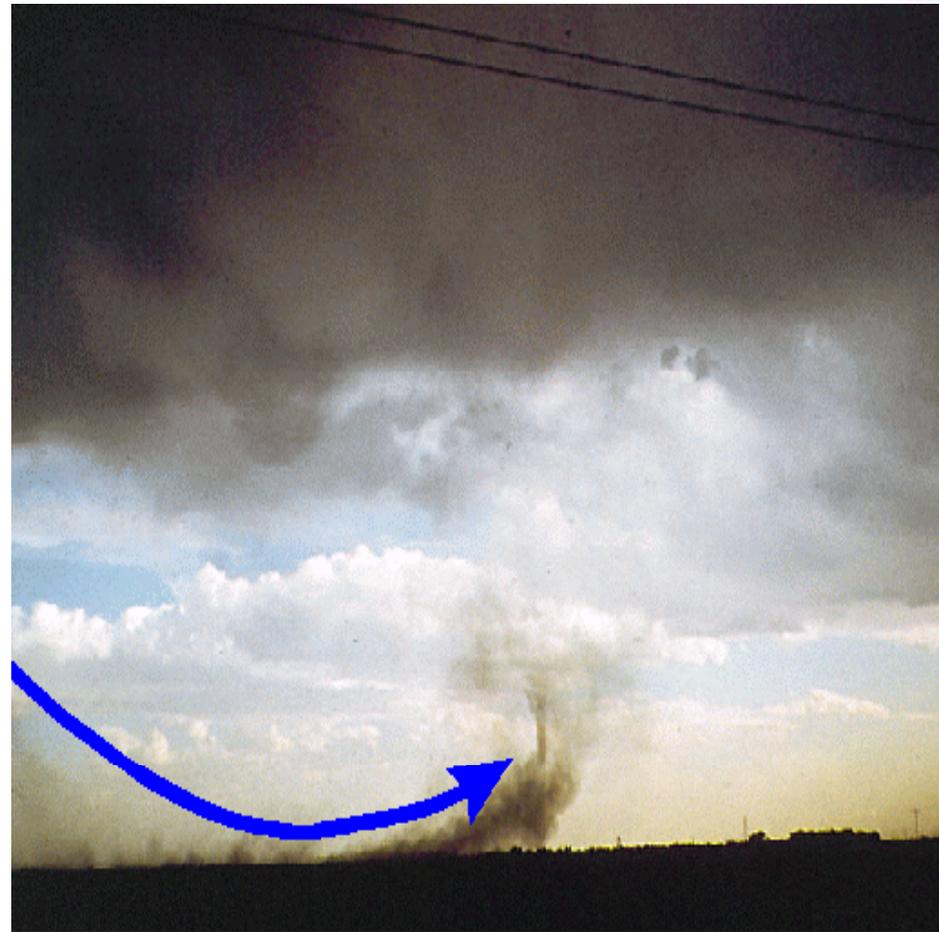
Note the lack of radar returns where the tornadoes formed

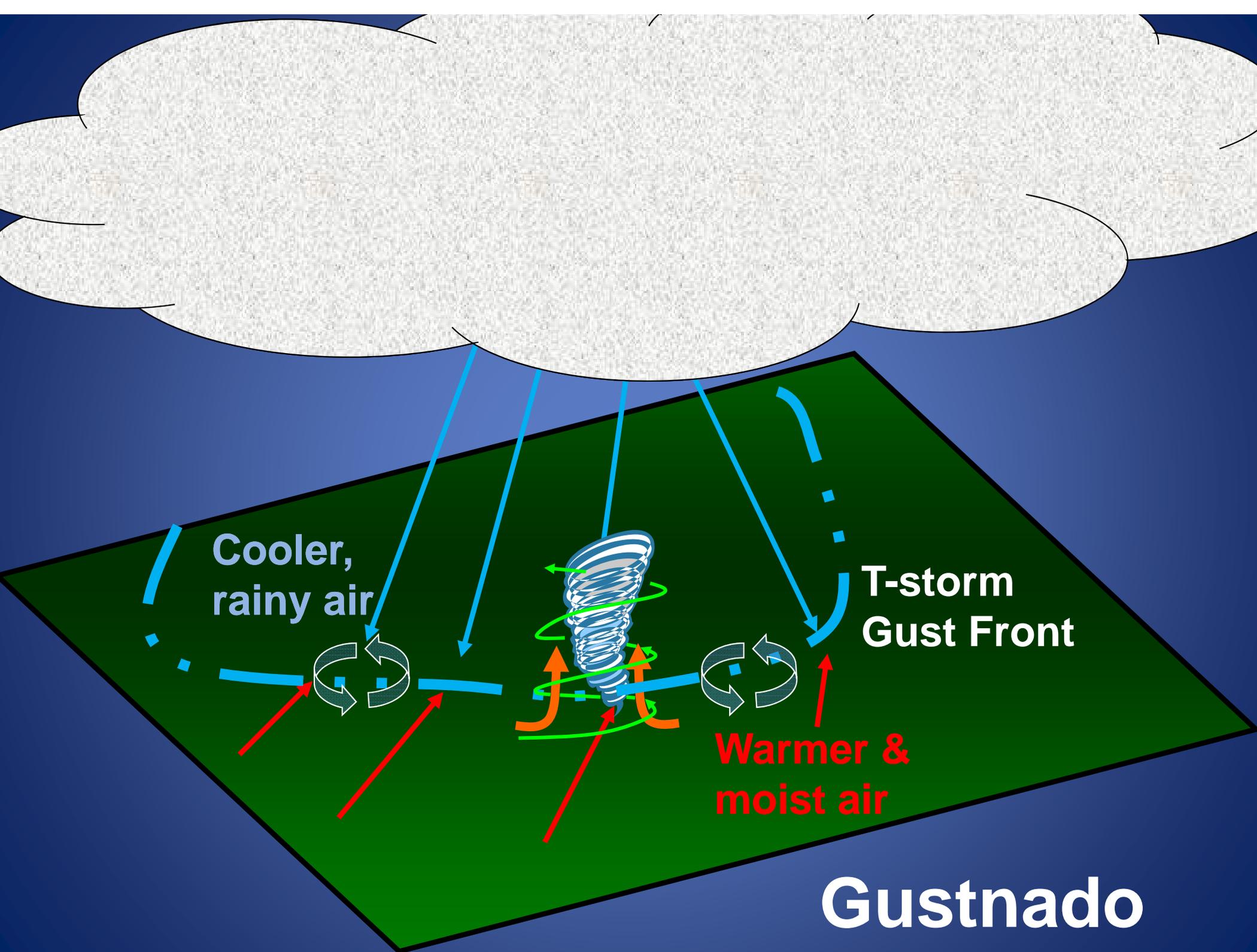




Gustnado

- Small short-lived rotations along a gust front
- Does not reach up to cloud, no rotation in cloud or on radar
- Look for rotation at ground not just blowing dust
- Can cause damage to structures and are hazardous to people





Cooler,
rainy air

T-storm
Gust Front

Warmer &
moist air

Gustnado



Gust Front on Radar

**Multiple
gustnadoes
could form
anywhere along
or just ahead of
the gust front**





Cold Air Funnel



Photo by Dorothy Bullard

- Occur in vertically developed clouds, usually with no thunder
- **Most common in late spring/early summer, and in autumn**
- Rarely touch down... but if they do, they can cause minor damage



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TORNADO AND FUNNEL CLOUD “LOOK ALIKES”



Look Alikes: Scud Clouds



Photo by Joshua Jans

- Low hanging clouds
- Can be attached or detached from cloud base
- Easily confused for wall clouds and funnel clouds – especially at night
- Look for lack of rotation to confirm it is scud



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More Scud Clouds



Bernard Hulshof (2001)





Look Alikes: Rain Shaft



Rain Shafts – Can easily be confused for tornadoes



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Look Alikes: Smoke



© 2003 Andrew Revering



If you see a low hanging feature you think may be a tornado or funnel:

- Can I see the whole feature clearly?
- Is the feature rotating?
- Is it attached to the bottom of the cloud?
- Is the feature in a part of the storm where a tornado would typically form?
- Is there any debris being lifted?



What is occurring in this photo?



If you see a low hanging feature you think may be a tornado or funnel:

- Can I see the whole feature clearly?
- Is the feature rotating?
- Is it attached to the bottom of the cloud?
- Is the feature in a part of the storm where a tornado would typically form?
- Is there any debris being lifted?



Rain Shaft



If you see a low hanging feature you think may be a tornado or funnel:

- Can I see the whole feature clearly?
- Is the feature rotating?
- Is it attached to the bottom of the cloud?
- Is the feature in a part of the storm where a tornado would typically form?
- Is there any debris being lifted?



What is occurring in this photo?

Photo by Jarrod Cook



If you see a low hanging feature you think may be a tornado or funnel:

- Can I see the whole feature clearly?
- Is the feature rotating?
- Is it attached to the bottom of the cloud?
- Is the feature in a part of the storm where a tornado would typically form?
- Is there any debris being lifted?



What is occurring in this photo?

Photo by Jarrod Cook

Scud Clouds



If you see a low hanging feature you think may be a tornado or funnel:

- Can I see the whole feature clearly?
- Is the feature rotating?
- Is it attached to the bottom of the cloud?
- Is the feature in a part of the storm where a tornado would typically form?
- Is there any debris being lifted?

What is occurring in this photo?



Photo by Mark Sefried



If you see a low hanging feature you think may be a tornado or funnel:

- Can I see the whole feature clearly?
- Is the feature rotating?
- Is it attached to the bottom of the cloud?
- Is the feature in a part of the storm where a tornado would typically form?
- Is there any debris being lifted?



Photo by Mark Sefried

What is occurring in this photo?

Tornado developing



If you see a low hanging feature you think may be a tornado or funnel:

- Can I see the whole feature clearly?
- Is the feature rotating?
- Is it attached to the bottom of the cloud?
- Is the feature in a part of the storm where a tornado would typically form?
- Is there any debris being lifted?



What is occurring in this photo?

Photo courtesy of
Lawrence Co. EMA



If you see a low hanging feature you think may be a tornado or funnel:

- Can I see the whole feature clearly?
- Is the feature rotating?
- Is it attached to the bottom of the cloud?
- Is the feature in a part of the storm where a tornado would typically form?
- Is there any debris being lifted?



What is occurring in this photo?

Photo courtesy of Lawrence Co. EMA

06/16/2009

Smoke Stack



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SPOTTER SAFETY



Useful Items for Spotters

- **Communications**
(phone or radio)
- **Binoculars**
- **Safe shelter nearby**
- **Spotter guide**
- **Weather radio**
- **Computer**
- **GPS or local maps**
- **Cameras**
(still and/or video)





General Severe Weather Safety

Mobile Spotters

- Go in pairs
- Park far enough off the road and not under power lines
- Let someone know your location
- Be familiar with the area and your position relative to the storm





Night Spotting

**Spotting at night is
very dangerous!**

This should only be done
from a safe shelter.

Mobile spotters should
only attempt this if they
have communications with
someone who knows their
position and if a shelter is
nearby.





Lightning Safety



© Paul M. Hadfield



Lightning Safety

- **Seek shelter:**
 1. **Indoors**, in a **substantial building**, away from windows and doors
 2. A hard topped **vehicle** with windows closed

**Do NOT lie
Flat on the ground !**





Lightning Safety

- **AVOID:**
 - Car ports and garages
 - Porches
 - Sheds
 - Picnic shelters





Lightning Safety

**Intense lightning
can occur many
miles away from
the storm**

**Don't return
outdoors too soon!!**

**Wait 30 minutes
AFTER you hear the
LAST rumble of
thunder**





Lightning Safety

**Lightning is the
GREATEST danger
to spotters !!**

- 1. If you see lightning or hear thunder, head for shelter immediately!**
- 2. Don't return outdoors too soon !**
 - Stay in the shelter for 30 minutes AFTER the last rumble of thunder**

© Paul M. Hadfield





High Wind & Hail Safety



Photo by Paul Hadfield



Photo by Kevin Osborne



High Wind Safety

- **Indoors**
 - Stay away from windows
 - Get to the lowest floor
 - Be alert for trees or power poles falling onto a structure





High Wind Safety

- **Outdoors**
 - Try to get indoors if possible
 - Keep a firm grip on steering wheel
 - Point vehicle toward direction wind is blowing
 - Be aware of trees & power poles





Hail Safety

- Mainly a threat to spotters in autos
- Golf ball sized hail or larger will damage car windows – which could injure you
- Remember



- Large hail = Intense Updrafts
- Intense Updrafts = Higher TORNADO Potential



Flood Safety





Flood Safety

- **Flooding is the #1 storm related killer, mainly in vehicles**
- **Most flash floods occur at NIGHT in Illinois when it is hard to judge the water depth**



Photo by John Smith



Flood Safety

- More than 75% of flood deaths occur in vehicles
- It only takes 18" – 24" of flowing water to carry a car away





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Flood Safety



The
National Weather Service
says

**Turn
Around
Don't
Drown**

Be safe when it comes to flooding.



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Flooding Can Wash Roads Away





National Weather Service
Lincoln, IL



Tornado Safety



Scott Leopold
Lake Springfield
August 19, 2009



Tornado Safety

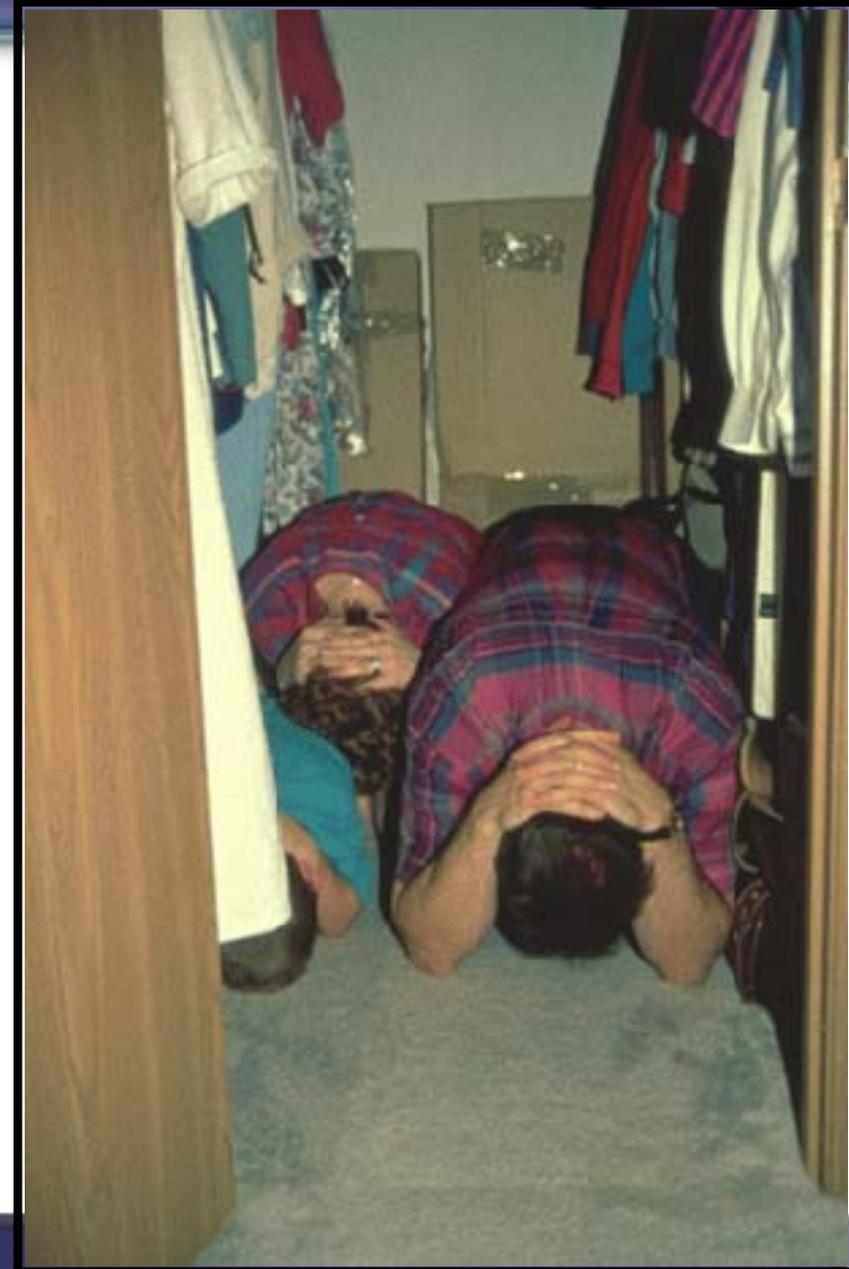
- **Whether indoors or outdoors: Flying & Falling debris is the BIGGEST tornado HAZARD**





Tornado Safety

- **Whether indoors or outdoors: Flying & Falling debris is the BIGGEST tornado HAZARD**
 - **Get in: STURDY shelter**
 - **Get down: Lowest floor away from windows**
 - **Cover up: Minimizes your risk of injury from debris**





Tornado Safety

- **Mobile Spotters**
 - Keep an eye out for other tornadoes that could form
 - Never outrun a tornado in an urban or congested area
 - Immediately get into a sturdy building
 - Know the buildings you can access **BEFORE** you go out spotting

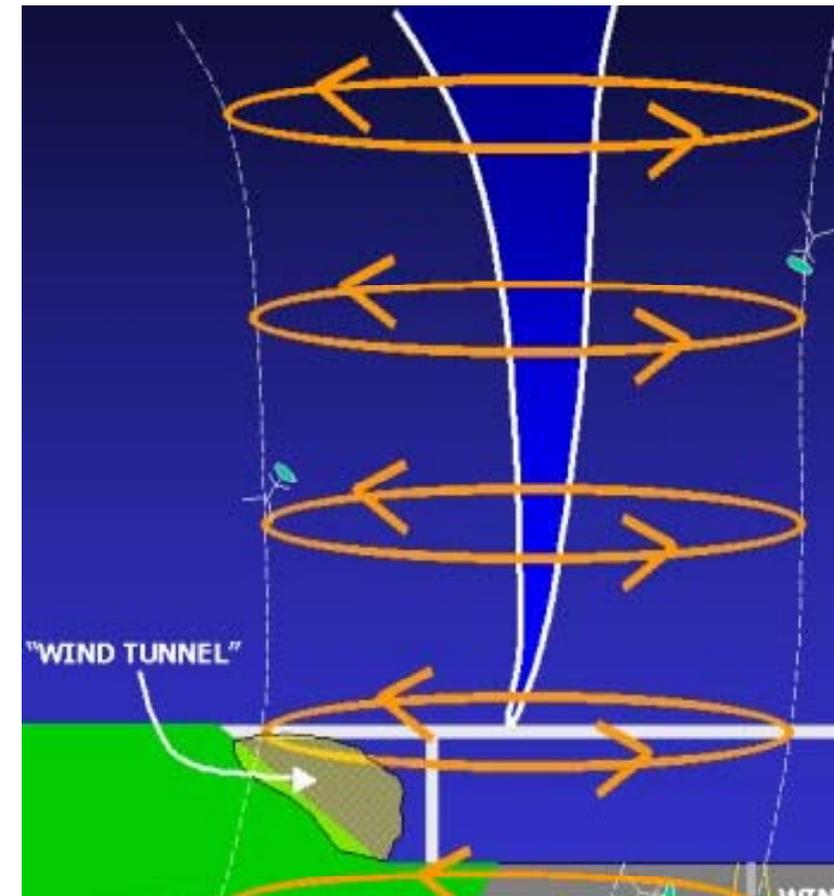




Tornado Safety

• Mobile Spotters

- Keep an eye out for other tornadoes that could form
- Never outrun a tornado in an urban or congested area
 - Immediately get into a sturdy building
 - Know the buildings you can access BEFORE you go out spotting
- NEVER seek shelter under a bridge or overpass





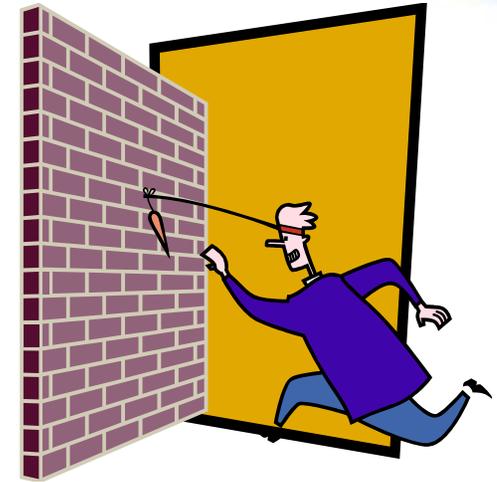
Tornado Safety

- **Outdoors/Open Areas**

1. **Walk (RUN!) to a STURDY building. If none around, then...**

2. **SAFELY drive to the closest sturdy shelter.**

If you see flying debris or none is available, then...





Tornado Safety

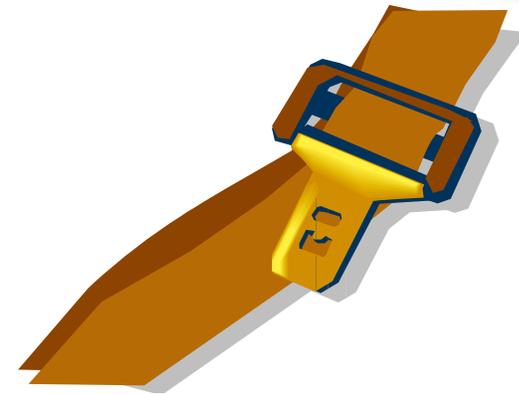
3. Pull over safely. You have two options as a LAST RESORT

a) Stay in your auto, with a seat belt on, and put your head below the window line (Red Cross advice)

OR

b) Exit the vehicle, run to a ditch and lie flat

**NEITHER is the BEST option...
your circumstances will
dictate your choice...**





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SPOTTER REPORTS



What To Report

- **Tornadoes**
 - Is it still in sight or has it dissipated?
 - Any damage?
 - How long was it on the ground?





What To Report

- Wall Clouds
- Funnel Clouds
 - Is there rotation?
 - How long has the rotation been present?



Photo by Jarrod Cook



Photo by Mark Sefried



What To Report

- **Flash Flooding**
 - Which roads, creeks or streams are affected?
 - How deep is the water?
 - Is the water flowing or ponded?
 - Is the area prone to flooding?





What To Report

High Wind or Wind Damage

- Report 40 mph+
- Wind Damage
 - Trees or tree limbs down
 - Power lines or poles down
 - Damage to buildings

Speed	Effects
25 – 30 mph	Large branches in motion
30 – 40 mph	Whole Trees in motion
40 – 55 mph	Small tree branches break
55 – 70 mph	Large branches break Shallow rooted trees blown down
70 – 110 mph	Shingle damage Windows break Some trees down Sheds damaged
110 mph +	Roofs lifted off Trailers & sheds destroyed Most trees down



What To Report

- **Wind / Wind Damage**
 - Estimated or measured wind?
 - Permanent, modular or mobile home?
 - Reinforced structure or outbuilding?
 - Size of limbs, type of tree, healthy or rotted?



Photo by Roger Look



What To Report

Hail – Report all sizes!

Report size of hail with
respect to coins



or

Common objects

or

Exact
measurements!

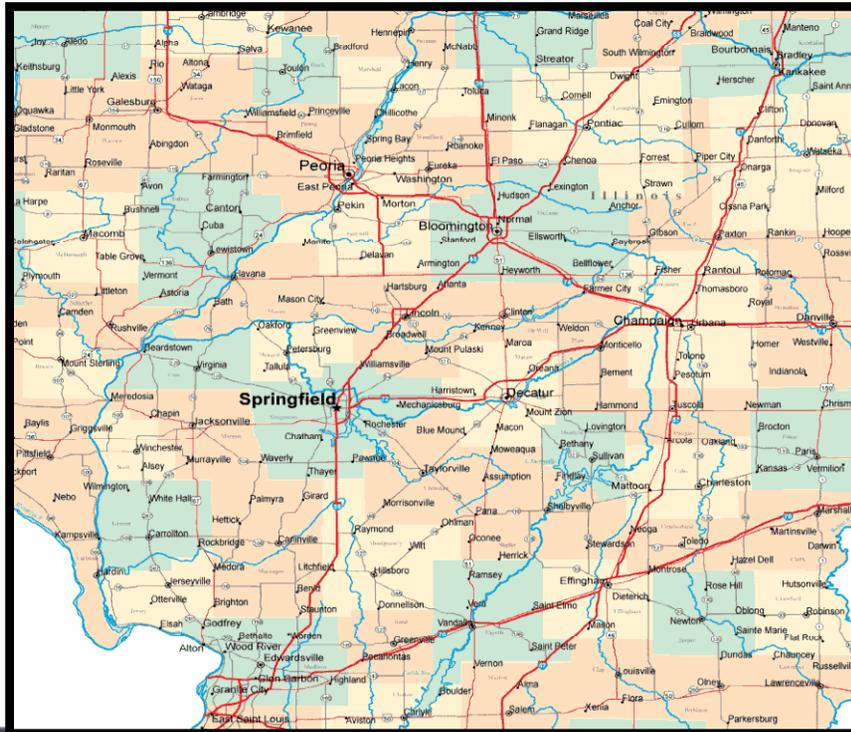




Reporting: When and Where

Time

Report the time the event occurred.



Locations

Report your position, AND the direction & distance of the feature.

Use well known roads or landmarks.



Severe Weather Reporting

**Follow the
reporting rules of
your area !!**

**Contact your local
EMA / ESDA or 9-1-1
dispatch center**





Steps to Effective Spotting

1. Spot Safely

- This **MUST** come first!

2. Be Ready to Spot

- Prepare, Remember basics of t-storms

3. Report Efficiently

- During and after the storm!

4. Keep Learning

- Attend training annually, go out with an experienced spotter





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Lincoln, IL



FOR MORE INFORMATION

On the Internet:

www.weather.gov/Lincoln

Lincoln Weather HAM Call Sign: **WX9ILX**