

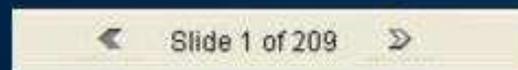
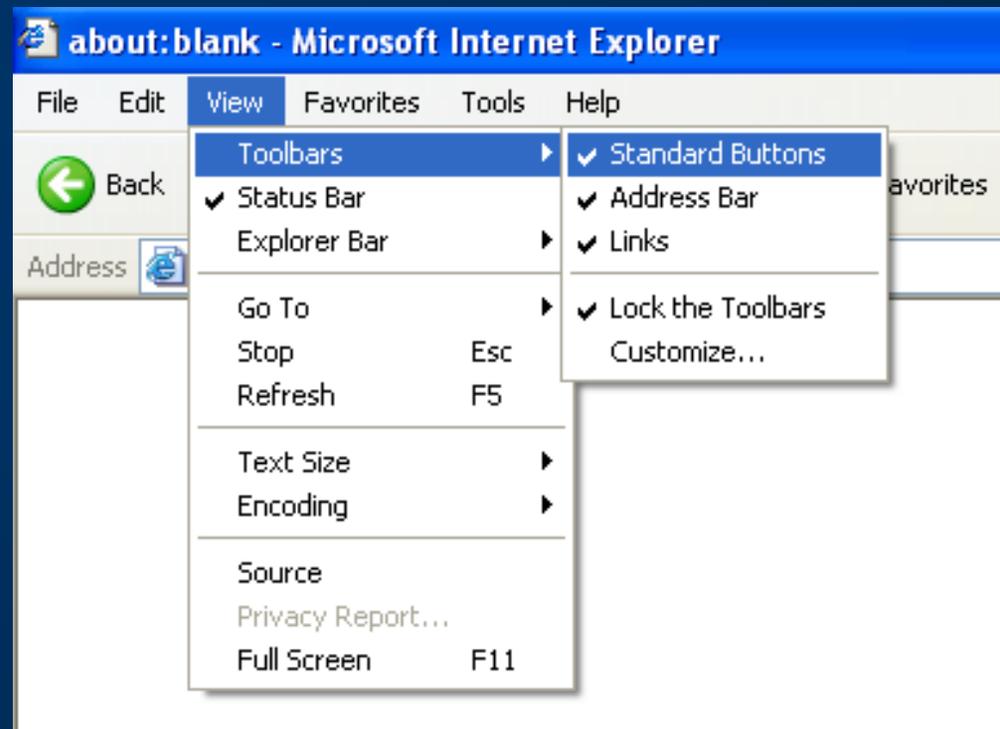
National Weather Service Storm Spotter Training

Before we start...a few pointers about this presentation. This presentation will not work with a Netscape browser. You must use Microsoft Internet Explorer (version 6.0). To maximize your viewing area, drag the outline bar to the left. Your text is displayed at the bottom of the screen. Do not select 'slide show' mode as this will hide the text area. Enlarging the text area will decrease the size of the graphics. You can also maximize your viewing area by toggling off your browser's status bar, standard buttons, and address bar. To do this, click 'view' on your browser's main menu, then click 'toolbars' (see illustration).



Outline bar

Text area



Use the slide advancer at the bottom of your screen to go to the next or previous slide.

National Weather Service

Storm Spotter Training



Introduction

Welcome to the National Weather Service storm spotter training. Storm spotting is very difficult to do accurately on a consistent basis. This presentation will provide some useful background for your training. However, accurate storm spotting cannot be learned by just taking a course. Actually observing storms and severe weather will be your best training. Try to do this with someone who has experience. Every thunderstorm and weather situation looks different. No matter how many years one may have been storm spotting, each storm season brings new learning experiences. This spotter training uses numerous examples of those various cloud formations most important to storm spotting. Storm phenomenon examples range from classics to the obscure. The presentation is quite long and is best completed in sections. Good luck!!

Presentation Topics

- ✦ National Weather Service overview, mission, and products
- ✦ Why we need spotters
- ✦ What to report
- ✦ What causes thunderstorms? Severe Thunderstorms?
- ✦ Severe weather climatology
- ✦ Thunderstorm types
- ✦ Thunderstorm components
- Tornado look alikes
- ✦ Storm surveys – Tornado or downburst?

Your National Weather Service

The National Weather Service (NWS) is part of the National Oceanic & Atmospheric Administration (NOAA), which is within the Department of Commerce.

Our mission: The NWS provides weather, hydrologic, and climate forecasts and warnings for the United States, its territories, adjacent waters and ocean areas, for the protection of life and property and the enhancement of the national economy. NWS data and products form a national information database and infrastructure which is used by other governmental agencies, the private sector, the public, and the global community.

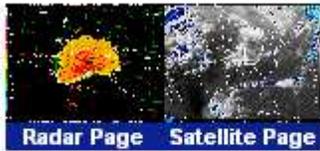
www.noaa.gov

Sources of Weather Information

- **NOAA Weather Radio** - Your fastest link to vital information 24 hours/day
 - www.weather.gov/nwr
- **The Internet** - Your official source for reliable and accurate weather information
 - For local weather, www.srh.noaa.gov/tlh For national weather, www.weather.gov
- **EMWIN** - Emergency Management Weather Information Network
 - A suite of data access methods which make available a live stream of weather and other critical emergency information
 - <http://iwin.nws.noaa.gov/emwin/index.html>
- **Commercial or cable television** – You can tune to your local or cable TV station to receive National Weather Service watches/warnings/advisories
- **Commercial radio** – LP1 stations broadcast all tornado, severe thunderstorm, and flash flood warnings.

Top News of the Day

- October warmer & much drier than normal in Tallahassee.
- 2005 Hurricane Season sets records.
- NOAA updates its 2005-2006 Winter Outlook.
- Listen to NWR audio files via the internet or over the phone.
- Hazardous Weather Awareness Week Poster Contest.



[Point Forecast Interactive Map](#) ([What is this?](#)) [Map Help](#)

[Submit Storm Reports](#)

Click on the map below for the latest forecast. [en español](#)

Read watches, warnings & advisories. [Zoom Out](#)

Special Weather Statement

Hazardous Weather Outlook

Last map update: Mon, Nov. 7, 2005 at 1:54:26 pm EST

[Original Homepage Layout](#)



NDFD
NWS National Digital Forecast Database

Get your NWS weather forecast **Anywhere/Anytime** by wireless device!
[Click for details](#)

County Forecasts

What's New on the website?

[Weather Hazards](#) | [Weather Forecasts](#) | [Present Weather](#) | [Past Weather](#) | [Tropical Weather](#) | [Contact Us](#)

National Weather Service • Since 1870

Your Official Weather Source



County Specific Information:

* Hazardous Weather Outlook

* Watches

* Warnings

• Severe Weather Statements

* Short Term Forecasts

National Weather Service • Since 1870

NOAA ALL Hazards Weather Radio

www.srh.noaa.gov/nwr

Broadcasts are found in the public service band at these seven broadcast frequencies (MHz):

162.400 MHz	162.425 MHz	162.450 MHz	162.475 MHz	162.500 MHz	162.525 MHz	162.550 MHz
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Products

Look for these useful NWS products during severe weather:

Hazardous Weather Outlook – summary of potential hazardous weather threats for the next seven days

Zone Forecast – a general seven day forecast for your specific county

Short Term Forecast – a forecast for up to six hours in advance providing greater detail of significant weather features in your area

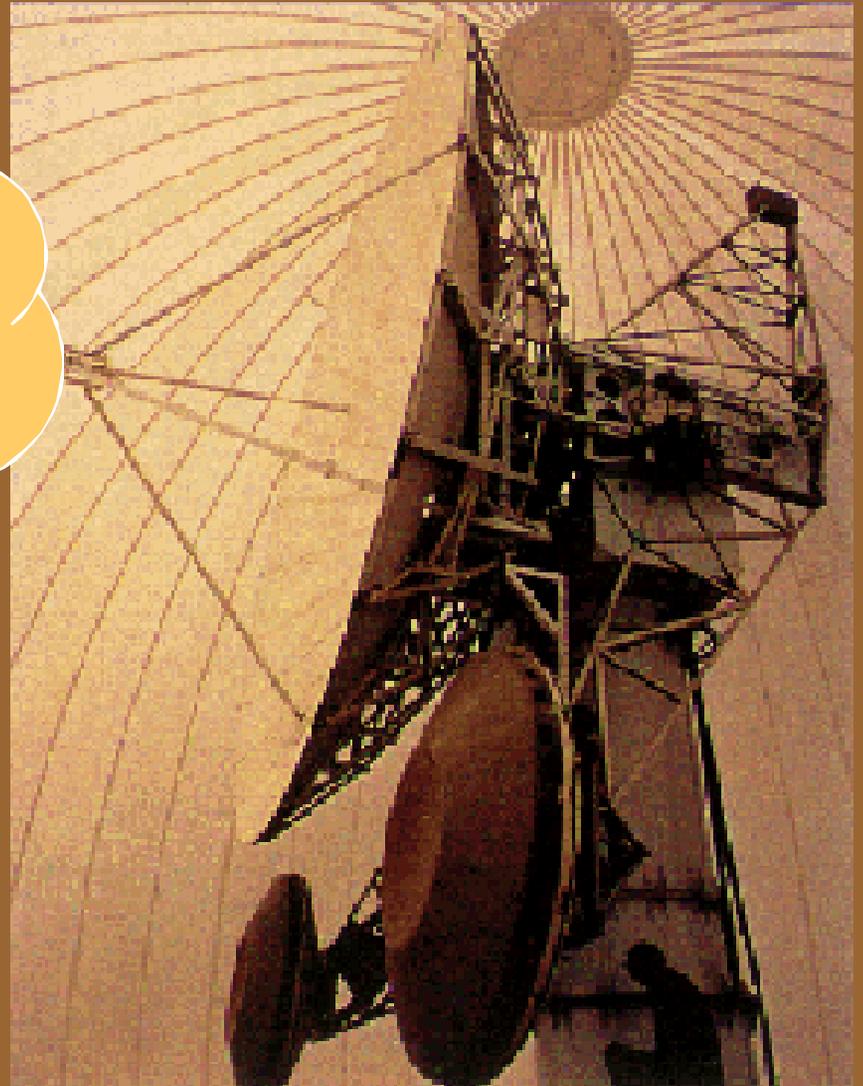
Watch – a statement detailing potential development of severe weather

Warning – product detailing specific severe weather threats on a county level

Severe Weather Statement – a follow-up statement to a previous warning which contains additional updated information

WSR-88D Products – National Weather Service Doppler radar images

**With all those fancy
gadgets, why does
the NWS need
weather spotters?**



A word of caution- the next few slides may get a bit technical. Don't worry if you do not understand all the concepts presented.



Don't get frustrated

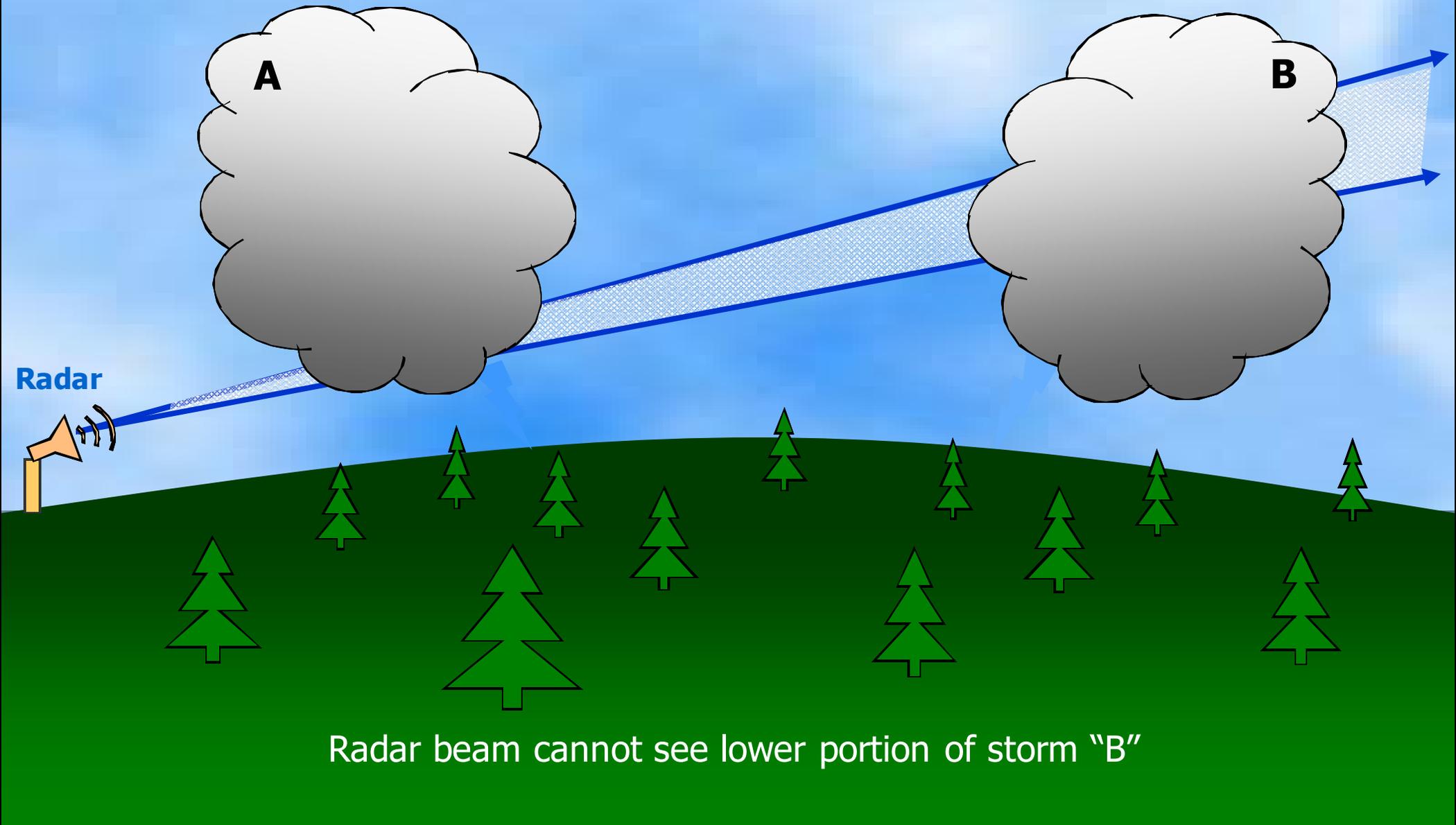
Why we need spotters

- **Radar limitations** (beam height & resolution...effective resolution decreases with distance...radars do not see tornadoes)
- **Very high percent of weak tornadoes** (radar signatures less defined)
- **Real-time verification** (adds credibility, enhances public response, and improves warning accuracy)



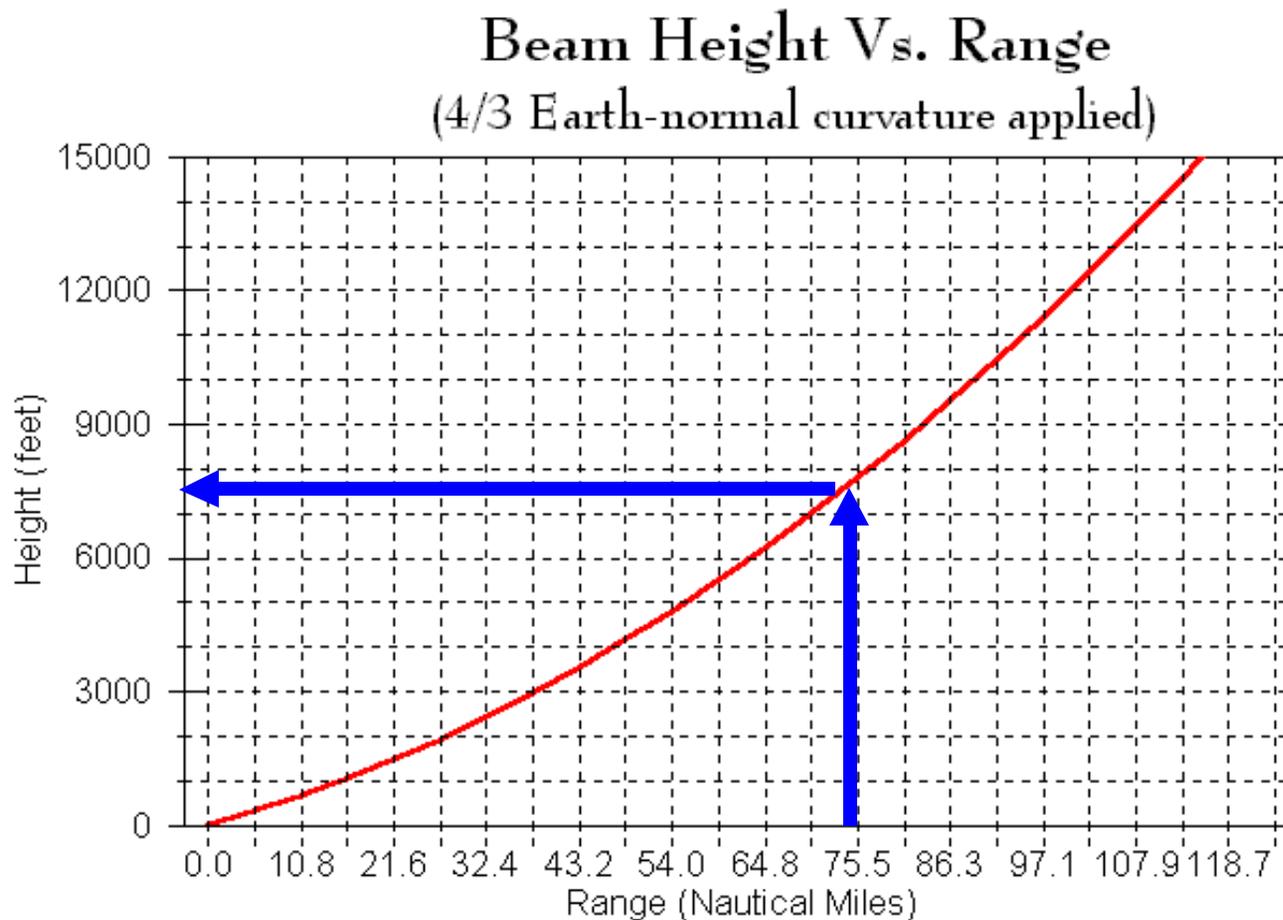
Why we need spotters

Radar Horizon



Radar beam cannot see lower portion of storm "B"

Why we need spotters

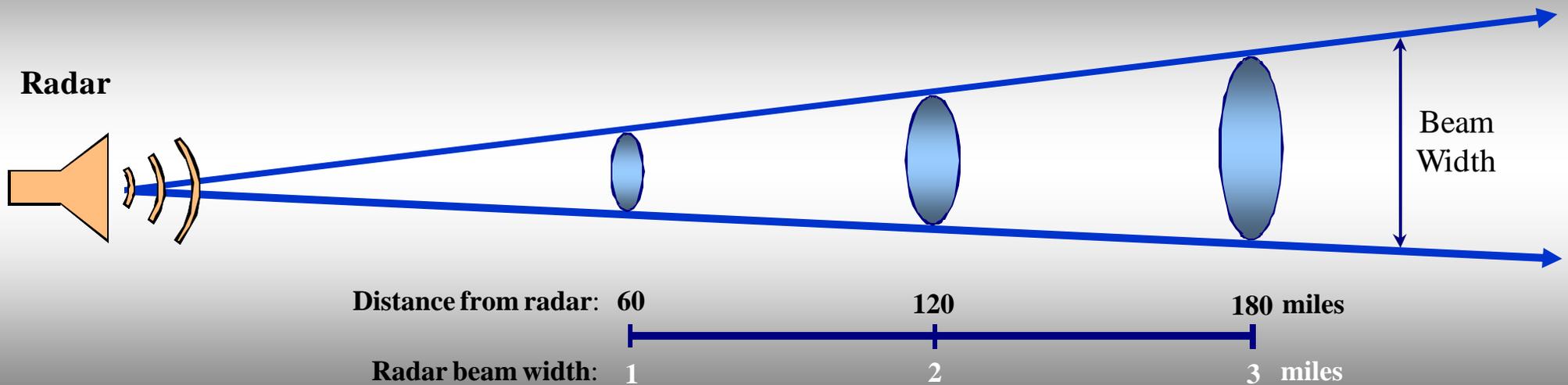


At a distance of 75 miles, the radar is looking 7,600 feet above the ground.

— Antenna tilt = 0.5 deg
(lowest elevation angle)

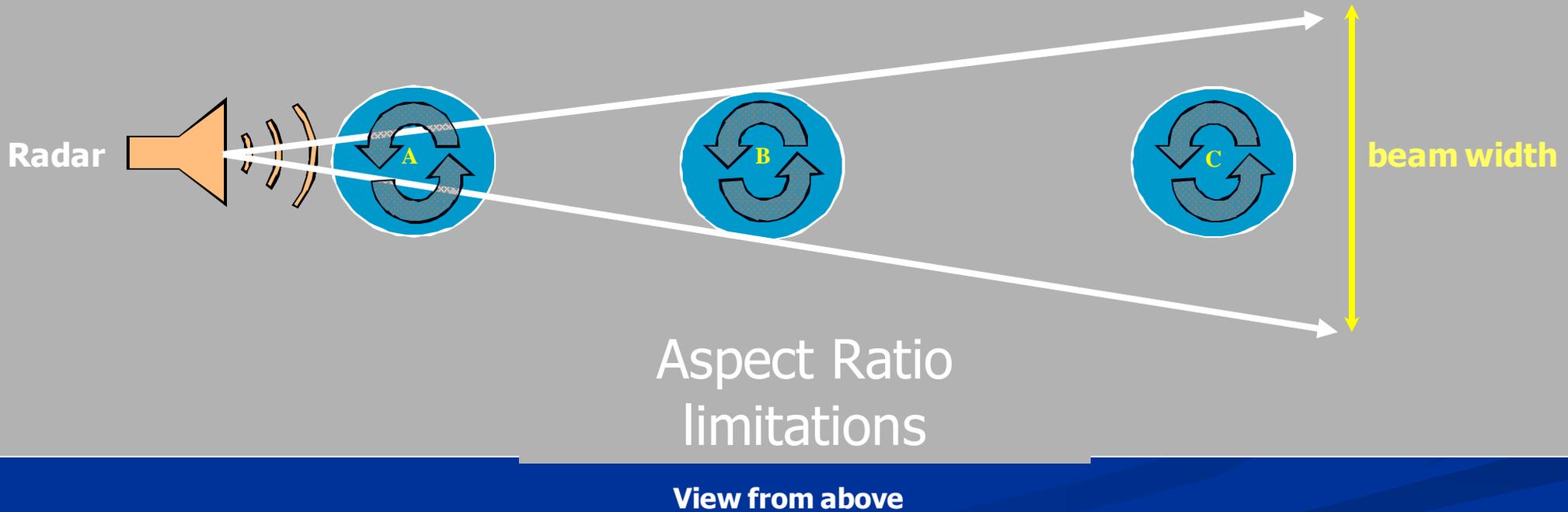
Why we need spotters

Beam width vs. range

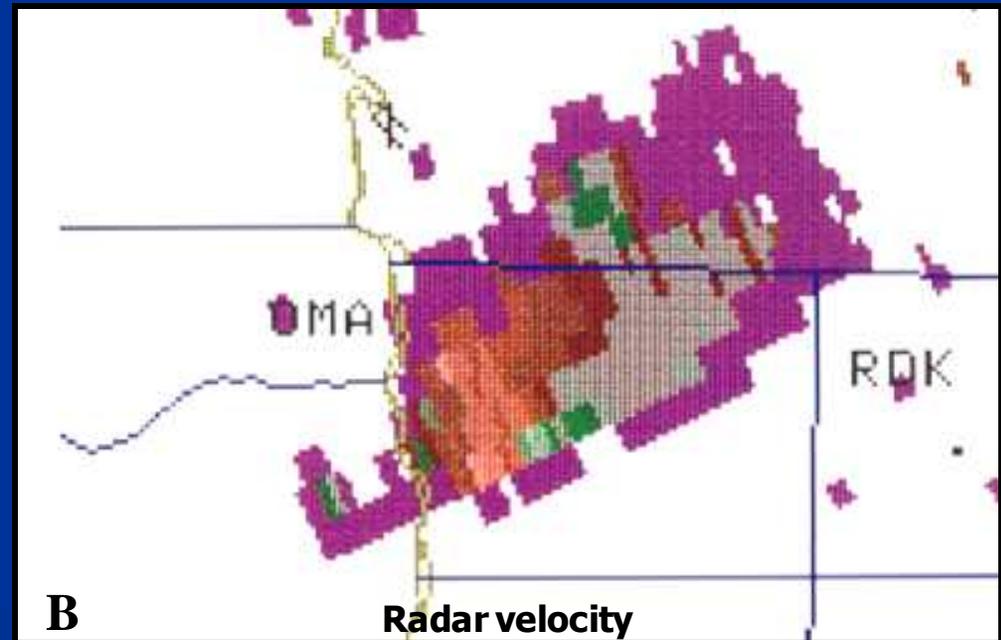


Why we need spotters

Distance vs. effective resolution



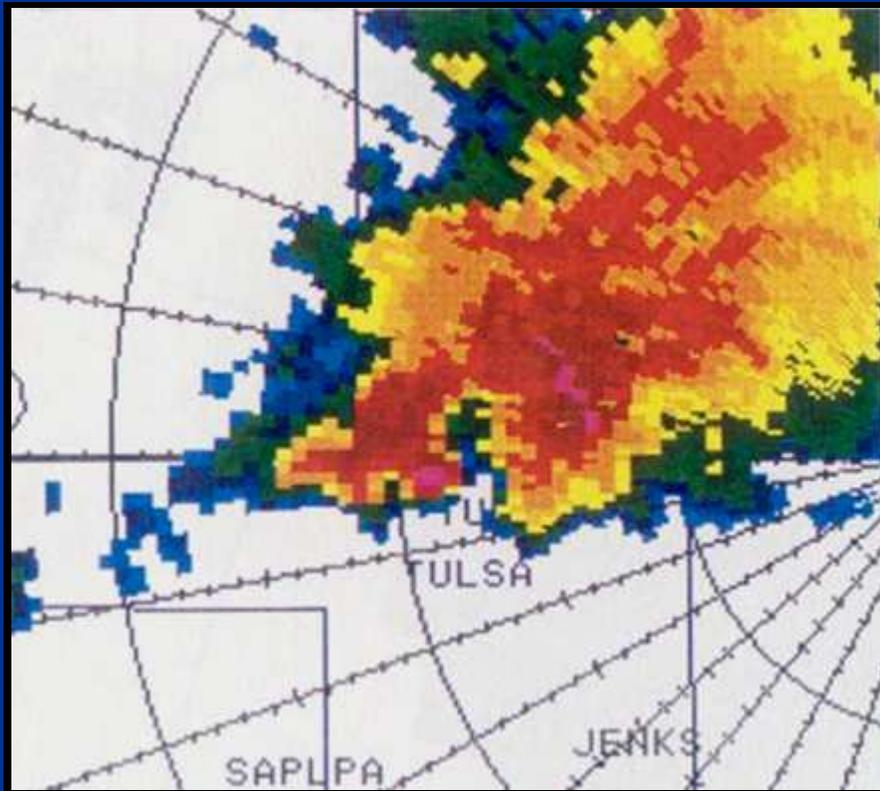
Why we need spotters



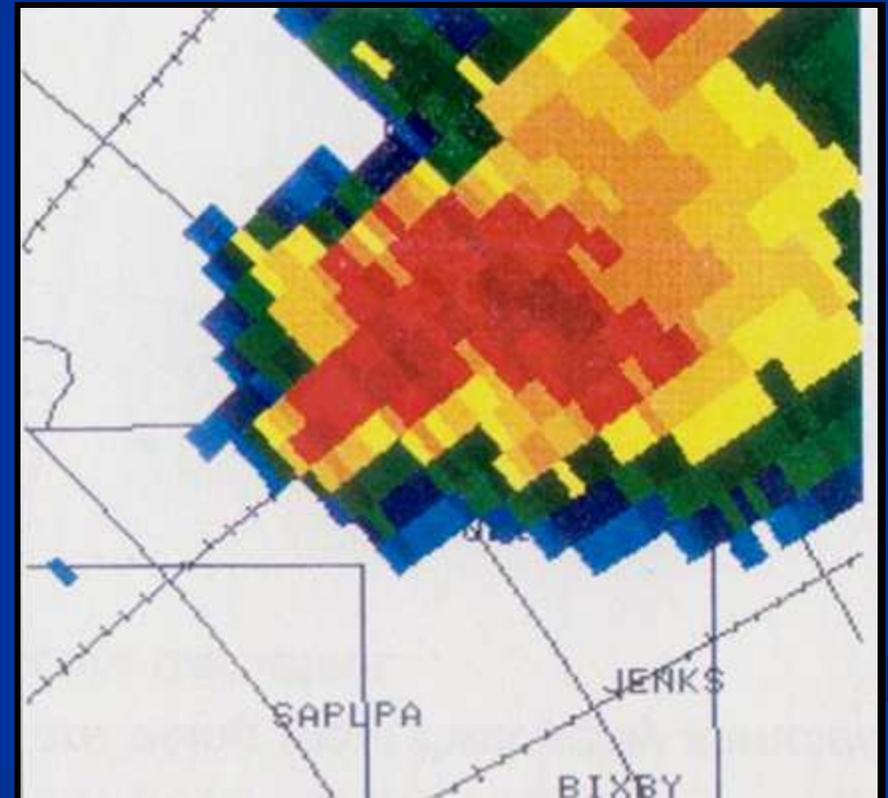
Beam height & width vs. effective resolution

Why we need spotters

Beam width vs. effective resolution



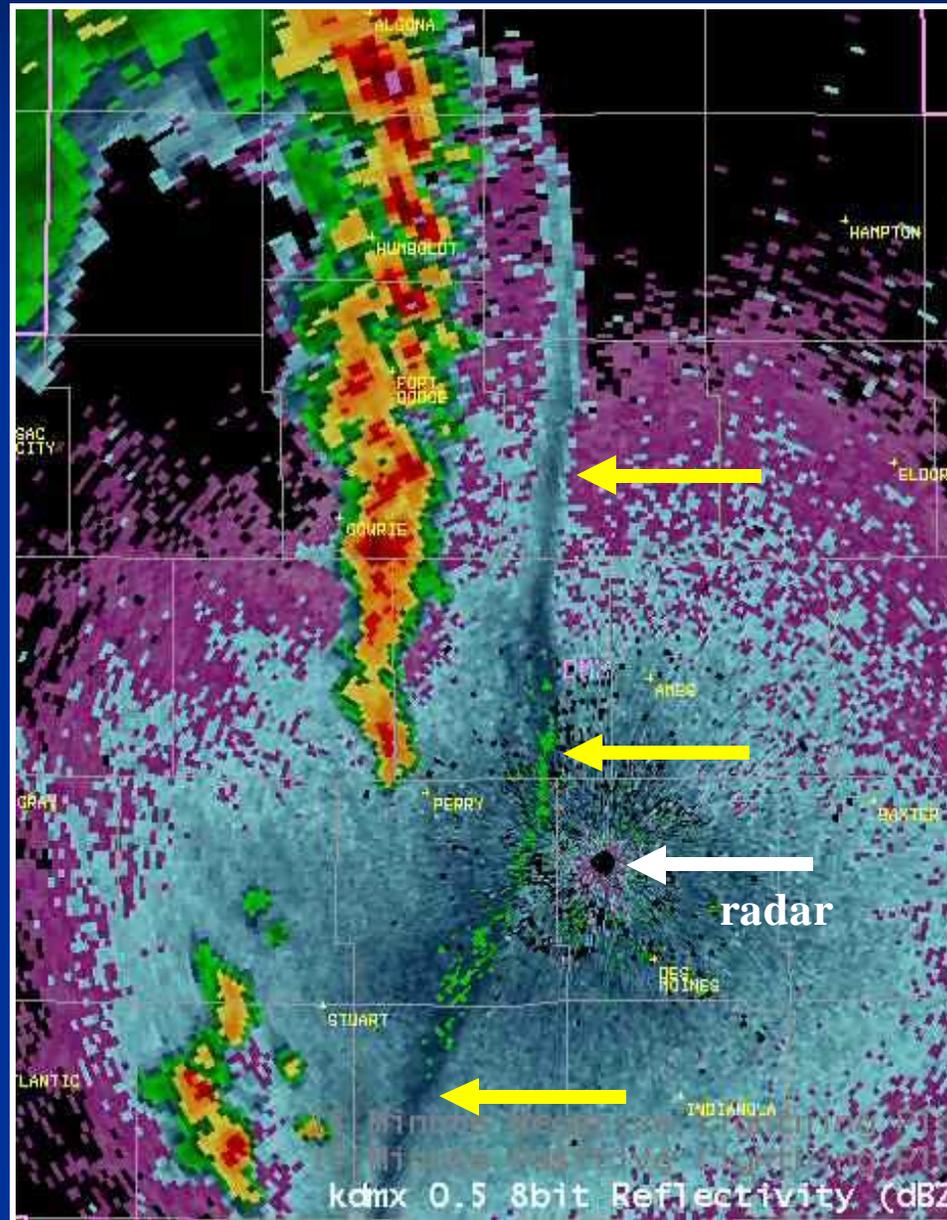
Storm 20 miles from radar



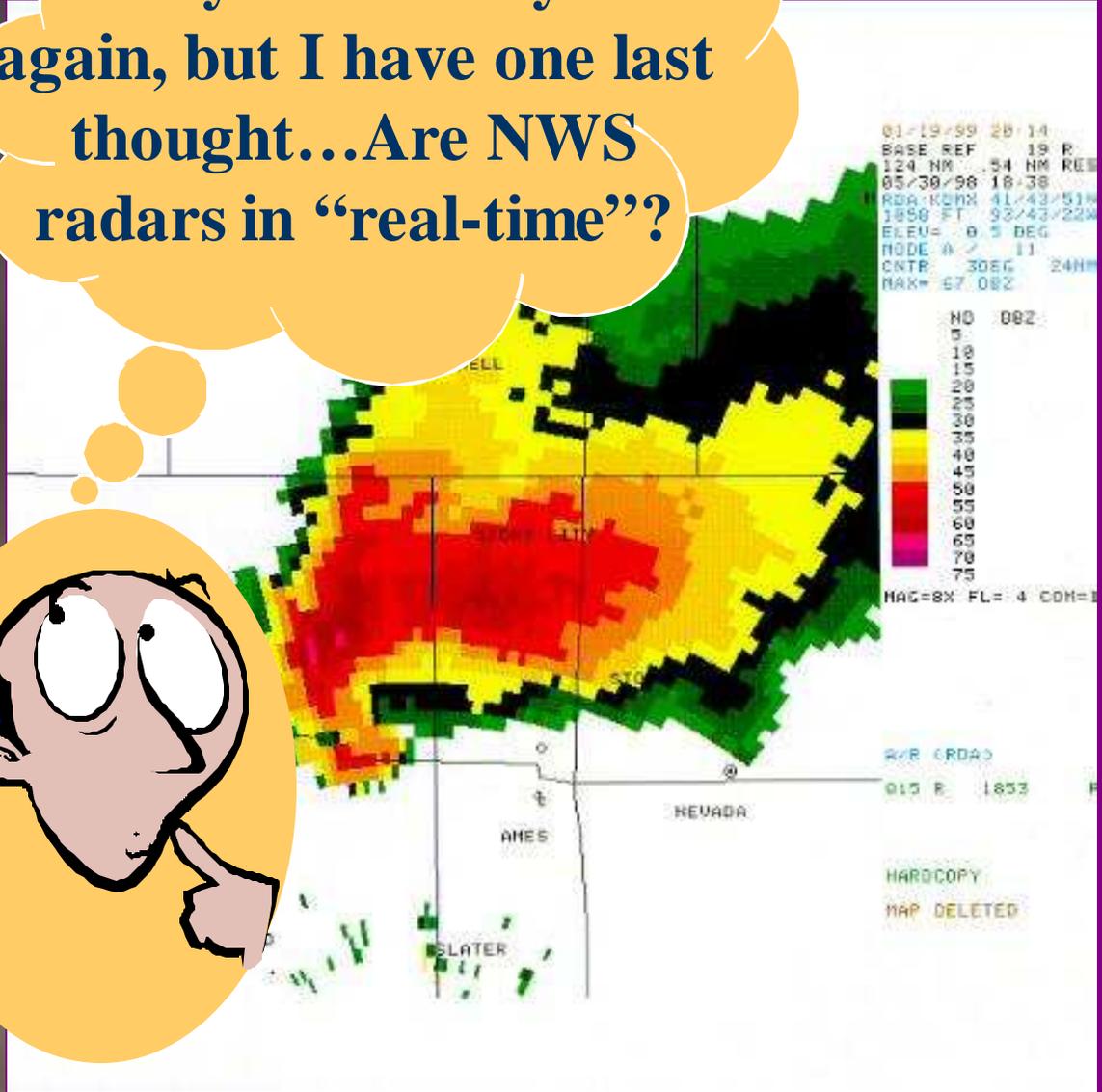
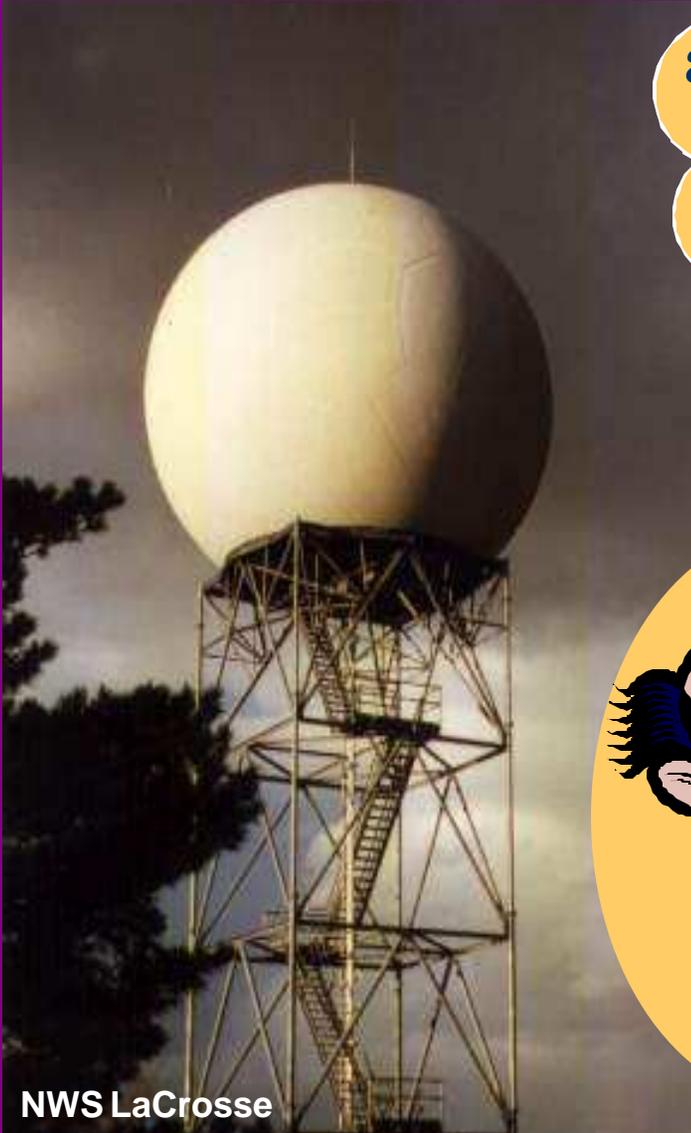
Same storm 80 miles from radar

Why we need spotters

Distance vs. height



Sorry to bother you again, but I have one last thought...Are NWS radars in “real-time”?



Important Definitions

- **Watch** - Atmospheric conditions are favorable (or could become favorable) for the development of thunderstorms which could produce severe weather – remain alert.
- **Warning** - Severe weather has occurred or is likely to occur – take protective action.

Tornado Warning Criteria

A tornado is occurring, a verified funnel cloud is reported and the NWS believes it could develop on the ground, or radar indicates a thunderstorm capable of producing a tornado.



Severe Thunderstorm Criteria

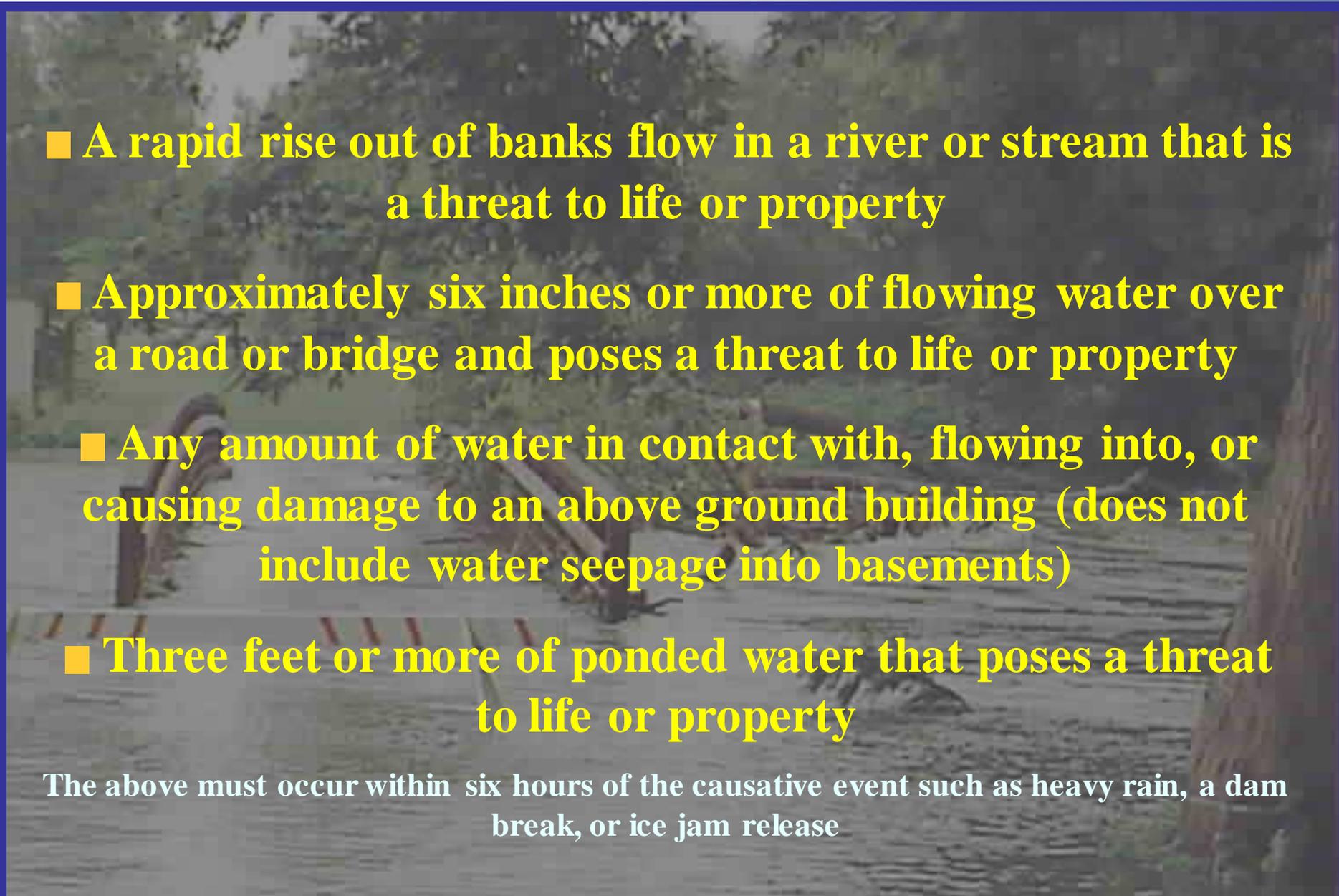
wind 58 mph or greater



3/4 inch or larger hail



Flash Flood Warning Criteria

- 
- A photograph showing a road completely submerged in floodwater. A car is partially visible, with only its roof and the tops of its windows above the water level. The water is murky and turbulent. In the background, there are trees and a utility pole. The scene illustrates the danger of flash flooding.
- A rapid rise out of banks flow in a river or stream that is a threat to life or property
 - Approximately six inches or more of flowing water over a road or bridge and poses a threat to life or property
 - Any amount of water in contact with, flowing into, or causing damage to an above ground building (does not include water seepage into basements)
 - Three feet or more of ponded water that poses a threat to life or property

The above must occur within six hours of the causative event such as heavy rain, a dam break, or ice jam release

Spotter Groups

- County Emergency Management – Law enforcement, fire departments, trained volunteers
- NWS Skywarn Spotters – www.skywarn.org
- Amateur Radio - www.arrrl.org
- Others – media, surface observations, storm chasers

The Effective Spotter Report



Best



National Weather Service

The Effective Spotter Report

- Call your NWS office via phone, eSpotter, or via Amateur Radio. (more on eSpotter later)
- State source of report (your identity, i.e. trained spotter)
- Give your exact location (and location relative to the event)
- State the start & end time of the event (be sure to differentiate between event time & report time)
- Give an event description (be as specific and detailed as possible)
- If event is still occurring, provide frequent updates (continuous for tornado)

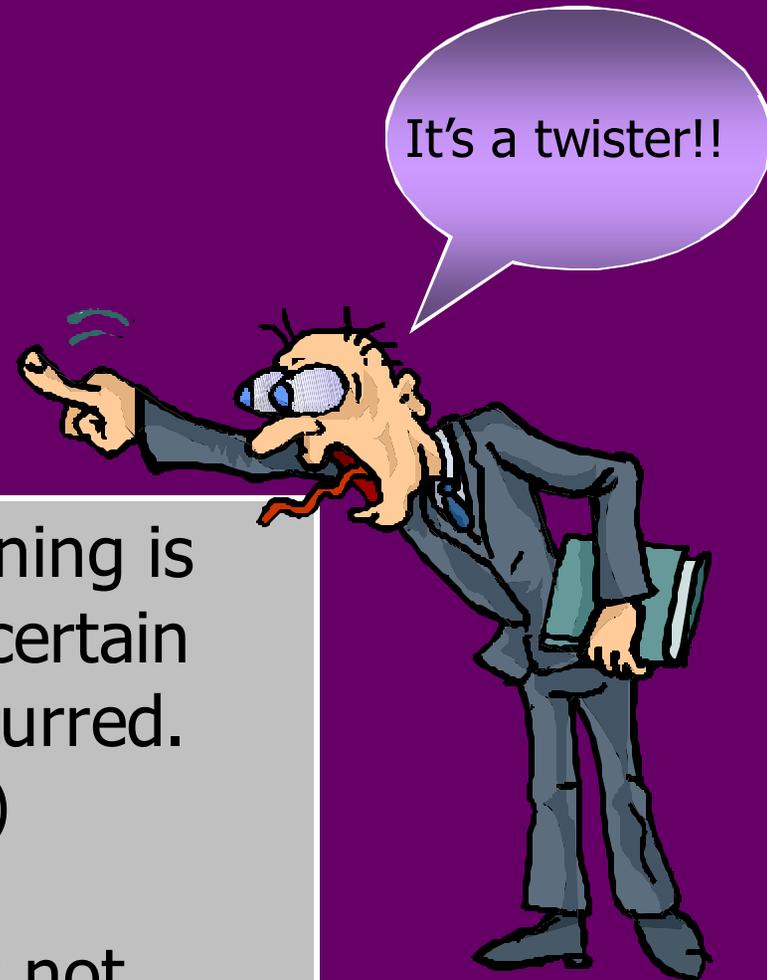
The Effective Spotter Report



Do not assume that if a warning is issued, the NWS knows for certain that severe weather has occurred. (we want to hear from you!)

Never assume your report is not important.

Do not exaggerate your report!



What To Report

Tornado, Funnel Cloud, or Wall Cloud



Copyright Eric O'Connor

What To Report

Strong or Damaging Wind



Copyright Chuck Palmer

Estimating Wind Speed

25-31 mph - large branches in motion

32-38 mph – whole trees in motion

39-54 mph – twigs break off, wind impedes walking

55-72 mph – damage to chimneys and TV antennas, large branches broken and some trees uprooted

73-112 mph – removes shingles, windows broken, trailer houses overturned, trees uprooted

113+ mph – roofs torn off, weak buildings and trailer houses destroyed, large trees uprooted



Copyright Mike Umscheid

Estimating Wind Speed

THE "SET" EFFECT.....

Storm spotters must also keep in mind that during a severe weather event, Stress, Excitement, and Tension levels are running high. This is called the "SET" effect, and it can alter your logic and reasoning abilities. Because of its presence, it is often very easy to over-estimate wind speeds.

A wind gust of 40 MPH during a fair weather day will not cause any great concern, but this same wind speed when experienced during a thunderstorm may seem like 60 MPH gust because of the SET effect.

When in doubt about your estimate, re-think it and try to remain calm and objective as possible. Use the table in the previous slide as a guide. Your goal is to pass real time observations with accuracy, speed, and professionalism.

What To Report

Hail



What To Report



Copyright Simon Brewer



What size are your marbles?



Copyright Greg Woods



What To Report

Any Storm Damage



To see current
storm reports,
click here.

What To Report

Urban Flooding



What To Report

Rural Flooding



What To Report

High Water



What To Report

Past Water/Flood Damage



Courtesy of Debbi Segina

What To Report

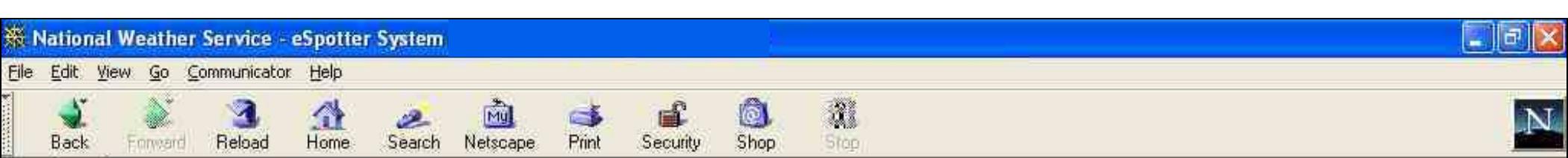
Snowfall or Ice Amounts



Courtesy KCCITV

Your storm report
can also be sent to
the NWS via the
Internet.





- After successfully completing this training, request access to eSpotter at <http://espotter.weather.gov> and you will receive an e-mail (including password) granting E-Spotter privileges.

Trained spotters are encouraged to register and participate by transmitting non-critical information that does not pose a danger to life and property

Date & Time			
Date	Time	<input type="radio"/> Estimated	
Feb / 21 / 2003	05 : 47	<input type="radio"/> Exact	
Location			
Select County, State	City/Town		
Story, IA (169)	Ames, IA		
Weather			
<input type="checkbox"/> Tornado			
<input type="checkbox"/> Funnel Cloud			
<input type="checkbox"/> Wall Cloud			
<input type="checkbox"/> Hail	Size: []		
<input type="checkbox"/> High Wind	Wind Speed: [] MPH	<input type="radio"/> Measured	<input type="radio"/> Estimated
<input type="checkbox"/> Flood			
<input type="checkbox"/> Flash Flood			
<input type="checkbox"/> Other			
Damage, Injuries, Narrative			
Any Damage?	<input type="radio"/> Yes	<input type="radio"/> No	
Was Anyone Hurt?	<input type="radio"/> Yes	<input type="radio"/> No	

•Connections made to this system are monitored. Your e-mail address is used to verify that you are authorized to access the system, and to contact you to follow up on your eSpotter reports

Cooking up a Thunderstorm

the 3 ingredients

- Moisture – (water vapor)
- Instablity (warm air below cold air)
- Lift (trigger)

More about moisture

- Moisture is integral to development
- Low level moisture help create thunderstorms and increase instability
- An absence of mid level moisture can create damaging downburst winds from a thunderstorm

What is instability?

- **Warm** air is less dense than **cold** air. When the ground is **heated**, the air just above the ground is **warmed**. This **warmer** air rises and if there is **colder** air above it, the **warmer** air will continue to rise until it encounters colder air. This is an **unstable** situation that, if enough *moisture* is present can lead to thunderstorm growth.

Lift...The trigger

- Many factors can trigger thunderstorm development on a given day.
- Large scale boundaries like cold fronts
- Mesoscale boundaries like the sea breeze
- Thunderstorm scale outflow boundary interactions

Severe thunderstorm ingredients

- Strong Upper Level Jet Stream – add to lift
- Important – low and mid level wind shear.

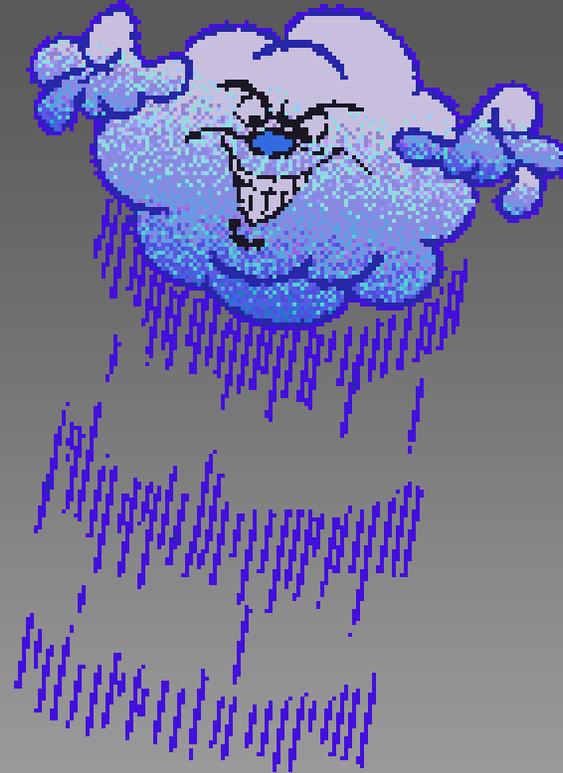
Important:
When NWS forecasts the 3
ingredients to be sufficient:

- We issue a Watch.
- A watch may cover much or all of a State.
- Warnings are then issued for individual storms.

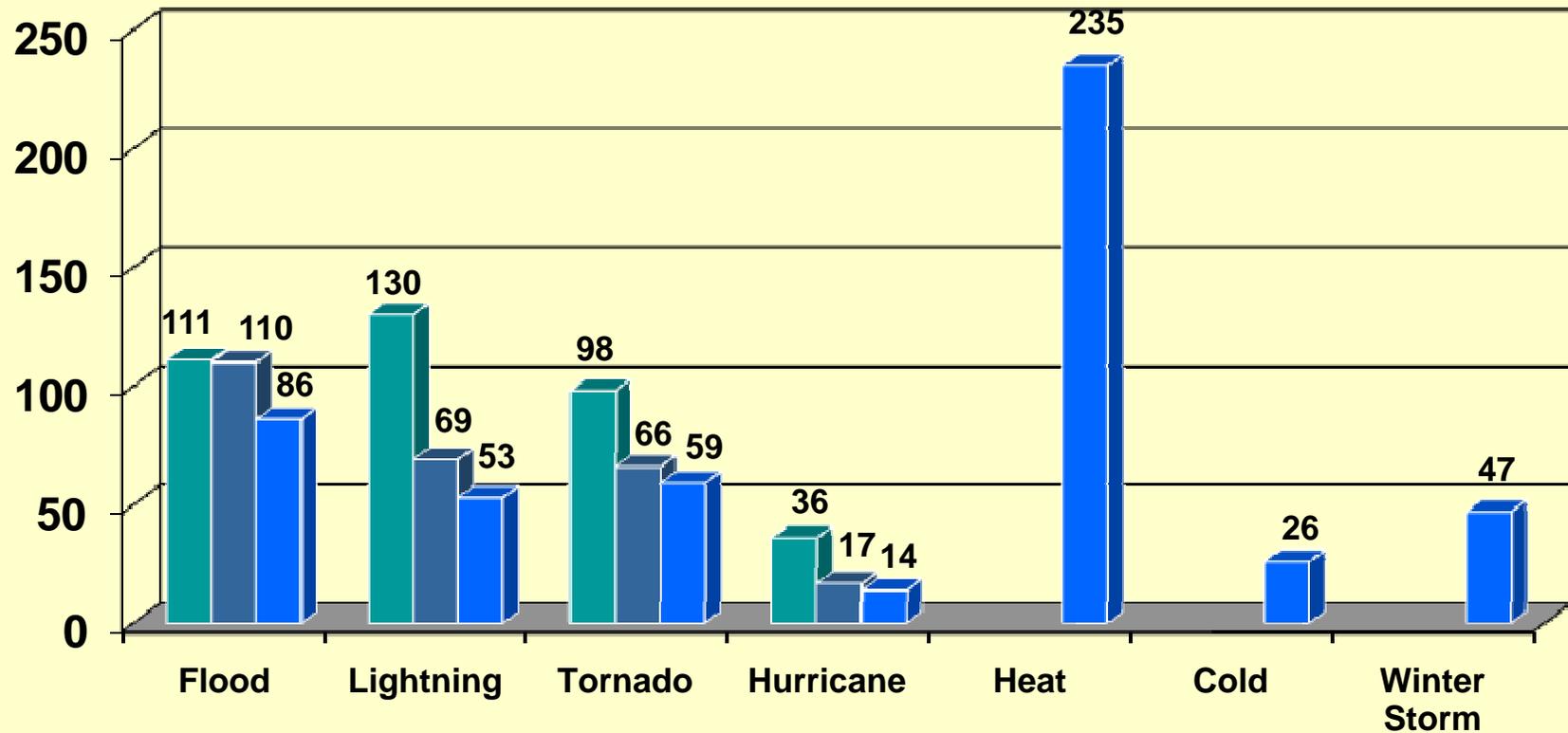
Tornado or Severe Thunderstorm Watch

- Watches are our SKYWARN activation criteria.
- ✓ Important - When a watch is issued, please actively monitor and report severe weather.

**Just how much
severe weather do
we receive?**



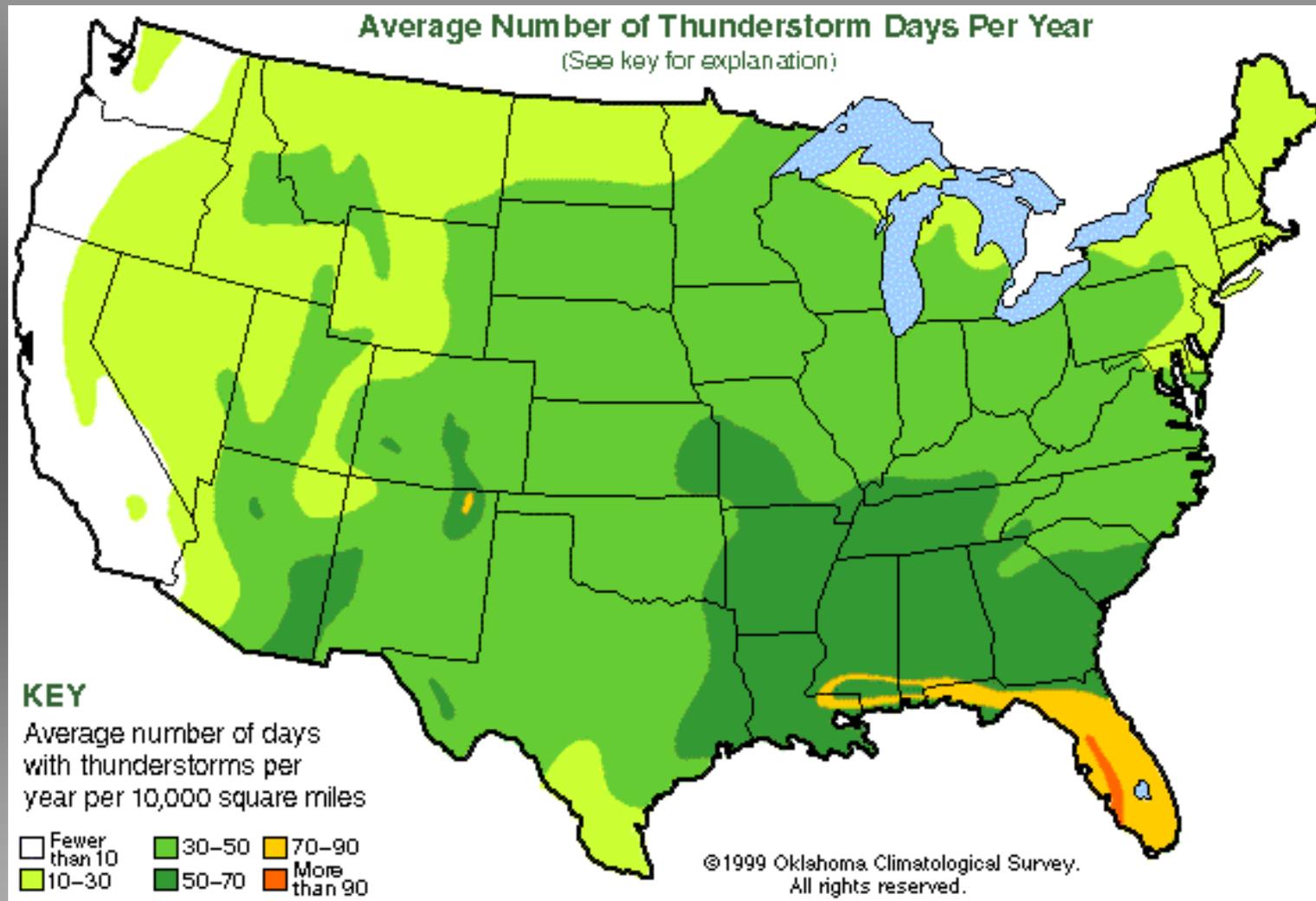
U.S. Weather Fatalities Per Year

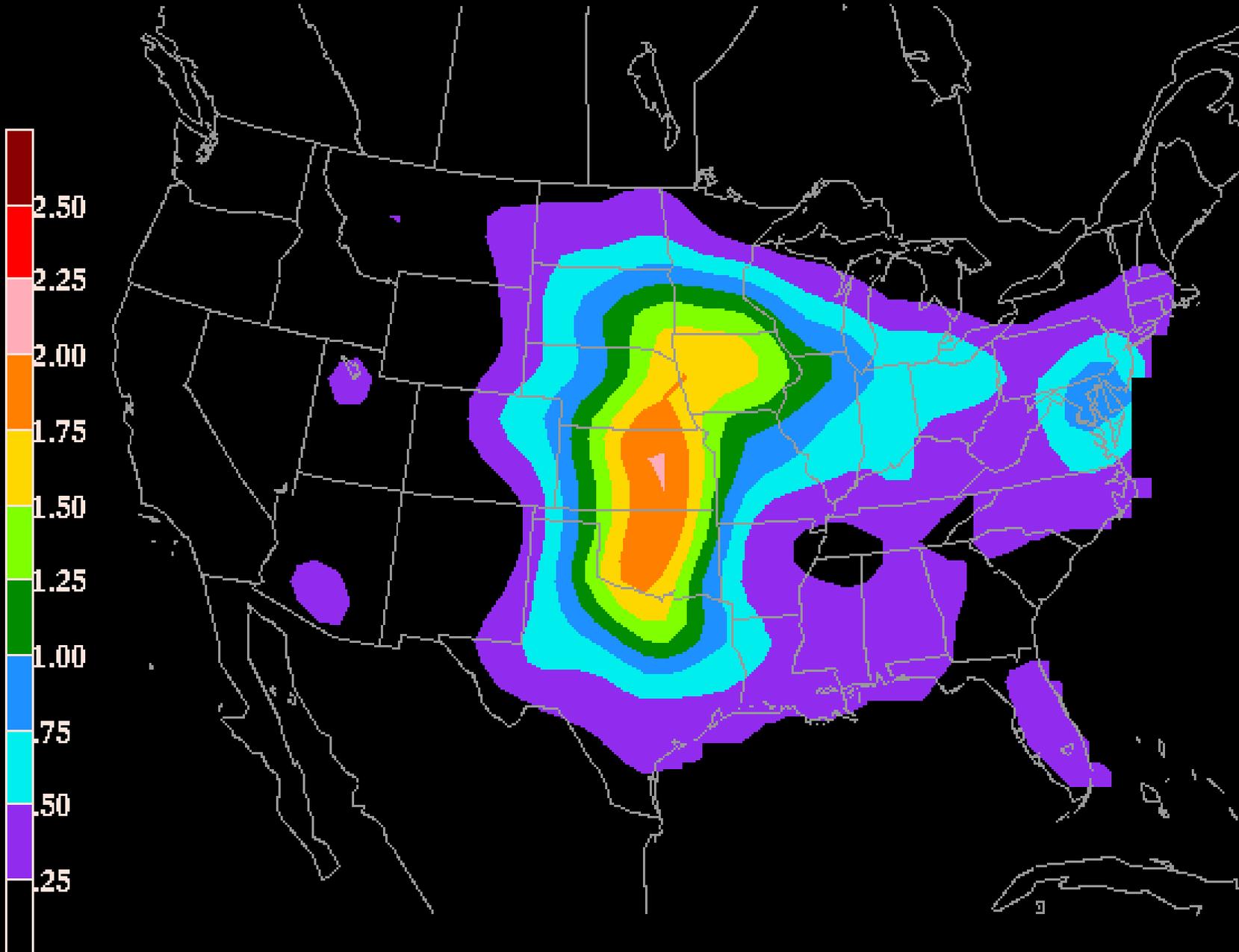


■ 60 year ave. ■ 30 year ave. ■ 10 year ave.

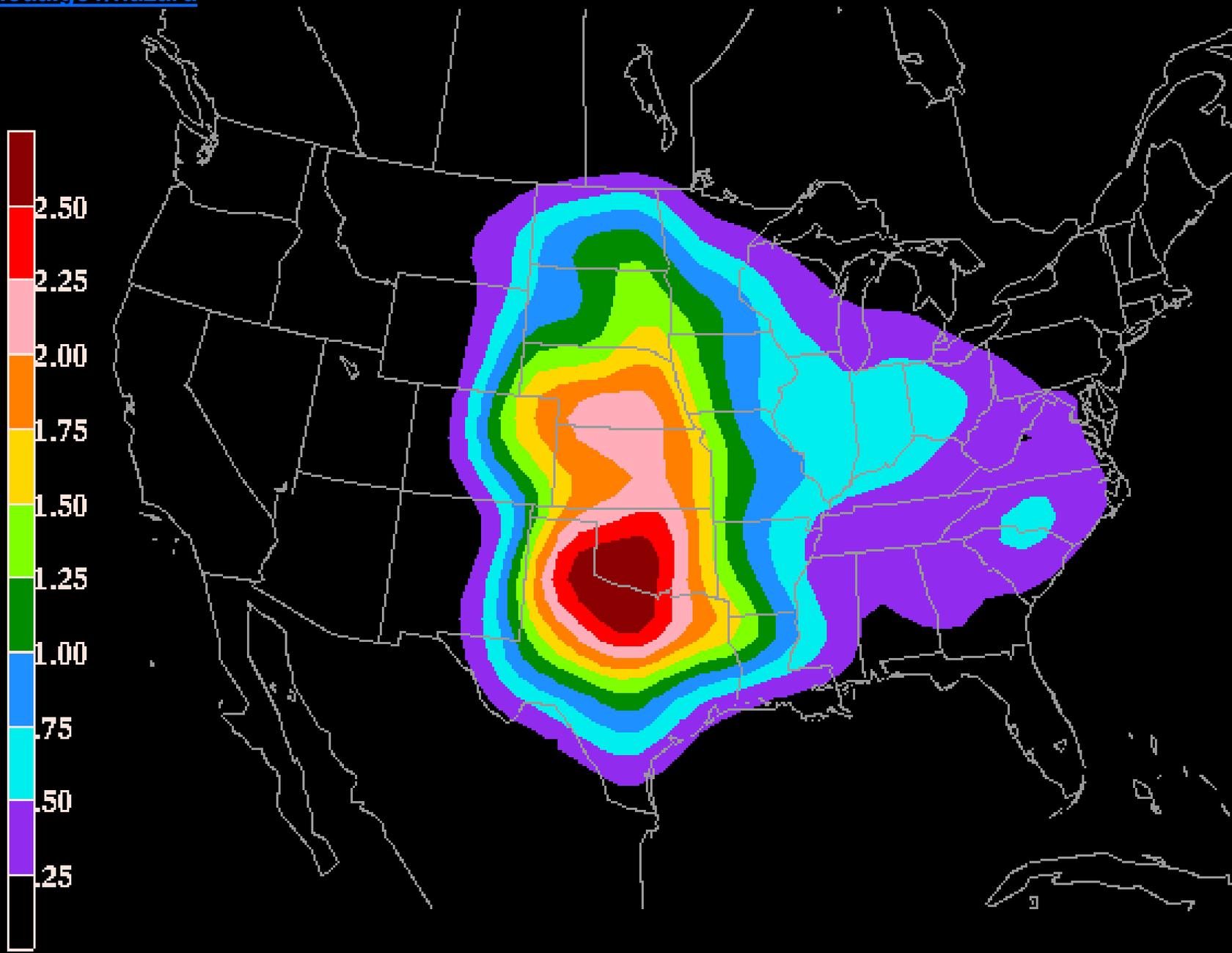
[Click here for more severe weather climatology and statistics](#)

Thunderstorm Climatology



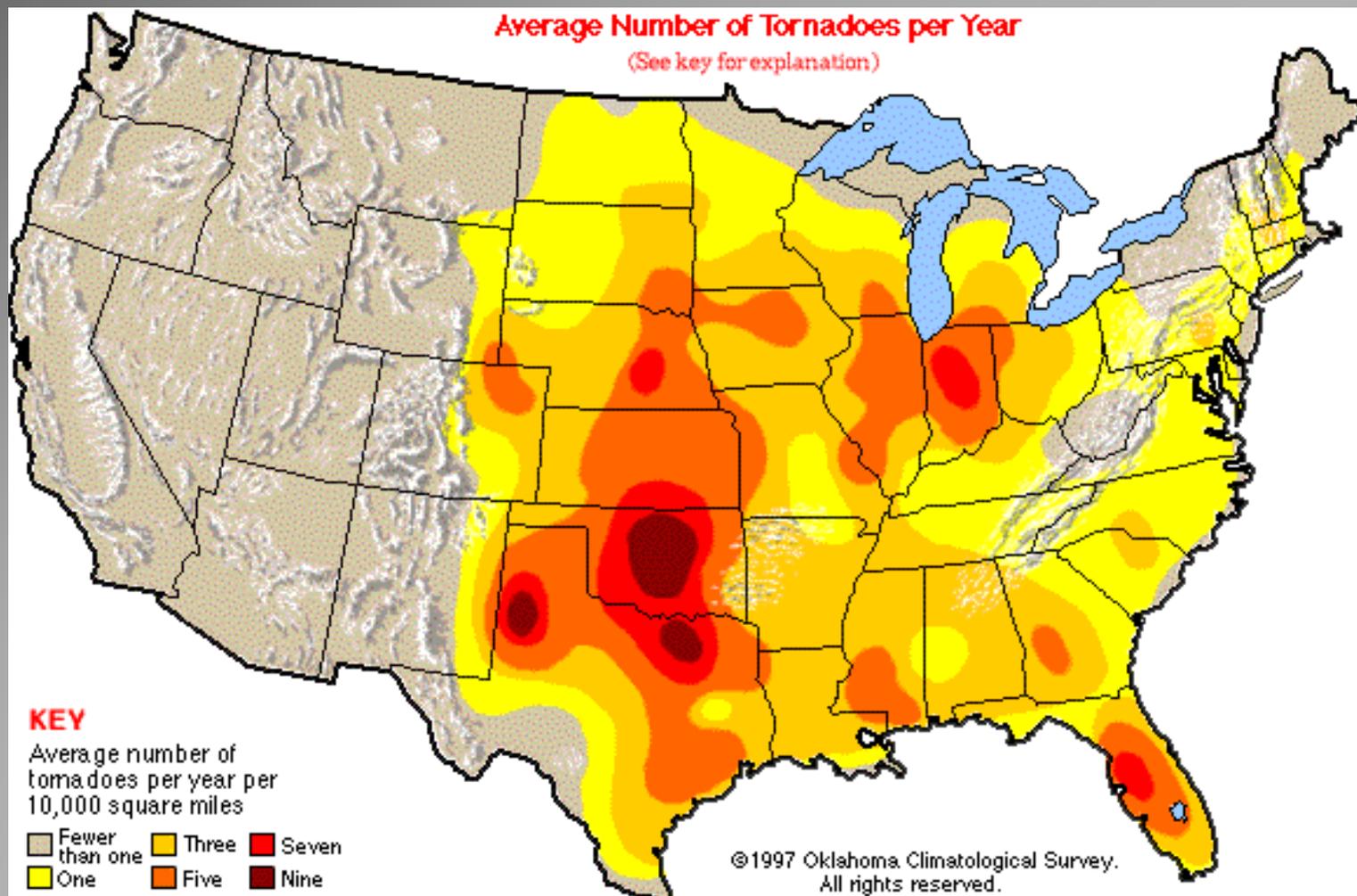


Wind (65 kts or more) Days Per Year (1980-1994)



Hail (2 inch or more) Days Per Year (1980-1994)

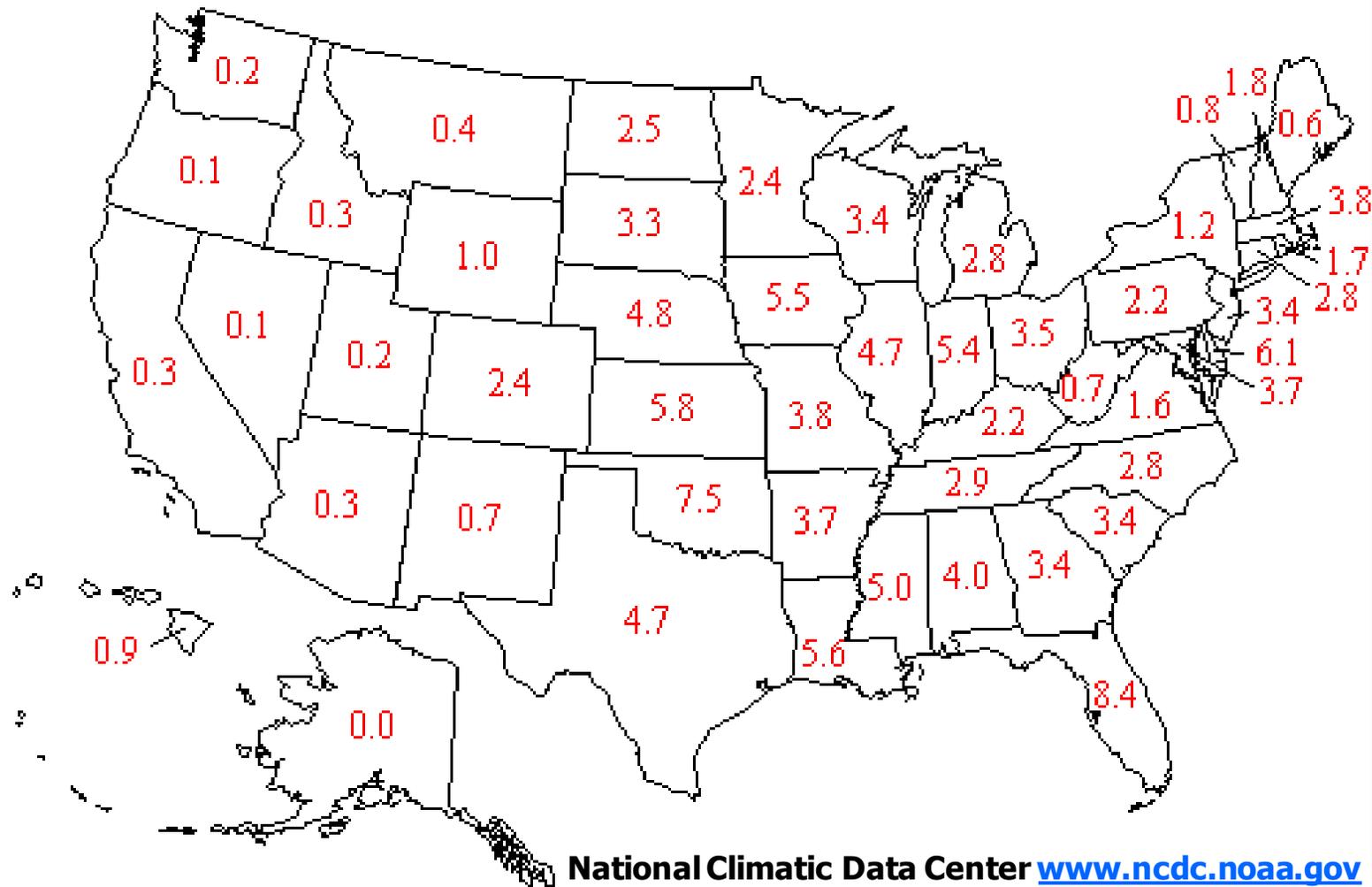
Tornado Alley



Oklahoma Climatological Survey <http://www.ocs.ou.edu>

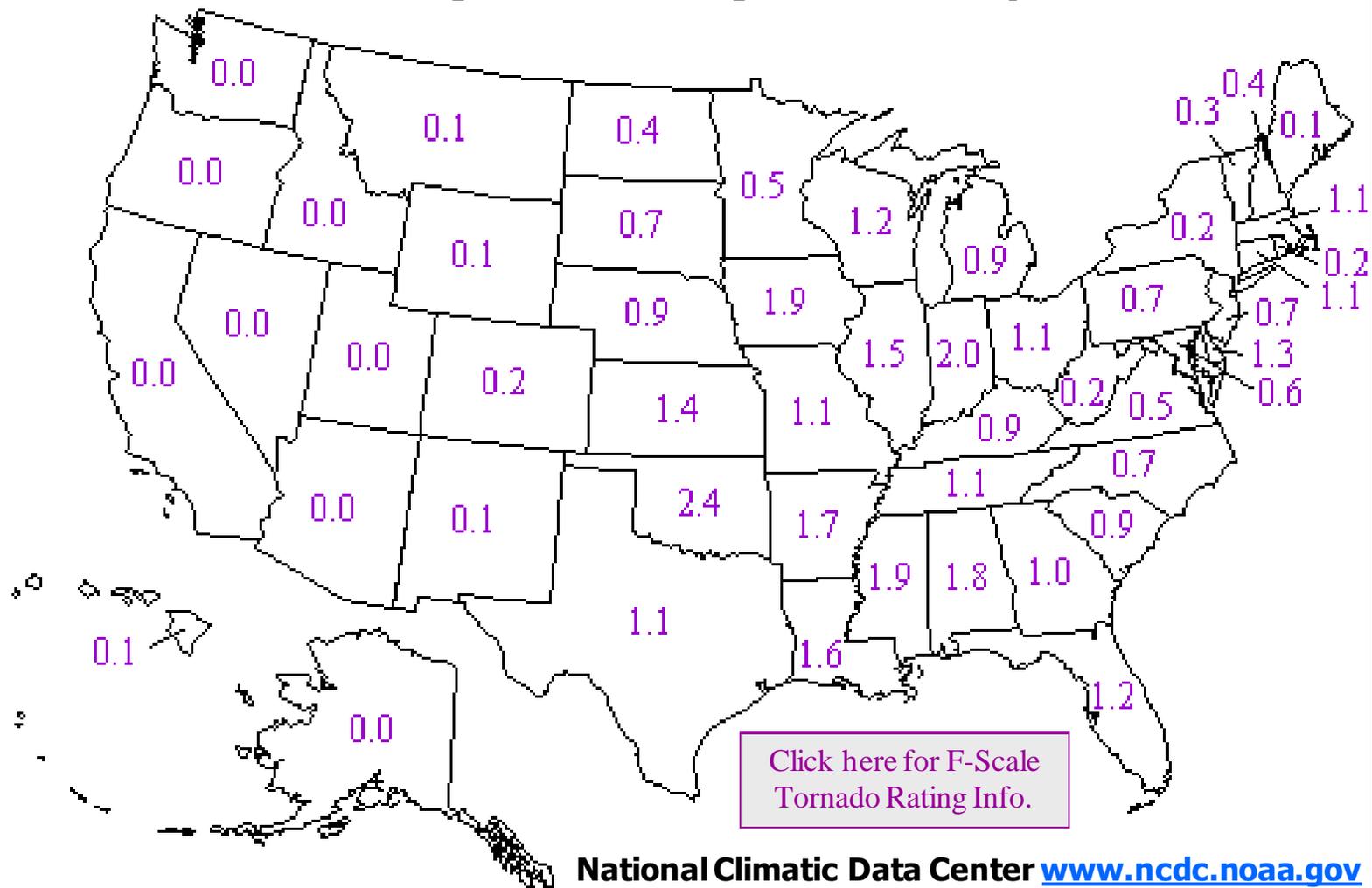
Tornado Climatology

Annual Average Number of Tornadoes per 10,000 Square Miles by State, 1950-1995

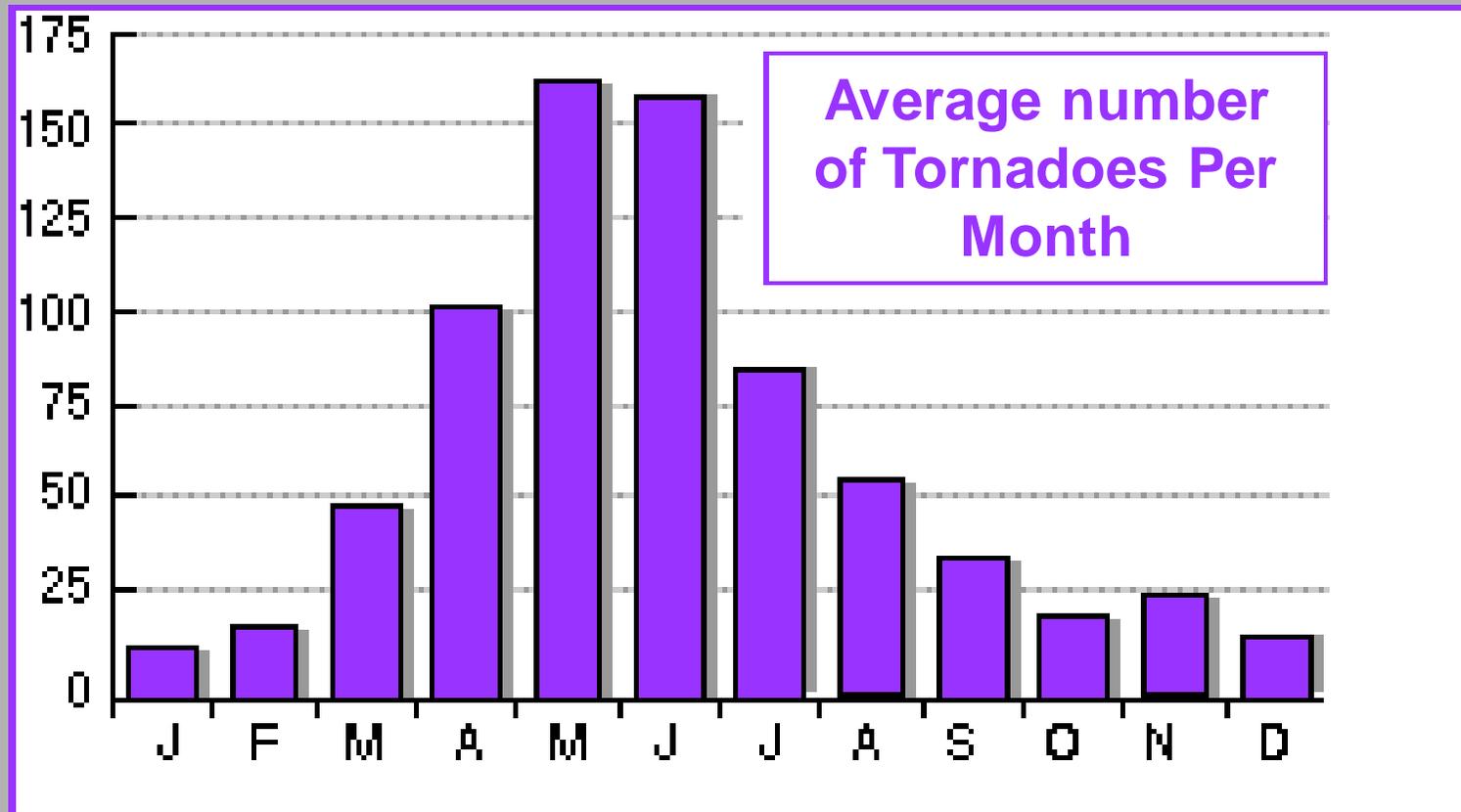


Tornado Climatology

Average Annual Number of Strong-Violent (F2-F5) Tornadoes per 10,000 Square Miles by State

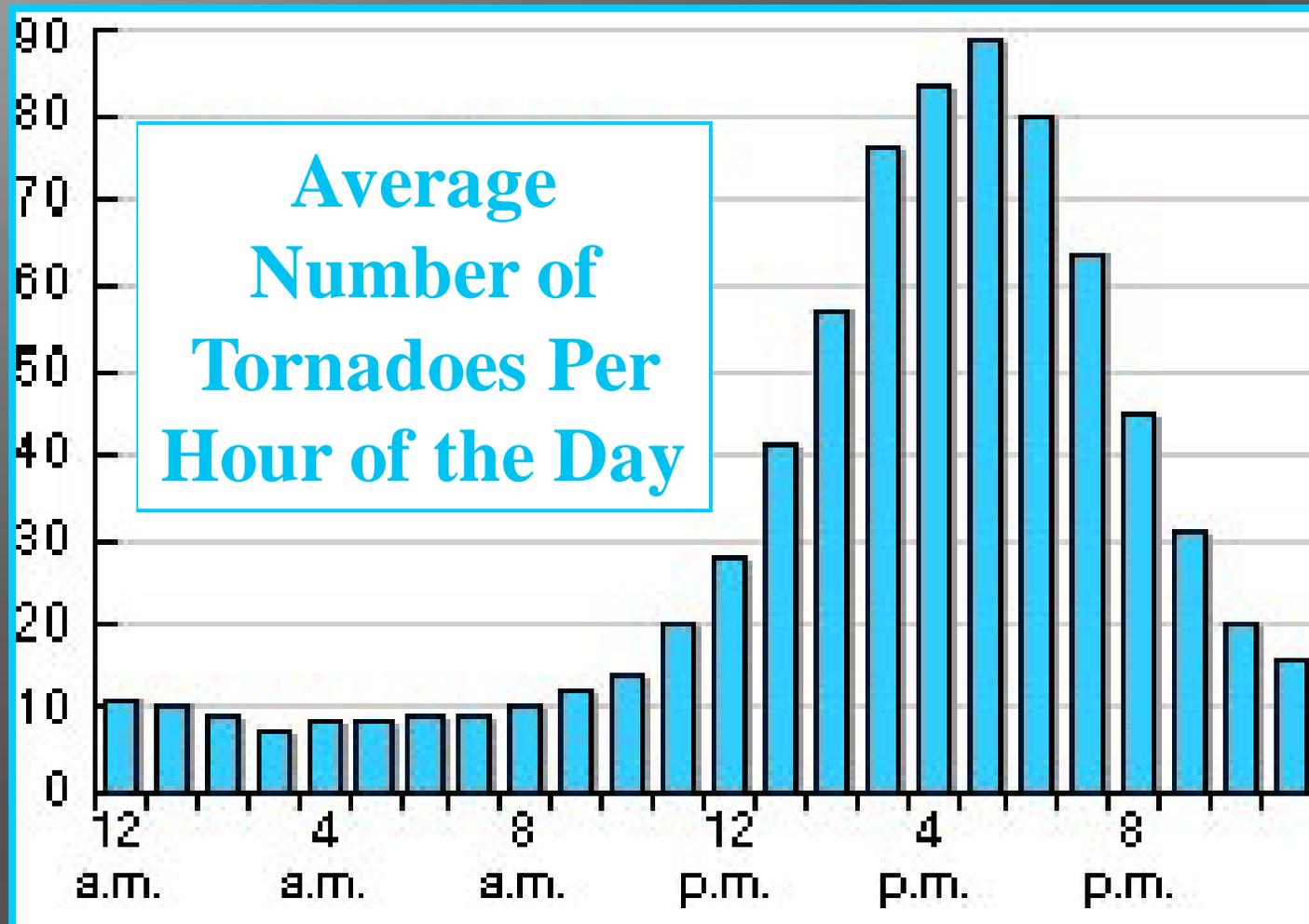


Tornado Climatology



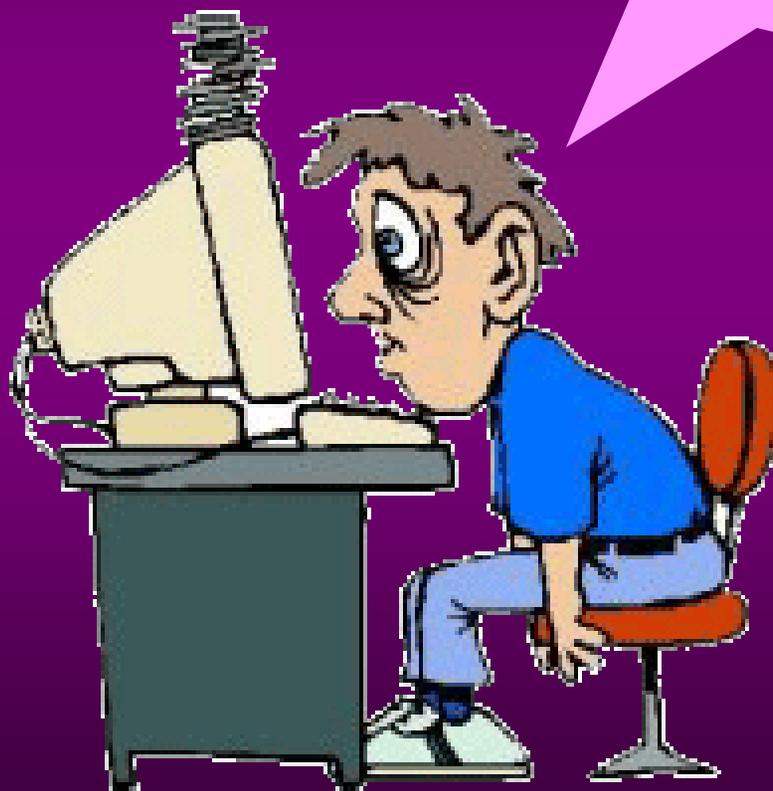
Oklahoma Climatological Survey

Tornado Climatology

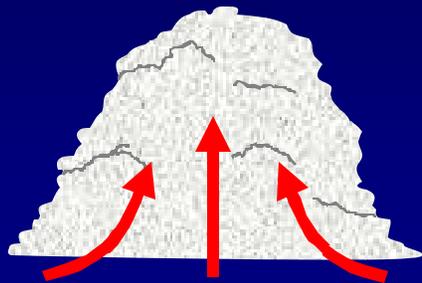


Oklahoma Climatological Survey

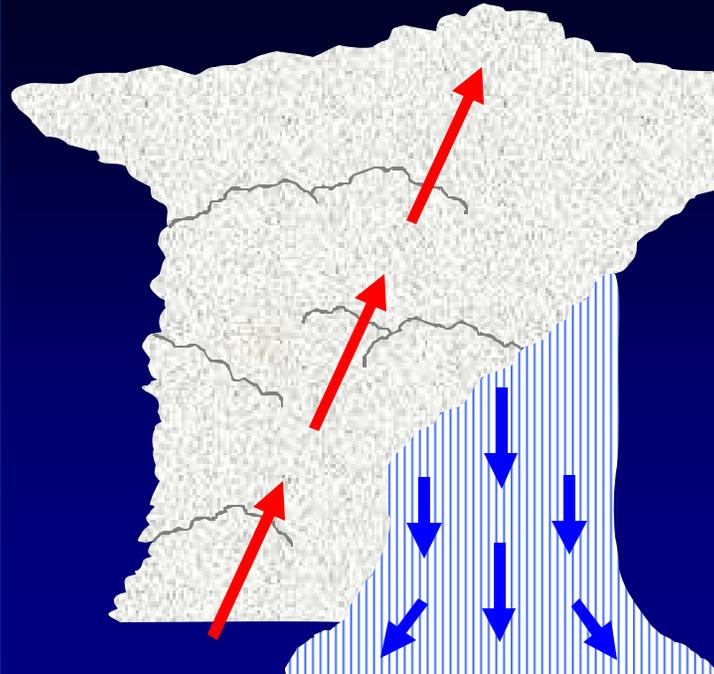
Enough of the
mumbo jumbo
statistics! I want to
see some tornadoes.



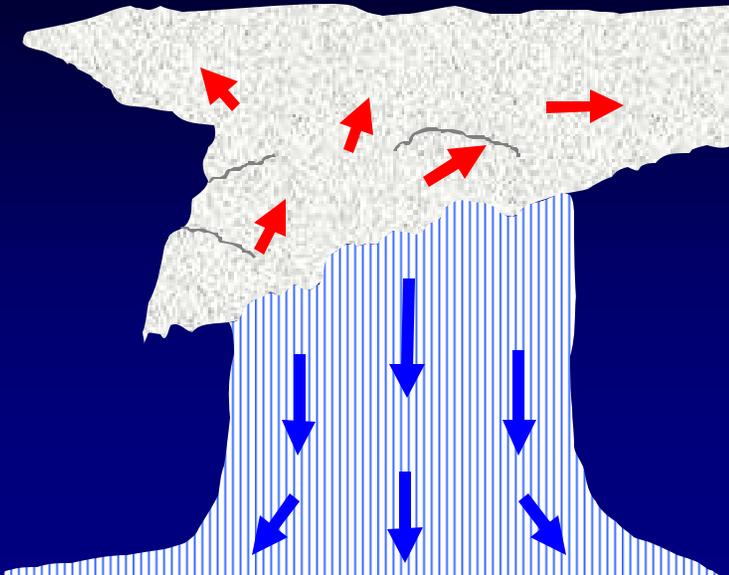
Thunderstorm Life Cycle



Cumulus Stage



Mature Stage



Dissipating Stage



©2001 Chris Kridler
skydiary.com



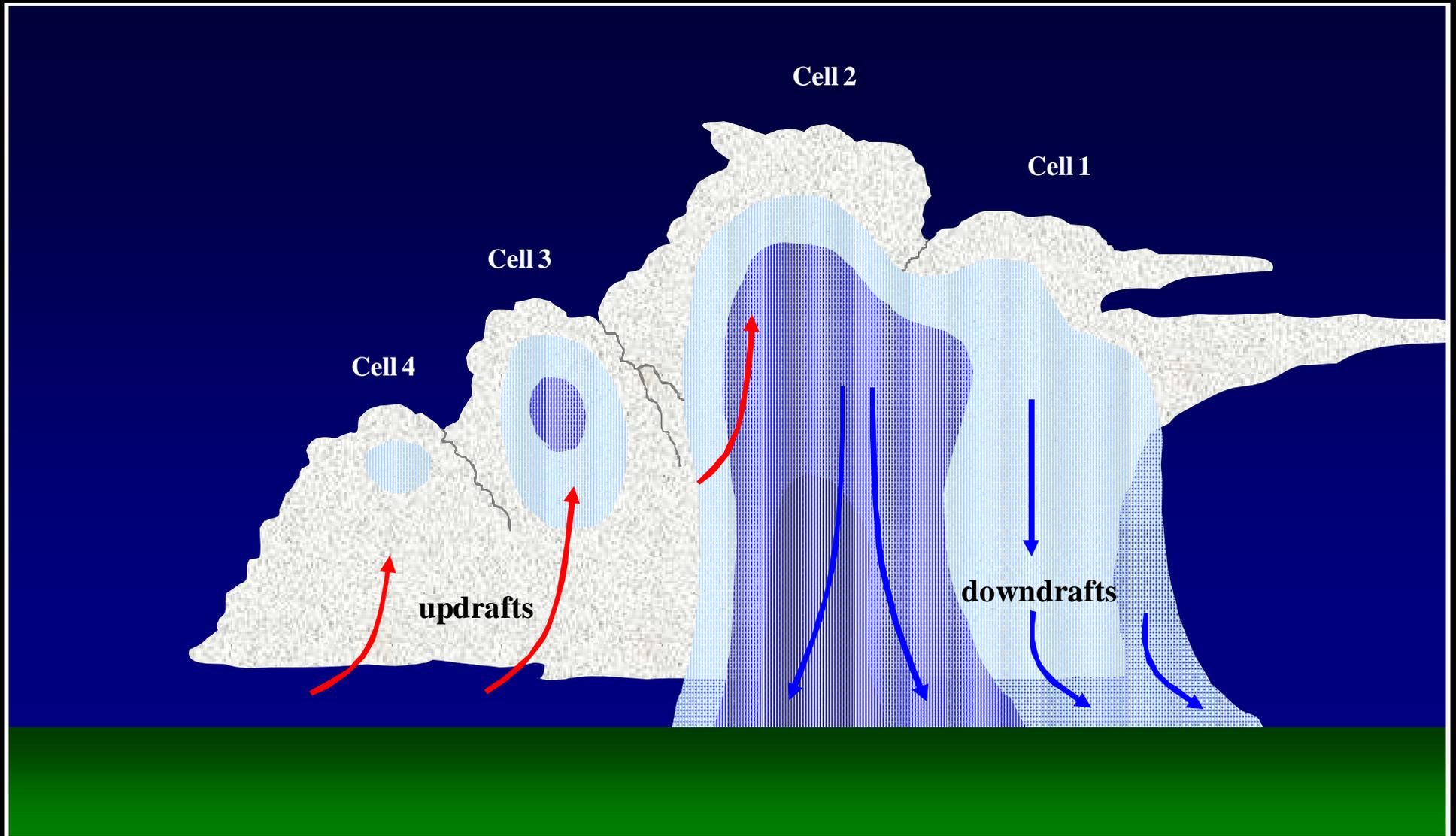
Common Thunderstorm Types

- **Multicell** - ordinary storms with low severe threat
- **Squall line** - line of storms with moderate wind threat
- **Classic Supercell** - rotating updraft with high severe threat
- **Mini Supercell** - small storm with rotating updraft, low wind/hail threat
- **HP (high precipitation) Supercell** - rotating updraft often times obscured by heavy rain, high severe threat
- **LP (low precipitation) Supercell** – rotating updraft with light precipitation area, moderate hail and low tornado threat



Copyright Bob Henson

Multicell Thunderstorm



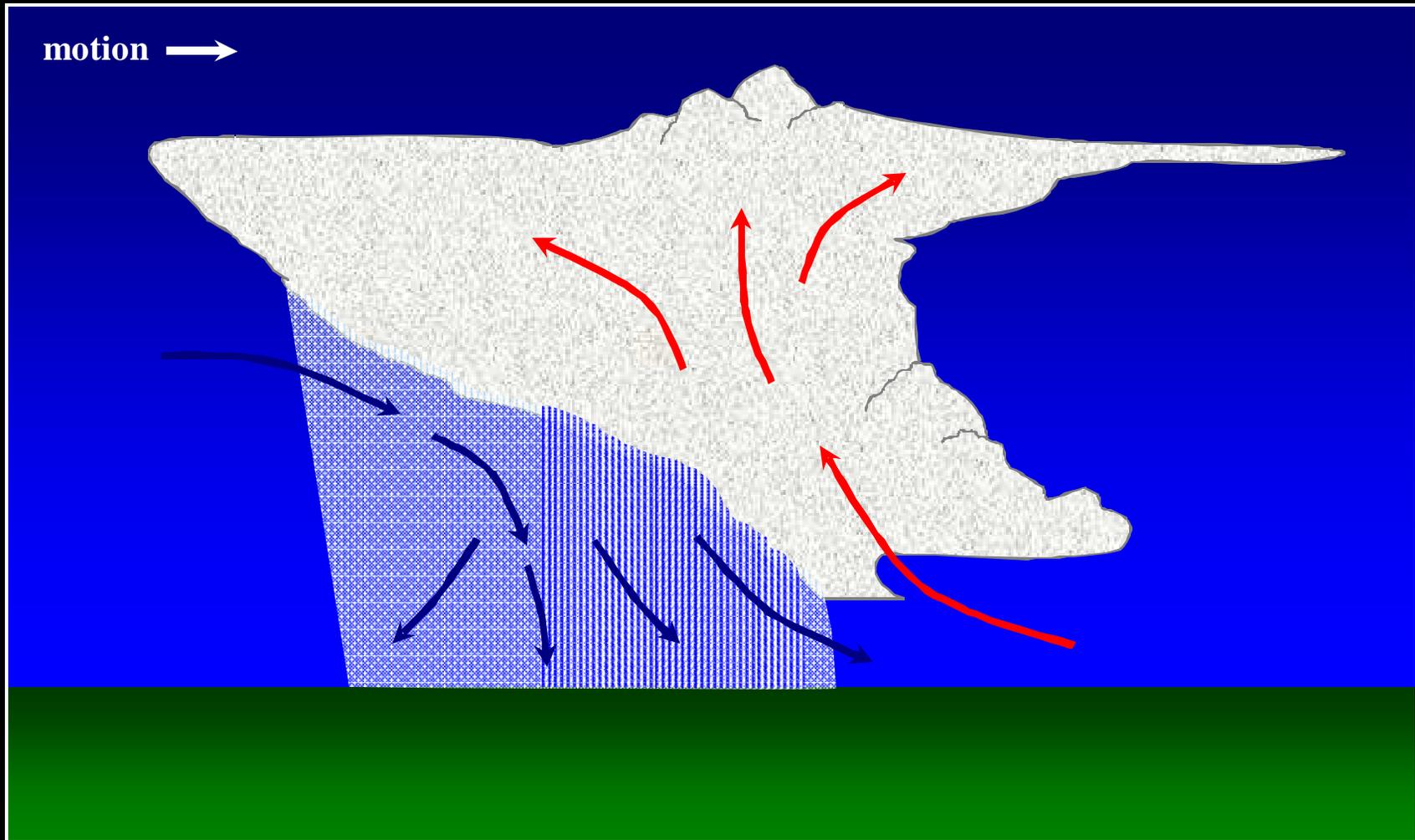
Side view

Multicell Thunderstorm



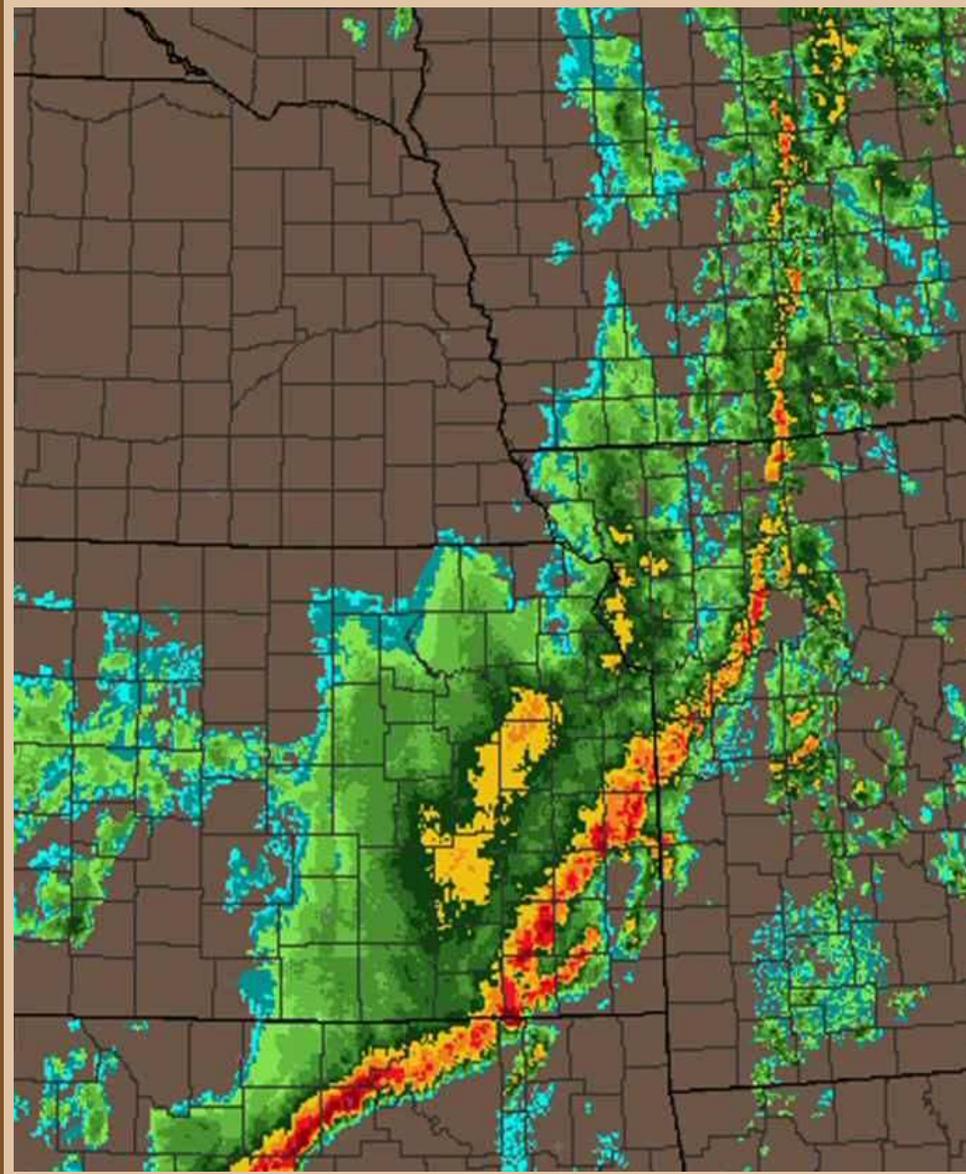
Copyright Alan Switzer

Squall Line



(Cross section)

Squall Line

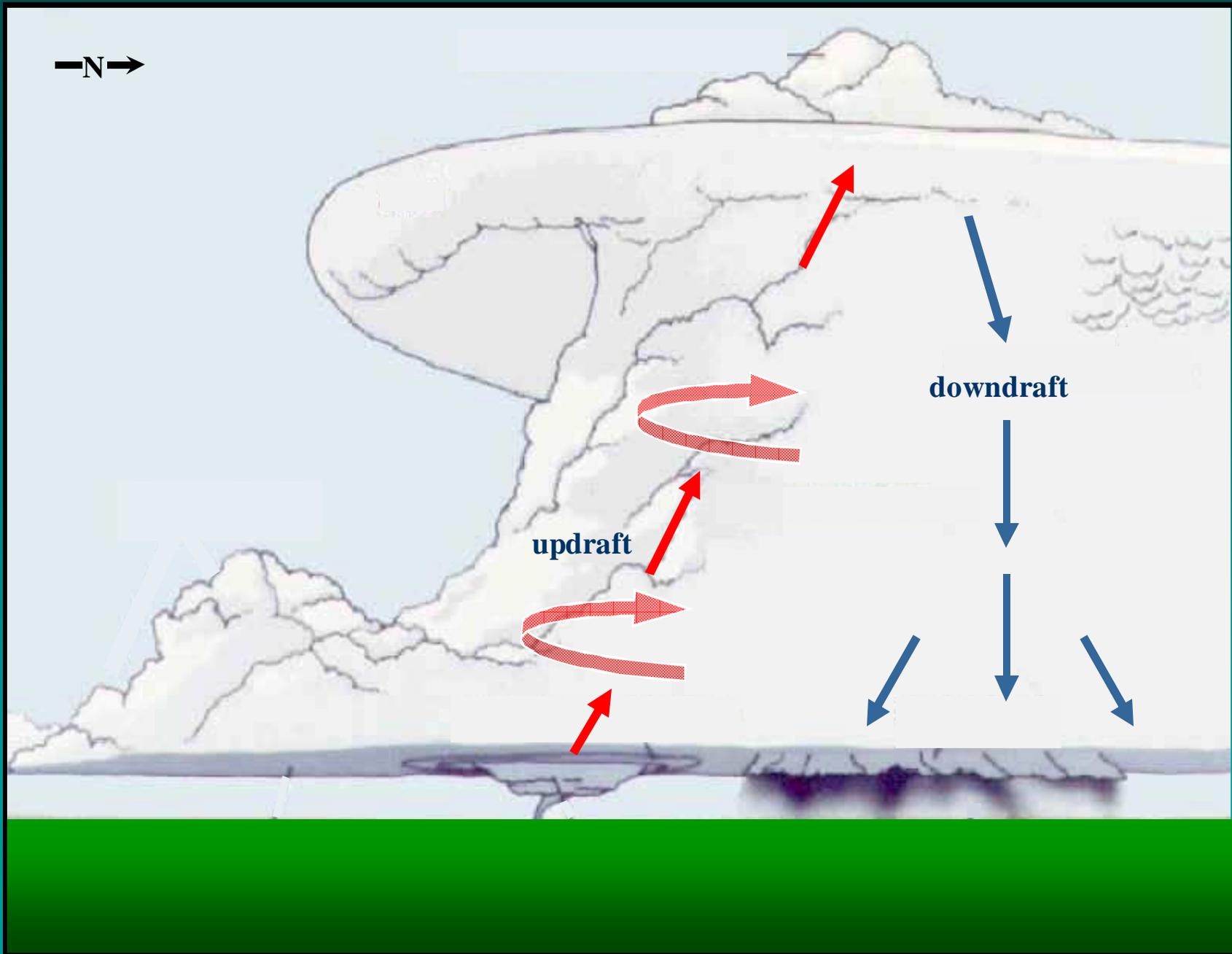


Squall Line

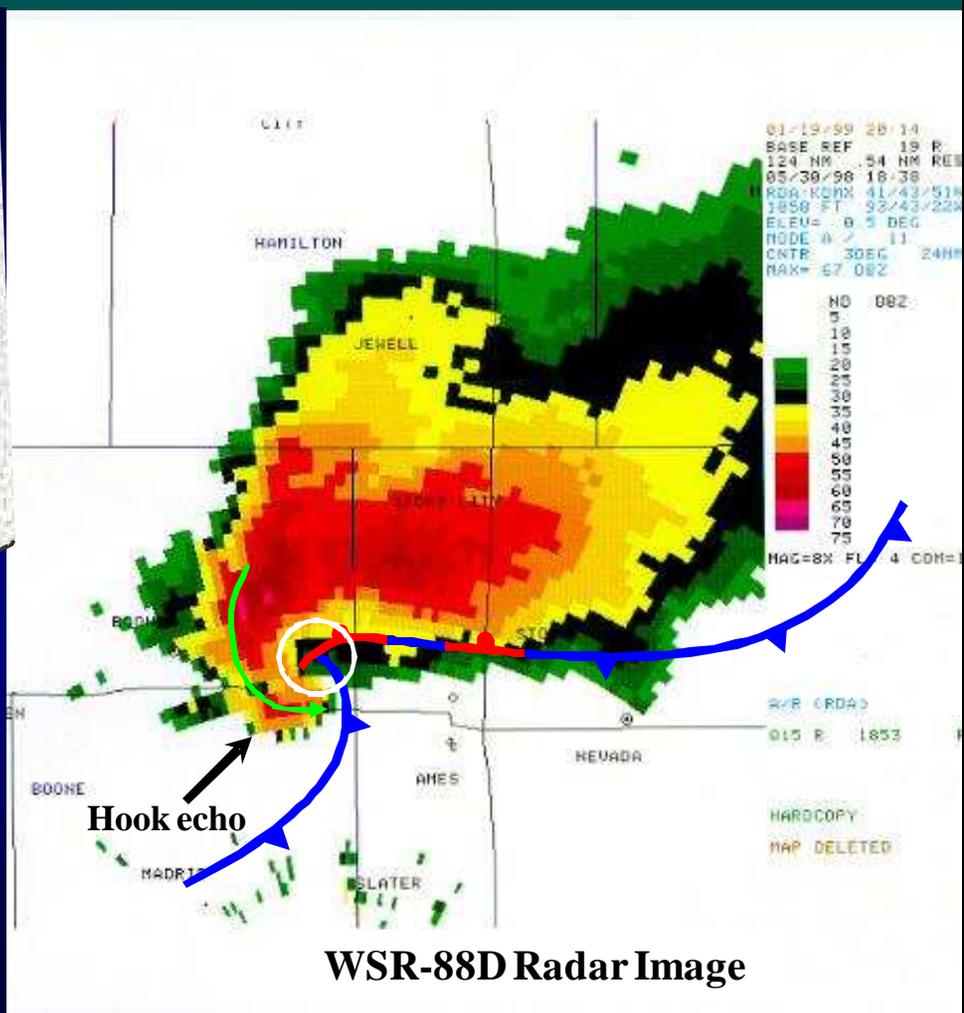
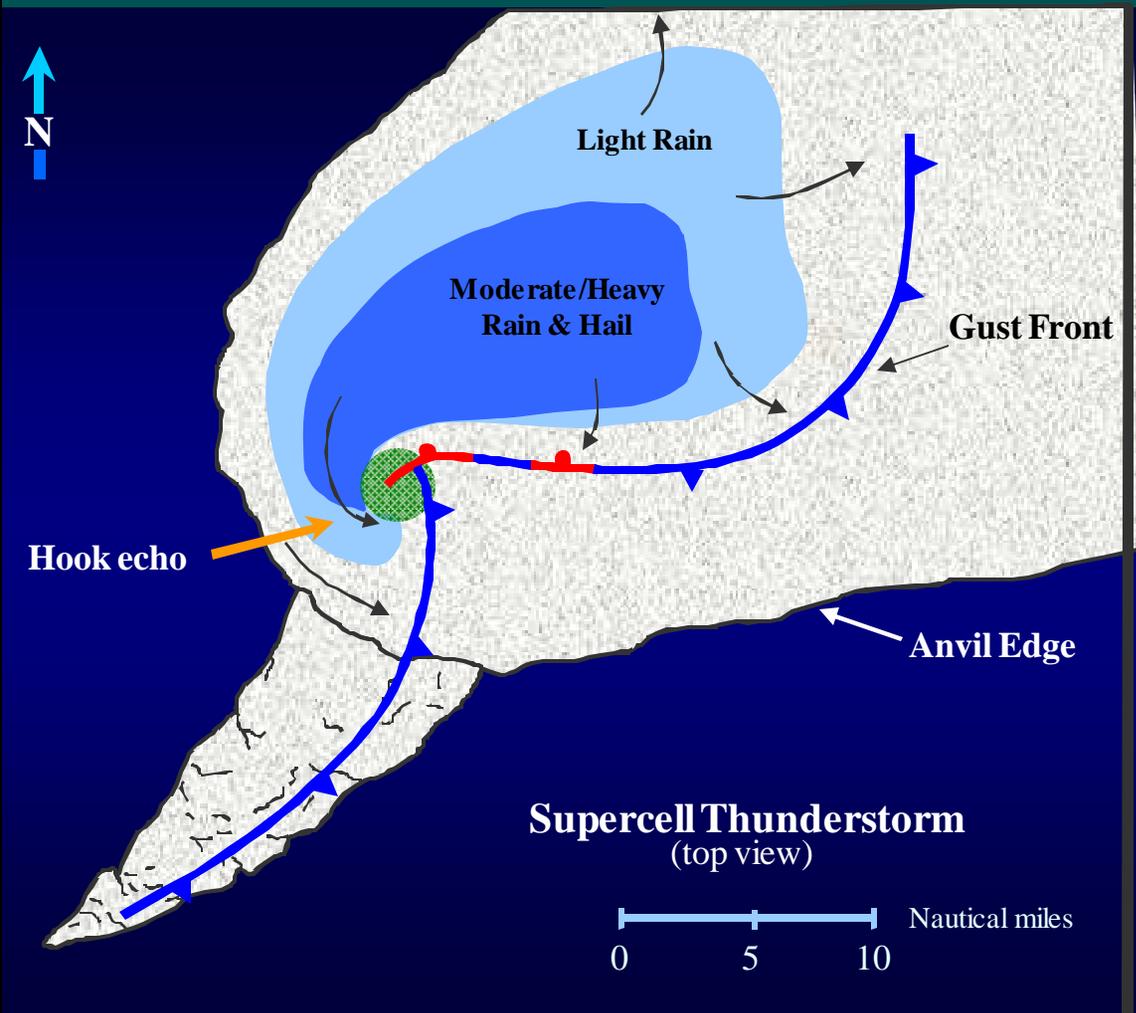


Copyright Jim Bishop

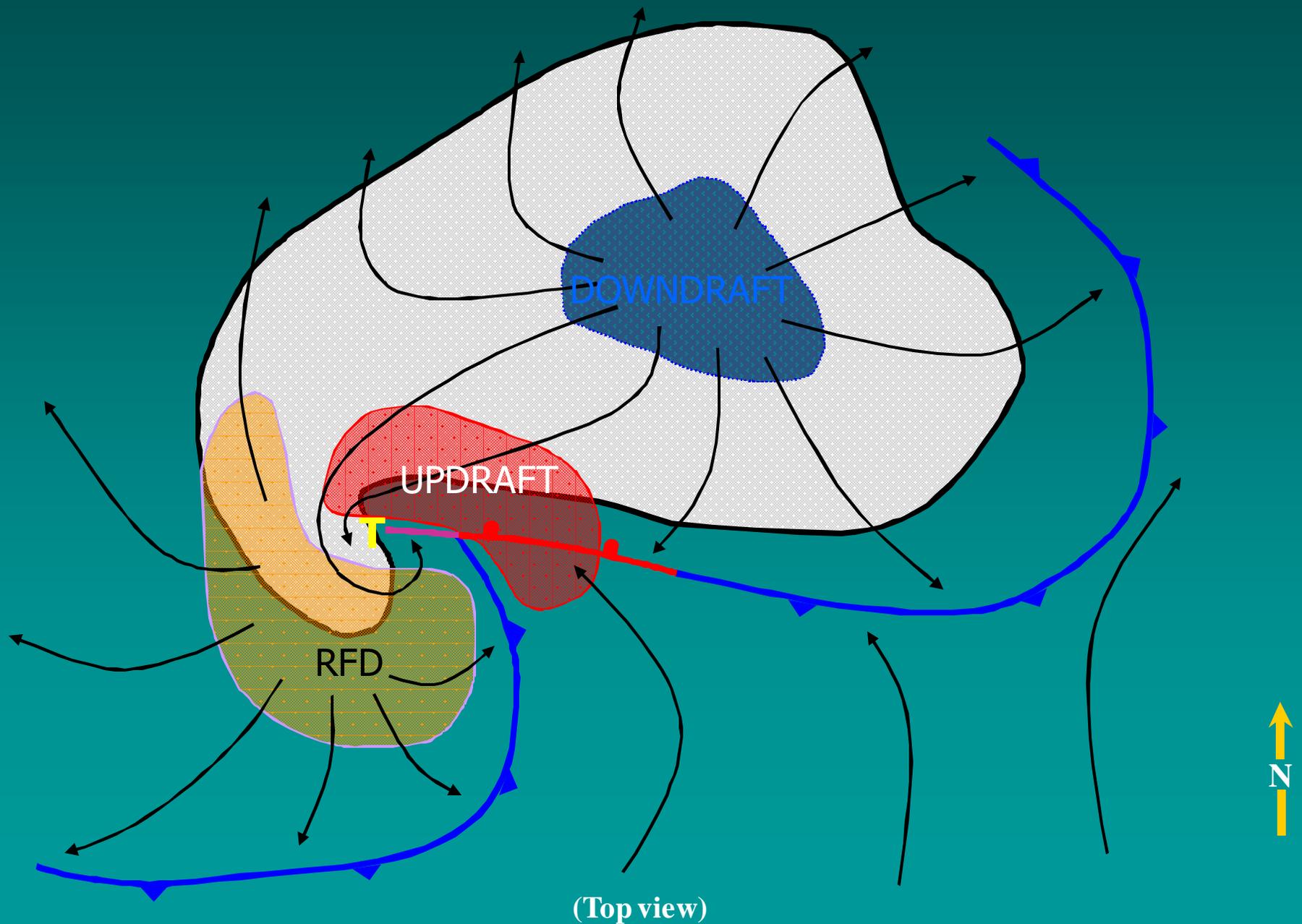
Classic Supercell Thunderstorm



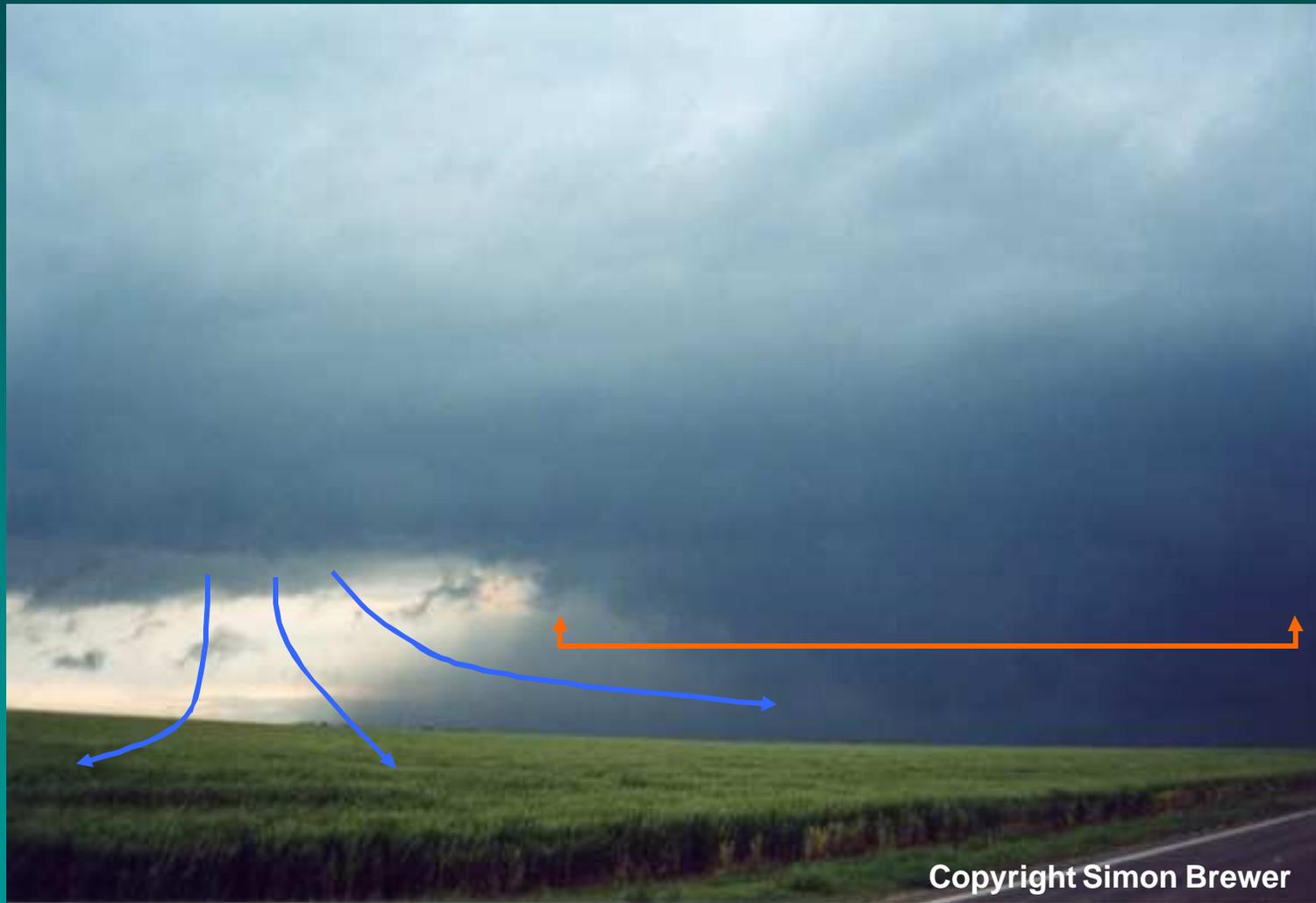
Classic Supercell Thunderstorm



Updraft/Downdraft Tornadogenesis



Rear Flank Downdraft

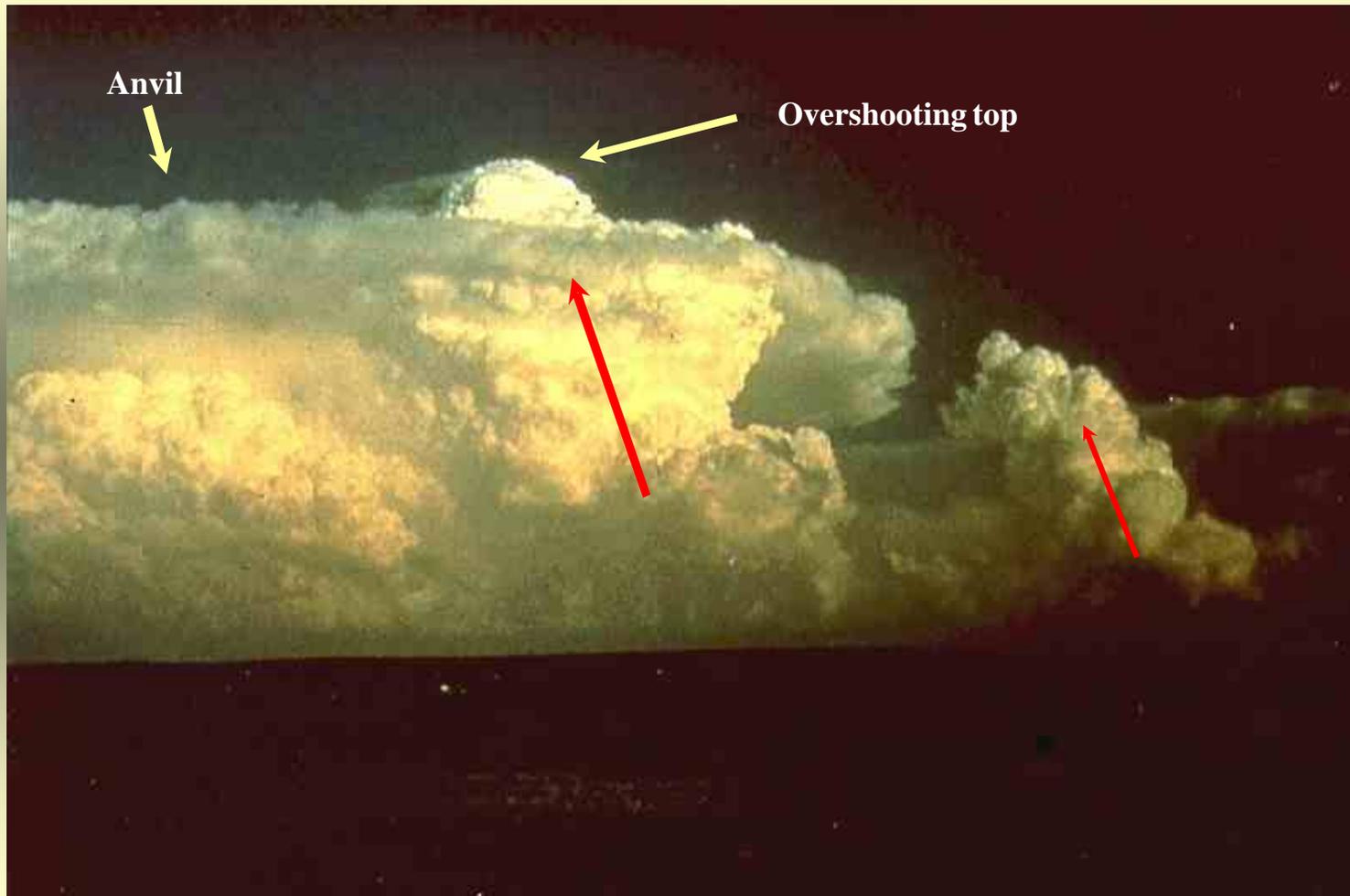


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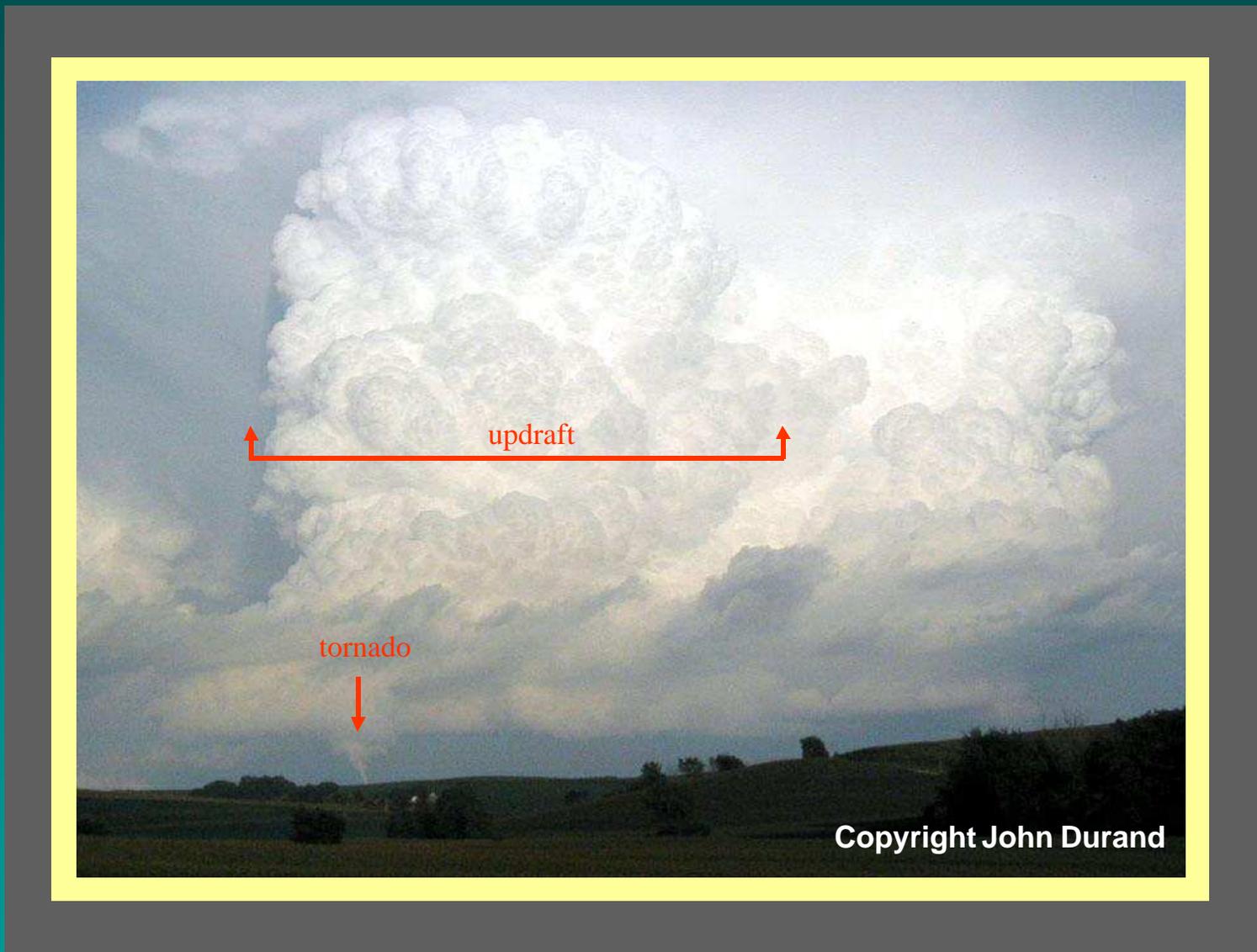
Rear Flank Downdraft



Classic Supercell Thunderstorm



Classic Supercell Thunderstorm

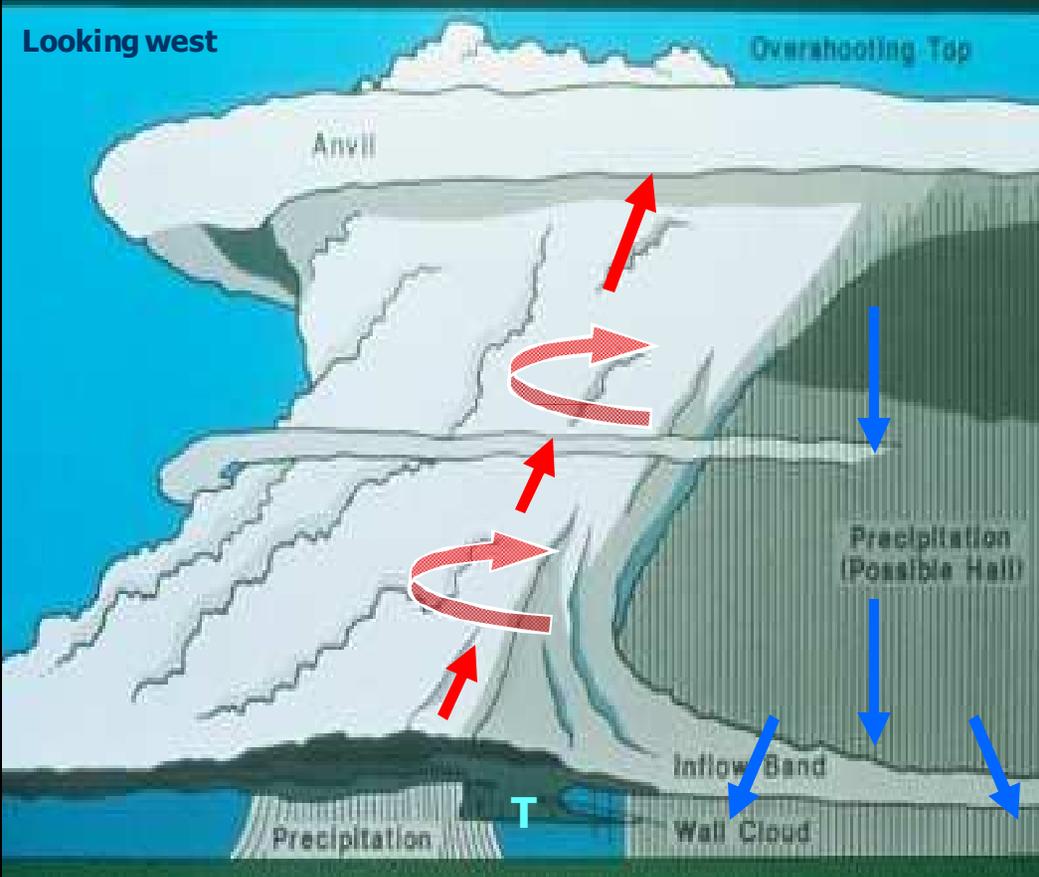


Mini Supercell

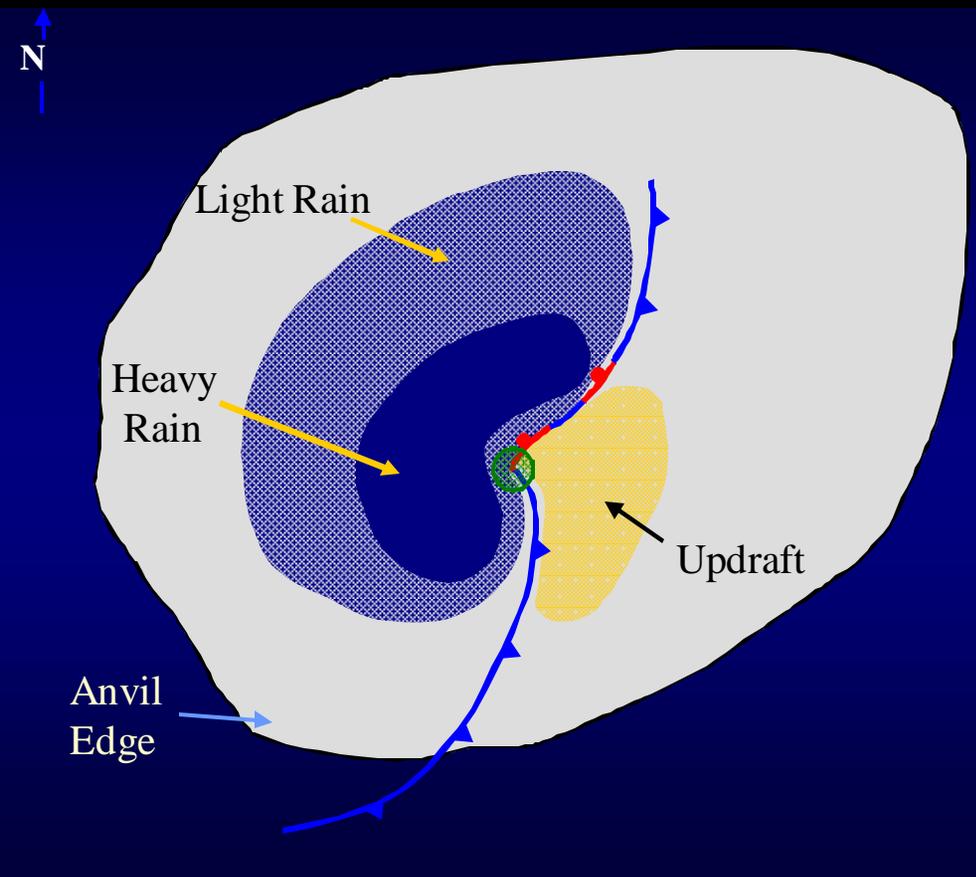


HP Supercell

HEAVY PRECIPITATION SUPERCELL (b)



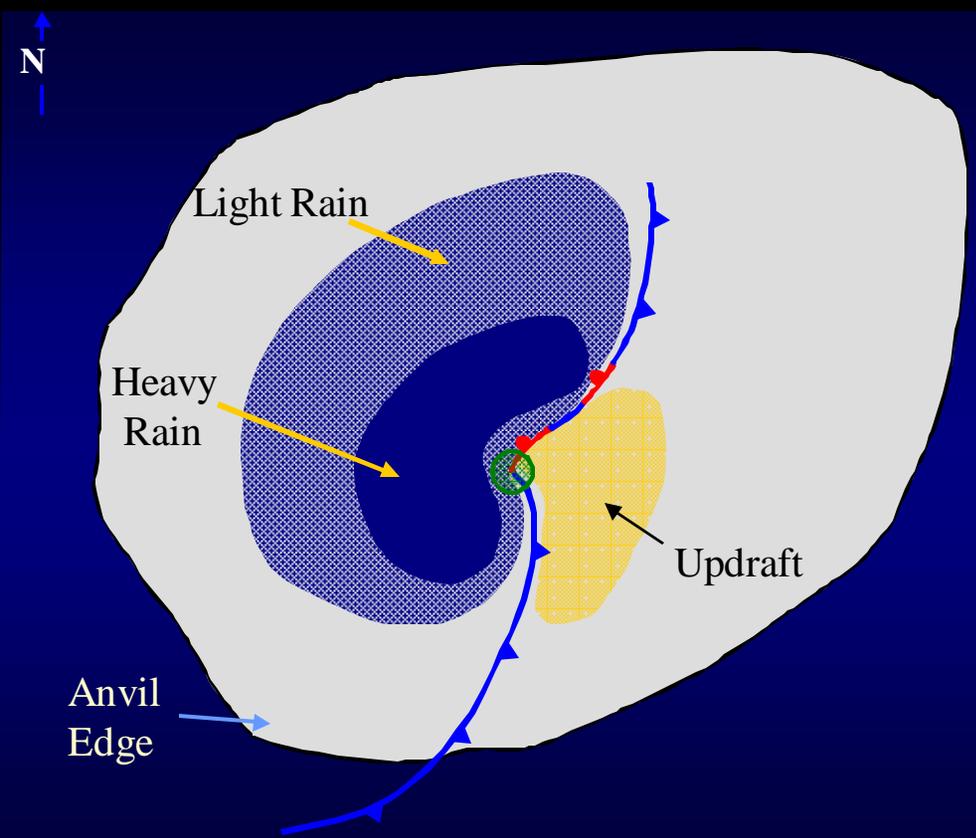
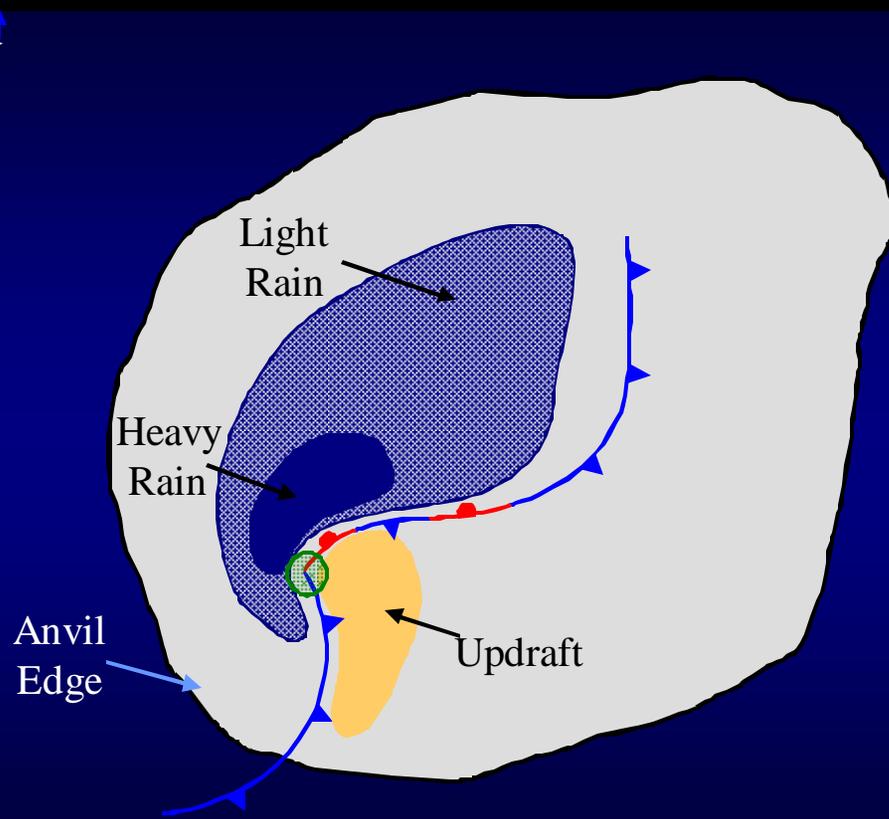
HP Supercell



Classic vs. HP comparison

Classic Supercell

HP Supercell



Top view

Top view

HP Supercell



Copyright Jon Davies

HP Supercell

©2001 Roger Edwards



HP Supercell



Copyright: Tom Matulay

HP Supercell



Copyright Matt Grzych

HP Supercell



Copyright Mike Umscheid

HP Supercell



Copyright Rich Thompson

HP Supercell

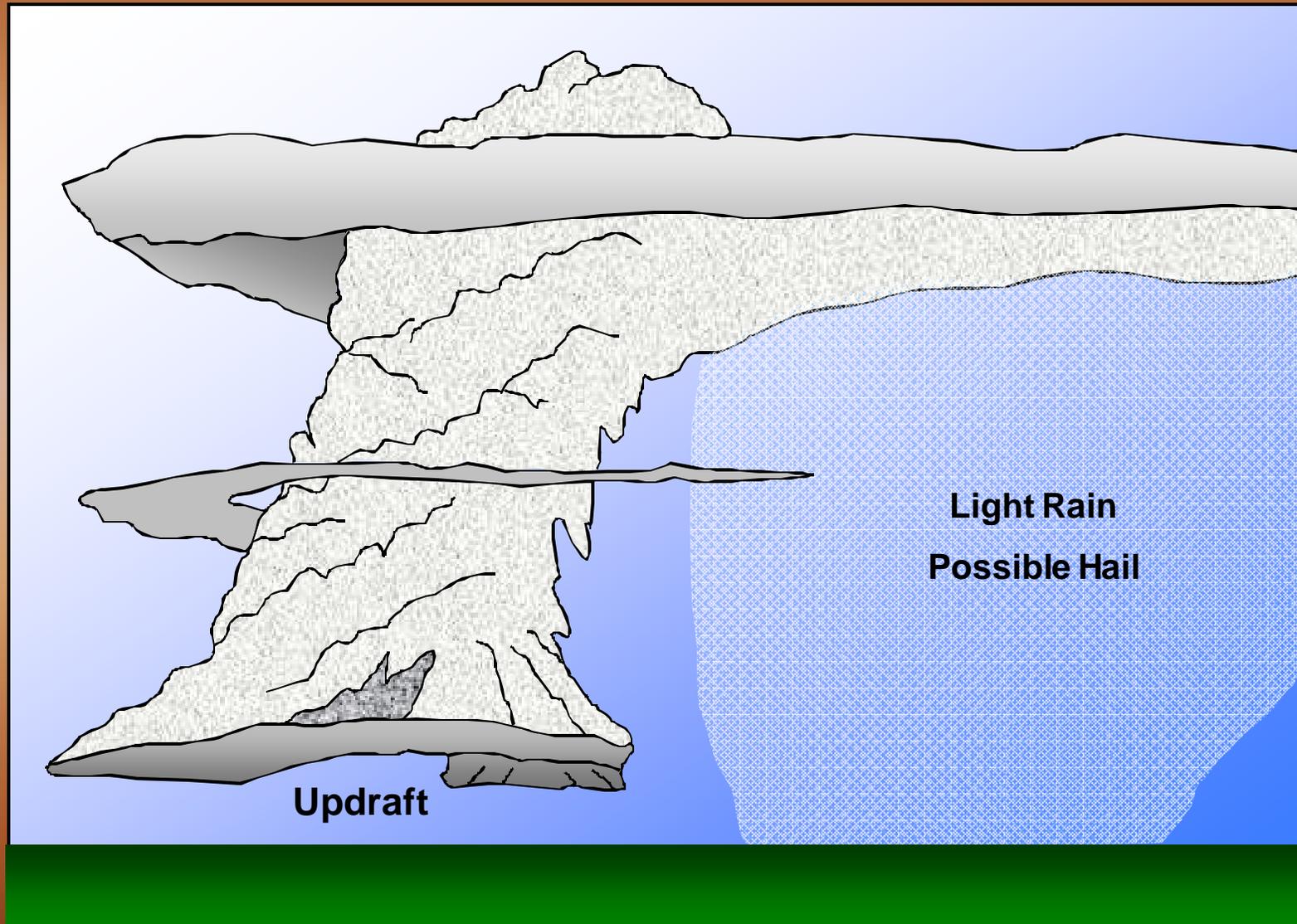


(c) 2001 Kenneth G. McCallister

HP Supercell



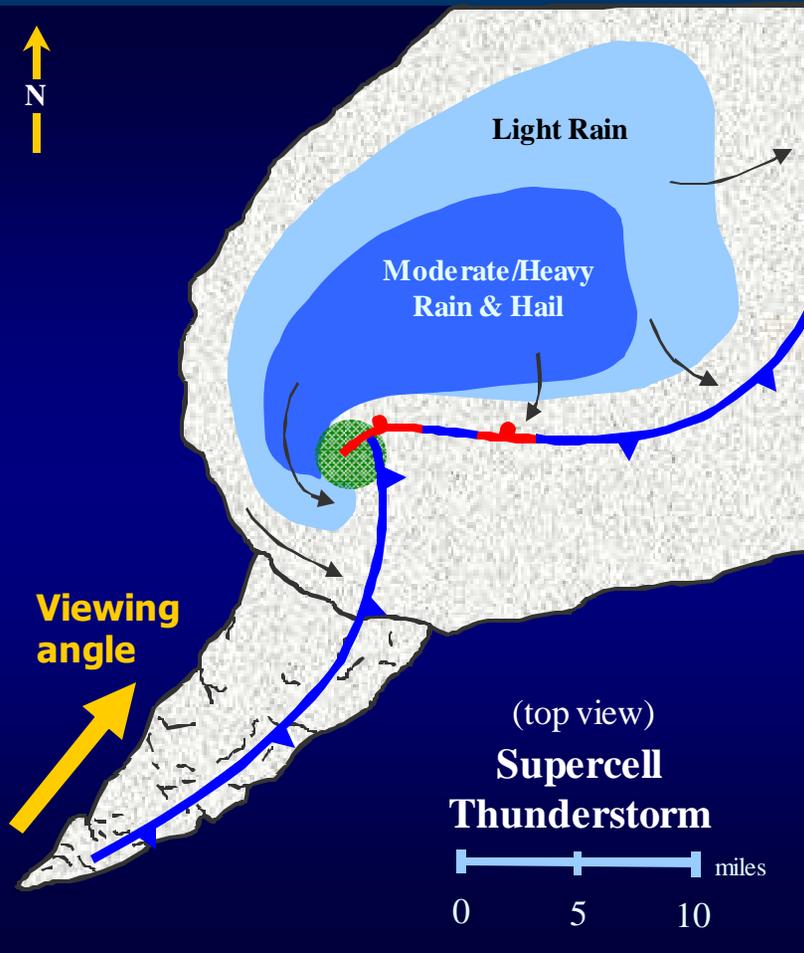
LP Supercell



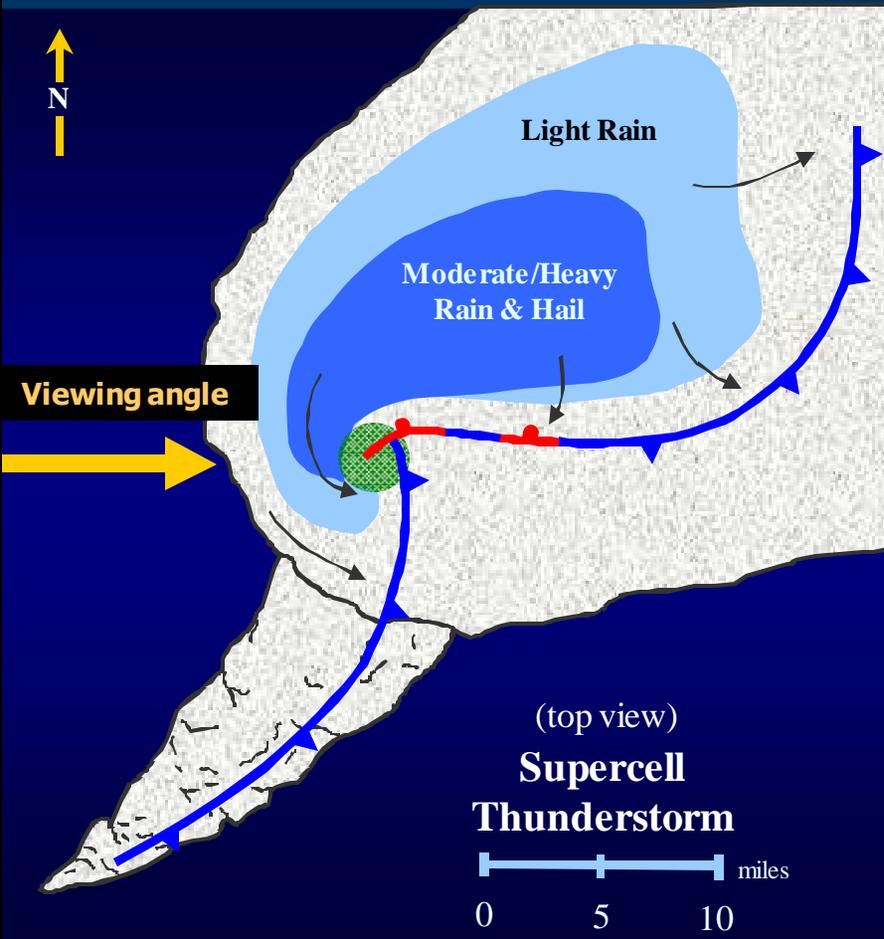
LP Supercell



Spotter Positioning



Spotter Positioning

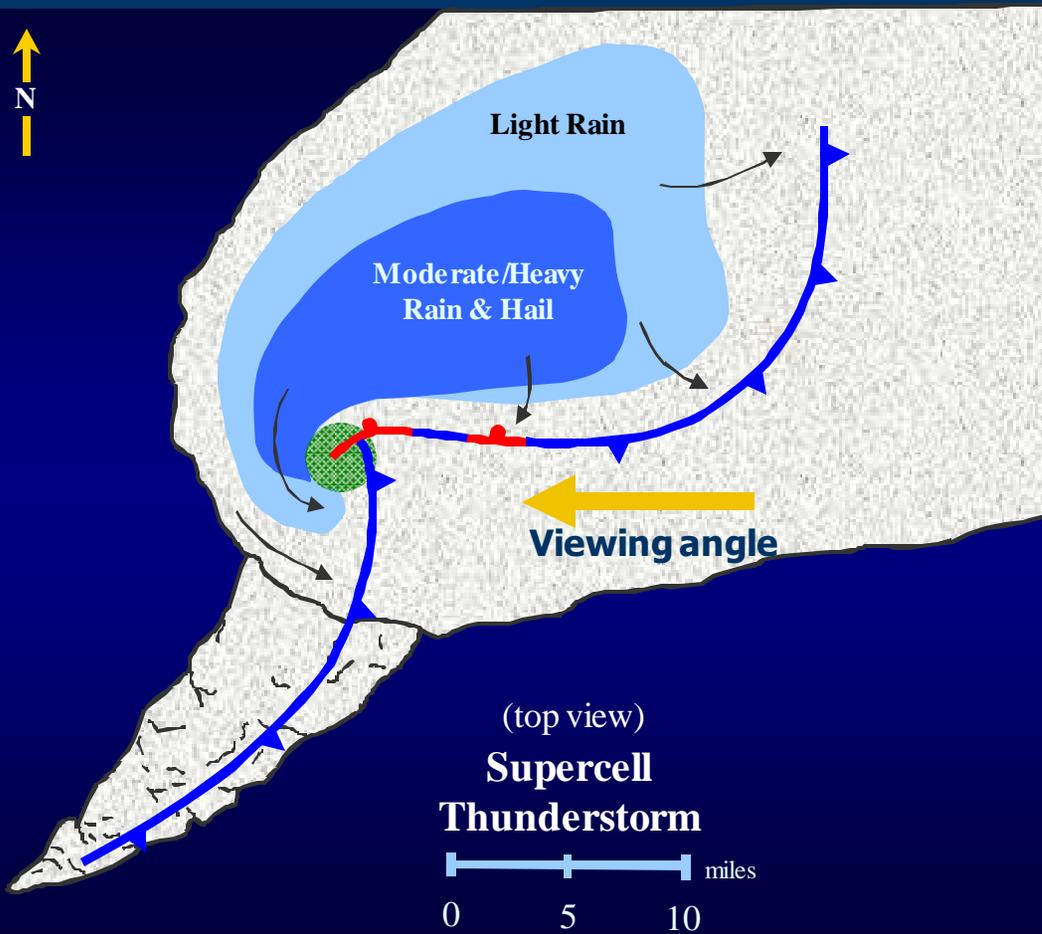


Spotter Positioning



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Spotter Positioning



Spotter Positioning



Spotter Positioning



Updrafts

Downdrafts

Shelf Cloud

Wall Cloud

Funnel Cloud



Rainfree Base

Land spout

Gust Front

Tornado

Gustnado

Updraft Characteristics



- “Back” side of storm
- Cumulus tower
- Rainfree base
- Upward cloud motion
- Supercell has rotating updraft

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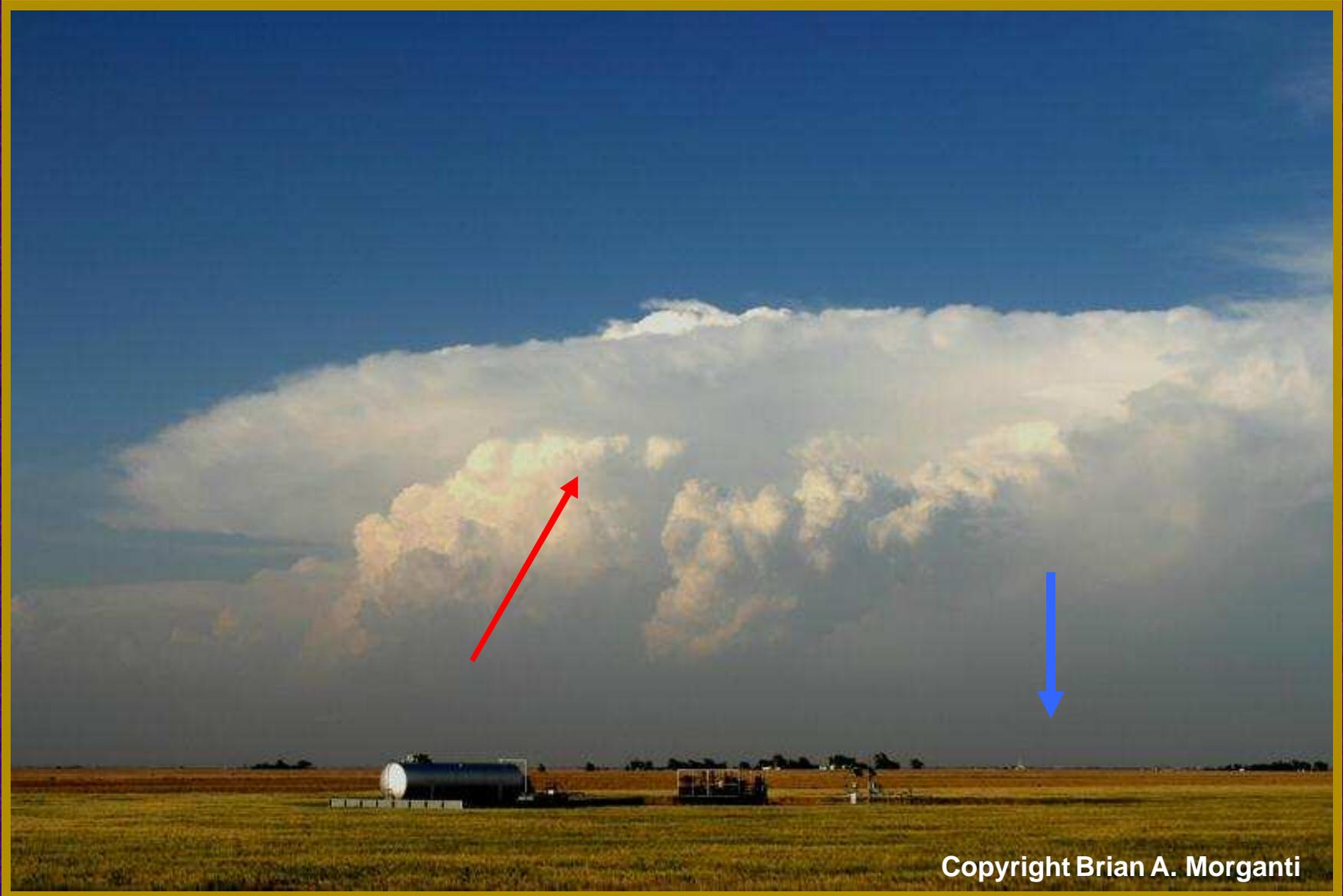
Downdraft Characteristics

- “Front” side of storm
- Dark area of storm
- Rainfall region
- Downward motion
- Downburst/hail threat



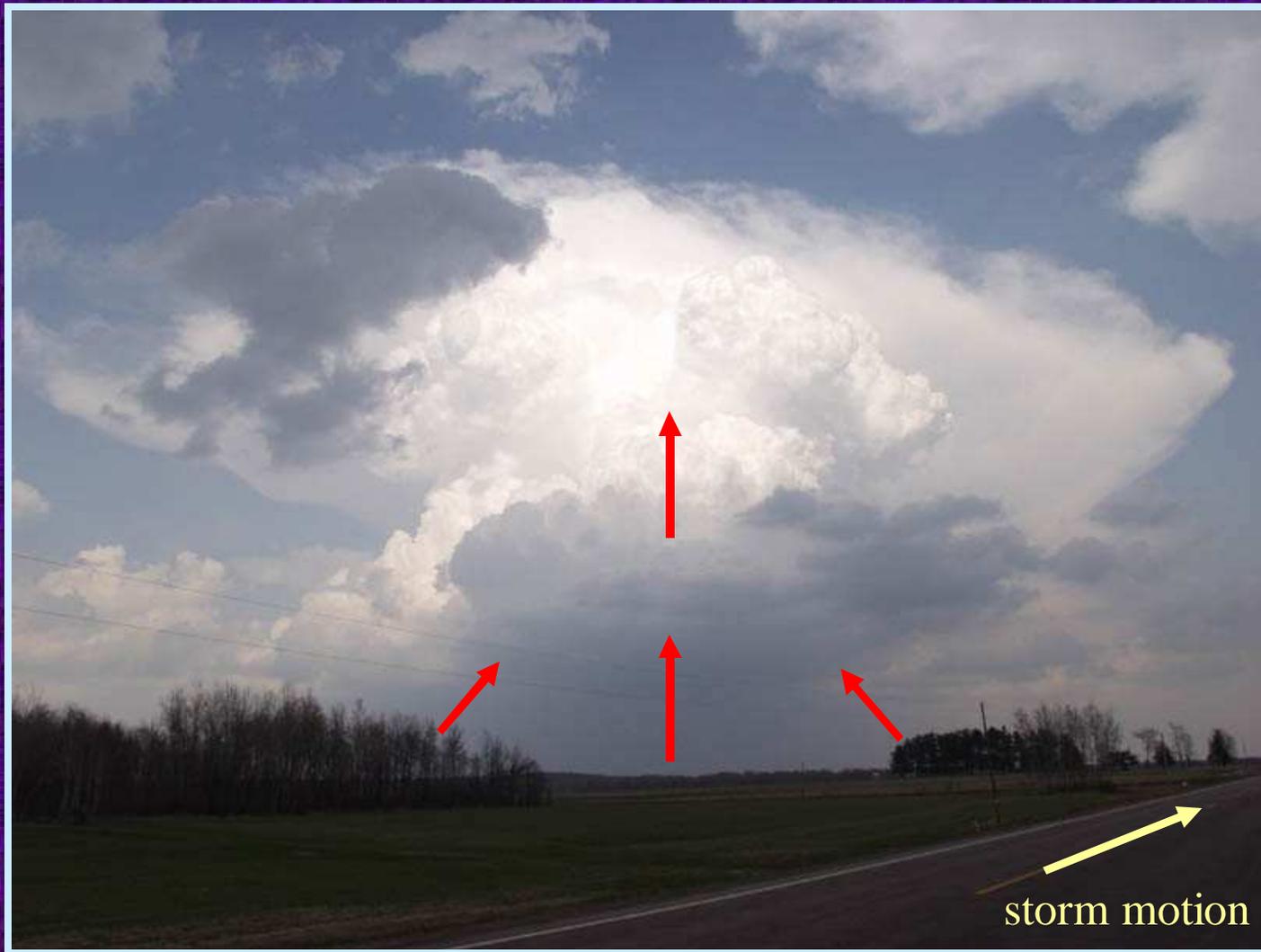
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Updraft/Downdraft



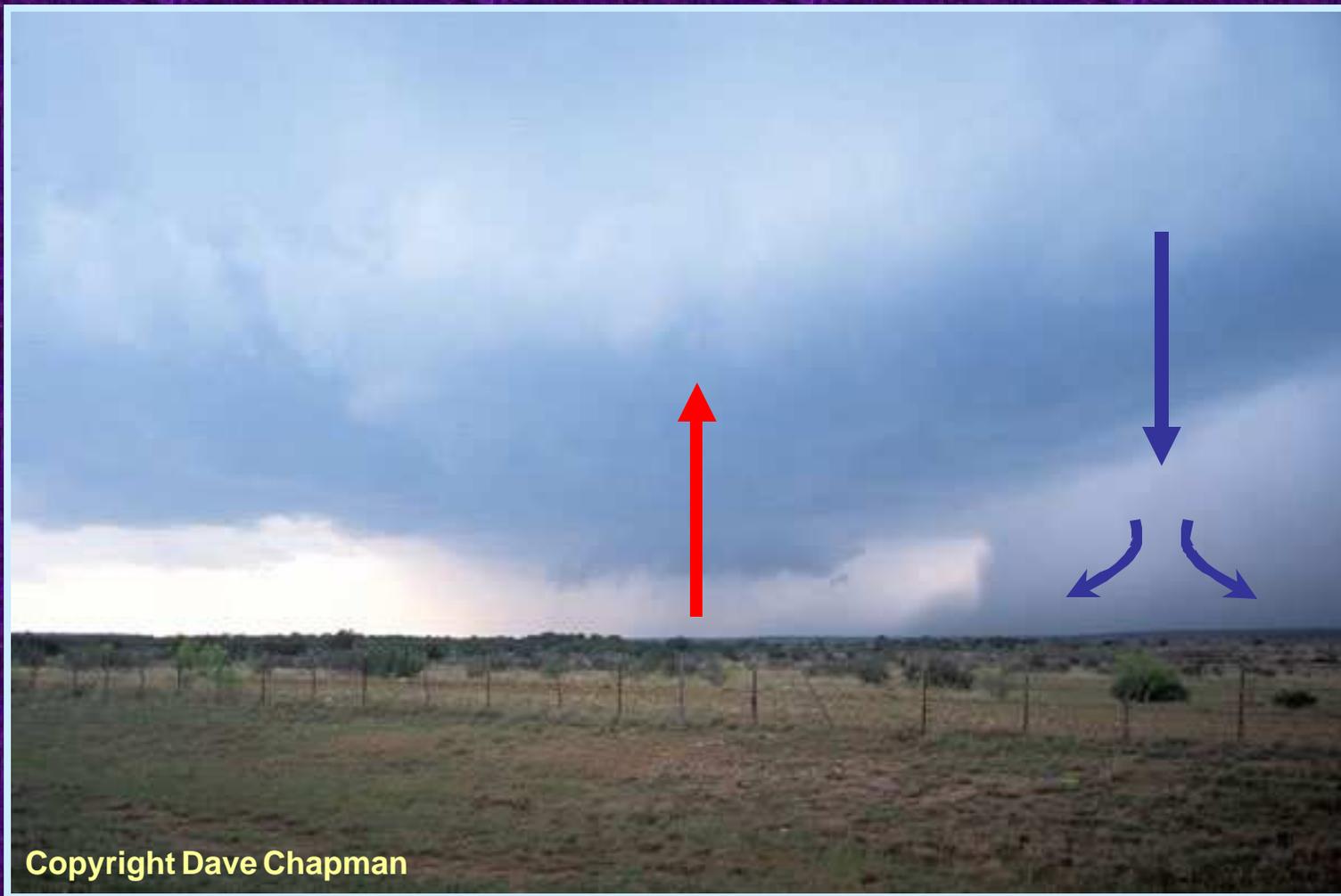
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Updraft/Downdraft





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Upper Level Storm Strength Clues



07/14/2004

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Mid Level Storm Strength Clues

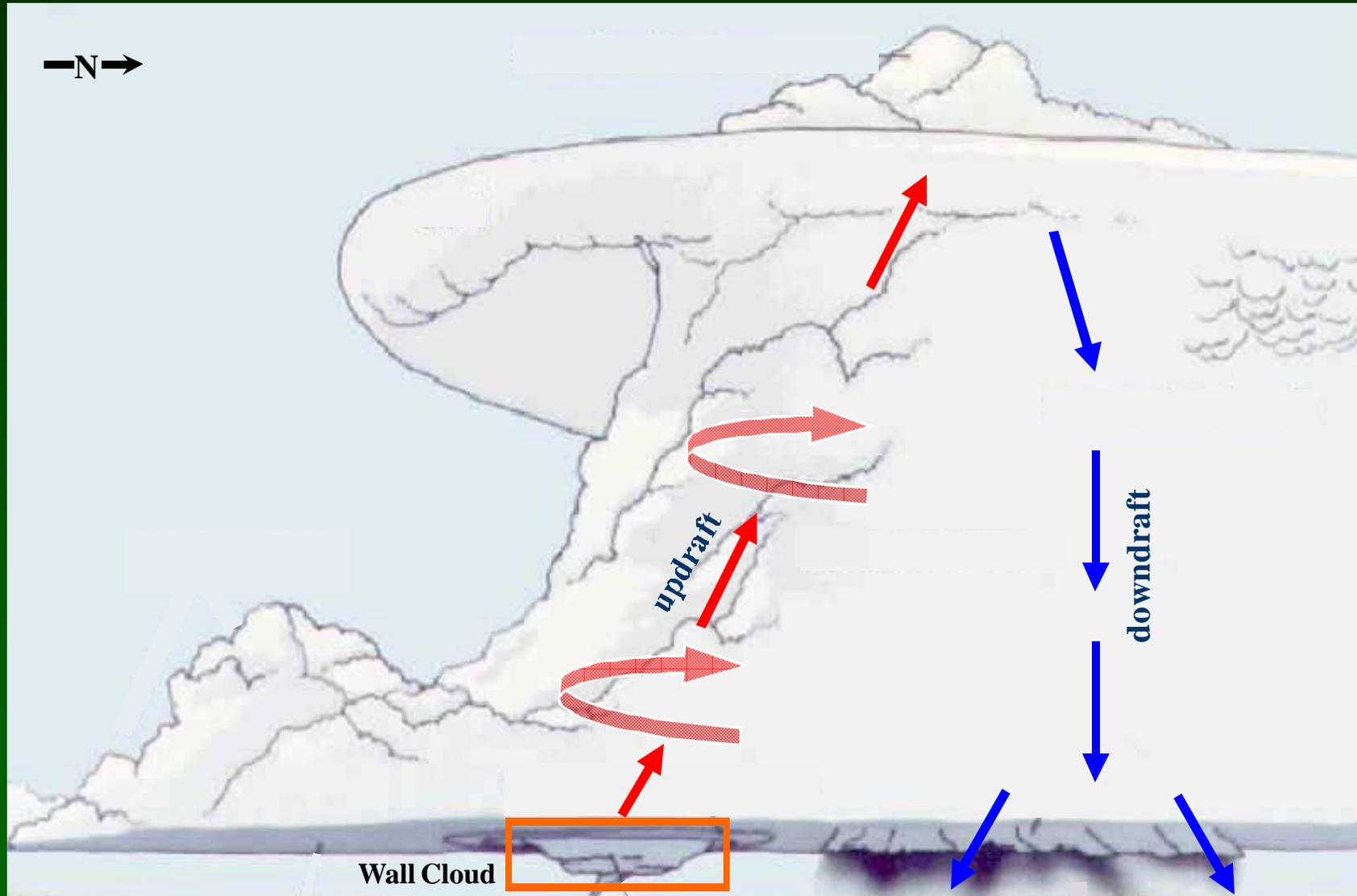


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Wall Clouds



Wall Cloud Characteristics

- > **Surface based inflow under the updraft**
- > **Attached to cloud base**
- > **Look for persistence**
- > **May or may not rotate**
- > **Look for vertical cloud motion**
- > **Often slopes or points toward precipitation or downdraft**

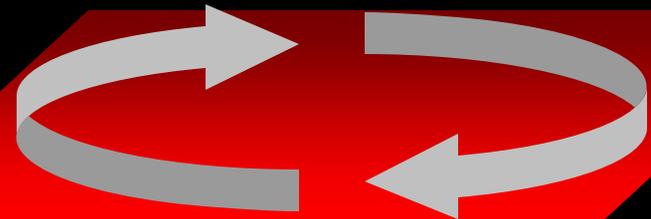


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Shear vs. Rotation



Shear



Rotation

Wall Cloud Development



1a.



1b.



1c.

Copyright Alan Switzer



2a.

Copyright Alan Moller



2b.

Copyright Alan Moller

Wall Cloud



Copyright Michael D. Peregrine

Wall Cloud



Wall Cloud



Copyright Jeff Wallenfang

Wall Cloud



Copyright Lisa Downing

Wall Cloud



Wall Cloud



Wall Cloud



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Wall Cloud



Copyright Chris Gullikson

Wall Cloud



Copyright Andy Kula

Wall Cloud



Copyright Steve Miller

Funnel Clouds

- > A **rotating**, funnel-shaped cloud extending downward from a thunderstorm base.
- > Usually located near updraft but can be found anywhere
- > **Attached** to cloud base
- > Exhibit rapid rotation and are most often laminar or smooth in appearance
- > **Do not** reach ground





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Tornado

A violently **rotating** column of air extending from **cloud base** to the **ground**.



Copyright Eric O'Connor



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Funnel Cloud



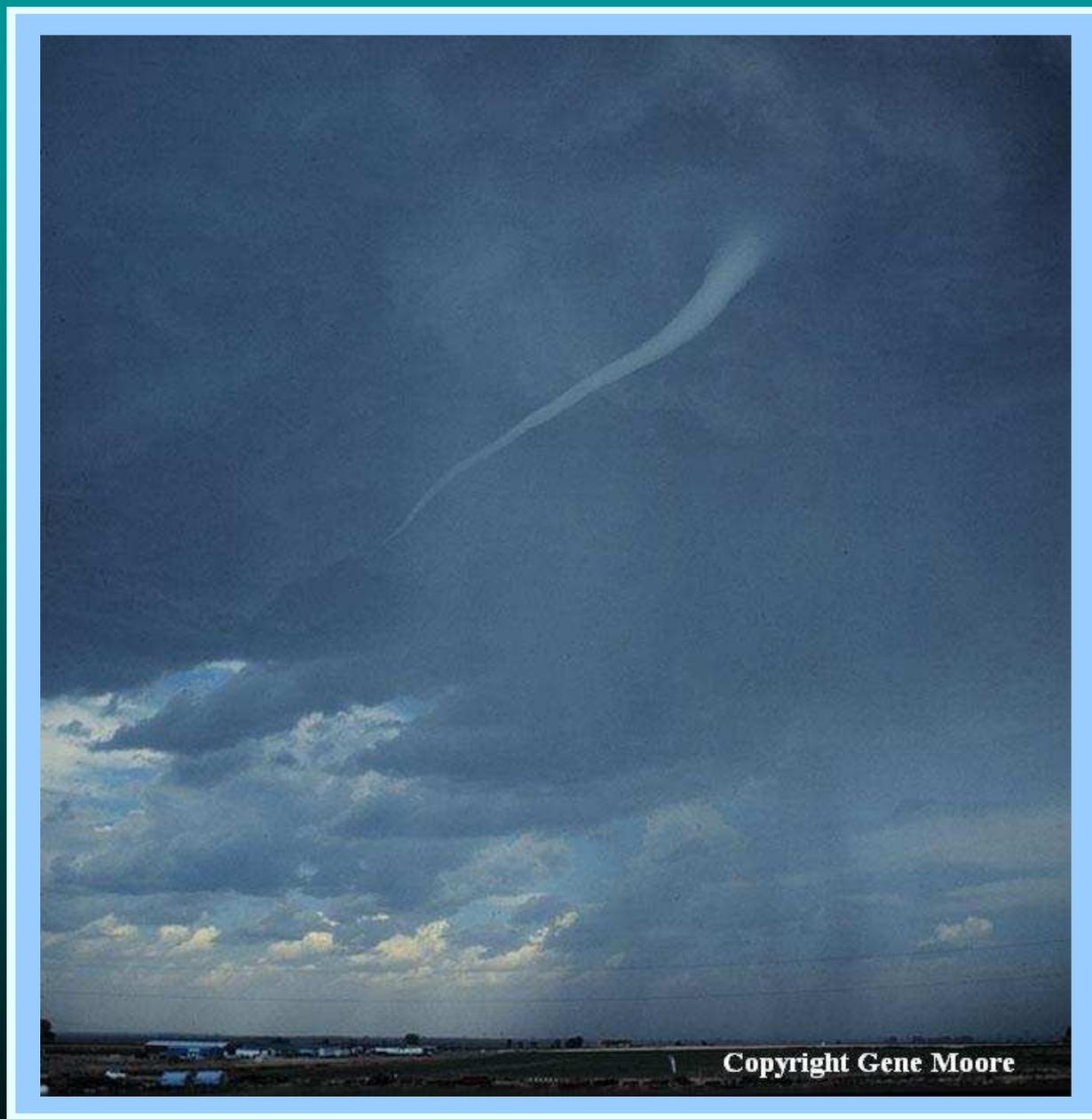
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Funnel Cloud



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Funnel Cloud



Copyright Gene Moore

Tornado



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Funnel Cloud or Tornado



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Tornado



Courtesy NSSL

Funnel Cloud/Tornado



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Tornado

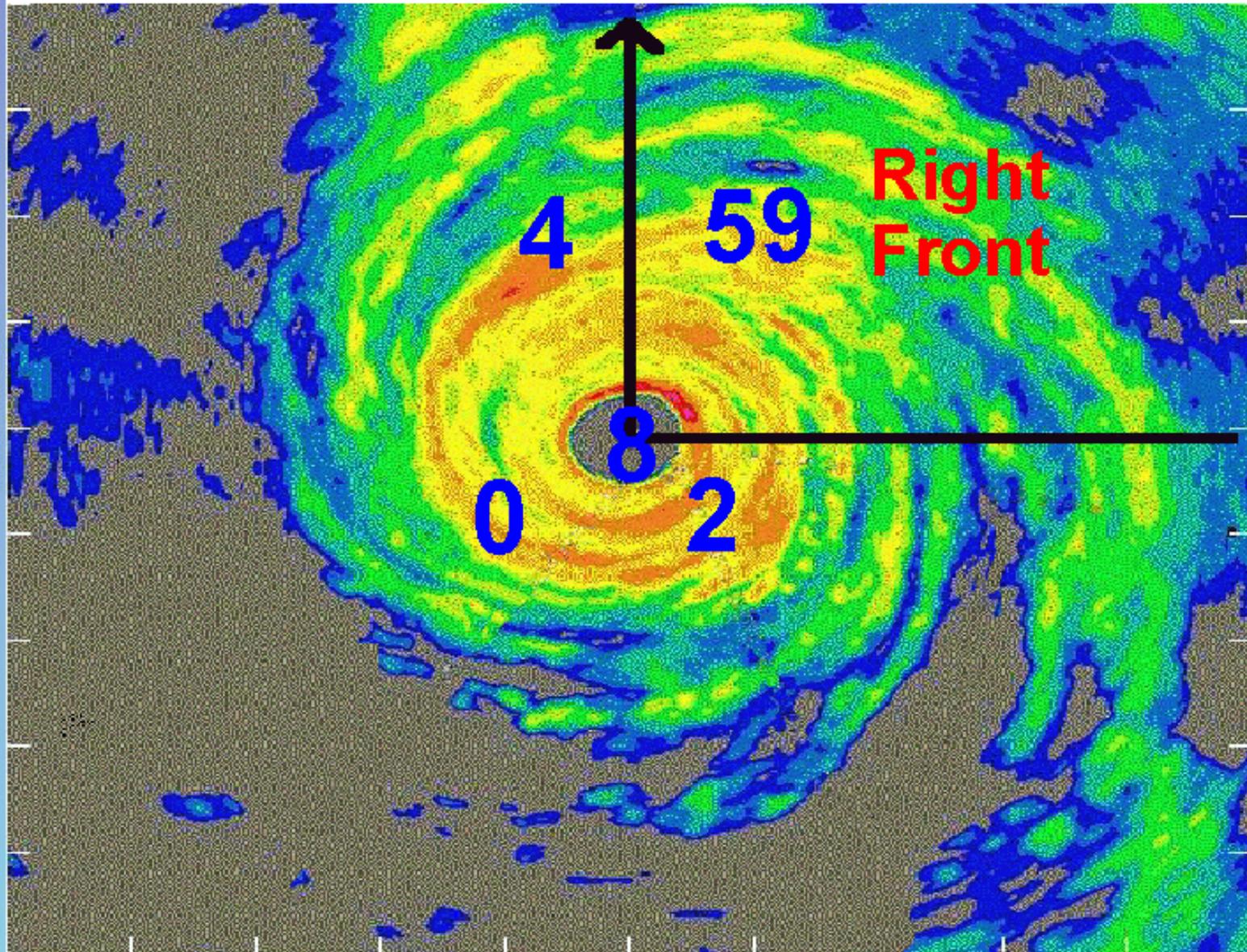


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Tropical Cyclones and Tornadoes

- Tropical Cyclones often create an environment for tornadoes.
- Ample moisture and instability.
- Favorable vertical wind shears produce mesocyclones.
- Especially favorable front right side of cyclone.

Location of Tornadoes Relative to Cyclone Center With Respect to Cyclone Motion (1882-1999)





Ivan Tornadoes



Tornadic Waterspout

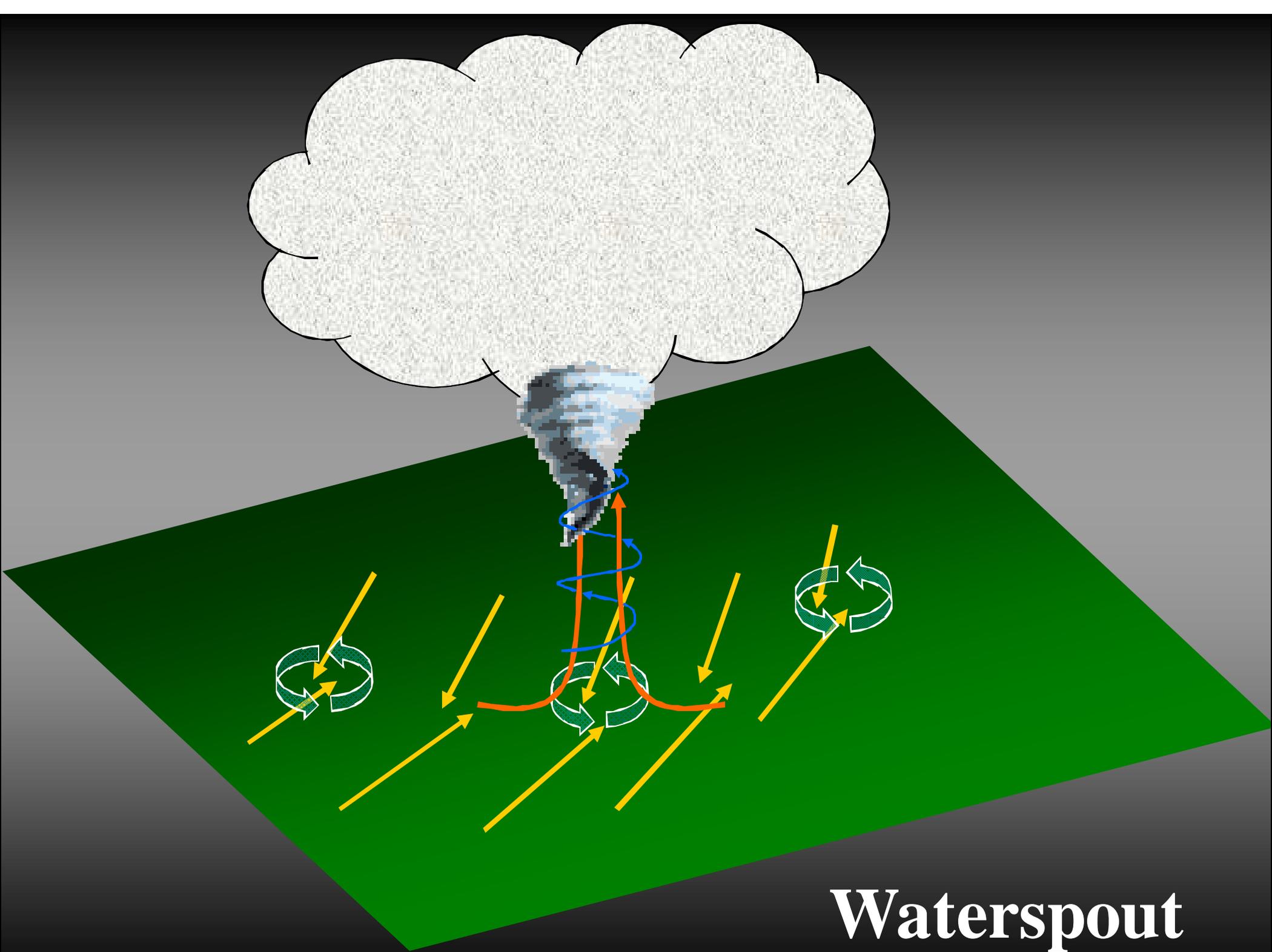
- A tornado that happens to be over water.
- Stronger than common waterspouts.
- Can be destructive and deadly when they move on-shore as tornadoes.



Common Waterspouts

- Can form in many areas of the thunderstorm or in cumulus clouds
- Not associated with a larger scale rotation (i.e. mesocyclone) in the thunderstorm
- Connected to cloud base
- Form along horizontal shear areas
- Can be very persistent and destructive, usually slow moving



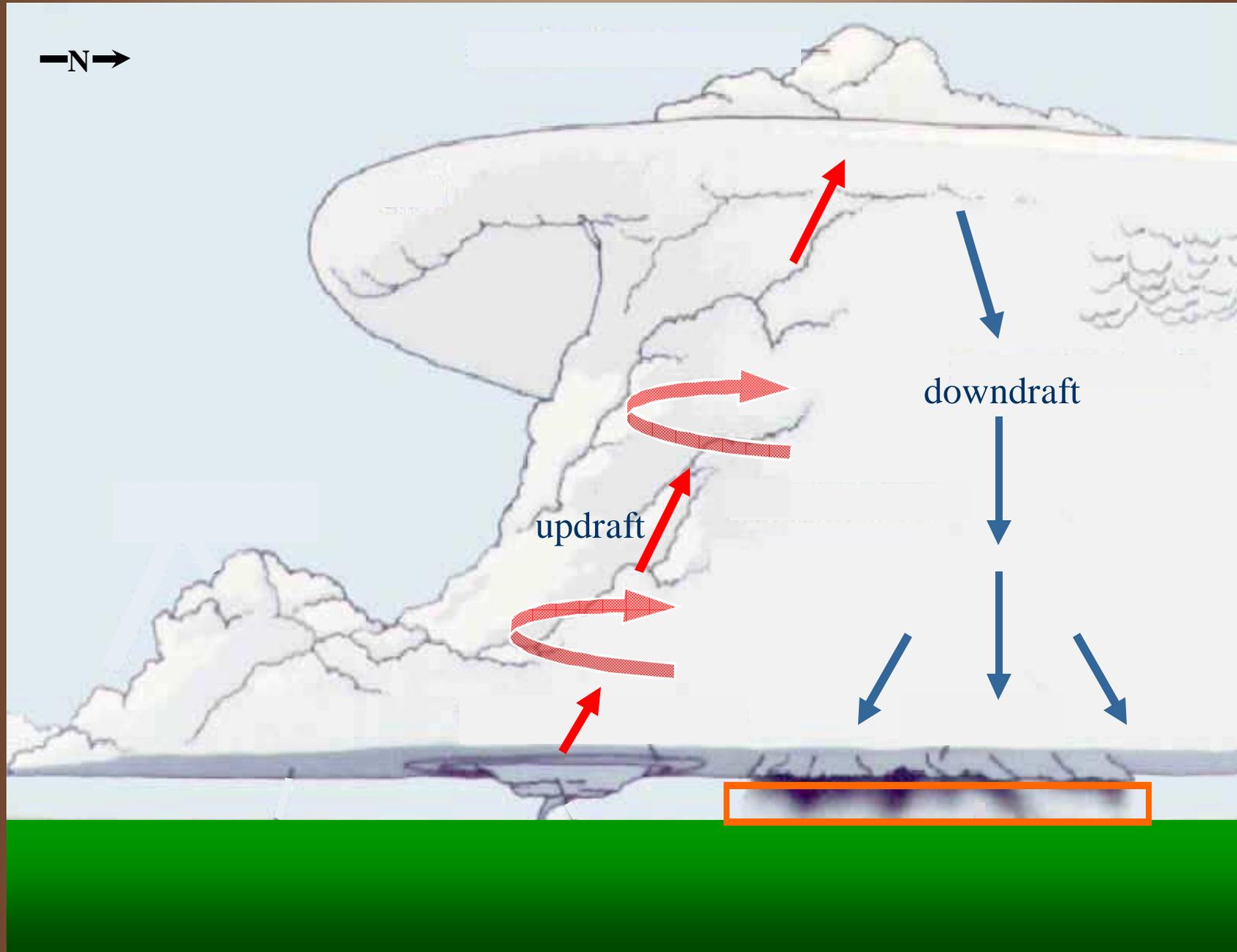


Waterspout

Land Spout



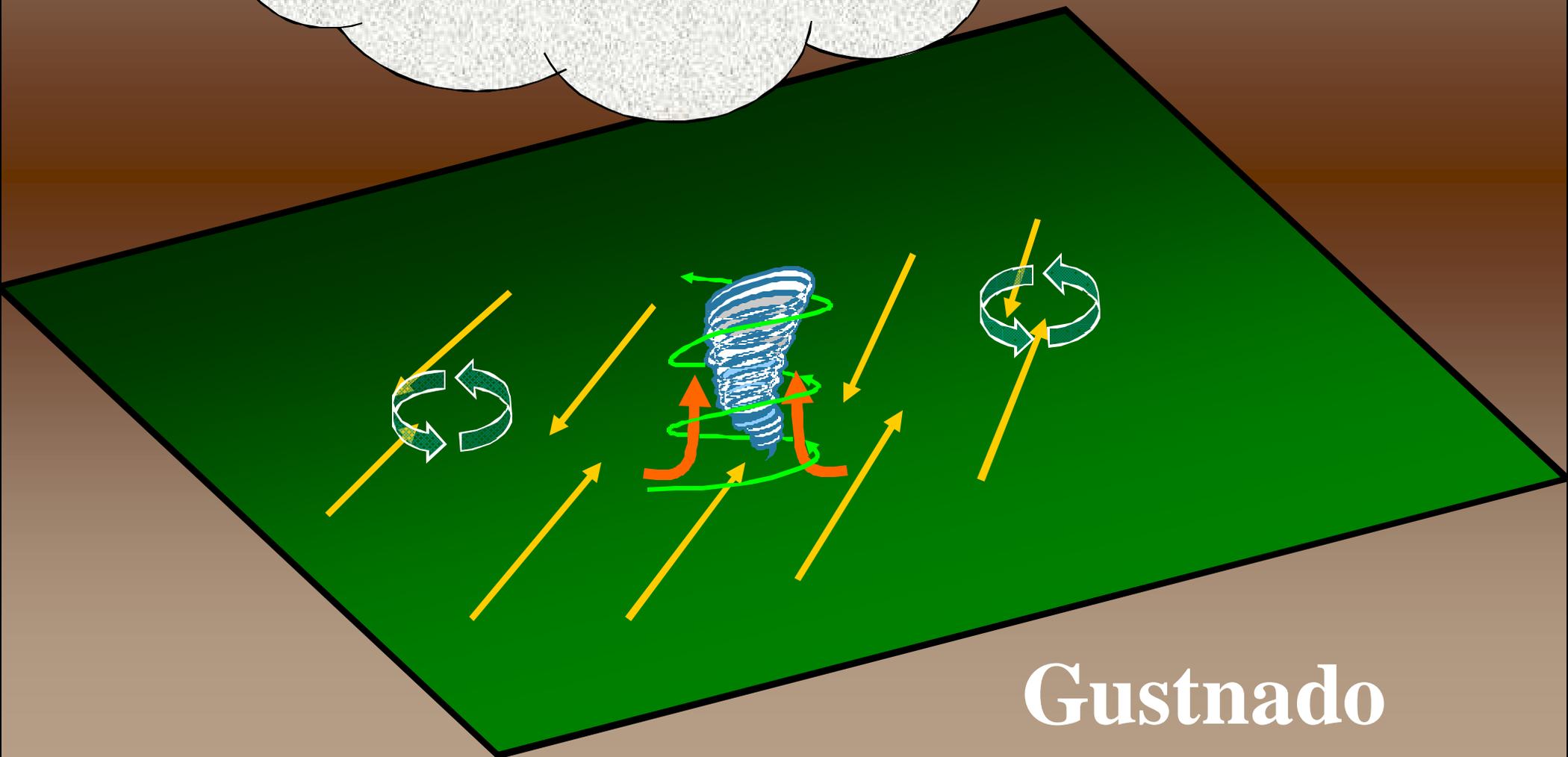
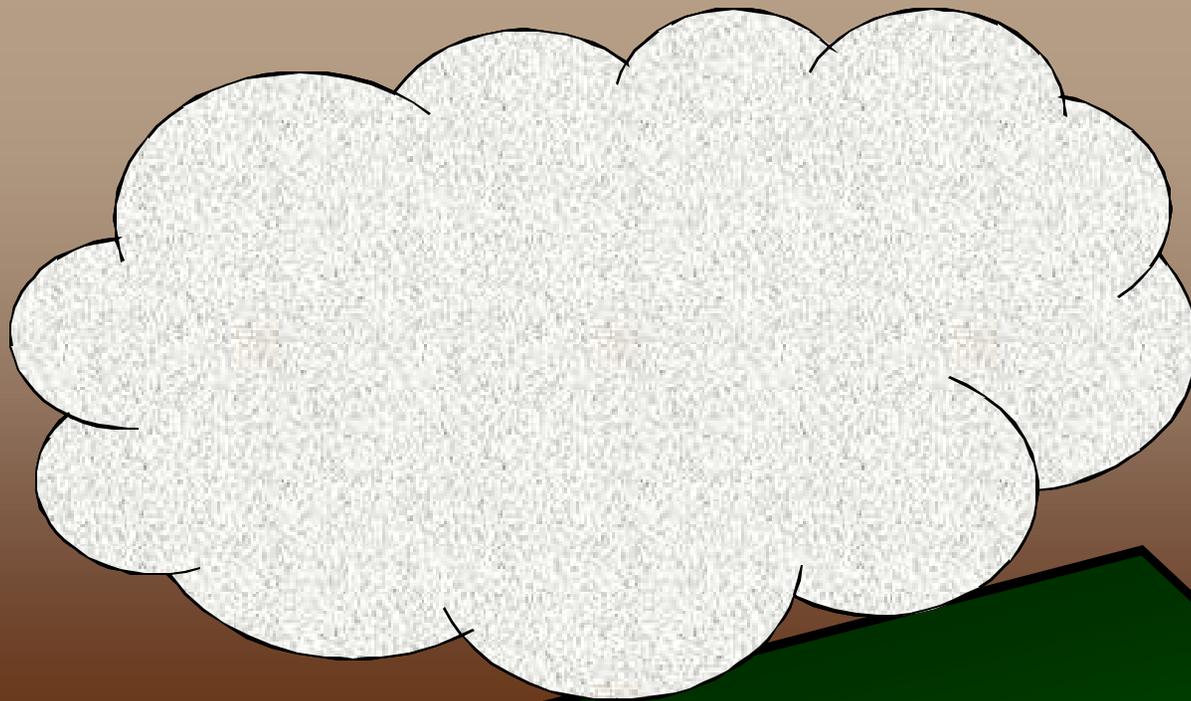
Gustnadoes



Gustnado Characteristics

- * Small short-lived low-level based vortices usually along a gust front
- * Generally not associated with mesocyclone, wall cloud, or updraft
- * Look for rotation, not just blowing dust
- * Can cause damage to structures and are hazardous to people in open areas
- * If it can be correctly identified, report as a gustnado and *not* as a tornado

Copyright Gene Moore



Gustnado

Gustnado



Gustnado



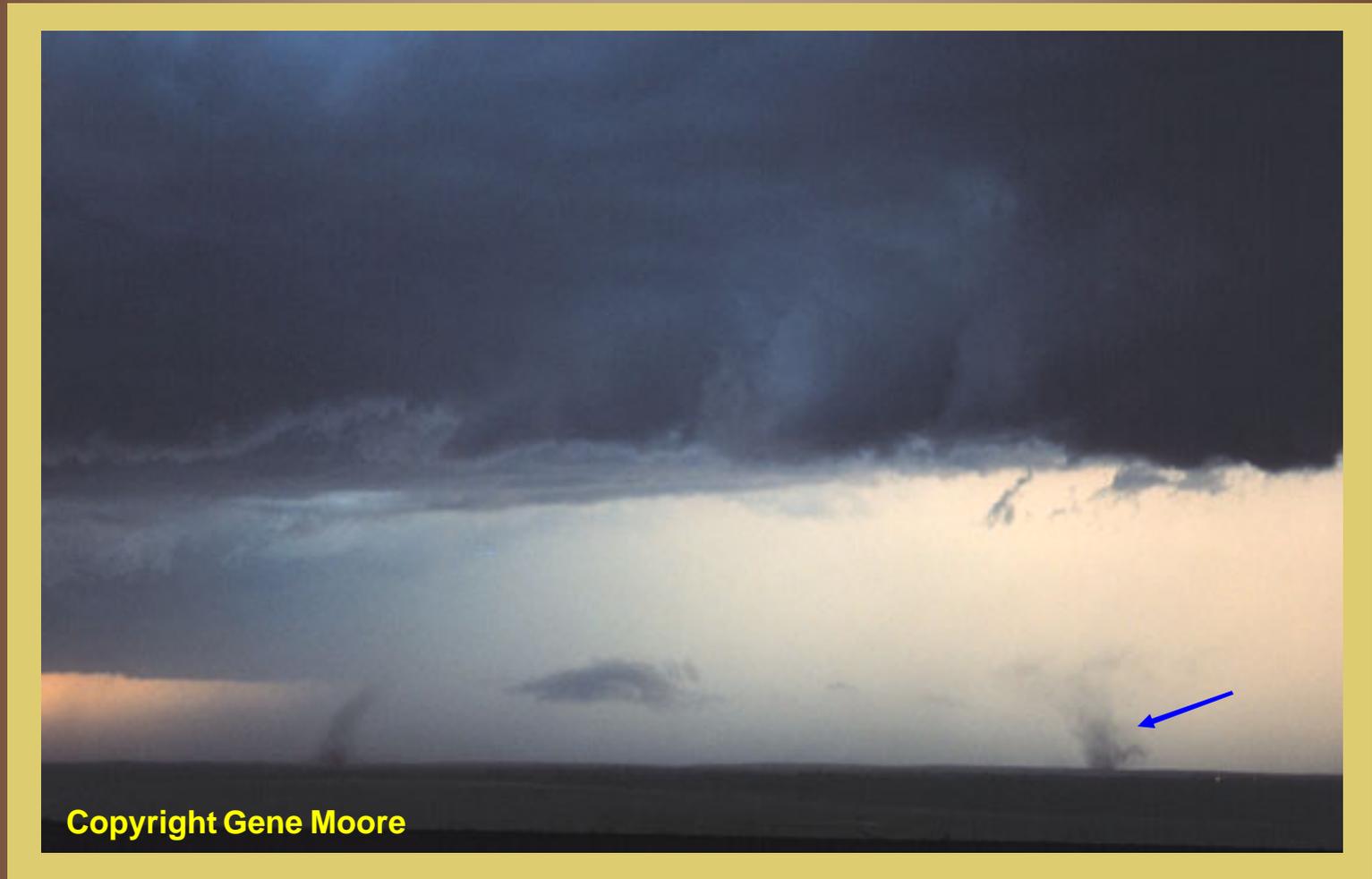
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Gustnado



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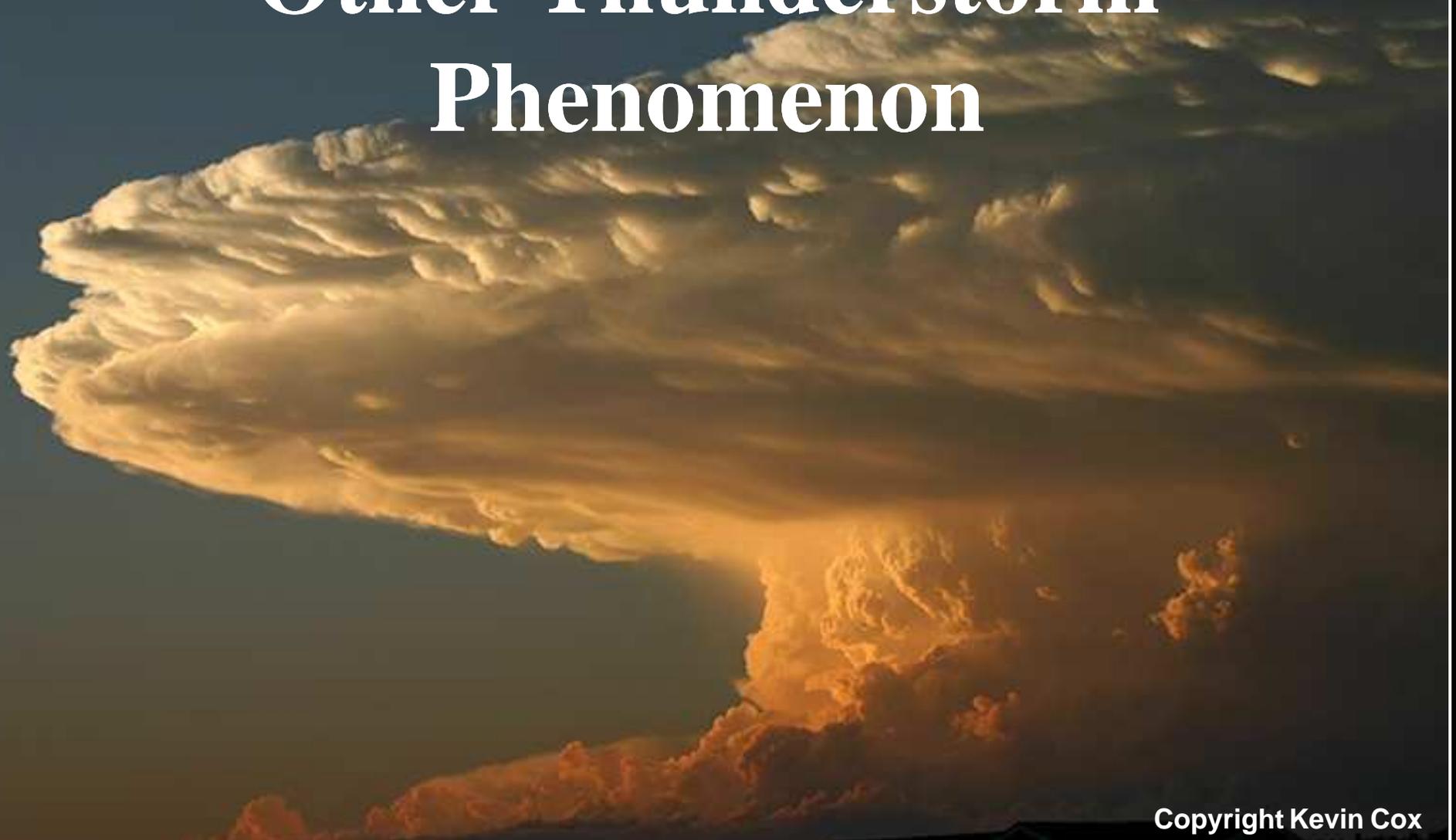
Gustnado



Tornado/Gustnado Summary

	Tornado	Land spout	Gustnado
Associated with the mesocyclone	Yes	No	No
Extends from cloud base to ground	Yes	Yes	No
Can be seen by radar	No*	No	No
Usually located along a gust front	No	sometimes	Yes

Other Thunderstorm Phenomenon



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Hail Shaft



Copyright Jim Bishop

Hail Shaft



Hail Shaft



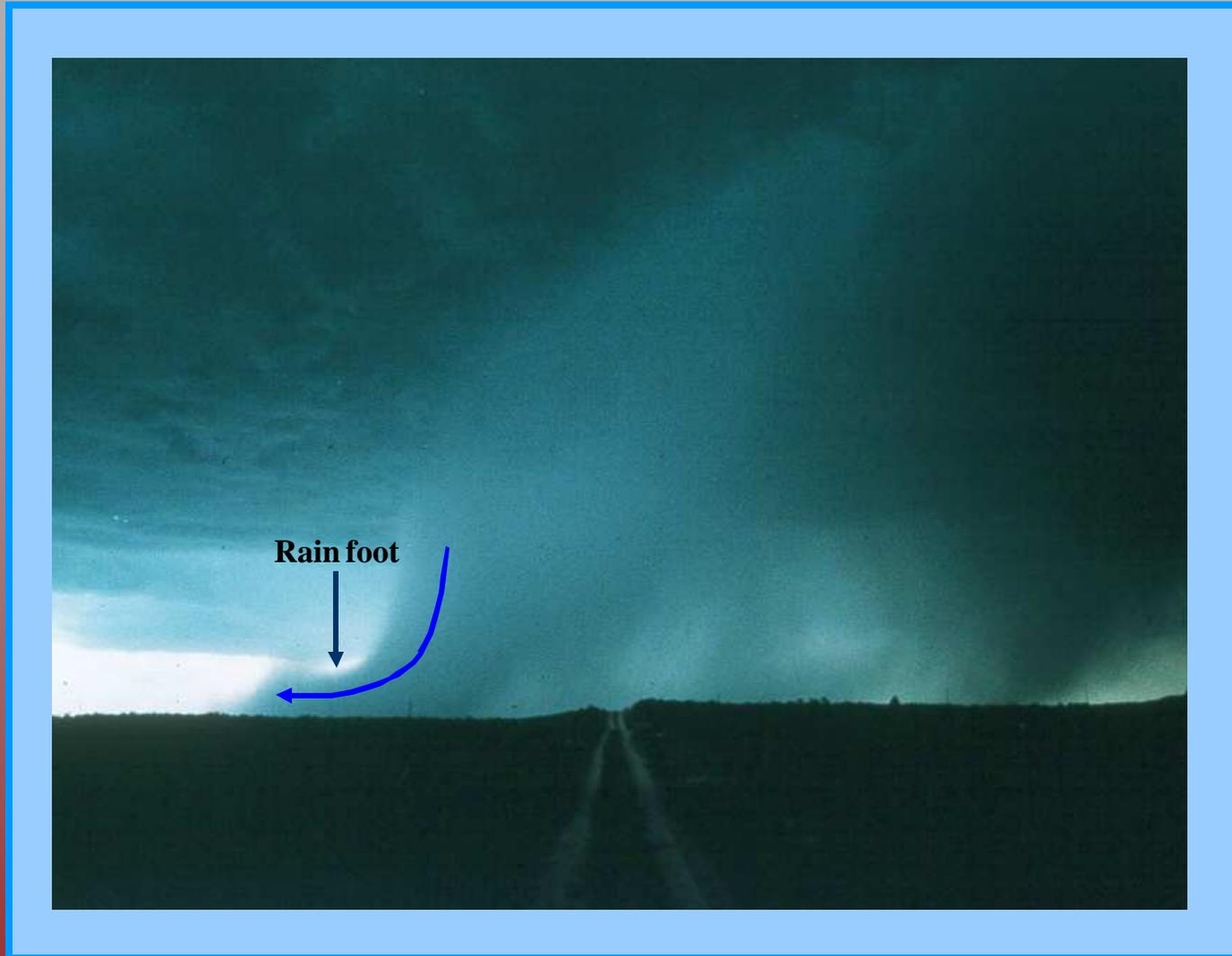
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Outflow Dust



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Rain Foot



Mammatus





Storm Feature Look Alike

Copyright Mike Hollingshead

Look Alike - Shelf Clouds

- Marks the leading edge of the gust front
- Usually produced by rain cooled air
- Can be found on the FFD or RFD
- Usually in area of low level shear
- Slope down away from precipitation area
- Often associated with a squall line- can be associated with gustnadoes or damaging straight-line wind



Shelf Cloud



Shelf Clouds



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Wall Cloud / Shelf Cloud Summary

	Wall Cloud	Shelf Cloud
Associated with the updraft	Yes	No
Associated with the downdraft	No	Yes
Often slopes down toward the rain (downdraft)	Yes	No
Slopes down away from the rain (downdraft)	No	Yes
Sometimes associated with gustnadoes	No	Yes
Often associated with funnel clouds	Yes	No
Favored area for rotation	Yes	No

Look Alike



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Look Alike



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Spotter Safety

- ◆ If a mobile spotter, use two people (an extra pair of eyes needed to watch skies above and behind you)
- ◆ If you are a mobile spotter, do not speed (especially on wet roads)
- ◆ If mobile, avoid dirt roads (they get extremely slick when wet)
- ◆ If mobile, park well off the road (and not under electrical lines)
- ◆ If mobile, never take shelter under a highway overpass ([click here for overpass safety](#))

Spotter Safety

- ◆ **Keep a one to two mile safety buffer zone between you and the storm. Have an escape route available.**
- ◆ **If a tornado approaches, when possible, move away at a right angle to the tornado- if this is not possible, abandon your vehicle for a sturdy shelter (like a house)- if no shelter is available, lay flat in a dry ravine or ditch away from your vehicle**
- ◆ **If indoors – the safest place is the basement, if a basement is not available, move to a small interior room away from windows**

Lightning Safety



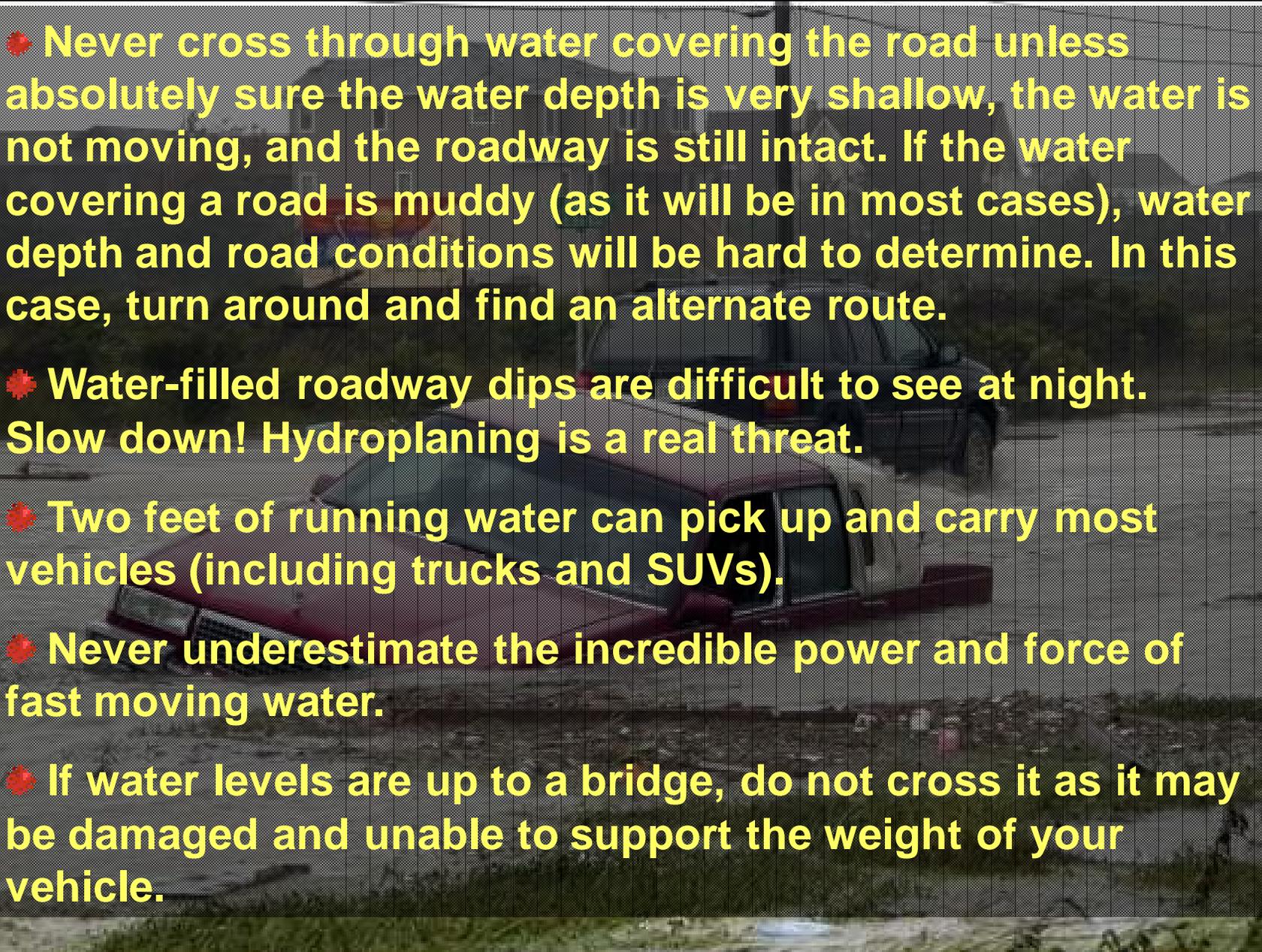
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Lightning Safety

- The safest place to remain is indoors and away from windows and electrical appliances
- If mobile spotting, the safest place is to remain inside your vehicle
- If mobile spotting, do not park along fence lines, or near overhead electric/phone lines
- Avoid being the tallest object, and stay away from other tall objects such as isolated trees.
- If you can hear thunder, you are in danger of being struck by lightning. Take shelter.



Flood Safety

- 
- ❖ Never cross through water covering the road unless absolutely sure the water depth is very shallow, the water is not moving, and the roadway is still intact. If the water covering a road is muddy (as it will be in most cases), water depth and road conditions will be hard to determine. In this case, turn around and find an alternate route.
 - ❖ Water-filled roadway dips are difficult to see at night. Slow down! Hydroplaning is a real threat.
 - ❖ Two feet of running water can pick up and carry most vehicles (including trucks and SUVs).
 - ❖ Never underestimate the incredible power and force of fast moving water.
 - ❖ If water levels are up to a bridge, do not cross it as it may be damaged and unable to support the weight of your vehicle.

Flood Safety



**It may just be a whole lot deeper than
what you think!**

Remember, boats float, cars don't.



Don't risk it and become a statistic



Story County, IA

Nighttime Spotting

- ▼ Mobile spotting at night is especially dangerous
- ▼ Watch for ground based flashes produced by a tornado breaking power lines
- ▼ Note the wind direction and changes in wind direction
- ▼ Utilize lightning to note storm structure and possible lower cloud base
- ▼ Know your directional relationship to the storm
- ▼ Don't confuse shelf clouds with wall clouds, look for signs of rising or rotating clouds.

Spotters Must

➤ **Know the difference between shear and rotation**

➤ **Know the difference between a shelf cloud and a wall cloud**

➤ **Know that funnel clouds usually do not form on a shelf cloud**

➤ **Know that a low hanging cloud in the shape of a funnel, if not rotating, is NOT a funnel cloud**

➤ **Know the difference between blowing dust and a tornado**

➤ **Spotters must not exaggerate their report**

Myths

● **Myth - I heard a loud noise and it sounded like a train...it had to be a tornado.**

Truth - Any very strong wind will make a “roaring” noise or sound like a train – the sound depends on the wind speed, local terrain, obstructions to flow, and atmospheric conditions.

● **Myth - The wind twisted the metal on my shed...the trees that were blown down are twisted...it had to be a tornado.**

Truth - One generally cannot look at any individual object to determine if the damage was caused by a tornado or straight-line wind. The total damage pattern and how the debris is strewn in relation to other debris is a better indicator of the causative effect. A straight-line wind can cause an object to twist as the destructive force of the wind on an object can cause uneven stress loads with different failure points.

● **Myth - Objects like lakes, rivers, and hills protect areas from getting hit by a tornado.**

Truth – Nothing more than folklore. These features provide no protection or have any bearing on the development or movement of a tornado. Some thought tornadoes would not strike the downtown area of a large metropolitan city. Recent tornadoes in downtown Fort Worth, Salt Lake City and Nashville dispelled that myth.

Myths

• **Myth – Mobile homes attract tornadoes.**

Truth – Mobile homes are not more likely to get hit by a tornado. Mobile homes are more likely to sustain damage (compared to a house) if struck by a tornado or strong winds.

• **Myth – It is safe to seek shelter from a tornado under an overpass.**

Truth – Overpasses are not a safe place to take shelter. They can funnel the wind flow and increase the strength of the wind. They do not provide protection from flying debris. In addition, parking your car under or near an overpass creates a hazard to other motorists trying to pass through the area. Virtual traffic jams have been created by motorists gathering under an overpass. See this link for [overpass safety](#).

• **Myth – We should open our windows if a tornado approaches.**

Truth – Stay away from windows if a tornado approaches. If your windows are closed, leave them closed. Your house will not explode due to the decrease in pressure within the tornado. If the tornado is close enough to your house that it experiences a significant and rapid drop in pressure, chances are the wind and debris will have damaged or destroyed your house before the minimum drop in pressure occurred.

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We want your storm photos!!



If you have any storm photos or videos that you would like to share with us, please e-mail them to your local NWS. Include your name, date of the photo, where the photo was taken, and a description of the photo. Also indicate if you give the NWS permission to use the photo. We are interested in ALL weather phenomenon and cloud types. The best photos or videos are those taken which show a wide view of thunderstorm structure. Close-ups are good, but they do not allow others to take in the bigger picture (no pun intended). It is this wider perspective that allows others to learn by seeing the structure of a specific phenomenon relative to that of the entire thunderstorm.

Special thanks to the following people for the
generous use of their photos:

Jim Bishop & Simon Brewer – www.stormgasm.com

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Gene Moore - www.chaseday.com

Alan Switzer – home.telepath.com/~aswitzer/tornado-page.htm

Mike Umscheid – www.underthameso.com

The End

NWS Tallahassee Skywarn Spotter Training Version 1001

Thank you reading the Skywarn Spotter Training.

To complete your training please take your certification test at:

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