



NOAA's National Weather Service Milwaukee/Sullivan

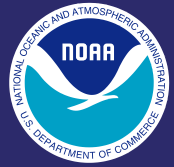


Weather Impacts on Aviation

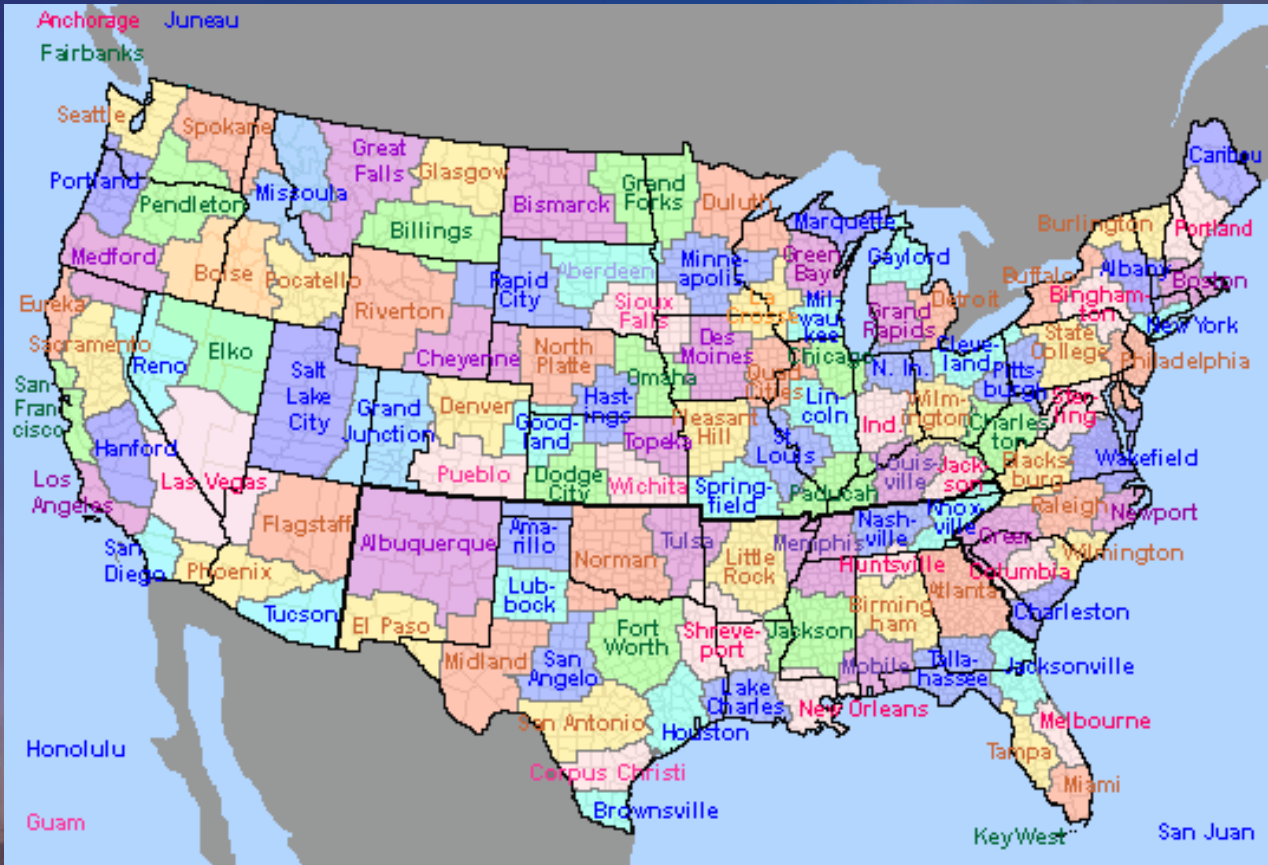
Marcia Cronce
Meteorologist, Aviation Focal Point

April 2014

weather.gov/milwaukee



NWS: A Federal Government Agency

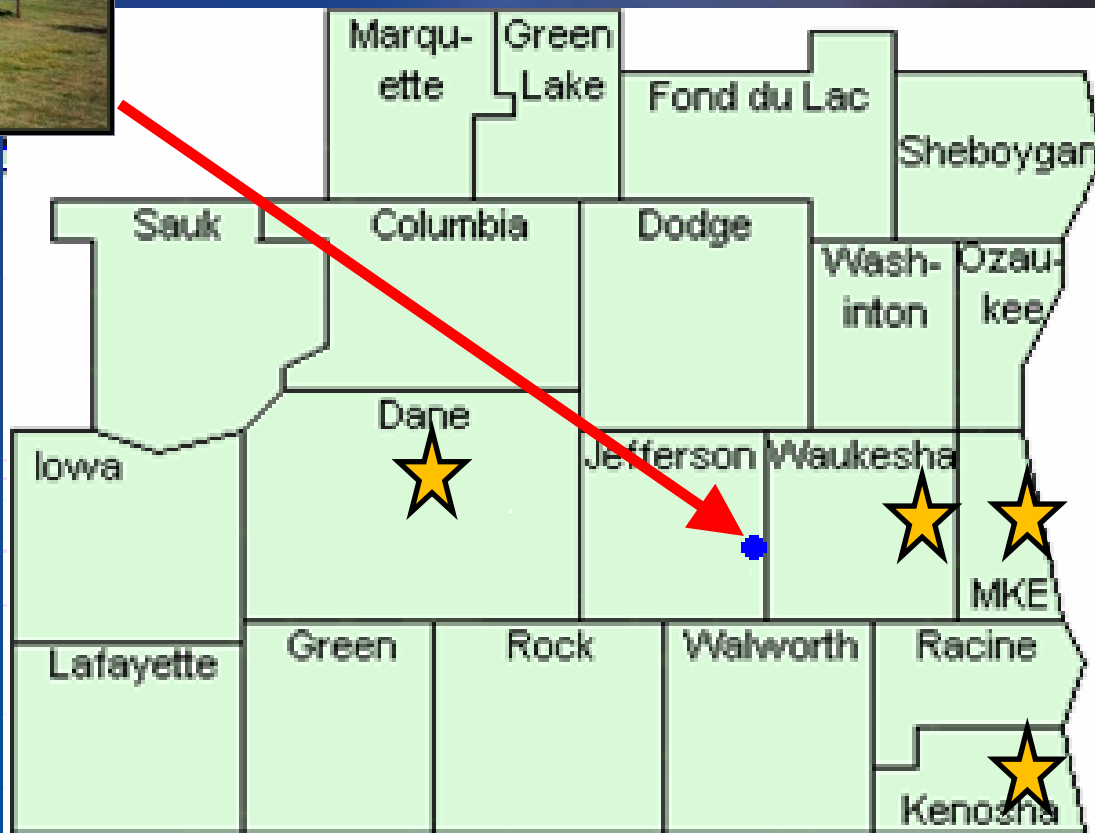




WFO Milwaukee/Sullivan Service Area



★ TAF Sites



- Watch/Warning Responsibility
- 20 counties
- Southeast and South-Central Wisconsin.



Goals of Presentation



- **Make more informed decisions**
- **Know where to find additional weather information**



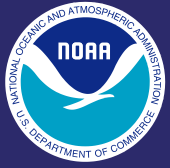


The Tools We Use...

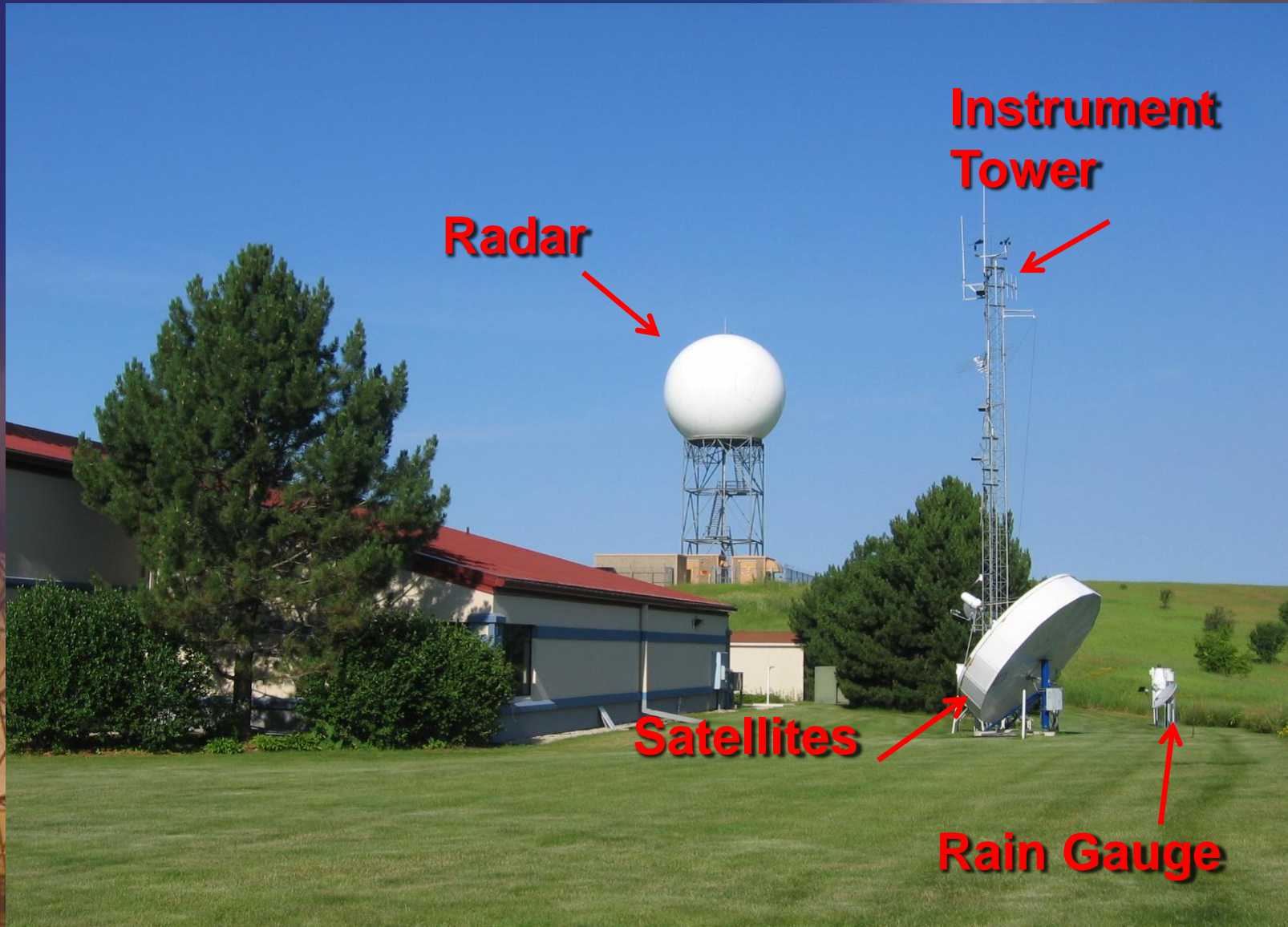


**ASOS Station:
7 in our CWA**



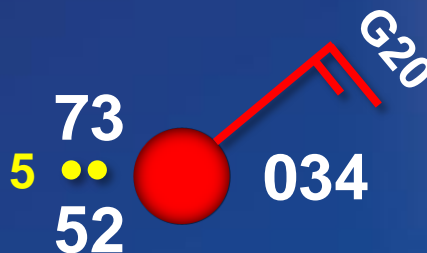


The Tools We Use...





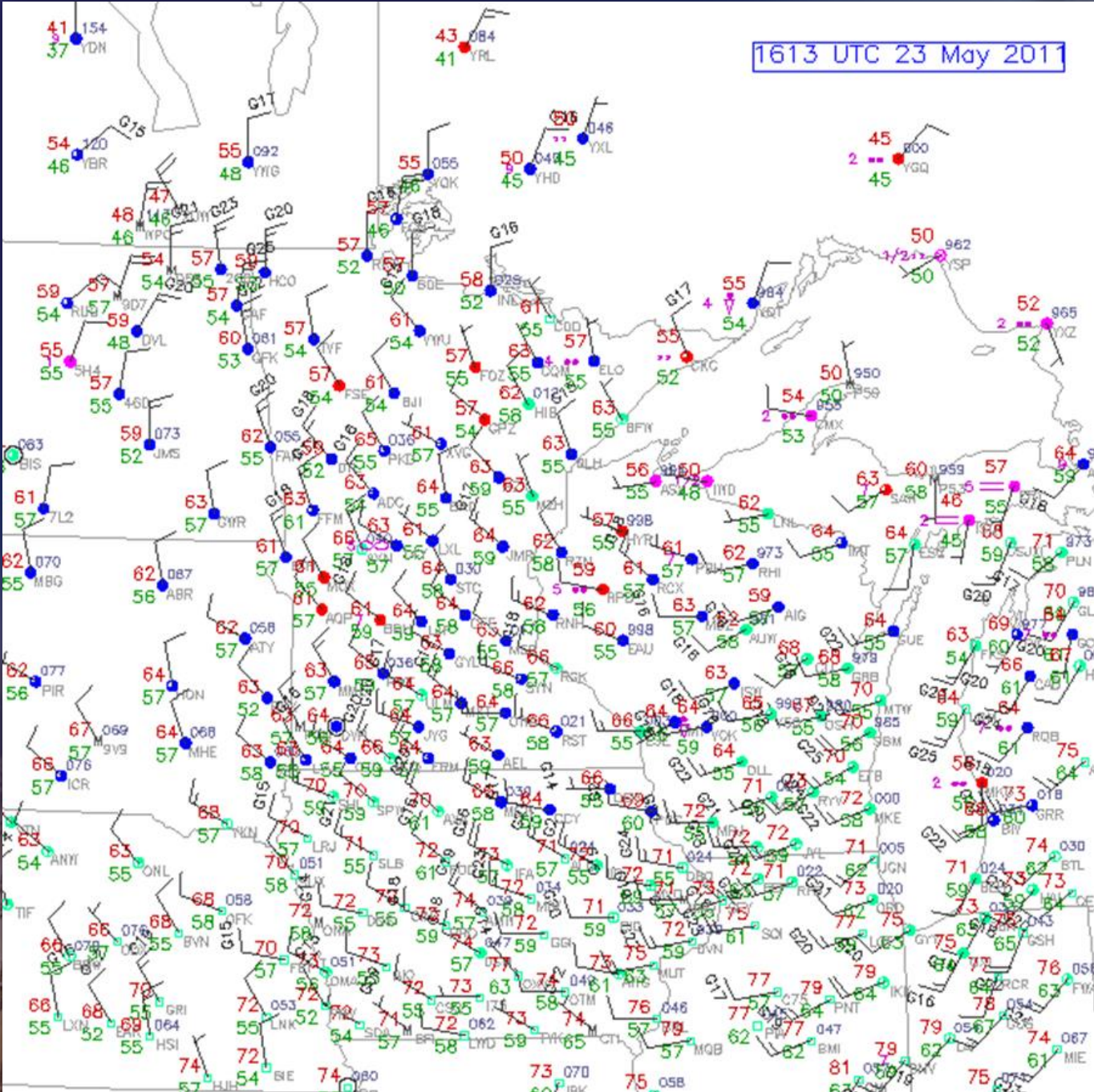
Surface Obs and METARs

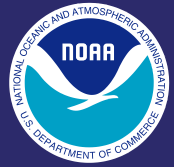


**METAR KMKE 011255Z AUTO 04015G20KT 5SM -RA BR
SCT047 OVC070 23/11 A3007 RMK A02 SLP034
P0003=**



1613 UTC 23 May 2011





Webcams

WISCONSIN DEPARTMENT OF TRANSPORTATION *Travel Information*

[Drivers & Vehicles](#) | [Safety](#) | [Travel](#) | [Plans & Projects](#) | [State Patrol](#) | [Doing Business](#) | [Programs for Local Gov't](#)

- [Milwaukee-area current travel information](#)
- [Travel times](#)
- [Freeway camera images](#)
- [Lane and ramp closures](#)
- [Congestion maps](#)

[Travel](#) > [Travel by](#) > [Road](#) > [Milwaukee-area current travel info](#) >

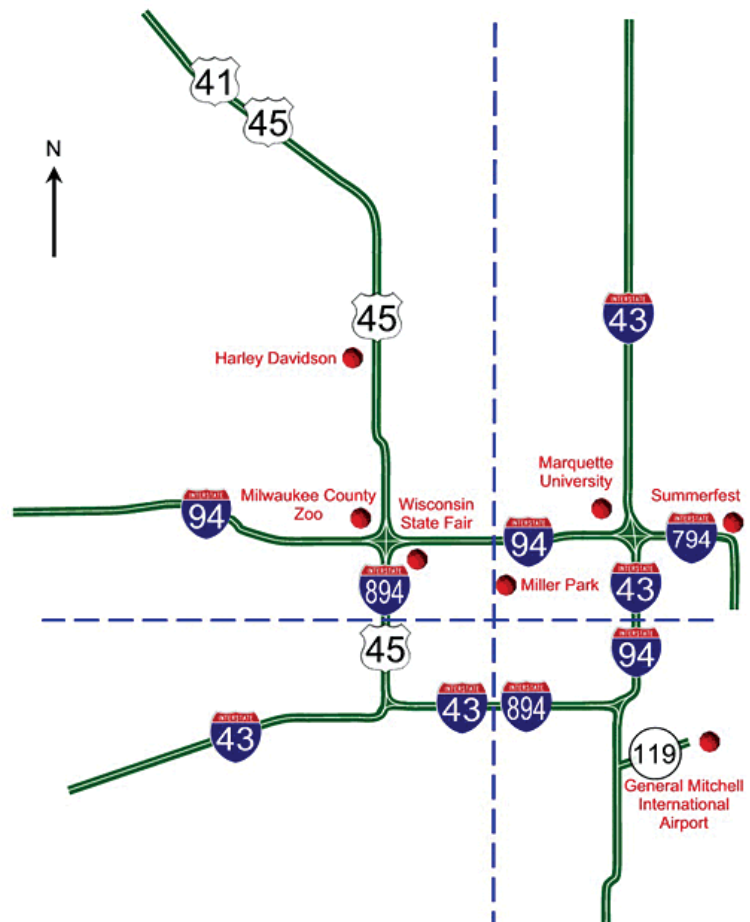
Milwaukee-area freeway camera images

Images from the Milwaukee area cameras are available to help travelers check freeway conditions. timestamp appears at the bottom of each camera image.

Select a quadrant below to view the current conditions.

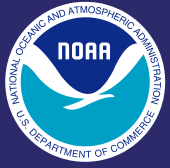


Tuesday, May 12, 2009 10:20:28 AM



RADAR AND SATELLITE INTERPRETATION





How Radar Works



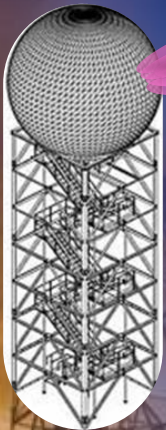
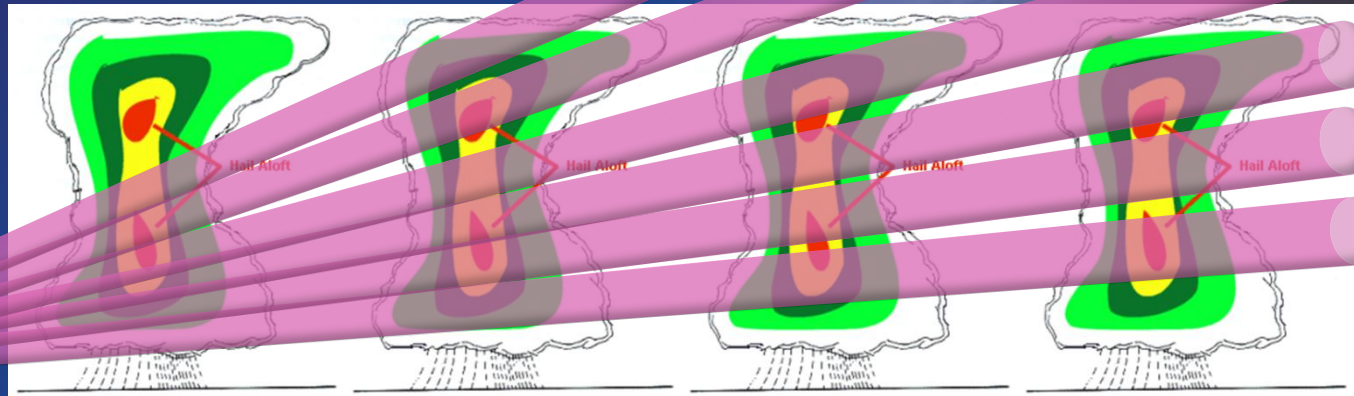


How Radar Works





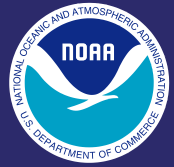
How Radar Works



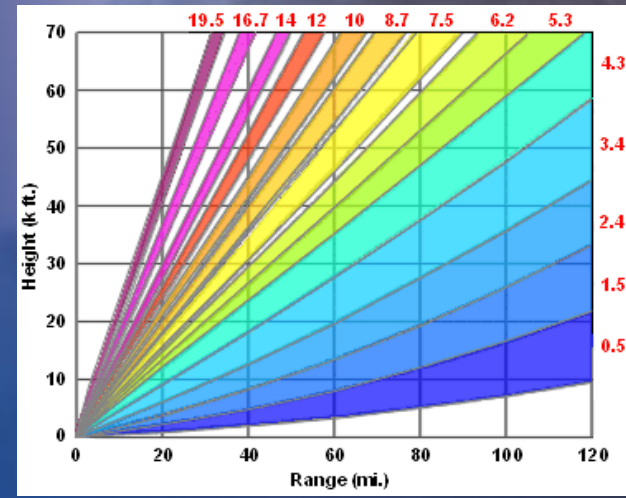
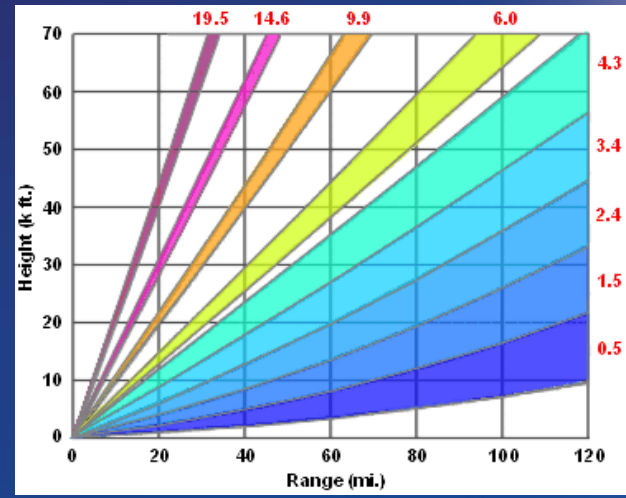
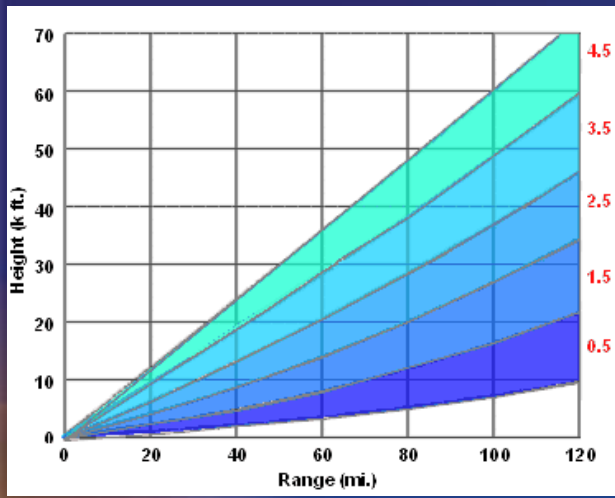
Base level (0.5°) radar scan “sees” the lower parts of storms when they’re close to the radar and higher parts of storms when they’re further away from the radar (due to Earth’s curvature)



The radar then tilts upward and does another rotation for a higher elevation scan. This process repeats several times, depending on which scanning mode it’s in.



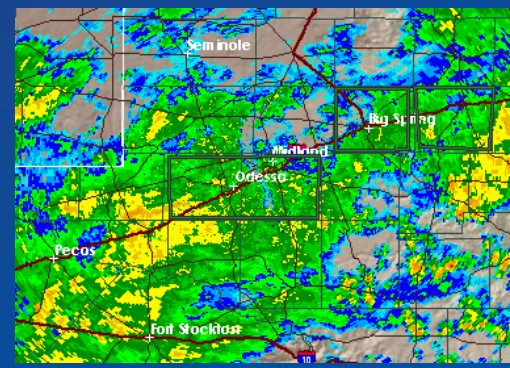
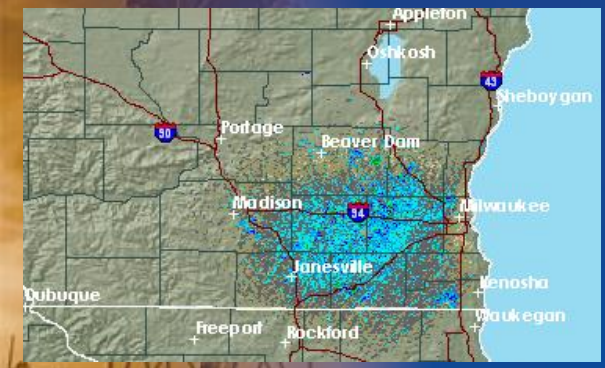
Radar Sampling Patterns



Clear Air Mode

Precip Mode

Storm Mode

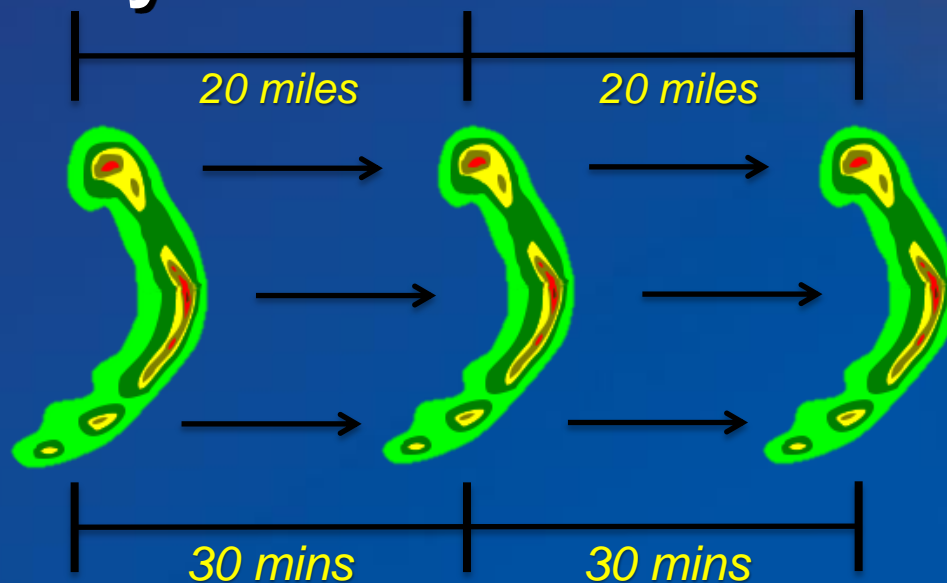


Radar automatically detects clear air vs. precip mode. NWS employee manually switches it to storm mode when necessary.



Radar

- How to figure timing or onset of precip using radar
- Use time of radar and your fingers
- Look out your window for “calibration”



If you're in the "green" area on radar reflectivity and you see yellow or red heading toward you, you can expect the rain to become heavier.



Milwaukee, WI Radar

Go to: [Enhanced Version](#)

Local weather forecast by "City, St"

[Radar Status Message](#)

Adjacent Radars:



Short Range Images

Reflectivity:
Composite Loop
Base Loop

Velocity:
Storm Relative Loop
Base Loop

Rainfall:
1-Hour Total Loop
Storm Total Loop

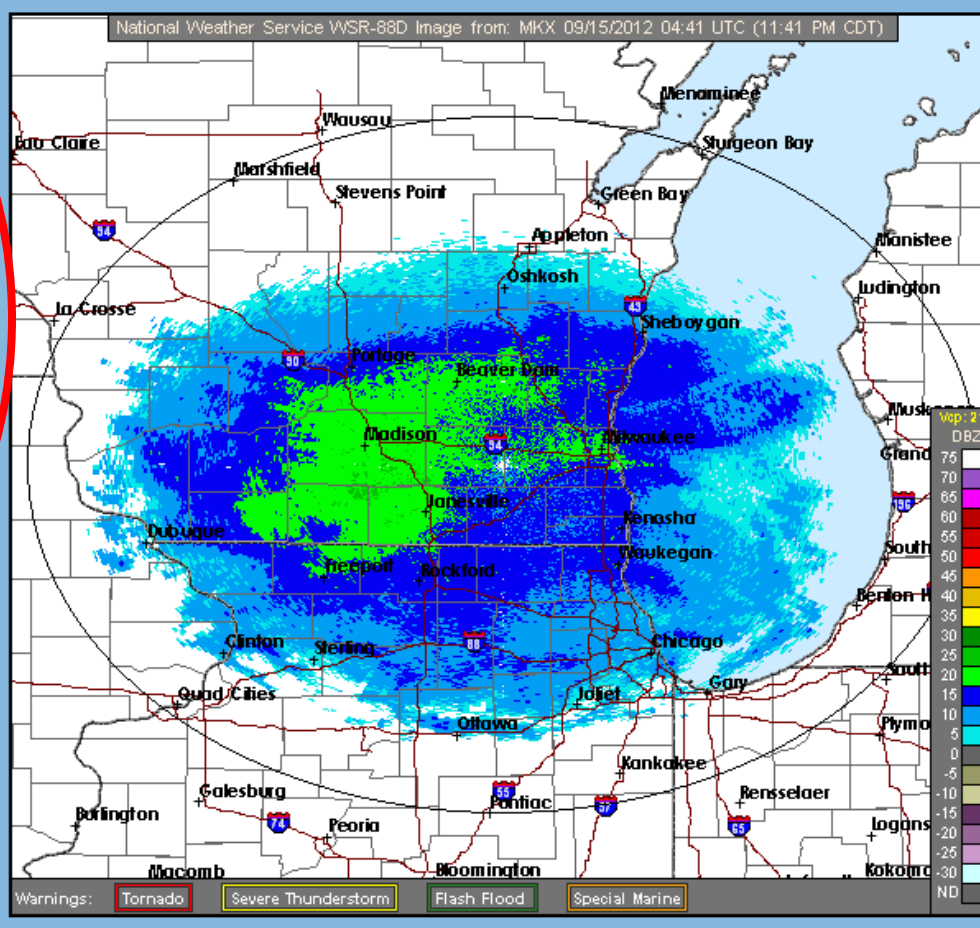
Long Range Images
Reflectivity:
Base Loop

U.S. Views
Reflectivity:
National Loop
Alaska Loop
Hawaii Loop
Guam Loop
Puerto Rico Loop
Radars by State

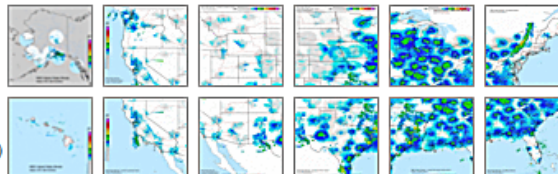
Additional Info:
[Radar FAQ](#)
[Downloading Images](#)
[Mobile Users](#)
[GIS Users](#) **KML**
[Doppler University](#)
[Color Blindness Tool](#)
[Credits](#)

Base Reflectivity

NWS Milwaukee, WI



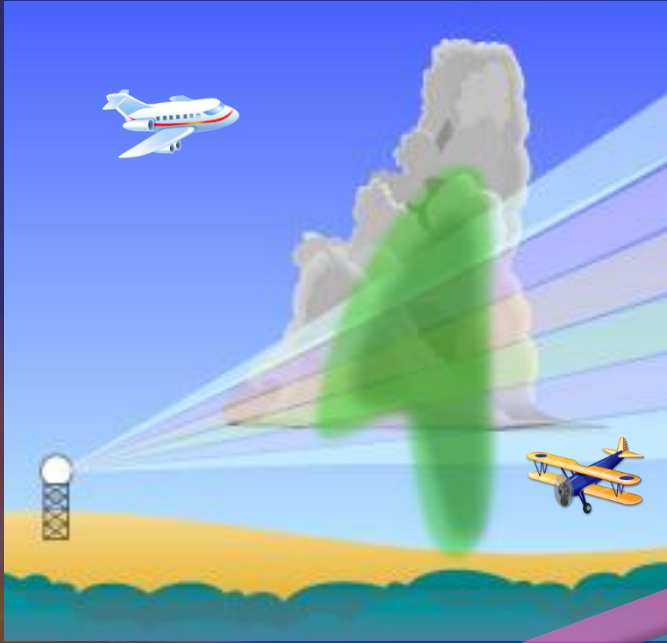
National
Radar
Mosaic
Sectors



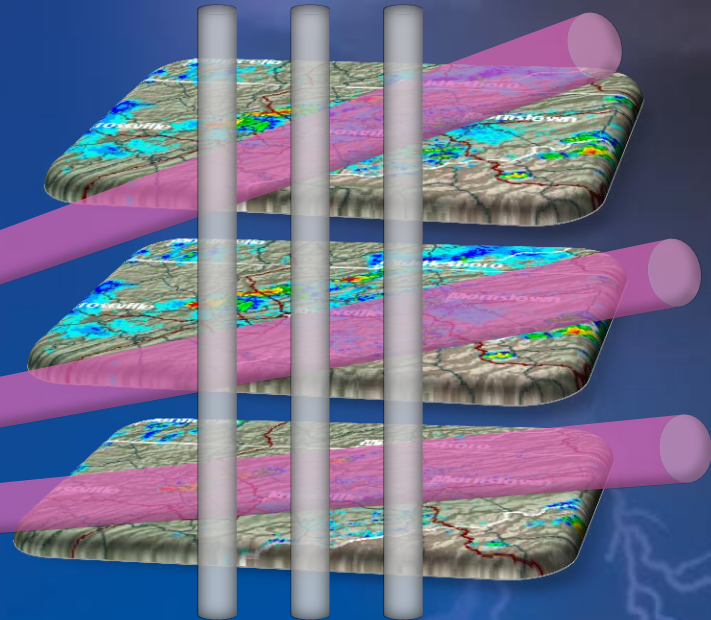
(click image)



Composite Reflectivity



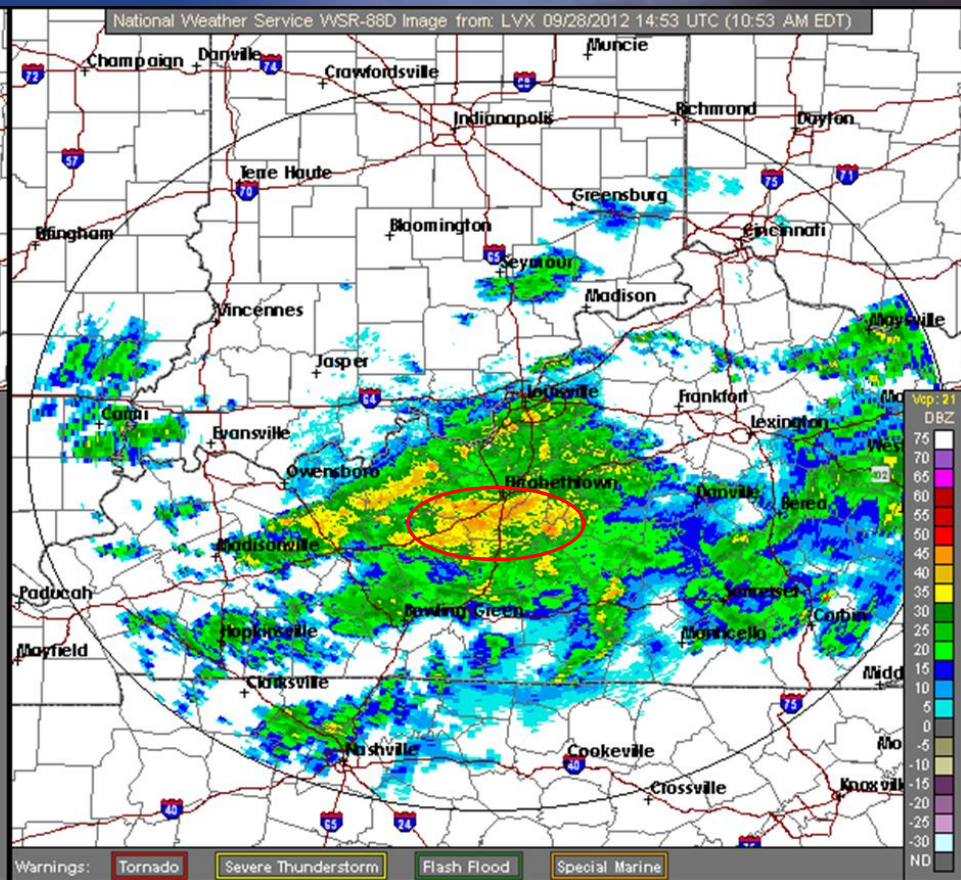
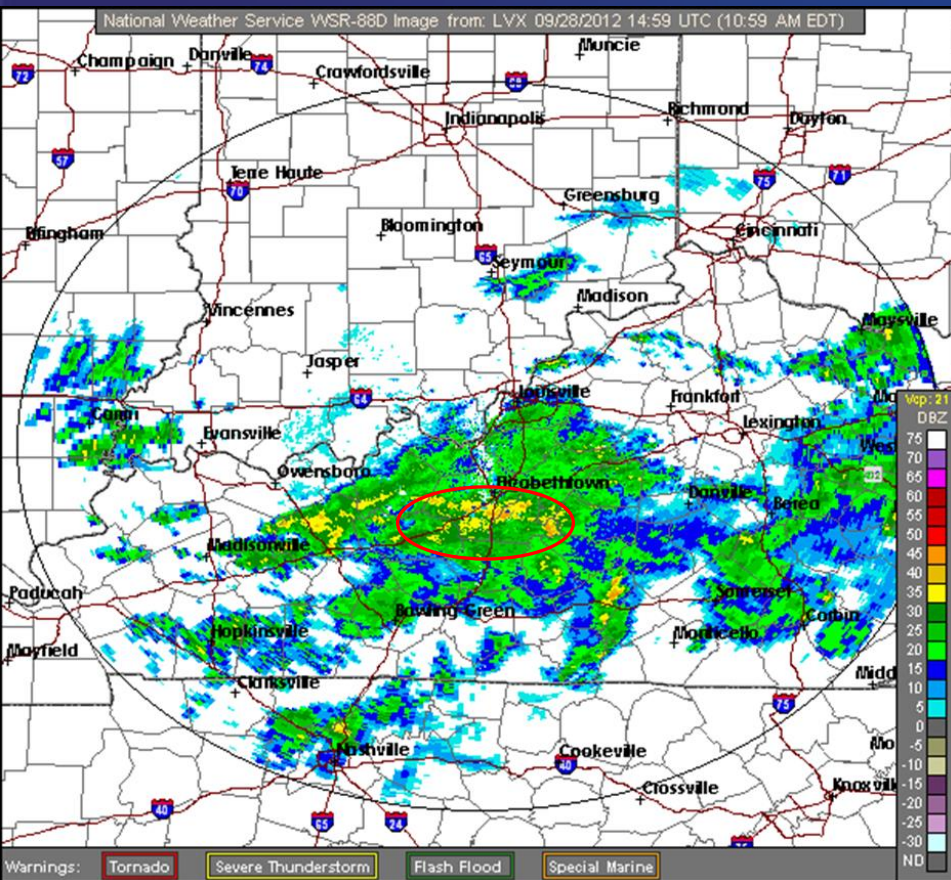
Some precipitation may not be reaching ground



Shows highest reflectivity in a column

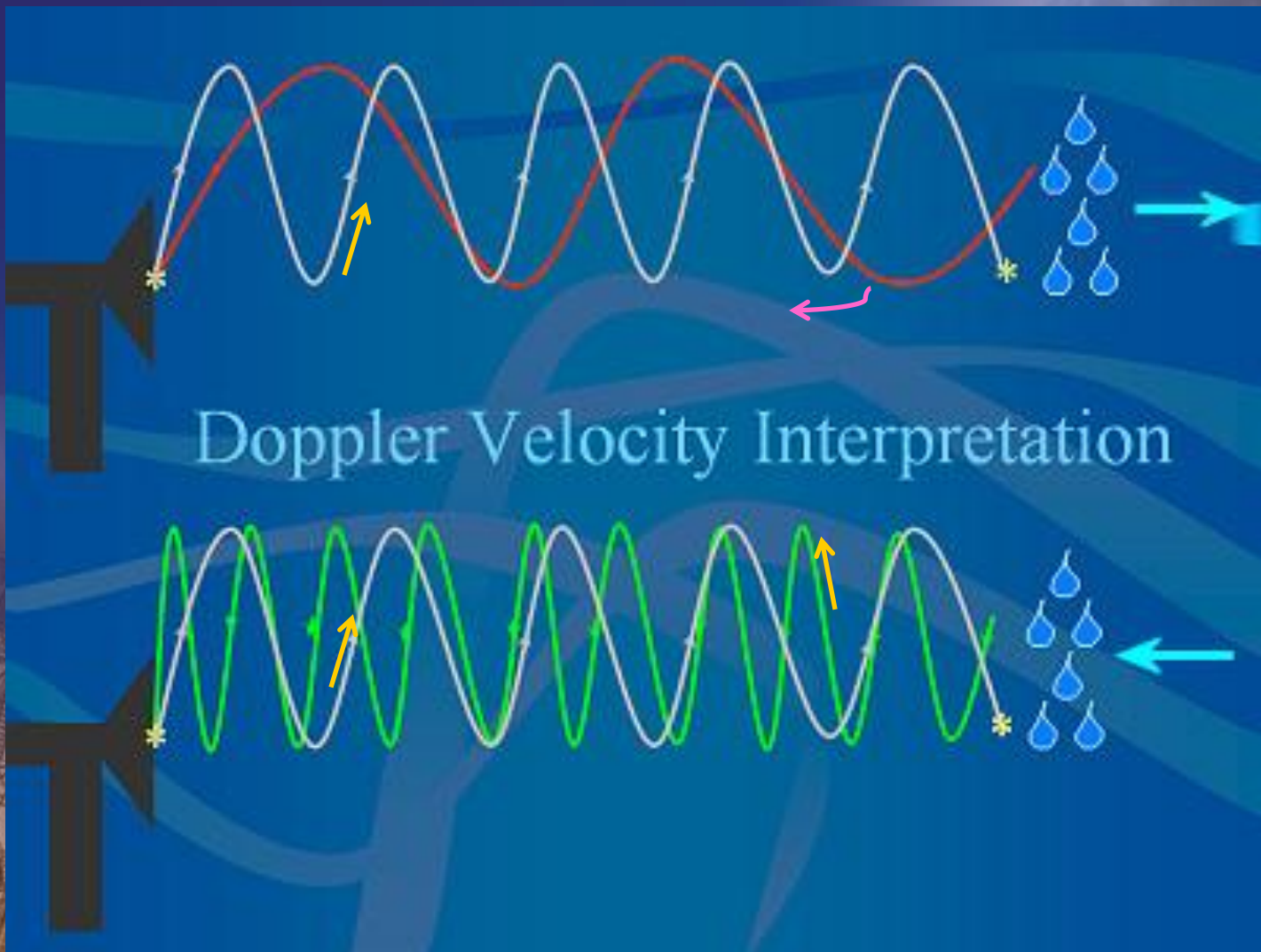


Base vs. Composite Reflectivity





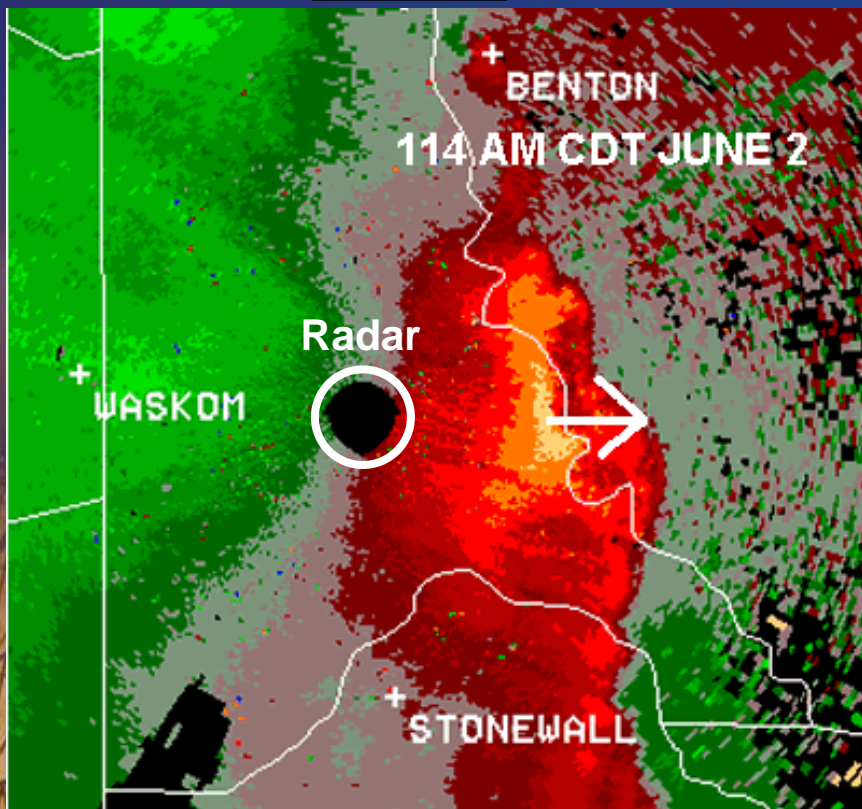
Radar Velocity



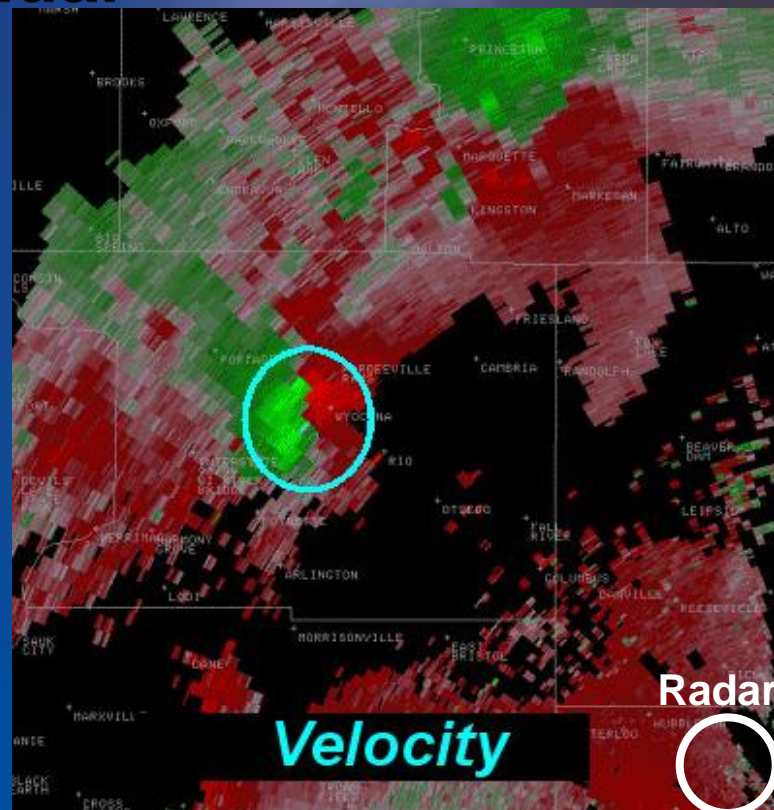


Radar Velocity Interpretation

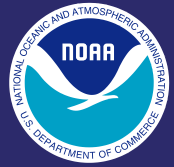
- Green: Toward the radar
- Red: Away from the radar



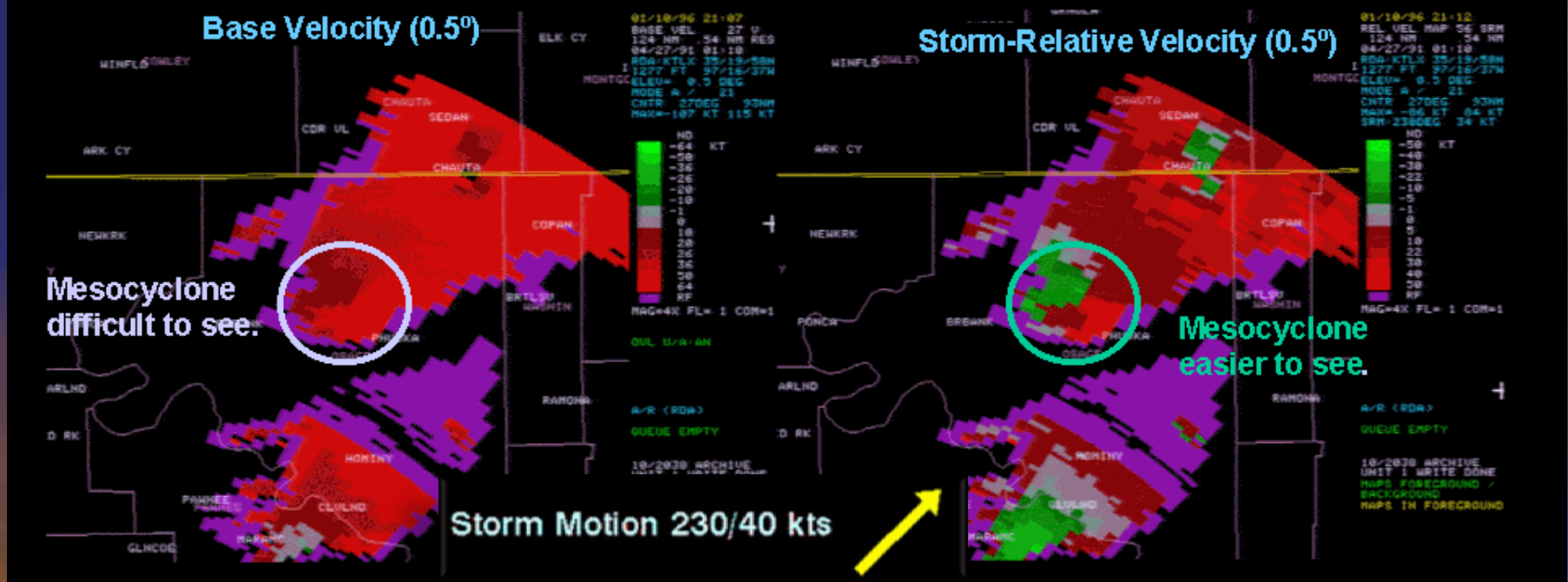
Highest winds are near leading edge of a squall line



Red and green together show rotation (above) or divergence (e.g. microburst), depending on the couplet's orientation in reference to the radar location.



Base vs. Storm Relative Velocity

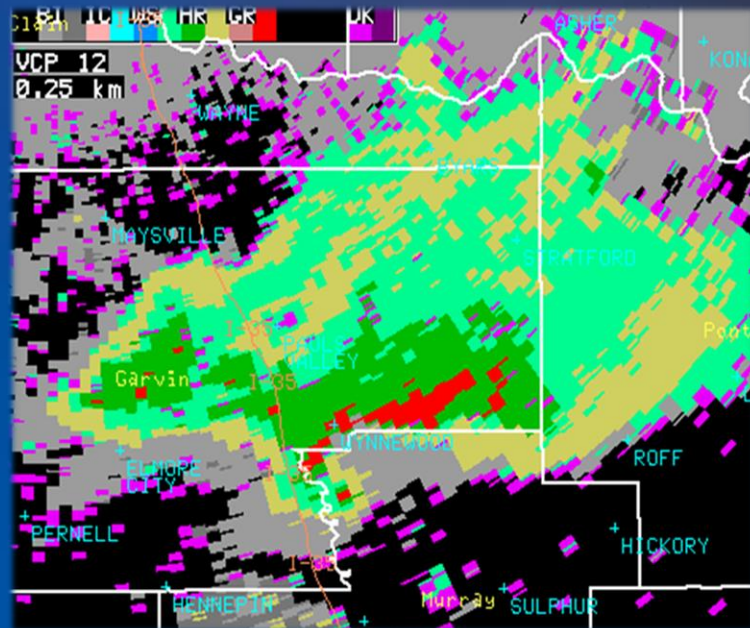


- The motion of the storm is removed from the mean velocity
- Storm-relative velocity shows velocity in the storm as if it were stationary
- You may not be able to configure this feature correctly, depends on radar vendor



Dual-Polarization Radar “Dual-Pol”

- Improvements to Conventional Doppler Radar Products
 - *Precipitation classification*
 - *Feature identification*
 - *Better estimate of rainfall amounts*

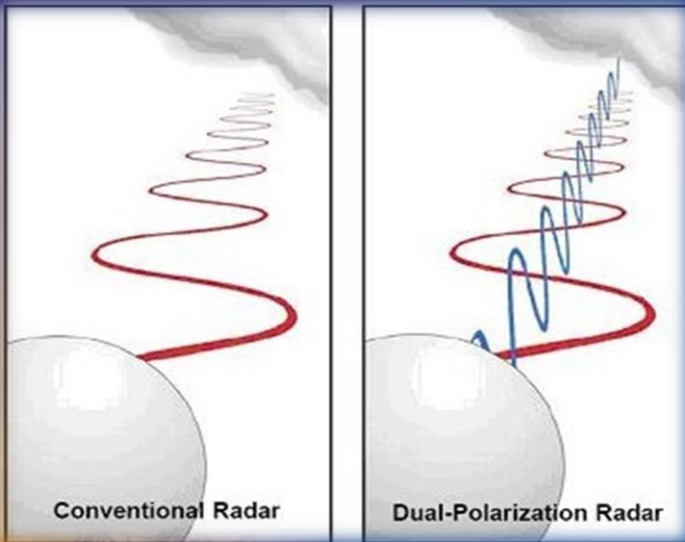




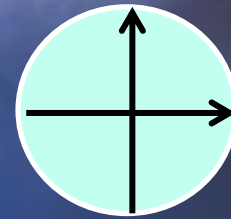
Dual-Pol Radar



- Transmits pulses in two orientations

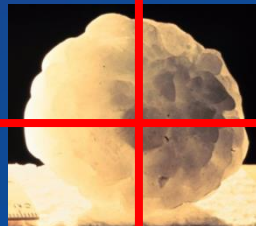
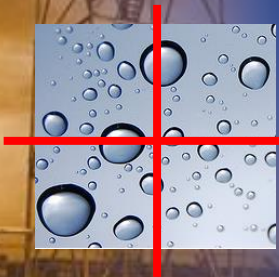


Versus



Drag causes large raindrops to "flatten"

Hail has a tumbling motion and appears spherical

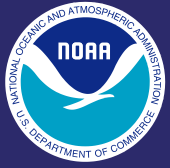




Dual-Pol Radar Products

- Reflectivity
- Velocity
- Spectrum Width
- Differential Reflectivity
- Correlation Coefficient
- Specific Differential Phase
- Hydrometeor Classification Algorithm





Differential Reflectivity

- Tells us the shape of the target

$$\frac{\text{Horizontal power returned}}{\text{Vertical power returned}}$$



-7 dB

0 dB

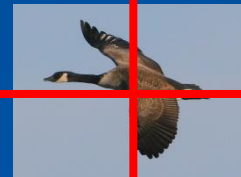
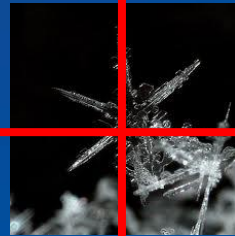
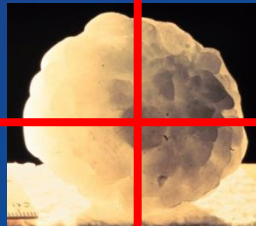
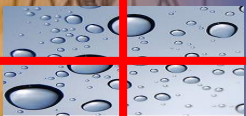
+7 dB



Vertically oriented
Ice crystals

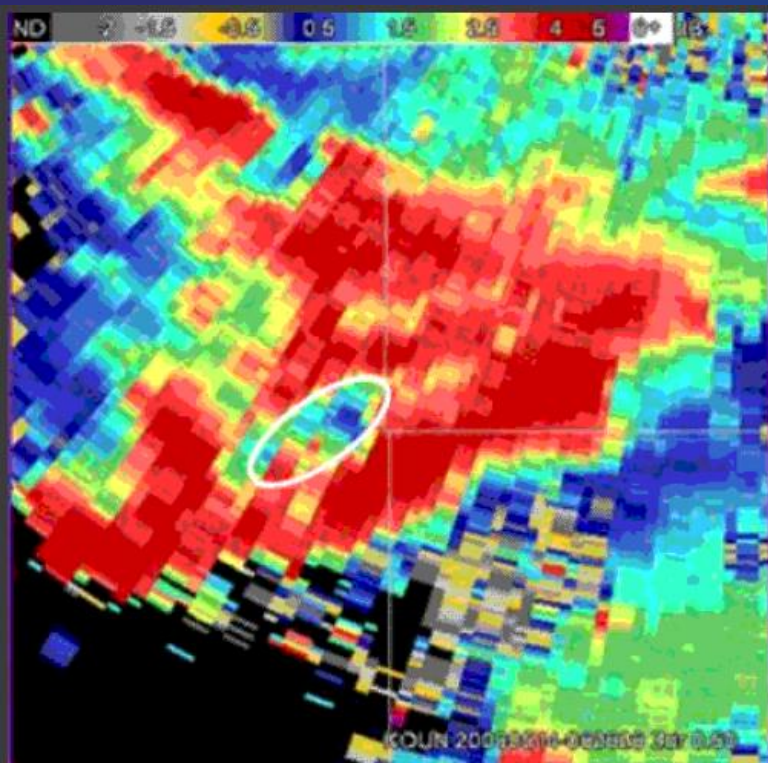
Drizzle,
Small Hail
Birds

Rain,
Melting Hail,
Insects, Birds

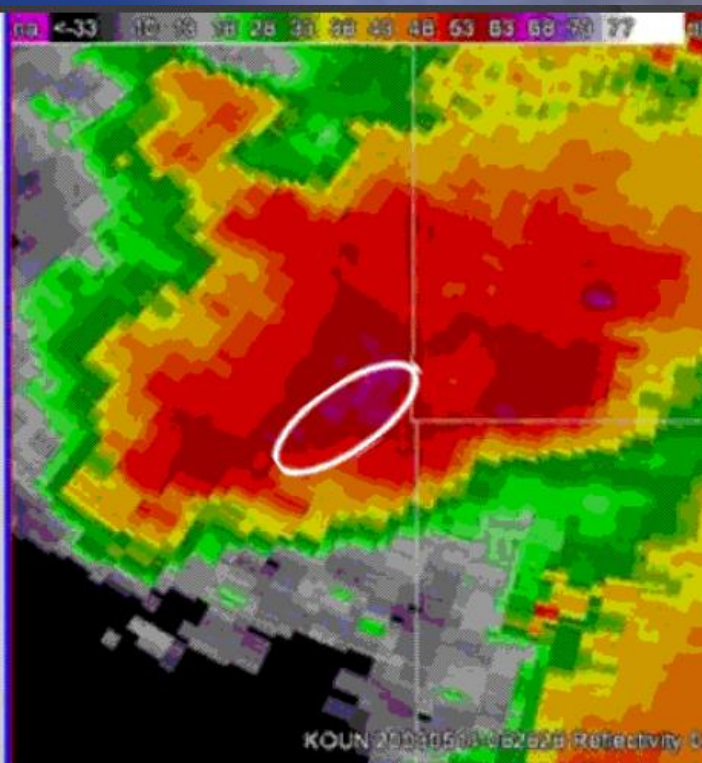




Differential Reflectivity



Differential Reflectivity (ZDR)



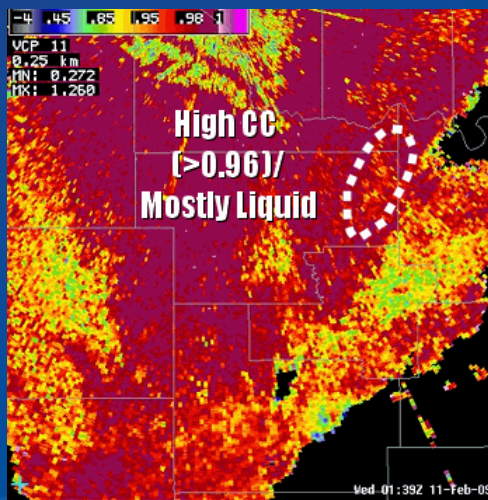
Reflectivity (Z)

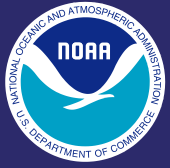
The new differential reflectivity product will allow to more closely pinpoint location of largest hail in supercells (areas of ZDR near zero)



Correlation Coefficient

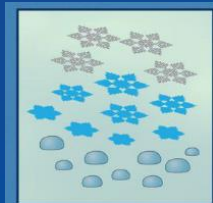
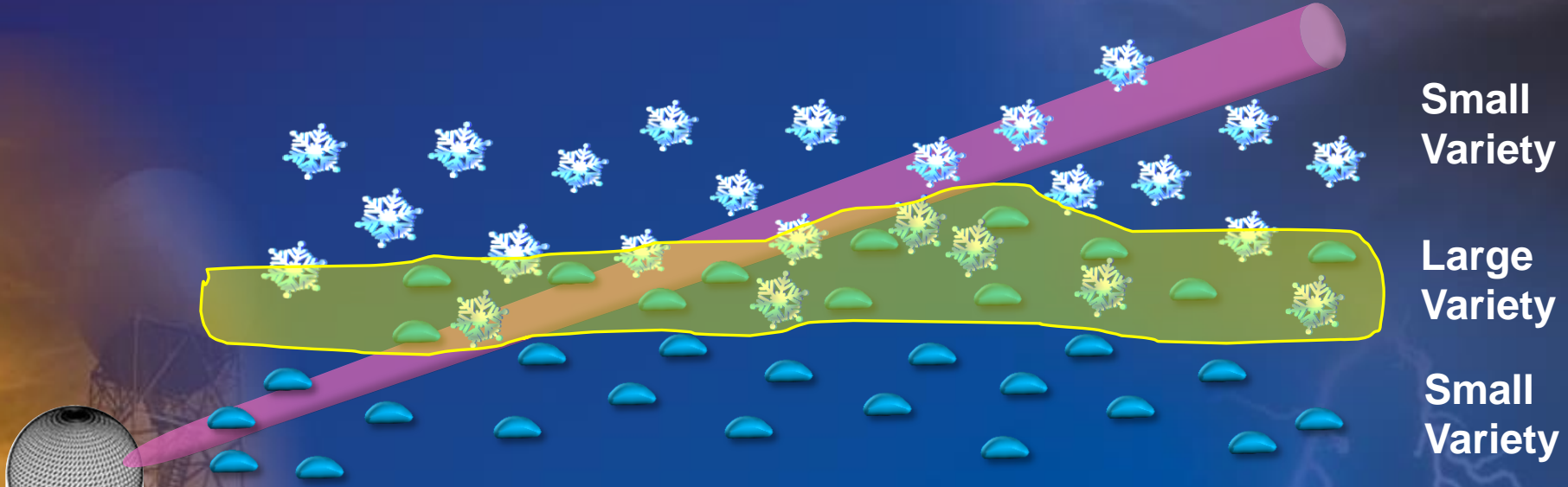
- Shows us similarities or differences between the scatterers





Correlation Coefficient

- Helps identify the melting layer
- Icing usually occurs just above the melting layer



More than one precipitation type



Differentiating biological from weather targets



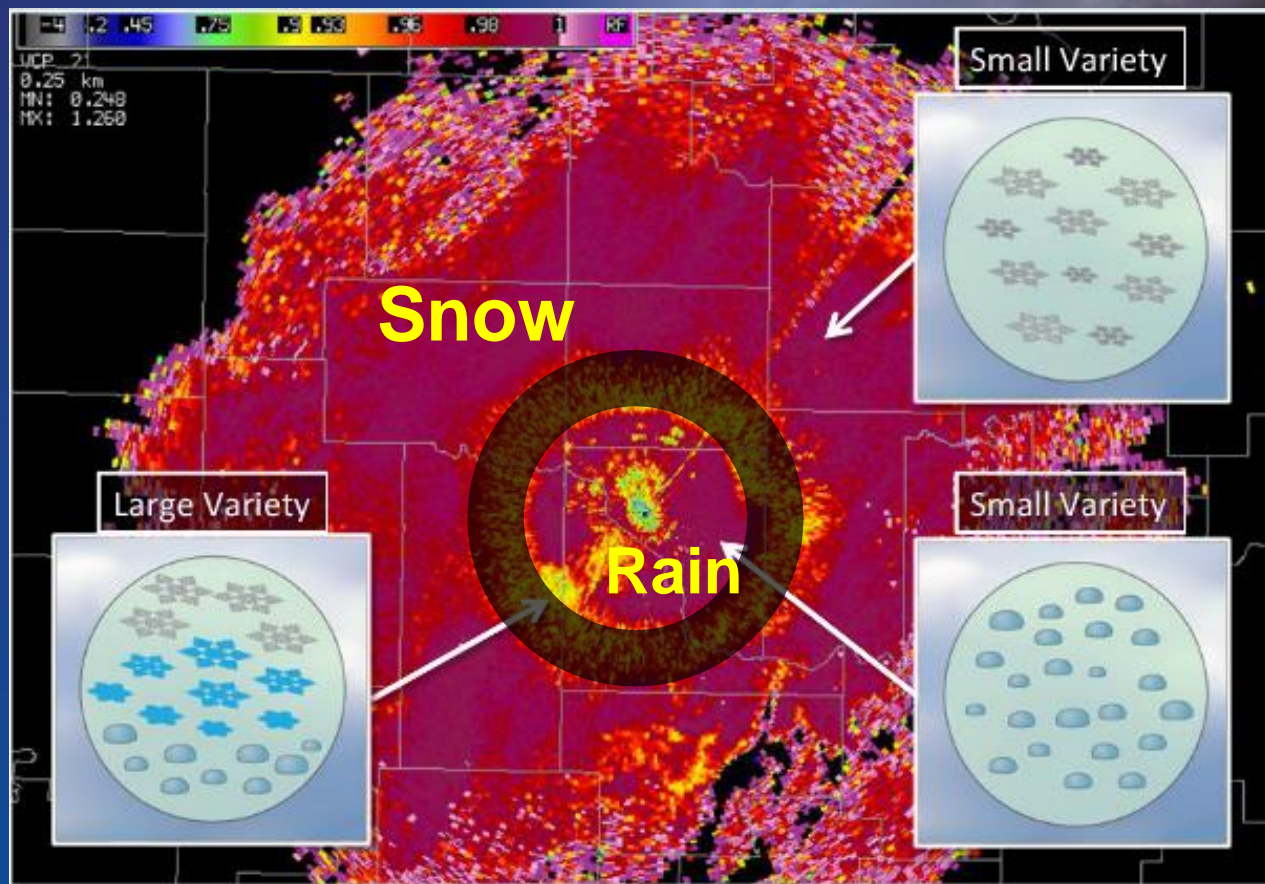
Identifying debris from significant tornadoes

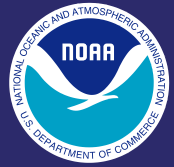


Correlation Coefficient



- Where's the melting layer?
- If no melting layer: expect all snow or freezing drizzle

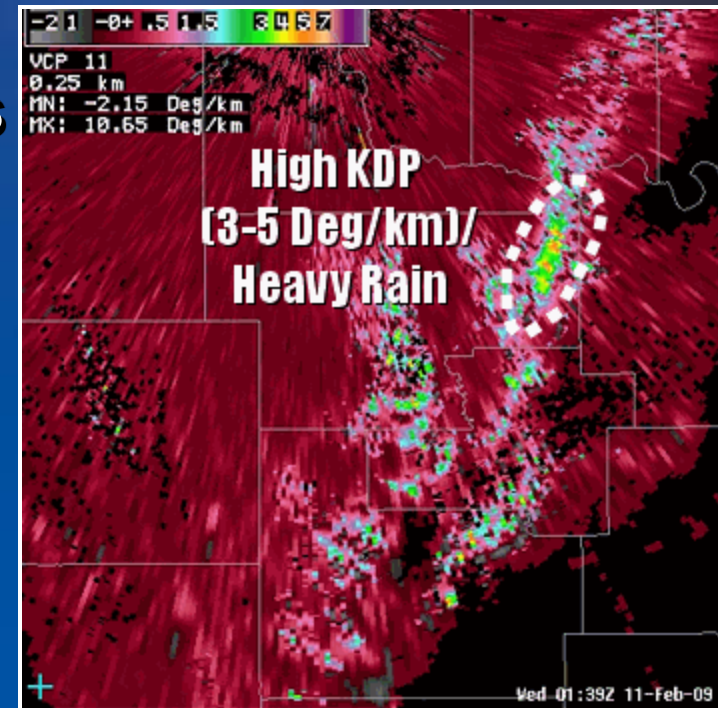




Specific Differential Phase



- Tells us how much liquid water is present in an area of precipitation
- Heavy Rain Detection
- Higher in hamburger buns than in meatballs





More Information

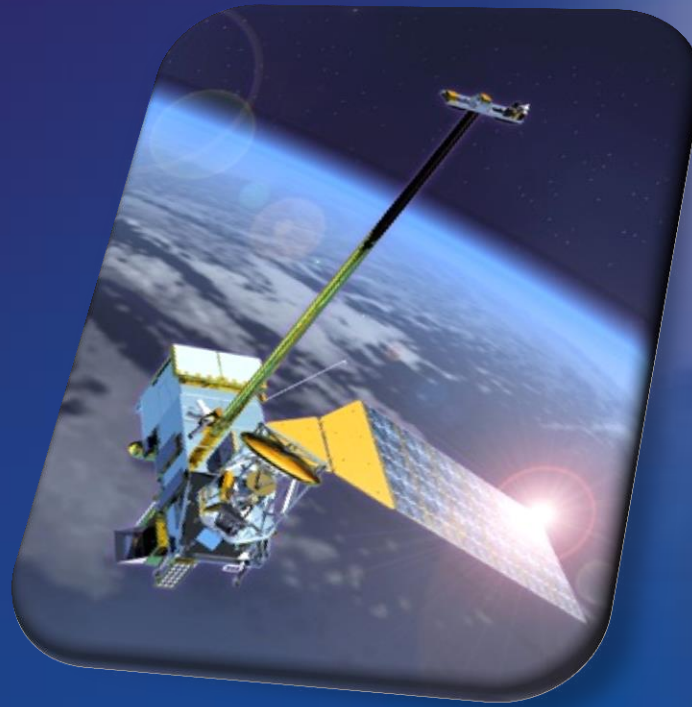
- <http://www.wdtb.noaa.gov/courses/dualpol/outreach/>



Training for the Non-Meteorologists:

The following lessons were developed to help non-meteorologists who rely on WSR-88D data to make weather-related decisions. These lessons are available in a streaming format that uses [Adobe Flash Player](#) and can be viewed using the links below. We recommend that students attempt these lessons **no more than 1 month prior** to the installation of dual-polarization technology at their local WSR-88D site.

- [Dual-Polarization Technology Overview](#) **Download**
- [Best Uses for the Hydrometeor Classification Product](#) **Download**
- [Best Uses for the Dual-Polarization Estimated Rainfall Amount Products](#) **Download**



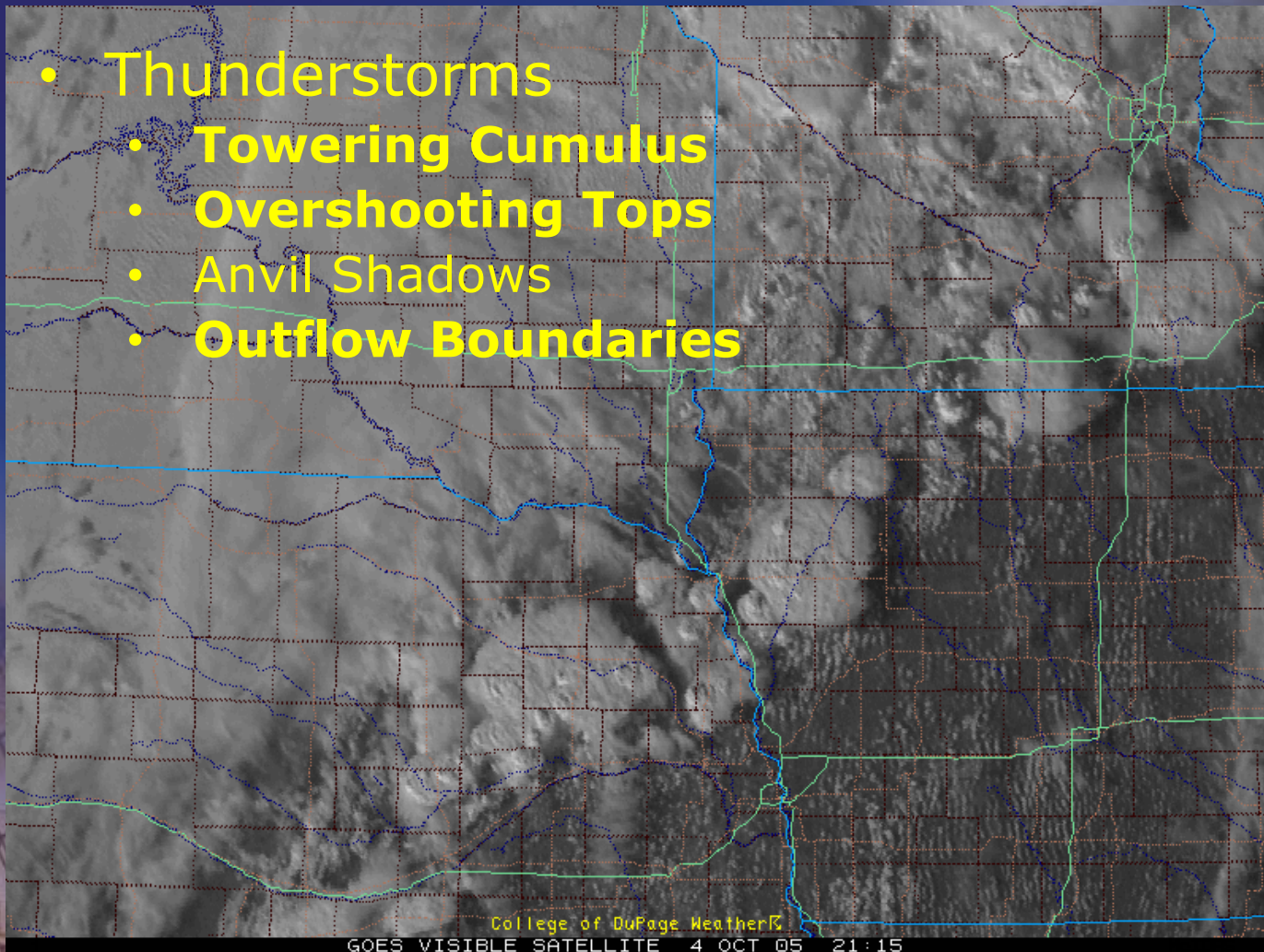
SATELLITE INTERPRETATION





Visible Satellite (VIS)

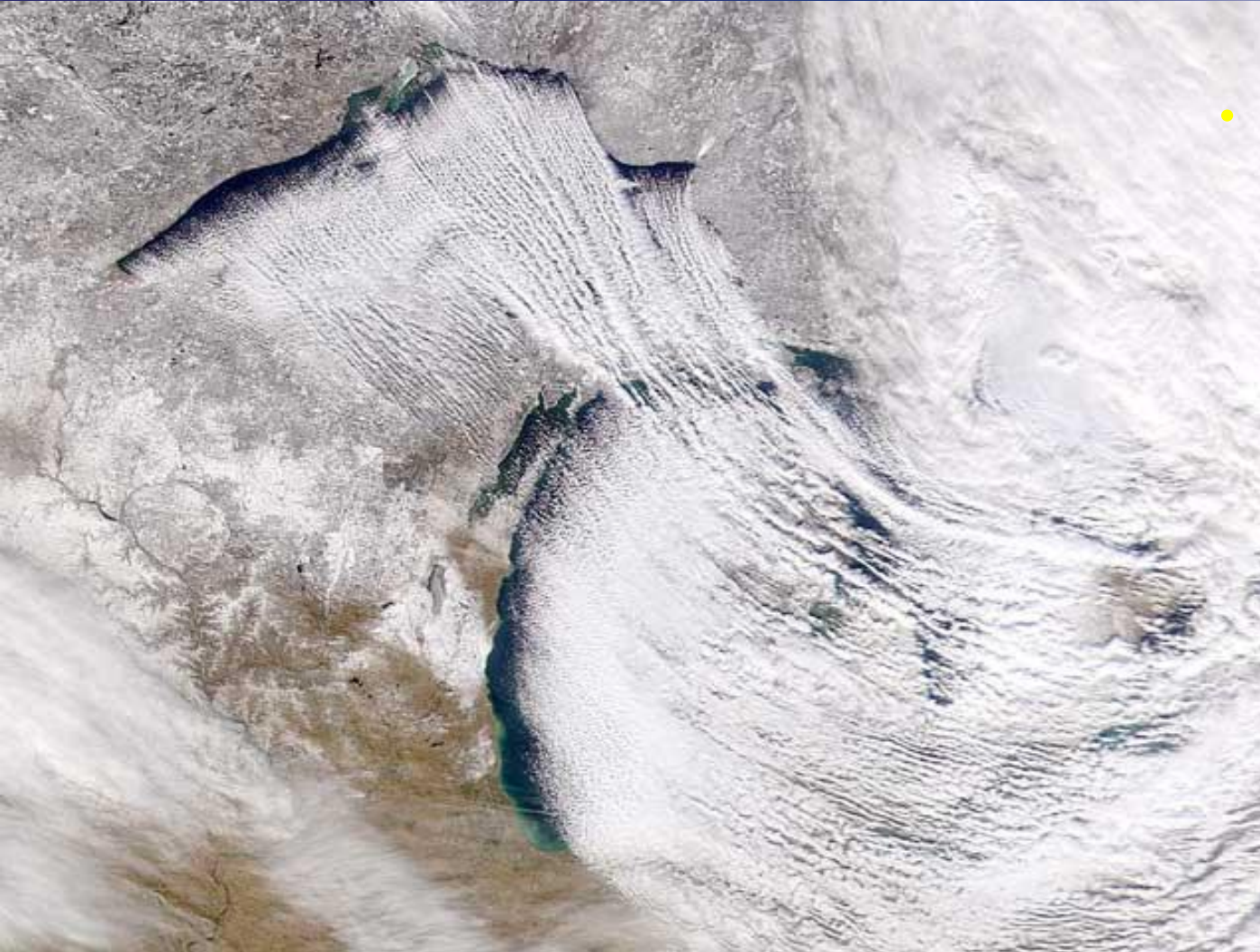
- Thunderstorms
 - Towering Cumulus
 - Overshooting Tops
 - Anvil Shadows
 - Outflow Boundaries



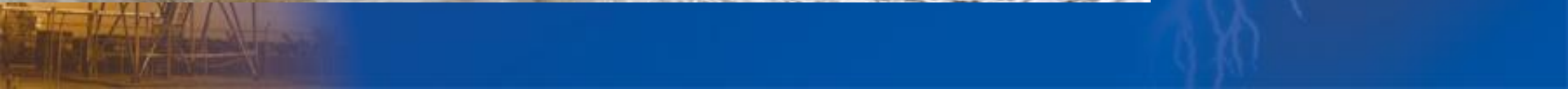
College of DuPage Weather
GOES VISIBLE SATELLITE 4 OCT 05 21:15



Visible Satellite (VIS)



- **Other Features**
 - **Lake Effect Clouds**
 - **Snow Cover**
 - **Fog**
 - **Marine Layer Clouds/Fog**
 - **Cirrus streaks (Jet Stream Features)**
 - **Hurricane Features**



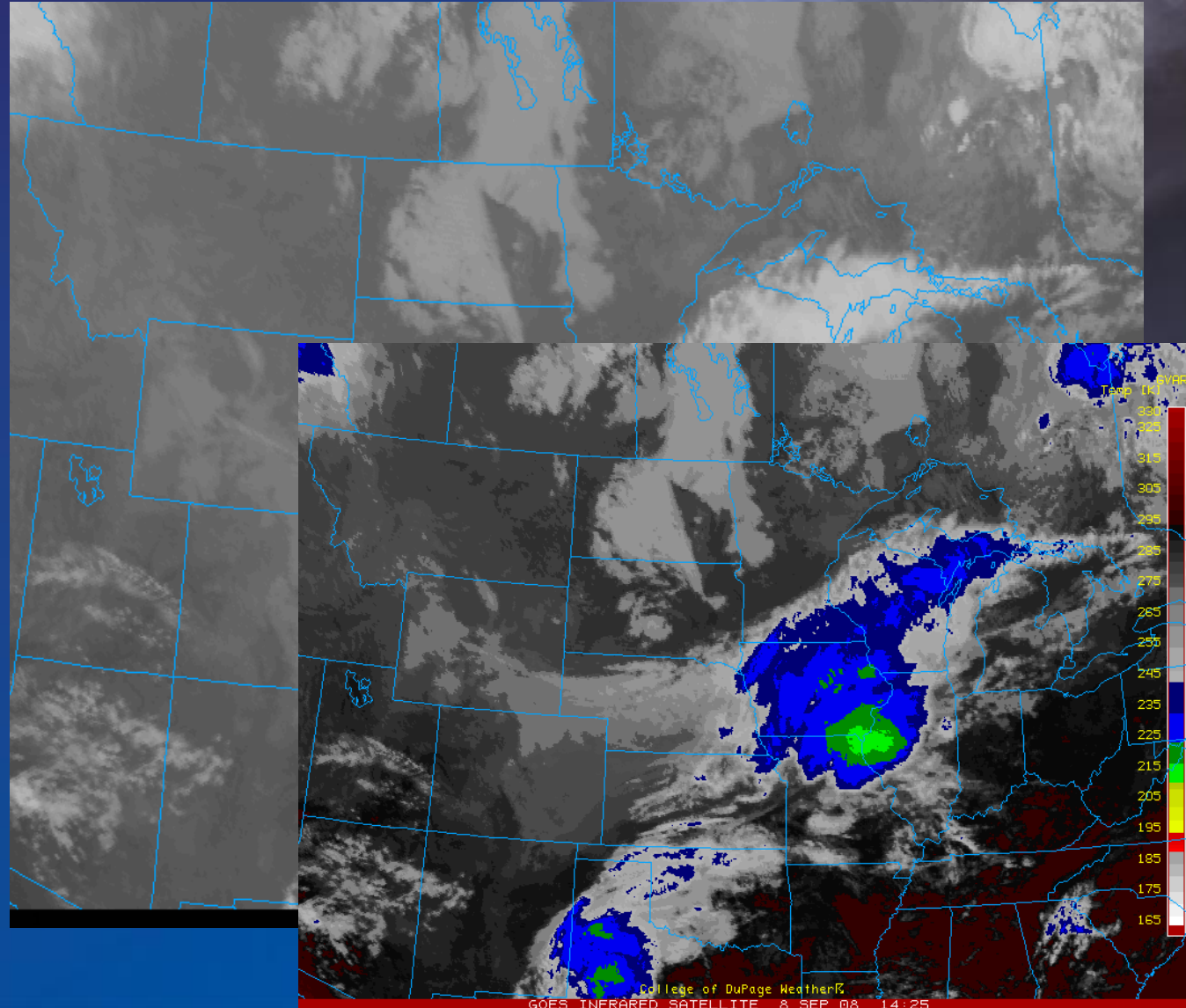


Infrared Satellite (IR)

- **Measures Temperature of Cloud Tops**

- Colder is Brighter (higher clouds)
- Warmer is Darker (lower clouds)

- *Now...
Use an enhancement*

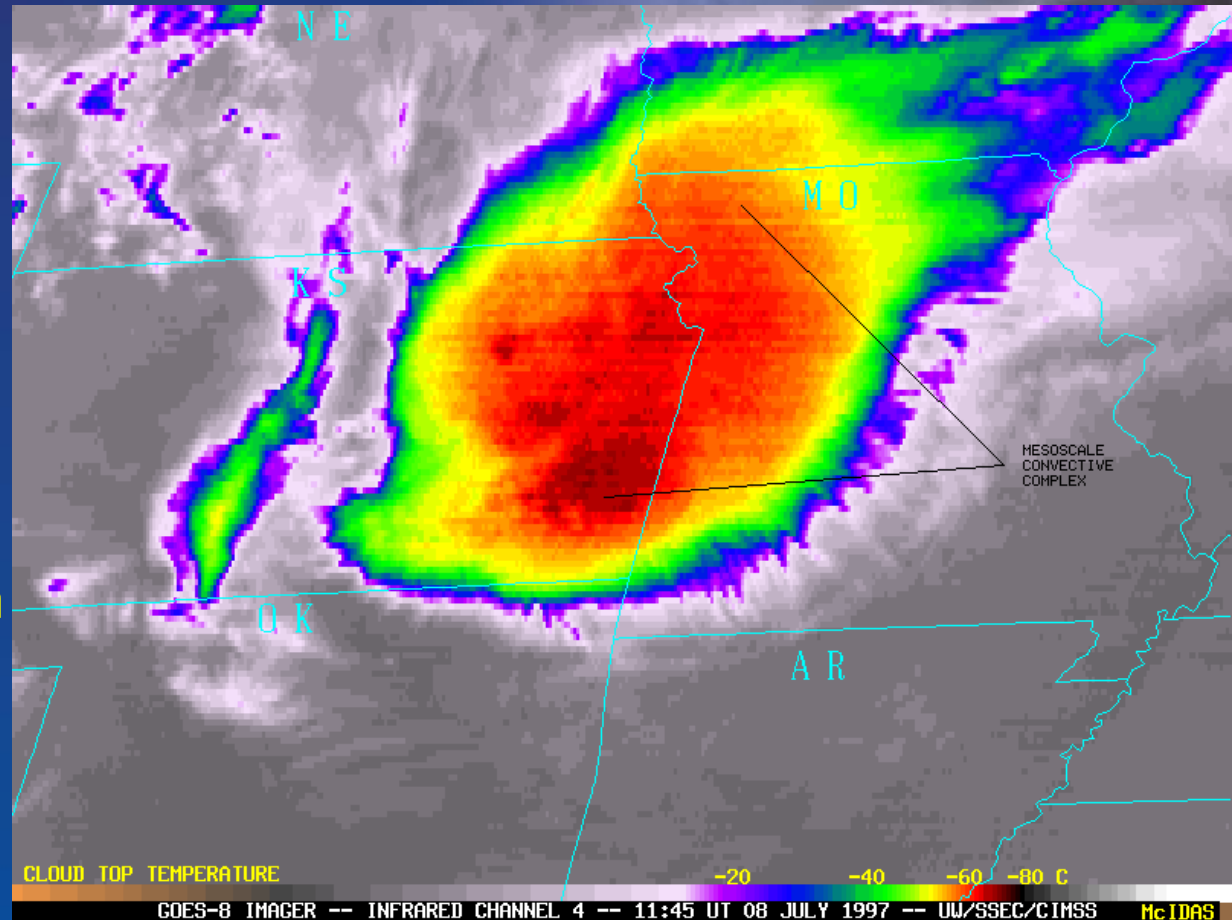




Infrared Satellite (IR)



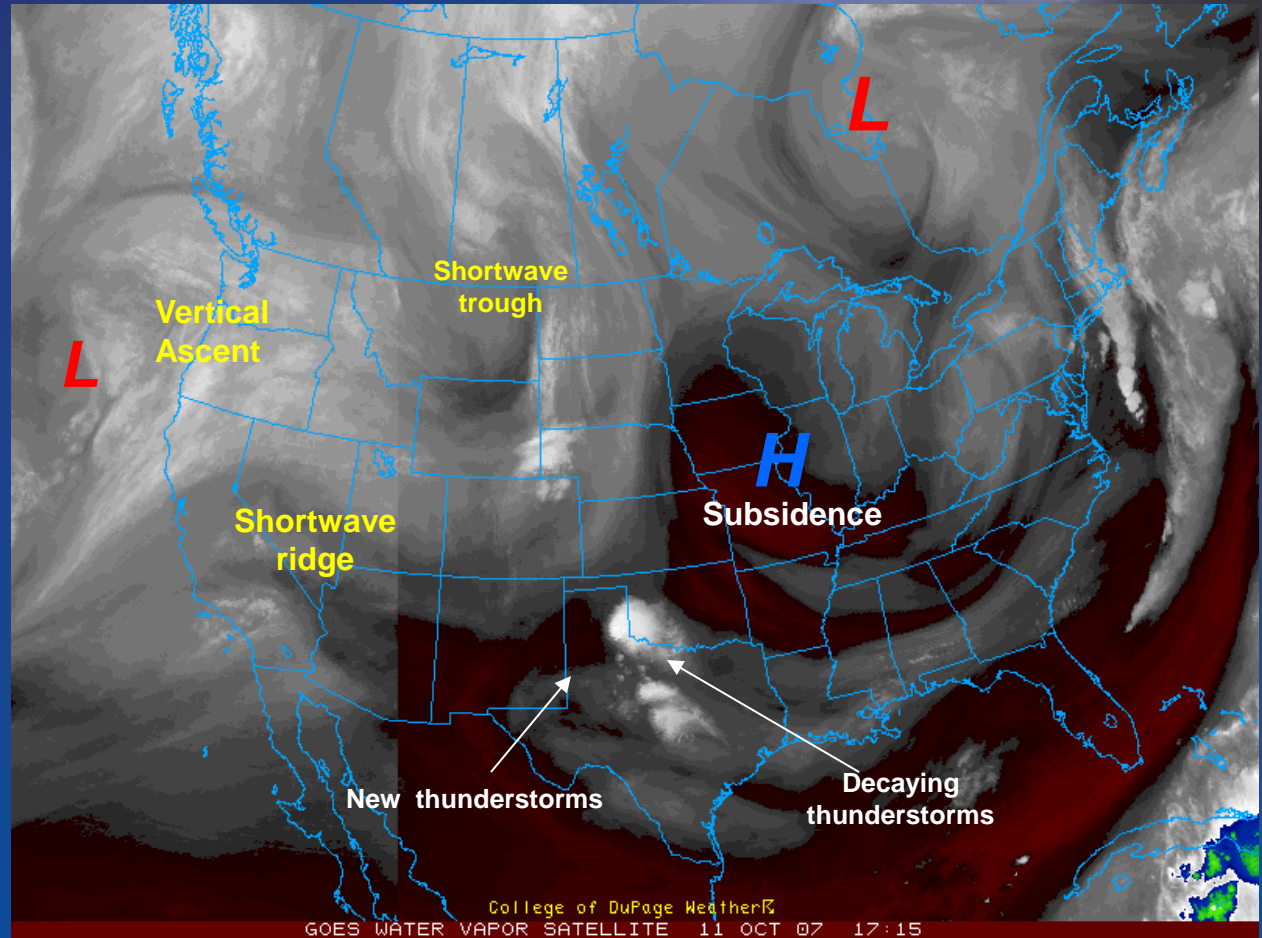
- Many Uses for IR
 - Convection Strength
 - Afternoon Drylines
 - Cyclone Development
 - Approach of Cold Airmasses
 - Hurricane Strength & Analysis





Water Vapor Satellite (WV)

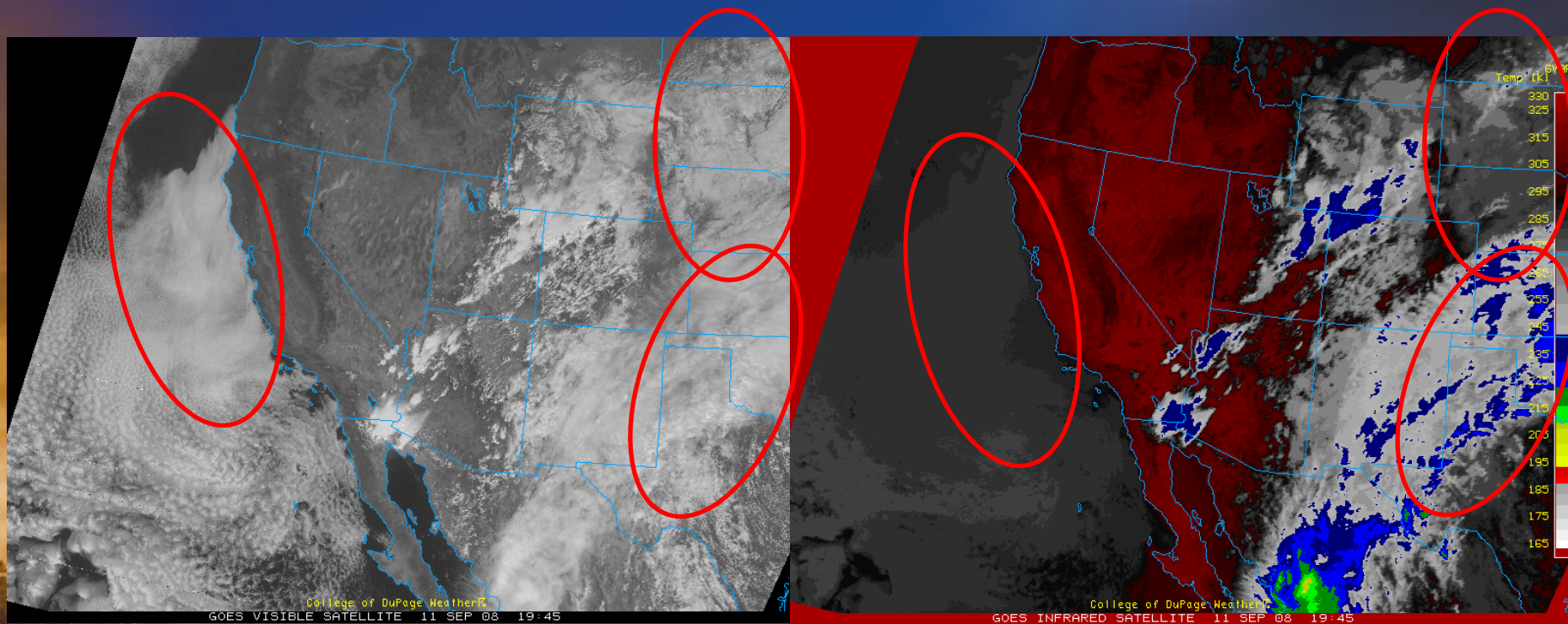
- Mid and Upper Levels of Atmosphere
 - **Brighter** → **More Moisture**
 - **Darker** → **Drier Air**





Applications of Satellite Products

- CA Coast: Marine Layer
- Dakotas/NE: Low Clouds
- Mexico → TX → KS: High Clouds





Terminal Aerodrome Forecasts TAFs





Terminal Aerodrome Forecasts (TAFs)



- TAF sites around the region
- 24- to 30-hour forecast
- 5-mile radius of site
- Forecast



- *Wind direction, speed*
- *Visibility*
- *Weather*
- *Ceiling Heights*

```
KUES 111801Z 1118/1218 05010G16KT 6SM HZ VCTS  
SCT005 SCT040CB  
TEMPO 1118/1121 3SM -TSRA BR BKN040CB  
FM112100 09007KT 6SM HZ VCTS SCT005 SCT040CB  
TEMPO 1121/1201 2SM TSRA SCT005 BKN030CB  
FM120100 17005KT 5SM BR SCT035 BKN120  
FM120600 23005KT 5SM BR SCT035 BKN120  
FM121500 17005KT 6SM HZ BKN120=
```




Flight Categories Amendment Criteria

Ceiling / Visibility Thresholds	CAC Flight Categories
2000 thru 3000 ft and/or 3 thru 5 sm	MVFR
< 2000 ft and/or < 3 sm	Must File Alternate
< 1000 ft and/or < 3 sm	IFR
< 600 ft and/or < 2 sm	Alternate Landing Minimums
< 200 ft and/or < ½ sm	Airfield Landing Minimums

- We amend when we expect flight category to change
- LLWS (>20 KT within 2000 ft of ground), PIREPS help



TAF Hints

KMSN 240728Z 2407/2506 VRB06KT 3SM TSRA BR SCT015 OVC023CB

TEMPO 2408/2411 1SM +TSRA BKN015CB

FM241200 VRB05KT 3SM BR BKN007 OVC020

FM241500 14006KT 6SM BR SCT007 BKN015 OVC150

FM241700 20004KT P6SM BKN025

**FM241900 26006KT P6SM BKN035 PROB30 2419/2423 5SM TSRA
BKN025CB**

FM250300 01004KT 6SM BR BKN070=

- A scattered group before a ceiling group may hint that ceilings could become lower
- 6SM visibility may hint that visibilities could be lower (MVFR)



Aviation Forecast Discussion

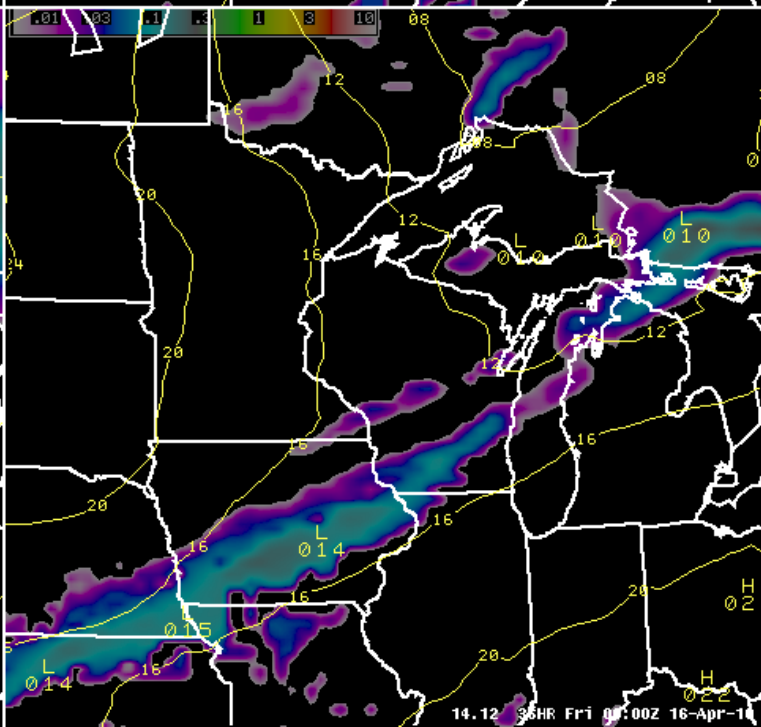
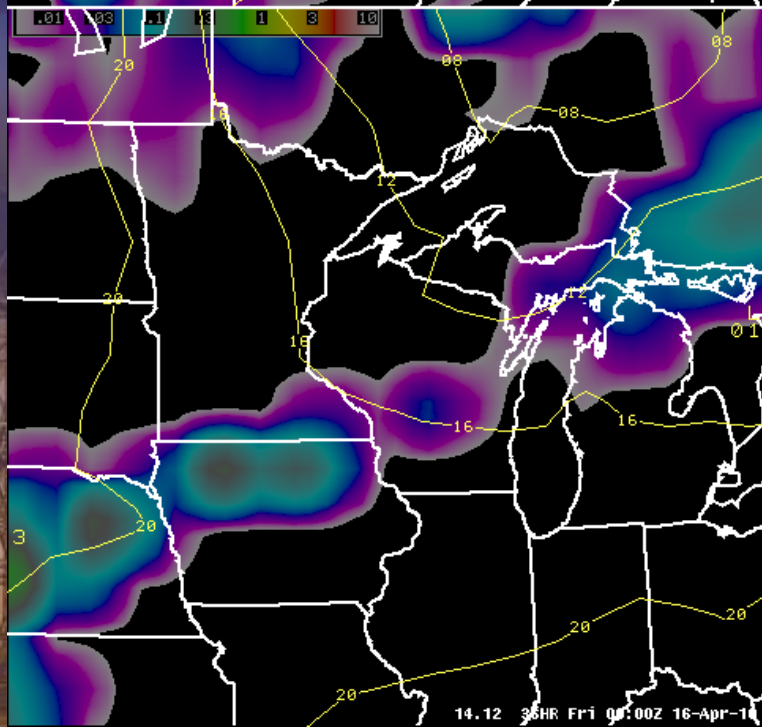
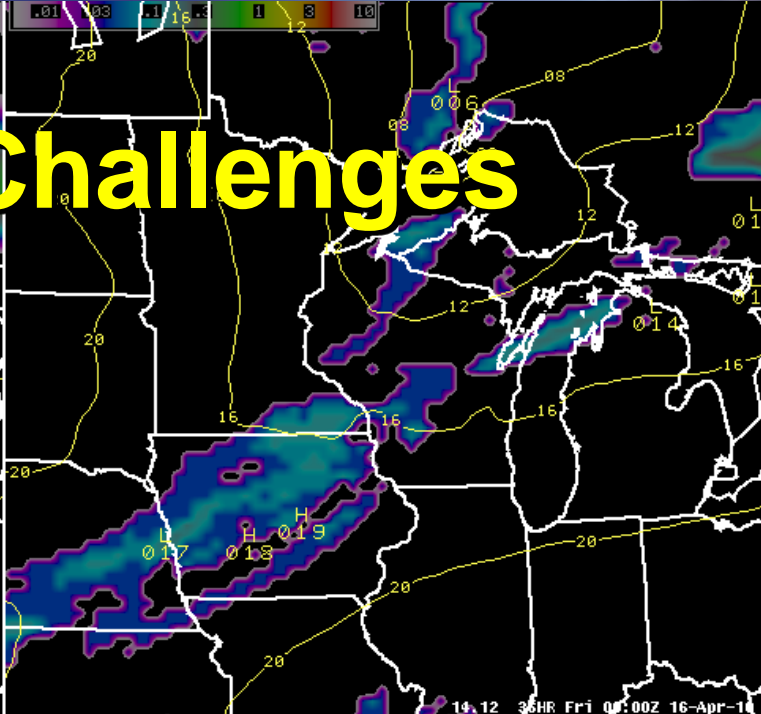
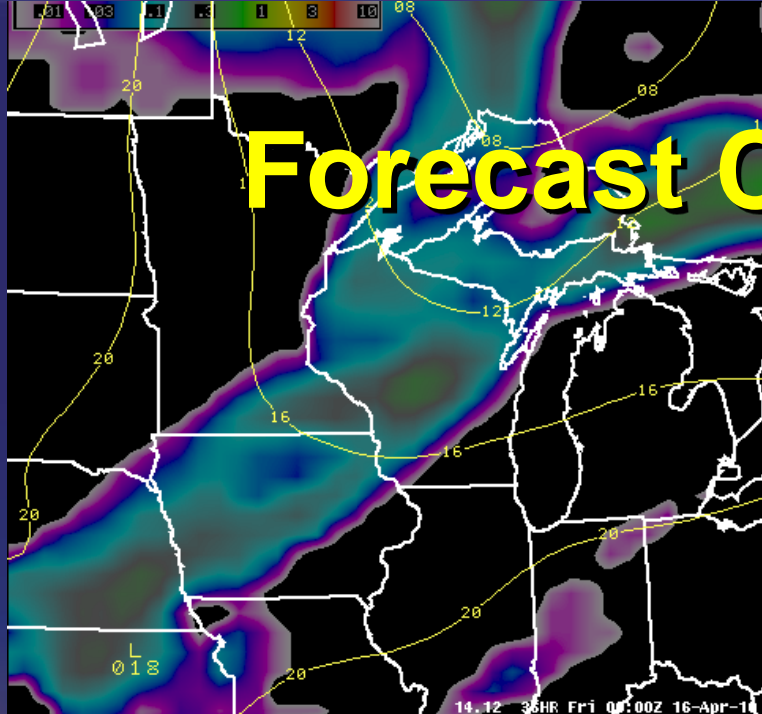


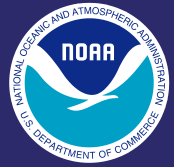
Found at bottom of Area Forecast Discussion (AFD)

.AVIATION...SOME LINGERING LOWER CLOUDS IN THE SOUTHEAST...MAINLY MVFR...SHOULD CLEAR OUT BY 12Z THIS MORNING. VFR THEREAFTER AS DRY AIR WORKS IN. ATMOSPHERE DESTABILIZES THIS AFTERNOON TO BRING A SMALL CHANCE FOR MAINLY AFTERNOON INTO EARLY EVENING SHOWERS AND THUNDERSTORMS. A WEAK MID LEVEL SHORTWAVE ARRIVING THIS AFTERNOON WILL ADD SOME DEEPER LIFT TO THE INSTABILITY. ANY SHOWERS WILL DIMINISH QUICKLY IN THE DIURNAL DOWNSWING THIS EVENING...WITH SKIES CLEARING OUT OVERNIGHT.

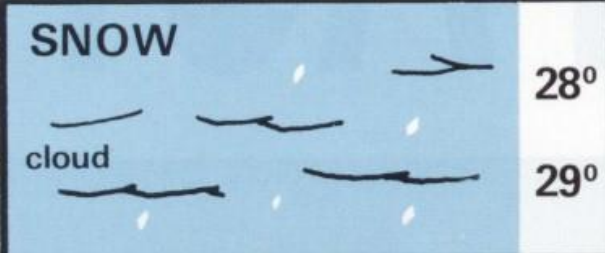

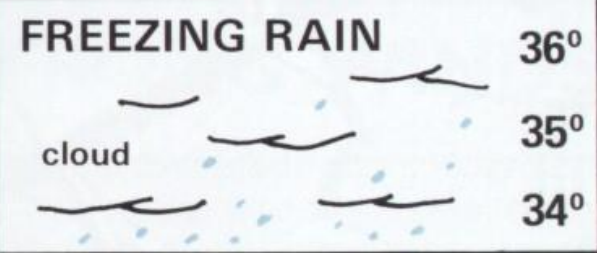





Forecast Challenges





What Kind of Precipitation?

SNOW	SLEET	FREEZING RAIN
 <p>cloud</p>	 <p>cloud</p>	 <p>cloud</p>
28° 29°	34° 33° 32°	36° 35° 34°
		
30° 31° 31° 30°	31° 30° 30° 30°	33° 32° 31°
Cloud temperature is cold enough for snow to form; air above the ground does not melt it. 30°	Rain freezes to ice pellets which do not stick to surfaces, but accumulate on the ground. 30°	Glaze of ice forms over surfaces. 30°





Convection Basics



- Moisture
- Instability
- Lift
- Wind Shear (for severe storms)

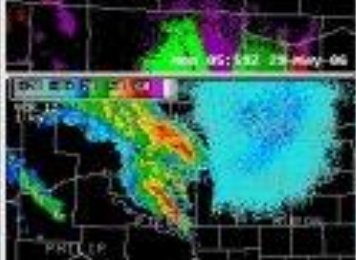
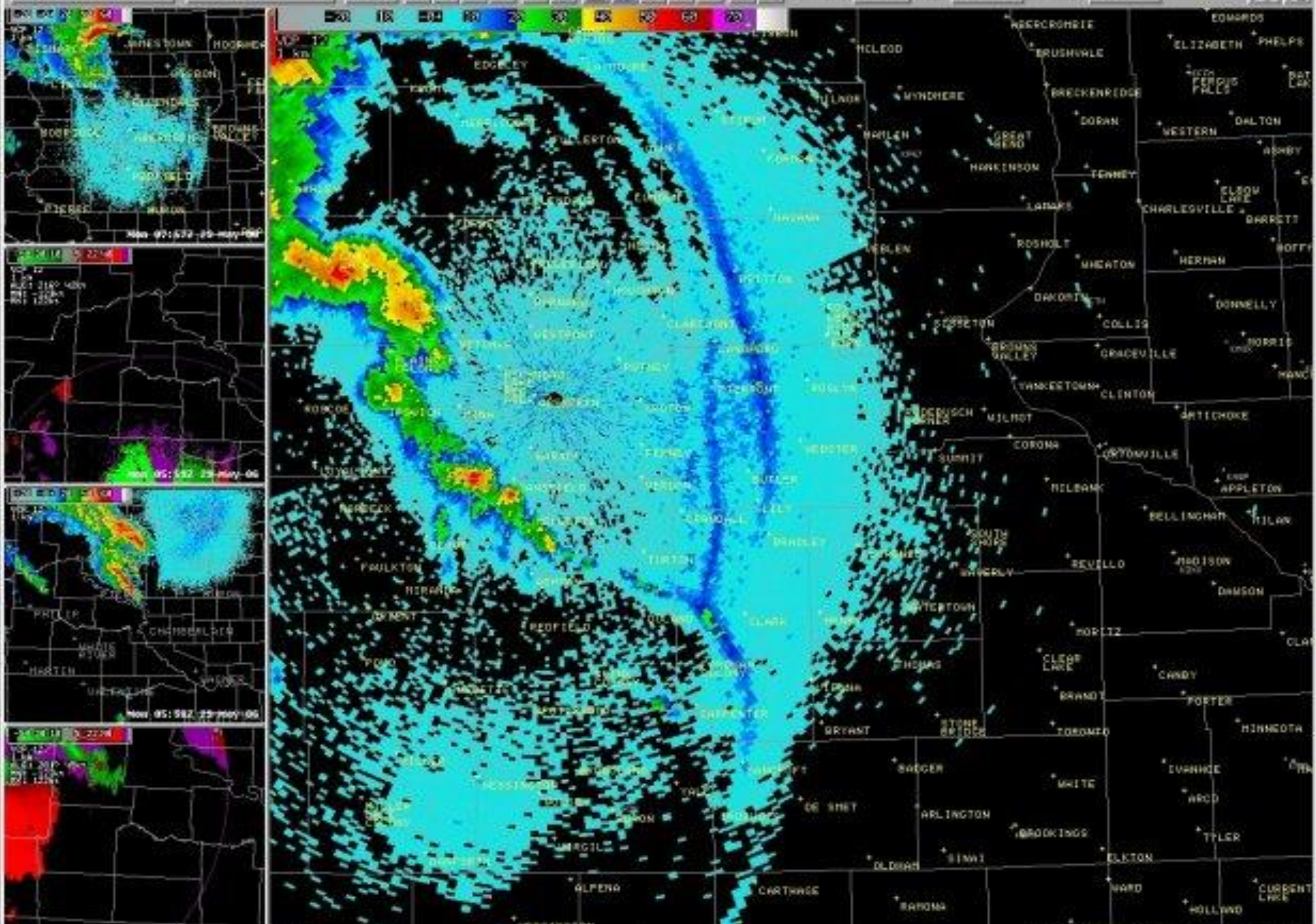


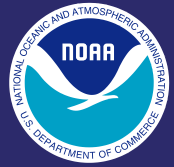


“Triggering” Mechanisms



- **Starts the convection**
 - *Low pressure systems*
 - *Air mass boundaries, Fronts*
 - *Sea/Lake Breeze*
 - *Thunderstorm ‘outflow boundaries’*
 - *Orographic lift*

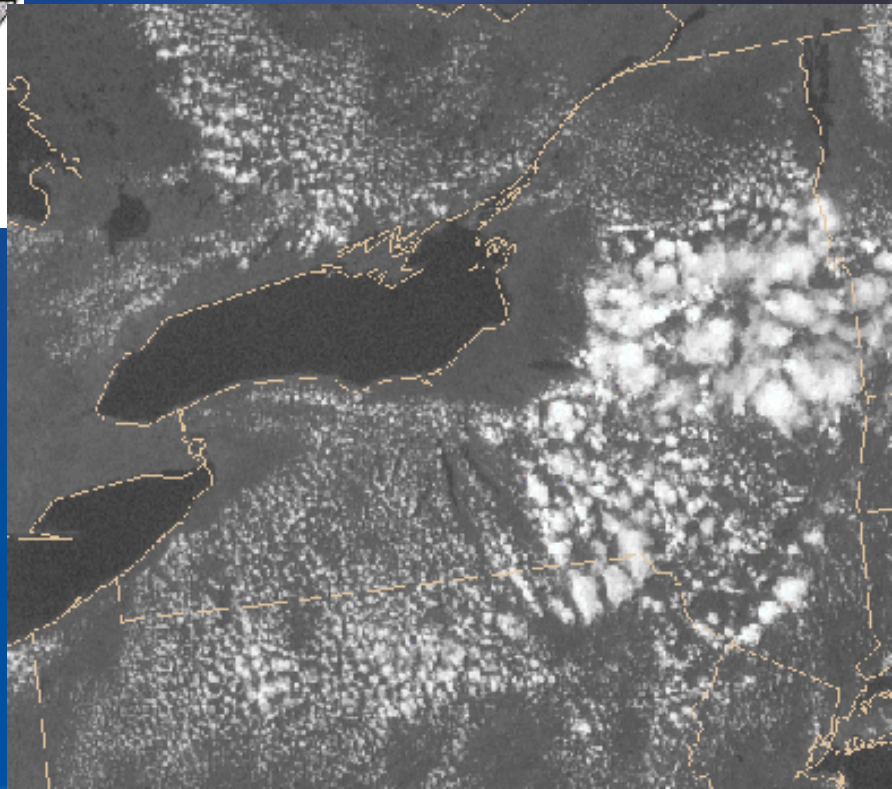
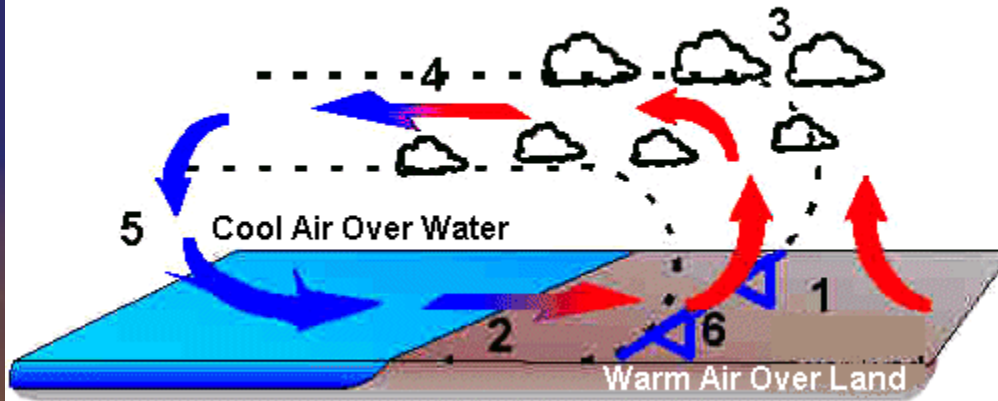




Lake Breeze



Sea Breeze Circulation



Four Types of Thunderstorms

Single
Cell

Multicell
Cluster

Multicell
Line

Supercell

Weak updraft
(non-severe
or severe)

Moderate
updraft (non-
severe
or severe)

Moderate
updraft (non-
severe
or severe)

Intense updraft
(Always severe)

**Mesocyclone -
Rotating updraft**

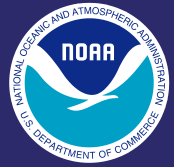
Slight threat

*Moderate
threat*

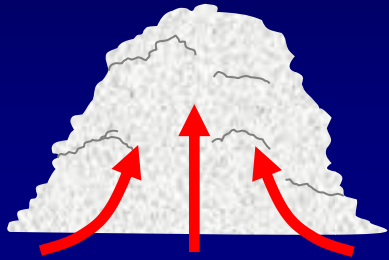
*Moderate
threat*

High threat

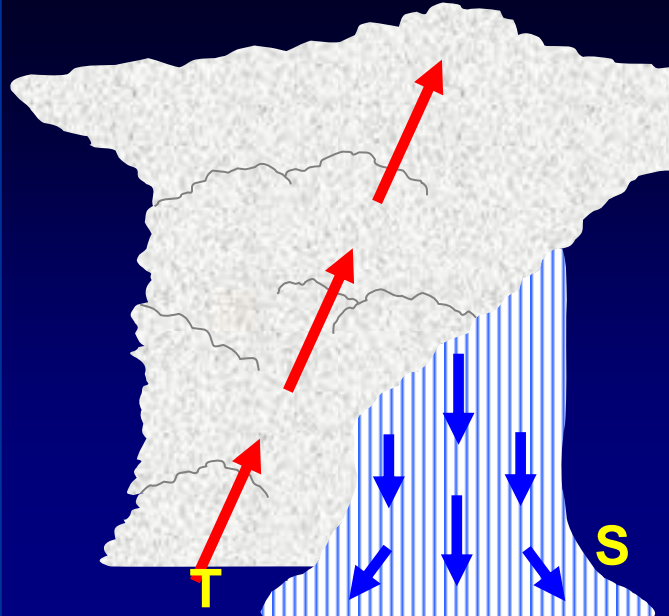




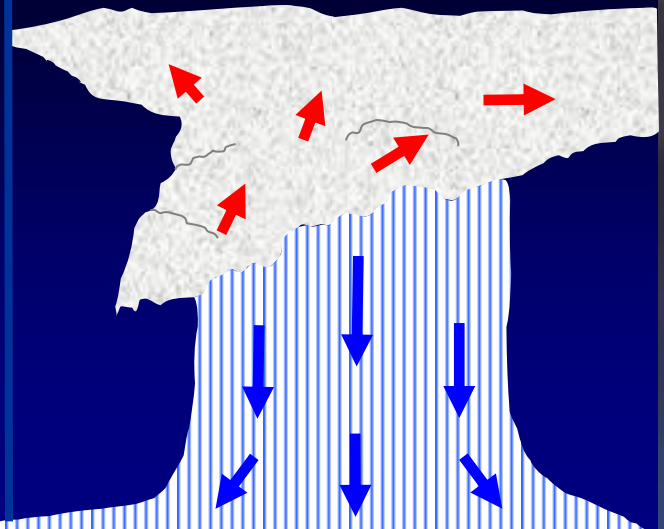
Thunderstorm Life Cycle



Cumulus Stage



Mature Stage



Dissipation Stage



©2001 Chris Kridler
skydiary.com



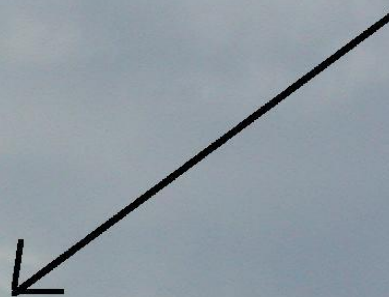


**Keep distance of
At least 20 miles from
Severe Thunderstorm
Such as this**

Overshooting Top



Mixed Icing



Hard Edges

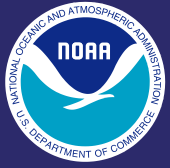
Clear Icing

Severe or Extreme Turbulence

**Area with Low Visibilities
Hail, Wind Shear**



Microbursts



Brief Icing Overview





Brief Icing Overview



Types of Icing

- Rime (most common)
- Clear
- Mixed

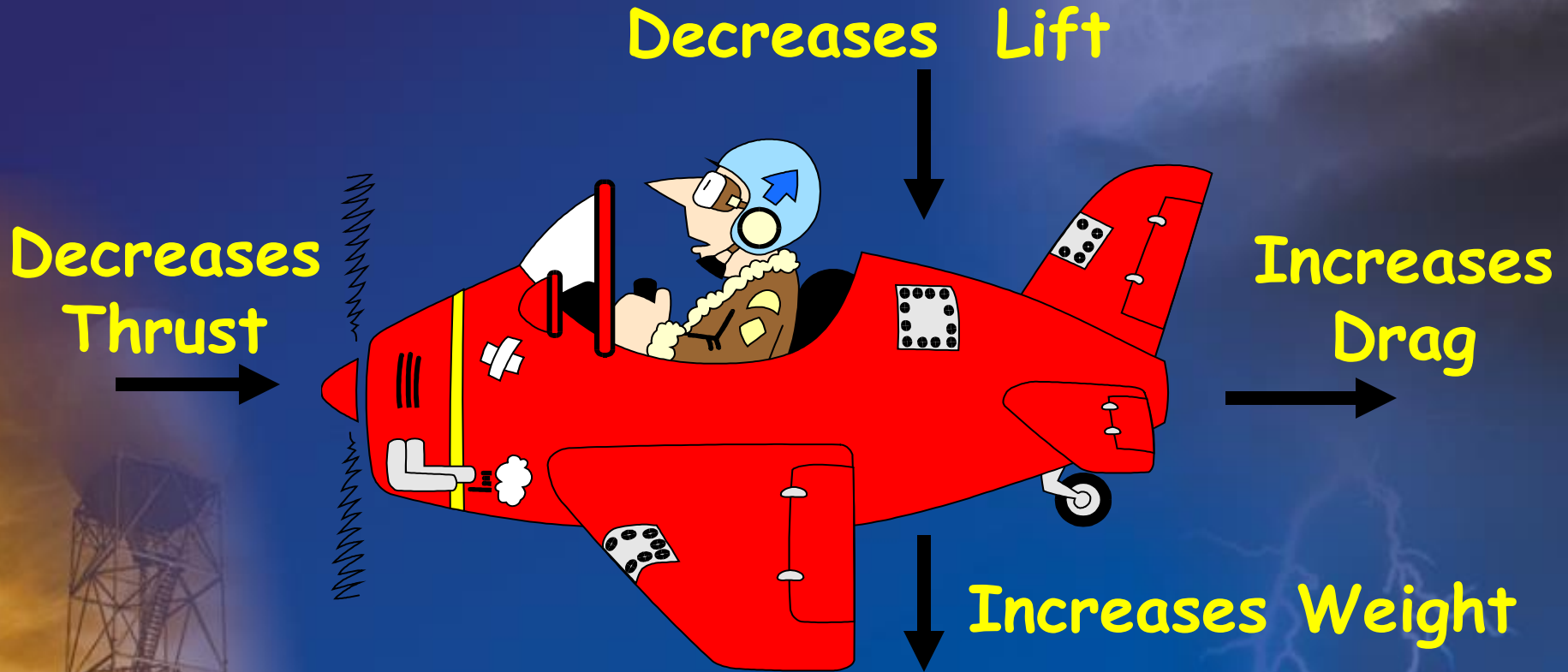
Causes of Icing

- Supercooled Liquid Water Droplets
 - *Strike leading edge of airfoil*
 - *Freeze on impact*
- Residence time in cloud
- Forms 0°C to -20°C
- Common Temp -8 to -12C





Cumulative Affects of Icing



from Sally Pavlow, NWS Louisville



Lightning



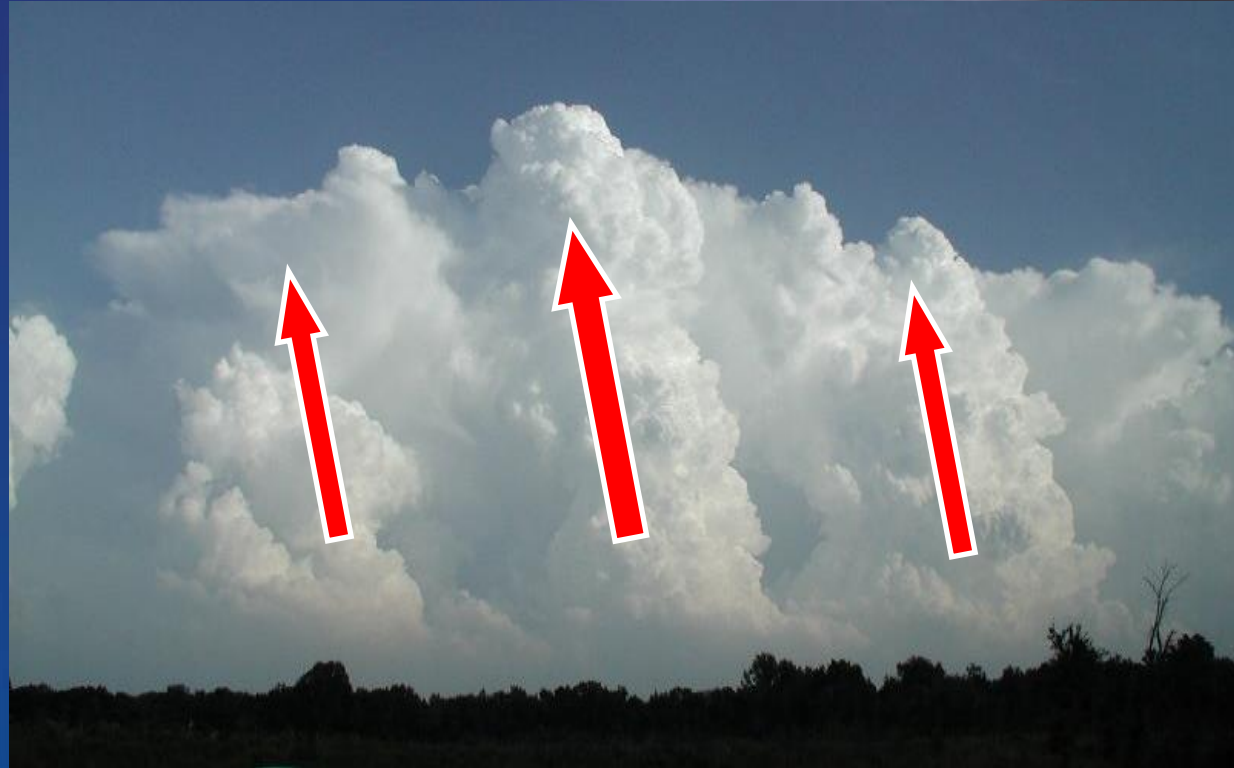


Multi-Cell Thunderstorms



Ordinary, non-organized storms with low severe threat

Each cell lasts 20-30 minutes, but a cluster can last for hours



Heavy rain is the main problem

Strong winds, small hail and weak tornadoes are possible



Multi-Cell Thunderstorms



Ordinary, scattered storms with low severe threat

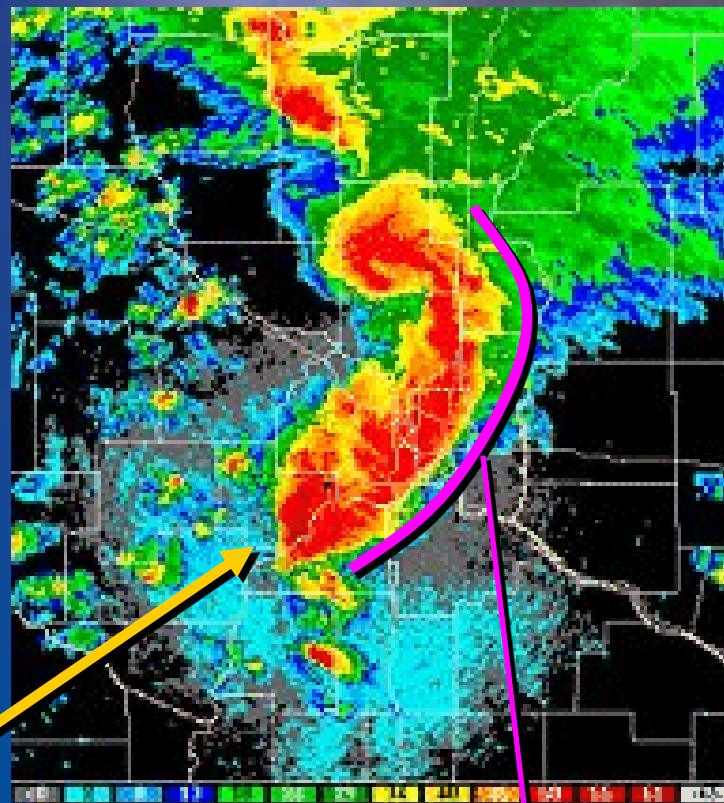




Squall Line - Bow Echo



**This shelf cloud is ahead of
bow echo on right!**

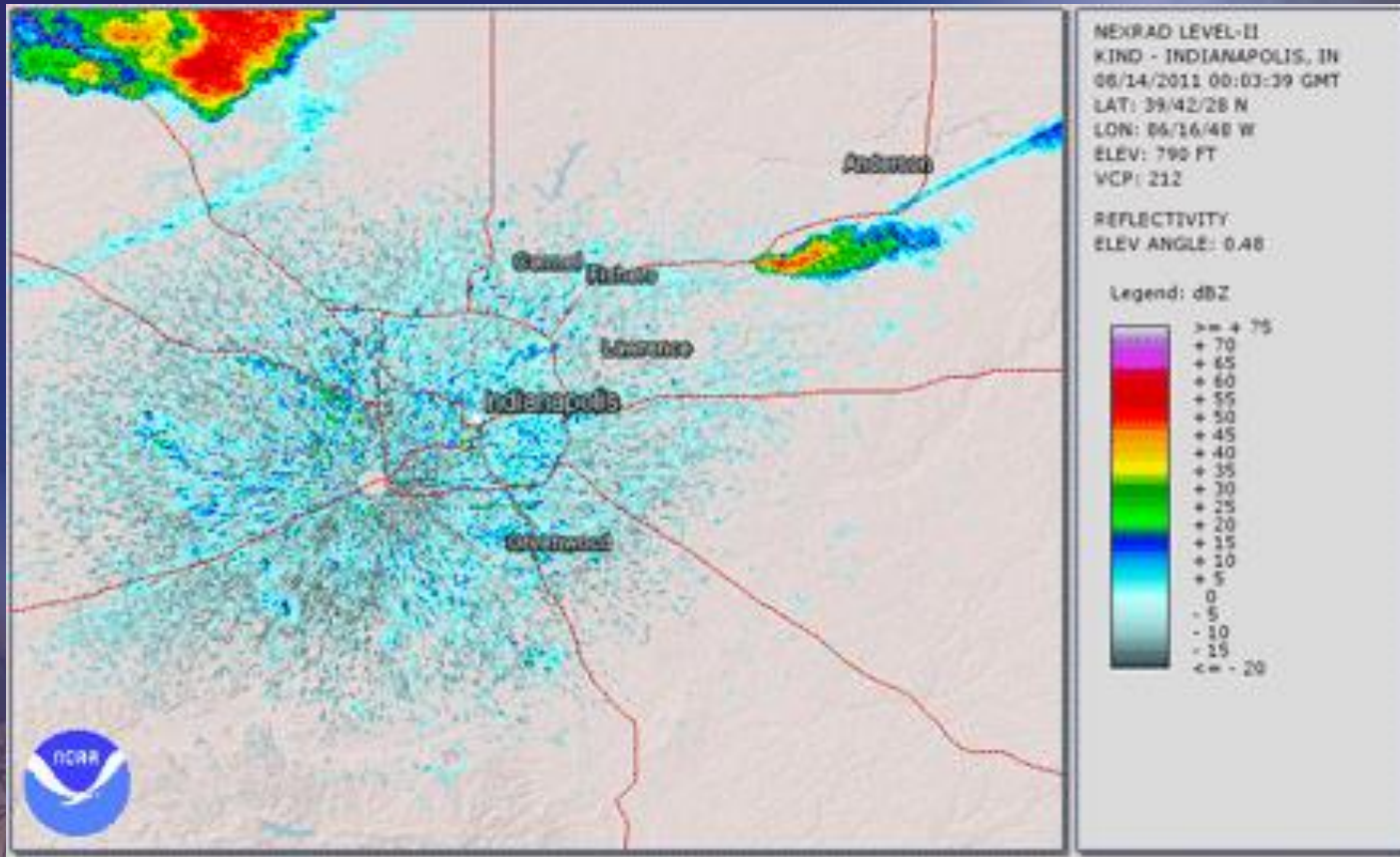


**Storm moving left
to right (W-E)**

Well-developed shelf cloud is
found on front side of line



8-13-2011 Indy State Fair



Straight-lined winds on leading edge of squall line
7 Fatalities, 43 injured, Estimated Wind Gusts 70 mph



Hail Shaft



Copyright Paul Craven

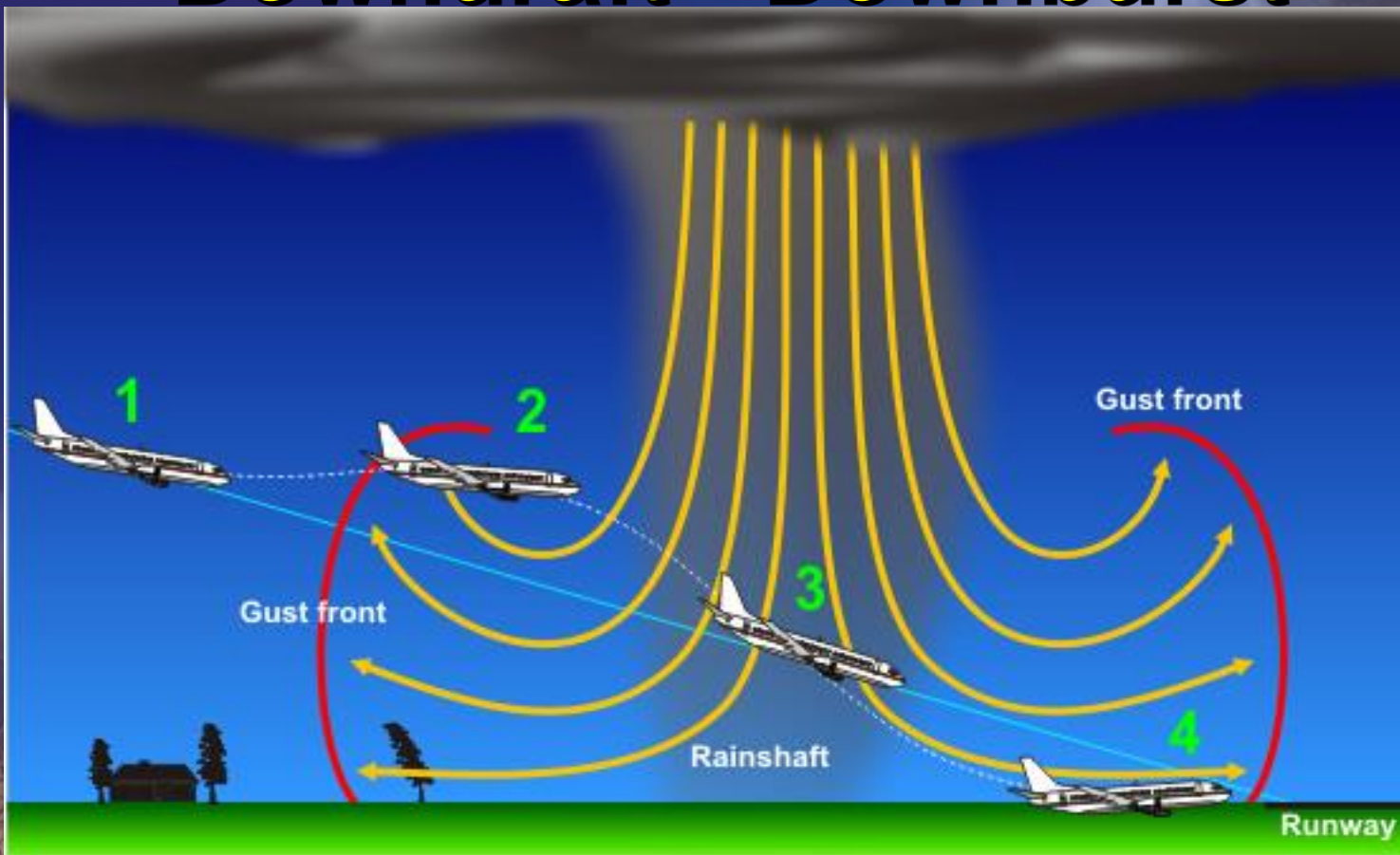


Hail Damage





Downdraft - Downburst



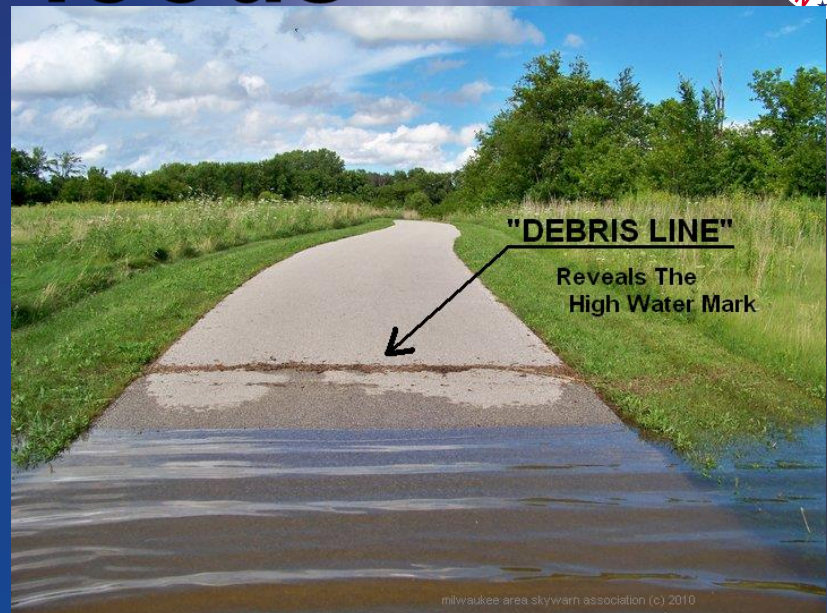
Gust Front - is leading edge of downdraft/
downburst, you don't see it but you do feel it as winds
pick up and temperatures drop and then rain/hail start.



Flash Floods



NIGHT TIME FLOODING:
Judging Water Depth Can Be Difficult
Turn Around - Don't Drown



ABOVE THE ROAD



BELOW THE ROAD

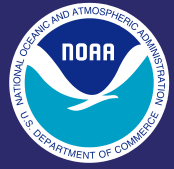
AVOID
DIRT ROADS AT LOW WATER CROSSINGS

CREVASSES BELOW THE WATER ARE NOT SEEN UNTIL AFTER THE FLOOD WATERS HAVE DRAINED AWAY

mike-skywarn.org



Photo by Melody Bergdahl
Near Lindsey, WI - Sept. 23, 2010



Rotation in Updraft Tower



Spiral bands and cork-screw look





Rotating Wall Clouds

An isolated lowering of the rain-free base, rotating on a vertical axis



A good number of, but not all, tornadoes develop underneath or near a rotating wall cloud



Funnel Clouds



Doug Raflik



Doug Raflik





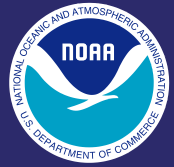
Tornado



Lone Tree, IA May 15, 1998

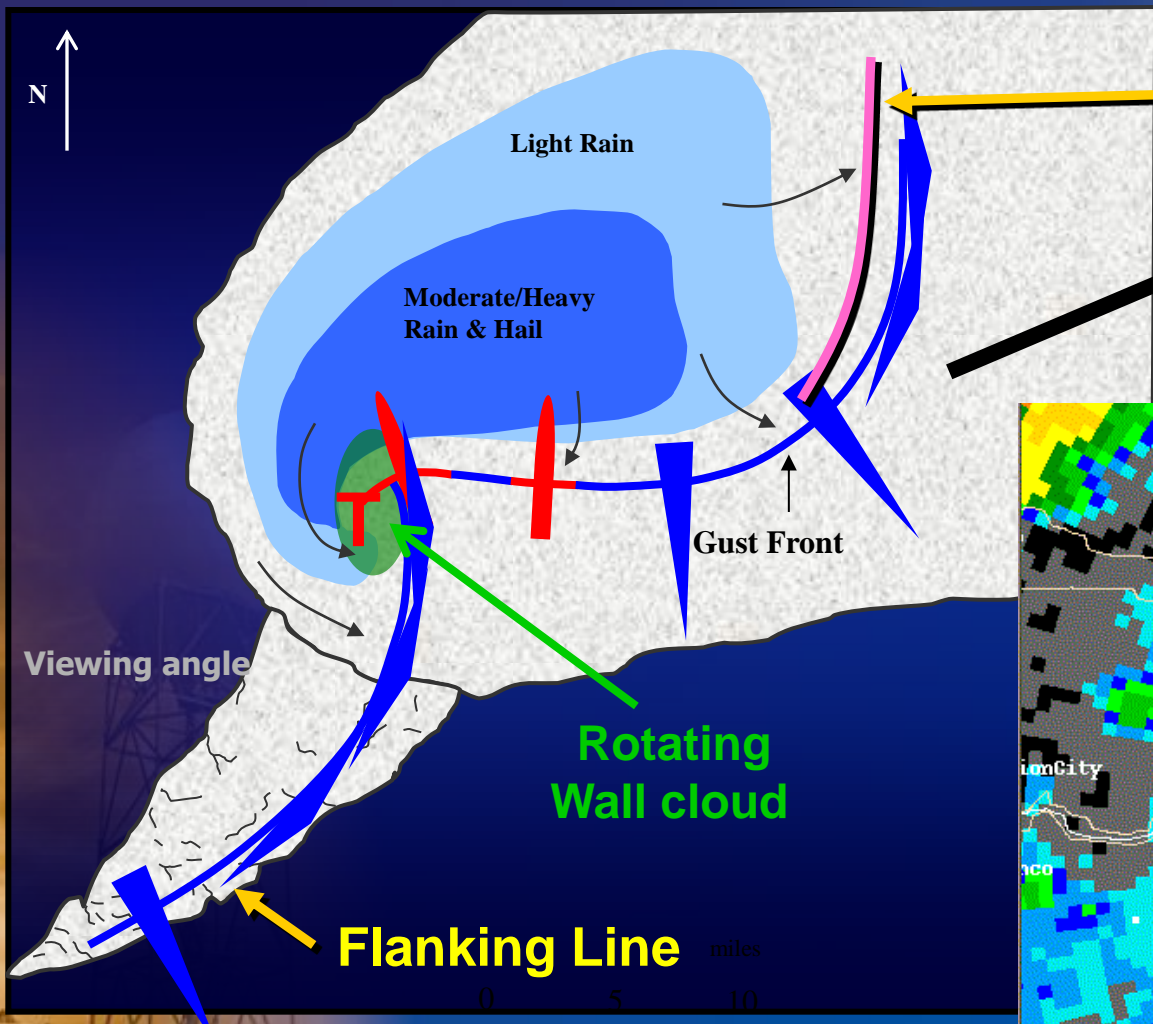
5:39:03 PM

©1998 Brian Jewett



Tornadic Supercell Thunderstorm

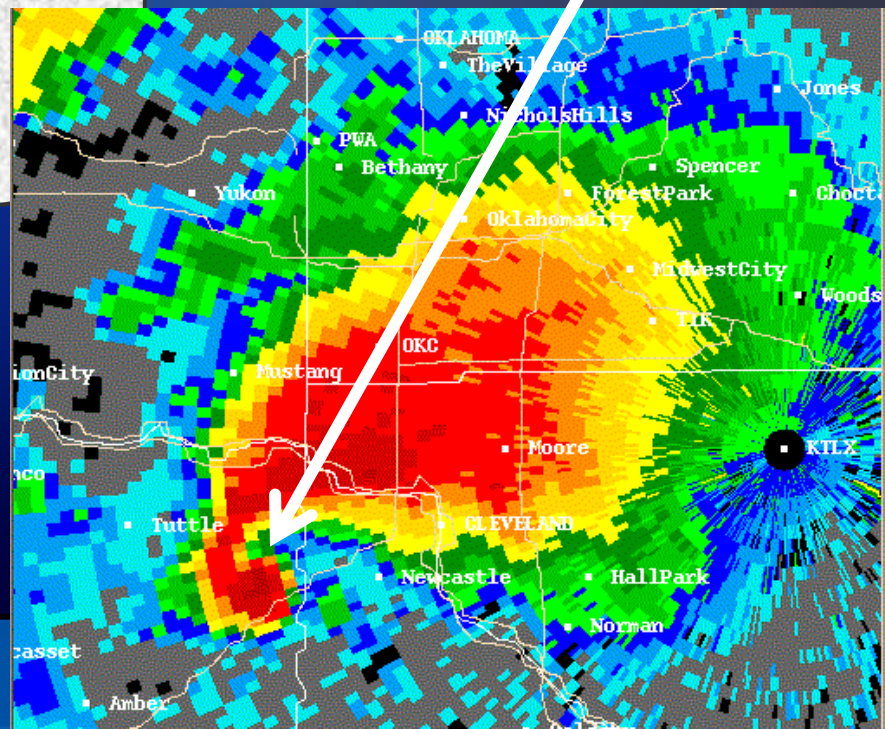
top-down view



**Shelf
Cloud**

Storm motion

**Hook Echo
(tornado
found in rain-
free area
within hook)**



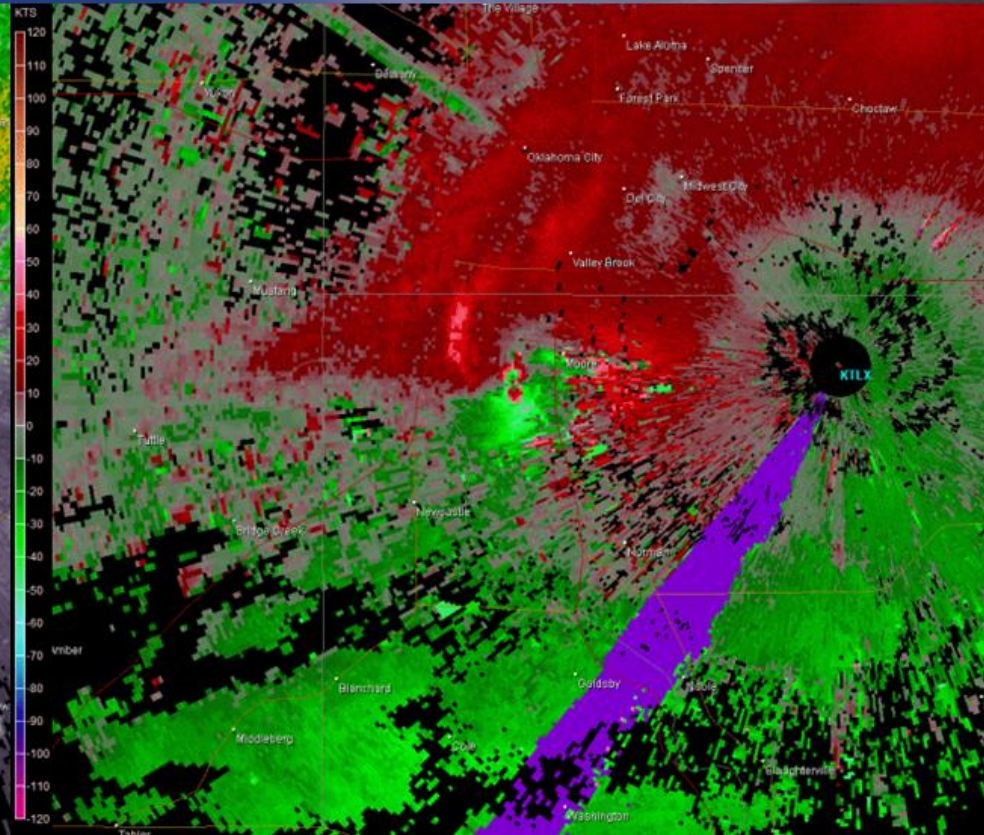
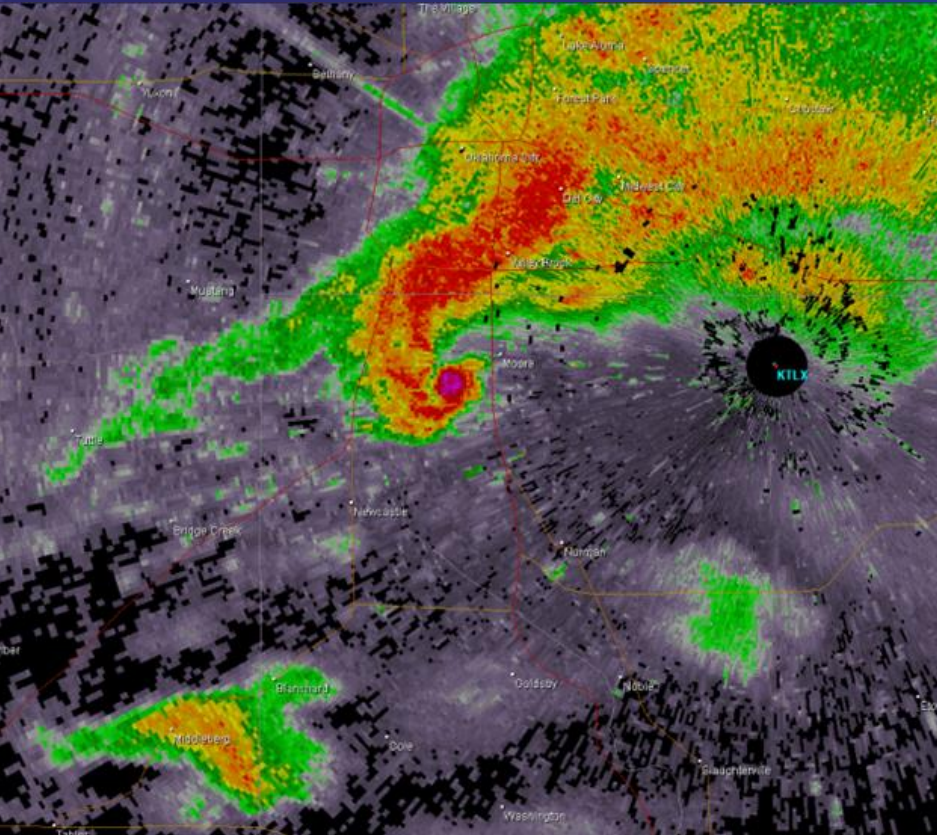


Radar Loops

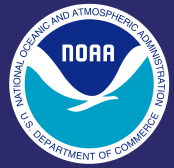


Base Reflectivity

Storm Relative Velocity



May 20, 2013 Moore, OK



Wisconsin Tornadoes 1950-2011

Credit: Doug Norgord, Geographic Techniques





Personal Safety



This was a weak tornado – what about a strong or violent tornado?



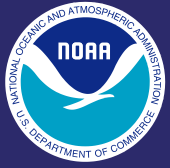


Goals of Presentation



- **Make more informed decisions**
- **Know where to find additional weather information**





Weather.gov

Local forecast by *City, ST* or ZIP code
Enter location ...
[Location Help](#)

2013 National Tsunami Preparedness Week

It is National Tsunami Preparedness Week (March 24-30, 2013). If you live near or visit a coastal area, would you know what to do if a tsunami hit? Learn how to become TsunamiReady: [Read More](#)

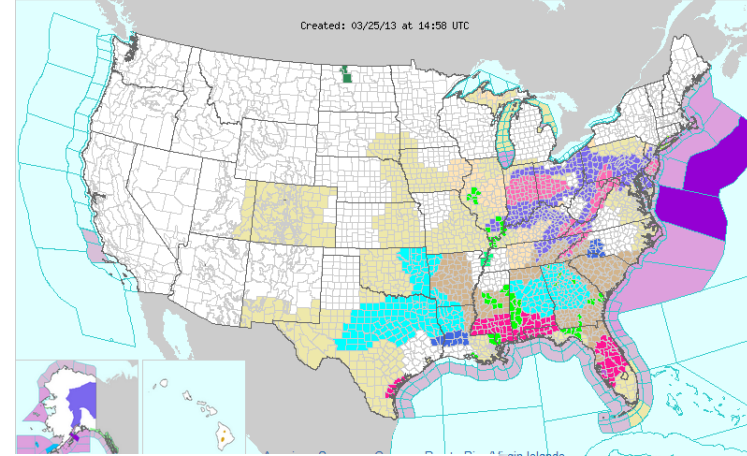
Customize Your Weather.gov

City, ST

Enter Your City, ST or ZIP Code

Remember Me

[Privacy Policy](#)



ACTIVE ALERTS

- Warnings By State
- Excessive Rainfall and Winter Weather Forecasts
- River Flooding
- Latest Warnings
- Thunderstorm/Tornado Outlook
- Hurricanes
- Fire Weather Outlooks
- UV Alerts
- Drought
- Space Weather
- NOAA Weather Radio
- NWS CAP Feeds

PAST WEATHER

- Past Weather
- Climate Monitoring
- Heating/Cooling Days
- Monthly Temps
- Records
- Astronomical Data
- Certified Weather Data

CURRENT CONDITIONS

- Radar
- Climate Monitoring
- River Levels
- Observed Precipitation
- Surface Weather
- Upper Air
- Marine and Buoy Reports
- Snow Cover
- Satellite
- Space Weather

FORECAST

- Local Forecast
- Severe Weather
- Current Outlook Maps
- Drought
- Fire Weather
- Fronts/Precipitation Maps
- Current Graphical Forecast
- Maps
- Rivers
- Marine
- Offshore and High Seas
- Hurricanes
- Aviation Weather
- Climatic Outlook

INFORMATION CENTER

- Space Weather
- Tsunami
- For Developers
- Storm Spotters
- Cooperative Observers
- GIS
- Water
- Forecast Models
- Aviation**
- Fire Weather
- Climate
- Marine
- Daily Briefing
- Facts and Figures

WEATHER SAFETY

- NOAA Weather Radio
- StormReady
- Heat
- Lightning
- Hurricanes
- Thunderstorms
- Tornadoes
- Severe Weather
- Rip Currents
- Floods
- Winter Weather
- Ultra Violet Radiation
- Air Quality
- Damage/Fatality/Injury Statistics
- Red Cross
- Federal Emergency Management Agency (FEMA)
- Brochures

NEWS

- Newsroom
- Social Media
- Events
- Pubs/Brochures/Booklets

EDUCATION

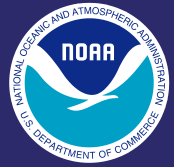
- NOAA Economics
- NOAA Education Resources
- Glossary
- JetStream
- NWS Training Portal
- NOAA Library
- Play Time for Kids
- For Students
- For Teachers
- Brochures
- Other Links

ABOUT

- Organization
- Strategic Plan
- For NWS Employees
- International
- National Centers
- Products and Services
- Glossary
- Contact Us

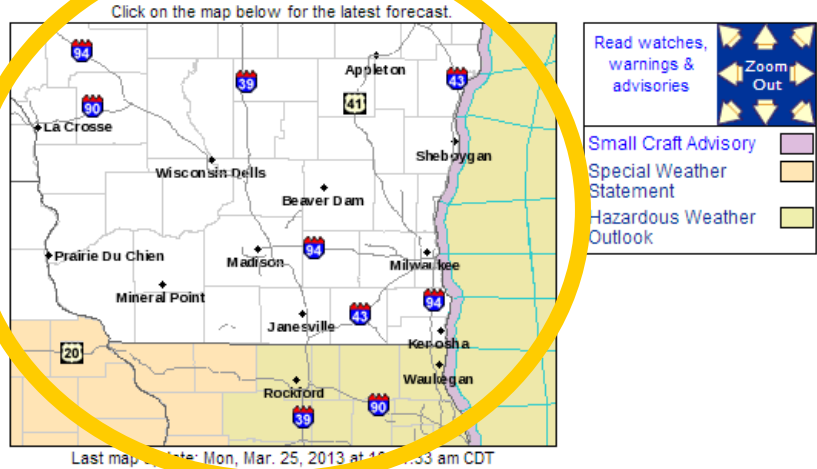
...rts in XML/CAP v1.1 and ATOM Formats

- Beach Hazards Statement
- Flood Watch
- Freeze Watch
- Fire Weather Watch
- Special Weather Statement



- Top News of the Day**
- Sheboygan Weather Radio Transmitter Is Down
 - March 2012 vs. March 2013 - A Tale of Very Different Temperature Regimes (Updated 3/24/13)
 - Drought Has Ended Over Southern Wisconsin
 - Additional News Headlines

- Watches & Warnings
- Observations
- Graphics
- Rivers & Lakes
- Climate
- Marine



Latest Conditions in Milwaukee, WI Choose Your Front Page City

Mar 25 9:52 am **33°F** (1°C) Select A City:

Weather Story **Radar** **Satellite** **Weather Map**

A Gradual Warmup Ahead

NWS MKX Weather Observation **NWS Reference Guide**

Web Page Tutorials: [Climate Page](#) [Activity Planner](#) [Hourly Weather Planner](#)

Four Areas of Interest



Local forecast by "City, St" or Zip Code

City, St Go

- XML RSS Feeds
- Current Hazards
- Watches/Warnings
- Outlooks
- Submit Report
- Current Conditions
- Observations
- Radar
- Satellite
- Snow Cover
- Snowfall Analysis
- Precip Analysis
- Forecasts
- Forecast Discussion
- Activity Planner
- Aviation Weather
- Fire Weather
- Marine Weather
- Severe Weather
- Winter Weather
- Hurricane Center

- Hydrology
- Rivers & Lakes
- Climate
- Local
- National
- Drought
- More...
- Local Drought Info

- Weather Safety
- Preparedness
- Weather Radio
- StormReady
- SkyWarn

- Additional Info
- Other Useful Links
- Education Resources
- Coop Observer
- Top News Archives
- Our Office

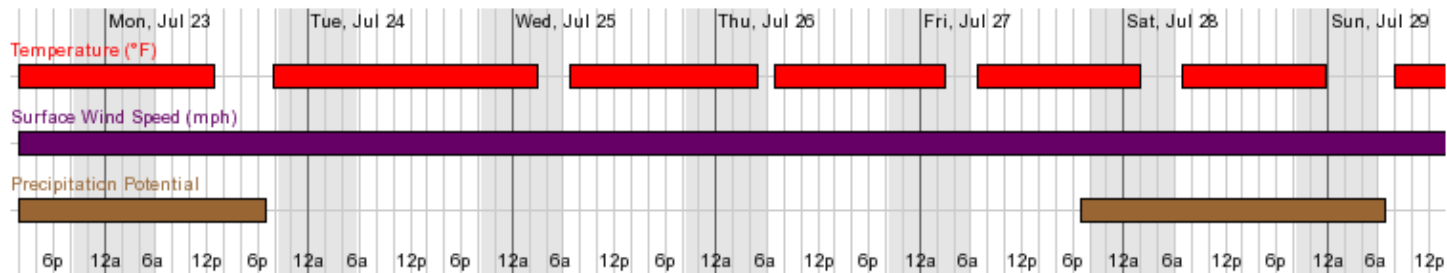
- Contact Us
- Contact Info
- Feedback



Activity Planner

Let's say we want certain weather conditions

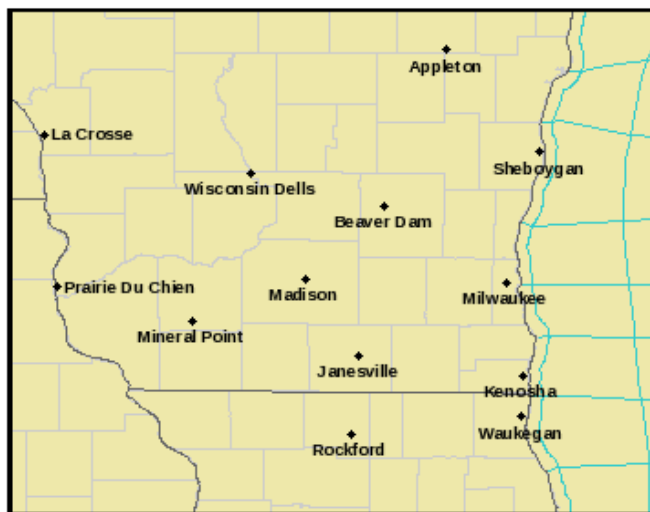
NOT TO REPLACE A SPOT FORECAST



Saturday, July 28 at 6pm
 Temperature: 81 °F Surface Wind: NW 7mph
 Precipitation Potential: 12%

Hazardous weather condition(s):
[Hazardous Weather Outlook](#)

Element	Min	to	Max	Element	Min	to	Max
Temperature (°F) <input type="text"/>	70	to	90	Surface Wind Speed (mph) <input type="text"/>	<input type="text"/>	to	<input type="text"/>
Relative Humidity <input type="text"/>	<input type="text"/>	to	<input type="text"/>	Sky Cover <input type="text"/>	<input type="text"/>	to	<input type="text"/>
Surface Wind Speed (mph) <input type="text"/>	0	to	15	Precipitation Potential <input type="text"/>	0	to	25



Last Updated: Sat, Jul. 21 2012 10:02 AM

[Read watches, warnings & advisories](#)

Hazardous Weather Outlook

Latitude/Longitude Entry
 decimal degrees (i.e. 42.134) or deg min sec (i.e. 42 23 34)

Latitude:

Longitude:

Use "-" (negative sign) in longitude for locations in Western Hemisphere





Hourly Weather Graph

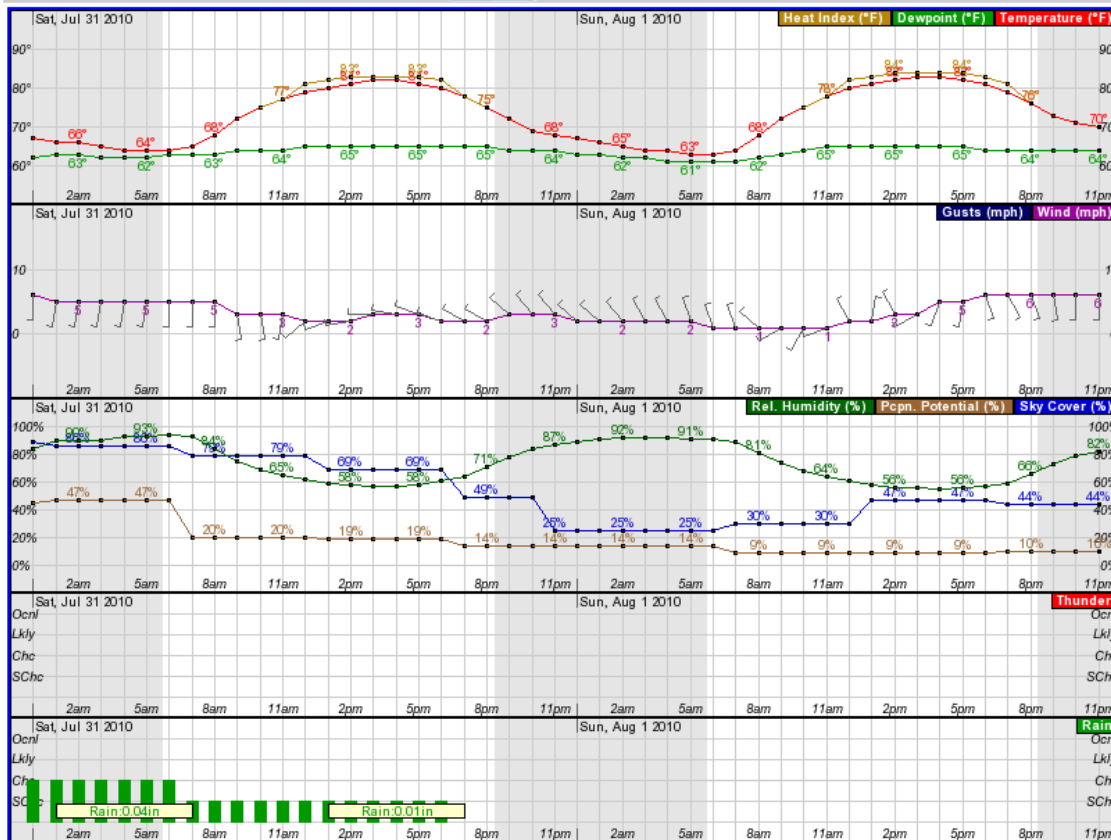


Hourly Weather Forecast Graph

[\[dashes/dots\]](#) | [\[b/w\]](#) | [\[hide menu\]](#)

Weather Elements		Weather/Precipitation	
<input checked="" type="checkbox"/> Temperature (°F)	<input checked="" type="checkbox"/> Surface Wind <input type="text" value="mph"/>	<input checked="" type="checkbox"/> Thunder	
<input checked="" type="checkbox"/> Dewpoint (°F)	<input checked="" type="checkbox"/> Sky Coverage	<input checked="" type="checkbox"/> Rain	
<input checked="" type="checkbox"/> Heat Index (°F)	<input checked="" type="checkbox"/> Precipitation Potential		
	<input checked="" type="checkbox"/> Relative Humidity		

48-Hour Period Starting:



Sunday, August 1 at 4pm

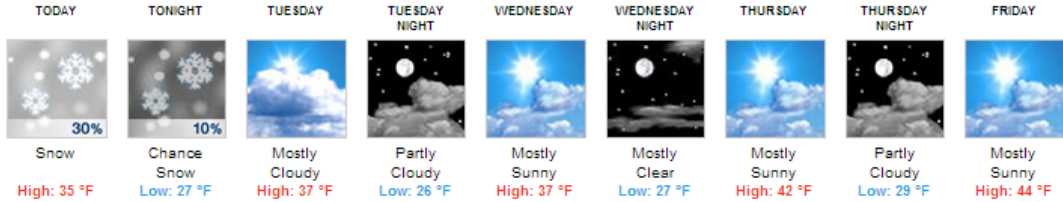
Temperature: 83 °F Dewpoint: 65 °F Heat Index: 84 °F Surface Wind: SSW 5mph

Sky Cover: 47% Precipitation Potential: 9% Relative Humidity: 55%

Thunder: <10% Rain: <10%

Variables:

- Temp
- Dewpoint
- Wind
- RH
- Sky Cover
- Probability (Precip. & Thunder)
- Precip. Amount



7-DAY FORECAST

Today	Flurries before 1pm, then a chance of snow showers. Cloudy, with a high near 35. North wind around 15 mph, with gusts as high as 25 mph. Chance of precipitation is 30%.
Tonight	A slight chance of snow showers before 7pm, then a chance for flurries before ending. Cloudy, with a low around 27. North wind 10 to 15 mph. Chance of precipitation is 10%.
Tuesday	Mostly cloudy, with a high near 37. Northwest wind 10 to 15 mph.
Tuesday Night	Partly cloudy, with a low around 28. Northwest wind around 10 mph.
Wednesday	Mostly sunny, with a high near 37. Northwest wind around 10 mph.
Wednesday Night	Mostly clear, with a low around 27. Northwest wind 5 to 10 mph.
Thursday	Mostly sunny, with a high near 42. Northwest wind around 5 mph.
Thursday Night	Partly cloudy, with a low around 29. North wind around 5 mph becoming west after midnight.
Friday	Mostly sunny, with a high near 44.
Friday Night	Partly cloudy, with a low around 31.
Saturday	Mostly sunny, with a high near 47.
Saturday Night	A 30 percent chance of rain. Mostly cloudy, with a low around 36.
Sunday	A 40 percent chance of rain. Mostly cloudy, with a high near 49.

NWS Milwaukee, WI

Point Forecast: Milwaukee, General Mitchell International Airport WI
42.95°N 87.89°W (Elev. 699 ft)

Last Update: 10:10 am CDT Mar 25, 2013

Forecast: 11am CDT Mar 25, 2013-6pm

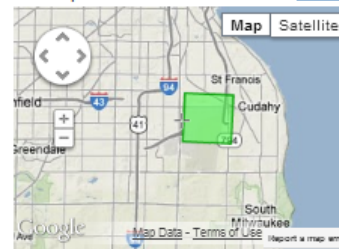
Valid: CDT Mar 31, 2013

[Forecast Discussion](#)

[KML](#) [XML](#)

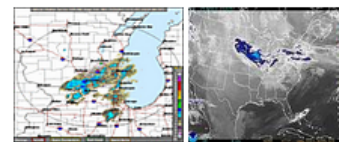
Click Map for Forecast

[Disclaimer](#)

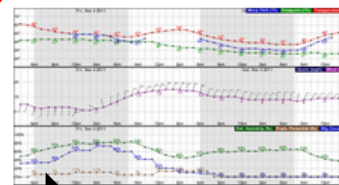


Requested Location: Milwaukee, WI
Forecast Area: Milwaukee, WI
Lat/Lon: 42.95°N 87.89°W Elevation: 699 ft

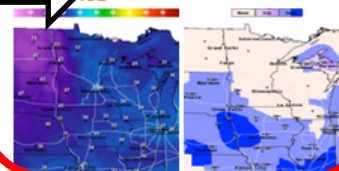
RADAR & SATELLITE IMAGES



HOURLY WEATHER GRAPH



ADDITIONAL DIGITAL FORECAST



ADDITIONAL FORECASTS AND INFORMATION

[ZONE AREA FORECAST FOR MILWAUKEE COUNTY, WI](#)

[Forecast Discussion](#)
[Printable Forecast](#)
[Text Only Forecast](#)

[Hourly Weather Graph](#)
[Tabular Forecast](#)
[Quick Forecast](#)

[Air Quality Forecasts](#)
[International System of Units](#)
[About Point Forecasts](#)

[Hazardous Weather Outlook](#)
[Hourly Weather Graphs For Milwaukee](#)
[Michigan Nearshore Post Climate Graphs For Milwaukee](#)
[Madison](#)

Graphical Depiction





National Digital Forecast Database



Use areal view to get an idea of uncertainty. Are you on the edge of two different weather types? Or are you in the middle of one type?

Graphical Forecasts - Upper Mississippi Valley

Public Marine Fire Weather Tropical Hazardous

Zoom Out

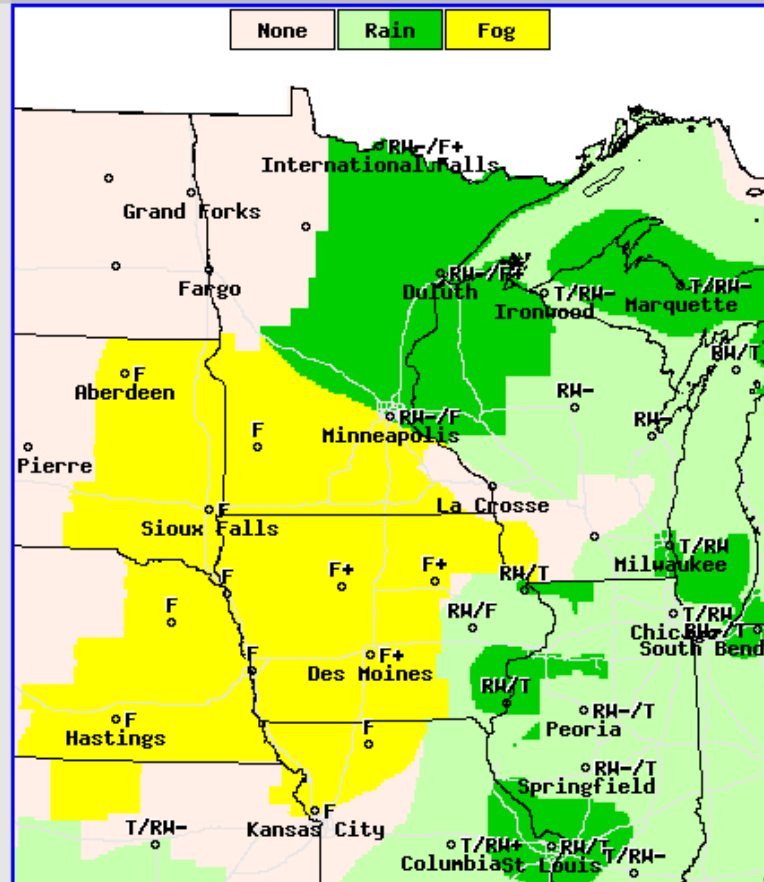
Daily View Weekly View Loops

[Image List](#) | [Page Help](#) | [Metric Units](#) | [Key](#)

Go to Region Zoom In Get Text Forecast

Mouse over the table below to change the forecast image.

▶ Today	◀ -12Hrs +12Hrs ▶			
Max/Min Temperature	Low			
Probability of Precip.	12 hr. probability			
Weather	8pm	11pm	2am	5am
Hazards	8pm	11pm	2am	5am
Temperature	8pm	11pm	2am	5am
Dewpoint	8pm	11pm	2am	5am
Wind Speed & Direction	8pm	11pm	2am	5am
Wind Gust	8pm	11pm	2am	5am
Sky Cover	8pm	11pm	2am	5am
Amount of Precip.	QPF		QPF	
Snow Amount	Snow Amount		Snow Amount	
Wave Height	Wave Height		Wave Height	
Apparent Temperature	8pm	11pm	2am	5am
Relative Humidity	8pm	11pm	2am	5am
Next Image	◀		▶	



Predominant Weather For Sat Jul 31 2010 5AM EDT
(Sat Jul 31 2010 09Z)



National Digital Forecast Database

08z issuance Graphic created-Jul 31 4:13AM EDT



Table MouseOver Effect On



Milwaukee/Sullivan, WI



Home Site Map News Organization Search for: NWS All NOAA Go

Local forecast by "City, St" or Zip Code

City, St Go

XML RSS Feeds

Current Hazards

Watches/Warnings

Outlooks

Submit Report

Current Conditions

Observations

Radar

Satellite

Observed Precip

Forecasts

Forecast Discussion

Activity Planner

Aviation Weather

Fire Weather

Marine Weather

Severe Weather

Winter Weather

Hurricane Center

Hydrology

Rivers & Lakes

Top News of the Day

- November 8 -12 is Wisconsin Winter Awareness Week
- NOAA: Winter Outlook For 2010-2011
- Fond du Lac NWR Running at Half-power

- Watches & Warnings
- Observations
- Forecast Graphics
- Rivers & Lakes
- Climate
- Marine

Click on the map below for the latest forecast.



Read watches, warnings & advisories

Zoom Out

Small Craft Advisory

Hazardous Weather Outlook

Last map update: Sun, Nov. 7, 2010 at 11:31:41 am CST

Latest Conditions in Milwaukee, WI

Choose Your Front Page City

Nov 7
10:52 am **53°F**
A Few Clouds (12°C)

Select A City:

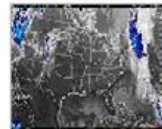
Weather Story



Radar



Satellite



Weather Map



Local Historical Weather Events Search Page

Graphical Weekend Weather Forecast

Winter Weather Page

NWS on Facebook!



**Caveat!
Aviation
Pages
May Be
Different**

Forecasts

Forecast Discussion

Local Area

Activity Planner

Aviation Weather

Fire Weather

Marine Weather

Severe Weather

Winter Weather

Hurricane Center

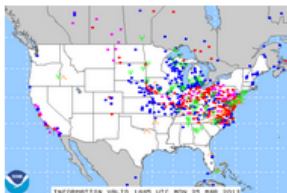


Aviation Page



- XML** RSS Feeds
- Current Hazards**
 - Watches/Warnings
 - Outlooks
 - Submit Report
- Current Conditions**
 - Observations
 - Radar
 - Satellite
 - Snow Cover
 - Snowfall Analysis
 - Precip Analysis
- Forecasts**
 - Forecast Discussion
 - Activity Planner
 - Aviation Weather**
 - Fire weather
 - Marine Weather
 - Severe Weather
 - Winter Weather
 - Hurricane Center
- Hydrology**
 - Rivers & Lakes
- Climate**
 - Local
 - National
 - Drought
 - More...
 - Local Drought Info
- Weather Safety**
 - Preparedness
 - Weather Radio
 - StormReady
 - SkyWarn
- Additional Info**
 - Other Useful Links
 - Education Resources
 - Coop Observer
 - Top News Archives
 - Our Office
- Contact Us**
 - Contact Info
 - Feedback

Tools for the Aviator:



Aviation Digital Data Service (ADDS)

ADDS:

- METARS
- TAFS
- PIREPS
- Satellite

Other Java Tools



Hot Air Balloon Forecast (May-Oct)



Tactical Decision Aid

TDA for:

- KMKE
- KMSN
- KENW
- KUES
- KORD
- KMSP

Use these!
They can describe uncertainty

TAFS: Using the pull down menu to the right, you can retrieve TAFS for Wisconsin, Michigan, Illinois, Minnesota and Iowa. Go here for help in [Decoding the TAF](#)

Aviation Forecast Discussions
(scroll down to AVIATION section)

MKX	GRB	ARX	LOT	DVN	MSP	DLH
MQT	APX	GRR	DTX	IWX	ILX	DMX
Anywhere in the U.S.						

Presentations are toward bottom of page





NOAA's National Weather Service Aviation Weather Center Aviation Digital Data Service (ADDS)

[Home](#)[News](#)[Organization](#)[@adds](#)
[Home](#)[Turbulence](#)
[METARs](#)[Icing](#)
[TAFs](#)[Convection](#)
[PIREPs](#)[Winds/Temps](#)
[AIR/SIGMETs](#)[Prog Charts](#)
[Satellite](#)[Java Tools](#)
[Radar](#)

Local forecast by "City, St" or Zip Code

Find us on Facebook
AWC on FacebookAdvisories
SIGMET/AIRMET »
Center WeatherForecasts
Convection »
Turbulence
Icing
Winds/Temps »
Prog Charts »
TAF / FA »Observations
PIREPs »
METARs »
Radar »
Satellite »**Java Tools »**Data Services
Text Data ServerRelated Information
Home »
Flight Folder
Standard Briefing
Aviation Testbed
Aviation LinksContact Us
FAQ
Feedback
Site Information »

• Java Tools

- SIGMETs

- TAFs

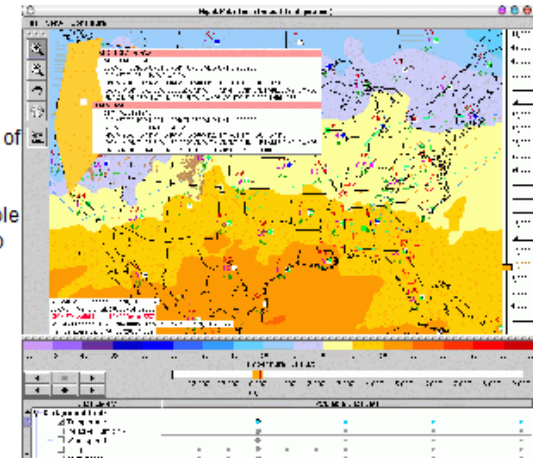
- METARs

- Flight Path Tool

- [Flight Path Tool Application](#)
- [Convective \(NCWF\) Java Tool](#)
- [METARs Java Tool](#)
- [TAFs Java Tool](#)
- [AIR/SIGMETs Java Tool](#)
- [PIREPs Java Tool](#)
- [or NCWF LARGE version](#)
- [or METARs LARGE version](#)
- [or TAFs LARGE version](#)
- [or AIR/SIGMETs LARGE version](#)
- [or PIREPs Java Tool LARGE version](#)

Flight Path Tool Application

This tool provides all of the features of the old Flight Path Tool applet and more. It still allows you to view data along your route of flight. You can still view icing, turbulence, temperature, winds, humidity, AIRMETS, METARs, TAFs, etc. both horizontally and vertically. Now, however, you get many more features not available in the applet. In the future, we'll be adding even more features to the application but not to the applet. Take [a look](#).



NCWF Java Tool

The National Convective Weather Forecast (NCWF) product contains a convective hazard detection and 1-hour forecast. The current hazard field is colored green to red for increasingly strong convection and the 1-hour forecast hazard region is outlined with cyan polygons.



METARs Java Tool



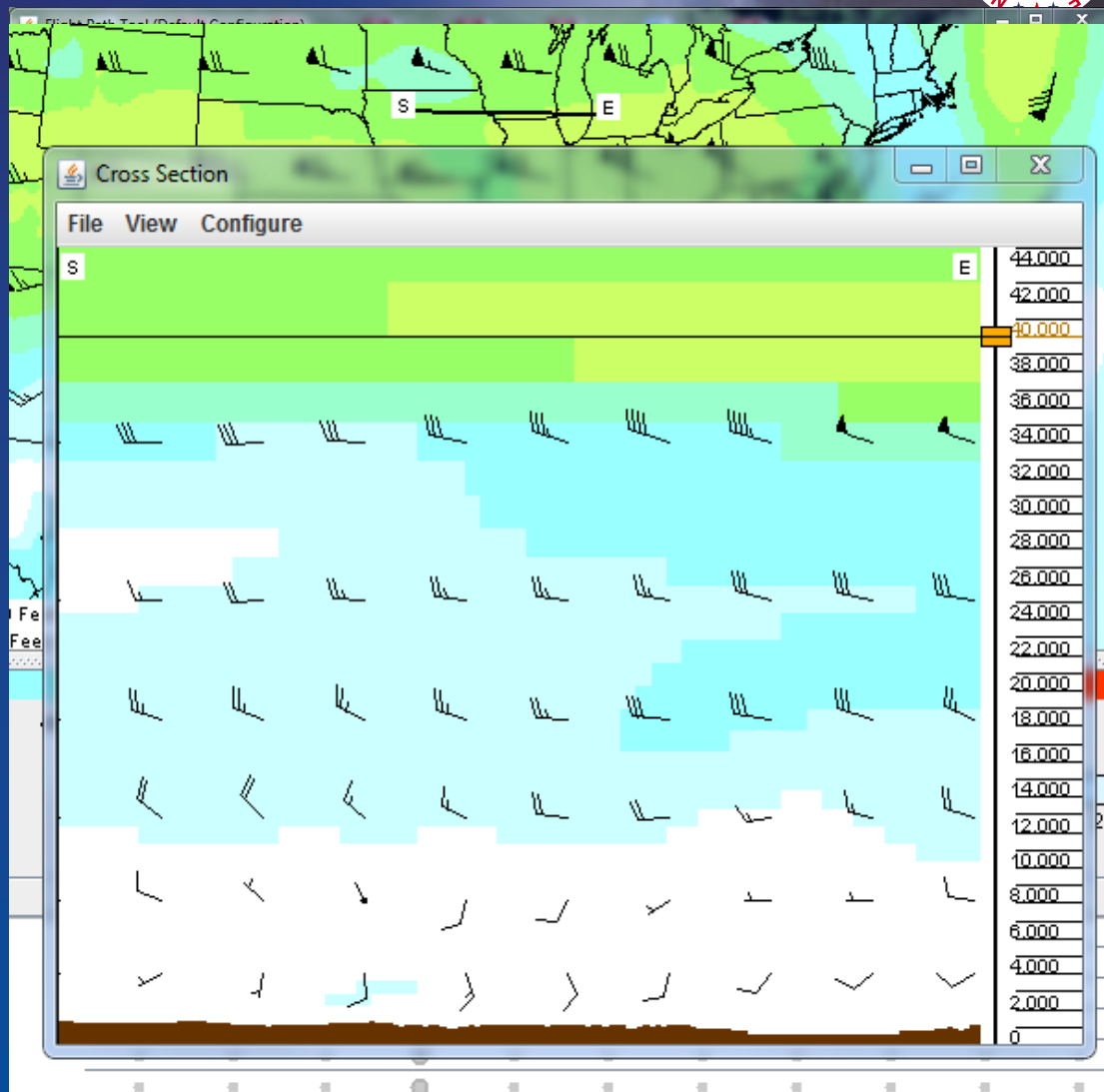


ADDS Highlights



- **Java Tools**

- **SIGMETs**
- **TAFs**
- **METARs**
- **Flight Path Tool**
(now a Java APP!)



Ceiling and Visibility	
Flight Planning»	Flight Path Tool
Data Services	AIR/SIGMETs
Text Data Server	Convection
Related Information	TAFs
Home »	PIREPs
	METARs



Mobile Web Services



- NWS Mobile Weather Website
- CWSU Mobile Weather Website



NWS Mobile Weather Website




 National Weather Service

2 Miles SSE Greenville WI 







Current Conditions


Appleton / Outagamie
Lat: 44.26 N Lon: -88.52 W Elev: 919 ft
Last Updated: Jul 12 2012 12:45:00


 Partly Cloudy 84°F	Wind Speed SE 7 MPH 
---	--


Quick Forecast 


11:15 am CDT Jul 12
Periods 1-3 of 13

This Afternoon	Tonight	Friday
 Mostly Sunny Hi 87°F 	 Mostly Clear Lo 65°F 	 Sunny Hi 89°F 

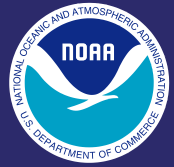
Full Forecast 

Radar 

Satellite 

Forecast Discussion 

mobile.weather.gov



National Weather Service

2 Miles SSE Greenville WI

Current Conditions

Appleton / Outagamie
Lat: 44.26 N Lon: -88.52 W Elev: 919 ft
Last Updated: Jul 12 2012 12:45:00

 Partly Cloudy 84°F	Wind Speed SE 7 MPH
----------------------------------	-------------------------------

Quick Forecast
11:15 am CDT Jul 12
Periods 1-3 of 13

This Afternoon	Tonight	Friday
 Mostly Sunny Hi 87°F	 Mostly Clear Lo 65°F	 Sunny Hi 89°F

Full Forecast

Radar

Satellite

Forecast Discussion

Full Forecast

3 Miles SE Evansville WI

This Afternoon
Mostly sunny and hot, with a high near 91. Southeast wind 5 to 10 mph.

Tonight
Mostly clear, with a low around 62. Southeast wind around 5 mph.

Friday
Mostly sunny and hot, with a high near 93. Light southeast wind becoming south 5 to 10 mph in the morning.

Friday Night
Partly cloudy, with a low around 70. South wind around 5 mph.

Saturday
A 40 percent chance of showers and thunderstorms. Partly sunny and hot, with a high near 90. Southwest wind 5 to 10 mph.

Saturday Night
A 30 percent chance of showers and thunderstorms. Mostly cloudy, with a low around 70. Southwest wind around 5 mph.

Sunday
A 40 percent chance of showers and thunderstorms. Partly sunny and hot, with a high near 91. Southwest wind around 5 mph.





CWSU Mobile Weather Website



- Many aviation and weather products

1. Aviation text

2. HAZARDS

3. RADAR

3. Local RADARs

4. SATELLITE

5. Discussions Map *updated!*

TAF/METAR:

Translated Raw

Example: KSFO KORD KATL EDDR @CA (all California)

METARs TAFs

past 6 hours

Submit

Search PIREPs:

KSFO

Distance (radius):

250 SM (402 KM)

Past 4 hours

Get PIREPs

www.wrh.noaa.gov/zoa/MOBILE/ZOA2.htm



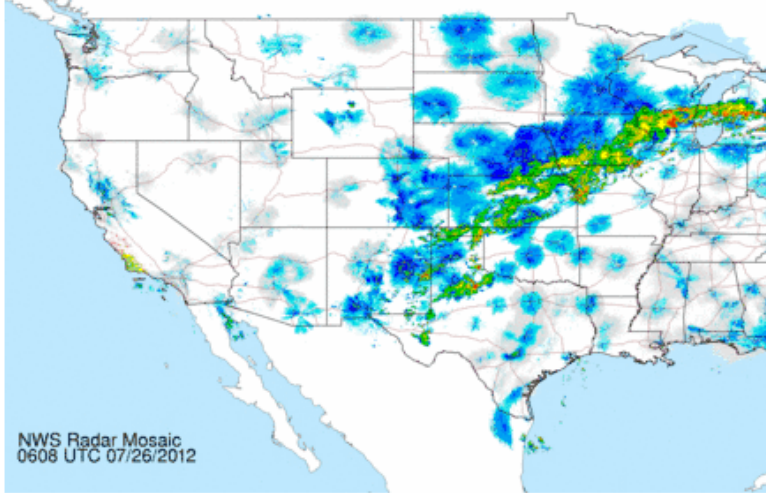
CWSU Mobile Weather Website



<http://www.wrh.noaa.gov/zoa/MOBILE/ZOA2.htm>

RADAR > smartphone NWS RADARs:

Tap for YOUR Local Radar:



- 1. Back to top
- 5. RADAR main
- 0. CWSU Mobile Main Menu

[Feedback](#) | [Privacy Policy](#) | [Disclaimer](#)

NOAA National Weather Service



Radars

Local
Radars

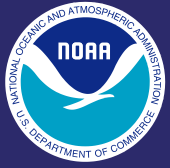


Home > Radar Page:

CONUS Local RADARs (for Smartphones)
Alaska Local RADARs (for Smartphones)

Select Location:

NW	N.mtn	N.plns
SW	S.mtns	S.plns
AK	G.lakes	NE
HI	Gulf	SE
Guam	PR	



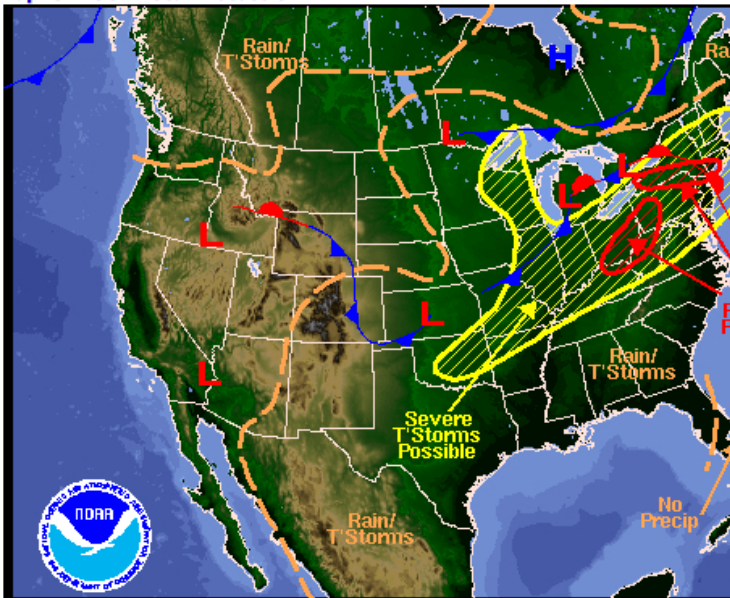
CWSU Mobile Weather Website



<http://www.wrh.noaa.gov/zoa/MOBILE/ZOA2.htm>

HOME > NWS Forecast Discussions/Map:

Tap for YOUR Local Discussion:



Weather Forecast for Thu, Jul 26, 2012, issued 3:19 AM EDT
 DOC/NOAA/NWS/NCEP/Hydrometeorological Prediction Center
 Prepared by McReynolds based on HPC, SPC, and NHC forecasts

1. Back to top
5. RADAR main



NWS • Mobile

AREA FORECAST DISCUSSION...UPDATED
 National Weather Service Twin Cities/chanhassen MN
 1218 AM CDT THU JUL 26 2012

.UPDATE...

UPDATED FOR THE 06Z AVIATION DISCUSSION BELOW.

.DISCUSSION...

THE MAIN ISSUE IN THE SHORT TERM IS OBVIOUSLY THE CHANCES FOR SHRA/TSRA LATE THIS AFTERNOON INTO THIS EVENING AS THE SURFACE LOW SLIDES EAST AND THE FRONTAL BOUNDARY DROPS THROUGH THE AREA. LATEST MSAS ANALYSIS AND SURFACE OBS SHOW A WELL DEFINED WIND SHIFT CURRENTLY BISECTING THE FORECAST AREA FROM SOUTHWEST TO NORTHEAST... AND SOME CONVECTION HAS TRIED TO DEVELOP NEAR THIS OVER THE PAST SEVERAL HOURS... BUT HAS THUS FAR BEEN UNSUCCESSFUL. THE ACTUAL FRONTAL BOUNDARY IS STILL WELL TO THE WEST OVER THE DAKOTAS... WHERE THE DEWPOINT GRADIENT CAN BE FOUND. THIS WILL EVENTUALLY BE PUSHED EAST THIS EVENING AS THE MAIN UPPER SHORTWAVE CURRENTLY SEEN NEAR THE SASKATCHEWAN/MANITOBA BORDER PUSHES SOUTHEAST. AT THIS POINT... IT/S QUESTIONABLE AS TO WHETHER THE FORCING ASSOCIATED WITH THE ACTUAL UPPER WAVE AND COLD FRONTAL BOUNDARY WILL MANAGE TO GET ANY CONVECTION GOING. CONTINUED CHANCE POPS OF THE AFTERNOON OVER

<http://mobile.wrh.n...p?pil=afd&sid=arx/>



New Technology on Horizon



- **Phased Array Radar**





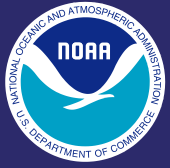
Phased Array Radar



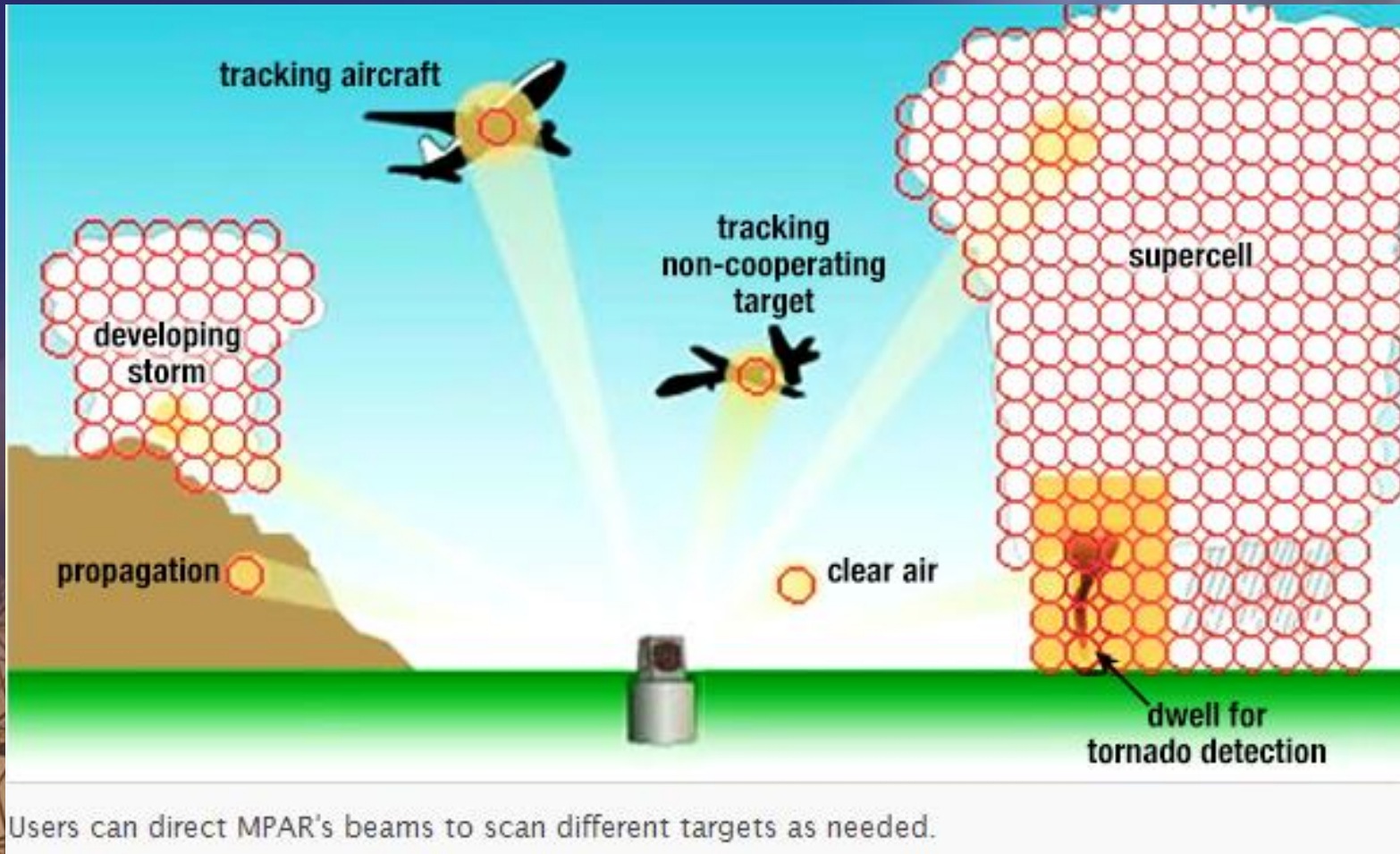
- **National Weather Radar Testbed (NWRT)**
 - *Military technology – used by Navy ships to protect naval battle groups from missile threats*
 - *Flat panel antenna*
 - *Scans sky in less than 1 minute*
 - *Possible cost-effective replacement for aging weather and aircraft tracking radars*



www.nssl.noaa.gov/tools/radar/mpar



Phased Array Radar



www.nssl.noaa.gov/tools/radar/mpar



Any Questions?



- Marcia.Cronce@noaa.gov

