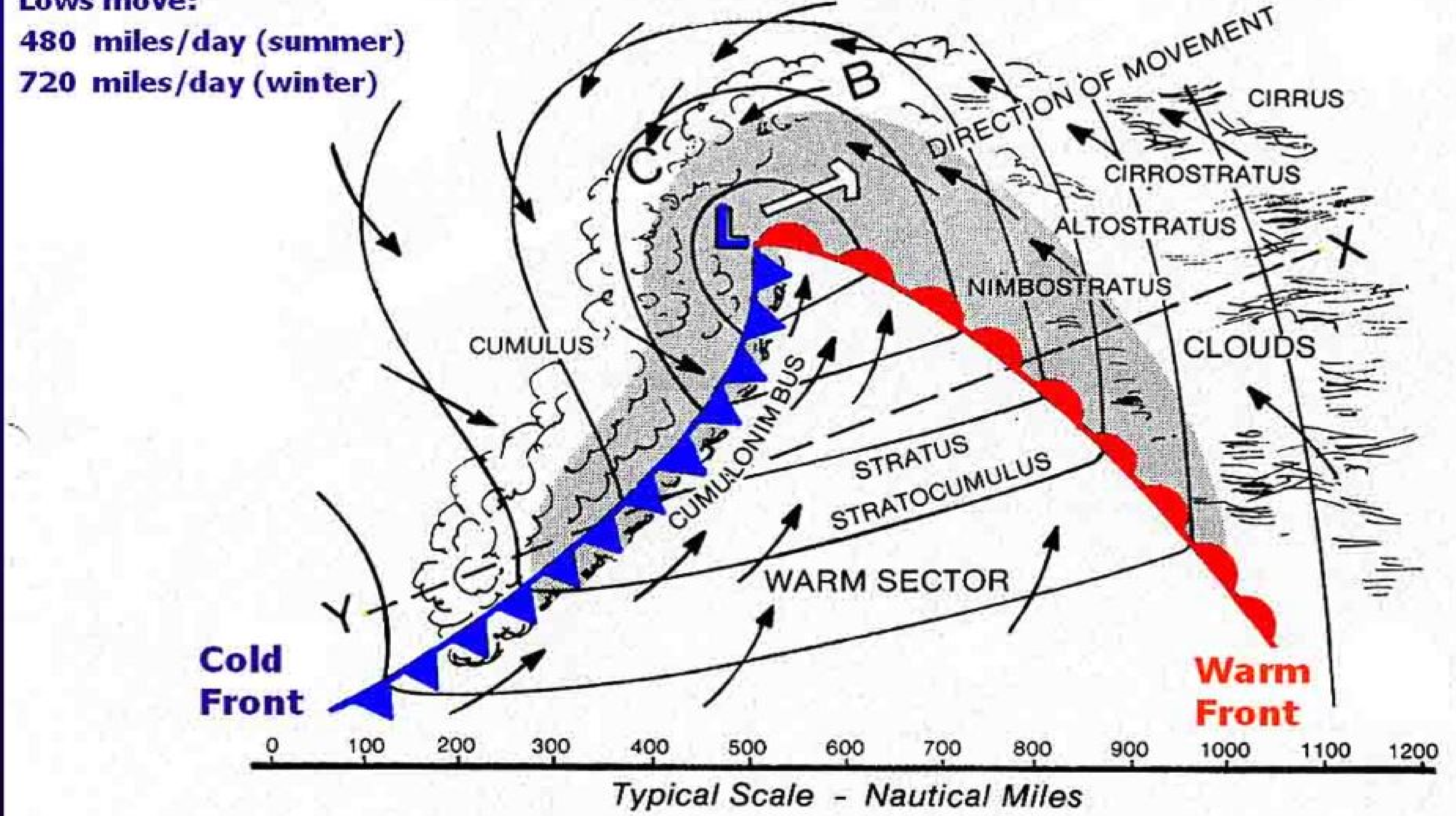

Aviation Weather

Lows move:

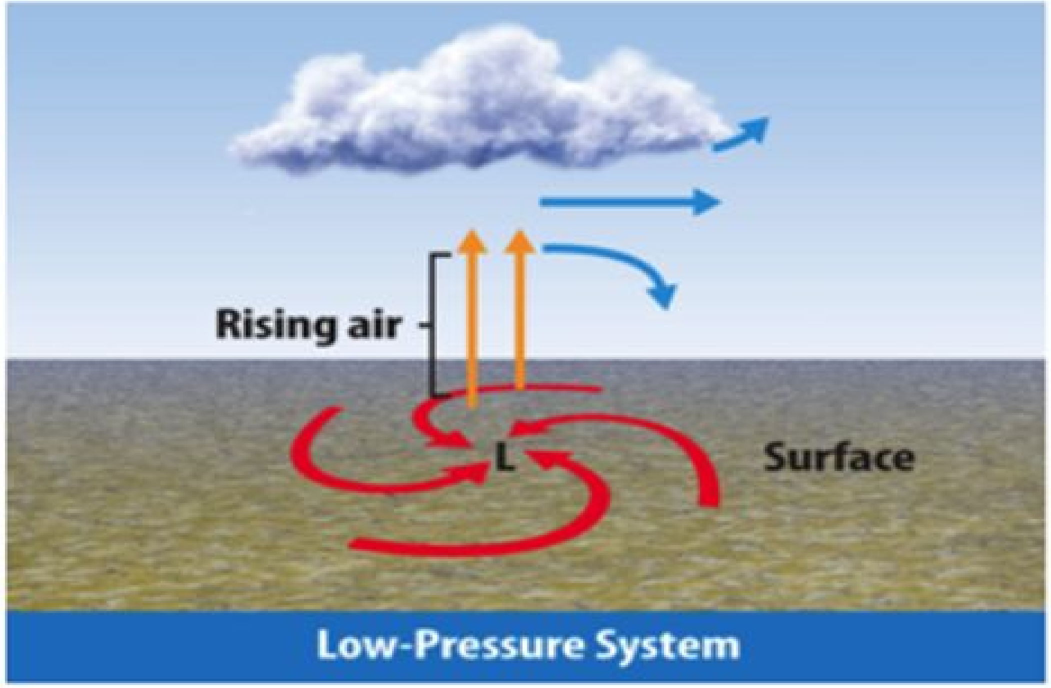
480 miles/day (summer)

720 miles/day (winter)



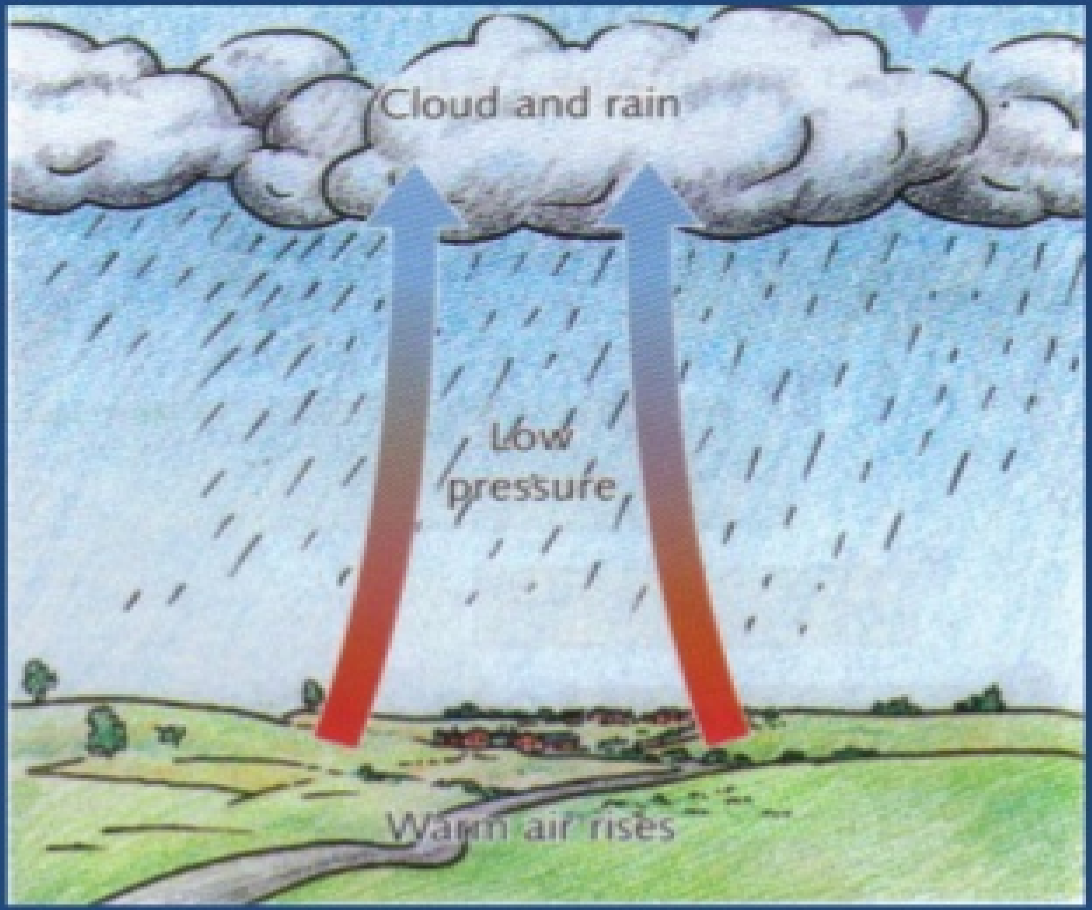
Low Pressure System

* A **low-pressure system** is a large mass of circulating air with low pressure at its center and higher pressure outside of the system



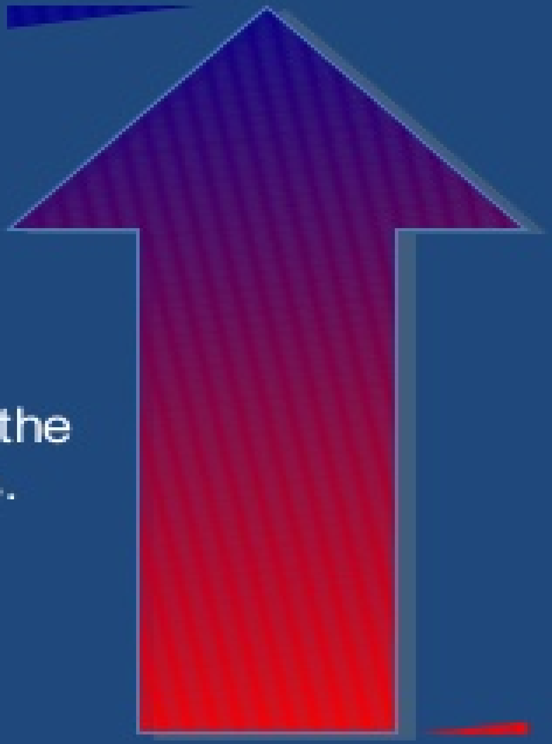
Weather under Low pressure

What kind of weather does low pressure create?



As the air cools, water in it condenses forming clouds.

As it rises the air cools.

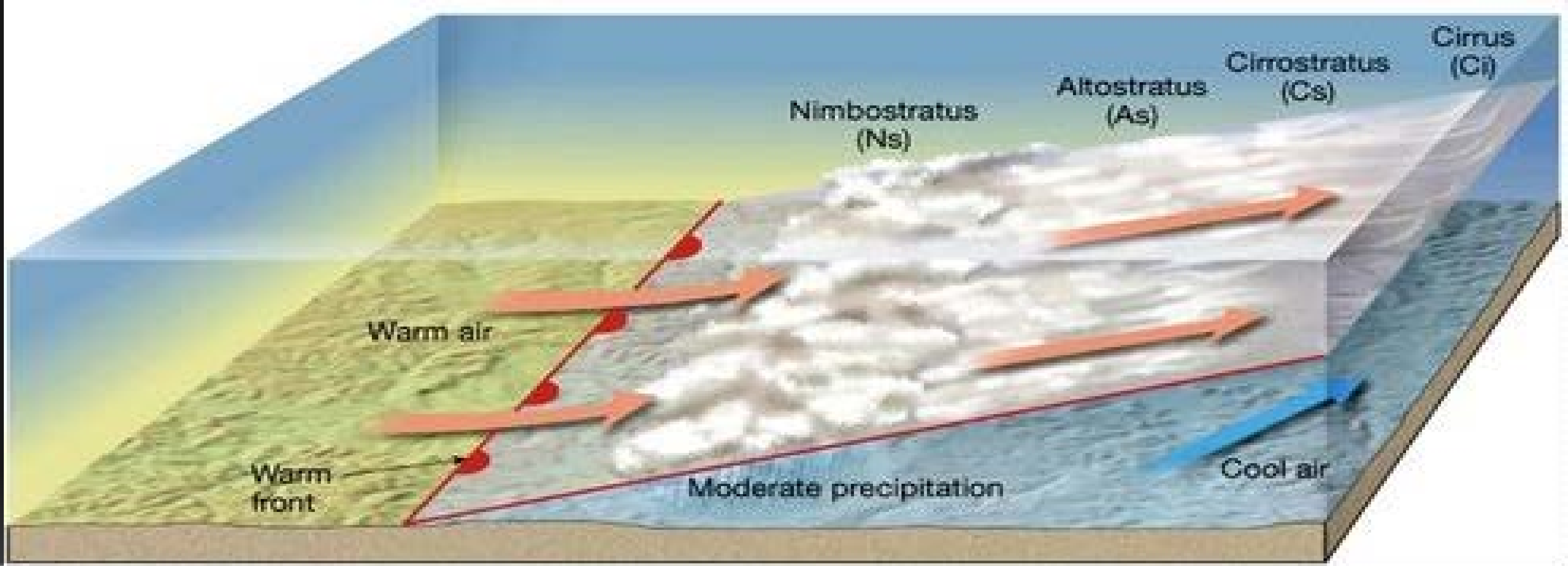


Warm air rises.

Unstable conditions that bring changeable weather.

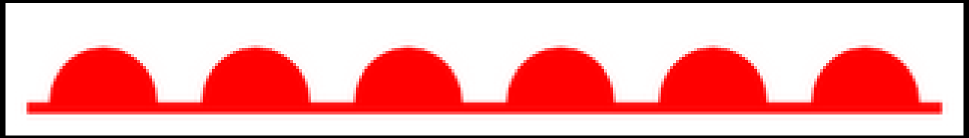
A warm front occurs when a warm mass of air advances and replaces a body of colder air. Warm fronts move slowly, typically 10 to 25 miles per hour (mph). The slope of the advancing front slides over the top of the cooler air and gradually pushes it out of the area. Warm fronts contain warm air that often have very high humidity. As the warm air is lifted, the temperature drops and condensation occurs.

Generally, prior to the passage of a warm front, cirriform or stratiform clouds, along with fog, can be expected to form along the frontal boundary. In the summer months, cumulonimbus clouds (thunderstorms) are likely to develop. Light to moderate precipitation is probable, usually in the form of rain, sleet, snow, or drizzle, accentuated by poor visibility. The wind blows from the northeast to south-southeast, and the outside temperature is cool or cold, with an increasing dew point.

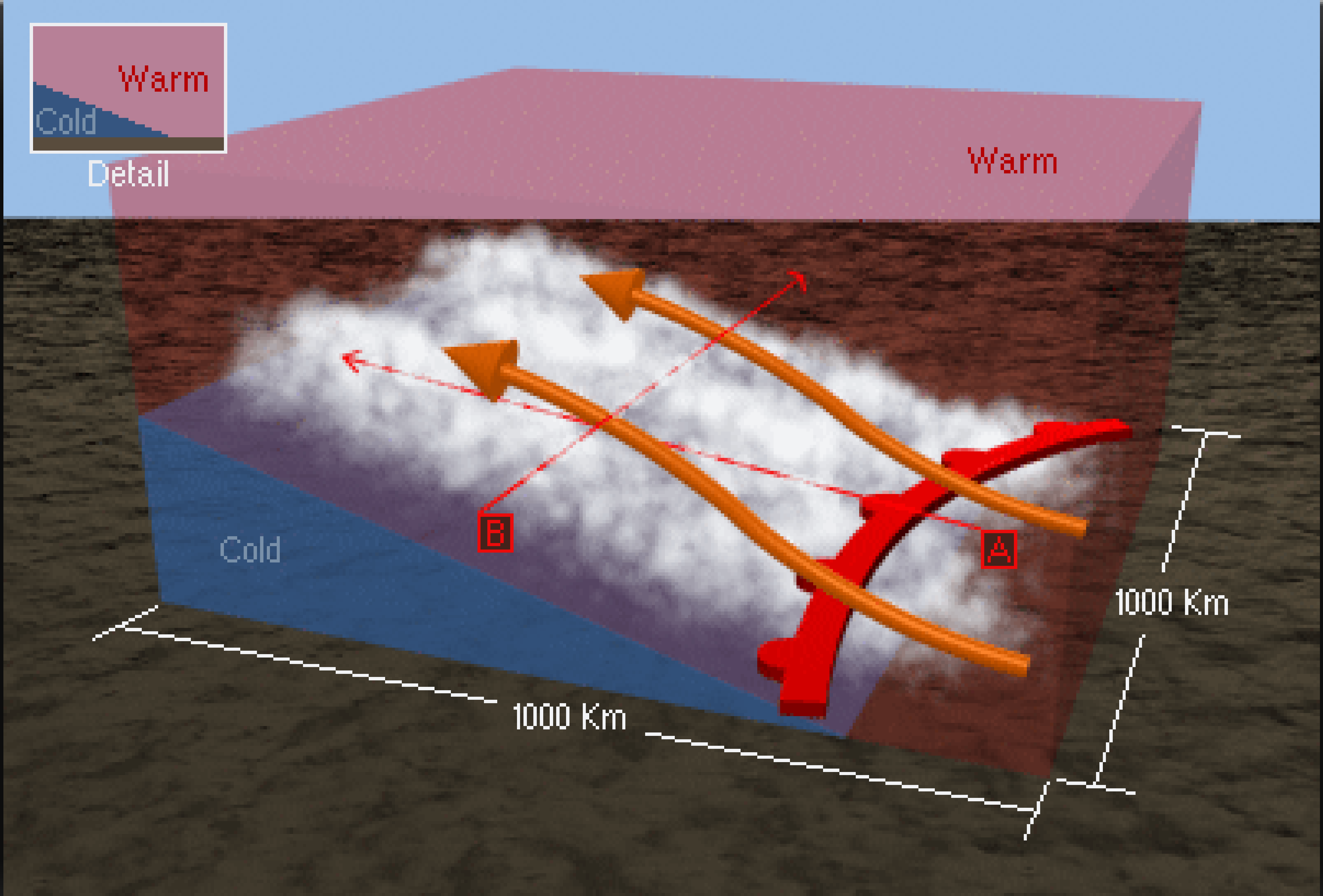


Finally, as the warm front approaches, the barometric pressure continues to fall until the front passes completely.

During the passage of a warm front, stratiform clouds are visible and drizzle may be falling. The visibility is generally poor, but improves with variable winds. The temperature rises steadily from the inflow of relatively warmer air. For the most part, the dew point remains steady and the pressure levels off.



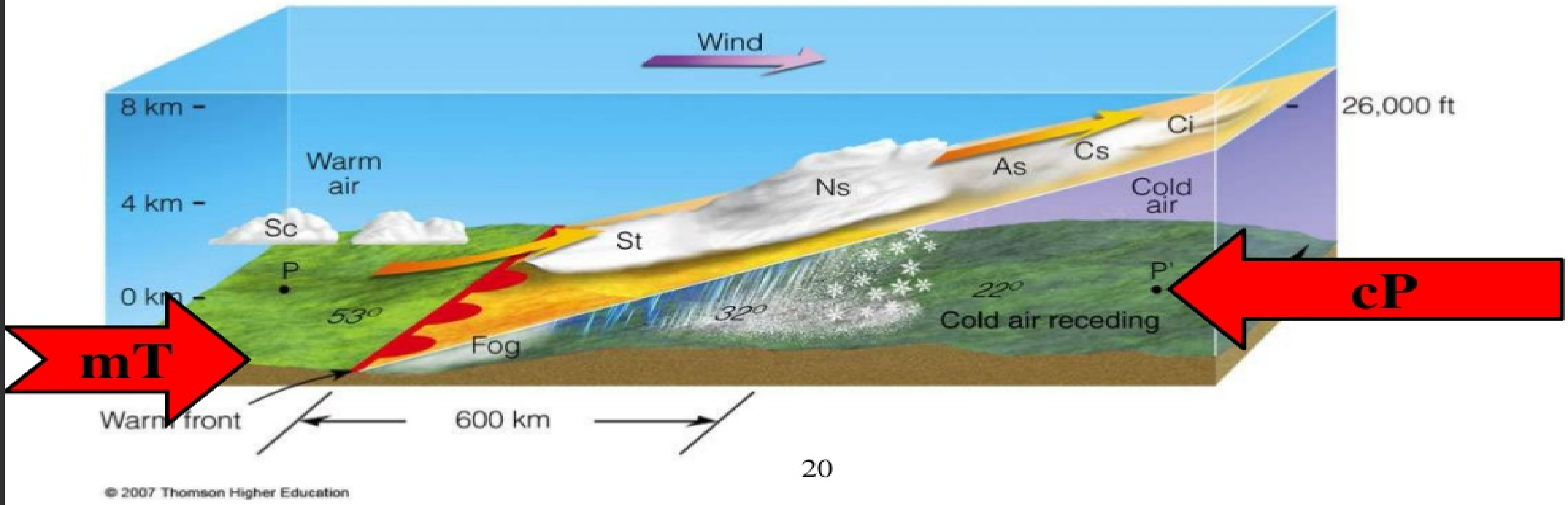
After the passage of a warm front, stratocumulus clouds predominate and rain showers are possible. The visibility eventually improves, but hazy conditions may exist for a short period after passage. The wind blows from the south- southwest. With warming temperatures, the dew point rises and then levels off. There is generally a slight rise in barometric pressure, followed by a decrease barometric pressure.



Both Flight Paths A and B Can Result In a Significant Icing Hazard

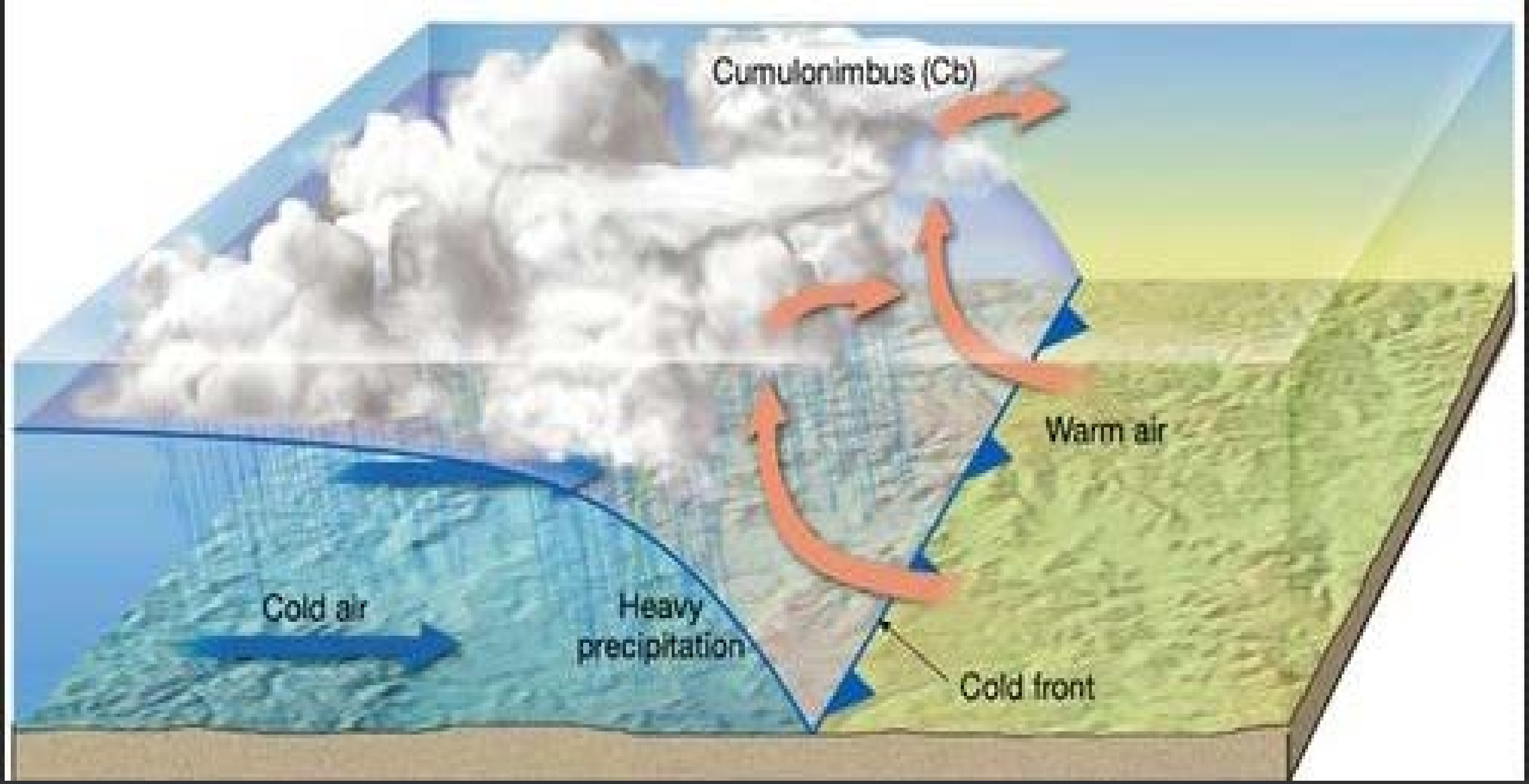
Warm Fronts

- → *Warm air replaces cold*
- → *Gentle slope*
- → *Covers a wide area with its weather*
- → *Stratus clouds get lower as front approaches*
- → *Drizzle or steady rain*



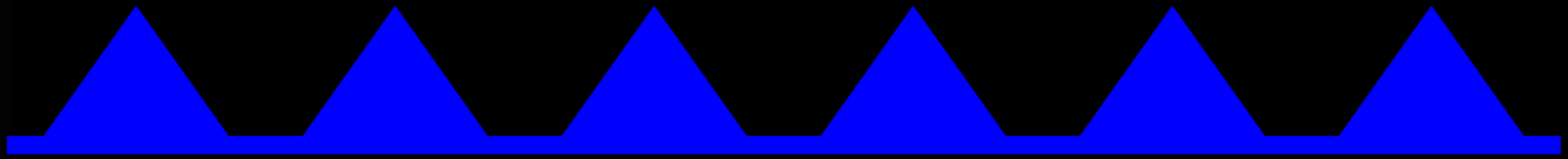
A cold front occurs when a mass of cold, dense, and stable air advances and replaces a body of warmer air.

Cold fronts move more rapidly than warm fronts, progressing at a rate of 25 to 30 mph. However, extreme cold fronts have been recorded moving at speeds of up to 60 mph. A typical cold front moves in a manner opposite that of a warm front. It is so dense, it stays close to the ground and acts like a snowplow, sliding under the warmer air and forcing the less dense air aloft. The rapidly ascending air causes the temperature to decrease suddenly, forcing the creation of clouds. The type of clouds that form depends on the stability of the warmer air mass. A cold front in the Northern Hemisphere is normally oriented in a northeast to southwest manner and can be several hundred miles long, encompassing a large area of land.

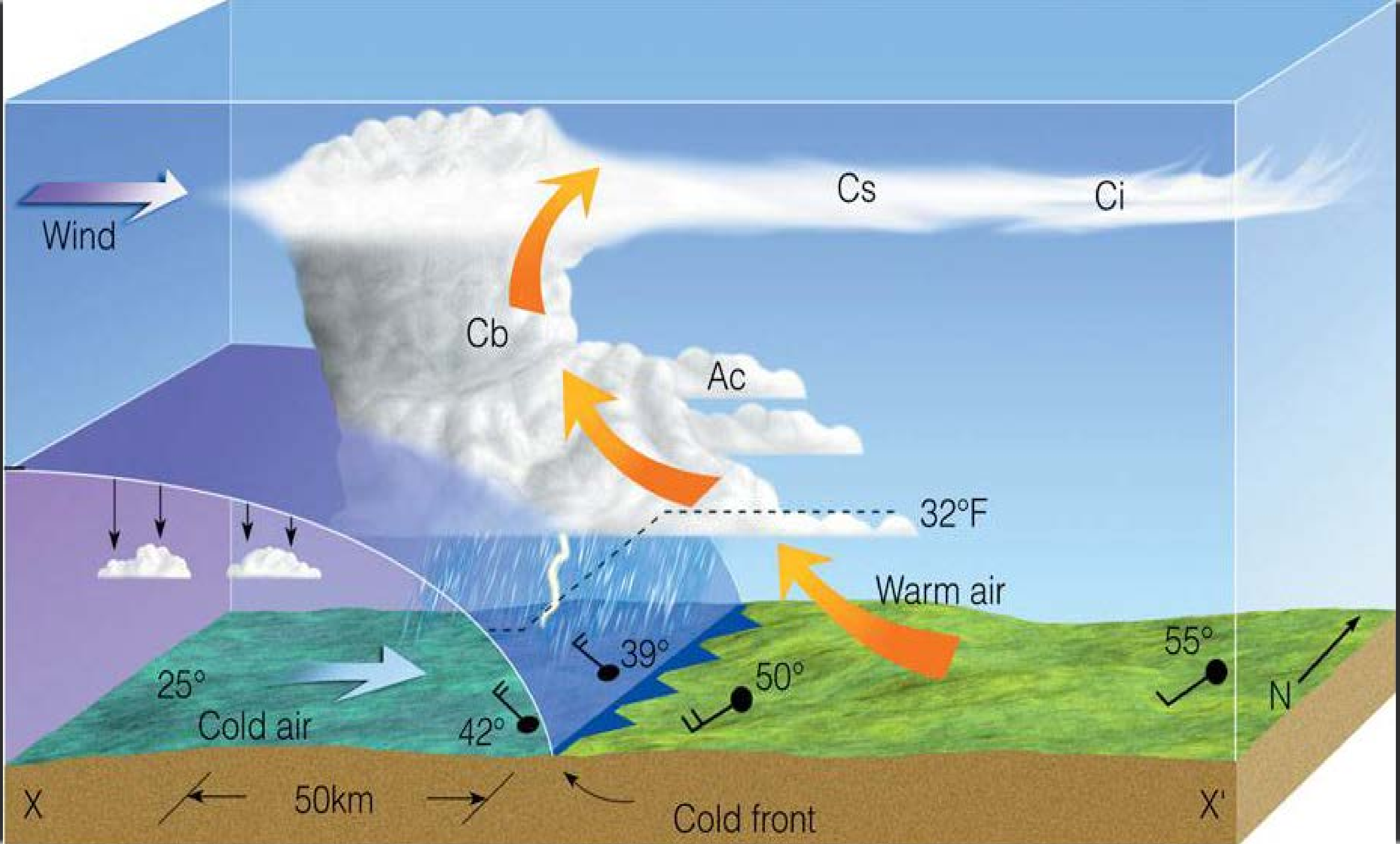


Prior to the passage of a typical cold front, cirriform or towering cumulus clouds are present, and cumulonimbus clouds are possible. Rain showers and haze are possible due to the rapid development of clouds. The wind from the south- southwest helps to replace the warm temperatures with the relative colder air. A high dew point and falling barometric pressure are indicative of imminent cold front passage.

As the cold front passes, towering cumulus or cumulonimbus clouds continue to dominate the sky. Depending on the intensity of the cold front, heavy rain showers form and might be accompanied by lightning, thunder, and/or hail. More severe cold fronts can also produce tornadoes. During cold front passage, the visibility is poor, with winds variable and gusty, and the temperature and dew point drop rapidly. A quickly falling barometric pressure bottoms out during frontal passage, then begins a gradual increase.

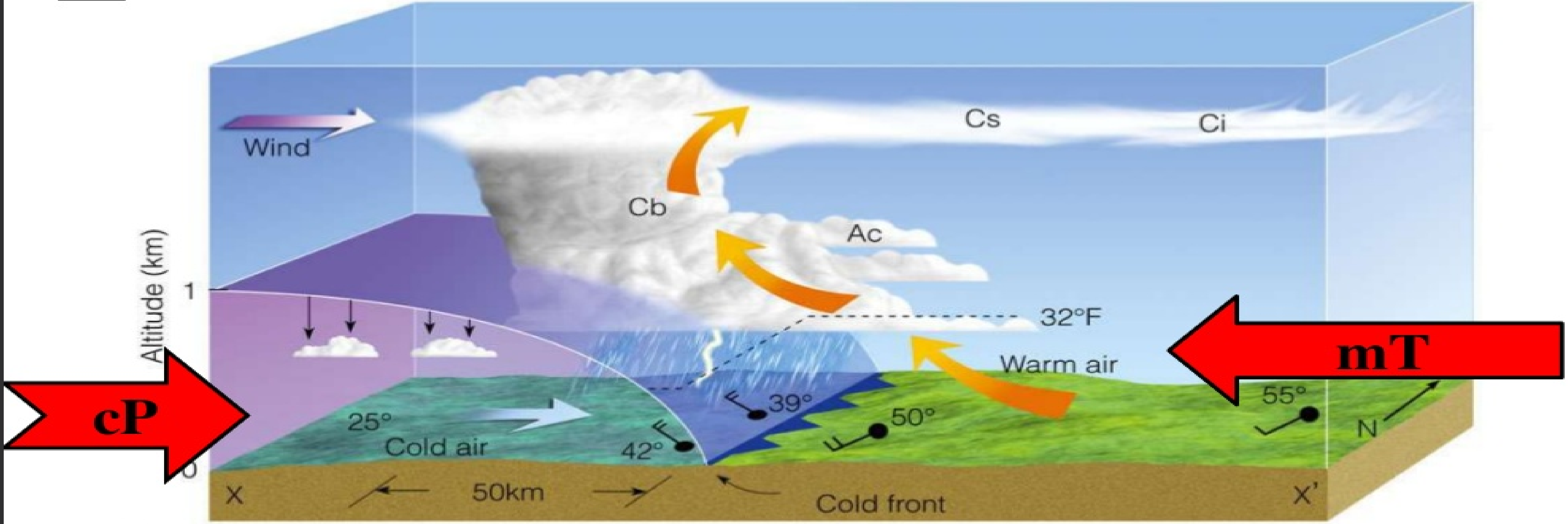


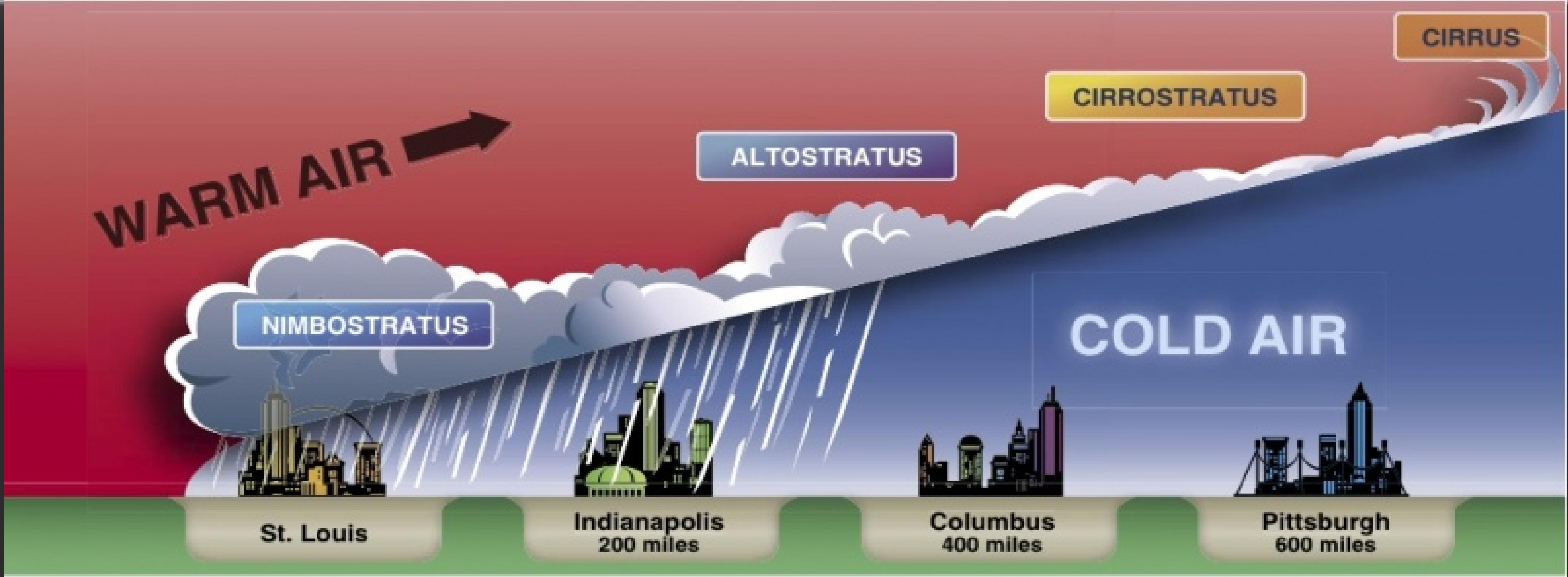
After frontal passage, the towering cumulus and cumulonimbus clouds begin to dissipate to cumulus clouds with a corresponding decrease in the precipitation. Good visibility eventually prevails with the winds from the west-northwest. Temperatures remain cooler and the barometric pressure continues to rise.

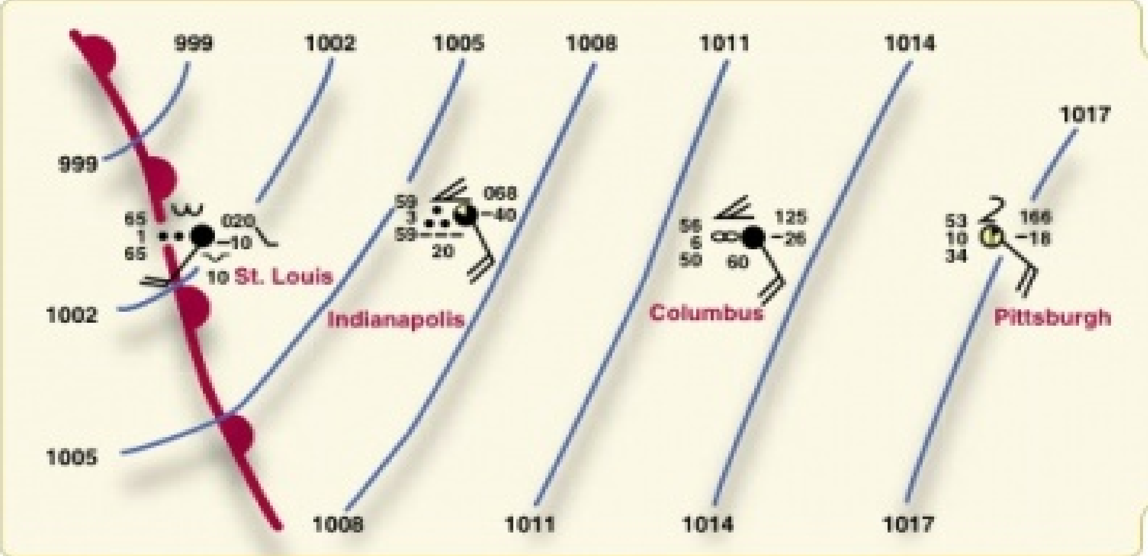

Wind
Cs
Ci
Cb
Ac
32°F
Warm air
55°
39°
50°
25°
Cold air
42°
N
X
50km
Cold front
X'

Cold Fronts

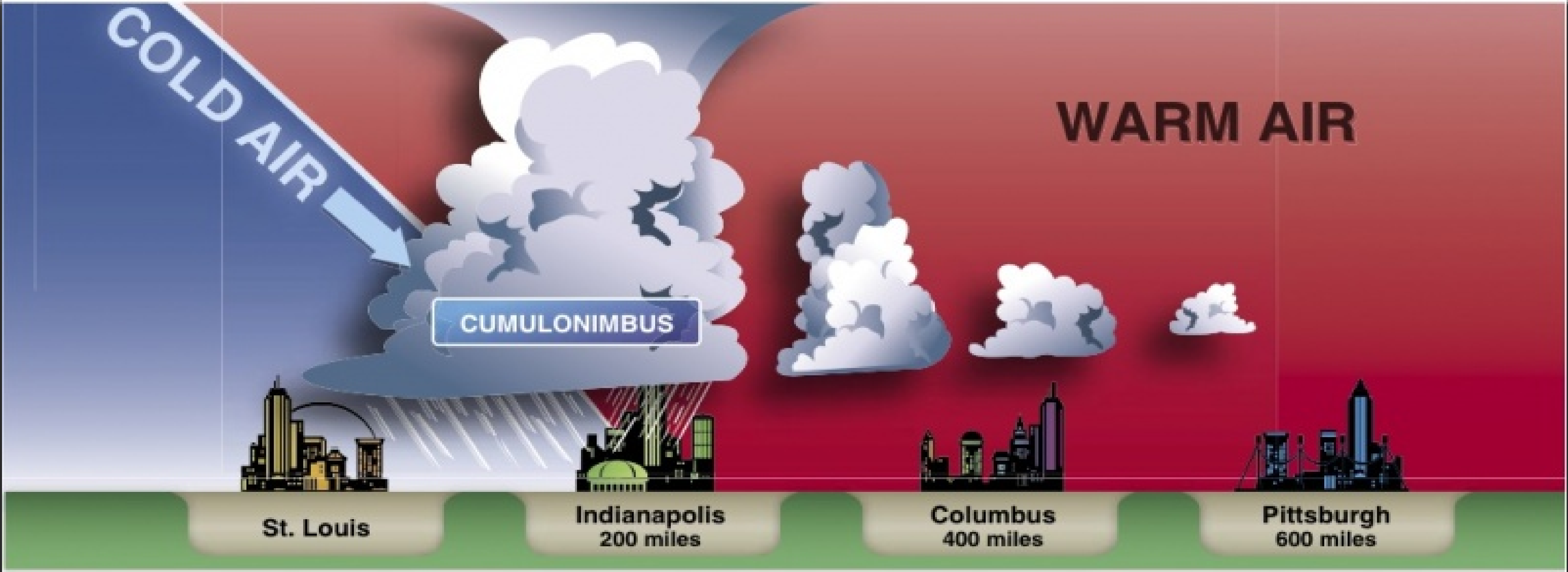
→ *Cold air replaces warm*
→ *Much steeper than warm fronts*
→ *Advances faster than warm front*
→ *More violent weather –cumulonimbus clouds*
→ *Short, sharp showers*

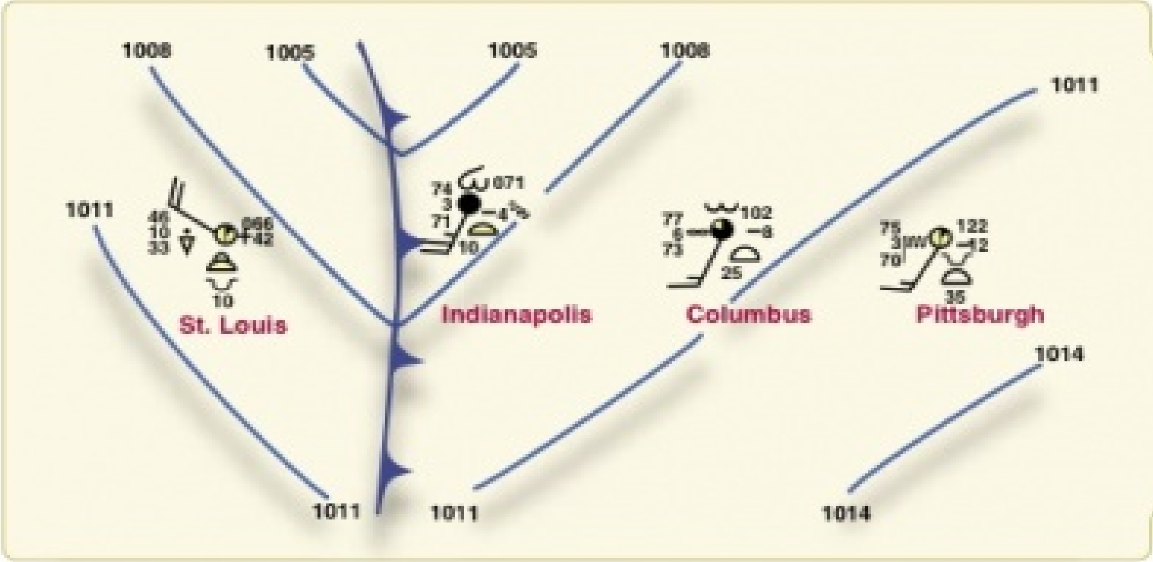




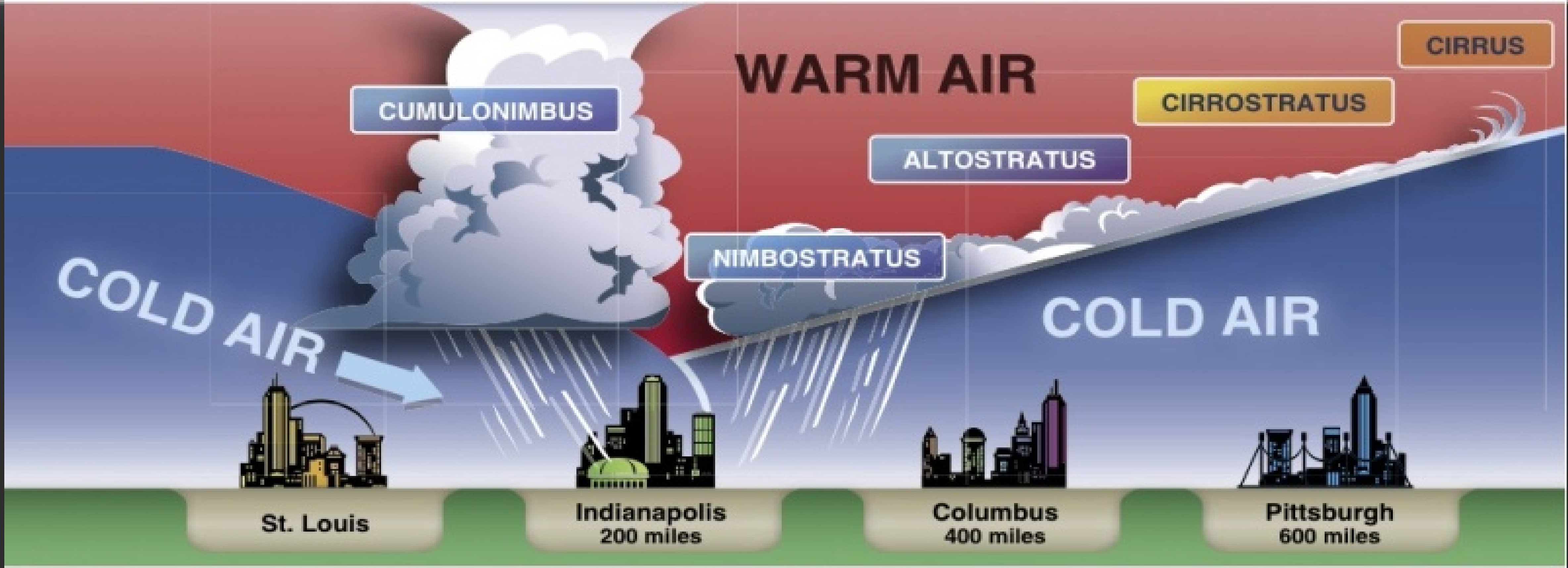


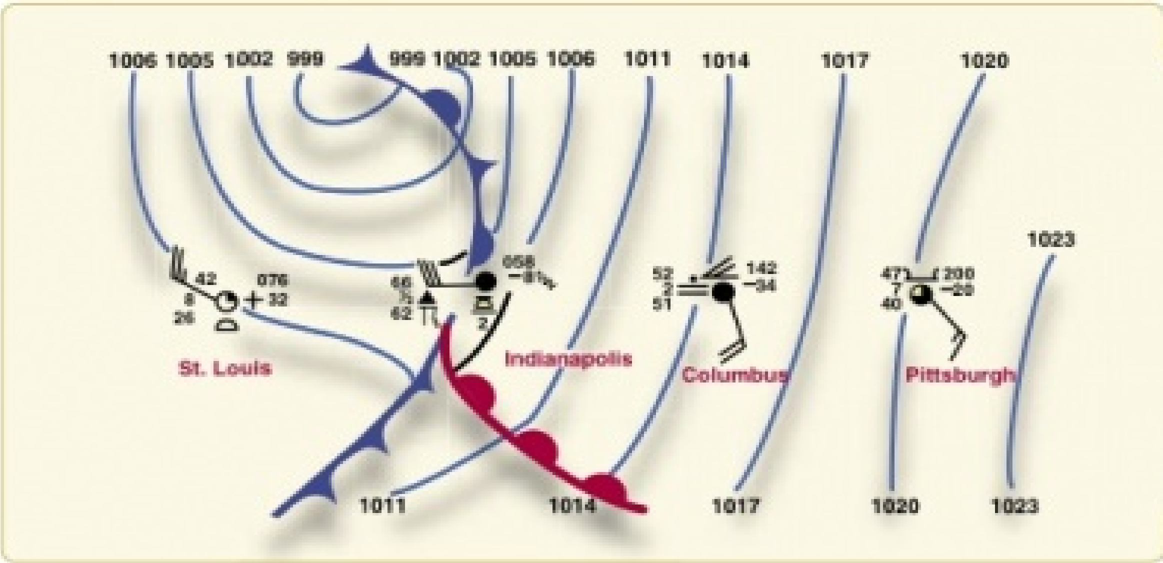
METAR	KSTL 0VC010	1950Z	21018KT 18/18	1SM A2960	–RA
METAR	KIND BKN020	1950Z	16012KT 15/15	3SM A2973	RA
METAR	KCMH 0VC060	1950Z	13018KT 14/10	6SM A2990	HZ
METAR	KPIT SCT150	1950Z	13012KT 12/01	10SM A3002	





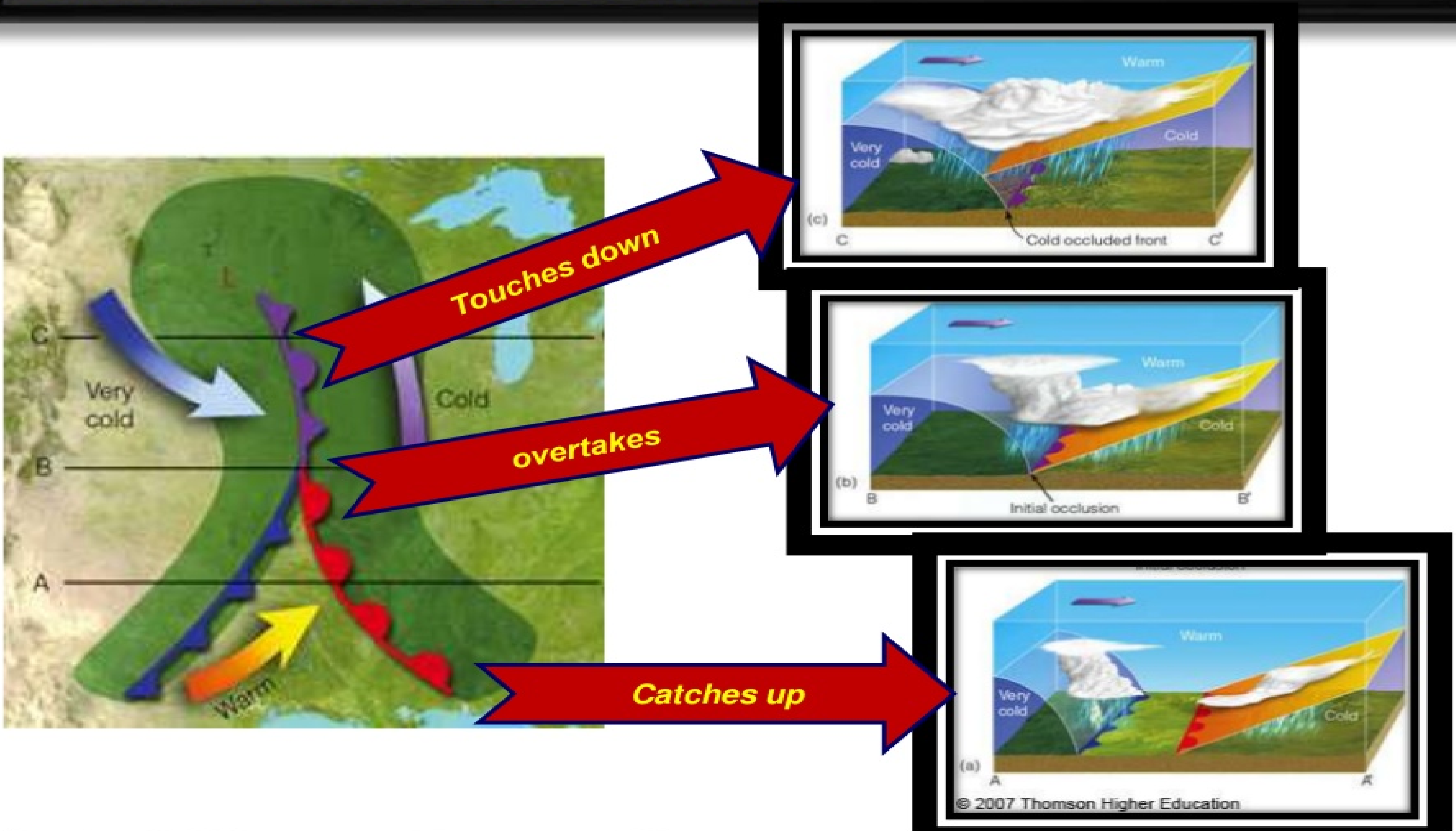
METAR	KSTL SCT010	1950Z	30018KT 08/02	10SM A2979	
METAR	KIND OVC010	1950Z	20024KT 24/23	3SM A2974	+TSRA
METAR	KCMH BKN025	1950Z	20012KT 25/24	6SM A2983	HZ
METAR	KPIT SCT035	1950Z	20012KT 24/22	3SM A2989	FU





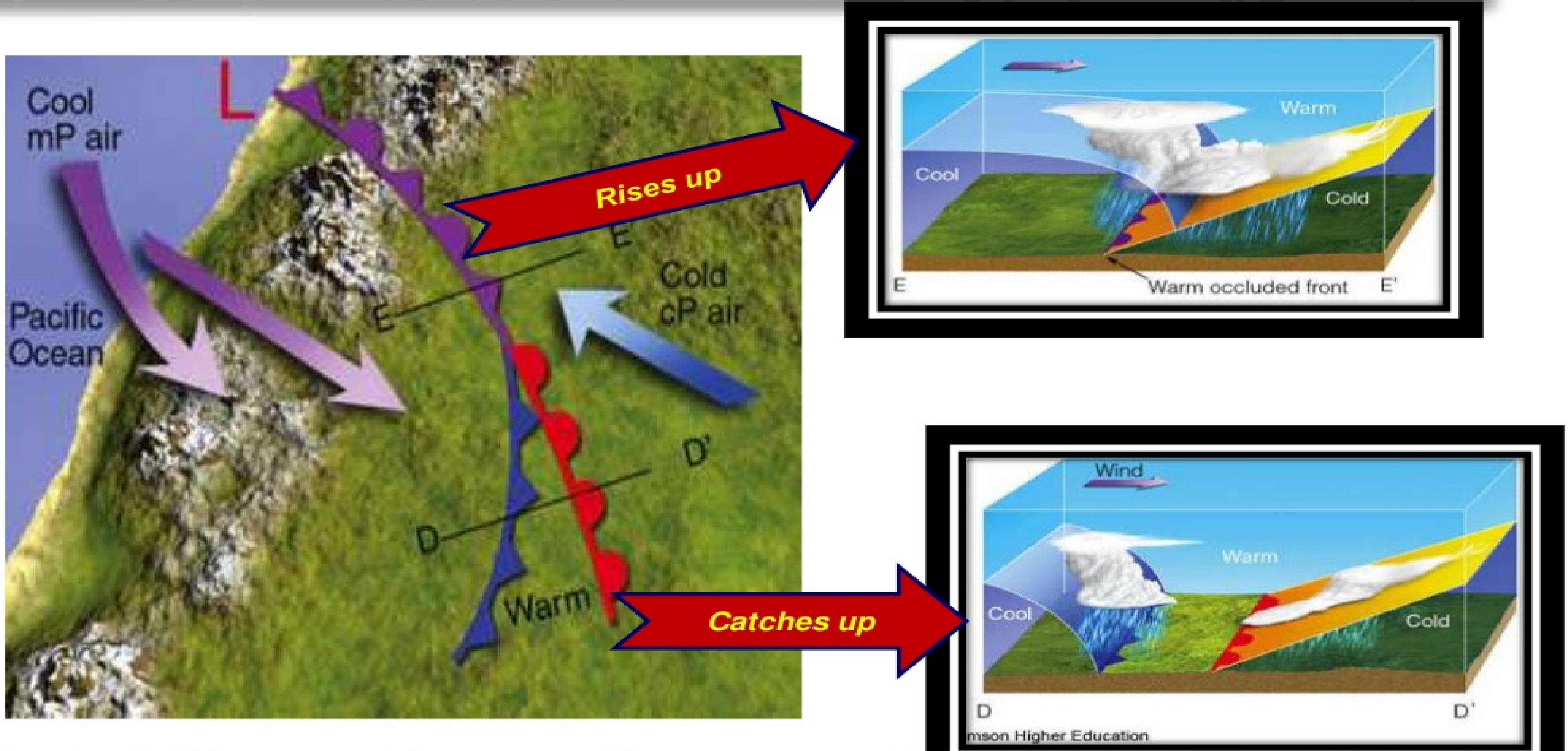
METAR	KSTL SCT035	1950Z	31023G40KT 05/M03	8SM A2976	
METAR	KIND VV005	1950Z	29028G45KT 18/16	1/2SM A2970	TSRAGR
METAR	KCMH OVC080	1950Z	16017KT 11/10	2SM A2970	BR
METAR	KPIT BKN130	1950Z	13012KT 08/04	75SM A3012	

Cold Occluded Front



➢ cold front moves quicker → catches up to the warm front

Warm Occluded Front



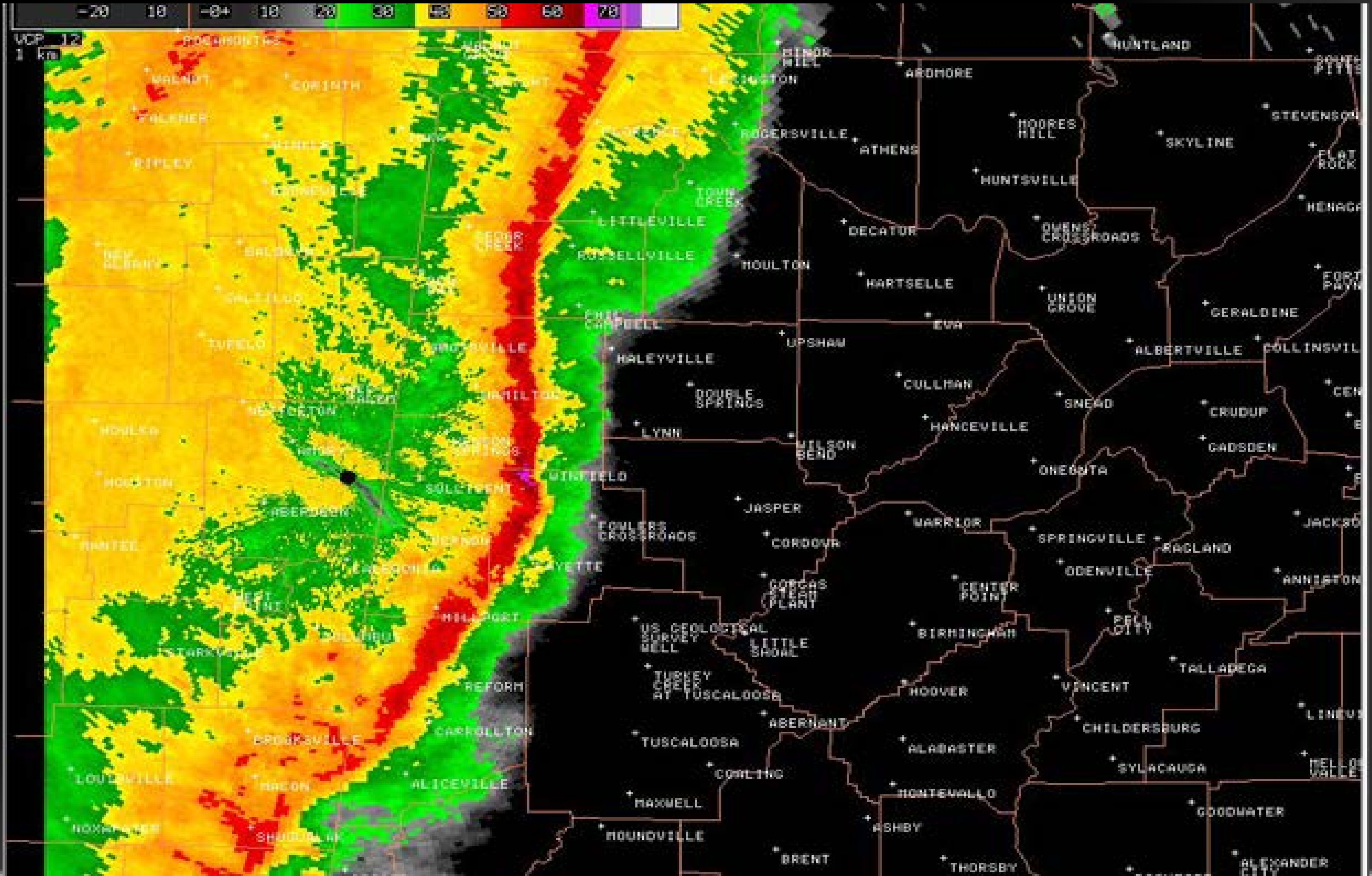
➢ cold front moves quicker → catches up to the warm front

Fast-Moving Cold Front

Fast-moving cold fronts are pushed by intense pressure systems far behind the actual front. The friction between the ground and the cold front retards the movement of the front and creates a steeper frontal surface. This results in a very narrow band of weather, concentrated along the leading edge of the front.

If the warm air being overtaken by the cold front is relatively stable, overcast skies and rain may occur for some distance ahead of the front. If the warm air is unstable, scattered thunderstorms and rain showers may form.

A continuous line of thunderstorms, or squall line, may form along or ahead of the front. Squall lines present a serious hazard to pilots as squall type thunderstorms are intense and move quickly. Behind a fast-moving cold front, the skies usually clear rapidly and the front leaves behind gusty, turbulent winds and colder temperatures



Aviation Routine Weather Reports (METAR) and Special Weather Reports (SPECI). Surface weather observations are fundamental to all meteorological services. Aviators typically view surface observations through METARs and SPECIs.

General Types of Observations. There are three general types of surface observations:

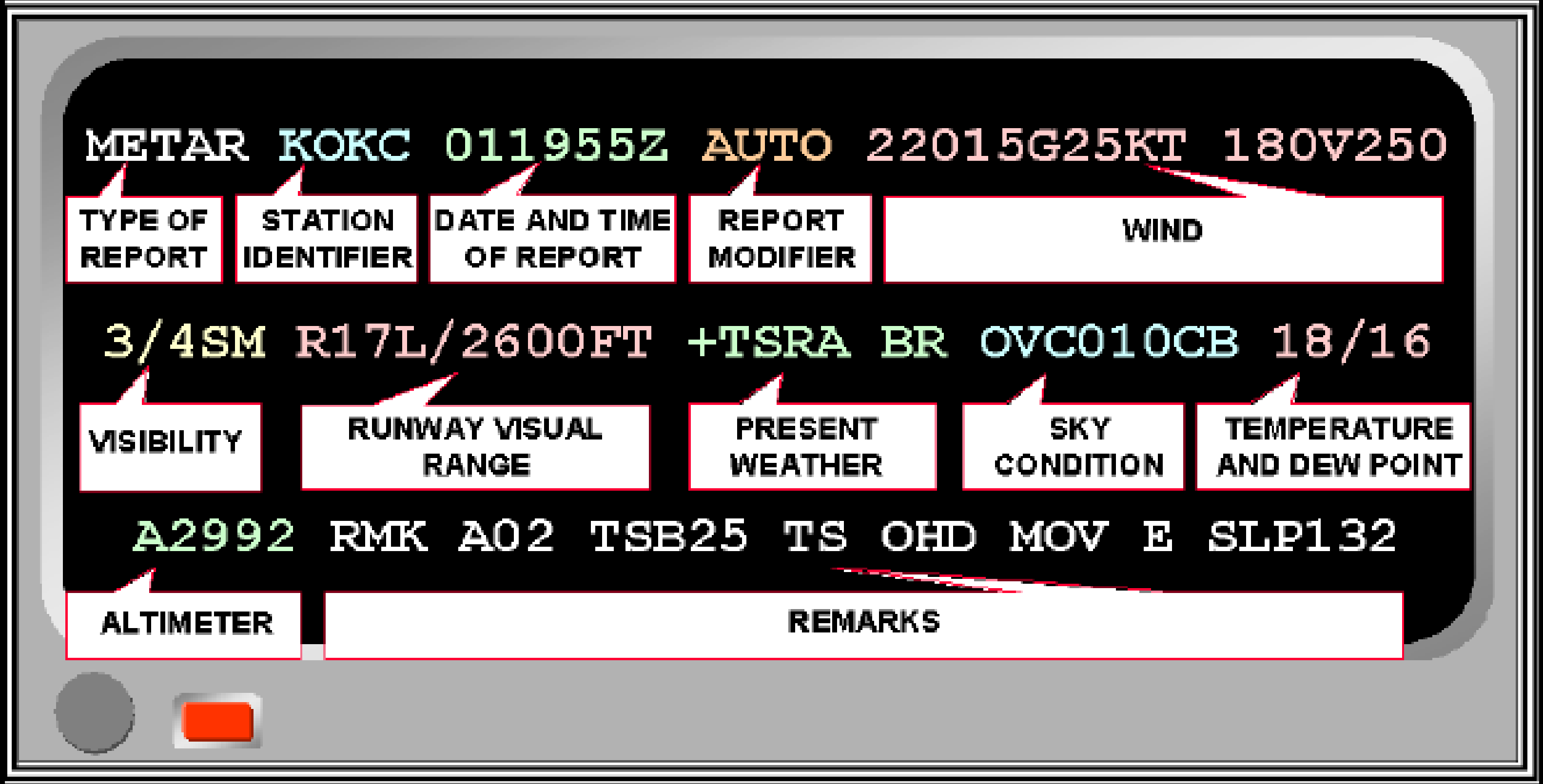
- Manual Observation. Weather observations done by a human weather observer who is certified by the NWS or the FAA.

- Automated Observation. Automated observations are derived from instruments and algorithms without human input or oversight. In the United States, there are two main kinds of automated observing systems: the automated surface observing system (ASOS) and the Automated Weather Observing System (AWOS). Detailed information on ASOS and AWOS can be found in the Aeronautical Information Manual (AIM).

- Augmented Observation. At select airports in the United States, the automated observing system will have input and oversight by human weather observers or tower controllers certified in weather observing. These are referred to as augmented stations. Human observers report weather elements that are beyond the capabilities of the automated system and/or are deemed operationally significant. The weather elements observed and reported by the human observer vary, depending on the selected airport. AUTO is not used in augmented reports.

Aviation Routine Weather Report (METAR). The METAR report has been adopted by the United States to provide surface observations in support of aviation for the terminal. A METAR report includes the airport identifier, time of observation, wind, visibility, Runway Visual Range (RVR), present weather phenomena, sky conditions, temperature, dew point, and altimeter setting. Excluding the airport identifier and the time of observation, this information is collectively referred to as the “body” of the report. Coded and/or plain language information elaborating on data in the body may be appended to the end of the METAR as “remarks.” The contents of the remarks section varies with the type of reporting station.

Recency of Observed Elements at Automated Stations. For those elements that the human observer evaluates using spatial averaging techniques (e.g., sky cover and visibility), the automated station substitutes time averaging of sensor data. Therefore, in an automated observation, sky condition is an evaluation of sensor data gathered during the 30-minute period ending at the actual time of the observation. All other elements are based on sensor data that is within 10 minutes or less of the actual time of the observation.


METAR KOKC 011955Z AUTO 22015G25KT 180V250
TYPE OF REPORT
STATION IDENTIFIER
DATE AND TIME OF REPORT
REPORT MODIFIER
WIND
3/4SM R17L/2600FT +TSRA BR OVC010CB 18/16
VISIBILITY
RUNWAY VISUAL RANGE
PRESENT WEATHER
SKY CONDITION
TEMPERATURE AND DEW POINT
A2992 RMK A02 TSB25 TS OHD MOV E SLP132
ALTIMETER
REMARKS

METAR KGGG 161753Z AUTO 14021G26KT 3/4SM +TSRA BR BKN008 OVC012CB 18/17 A2970 RMK PRESFR

Type of report—there are two types of METAR reports. The first is the routine METAR report that is transmitted on a regular time interval. The second is the aviation selected SPECI. This is a special report that can be given at any time to update the METAR for rapidly changing weather conditions, aircraft mishaps, or other critical information.

METAR KGGG 161753Z AUTO 14021G26KT 3/4SM +TSRA
BR BKN008 OVC012CB 18/17 A2970 RMK PRESFR

Station identifier—a four-letter code as established by the International Civil Aviation Organization (ICAO). In the 48 contiguous states, a unique three-letter identifier is preceded by the letter “K.” For example, Gregg County Airport in Longview, Texas, is identified by the letters “KGGG,” K being the country designation and GGG being the airport identifier. In other regions of the world, including Alaska and Hawaii, the first two letters of the four-letter ICAO identifier indicate the region, country, or state. Alaska identifiers always begin with the letters “PA” and Hawaii identifiers always begin with the letters “PH.” Station identifiers can be found by calling the FSS, a NWS office, or by searching various websites such as DUATS and NOAA's Aviation Weather Aviation Digital Data Services (ADDS).

METAR KGGG 161753Z AUTO 14021G26KT 3/4SM +TSRA
BR BKN008 OVC012CB 18/17 A2970 RMK PRESFR

Date and time of report—depicted in a six-digit group (161753Z). The first two digits are the date. The last four digits are the time of the METAR/SPECI, which is always given in coordinated universal time (UTC). A “Z” is appended to the end of the time to denote the time is given in Zulu time (UTC) as opposed to local time.

Zulu time—a term used in aviation for UTC, which places the entire world on one time standard

METAR KGGG 161753Z AUTO 14021G26KT 3/4SM +TSRA
BR BKN008 OVC012CB 18/17 A2970 RMK PRESFR

Modifier—denotes that the METAR/SPECI came from an automated source or that the report was corrected. If the notation “AUTO” is listed in the METAR/SPECI, the report came from an automated source. It also lists “AO1” (for no precipitation discriminator) or “AO2” (with precipitation discriminator) in the “Remarks” section to indicate the type of precipitation sensors employed at the automated station.

When the modifier “COR” is used, it identifies a corrected report sent out to replace an earlier report that contained an error (for example: METAR KGGG 161753Z COR).

METAR KGGG 161753Z AUTO 14021G26KT 3/4SM +TSRA
BR BKN008 OVC012CB 18/17 A2970 RMK PRESFR

Wind—reported with five digits (14021KT) unless the speed is greater than 99 knots, in which case the wind is reported with six digits. The first three digits indicate the direction the true wind is blowing from in tens of degrees. If the wind is variable, it is reported as "VRB." The last two digits indicate the speed of the wind in knots unless the wind is greater than 99 knots, in which case it is indicated by three digits. If the winds are gusting, the letter "G" follows the wind speed (G26KT). After the letter "G," the peak gust recorded is provided. If the wind direction varies more than 60° and the wind speed is greater than six knots, a separate group of numbers, separated by a "V," will indicate the extremes of the wind directions.

METAR KGGG 161753Z AUTO 14021G26KT 3/4SM +TSRA
BR BKN008 OVC012CB 18/17 A2970 RMK PRESFR

Visibility—the prevailing visibility (¾ SM) is reported in statute miles as denoted by the letters “SM.” It is reported in both miles and fractions of miles. At times, runway visual range (RVR) is reported following the prevailing visibility. RVR is the distance a pilot can see down the runway in a moving aircraft. When RVR is reported, it is shown with an R, then the runway number followed by a slant, then the visual range in feet. For example, when the RVR is reported as R17L/1400FT, it translates to a visual range of 1,400 feet on runway 17 left..

METAR KGGG 161753Z AUTO 14021G26KT 3/4SM +TSRA
BR BKN008 OVC012CB 18/17 A2970 RMK PRESFR

Weather—can be broken down into two different categories: qualifiers and weather phenomenon (+TSRA BR). First, the qualifiers of intensity, proximity, and the descriptor of the weather are given. The intensity may be light (–), moderate ( ), or heavy (+). Proximity only depicts weather phenomena that are in the airport vicinity. The notation "VC" indicates a specific weather phenomenon is in the vicinity of five to ten miles from the airport. Descriptors are used to describe certain types of precipitation and obscurations. Weather phenomena may be reported as being precipitation, obscurations, and other phenomena, such as squalls or funnel clouds. Descriptions of weather phenomena as they begin or end and hailstone size are also listed in the "Remarks"
sections of the report

METAR KGGG 161753Z AUTO 14021G26KT 3/4SM +TSRA
BR BKN008 OVC012CB 18/17 A2970 RMK PRESFR

Qualifier		Weather Phenomena		
Intensity or Proximity 1	Descriptor 2	Precipitation 3	Obscuration 4	Other 5
– Light	**MI** Shallow	**DZ** Drizzle	**BR** Mist	**PO** Dust/sand whirls
Moderate (no qualifier)	**BC** Patches	**RA** Rain	**FG** Fog	**SQ** Squalls
+ Heavy	**DR** Low drifting	**SN** Snow	**FU** Smoke	**FC** Funnel cloud
VC in the vicinity	**BL** Blowing	**SG** Snow grains	**DU** Dust	**+FC** Tornado or waterspout
	SH Showers	**IC** Ice crystals (diamond dust)	**SA** Sand	**SS** Sandstorm
	TS Thunderstorms	**PL** Ice pellets	**HZ** Haze	**DS** Dust storm
	FZ Freezing	**GR** Hail	**PY** Spray	
	PR Partial	**GS** Small hail or snow pellets	**VA** Volcanic ash	
		UP *Unknown precipitation		

METAR KGGG 161753Z AUTO 14021G26KT 3/4SM +TSRA BR BKN008 OVC012CB 18/17 A2970 RMK PRESFR

Sky condition—always reported in the sequence of amount, height, and type or indefinite ceiling/height (vertical visibility) (BKN008 OVC012CB, VV003).
The heights of the cloud bases are reported with a three-digit number in hundreds of feet AGL. Clouds above 12,000 feet are not detected or reported by an automated station. The types of clouds, specifically towering cumulus (TCU) or cumulonimbus (CB) clouds, are reported with their height. Contractions are used to describe the amount of cloud coverage and obscuring phenomena. The amount of sky coverage is reported in eighths of the sky from horizon to horizon

METAR KGGG 161753Z AUTO 14021G26KT 3/4SM +TSRA BR BKN008 OVC012CB 18/17 A2970 RMK PRESFR

Sky Cover	Contraction
Less than ⅛	SKC, CLR, FEW
(Clear) ⅛–2⁄8 (Few)	FEW
⅜–4⁄8 (Scattered)	SCT
⅝–⅞ (Broken)	BKN
8⁄8 or (Overcast)	OVC

METAR KGGG 161753Z AUTO 14021G26KT 3/4SM +TSRA BR BKN008 OVC012CB 18/17 A2970 RMK PRESFR

Temperature and dew point—the air temperature and dew point are always given in degrees Celsius (C) or (18/17). Temperatures below 0 °C are preceded by the letter “M” to indicate minus.

METAR KGGG 161753Z AUTO 14021G26KT 3/4SM +TSRA BR BKN008 OVC012CB 18/17 A2970 RMK PRESFR

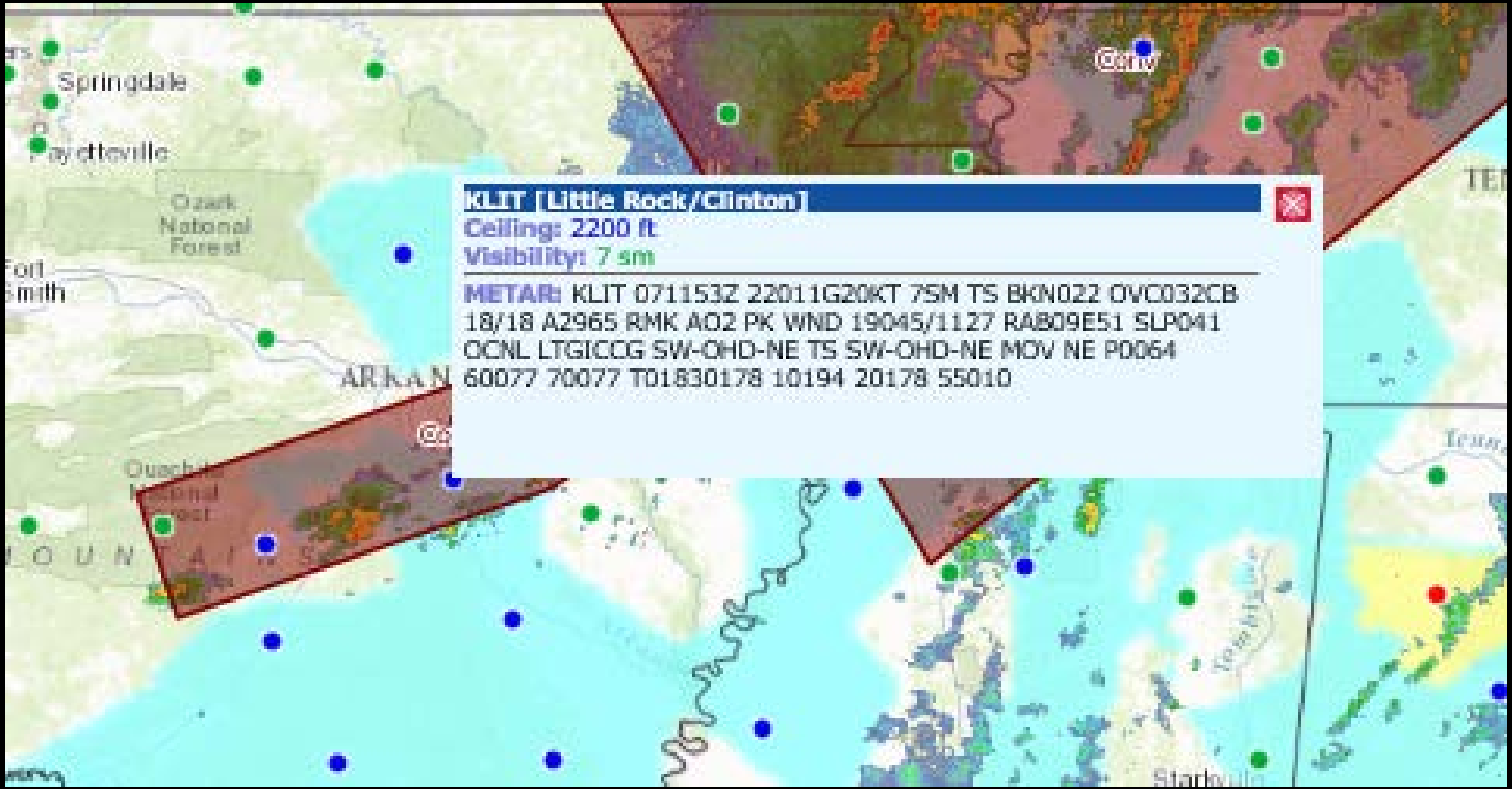
Altimeter setting—reported as inches of mercury ("Hg) in a four-digit number group (A2970). It is always preceded by the letter "A." Rising or falling pressure may also be denoted in the "Remarks" sections as "PRESRR" or "PRESFR," respectively.

METAR KGGG 161753Z AUTO 14021G26KT 3/4SM +TSRA BR BKN008 OVC012CB 18/17 A2970 RMK PRESFR

Remarks—the remarks section always begins with the letters “RMK.” Comments may or may not appear in this section of the METAR. The information contained in this section may include wind data, variable visibility, beginning and ending times of particular phenomenon, pressure information, and various other information deemed necessary. An example of a remark regarding weather phenomenon that does not fit in any other category would be: OCNL LTGICCG. This translates as occasional lightning in the clouds and from cloud to ground. Automated stations also use the remarks section to indicate the equipment needs maintenance.

METAR KGGG 161753Z AUTO 14021G26KT 3/4SM +TSRA BR BKN008 OVC012CB 18/17 A2970 RMK PRESFR

Routine METAR for Gregg County Airport for the 16th day of the month at 1753Z automated source. Winds are 140 at 21 knots gusting to 26. Visibility is ¾ statute mile. Thunderstorms with heavy rain and mist. Ceiling is broken
at 800 feet, overcast at 1,200 feet with cumulonimbus clouds.
Temperature 18 °C and dew point 17 °C. Barometric pressure
is 29.70 "Hg and falling rapidly.


KLIT [Little Rock/Clinton]
Ceiling: 2200 ft
Visibility: 7 sm
METAR: KLIT 071153Z 22011G20KT 7SM TS BKN022 OVC032CB 18/18 A2965 RMK AO2 PK WND 19045/1127 RAB09E51 SLP041 OCNL LTGICCG SW-OHD-NE TS SW-OHD-NE MOV NE P0064 60077 70077 T01830178 10194 20178 55010
Springdale
Ozark National Forest
Fort Smith

Special Weather Report (SPECI). A SPECI is an unscheduled report taken when any of the criteria given in SPECI Criteria, are observed during the period between hourly reports. SPECIs contain all data elements found in a METAR. All SPECIs are issued as soon as possible when relevant criteria are observed.

Whenever SPECI criteria are met at the time of the routine METAR, a METAR is issued

1	**Wind Shift**	Wind direction changes by 45 degrees or more, in less than 15 minutes and the wind speed is 10 knots or more throughout the wind shift.
2	**Visibility**	Surface visibility, as reported in the body of the report, decreases to less than, or if below, increases to equal to or exceeding: • 3 miles • 2 miles • 1 mile • The lowest standard instrument approach procedure minimum as published in the National Ocean Service (NOS) U.S. Instrument Procedures. If none published, use ½ mile
3	**Runway Visual Range (RVR)**	The highest value from the designated RVR runway decreases to less than, or if below, increases to equal to or exceeding 2,400 feet during the preceding 10 minutes. U.S. military stations may not report a SPECI based on RVR.
4	**Tornado, Funnel Cloud, or Waterspout**	• Is observed • Disappears from sight, or ends
5	**Thunderstorm**	• Begins (a SPECI is not required to report the beginning of a new thunderstorm if one is currently reported) • Ends
6	**Precipitation**	• Hail begins or ends • Freezing precipitation begins, ends or changes intensity • Ice pellets begin, end or change intensity
7	**Squalls**	When a squall occurs.
8	**Ceiling**	The ceiling (rounded to reportable values) forms or dissipates below, decreases to less than, or if below, increases to equal to or exceeding: • *3,000 feet* • *1,500 feet* • *1,000 feet* • *500 feet* • *The lowest standard instrument approach procedure minimum as published in the National Ocean Service (NOS) U.S. Instrument Procedures. If none published, use 200 feet.*
9	**Sky Condition**	A layer of clouds or obscurations aloft is present below 1,000 feet and no layer aloft was reported below 1,000 feet in the preceding METAR or SPECI.
10	**Volcanic Eruption**	When an eruption is first noted.
11	**Aircraft Mishap**	Upon notification of an aircraft mishap, unless there has been an intervening observation.
12	**Miscellaneous**	Any other meteorological situation designated by the responsible agency of which, in the opinion of the observer, is critical.

Type of Lightning		
Type	**Contraction**	**Definition**
Cloud-ground	CG	Lightning occurring between cloud and ground
In-cloud	IC	Lightning which takes place within the cloud
Cloud-cloud	CC	Streaks of lightning reaching from one cloud to another
Cloud-air	CA	Streaks of lightning which pass from a cloud to the air, but do not strike the ground

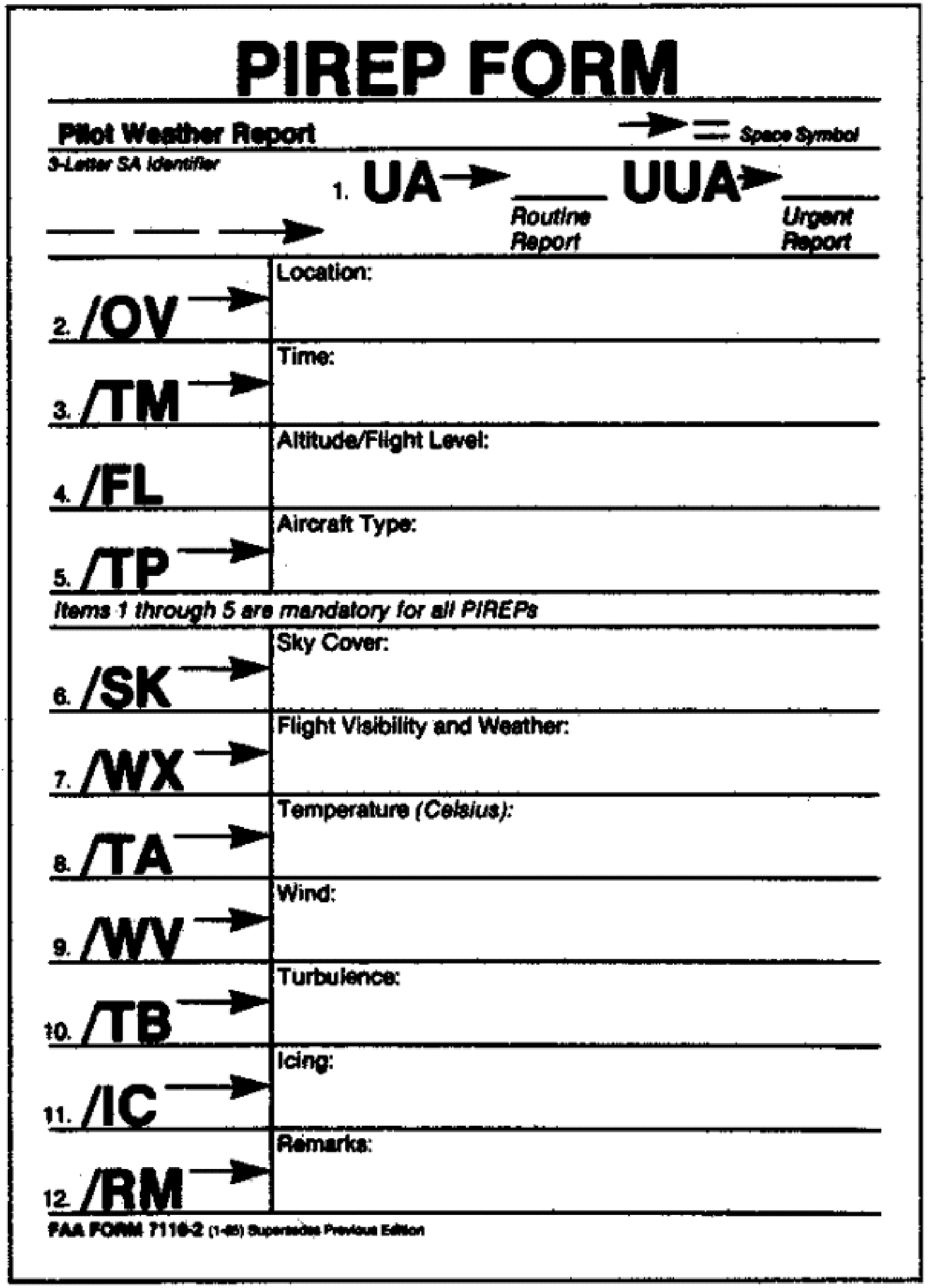
Frequency of Lightning		
Frequency	**Contraction**	**Definition**
Occasional	OCNL	Less than 1 flash/minute
Frequent	FRQ	About 1 to 6 flashes/minute
Continuous	CONS	More than 6 flashes/minute

Type of Lightning		
Type	**Contraction**	**Definition**
Cloud-ground	CG	Lightning occurring between cloud and ground
In-cloud	IC	Lightning which takes place within the cloud
Cloud-cloud	CC	Streaks of lightning reaching from one cloud to another
Cloud-air	CA	Streaks of lightning which pass from a cloud to the air, but do not strike the ground

Frequency of Lightning		
Frequency	**Contraction**	**Definition**
Occasional	OCNL	Less than 1 flash/minute
Frequent	FRQ	About 1 to 6 flashes/minute
Continuous	CONS	More than 6 flashes/minute

Pilot Weather Reports (PIREPs)

PIREPs provide valuable information regarding the conditions as they actually exist in the air, which cannot be gathered from any other source. Pilots can confirm the height of bases and tops of clouds, locations of wind shear and turbulence, and the location of inflight icing. If the ceiling is below 5,000 feet, or visibility is at or below five miles, ATC facilities are required to solicit PIREPs from pilots in the area. When unexpected weather conditions are encountered, pilots are encouraged to make a report to a FSS or ATC. When a pilot weather report is filed, the ATC facility or FSS adds it to the distribution system to brief other pilots and provide inflight advisories.



PIREP FORM

Pilot Weather Report → = *Space Symbol*

3-Letter SA Identifier

1. **UA** → ____ *Routine Report* **UUA** → ____ *Urgent Report*

2. **/OV** →	Location:
3. **/TM** →	Time:
4. **/FL**	Altitude/Flight Level:
5. **/TP** →	Aircraft Type:

Items 1 through 5 are mandatory for all PIREPs

6. **/SK** →	Sky Cover:
7. **/WX** →	Flight Visibility and Weather:
8. **/TA** →	Temperature *(Celsius)*:
9. **/WV** →	Wind:
10. **/TB** →	Turbulence:
11. **/IC** →	Icing:
12. **/RM** →	Remarks:

FAA FORM 7110-2 (1-85) Supersedes Previous Edition

UA/OV GGG 090025/TM 1450/FL 060/TP C182/SK 080 OVC/WX FV04SM RA/TA 05/WV 270030KT/TB LGT/RM HVY RAIN

Explanation:

Type: ....Routine pilot report

Location: .... 25 NM out on the 090° radial, Gregg County VOR

Time: .... 1450 Zulu

Altitude or Flight Level: 6,000 feet

Aircraft Type: ....Cessna 182

Sky Cover: ....8,000 overcast

Visibility/Weather: ....4 miles in rain

Temperature: ....5 °Celsius

Wind: ....270° at 30 knots

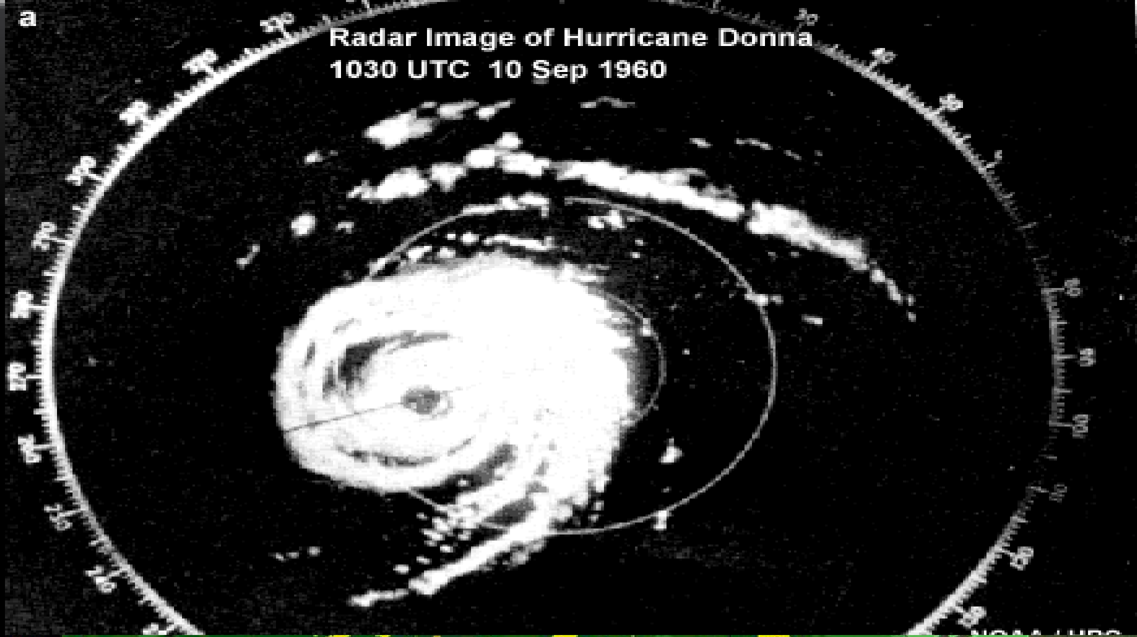
Turbulence: ....Light

Icing: .... None reported

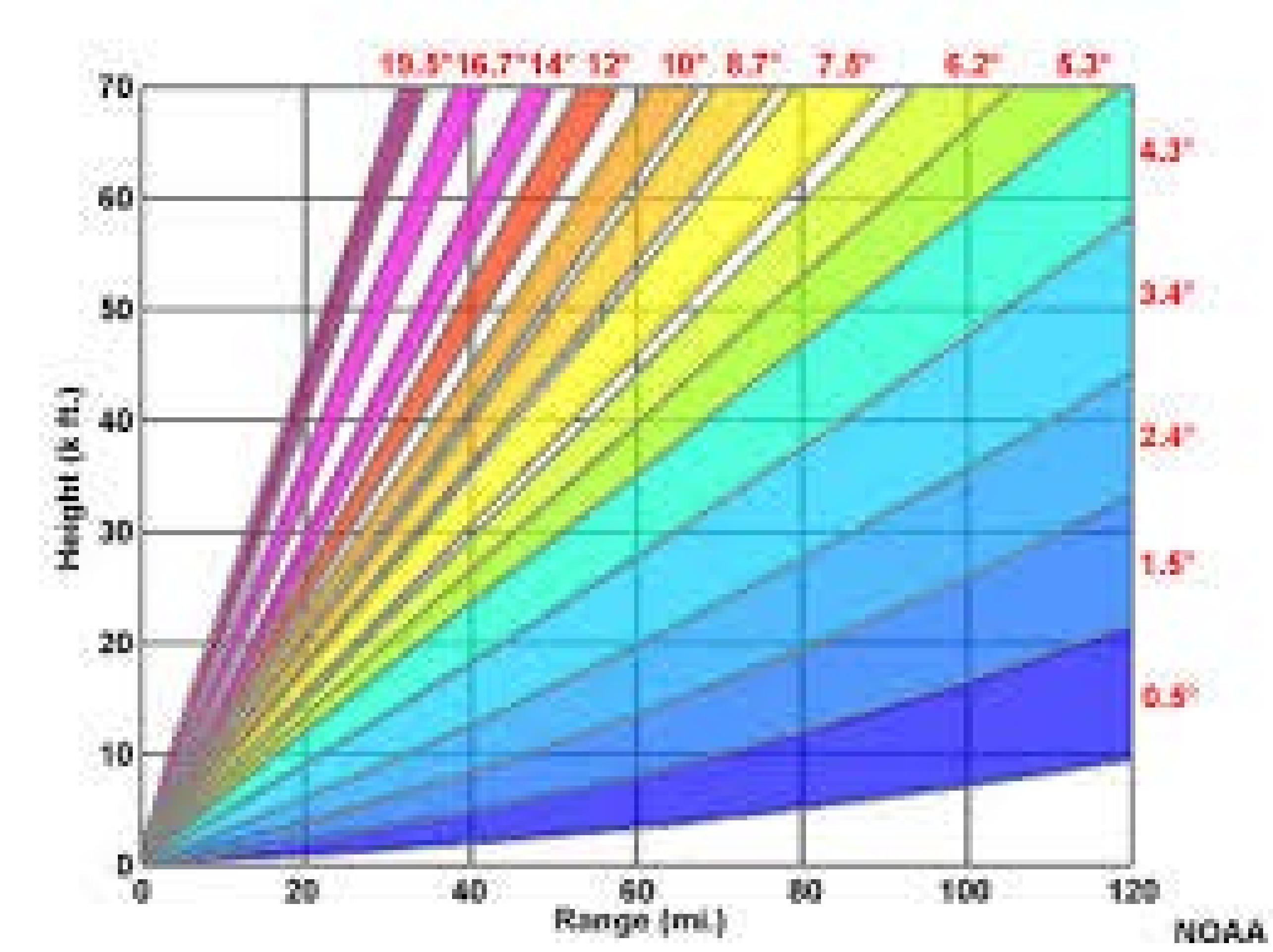
Remarks: .... Rain is heavy

Encoding Pilot Weather Reports (PIREPS)			
1	XXX	3-letter station identifier	Nearest weather reporting location to the reported phenomenon
2	UA	Routine PIREP, UUA-Urgent PIREP.	
3	/OV	Location	Use 3-letter NAVAID idents only. a. Fix: /OV ABC, /OV ABC 090025. b. Fix: /OV ABC 045020-DEF, /OV ABC-DEF-GHI
4	/TM	Time	4 digits in UTC: /TM 0915.
5	/FL	Altitude/flight level	3 digits for hundreds of feet. If not known, use UNKN: /FL095, /FL310, /FLUNKN.
6	/TP	Type aircraft	4 digits maximum. If not known, use UNKN: /TP L329, /TP B727, /TP UNKN.
7	/SK	Sky cover/cloud layers	Describe as follows: a. Height of cloud base in hundreds of feet. If unknown, use UNKN. b. Cloud cover symbol. c. Height of cloud tops in hundreds of feet.
8	/WX	Weather	Flight visibility reported first: Use standard weather symbols: /WX FV02SM RA HZ, /WX FV01SM TSRA.
9	/TA	Air temperature in celsius (C)	If below zero, prefix with a hyphen: /TA 15, /TA M06.
10	/WV	Wind	Direction in degrees magnetic north and speed in six digits: /WV270045KT, WV 280110KT.
11	/TB	Turbulence	Use standard contractions for intensity and type (use CAT or CHOP when appropriate). Include altitude only if different from /FL, /TB EXTRM, /TB LGT-MOD BLO 090.
12	/IC	Icing	Describe using standard intensity and type contractions. Include altitude only if different than /FL: /IC LGT-MOD RIME, /IC SEV CLR 028-045.
13	/RM	Remarks	Use free form to clarify the report and type hazardous elements first: /RM LLWS -15KT SFC-030 DURC RY22 JFK.

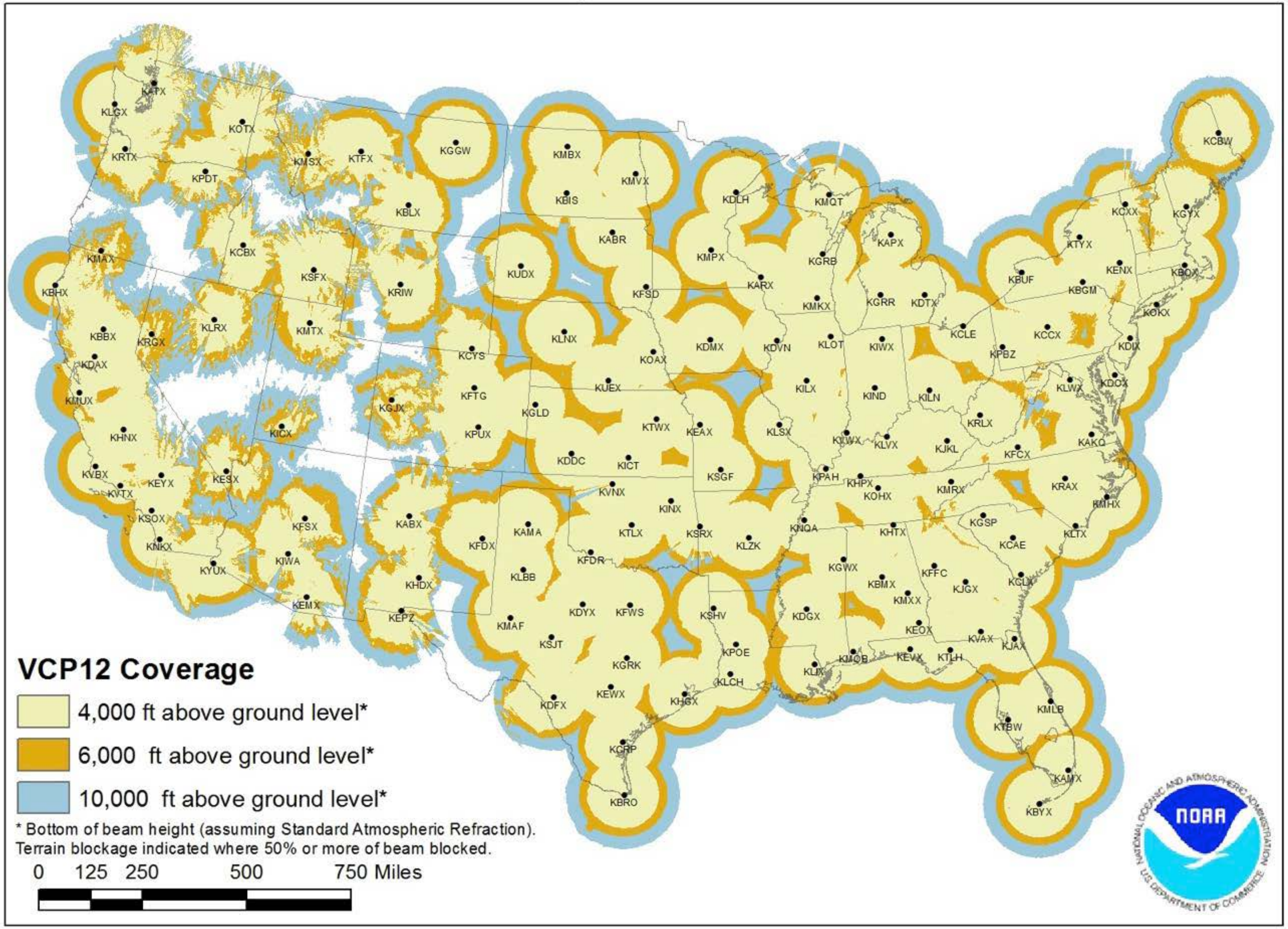
Weather radar observations and their resultant images are graphical displays of precipitation and non-precipitation targets detected by weather radars. Weather Surveillance Radar–1988 Doppler (WSR-88D), also known as next generation weather radar (NEXRAD), displays these targets on a variety of products, which can be found on the Web sites of all NWS Weather Forecast Offices (WFO), the AWC, Storm Predication Center (SPC), and various flight planning and weather service providers.



WSR-88D radars are continuously generating radar observations. Each radar observation, called a volume scan, consists of 5 to 14 separate elevation “tilts,” and takes between 4 and 11 minutes to generate, depending on the radar’s mode of operation. Once one observation is complete, the next one begins. Radar observation times are not standard, nor are they synchronized with other radars. The valid time of the observation is the time assigned to the product, which is the end of the last radar scan.

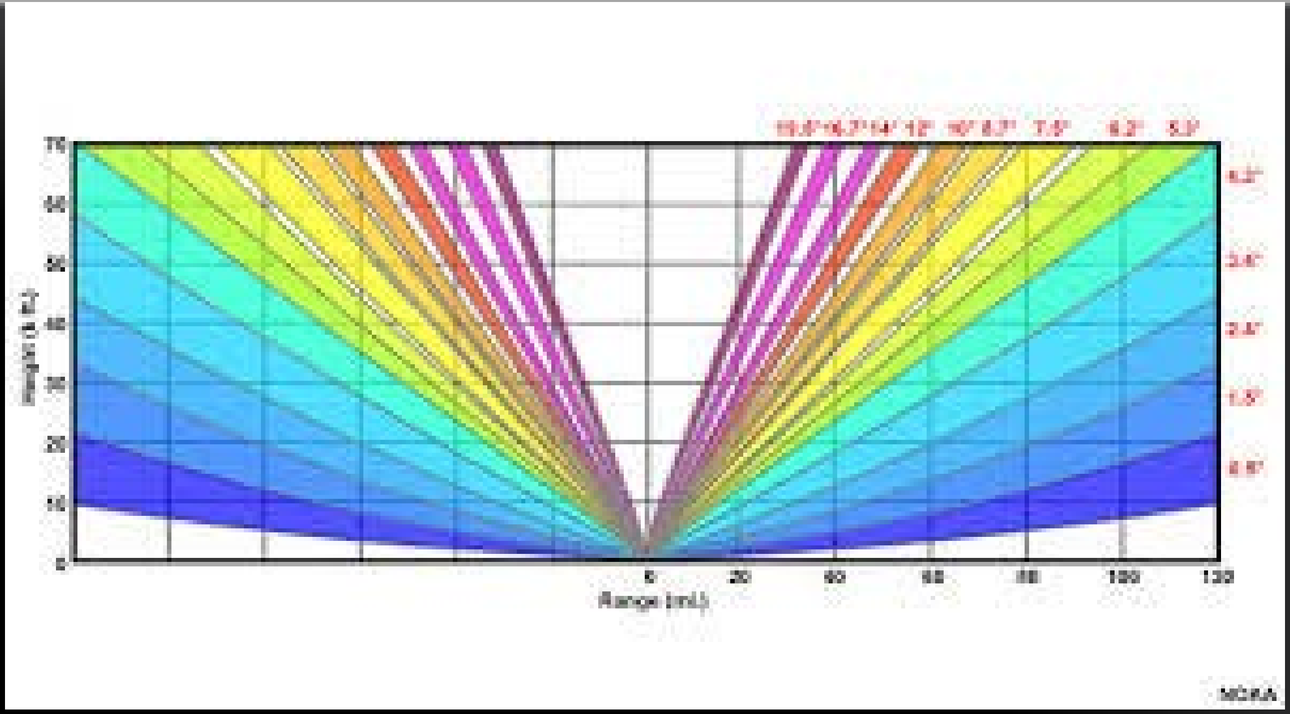


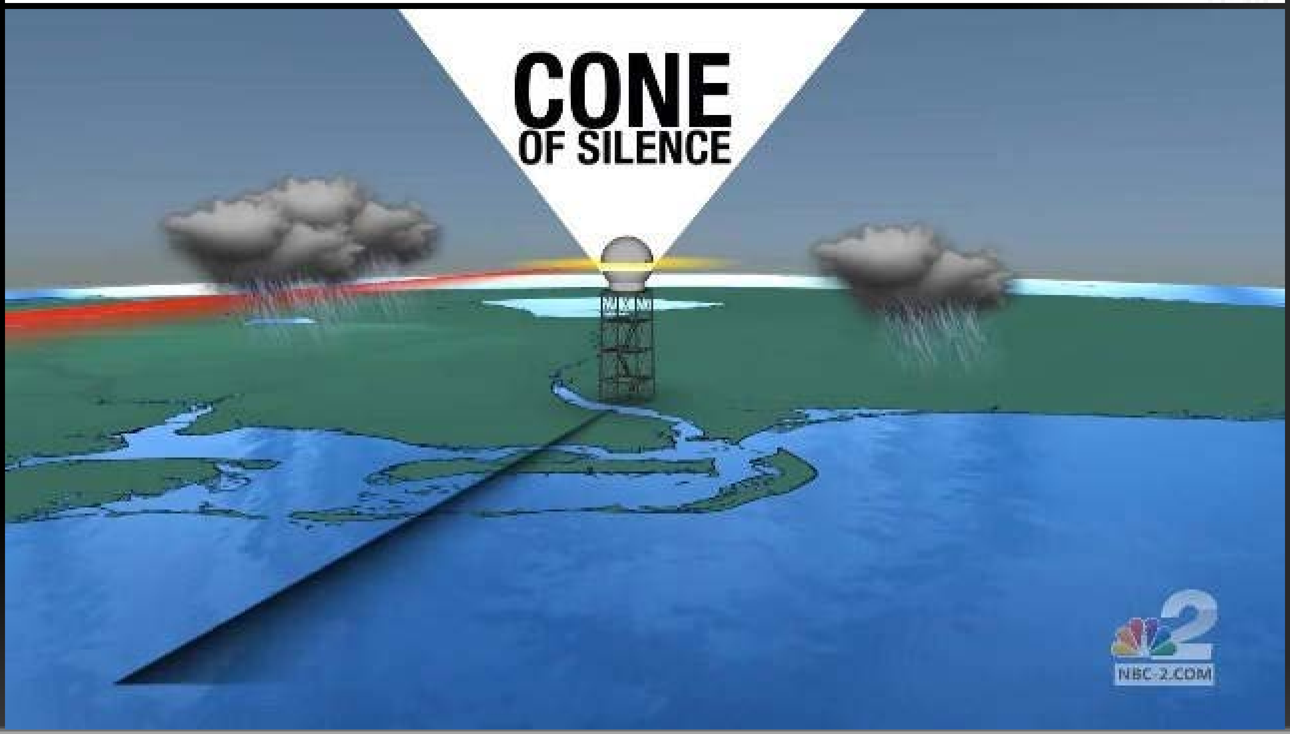
WSR-88D Radar (NEXRAD) Network. The WSR-88D radar network consists of 160 radars operated by the NWS, FAA, and Department of Defense (DOD). Location of WSR-88D Weather Radar in the CONUS and Their Respective Coverage at 4,000 Feet AGL, 6,000 Feet AGL, and 10,000 Feet AGL



The WSR-88D employs scanning strategies in which the antenna automatically raises to higher and higher preset angles, or elevation scans, as it rotates. These elevation scans comprise a volume coverage pattern (VCP). Once the radar sweeps through all elevation slices, a volume scan is complete. The WSR-88D radar can use several VCPs.

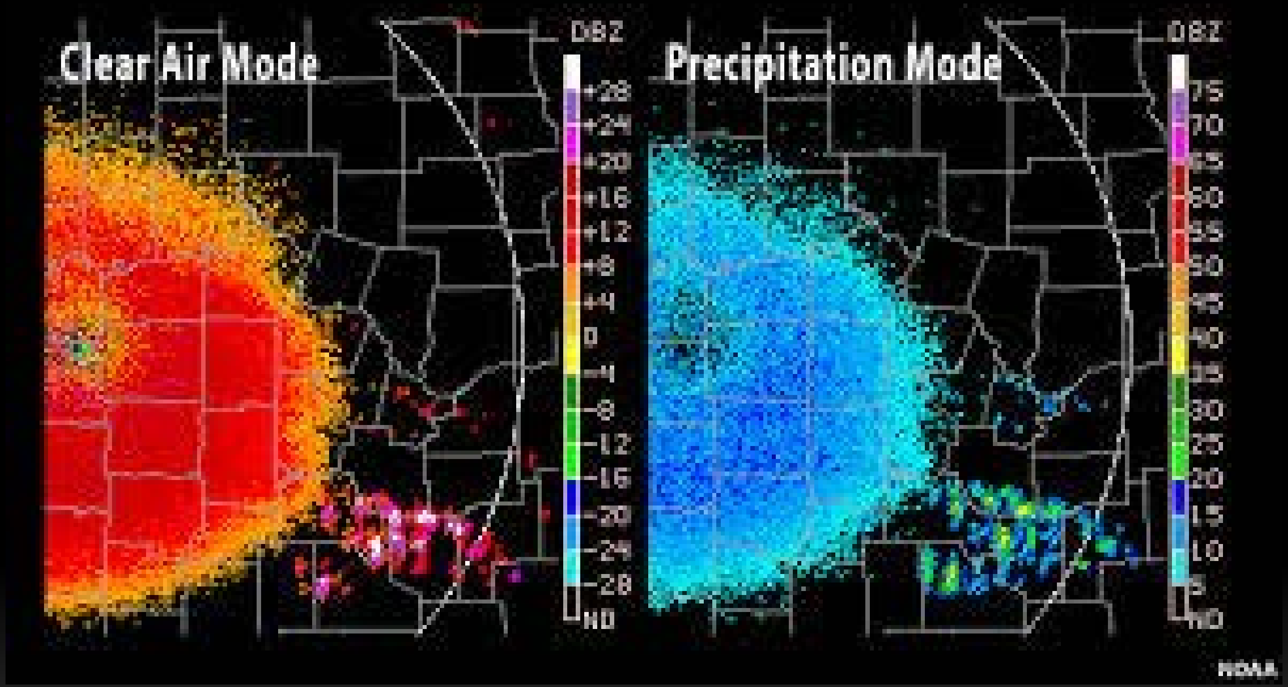
There are two main classes of VCPs, which are commonly referred to as Clear Air and Precipitation Modes.



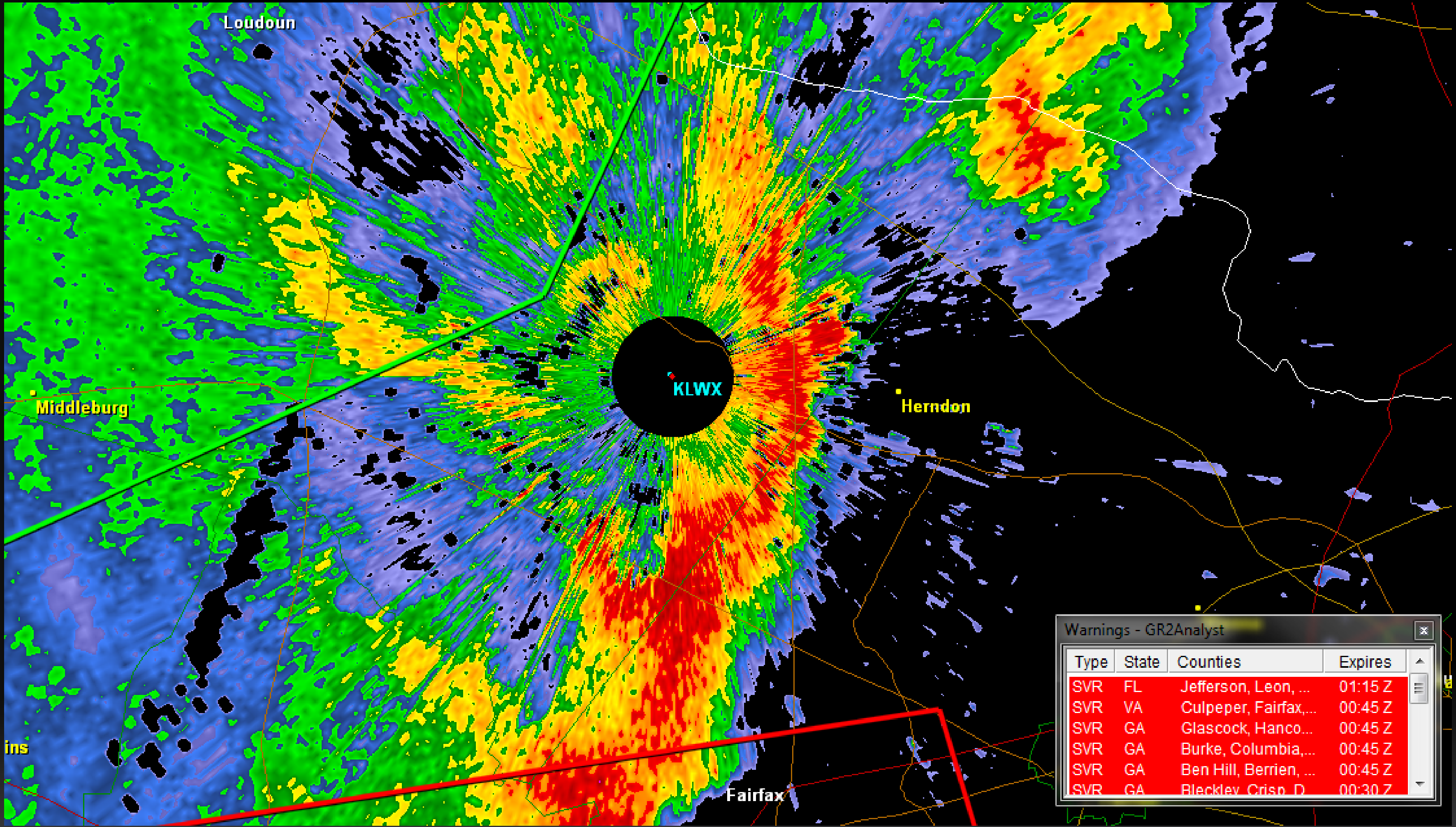


In Clear Air Mode, the radar is in its most sensitive operation. This mode has the slowest antenna rotation rate, which permits the radar to sample the atmosphere longer. This slower sampling increases the radar's sensitivity and ability to detect smaller objects in the atmosphere. The term "clear air" does not imply "no precipitation" mode. Even in Clear Air Mode, the WSR-88D can detect light, stratiform precipitation (e.g., snow) due to the increased sensitivity.

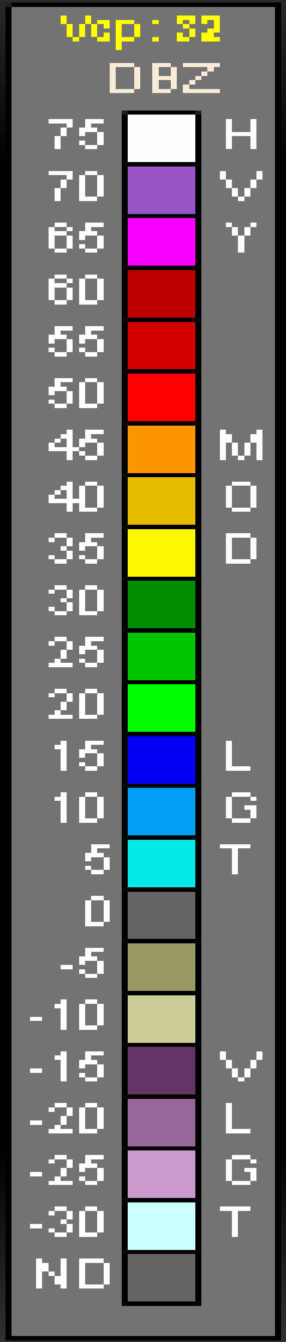
Many of the radar returns in Clear Air Mode are airborne dust and particulate matter. The WSR-88D images are updated approximately every 10 minutes when operating in this mode.



Precipitation Mode. Precipitation targets typically provide stronger return signals to the radar than non-precipitation targets. Therefore, the WSR-88D is operated in Precipitation Mode when precipitation is present, although some non-precipitation echoes can still be detected in this operating mode.
The faster rotation of the WSR-88D in Precipitation Mode allows images to update at a faster rate approximately every 4 to 6 minutes.



The colors on radar images represent the reflective power of the precipitation target. In general, the amount of radar power received is proportional to the intensity of the precipitation. This reflective power, commonly referred to by meteorologists as "reflectivity," is measured in terms of decibels (dBZ). A decibel is a unit that describes the change of power emitted versus the power received. Since the power emitted is constant, the power received is related to the intensity of the precipitation target. Each reflectivity image includes a color scale that describes the relationship among reflectivity value, color on the radar image, and precipitation intensity. WSR-88D (NEXRAD) Weather Radar Echo Intensity Legend, depicts the correlations for most NWS radar images. The scale ranges from -30 dBZ to greater than 75 dBZ. The scale also includes ND correlated to black, which indicates no data was measured. The colors and decibel scale can vary depending on the service provider and Web site..



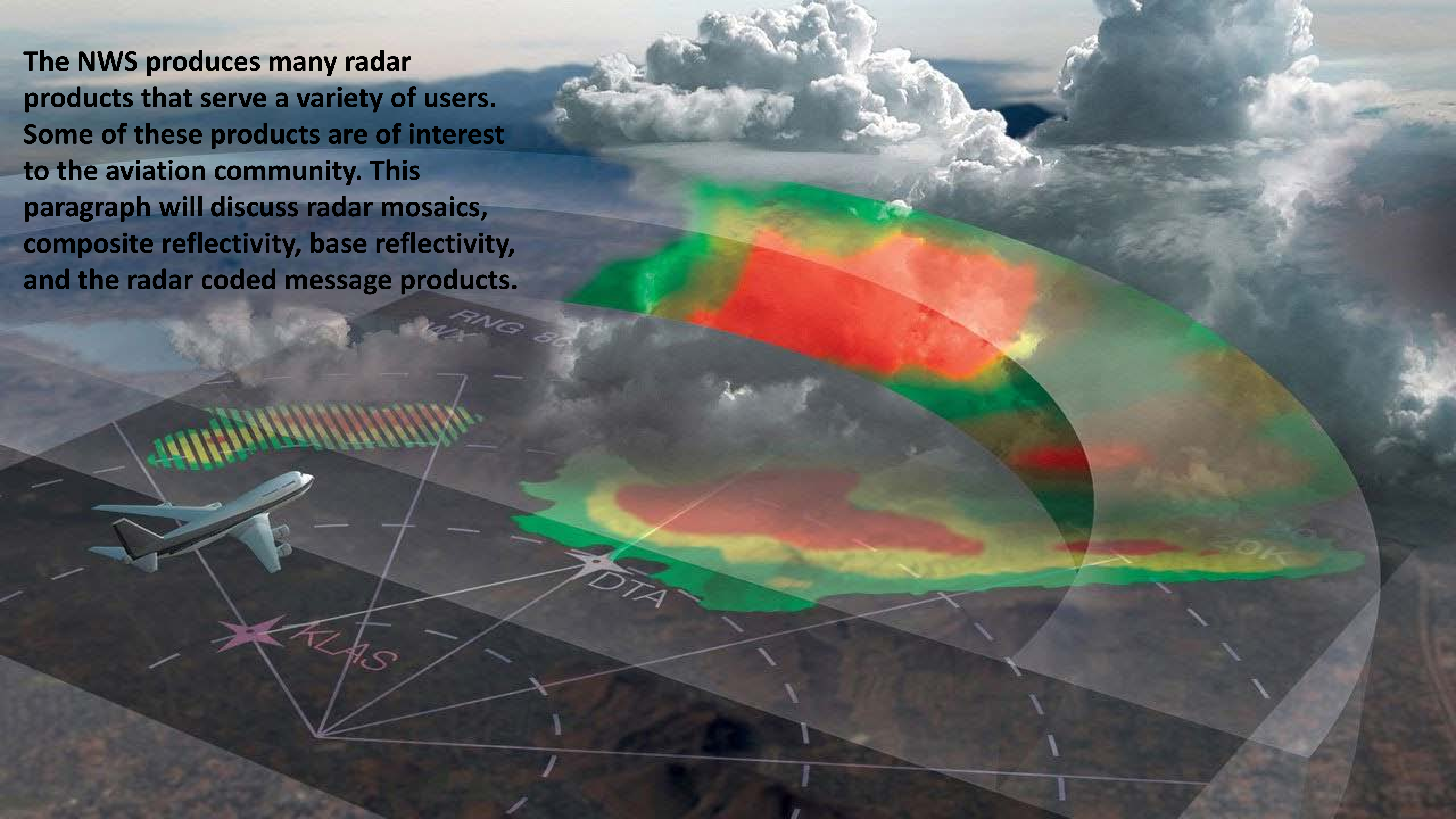
Reflectivity is correlated to intensity of precipitation. For example, in Precipitation Mode, when the decibel value reaches 15, light precipitation is present. The higher the indicated reflectivity value, the higher the rainfall rate. The interpretation of reflectivity values is the same for both Clear Air and Precipitation Modes. Reflectivity is also correlated with intensity terminology (phraseology) for air traffic control (ATC) purposes. WSR-88D Weather Radar Precipitation Intensity Terminology, defines this correlation.

Reflectivity (dBZ) Ranges	Weather Radar Echo Intensity Terminology
<30 dBZ	Light
30-40 dBZ	Moderate
>40-50 dBZ	Heavy
50+ dBZ	Extreme

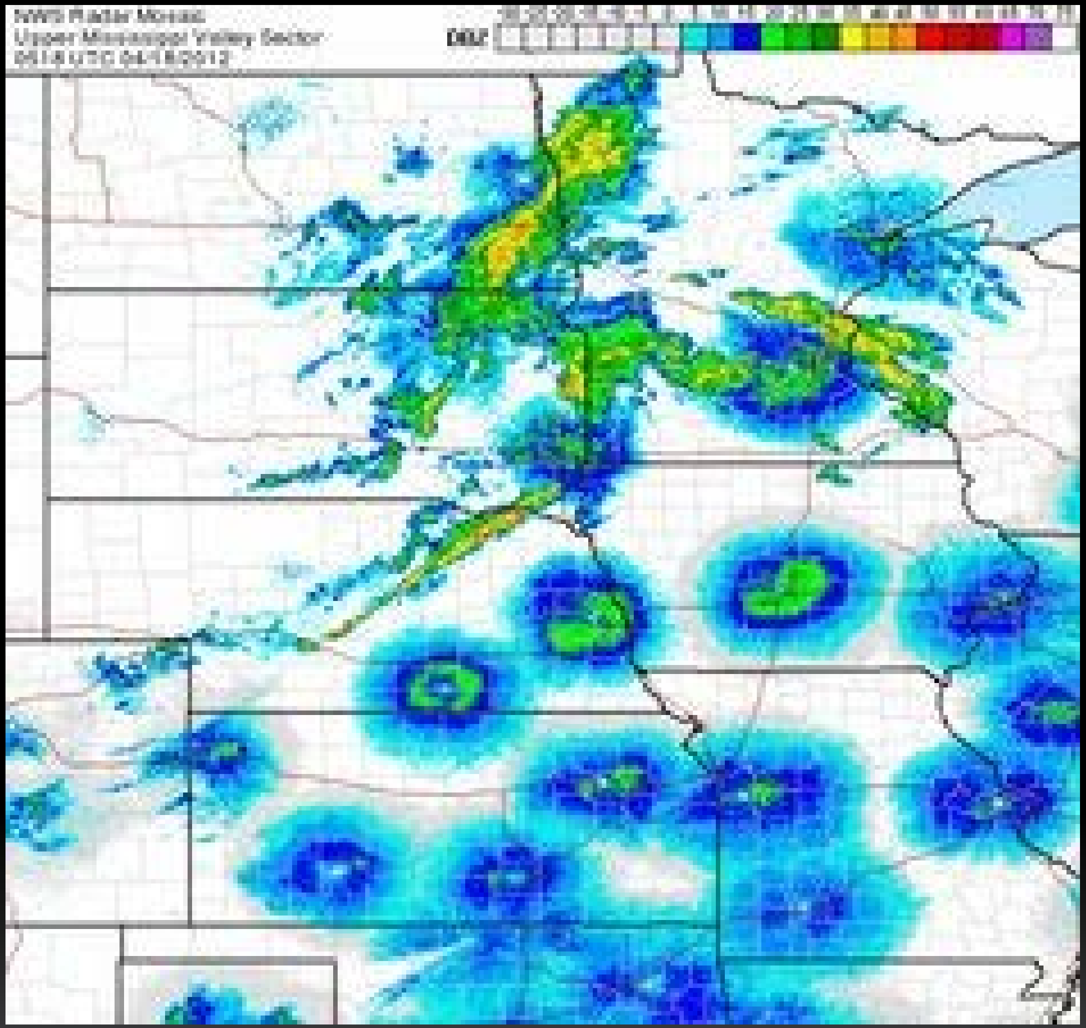
Values below 15 dBZ are typically associated with clouds. However, they may also be caused by atmospheric particulate matter such as dust, insects, pollen, or other phenomena. The scale cannot reliably be used to determine the intensity of snowfall. However, snowfall rates generally increase with increasing reflectivity.

Reflectivity (dBZ) Ranges	Weather Radar Echo Intensity Terminology
<30 dBZ	Light
30-40 dBZ	Moderate
>40-50 dBZ	Heavy
50+ dBZ	Extreme

The NWS produces many radar products that serve a variety of users. Some of these products are of interest to the aviation community. This paragraph will discuss radar mosaics, composite reflectivity, base reflectivity, and the radar coded message products.

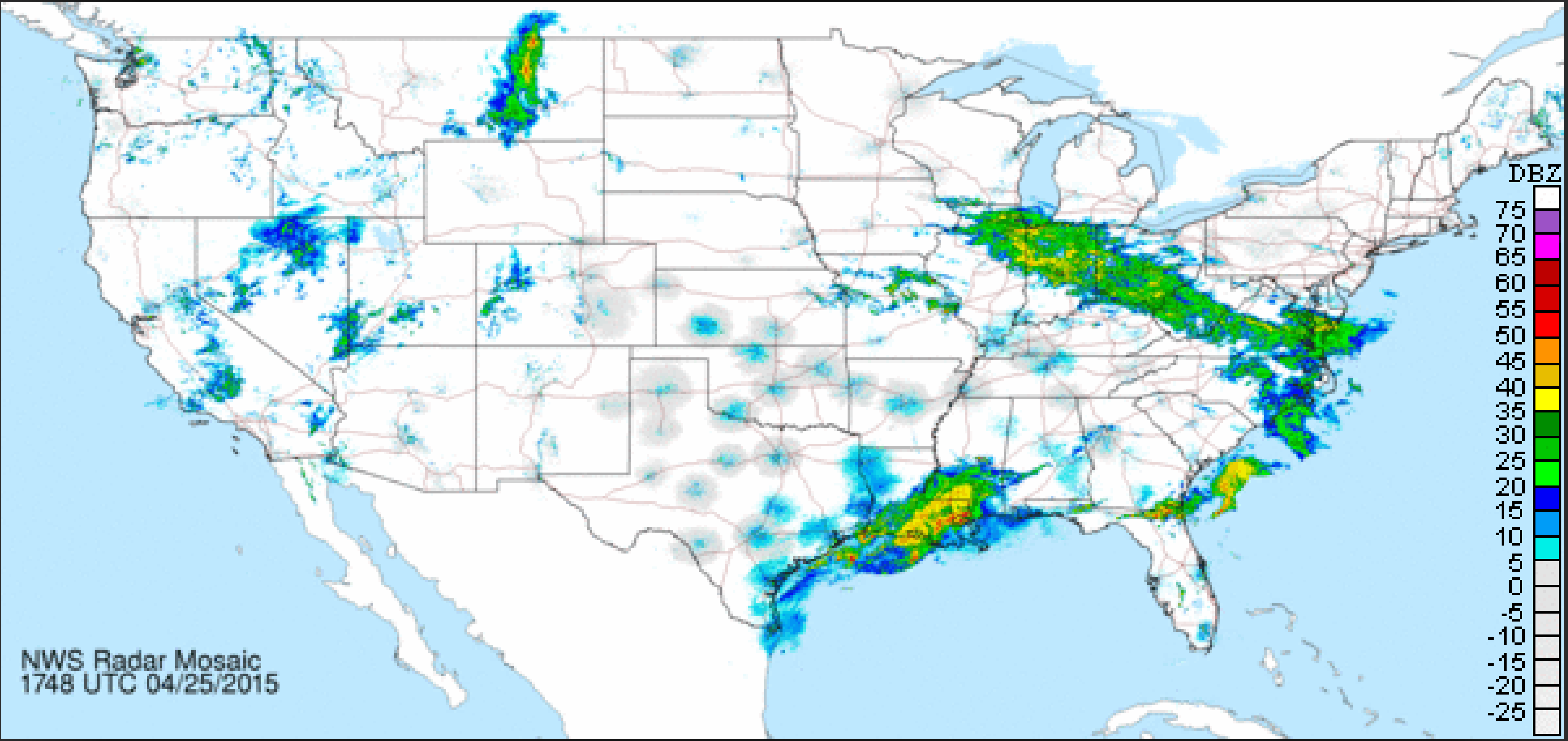


Radar Mosaic. A radar mosaic consists of multiple single-site radar images combined to produce a radar image on a regional or national scale. Regional and national mosaics can be found on the Web sites of NWS, AWC, all NWS WFOs, as well as commercial aviation weather providers

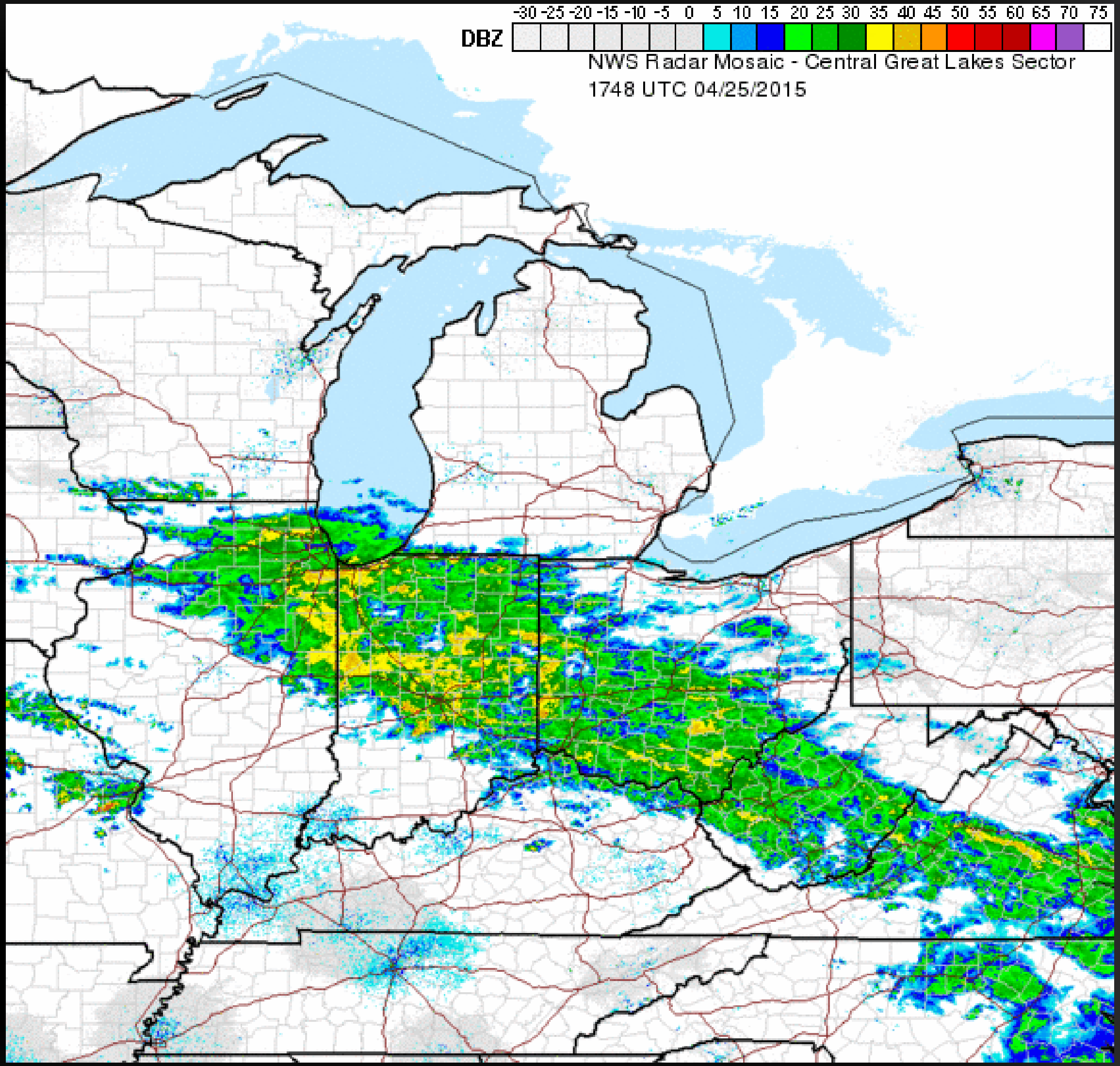


Radar mosaics can be assembled from either composite reflectivity or base reflectivity, depending on the Web site or data provider. At this time, NWS national, NWS National Radar Mosaic Example, Which Utilizes NEXRAD Base Reflectivity) and regional, NWS Regional Radar Mosaic Sector Example, Which Utilizes NEXRAD Base Reflectivity), and Alaska, Alaska Radar Mosiac Example) radar mosaic sectors are assembled using only base reflectivity data (0.5º radar beam angle with a 124 NM range) and are set up to display all echoes (precipitation and non-precipitation).

Most commercial aviation weather providers use composite reflectivity for their mosaics and configure the display to eliminate most non-precipitation echoes. NEXRAD radar data data-linked to aircraft cockpit displays via FAA Flight Information Service-Broadcast (FIS-B) use the composite reflectivity data for their radar mosaics.

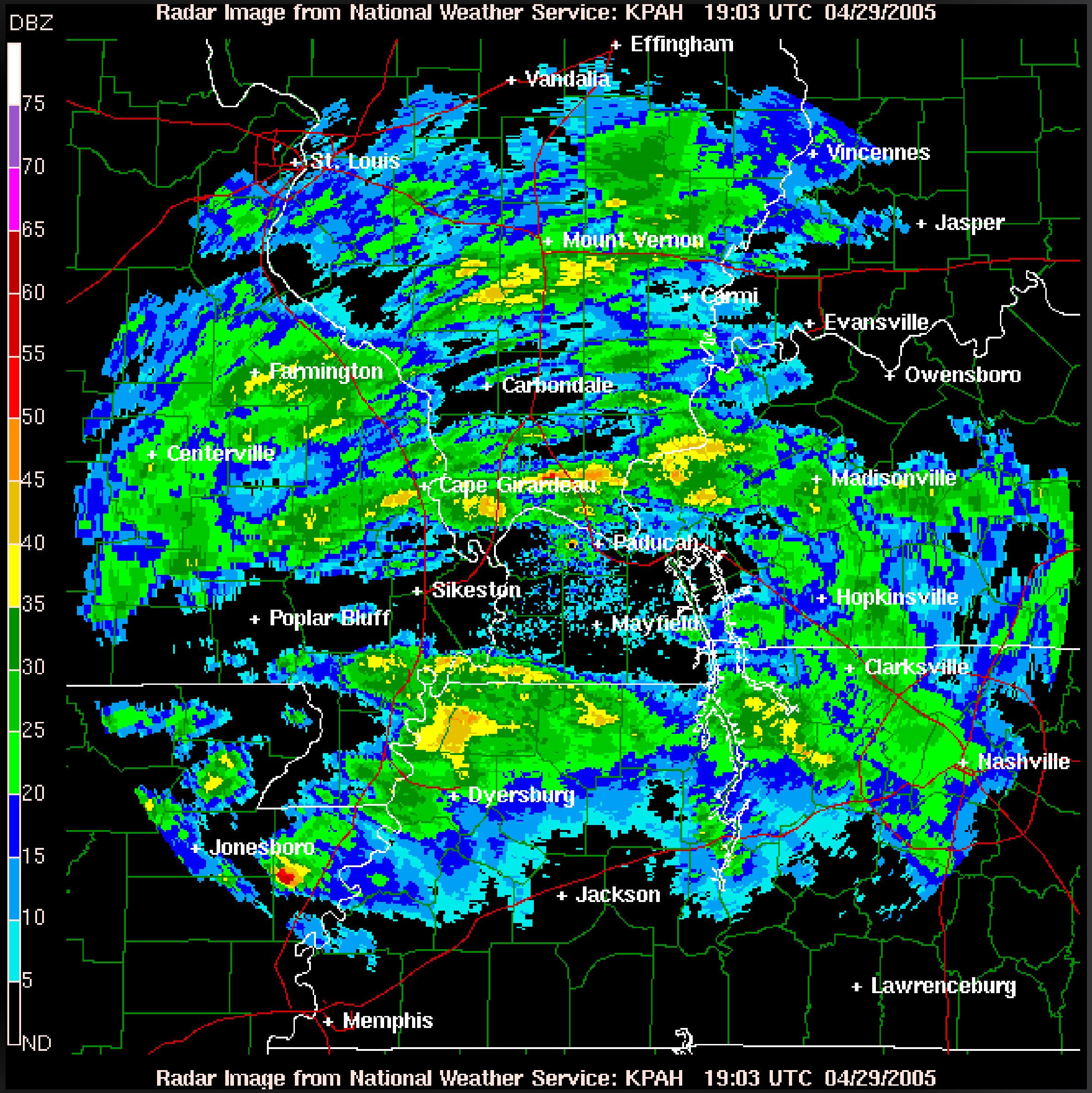

NWS Radar Mosaic
1748 UTC 04/25/2015
DBZ
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
-5
-10
-15
-20
-25

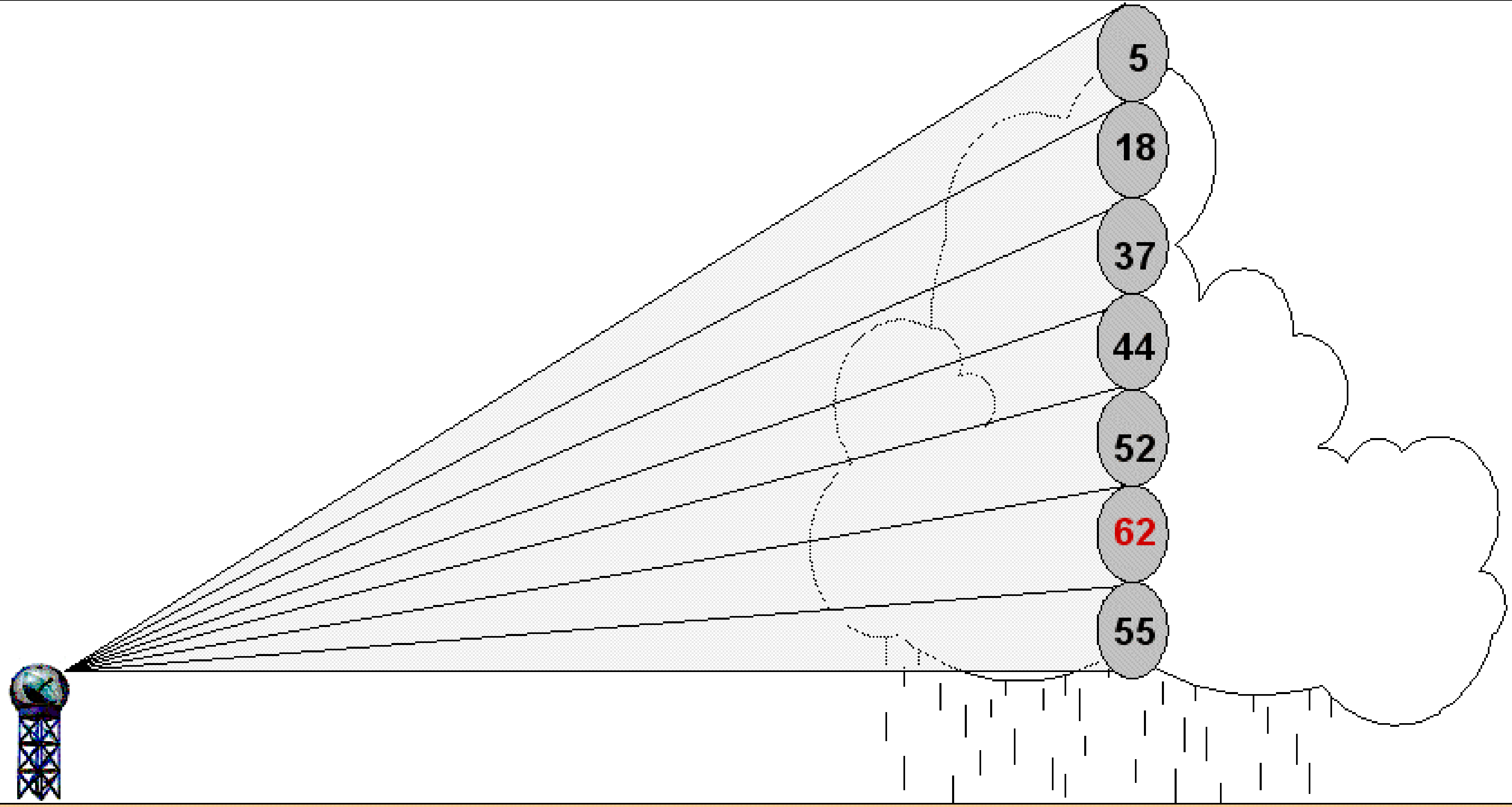
NWS Regional Radar Mosaic Sector Example, Which Utilizes NEXRAD Base Reflectivity



Composite Reflectivity. Because the highest precipitation intensity can be at any altitude, the composite reflectivity product , WSR-88D Weather Radar Composite Reflectivity, Single-Site Product Example) is needed. Composite reflectivity is the maximum echo intensity (reflectivity) detected within a column of the atmosphere above a location. During its tilt sequence, the radar scans through all of the elevation slices to determine the highest decibel value in the vertical column, Creation of a Composite Reflectivity, Single-Site Product), then displays that value on the product. When compared with base reflectivity, the composite reflectivity can reveal important storm structure features and intensity trends of, Weather Radar 0.5º Base Reflectivity (left) versus Composite Reflectivity (right) Comparison).

NEXRAD radar displays on airplane avionics use the composite reflectivity data for their radar mosaics.





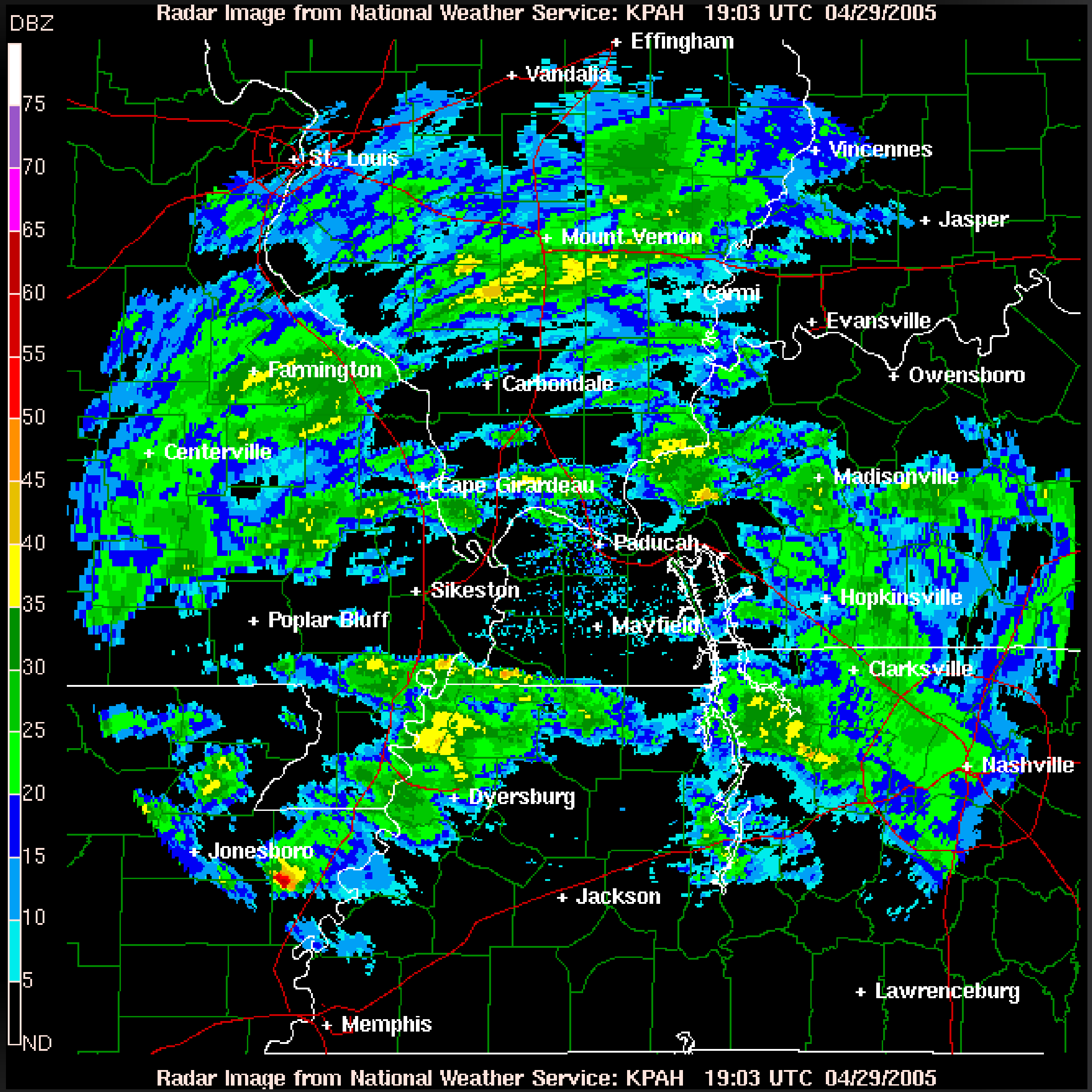
THE VALUE DISPLAYED ON THE COMPOSITE REFLECTIVITY PRODUCT IS: 62

RADAR

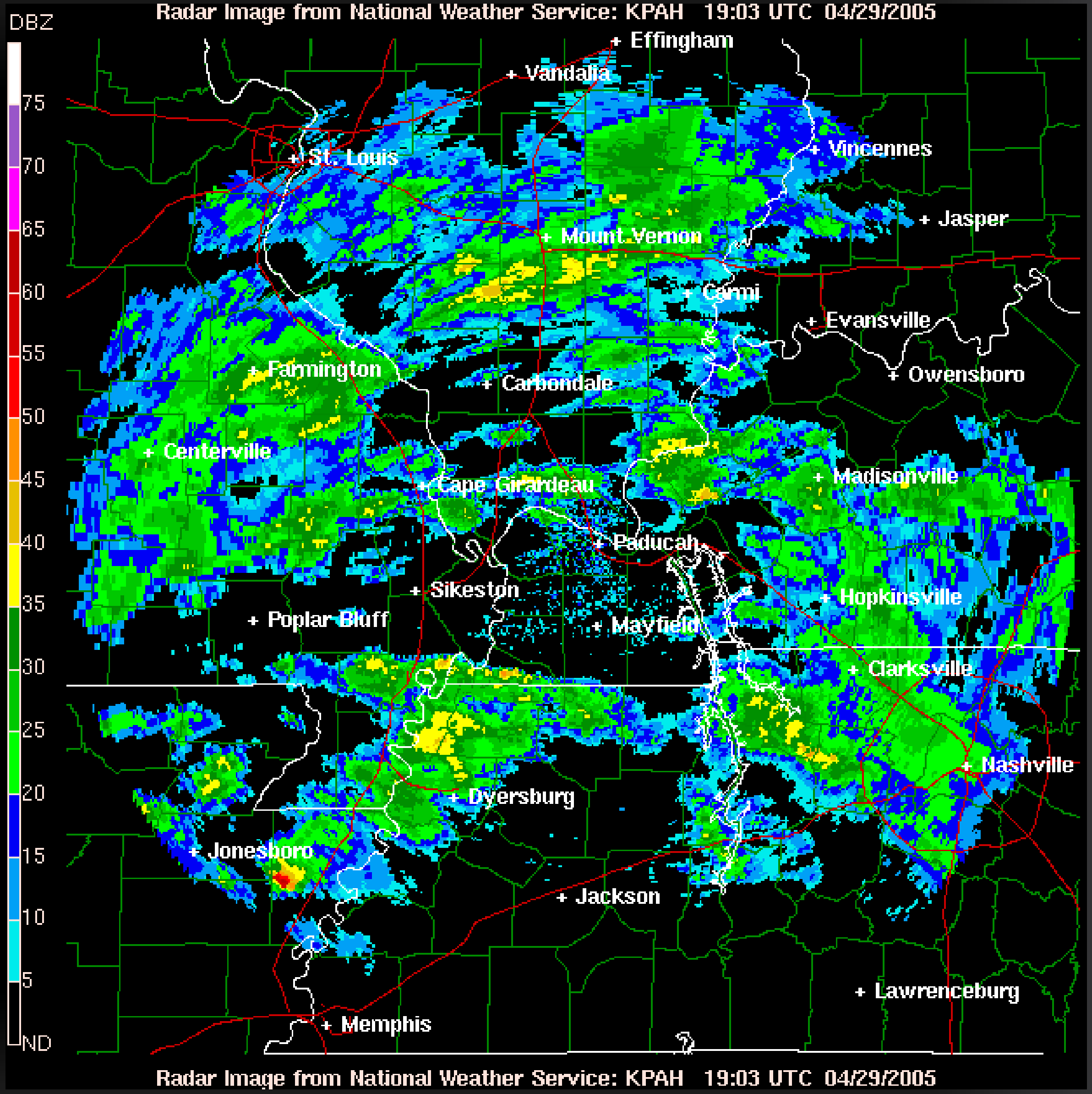
Composite Radar Reflectivity: The radar takes several sweeps of the atmosphere and combines the images into one image. Problem is it makes showers appear as storms.

Base reflectivity product is a display of both the location and intensity of reflectivity data from the lowest elevation angle, or 0.5º above the horizon.

The Base reflectivity product is one elevation scan, whereas composite reflectivity looks at all elevation scans. Base reflectivity products are available several minutes sooner than composite reflectivity products.

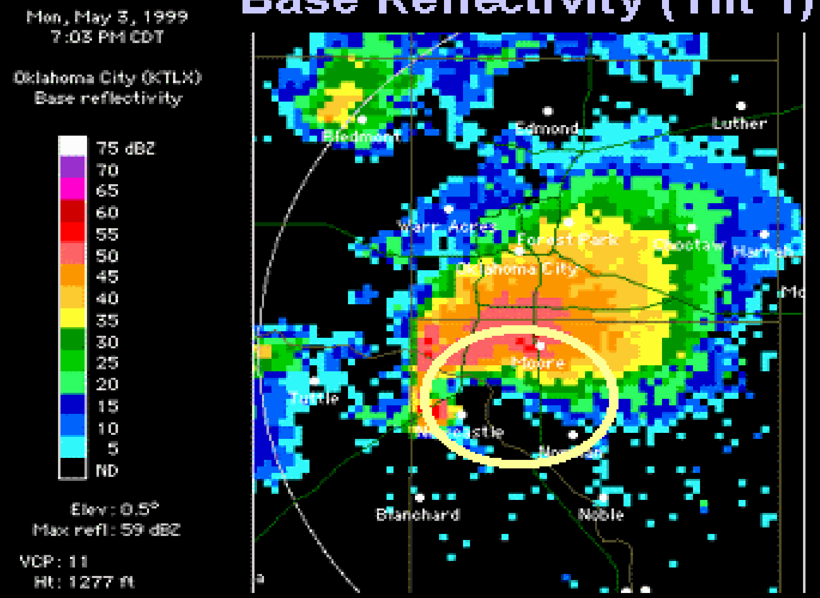


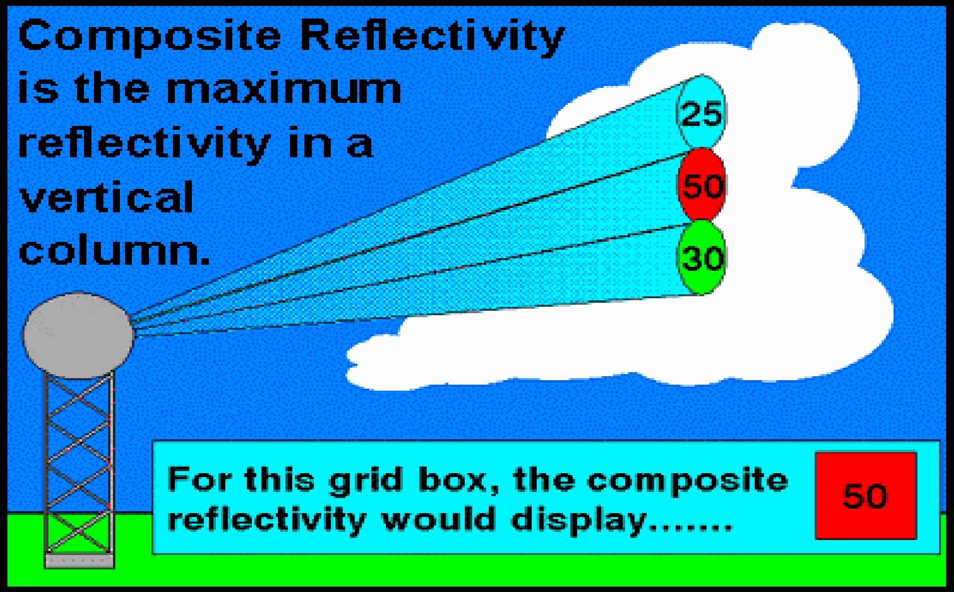
Precipitation at any location may be heavier than depicted on the base reflectivity image because it is occurring above the lowest elevation angle. Both a short-range, WSR-88D Weather Radar Short-Range (124 NM) Base Reflectivity, Single Site Product Example) and long-range, WSR-88D Weather Radar Long-Range (248 NM) Base Reflectivity, Single Site Product Example) image are available from the 0.5º base reflectivity product. The maximum range of the short-range, single-site radar base reflectivity product is 124 NM from the radar location. Long-range, single-site, base reflectivity product's range is 248 NM from the radar location. When using a single-site radar, i.e., not using a radar mosaic, echoes farther than 124 NM (short-range) or 248 NM (long-range) from the radar site will not be displayed, even if precipitation may be occurring at these greater distances.



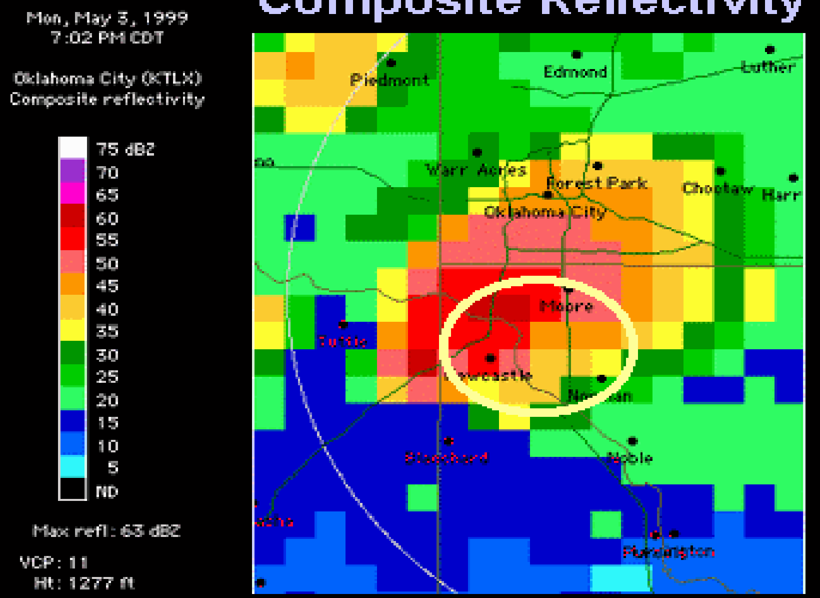
Composite Reflectivity

Base Reflectivity (Tilt 1)



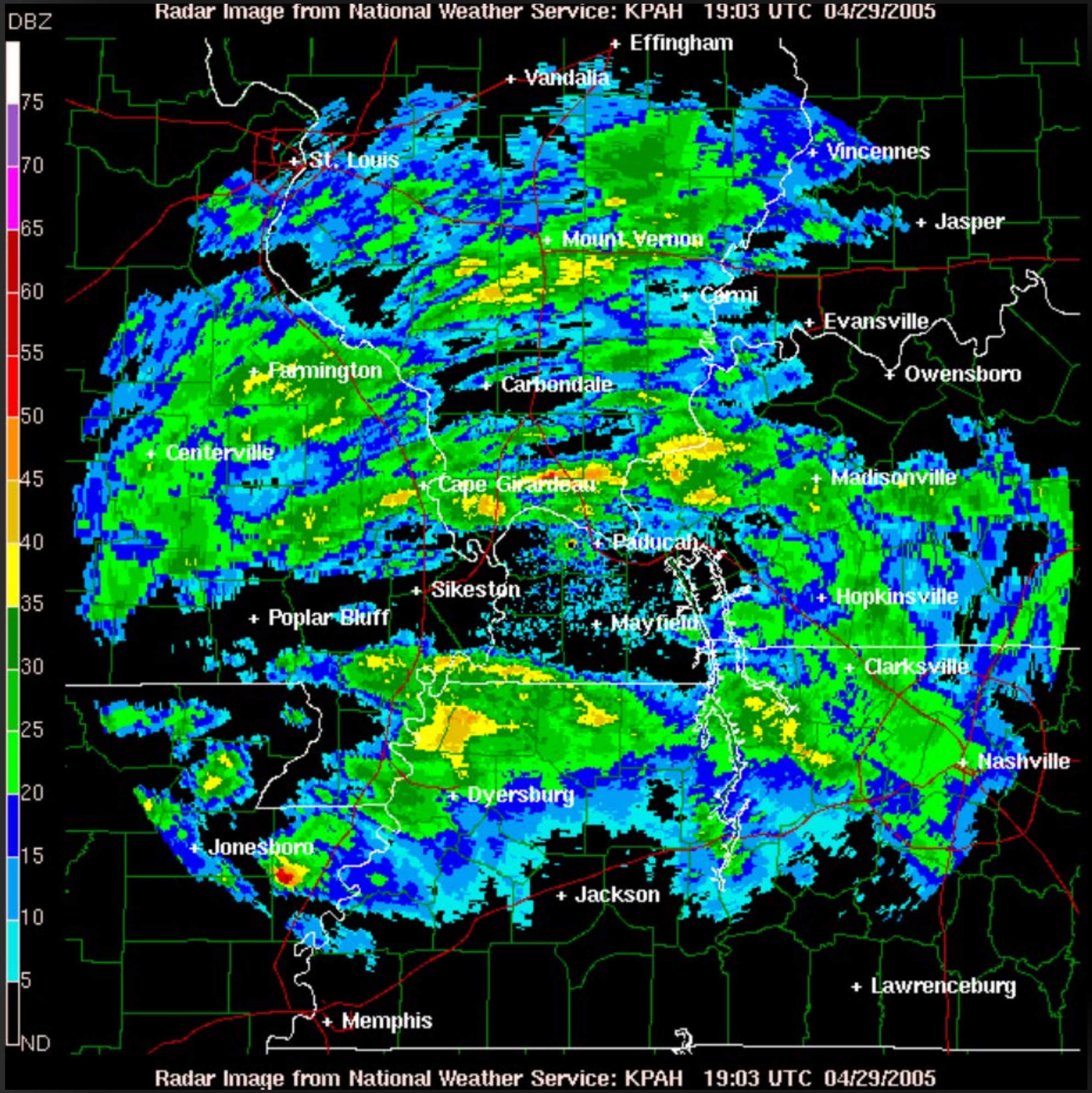


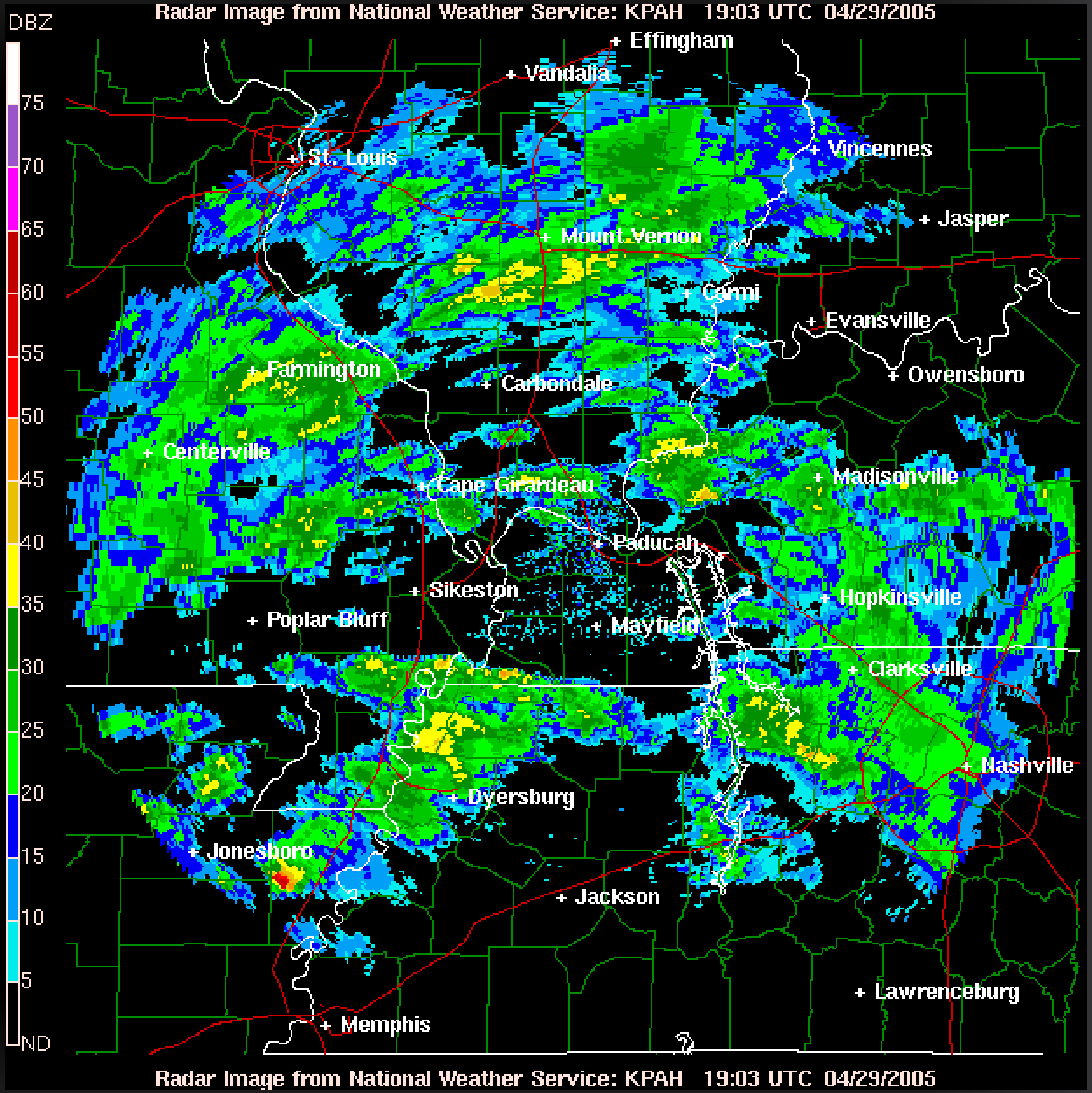
Composite Reflectivity

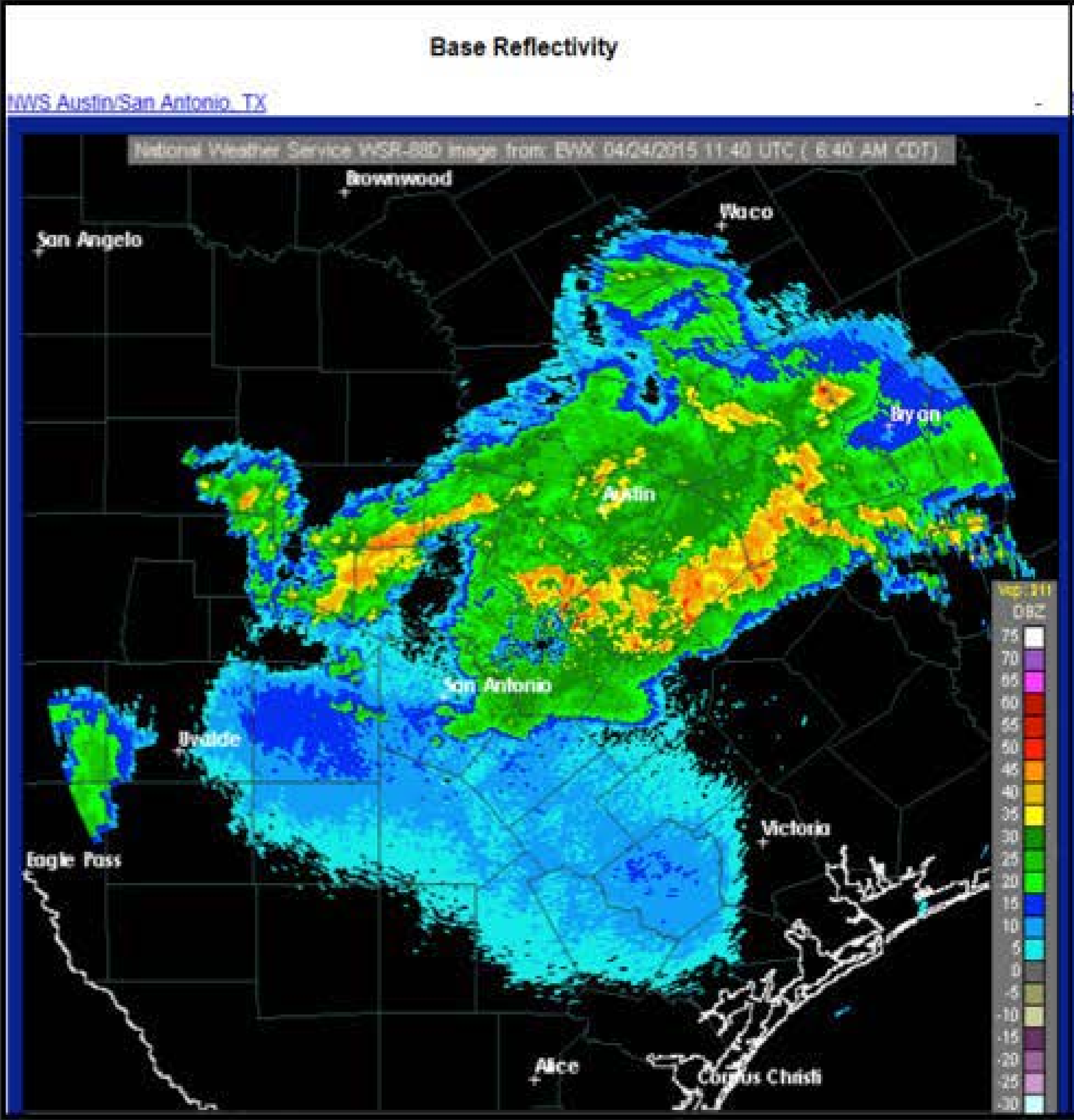


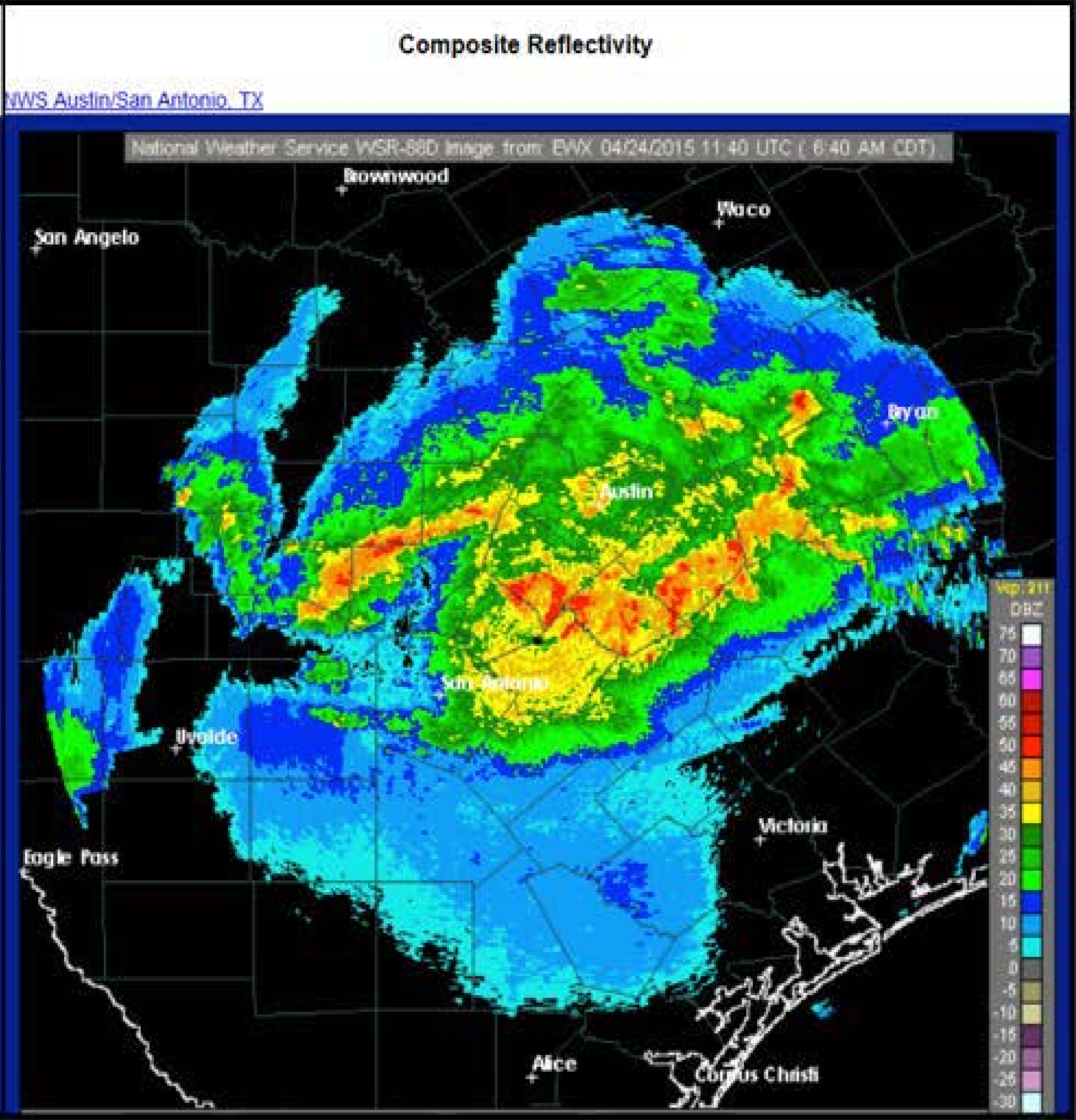
Echoes south of Moore and east of Newcastle appear in Composite Reflectivity but not in Tilt 1 of Base Reflectivity. These echoes must be observed at some level above Tilt 1.

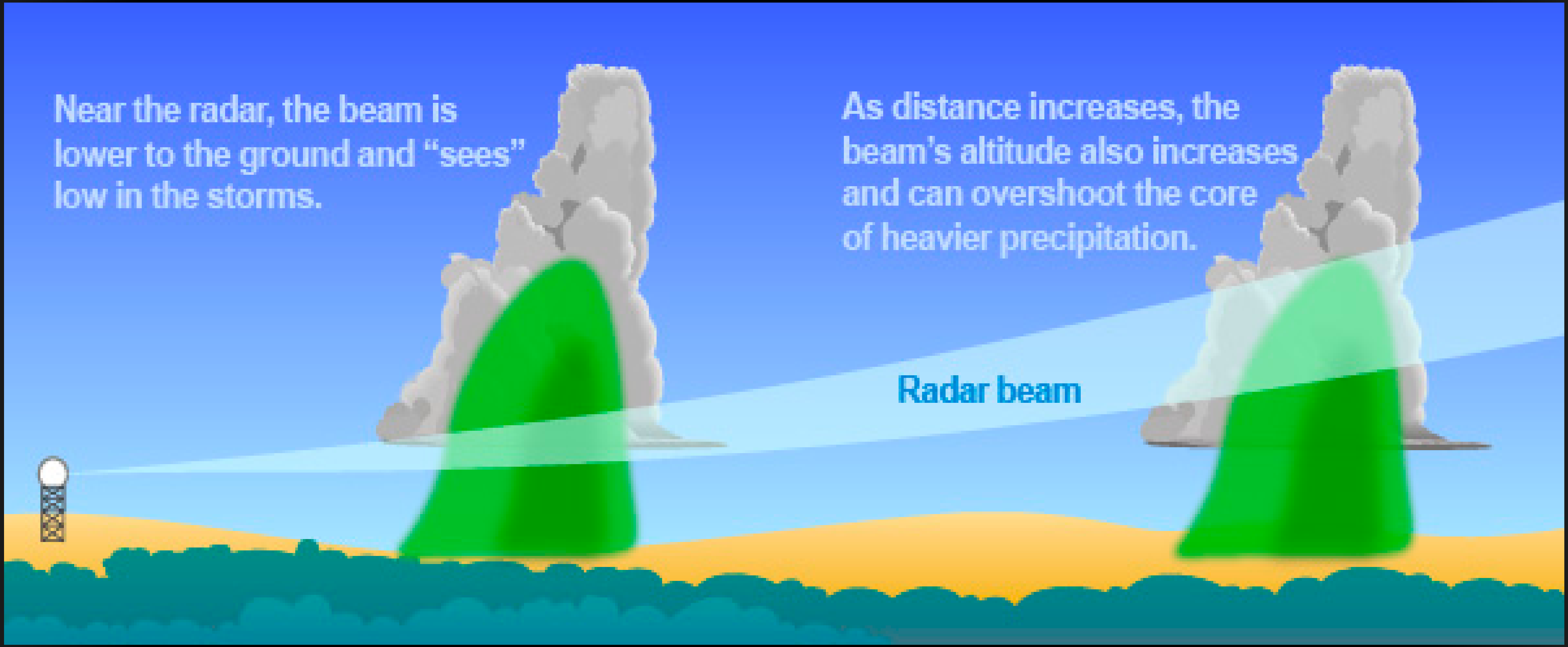
Be careful when interpreting Composite Reflectivity. It masks low-level features, like hook echoes!


Radar Image from National Weather Service: KPAH 19:03 UTC 04/29/2005
DBZ
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
ND
Effingham
Vandalia
St. Louis
Vincennes
Jasper
Mount Vernon
Carmi
Evansville
Owensboro
Farmington
Carbondale
Centerville
Cape Girardeau
Madisonville
Paducah
Sikeston
Hopkinsville
Poplar Bluff
Mayfield
Clarksville
Nashville
Dyersburg
Jonesboro
Jackson
Lawrenceburg
Memphis
Radar Image from National Weather Service: KPAH 19:03 UTC 04/29/2005


Radar Image from National Weather Service: KPAH 19:03 UTC 04/29/2005
DBZ
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
ND
Effingham
Vandalia
St. Louis
Vincennes
Jasper
Mount Vernon
Carmi
Evansville
Owensboro
Farmington
Carbondale
Centerville
Cape Girardeau
Madisonville
Paducah
Sikeston
Hopkinsville
Poplar Bluff
Mayfield
Clarksville
Nashville
Dyersburg
Jonesboro
Jackson
Lawrenceburg
Memphis
Radar Image from National Weather Service: KPAH 19:03 UTC 04/29/2005

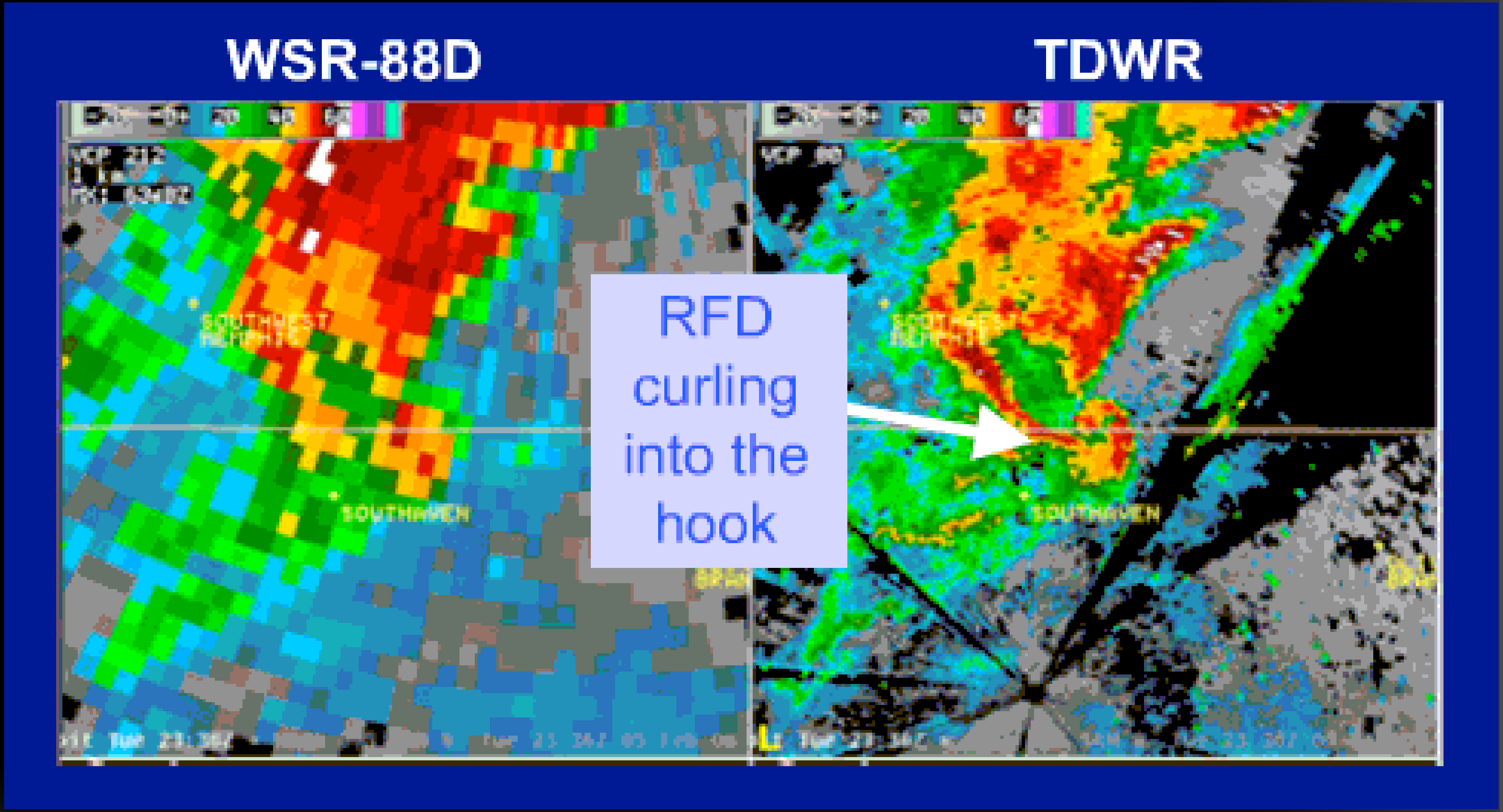

Base Reflectivity
NWS Austin/San Antonio, TX
National Weather Service WSR-88D image from: EWX 04/24/2015 11:40 UTC (6:40 AM CDT)
Brownwood
Waco
San Angelo
Bryan
Austin
San Antonio
Uvalde
Eagle Pass
Victoria
Alice
Corpus Christi
DBZ
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
-5
-10
-15
-20
-25
-30


Composite Reflectivity
NWS Austin/San Antonio, TX
National Weather Service WSR-88D image from: EWX 04/24/2015 11:40 UTC (6:40 AM CDT)
Brownwood
Waco
San Angelo
Bryan
Austin
San Antonio
Uvalde
Eagle Pass
Victoria
Alice
Corpus Christi
DBZ
75
70
65
60
55
50
45
40
35
30
25
20
15
10
5
0
-5
-10
-15
-20
-25
-30



Near the radar, the beam is lower to the ground and “sees” low in the storms.
As distance increases, the beam's altitude also increases and can overshoot the core of heavier precipitation.
Radar beam

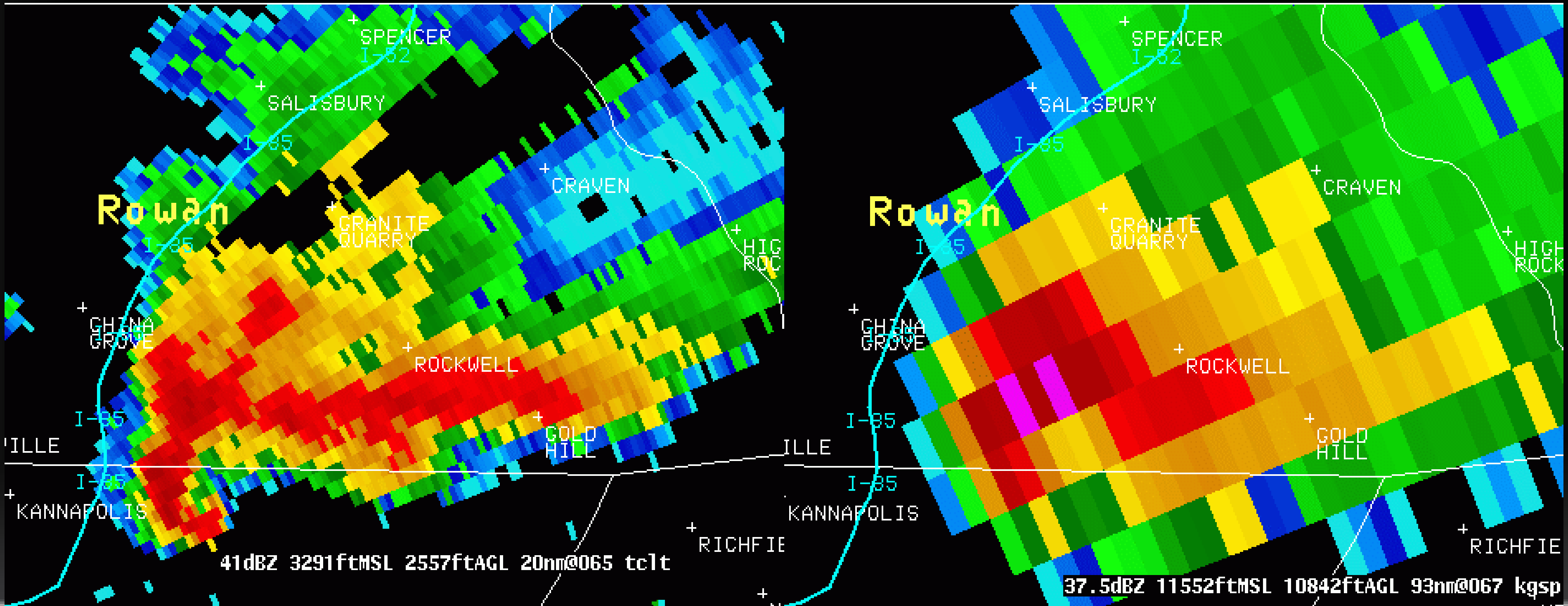
The Terminal Doppler Weather Radar (TDWR) network is a Doppler weather radar system used primarily for the detection of hazardous wind shear conditions, precipitation, and winds aloft on and near major airports situated in climates with great exposure to thunderstorms in the United States. NCEI archives the derived products (called Level III), which are in the same data format as Next Generation Weather Radar (NEXRAD) Level III.

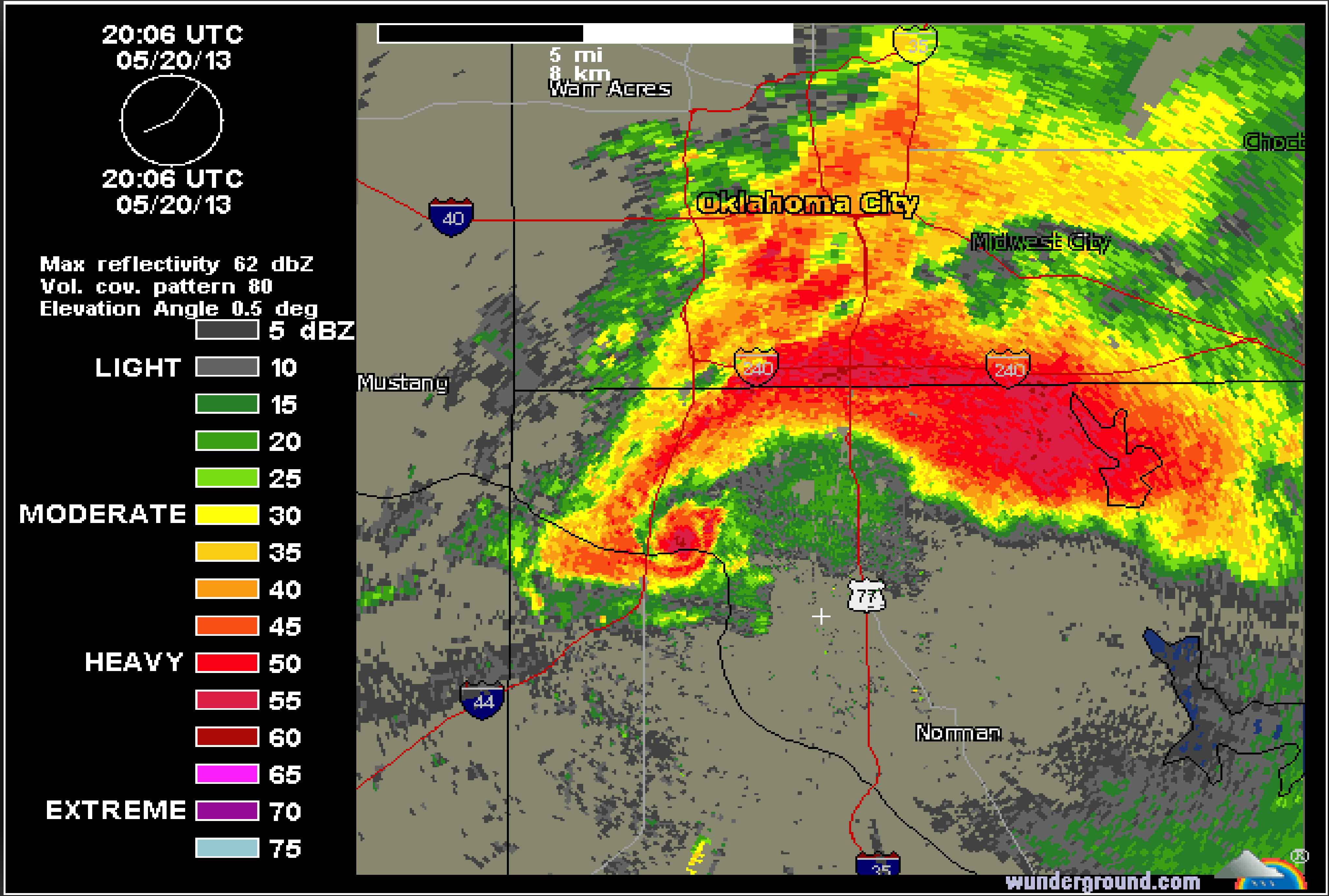


Comparison of the TDWR to the WSR-88D

The range resolution of the TDWR is finer than what is available in the Weather Surveillance Radar, 1988 Doppler (WSR-88D), or any other FAA radar that has weather channel capability. The TDWR utilizes a range gate resolution of 150 m for Doppler data. It has a resolution of 150 m for reflectivity data within 135 km and 300 m from beyond 135 km to 460 km. By contrast, the WSR-88D employed by the National Weather Service, FAA, and Department of Defense has a maximum range gate resolution of 250 m for Doppler and 1 km for surveillance data.

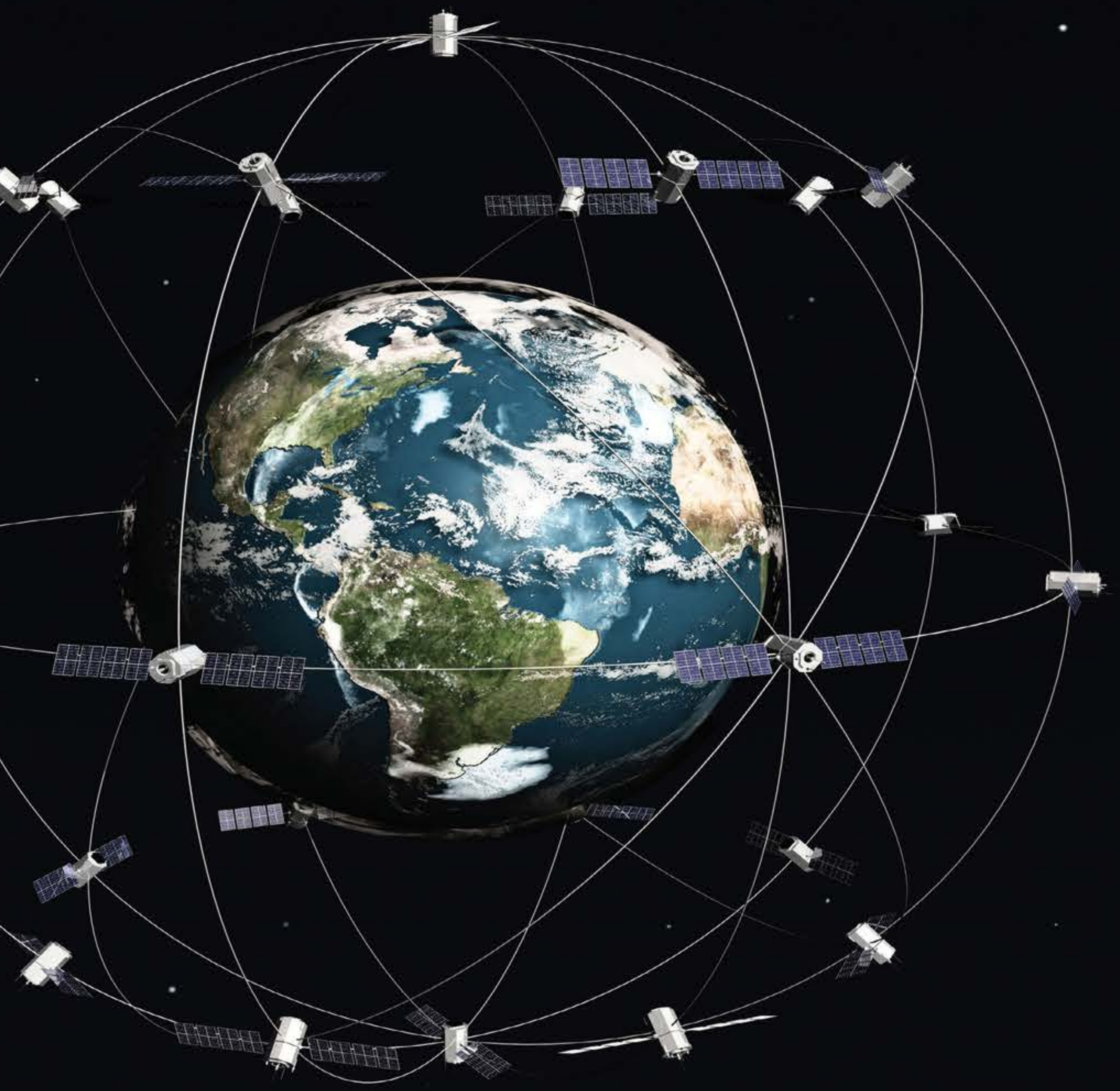
The angular (azimuth) resolution of the TDWR is nearly twice what is available in the WSR-88D. Each radial in the TDWR has a beam width of 0.55 degrees. The average beam width for the WSR-88D is 0.95 degrees. The following table shows a comparison of technical specifications between the TDWR and the WSR-88D.



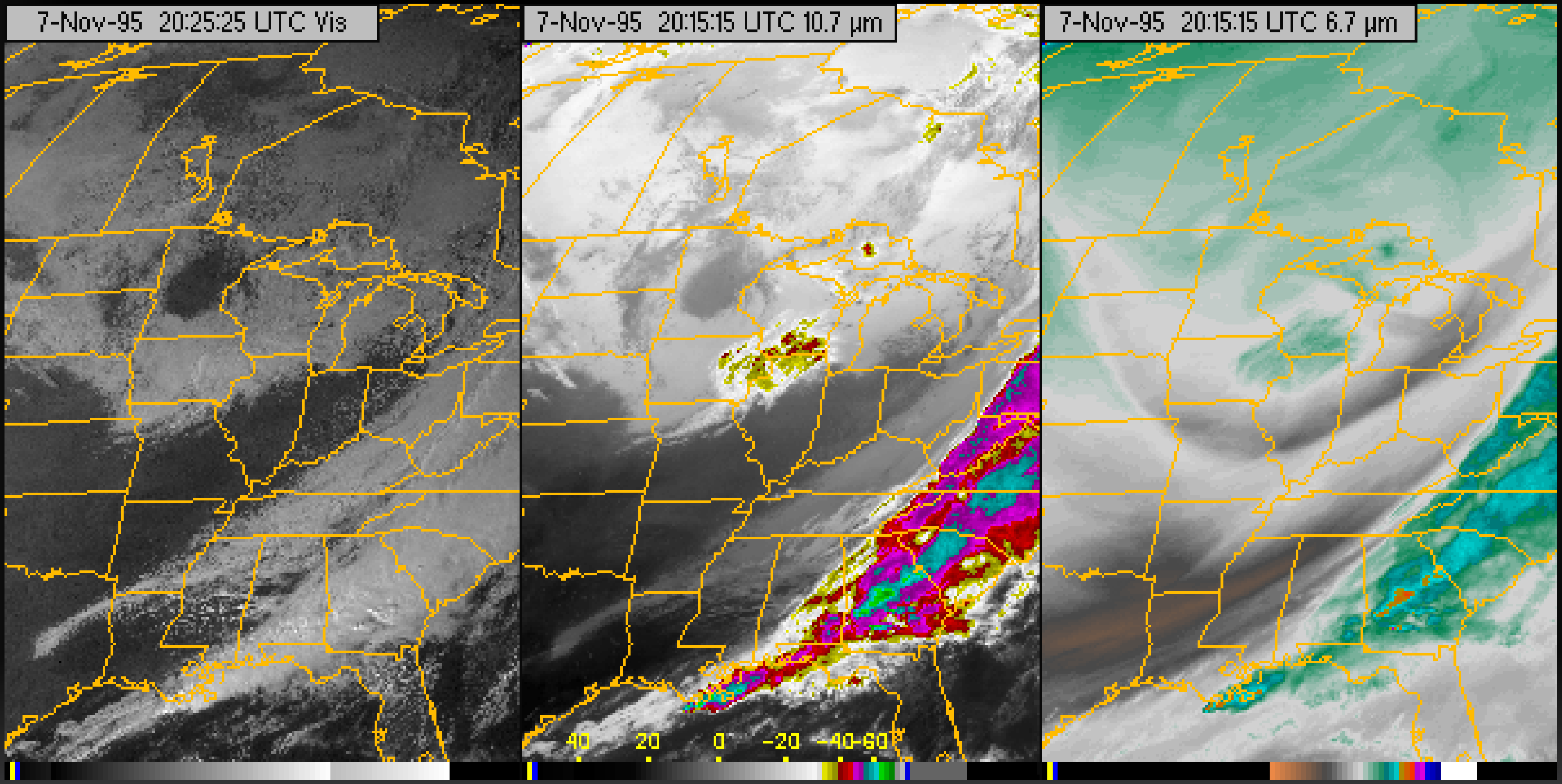


20:06 UTC
05/20/13
20:06 UTC
05/20/13
Max reflectivity 62 dbZ
Vol. cov. pattern 80
Elevation Angle 0.5 deg
5 dBZ
LIGHT 10
15
20
25
MODERATE 30
35
40
45
HEAVY 50
55
60
65
EXTREME 70
75
5 mi
8 km
Warr Acres
Oklahoma City
Midwest City
Mustang
Norman
40
240
240
44
77
35
wunderground.com

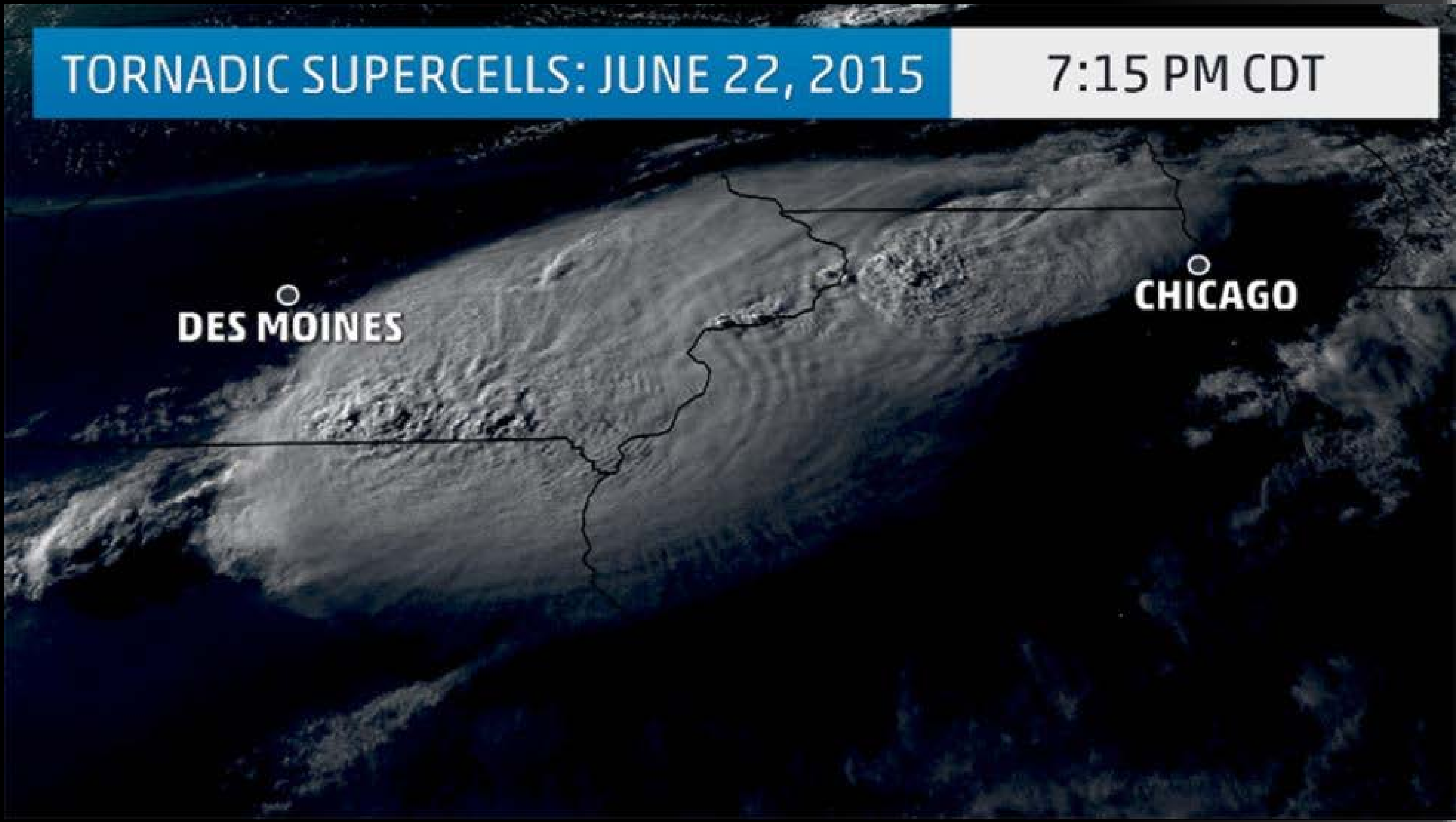
Satellite is perhaps the single most important source of weather data worldwide, particularly over data-sparse regions, such as countries without organized weather data collection and the oceans. The National Oceanic and Atmospheric Administration's (NOAA) Geostationary Operational Environmental Satellite (GOES) imagery can be found on the AWC's Web site, as well as all NWS WFO Web sites. Additional satellite imagery for Alaska can be found on the NWS Alaska Aviation Weather Unit (AAWU) Web site.



Three types of satellite imagery are commonly used: visible, infrared (IR), and water vapor. Visible imagery is only available during daylight hours. IR and water vapor imagery are available day or night.



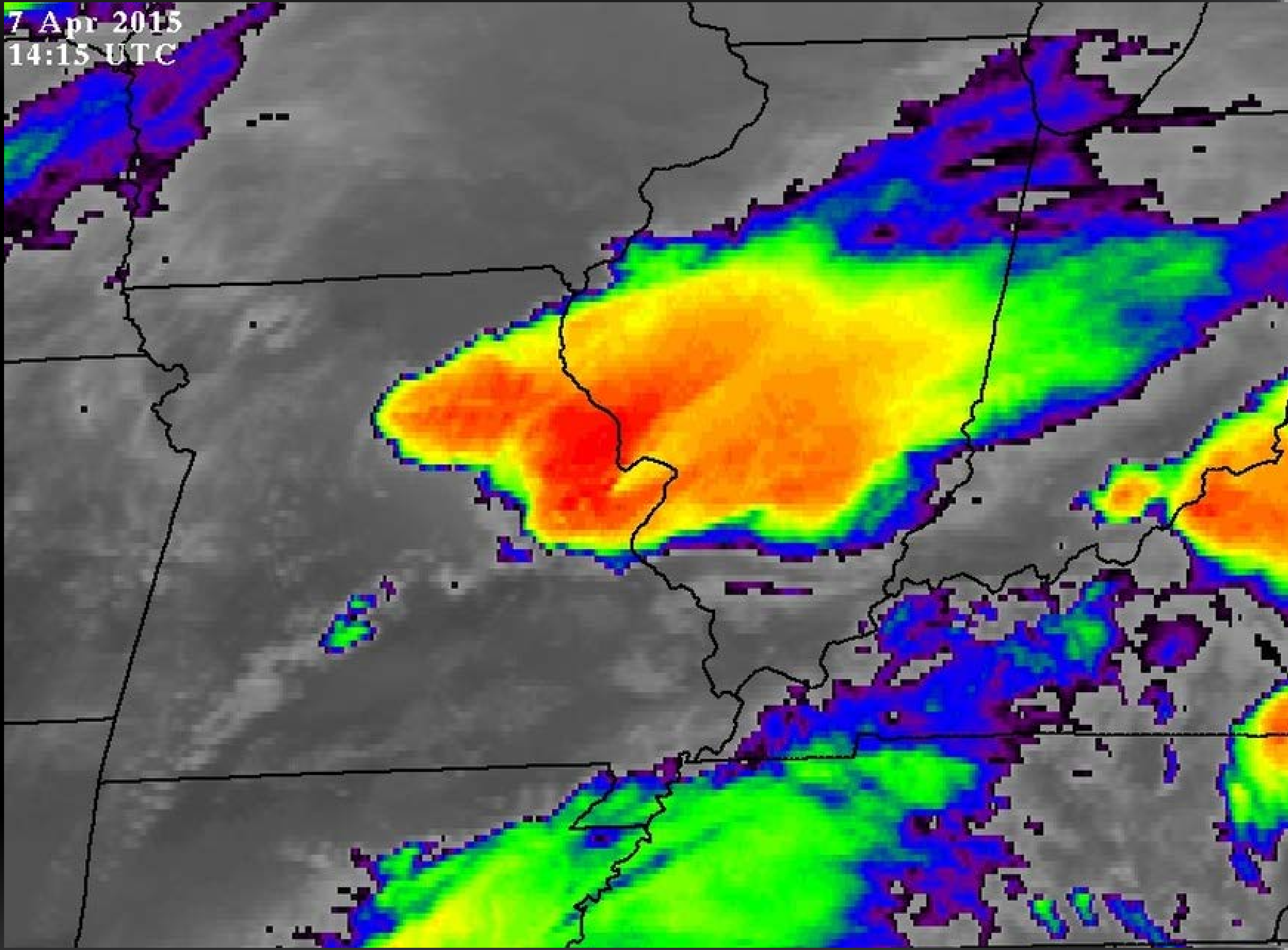
Visible Imagery. Visible imagery, Visible Satellite Image—U.S. Example) displays reflected sunlight from the Earth's surface, clouds, and particulate matter in the atmosphere. Visible satellite images, which look like black and white photographs, are derived from the satellite signals. Clouds usually appear white, while land and water surfaces appear in shades of gray or black.



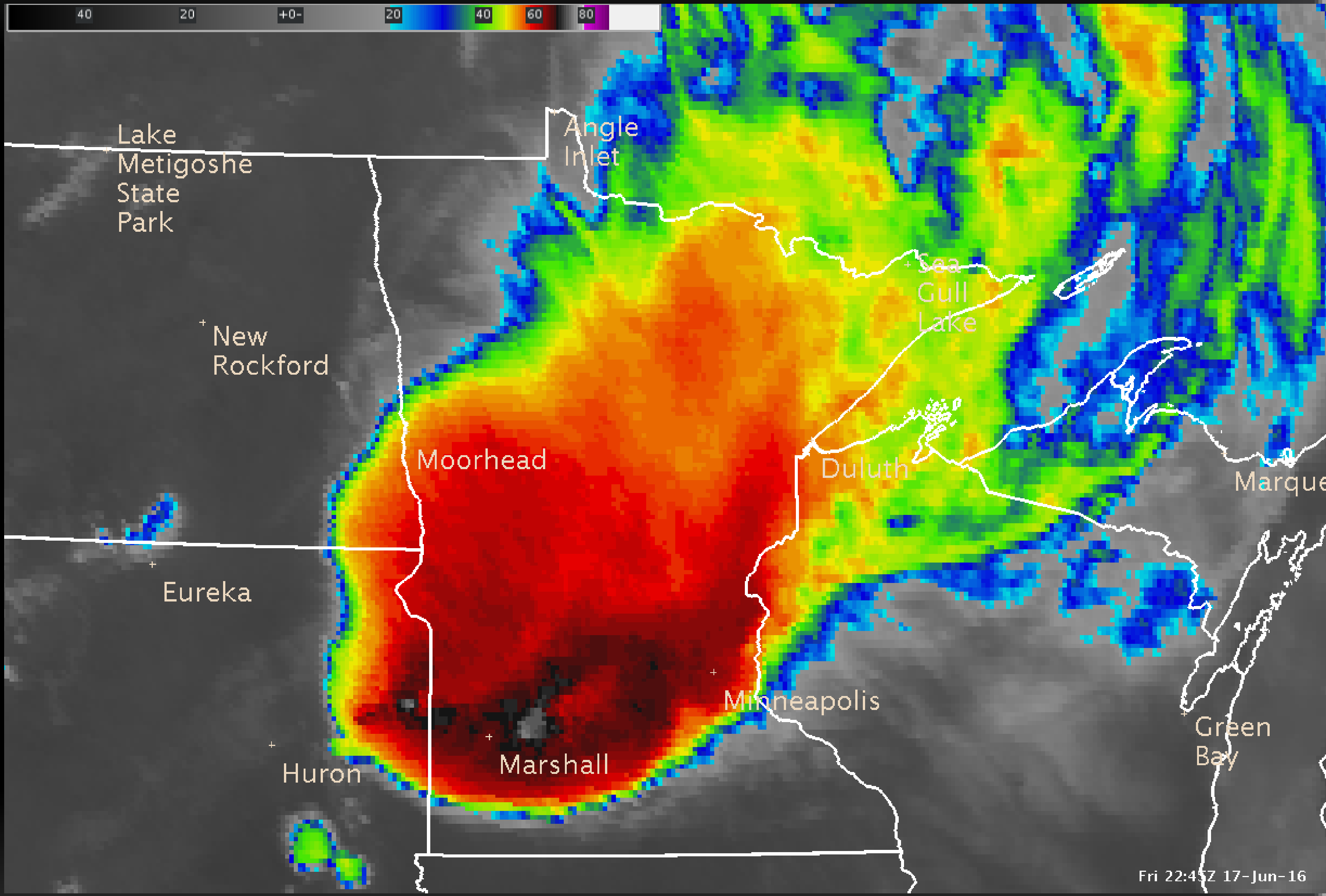
The visible channel senses reflected solar radiation. Clouds, the Earth's atmosphere, and the Earth's surface all absorb and reflect incoming solar radiation. Since visible imagery is produced by reflected sunlight (radiation), it is only available during daylight.

The data legend, Visible Satellite Data Legend) on a visible image displays albedo, or reflectance, expressed as a percentage. For example, an albedo of 72 means 72 percent of the sunlight that struck a feature was reflected back to space.

Infrared (IR) Imagery. IR images, Infrared (Color) Satellite Image, Unenhanced Infrared (Black and White) Satellite Image—U.S. Example) display temperatures of the Earth's surface, clouds, and particulate matter. Generally speaking, the warmer an object, the more IR energy it emits. The satellite sensor measures this energy and calibrates it to temperature using a very simple physical relationship.

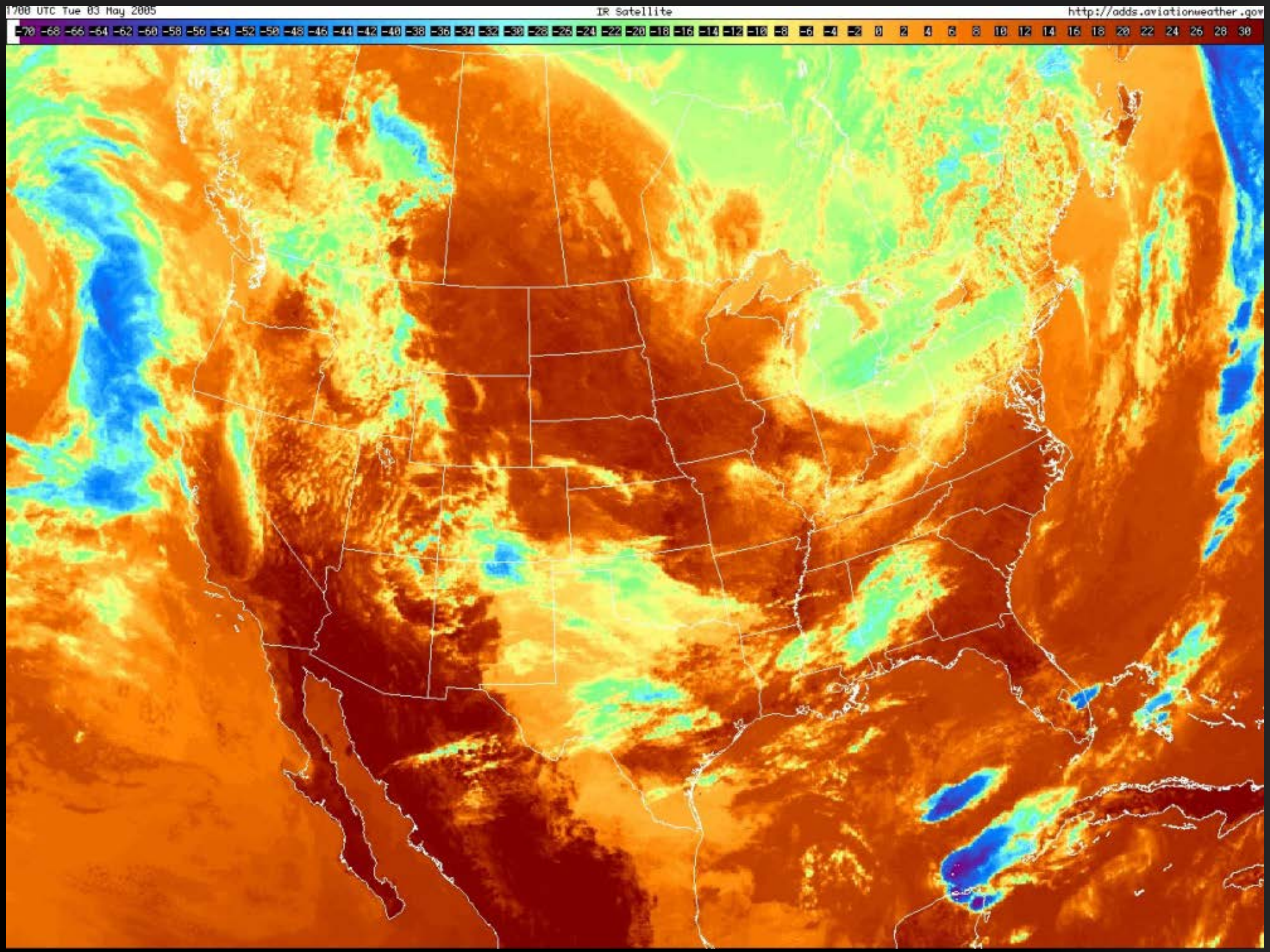


Clouds that are very high in the atmosphere are generally quite cold (e.g., -50 ºC), whereas clouds very near the Earth's surface are generally quite warm (e.g., +5 ºC). Likewise, land may be even warmer than the lower clouds (e.g., +20 ºC). Those colder clouds emit much less infrared energy than the warmer clouds and the land emits more than those warm clouds..



The data measured by satellite is calibrated and colorized according to the temperature. If the temperature of the atmosphere decreases with height (which is typical), cloud-top temperature can be used to roughly determine which clouds are high-level and which are low-level.

When clouds are present, the temperature displayed on the IR images is that of the tops of clouds. When clouds are not present, the temperature is that of the ground or the ocean. A major advantage of the IR channel is that it can sense energy at night, so this imagery is available 24 hours per day.

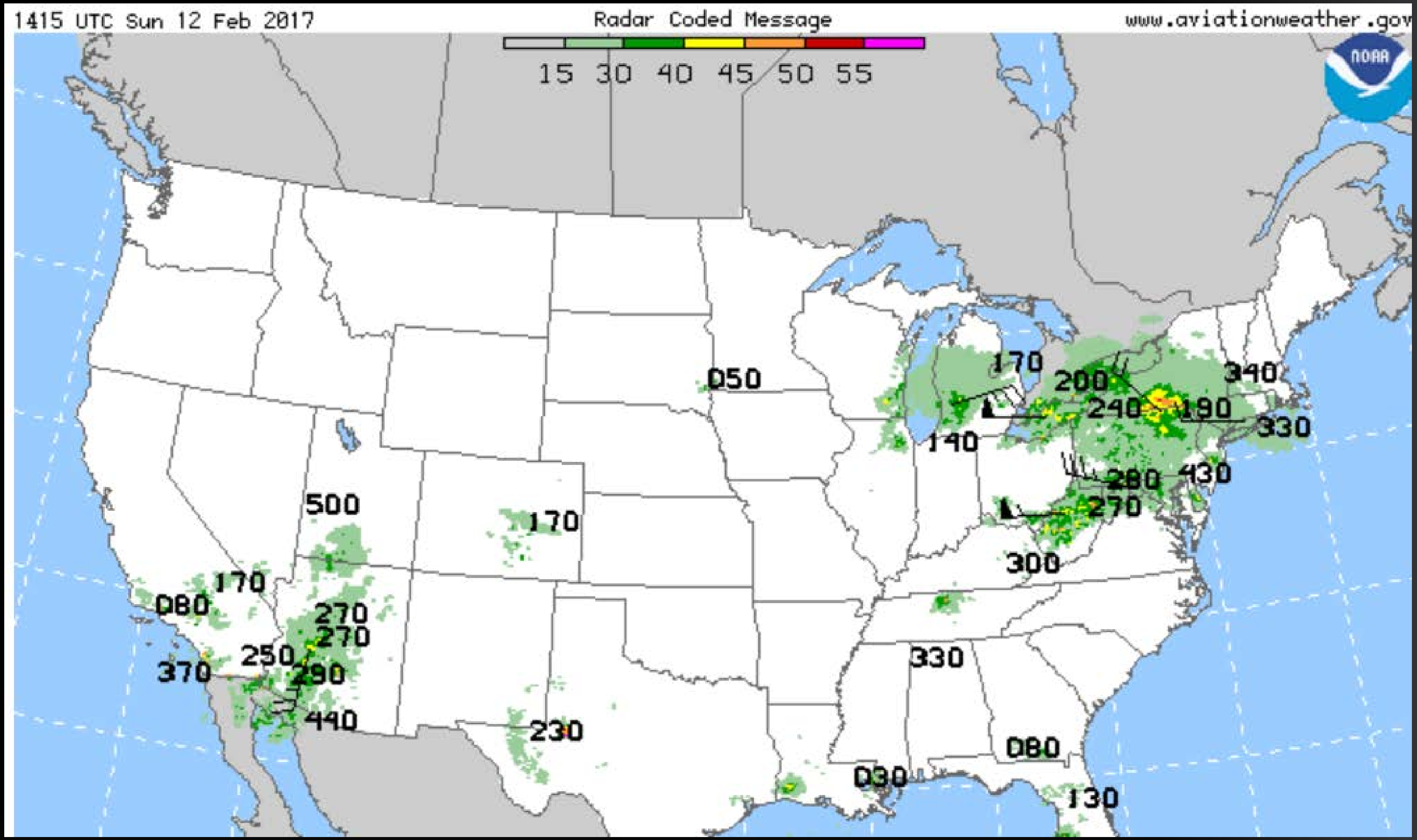


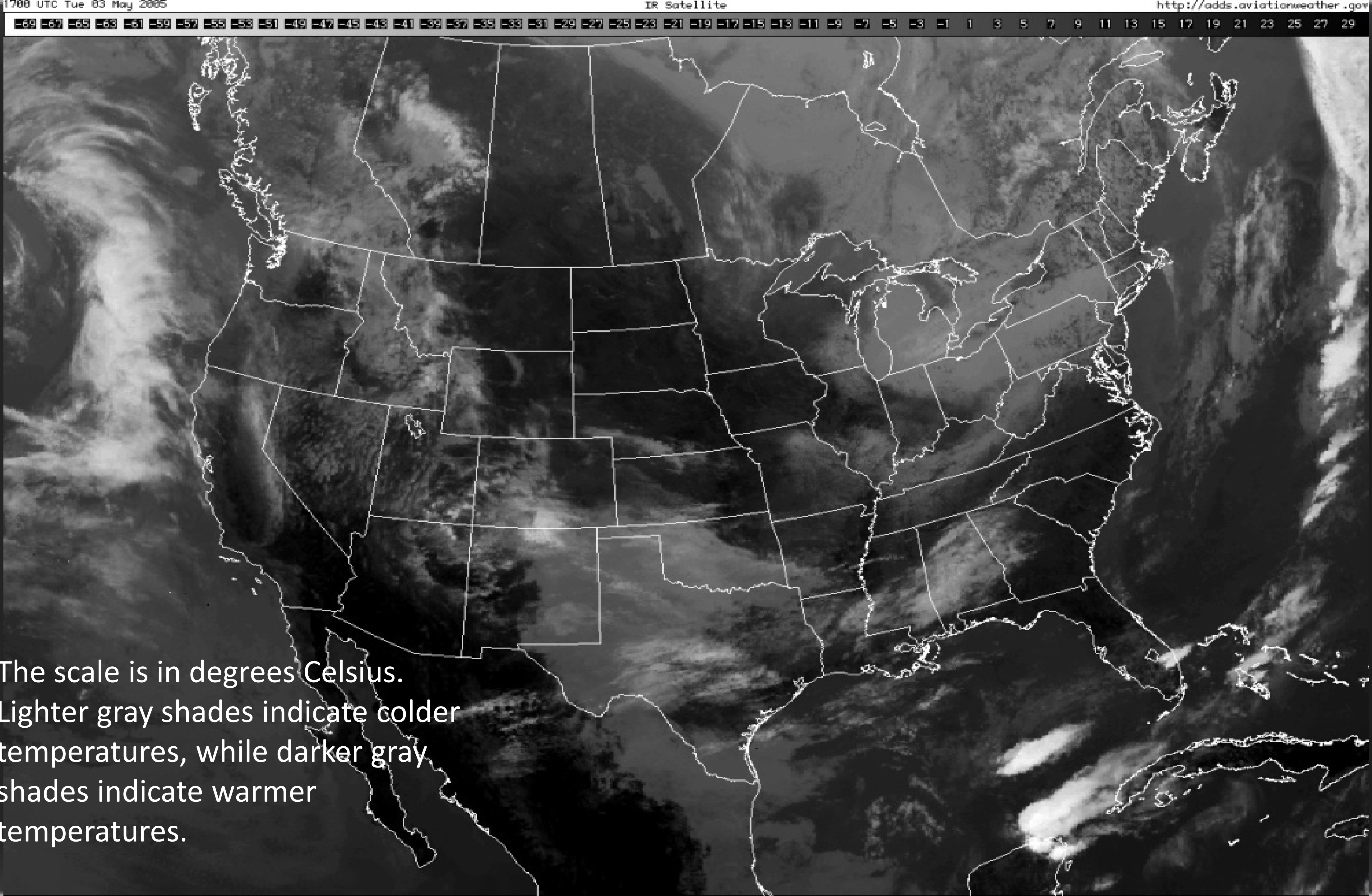
The scale is in degrees Celsius. Blue/purple colors indicate colder temperatures, while orange/red colors indicate warmer temperatures.

NWS Radar Summary chart

The displayed image is the edited reflectivity. The RCM includes the max top for each radar's area of coverage. The other tops shown on the display are derived from the satellite images at the centers of convective activity. Movements shown are the radar centroid movements as generated by the Nexrad processor.

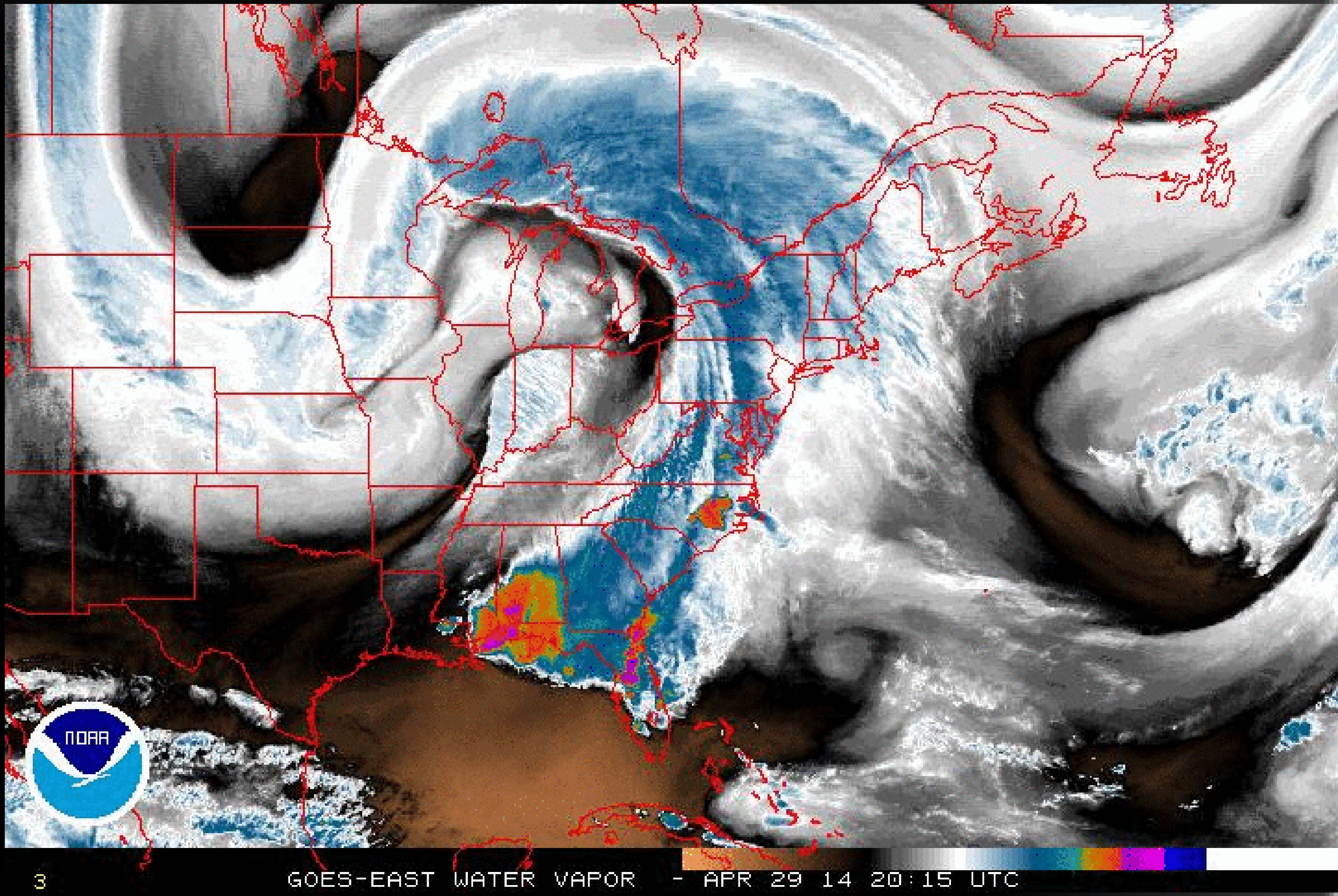
The images are updated twice hourly and are posted at HH:15 and HH:45





The scale is in degrees Celsius. Lighter gray shades indicate colder temperatures, while darker gray shades indicate warmer temperatures.

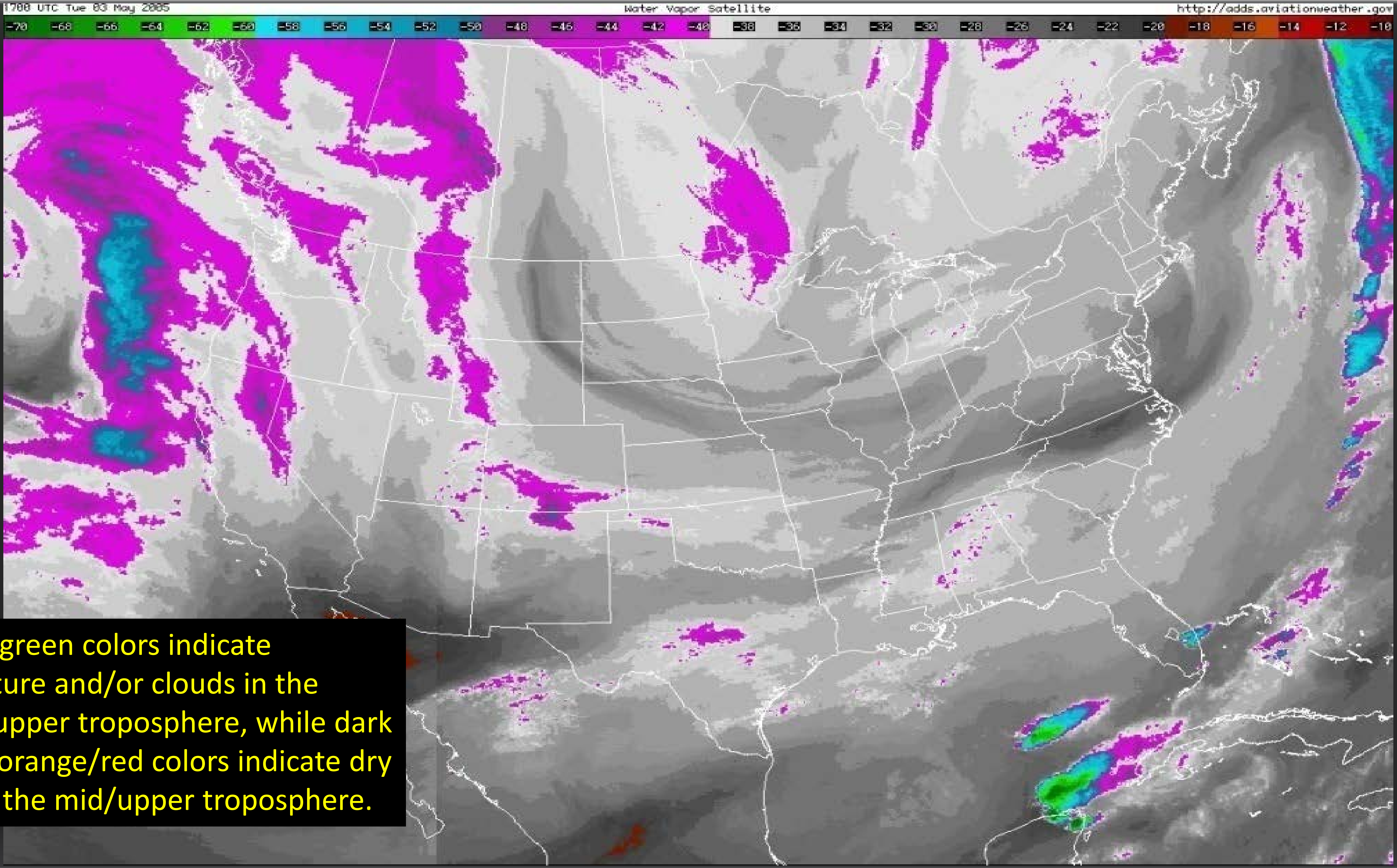
Water Vapor Imagery. The water vapor imagery, Water Vapor Satellite Image—U.S. Example) displays the quantity of water vapor generally located in the middle and upper troposphere within the layer between 700 mb (approximately 10,000 ft MSL) and 200 mb (approximately flight level (FL) 390). The actual numbers displayed on the water vapor images correspond to temperature in degrees Celsius. No direct relationship exists between these values and the temperatures of clouds, unlike IR imagery. Water vapor imagery does not really “see” clouds, but “sees” high-level water vapor instead.



The most useful information to be gained from the water vapor images is the locations and movements of weather systems, jet streams, and thunderstorms.

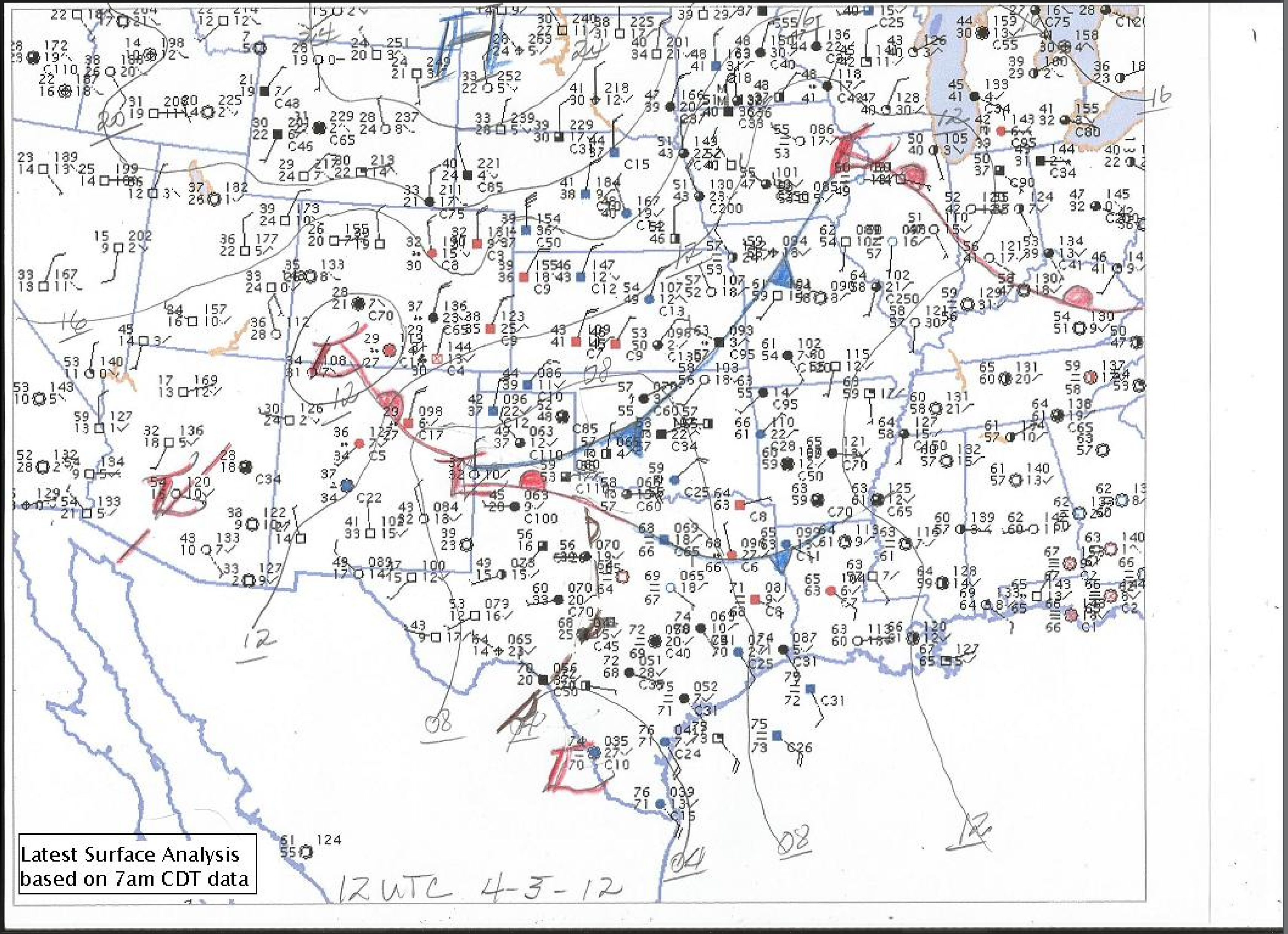
Another useful tidbit is aided by the color scale used on the images. In general, regions displayed in shades of red are very dry in the upper atmosphere and may correlate to crisp, blue skies from a ground perspective. On the contrary, regions displayed in shades of blue or green are indicative of a lot of high-level moisture and may also indicate cloudiness. This cloudiness could simply be high-level cirrus types or thunderstorms. That determination cannot be ascertained from this image by itself, but could easily be determined when used in conjunction with corresponding visible and IR satellite images.

A major advantage of the water vapor channel is that it can sense energy at night, so this imagery is available 24 hours per day.



Blue/green colors indicate moisture and/or clouds in the mid/upper troposphere, while dark gray/orange/red colors indicate dry air in the mid/upper troposphere.

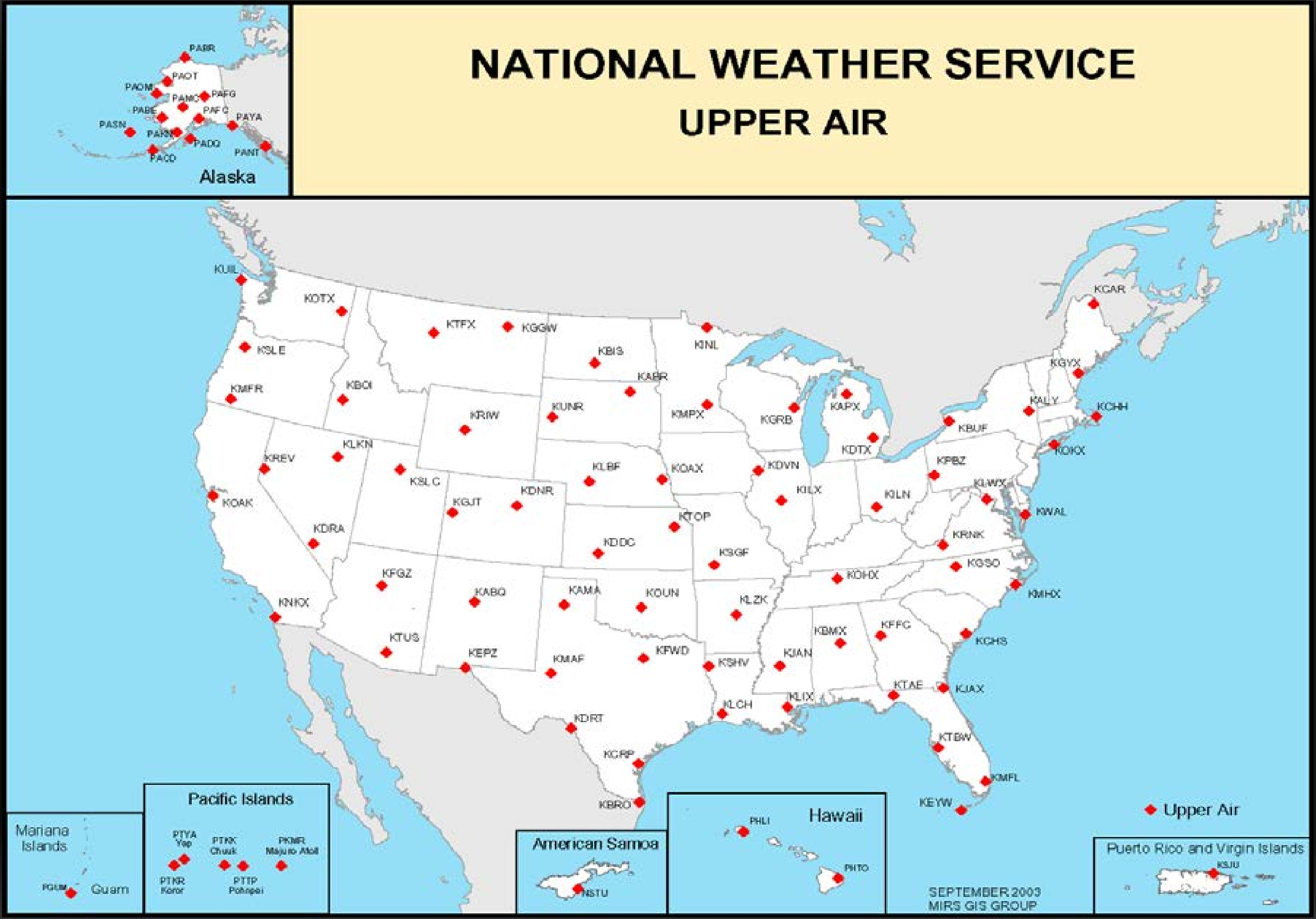
The second of three distinct types of weather (meteorological) information are analyses. Analyses of weather information are an enhanced depiction and/or interpretation of observed weather data. Prior to the 1990s, most analysis charts were hand drawn by forecasters. Today's analyses are automated, and depending on the weather information provider (i.e., NWS, commercial weather services, and flight planning services), the appearance and content of these analyses will vary.



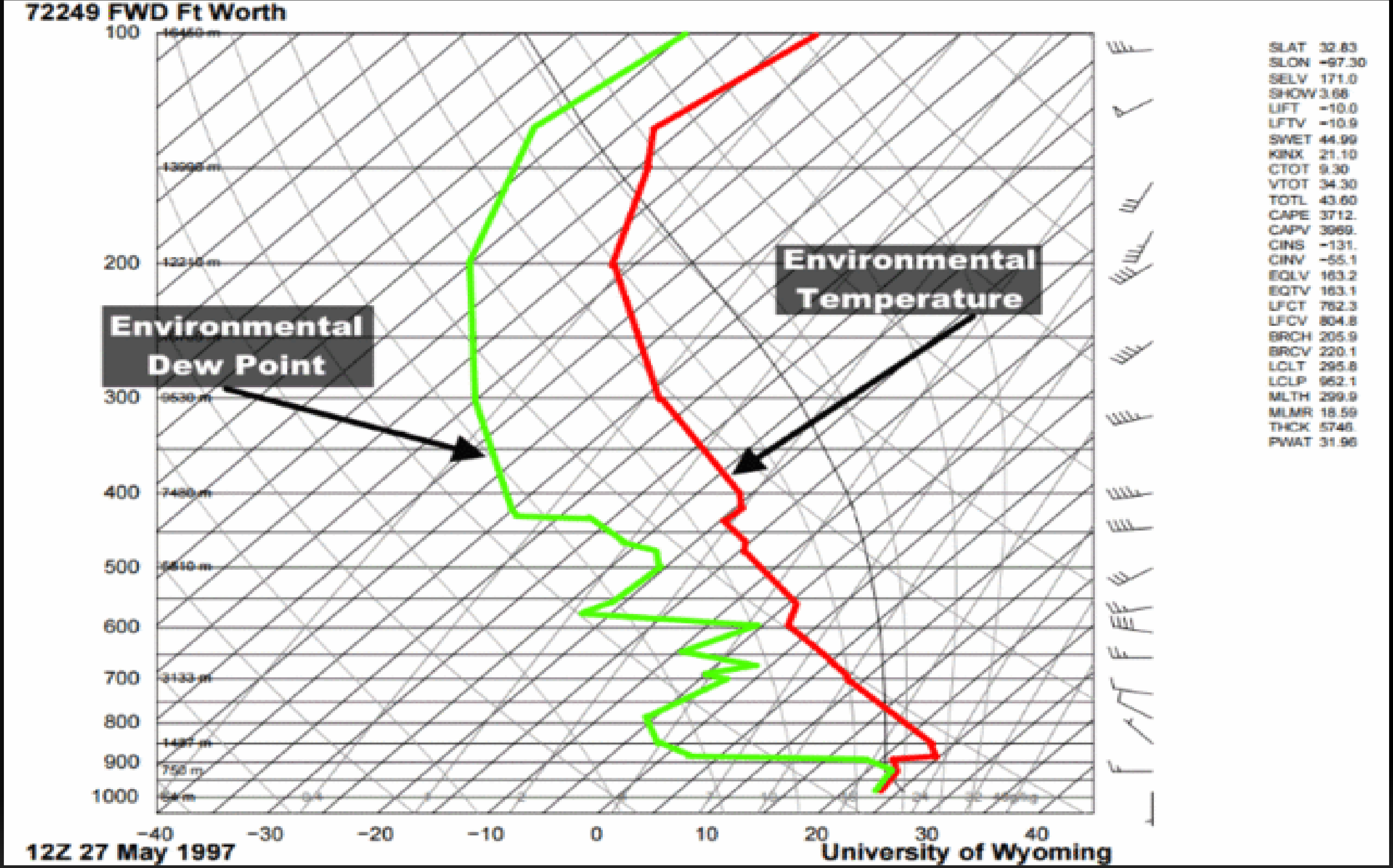
Radiosonde Observations. Since the late 1930s, the NWS has taken upper air observations with radiosondes attached to weather balloons. Weather data from the radiosonde are foundational to all computer model forecasts produced by the NWS.

The radiosonde is a small, expendable instrument package (weighing 100 grams (g) to 500 g) that is suspended below a large balloon inflated with hydrogen or helium gas. As the radiosonde rises at about 300 m per minute (about 1,000 ft per minute), sensors on the radiosonde measure profiles of pressure, temperature, and moisture. These sensors are linked to a battery-powered radio transmitter that sends the sensor measurements to a ground tracking antenna. Wind speed and direction aloft are also obtained by tracking the position of the radiosonde in flight using Global Positioning Satellites (GPS)..

Weather balloons with radiosondes are launched twice a day worldwide from designated locations, U.S. Radiosonde Network, for U.S. locations) at around 1100 UTC and 2300 UTC. It takes approximately 90 minutes for the balloon to reach an altitude of 100,000 ft. The weather data collected is assigned the observation times of 1200 UTC and 0000 UTC. Special radiosondes may be launched at select times for various reasons, including when severe weather is expected in a region.

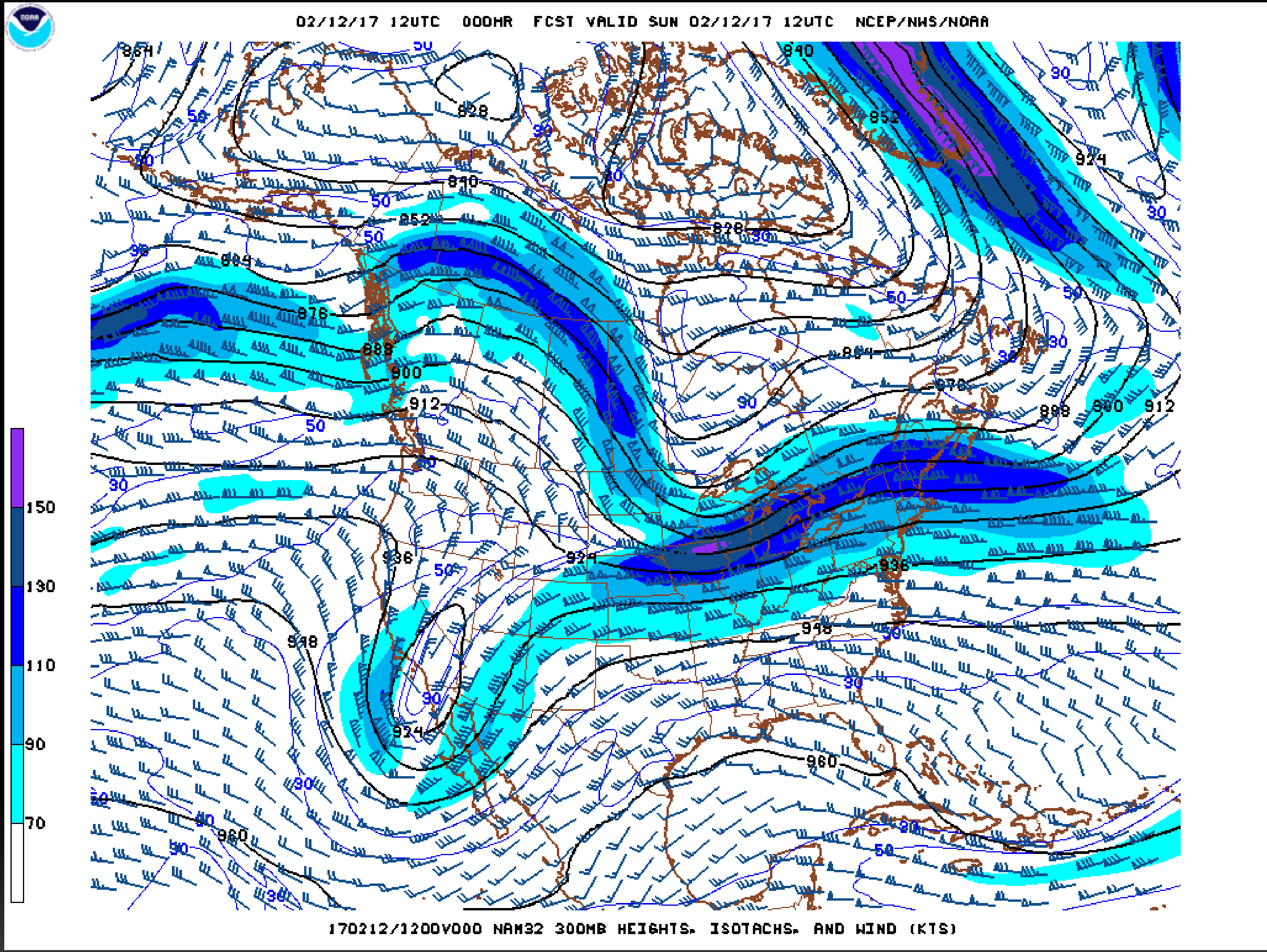

NATIONAL WEATHER SERVICE
UPPER AIR
Alaska
PABR
PAOT
PAOM
PAMC
PAFG
PABE
PAFC
PAYA
PASN
PAKN
PADQ
PANT
PACD
KUIL
KOTX
KTFX
KGGW
KSLE
KBIS
KINL
KMFR
KBOI
KABR
KRIW
KUNR
KMPX
KGRB
KAPX
KCAR
KGYX
KALY
KCHH
KBUF
KOKX
KDTX
KPBZ
KLWX
KWAL
KREV
KLKN
KSLC
KLBF
KOAX
KDVN
KILX
KILN
KOAK
KGJT
KDNR
KTOP
KRNK
KDRA
KDDC
KSGF
KGSO
KOHX
KMHX
KFGZ
KABQ
KAMA
KOUN
KLZK
KNKX
KBMX
KFFC
KCHS
KTUS
KEPZ
KMAF
KFWD
KSHV
KJAN
KTAE
KJAX
KLIX
KLCH
KDRT
KTBW
KCRP
KMFL
KBRO
KEYW
Upper Air
Mariana Islands
PGUM
Guam
Pacific Islands
PTYA Yap
PTKK Chuuk
PKMR Majuro Atoll
PTKR Koror
PTTP Pohnpei
American Samoa
NSTU
Hawaii
PHLI
PHTO
SEPTEMBER 2003
MIRS GIS GROUP
Puerto Rico and Virgin Islands
TJSJU

Skew T

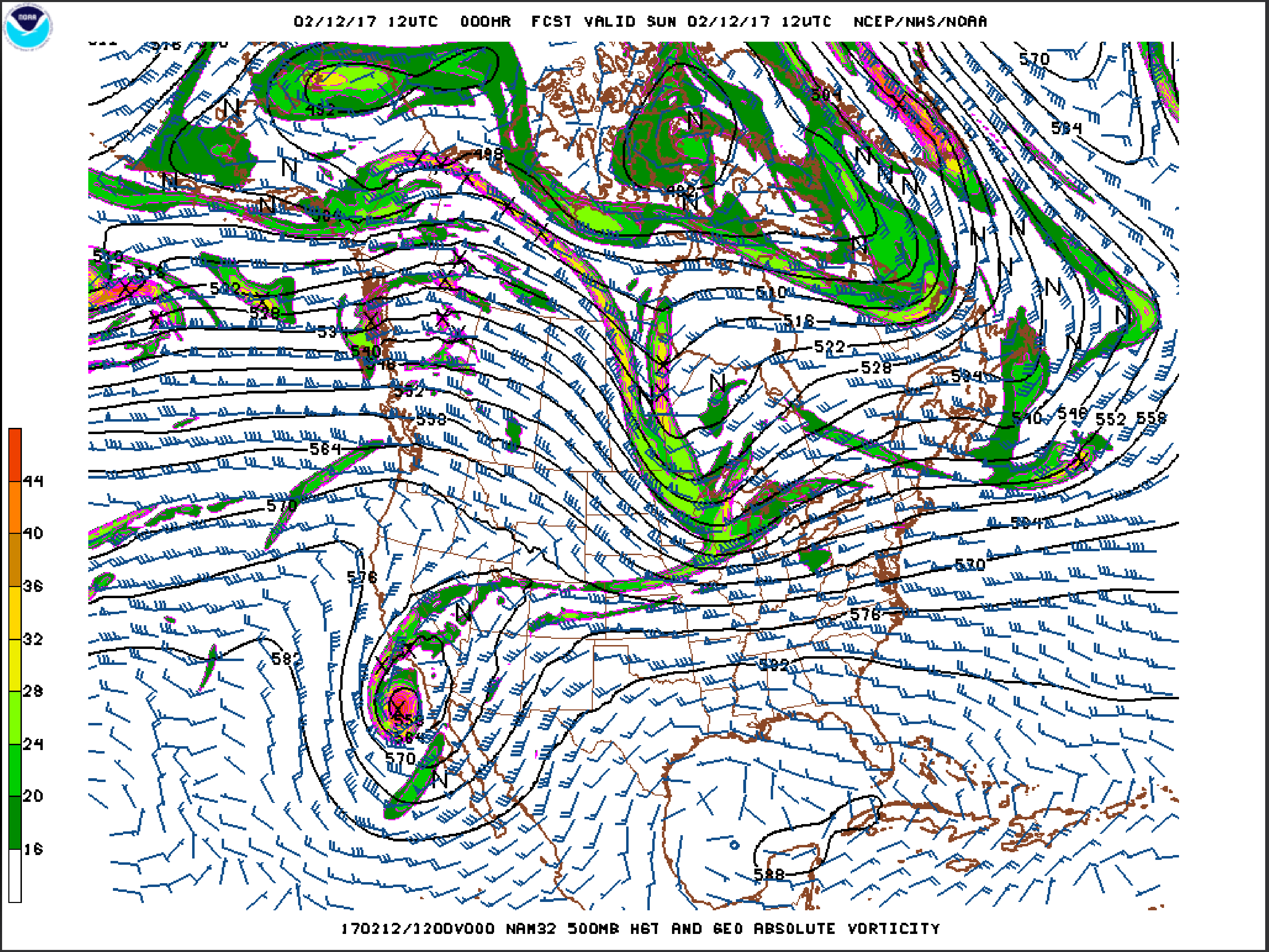


72249 FWD Ft Worth
100
200
300
400
500
600
700
800
900
1000
Environmental
Temperature
Environmental
Dew Point
SLAT 32.83
SLON -97.30
SELV 171.0
LIFT -10.0
SWET 44.99
KINX 21.10
VTOT 34.30
TOTL 43.60
CAPE 3712.
CINS -131.
EQTV 163.1
MLMR 18.59
PWAT 31.96
-40
-30
-20
-10
0
10
20
30
40
12Z 27 May 1997
University of Wyoming

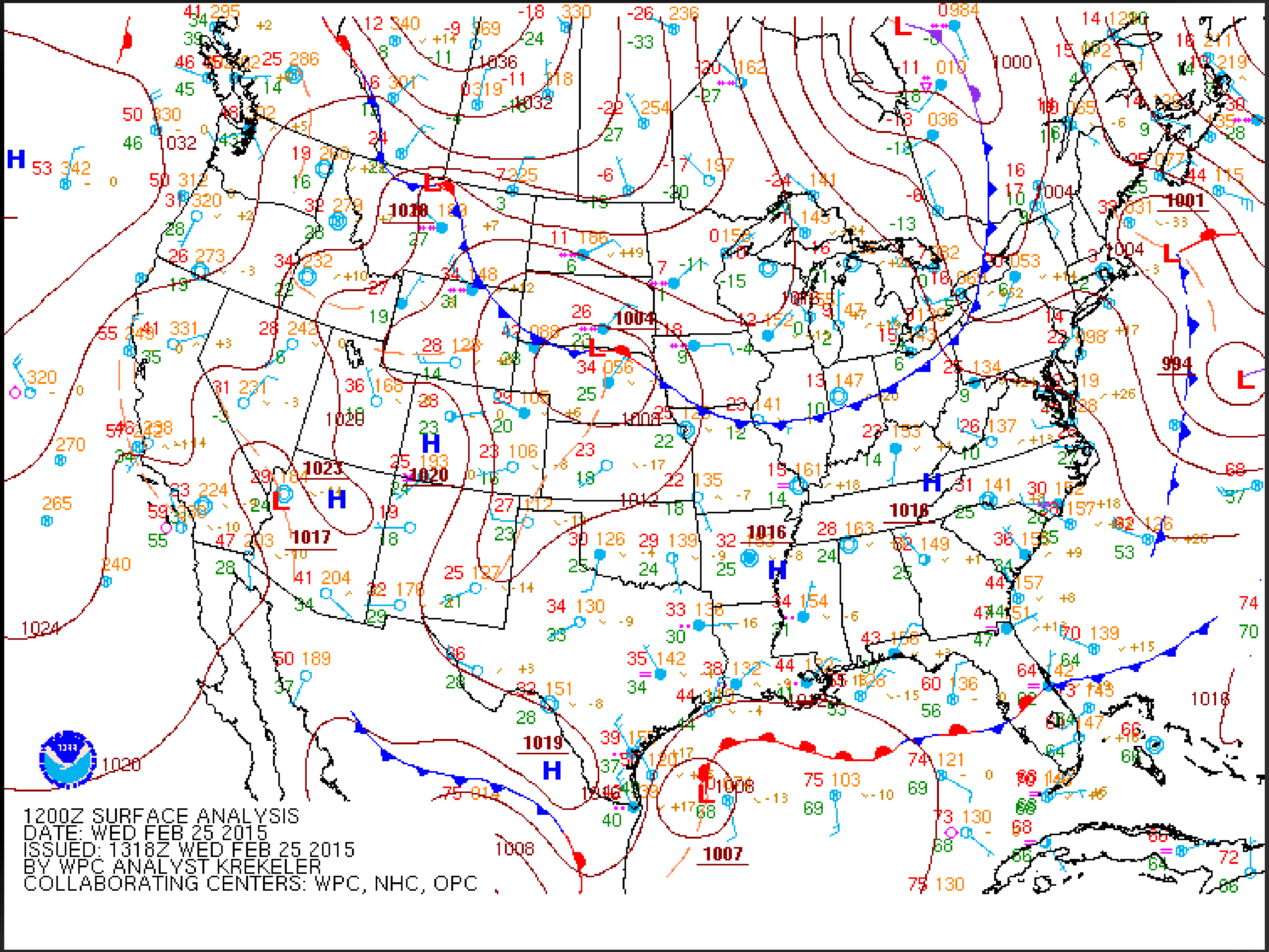
300 MB Chart
Polar Front Jet

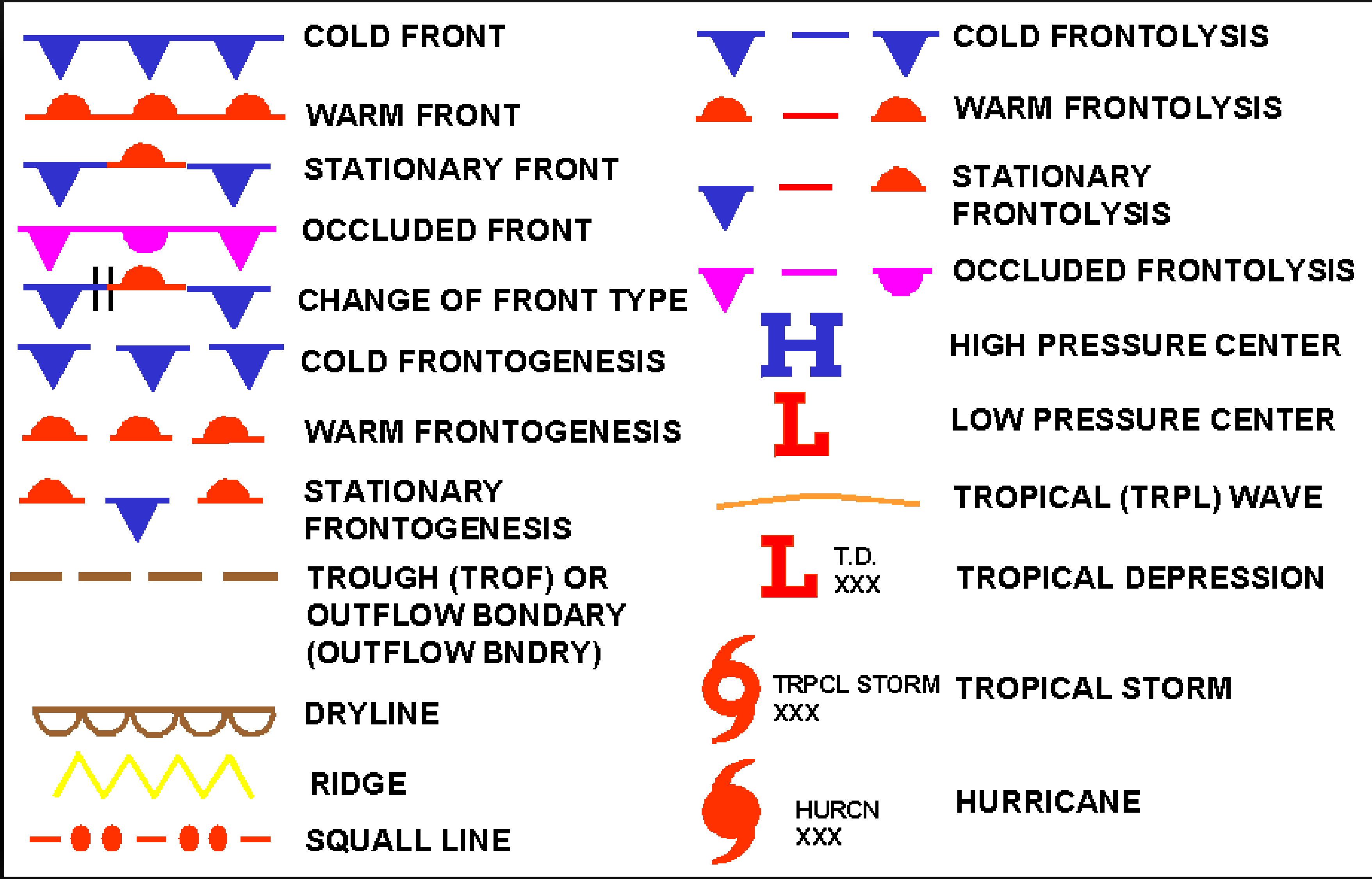


500 MB Chart
18,000 FT

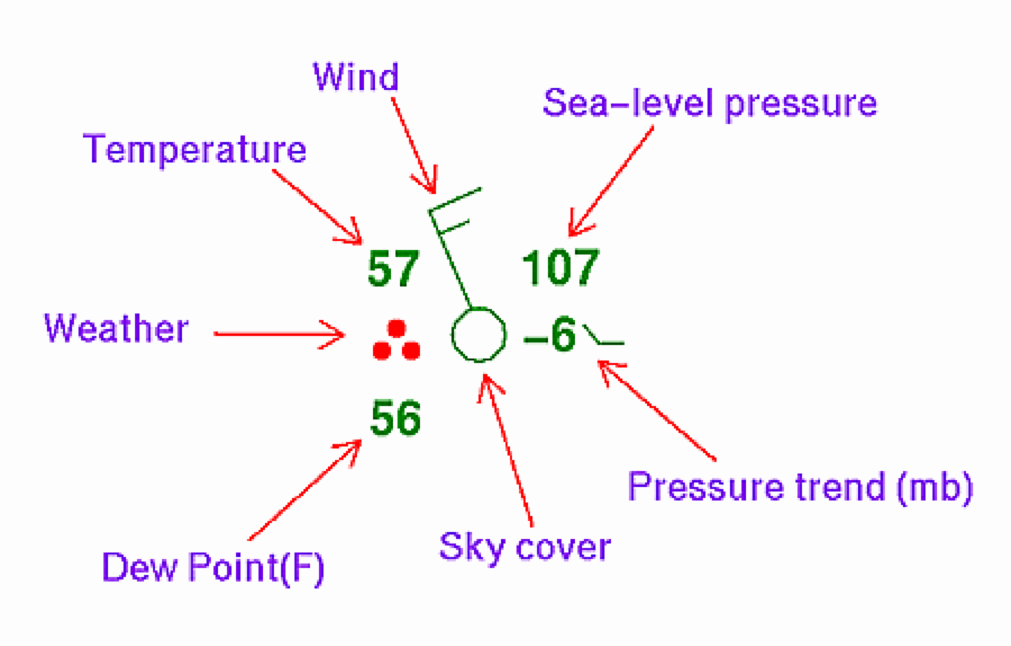


Surface Analysis Charts. Surface analysis charts are analyzed charts of surface weather observations. The chart depicts the distribution of several items, including sea-level pressure; the positions of highs, lows, ridges, and troughs; the location and type of fronts; and the various boundaries such as drylines. Pressure is referred to in mean sea level (MSL) on the surface analysis chart while all other elements are presented as they occur at the surface point of observation.

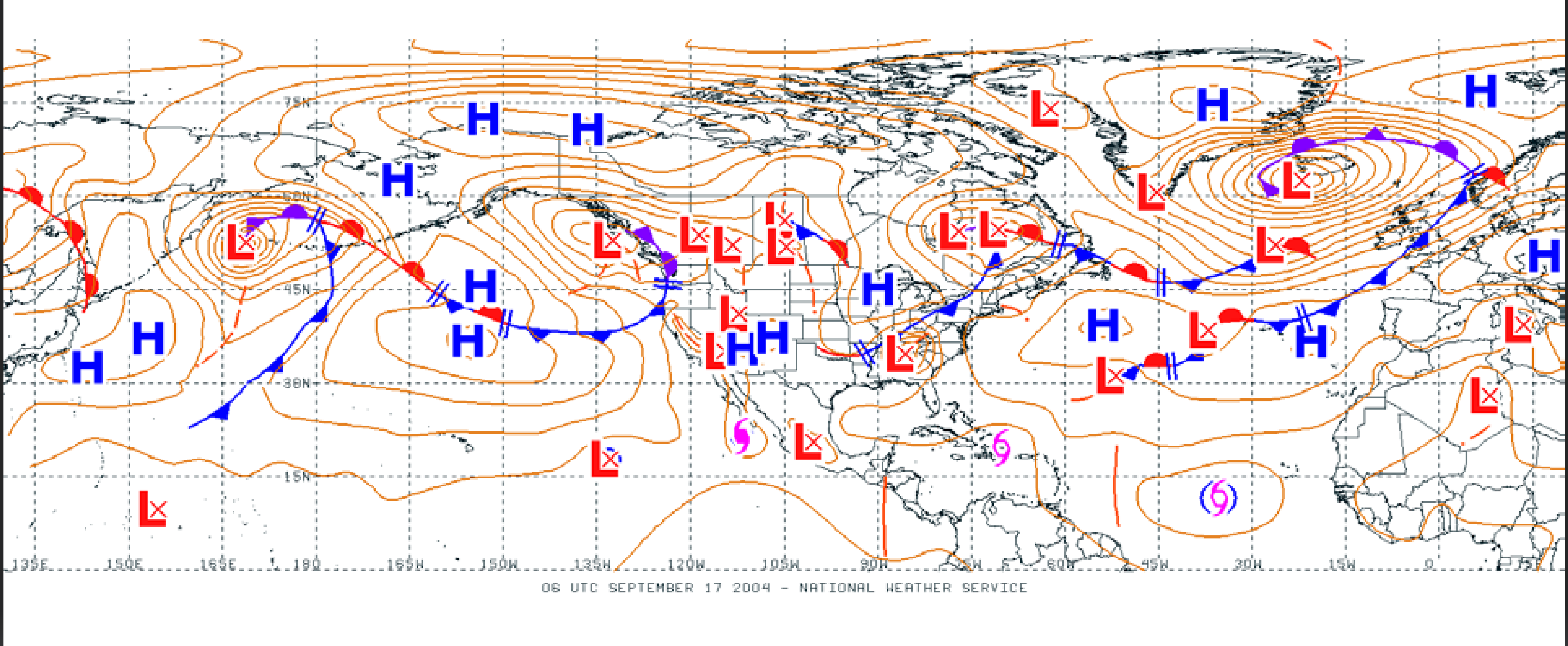



COLD FRONT
WARM FRONT
STATIONARY FRONT
OCCLUDED FRONT
CHANGE OF FRONT TYPE
COLD FRONTOGENESIS
WARM FRONTOGENESIS
STATIONARY FRONTOGENESIS
TROUGH (TROF) OR OUTFLOW BONDARY (OUTFLOW BNDRY)
DRYLINE
RIDGE
SQUALL LINE
COLD FRONTOLYSIS
WARM FRONTOLYSIS
STATIONARY FRONTOLYSIS
OCCLUDED FRONTOLYSIS
H
HIGH PRESSURE CENTER
L
LOW PRESSURE CENTER
TROPICAL (TRPL) WAVE
L
T.D. XXX
TROPICAL DEPRESSION
TRPCL STORM XXX
TROPICAL STORM
HURCN XXX
HURRICANE

Land, ship, buoy, and Coastal-Marine Automated Network (C-MAN) stations are plotted on the chart to aid in analyzing and interpreting the surface weather features. These plotted observations are referred to as station models. Some stations may not be plotted due to space limitations. However, all reporting stations are used in the analysis.
NWS Surface Analysis Chart Station Plot Model, NWS Surface Analysis Chart Ship/Buoy Plot Model, contain the most commonly used station plot models used in surface analysis charts.



The NWS Unified Surface Analysis Chart is a surface analysis product produced collectively and collaboratively by NWS's WPC, the OPC, the National Hurricane Center (NHC), and Weather Forecast Office (WFO) Honolulu. The chart contains an analysis of isobars, pressure systems, and fronts.



Ceiling and Visibility Analysis

The CVA product provides a real-time analysis of current observed and estimated ceiling and visibility conditions across the continental United States (CONUS). The product is primarily intended to help the general aviation pilot (particularly the Visual Flight Rules (VFR)-only pilot) avoid instrument flight rules (IFR) conditions. However, CVA's overview of ceiling and visibility conditions can be useful to others involved in flight planning or weather briefing.

CVA is issued every 5 minutes and is available through http://www.aviationweather.gov. CVA presents information via full-CONUS graphic and 18 regional graphics. Each graphic is rendered on a horizontal grid of 5 km resolution and shows viewer-selectable representations of ceiling height (AGL), surface visibility in statute miles (sm) and flight category designation. Each regional display includes an overlay of station plots showing the current ceiling and visibility observations reported at selected Aviation Routine Weather Report (METAR) stations.

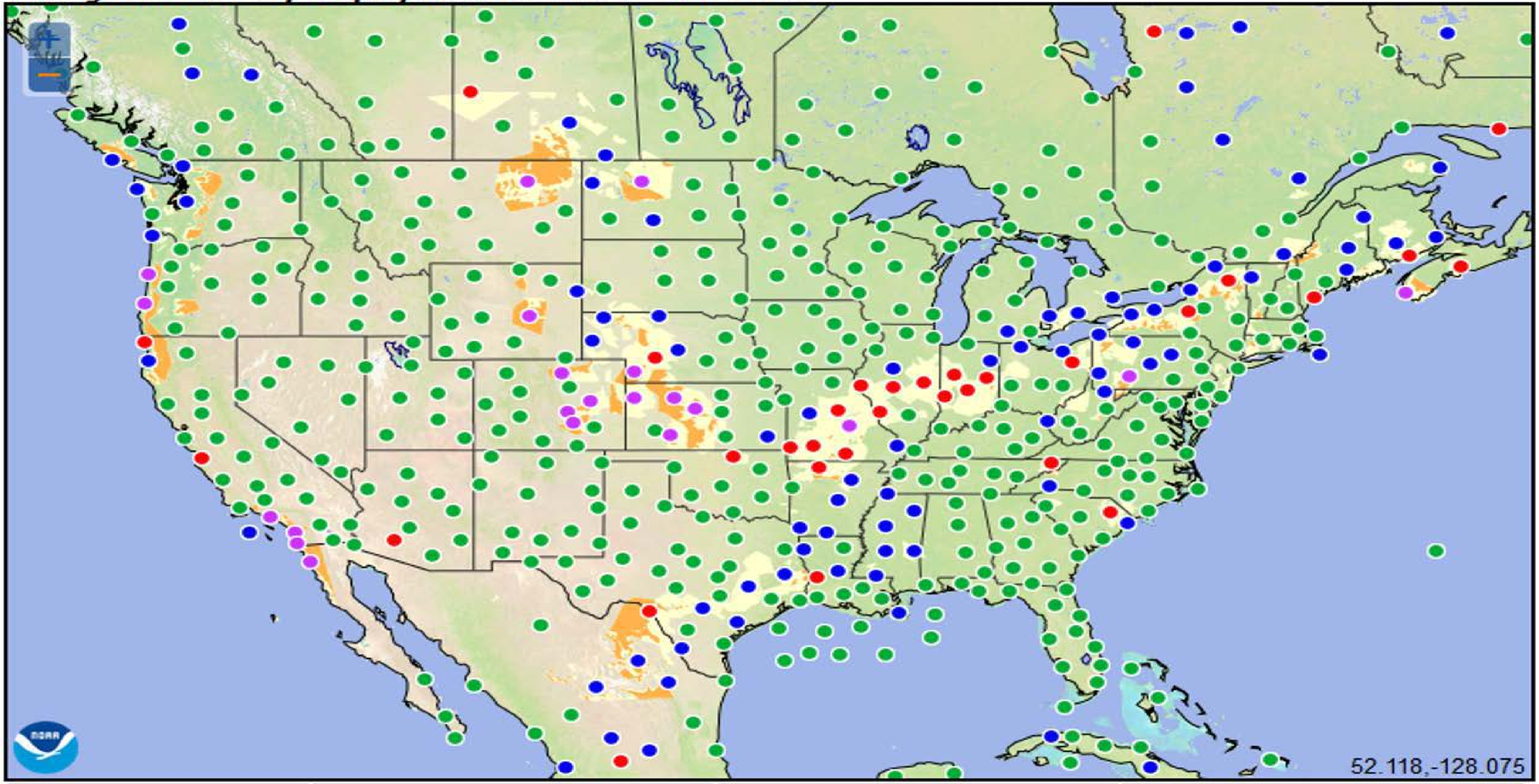
To avoid overcrowding, the overlay shows only a subset of the total number of stations available at the CONUS scale view. Additional stations are displayed when zooming in.

The CVA Ceiling Analysis uses observed and estimated ceiling heights as follows:

- At display points corresponding to METAR locations, CVA uses the ceiling values observed by the nearest METAR.

- At display points between METAR locations (where there are no direct observations), CVA uses estimated ceiling values derived by adjusting the ceiling observation from the nearest METAR to take into account intervening changes in terrain height. When corresponding Geostationary Operational Environmental Satellite (GOES) observations yield an unambiguous indication that no cloud is present, adjusted ceiling observations are reset to indicate clear conditions.

Ceiling and Visibility Display at 1340 UTC 19 Jun 2015



Map:
- Light
- Dark
- Simple

Plot Options:
- Hover

Data Options:
- 1340 UTC 19 Jun — Time
- FltCat — Plottype

Overlays:
- Highways
- Top Jetroutes
- ARTCC/FIR Bounds

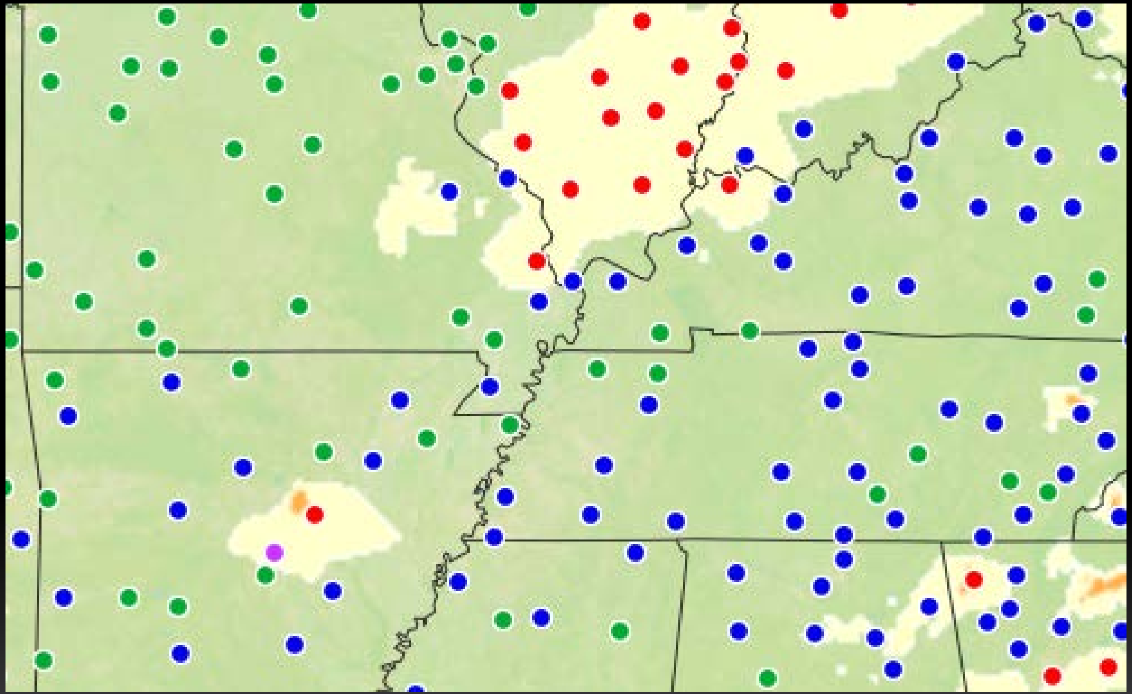
FltCat: Possible Terrain Obscuration | IFR

Flt Cat: VFR MVFR IFR LIFR

CVA Strengths.

• The CVA's area-wide graphics highlight observed and estimated IFR, VFR, and possible ground obscuration conditions, enabling a user's quick recognition of ceiling and visibility hazards, as represented by existing observational tools.

• The CVA is issued every 5 minutes using the most current METAR and GOES observations available. These rapid updates enhance recognition of trends when conditions are changing. The CVA incorporates "special" METAR observations as they are issued.



CVA Limitations.

• The CVA is an analysis of estimated real-time conditions only. It is not a forecast and cannot be used in place of a forecast.

• The CVA must only be used with products such as METARs, Terminal Aerodrome Forecasts (TAF), and Airmen's Meteorological Information (AIRMET).

• The CVA's representation of ceiling and visibility conditions in regions between METARS (where direct observations are unavailable) can be significantly in error. As distance from the nearest METAR increases, the uncertainty in represented conditions increases.

• Impacted ceiling and visibility conditions can be highly localized and smaller in scale than the 5 km grid used to convey CVA information. Thus, small-scale variations in ceiling and visibility conditions may not be represented by CVA, even in regions close to observing stations.

The HEMS Tool is specifically designed to display weather conditions for short-distance and low-altitude flights that are common for emergency first responders. HEMS operators are extremely sensitive to changing and/or adverse weather conditions and need weather information presented for non-weather experts quickly and effectively. To meet this need, the Flight Path Tool on the AWC's Web site was adapted and simplified to display high-resolution grids of critical weather parameters, particularly cloud ceiling and surface visibility. Using a highly interactive and intuitive tool that focuses on small, localized regions, HEMS operators gain critical weather awareness to make all their flights safe for crews and patients.

The HEMS Tool can overlay multiple grids of various weather parameters, as well as NWS textual weather observations and forecasts including: ceiling, visibility, flight category, winds, relative humidity, temperature, icing, satellite, radar (base and composite reflectivity), Airmen's Meteorological Information (AIRMET) and significant meteorological information (SIGMET), Aviation Routine Weather Reports (METAR), Terminal Aerodrome Forecasts (TAF), Pilot Weather Reports (PIREP), NWS hazards, and Center Weather Advisories (CWA). Some gridded products (e.g., temperature, relative humidity, winds, and icing) are three-dimensional (3-D). Other gridded products are two-dimensional (2-D) and may represent a "composite" of a 3-D weather phenomenon or a surface weather variable, such as horizontal visibility. The tool also displays relevant NWS textual weather observations and forecasts needed for aviation. These data are either points of observed or forecast weather, often at airports, or regions of hazardous weather represented by 2-D polygons.

Visibility and Flight Category. Three products are available for the ceiling and visibility analysis (CVA). The ceiling, visibility, and flight category weather products originate from the CVA product, which is a gridded analysis of ceiling and visibility based on surface observations and satellite imagery, and is updated approximately every 5 minutes.

The ceiling and visibility are used together to classify the flight category as visual flight rules (VFR), Marginal Visual Flight Rules (MVFR), instrument flight rules (IFR), and Low Instrument Flight Rules (LIFR). Due to limitations of the observations, the grid cells are approximately 5 kilometers (km) apart at best. In data sparse regions, the best possible estimate of ceiling and visibility is assumed from the nearest surrounding data and may not represent the actual conditions at a specific point. Analyses of these fields are not available if the time slider is moved into the future.

Flight Category Definitions

Category	Ceiling		Visibility
LIFR* (magenta sky symbol)	below 500 feet AGL	and/or	less than 1 mile
IFR (red sky symbol)	500 to below 1,000 feet AGL	and/or	1 mile to less than 3 miles
MVFR (green sky symbol)	1,000 to 3,000 feet AGL	and/or	3 to 5 miles
VFR+ (blue sky symbol)	greater than 3,000 feet AGL	and	greater than 5 miles

* By definition, IFR applies when the ceiling is less than 1,000 feet AGL **and/or** visibility less than 3 miles, while LIFR is a sub-category of IFR.

+ By definition, VFR applies when the ceiling is greater than or equal to 1,000 feet AGL and visibility greater than or equal to 3 miles while MVFR is a sub-category of VFR.

Radar. The HEMS Tool uses the Multi-Radar/Multi-System (MRMS) mosaic produced by NWS. The radar image combines more than 140 radars from around the country into a single image. Additional post-processing is performed to remove some ground clutter and Anomalous Propagation (AP). Due to limitations of the radar, such as blockage by mountains, spacing of radar locations, and over processing of clutter and AP, there may be precipitation when radar data does not detect or show a complete weather picture.

The image used in HEMS is the lowest reflectivity scan from the nearest radar. This is a 1 km image for the continental United States (CONUS). Like the satellite images, the radar mosaic is sliced up and put into the tile cache to provide the maximum resolution and optimal transmission bandwidth. The tile cache is only updated every 10 minutes (MRMS data is available every 2 minutes).

Satellite. The HEMS Tool uses a global satellite mosaic constructed from the five geostationary satellites plus the appropriate polar global imagery. The resulting image is created every 30 minutes from the available imagery. Images are sliced up and provided through a progressive tile cache to optimize data transmission and image resolution.

There are three types of satellite imagery available in HEMS:

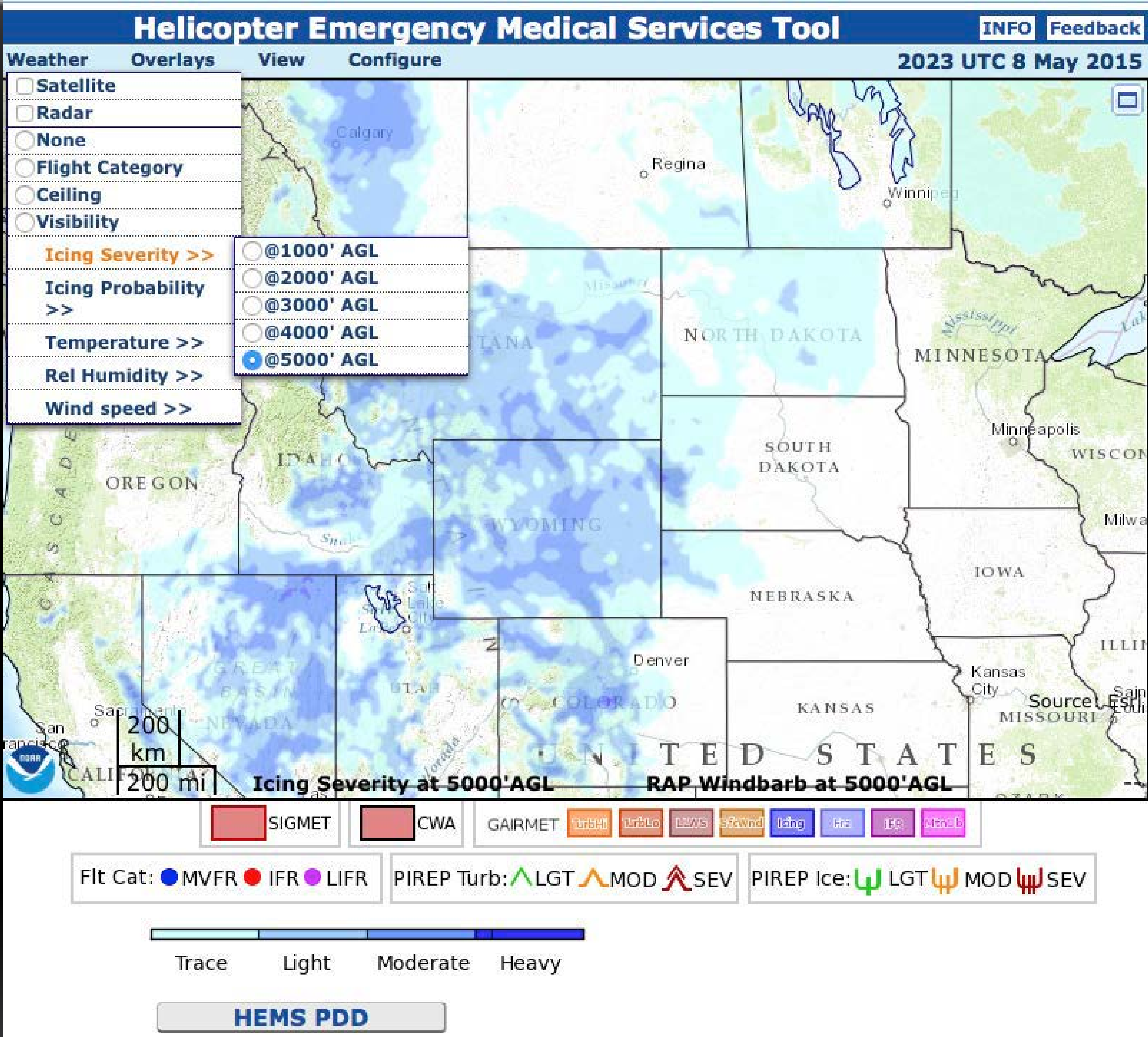
Infrared (IR): This is a 10 km image where brighter grays show colder cloud temperatures.

Visible: This is a 5 km image showing visible reflection from clouds and the ground surface. Consequentially, these images will be black at night.

Water Vapor: This is a 10 km image where brighter grays show higher areas of water vapor.

Icing. The icing severity product is a 3-D product and provides depictions at specified altitudes AGL at 1,000 foot-intervals up to 5,000 ft.

These products originate from the Current Icing Product (CIP) and Forecast Icing Product (FIP) (see paragraph 5.19.1). These products start with data from the Rapid Refresh (RAP) model, which is run hourly. FIP has forecasts at 1, 2, 3, 6, 9, 12, 15, and 18 hours. The time slider will use CIP for current and past times and time-adjusted FIP for future times.

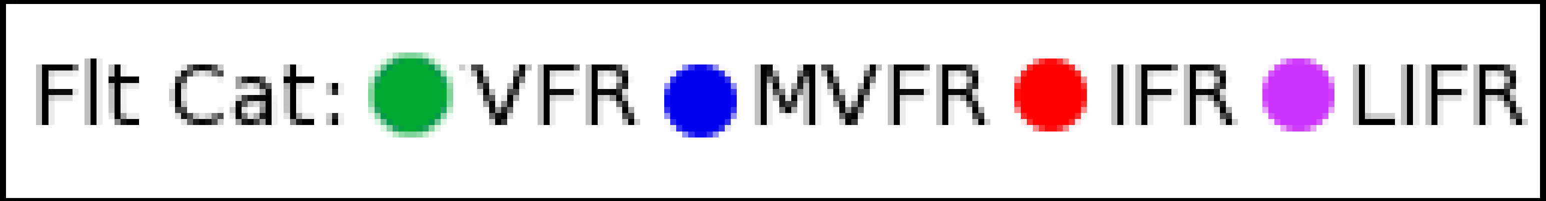


Data Overlays. The HEMS Tool allows the user to select multiple fields to be overlaid on the grids including: METARs/TAFs, Flight Category, PIREPs, Windbarbs, SIGMETs and G-AIRMETs (Graphical Airmen's Meteorological Information), CWAs, and NWS hazards. These fields may be selected on or off in the drop-down Overlays menu.

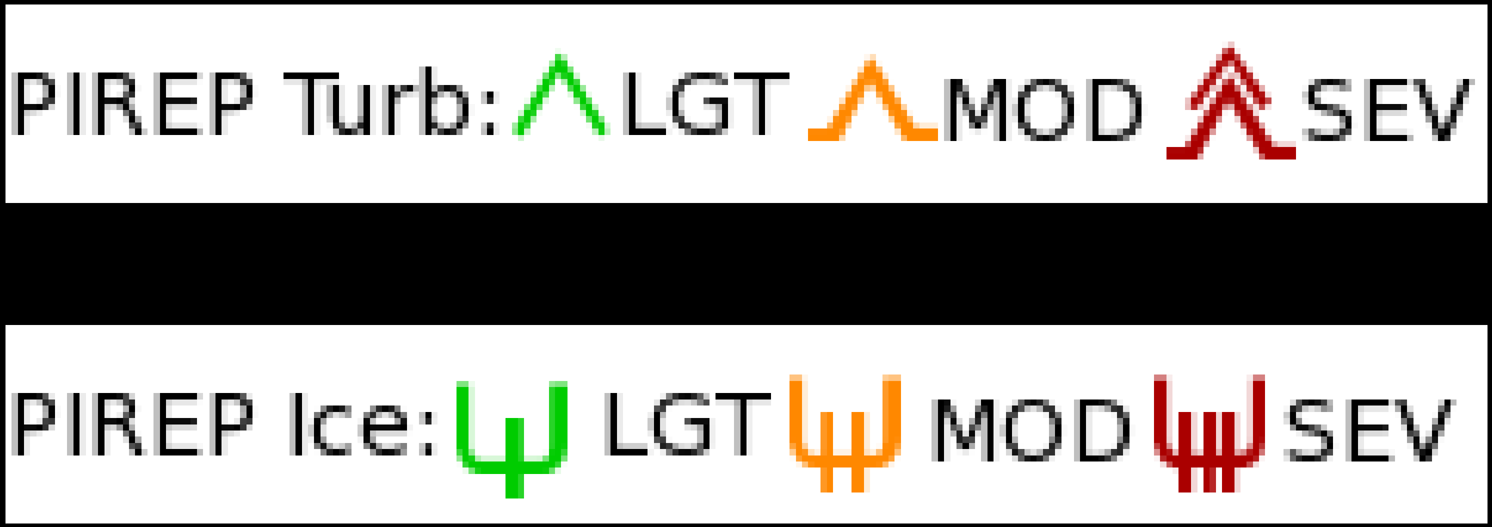
The METAR observations plotted using the standard station model where temperature, dewpoint, winds, altimeter setting, weather, ceiling, and visibility are displayed around the station location.

The data plotted comes from the latest available observation, including Special Weather Reports (SPECI). The stations displayed follow a progressive priority scheme that will show more stations depending on how far the user zooms in. This density can be changed through the Configuration menu. If the time slider is moved into the past, the nearest observation before the listed time is displayed. If the slider is moved into the future, the TAF for that station is shown. It should be noted there are fewer TAF stations than available METAR sites. More configuration options are available, including parameters displayed, scale factor of graphic, and whether the TAF is included in the pop-up display.

Flight Category. This displays only the flight conditions at a particular airport as a colored dot. The flight category display uses the same priority filter system as the METAR plots, but the density is much higher.

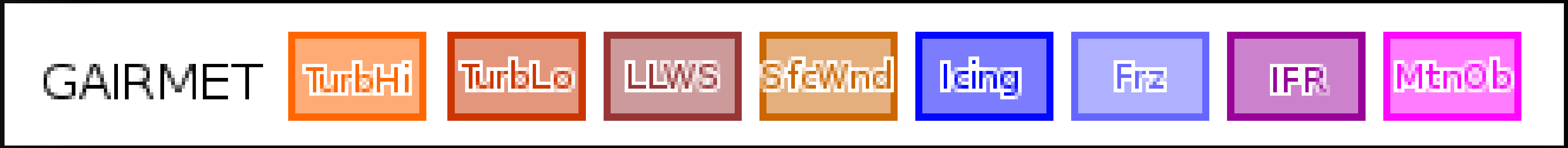


PIREPs. This displays turbulence and icing PIREPs. The default is to show only PIREPs reported in the last 90 minutes, and only those below 12,500 ft. These options can be changed in the Configuration menu.

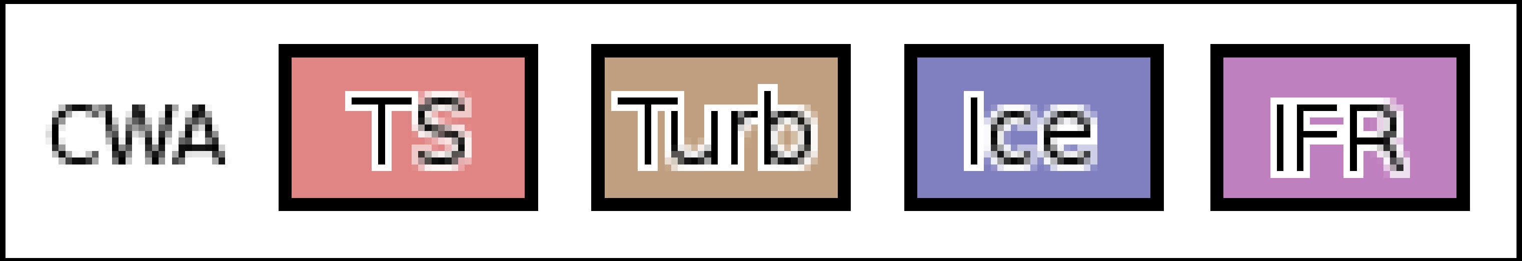


SIGMETs. This displays the current valid SIGMETs. This will show both domestic and international SIGMETs. Individual SIGMET types can be toggled on and off through the configuration menu. SIGMETs can be distinguished by their red outline and red labels.

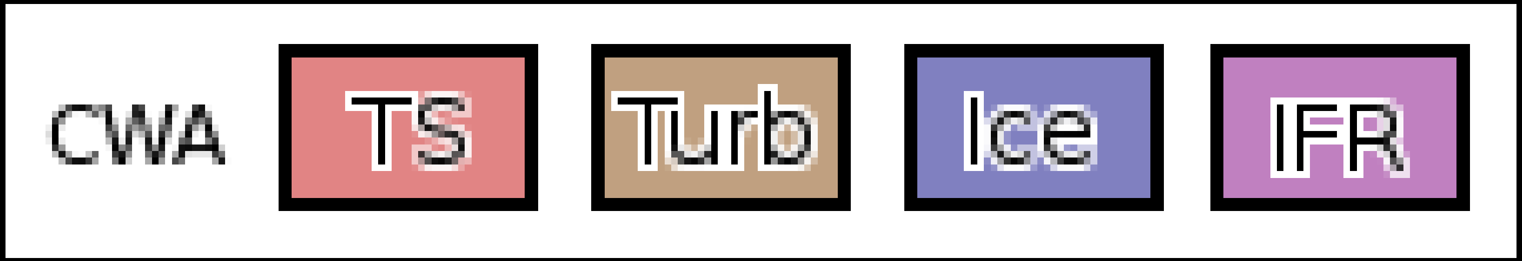
G-AIRMET. This displays the current valid G-AIRMETs. This will show all G-AIRMET types, which can be cluttered. Each type can be toggled on and off through the Configuration menu.



Center Weather Advisories (CWA). This displays the CWA issued by the Center Weather Service Units (CWSU) at each air route traffic control center (ARTCC). CWAs can be distinguished by the black outline and black labels.



NWS Hazards. This displays all current warnings, watches, and advisories. The Configuration menu will allow the user to select “Warnings” which will only show tornado, severe thunderstorm, blizzard, winter storm, and ice storm warnings..



Strengths and Limitations.

HEMS Strengths.

One-stop shop for multiple data fields.

Focused on low-altitude flights common to HEMS.

Simplified display for non-meteorologist users.

Available 24/7.

HEMS Limitations.

Due to limitations of the observations, the ceiling, visibility, and flight category grid cells are approximately 5 km apart. sparse regions, the best possible estimate of ceiling and visibility is assumed from the nearest surrounding data and may not represent the actual conditions at a specific point.

Due to limitations of the radar, such as blockage by mountains, spacing of radar locations and over processing of clutter and AP, there may be precipitation when radar data does not detect or show a complete weather picture. The most commonly seen example is very shallow clouds with light precipitation, like freezing drizzle or snow.

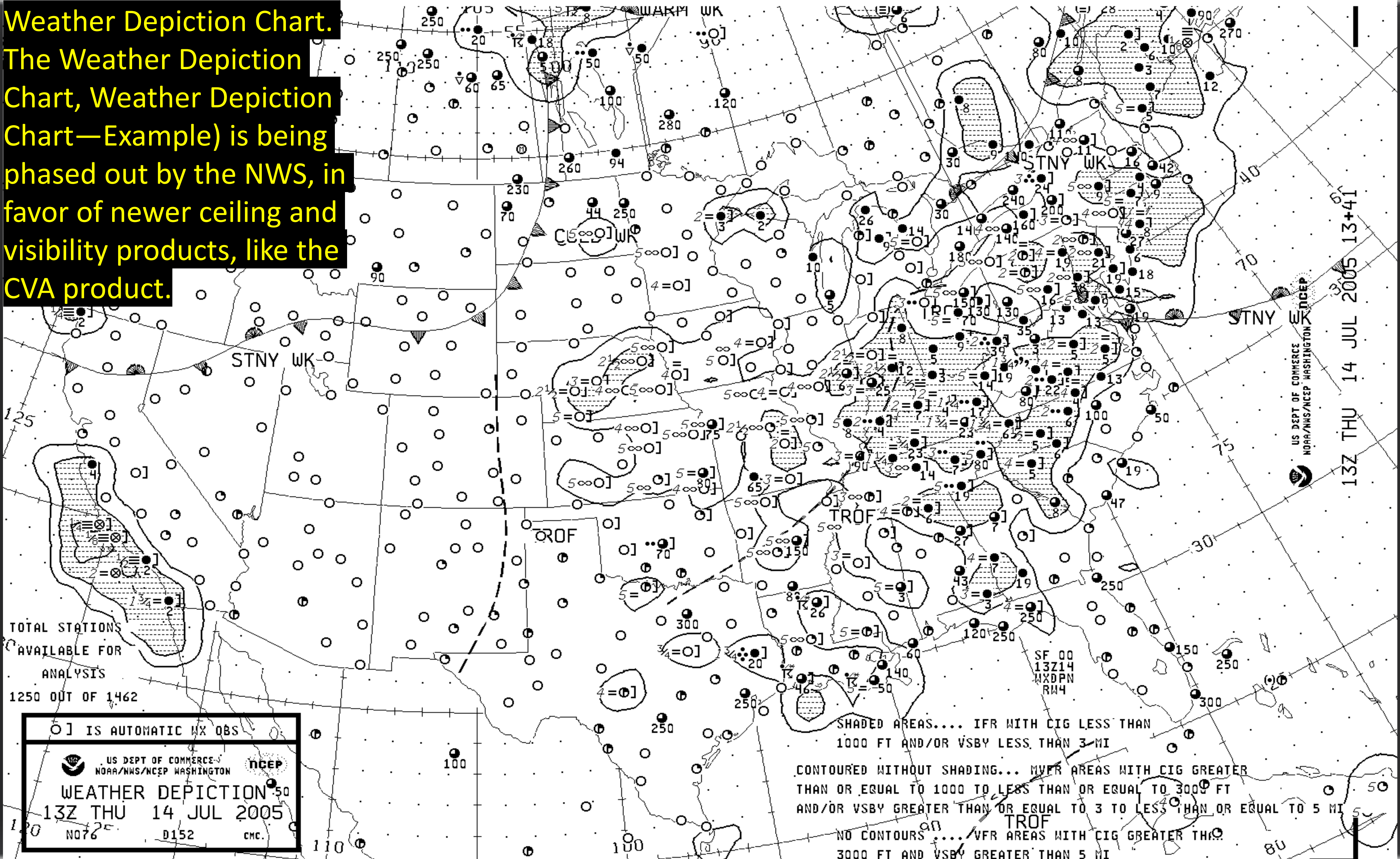
In regions of steep terrain, AGL altitudes may have significant deviations from actual height above terrain, given the limiting factor of grid cell size, which is approximately 13 km, and the resolution of the topography in the model.

Use. The HEMS Tool has been specially designed to meet the needs of emergency first responders flying short-distance, low-altitude flight routes. This tool is not designed for General Aviation (GA) or commercial flights and does not constitute an official weather brief.

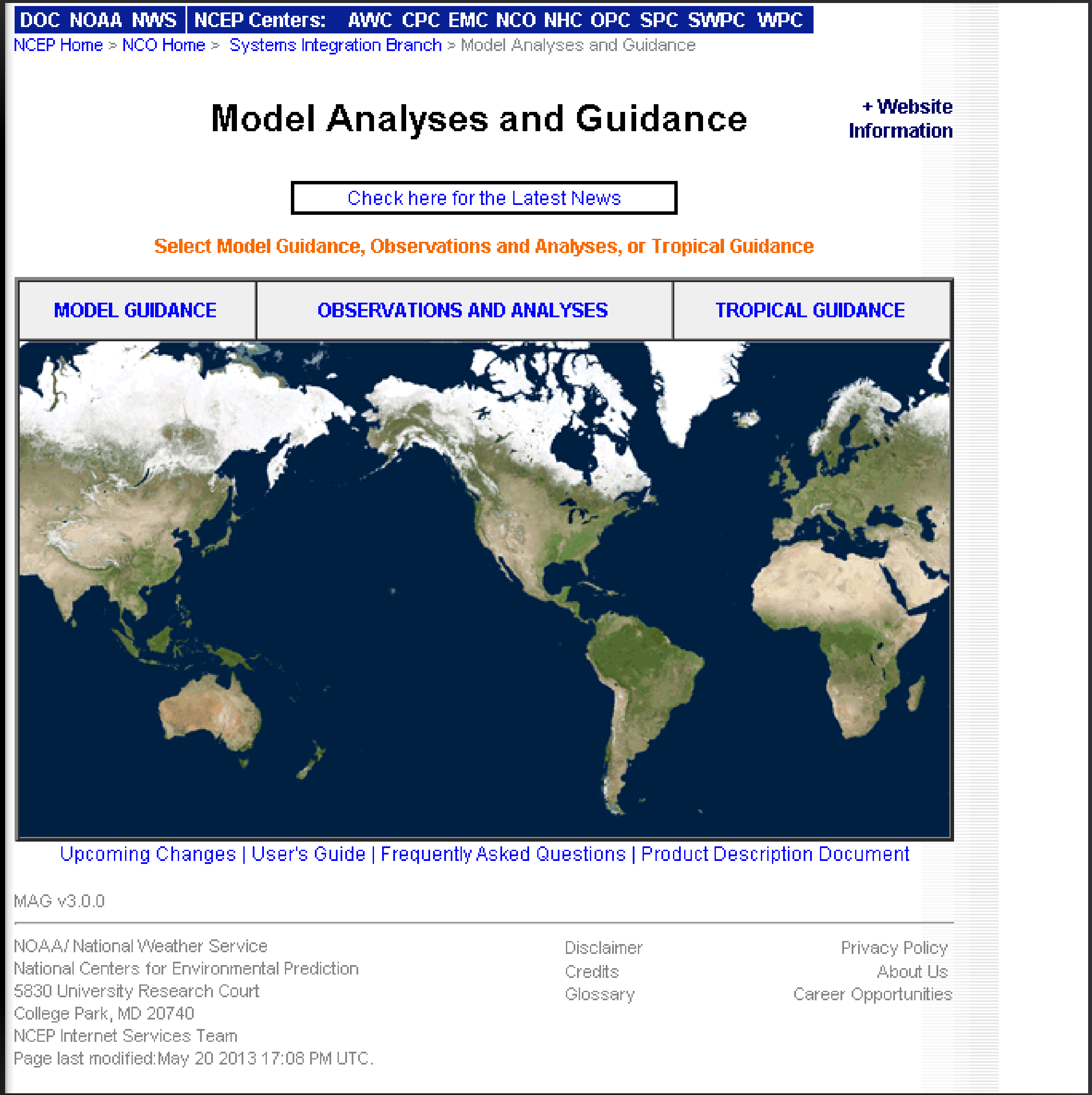
Table 1 – Weather Minimums

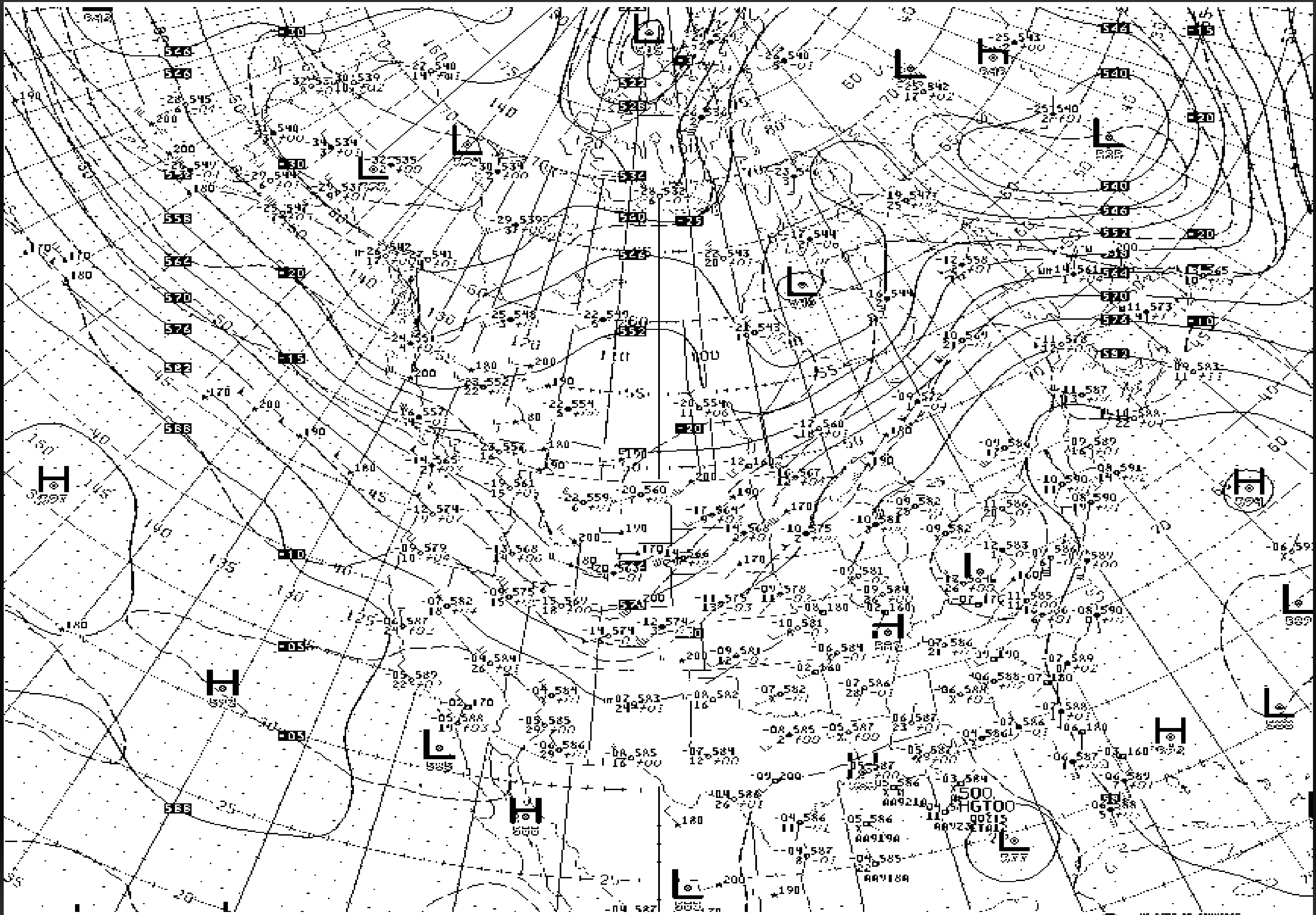
	Non-Mountainous		Mountainous (see 14 CFR 95)	
Area / Condition	Local	Cross Country	Local	Cross Country
	Ceiling-visibility			
Day	800-2	800-3	800-3	1000-3
Night – Equipped with Night Vision Imaging System (NVIS) or Terrain Awareness Warning System	800-3	1000-3	1000-3	1000-5
Night – Without NVIS or TAWS	1000-3	1000-5	1500-3	1500-5

Weather Depiction Chart. The Weather Depiction Chart, Weather Depiction Chart—Example) is being phased out by the NWS, in favor of newer ceiling and visibility products, like the CVA product.



Upper-Air Analyses.
The NWS National Centers for Environmental Prediction (NCEP) Central Operations (NCO) produces and provides upper-air analyses and forecast products. Their Web site, Model Analyses and Guidance NWS NCEP Central Operations Model Analyses and Guidance Web Site), contains a user's guide that provides descriptions, details, and examples of the various products. A select subset of these products is available on http://www.aviationweather.gov





D020 .. 500MB ANALYSIS HEIGHTS/TEMPERATURE VALID 00Z WED 15 SEP 2004

FORECASTS

The third distinct type of weather (meteorological) information is forecasts. Will discuss many forecast products, including in-flight advisories, produced by the NWS that are either specific to aviation or are public products of interest to aviation users.

Observed weather condition reports are often used in the creation of forecasts for the same area. A variety of different forecast products are produced and designed to be used in the preflight planning stage.

The printed forecasts that pilots need to be familiar with are the terminal aerodrome forecast (TAF), aviation area forecast (FA), inflight weather advisories (SIGMET, AIRMET), and the winds and temperatures aloft forecast (FB).

Terminal Aerodrome Forecasts (TAF)
A TAF is a report established for the five statute mile radius around an airport. TAF reports are usually given for larger airports. Each TAF is valid for a 24 or 30-hour time period and is updated four times a day at 0000Z, 0600Z, 1200Z, and 1800Z. The TAF utilizes the same descriptors and abbreviations as used in the METAR report. The TAF includes the following information in sequential order:

KPIR 111130Z 1112/1212
TEMPO 1112/1114 5SM BR
FM1500 16015G25KT P6SM SCT040 BKN250
FM120000 14012KT P6SM BKN080 OVC150
PROB30 1200/1204 3SM TSRA BKN030CB
FM120400 1408KT P6SM SCT040 OVC080
TEMPO 1204/1208 3SM TSRA OVC030CB

1. Type of report—a TAF can be either a routine forecast (TAF) or an amended forecast (TAF AMD).

2. ICAO station identifier—the station identifier is the same as that used in a METAR.

3. Date and time of origin—time and date (081125Z) of TAF origination is given in the six-number code with the first two being the date, the last four being the time. Time is always given in UTC as denoted by the Z following the time block.

KPIR 111130Z 1112/1212
TEMPO 1112/1114 5SM BR
FM111500 16015G25KT P6SM SCT040 BKN250
FM120000 14012KT P6SM BKN080 OVC150
PROB30 1200/1204 3SM TSRA BKN030CB
FM120400 1408KT P6SM SCT040 OVC080
TEMPO 1204/1208 3SM TSRA OVC030CB

Valid period dates and times—The TAF valid period follows the date/time of forecast origin group. Scheduled 24 and 30 hour TAFs are issued four times per day, at 0000, 0600, 1200, and 1800Z. The first two digits are the day of the month for the start of the TAF. The next two digits (12) are the starting hour (UTC). The day of the month for the end of the TAF, and the last two digits (12) are the ending hour (UTC) of the valid period. A forecast period that begins at midnight UTC is annotated as 00. If the end time of a valid period is at midnight UTC, it is annotated as 24. For example, a 12Z TAF issued on the 11th of the month and valid for 24 hours would have a valid period of 1112/1212.

KPIR 111130Z 1112/1212
TEMPO 1112/1114 5SM BR
FM1500 16015G25KT P6SM SCT040 BKN250
FM120000 14012KT P6SM BKN080 OVC150
PROB30 1200/1204 3SM TSRA BKN030CB
FM120400 1408KT P6SM SCT040 OVC080
TEMPO 1204/1208 3SM TSRA OVC030CB

Forecast wind—the wind direction and speed forecast are coded in a five-digit number group. An example would be 15011KT. The first three digits indicate the direction of the wind in reference to true north. The last two digits state the windspeed in knots appended with "KT." Like the METAR, winds greater than 99 knots are given in three digits.

KPIR 111130Z 1112/1212
TEMPO 1112/1114 5SM BR
FM1500 16015G25KT P6SM SCT040 BKN250
FM120000 14012KT P6SM BKN080 OVC150
PROB30 1200/1204 3SM TSRA BKN030CB
FM120400 1408KT P6SM SCT040 OVC080
TEMPO 1204/1208 3SM TSRA OVC030CB

Forecast visibility—given in statute miles and may be in whole numbers or fractions. If the forecast is greater than six miles, it is coded as “P6SM.”

KPIR 111130Z 1112/1212
TEMPO 1112/1114 5SM BR
FM1500 16015G25KT P6SM SCT040 BKN250
FM120000 14012KT P6SM BKN080 OVC150
PROB30 1200/1204 3SM TSRA BKN030CB
FM120400 1408KT P6SM SCT040 OVC080
TEMPO 1204/1208 3SM TSRA OVC030CB

Forecast significant weather—weather phenomena are coded in the TAF reports in the same format as the METAR.

KPIR 111130Z 1112/1212
TEMPO 1112/1114 5SM BR
FM1500 16015G25KT P6SM SCT040 BKN250
FM120000 14012KT P6SM BKN080 OVC150
PROB30 1200/1204 3SM TSRA BKN030CB
FM120400 1408KT P6SM SCT040 OVC080
TEMPO 1204/1208 3SM TSRA OVC030CB

Forecast sky condition—given in the same format as the METAR. Only cumulonimbus (CB) clouds are forecast in this portion of the TAF report as opposed to CBs and towering cumulus in the METAR.

KPIR 111130Z 1112/1212
TEMPO 1112/1114 5SM BR
FM1500 16015G25KT P6SM SCT040 BKN250
FM120000 14012KT P6SM BKN080 OVC150
PROB30 1200/1204 3SM TSRA BKN030CB
FM120400 1408KT P6SM SCT040 OVC080
TEMPO 1204/1208 3SM TSRA OVC030CB

Forecast change group—for any significant weather change forecast to occur during the TAF time period, the expected conditions and time period are included in this group. This information may be shown as from (FM), and temporary (TEMPO). “FM” is used when a rapid and significant change, usually within an hour, is expected. “TEMPO” is used for temporary fluctuations of weather, expected to last less than 1 hour.

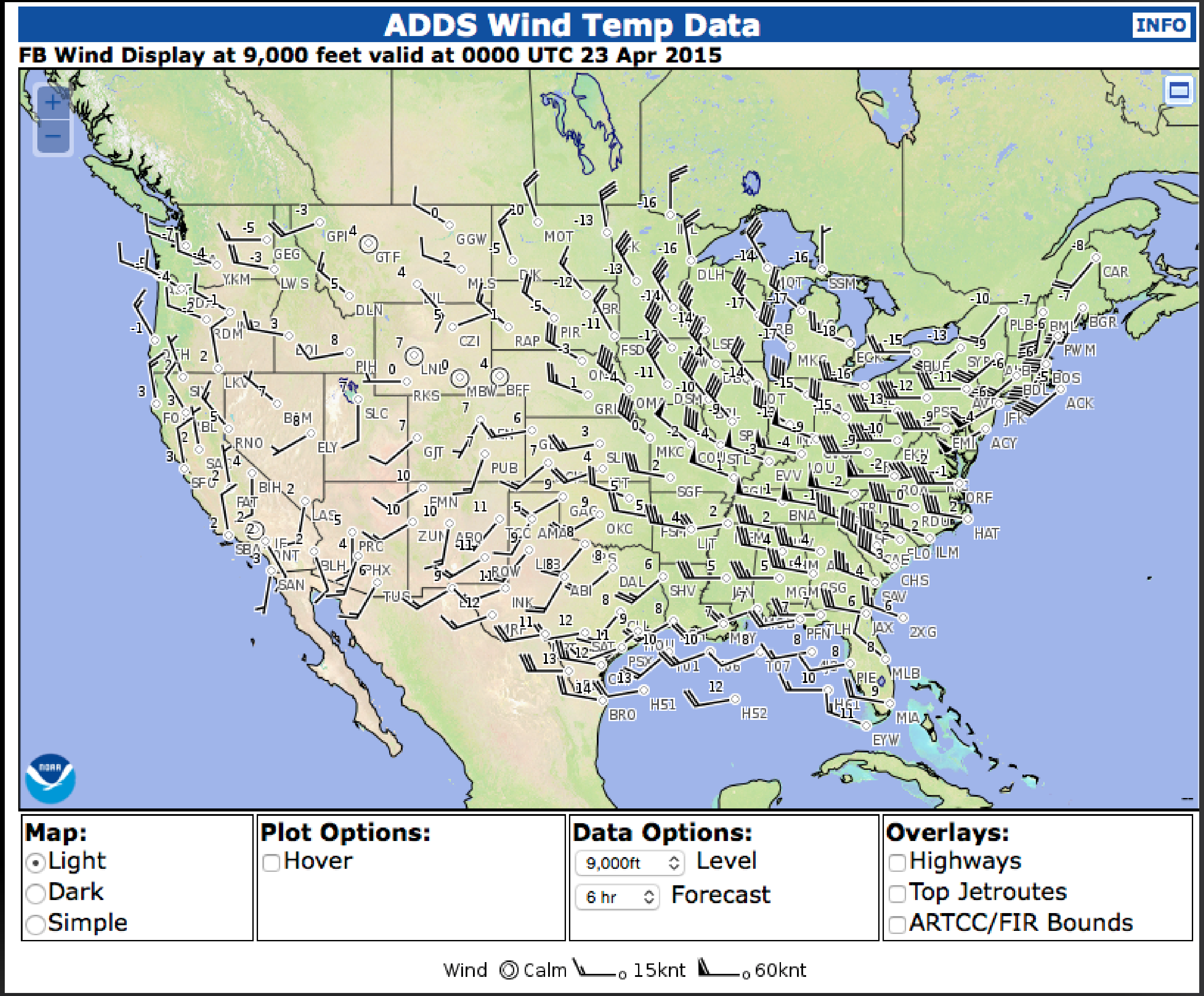
KPIR 111130Z 1112/1212
TEMPO 1112/1114 5SM BR
FM1500 16015G25KT P6SM SCT040 BKN250
FM120000 14012KT P6SM BKN080 OVC150
PROB30 1200/1204 3SM TSRA BKN030CB
FM120400 1408KT P6SM SCT040 OVC080
TEMPO 1204/1208 3SM TSRA OVC030CB

PROB30—a given percentage that describes the probability of thunderstorms and precipitation occurring in the coming hours. This forecast is not used for the first 6 hours of the 24-hour forecast.

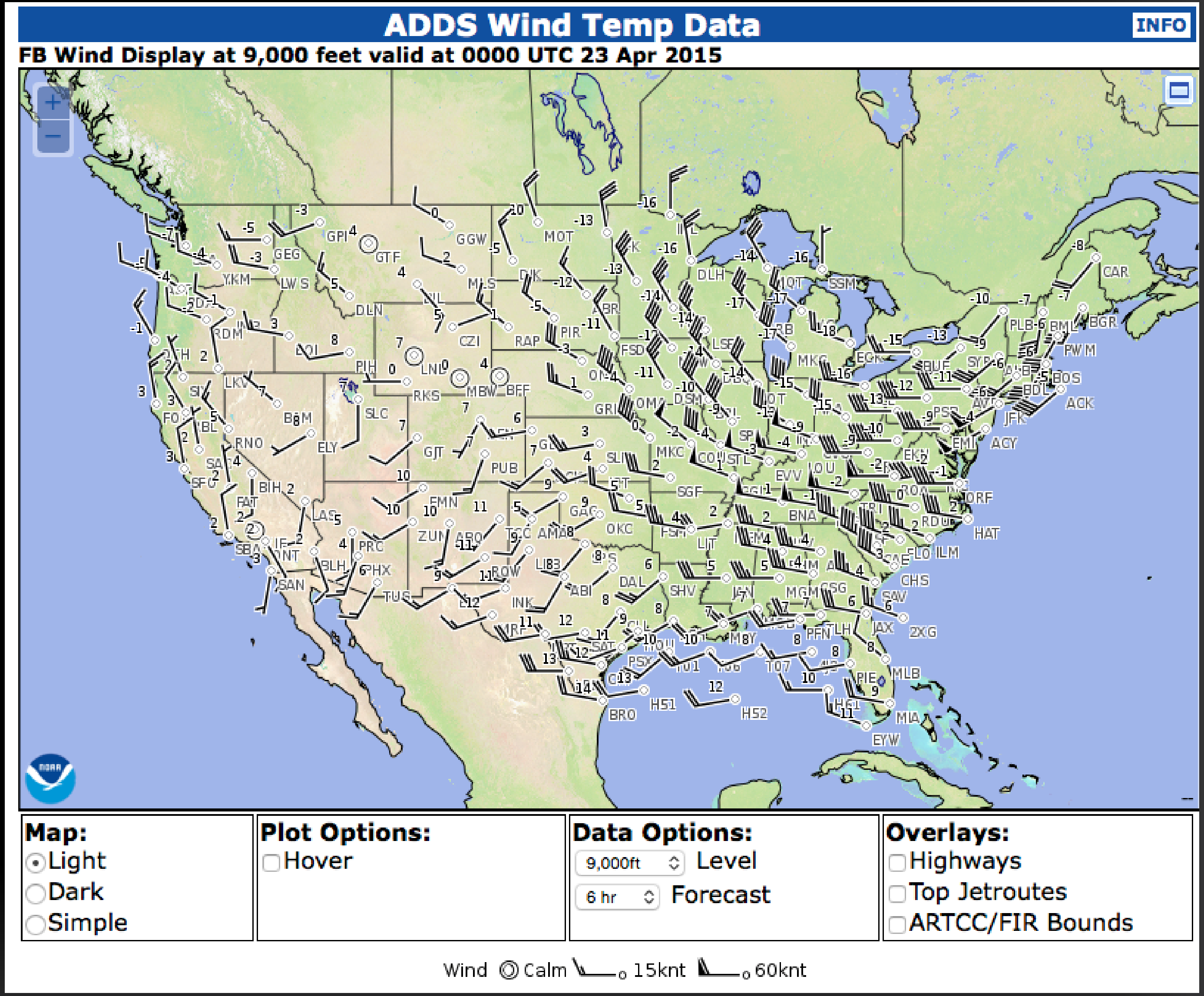
KPIR 111130Z 1112/1212
TEMPO 1112/1114 5SM BR
FM1500 16015G25KT P6SM SCT040 BKN250
FM120000 14012KT P6SM BKN080 OVC150
PROB30 1200/1204 3SM TSRA BKN030CB
FM120400 1408KT P6SM SCT040 OVC080
TEMPO 1204/1208 3SM TSRA OVC030CB

TAF AMD
KEYW 131555Z 1316/1412 VRB03KT P6SM VCTS SCT025CB BKN250
TEMPO 1316/1318 2SM TSRA BKN020CB
FM131800 VRB03KT P6SM SCT025 BKN250 TEMPO 1320/1324 1SM
TSRA OVC010CB
FM140000 VRB03KT P6SM VCTS SCT020CB BKN120 TEMPO
1408/1412 BKN020CB

Wind and Temperature Aloft Forecasts (FB) are computer-prepared forecasts of wind direction, wind speed, and temperature at specified times, altitudes, and locations. FBs are available on http://www.aviationweather.gov in both text and graphic format.



Wind and Temperature Aloft Forecasts (FB) are computer-prepared forecasts of wind direction, wind speed, and temperature at specified times, altitudes, and locations. FBs are available on http://www.aviationweather.gov in both text and graphic format.



AIRMETs (WAs) are examples of inflight weather advisories
that are issued every 6 hours with intermediate updates
issued as needed for a particular area forecast region. The
information contained in an AIRMET is of operational
interest to all aircraft, but the weather section concerns phenomena considered
potentially hazardous to light aircraft
and aircraft with limited operational capabilities.
An AIRMET includes forecast of moderate icing, moderate
turbulence, sustained surface winds of 30 knots or
greater, widespread areas of ceilings less than 1,000 feet
and/or visibilities less than three miles, and extensive
mountain obscurement

An AIRMET may be issued when any of the following weather phenomena are occurring or are expected to occur over an area of at least 3,000 mi2:

- Ceiling less than 1,000 ft and/or visibility less than 3 sm (IFR).
  - o Weather phenomena restricting the visibility including, but not limited to, precipitation (PCPN), smoke (FU), haze (HZ), mist (BR), fog (FG), and blowing snow (BS).
- Widespread mountain obscuration (MTN OBSCN).
  - o Weather phenomena causing the obscuration are included, but not limited to, clouds (CLDS), precipitation (PCPN), smoke (FU), haze (HZ), mist (BR), and fog (FG).
- Moderate turbulence (MOD TURB).
  - o Top and bottom of MOD TURB layer are specified.
- Sustained surface wind greater than 30 kts (STG SFC WND).
- Moderate icing (MOD ICE).
  - o Top and bottom of MOD ICE are specified.
  - o The range of freezing level altitudes is given when the bottom altitude of MOD ICE is the freezing level (FRZLVL).
  - o Areas with multiple freezing levels are specified.
  - o Range of freezing levels over the area is specified.
  - o Lowest freezing levels above ground level (AGL) at intervals of 4,000 ft MSL (or SFC as appropriate) are specified.
- Non-Convective low-level wind shear potential below 2,000 ft AGL (LLWS POTENTIAL).

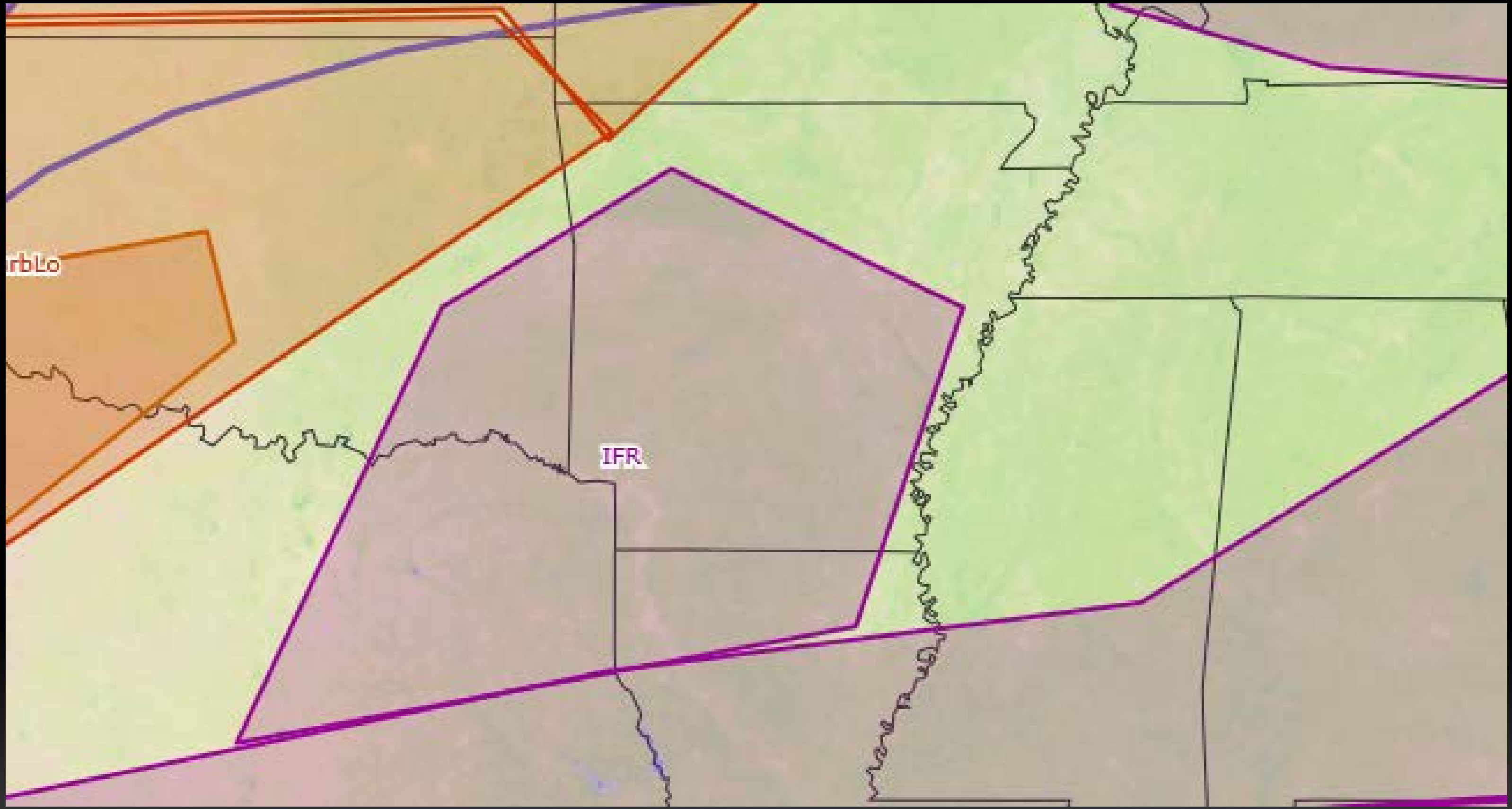
Each AIRMET bulletin has a fixed alphanumeric designator, numbered sequentially for easy identification, beginning with the first issuance of the day.

Sierra is the AIRMET code used to denote IFR and mountain obscuration;

Tango is used to denote turbulence, strong surface winds, and low-level wind shear;

Zulu is used to denote icing and freezing levels.

The Graphical AIRMET (G-AIRMET) product is a decision-making tool based on weather "snapshots" displayed at short time intervals. The G-AIRMET identifies hazardous weather in space and time more precisely than text products, enabling pilots to maintain high safety margins while flying more efficient routes.



Significant Meteorological Information (SIGMET). A SIGMET is a concise description of the occurrence or expected occurrence of specified en route weather phenomena that may affect the safety of aircraft operations. SIGMETs are issued in text format and intended for dissemination to all pilots in flight to enhance safety. SIGMETs are issued as soon as practical to give notice to operators and aircrews of potentially hazardous en route conditions.

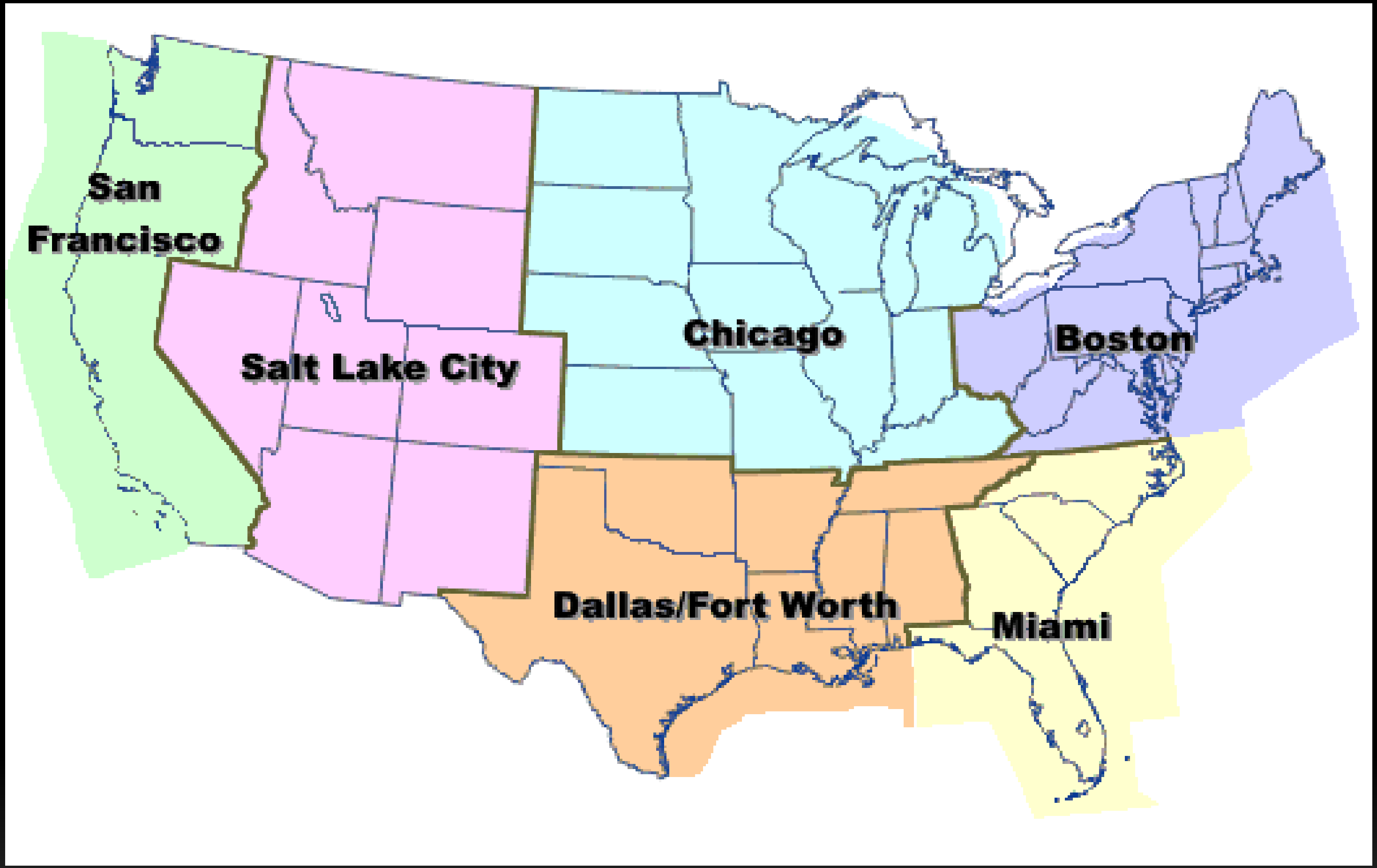
- All SIGMETs are available on http://www.aviationweather.gov.

- SIGMETs for Alaska are also available on the Alaska Aviation Weather Unit (AAWU) Web site.

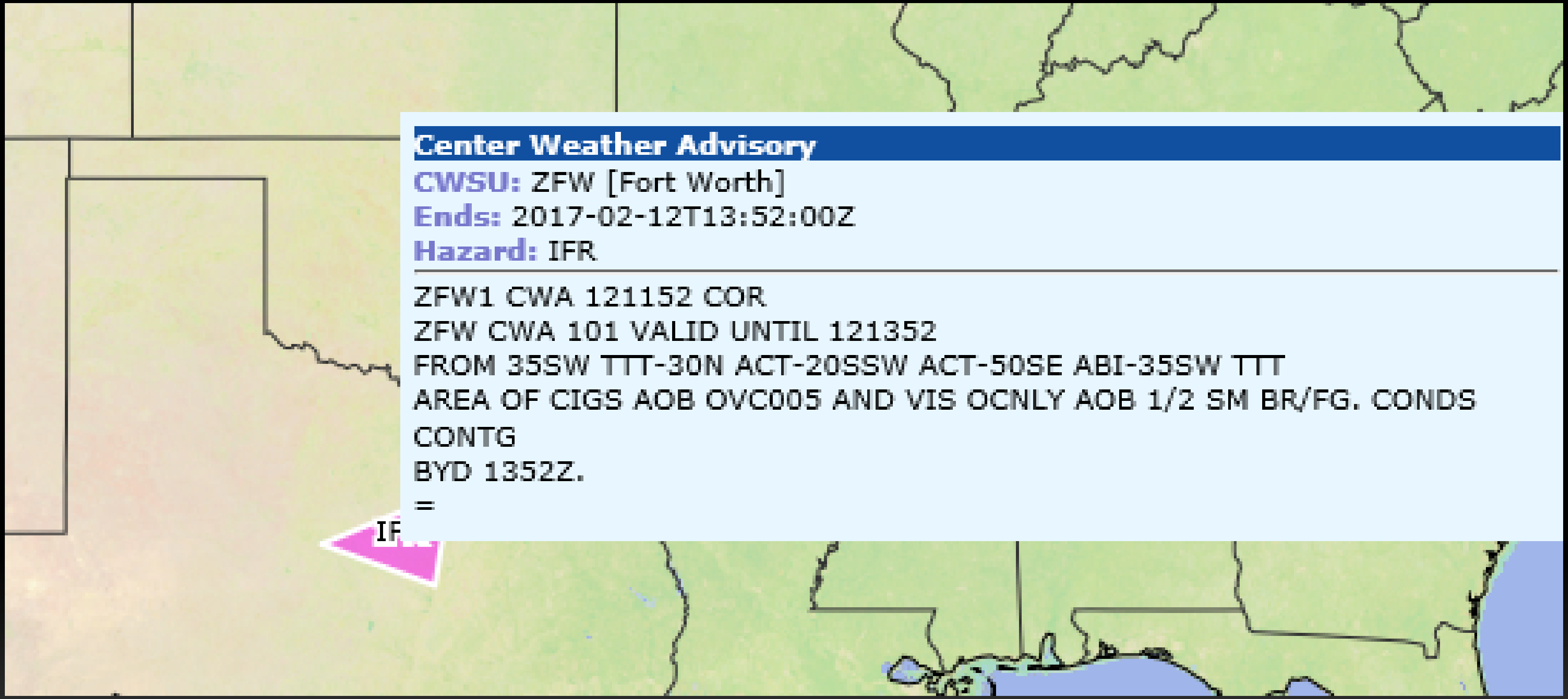
- SIGMETs for Hawaii are also available on the NWS Weather Forecast Office (WFO) Honolulu Web site.

Although the areas where the SIGMETs apply may be shown graphically, a graphical depiction of the SIGMET area is not the entire SIGMET. Additional information regarding the SIGMET may be contained in the text version.

AWC SIGMET Areas of Responsibility—Continental U.S.



SIGMETs (WSs) are inflight advisories concerning non-convective weather that is potentially hazardous to all aircraft. They report weather forecasts that include severe icing not associated with thunderstorms, severe or extreme turbulence or clear air turbulence (CAT) not associated with thunderstorms, dust storms or sandstorms that lower surface or inflight visibilities to below three miles, and volcanic ash. SIGMETs are unscheduled forecasts that are valid for 4 hours unless the SIGMET relates to a hurricane, in which case it is valid for 6 hours.



SFOR WS 100130 SIGMET ROME02
VALID UNTIL 100530 OR WA FROM SEA
TO PDT TO EUG TO SEA OCNL SEV CAT
BTN FL280 AND FL350 EXPCD DUE TO
JTSTR. CONDS BGNG AFT 0200Z
CONTG BYD 0530Z .

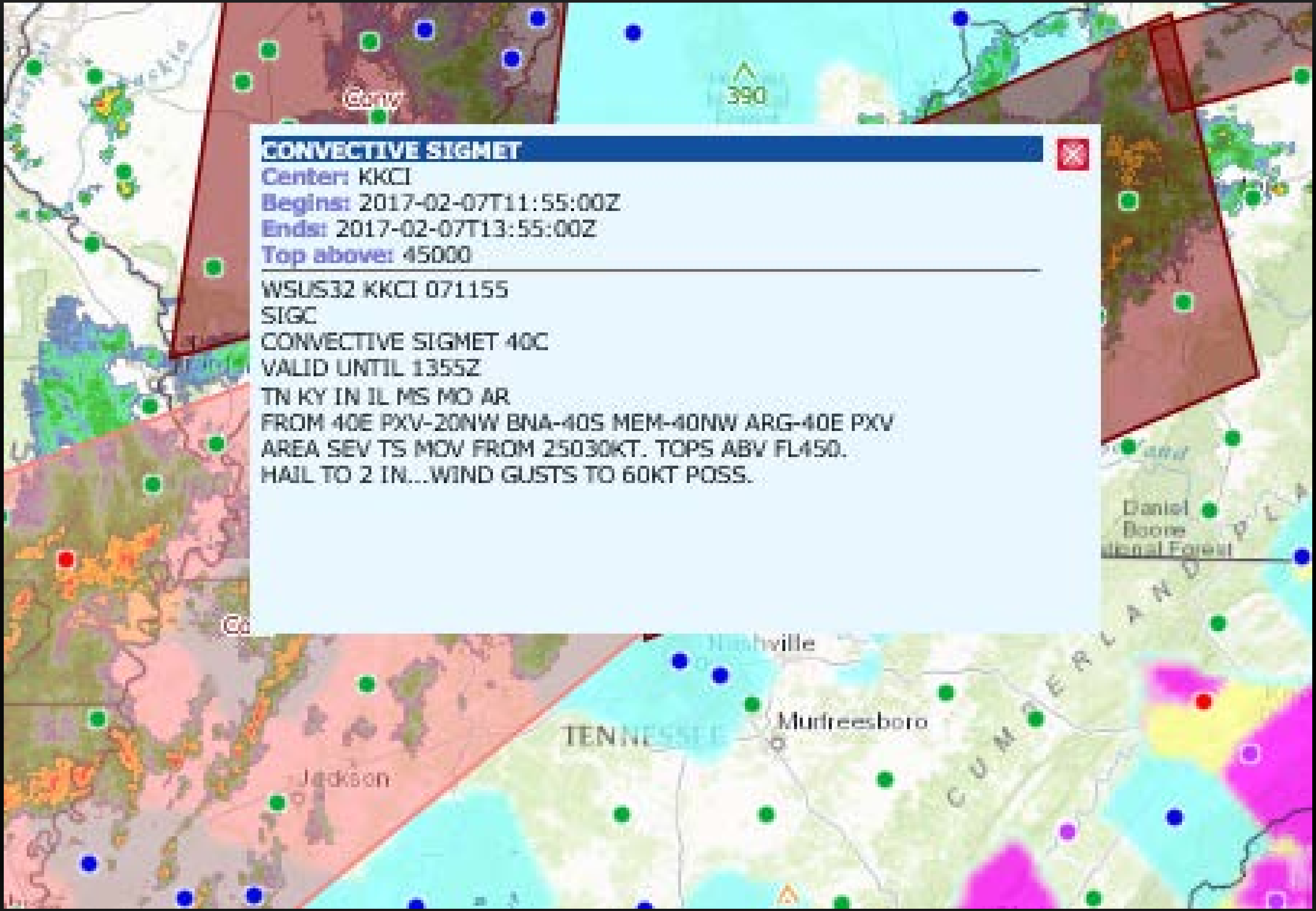
This is SIGMET Romeo 2, the second issuance for this weather phenomenon. It is valid until the 10th day of the month at 0530Z time. This SIGMET is for Oregon and Washington, for a defined area from Seattle to Portland to Eugene to Seattle. It calls for occasional severe clear air turbulence between FL280 and FL350 due to the location of the jet stream. These conditions will begin after 0200Z and continue beyond the forecast scope of this SIGMET of 0530Z.

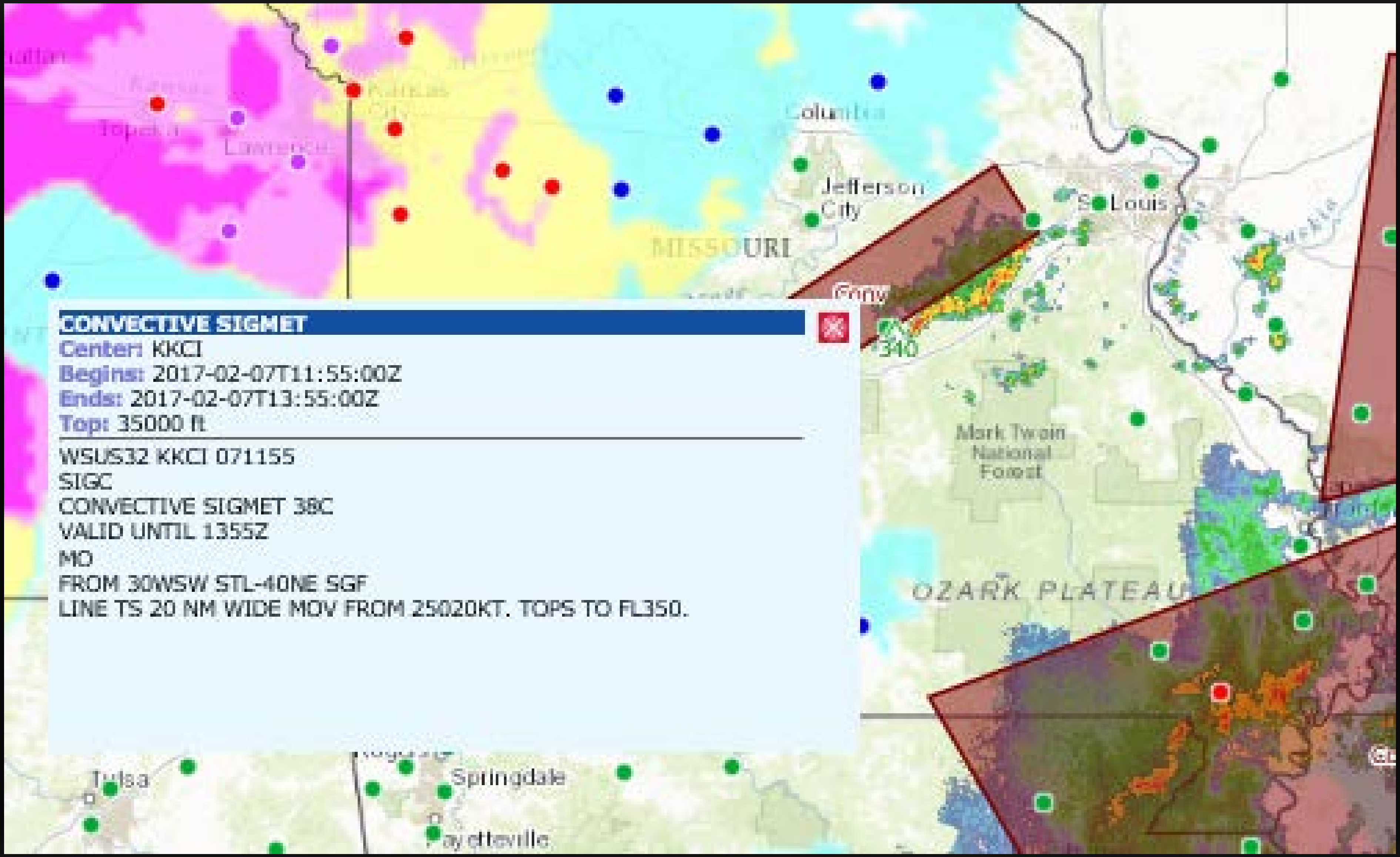
A Convective SIGMET (WST) is an inflight weather advisory issued for hazardous convective weather that affects the safety of every flight. Convective SIGMETs are issued for severe thunderstorms with surface winds greater than 50 knots, hail at the surface greater than or equal to ¾ inch in diameter, or tornadoes. They are also issued to advise pilots of embedded thunderstorms, lines of thunderstorms, or thunderstorms with heavy or greater precipitation that affect 40 percent or more of a 3,000 square mile or greater region.

Convective SIGMETs are issued for each area of the contiguous 48 states but not Alaska or Hawaii. Convective SIGMETs are issued for the eastern (E), western (W), and central (C) United States. Each report is issued at 55 minutes past the hour, but special Convective SIGMETs can be issued during the interim for any reason. Each forecast is valid for 2 hours. They are numbered sequentially each day from 1–99, beginning at 00Z time. If no hazardous weather exists, the convective SIGMET is still issued; however, it states “CONVECTIVE SIGMET…NONE.”

MKCC WST 221855 CONVECTIVE SIGMET 20C VALID UNTIL 2055Z ND SD FROM 90W MOT-GFK-ABR-90W MOT INTSFYG AREA SEV TS MOVG FROM 24045KT. TOPS ABV FL450. WIND GUSTS TO 60KTS RPRTD. TORNADOES…HAIL TO 2 IN… WIND GUSTS TO 65KTS POSS ND PTN

Explanation: Convective SIGMET was issued for the central portion of the United States on the 22nd at 1855Z. This is the 20th Convective SIGMET issued on the 22nd for the central United States as indicated by “20C” and is valid until 2055Z. The affected states are North and South Dakota, from 90 nautical miles west of Minot, ND; to Grand Forks, ND; to Aberdeen, SD; to 90 nautical miles west of Minot, ND. An intensifying area of severe thunderstorms moving from 240 degrees at 45 knots (to the northeast). Thunderstorm tops will be above FL 450. Wind gusts up to 60 knots were reported. Also reported were tornadoes, hail to 2 inches in diameter, and wind gusts to 65 knots possible in the North Dakota portion


CONVECTIVE SIGMET
Center: KKCI
Begins: 2017-02-07T11:55:00Z
Ends: 2017-02-07T13:55:00Z
Top above: 45000
WSUS32 KKCI 071155
SIGC
CONVECTIVE SIGMET 40C
VALID UNTIL 1355Z
TN KY IN IL MS MO AR
FROM 40E PXV-20NW BNA-40S MEM-40NW ARG-40E PXV
AREA SEV TS MOV FROM 25030KT. TOPS ABV FL450.
HAIL TO 2 IN...WIND GUSTS TO 60KT POSS.
390
Nashville
Murfreesboro
Jackson
Daniel
Boone

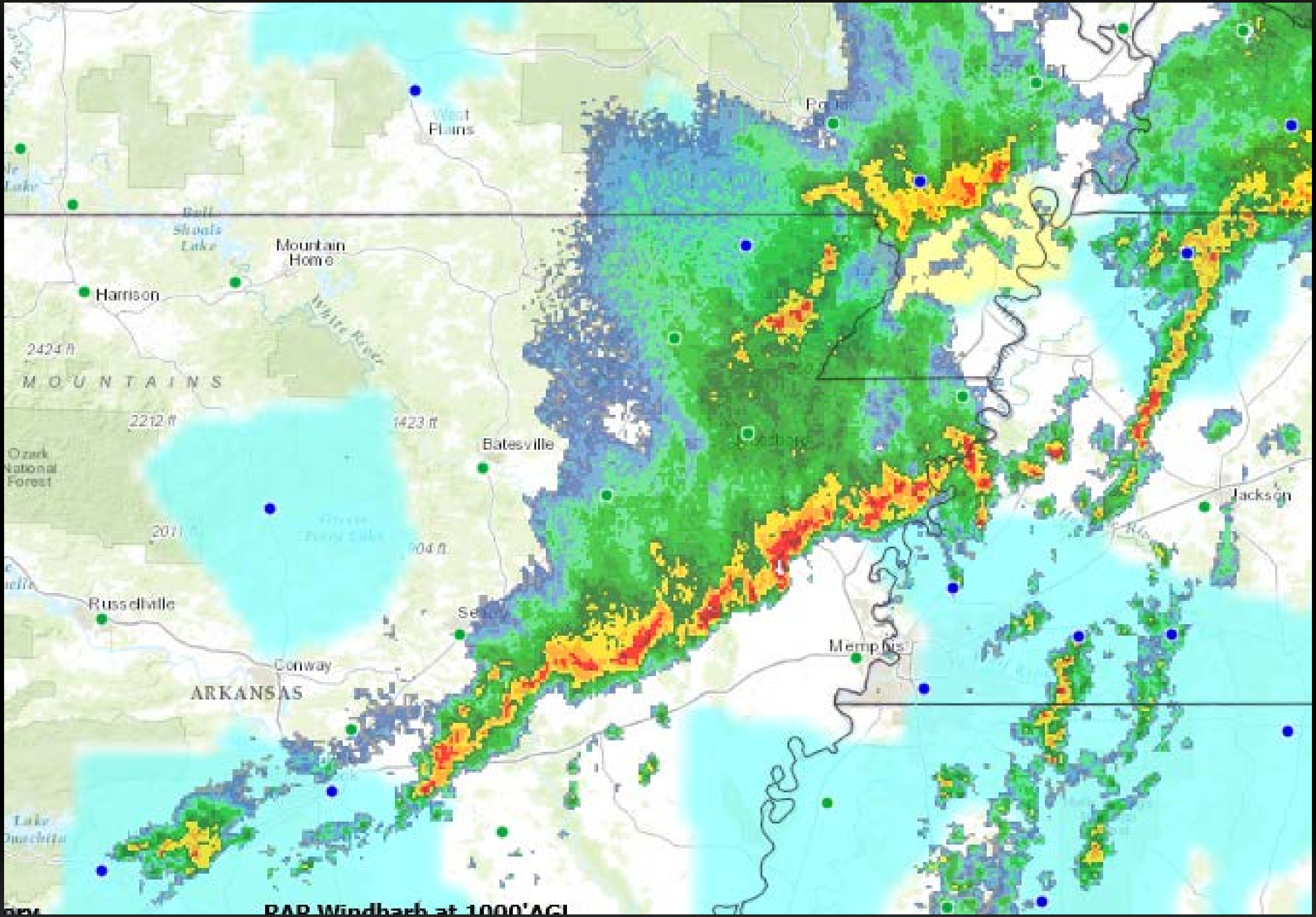

CONVECTIVE SIGMET
Center: KKCI
Begins: 2017-02-07T11:55:00Z
Ends: 2017-02-07T13:55:00Z
Top: 35000 ft
WSUS32 KKCI 071155
SIGC
CONVECTIVE SIGMET 38C
VALID UNTIL 1355Z
MO
FROM 30WSW STL-40NE SGF
LINE TS 20 NM WIDE MOV FROM 25020KT. TOPS TO FL350.
Topeka
Lawrence
Columbia
Jefferson City
St Louis
MISSOURI
340
Mark Twain National Forest
OZARK PLATEAU
Tulsa
Springdale
Fayetteville

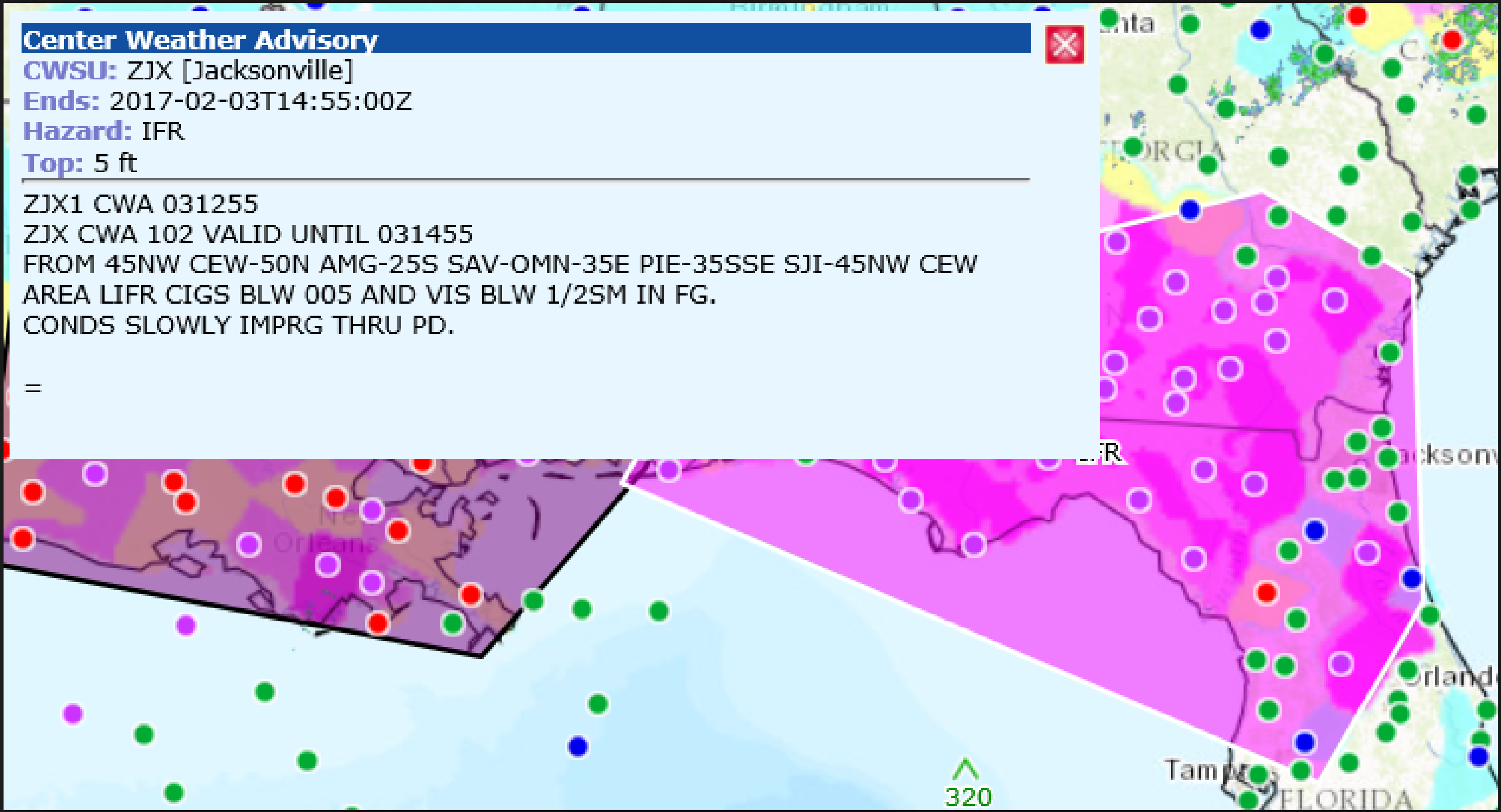
The CWA is an aviation weather warning for conditions meeting or approaching national in-flight advisory (AIRMET, SIGMET or SIGMET for convection) criteria. The CWA is primarily used by air crews to anticipate and avoid adverse weather conditions in the en route and terminal environments. It is not a flight planning product because of its short lead time and duration. Additionally, the CWA should be meteorologically consistent with other products and reflect conditions at the time of issuance and/or in the near future. If a CWA has been issued prior to coordination, notification to the appropriate offices, national center, or WFO should follow as soon as higher priority duties permit.

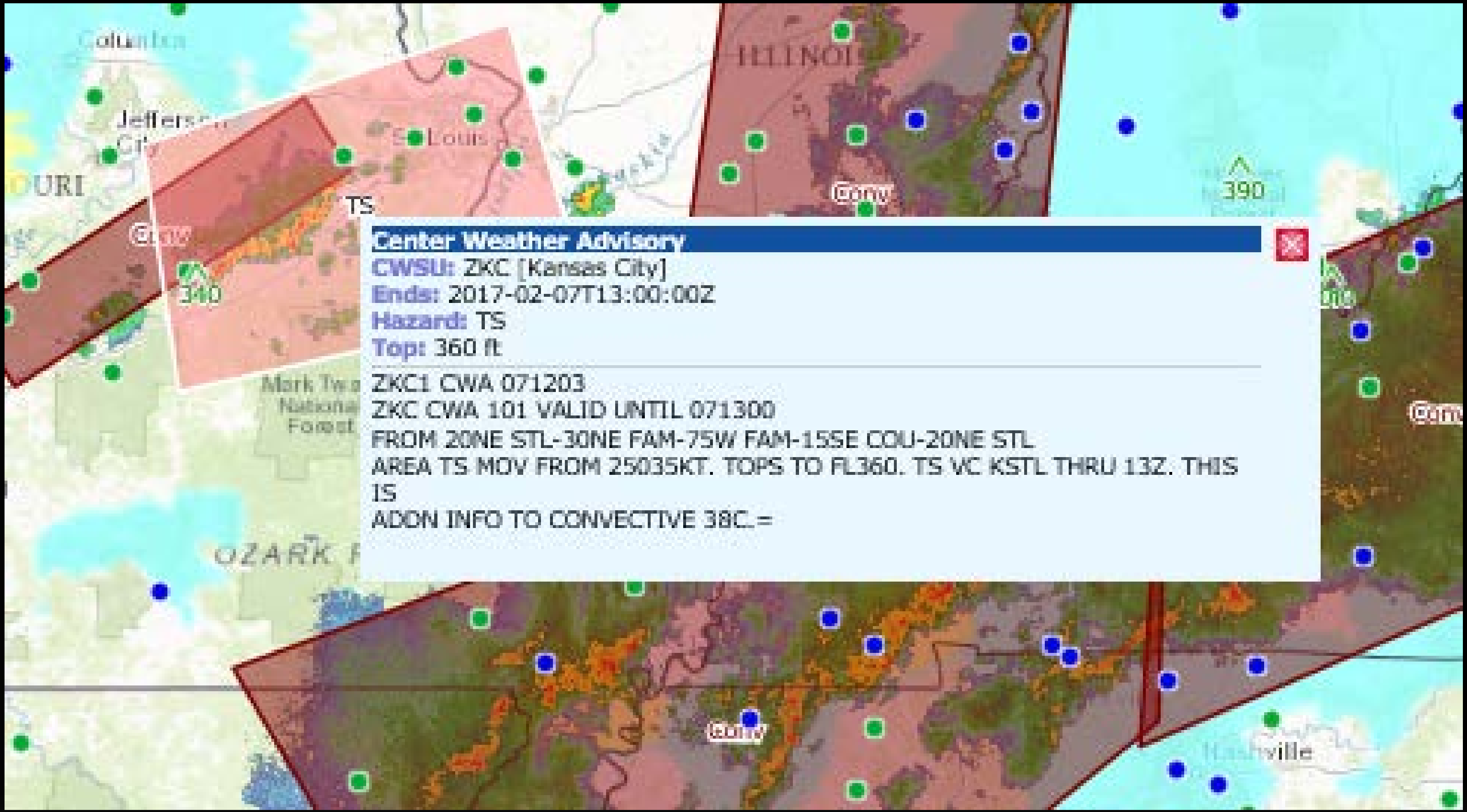
CWAs are valid for up to two (2) hours and may include forecasts of conditions expected to begin within two (2) hours of issuance. If conditions are expected to persist after the advisory's valid period, a statement to that effect should be included in the last line of the text. Follow-up CWAs should be issued as appropriate. Notice of significant changes in the phenomenon described in a CWA should be provided by a new CWA issuance for that phenomenon. If the forecaster deems it necessary, CWAs may be issued hourly for convective activity. This may improve the usefulness of the Hazardous In-flight Weather Advisory Service (HIWAS) recordings which include those CWAs.

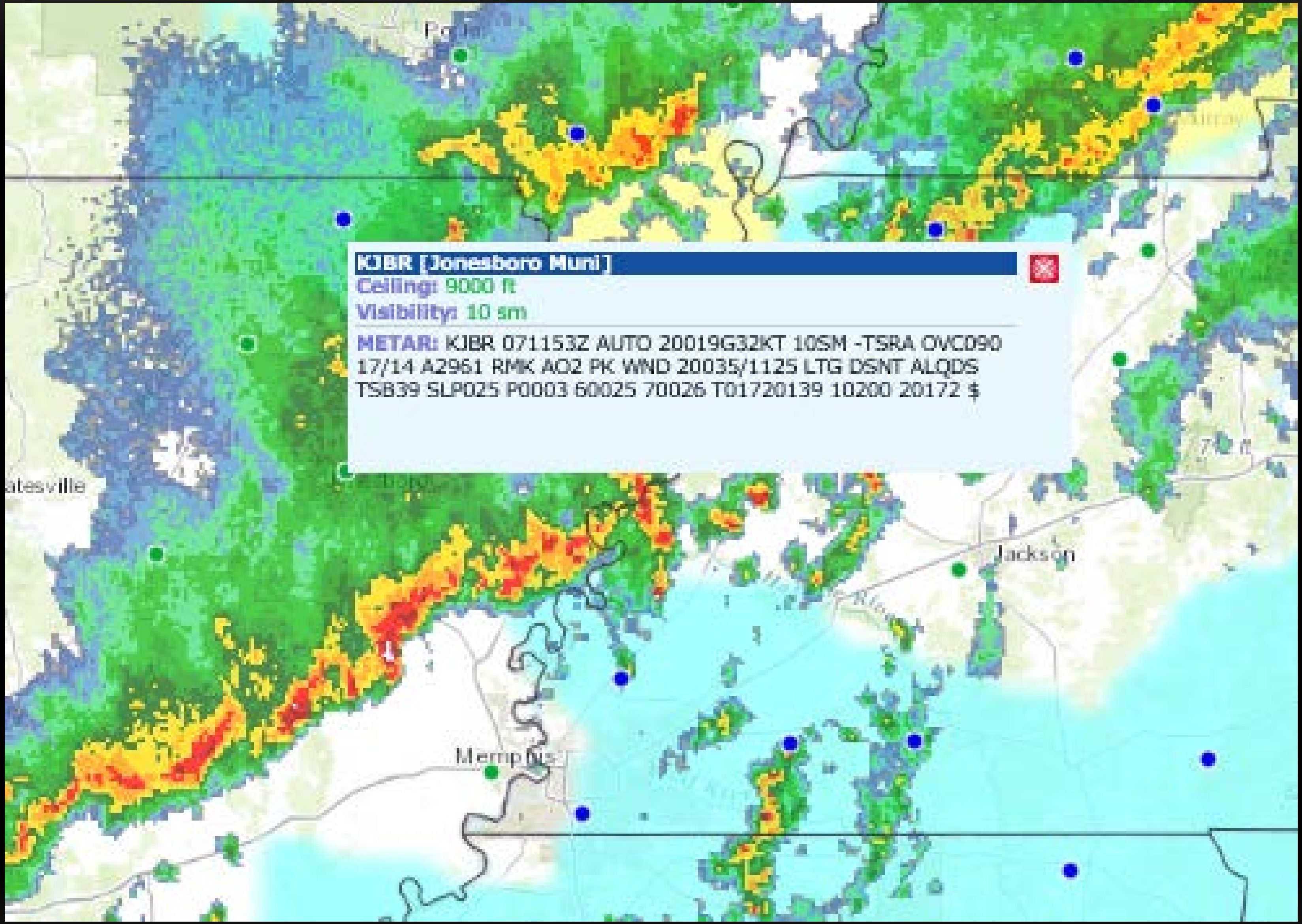
CWAs should be issued for any of the following events when they are expected to occur within two hours and have not been previously forecast by AWC or AAWU products, or to supplement the AWC and AAWU products.

- Conditions meeting convective SIGMET criteria
- Icing - moderate or greater
- Turbulence - moderate or greater
- Heavy precipitation
- Freezing precipitation
- Conditions at or approaching Low IFR
- Surface winds/gusts >30 knots
- Low Level Wind Shear (surface - 2,000 feet)
- Volcanic ash, dust storms, or sandstorms


West Plains
Bull Shoals Lake
Mountain Home
Harrison
White River
2424 ft
MOUNTAINS
2212 ft
1423 ft
Batesville
Ozark National Forest
Russellville
Conway
ARKANSAS
Memphis
Jackson
Lake Ouachita
RAP Windbarb at 1000'AGL

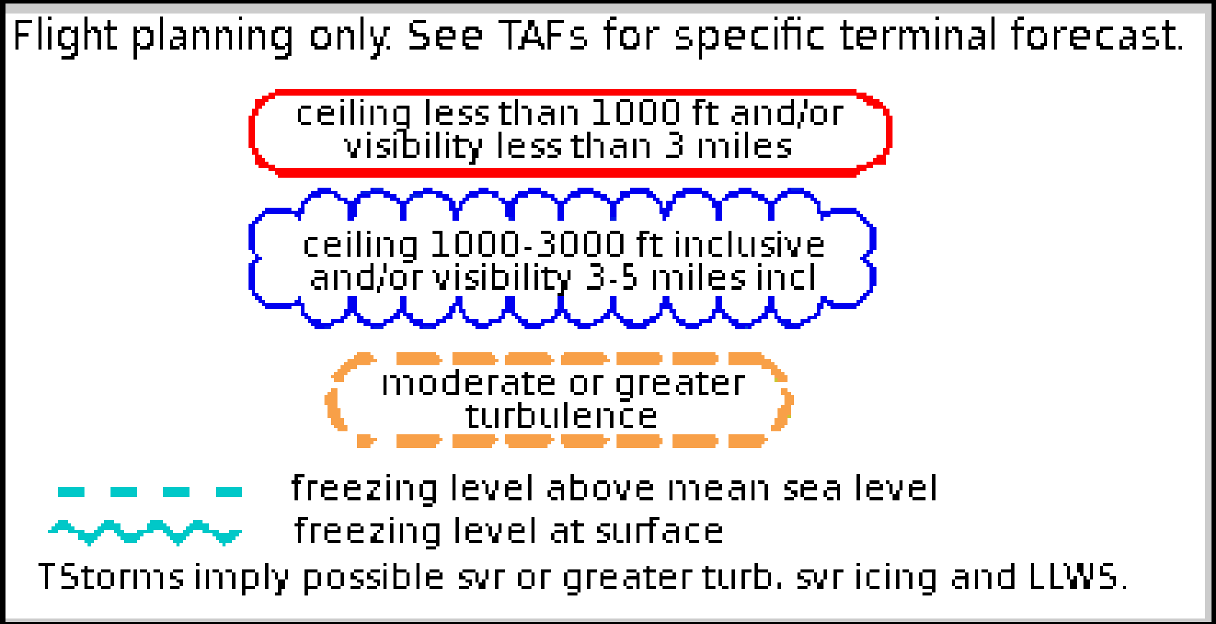

Center Weather Advisory
CWSU: ZJX [Jacksonville]
Ends: 2017-02-03T14:55:00Z
Hazard: IFR
Top: 5 ft
ZJX1 CWA 031255
ZJX CWA 102 VALID UNTIL 031455
FROM 45NW CEW-50N AMG-25S SAV-OMN-35E PIE-35SSE SJI-45NW CEW
AREA LIFR CIGS BLW 005 AND VIS BLW 1/2SM IN FG.
CONDS SLOWLY IMPRG THRU PD.
=
320
FLORIDA

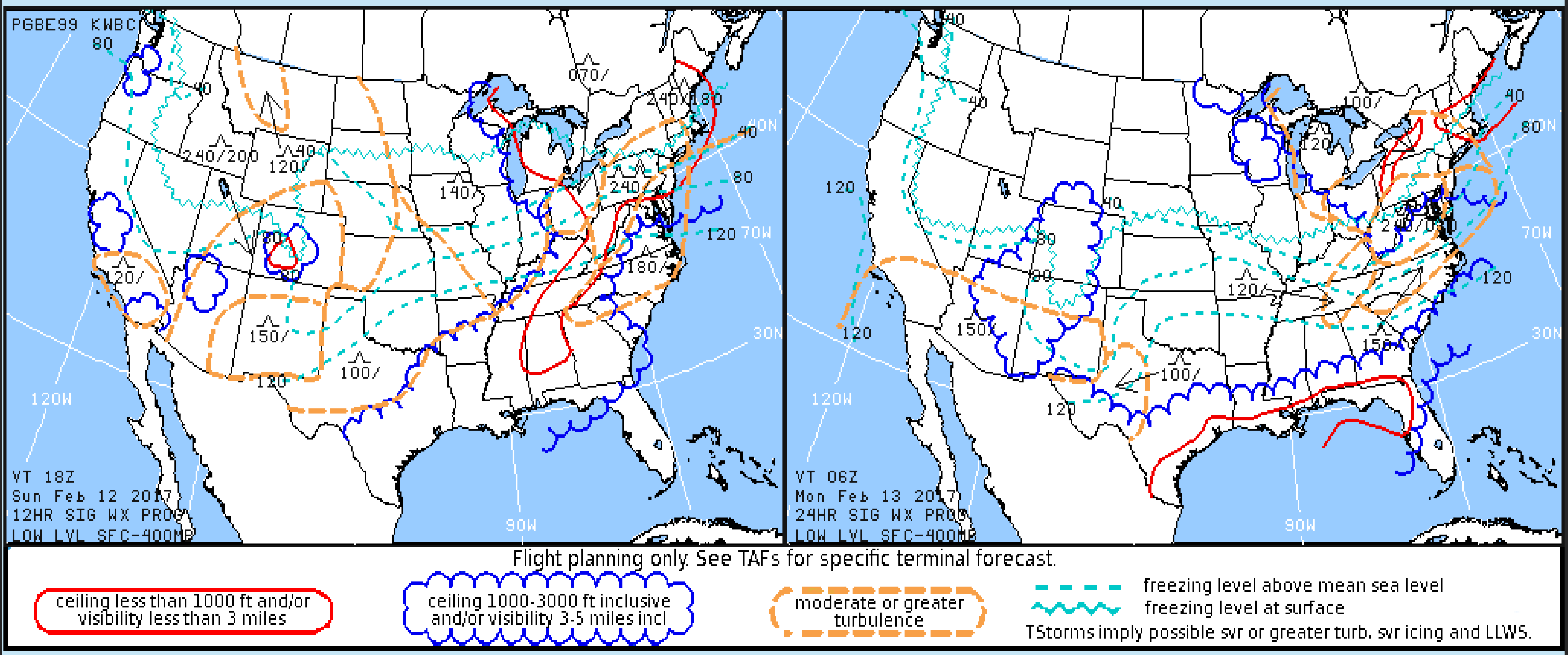

Center Weather Advisory
CWSU: ZKC [Kansas City]
Ends: 2017-02-07T13:00:00Z
Hazard: TS
Top: 360 ft
ZKC1 CWA 071203
ZKC CWA 101 VALID UNTIL 071300
FROM 20NE STL-30NE FAM-75W FAM-15SE COU-20NE STL
AREA TS MOV FROM 25035KT. TOPS TO FL360. TS VC KSTL THRU 13Z. THIS
IS
ADDN INFO TO CONVECTIVE 38C.=
TS
340
390
Conv
Conv
Conv
ILLINOI
St Louis
Nashville


KJBR [Jonesboro Muni]
Ceiling: 9000 ft
Visibility: 10 sm
METAR: KJBR 071153Z AUTO 20019G32KT 10SM -TSRA OVC090 17/14 A2961 RMK AO2 PK WND 20035/1125 LTG DSNT ALQDS TSB39 SLP025 P0003 60025 70026 T01720139 10200 20172 $
Jackson
Memphis


KHKA [Blytheville Muni]
Ceiling: 9000 ft
Visibility: 10 sm
METAR: KHKA 071222Z AUTO 21029G37KT 10SM -TSRA FEW033 SCT060 BKN090 17/15 A2965 RMK AO2 PK WND 21037/1222 LTG DSNT ALQDS RAB11 TSB16 P0000 T01720150
1423 ft
Batesville

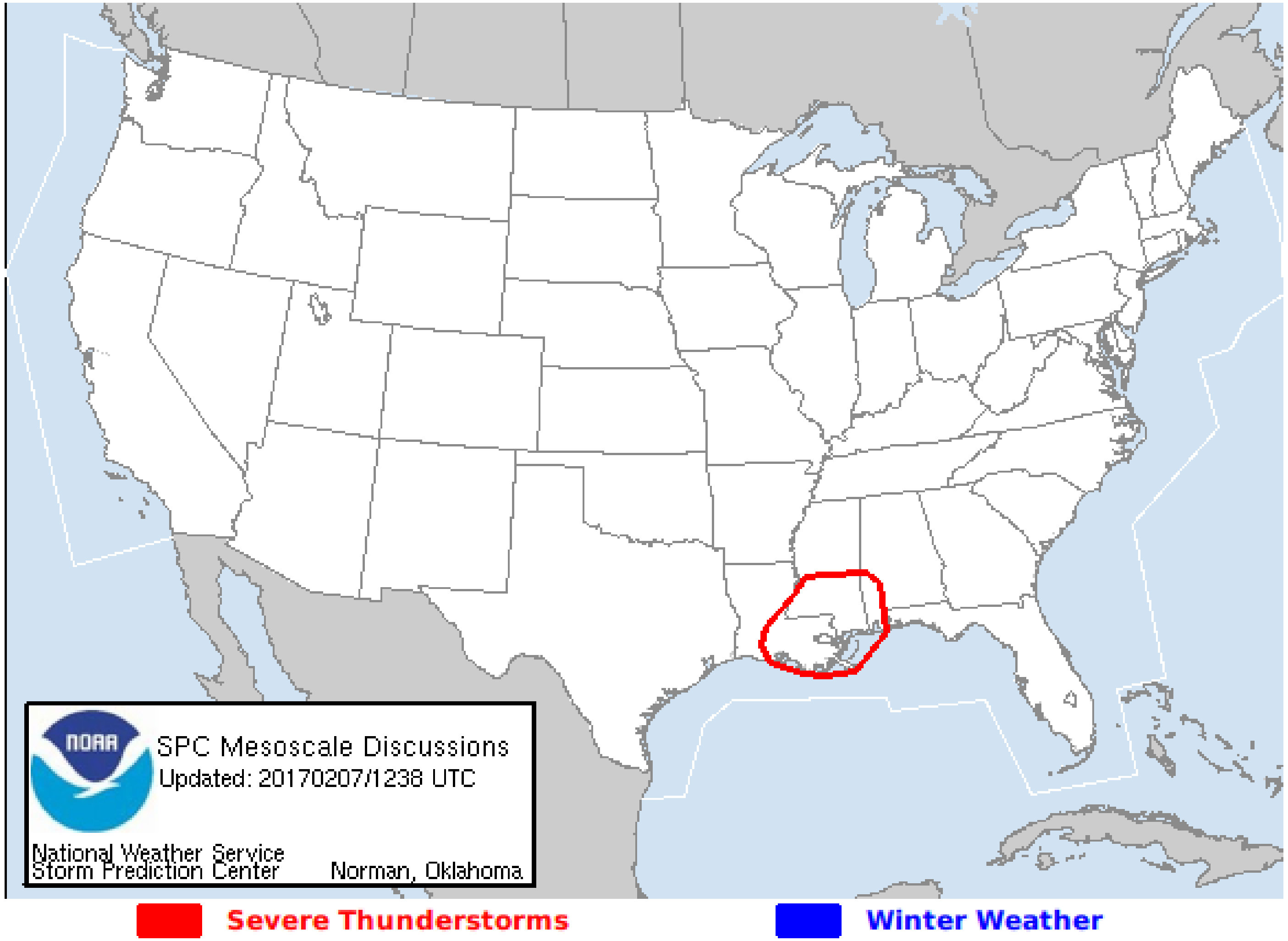
The low-level Prognostic graphics product is a forecast of aviation weather hazards, primarily intended to be used as a guidance product for briefing the VFR pilot. The forecast domain covers the 48 contiguous states, southern Canada and the coastal waters for altitudes below 24,000 ft. Low altitude Significant Weather charts are issued four times daily and are valid at fixed times: 0000, 0600, 1200, and 1800 UTC. Each chart is divided on the left and right into 12 and 24 hour forecast intervals (based on the current NAM model available). The two panels depict freezing levels, turbulence, and low cloud ceilings and/or restrictions to visibility (shown as contoured areas of MVFR and IFR conditions).


Flight planning only. See TAFs for specific terminal forecast.
ceiling less than 1000 ft and/or visibility less than 3 miles
ceiling 1000-3000 ft inclusive and/or visibility 3-5 miles incl
moderate or greater turbulence
freezing level above mean sea level
freezing level at surface
TStorms imply possible svr or greater turb. svr icing and LLWS.


PGBE99 KWBC
VT 18Z
Sun Feb 12 2017
12HR SIG WX PROG
LOW LVL SFC-400MB
VT 06Z
Mon Feb 13 2017
24HR SIG WX PROG
LOW LVL SFC-400MB
120W
90W
70W
40N
30N
120W
90W
70W
80N
30N
Flight planning only. See TAFs for specific terminal forecast.
ceiling less than 1000 ft and/or visibility less than 3 miles
ceiling 1000-3000 ft inclusive and/or visibility 3-5 miles incl
moderate or greater turbulence
freezing level above mean sea level
freezing level at surface
TStorms imply possible svr or greater turb. svr icing and LLWS.

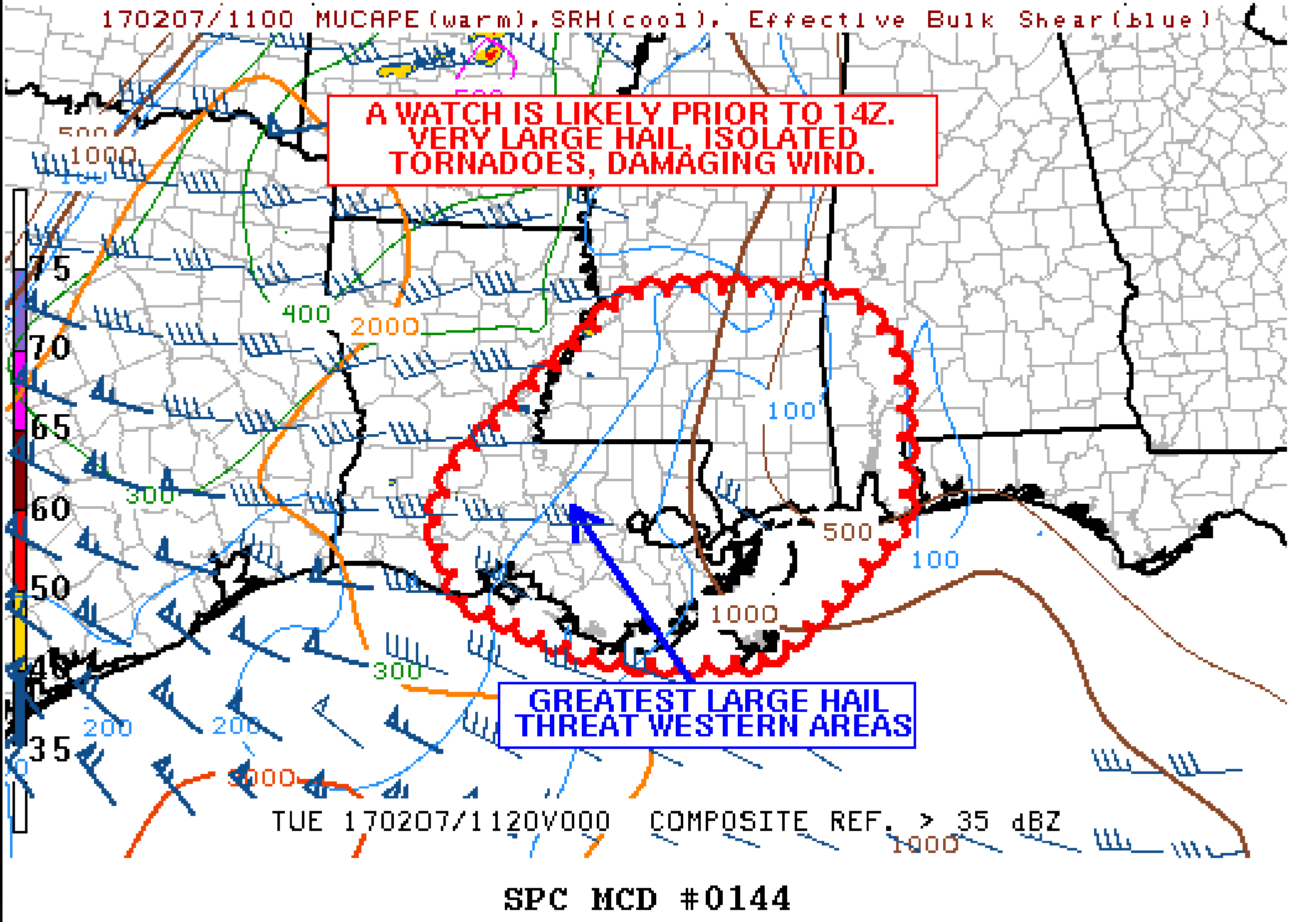
Current Mesoscale Discussions

Updated: Tue Feb 7 12:39:02 UTC 2017



Mesoscale Discussion 144

< Previous MD



Mesoscale Discussion 0144
NWS Storm Prediction Center Norman OK
0559 AM CST Tue Feb 07 2017

Areas affected...Central and southeastern Louisiana...much of southern Mississippi...far southwest Alabama

Concerning...Severe potential...Watch likely

Valid 071159Z - 071400Z

Probability of Watch Issuance...80 percent

SUMMARY...The threat for severe thunderstorms should increase through the day. Very large damaging hail is possible over Louisiana into southern Mississippi, with isolated tornadoes as well. The threat will develop from west to east, affecting Alabama later in the day.

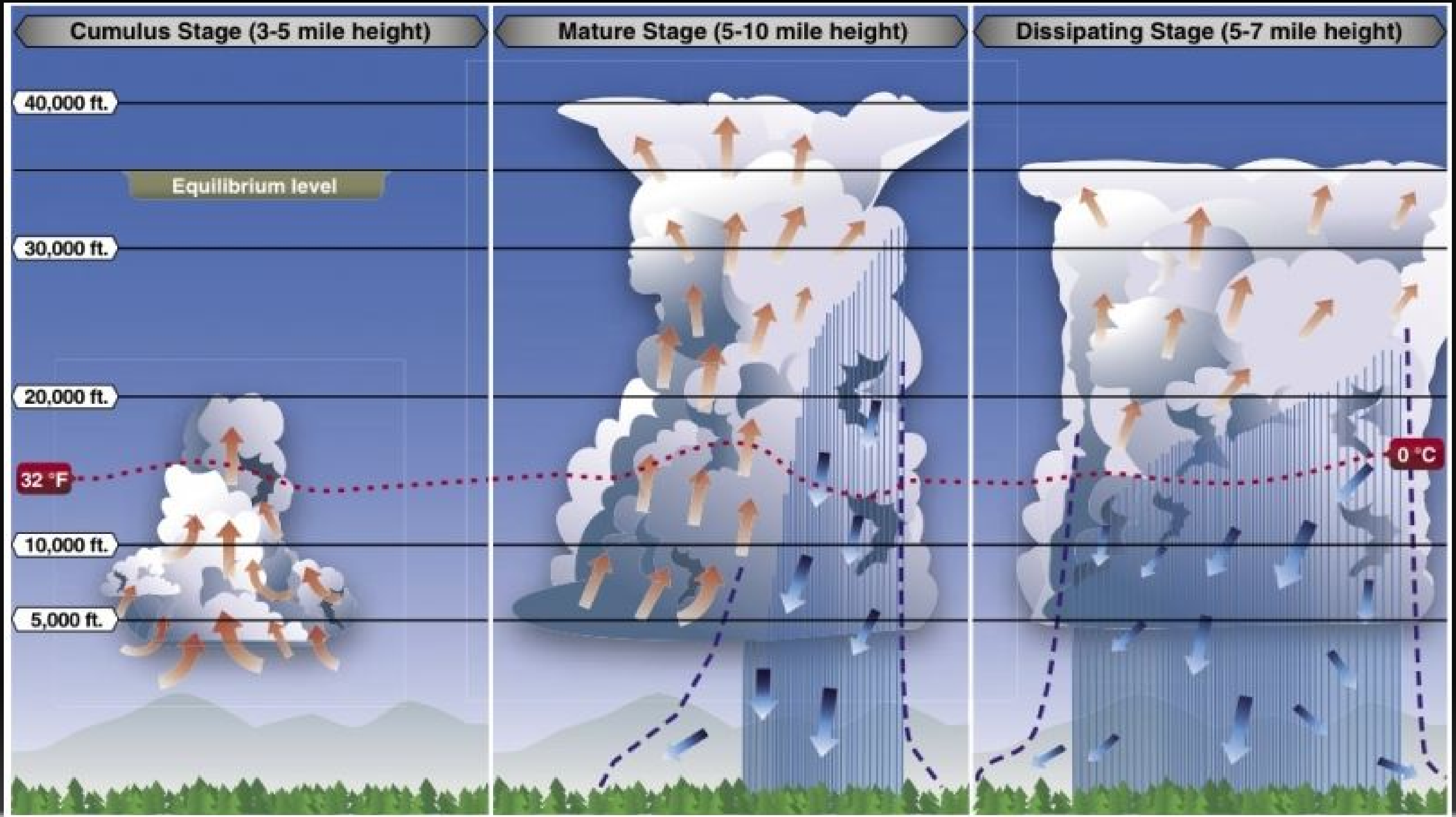
DISCUSSION...Very cold air aloft will continue to spread eastward across the region today with upper trough axis near the Mississippi river by 18Z. At the surface, substantial low-level moisture is already in place from Texas into Louisiana, with mid 60s dewpoints. This has created an unstable environment with MUCAPE in the 1500-2000 J/kg range. A more stable air mass currently resides roughly half way across Mississippi and points east, but gradual destabilization is expected there as well.

Low-level winds will remain veering with height, with 0-3 km SRH on the order of 200-300 m2/s2 throughout the day. Winds around 850 mb will tend to veer as the upper trough approaches, but at the same time, intense upper-level flow will spread southeastward across Louisiana into southern Mississippi, lengthening hodographs aloft and resulting in an increasingly favorable environment for very large hail. While tornadoes may not be the primary threat, a few will be possible due to supercell storm mode and sufficient low-level shear.

The greatest severe risk overall is likely to exist from Louisiana into southern Mississippi in closer proximity to the more unstable air, which is not forecast to spread east very quickly.

..Jewell/Guyer.. 02/07/2017

Thunderstorms



Types of thunderstorms

- Single cell

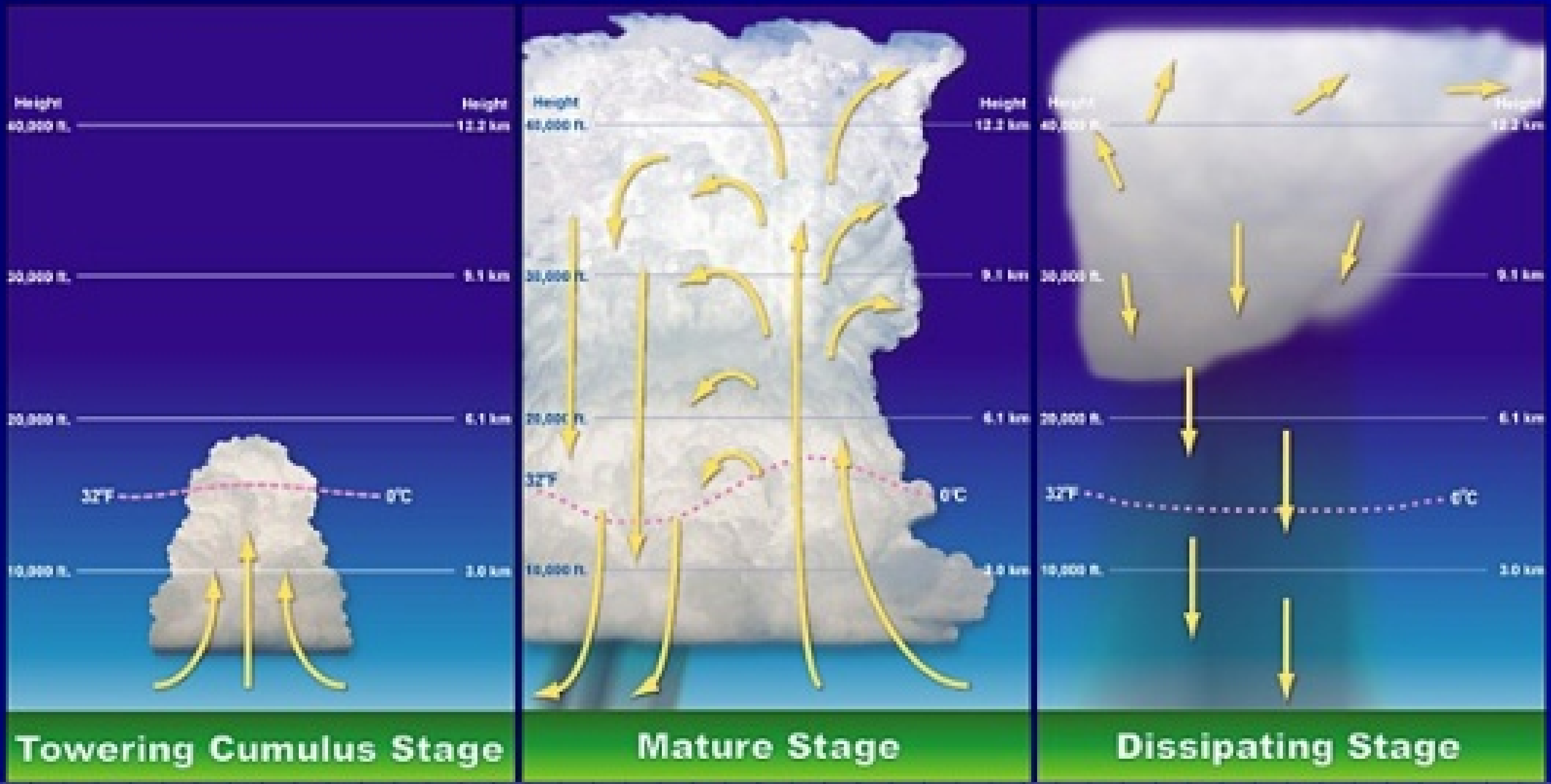
- Multicell (multicell cluster)

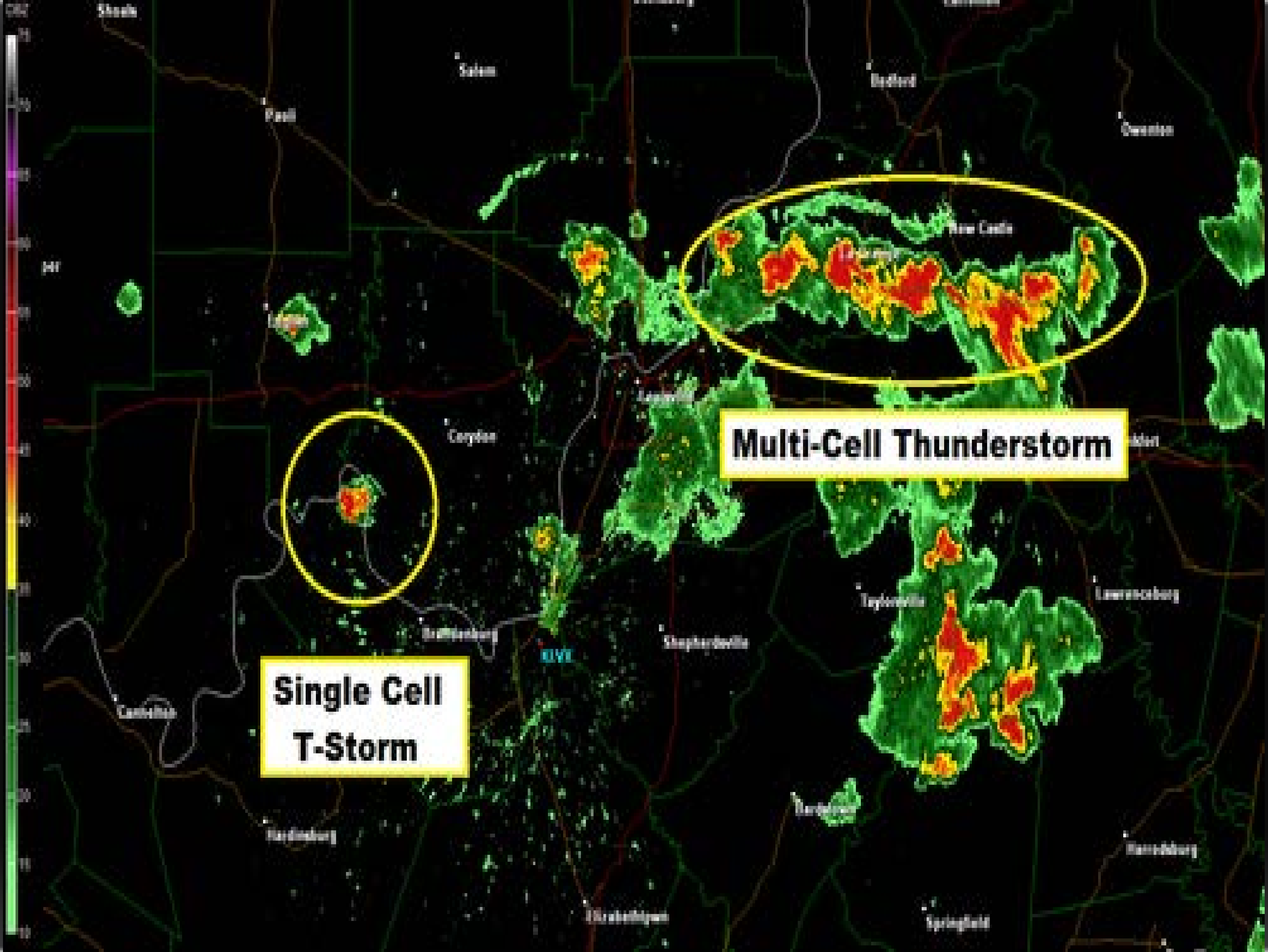
- Supercell

Single cell thunderstorm stages

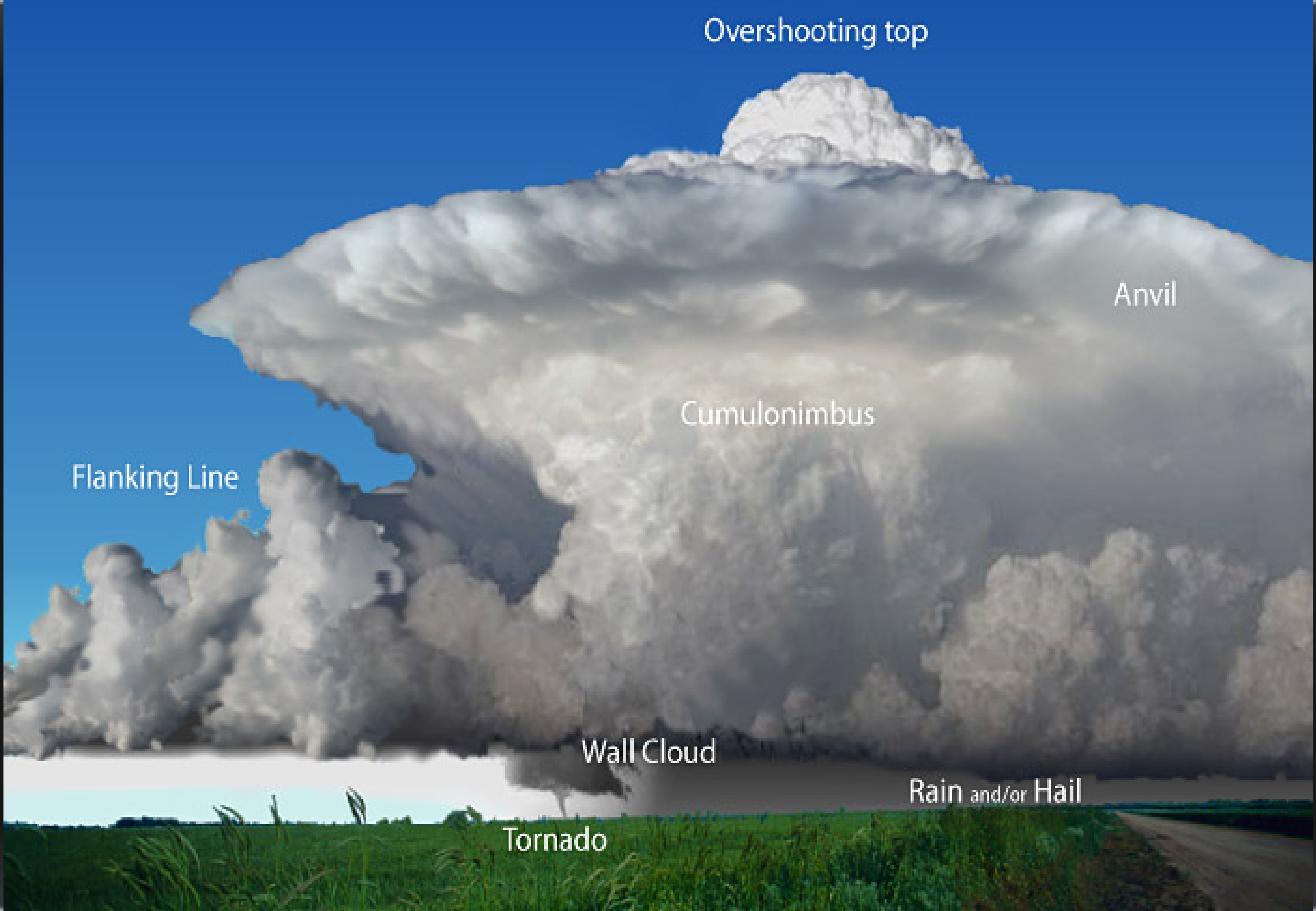
The meteorologically-assignedcloud type associated with the thunderstorm is cumulonimbus

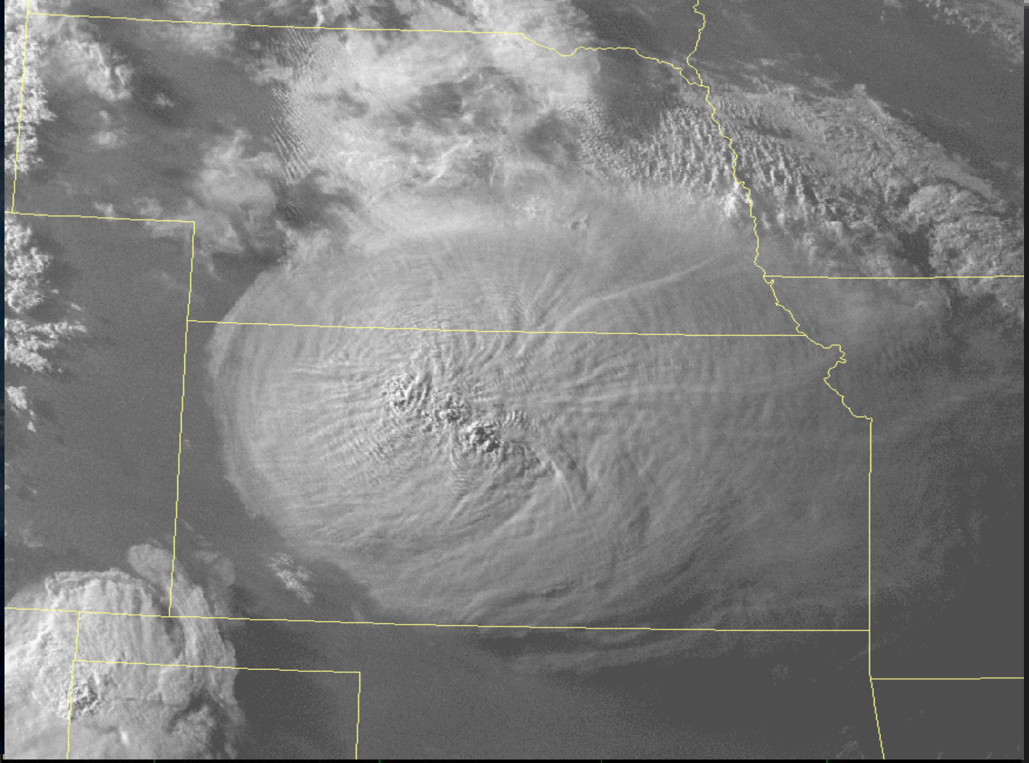
Most common; last for less than an hour; built-in self-destruct mechanism; occur all year long, but mostly in summer; can produce strong winds, lightning, hail, and microbursts; three stages of growth

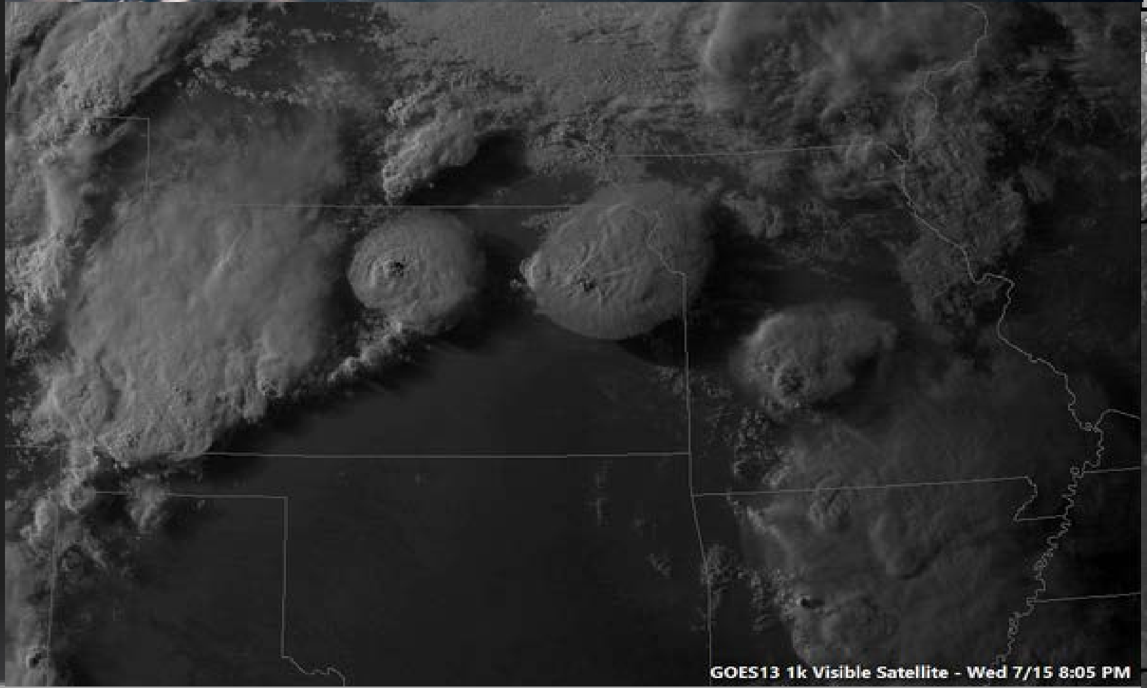


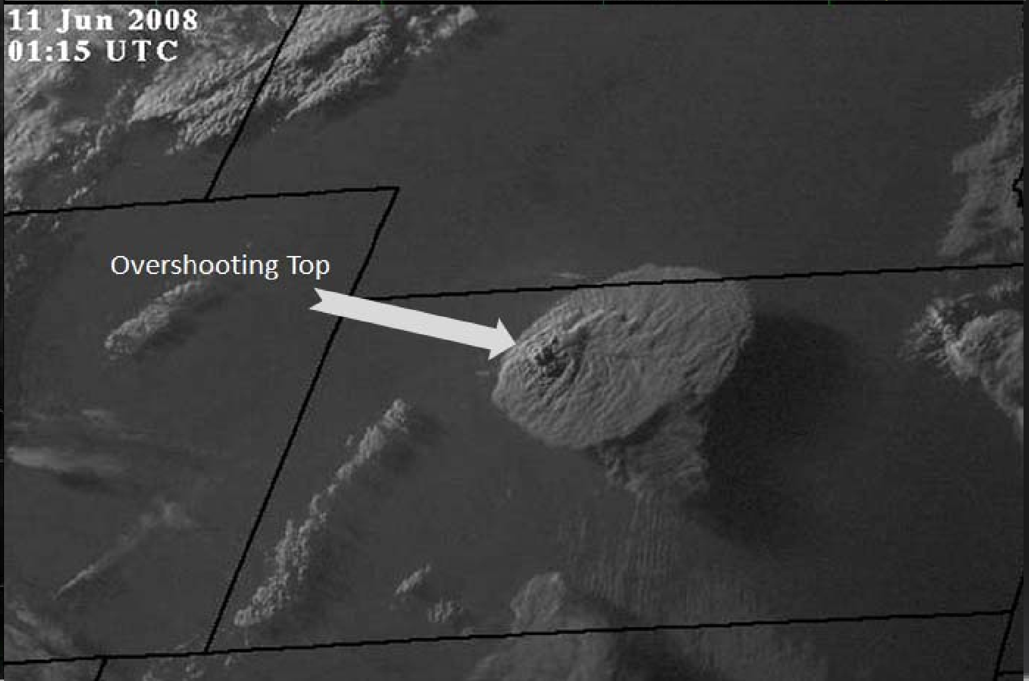


Multi-Cell Thunderstorm
Single Cell
T-Storm
Salem
Paoli
Bedford
Owenton
New Castle
Corydon
Taylorsville
Lawrenceburg
Shepherdsville
Elizabethtown
Springfield
Harrodsburg
Hardinsburg

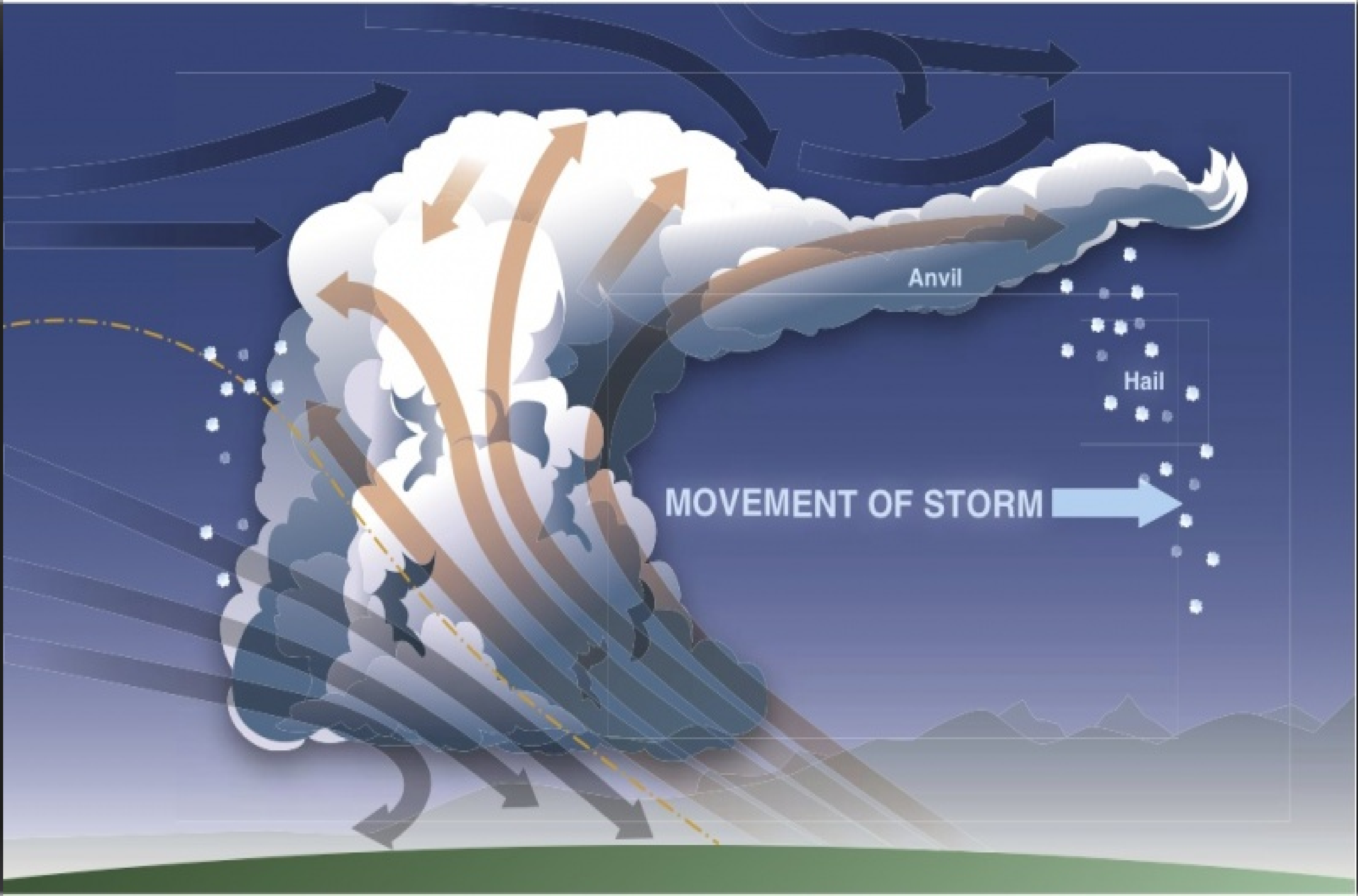

Overshooting top
Anvil
Cumulonimbus
Flanking Line
Wall Cloud
Rain and/or Hail
Tornado




GOES13 1k Visible Satellite - Wed 7/15 8:05 PM


11 Jun 2008
01:15 UTC
Overshooting Top


SEVERE T-STORMS
STRONG JET
FREEZING LEVEL
WARM, HUMID AIR
COOL AND/OR DRY AIR
©2010 WWW.ACCUWEATHER.COM


Anvil
Hail
MOVEMENT OF STORM

AC 00–24C 10. DOS AND DON'TS OF THUNDERSTORM AVOIDANCE

- Thunderstorm Avoidance. Never regard any thunderstorm lightly, even when radar observers report the echoes are of light intensity. Avoiding thunderstorms is the best policy. Following are some don'ts of thunderstorm avoidance:

- (1) Don't land or takeoff in the face of an approaching thunderstorm. A sudden gust front of low-level turbulence could cause loss of control.

- (2) Don't attempt to fly under a thunderstorm even if you can see through to the other side. Turbulence and wind shear under the storm could be hazardous.

- (3) Don't attempt to fly under the anvil of a thunderstorm. There is a potential for severe and extreme clear air turbulence.

- (4) Don't fly without airborne radar into a cloud mass containing scattered embedded thunderstorms. Scattered thunderstorms not embedded usually can be visually circumnavigated.
- (5) Don't trust the visual appearance to be a reliable indicator of the turbulence inside a thunderstorm.
- (6) Don't assume that ATC will offer radar navigation guidance or deviations around thunderstorms.
- (7) Don't use data-linked weather next generation weather radar (NEXRAD) mosaic imagery as the sole means for negotiating a path through a thunderstorm area (tactical maneuvering).

Some Do's

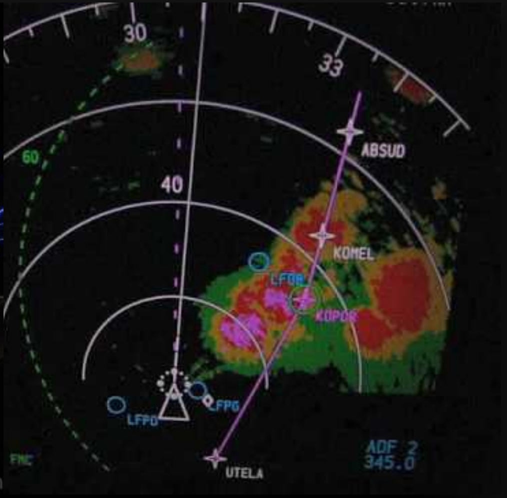
- (8) Do remember that the data-linked NEXRAD mosaic imagery shows where the weather was, not where the weather is. The weather conditions may be 15 to 20 minutes older than the age indicated on the display.
- (9) Do listen to chatter on the ATC frequency for Pilot Weather Reports (PIREP) and other aircraft requesting to deviate or divert.
- (10) Do ask ATC for radar navigation guidance or to approve deviations around thunderstorms, if needed.
- (11) .Do use data-linked weather NEXRAD mosaic imagery (e.g., Flight Information Service-Broadcast (FIS-B)) for route selection to avoid thunderstorms entirely (strategic maneuvering).
-
- (12) Do advise ATC, when switched to another controller, that you are deviating for thunderstorms before accepting to rejoin the original route.
- (13) Do ensure that after an authorized weather deviation, before accepting to rejoin the original route, that the route of flight is clear of thunderstorms.

- (14) Do avoid by at least 20 miles any thunderstorm identified as severe or giving an intense radar echo. This is especially true under the anvil of a large cumulonimbus.
- (15) Do circumnavigate the entire area if the area has 6/10 thunderstorm coverage.
- (16) Do remember that vivid and frequent lightning indicates the probability of a severe thunderstorm.
- (17) Do regard as extremely hazardous any thunderstorm with tops 35,000 feet or higher whether the top is visually sighted or determined by radar.
- (18) Do give a PIREP for the flight conditions.
- (19) Do divert and wait out the thunderstorms on the ground if unable to navigate around an area of thunderstorms.

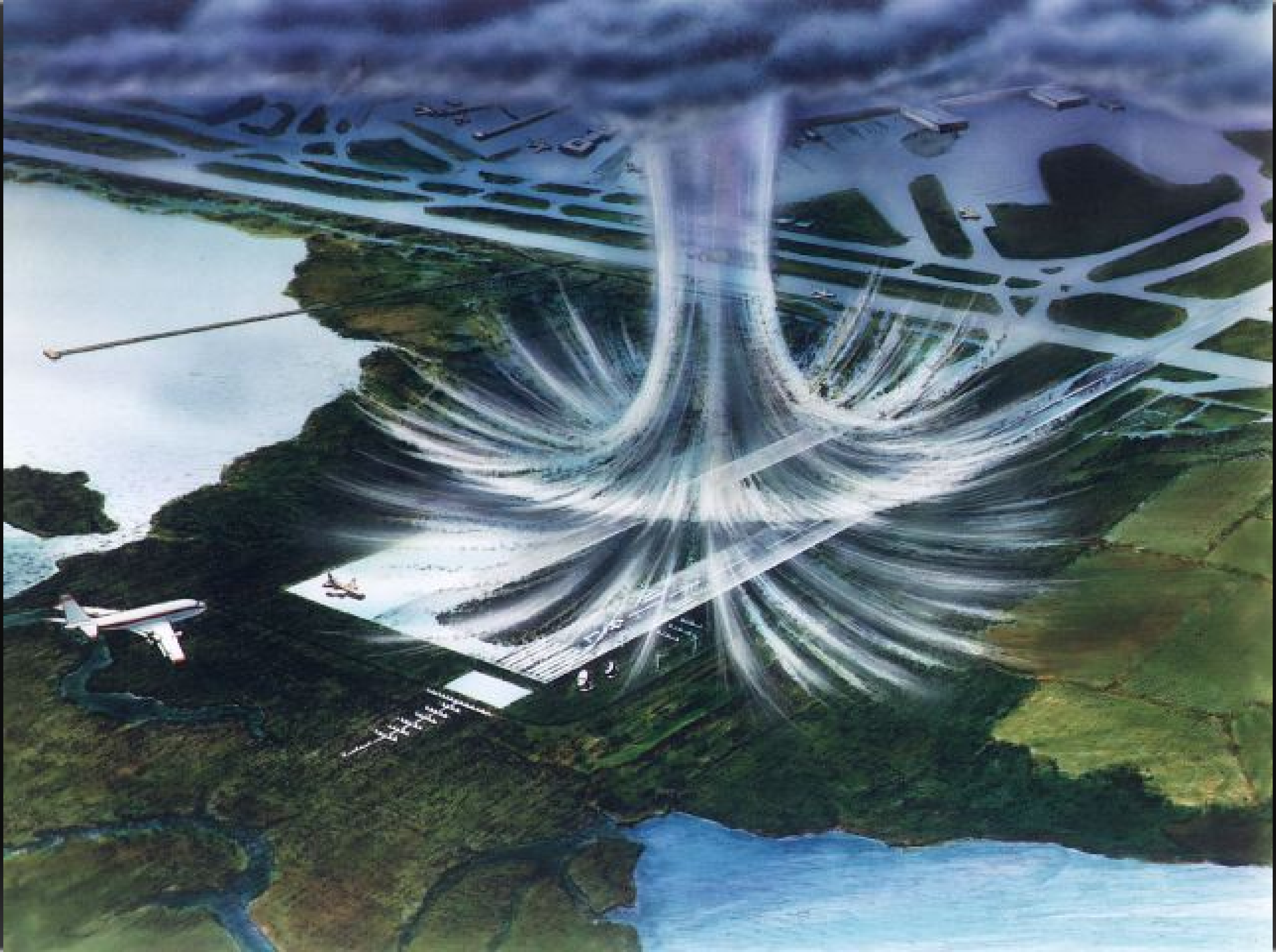
If unable to avoid penetrating a thunderstorm, the following are some dos before entering the storm:

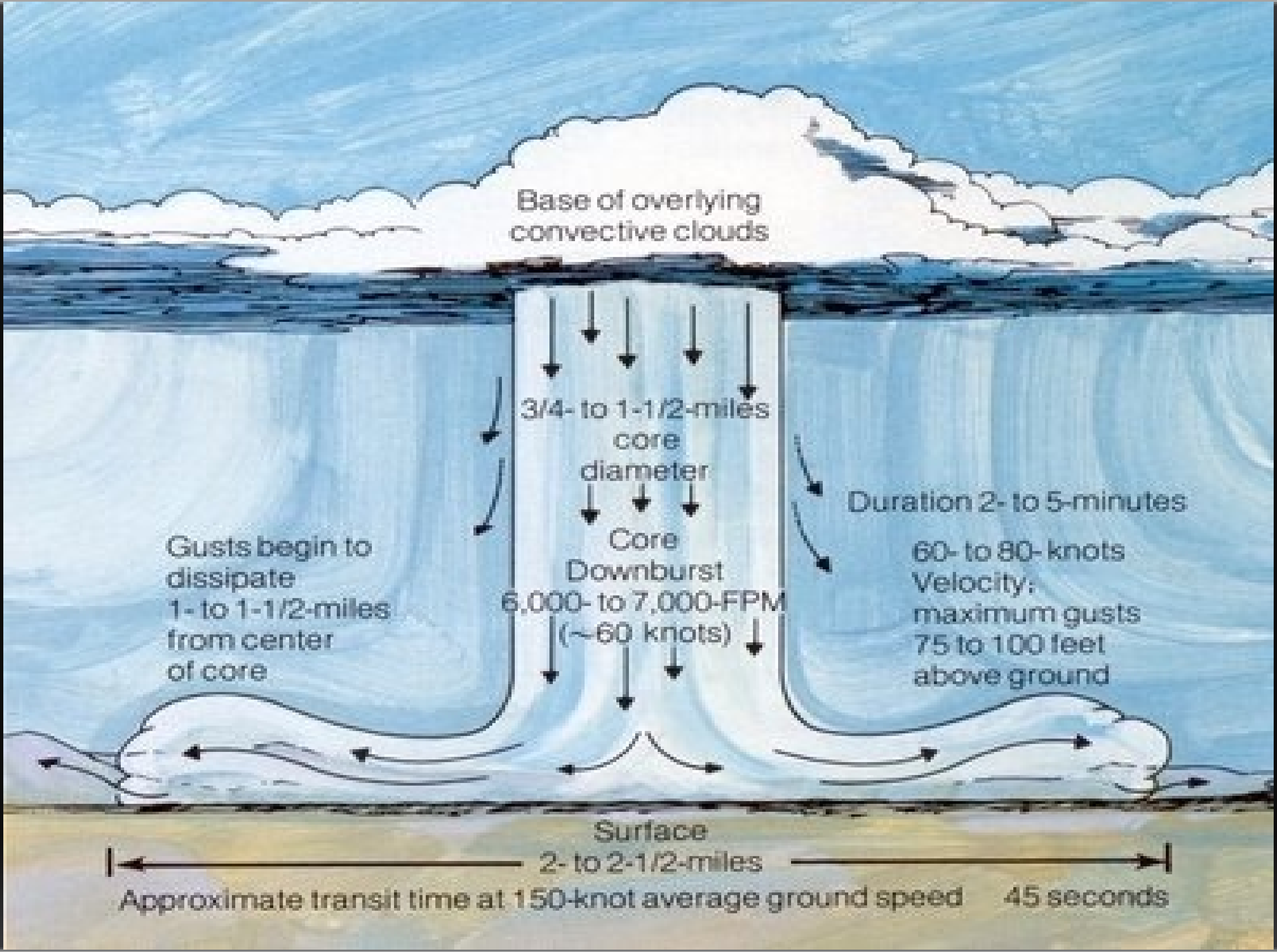
- (1) Tighten the safety belt, put on the shoulder harness (if installed), and secure all loose objects.
- (2) Plan and hold the course to take the aircraft through the storm in a minimum time.
- (3) To avoid the most critical icing, establish a penetration altitude below the freezing level or above the level of -15ºC.
- (4) Verify that pitot heat is on and turn on carburetor heat or jet engine anti-ice. Icing can be rapid at any altitude and cause almost instantaneous power failure and/or loss of airspeed indication.
- (5) Establish power settings for turbulence penetration airspeed recommended in the aircraft manual.
- (6) Turn up cockpit lights to highest intensity to lessen temporary blindness from lightning.
- (7) If using automatic pilot, disengage Altitude Hold Mode and Speed Hold Mode. The automatic altitude and speed controls will increase maneuvers of the aircraft thus increasing structural stress.
- (8) If using airborne radar, tilt the antenna up and down occasionally. This will permit the detection of other thunderstorm activity at altitudes other than the one being flown.

Do’s and don’ts during the thunderstorm penetration:

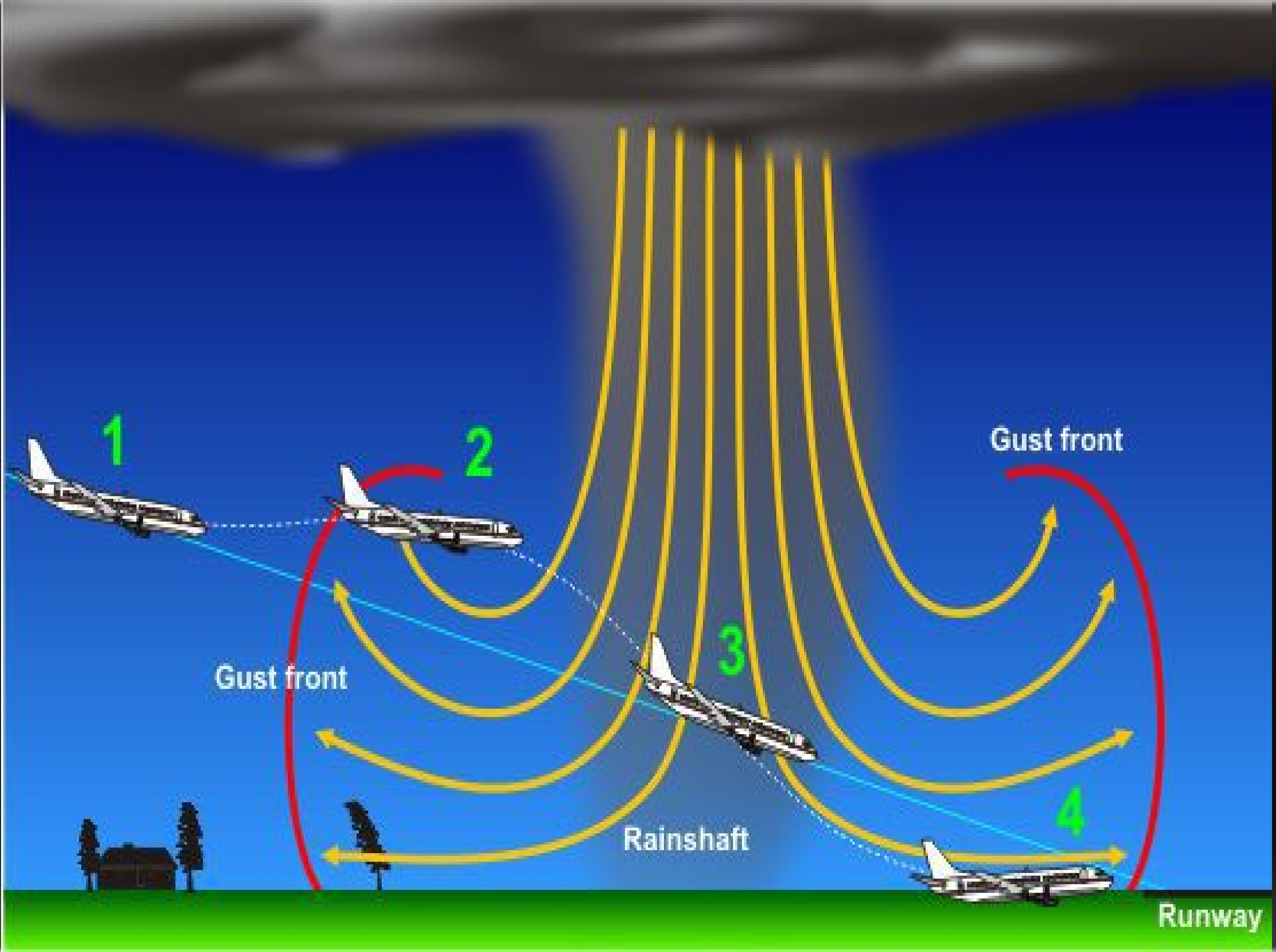


- (1) Do keep your eyes on the flight instruments. Looking outside the cockpit can increase danger of temporary blindness from lightning. 2/19/13 AC 00–24C
- (2) Don’t change power settings; maintain settings for the recommended turbulence penetration airspeed.
- (3) Do maintain constant attitude. Allow the altitude and airspeed to fluctuate.
- (4) Don’t turn back once in the thunderstorm. A straight course through the storm most likely will get the aircraft out of the hazards most quickly. In addition, turning maneuvers increase stress on the aircraft.





Base of overlying convective clouds
3/4- to 1-1/2-miles core diameter
Duration 2- to 5-minutes
Gusts begin to dissipate 1- to 1-1/2-miles from center of core
Core Downburst 6,000- to 7,000-FPM (~60 knots)
60- to 80- knots Velocity; maximum gusts 75 to 100 feet above ground
Surface
2- to 2-1/2-miles
Approximate transit time at 150-knot average ground speed 45 seconds


1
2
Gust front
3
Gust front
4
Rainshaft
Runway

https://www.youtube.com/watch?v=HDfodeURad0

https://www.youtube.com/watch?v=dKwyU1RwR[illegible]d0[illegible]

High-Pressure System

A small area of high pressure can develop into a larger system.

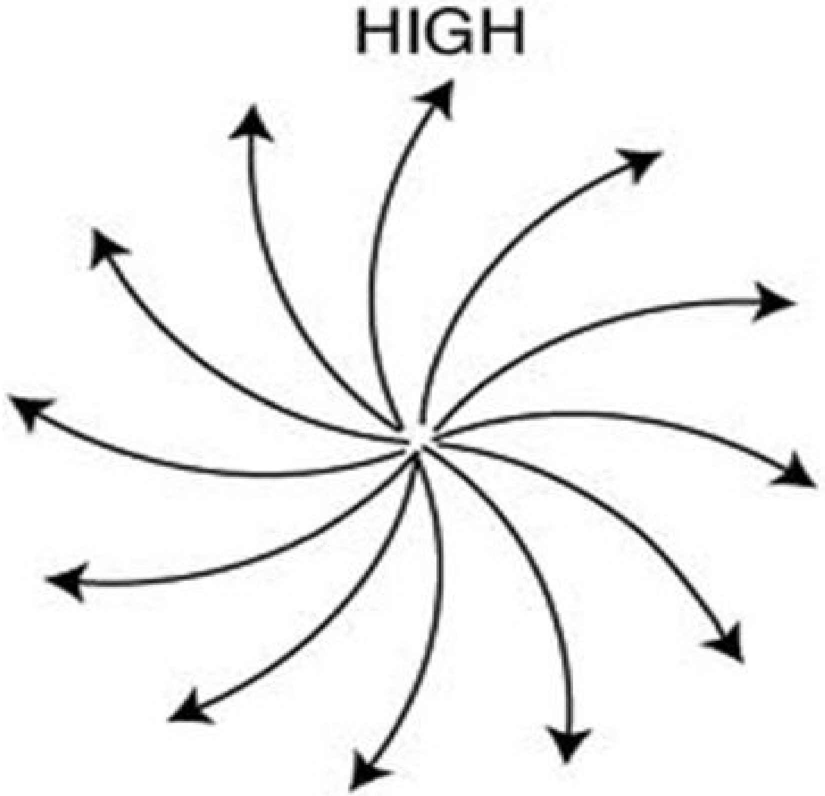
A high pressure system forms when air moves around a high-pressure center.

Air sinks slowly to warmer, lower altitudes. As the air nears the ground, it spreads outwards, toward areas of lower pressure.

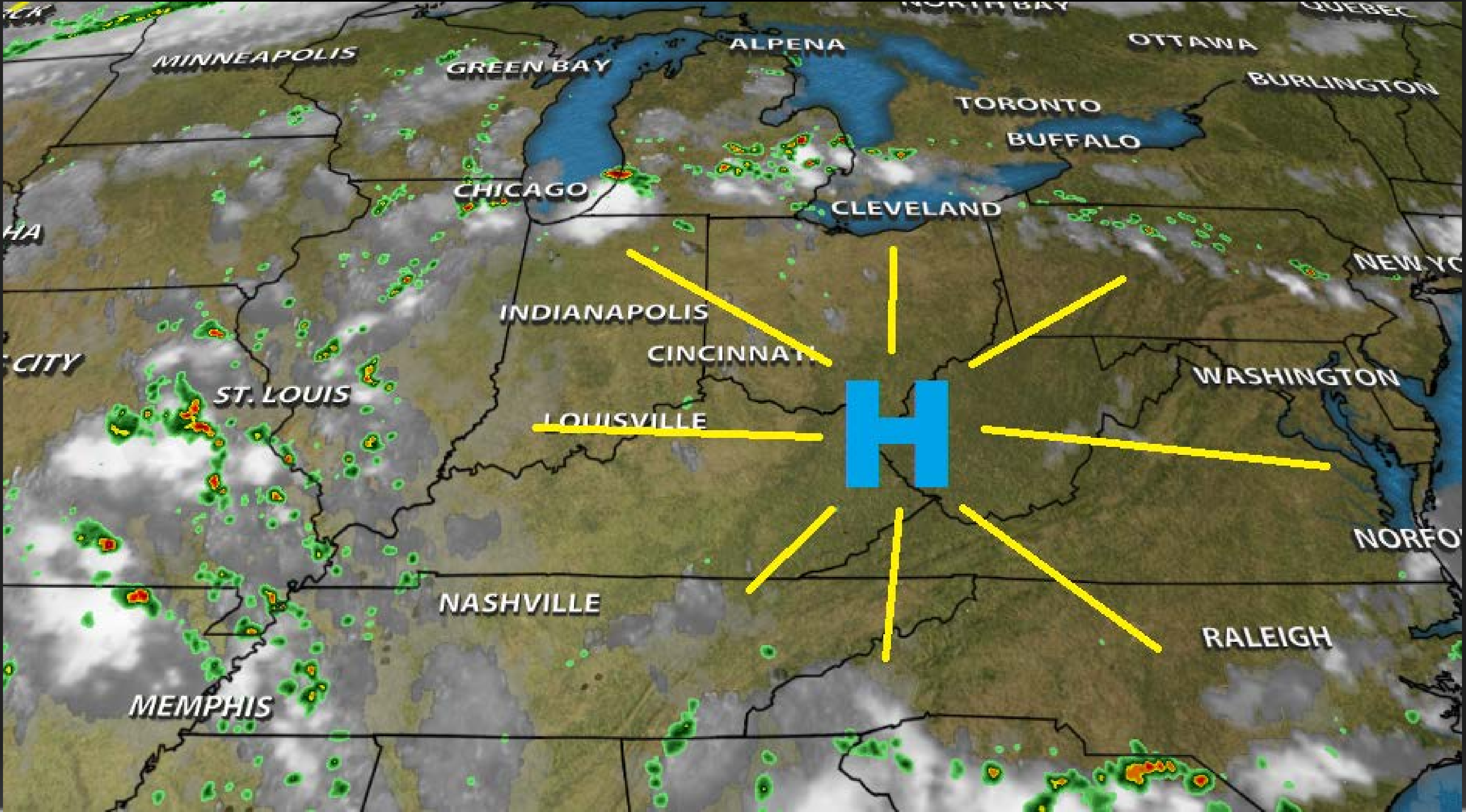
Most high-pressure systems are large and change slowly. When it stays in the same location for a long time, an air mass may form.

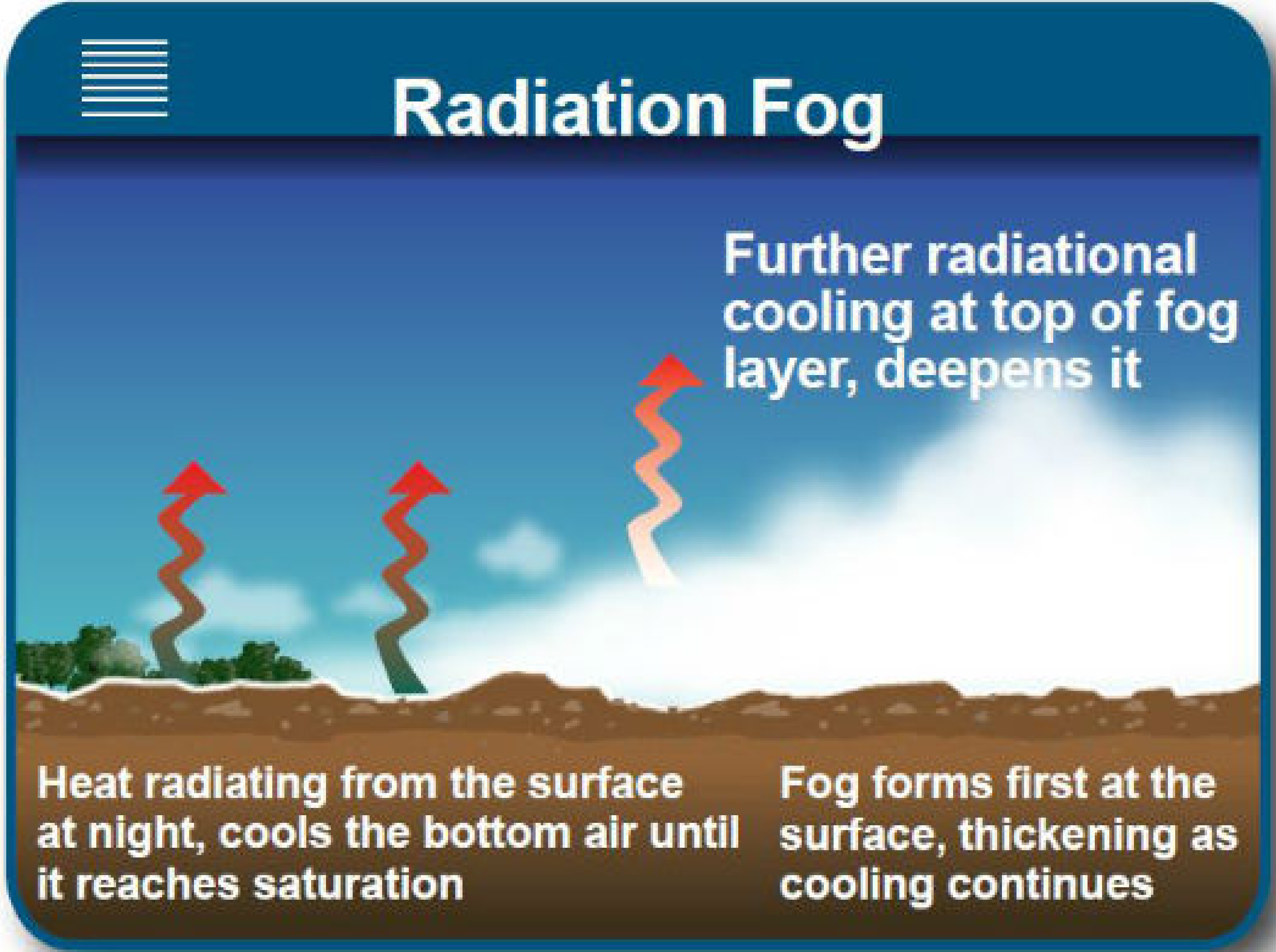
High-pressure systems bring clear and calm weather.

Air moves **down, out, and around!**

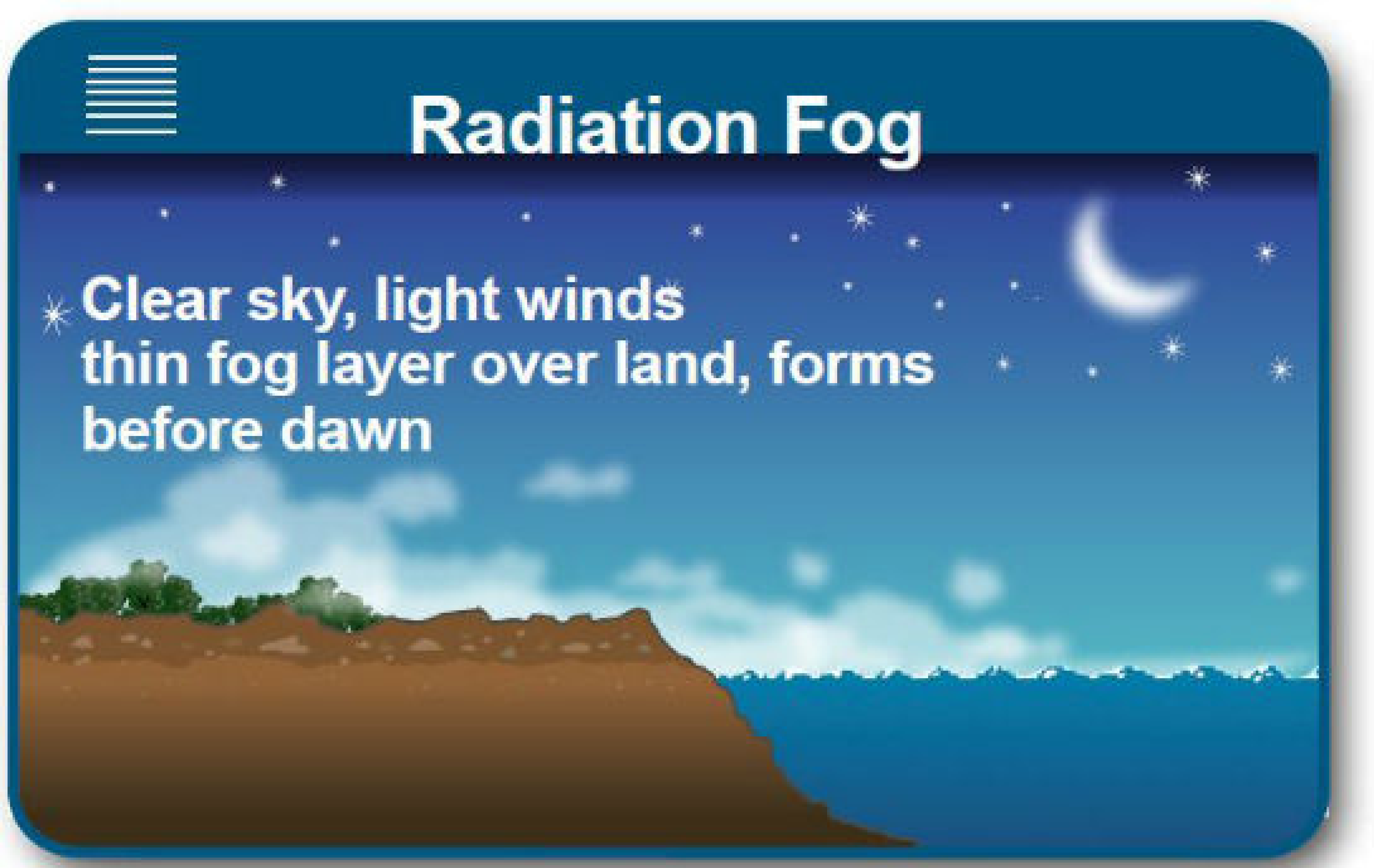


High Pressure any Questions ?

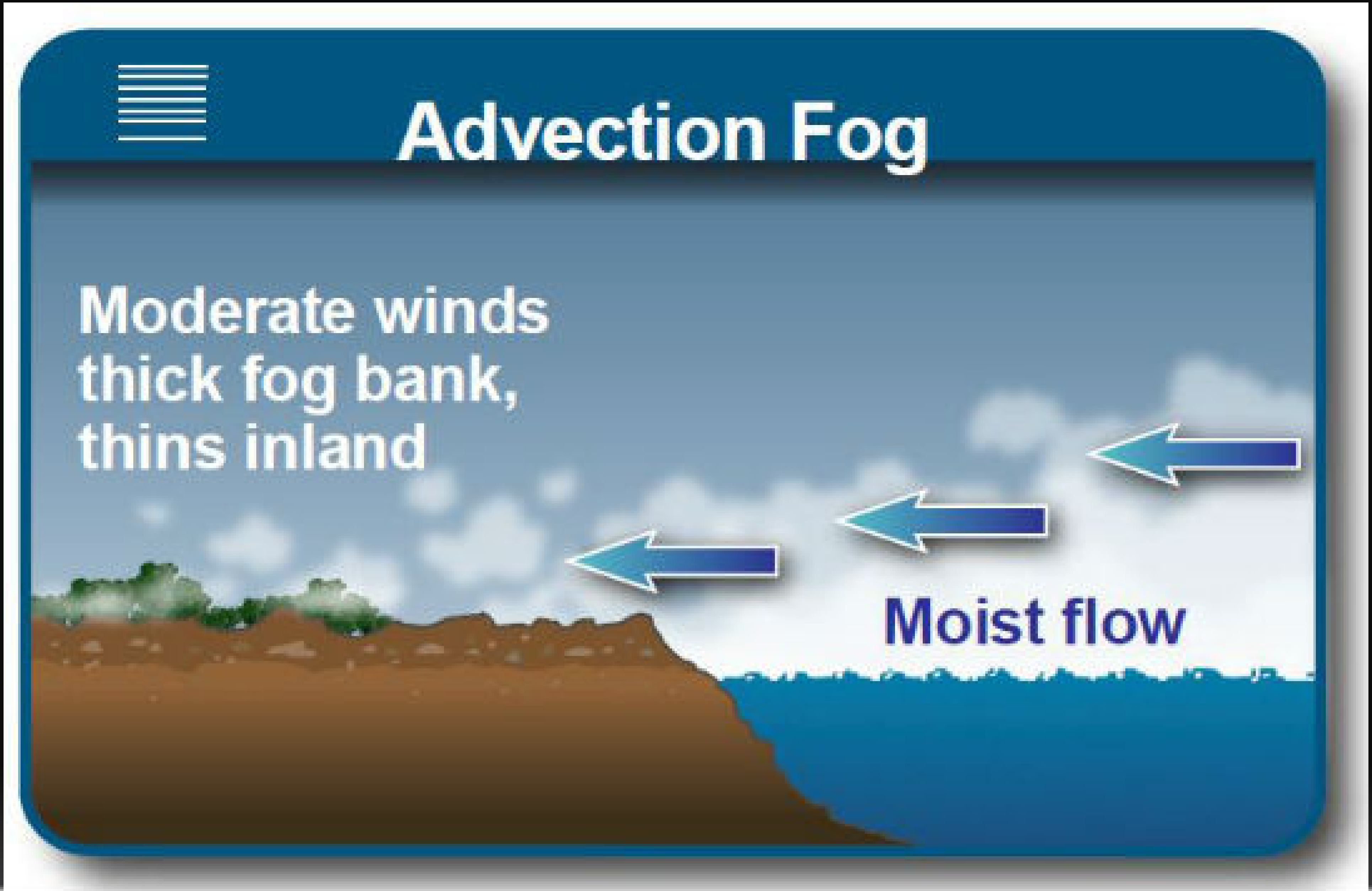



Radiation Fog
Further radiational cooling at top of fog layer, deepens it
Heat radiating from the surface at night, cools the bottom air until it reaches saturation
Fog forms first at the surface, thickening as cooling continues

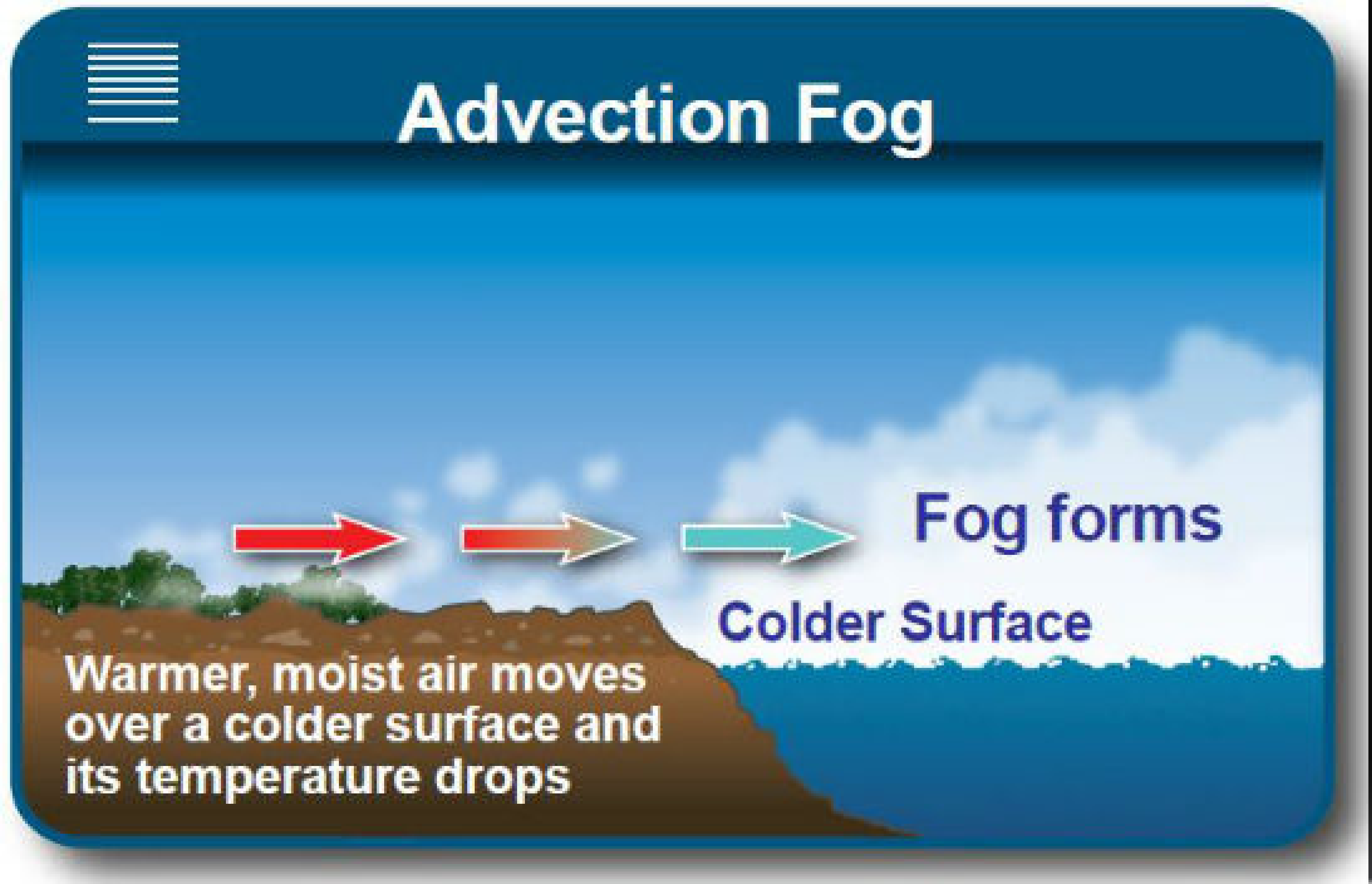
Center Area of High Pressure Areas

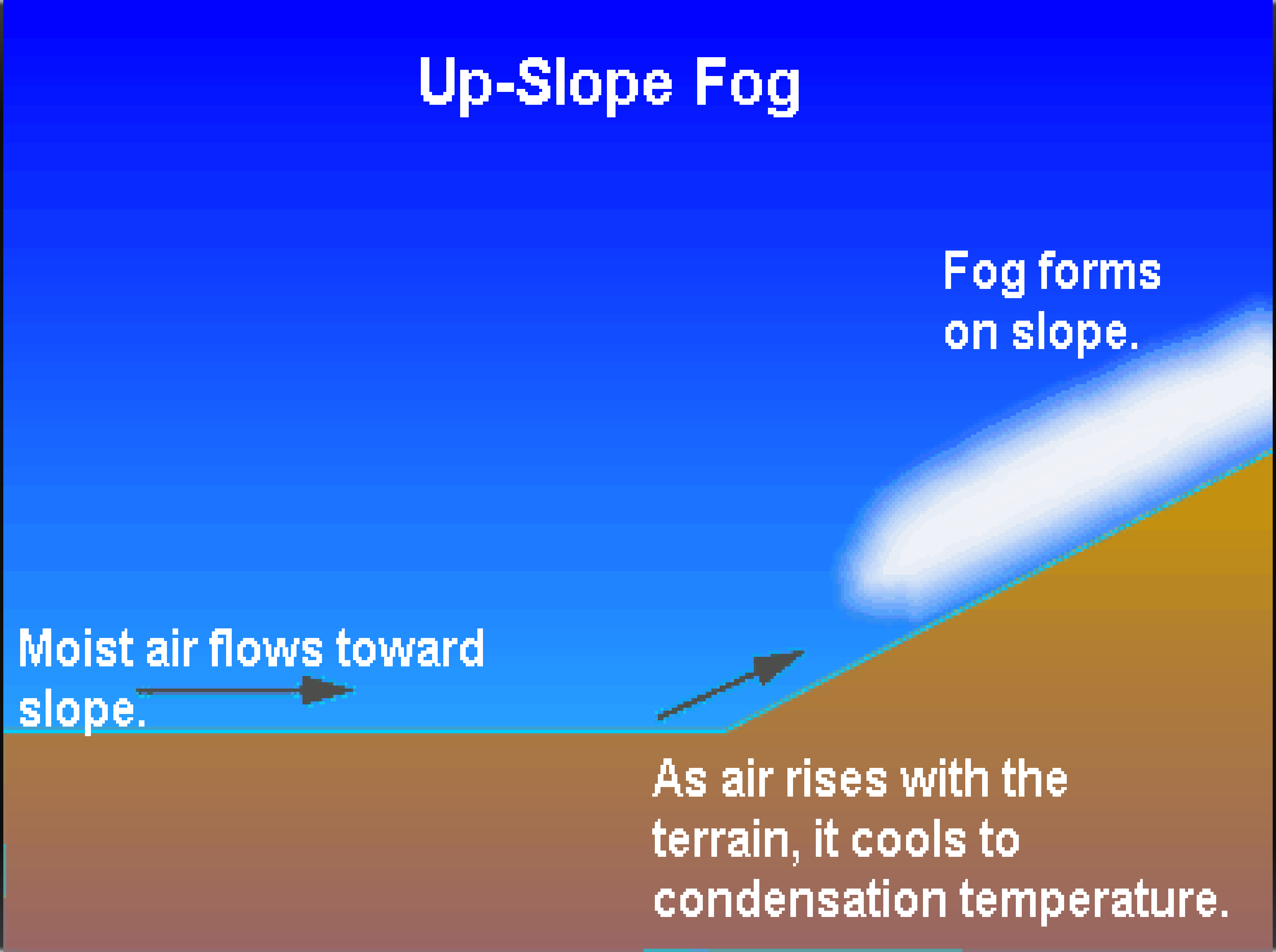


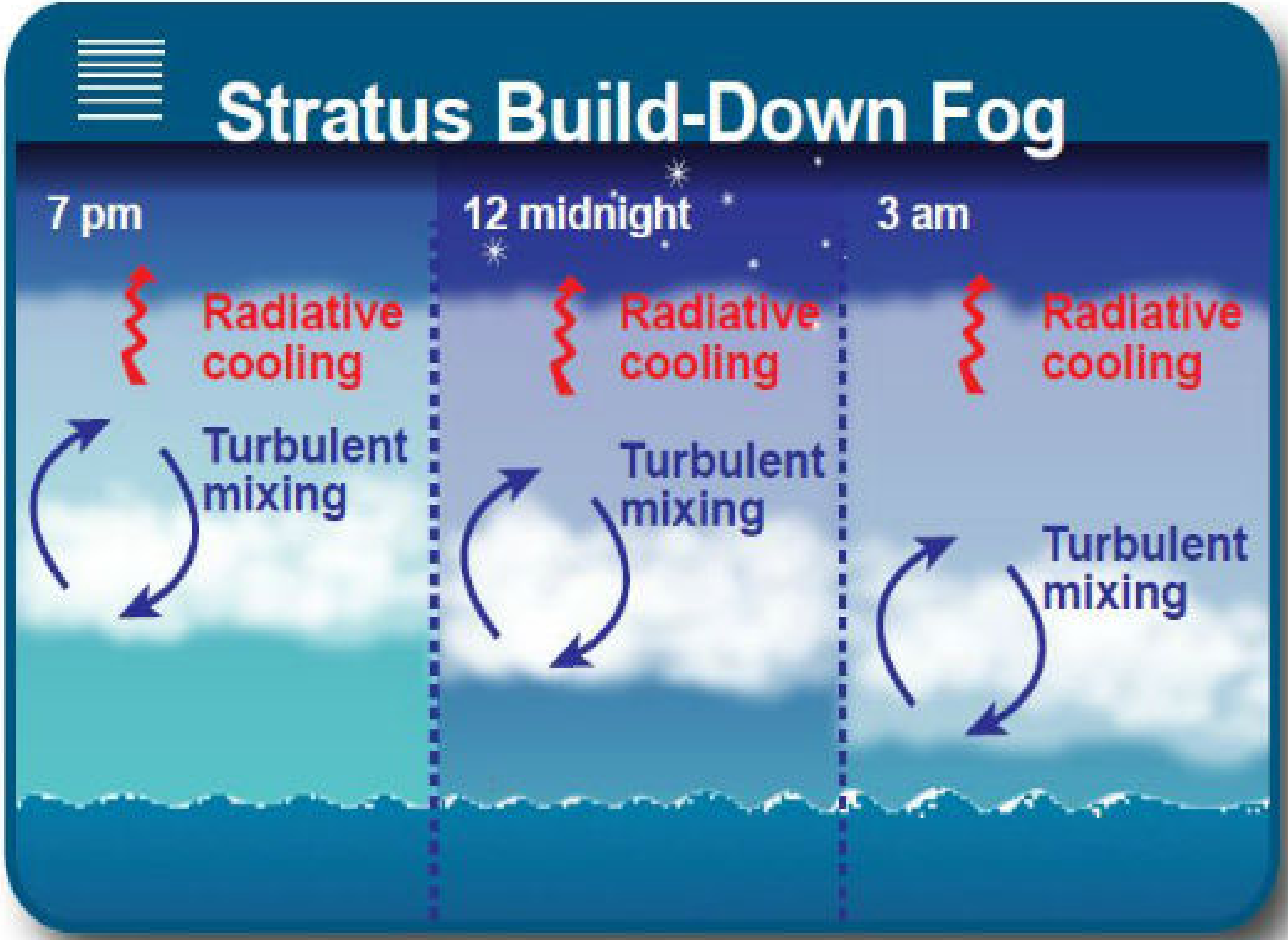
Needs a Wind to Form



Can Form Over Cold Water

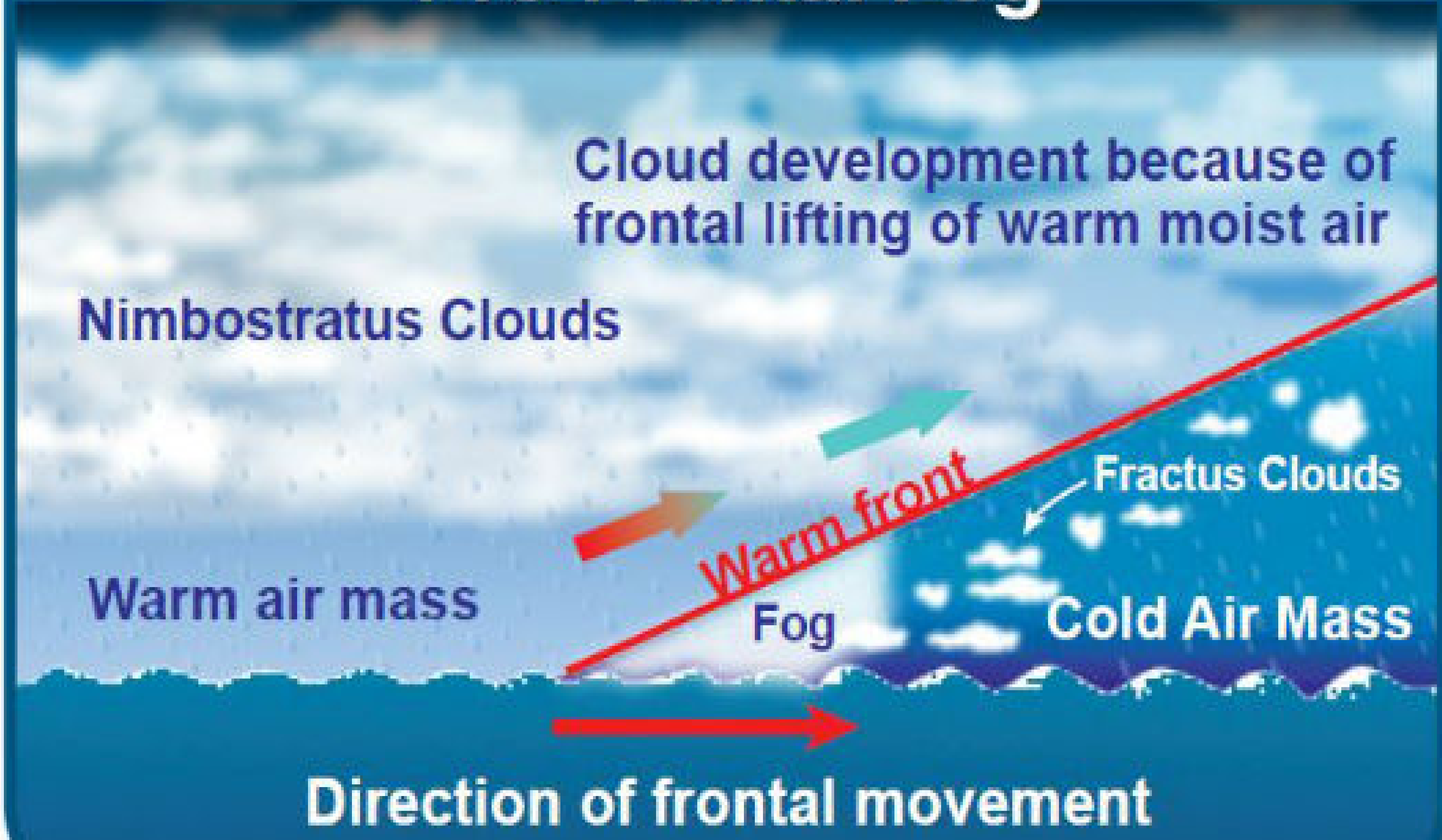


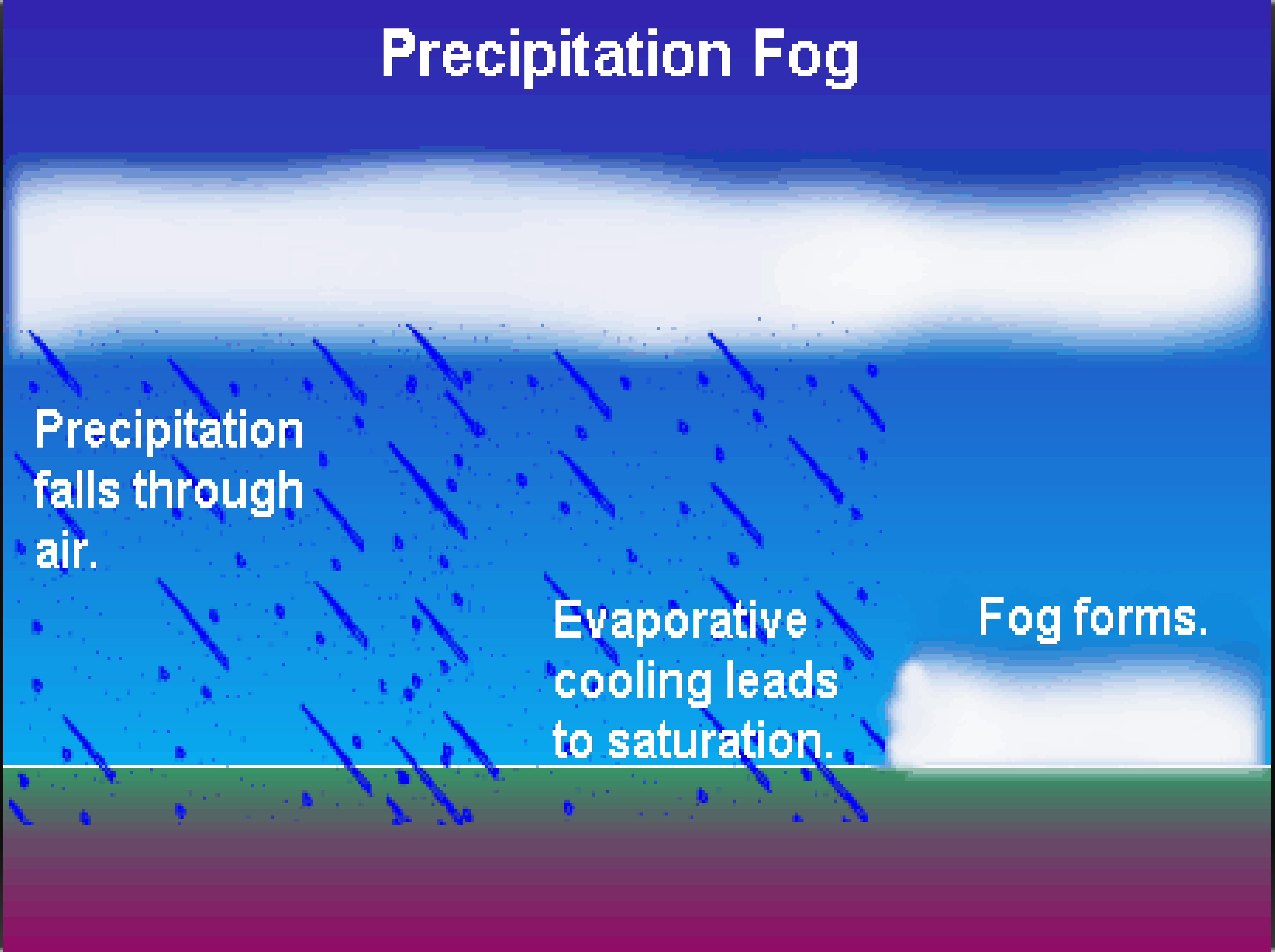

Up-Slope Fog
Fog forms on slope.
Moist air flows toward slope.
As air rises with the terrain, it cools to condensation temperature.

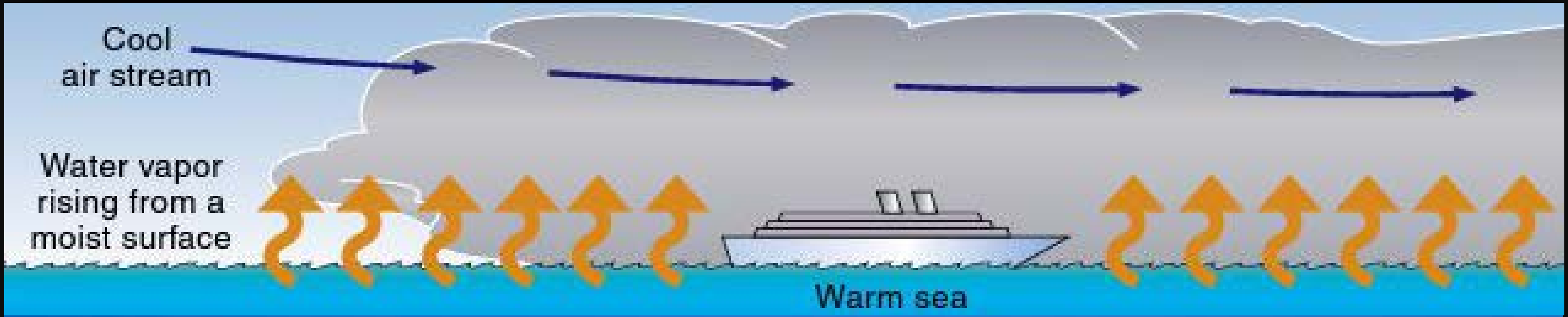


Stratus Build-Down Fog
7 pm
12 midnight
3 am
Radiative cooling
Turbulent mixing
Radiative cooling
Turbulent mixing
Radiative cooling
Turbulent mixing

Pre-Frontal Fog




Precipitation Fog
Precipitation falls through air.
Evaporative cooling leads to saturation.
Fog forms.


Cool
air stream
Water vapor
rising from a
moist surface
Warm sea

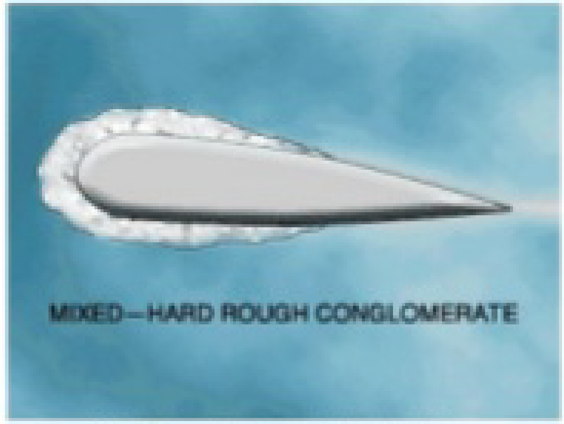

Types of Ice

- Rime: "has a rough milky white appearance and generally follows the surface closely"
- Clear/Glaze: "sometimes clear and smooth but usually contain some air pockets that result in a lumpy translucent appearance, denser, harder and more difficult to break than rime ice"
- Mixed

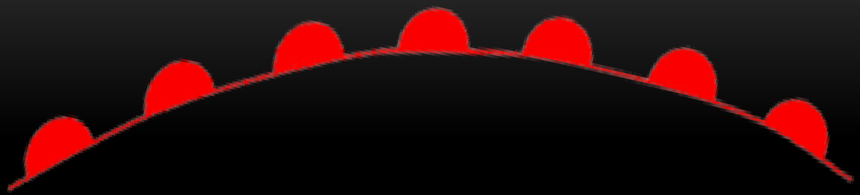
Outside Air	Temperature Range	Icing Type
0 °C to	-10 °C	Clear
-10 °C to	-15 °C	Mixed clear and rime
-15 °C to	-20 °C	Rime

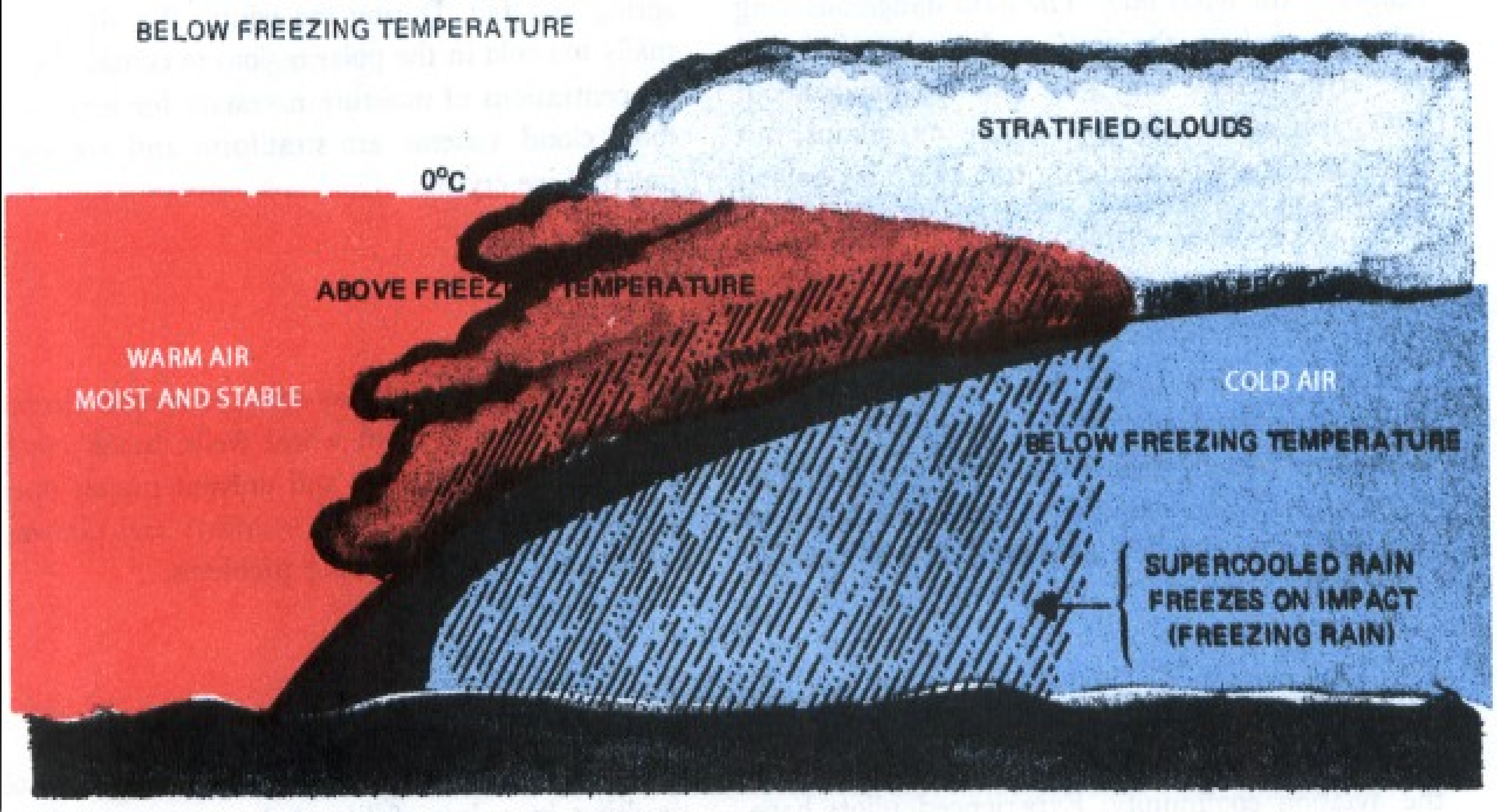
Sideview of wing with rime.

Sideview of wing with clear ice

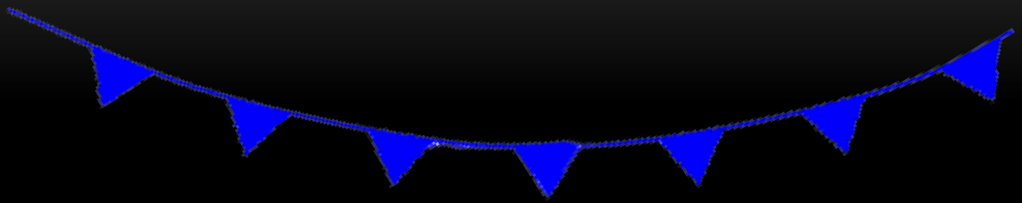


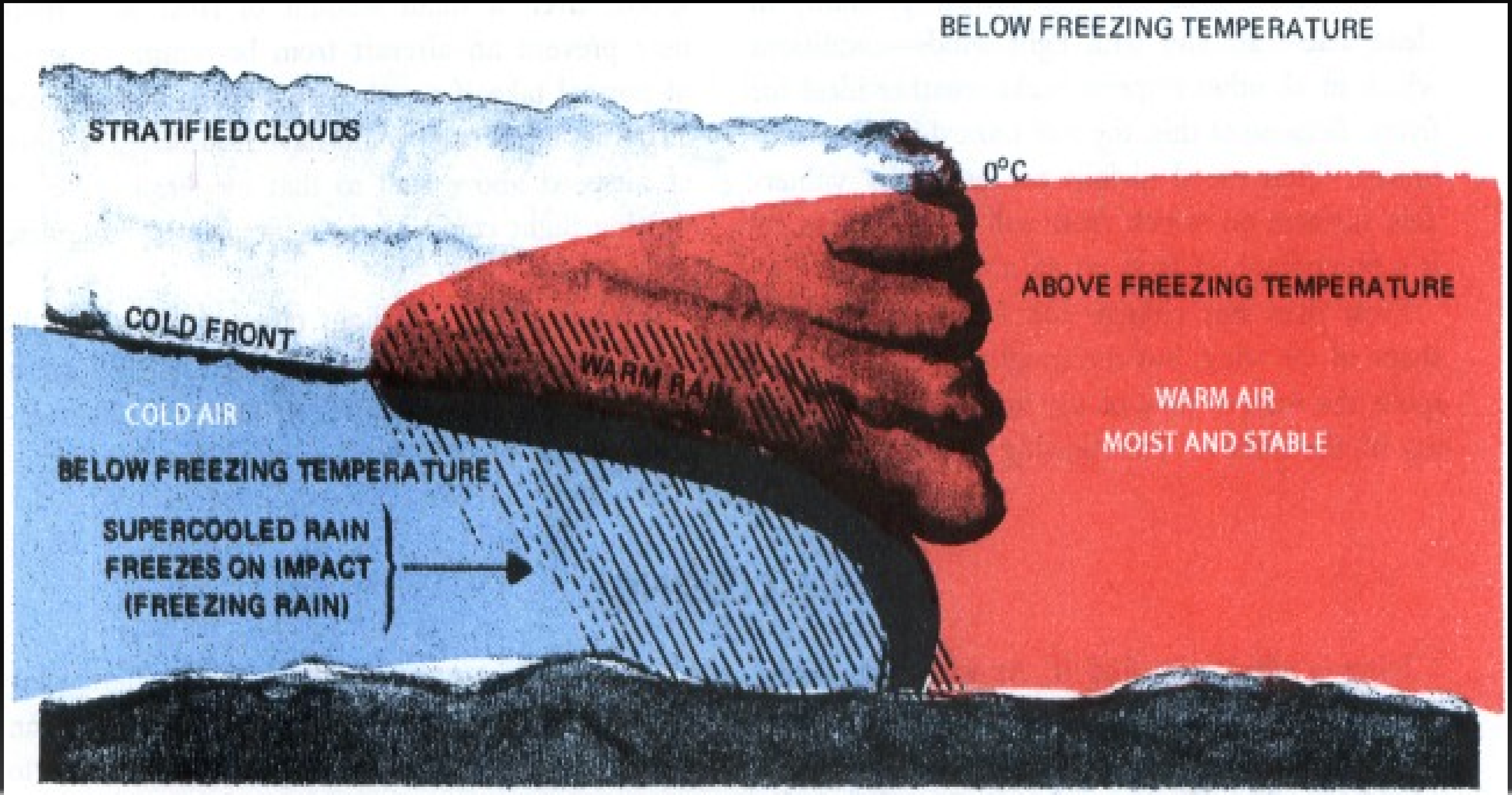
Sideview of wing with mixed ice





BELOW FREEZING TEMPERATURE
STRATIFIED CLOUDS
0°C
ABOVE FREEZ TEMPERATURE
WARM RAIN
WARM AIR
MOIST AND STABLE
COLD AIR
BELOW FREEZING TEMPERATURE
SUPERCOOLED RAIN
FREEZES ON IMPACT
(FREEZING RAIN)




BELOW FREEZING TEMPERATURE
STRATIFIED CLOUDS
0°C
ABOVE FREEZING TEMPERATURE
COLD FRONT
WARM RAIN
COLD AIR
WARM AIR
MOIST AND STABLE
BELOW FREEZING TEMPERATURE
SUPERCOOLED RAIN
FREEZES ON IMPACT
(FREEZING RAIN)

Dealing With Icing

- Here are a few specific points to remember:

- 1. Before takeoff, check weather for possible icing areas along your planned route. Check for pilot reports, and if possible talk to other pilots who have flown along your proposed route.
- 2. If your aircraft is not equipped with deicing or anti-icing equipment, avoid areas of icing. Water (clouds or precipitation) must be visible and outside air temperature must be near 0° C or colder for structural ice to form.
- 3. Always remove ice or frost from airfoils before attempting takeoff.
- 4. In cold weather, avoid, when possible, taxiing or taking off through mud, water, or slush. If you have taxied through any of these, make a preflight check to ensure freedom of controls.
- 5. When climbing out through an icing layer, climb at an airspeed a little faster than normal to avoid a stall. .
- 6. Use deicing or anti-icing equipment when accumulations of ice are not too great. When such equipment becomes less than totally effective, change course or altitude to get out of the icing as rapidly as possible.




- 7. If your aircraft is not equipped with a pitot-static system deicer, be alert for erroneous readings from your airspeed indicator, rate-of-climb indicator, and altimeter.
- 8. In stratiform clouds, you can likely alleviate icing by changing to a flight level and above-freezing temperatures or to one colder than _10° C. An altitude change also may take you out of clouds. Rime icing in stratiform clouds can be very extensive horizontally.
- 9. In frontal freezing rain, you may be able to climb or descend to a layer warmer than freezing. Temperature is always warmer than freezing at some higher altitude. If you are going to climb, move quickly; procrastination may leave you with too much ice. If you are going to descend, you must know the temperature and terrain below.
- 10. Avoid cumuliform clouds if at all possible. Clear ice may be encountered anywhere above the freezing level. Most rapid accumulations are usually at temperatures from 00 C to -150 C.
- 11. Avoid abrupt maneuvers when your aircraft is heavily coated with ice since the aircraft has lost some of its aerodynamic efficiency.
- 12. When "iced up," fly your landing approach with power. The man on' the ground has no way of observing actual icing conditions. His only confirmation of the existence or absence of icing comes from pilots. Help your fellow pilot and the weather service by sending pilot reports when you encounter icing or when icing is forecast but none encountered. Use the table in Section 16 of AVIATION WEATHER SERVICES as a guide in reporting intensities.

We operate in accordance with FAR 135:

Daytime Weather Minimums:
800 FT AGL Ceiling (Broken or Overcast)
3 Miles Visibility

Nighttime Weather Minimums:

Unaided
1,000 FT AGL Ceiling (Broken or Overcast)
5 Miles Visibility

Aided
1,000 FT AGL Ceiling (Broken or Overcast)
3 Miles Visibility

Stuff

Products from NWS are the only legal and approved source of weather.

If METAR and TAFS are displayed in the raw format….they are from the NWS.

VMC: Visual Meteorological Conditions

We can SEE !! We be outside clouds and things.

IMC: Instrument Meteorological Conditions

We Can't SEE !! Must be in da clouds or forgot to remove sunshades from windshield

VFR: Visual Flight Rules
Ceiling > 3,000 FT AGL
Visibility > 5 SM

MVFR: Marginal Visual Flight Rules
Ceiling 1,000 – 3,000 FT AGL
Visibility 3 – 5 SM

IFR: Instrument Flight Rules
Ceiling 500 - < 1,000 FT AGL
Visibility 1 - < 3 SM

LIFR: Low Instrument Flight Rules
Ceiling < 500 FT AGL
Visibility < 1 SM

Things to Look For

```
BKN013 OVC024 M02/M03 A2993=

SPECI PAOM 241715Z 20014G23KT 2SM R28/4000VP6000FT TSSN BLSN BKN008
 BKN013 OVC024 M02/M03 A2993 RMK AO2 TSB14 OCNL LTG NW TS NW
 P0002 T10221028=

PAOM 241721Z 20015KT 2SM TSSN BLSN FEW006 BKN011 OVC025 M02/M03
A2993=

SPECI PAOM 241721Z 20015KT 2SM TSSN BLSN FEW006 BKN011 OVC025 M02/M03
     A2993 RMK AO2 TSB14 OCNL LTG NW TS NW P0002 T10221033=

PAOM 241723Z 20015KT 4SM TSSN BLSN FEW005 BKN023 OVC029 M02/M04
A2993=

SPECI PAOM 241723Z 20015KT 4SM TSSN BLSN FEW005 BKN023 OVC029 M02/M04
     A2993 RMK AO2 TSB14 CIG 011 NE OCNL LTG NW TS NW P0002
     T10221039=

PAOM 241731Z 20014KT 6SM -SN FEW010 BKN028 OVC038 M03/M04 A2993=

SPECI PAOM 241731Z 20014KT 6SM -SN FEW010 BKN028 OVC038 M03/M04 A2993
     RMK AO2 TSB14E31 P0002 T10281039=
```

Mo Practice

KJBR 160520Z 1606/1706 10004KT 1/4SM FG VV002

FM1608 13004KT 2SM BR OVC003

TEMPO 160800/1612 1/4SM FG VV002

FM161500 19013G19KT P6SM OVC100

FM161900 31020G27KT P6SM OVC050

FM170300 34008KT P6SM OVC025

KSTL 160912Z 1609/1712 13006KT 5SM BR OVC035 FM161300 13007KT 2SM -RASN BR OVC009

FM161600 VRB05KT 3SM -RA BR OVC008

FM162000 32008KT 5SM BR OVC010

FM170100 31006KT 6SM BR OVC010

KMEM 062254Z 20014G22KT 10SM BKN031 BKN038 OVC070 21/16 A2988 RMK AO2 PK WND 22028/2214 SLP116 T02110161

KMEM 062328Z 0700/0724 20015G25KT P6SM BKN035
FM070400 19015G23KT P6SM SCT015 BKN060 WS020/21050KT
FM070700 20018G25KT P6SM BKN012 OVC045 WS020/21055KT
FM070900 20015G22KT 6SM -SHRA VCTS BKN010 OVC035CB WS020/21050KT
TEMPO 0712/0716 4SM TSRA OVC010CB
FM071700 23014G21KT P6SM BKN015
FM072200 24012KT P6SM SCT025 SCT250

KLIT 062253Z 18010G20KT 10SM BKN030 BKN034 OVC070 21/17 A2982 RMK AO2 SLP098 BKN030 V SCT T02060167

KLIT 062324Z 0700/0724 18014KT P6SM OVC035
FM070600 20015KT P6SM VCSH OVC035
TEMPO 0706/0710 4SM TSRA BR OVC025CB
FM071500 23010KT P6SM BKN025
FM072100 25011KT P6SM BKN250

KJBR 062253Z AUTO 20014KT 10SM FEW037 BKN047 OVC070 21/16 A2980 RMK AO2 RAE02 SLP090 P0000 T02060161

KJBR 062328Z 0700/0724 20012G18KT P6SM VCSH SCT018 OVC035
FM070600 21016G23KT P6SM -SHRA VCTS BKN015 OVC035CB WS020/21055KT
TEMPO 0709/0713 3SM TSRAGS OVC015CB
FM071400 24016G25KT P6SM SCT035
FM072100 24008KT P6SM SKC

KBPK 062324Z 0700/0724 19013KT P6SM BKN030
FM070600 18015KT P6SM VCSH OVC035
TEMPO 0706/0710 4SM TSRA BKN025CB
FM071000 20013KT P6SM OVC250
FM071500 27008KT P6SM BKN250
FM072100 28007KT P6SM SKC AMD NOT SKED

KSGF 062252Z 18012G20KT 10SM SCT035 OVC043 19/14 A2964 RMK AO2 SLP032 T01940139

KSGF 062320Z 0700/0724 18012G20KT P6SM VCTS OVC035CB
FM070500 22014G22KT P6SM VCTS SCT030CB BKN050 WS020/21040KT
FM071200 25008KT P6SM BKN070
FM071600 29009KT P6SM SCT250

KJBR 071153Z AUTO 20019G32KT 10SM -TSRA OVC090 17/14 A2961 RMK AO2 PK WND 20035/1125 LTG DSNT ALQDS TSB39 SLP025 P0003 60025 70026 T01720139 10200 20172 $

```
KJBR 071138Z 0712/0812 20018G28KT P6SM -SHRA VCTS BKN020CB OVC050 WS020/21055KT
  TEMPO 0712/0715 VRB25G35KT 2SM TSRA BKN015CB
  FM071500 24016G25KT P6SM BKN035
  FM072200 24008KT P6SM SCT035 SCT250
  FM080000 31005KT P6SM SCT250
  FM080600 02003KT 5SM BR SCT250
```

KLIT 071153Z 22011G20KT 7SM TS BKN022 OVC032CB 18/18 A2965 RMK AO2 PK WND 19045/1127 RAB09E51 SLP041 OCNL LTGICCG SW-OHD-NE TS SW-OHD-NE MOV NE P0064 60077 70077 T01830178 10194 20178 55010

```
KLIT 071140Z 0712/0812 22020G30KT 2SM TSRA BR SCT015 OVC025CB
  FM071300 23010G20KT 6SM -SHRA OVC030
  FM071500 24008KT P6SM OVC250
  FM080000 27003KT P6SM SKC
```

KLRF 071225Z AUTO 18007KT 10SM CLR 17/17 A2963 RMK AO2 LTG DSNT NE-E AND S RAE00RAB02E13DZB13E16RAB16E25 TSE05 SLP035

```
TAF AMD KLRF 071230Z 0712/0813 20012KT 9000 -SHRA BKN020 QNH2960INS
  TEMPO 0712/0714 20015G25KT 4800 -TSRA BKN012 OVC020CB
  BECMG 0714/0715 25020G25KT 9999 NSW FEW020 QNH2962INS
  BECMG 0720/0721 25010G15KT 9999 SKC QNH2968INS
  BECMG 0723/0724 VRB06KT 9999 FEW200 QNH2971INS TX24/0720Z TN16/0712Z
```

KMEM 071154Z 21015G25KT 10SM -RA BKN024 BKN038 OVC075 18/15 A2971 RMK AO2 PK WND 20028/1106 LTG DSNT ALQDS RAE1058B52 SLP058 P0000 60001 70001 T01830150 10200 20178 55005

```
KMEM 071138Z 0712/0812 20018G28KT P6SM -SHRA VCTS BKN050CB OVC100 WS020/21060KT
  TEMPO 0713/0716 VRB25G35KT 2SM TSRA BKN015CB
  FM071800 22015G25KT P6SM BKN025
  FM072200 24015G25KT P6SM SCT025 SCT250
  FM080100 26005KT P6SM SCT035 SCT250
  FM080600 VRB02KT 6SM BR SCT250
  TEMPO 0808/0812 4SM BR
```

KSRC 071210Z AUTO 21009G21KT 190V250 10SM -TSRA OVC100 15/12 A2961 RMK AO2 LTG DSNT ALQDS TSE08B10 P0001

Brownout

Whiteout

FlightService POWERED BY LOCKHEED MARTIN 1800wxbrief

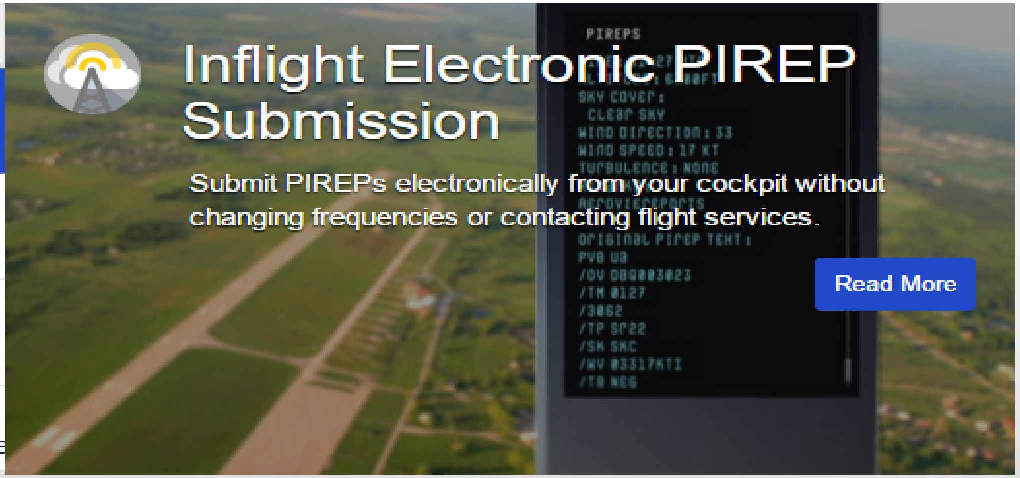
Better Briefings, Safer Flights

Home | Pilot Dashboard | Weather ▾ | Flight Planning & Briefing ▾ | Airports ▾ | UAS ▾ | Account ▾ | Links ▾ | Help ▾

Thu Mar 17 19:11:32 CDT | 0:11:32 Z

Featured Capabilities

- Inflight Electronic PIREP Submission
- **ACAS** - Adverse Condition Alerting Service
- **NGB** - Next Generation Briefings
- **SE-SAR** - Surveillance-Enhanced Search and Rescue



Lockheed Martin Pilot Web

Username

Your Email Address

Password

Password

Login | Forgot/Reset

Create New Account

Partnerships

Honeywell, spidertracks, GARMIN, DELORME, ForeFlight, Naviator, iFlyGPS, SkyVector, aerovie, AVARE, spot, avplan efb, Seattle Avionics Software, DroidEFB

LEARN MORE ›

Pilot Advocacy

News & Announcements

March 2, 2016

Did You Know? SE-SAR: You too can have a Guardian Angel on every Flight

For flights within the Contiguous United States (CONUS), HAWAII, Puerto Rico, US Virgin Islands, and Guam, Flight Service's free Surveillance-Enhanced Search & Rescue (SE-SAR) service, at 1800wxbrief.com, will monitor your position reports sent by the service providers of Position Reporting and Communications Devices you select and activate within your Pilot Web account.

When the system detects no movement or an emergency signal is received, SE-SAR will alert an In-Flight Specialist who will attempt to verify your status via radio, ATC, and phone. If unsuccessful, **Flight Service will initiate Search and Rescue procedures much earlier than with traditional procedures and with a greatly reduced search area**. SE-SAR also will send alert messages to other devices you have activated or contacts that you have provided.

READ MORE ›

Upcoming Events

There are no upcoming events.

How-To Videos

- Register and Logging In
- File a Flight Plan
- Flight Plan Route Briefing

MORE VIDEOS ›

Resources

- Phone Numbers & Quick Steps
- FileSmart

NATIONAL WEATHER SERVICE

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Local forecast by "City, St" or ZIP code

Enter location ... Go

Location Help

Active Weather Pattern To Persist Over The Eastern U.S Through Midweek

A slow moving low pressure system will bring rounds of showers and thunderstorms from the Middle Atlantic to the Southeast U.S over the next couple of days. Some of the storms could be severe especially over the Southeast. Locally heavy rainfall could pose a risk for flooding of low lying and poor drainage areas.

Read More...

Customize Your Weather.gov

City, ST

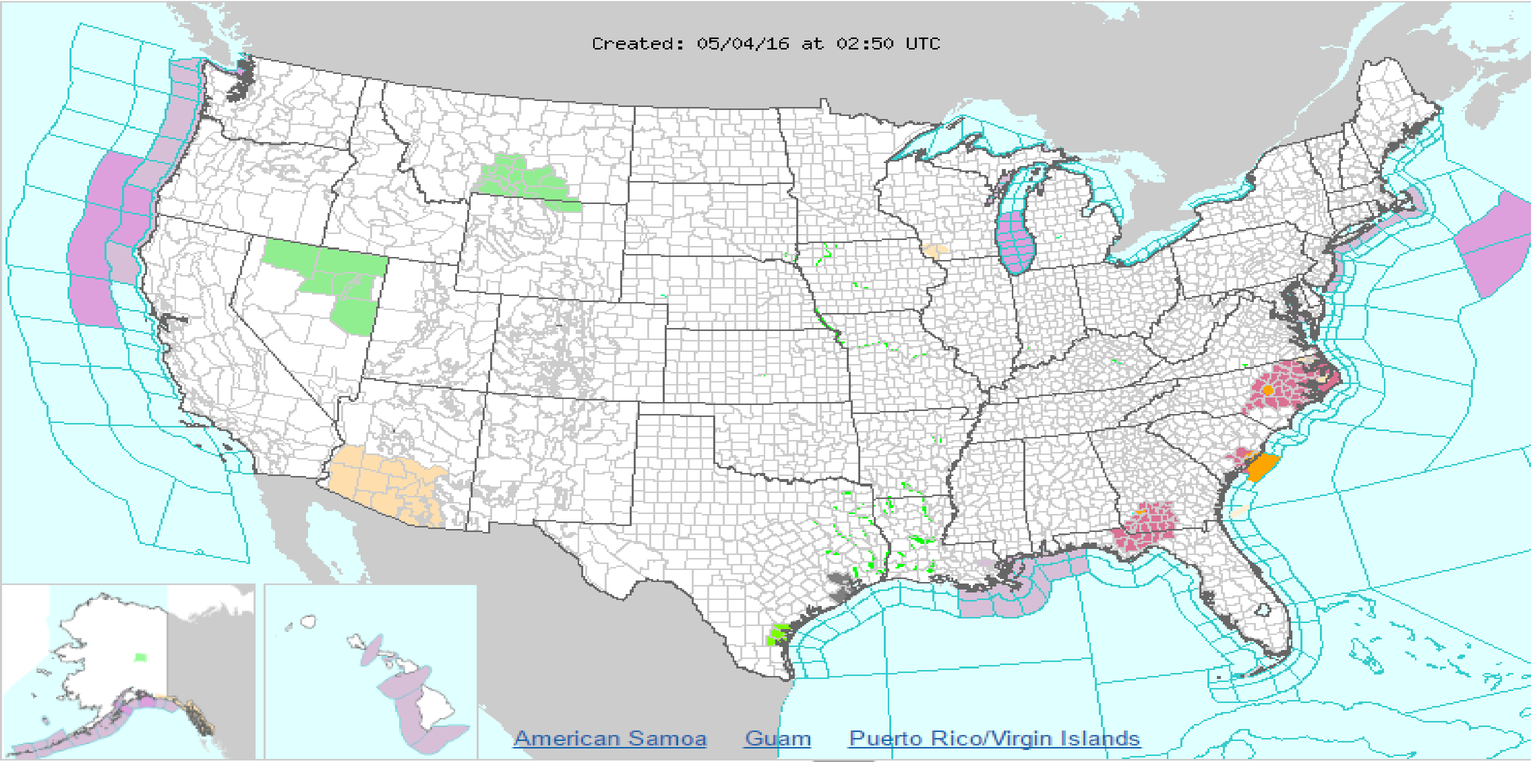
Enter Your City, ST or ZIP Code

Remember Me

Get Weather

Privacy Policy

ACTIVE ALERTS FORECAST MAPS RADAR RIVERS, LAKES, RAINFALL AIR QUALITY SATELLITE PAST WEATHER



Click on the map above for detailed alerts or Warnings By State Go

Public Alerts in XML/CAP v1.1 and ATOM Formats

- Severe Thunderstorm Warning
- Severe Weather Statement
- Special Marine Warning
- Flood Warning
- Gale Warning
- Flood Advisory
- Coastal Flood Advisory
- Small Craft Advisory For Hazardous Seas
- Small Craft Advisory
- Hazardous Seas Watch
- Fire Weather Watch
- Special Weather Statement
- Air Quality Alert
- Hydrologic Outlook

Current time (in UTC/GMT/Zulu): 02:53:11

Site Map | Organization | About Us | Mobile | Feedback | Local Forecast by ZIP

Storm Prediction Center

NOAA / National Weather Service

HOME | NEWS | SPC PRODUCTS | WEATHER INFO | FORECAST TOOLS | RESEARCH | OUTREACH | NWS/NCEP

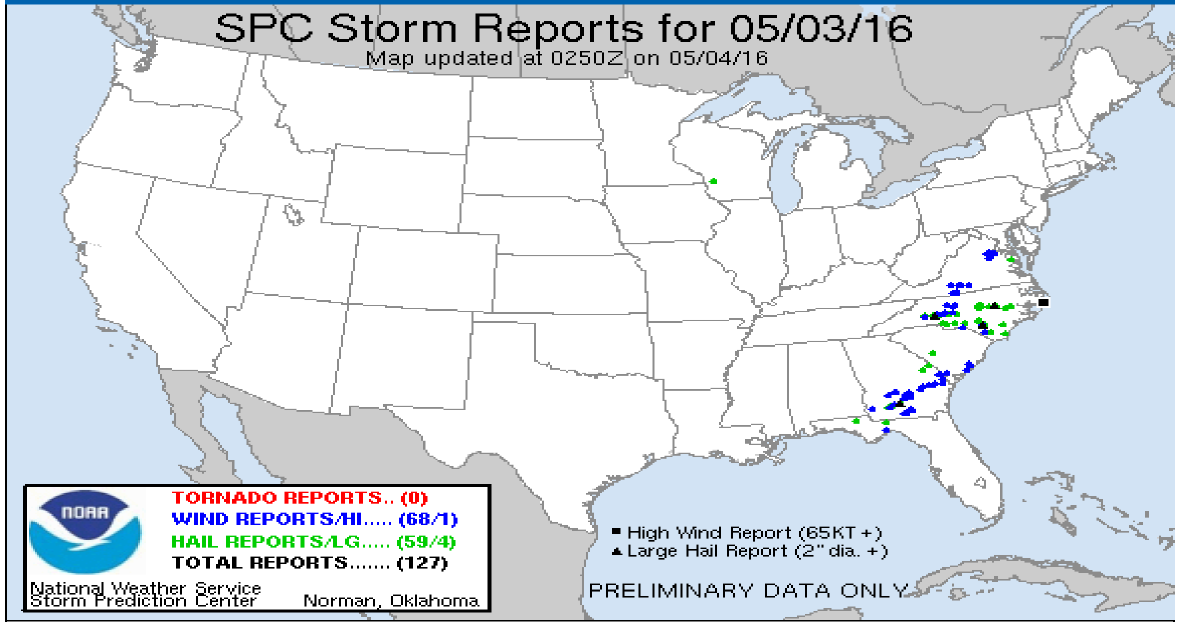
Search SPC...

A Slight Risk of Severe Thunderstorms is Forecast Today and/or Tonight

Widely scattered strong storms linger to the east of the central Appalachians, and across parts of the southern Mid Atlantic Coast region, but severe weather potential is generally in the process of diminishing.

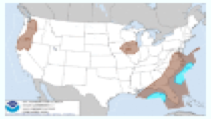
» For additional details, see the latest Day 1 Convective Outlook.

Overview | Conv. Outlook | Watches | MDs | Storm Reports | Mesoanalysis | Fire | Hazards

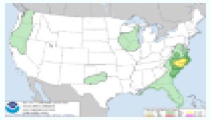


Hazard	Tue (05/03)	Wed (05/04)	Thu (05/05)	Fri (05/06)	Sat (05/07)	Sun (05/08)	Mon (05/09)	Tue (05/10)
Severe	Slight	Marginal	No Severe	No Area	Severe	No Area	No Area	No Area
Fire	Elevated	Elevated	Critical	Critical	Critical	Critical	No Area	No Area

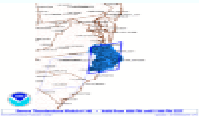
All Products | Watches | MDs | Outlooks | Fire



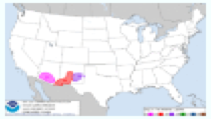
Thunderstorm Outlook
– Issued: 05/04/2016 at 0111Z



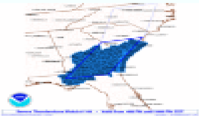
Day 1 Convective Outlook
– Categorical Risk: Slight
– Issued: 05/04/2016 at 0051Z



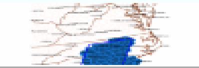
SEVERE THUNDERSTORM 0142
– Valid until: 05/04/2016 0300Z
– States affected: NC VA AM AN CW
– Issued: 05/03/2016 at 2255Z



Day 3-8 Fire Weather Outlook
– Categorical Risk: Critical
– Issued: 05/03/2016 at 2035Z

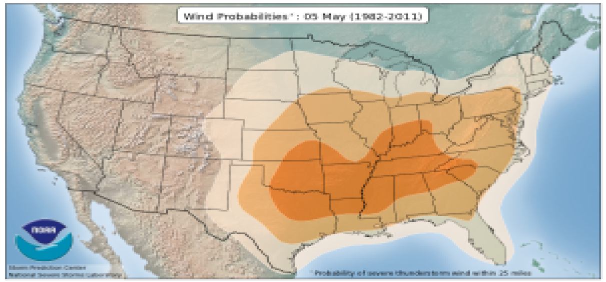


SEVERE THUNDERSTORM 0141
– Valid until: 05/04/2016 0200Z
– States affected: FL GA SC AM CW
– Issued: 05/03/2016 at 2005Z



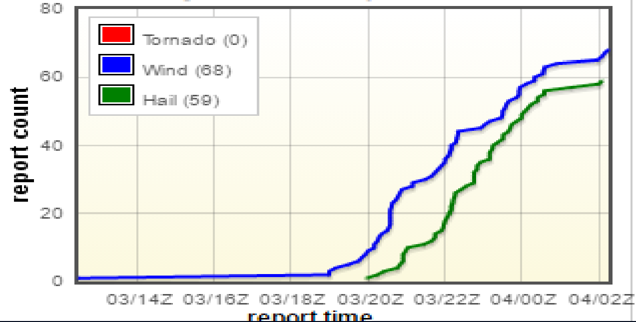
SEVERE THUNDERSTORM 0140
– Valid until: 05/04/2016 0100Z
– States affected: GA NC SC AM CW

Severe Weather Climatology (1982-2011)



...obabilities: 04 May

Today's Storm Report Trend



Did You Know?

La tormenta factor de riesgo.

AVIATION WEATHER CENTER

NOAA NATIONAL WEATHER SERVICE

Local Forecast | Go

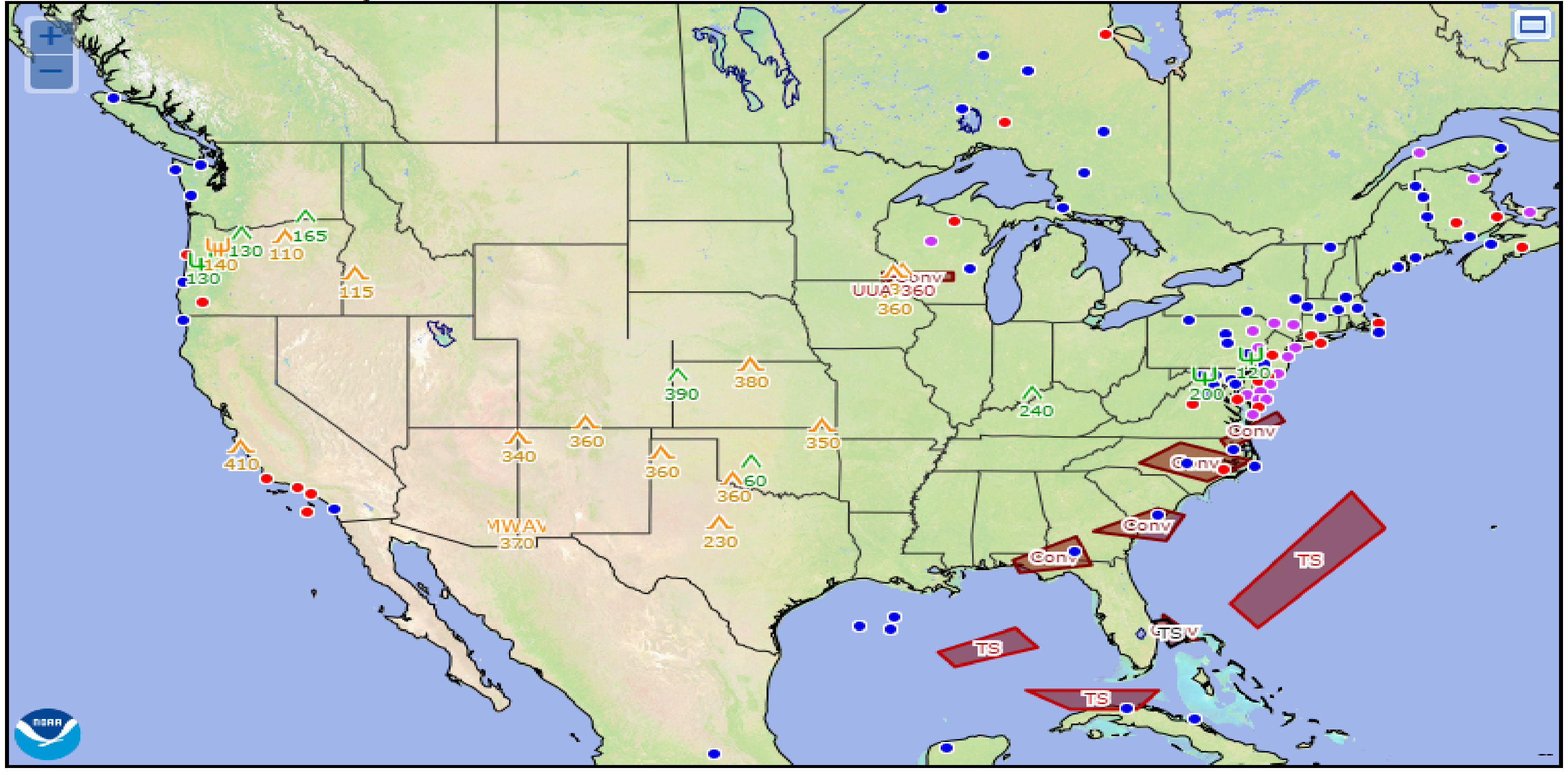
HOME ADVISORIES FORECASTS OBSERVATIONS TOOLS NEWS SEARCH ABOUT USER

Aviation Weather Overview

INFO

METARs | TAFs | AIR/PIREPs | SIGMETs | G-AIRMETs

Valid at 0253 UTC 4 May 2016



☐ Sat ☐ VisFog ☐ Radar ☐ METAR ☑ FltCat ☑ SIGMET ☑ CWA ☐ G-AIRMET ☑ PIREP-Ice ☑ PIREP-Turb

☐ Highways ☐ Jetroutes ☐ FIRs ☐ Hover

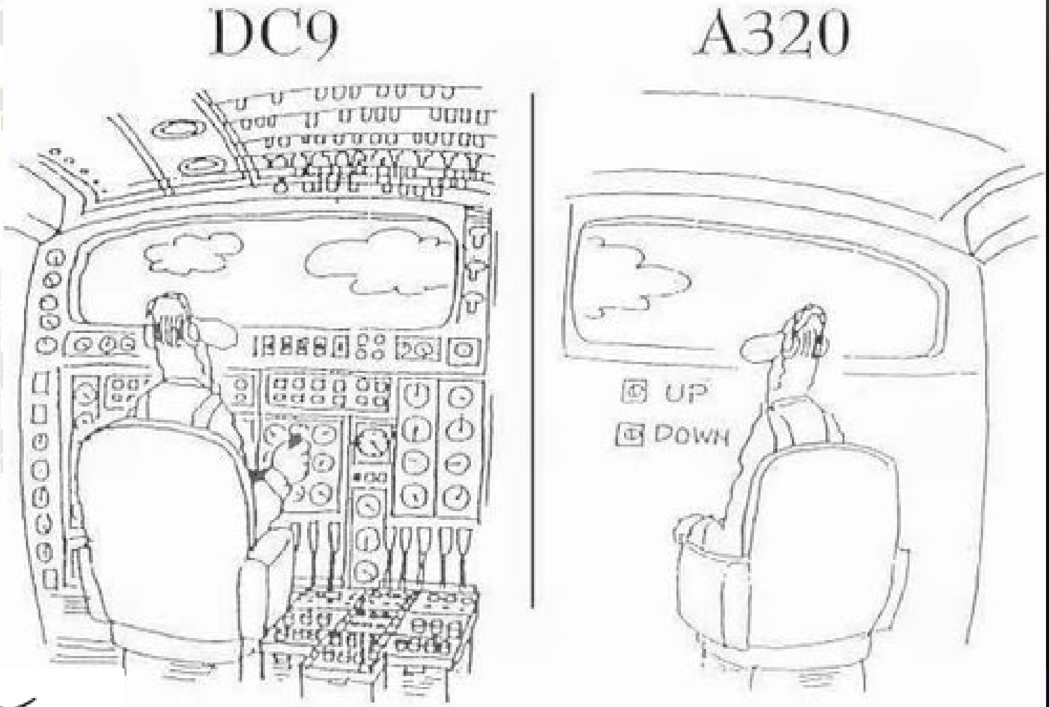
SIGMET | CWA | GAIRMET TurbHi TurbLo LLWS Sfcwnd Icing Frz IFR Mtnob

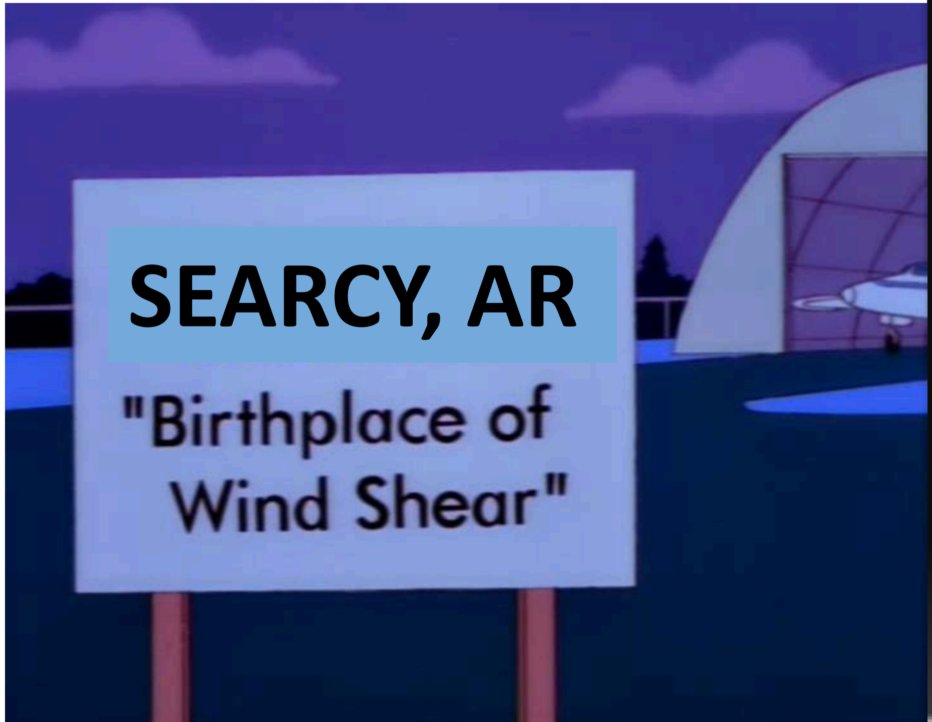
Flt Cat: MVFR IFR LIFR | PIREP Turb: LGT MOD SEV | PIREP Ice: LGT MOD SEV

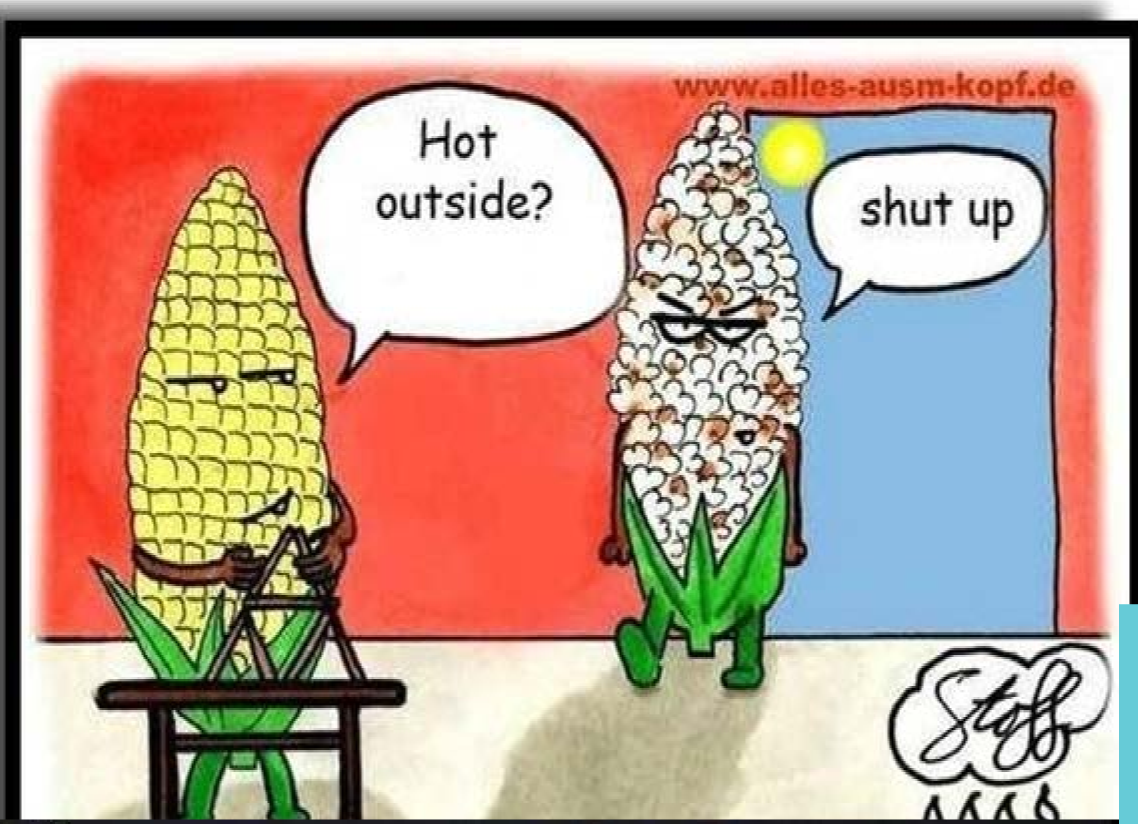
Disclaimer: International SIGMET locations approximated. Please refer to SIGMET text for full details

Interactive Maps: On ▾

Turns off interactive maps on main pages and adds a link to the interactive maps on a secondary page. Turning off maps is recommended for slow browsers and network connections.



DC9
A320
UP
DOWN

FAA
'WELL, HIGGINS, I SEE EVERYTHING'S UNDER CONTROL.'

SEARCY, AR
"Birthplace of
Wind Shear"


www.alles-ausm-kopf.de
Hot outside?
shut up


Walking My Fish


Why would someone use an umbrella?
A: kazizzle
B: fo drizzle
C: fo shizzle
D: fo rizzle


Actually,
YES!
the weather
IS great
up here!