

NWS Pilot Talk

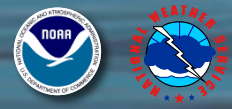
NWS PITTSBURGH



*National Weather Service
Pittsburgh, PA*

Presentation Overview

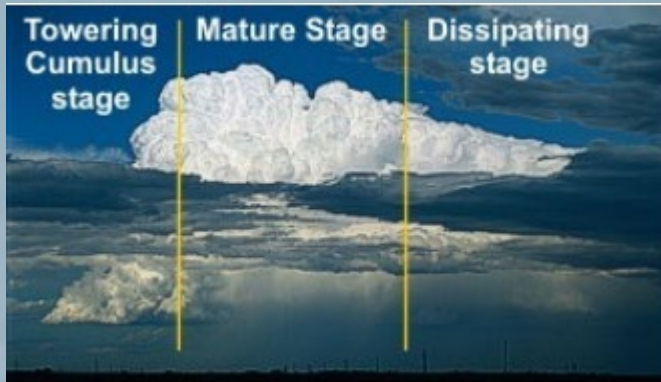
- Severe Weather Climatology
- Summer Outlook
- Interpreting a Sounding
- NWS Convective Support from National, Regional, and Local Level



Types of Thunderstorms

Single Cell (Pulse):

- One updraft followed by one downdraft
- Can produce strong downburst winds and (usually small) hail



Quasi-Linear Convective System (QLCS):

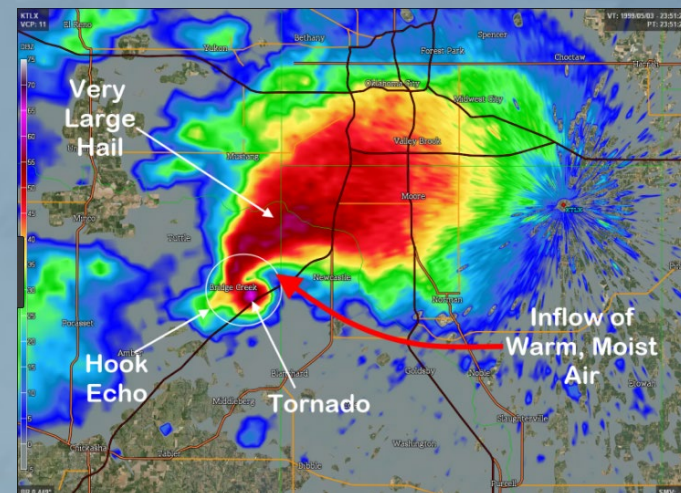
- New cells develop along leading edge of line, producing strong winds, hail and even an isolated tornado



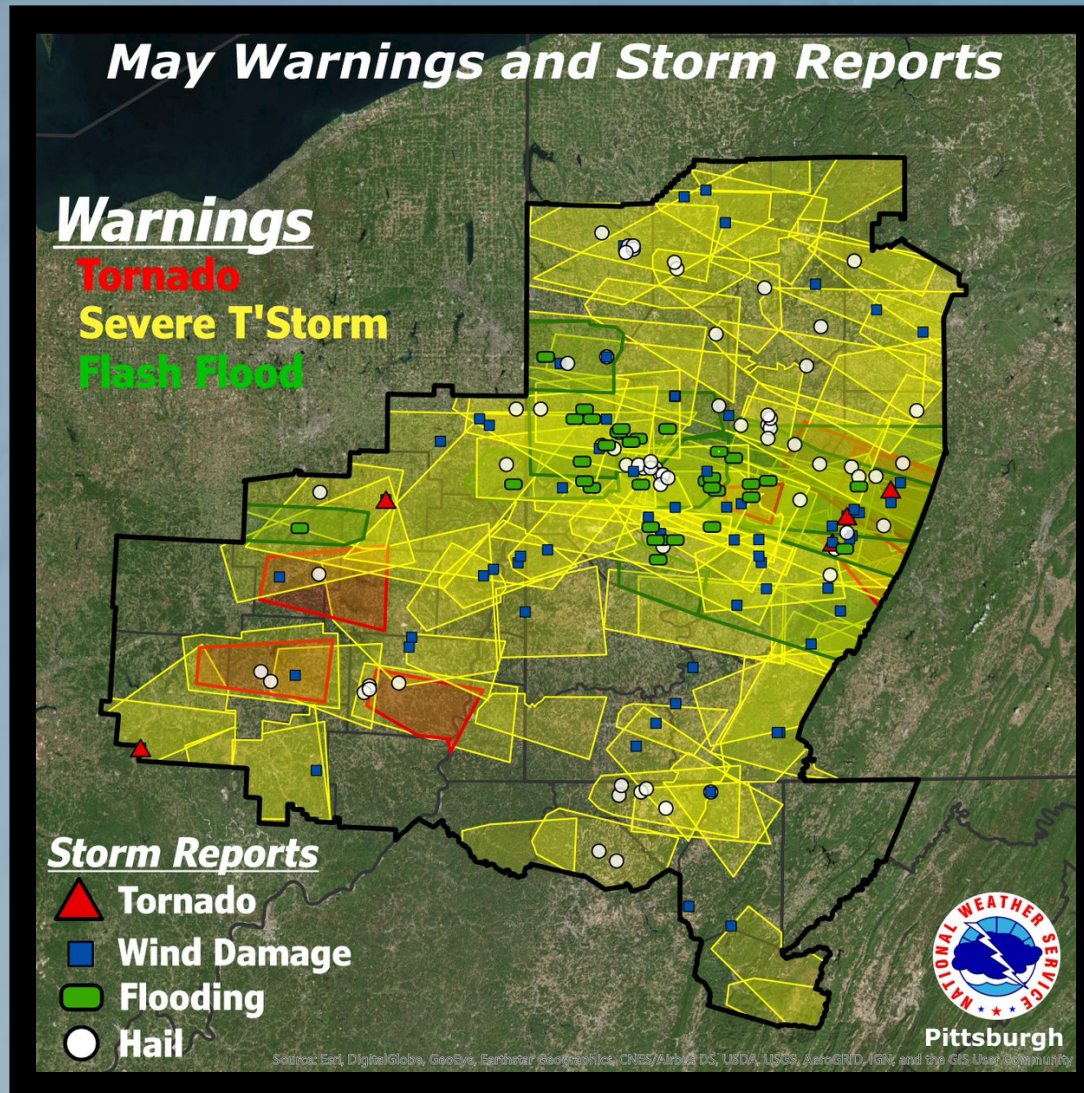
Types of Thunderstorms

Supercells:

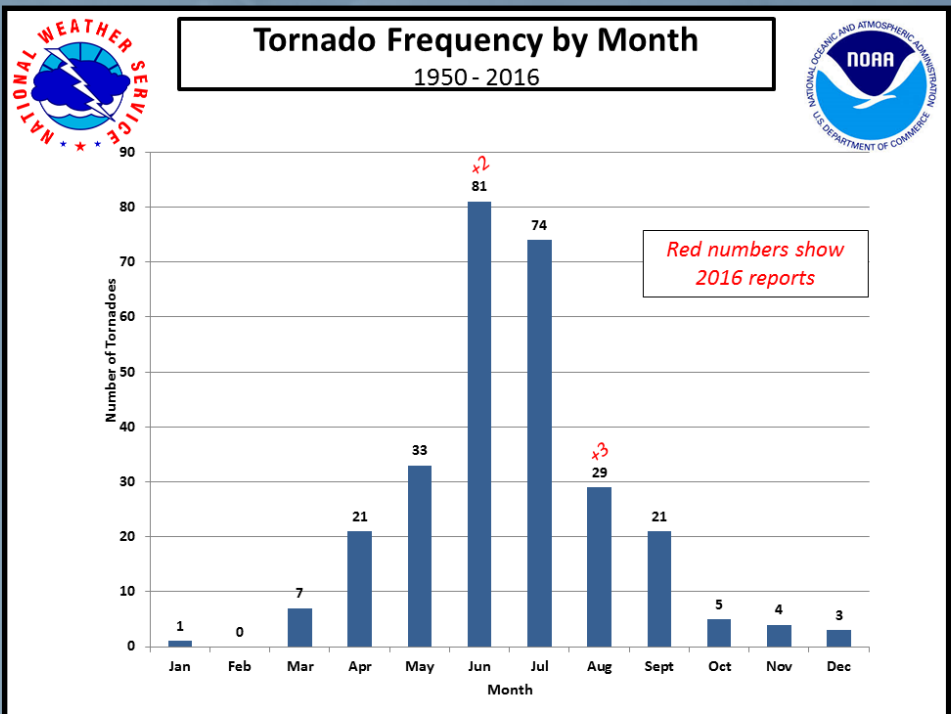
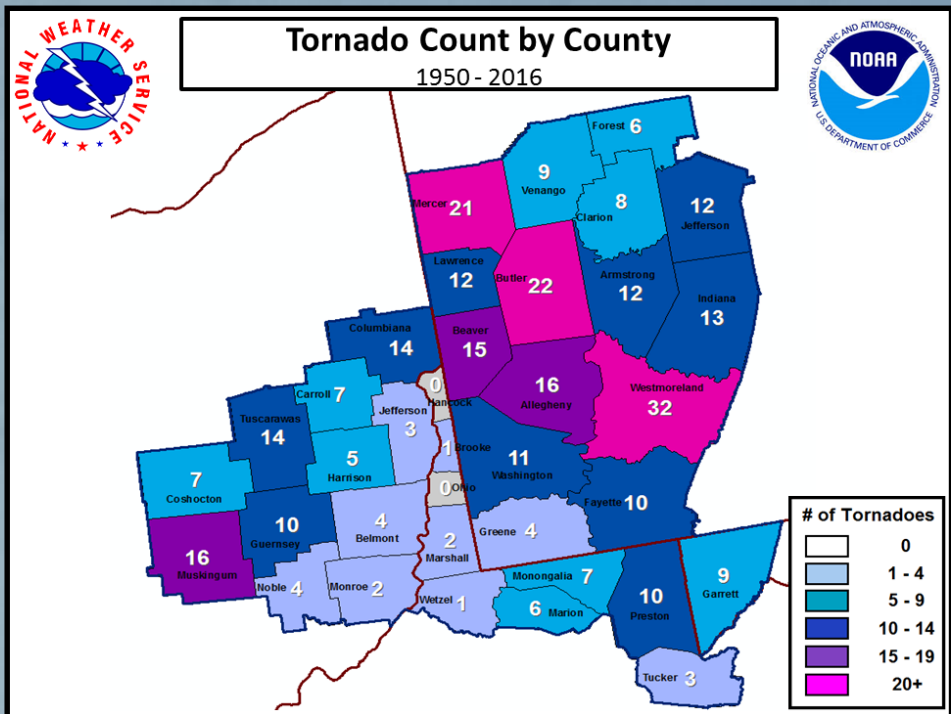
- Highly organized storms resulting from sheared environment, producing damaging winds, large hail, and tornadoes.



Active May for Severe Weather



Tornado Climatology

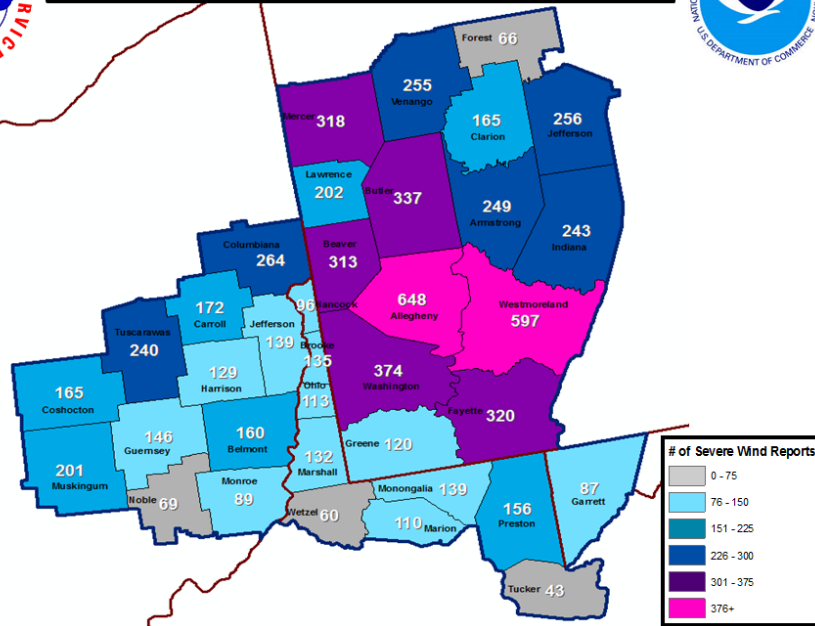
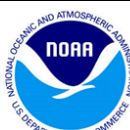


- Since 2016, 41 more tornadoes across our CWA (3 in WV)
- In 2019, already 33 confirmed tornadoes in the state of PA, tied for 3rd most since 1950.

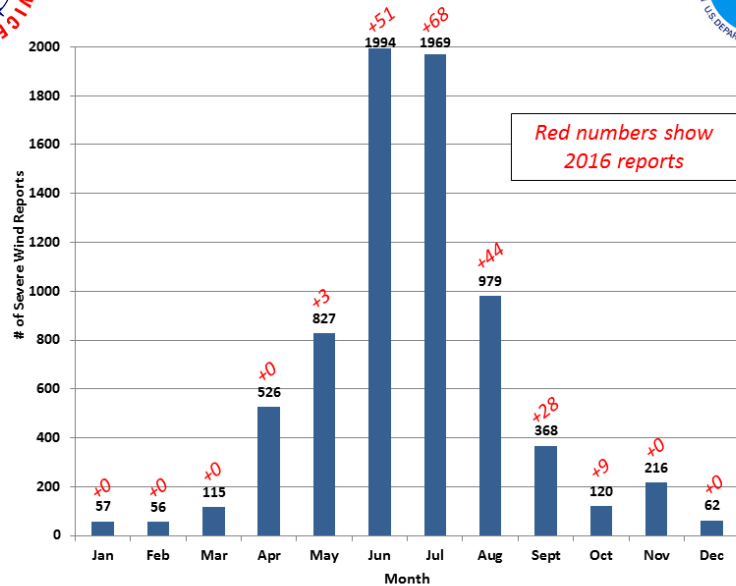
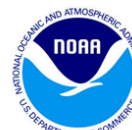
Severe Wind Climatology



Severe Wind Reports County by County
1955 - 2016



Severe Wind Frequency by Month
1955 - 2016

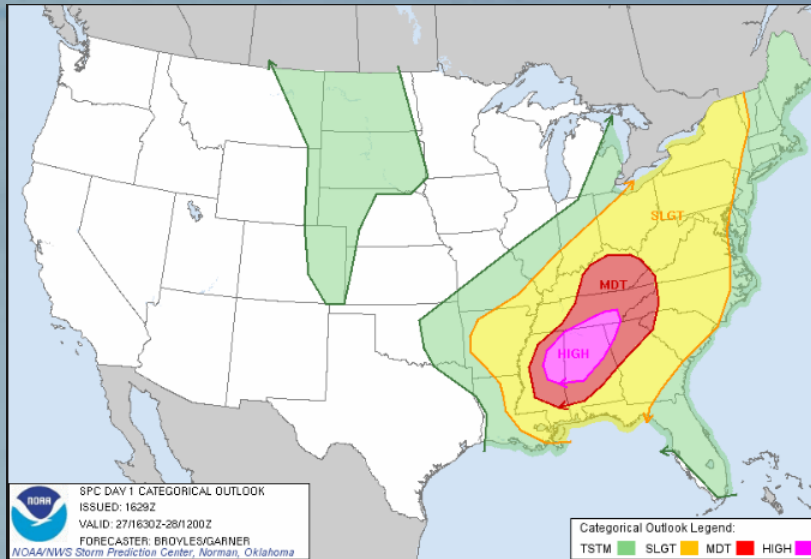


Storm Prediction Center



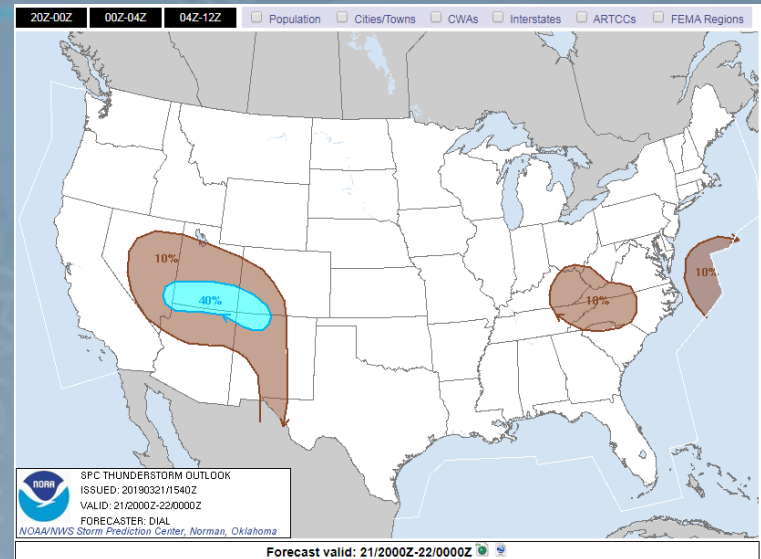
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Storm Prediction Center Convective Outlooks



Day 1-3; and 4-8 severe outlooks

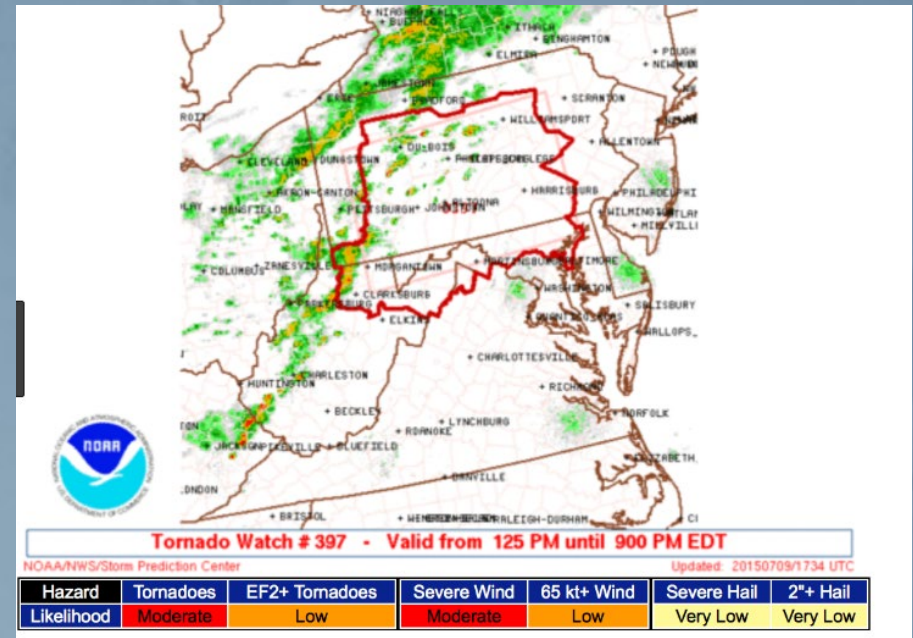
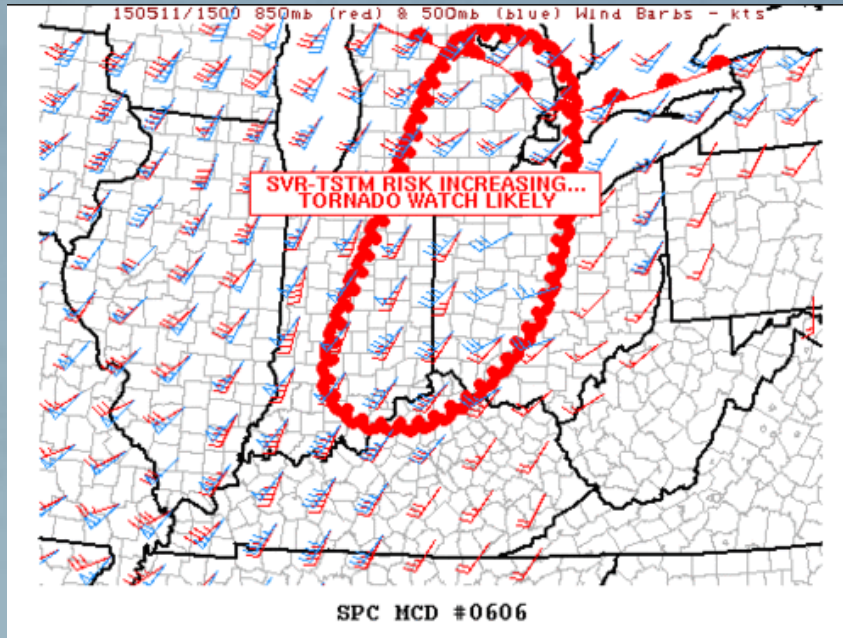
Severe Thunderstorm is defined by one or more:
A tornado.
Damaging winds or speeds of 58 mph (50 knots) or greater.
Hail 1 inch in diameter or larger.



Thunderstorm Outlooks

Probability of Thunderstorm occurring within 25 miles of a point.

Storm Prediction Center Convective Outlooks



Mesoscale Discussion:
Development and / or evolution of severe convection in relation to watch potential or within valid watches

Watches	
Conditions are favorable or expected but not occurring or imminent	
Tornado	Atmospheric <i>conditions are favorable</i> for the development of severe thunderstorms capable of producing tornadoes.
Severe Thunderstorm	Atmospheric <i>conditions are favorable</i> for the development of severe thunderstorms (i.e. – producing hail at least 1" in diameter and/or 50 knot (58 mph) or greater wind speeds).
Warnings	
Conditions are occurring or imminent	
Tornado	A severe thunderstorm <i>has developed</i> and has either produced a tornado <i>or radar has indicated</i> intense low level rotation in the presence of atmospheric conditions conducive to tornado development
Severe Thunderstorm	A severe thunderstorm <i>has developed</i> , capable of producing hail greater than 1" diameter and/or 50 knot (58 mph) wind speeds.



Upper Air Soundings

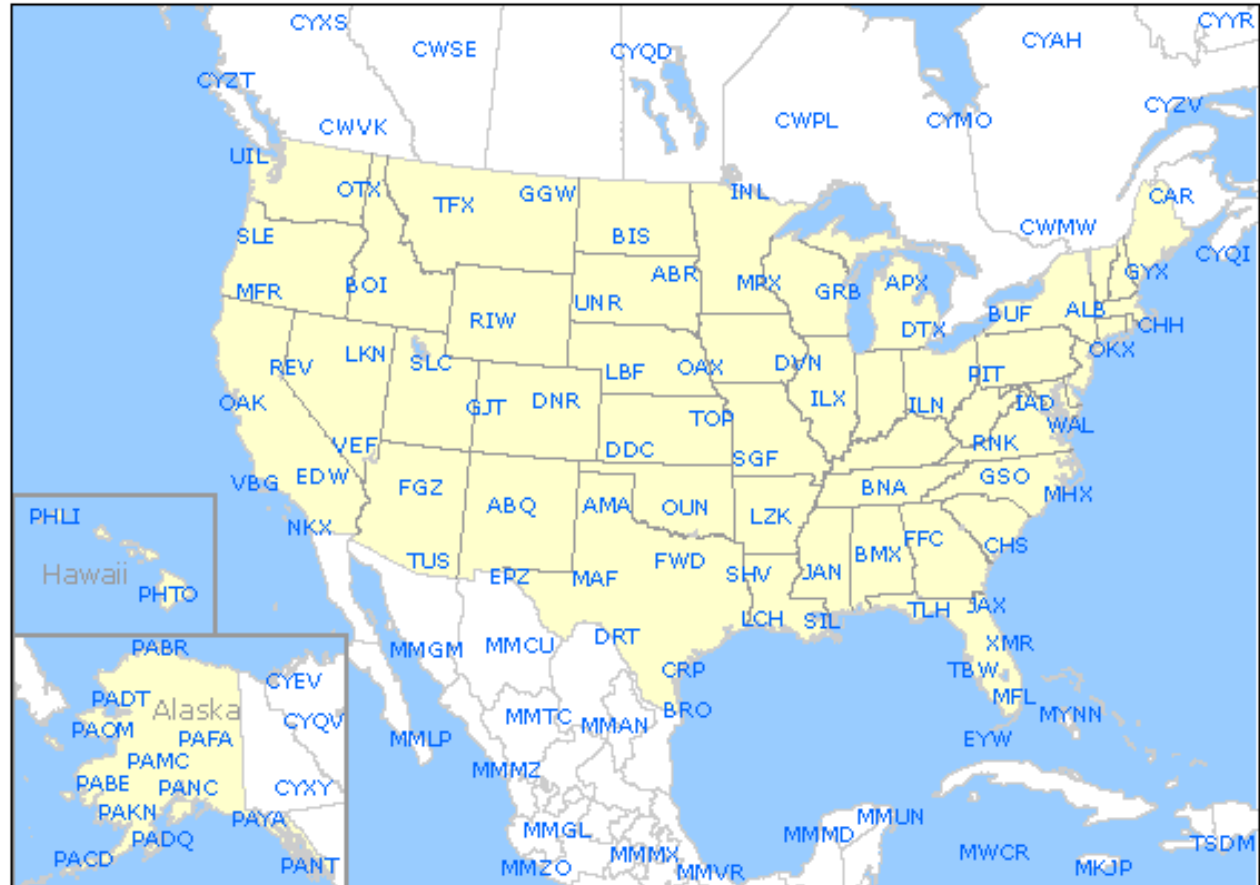


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Atmospheric Sounding Sites

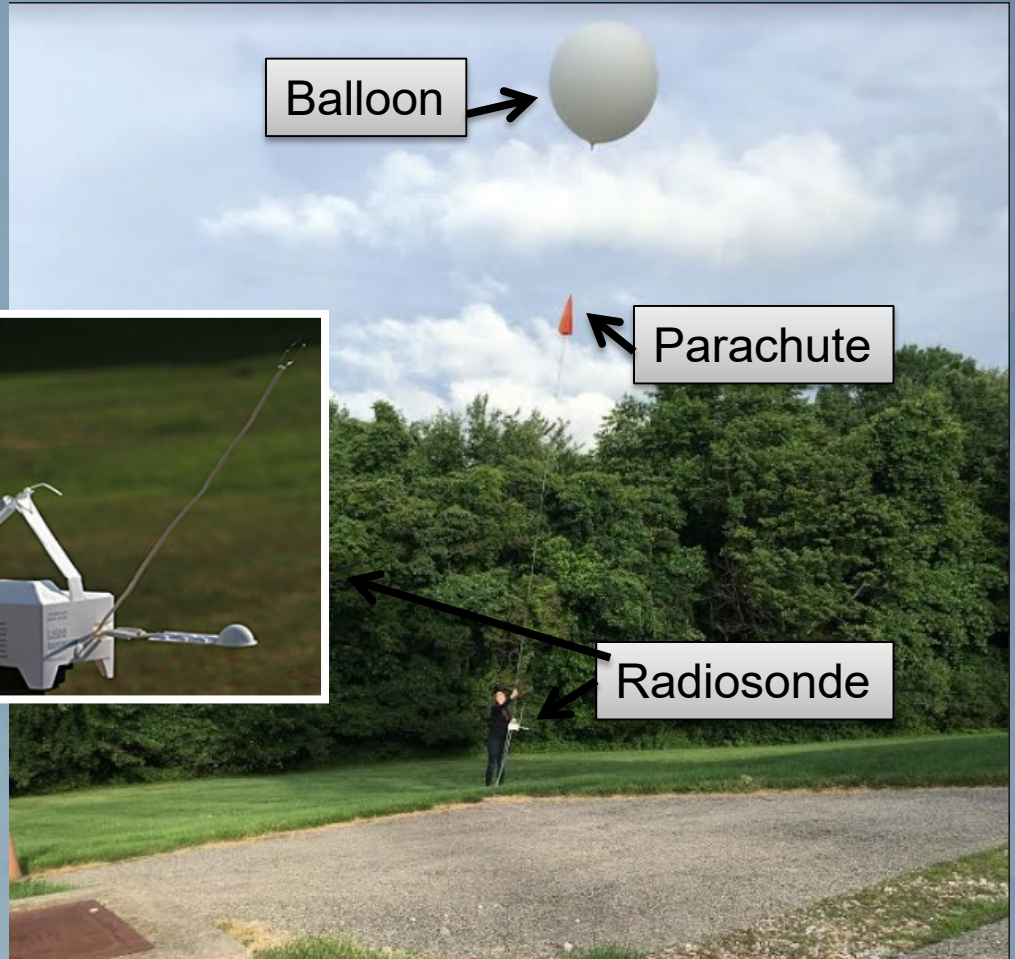
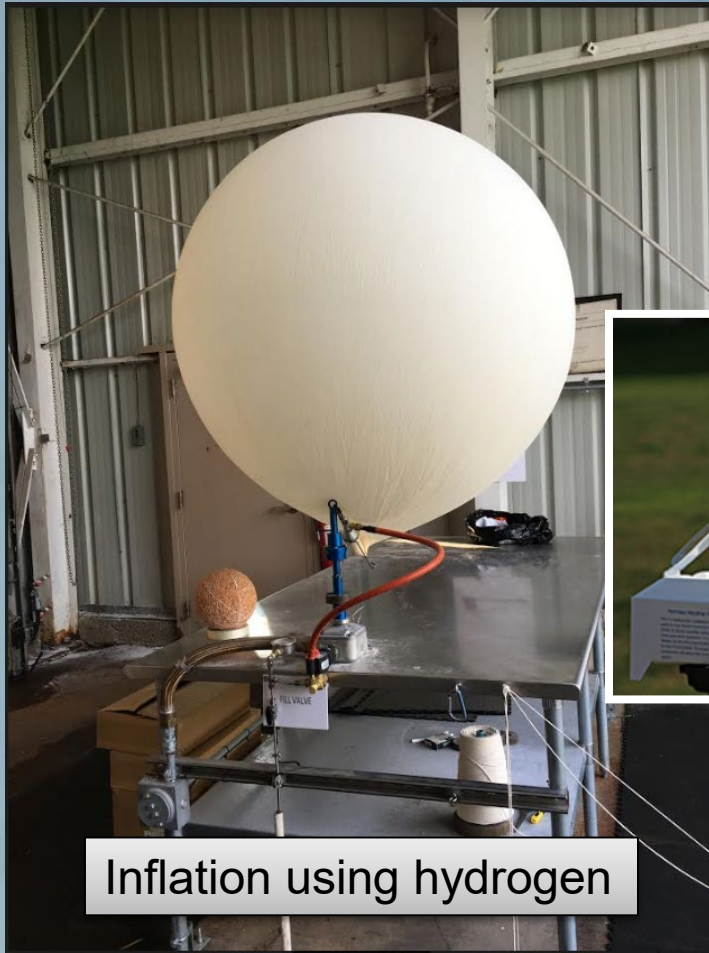
Radiosondes provide pressure, temperature, relative humidity, and wind data.

Skew-T/Log-P diagrams created from rawinsonde data



Radiosondes ascend over 115,000 ft and can drift more than 180 miles from the release point.

Balloon Launch



Balloon Launch

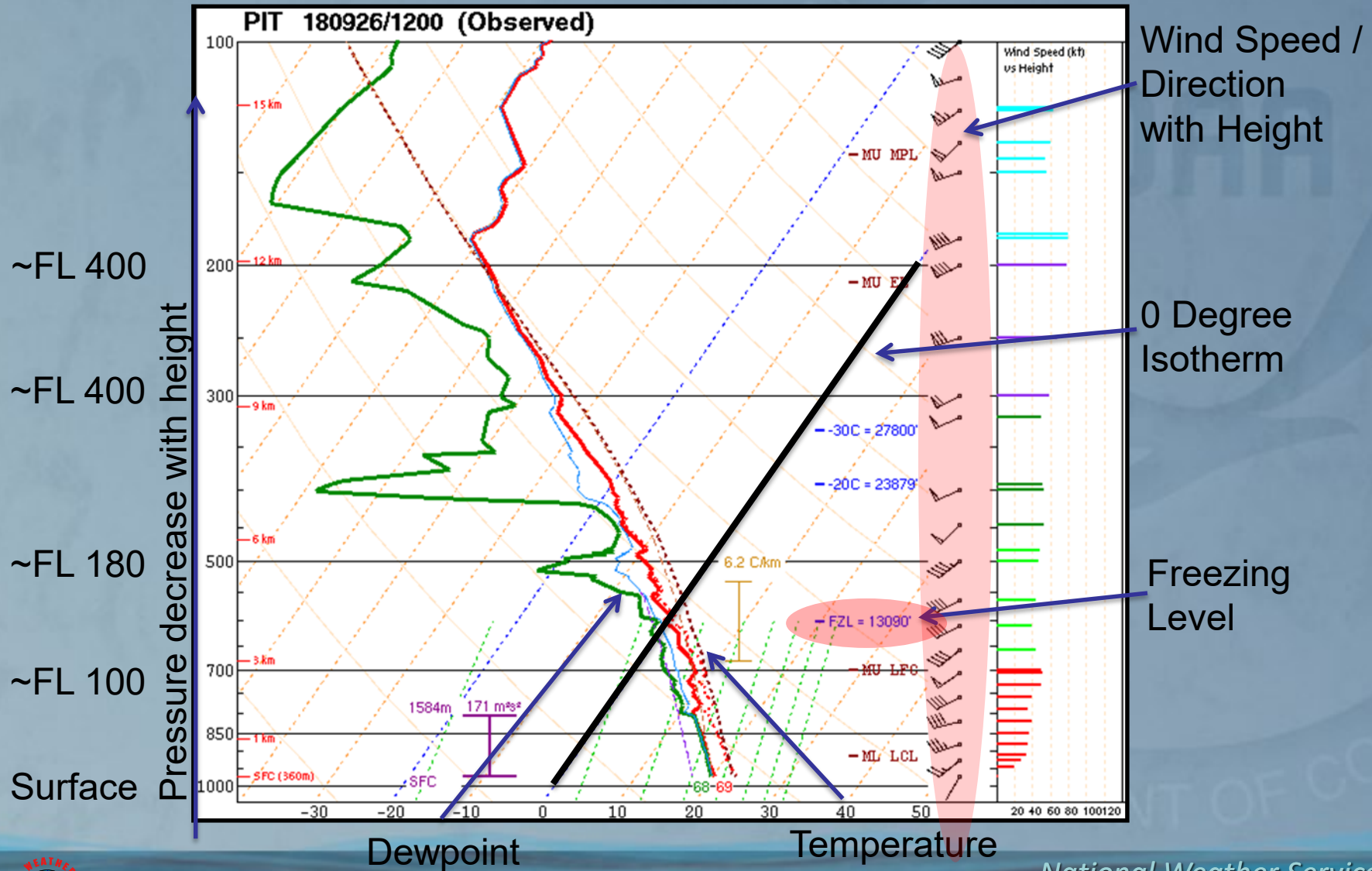


What Soundings Tell Us

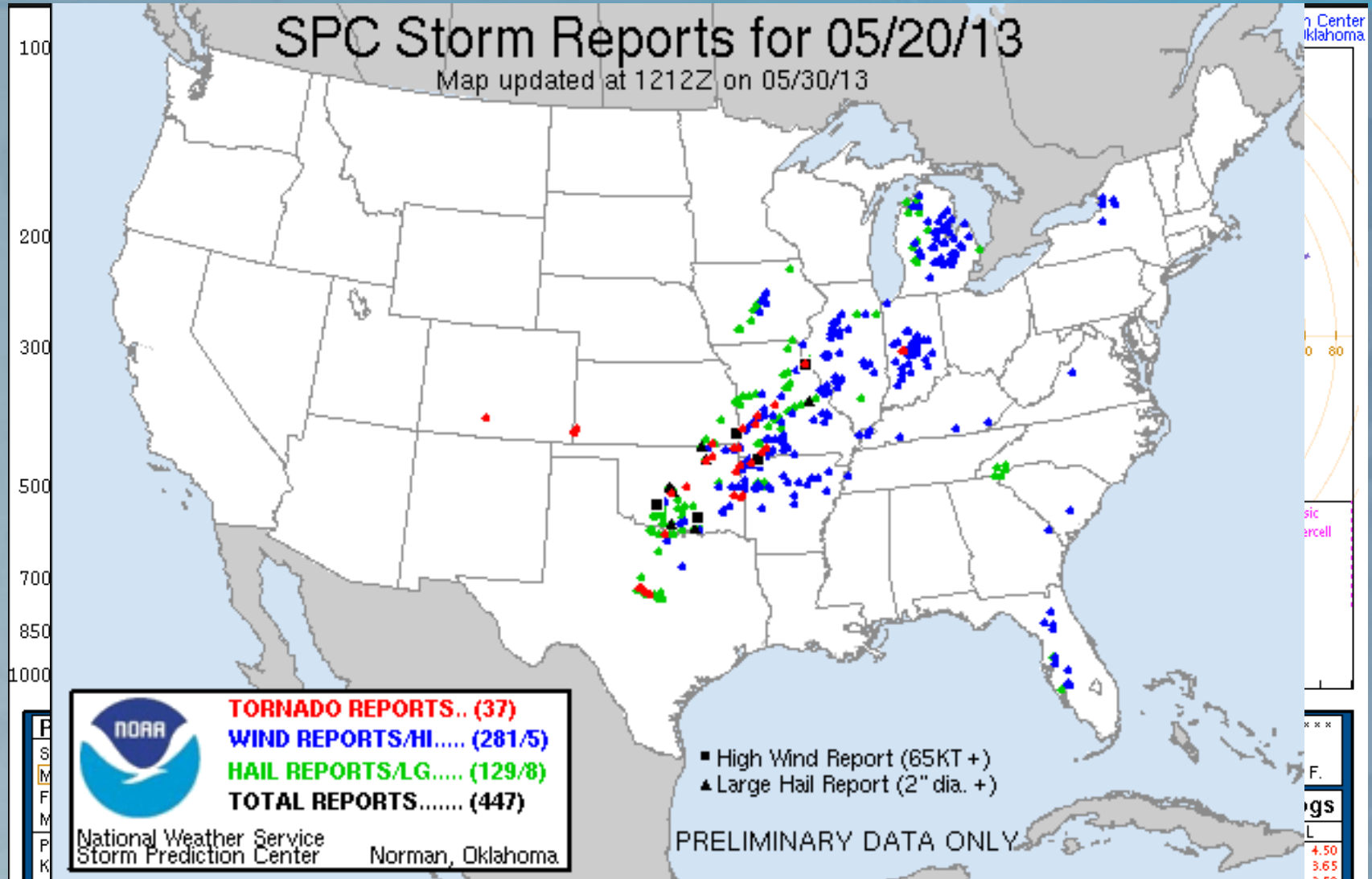
- Cloud Layers
- Temperature Inversions
- Freezing Level(s)
- Wind Speed and Directional Shear (i.e. Low Level Wind Shear, Jet Stream)
- Height of Tropopause
- Instability
- Severe Parameters: Hail, Microburst, Tornado, Flash Flood Potential
- Precipitation Types: Snow, Sleet, Freezing Rain, Rain



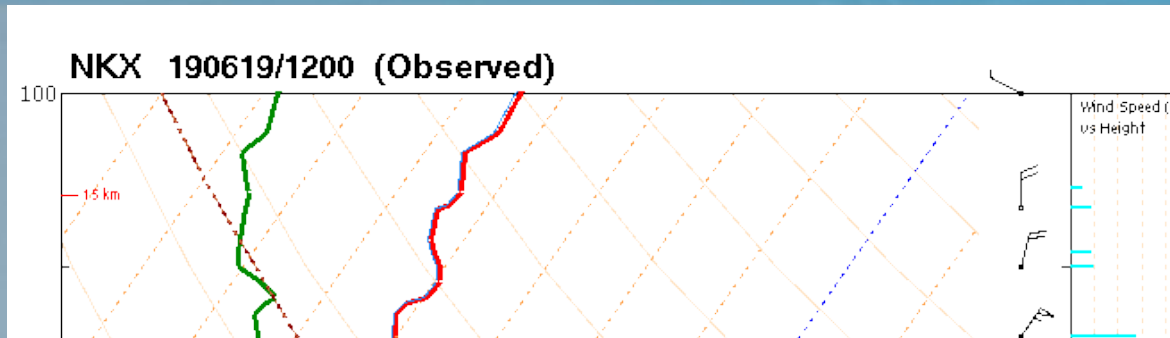
Upper Air Soundings



Example of Unstable Sounding



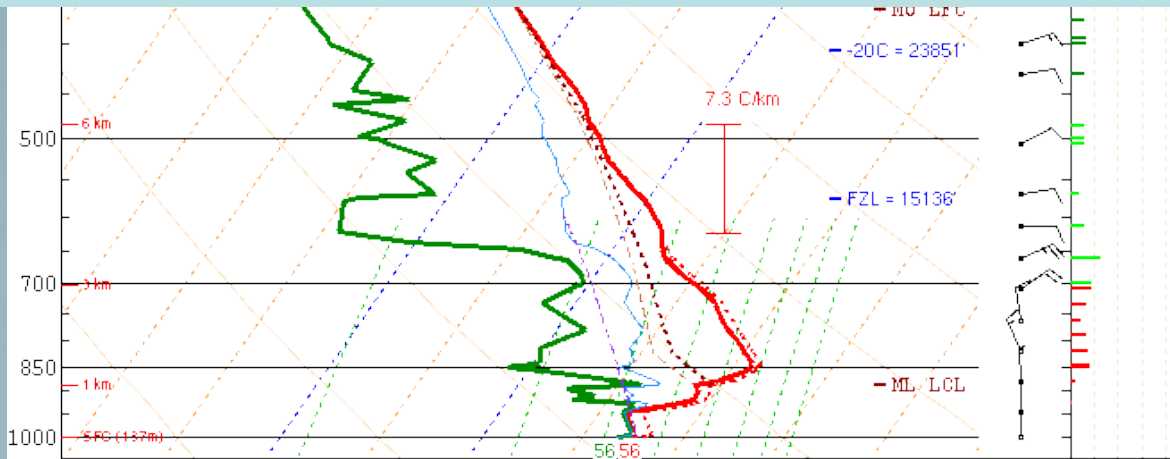
Example of Stable Sounding



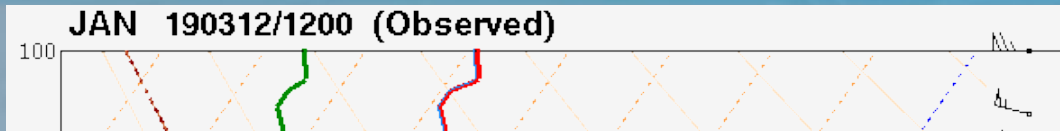
KSAN 191151Z 00000KT 10SM BKN015 17/13 A2997 RMK AO2 SLP169
T01670133 55003 \$

KSAN 191125Z 00000KT 10SM BKN015 17/13 A2996 RMK AO2 T01670133 \$

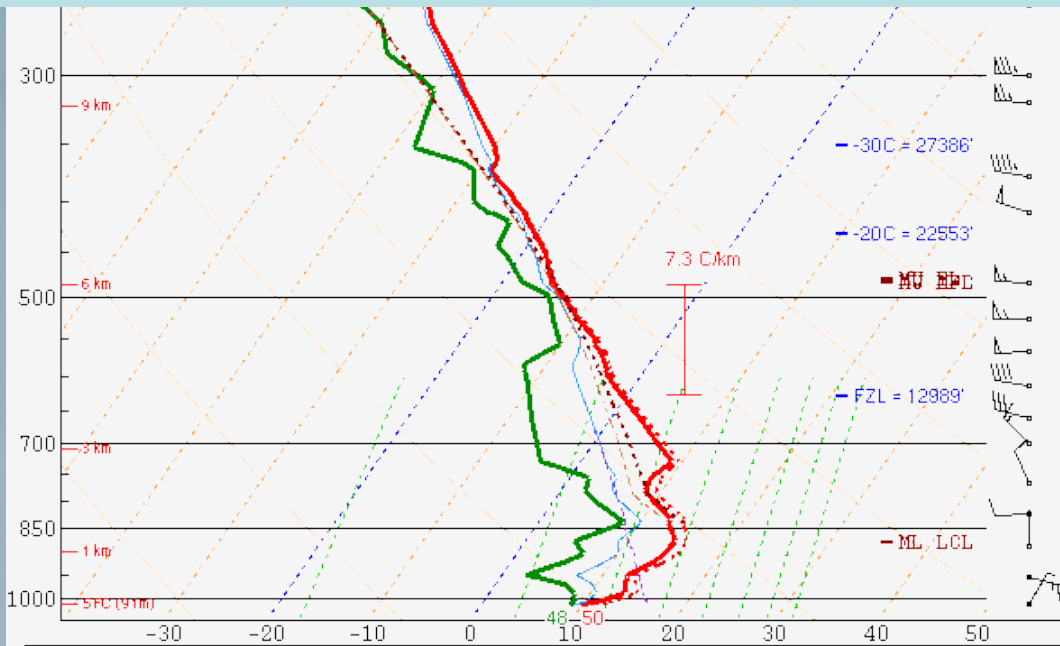
KSAN 191051Z 00000KT 10SM SCT015 17/13 A2996 RMK AO2 SLP166
T01670133 \$



Example of Cloud Heights/Icing



AIRMET ICE...OK TX AR TN LA MS
FROM OSW TO RZC TO 30N ARG TO 30SW DYR TO 40ENE SQS TO 40NW SQS
TO 40SW SQS TO 30SW ELD TO 60E TTT TO 30E ABI TO 60SSE MRF TO ELP
TO INK TO 30ESE TBE TO 50W LBL TO OSW
MOD ICE BTN FRZLVL AND FL250. FRZLVL 110-140. CONDS CONTG BYD 15Z
THRU 21Z. .



Where to Find Them & Explanations

- Latest Observed Soundings
 - <https://www.spc.noaa.gov/exper/soundings/>
- Sounding Interpretation Help
 - <https://www.spc.noaa.gov/exper/soundings/help/index.html>
- Explanation of Parameters
 - <https://www.spc.noaa.gov/exper/mesoanalysis/help/begin.html>
- Forecast Model Soundings
 - <https://www.tropicaltidbits.com/analysis/models/>
- Sounding Examples
 - https://www.weather.gov/jetstream/skewt_samples

National Aviation Weather Forecast Support



*National Weather Service
Pittsburgh, PA*

Aviation Weather Center

The screenshot shows the Aviation Weather Center website interface. At the top, there are logos for NOAA and the National Weather Service, followed by the text "AVIATION WEATHER CENTER" and "NOAA NATIONAL WEATHER SERVICE". Below this is a navigation bar with links for "HOME", "ADVISORIES", "FORECASTS", "OBSERVATIONS", "TOOLS", "NEWS", "SEARCH", "ABOUT", and "USER". A "Local Forecast" search box is on the left, and social media icons for Facebook and Twitter are on the right. The main content area is titled "Aviation Weather Overview" and includes tabs for "METARs", "TAFs", "AIR/PIREPs", "SIGMETs", and "G-AIRMETS". Below the tabs is a map of the United States with various weather symbols. A legend below the map defines the symbols: "Flt Cat: MVFR (blue dot), IFR (red dot), LIFR (purple dot)", "SIGMET (red square)", "CWA (red circle)", "GAIMET (orange square)", "PIREP Turb: NIL (blue circle), LGT (green triangle), MOD (orange triangle), SEV (red triangle)", "PIREP Ice: NIL (blue circle), LGT (green triangle), MOD (orange triangle), SEV (red triangle)", and "PIREP Other: (airplane icon)". A "Disclaimer" states: "International SIGMET locations approximated. Please refer to SIGMET text for full details". Below the legend is an "Interactive Maps" section with a dropdown menu set to "On". A "Mission Statement" and "Our Vision" section are also present.

Aviation Weather Center Mission Statement:
The Aviation Weather Center delivers consistent, timely and accurate weather information for the world airspace system. We are a team of highly skilled people dedicated to working with customers and partners to enhance safe and efficient flight.

Our Vision:
To be the trusted authority and leading innovator for aviation weather information.

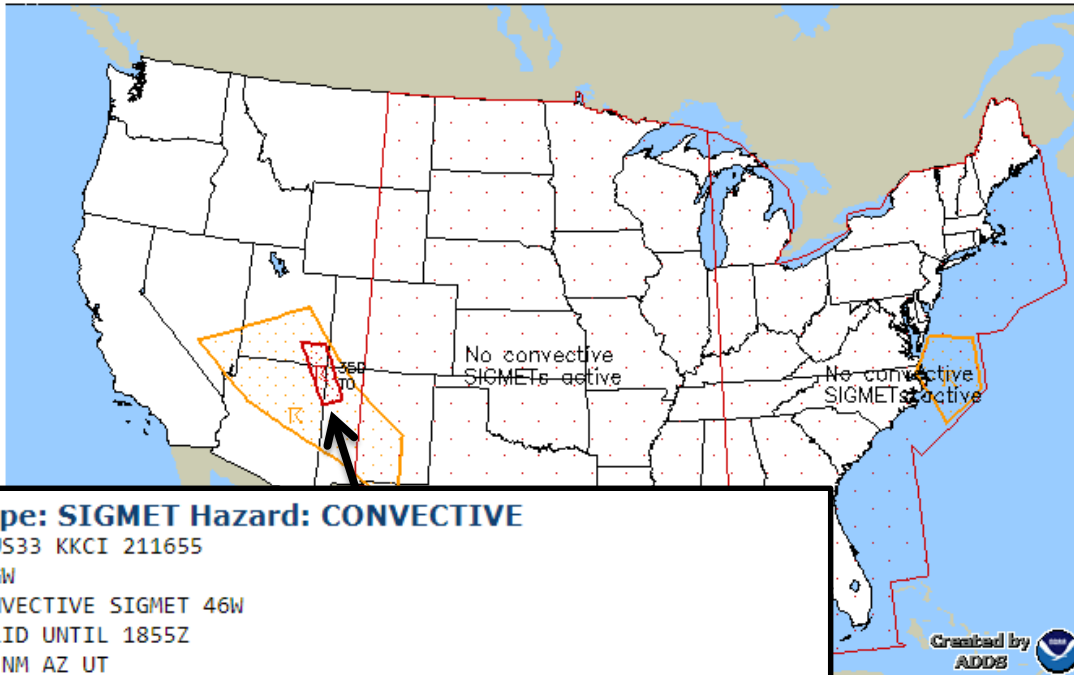
• <https://www.aviationweather.gov/>



Convective SIGMETs

Convective SIGMETs (red) and outlooks (orange)

chart created at 1705 UTC Thu 21 Mar 2019



Type: SIGMET Hazard: CONVECTIVE

WSUS33 KPCI 211655

SIGW

CONVECTIVE SIGMET 46W

VALID UNTIL 1855Z

CO NM AZ UT

FROM 20WNNV DVC-70S RSK-50N SJN-30S HVE-20WNNV DVC

AREA EMBD TS MOV FROM 19025KT. TOPS TO FL350.

OUTLOOK VALID 211855-212255

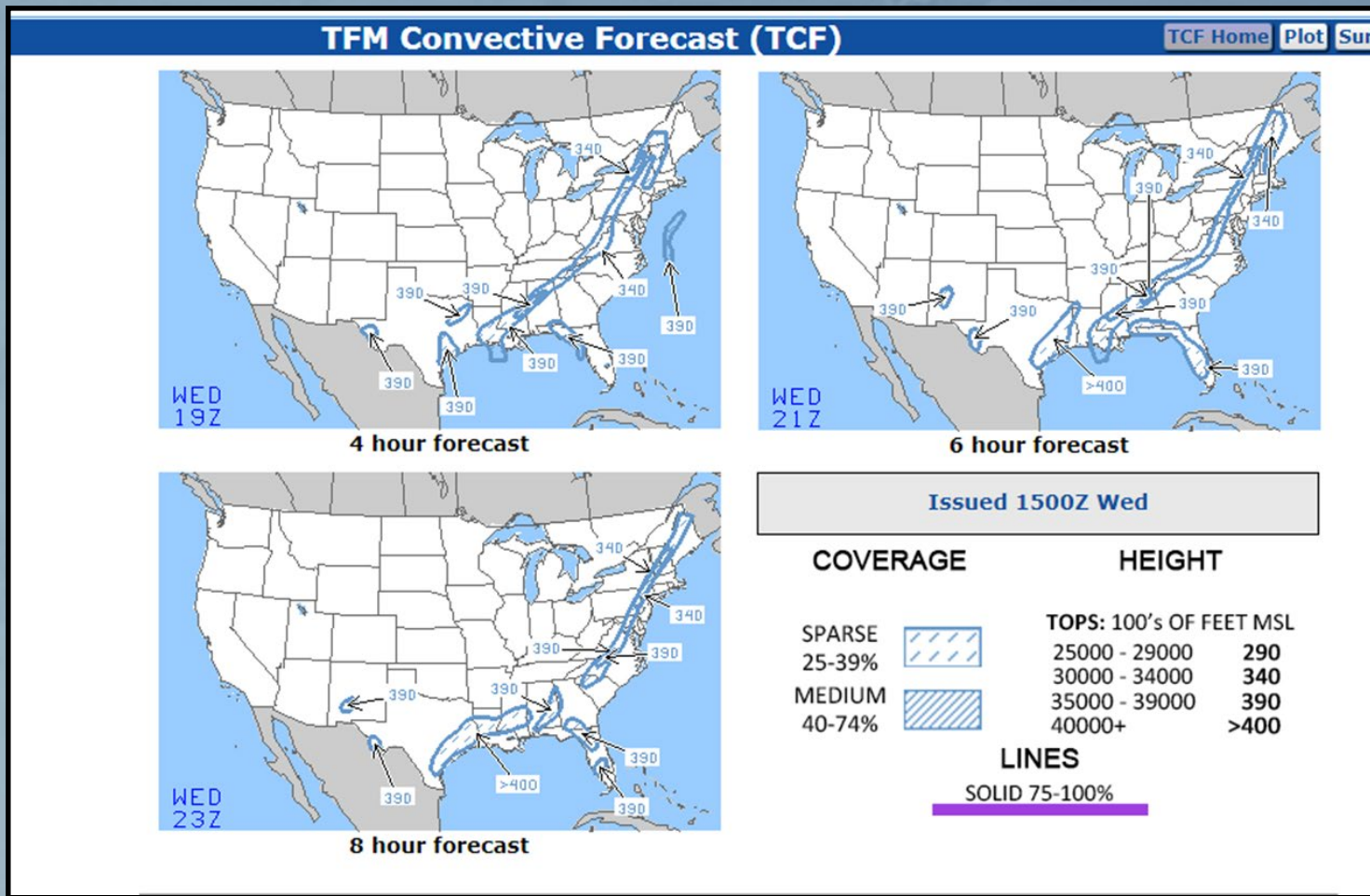
FROM 40SSW MTU-50SE RSK-50N CME-50SW MRF-ELP-30NNW DMN-60NE

PHX-40SSE PGS-40NNE BTY-40SSW MTU

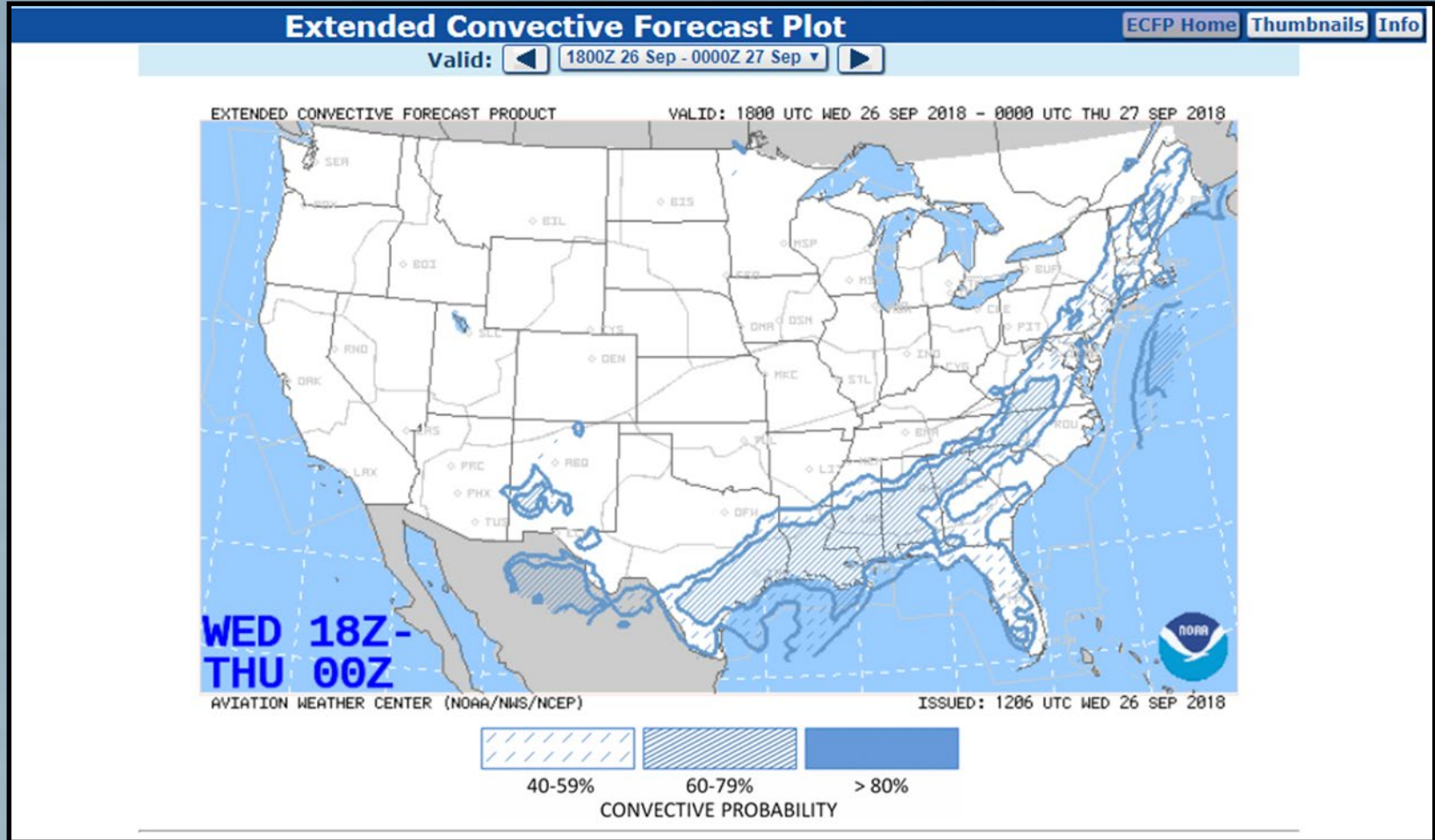
WST ISSUANCES POSS. REFER TO MOST RECENT ACUS01 KWNS FROM STORM PREDICTION CENTER FOR SYNOPSIS AND METEOROLOGICAL DETAILS.

- **Line of thunderstorms** at least 60 miles long with thunderstorms affecting 40% of its length.
- **Area of thunderstorms** affecting at least 3000 square miles covering at least 40% of the area and exhibiting a very strong radar reflectivity or a significant satellite or lightning signature.
- **Embedded or severe thunderstorms** expected to occur for more than 30 minutes.

TCF: Traffic Convective Forecast



ECFP: Extended Convective Forecast Product



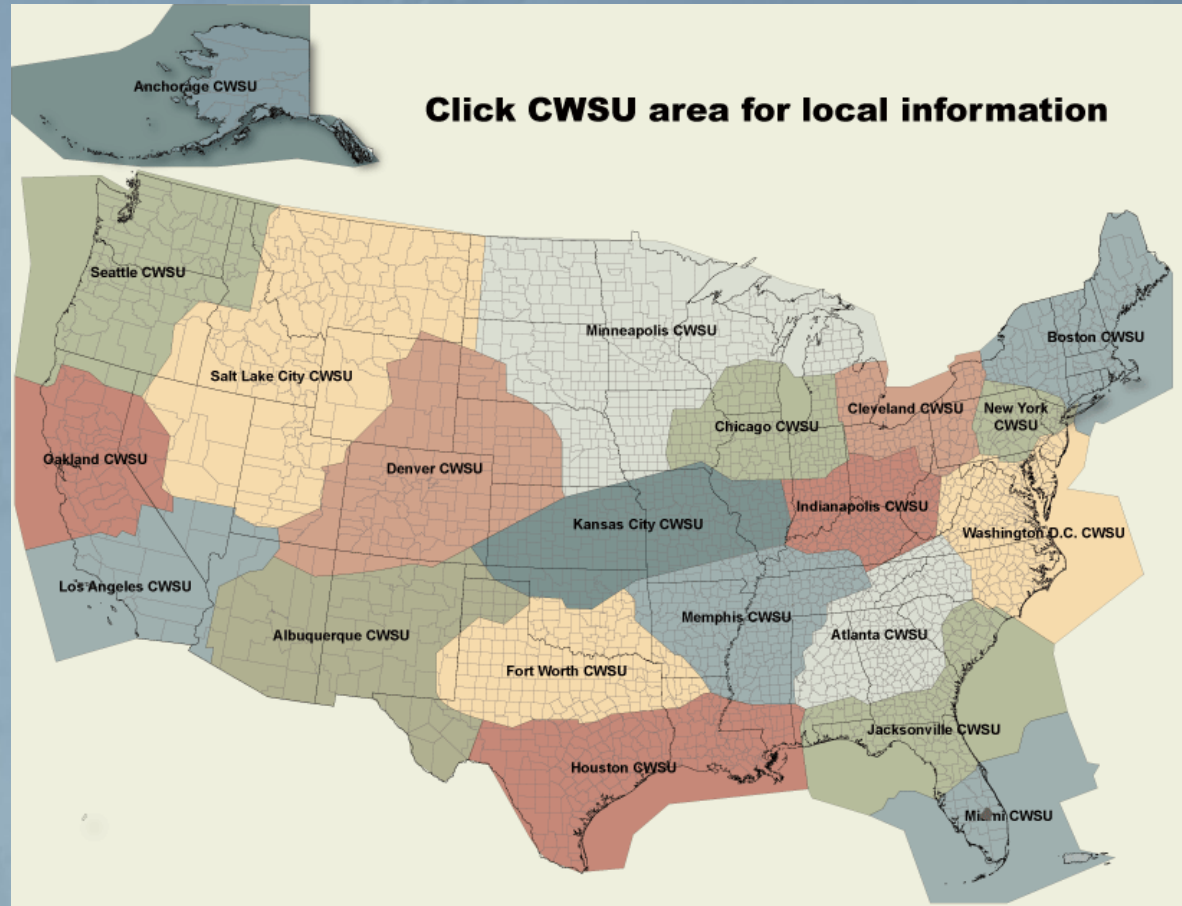
Center Weather Service Unit Support



*National Weather Service
Pittsburgh, PA*

Center Weather Service Units (CWSUs)

- Joint FAA / NWS weather support units
 - Staffed 16 hours per day by NWS personnel
 - Staffed 24 hours per day by Traffic Management Unit personnel



CWSU Issued Products

- CWA: Center Weather Advisory
 - Aviation weather warning for conditions meeting or approaching national in-flight advisory criteria (AIRMET / SIGMET)
 - Includes Convection, Icing, Turbulence, Heavy Precipitation, Frozen Precipitation, Low IFR, SFC winds/gusts > 30kts, LLWS, Volcanic Ash, Dust storms, Sandstorms
 - Used to provide real-time or near-term guidance during en-route or terminal environments
 - Valid for up to 2 hours
- MIS: Meteorological Impact Statement
 - Unscheduled flow control and flight operations planning forecast
 - Details weather conditions expected to adversely impact air traffic flow
 - Valid up to 12 hours after issuance time



Cleveland CWSU Observation Display

NWS Cleveland Center Weather Service Unit

Weather.gov > Cleveland CWSU

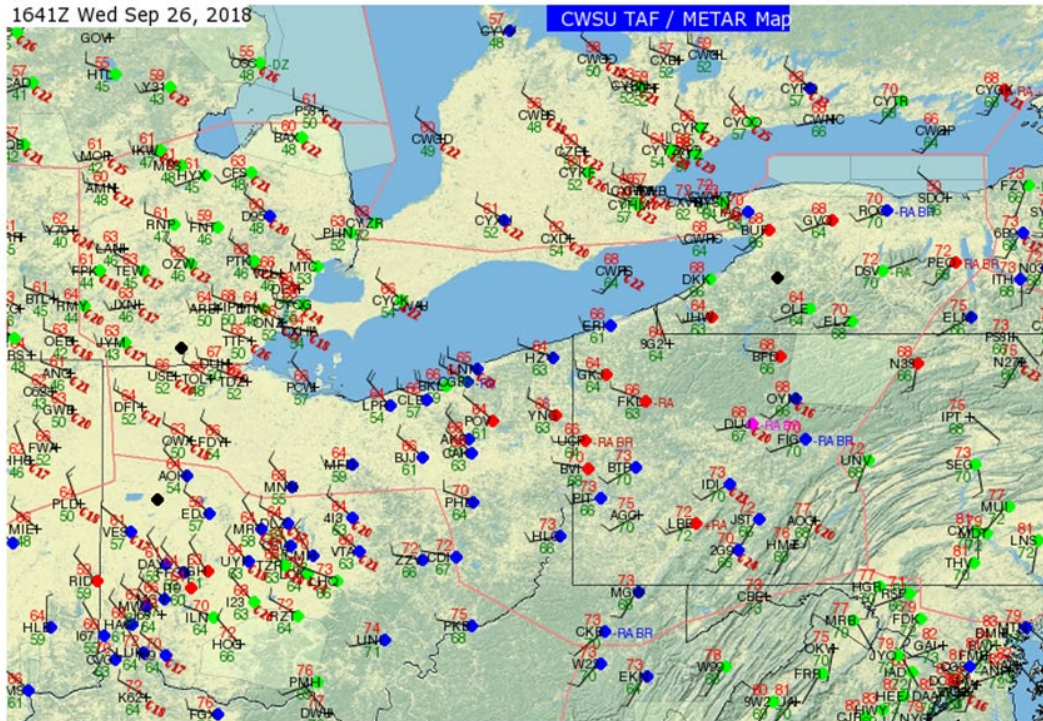
Cleveland CWSU

Center Weather Service Unit

[Current Hazards](#) [Current Conditions](#) [Radar](#) [Forecasts](#) [Strategic Planning Aids](#) [Tactical Planning Aids](#) [Additional Info](#)

1641Z Wed Sep 26, 2018

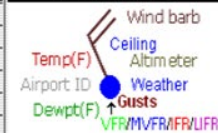
CWSU TAF / METAR Map



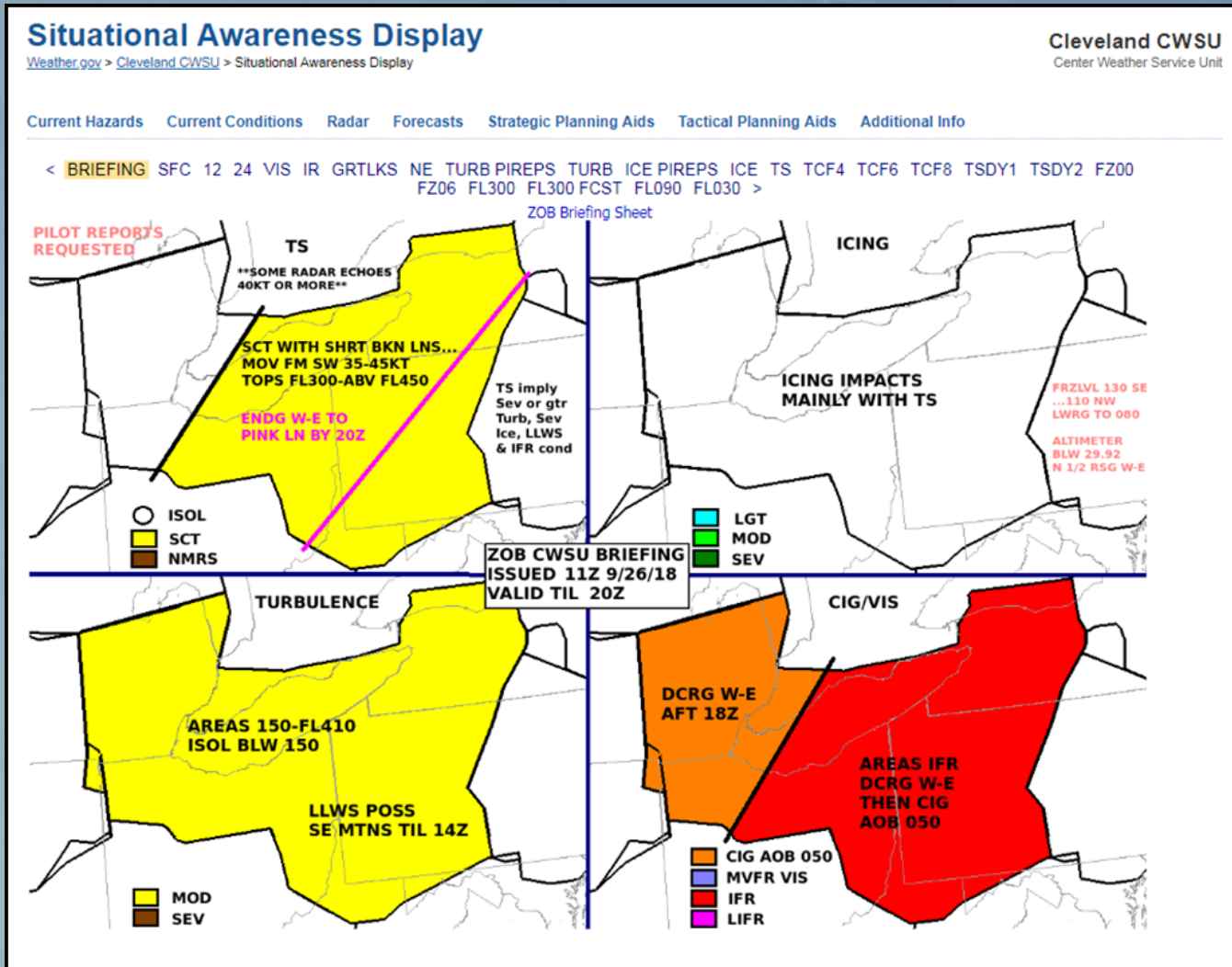
FLIGHT CATEGORY RULES

SYMBOL	CAT	CIG (ft agl)	Boolean	VIS (miles)
● (magenta)	LIFR	<500	and/or	<1
● (red)	IFR	500 to <1000	and/or	1 to <3
● (blue)	MVFR	1000 to 3000	and/or	3 to 5
● (green)	VFR	>3000	and	>5
+	VFR and/or no CIG reported			

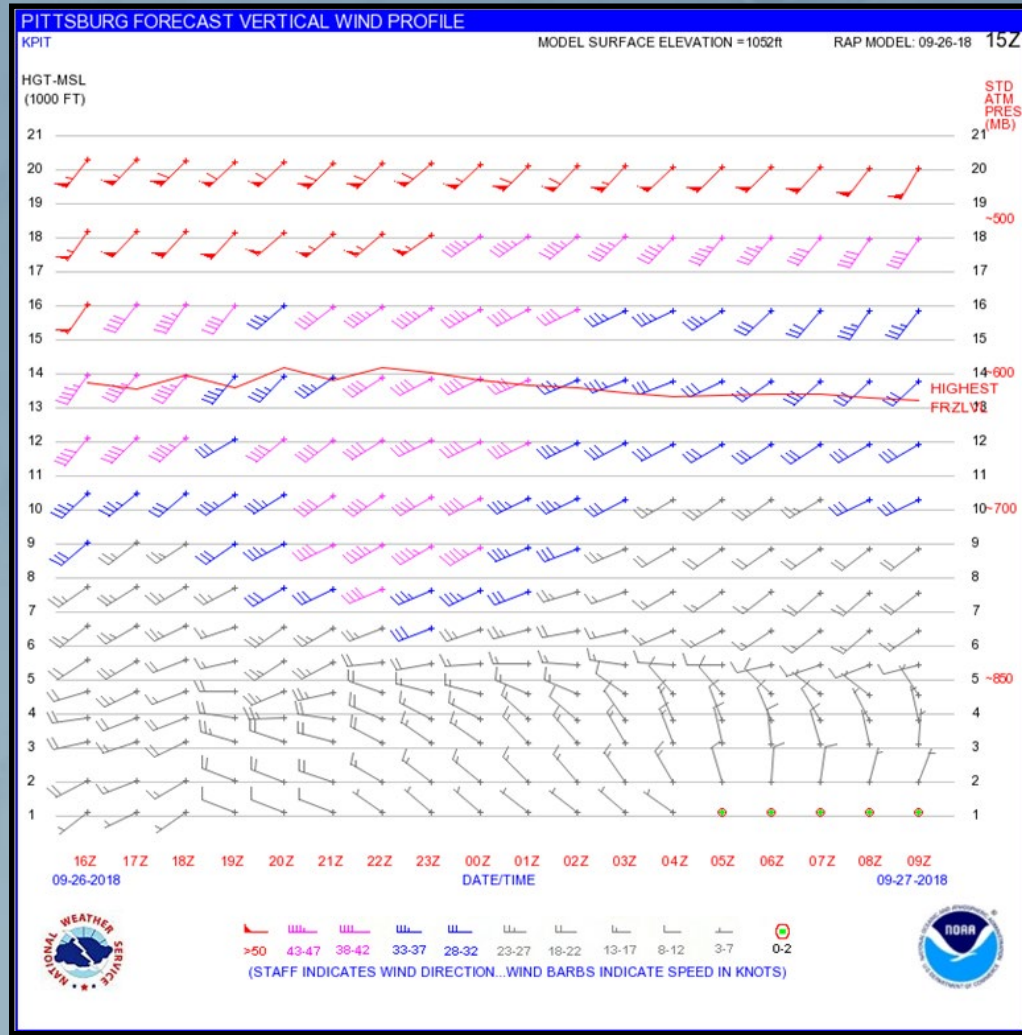
METAR Data Key



Situational Awareness Display Briefings



Forecast Vertical Wind Profile



National Weather Service Pittsburgh Support



*National Weather Service
Pittsburgh, PA*

Pittsburgh NWS Website

Pittsburgh Aviation Page Pittsburgh, PA
Weather Forecast Office

Weather.gov > Pittsburgh, PA > Pittsburgh Aviation Page

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Pittsburgh International Airport

Scroll over for the latest:

[Terminal Aerodrome Forecast](#)

[Aviation Forecast Discussion](#)

Terminal Impact Board	Hourly - Tabular forecast
24 hours of observations	Hourly - Graph forecast
Model Vertical Wind Profile	7-day forecast
FAA Terminal details	

[Current Surface Observation Map](#)

[Current Radar and Satellite Imagery](#)

[Surface Analysis and Surface Forecast Charts](#)

[Center Weather Service Units](#)

[Aviation Weather Center](#)

- <https://www.weather.gov/pbz/aviation>

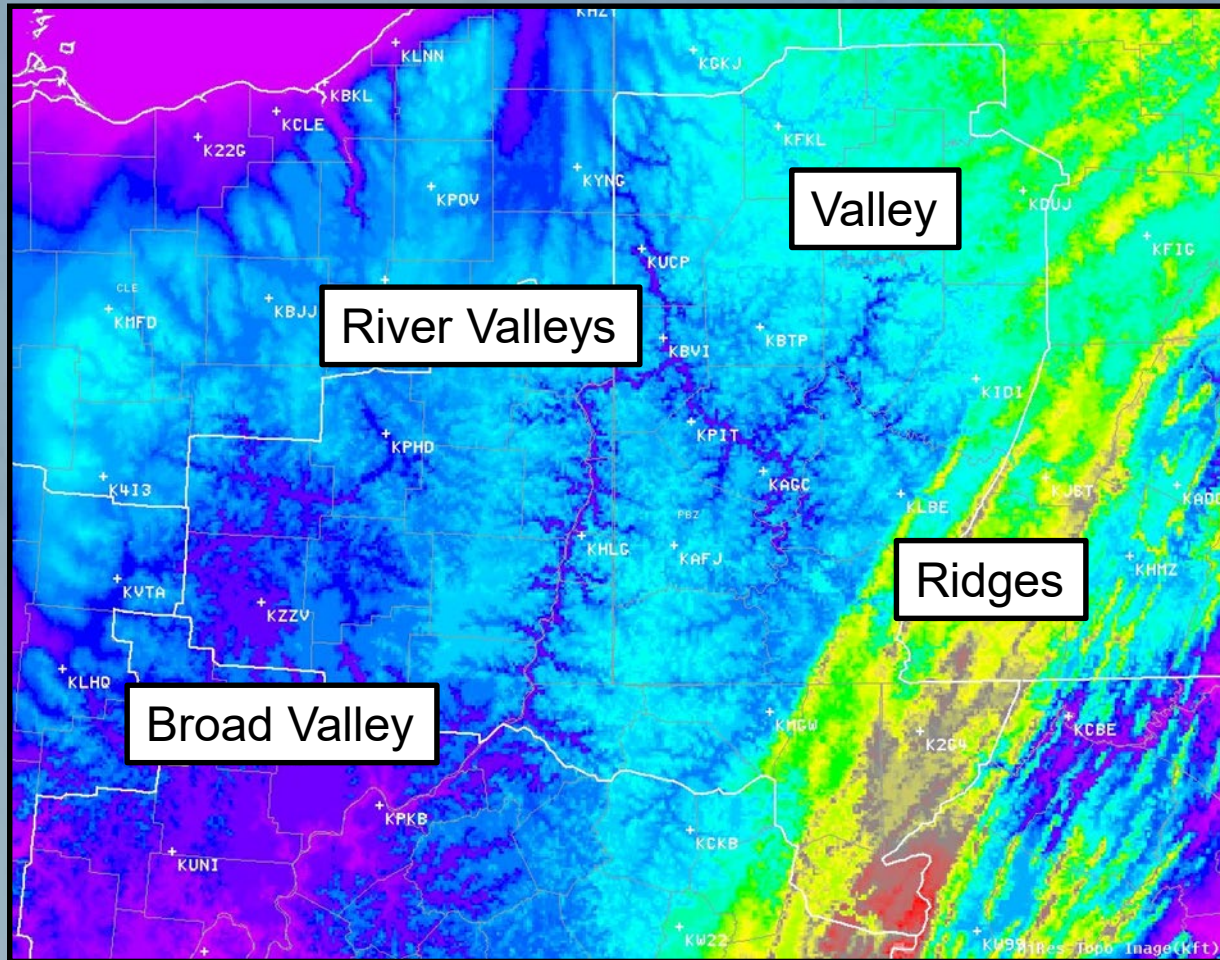


Pittsburgh NWS

- Staffed 24/7
- Issues TAFs for the following airports every 6 hours:
 - KPIT, KAGC, KBVI, KLBE, KHLG, KMGW, KZZV, KFKL, KDUJ
 - Issues amendment TAF for KPIT every 3 hours
- Supports TAFs with Aviation Weather Discussions
- Local area expertise; knowledge of terrain, local climate impacts
- Contact information for local aviation support:
 - 412-262-1591

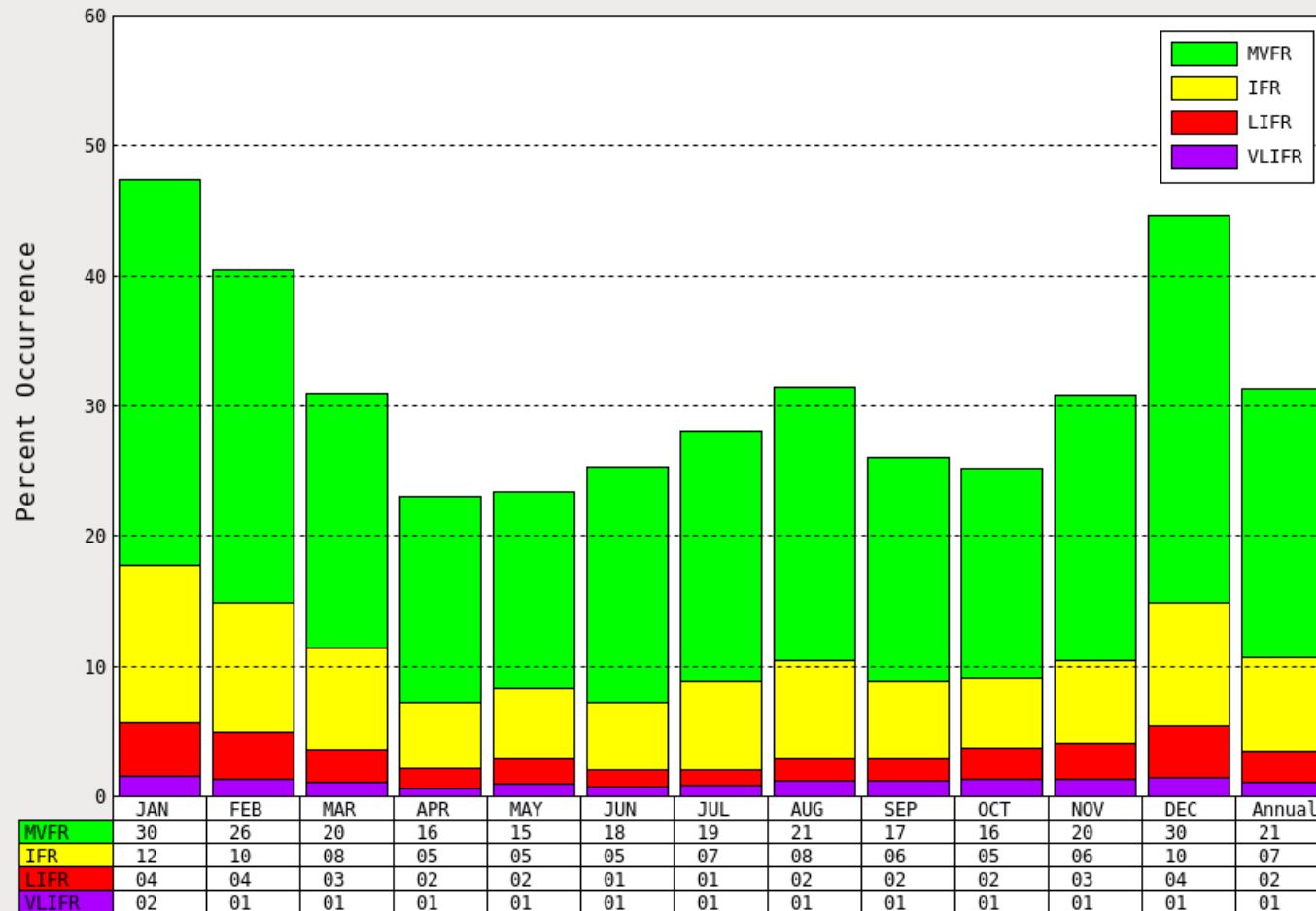


Topography Considerations



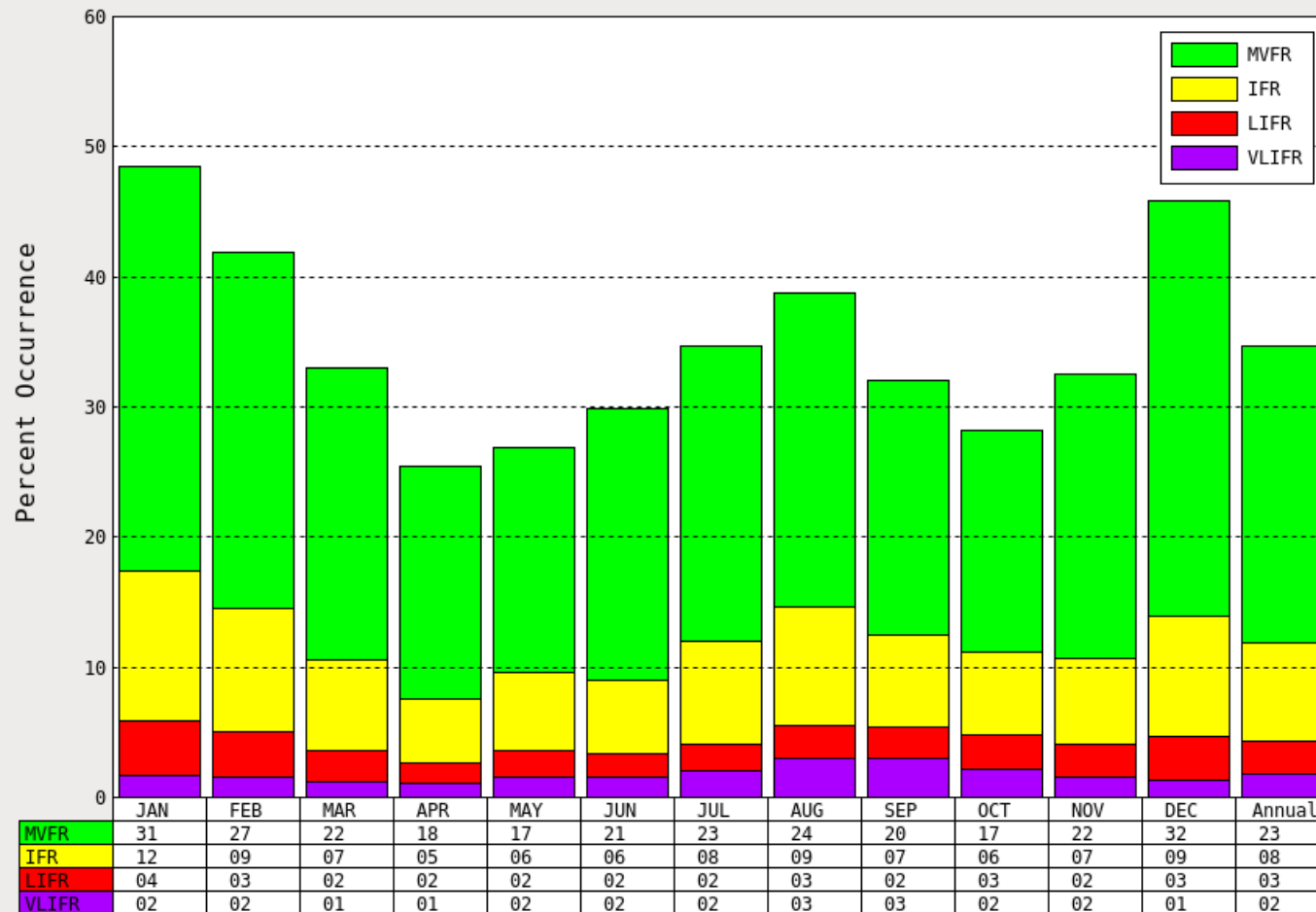
KPIT Climatology

KPIT Flight Category 00-23Z (1973-2018)



KHLG Climatology

KHLG Flight Category 00-23Z (1973-2018)



TAF Amendments for Area Airports

PITTSBURGH, PA							
	CAT A	CAT B	CAT C	CAT D ≤	CAT E	CAT F	APPROACH
AGC	200 - 3/4	600 - 2	1000 - 3	3000 - 5	2000 - 3		ILS OR LOC RWY 10
BVI	400 - 1	800 - 2	1000 - 3	3000 - 5	2000 - 3		LOC RWY 10
DUJ	200 - 1/2	600 - 2	1000 - 3	3000 - 5	2000 - 3		ILS OR LOC RWY 25
FKL	200 - 1/2	600 - 2	1000 - 3	3000 - 5	2000 - 3		ILS OR LOC RWY 21
HLG	200 - 1	700 - 2	1000 - 3	3000 - 5	2000 - 3		ILS RWY 03
LBE	200 - 1/2	1200 - 2	1000 - 3	3000 - 5	2000 - 3		ILS RWY 24
MGW	200 - 1/2	600-2	1000 - 3	3000 - 5	2000 - 3		ILS RWY 18
PIT	200 - 1/2	400 - 1	1000 - 3	3000 - 5	2000 - 3		ILS OR LOC RWY 10L/R, 28L/R
ZZV	200 - 3/4	600 - 2	1000 - 3	3000 - 5	2000 - 3		ILS RWY 22

- CAT E- Additional fuel required when forecast <2000/3
- CAT D–MVFR
- CAT C–IFR
- CAT B- Airport can not be used as an alternate
- CAT A- Airfield minimums

Aviation Discussion

Why is it important to read the Aviation Discussion?

- Can provide forecaster confidence in TAF
 - What he / she may be leaving out of TAF but still concerned about
- Wind Shifts during frontal passages
- Start/end time of weather event
- Type of thunderstorms, duration, timing
- Liquid water equivalent
- Low level wind shear concerns
- Restriction outlook

AVIATION /08Z WEDNESDAY THROUGH SUNDAY/

A FEW SCATTERED SHOWERS MOVING BACK INTO THE REGION EARLY THIS MORNING. VFR CONDITIONS PREVAIL AT ALL SITES BUT FKL WHERE -RA HAS DROPPED CIGS INTO MVFR. MVFR/IFR CONDITIONS ARE EXPECTED TO DEVELOP OVER THE NEXT SEVERAL HOURS, ESPECIALLY WITH INCREASING COVERAGE OF SHOWERS. THUNDERSTORMS ARE EXPECTED TO DEVELOP DURING THE MORNING AND AFTERNOON HOURS AHEAD OF A COLD FRONT. GUSTS OF 20-25KTS ARE EXPECTED IN THE LATE MORNING. CIGS WILL BEGIN LIFTING DURING THE LATE AFTERNOON, RETURNING ALL SITES TO VFR BY 00Z.

OUTLOOK... FLIGHT RESTRICTIONS MAY LINGER THURSDAY NIGHT INTO EARLY FRIDAY MORNING AS SCATTERED RAIN SHOWERS PUSH IN FROM THE SOUTHWEST.

.AVIATION /13Z WEDNESDAY THROUGH SUNDAY/...

MVFR/IFR conditions are expected as showers and thunderstorms cross the terminals through the afternoon with a cold front passage. Expect sw wind shifting to w-nw through the evening, and wind gusts to 25kts possible (higher in thunderstorms). CIGS will begin lifting during the late afternoon, returning all sites to VFR by 00z.

Outlook... Flight restrictions may linger Thursday night into early Friday morning as scattered rain showers push in from the southwest.



Thank you!



*National Weather Service
Pittsburgh, PA*