

Utilizing NWS as an Important Aviation Tool

NWS PITTSBURGH



*National Weather Service
Pittsburgh, PA*

Introduction

- The National Weather Service supports the aviation community on many different levels:
 - National: Aviation Weather Center (AWC)
 - Regional: Center Weather Service Units (CWSUs)
 - Local: Weather Forecast Offices (WFOs)
- This presentation will provide insight into how each level of NWS supports General Aviation interests, what products are offered, and where to find them.

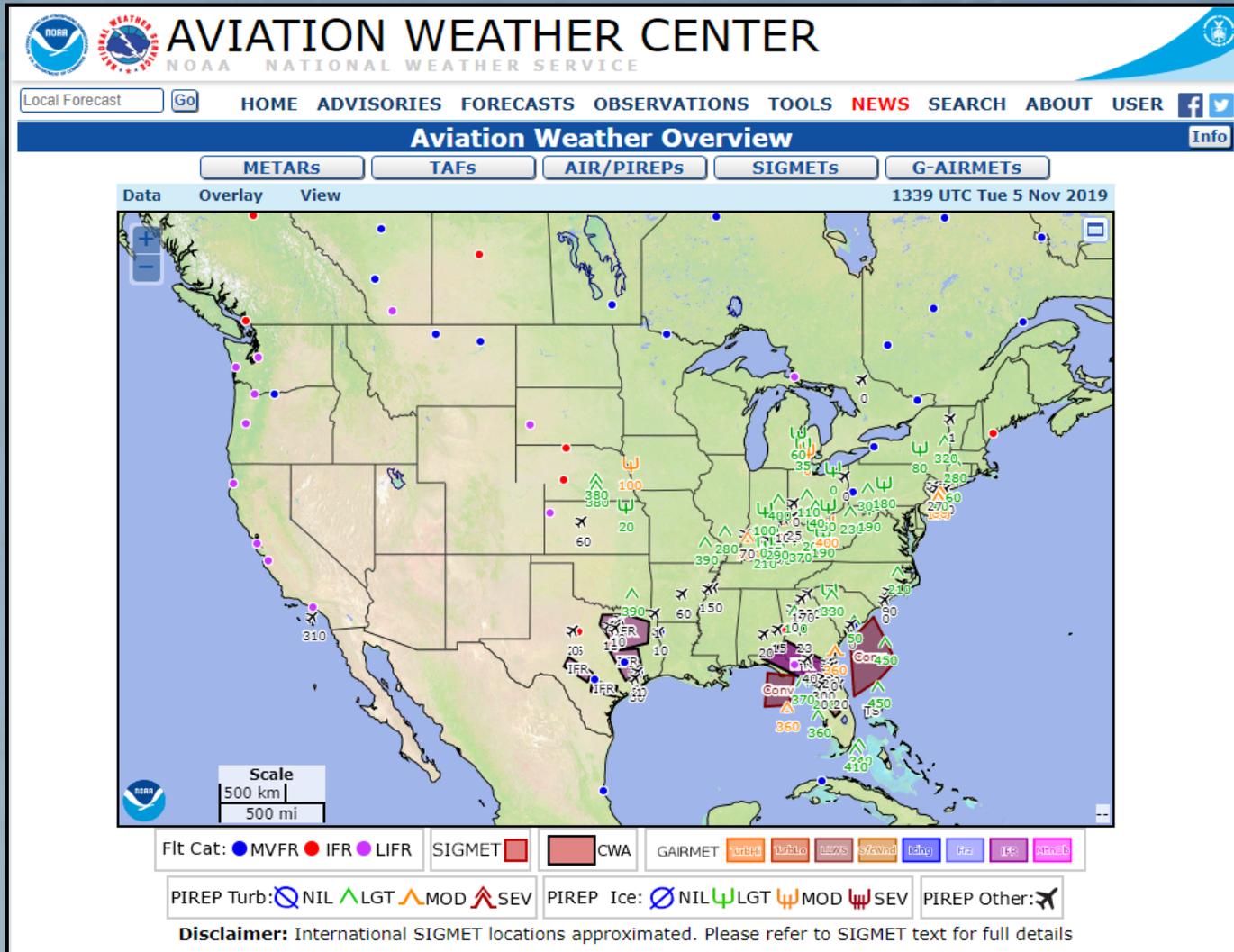


Flight Planning Questions

- Do I have airport weather minimums for takeoff / landing?
- Do I need an alternate?
 - ceiling $<$ or equal to 2000ft
 - visibility $<$ or equal to 3SM
- Are there any problems en-route such as turbulence, icing, etc.?
- Are there any current problems with ATC?
- What is the de-icing capacity at my takeoff airport and where does it take place?
- What limitations do I have with my aircraft?
- What are the ramp conditions at destination?
- What is the runway braking action?



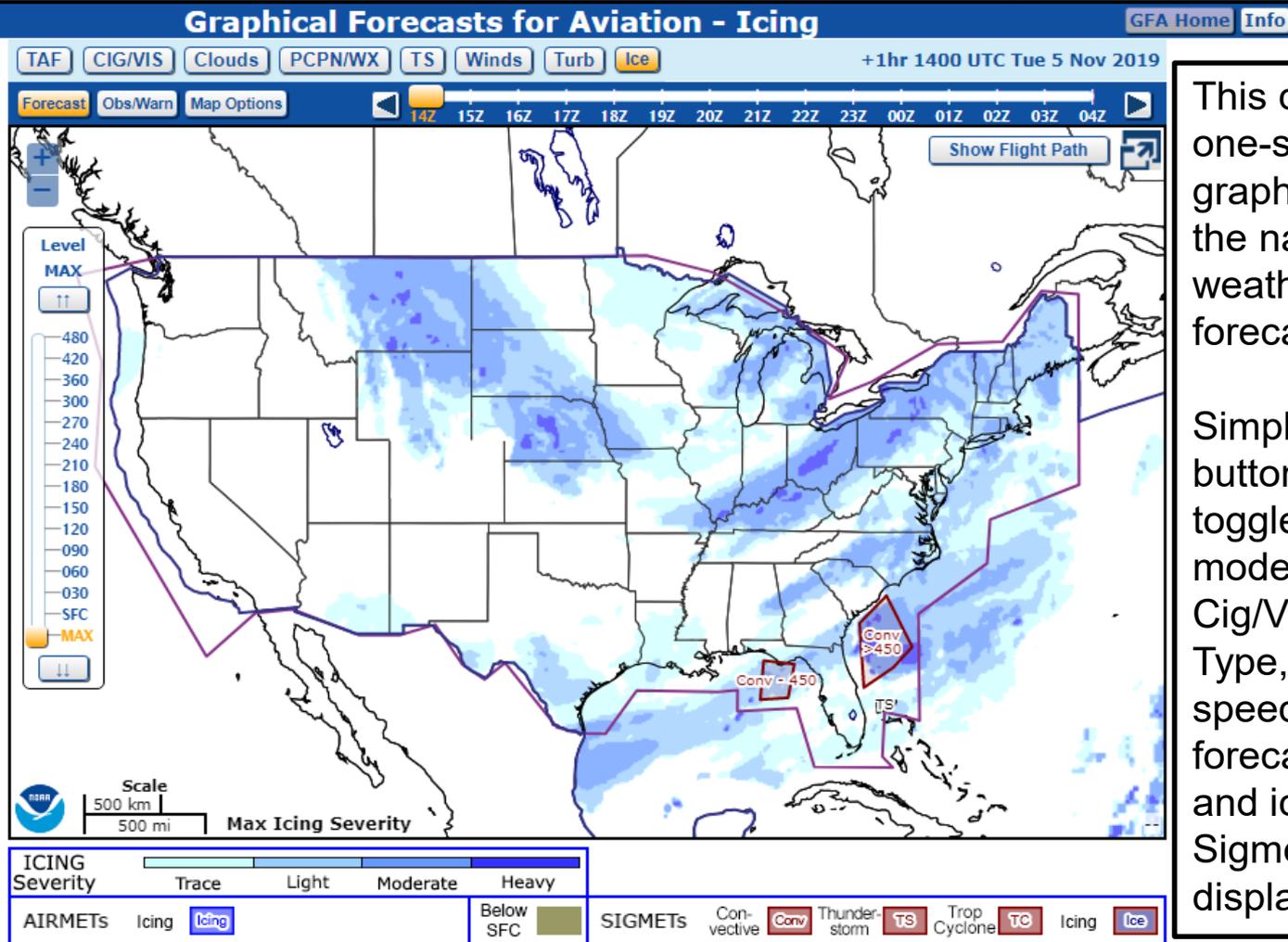
National Support



Aviation Weather Center



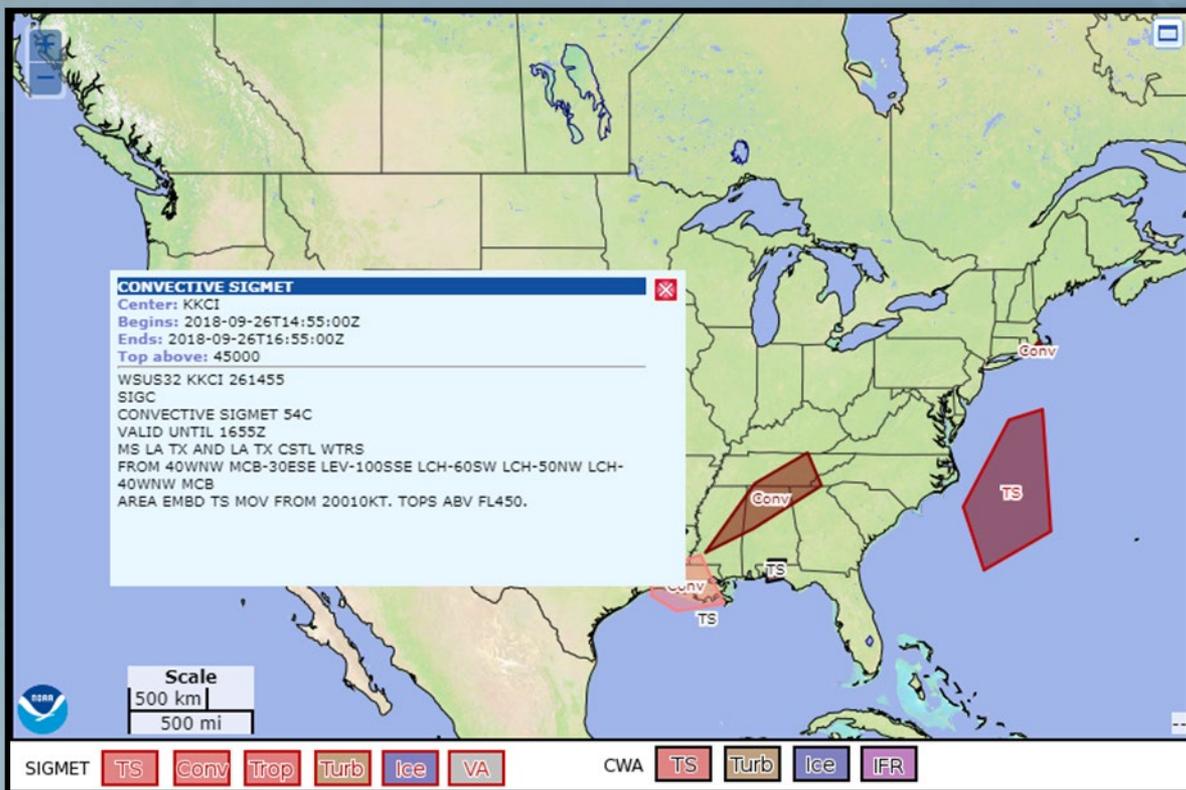
Graphical Forecasts for Aviation



This dynamic map is a one-stop shop to see a graphical display of all the national aviation weather products and forecasts.

Simply click through the buttons at the top to toggle between TAFs, model forecasts of Cig/Vis/Clouds/Precip/Wx Type, forecasted wind speed by height, forecasted Turbulence and icing with Sigmet/Airmets displayed.

SIGMETS / AIRMETS

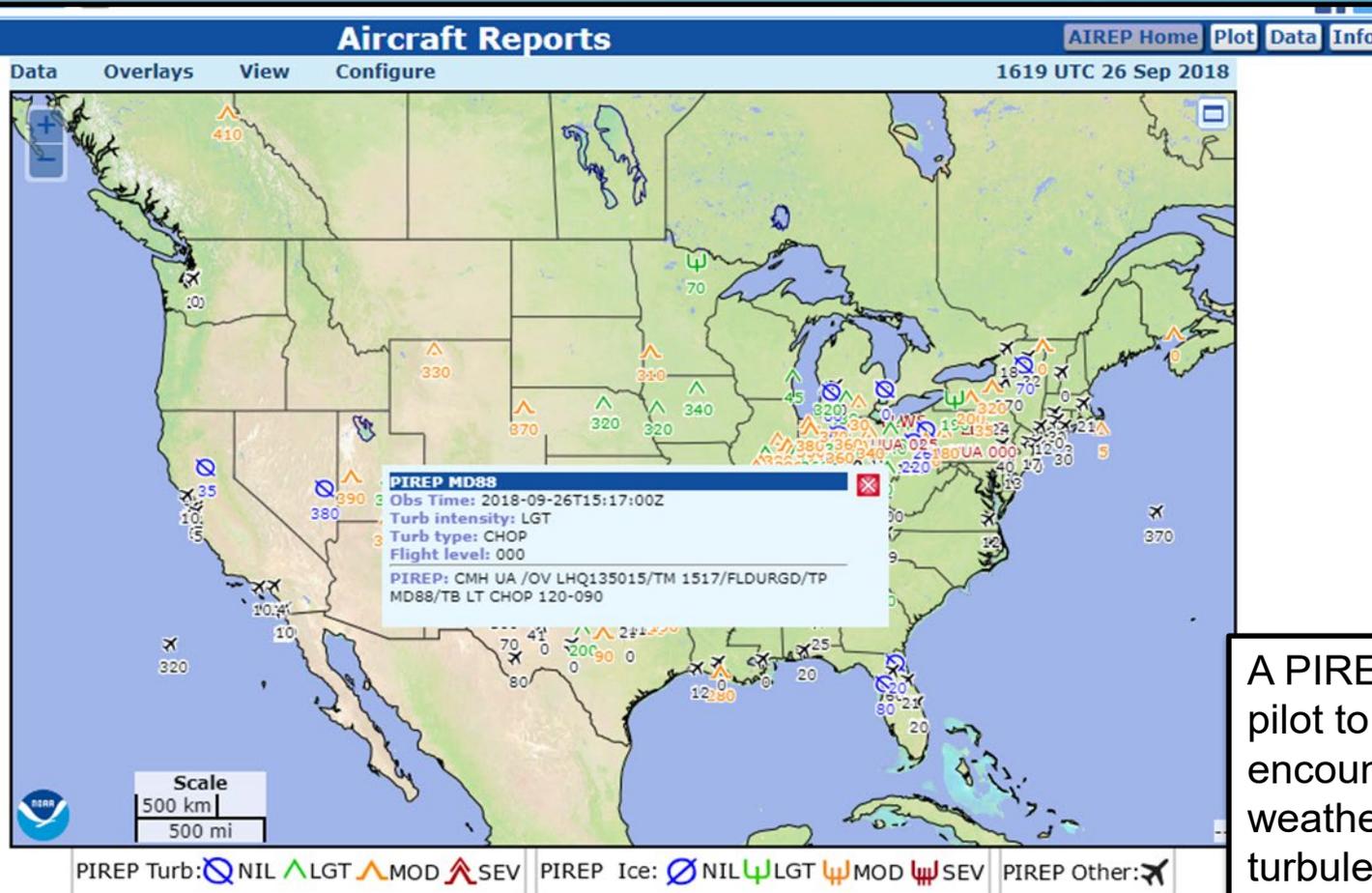


Airmen's Meteorological Information, is a concise description of weather phenomena that are occurring or may occur (forecast) along an air route that may affect aircraft safety.

... **AIRMETS** are broadcast on the ATIS at ATC facilities, and are referred to as Weather Advisories.

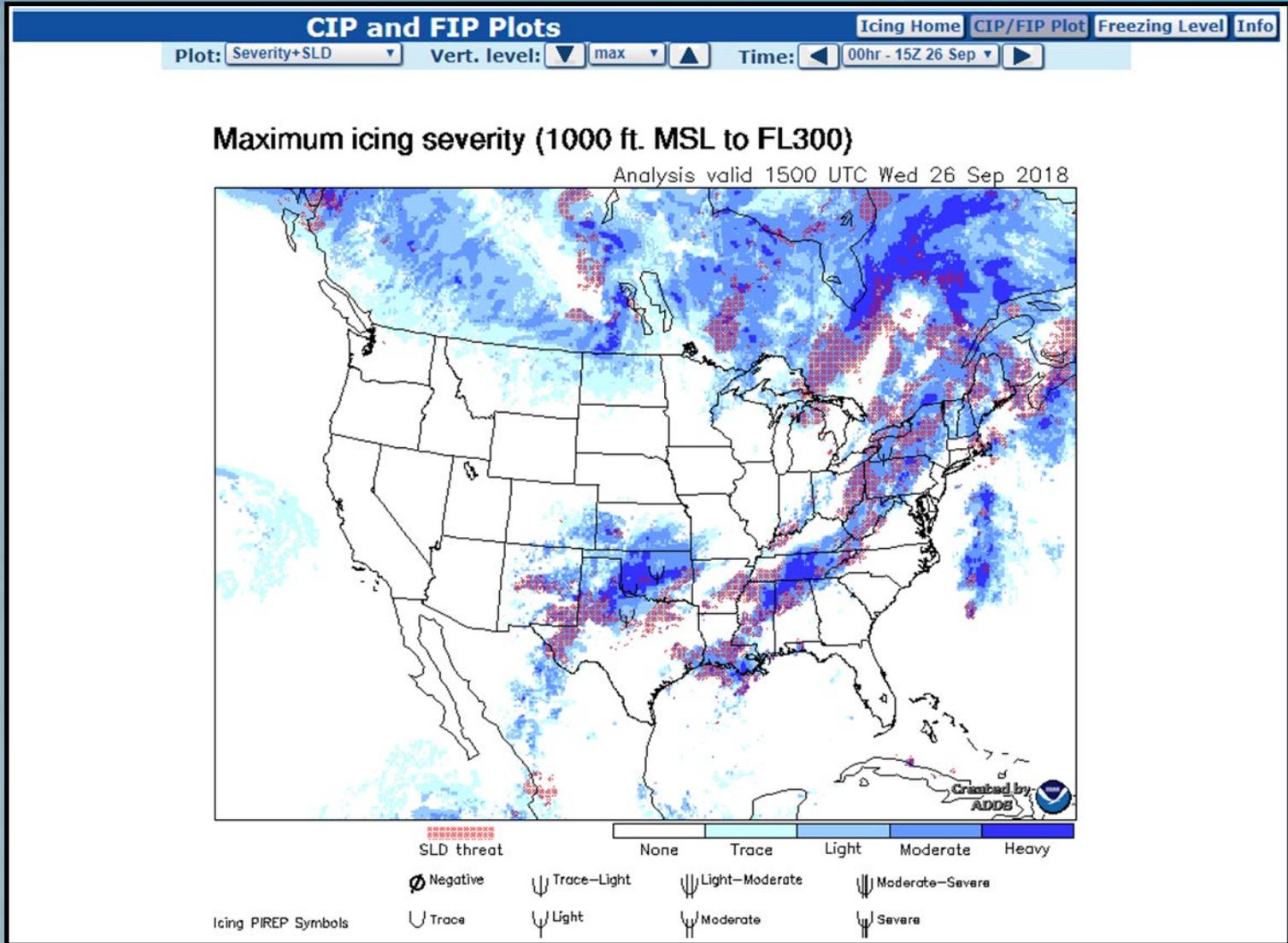
Significant Meteorological Information, is a weather advisory that contains meteorological information concerning the safety of all aircraft. There are two types of **SIGMETs**: convective and non-convective.

Pilot Reports - PIREPS



A PIREP is reported by a pilot to indicate encounters of hazardous weather such as icing, turbulence, runway braking action, etc.

Icing Guidance: CIP & FIP



Icing: Freezing Level Analysis

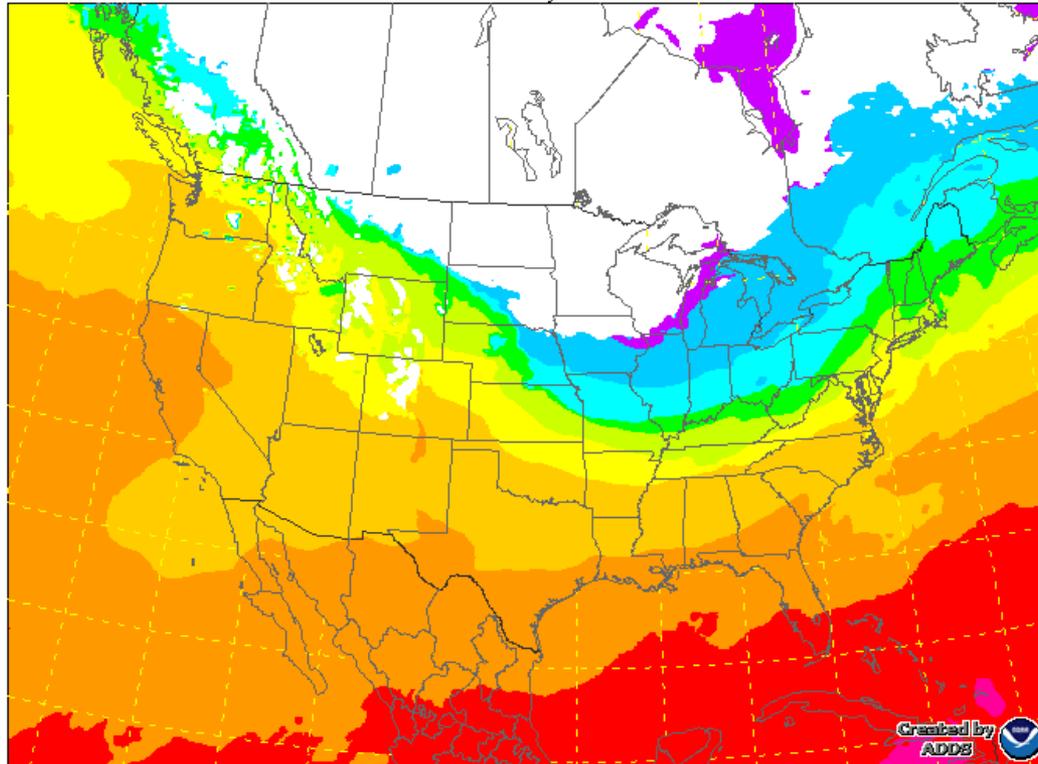
Current Freezing Level Forecast

[Icing Home](#) [CIP/FIP Plot](#) [Freezing Level](#) [Info](#)

Time: ◀ 00hr - 17Z 05 Nov ▶

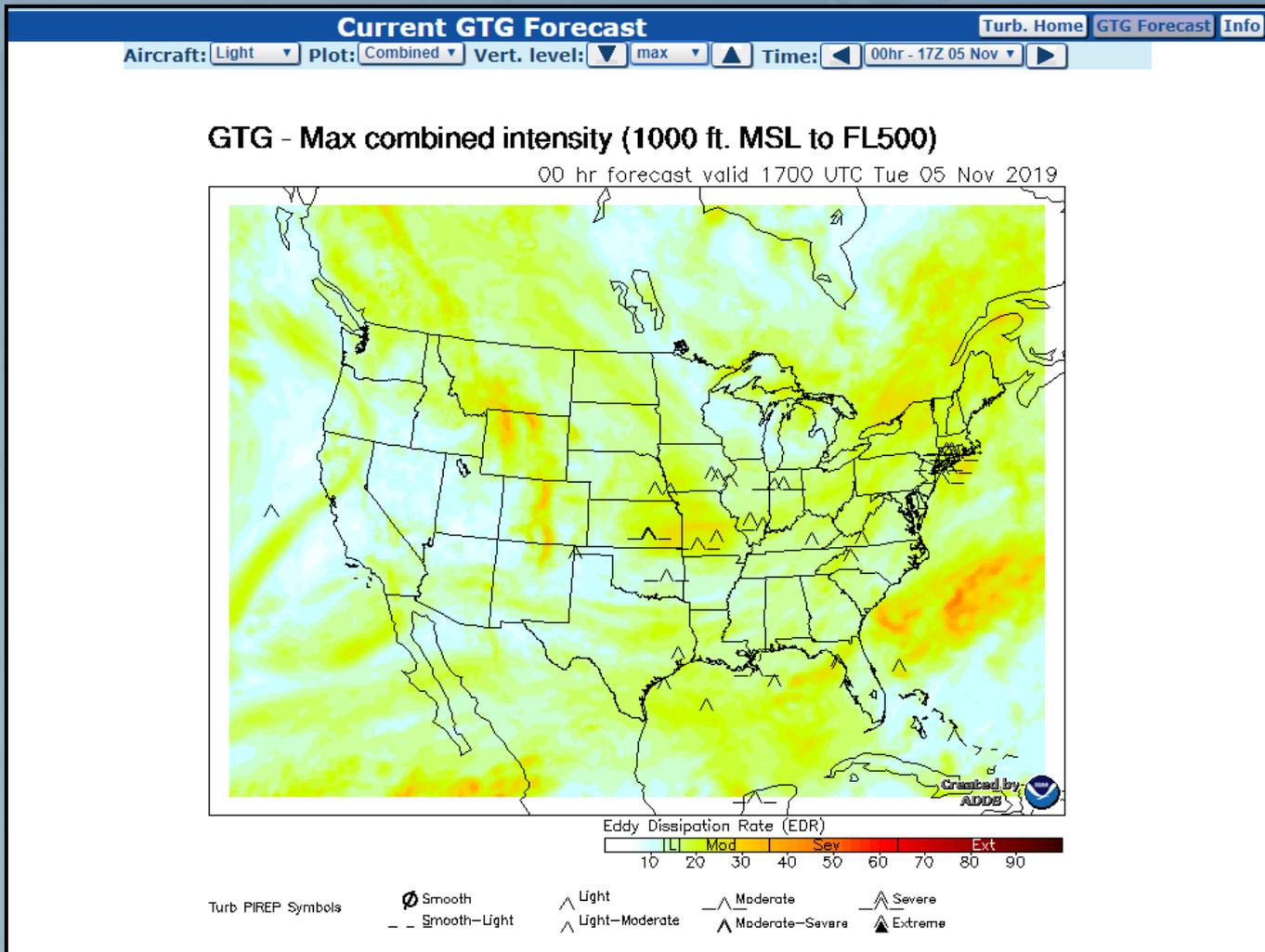
Lowest freezing level (100s of feet MSL)

Analysis valid 1700 UTC Tue 05 Nov 2019

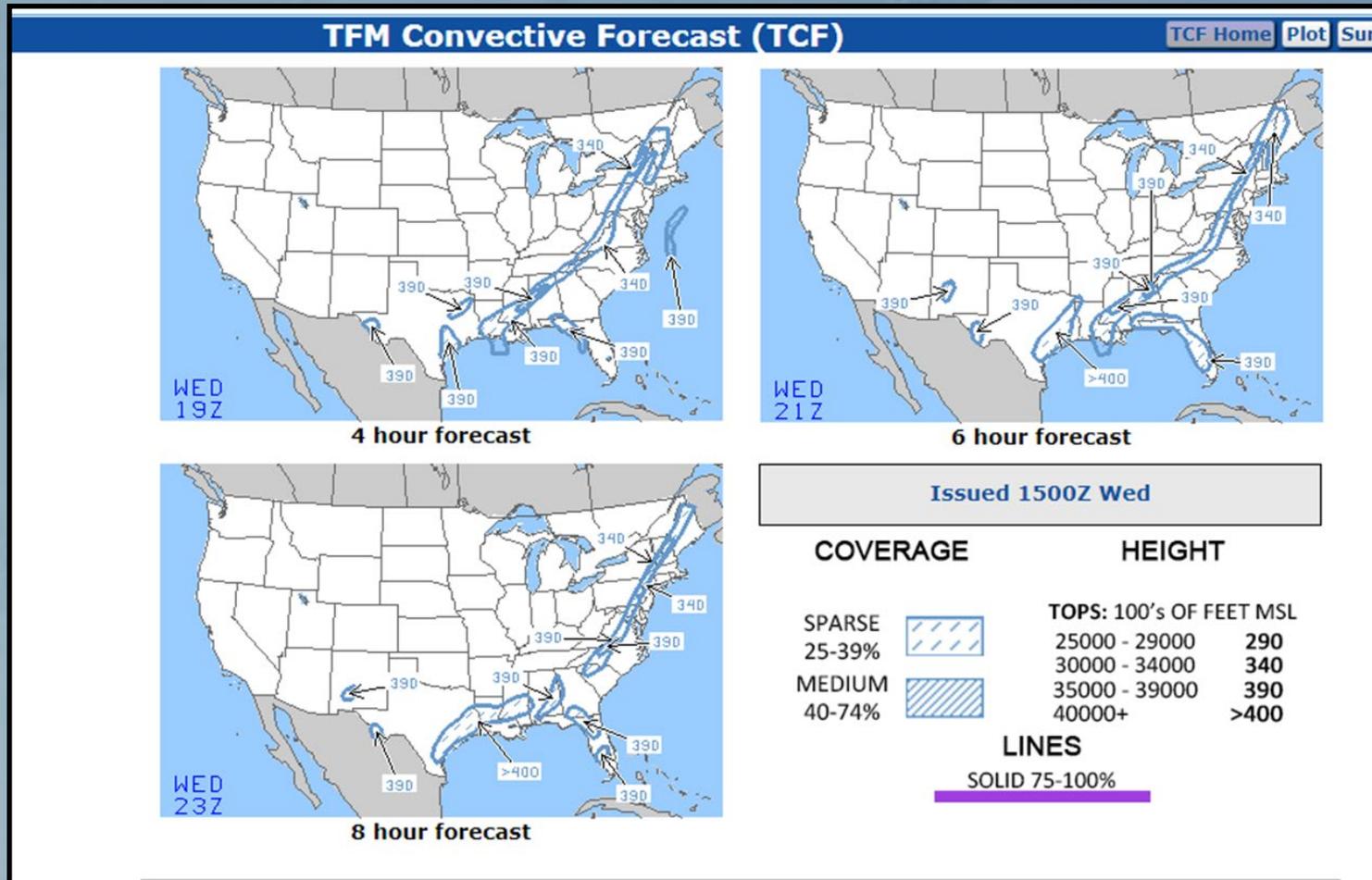


Sfc 010 030 050 070 090 110 130 150 170+
(100s of feet MSL)

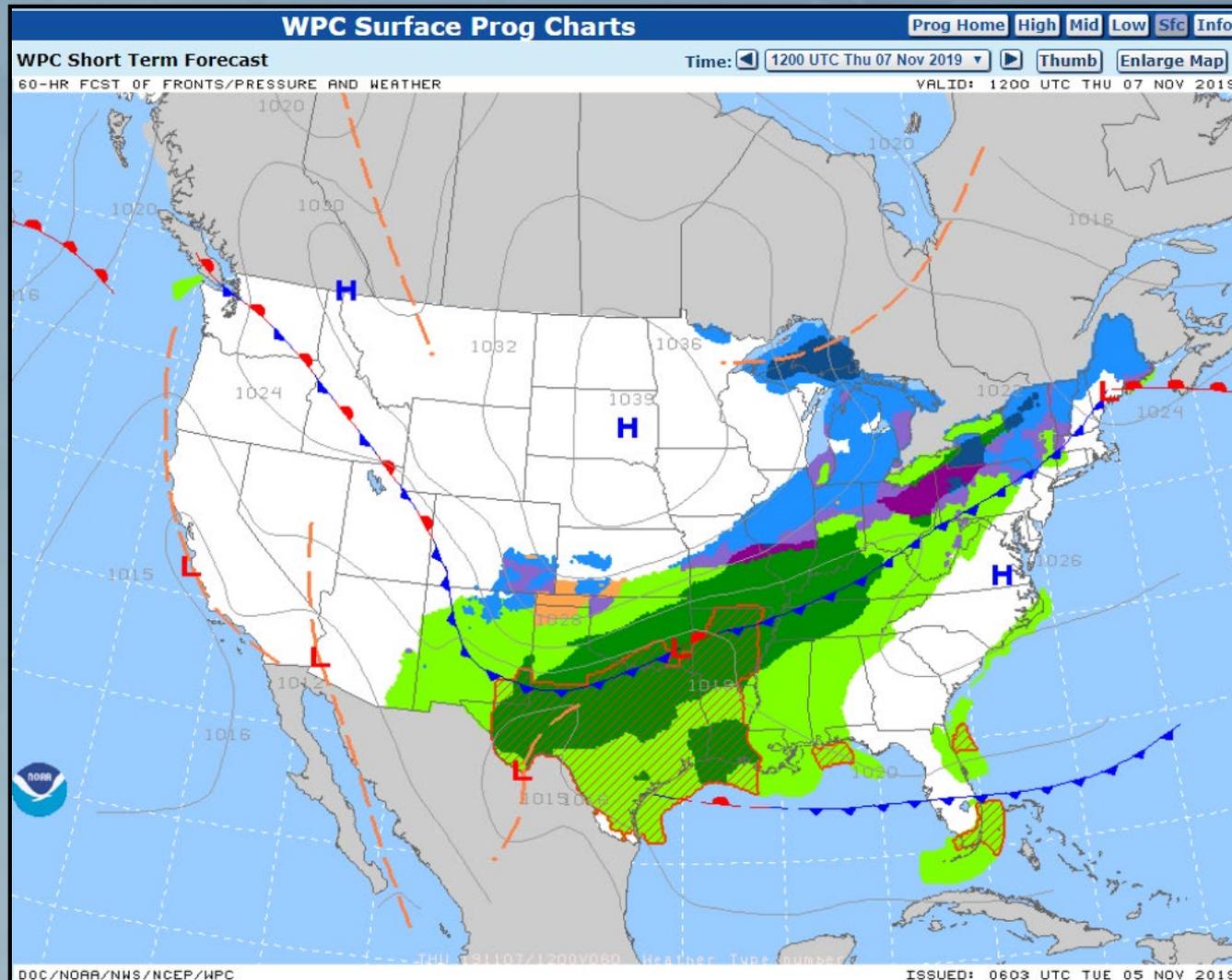
Turbulence: GTG



TCF: Traffic Convective Forecast



Surface Plot Analysis



National Support




Storm Prediction Center

NOAA / National Weather Service



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

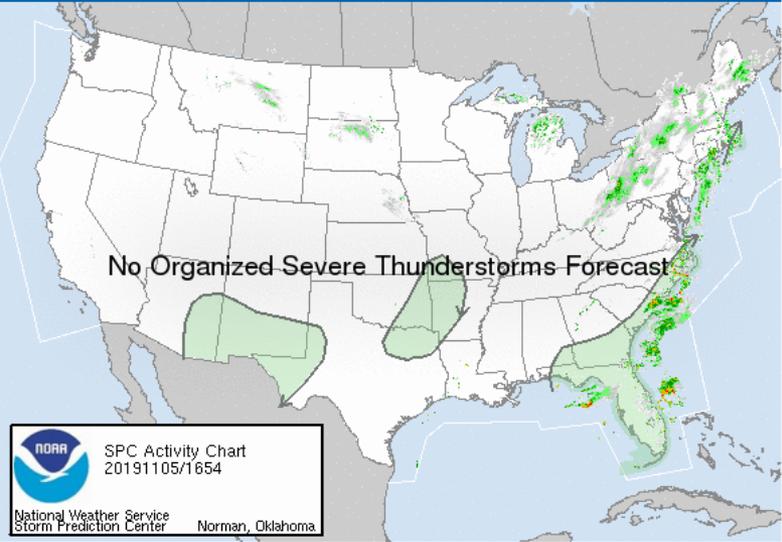
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What's New...

- » **September 6, 2019:** Effective April 18th, 2018 at 15Z, the SPC Outlook Headlines are simplified by removing headlines for all severe [more](#)
- » **September 6, 2019:** Effective April 18th, 2018 at 15Z, the SPC Day 2 Convective Outlooks started to include a text table indicating [more](#)
- » **March 30, 2018:** Interested in learning more about what is going on at the SPC? Click [here](#) for the Spring 2018 newsletter.
- » **November 1, 2017:** Effective Wednesday, November 1, 2017, SPC has a new High Resolution Ensemble Forecast version 2 (HREFv2) web page [more](#)
- » **May 15, 2017:** We present a [video lecture series](#) on severe thunderstorm forecasting, a collaboration between the NOAA Storm [more](#)

More news [here](#)

Overview
Conv. Outlook
Watches
MDs
Storm Reports
Mesoanalysis
Fire
Hazards





SPC Activity Chart
20191105/1654

National Weather Service
Storm Prediction Center
Norman, Oklahoma

Hazard	Tue (11/05)	Wed (11/06)	Thu (11/07)	Fri (11/08)	Sat (11/09)	Sun (11/10)	Mon (11/11)	Tue (11/12)
Severe	No Severe	No Severe	No Severe	No Area				
Fire	No Critical	No Critical	No Area					

All Products
Watches
MDs
Outlooks
Fire



[Day 2 Convective Outlook](#)
- Categorical Risk: No Severe
- Issued: 11/05/2019 at 1705Z



[Day 1 Convective Outlook](#)
- Categorical Risk: No Severe
- Issued: 11/05/2019 at 1618Z



[Thunderstorm Outlook](#)
- Issued: 11/05/2019 at 1612Z



[Day 1 Fire Weather Outlook](#)
- Categorical Risk: No Critical
- Issued: 11/05/2019 at 1558Z



[Day 4-8 Convective Outlook](#)
- Categorical Risk: No Areas
- Issued: 11/05/2019 at 0948Z



[Day 3 Convective Outlook](#)
- Categorical Risk: No Severe

Storm Prediction Center

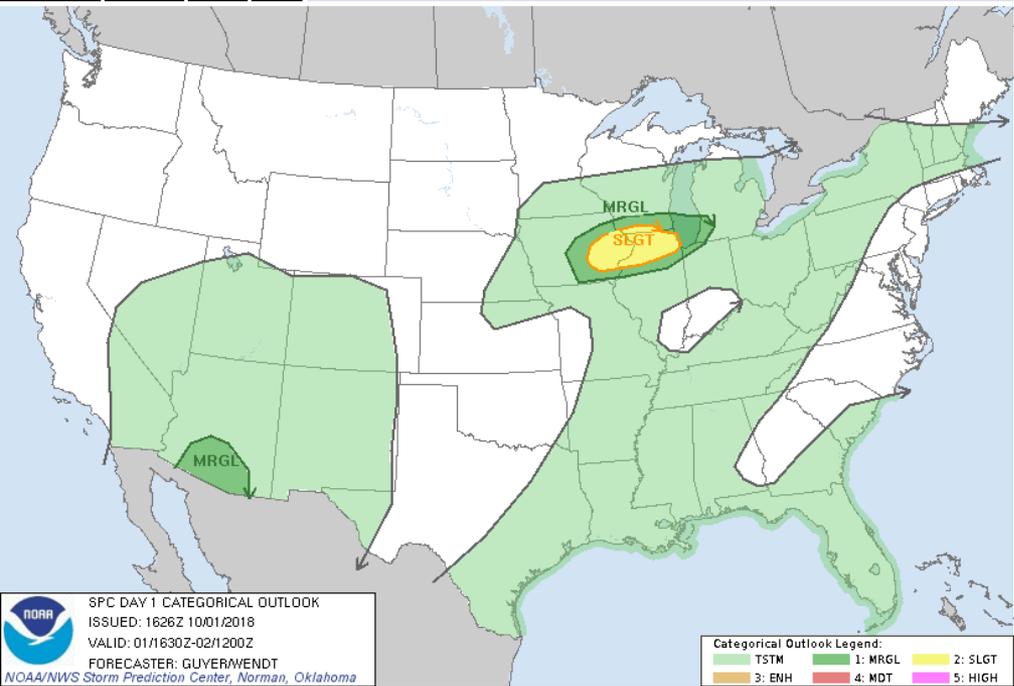


Storm Prediction Center Convective Outlooks

Oct 1, 2018 1630 UTC Day 1 Convective Outlook

Updated: Mon Oct 1 16:26:55 UTC 2018 (Print Version | |)
 Probabilistic to Categorical Outlook Conversion Table

Categorical Tornado Wind Hail Population Cities/Towns CWAs Interstates Counties ARTCC FEMA Region

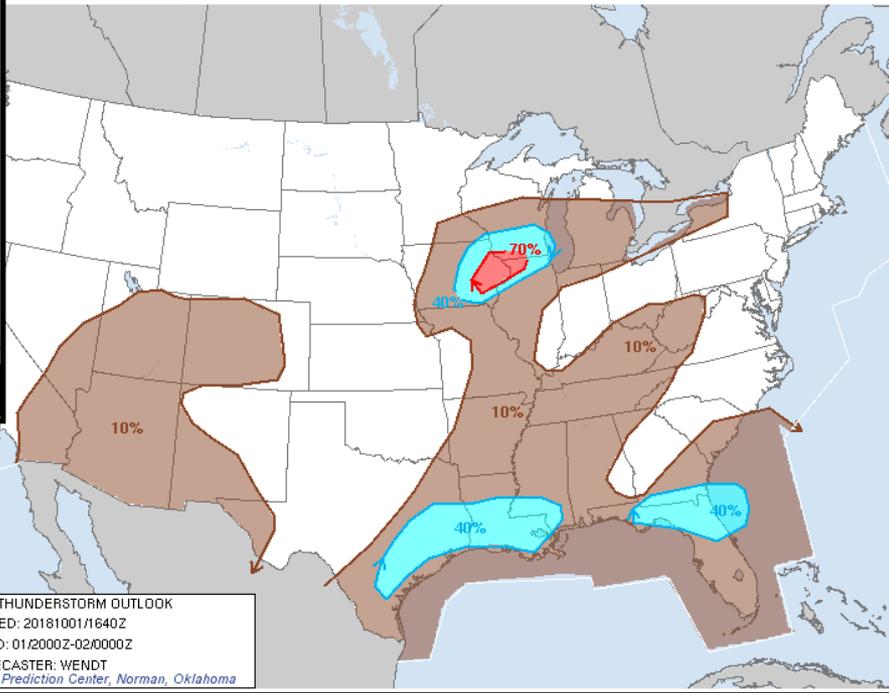


SPC DAY 1 CATEGORICAL OUTLOOK
 ISSUED: 1626Z 10/01/2018
 VALID: 01/1630Z-02/1200Z
 FORECASTER: GUYER/WENDT
 NOAA/NWS Storm Prediction Center, Norman, Oklahoma

SPC Oct 1, 2018 1630Z Thunderstorm Outlook

Mon Oct 1 16:42:02 UTC 2018

00Z-04Z 04Z-12Z Population Cities/Towns CWAs Interstates ARTCCs FEMA Regions



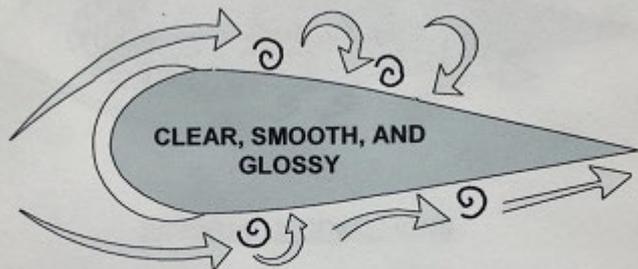
SPC THUNDERSTORM OUTLOOK
 ISSUED: 20181001/1640Z
 VALID: 01/2000Z-02/0000Z
 FORECASTER: WENDT
 NOAA/NWS Storm Prediction Center, Norman, Oklahoma

Forecast valid: 01/2000Z-02/0000Z



Types of Icing

CLEAR ICING

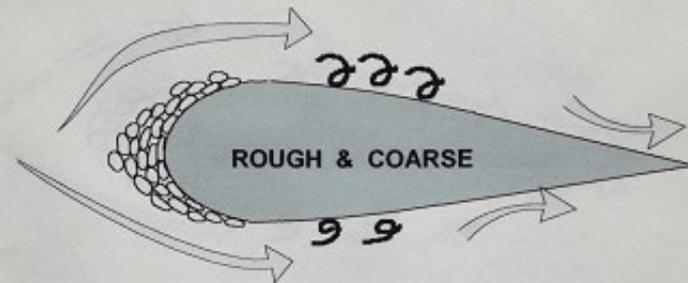


CLEAR, SMOOTH, AND GLOSSY

FAVORABLE CONDITIONS

- LARGE DROPLETS IN CUMULIFORM CLOUDS, FREEZING RAIN, OR TERRAIN EFFECTS

RIME ICING



ROUGH & COARSE

FAVORABLE CONDITIONS

- SMALL, SUPERCOOLED DROPLETS IN STRATIFORM CLOUDS

MIXED ICING



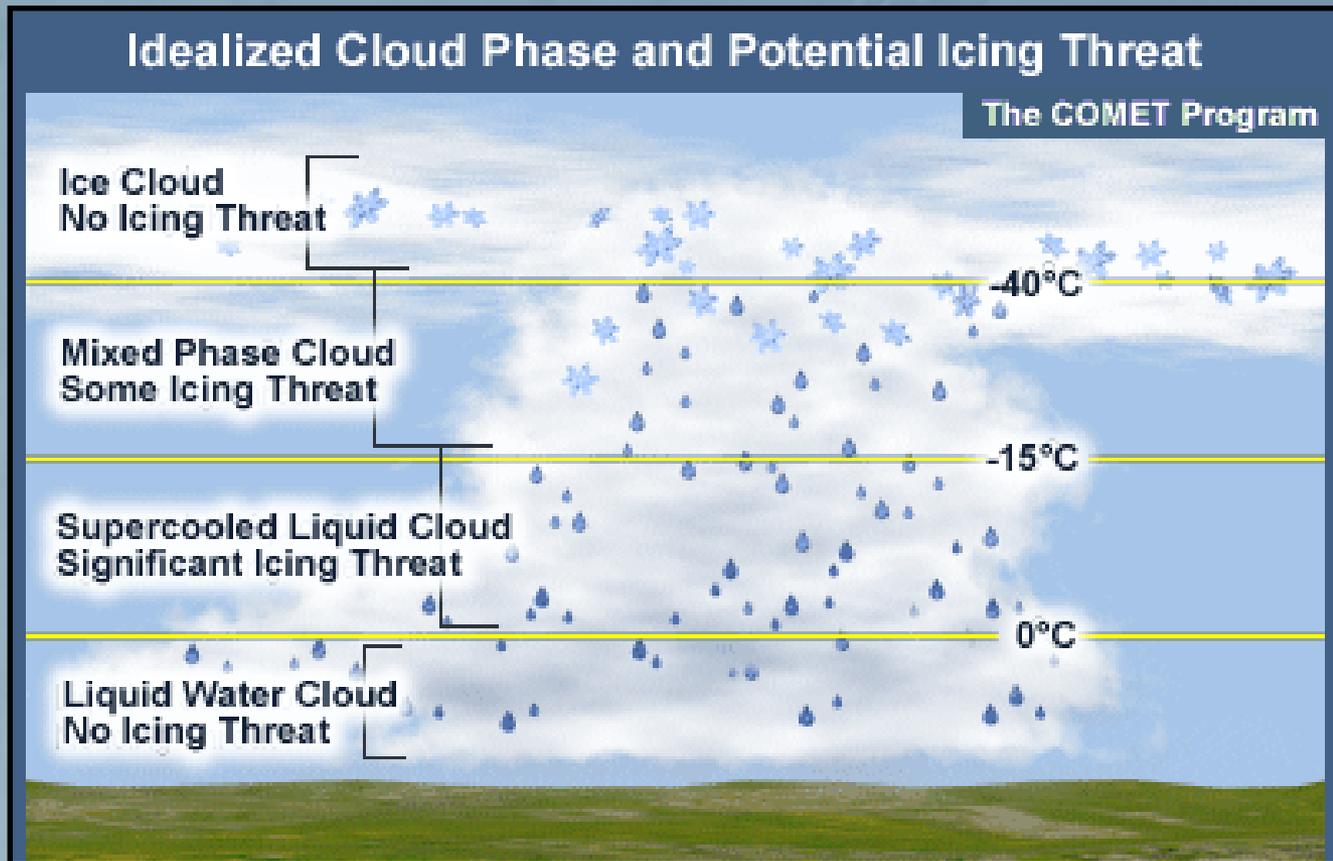
HARD, ROUGH CONGLOMERATE

FAVORABLE CONDITIONS

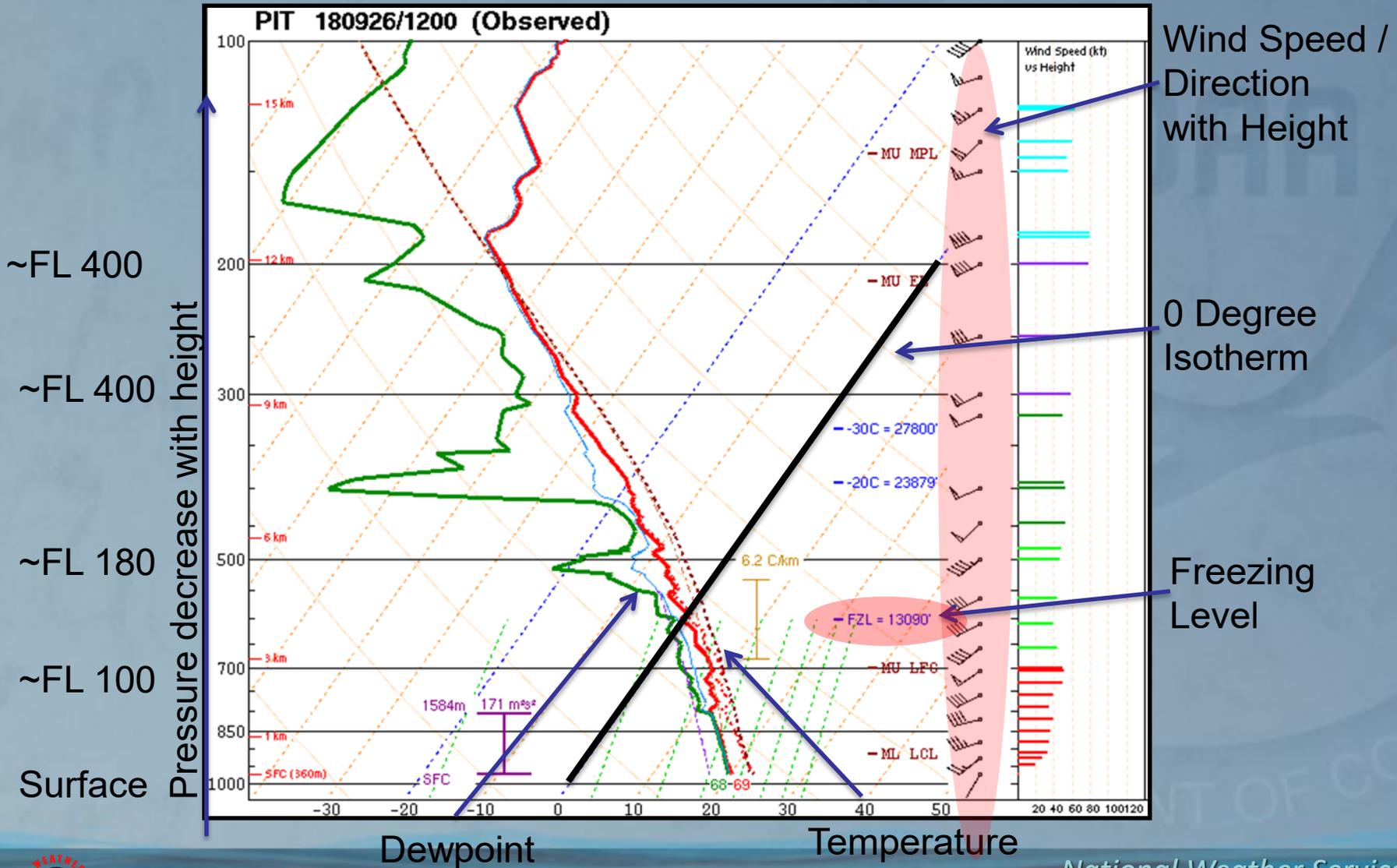
- LARGE AND SMALL DROPLETS COEXIST
- LIQUID AND FROZEN PARTICLES COEXIST
- WET SNOW

Outside Air Temp. Range	Icing Type
2° C to -10° C	Clear
-10° C to -15° C	Mixed
-15° C to -20° C	Rime

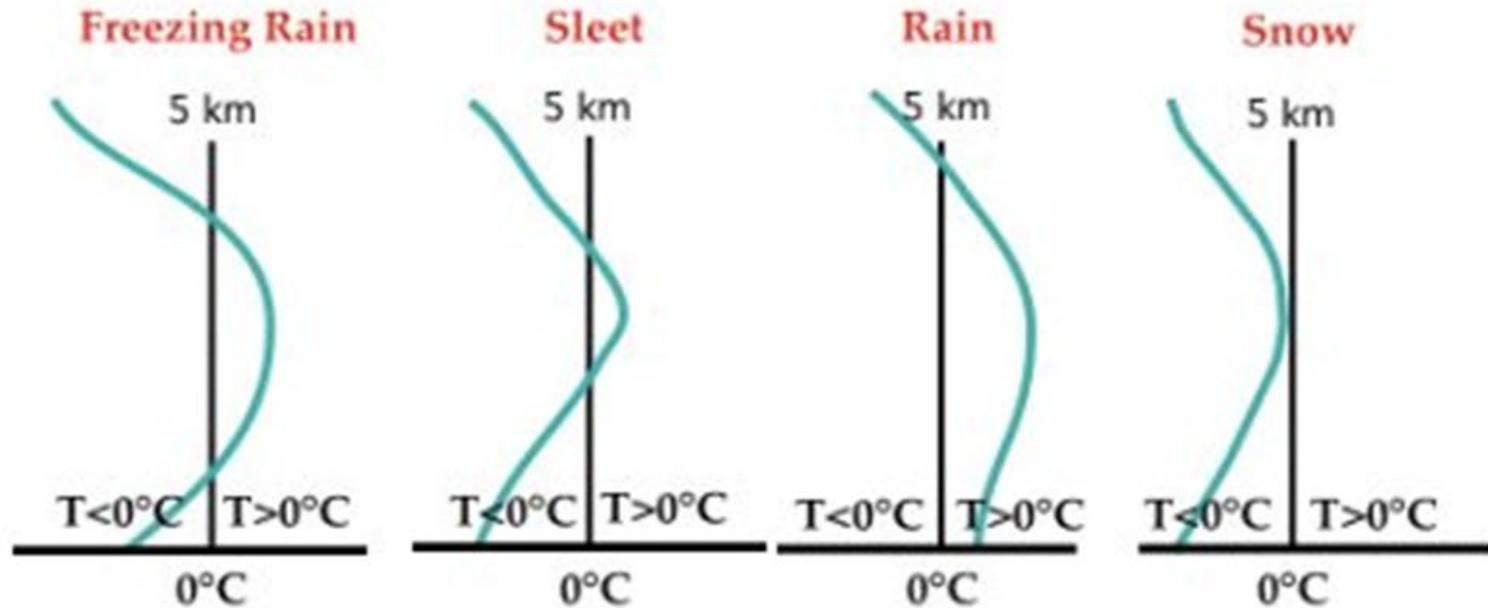
Icing Conditions



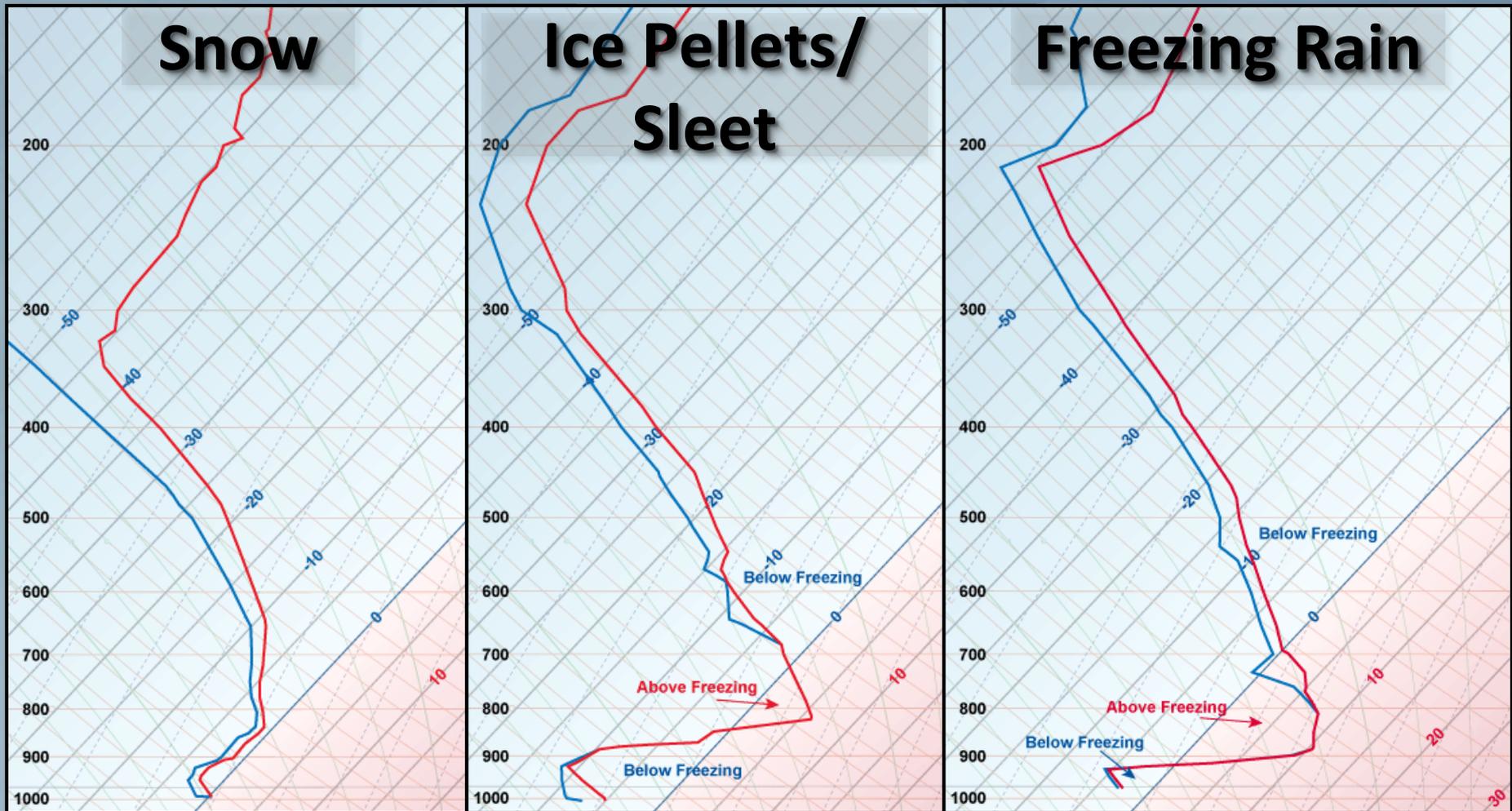
Upper Air Soundings



Using Soundings to Forecast Winter Precipitation



Using Soundings to Forecast Winter Precipitation

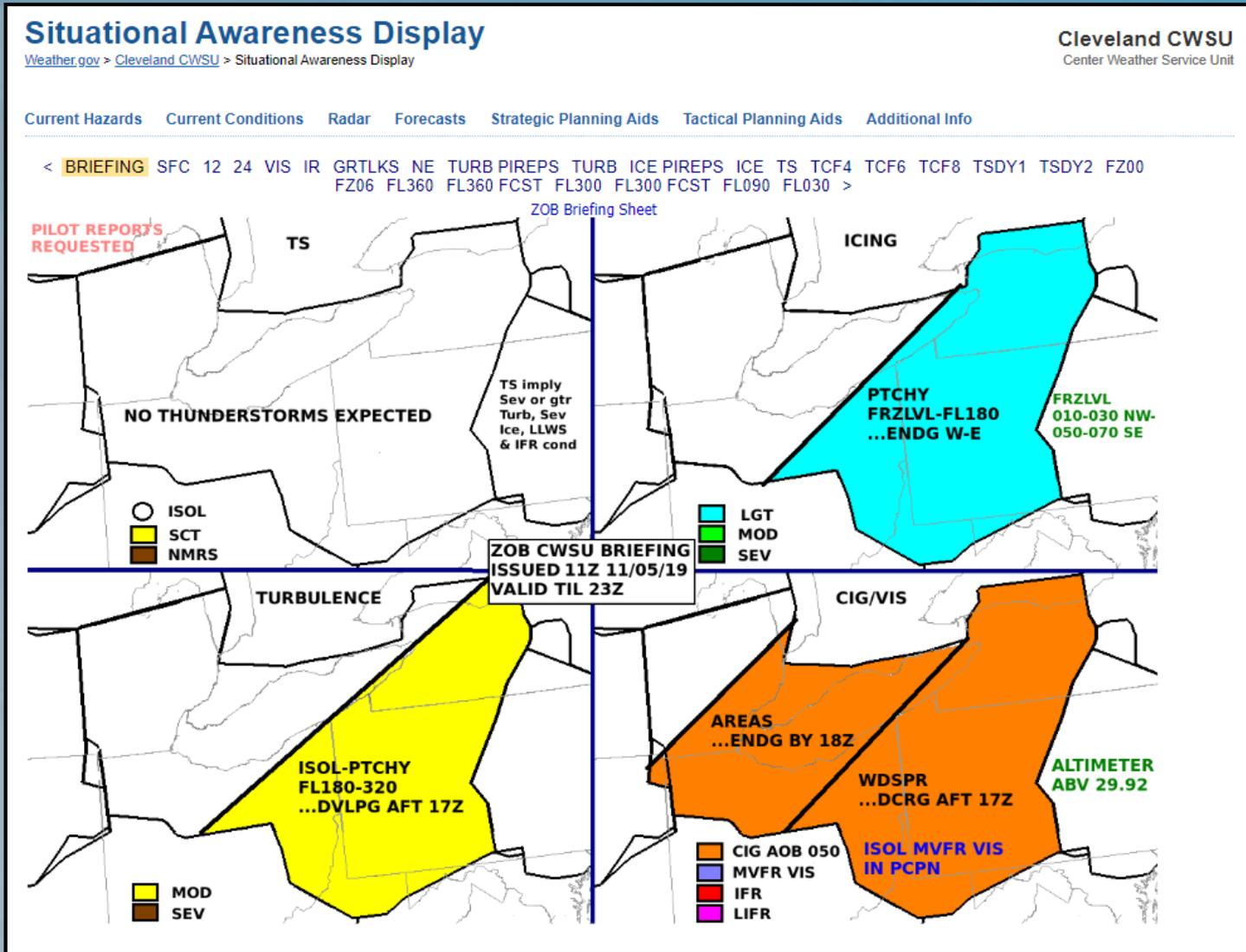


Center Weather Service Units (CWSUs)

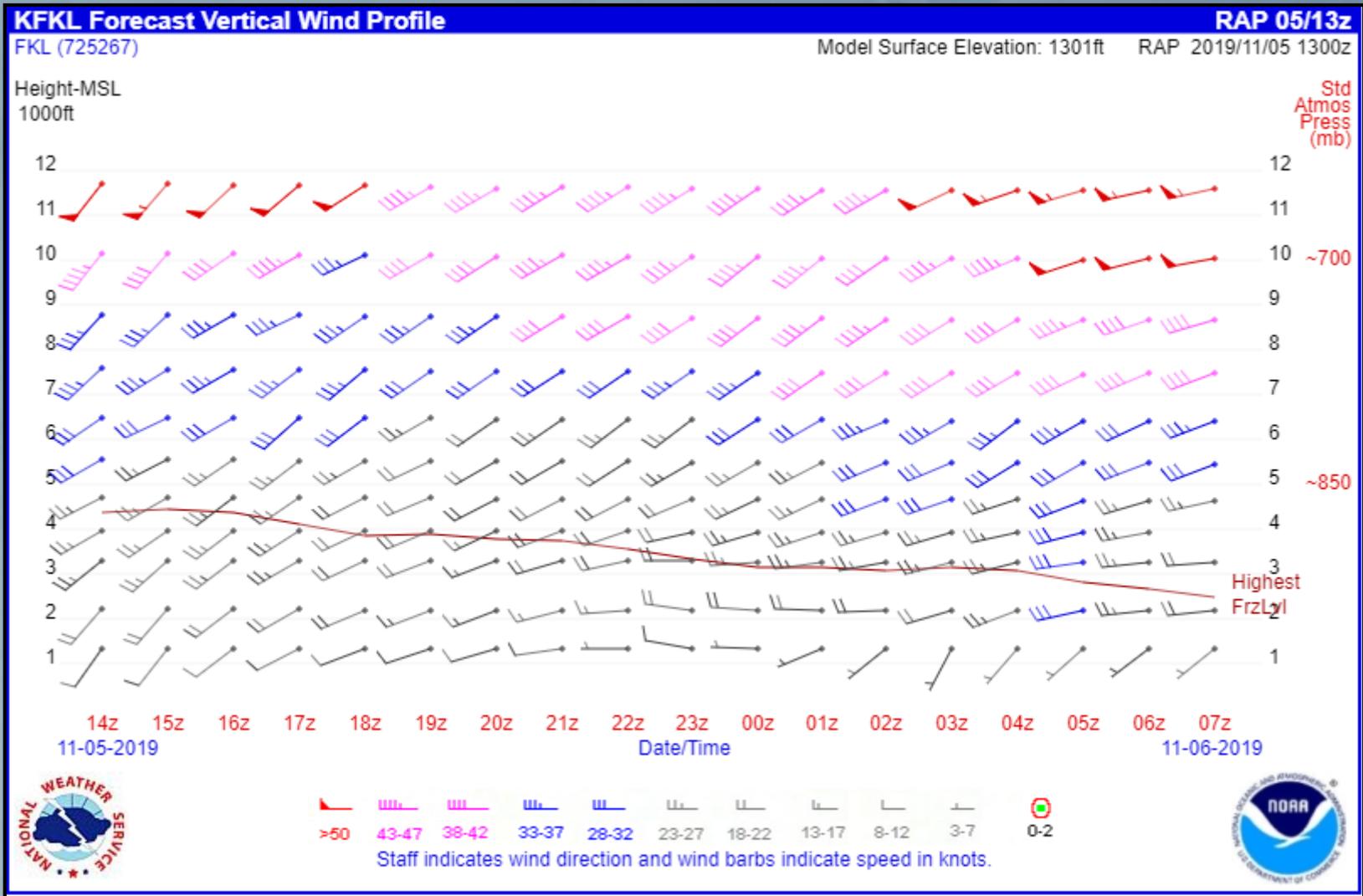
- Joint FAA / NWS weather support units
 - Staffed 16 hours per day by NWS personnel
 - Staffed 24 hours per day by Traffic Management Unit personnel



Situational Awareness Display Briefings



Forecast Vertical Wind Profile



Local Support

HOME FORECAST PAST WEATHER SAFETY INFORMATION EDUCATION NEWS SEARCH ABOUT

Local forecast by "City, St" or ZIP code

Enter location ...

Go

[Location Help](#)

News Headlines

- [Winter Weather Page Including Snowfall Forecasts](#)
- [We are looking for rain and snow reports! Sign up and report via an app.](#)
- [Get ready for fall weather hazards by visiting our Fall Safety website!](#)

Pittsburgh, PA
Weather Forecast Office

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](#)

NWS Pittsburgh

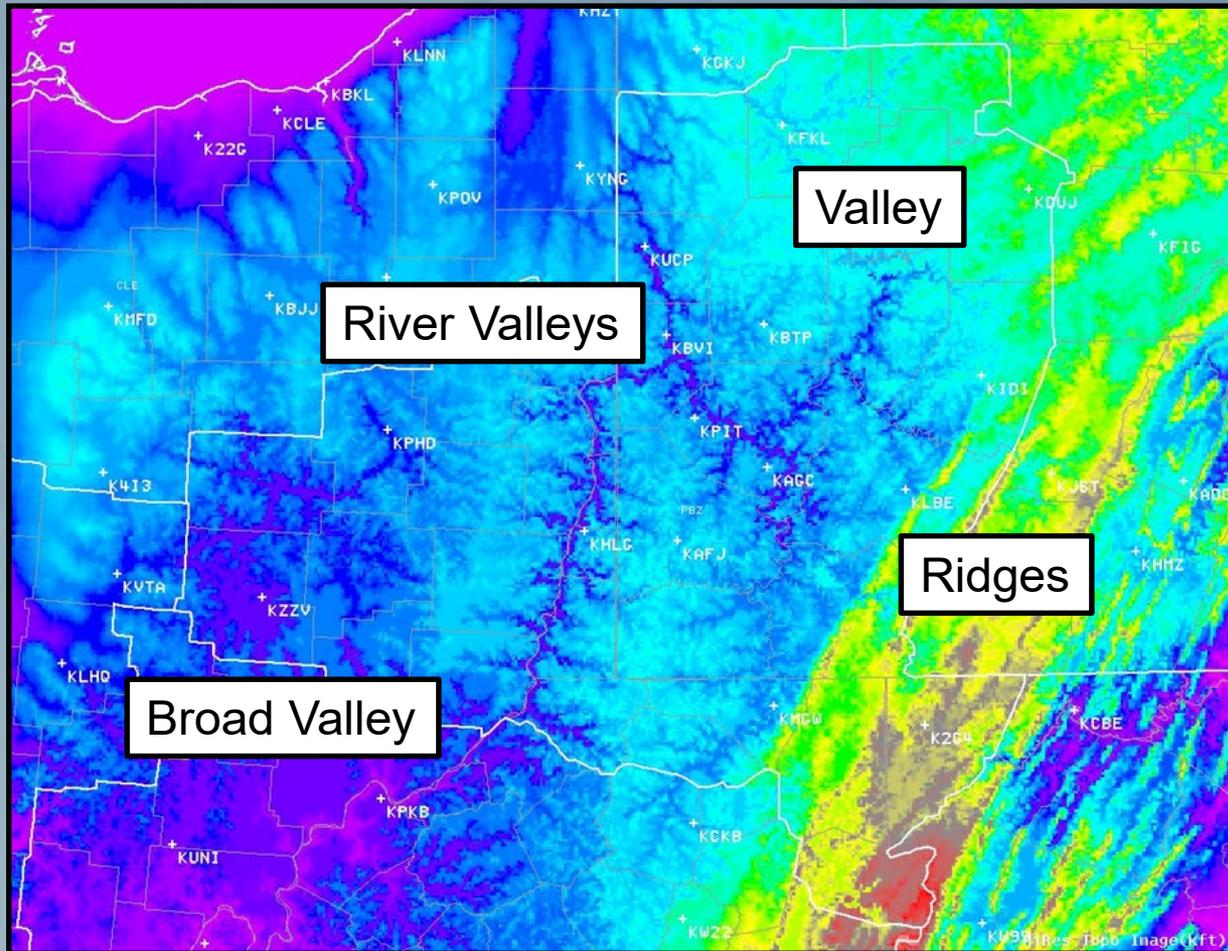


Pittsburgh NWS

- 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

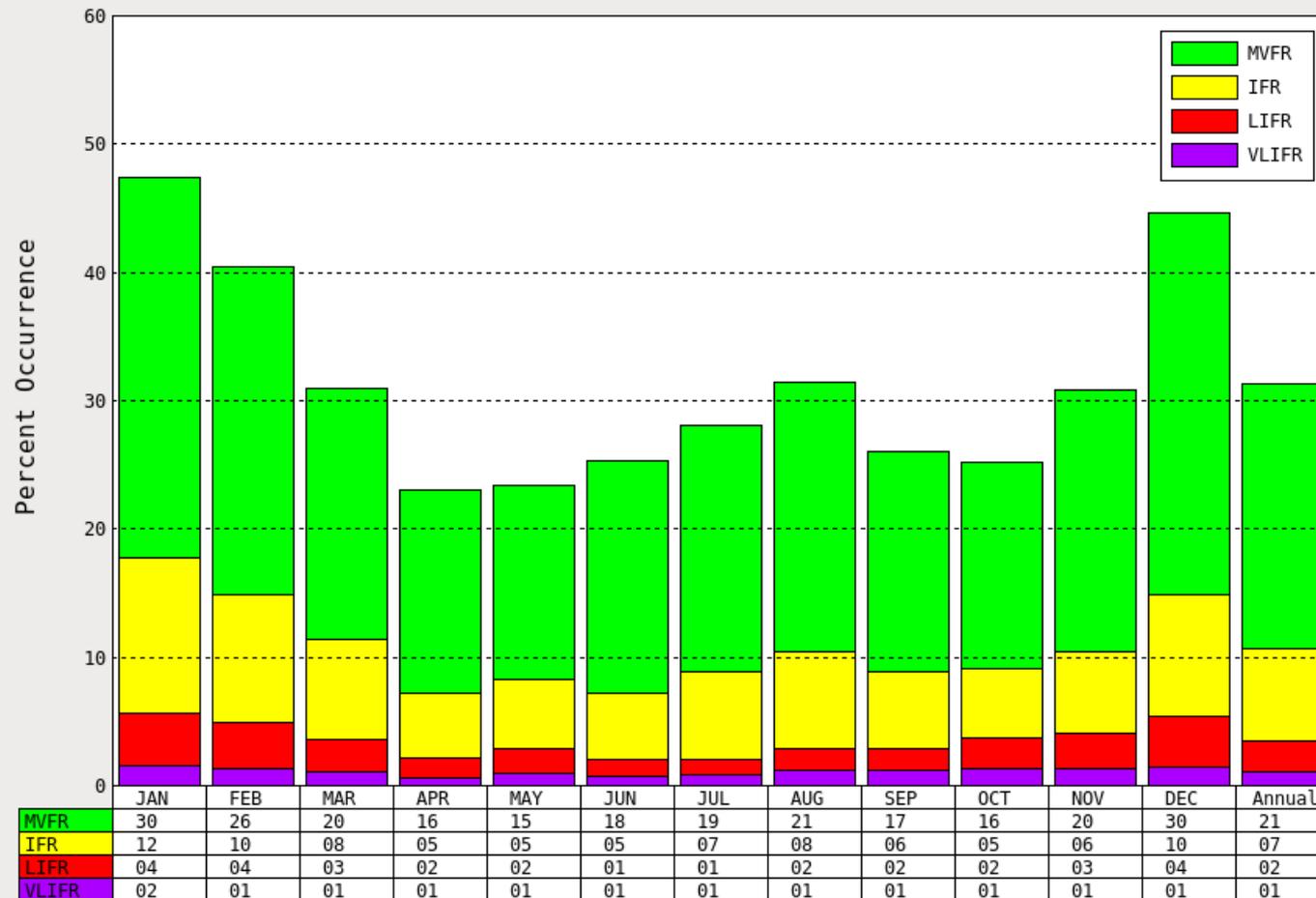


Topography Considerations



KPIT Climatology

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



TAF Amendments for Area Airports

PITTSBURGH, PA							
	THRESH A	THRESH B	THRESH C	THRESH D	THRESH E	THRESH F	APPROACH
AGC	200 - 3/4	600 - 2	1000 - 3	3000 - 5	2000 - 3		ILS RWY 10
BVI	300 - 1	800 - 2	1000 - 3	3000 - 5	2000 - 3		RNAV (GPS) RWY 10 or 28
DUJ	200 - 1/2	600 - 2	1000 - 3	3000 - 5	2000 - 3		ILS RWY 25
FKL	200 - 1/2	600 - 2	1000 - 3	3000 - 5	2000 - 3		ILS 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	300 - 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 RWY 10L, 10R, 28L, 28R
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



TAF

- Terminal Aerodrome Forecast
- Interpretation:
 - TAF is a concise statement of the expected meteorological conditions significant to aviation to impact an airport during the 24-hour forecast period.
 - 30-hour TAFs issued for 32 airports across the country (KPIT).
 - An airport is defined as the area within 5 statute miles of the center of an airport's runway complex.
 - Updated every 6 hours (00Z, 06Z, 12Z, 18Z)
 - 3-hourly amendments issued for 32 airports across the country (KPIT).

TAF Examples

KPIT 261134Z 2612/2718 23010KT 6SM -SHRA BR
OVC015

FM261500 25013KT 5SM -SHRA VCTS OVC010CB

FM262000 30012G18KT P6SM OVC035

FM262300 33005KT P6SM SCT100

FM270900 VRB03KT 4SM BR OVC250

KPIT 011514Z 0115/0218 21008KT P6SM SCT030

FM011800 20006KT P6SM BKN035

FM020900 21010KT P6SM VCSH BKN025



TAF Amendments

Flight Categories			Critical Amendment Criteria - CAC	
Flight Category	Ceiling (feet)	Visibility (SM)	Flight Category	Impact
VLIFR	< 200 and/or	< ½	MVFR	≤ 3000 ft and/or ≤ 5 sm
LIFR	< 500 and/or	< 1	Must File Alternate	< 2000 ft and/or < 3 sm
IFR	≥ 500 to < 1,000 and/or	≥ 1 to < 3	IFR	< 1000 ft and/or < 3 sm
MVFR	≥ 1,000 to ≤ 3,000 and/or	≥ 3 and ≤ 5	Alternate Landing Minimums (airport dependent)	600 ft and/or 2 sm
VFR	> 3,000 and	> 5	Airfield Landing Minimums (airport dependent)	200 ft and/or ½ sm

- Federal Aviation Regulations state that when flying under instrument flight rules alternate fuel and airport are required unless the ceiling AND visibility are \geq to 2000' AND 3SM.
- Current separation can often cause an unnecessary workload for forecasters and customers alike.

METAR

- **METAR: Meteorological Aerodrome Report**
- **KPIT 261151Z 31007KT 2SM +SN BKN005 02/02 A2994 RMK AO2 SLP139 60014 70036 T00210028 10211 20200 53001**
 - KPIT: Station Identifier
 - 261151Z: Date / Time in Zulu
 - 2SM: Visibility in statute miles
 - +SN: Precipitation type and intensity
 - BKN005: Cloud base and height
 - 02/02: Temperature / Dewpoint temperature (°C)
 - A2994: Altimeter / Pressure (i.e. 29.94 inches of mercury)
 - AO2: indicates that the site is automated and HAS a precipitation sensor.
 - AO1: indicates there is no precip sensor. This does not mean the site is un-manned. AUTO after the ID in the metar observation: there is no observer.
 - SLP 139: pressure - 1030.9 hPa (millibars)
 - 60014: 6 hourly precipitation
 - 70036: 24 hourly precipitation
 - T02060200: Temperature and Dewpoint to nearest tenth of a degree
 - 10211: 6-hour maximum temperature
 - 20200: 6-hour minimum temperature
 - 53001: 3-hour pressure tendency – 30.01 Hg (inches of mercury)



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
 - i.e. when accumulating snow is expected to occur
- Rate of accumulation
- Changeover time / confidence
- Liquid water equivalent
- 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 for your time!

Any Questions?

