Utilizing NWS as an Important Aviation Tool

NWS PITTSBURGH

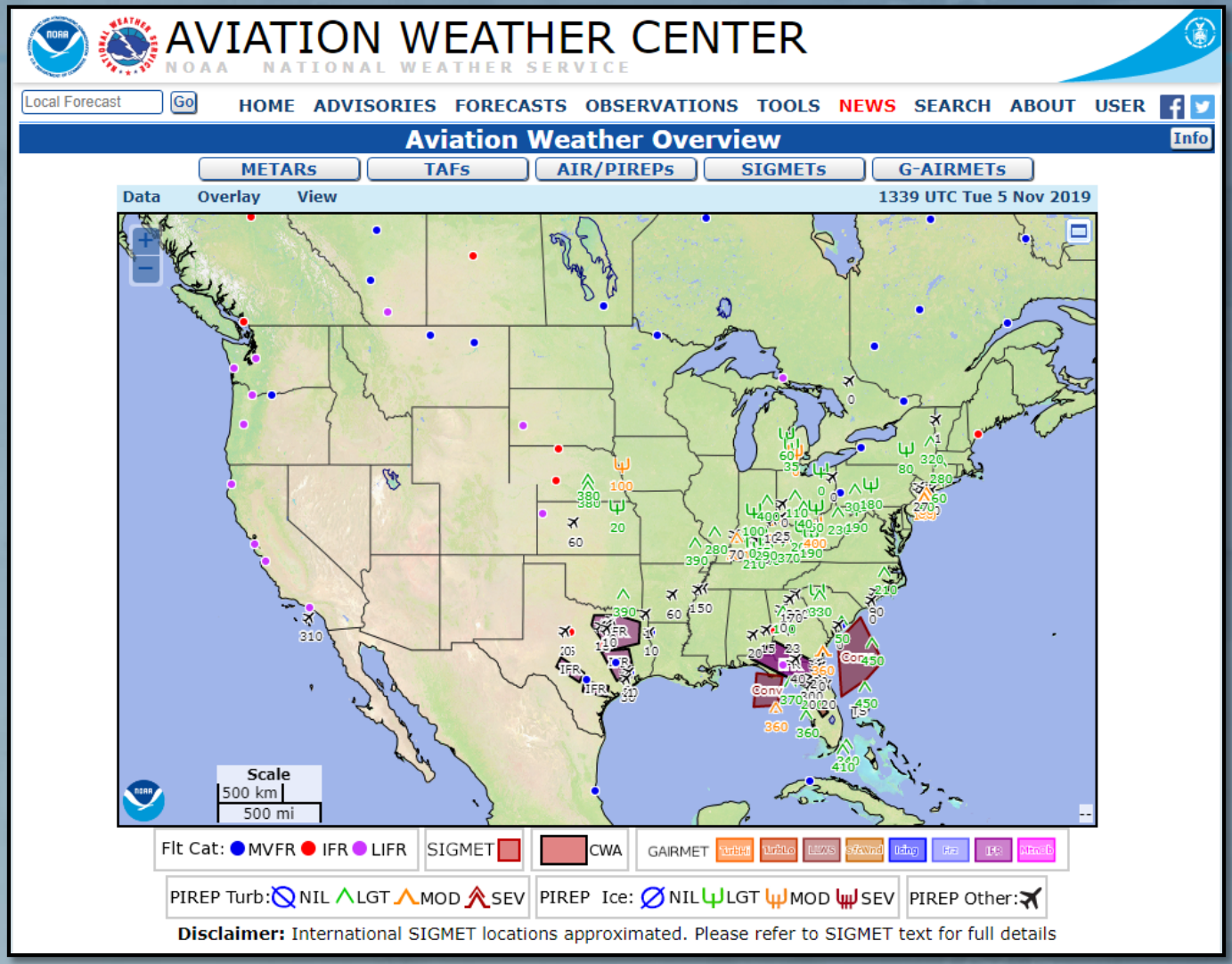
Introduction

- 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

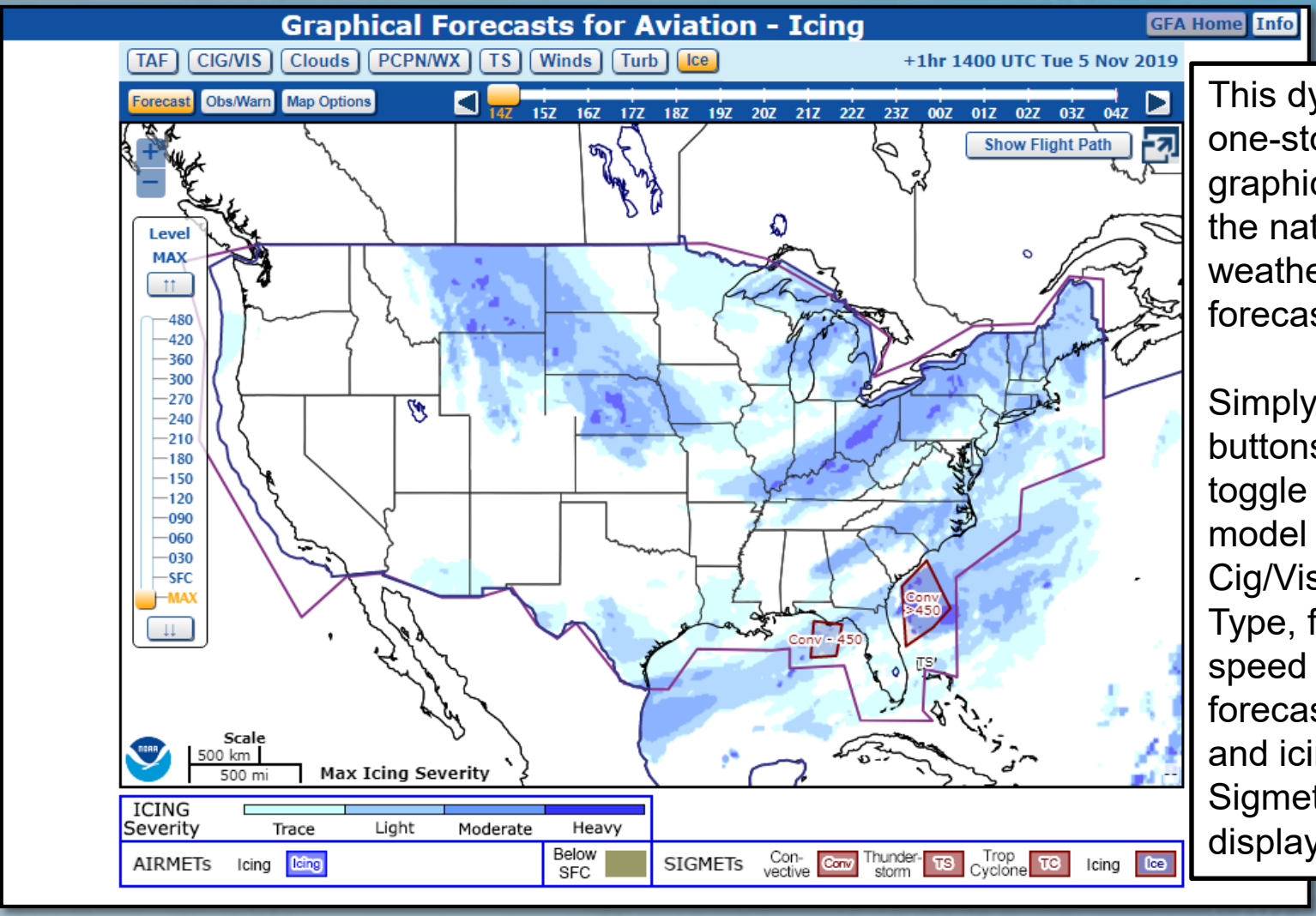
- Do I have airport weather minimums for takeoff / landing?
- Do I need an alternate?
  - ceiling < or equal to 2000ft
  - visibility < or equal to 3SM
- Are there any problems en-route such as turbulence, icing, etc.?
- Are there any current problems with ATC?
- What is the de-icing capacity at my takeoff 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

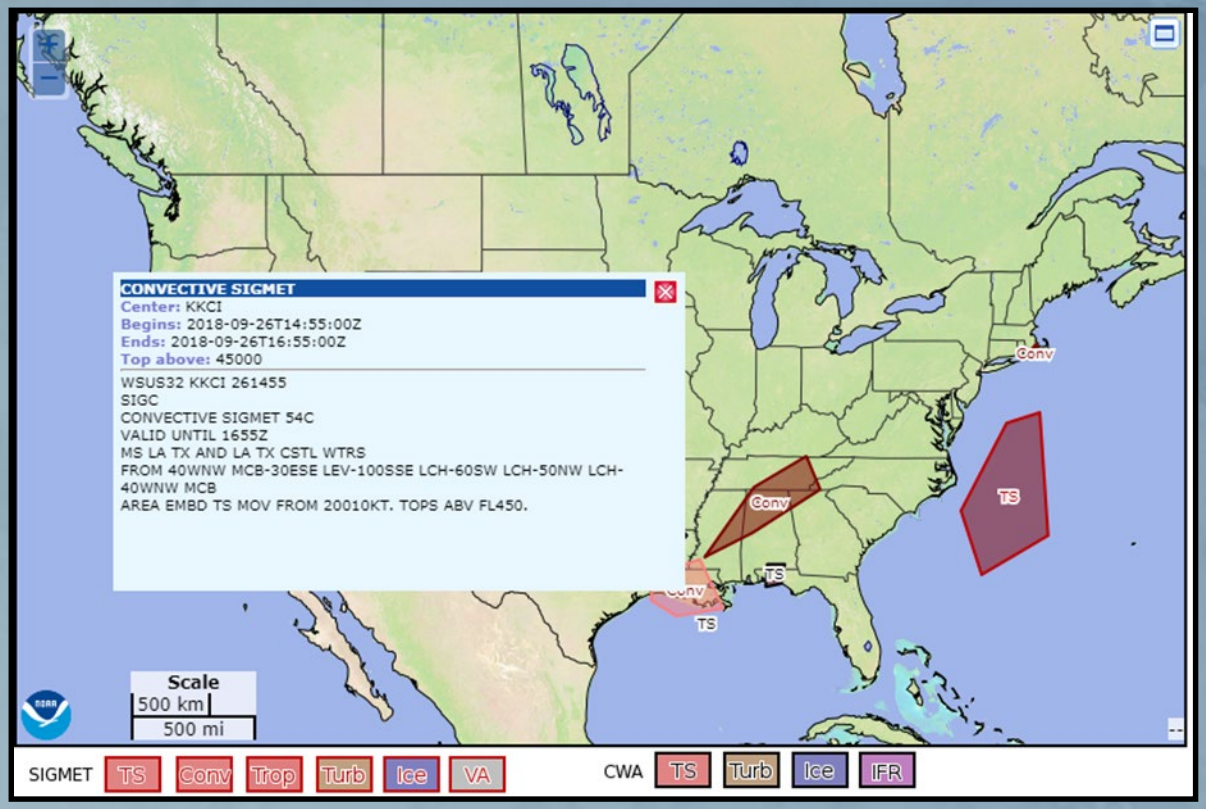
Graphical Forecasts for Aviation



This dynamic map is a one-stop shop to see a graphical display off 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 Sigmets/Airmets displayed.

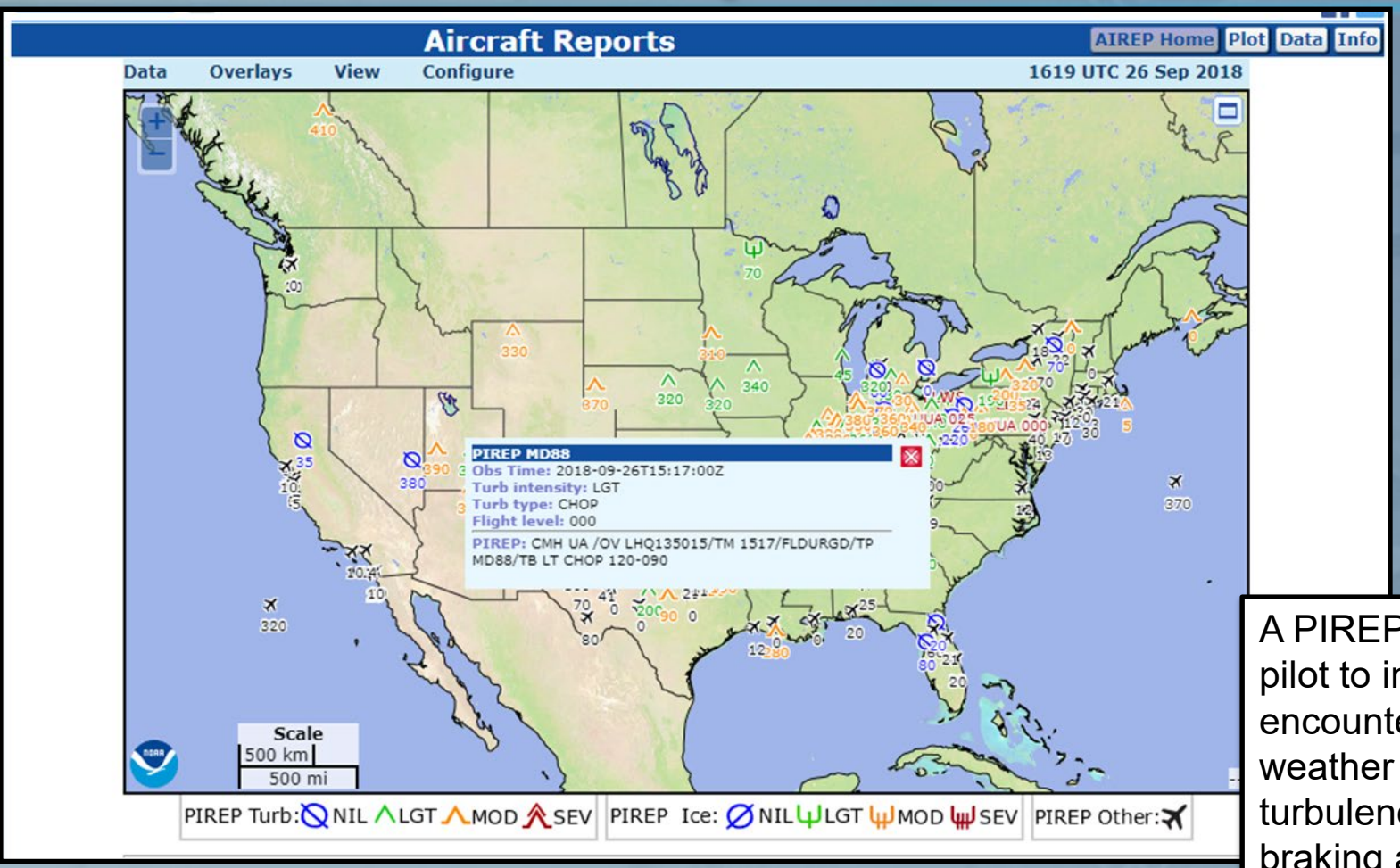
SIGMETS / AIRMETS



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.

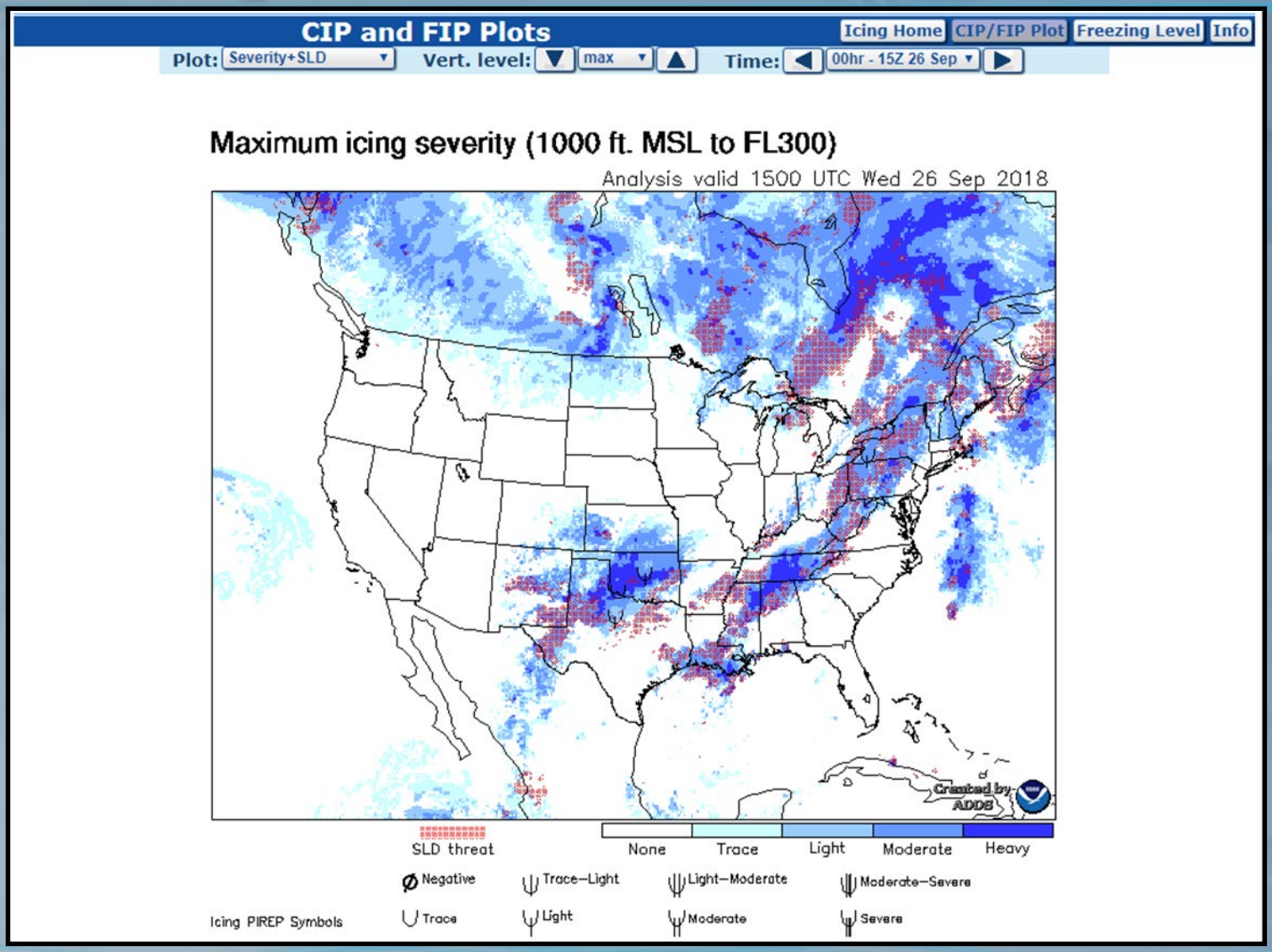
Significant Meteorological Information, is a weather advisory that contains meteorological information concerning the safety of all aircraft. There are two types of **SIGMETs**: convective and non-convective.

Pilot Reports - PIREPS

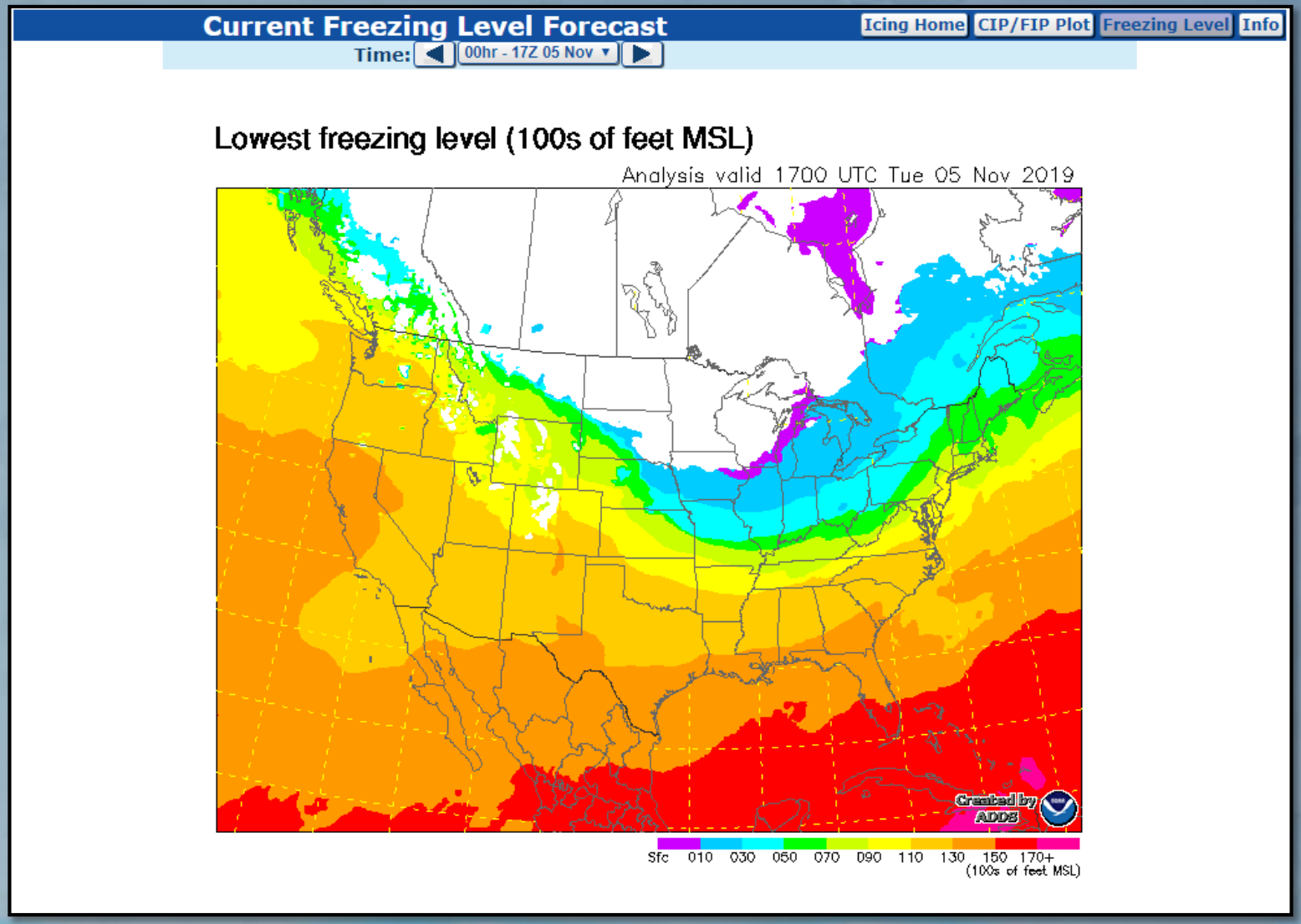


A PIREP is reported by a pilot to indicate encounters of hazardous weather such as icing, turbulence, runway braking action, etc.

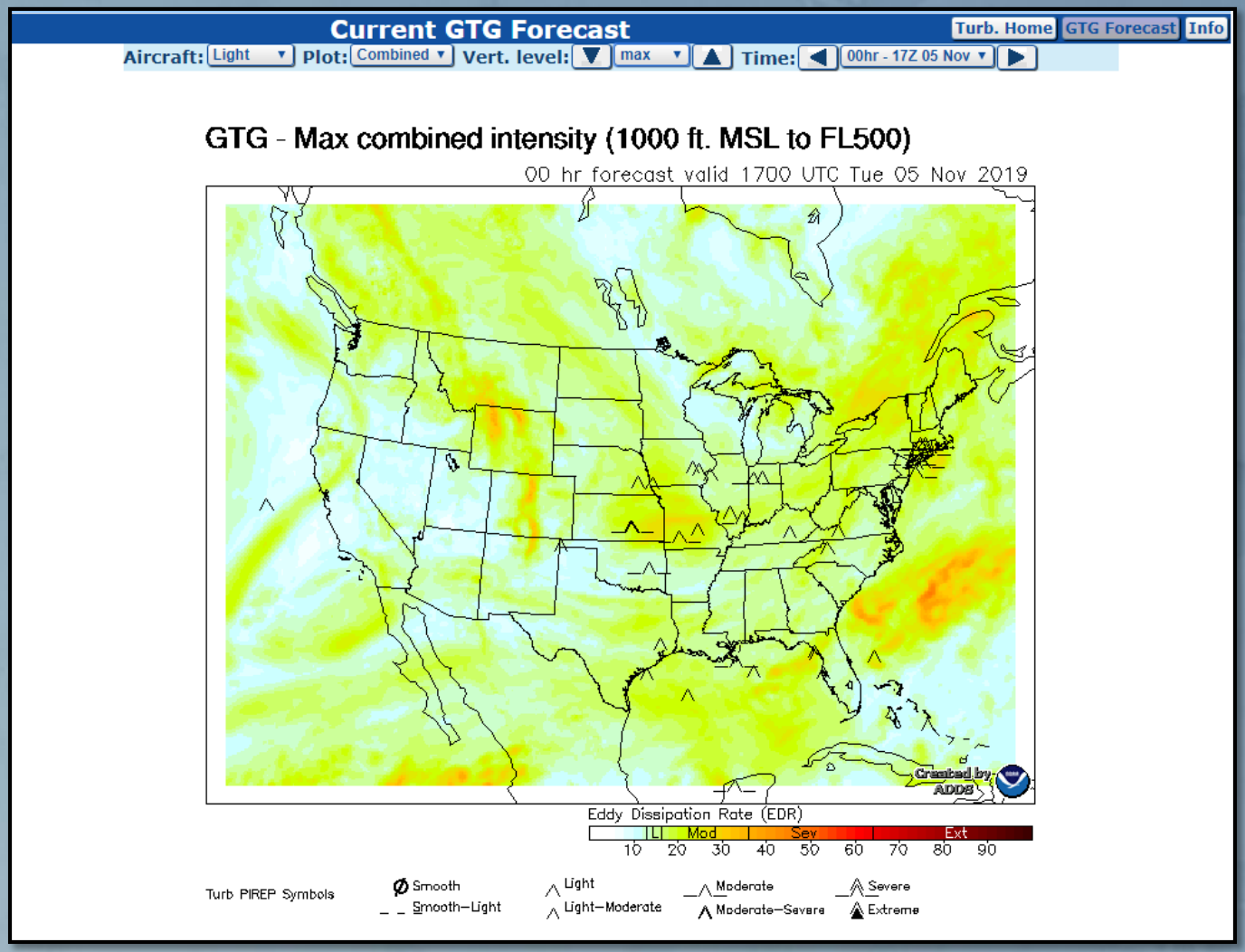
Icing Guidance: CIP & FIP



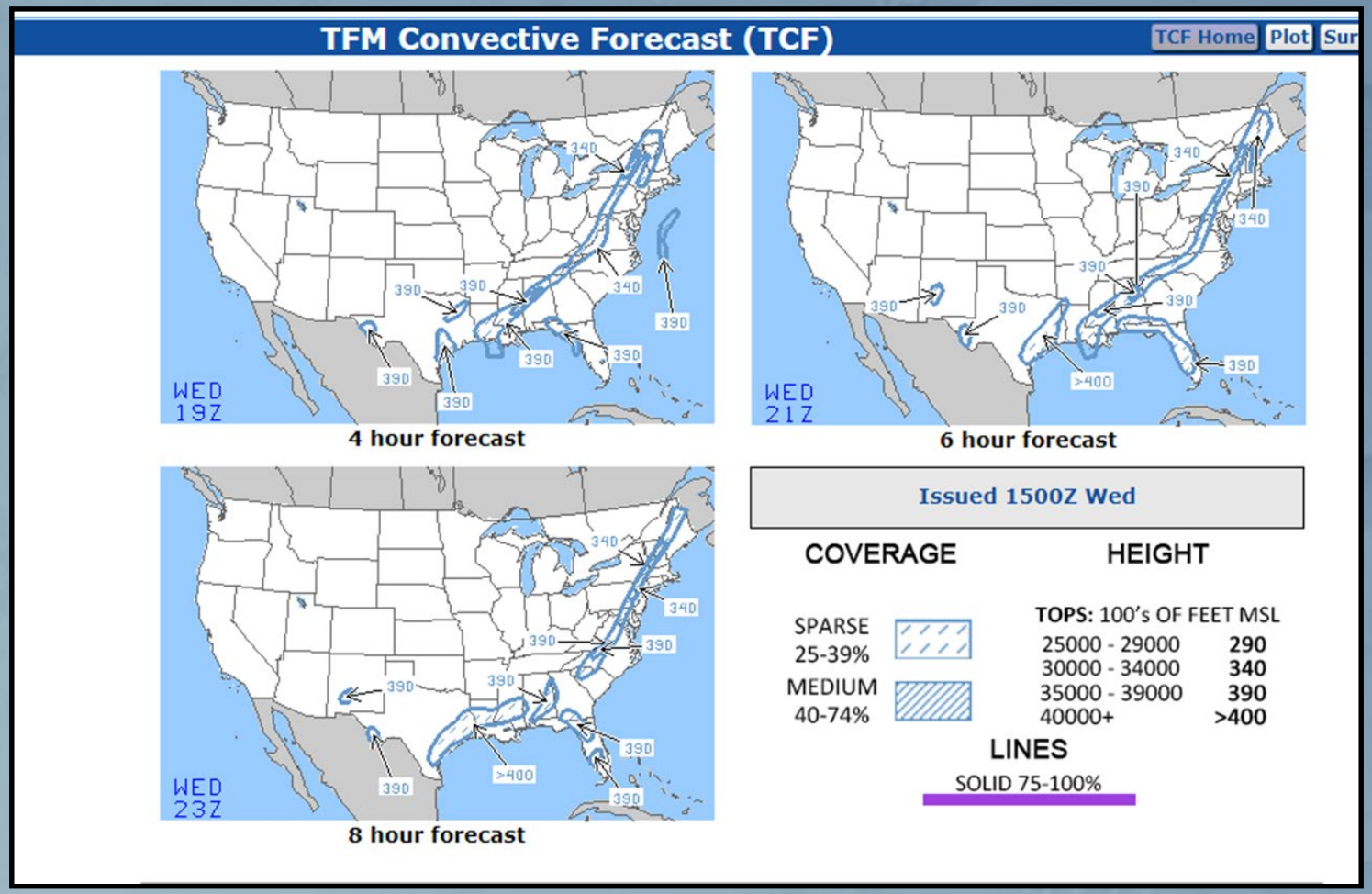
Icing: Freezing Level Analysis



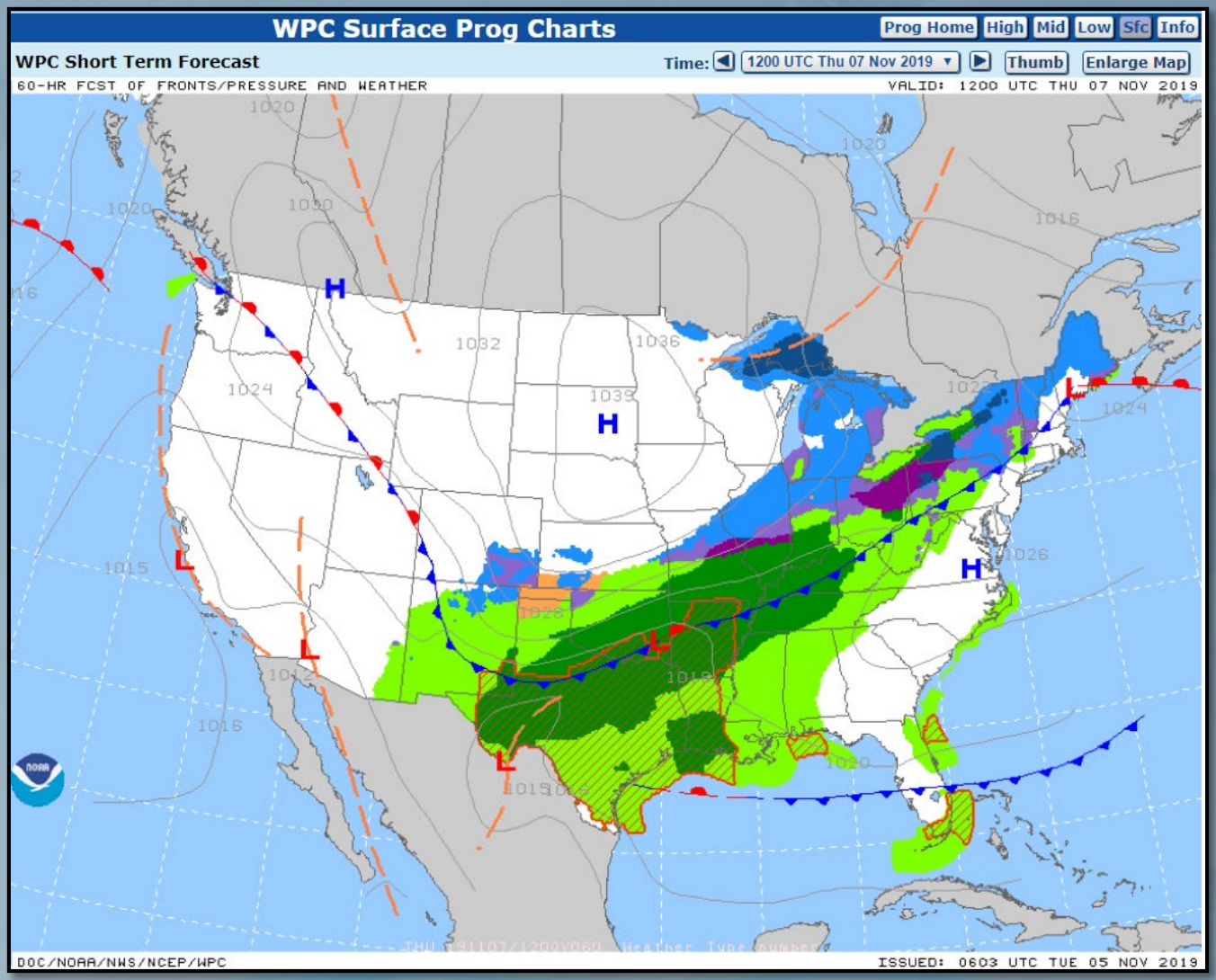
Turbulence: GTG



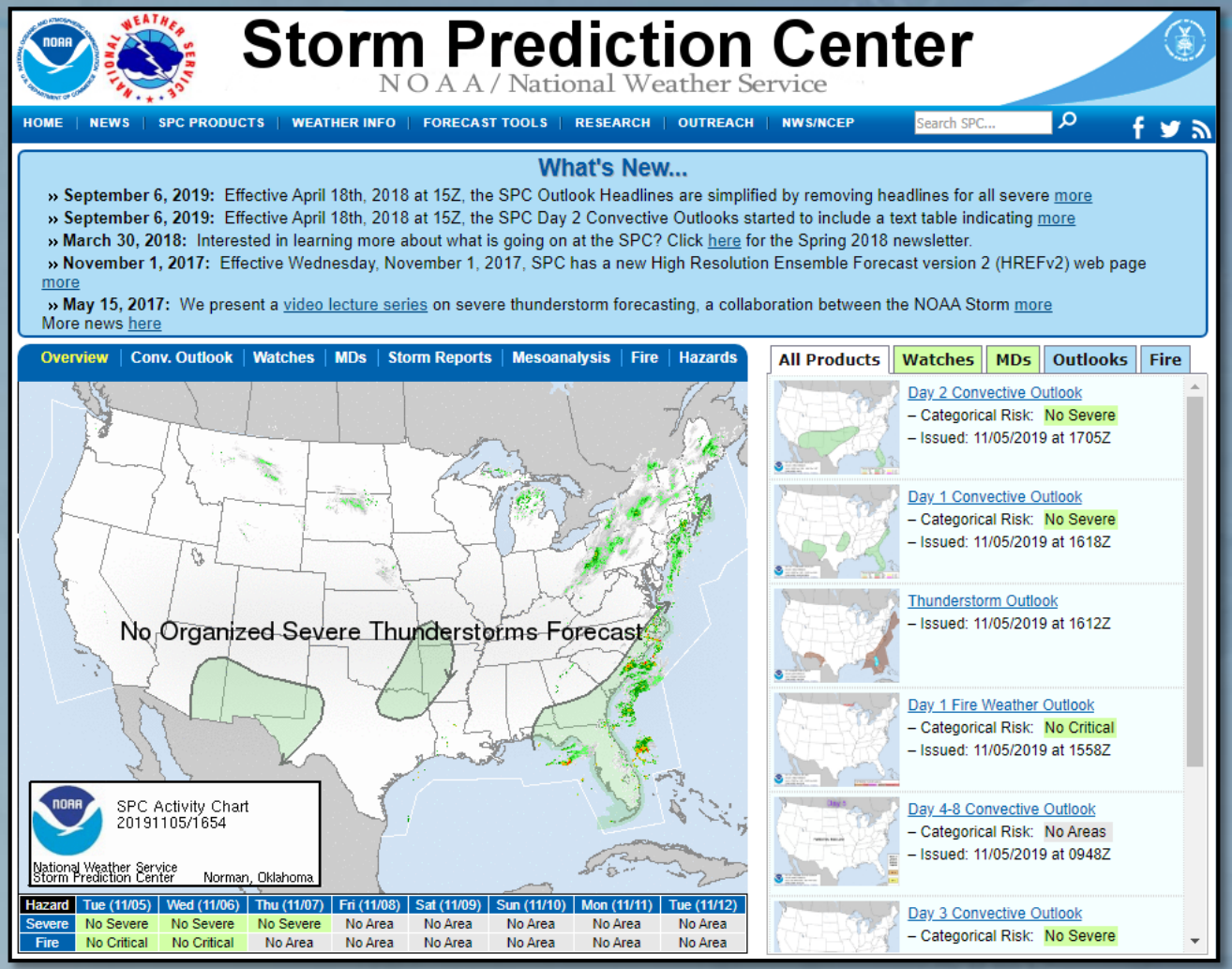
TCF: Traffic Convective Forecast



Surface Plot Analysis

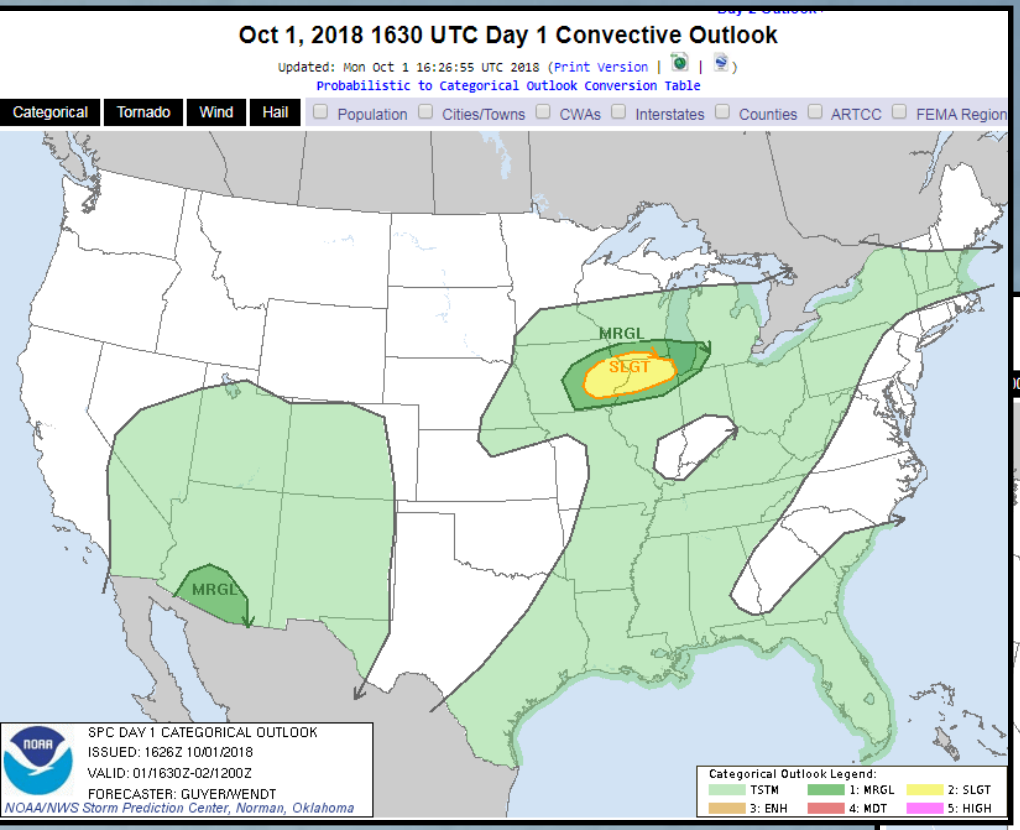


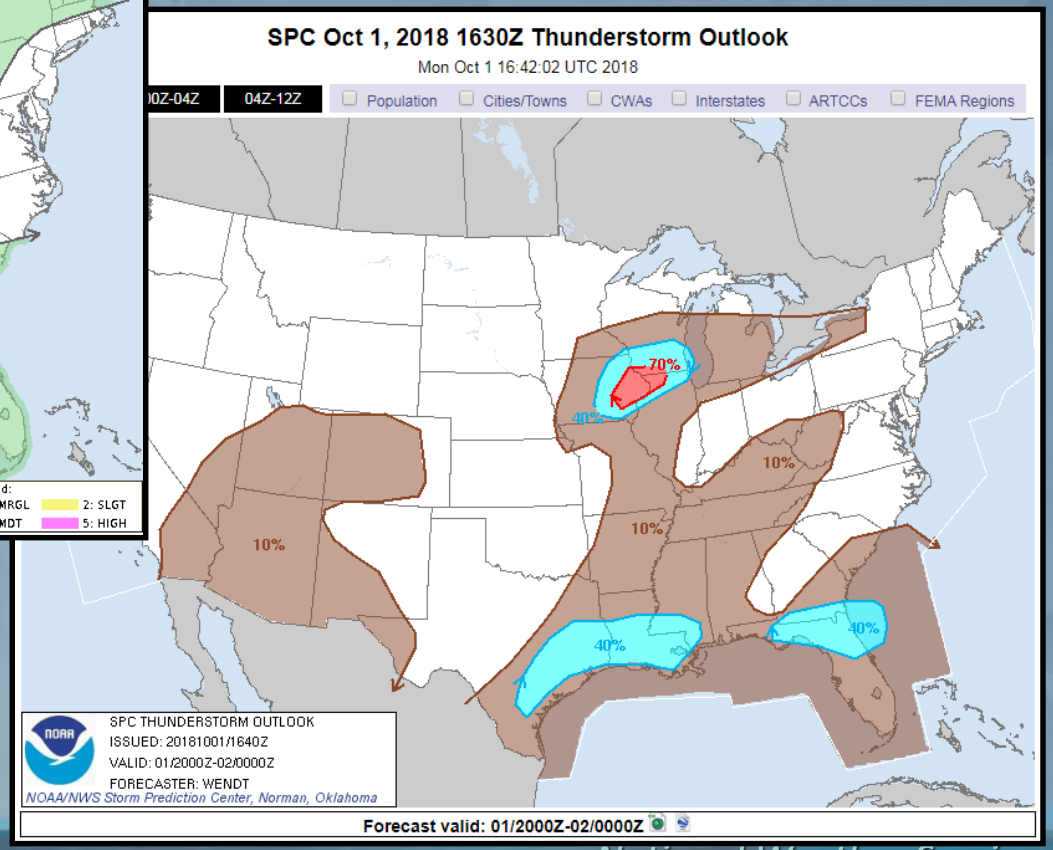
National Support



Storm Prediction Center

Storm Prediction Center Convective Outlooks

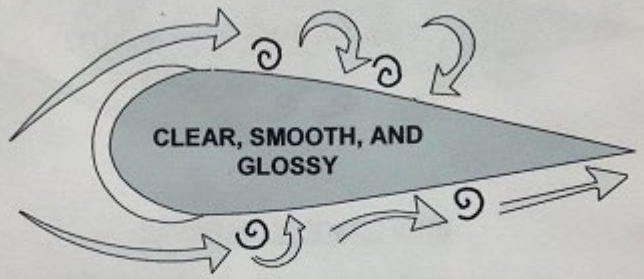




National Weather Service
Pittsburgh, PA

Types of Icing

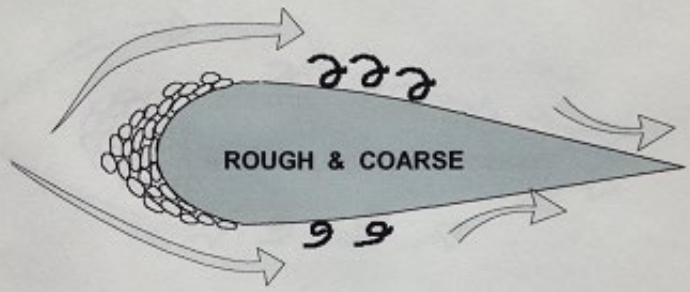
CLEAR ICING



FAVORABLE CONDITIONS

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

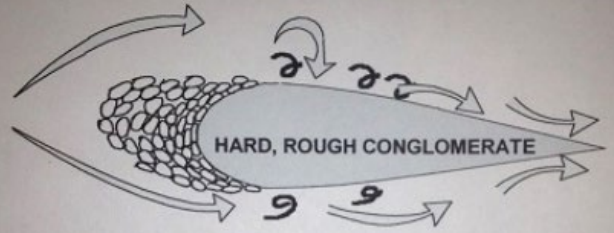
RIME ICING



FAVORABLE CONDITIONS

- SMALL, SUPERCOOLED DROPLETS IN STRATIFORM CLOUDS

MIXED ICING

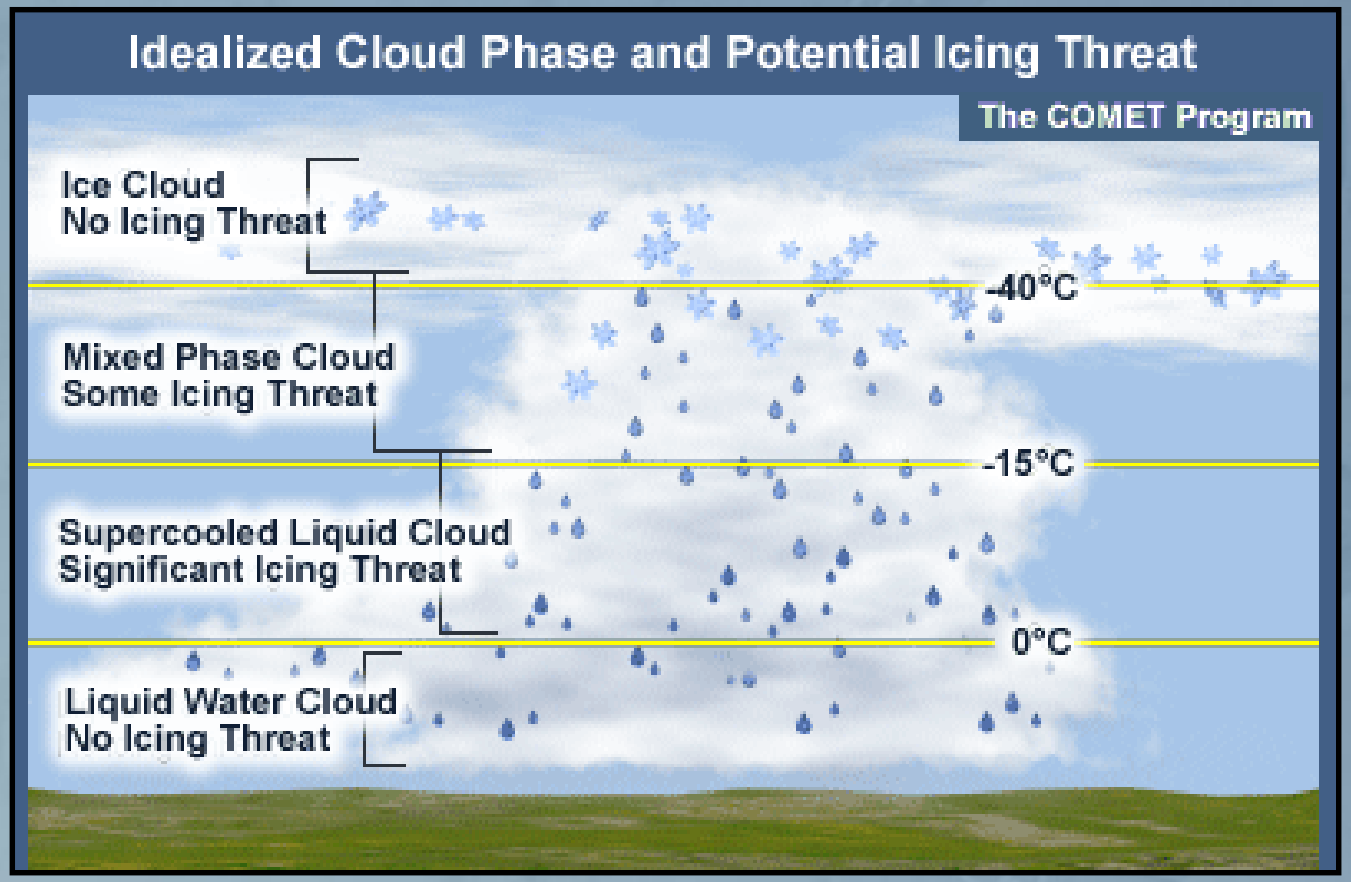


FAVORABLE CONDITIONS

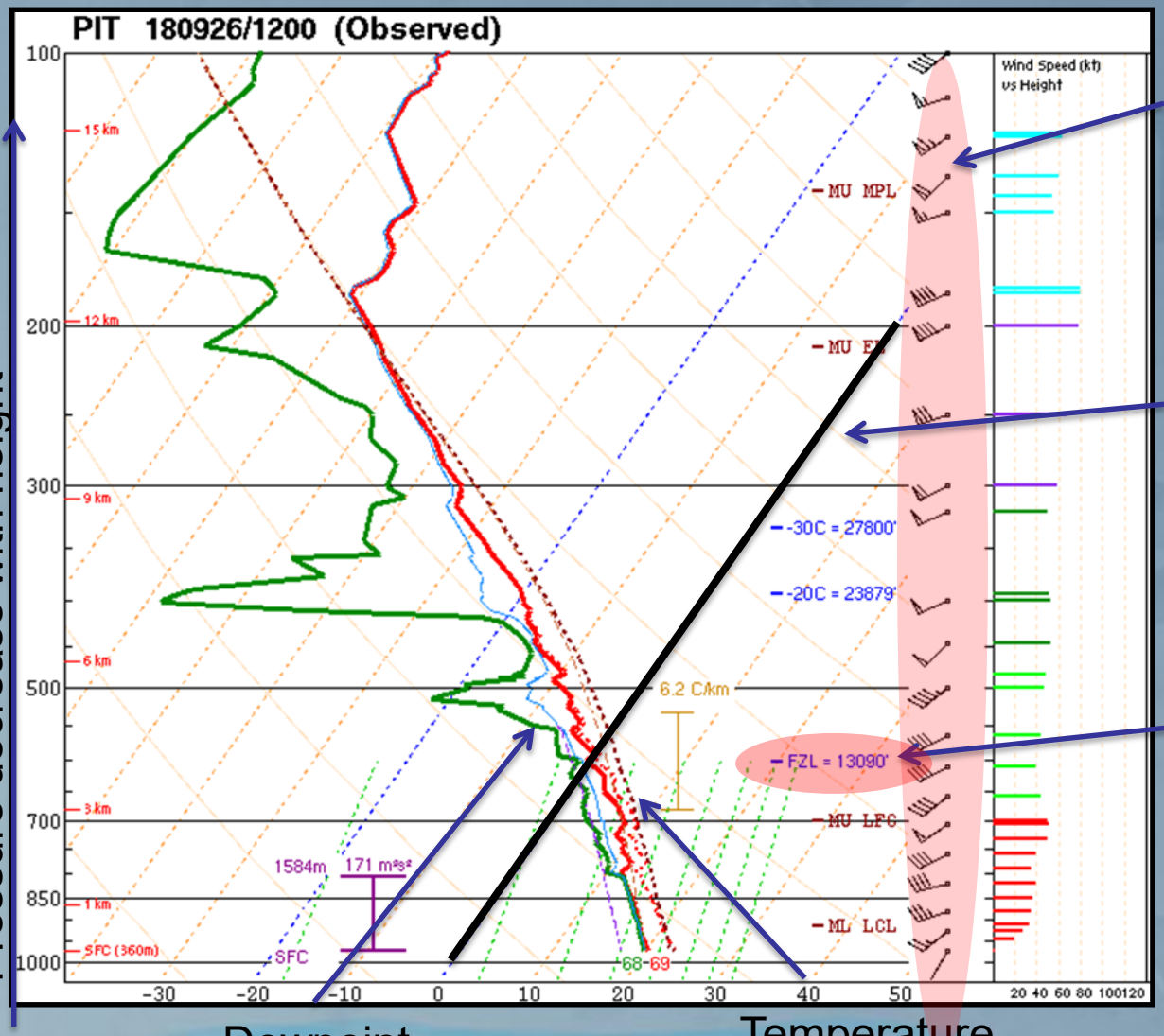
- LARGE AND SMALL DROPLETS COEXIST
- LIQUID AND FROZEN PARTICLES COEXIST
- WET SNOW

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



Wind Speed / Direction with Height

0 Degree Isotherm

Freezing Level

~FL 400

~FL 400

~FL 180

~FL 100

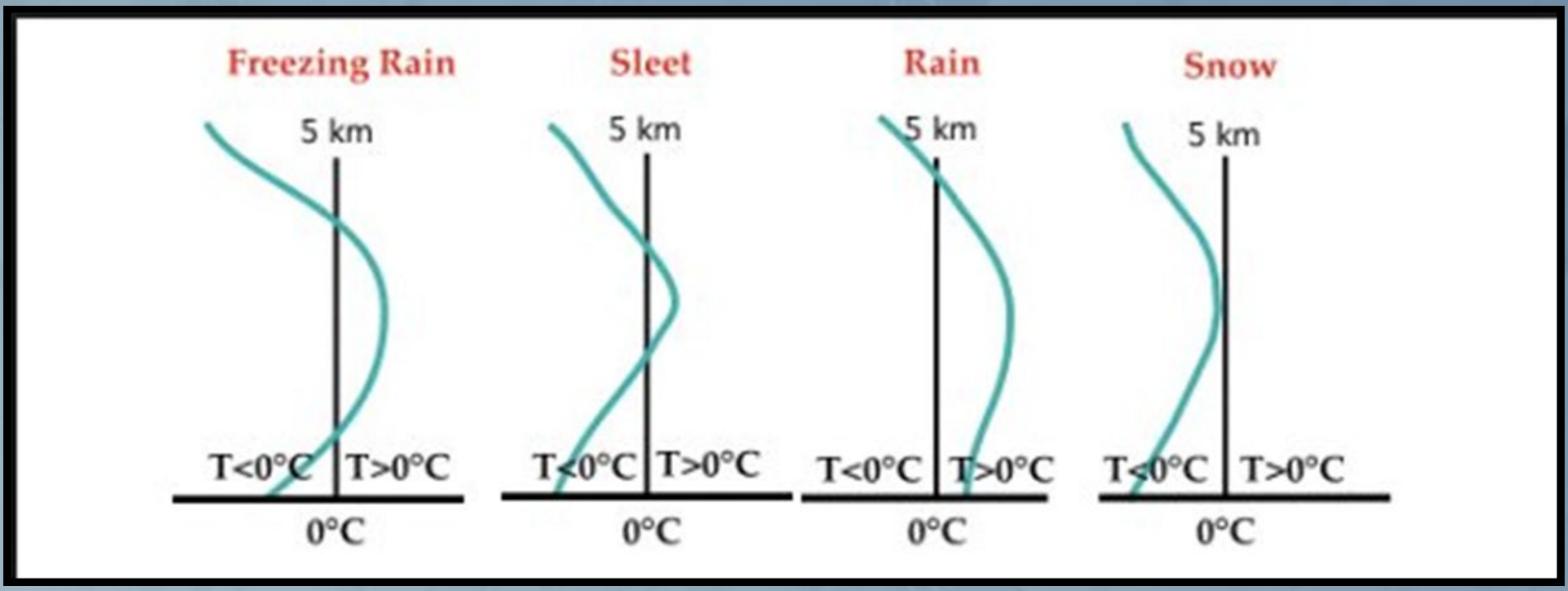
Surface

Pressure decrease with height

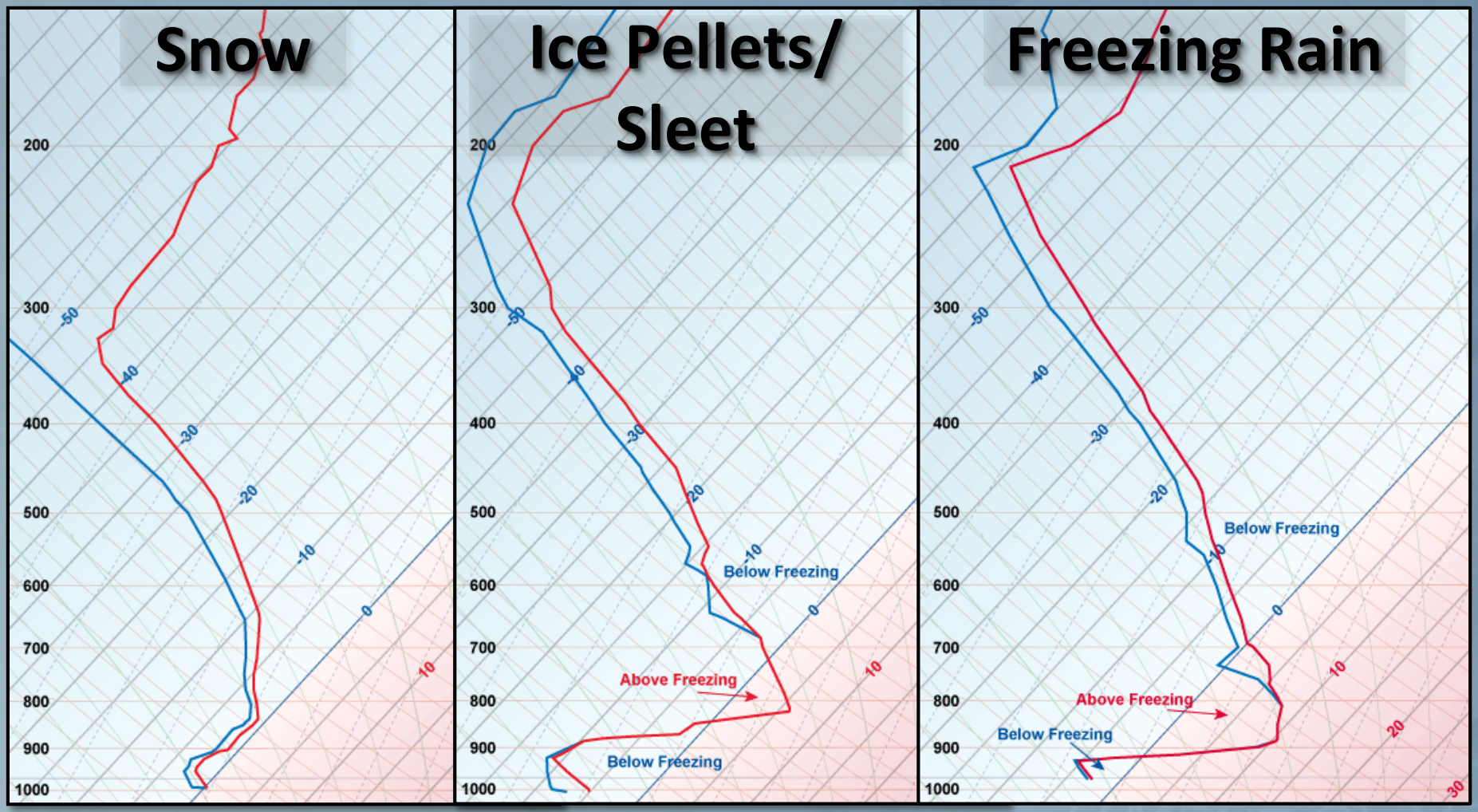
Dewpoint

Temperature

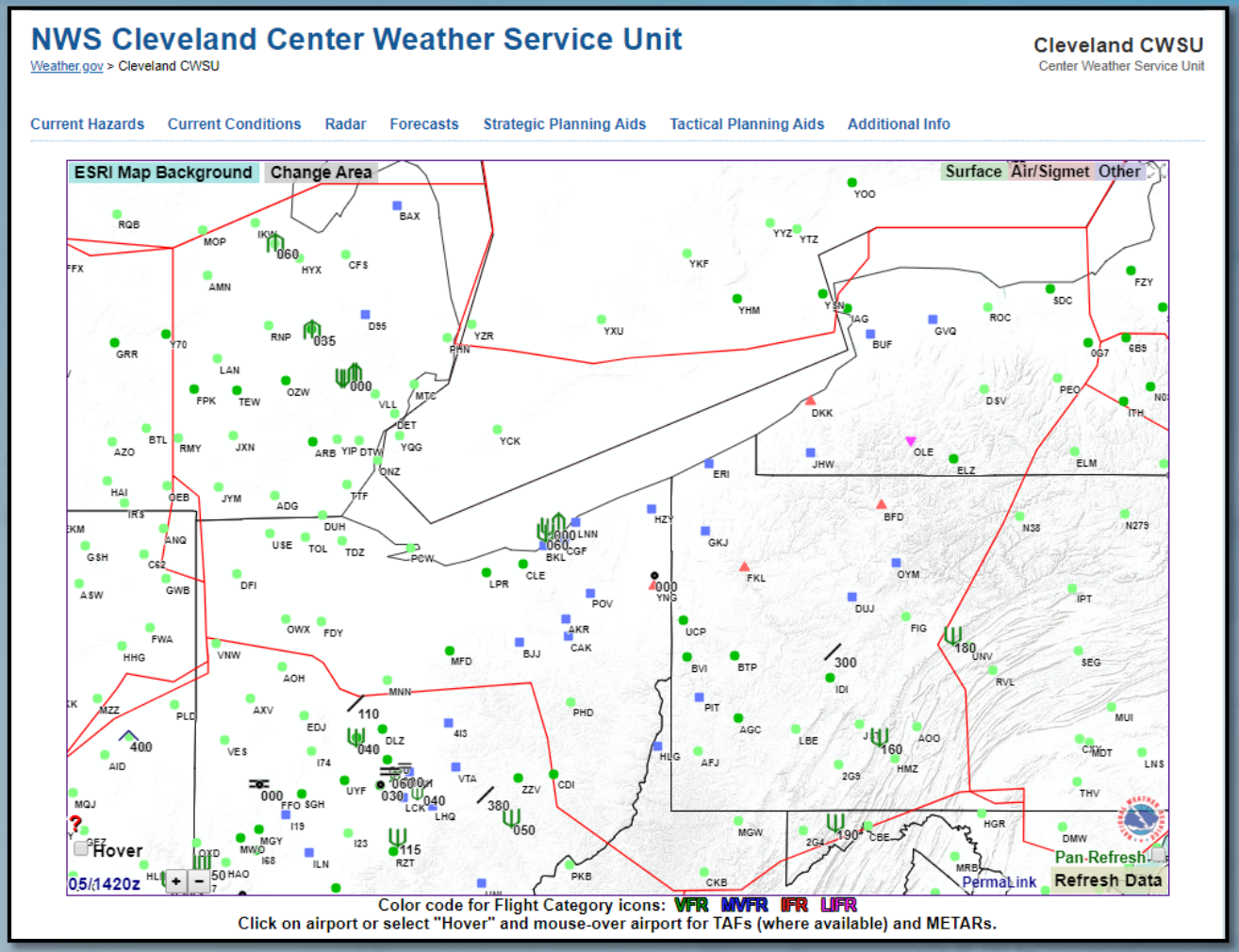
Using Soundings to Forecast Winter Precipitation



Using Soundings to Forecast Winter Precipitation



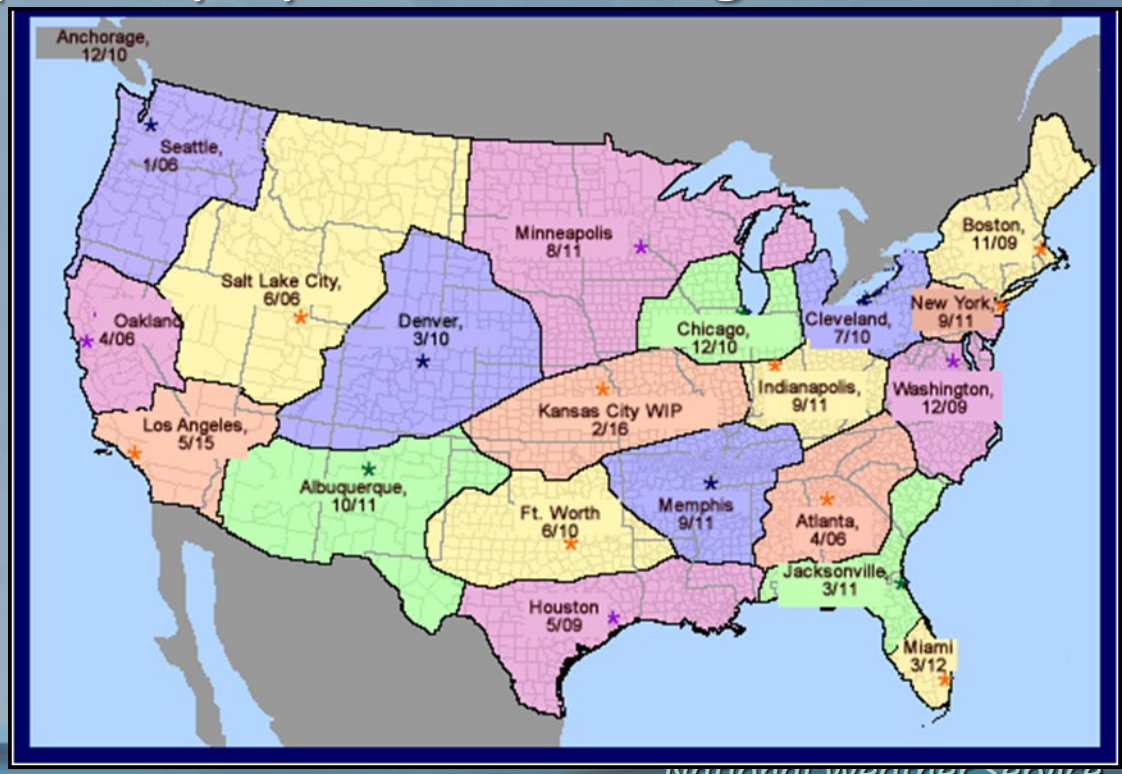
Regional Support



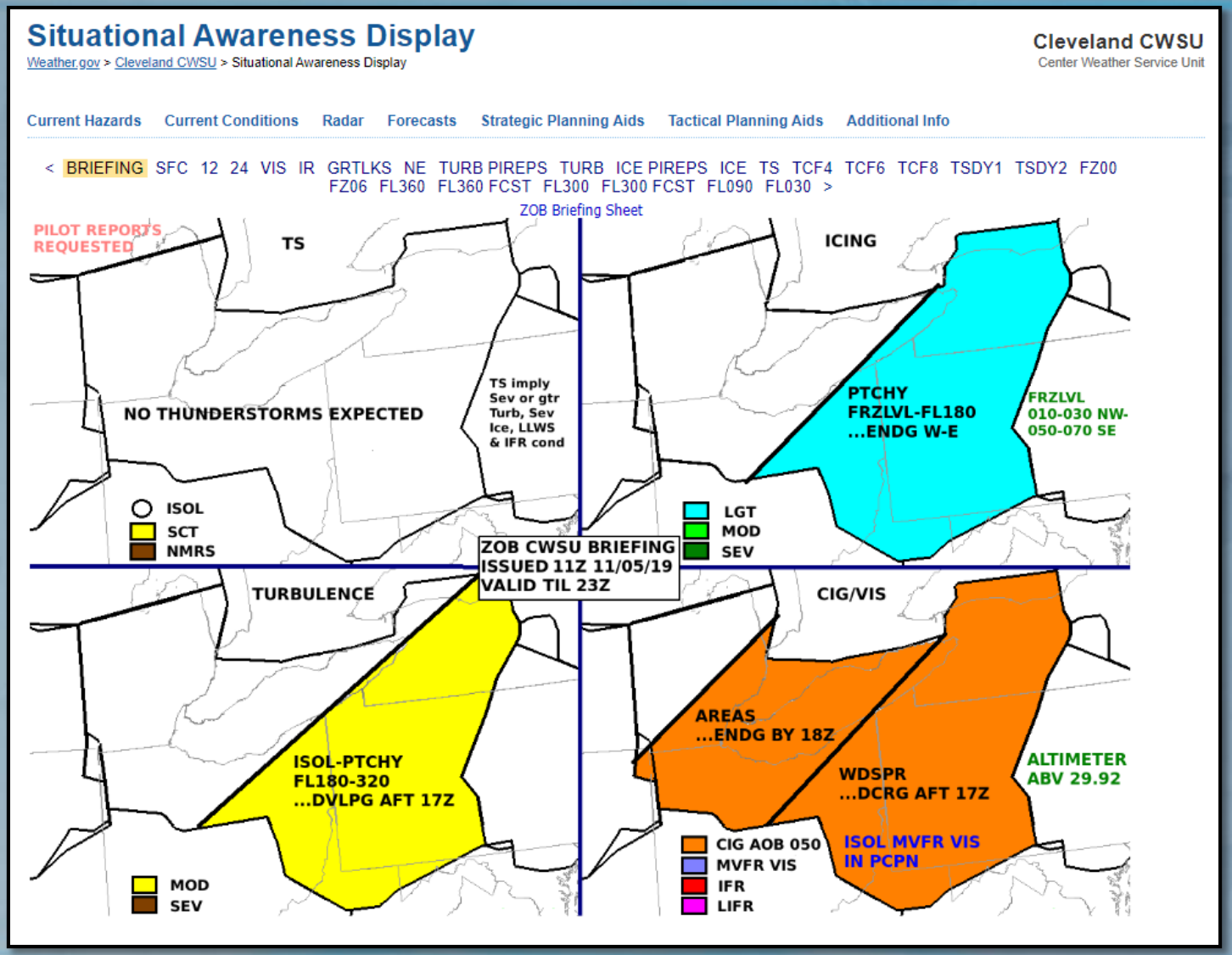
Center Weather Service Unit

Center Weather Service Units (CWSUs)

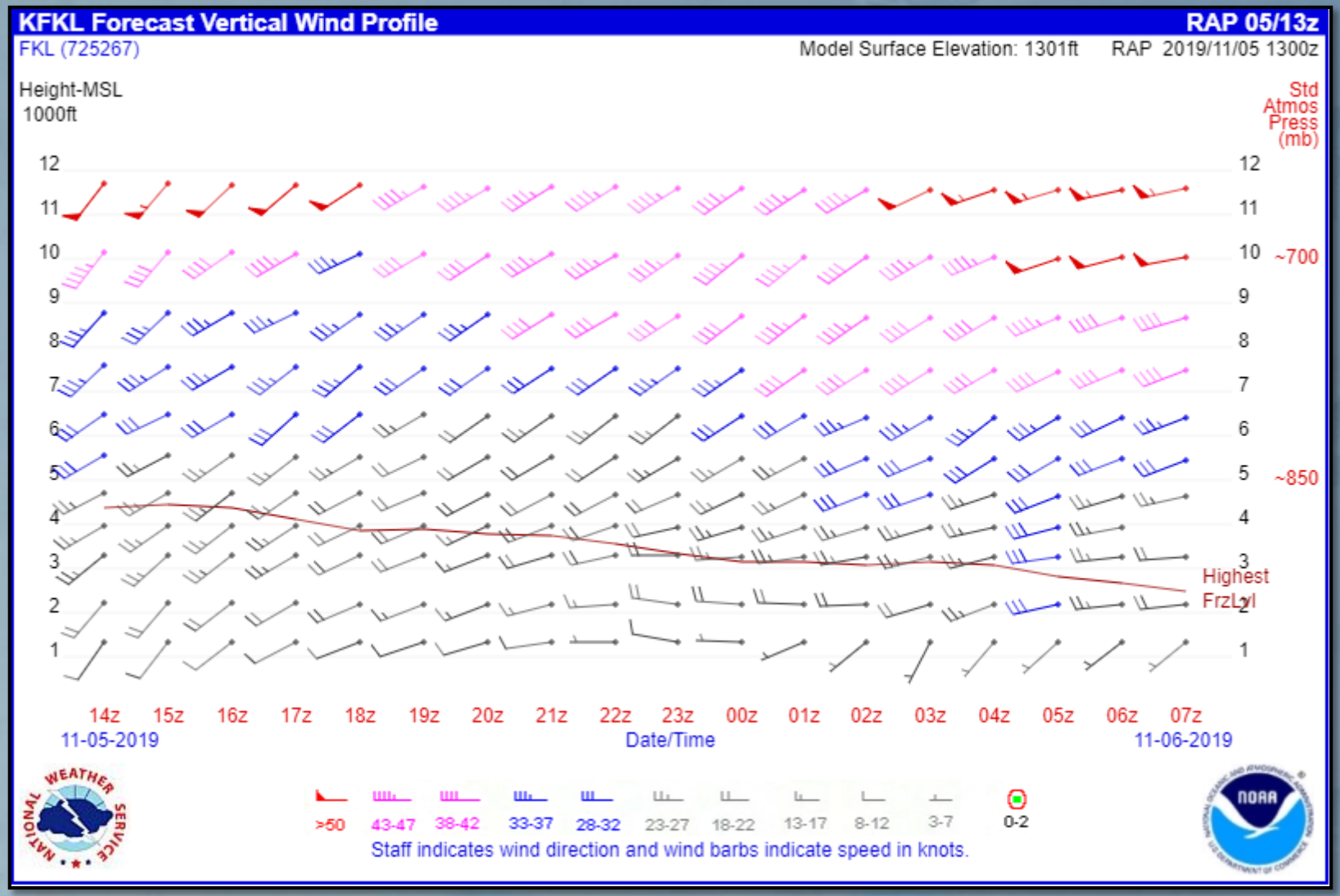
- Joint FAA / NWS weather support units
  - Staffed 16 hours per day by NWS personnel
  - Staffed 24 hours per day by Traffic Management Unit personnel



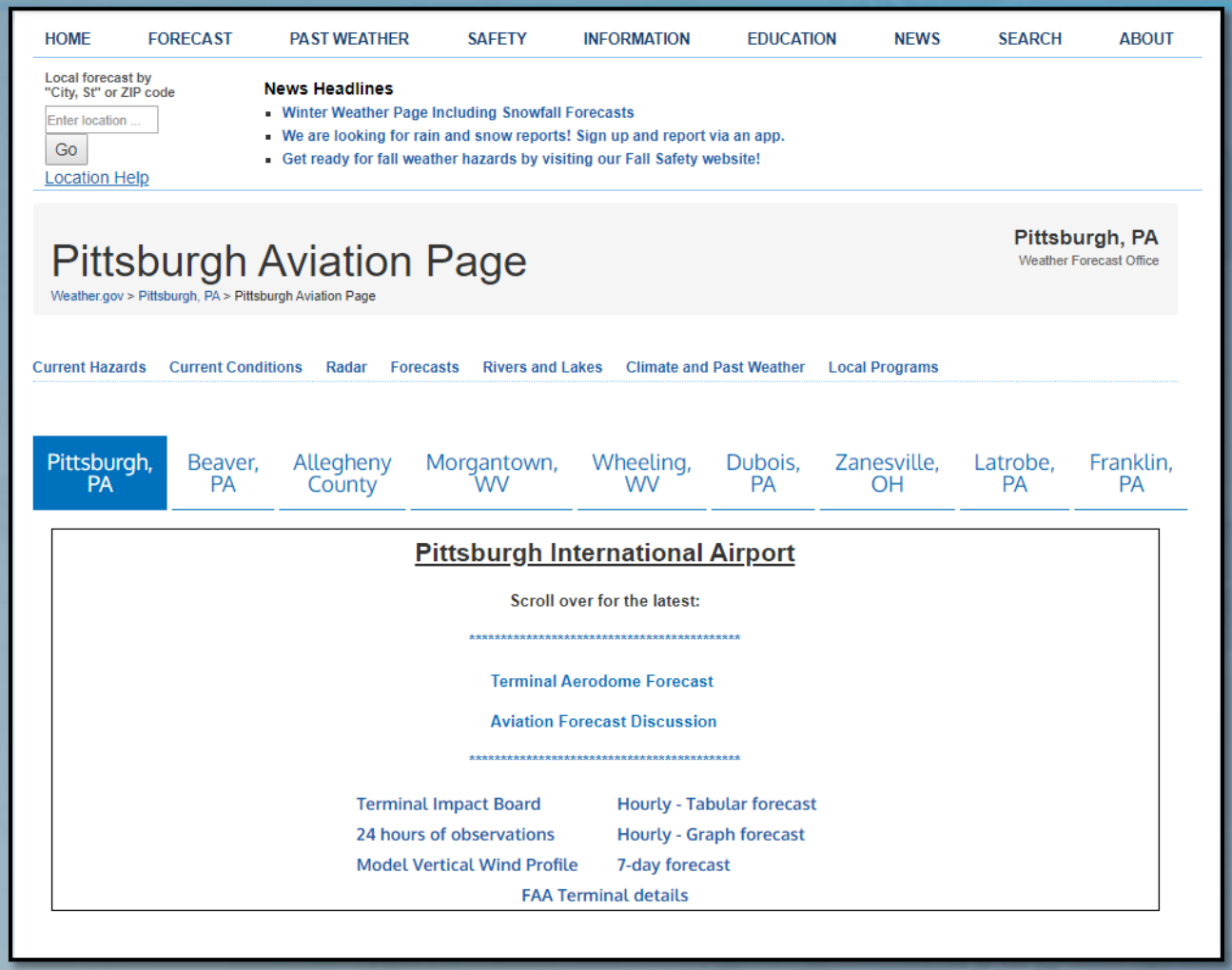
Situational Awareness Display Briefings



Forecast Vertical Wind Profiles



Local Support

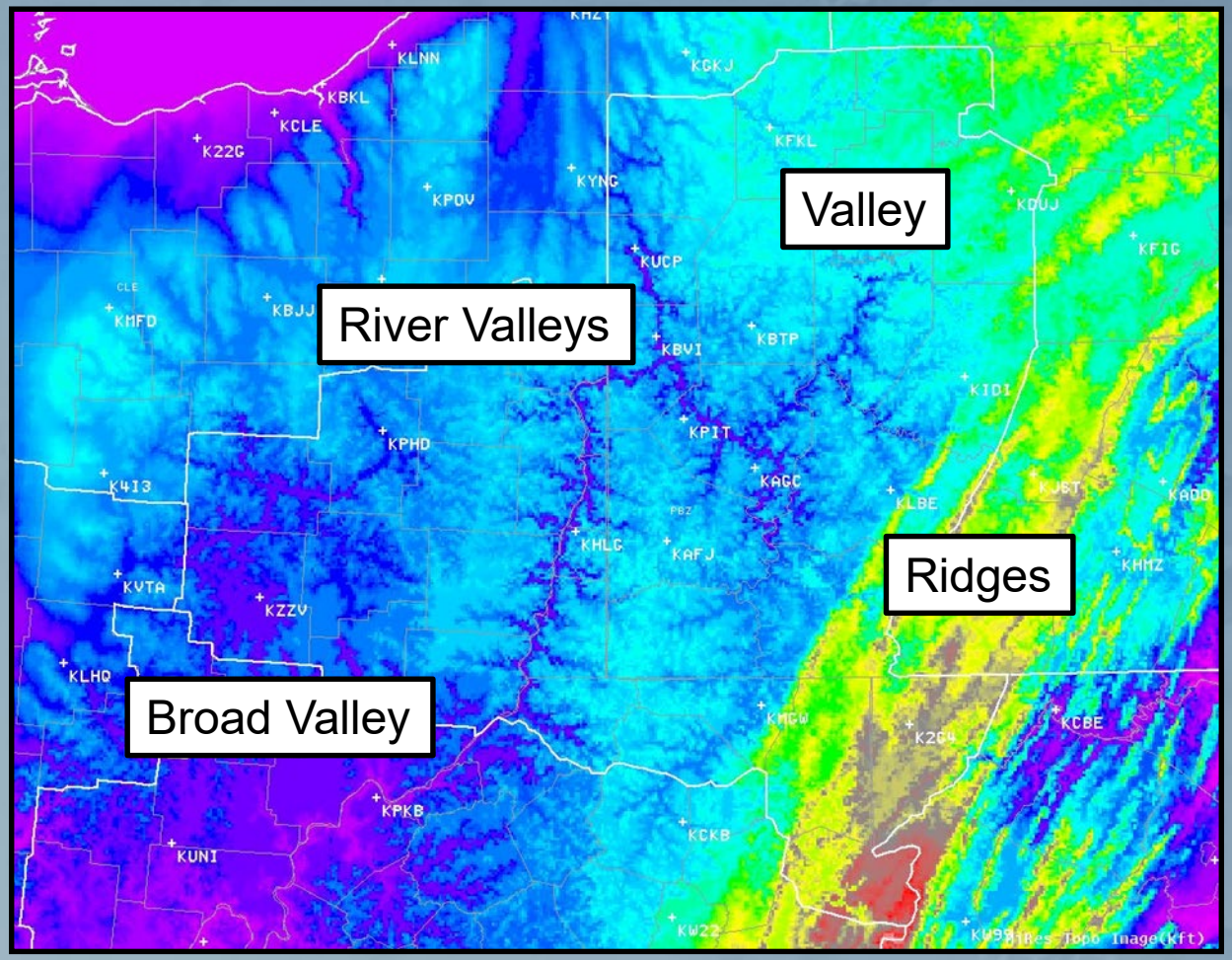


NWS Pittsburgh

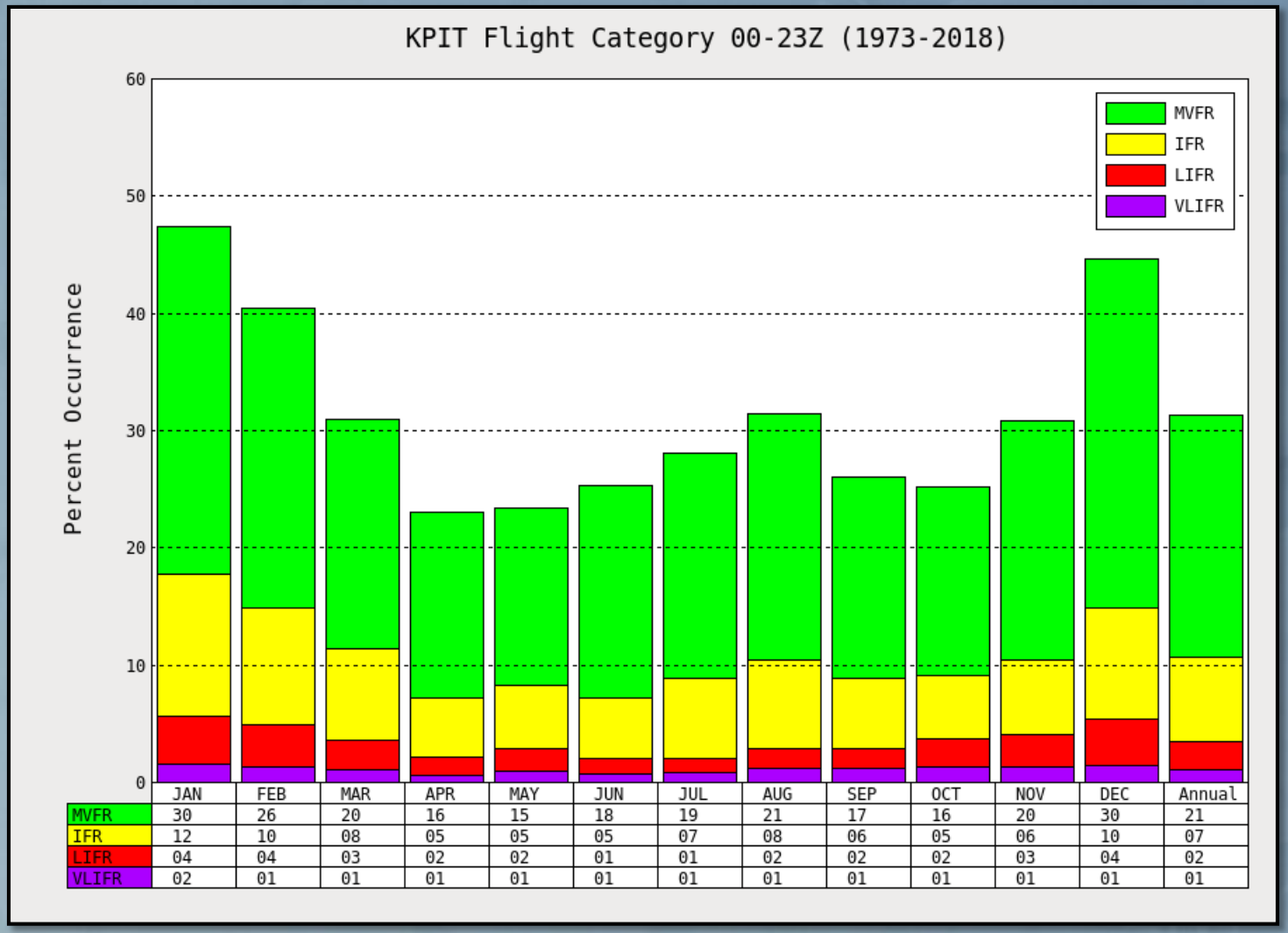
Pittsburgh NWS

- 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



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Annual
MVFR	30	26	20	16	15	18	19	21	17	16	20	30	21
IFR	12	10	08	05	05	05	07	08	06	05	06	10	07
LIFR	04	04	03	02	02	01	01	02	02	02	03	04	02
VLIFR	02	01	01	01	01	01	01	01	01	01	01	01	01

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		
Flight Category	Ceiling (feet)	Visibility (SM)
VLIFR	< 200 and/or	< ½
LIFR	< 500 and/or	< 1
IFR	≥ 500 to < 1,000 and/or	≥ 1 to < 3
MVFR	≥ 1,000 to ≤ 3,000 and/or	≥ 3 and ≤ 5
VFR	> 3,000 and	> 5

Critical Amendment Critera - CAC	
Flight Category	Impact
MVFR	≤ 3000 ft and/or ≤ 5 sm
Must File Alternate	< 2000 ft and/or < 3 sm
IFR	< 1000 ft and/or < 3 sm
Alternate Landing Minimums (airport dependent)	600 ft and/or 2 sm
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 >/= 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 (^{o}C)
  - A2994: Altimeter / Pressure (i.e. 29.94 inches of mercury)
  - A02: 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?