

## Central Indiana Pea Soup

Widespread IFR of February 4, 2008

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### Summary

In the early morning hours of February 4, a warm front moved north across central Indiana. As this front moved across the state, widespread IFR and VLIFR conditions developed. This event produced IFR or lower conditions for at least 16 hours at all TAF sites.

### Surface Observations

#### KIND

At 06Z KIND dropped to IFR conditions. Ceilings and visibility continued to deteriorate through the night and ceilings dropped to 100 feet or lower as surface wind dropped to 3 knots. As surface wind increased, visibility improved slightly. There was significant low level moisture advection as seen in the observations. Surface dew points started out around 37 and increased to 52 toward the end of the event. ACARS soundings (next page) showed a slight inversion that strengthened with time. Ceilings and visibility improved to MVFR by 2249Z

#### KLAF

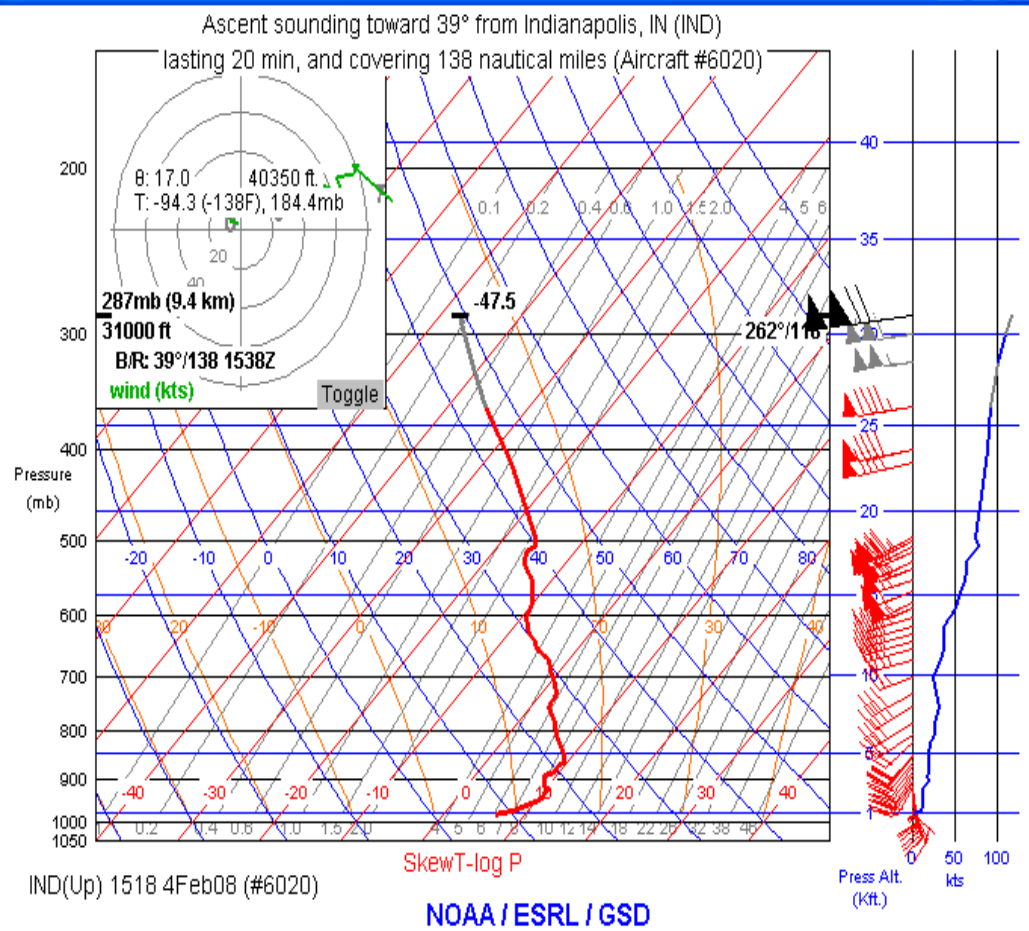
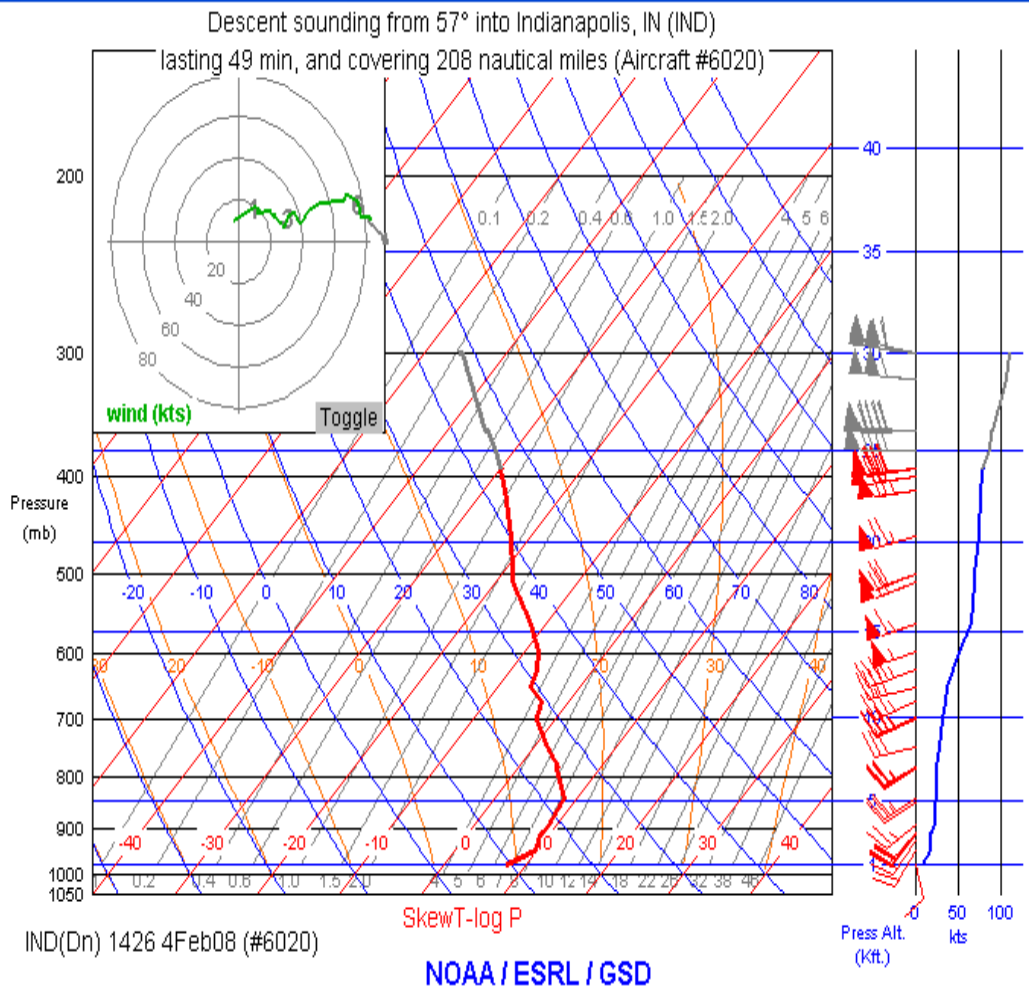
At midnight, KLAF was already IFR and remained that way until 22Z. As the warm front passed through KLAF, visibility dropped to M $\frac{1}{4}$  and remained there until 1815Z. Ceilings and visibility improved to MVFR by 2150Z.

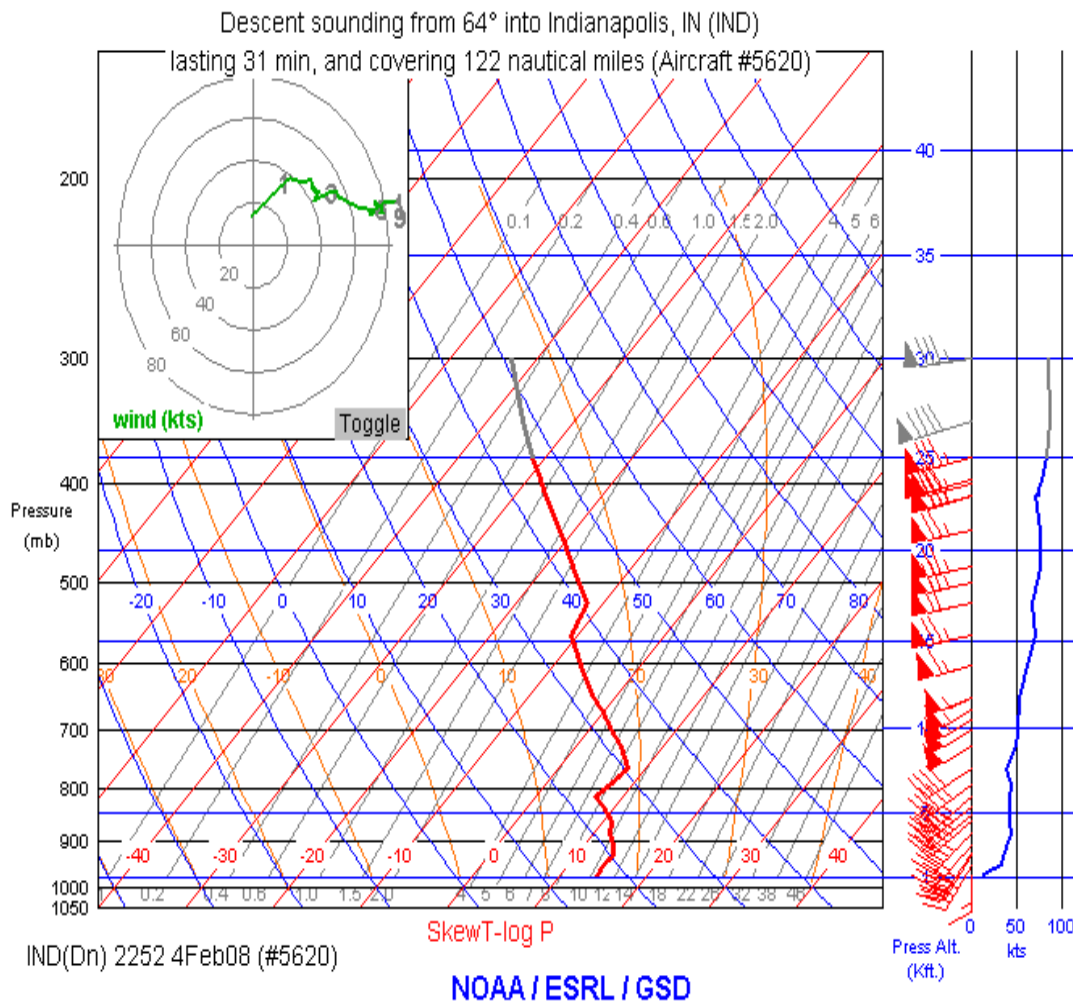
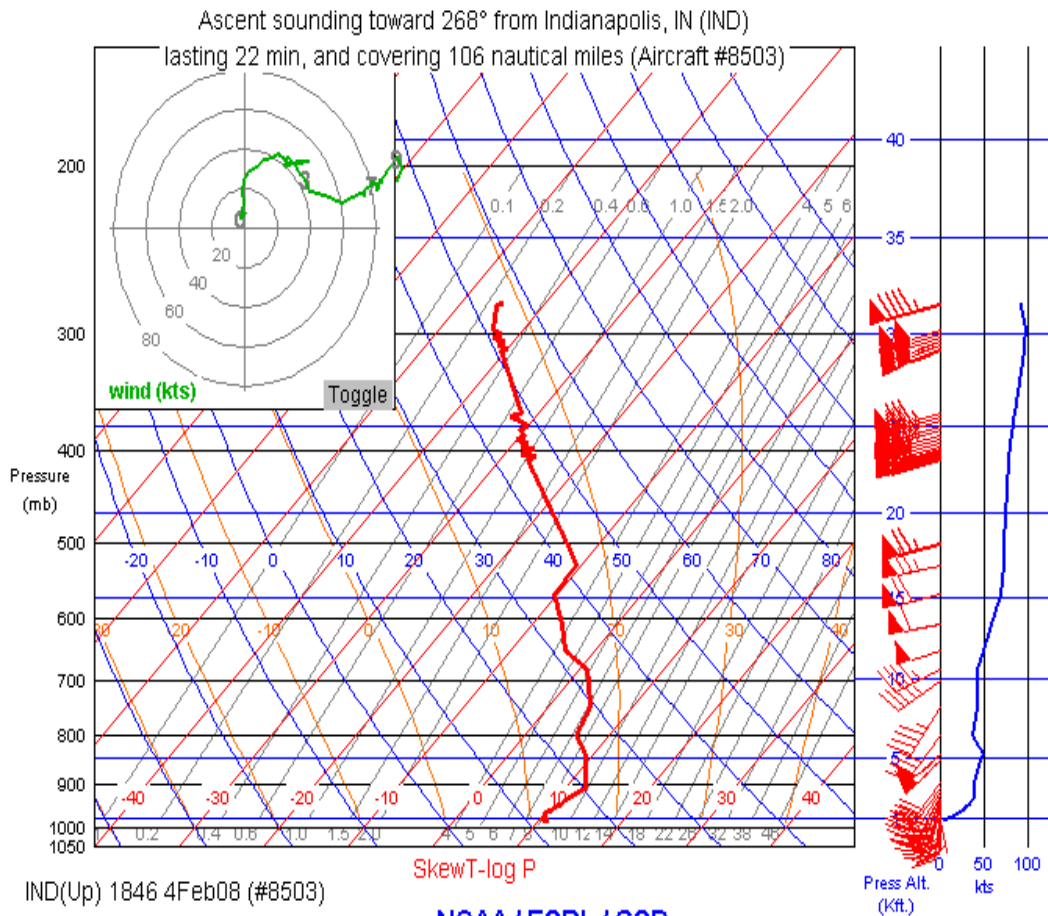
#### KHUF

At 0140Z, KHUF ceilings dropped to IFR. Conditions continued to deteriorate through the night and by 04Z both ceilings and visibility were in the LIFR category. Visibility dropped to M $\frac{1}{4}$  at 0820Z and remained there until 0940Z. Visibility improved to  $\frac{1}{4}$  SM then dropped again to M $\frac{1}{4}$  for a brief period from 1120Z to 12Z. Ceilings and visibility improved to MVFR by 1955Z.

#### KBMG

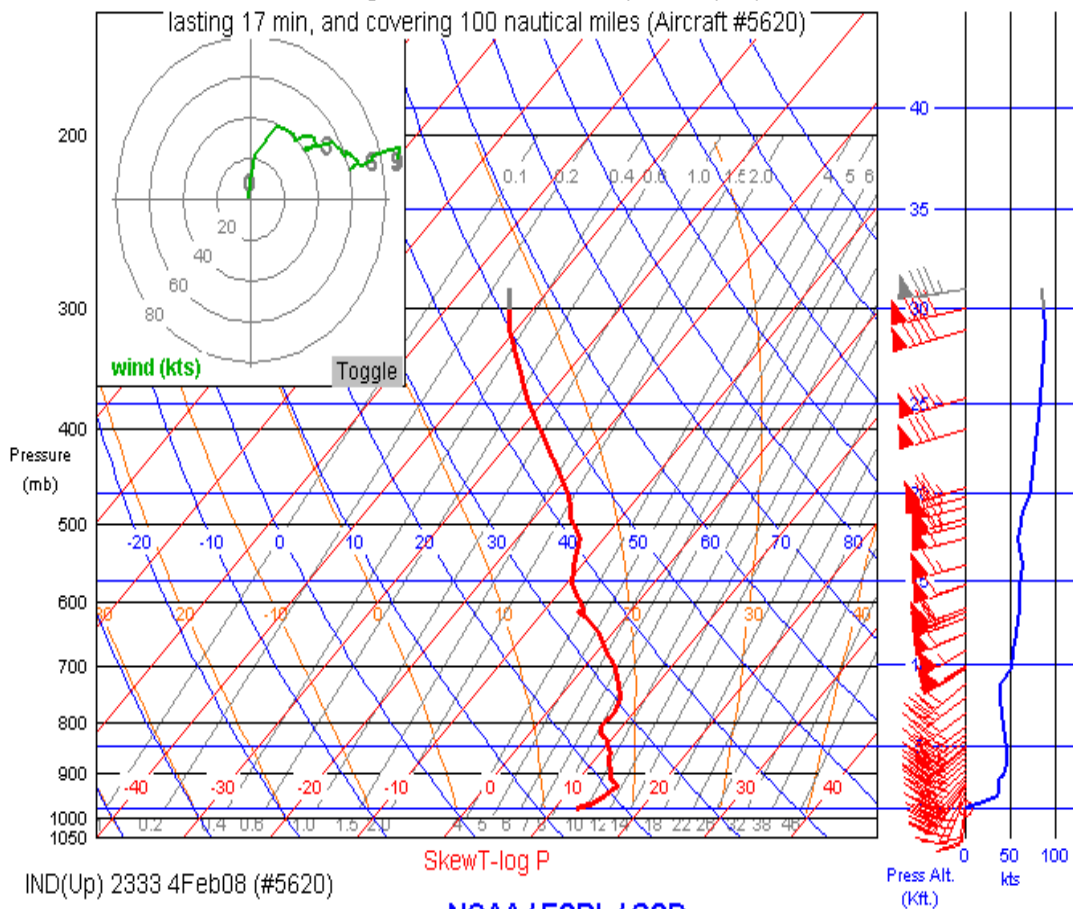
At 02Z, KBMG ceilings dropped to IFR. Conditions continued to deteriorate through the night and by 06Z both ceilings and visibility were in the LIFR category. Visibility dropped to M $\frac{1}{4}$  and remained there until 1210Z. Ceilings and visibility improved to MVFR by 1740Z.





Ascent sounding toward 33° from Indianapolis, IN (IND)

lasting 17 min, and covering 100 nautical miles (Aircraft #5620)



IND(Up) 2333 4Feb08 (#5620)

SkewT-log P

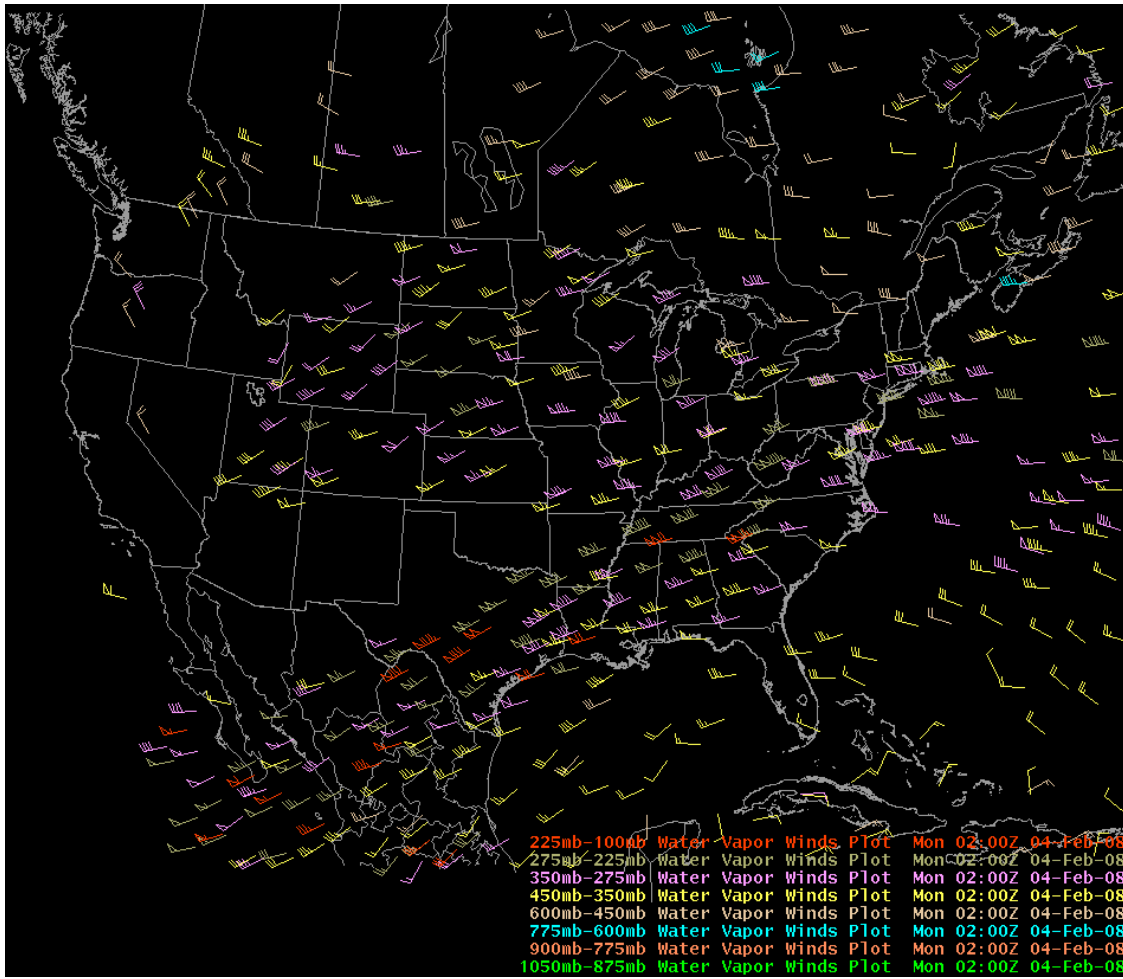
NOAA / ESRL / GSD

Press Alt. (Kft.)  
kts

## So, What Happened?

Between February 1 and 3, 0.43 inches of rain fell at KIND, 0.80 inches at KLAJ, 0.18 at KHUF and 0.30 at KBMG. Temperatures during that time frame were slightly above normal (anywhere from 2-9 degrees each day).

A warm front passed through central Indiana from south to north. On the warm side, plenty of warm tropical moisture was being pumped into the system. Satellite derived winds pictured below show the moisture source.



This series of surface charts shows the advancing warm front and the cig/vis plot.

**06Z**

**09Z**

**12Z**

**15Z**

This event is a fairly typical event as described in the COMET module “Synoptic Weather Considerations: Forecasting Fog and Low Stratus”. Temperatures ahead of the warm front were in the lower and middle 30’s. Right around midnight, KLAF reported a brief period of freezing rain.

Paraphrasing the COMET module’s section on pre-warm frontal events:

Fog and low stratus form in the cold wedge of air beneath and adjacent to a warm front boundary as the warm air overruns the cold wedge. Visibilities can be reduced to below minimums, especially if the underlying surface is very moist and cold.

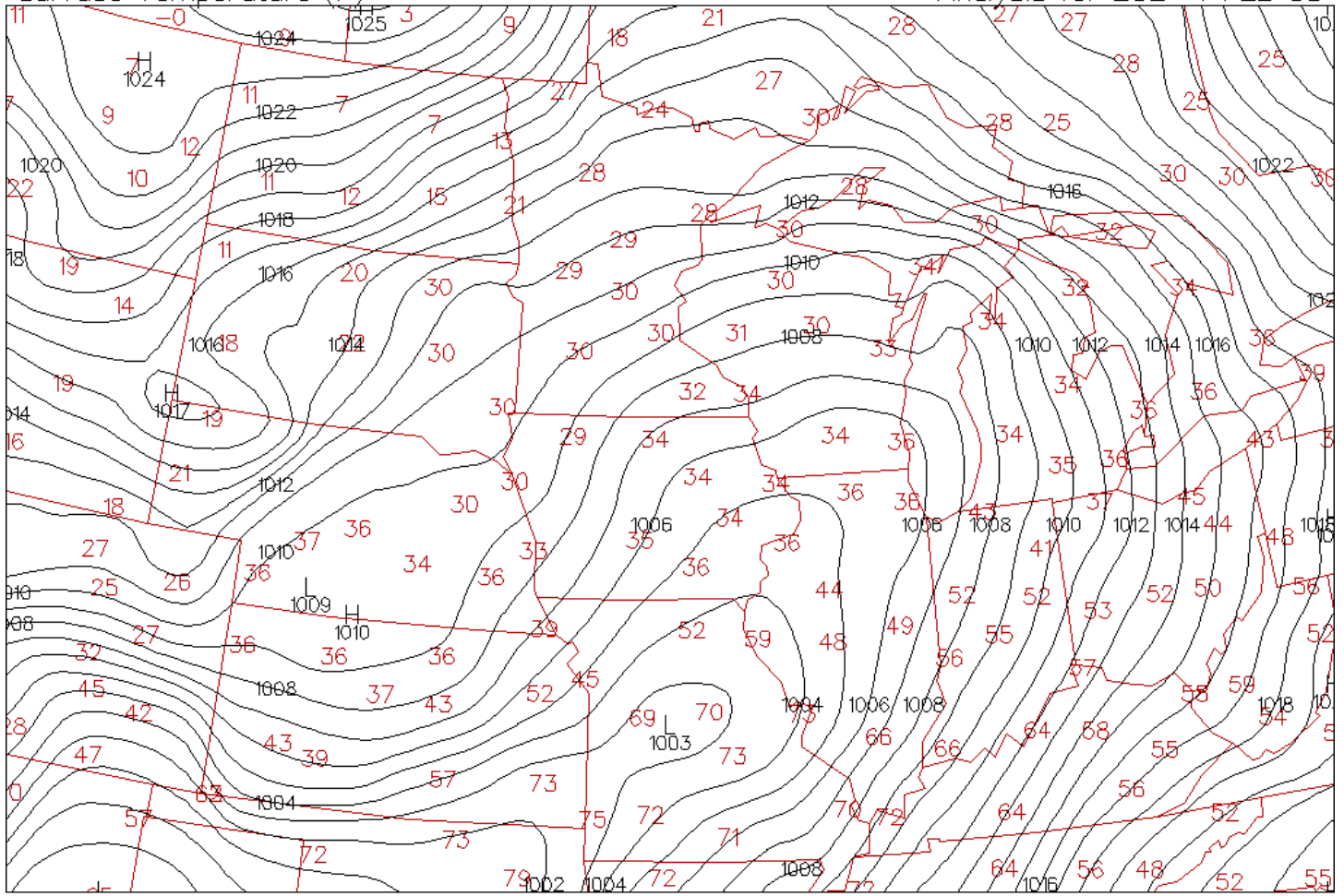
Since surface temperatures were cold in the pre-frontal environment, as the warm front passed over a cold, moist ground the result was low stratus and fog.

Temperatures and dew points began to rise after the warm front was well north of the TAF sites. Low level stability began to decrease and helped to bring ceilings and visibility up to the MVFR category. The next page shows surface temperatures at 23Z.



Sea level Pressure (mb)  
Surface Temperature (F)

WXP analysis for 23Z 4 FEB 08  
Analysis for 23Z 4 FEB 08



## TAF's

Looking at the 00Z TAF forecasts for each site our forecast was generally pessimistic, given the circumstances with a front in the area.

KIND 032320Z 040024 09008KT 5SM BR SCT010  
TEMPO 0204 2SM -TSRA BKN025CB  
FM0400 11010KT 5SM -SHRA OVC015CB  
FM0700 14010KT 4SM -RA BR OVC007  
FM0900 15008KT 2SM -RA BR OVC004  
FM1500 17010KT 4SM -RA BR OVC008

KBMG 032320Z 040024 12006KT P6SM BKN035  
FM0100 11010KT 3SM -SHRA OVC015CB  
FM0600 14010KT 4SM -RA OVC007  
FM0800 16010KT 2SM -RA BR OVC004  
FM1800 18015G22KT 5SM HZ OVC008 AMD LTD TO CLD VIS AND WIND 02Z-14Z

KLAF 032320Z 040024 09006KT 3SM FZRA OVC010  
TEMPO 0002 2SM TS FZRA BKN008CB  
FM0200 11010KT 3SM -SHRA OVC010  
FM0800 14010KT 4SM -RA OVC007  
FM1000 14008KT 2SM -RA BR OVC004  
FM1500 16010KT 4SM -RA BR OVC004 AMD LTD TO CLD VIS AND WIND 02Z-14Z

KHUF 032320Z 040024 10006KT P6SM BKN035  
TEMPO 0002 3SM -TSRA BKN015CB  
FM0300 16008KT 5SM -SHRA OVC015CB  
FM0700 11010KT 4SM -RA BR OVC007  
FM0900 14010KT 2SM -RA BR OVC004  
FM1500 16010KT 4SM -RA OVC004  
FM2100 17015G25KT 5SM HZ BKN008

The 18Z MAV MOS (the time that is available for the 00Z TAF)

**BMG (IFR @ 02Z) (MVFR @ 18Z)**

00Z – 06Z      Cat 7 to 6      (3100 – 12000 ft) (6 mi +)

**09Z-12Z**      **Cat 3** (Vis Cat 6)      (500-900 ft) (6 mi +)

15Z-18Z      Cat 2 (Vis Cat 5-6)      (200-400 ft) (3-6 mi)

Improvement to **Cat 4 by 00Z**

**HUF (IFR @ 02Z) (MVFR @ 20Z)**

00Z-03Z      Cat 7 to 6

06z-**12z**      Cat 4 to **3** (Vis Cat 5)      (1000-1900 ft down to 500-900 ft) (3 – 5 mi)

15Z-21Z      Cat 1-2-3 (Vis Cat 5-6)      (<200 improving to 500-900 ft) (3-5 mi improving to 6 +)

Gradual improvement to **Cat 4 by 00Z**

**IND (IFR @ 06Z) (MVFR @ 23Z)**

00Z-06Z      Cat 7 to 6 (Vis Cat 5)

**09Z-15Z**      **Cat 3** to 1 (Vis Cat 5-4)      (500-900 ft down to <200 ft) (3-5 mi down to 2 to <3 mi)

18Z-03Z      Cat 1-2-3 (Vis Cat 6-7)      (<200 ft improving to 500-900 ft)

Improving to **Cat 5 by 03Z**

**LAF (IFR @ 05Z) (MVFR @ 22Z)**

00Z-03Z      Cat 4 (Vis Cat 5)      (1000-1900 ft) (3-5 mi)

**06Z-15Z**      **Cat 3-2-1** (Vis Cat 5-4)      (500-900 ft down to <200 ft) (3-5 mi down to 2 to <3 mi)

18Z-00Z      Cat 2-1-2 (Vis Cat 5)      (200-400 ft down to <200 ft) (3-5 mi)

Improvement to **Cat 5 by 03Z**

MOS performed best at LAF for onset of low ceilings – possibly because IFR was already occurring when the 18Z run was created.

MOS was also very slow to improve conditions, as were we in our TAF's.

MOS 3 hourly temperatures actually did fairly well with raising the temperatures after frontal passage.

## Conclusions

Keeping an eye on surface temperatures as well as instability may have helped forecast improving conditions more accurately. MOS captured deteriorating conditions as the warm front approached and temperature and dew points increased.