# Aviation Post Mortem for the Overnight and Morning of August 12, 2008 by Michael Koch

### **Synoptic Setting:**

During the overnight of August 12, 2008, the surface pattern revealed a high pressure ridge from northern Michigan to western West Virginia with a frontal system across the Plains and a very weak surface pressure gradient across the lower Great Lakes and Ohio Valley. Meanwhile... at 12z August 12...there was a weak upper level shortwave across southern Illinois undercutting a weak upper ridge across southern Wisconsin. Meanwhile...The 08z 11-3.9 micron satellite loop (Figure 1) and surface observations (Figure 2) were indicating a thick cirrus deck across Illinois and southwest Indiana that had thinned some overnight across central Indiana especially near a corridor from Terre Haute to Bloomington. IFR conditions in fog were already taking place by 08z at Terre Haute and 10z at Bloomington. Model (Figure 6) and ACARS soundings were showing a shallow inversion from the surface to 950 mb at Bloomington at 12z and were showing dry air above the inversion but light winds and some moisture below the inversion with a calm wind noted in the surface observations. Finally...no rainfall was recorded for any of the sites on August 11, 2008 or August 12, 2008, so the atmosphere was not preconditioned for fog or stratus. The late afternoon foggy program (Figure 7) was revealing a crossover value of 1 at IND...while the stability index was 5.0 which strongly favored fog over stratus if either was to develop. Dew points during the warmest part of the day were 55 except at Terre Haute where it was 56. CCF forecasts only had overnight lows at the terminals as low as the afternoon dew point.

#### Model Forecasts and MOS:

The GFS and NAM were pretty consistent in showing only a weak inversion at 12z. The models had the inversion further weakening by 15z. They also both favored a few hours of MVFR conditions prior to 12 August 12 at all stations but Lafayette and also both brought in a lot of high level moisture overnight and during the morning of August 12.

#### **TAF Forecasts:**

18z August 11 and 00z August 12 TAFs had MVFR fog from 09z-12z for all but IND. However, with cirrus was increasing during the evening. The 06z TAFs held the fog out all together. However, by 06z, breaks in the cirrus overcast deck were already opening up near a Terre Haute to Bloomington corridor and IFR conditions developed by 08z at Terre Haute and 10z at Bloomington. A look at the hourly roundups for the late evening of August 11, showed dew point depressions at Terre Haute and Bloomington getting markedly lower than the 18 degrees at 8 pm EDT (Figures 4 and 5). Lafayette and Indianapolis never fell below 6 statute miles as the cirrus deck held long enough there. Finally...by 11z

(Figure 3) thicker cirrus overspread Terre Haute and Bloomington which put an abrupt end to the fog.

#### **Results:**

#### LAF:

The cirrus deck remained thick enough over Lafayette to keep fog from forming.

#### IND:

The cirrus deck remained thick enough over Indianapolis to keep fog from forming.

#### TAFs:

IFR conditions were not forecasted in the TAFs possibly due to increasing and fairly thick cirrus hinted at by the models and seen on the Satellite loop during the evening of August 11. Also, model soundings only showed a modest amount of moisture below an inversion and a crossover value greater than 0. However...the thinning cirrus perhaps was not diagnosed well enough by the overnight shift or maybe the WRKTAFs were not looked over enough 1prior to sending out the 06z TAFs. Also, the quickly lowering dew point depressions at Terre Haute and Bloomington appeared to be not taken into account.

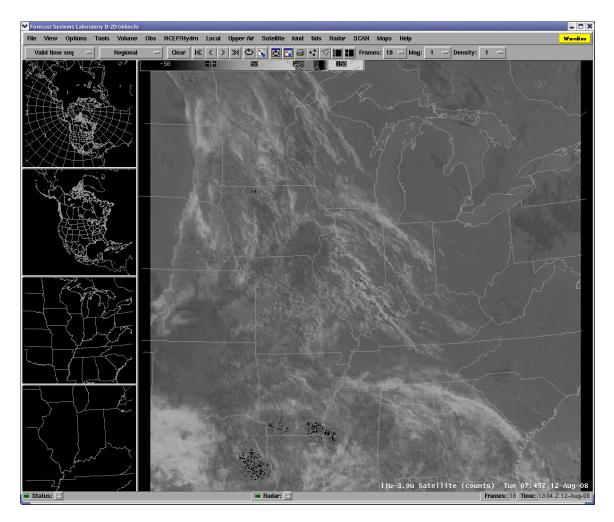


Figure 1. 0745Z 8/12/08 11-3.9 Micron Satellite Picture

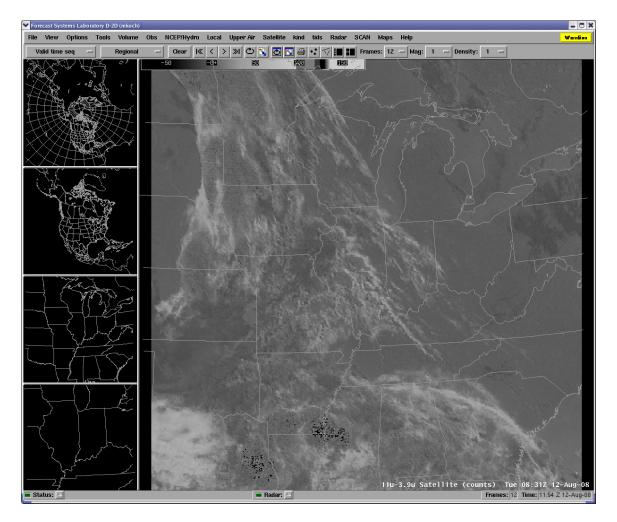


Figure 2. 0831Z 8/12/08 11-3.9 Micron Satellite Picture

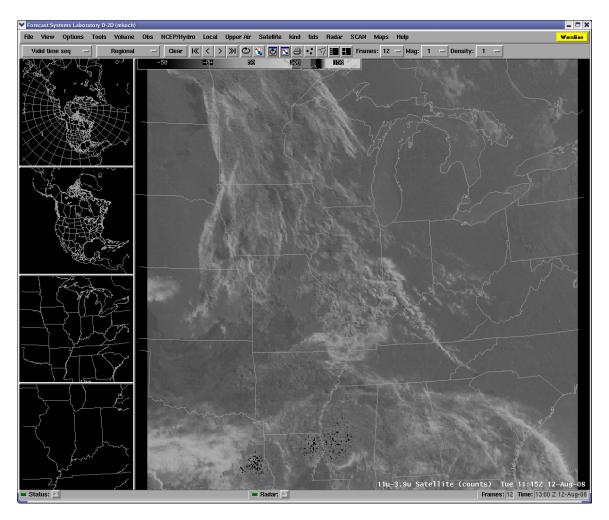


Figure 3. 1115Z 08/12/08 11-3.9 Micron Satellite Picture

## TERRE HAUTE CLEAR 73 57 57 NE7 29.97F

BLOOMINGTON CLEAR 73 55 53 N5 29.96F

Figure 4. 02Z August 12, 2008 Hourly Weather

TERRE HAUTE CLEAR 60 56 86 CALM 29.97S

BLOOMINGTON CLEAR 56 55 97 CALM 29.96F

Figure 5. 05Z August 12, 2008 Hourly Weather

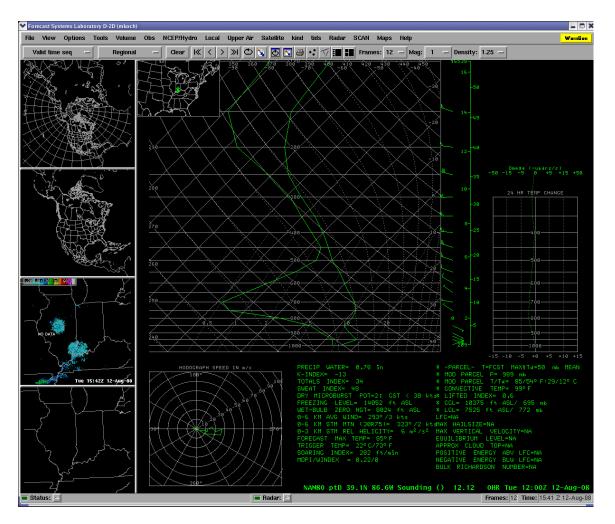


Figure 6. 12Z August 12, 2008 NAM BMG Sounding

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- A Stability Index less than 0.03 indicates turbulent eddys and favors stratus rather than fog.	
- A Stability Index from 0.03 to 0.04 is marginal - consider other factors that may favor or disfavor fog.	
- A Stability Index greater than 0.04 indicates stagnant air and favors fog developmentif other conditions are also present.	
If Crossover Value is zero1-3 mi is likely and <1/2 mi possible. If Crossover Value is -3<1/2 mi is likely.	- 11
The Crossover Value is the Forecast Low Temp minus the Runtime Dewpoint.	- 11
Additional Considerations include	- 11
<ul> <li>Soil or Ambient air Temperature?</li> <li>Use the 4 inch soil temperature if there is no snowcover.</li> <li>If the soil temp is 5-10F warmer than the Dewpoint Temp, it is much harder to get fog. More likely to get low ceiling due to warming from the ground. The Dewpoint Temp is the value of the dewpoint at maximum mixing. This is likely going to be at the warmest part of the day.</li> <li>Soil temperature colder than the Dewpoint Temp hastens fog formation.</li> </ul>	
Stratus deck already present? - In absence of mid/high clouds, top of the low stratus cools and thickens	
the cloud layer. - The base of the cloud layer can thus build down 200 feet per hourand even faster if the ground temps are 5-10F colder than the Dewpoint temps.	
Clearing Out? - While precipitation and low dew point spreads precede frontal boundaries behind them there is often a 2-4 hour lag between the clearing and the low level CAA.	
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Dewpoint at Runtime was 55 F Forecast Low Temperature Tonight is 56 F	- 11
Boundary Layer Wind Speed was 1 Knots Boundary Layer Temperature was 18 Celsius	
Boundary Dayer Temperature was to Cersius	$\nabla$

