

I reviewed the weather conditions for the area between Hamburg, PA and Lenhartsville, PA on I-78 for January 19-20th 2009. I looked at the surface observations from the nearest ASOS station (Reading – Figure 1), which is approximately 20 miles away, in addition looking at the NEXRAD radar information from Mount Holly (Figure 2). Using this information, I was able to, with a reasonable amount of meteorological certainty, determine the weather conditions in the area.

On Monday January 19th 2009, there was a low pressure system moving through the state of Pennsylvania that caused precipitation to occur throughout the state. In the Hamburg area, most of the precipitation fell between the hours of 16Z and 21Z (12pm – 5pm). During this time, temperatures remained between 25 and 28 degrees Fahrenheit as seen in Figure 1. Because of these temperatures being well below freezing, it is likely that any precipitation that fell, would have been snow. During the rest the 19th and 20th of January 2009, no precipitation occurred and temperatures remained well below freezing. (Warmest temperature 28 degrees at Noon on the 19th, Coolest temperature 5:00 am on the 20th).

Looking at the NEXRAD radar images, I was able to look at the dBZ levels on the legend, and convert that information to a more useful variable such as rainfall rate. This conversion is shown in the table in Figure 3. These rainfall rates are equivalent to the about of liquid water that would be approaching the ground. Using estimates from the NEXRAD radar, approximately .275 inches of liquid equivalent water would have fallen during this time frame. Utilizing a 10:1 liquid water to snow depth ratio, which would mean approximately 3 inches of snow would have fallen.

It is possible that some of the precipitation could have fallen as sleet or freezing rain, but there is not enough data to suggest that this would have been the case. More information about temperatures aloft and more precise precipitation measurements would be needed to make an accurate assessment. If some of the precipitation were in the form of sleet or freezing rain, snowfall amounts would be lower, but the likelihood of dangerous road conditions would be much higher.

This analysis is done under the assumption that weather conditions were very similar at the ASOS observing station in Reading and the impacted area of I-78. Any minor differences in the conditions, particularly the temperatures, between these two locations could have propagate some inaccuracies in the analysis. This is also done using an estimation of the precipitation rate based on radar imagery and an approximate conversion between the legend in dBZ and rainfall rates and the assumption of a 10:1 snowfall ratio.

The above conclusion represents my meteorological opinion of the weather conditions surrounding the time and place as mentioned above.

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Figure 1: Data Table of Average hourly temperatures and 1 hour precipitation values for the Reading, PA ASOS

Time (GMT)	Average Temp (F)	1 Hour Precip (in)	Average Temp (F)	1 Hour Precip (in)
	January 19th		January 20th	
0:00	27.93		19.9	
1:00	26.28		19.27	
2:00	25.23		17.1	
3:00	24.9		17.1	
4:00	24.57		15.1	
5:00	24.66		16	
6:00	24.35		15.1	
7:00	24.1		10.9	
8:00	24.45		10	
9:00	24.87		7	
10:00	24.45		8.1	
11:00	24.57		12	
12:00	24.57		7	
13:00	23.9		14	
14:00	24.9		19	0
15:00	25.78	0	21.9	
16:00	26.5	0	23	
17:00	27.6	0	25	0
18:00	28.2	0	27	0
19:00	26.7	0.01	27	0
20:00	26.7	0	26.1	
21:00	26.53	0	25	
22:00	24.9		24.1	
23:00	21.9		23	

Figure 2: NEXRAD radar image with maximum reflectivity near the I-78 corridor near Hamburg and Lenhartsville PA.

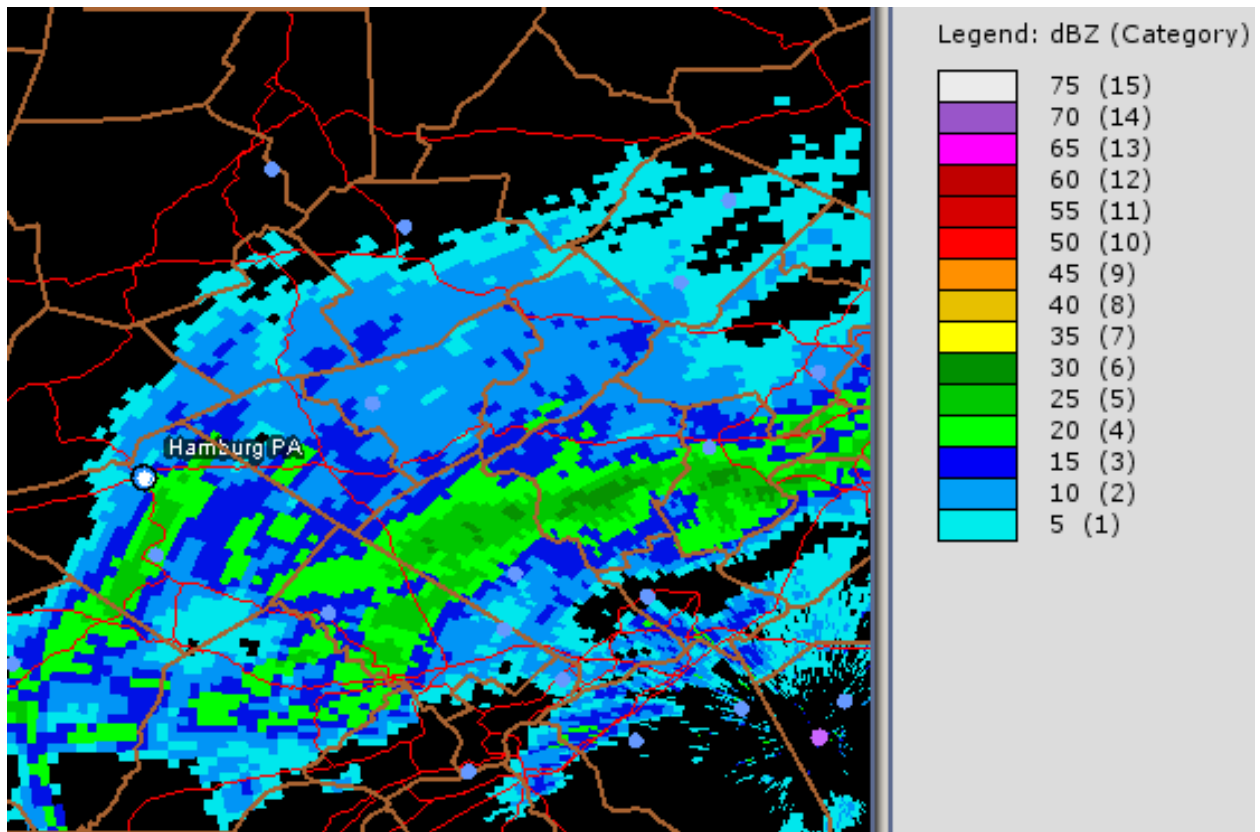


Figure 3: Conversion Table between dBZ and rainfall rate (in/hour)

dBZ	Rate (in/hr)
5	< 0.01
10	< 0.01
15	0.01
20	0.02
25	0.05
30	0.1
35	0.22
40	0.45
45	0.92
50	1.9
55	4
60	8
65	16.6