NOAA AIR QUALITY MODEL PERFORMANCE IN ALABAMA – 2007

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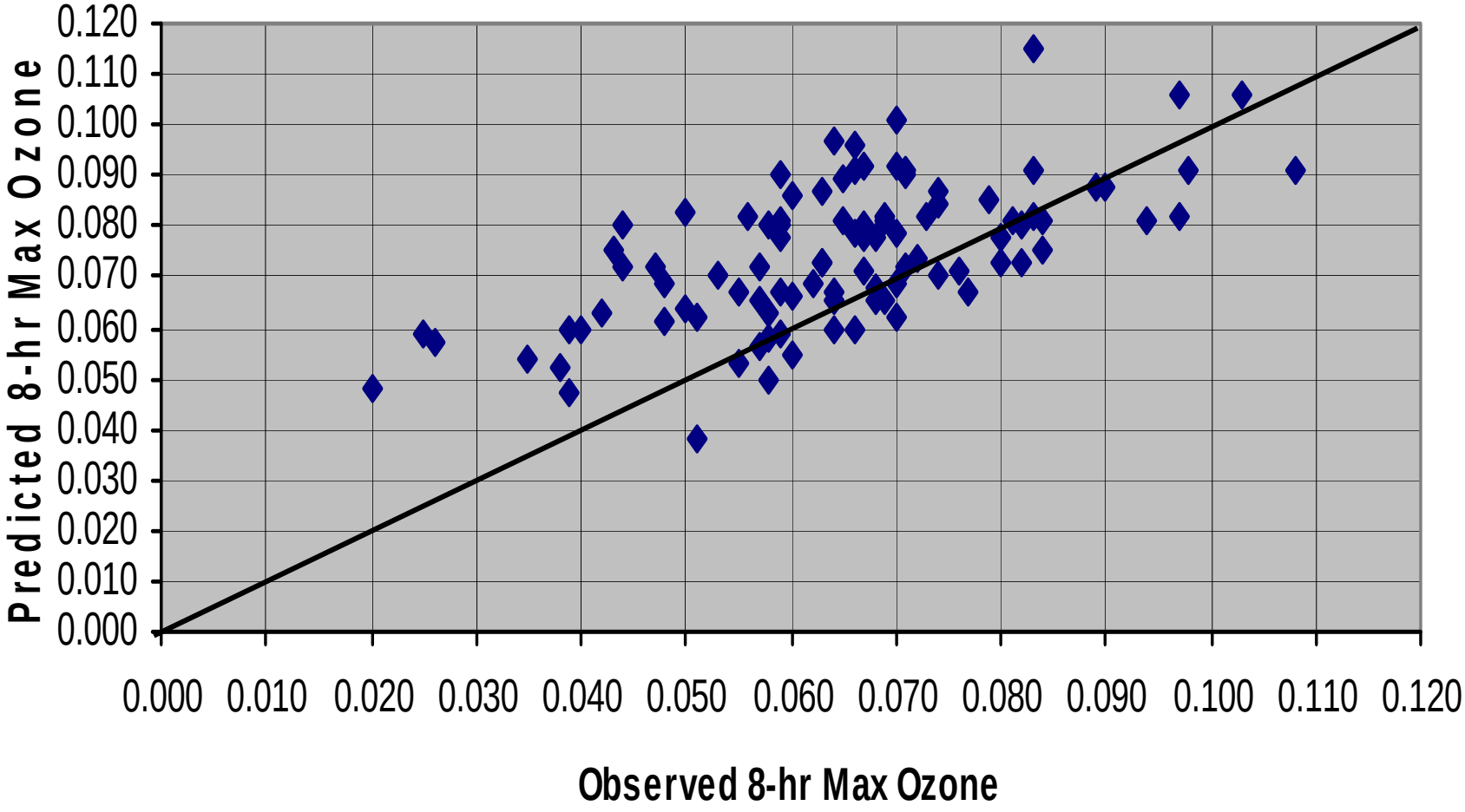
- Verified next day forecasts for Birmingham, Mobile and Huntsville/Decatur areas.
  - May 1 – August 31, 2007
  - Based on 12Z model run
  - Based on Eastern US grid
- Logged discrete forecast for each monitor at each city, using “point data” feature of NOAA website.
  - Verified maximum values forecast and observed among all monitors at each city.
  - Birmingham – 10 monitors, Mobile – 3, Huntsville – 2
- Also verified AQI category forecasts.

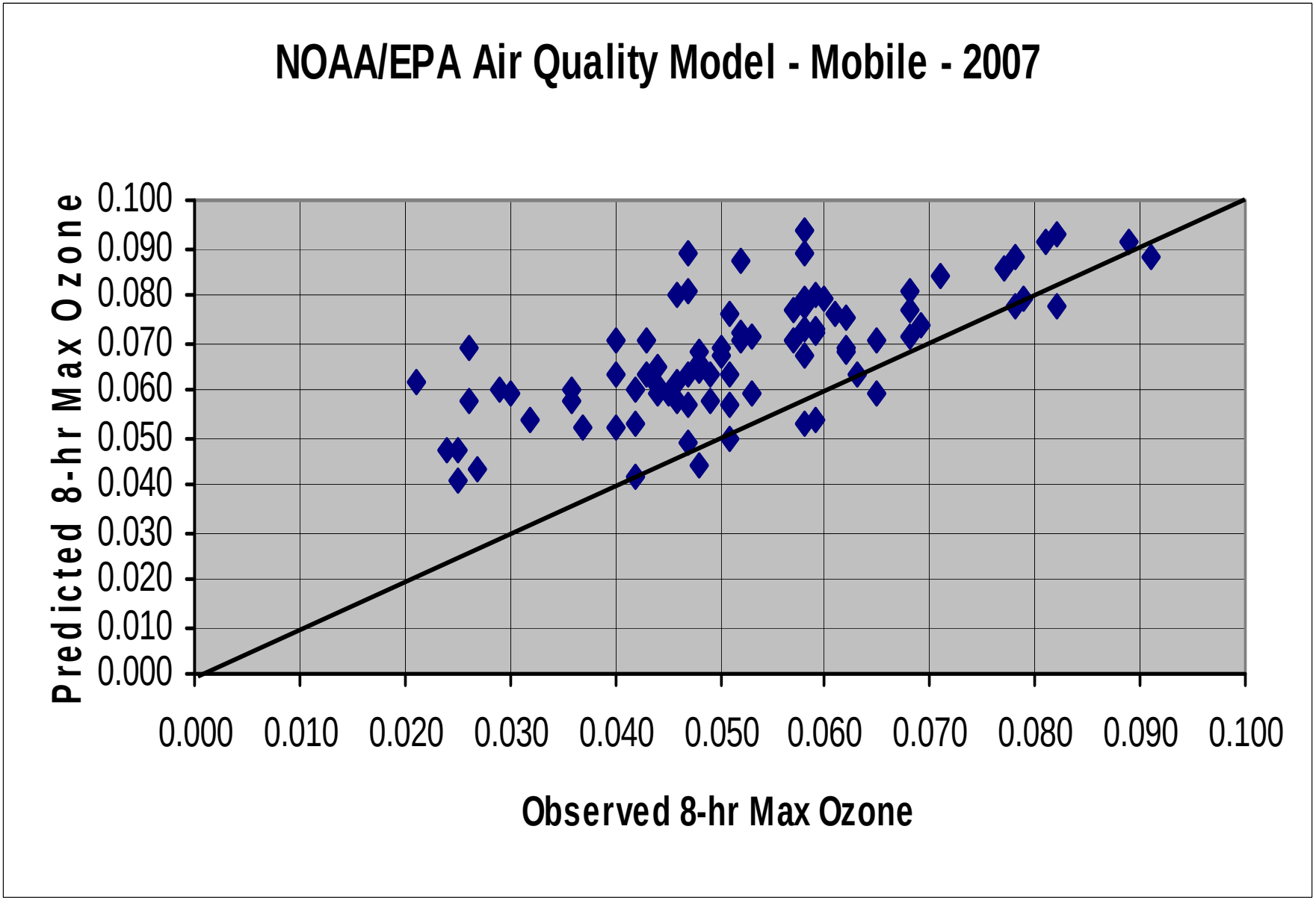
Alabama Ozone Forecast Areas & Monitors

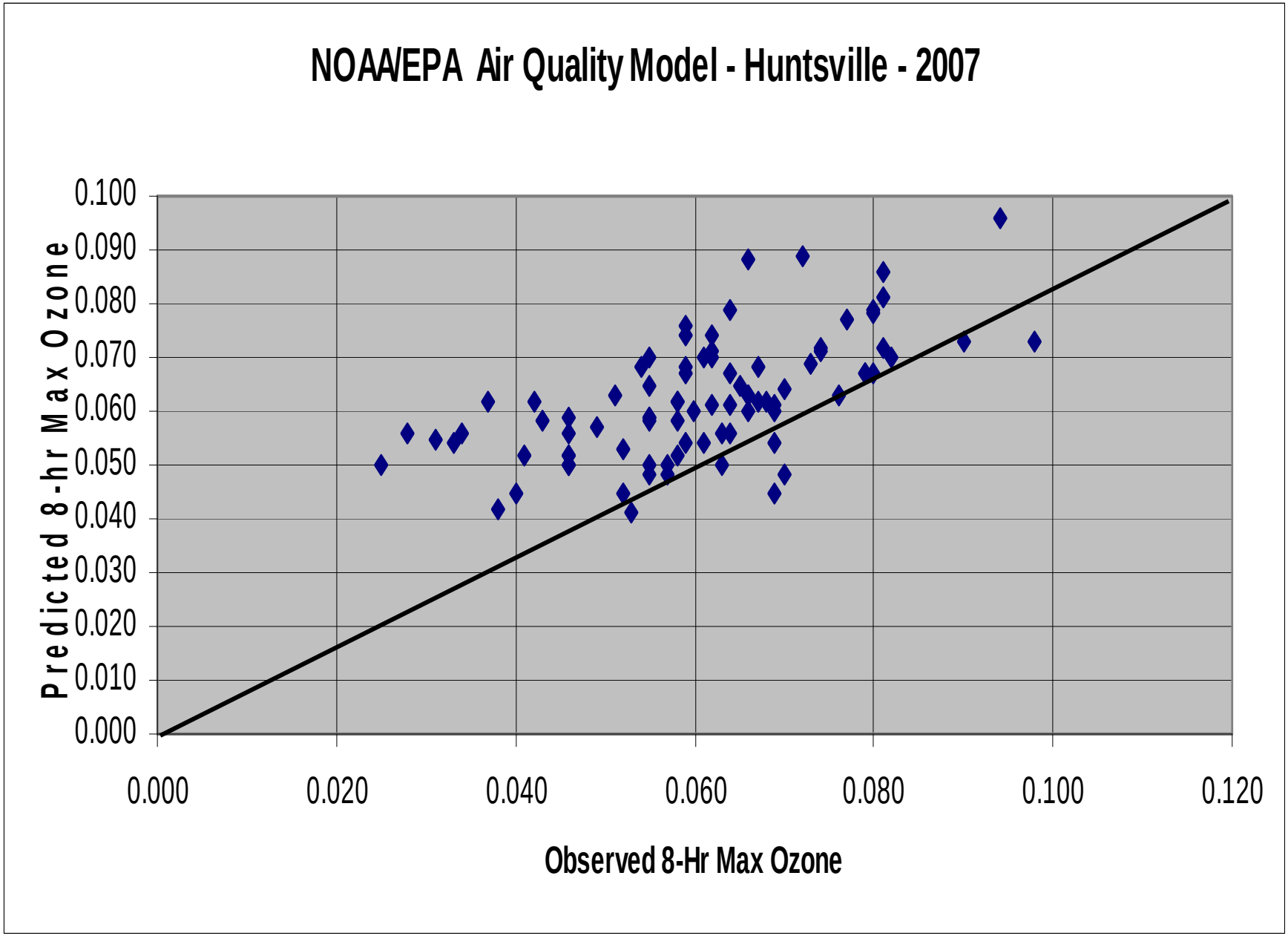
NOAA Air Quality Model Performance – ADEM Statistics

	Birmingham			Mobile			Huntsville		
CATEGORY FORECASTS	**2005**	**2006**	**2007**	**2005**	**2006**	**2007**	**2005**	**2006**	**2007**
Percent Correct									
Green	72%	96%	**95%**	94%	94%	**97%**	76%	79%	**77%**
Yellow	44%	42%	**54%**	23%	35%	**24%**	46%	71%	**48%**
Orange	50%	30%	**15%**	0%	30%	**20%**	N/A	50%	**25%**
Red	N/A	0%	**0%**	N/A	N/A	**N/A**	N/A	N/A	**N/A**
All Categories	60%	54%	**52%**	57%	55%	**56%**	69%	76%	**65%**
ALERT Performance (AQI >100)									
ALERT Days (Observed)	4	14	**10**	1	5	**2**	0	2	**3**
Reliability (Accuracy of "YES" Forecast)	50%	33%	**26%**	0%	30%	**20%**	N/A	50%	**25%**
False Alarm Rate	50%	67%	**74%**	100%	70%	**80%**	N/A	50%	**75%**
Capability (Probability of Detection)	25%	58%	**75%**	N/A	60%	**100%**	N/A	50%	**33%**
Critical Success Indicator	20%	27%	**24%**	N/A	25%	**20%**	N/A	33%	**17%**
Bias	0.50	1.75	**2.88**	N/A	2.00	**5.00**	N/A	1.00	**1.33**
DISCRETE FORECASTS									
Accuracy (mean absolute error)	N/A	0.012	**0.013**	0.019	0.014	**0.016**	0.008	0.007	**0.009**
Bias (mean error)	N/A	0.009	**0.010**	0.018	0.012	**0.015**	0.004	0.001	**0.002**
Correlation	N/A	0.73	**0.63**	0.60	0.63	**0.70**	0.34	0.72	**0.62**

NOAA/EPA Air Quality Model - Birmingham - 2007




NOAA/EPA Air Quality Model - Mobile - 2007
Predicted 8-hr Max Ozone
0.100
0.090
0.080
0.070
0.060
0.050
0.040
0.030
0.020
0.010
0.000
0.000
0.010
0.020
0.030
0.040
0.050
0.060
0.070
0.080
0.090
0.100
Observed 8-hr Max Ozone

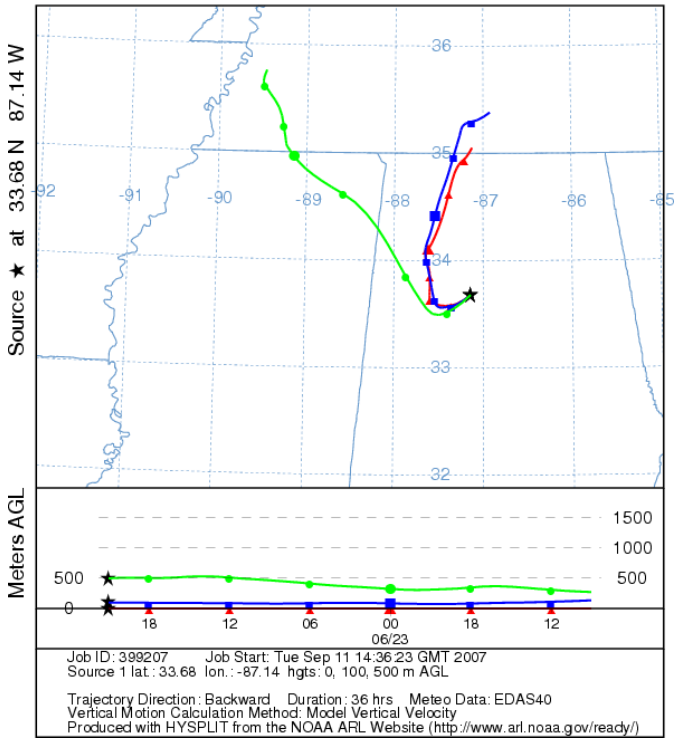

NOAA/EPA Air Quality Model - Huntsville - 2007
Predicted 8-hr Max Ozone
0.100
0.090
0.080
0.070
0.060
0.050
0.040
0.030
0.020
0.010
0.000
0.000
0.020
0.040
0.060
0.080
0.100
0.120
Observed 8-Hr Max Ozone

June 21-24 Ozone Episode (FAIR JOB)

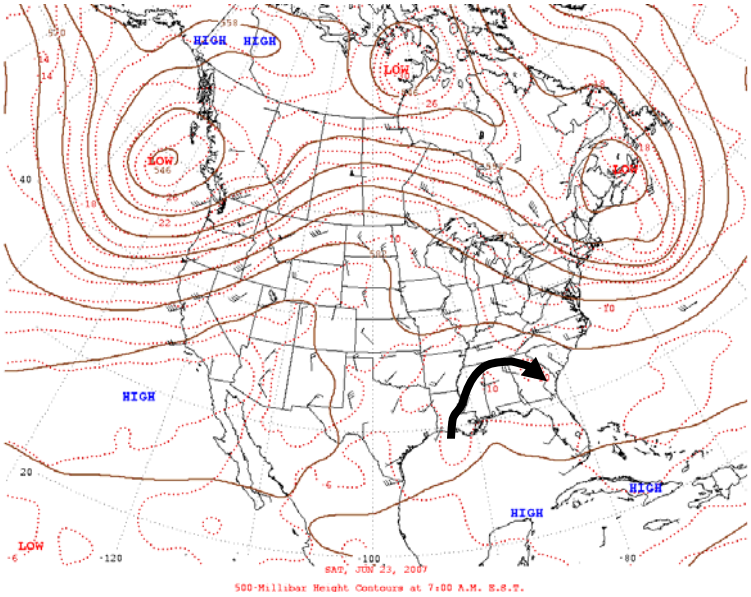
Birmingham Ozone (ppb)

DATE	OBS	ADEM FCST	NOAA
6/21/07	83	87	91
6/22/07	97	100	106
6/23/07	103	104	105
6/24/07	69	84	81

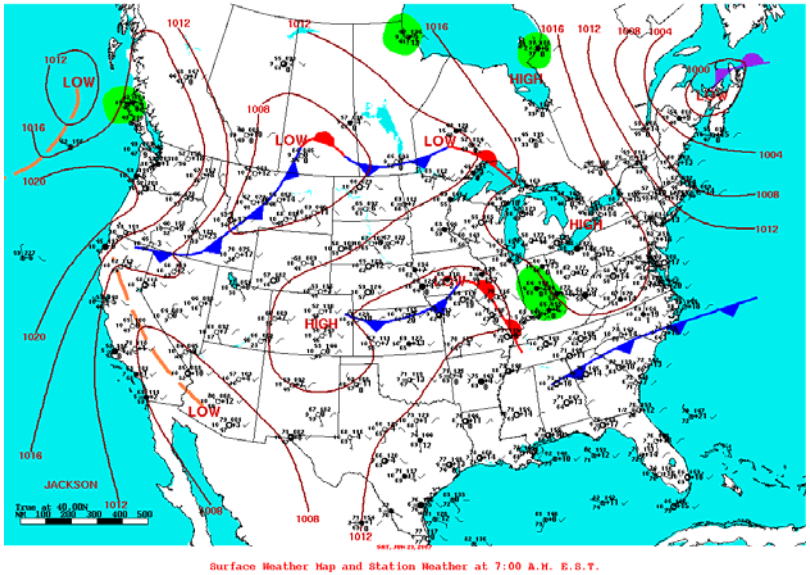
NOAA HYSPLIT MODEL
Backward trajectories ending at 21 UTC 23 Jun 07
EDAS Meteorological Data



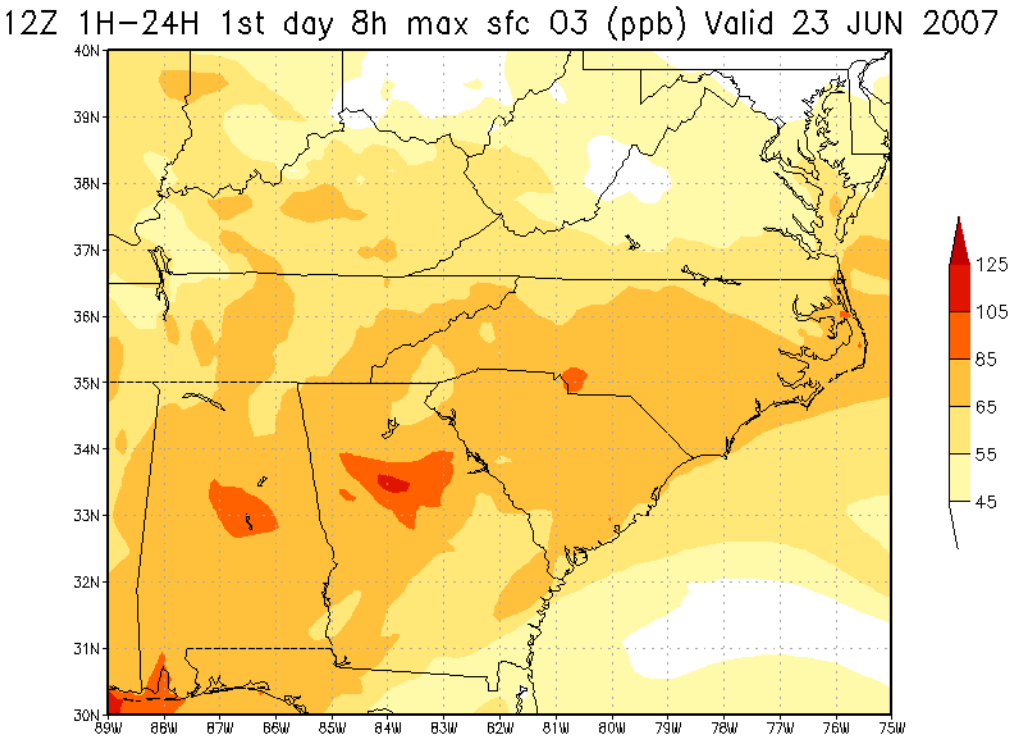
500MB 6/23/07 – 12Z



SFC 6/23/07 – 12Z

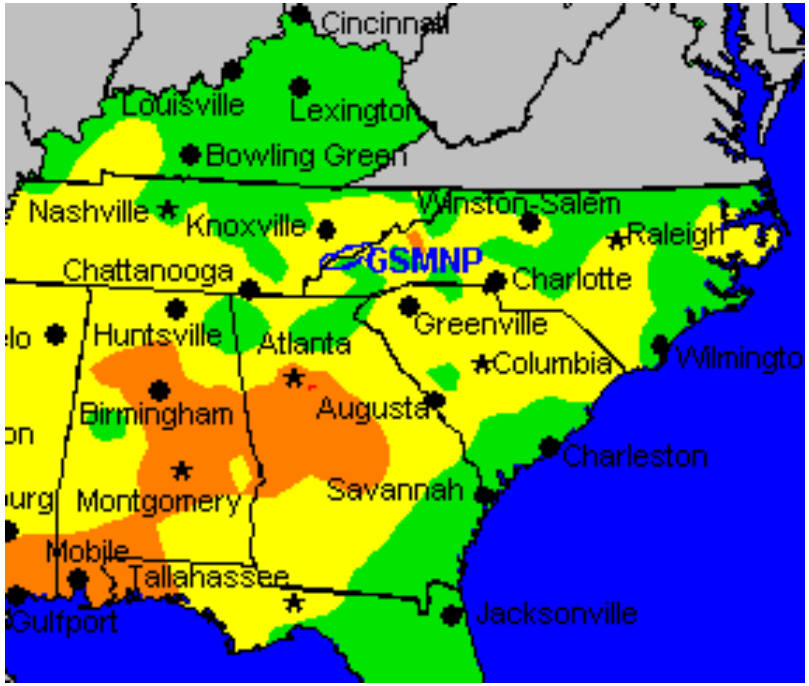


June 21-24 Ozone Episode (Cont'd)



BHM – 105; MOB – 91; HSV - 67

AIRNOW – June 23, 2007



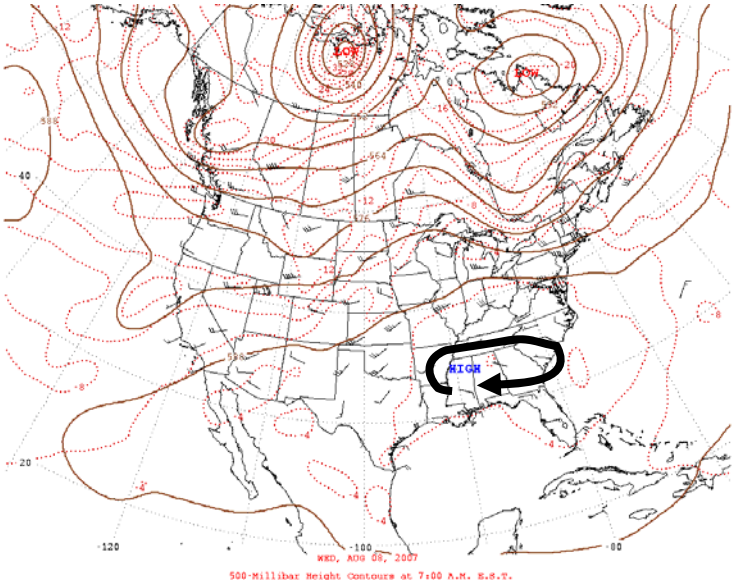
BHM – 103; MOB – 89; HSV - 80

August 6-9 Ozone Non-episode (NOT SO HOT)

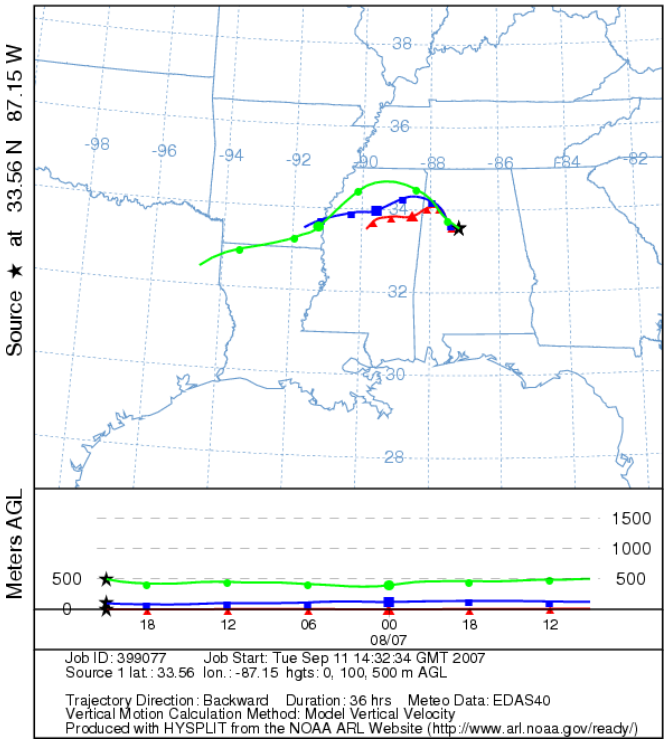
Birmingham Ozone (ppb)

DATE	OBS	ADEM FCST	NOAA
8/6/07	67	83	92
8/7/07	65	79	89
8/8/07	59	80	90
8/9/07	58	77	80

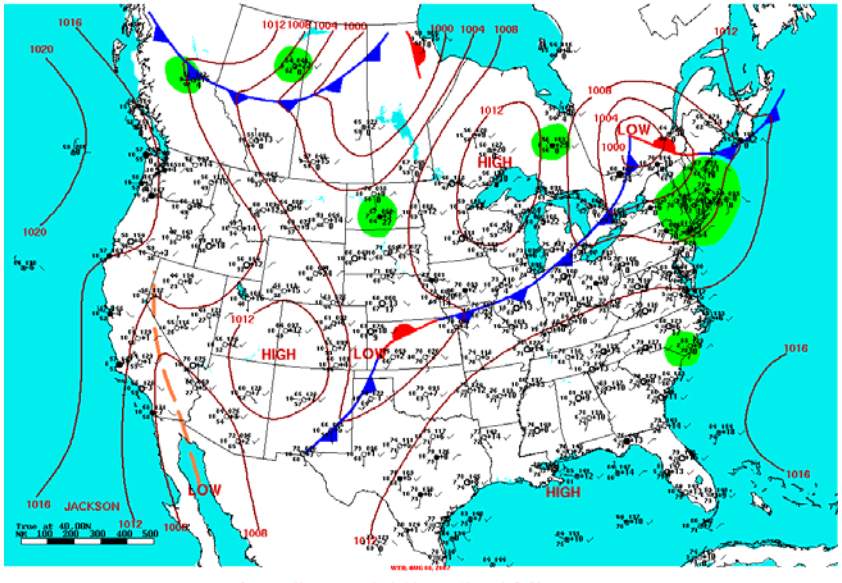
500MB 8/8/07 – 12Z



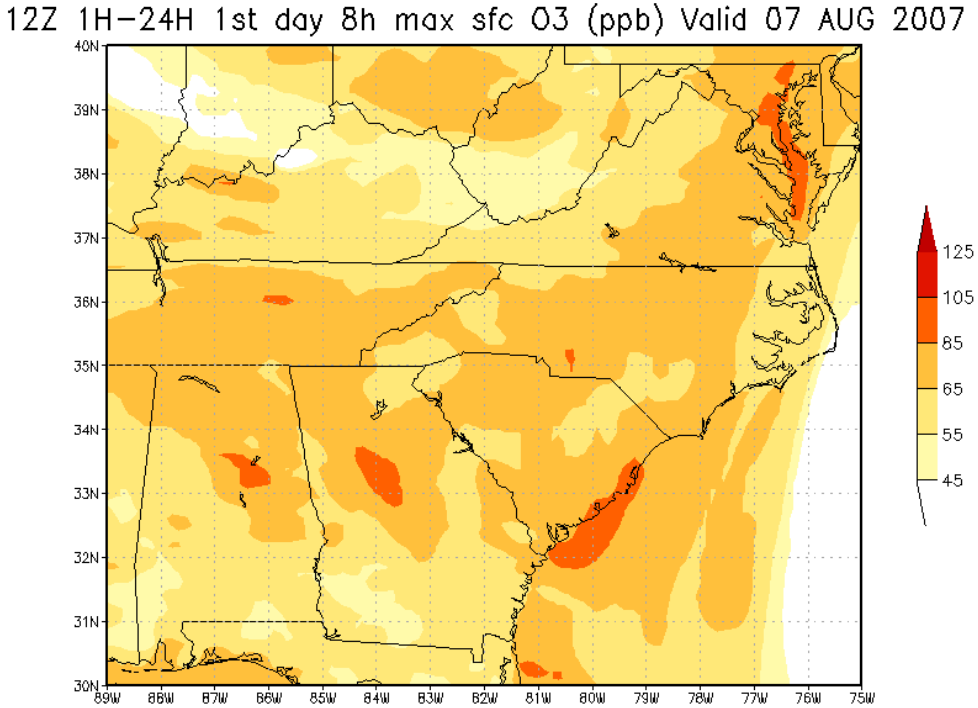
NOAA HYSPLIT MODEL
Backward trajectories ending at 21 UTC 07 Aug 07
EDAS Meteorological Data



SFC 8/8/07 – 12Z

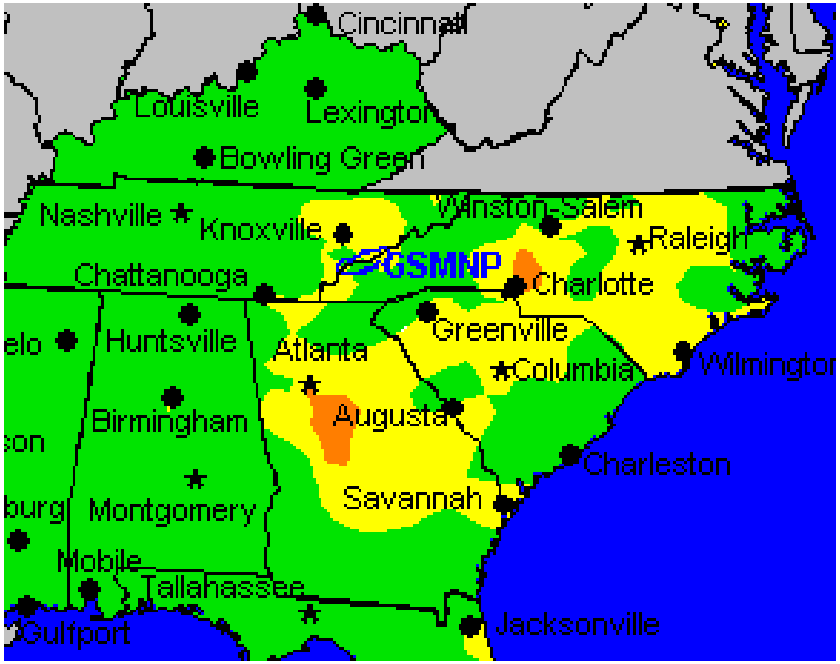


August 6-9 Ozone Non-episode (Cont'd)



BHM – 89; MOB – 87; HSV - 76

AIRNOW – August 7, 2007



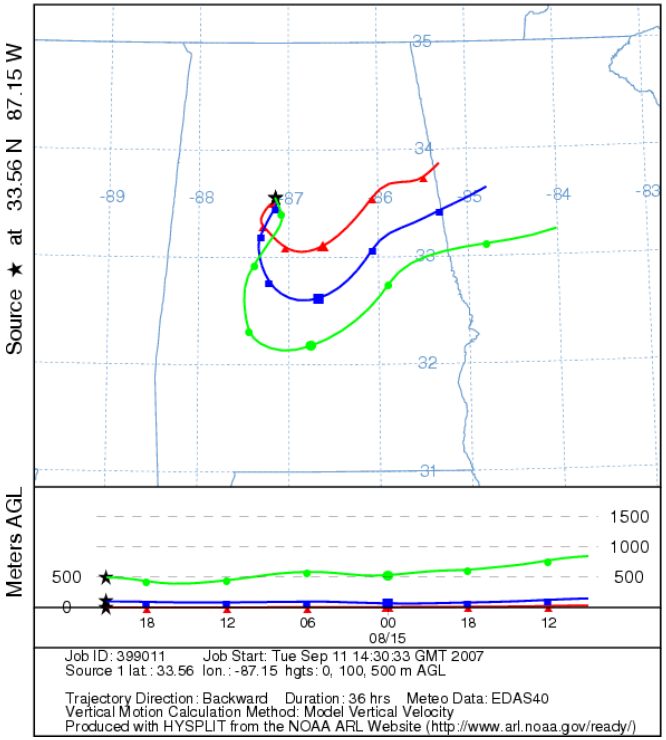
BHM – 65; MOB – 52; HSV - 59

August 12-16 Ozone Episode (PRETTY GOOD)

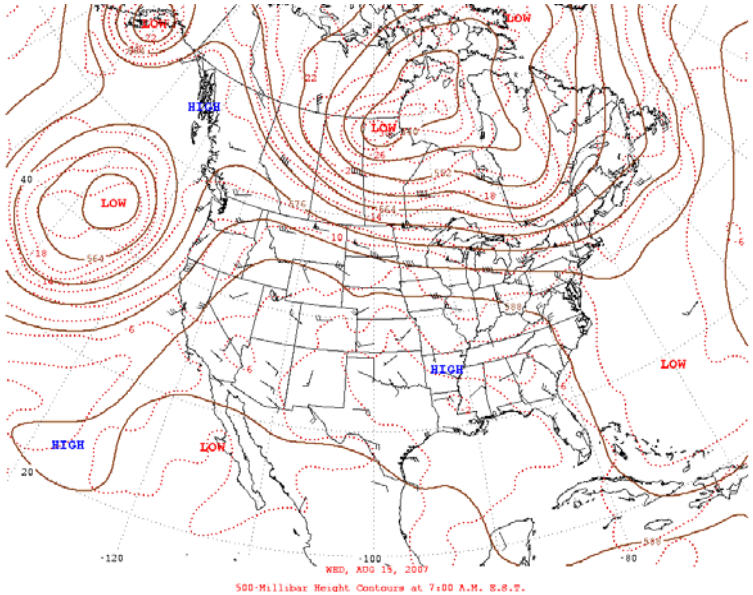
Birmingham Ozone (ppb)

DATE	OBS	ADEM FCST	NOAA
8/12/07	81	82	81
8/13/07	94	84	86
8/14/07	89	90	88
8/15/07	98	95	91
8/16/07	82	90	80

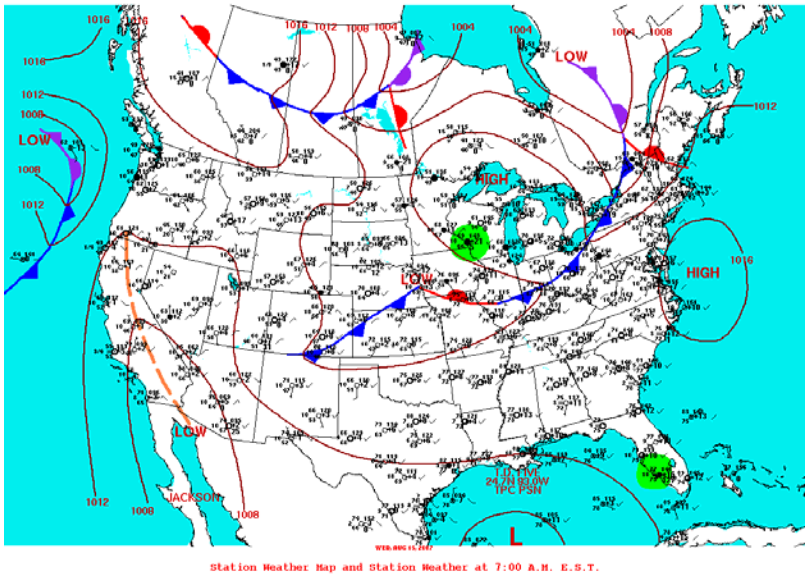
NOAA HYSPLIT MODEL
Backward trajectories ending at 21 UTC 15 Aug 07
EDAS Meteorological Data



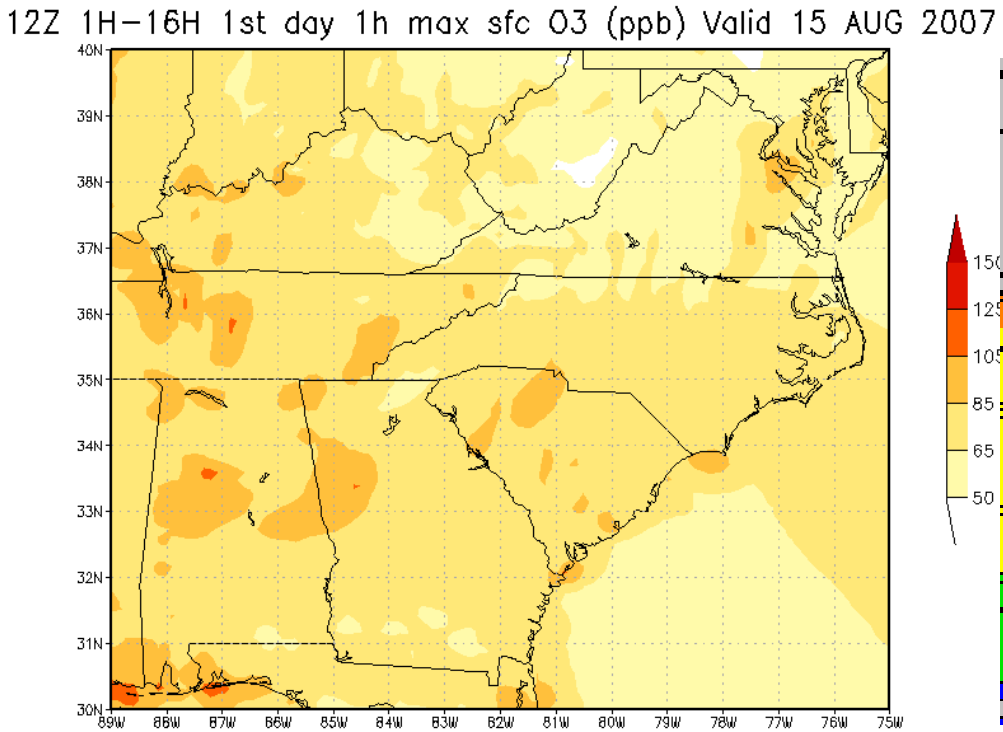
500MB 8/15/07 – 12Z



SFC 8/15/07 – 12Z

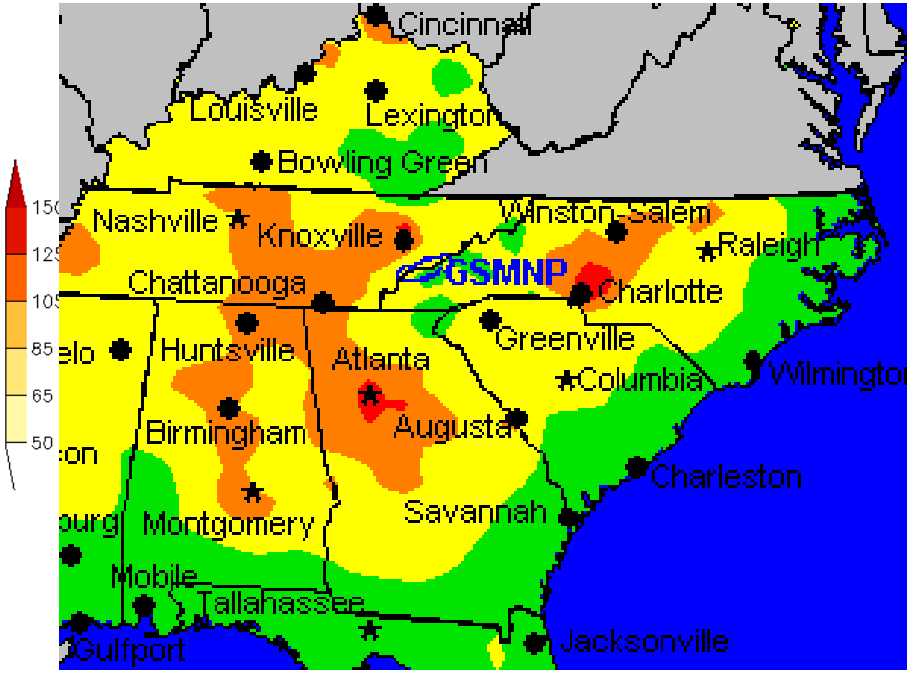


August 12-16 Ozone Episode (Cont'd)



BHM – 91; MOB – 83; HSV - 73

AIRNOW – August 15, 2007



BHM – 98; MOB – 45; HSV - 90

Large variations in ozone with similar weather observed???

Date	Max 8hr	Hi Temp	L Temp	RH	Ws	CC	Tdiff
8/6/2007	0.067	98	77	48	4	1	21
8/7/2007	0.065	100	77	48	4	2	23
8/8/2007	0.059	102	79	44	6	2	23
8/9/2007	0.058	103	77	44	5	1	26
8/10/2007	0.067	102	77	52	6	2	25
8/11/2007	0.074	102	73	38	7	0	29
8/12/2007	0.081	102	74	38	5	0	28
8/13/2007	0.094	103	77	46	4	1	26
8/14/2007	0.089	104	76	34	6	1	28
8/15/2007	0.098	105	74	33	4	1	31
8/16/2007	0.082	103	81	49	5	1	22