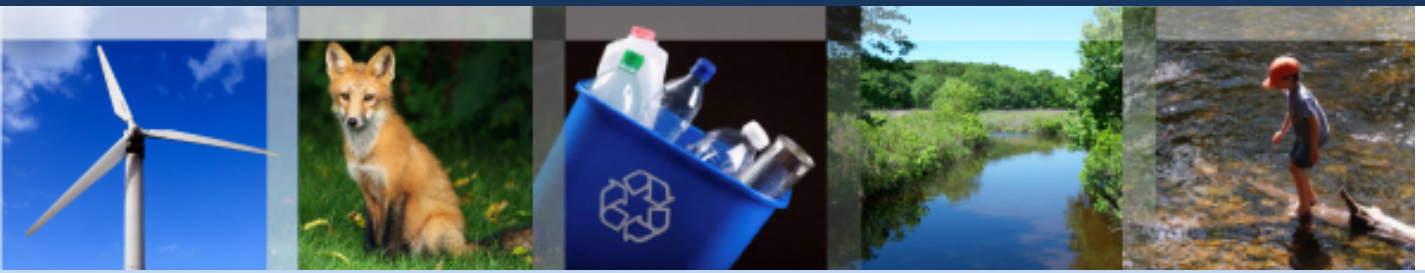
Connecticut Department of Energy and Environmental Protection



Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

2013 Ozone Season Forecasting Summary

October 10, 2013
Sam Sampieri
SIPRAC Meeting

2013 Ozone Season Re-Cap

18 Days over the 8-Hour Ozone NAAQS

5-Year Average 18 Days (2008-2012)

20 Days >=90° This Summer Season

How did we do this past year?

Actual Exceedences Days = 18

Forecast Exceedences Days = 17

Month	Actual Dates	Forecast Dates
April		N/A
May	30 & 31	21, 22, 30 & 31
June	1, 21, 22, 24, 25	1, 21, 22, 24, 25
July	6, 7, 8, 9, 10, 17, 18, 19, 20	9 ,18, 19, 20, 27
August	21	21, 22
September	11	11
Total	18	17

How did we really do this past year???

NOAA model:
11/18 hits
10 false alarm days
Mostly under predicted until August, then many over-predictions through September

Forecasters:
13/18 hits
4 false alarm days

NOAA model vs. Observed Exceedance Days vs. CT Forecasters		
Modeled Exceedance Days 06z NOAA model	Observed Exceedance Days	CT Forecasters
		5/21/2013
		5/22/2013
	5/30/2013	5/30/2013
5/31/2013	5/31/2013	5/31/2013
6/1/2013	6/1/2013	6/1/2013
6/21/2013	6/21/2013	6/21/2013
6/22/2013	6/22/2013	6/22/2013
6/23/2013		
	6/24/2013	6/24/2013
6/25/2013	6/25/2013	6/25/2013
6/27/2013		
6/29/2013		
	7/6/2013	
7/7/2013	7/7/2013	
	7/8/2013	
	7/9/2013	7/9/2013
	7/10/2013	
7/17/2013	7/17/2013	
7/18/2013	7/18/2013	7/18/2013
7/19/2013	7/19/2013	7/19/2013
	7/20/2013	7/20/2013
7/27/2013		7/27/2013
7/31/2013		
8/19/2013		
8/20/2013		
8/21/2013	8/21/2013	8/21/2013
8/22/2013		8/22/2013
8/26/2013		
9/1/2013		
9/11/2013	9/11/2013	9/11/2013

2013 Case Studies

May 21 & 30
June 1, 21, 28
July 6, 7, 16, 17, 19, 27
August 21, 22
September 11

May: Observed 8-Hour Ozone Concentrations

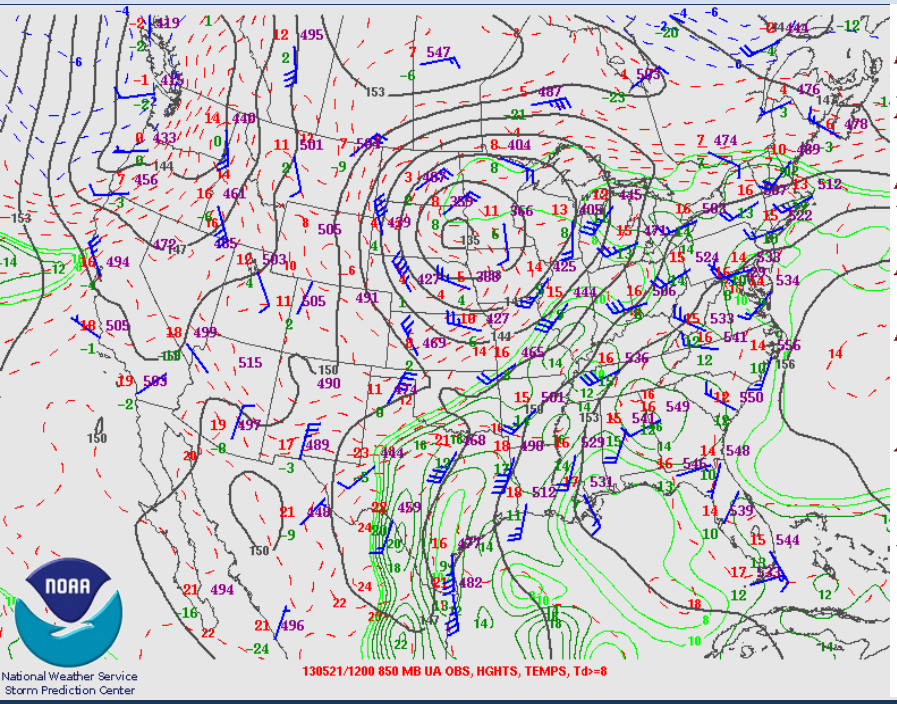
Connecticut Department of Energy & Environmental Protection
8-Hour Ozone Daily Maximums*
May 2013

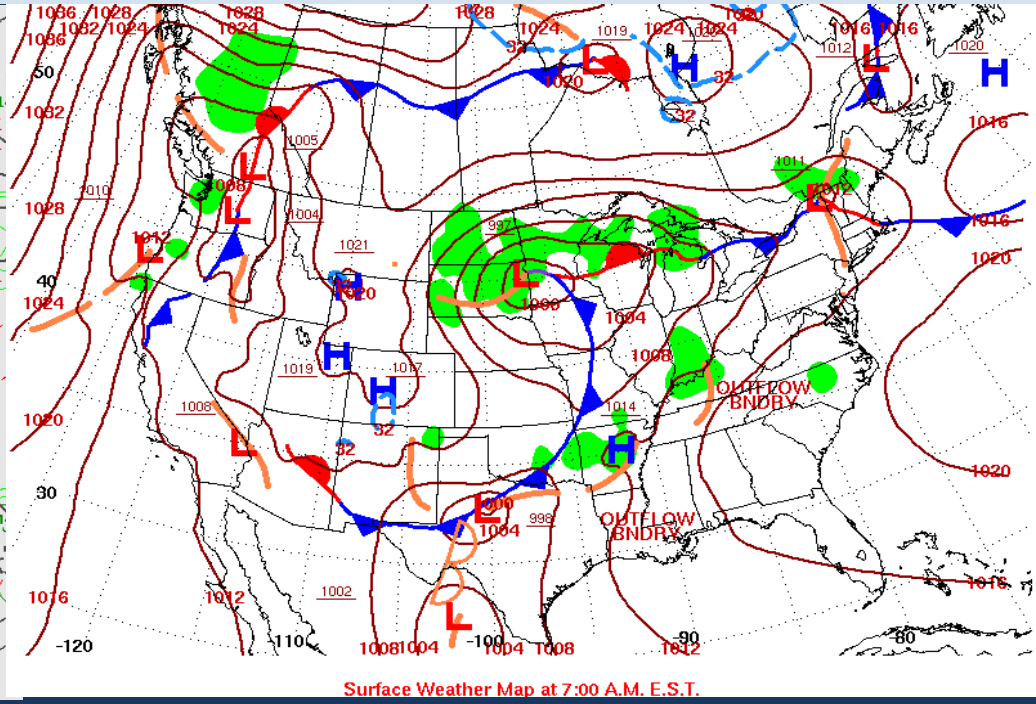
Site	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Cornwall	64	61	53	53	61	53	46	40	45	60	42	40	45	48	58	55	45	50	37	47	63	43	37	41	30	M	M	49	63	63	85
Danbury	60	54	50	50	56	45	36	36	35	60	41	43	43	46	56	52	41	49	37	43	71	43	25	24	31	38	45	40	62	68	81
East Hartford	54	56	45	50	54	45	35	33	31	57	40	39	41	43	53	48	40	50	35	41	68	44	22	20	27	34	42	49	49	57	79
Greenwich	54	47	51	47	53	50	40	36	33	53	45	50	47	50	56	54	44	42	37	44	57	34	30	25	34	41	47	41	54	89	76
Groton	54	46	45	49	50	44	35	37	38	56	48	46	46	48	55	59	43	54	40	45	51	35	25	21	27	34	51	M	49	85	78
Madison	55	45	46	49	51	48	35	37	37	51	49	51	45	51	58	57	40	53	38	45	51	35	29	21	31	37	53	51	51	85	71
Middletown	58	56	44	49	52	43	36	36	36	62	46	43	45	46	57	59	43	54	39	49	73	44	28	22	30	37	49	54	58	86	82
New Haven	60	40	46	51	54	44	38	35	33	44	34	44	44	44	53	50	44	47	38	39	37	33	22	22	29	38	47	46	39	71	82
Stafford	64	60	47	57	60	54	43	40	40	64	47	41	44	45	58	52	43	53	43	47	70	53	29	23	26	31	48	58	57	58	83
Stratford	55	45	52	50	54	50	38	40	40	52	50	50	46	50	57	57	44	47	40	45	55	37	31	20	28	39	51	51	48	94	82
Westport	58	49	52	49	53	49	39	34	35	57	47	49	46	50	56	55	43	47	37	43	58	33	31	21	30	40	52	41	44	95	82
# days > Federal Standard																														1	2

Good (0-59 ppb)
Moderate (60-75 ppb)
Unhealthy for Sensitive Groups (76-95 ppb)
Unhealthy (96-115 ppb)
Very Unhealthy (116 > ppb)

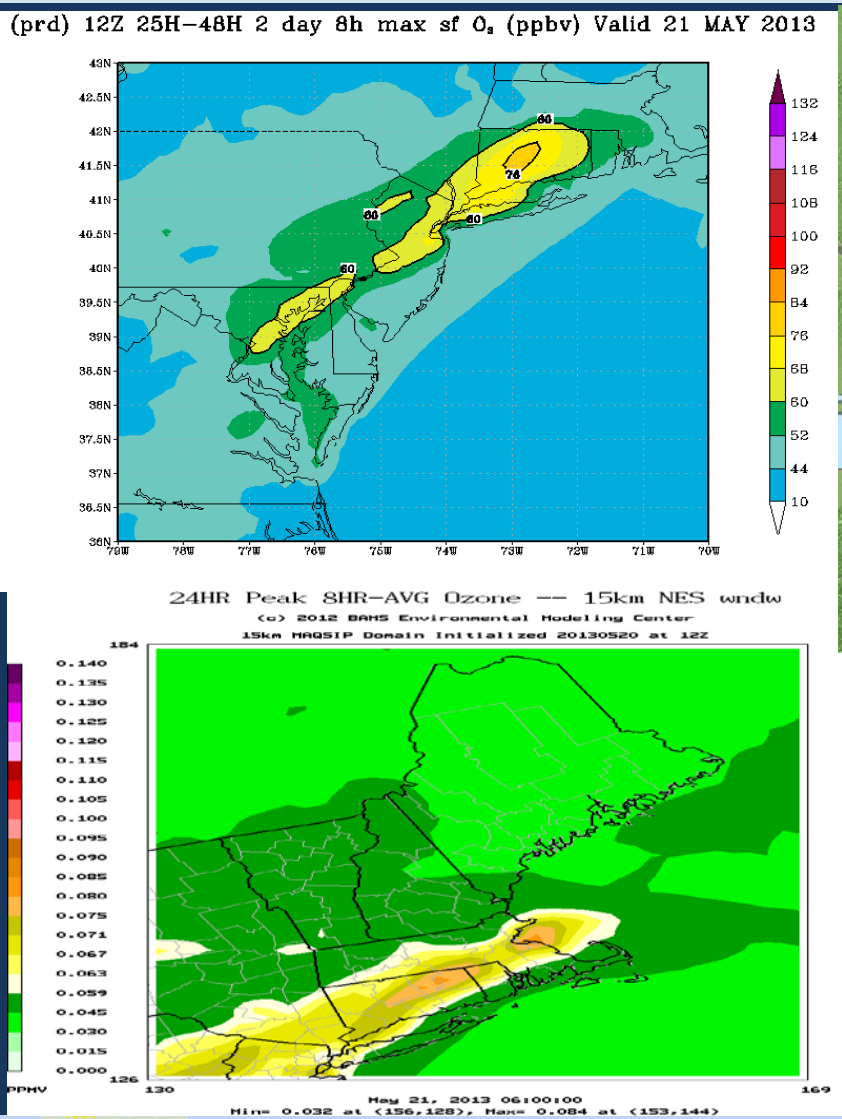
Units - parts per billion (ppb)
Federal Standard = 75 ppb
M = missing data
* Data is preliminary and has not been quality assured

May 21st Met Analysis





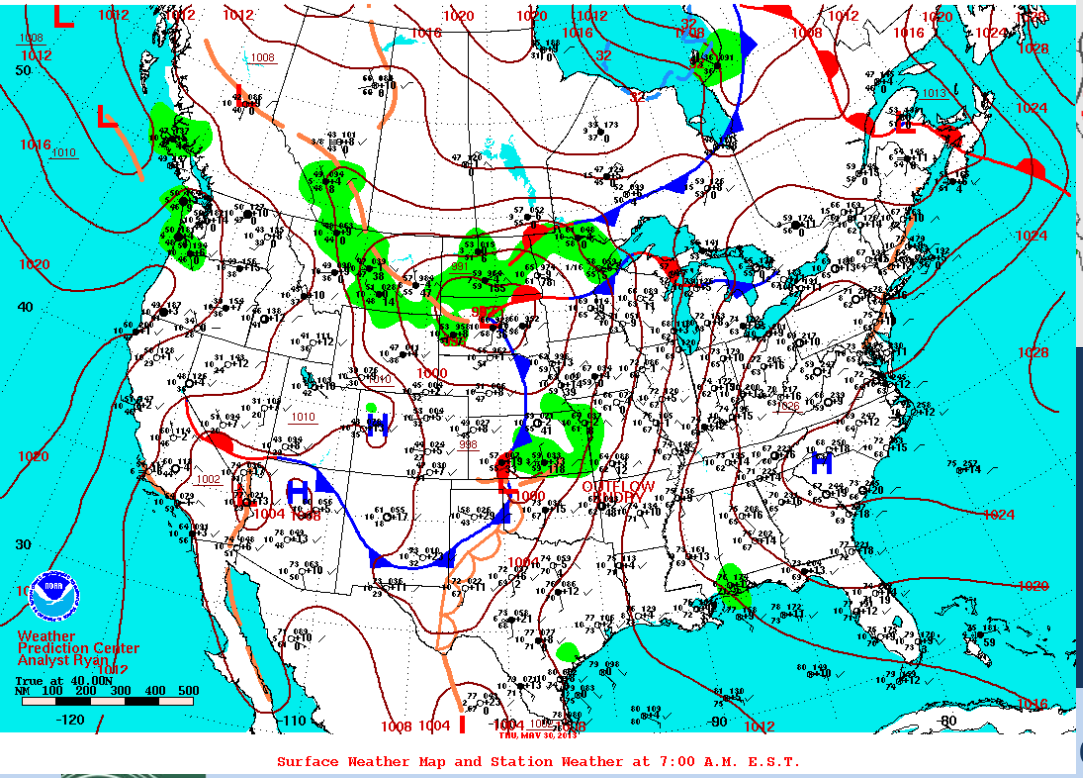
May 21st First False Alarm

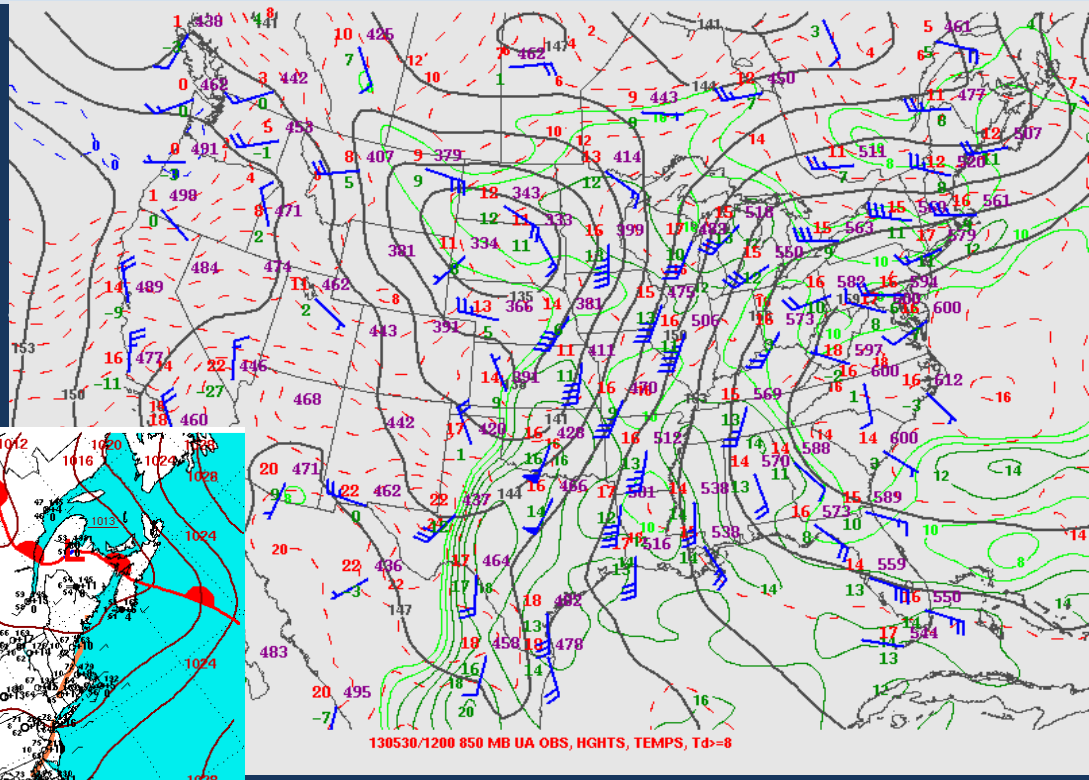


Forecast models showed low pressure & clouds stayed north keeping CT in the sunshine and SW flow. Forecasters predicted first Ozone Exceedance of 2013. However, system to the north developed a trough and cloud cover (50 miles further south than predicted) over our area, kept levels below the magic number of 76 ppb. Barons & NOAA models over-predicted by 5-10 ppb

May 30, 2013 First Real Event

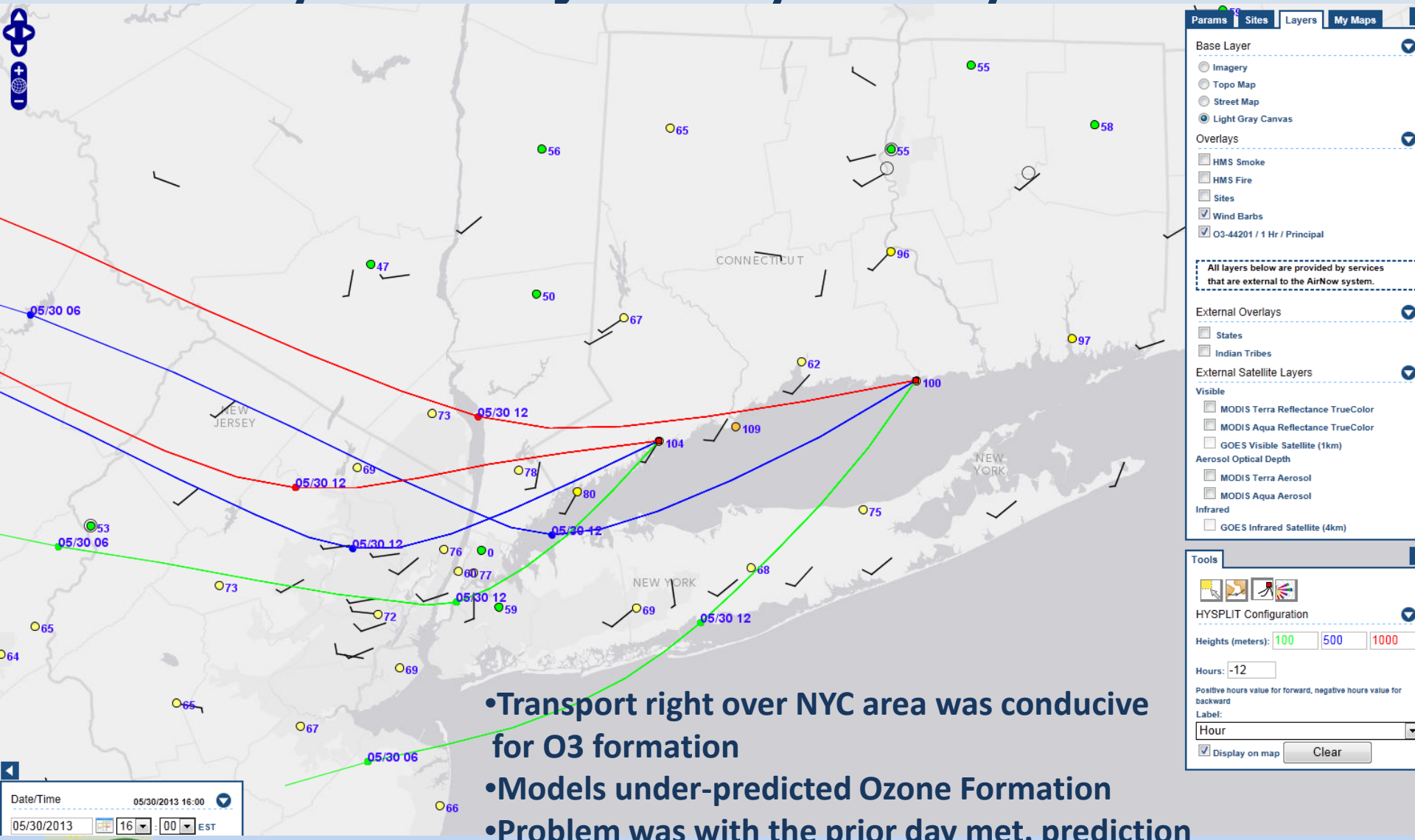
- 850 winds WNW-W
- Trajectories: 1000, 500, 100 meter wind transport
- Surface Winds: SSW
- Surface trough early, clouds gave way to sunshine, especially coastal Ct





d Environmental Protection

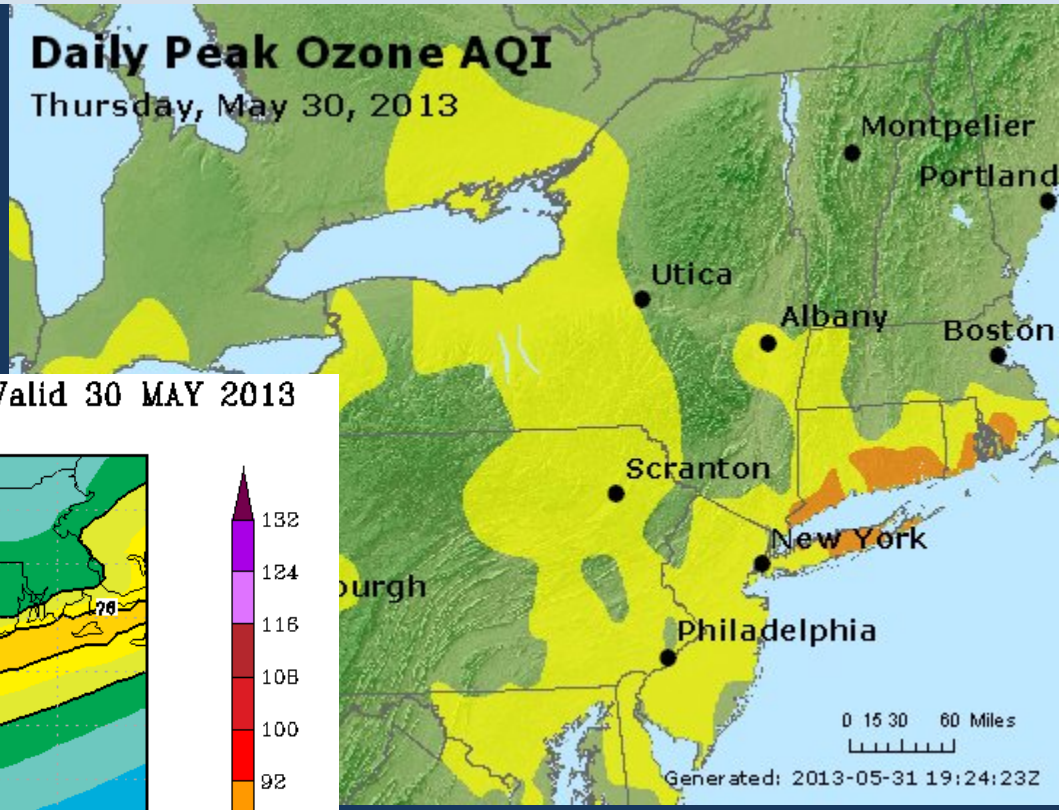
May 30 Trajectory Analysis

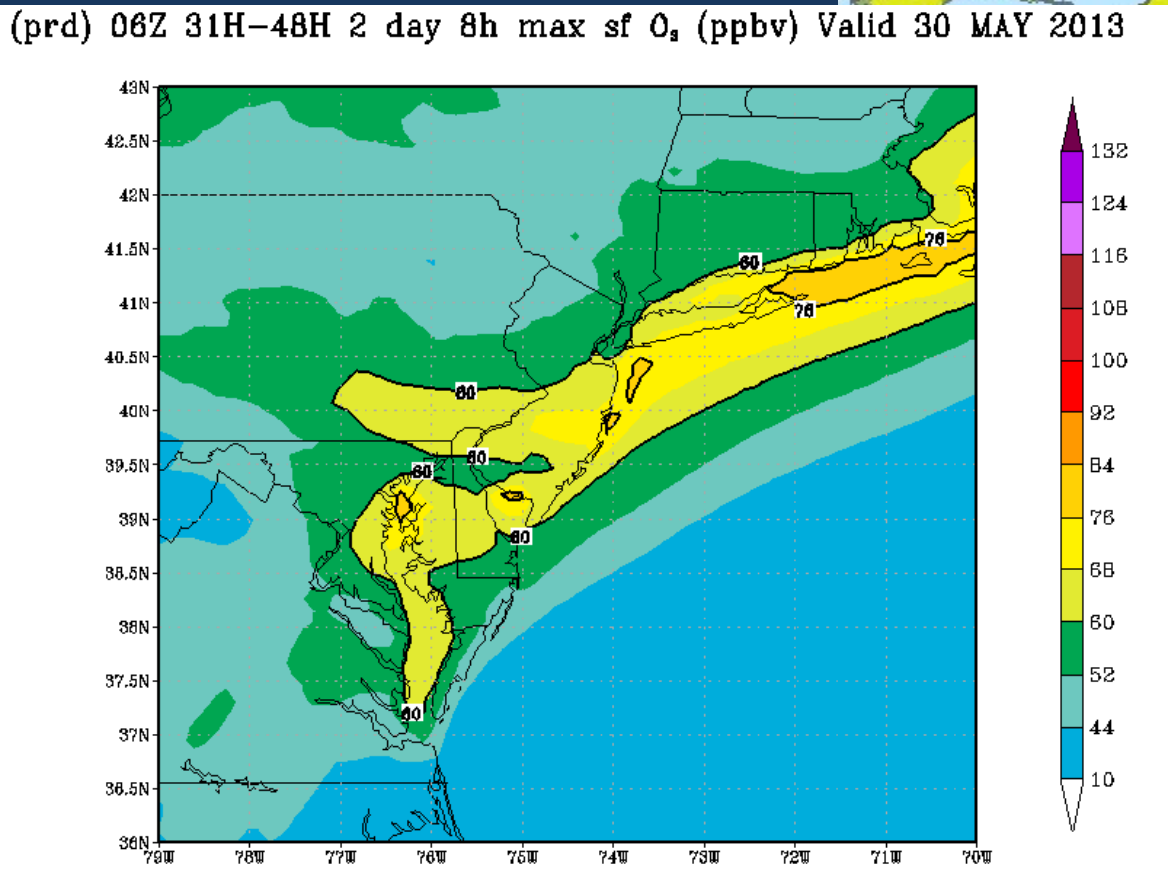


- **Transport right over NYC area was conducive for O3 formation**
- **Models under-predicted Ozone Formation**
- **Problem was with the prior day met. prediction**

May 30, 2013 First Real Event

- NOAA Model under predicted significant event for CT on May 29th
- Same day forecast brought USG to coast
- Performed well for the next two (2) days





ironmental Protection

June Observed 8-Hour Ozone Concentrations

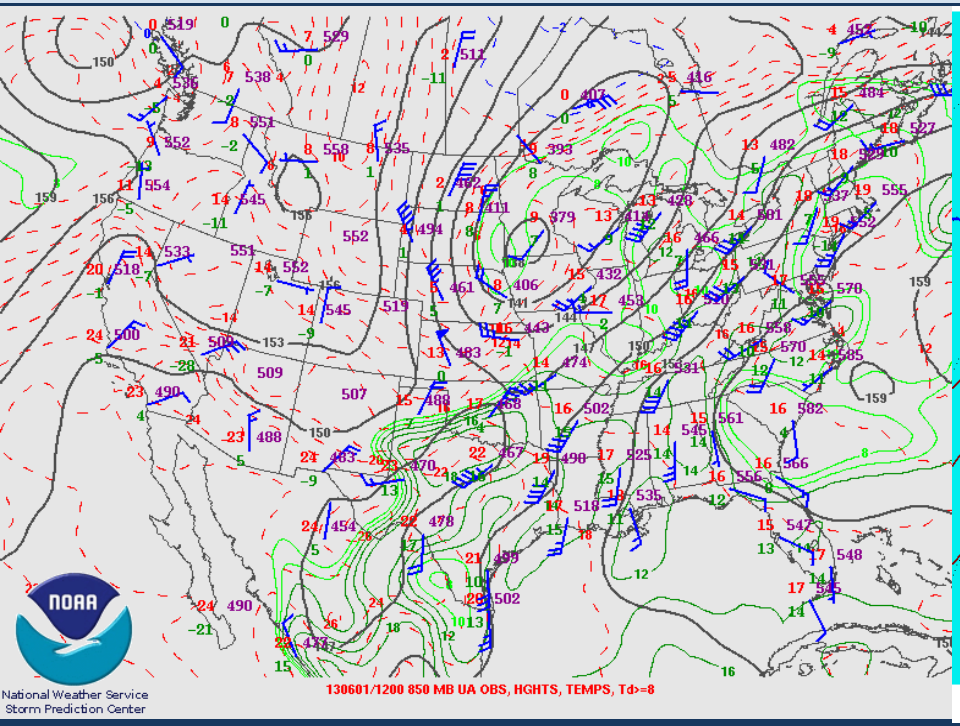
Connecticut Department of Energy & Environmental Protection
8-Hour Ozone Daily Maximums*
June 2013

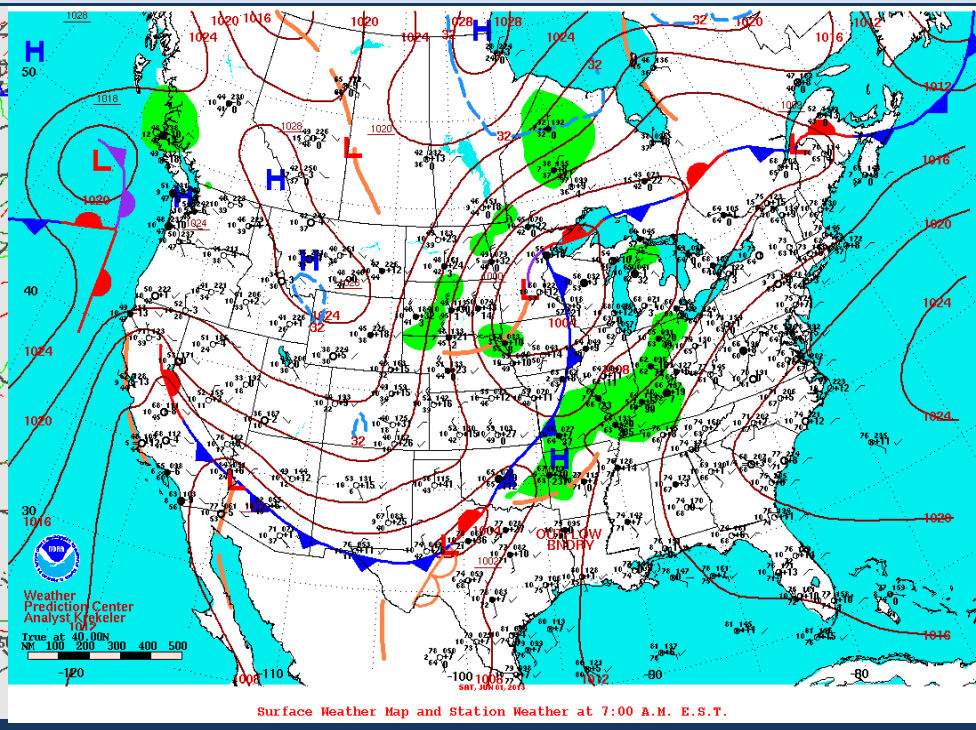
Site	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Cornwall	68	53	41	42	46	55	38	34	47	55	38	46	47	46	43	57	51	48	42	56	66	66	54	58	59	50	56	51	60	45
Danbury	75	63	37	43	49	57	34	32	48	53	46	39	42	41	38	62	54	61	37	62	76	76	57	64	72	42	63	M	M	M
East Hartford	75	47	40	38	45	48	32	30	41	M	35	43	42	43	37	58	62	44	44	62	77	74	64	55	74	37	45	53	61	47
Greenwich	62	46	38	49	41	50	36	38	62	59	52	44	43	42	44	60	59	47	43	58	61	67	45	80	73	56	50	60	60	40
Groton	50	33	41	44	37	52	36	42	57	53	54	41	40	40	47	54	65	50	41	53	55	54	48	86	90	55	42	41	46	40
Madison	55	36	40	48	41	52	38	47	58	56	52	43	40	47	48	56	61	53	49	59	56	55	52	89	88	62	44	51	M	M
Middletown	70	44	42	40	47	53	35	37	46	55	47	43	42	43	39	59	63	45	44	65	82	74	62	69	97	48	47	55	57	44
New Haven	66	40	35	43	41	53	32	40	34	57	41	43	40	38	38	57	60	58	45	58	67	72	45	71	77	44	51	48	59	44
Stafford	81	49	40	38	50	53	38	31	44	39	35	38	42	38	40	58	54	43	38	63	82	74	68	54	70	43	42	53	60	51
Stratford	60	41	40	48	43	56	38	44	60	60	44	41	42	47	49	58	66	55	47	57	63	65	49	88	91	62	54	59	59	43
Westport	65	43	44	46	42	54	34	44	66	58	54	44	40	46	45	62	62	49	43	59	69	72	53	85	87	57	49	59	61	42
# days > Federal Standard	3																				4	5		6	7					

Good (0-59 ppb)
Moderate (60-75 ppb)
Unhealthy for Sensitive Groups (76-95 ppb)
Unhealthy (96-115 ppb)
Very Unhealthy (116 > ppb)

Units - parts per billion (ppb)
Federal Standard = 75 ppb
M = missing data
* Data is preliminary and has not been quality assured

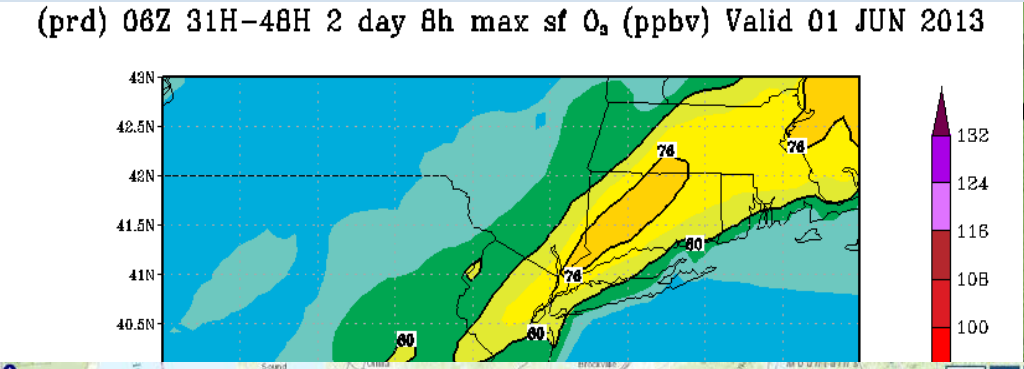
June 1st End of First 3-Day Event

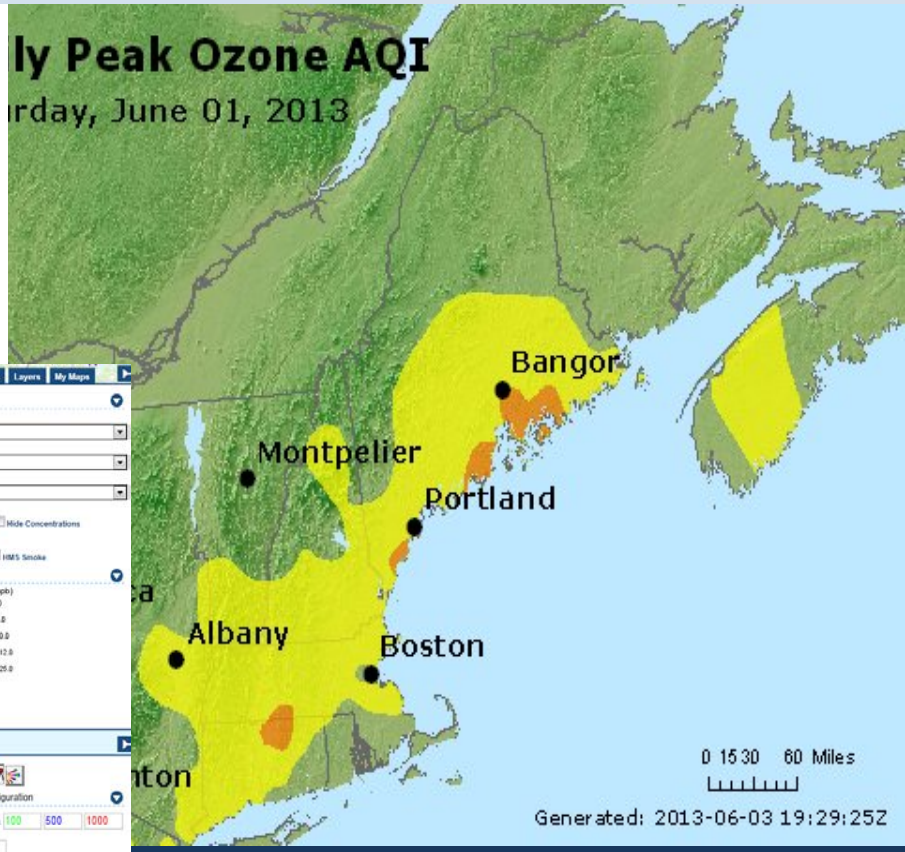


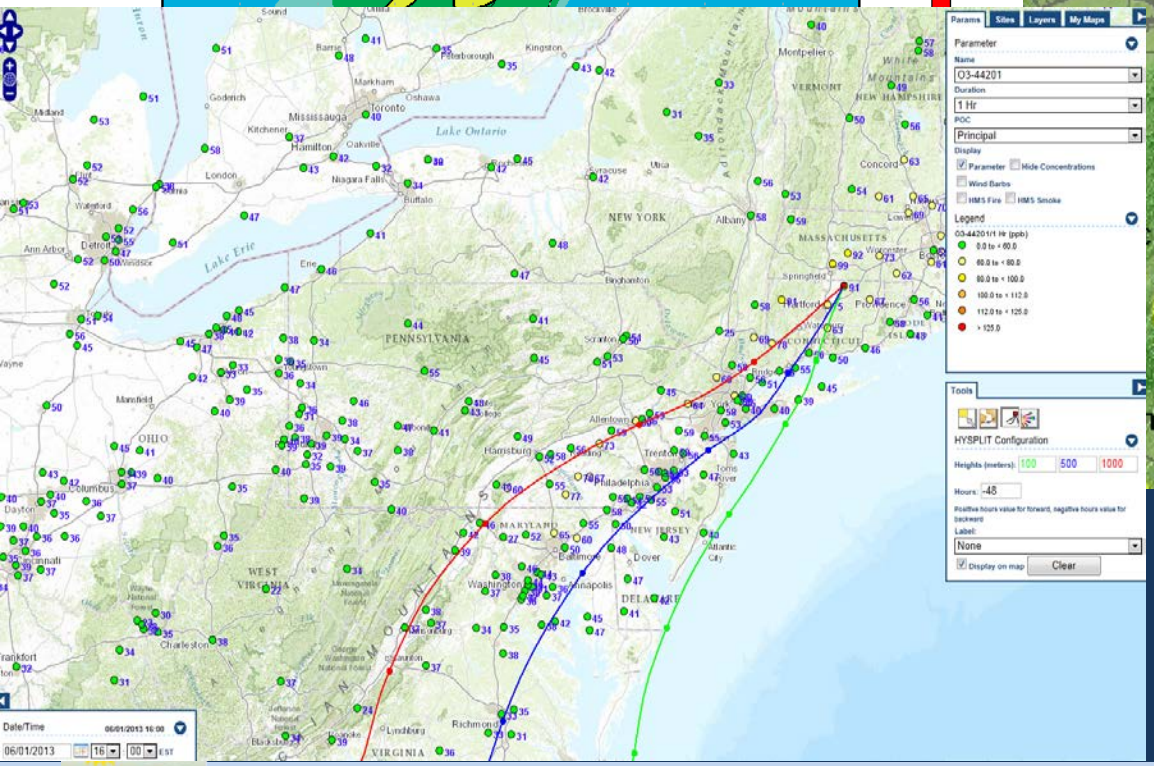


Upper level wind pattern shows the classic Bermuda High Pressure with first heat wave across the east coast. With the light upper level wind pattern from the SW and surface winds from the SW, it had become apparent that the combination of temperatures reaching the low-mid 90's, power plant, mobile sources emissions and transport from the I—95 corridor combined; caused acute high hourly levels of ozone reaching 124 ppb and 90 ppb for the 1-hour and 8-hour averages, respectively!

June 1 Event


(prd) 06Z 31H-48H 2 day 8h max sf O_3 (ppbv) Valid 01 JUN 2013
43N
42.5N
42N
41.5N
41N
40.5N
76
76
80
76
60
60
132
124
116
108
100

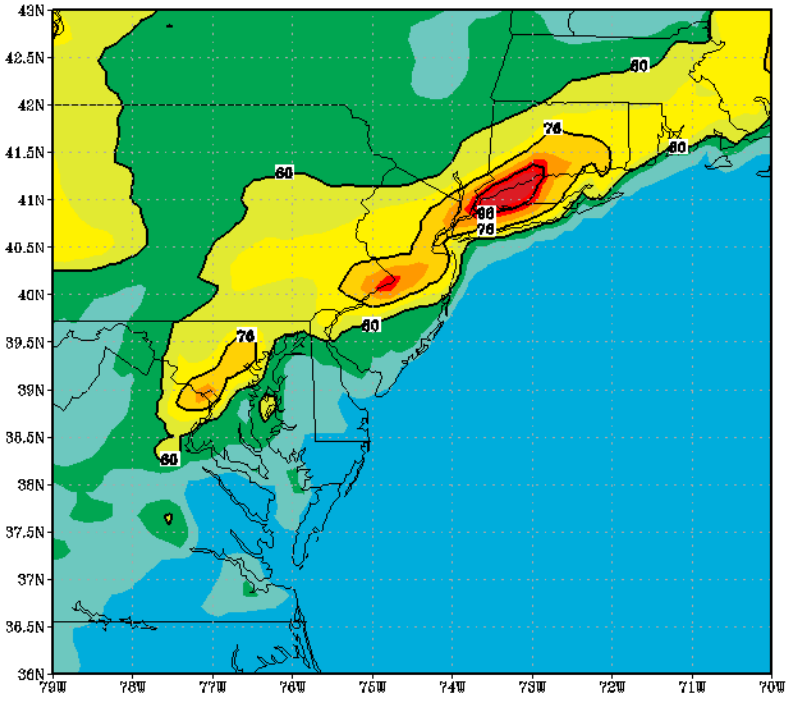

ly Peak Ozone AQI
rday, June 01, 2013
Bangor
Montpelier
Portland
Albany
Boston
0 15 30 60 Miles
Generated: 2013-06-03 19:29:25Z

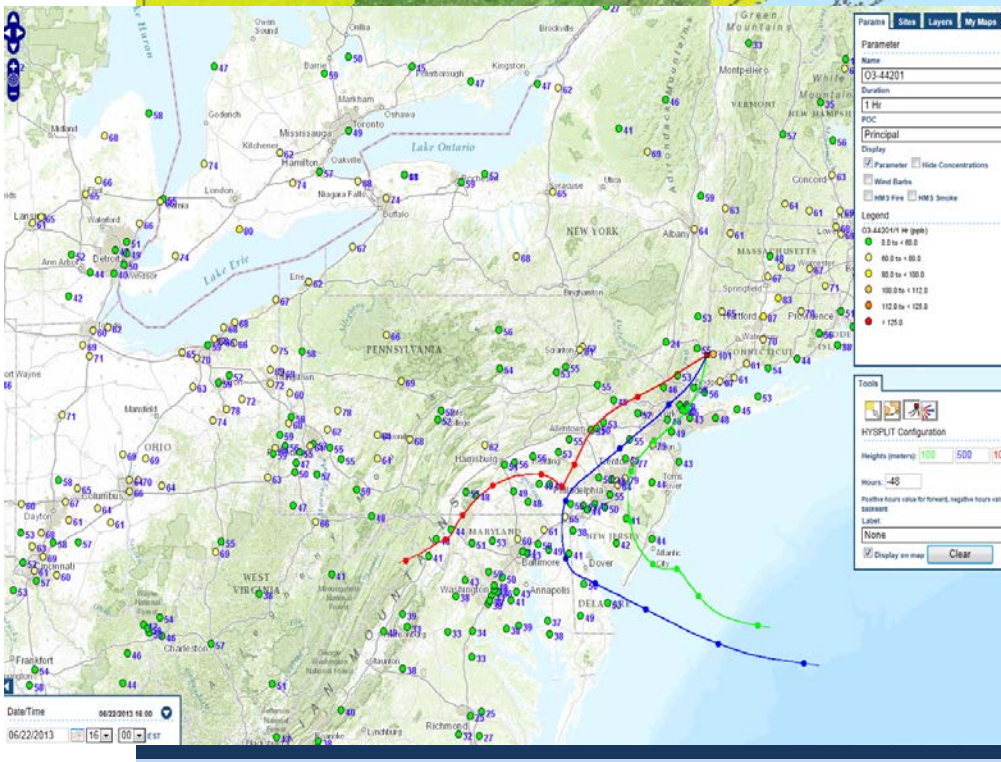

Params
Sites
Layers
My Maps
Parameter
O3-44201
1 Hr
Principal
Legend
Tools
HYSPLIT Configuration
None
Clear
Date/Time
06/01/2013
PENNSYLVANIA
NEW YORK
MASSACHUSETTS
CONNECTICUT
NEW JERSEY
MARYLAND
DELAWARE
VIRGINIA
WEST VIRGINIA
OHIO
Lake Ontario
Lake Erie

June 22, 2013

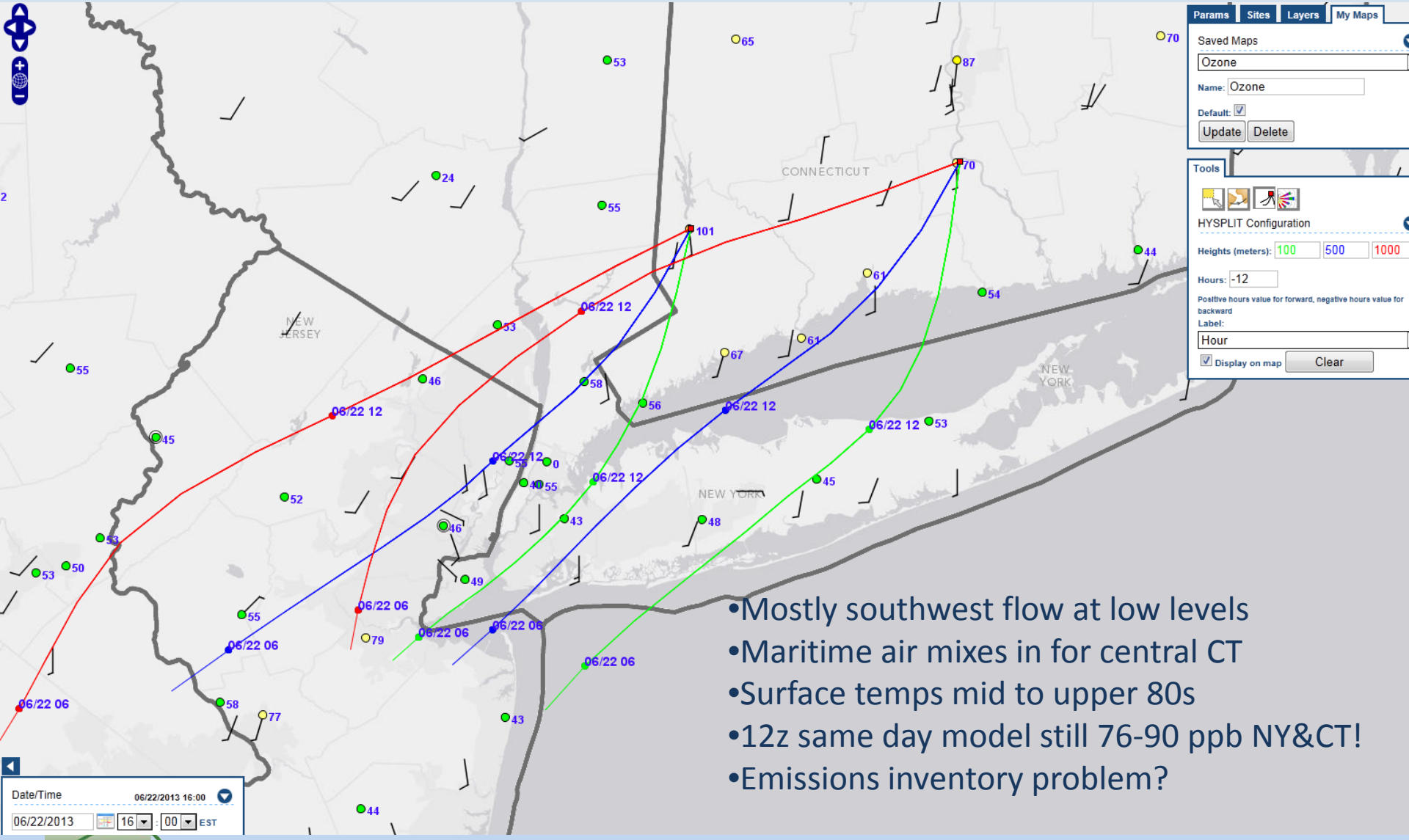
- NOAA Model (over) predicted significant event for NJ-NY-CT
- Only Danbury exceeded O3 NAAQS
- Trajectories support O3 exceedance

(prd) 06Z 31H-48H 2 day 8h max sf O_3 (ppbv) Valid 22 JUN 2013





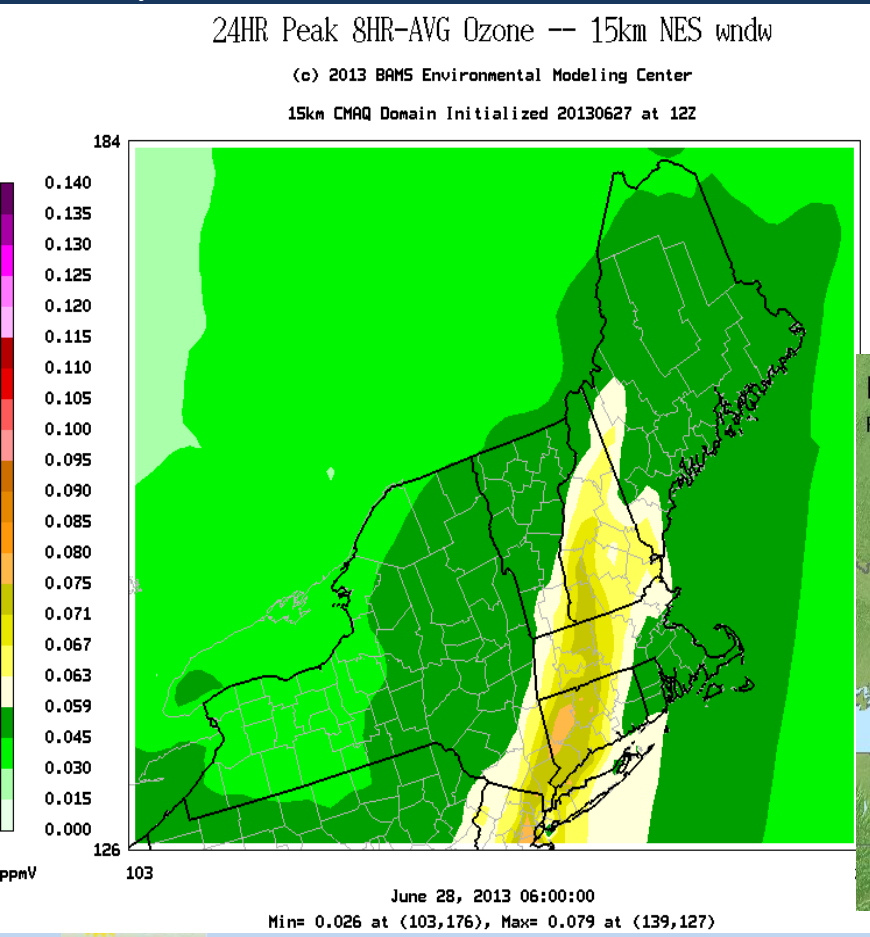
June 22 Trajectory Analysis

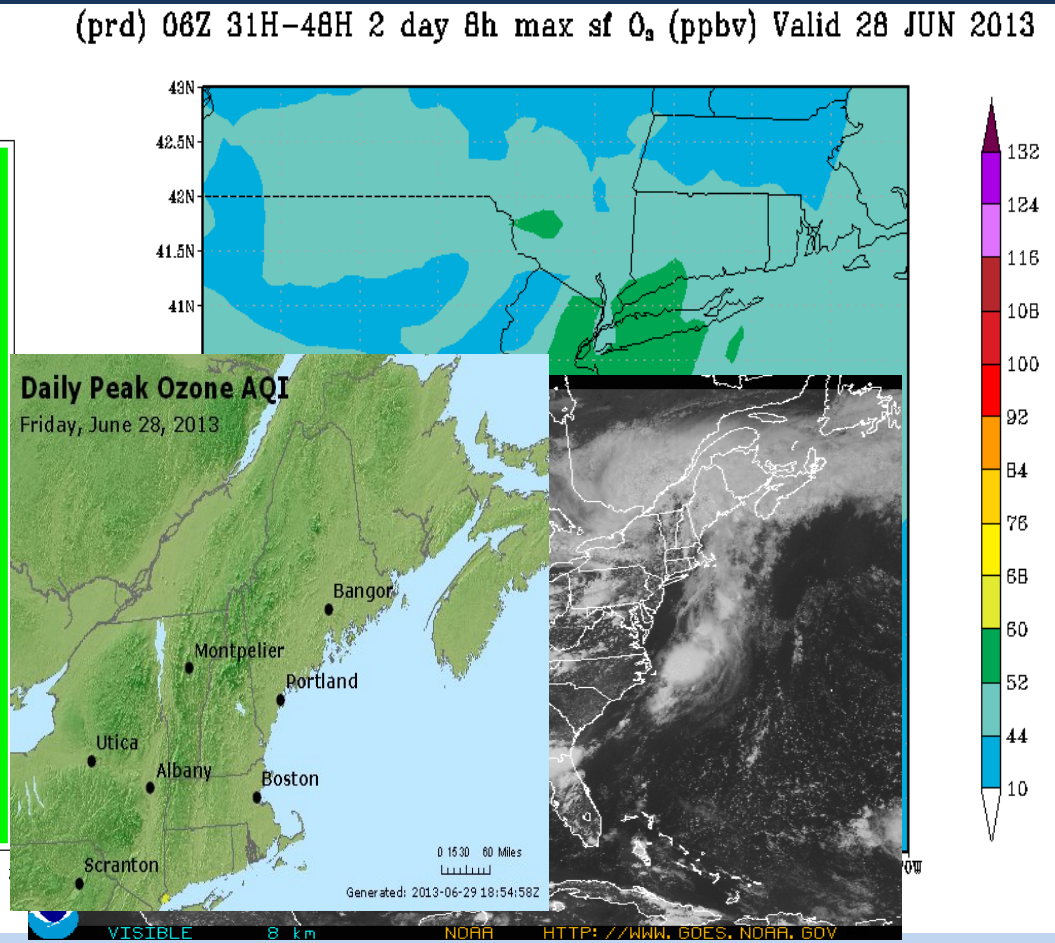


- Mostly southwest flow at low levels
- Maritime air mixes in for central CT
- Surface temps mid to upper 80s
- 12z same day model still 76-90 ppb NY&CT!
- Emissions inventory problem?

June 28th Non-Event

Barons CMAQ model over predicted 8-Hour Maximum Ozone Concentrations because of upper level SSW flow. NOAA outperformed Barons with this non-event; as it took into account a front nearby with clouds & PM thunderstorms.





July Observed 8-Hour Ozone Concentrations

Connecticut Department of Energy & Environmental Protection
8-Hour Ozone Daily Maximums*
July 2013

Site	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Cornwall	30	36	36	31	42	32	40	53	61	50	42	41	29	34	44	45	47	46	66	51	49	53	40	28	22	36	M	M	47	35	41
Danbury	25	37	40	41	53	39	62	51	64	61	43	43	22	31	38	45	54	54	75	60	45	48	43	30	17	31	74	52	50	37	44
East Hartford	26	34	43	41	55	33	51	43	60	50	43	25	8	14	45	52	52	51	78	55	45	48	40	32	17	25	65	52	55	37	46
Greenwich	27	33	34	42	51	56	74	69	78	68	59	42	31	44	50	46	79	83	82	71	48	50	56	43	18	48	65	50	67	41	60
Groton	25	25	29	51	54	67	55	66	54	45	48	41	22	43	51	45	55	75	91	83	45	46	59	44	16	45	59	39	41	48	46
Madison	32	30	36	50	57	73	77	77	57	54	56	43	31	56	52	61	72	80	79	79	47	49	64	38	18	52	67	48	45	53	48
Middletown	29	29	38	52	64	41	58	64	56	53	51	41	23	41	46	56	67	55	85	67	38	45	54	38	19	39	65	46	56	39	47
New Haven	31	35	39	47	52	37	75	71	54	57	55	42	21	47	43	44	59	66	77	65	45	41	54	35	17	34	68	50	57	37	41
Stafford	27	34	46	41	54	35	45	40	47	48	M	M	M	M	45	34	61	56	79	51	41	46	41	35	19	30	61	45	50	39	44
Stratford	33	35	35	50	57	76	77	81	73	71	55	M	24	37	49	48	74	90	90	81	52	50	72	40	19	51	72	53	68	46	52
Westport	29	35	37	49	58	57	81	80	75	76	53	41	26	48	41	50	79	86	99	75	49	46	69	41	16	44	70	52	68	45	56
# days > Federal Standard						8	9	10	11	12							13	14	15	16											

Good (0-59 ppb)
Moderate (60-75 ppb)
Unhealthy for Sensitive Groups (76-95 ppb)
Unhealthy (96-115 ppb)
Very Unhealthy (116 > ppb)

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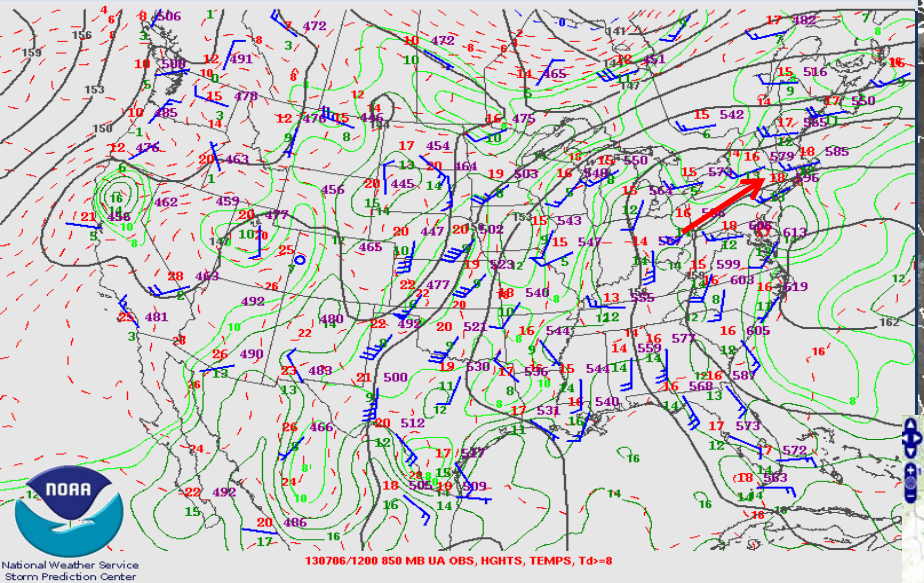
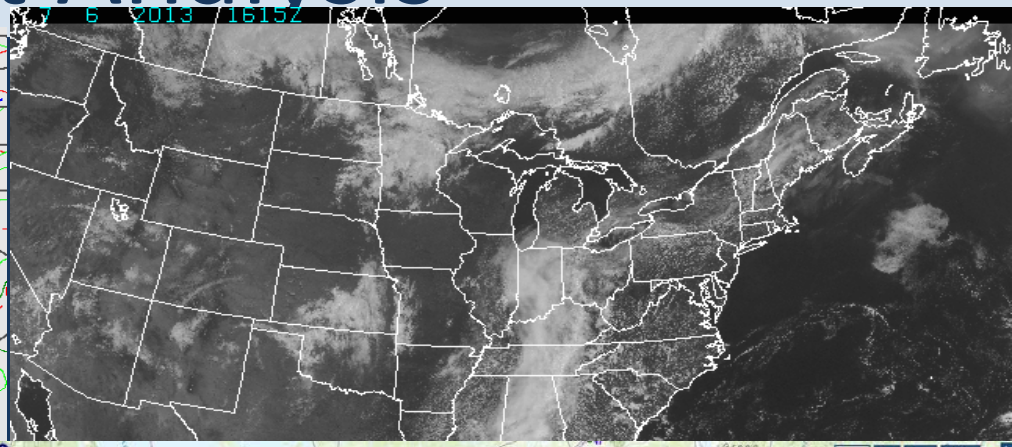
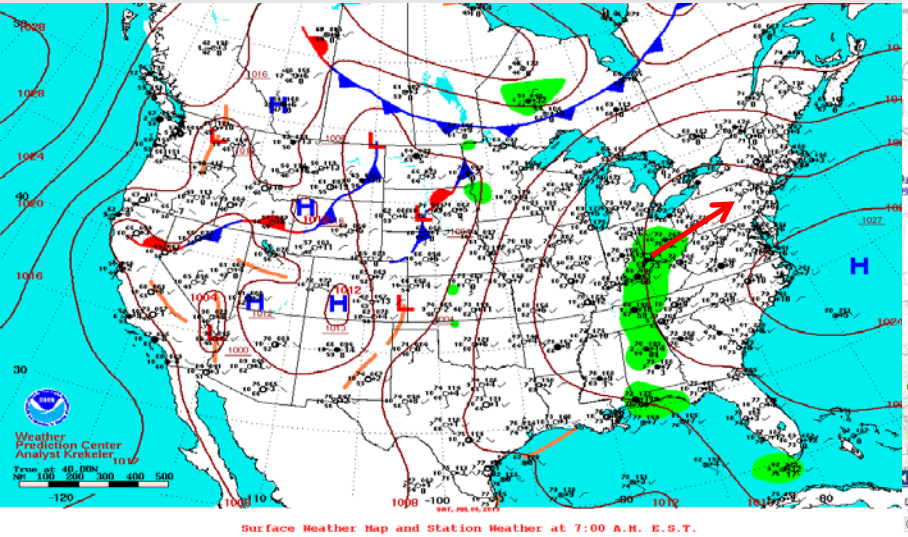
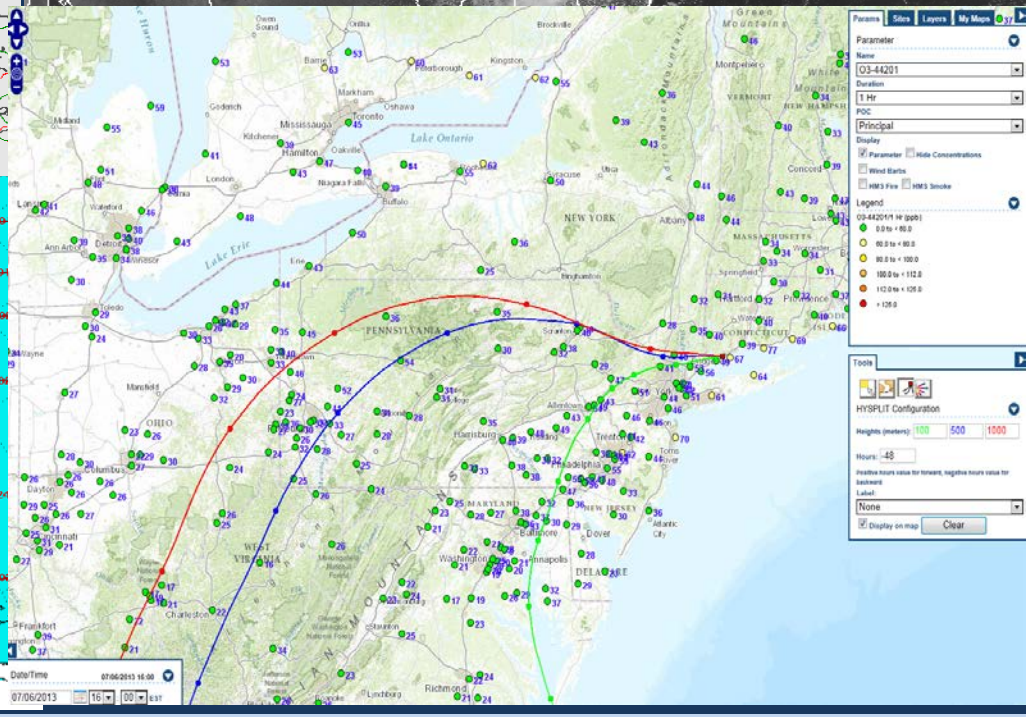
July 6th Met Analysis



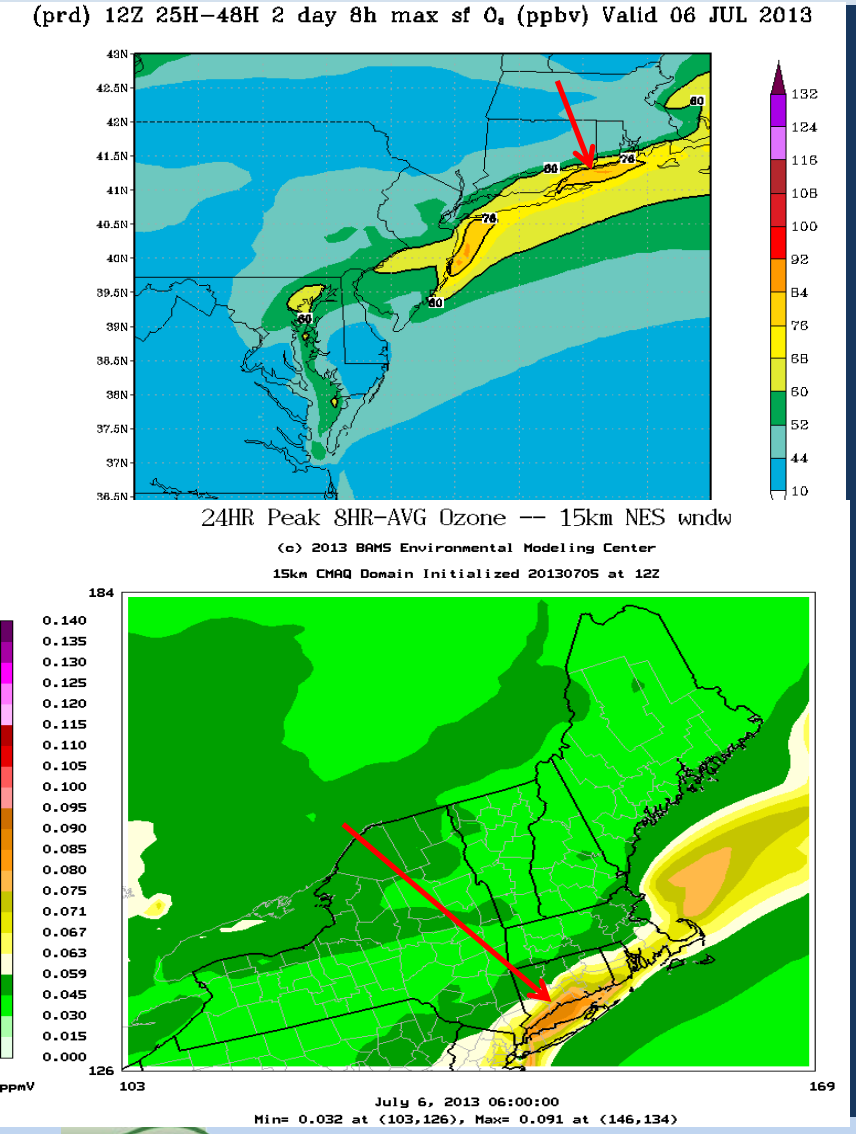






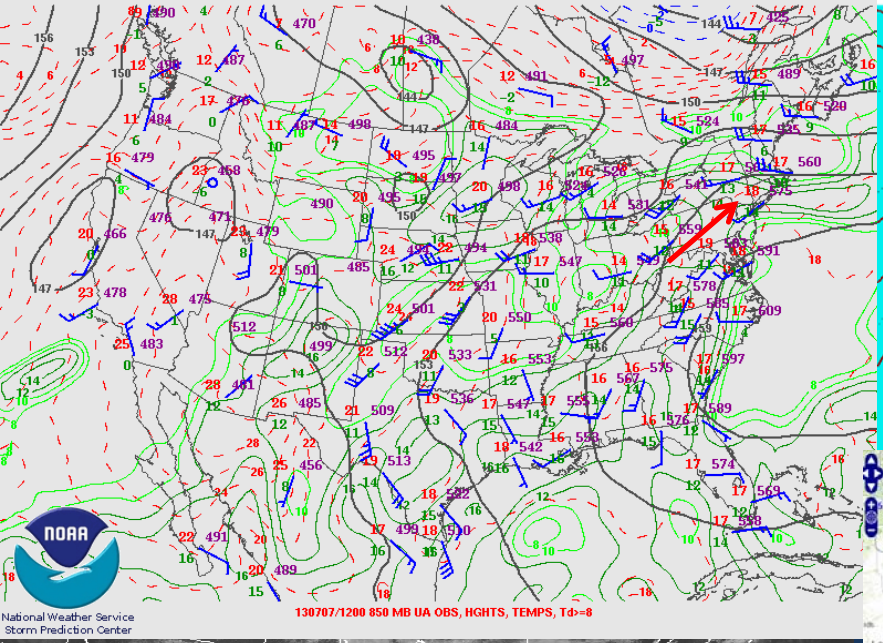
Connecticut Department of Energy and Environmental Protection

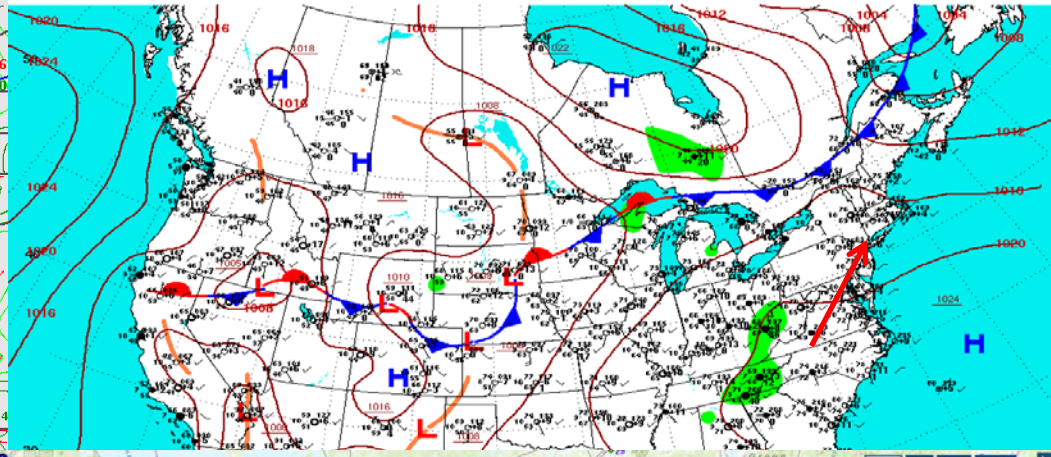
July 6th Close Call Event

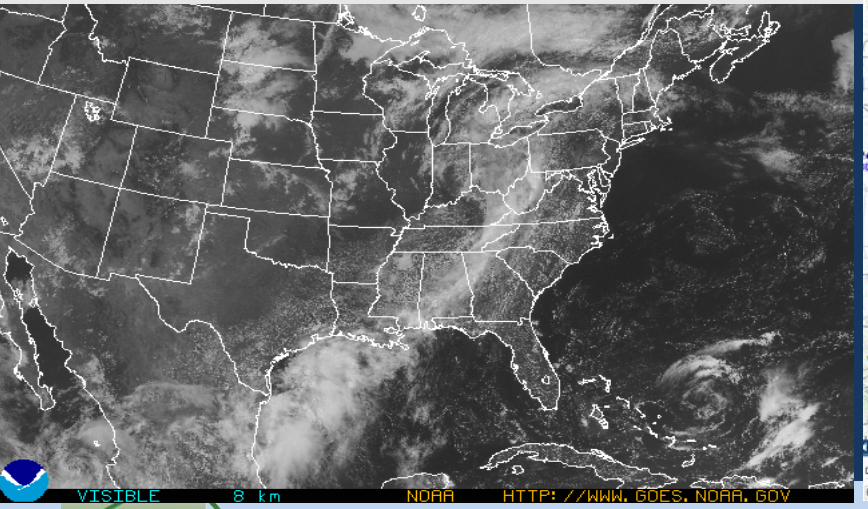


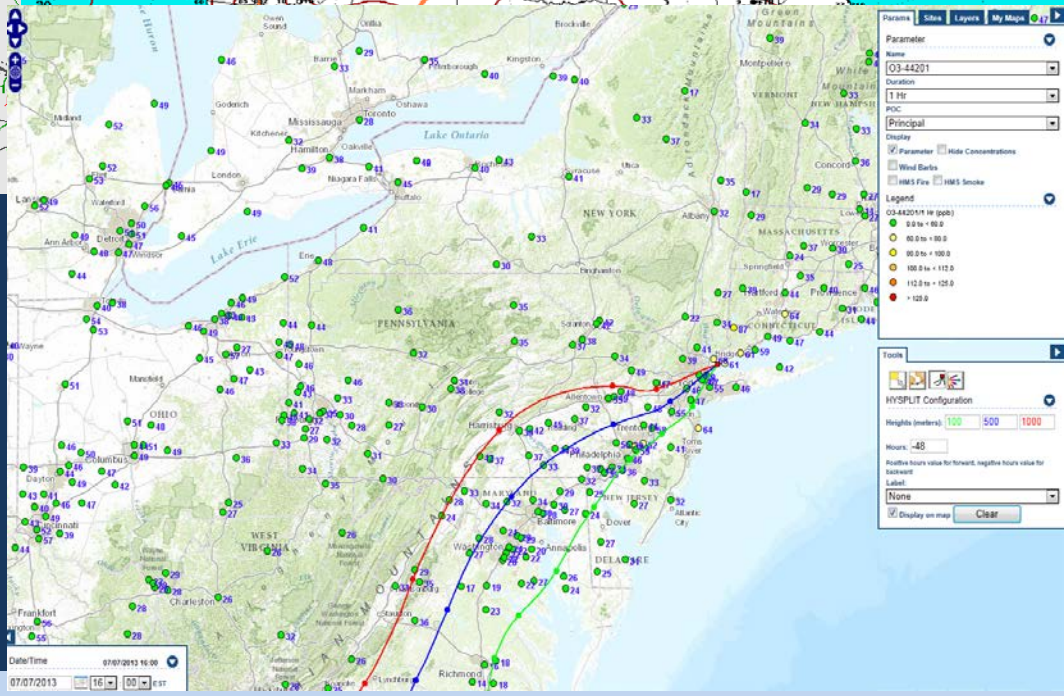
Model analyses showed west wind aloft, SSW surface wind - convergence zone off the New Jersey Coast and Eastern Long Island Sound. However, our Stratford Monitor reached 76 PPB, Sea-breeze along the coast transported the Ozone plume into SW Ct as depicted by the Barons Models. Forecasters put more weight toward the NOAA model which had out-performed the aforementioned BARONS models until this event!

July 7th Met Analyses



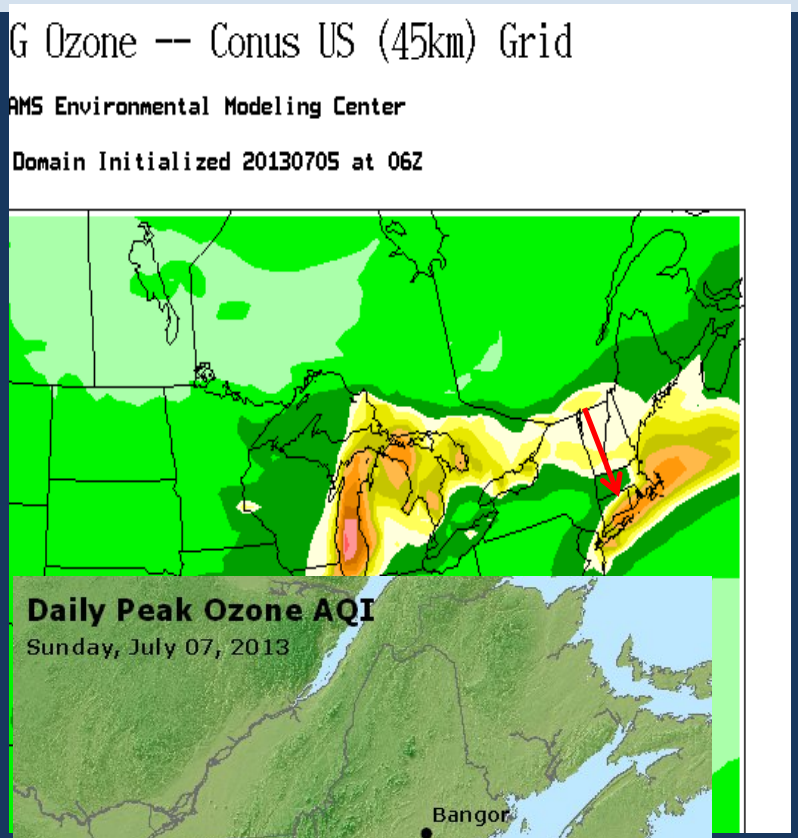


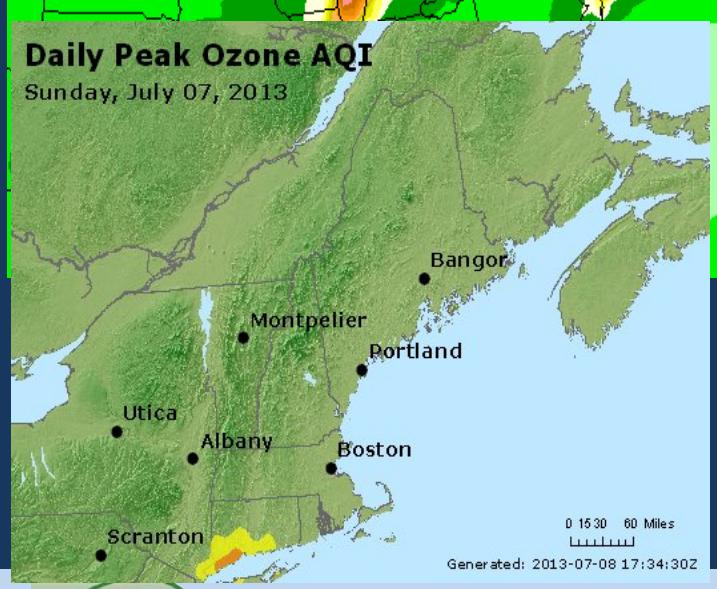


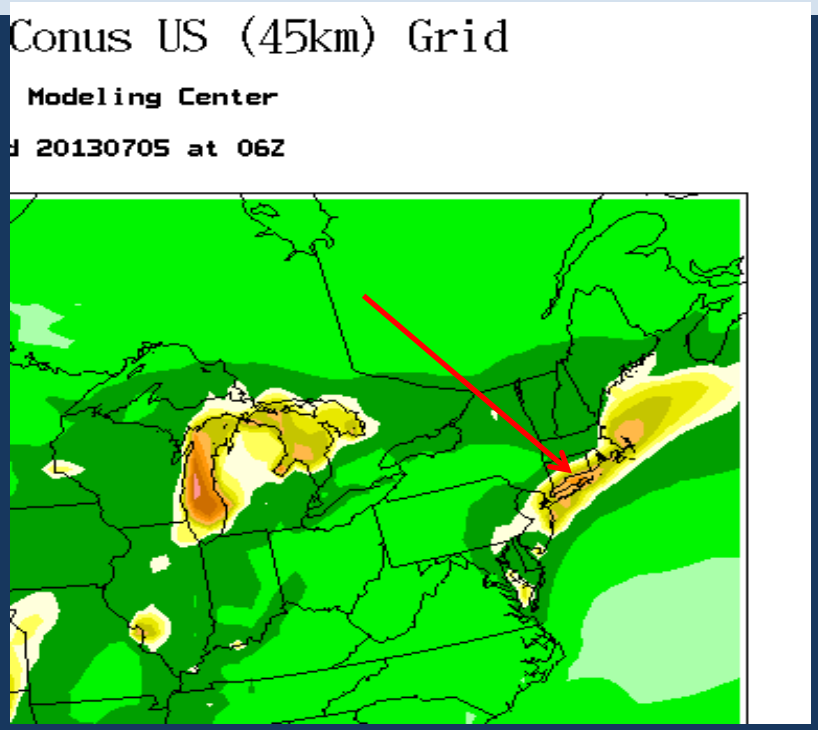


Connecticut Department of Energy and Environmental Protection

July 7th Close Call Event II

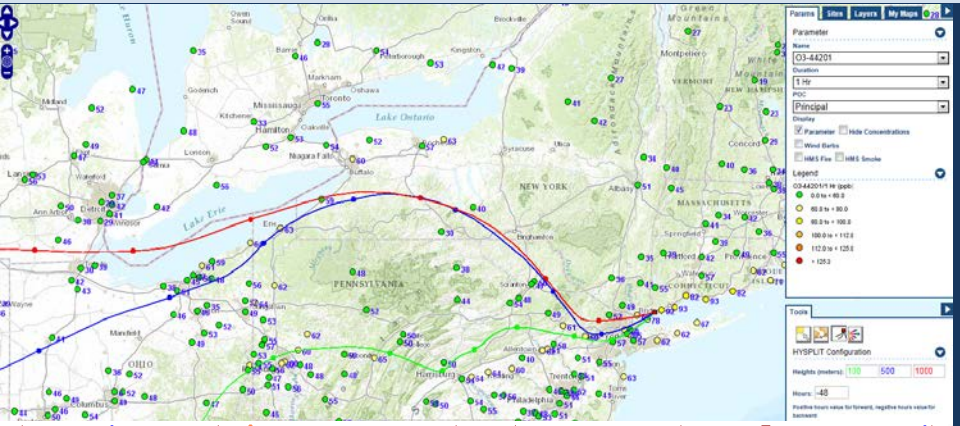


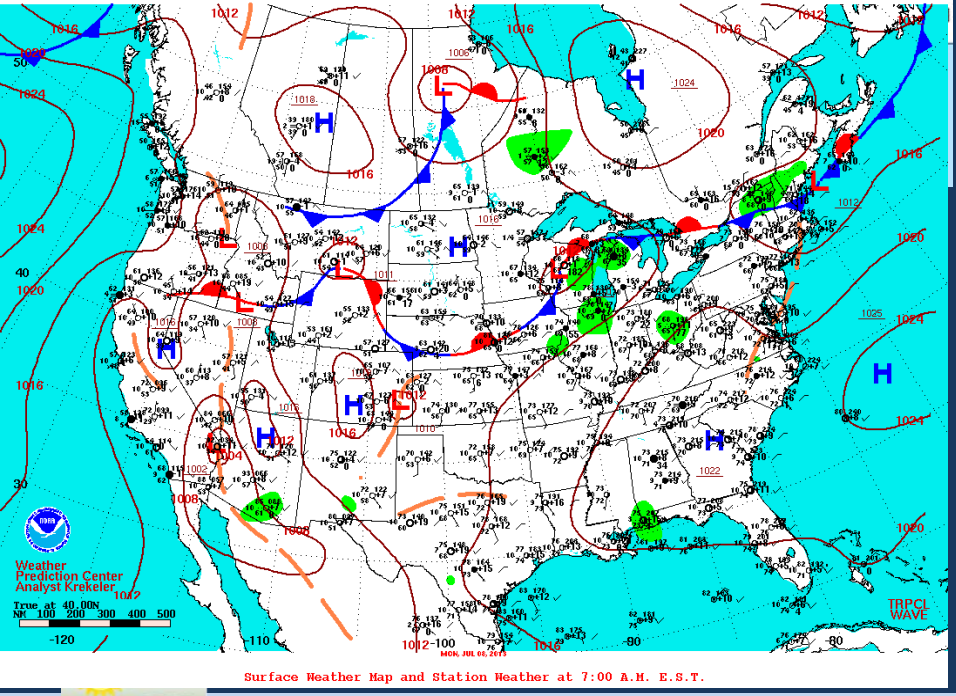


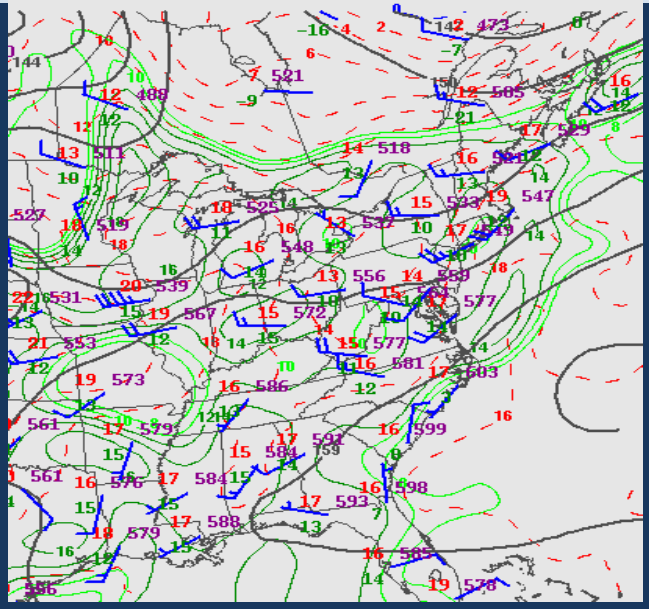


Barons MAQSIP & CMAQ models out-performed NOAA very well during this weekend as shown above with the 45 km modeled domain output. However, due to models over-predicting by 5-10 ppb over the weekend, forecasters decided to forecast MODERATE by subtracting 10 ppb off the modeled predicted 8-hour O3 concentrations given that the forecast was a 48 to 72 hour event!

July 8th Met Analysis

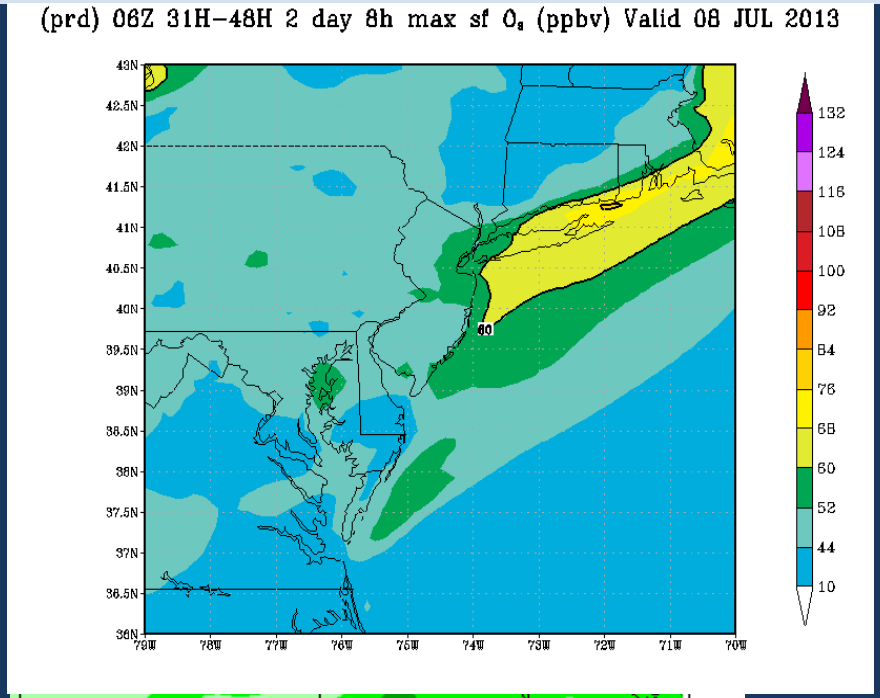


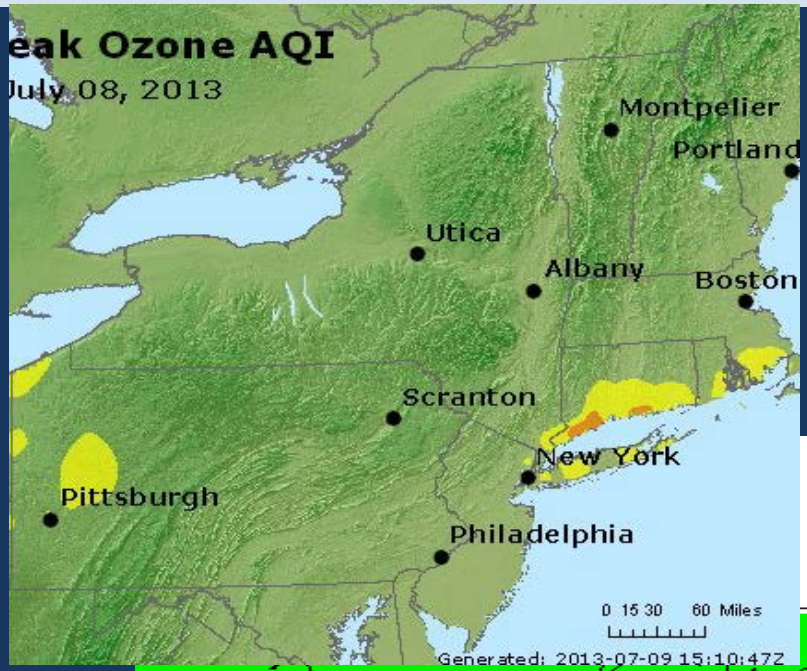


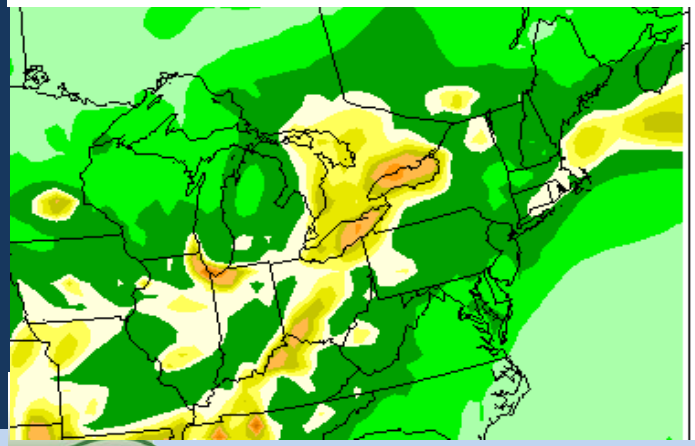


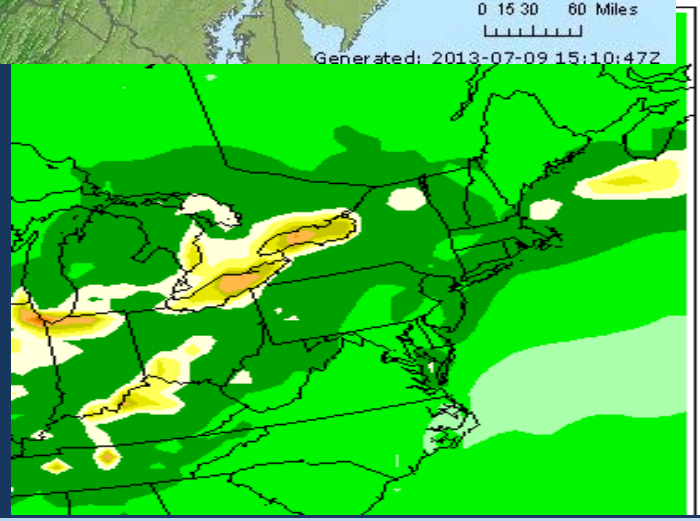
Forecast models showed west wind aloft, SW at surface would cause the convergence zone off the New Jersey Coast and Eastern Long Island Sound. However, our Stratford Monitor reached 76 PPB. MAAQSIP and CMAQ out performed the NOAA model. Due to modeled issues this year, forecasters decided to put AQI forecast weight toward the NOAA model which had out-performed BARONS up to this weekend event!

July 8th Event

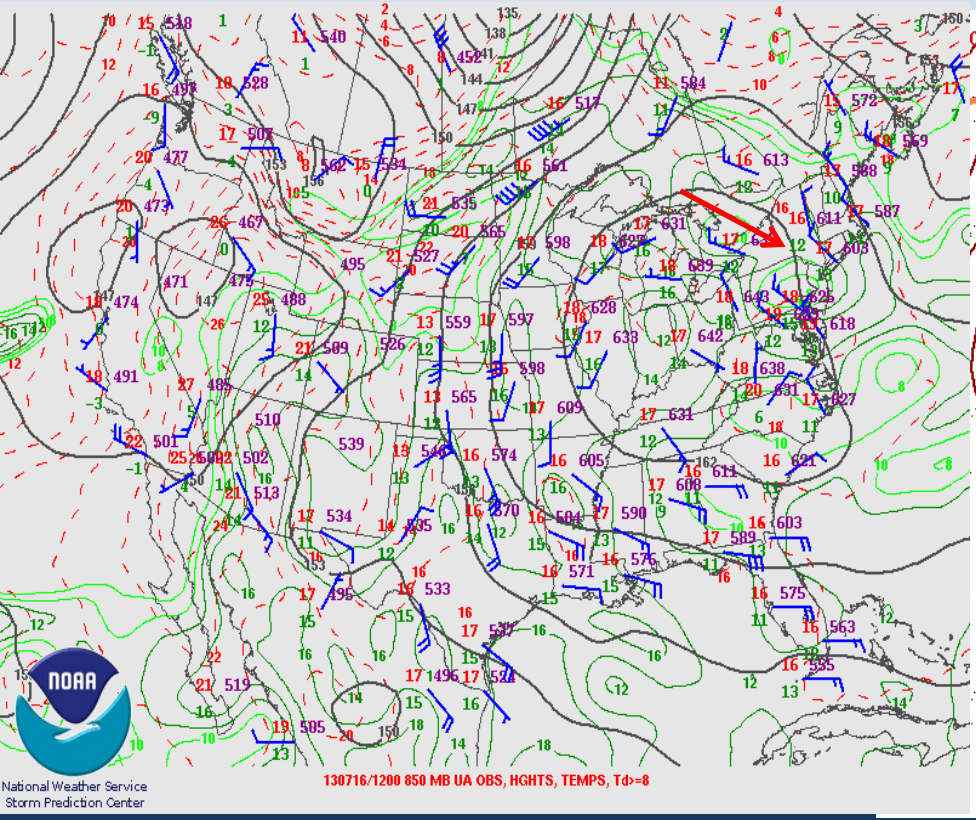


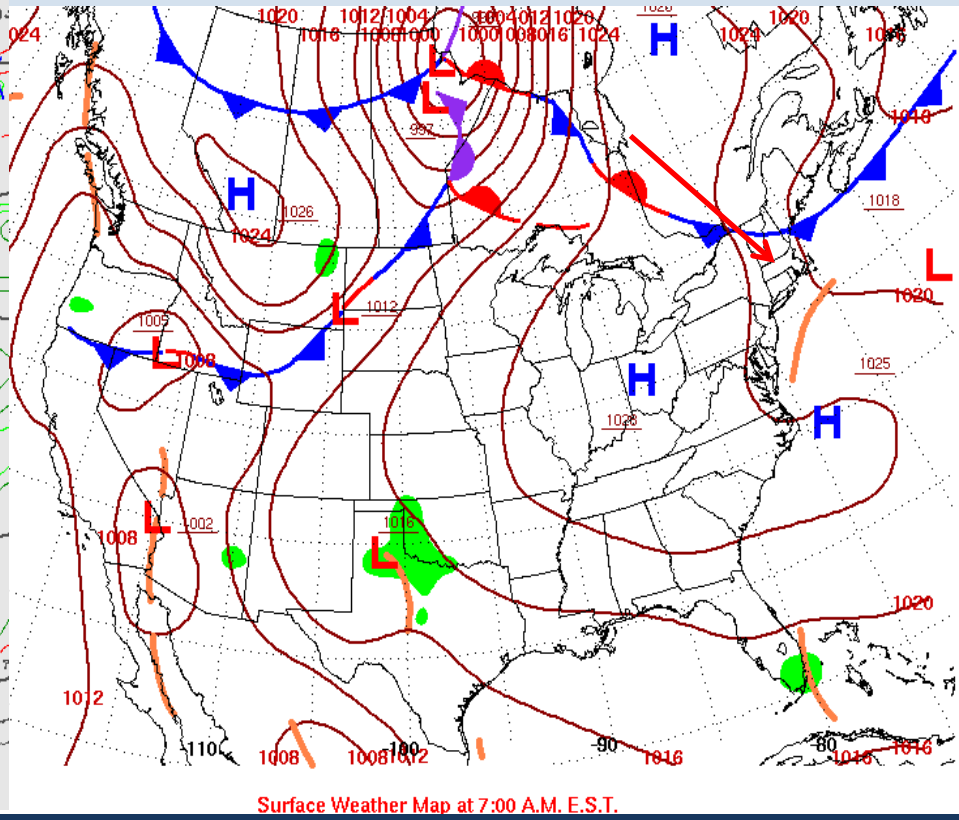






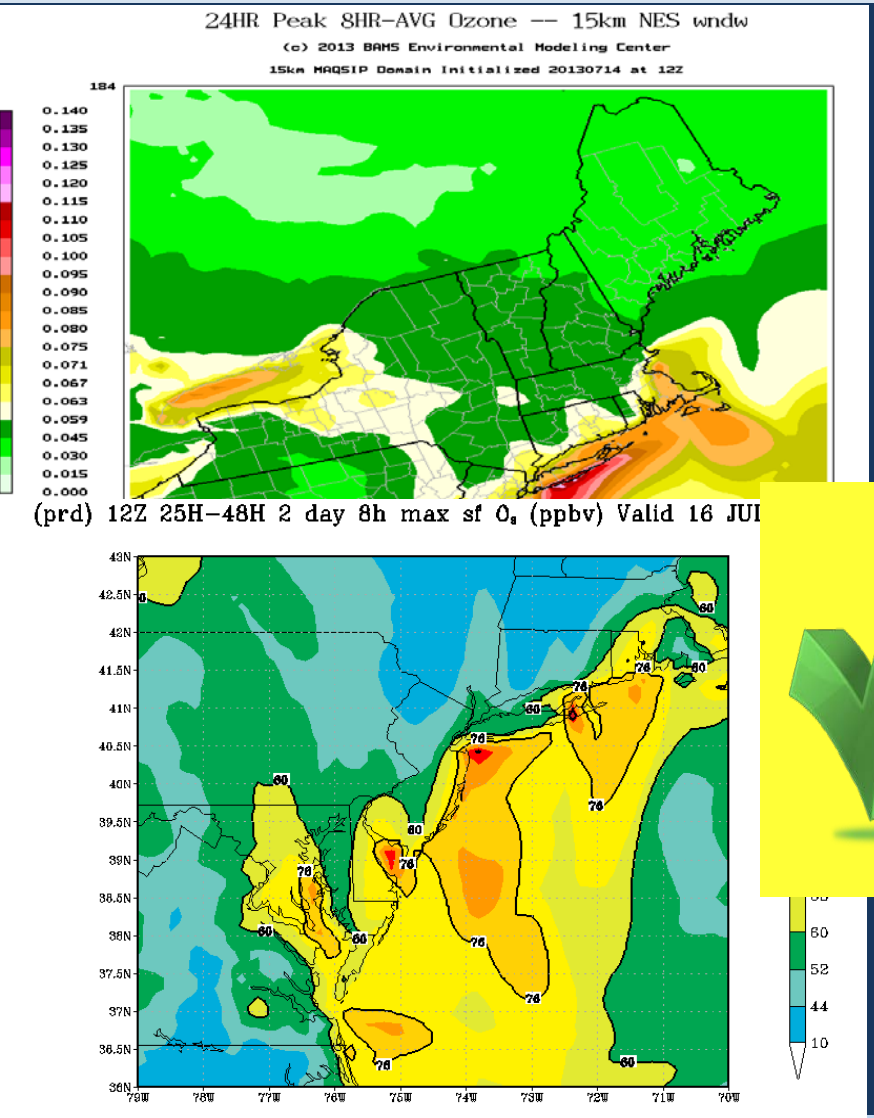
July 16th Met Analyses



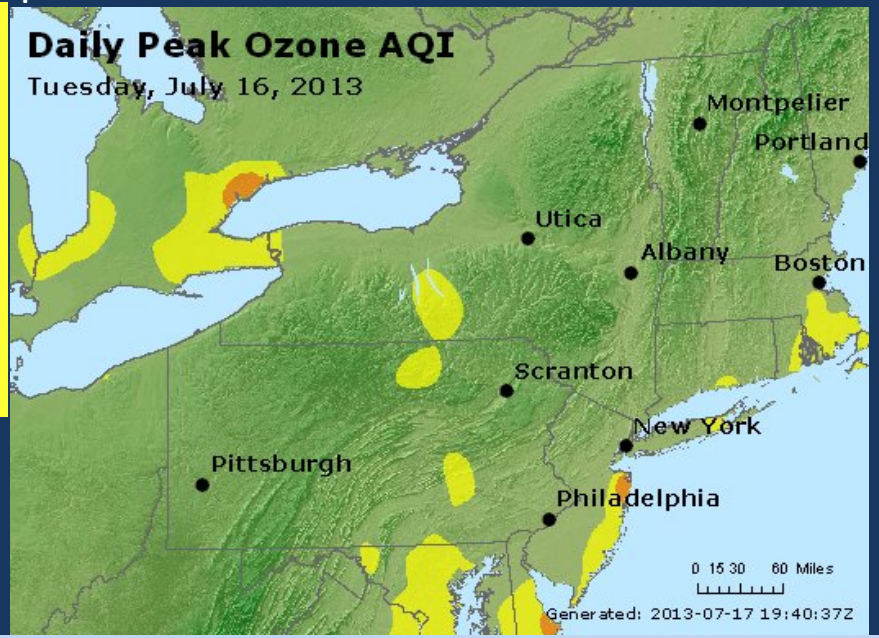


Despite the heat, upper level and surface winds from the NNW were not conducive for Ozone Formation from power plant emissions transport and localized contributions, especially along the coast where NO sea breezes were recorded; and therefore, Ozone stayed GOOD to MODERATE statewide!

July 16th Non-Event

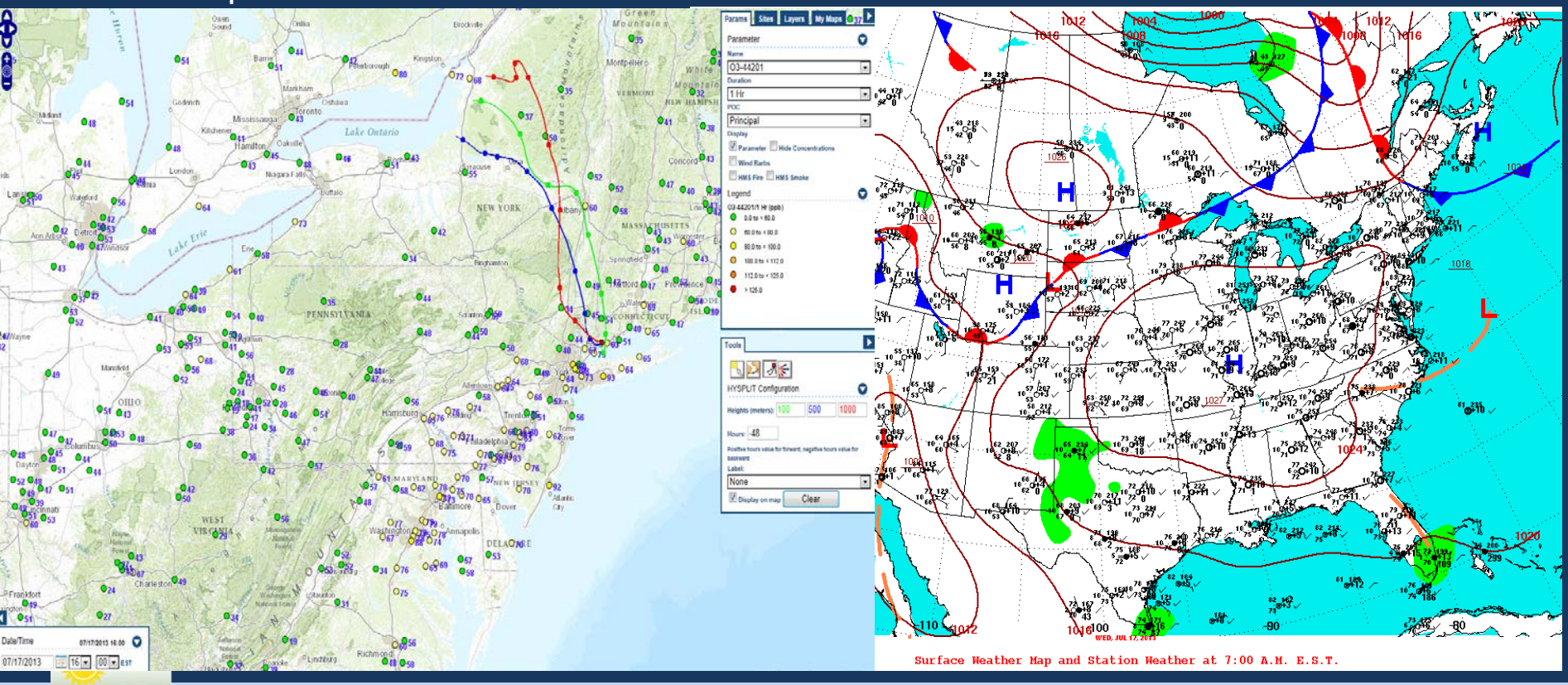


Middle of 4th Heat Wave with the high of 94°, 3rd consecutive day of 90 degree heat! However, ozone levels were below 60 ppb except Madison (61 ppb) due to Northwest winds aloft and at the surface. Therefore, no transport contribution during those first three 90 degree days. All models performed well due to met conditions!



July 17th Pinpoint Event

4th consecutive day of 90° heat and ozone levels finally started climbing as wind turn more Westerly inland, sea-breeze along the coast. The sea-breeze caused the Ozone Plume (off - shore) to move just into the SW corner of CT and therefore our Westport Monitor had an 8-hour average of 76 ppb by the end of the day! NOAA Model Pinpoint Prediction SW Ct. Baron models over-predicted well inland as well



Connecticut Department of Energy and Environmental Protection

July 17th Pinpoint Event

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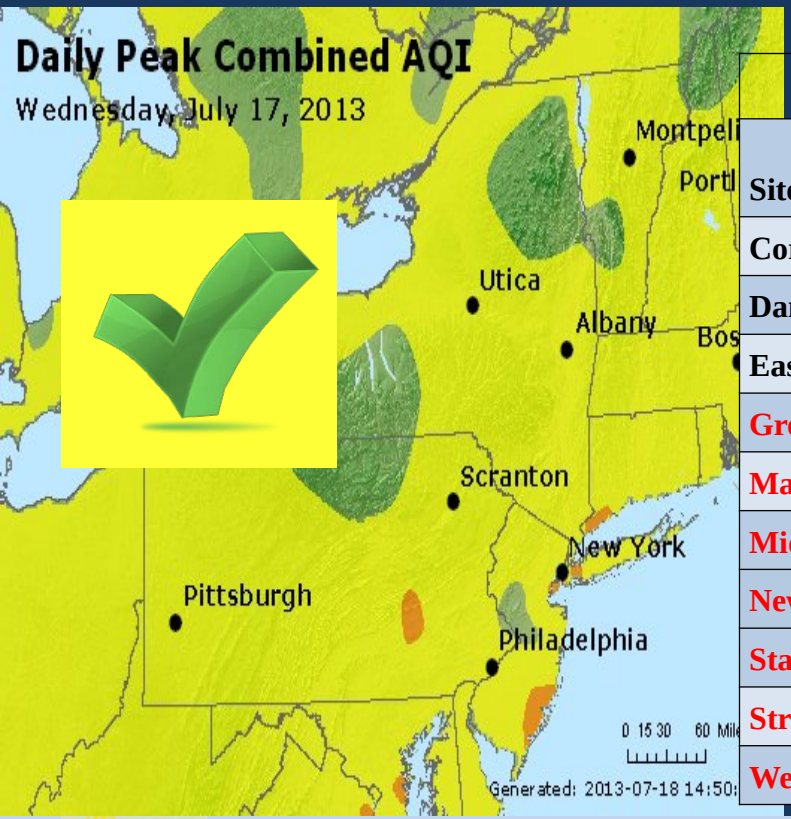
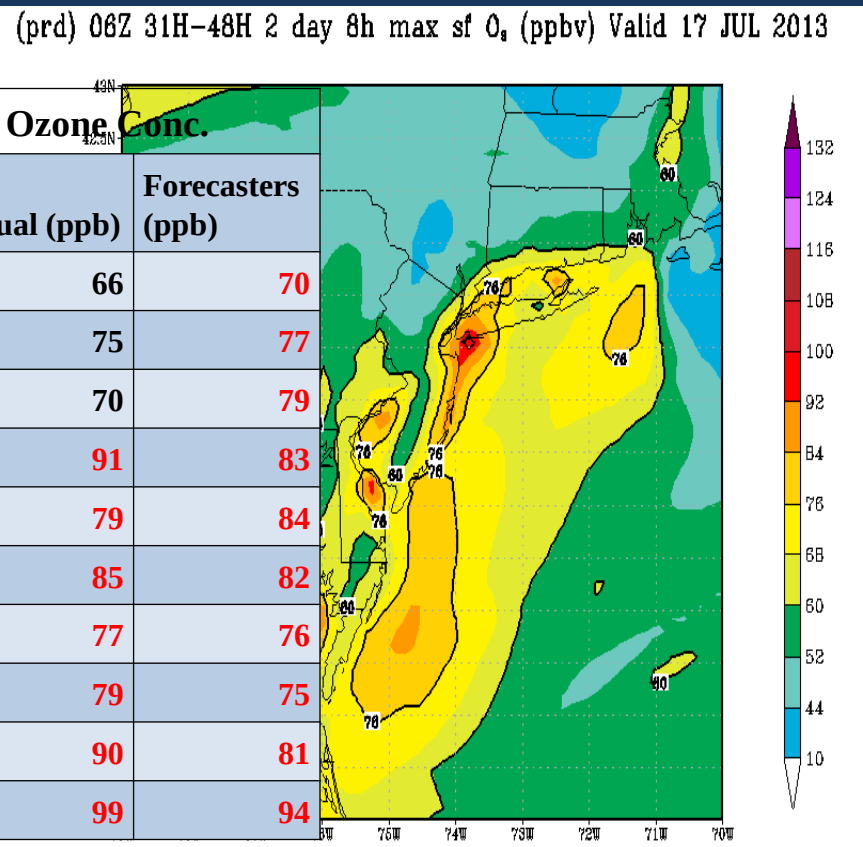


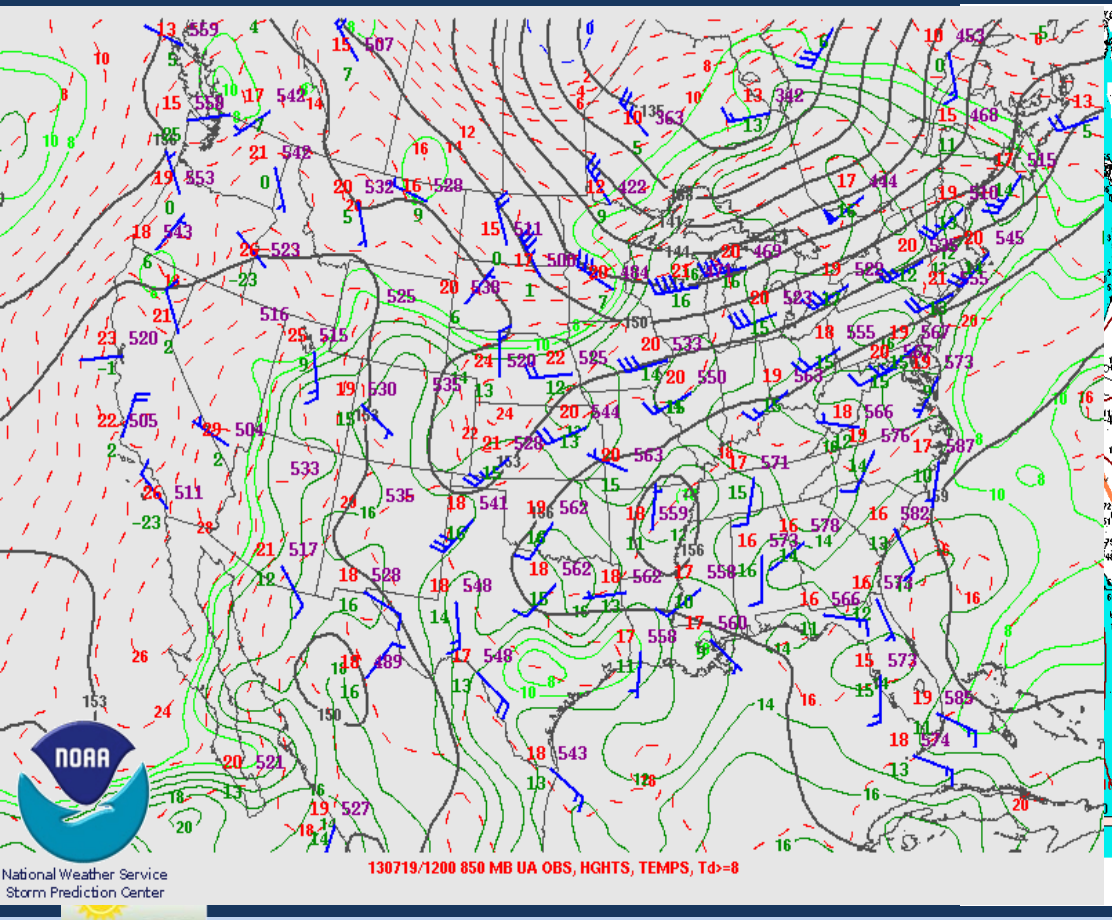
Peak 8-Hour Ozone Conc.

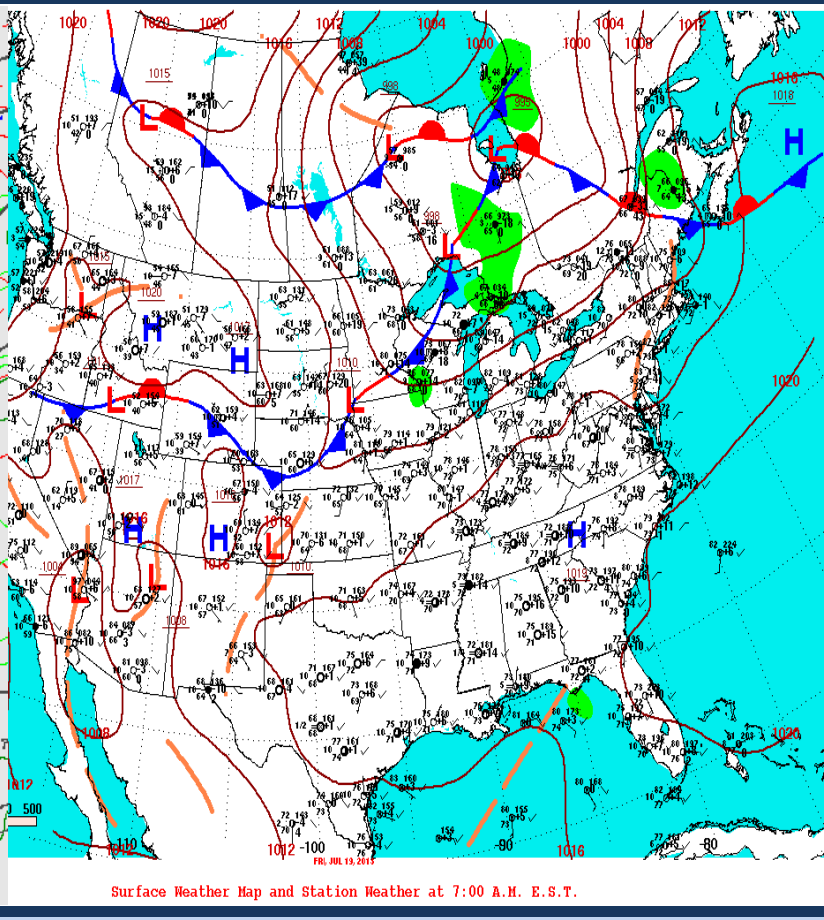
Site Name	Actual (ppb)	Forecasters (ppb)
Cornwall	66	70
Danbury	75	77
East Hartford	70	79
Groton	91	83
Madison	79	84
Middletown	85	82
New Haven	77	76
Stafford	79	75
Stratford	90	81
Westport	99	94



July 19th Met Analysis

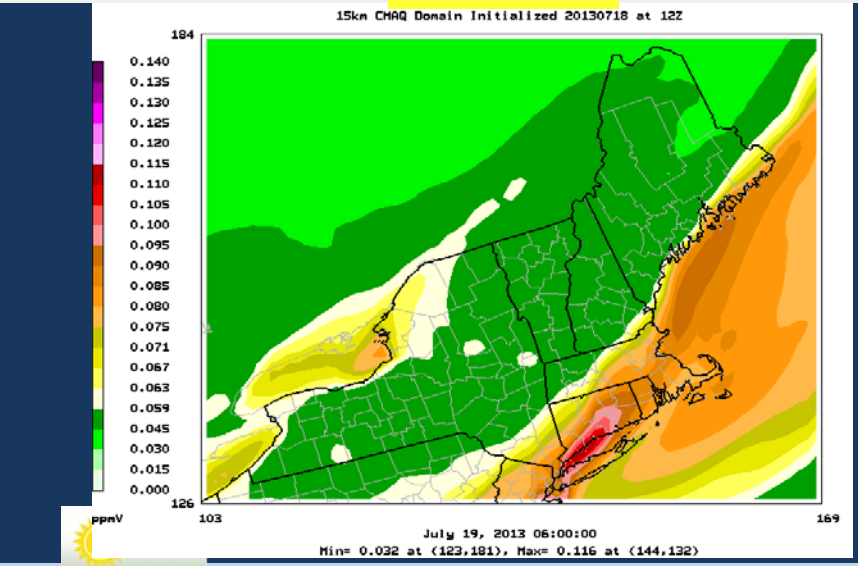
6th consecutive day of 90 degree heat with ozone levels maxed up to 99 ppb, located at our Westport Monitor as the wind turned SW across all of Ct. All models (NOAA and Barons CMAQ and MAQSIP models) matched well with levels exceeding the standard.

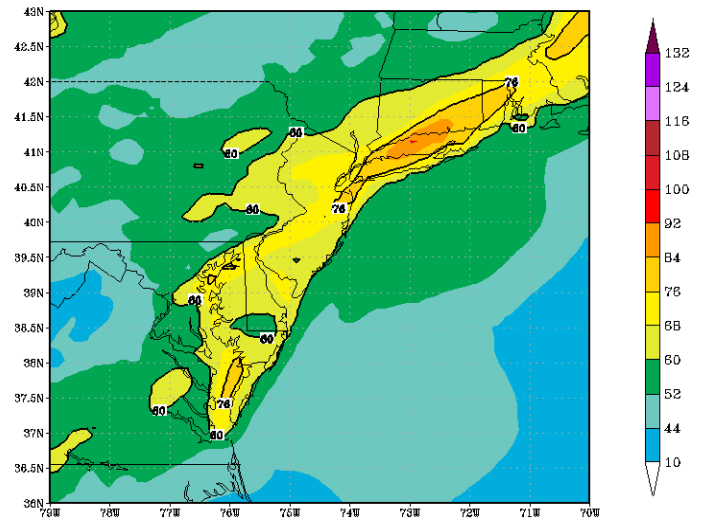




Connecticut Department of Energy and Environmental Protection

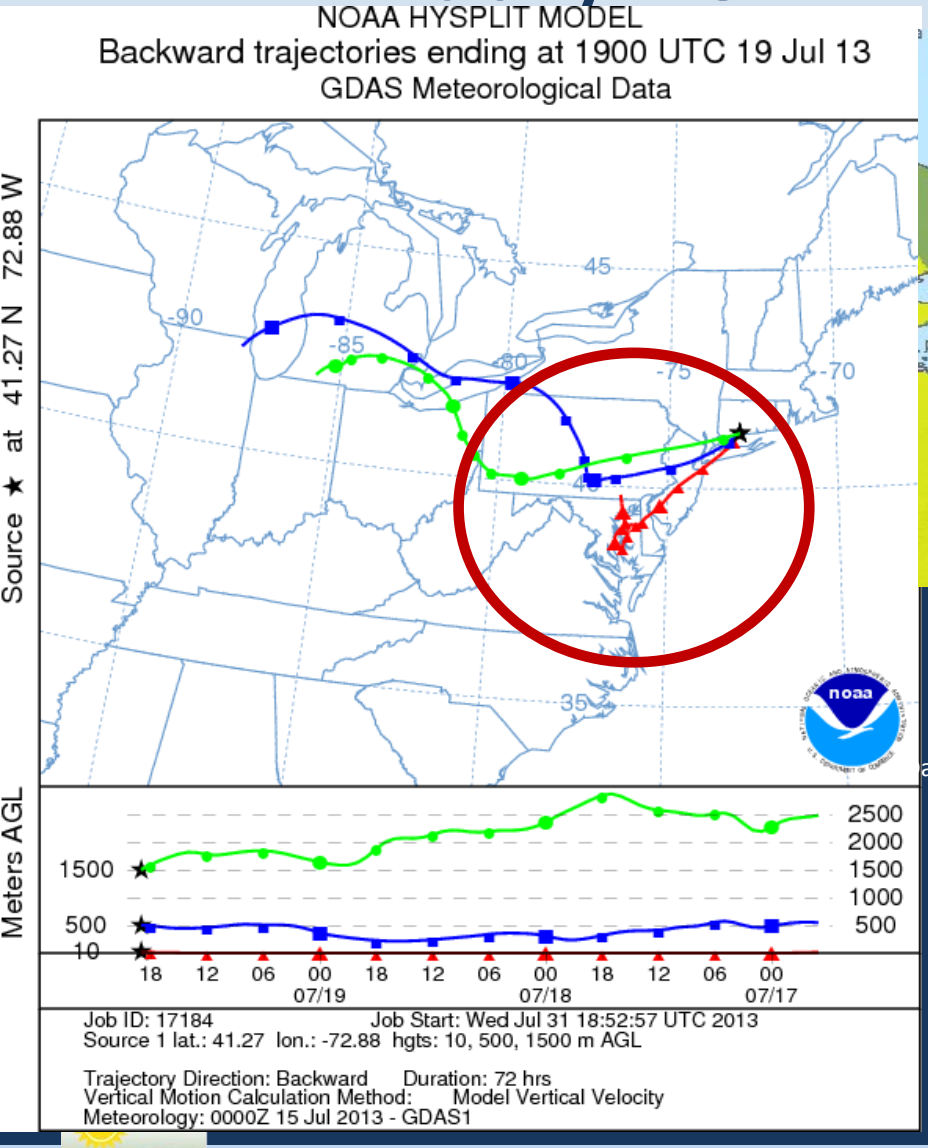
July 19th Big Event





Connecticut Department of Energy and Environmental Protection

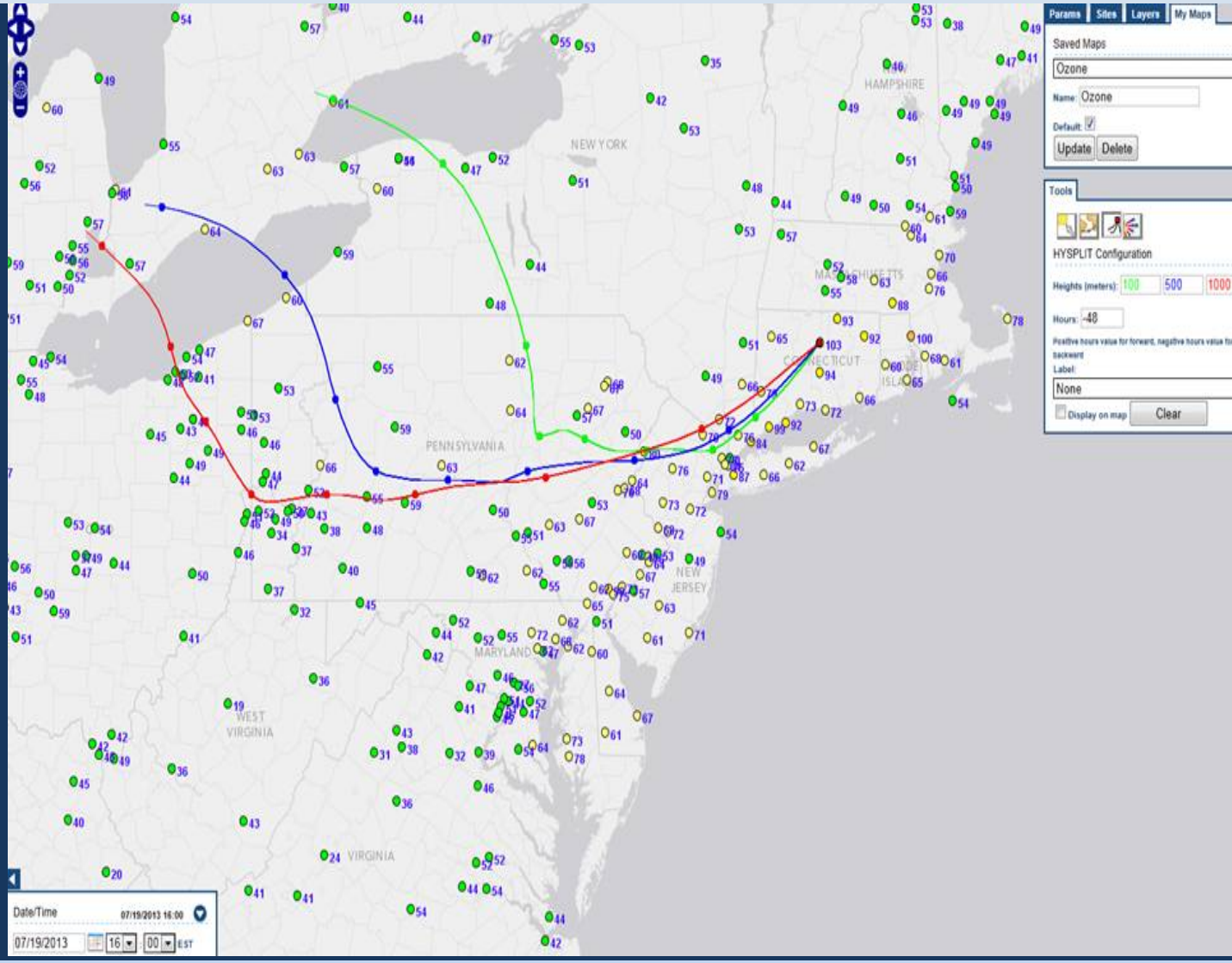
July 19th Big Event



anbury	East Hartford	Greenwich	Groton Fort Griswold	Madison-Beach Road	Middletown	New Haven - Criscuolo Park	Stafford	Stratford	Westport
45	52	46	45	61	56	44	34	48	50
54	52	79	55	72	67	59	61	74	79
54	51	83	75	80	55	66	56	90	86
75	78	82	91	79	85	77	79	90	99
60	55	71	83	79	67	65	51	81	75
45	45	48	45	47	38	45	41	52	49
48	48	44	46	49	45	41	46	50	46

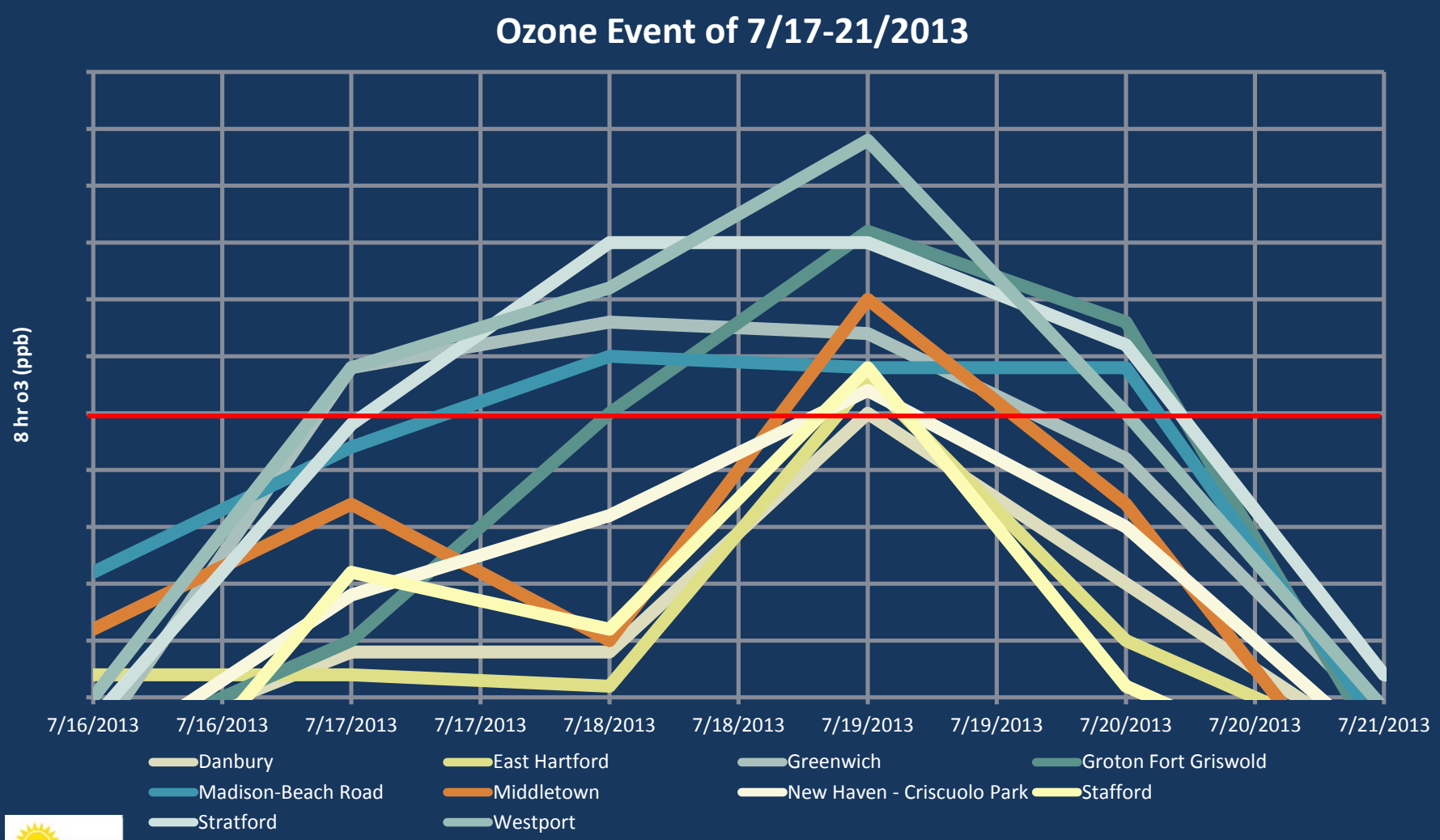
July 19th Big Event

Back Trajectories indicate mid-level NW-W transport winds plus localized surface SW wind showed = convergence of Ozone, exceeding the 8-Hour NAAQS onto Connecticut



Connecticut Department of Energy and Environmental Protection

July 17-21 Multi-Day Event



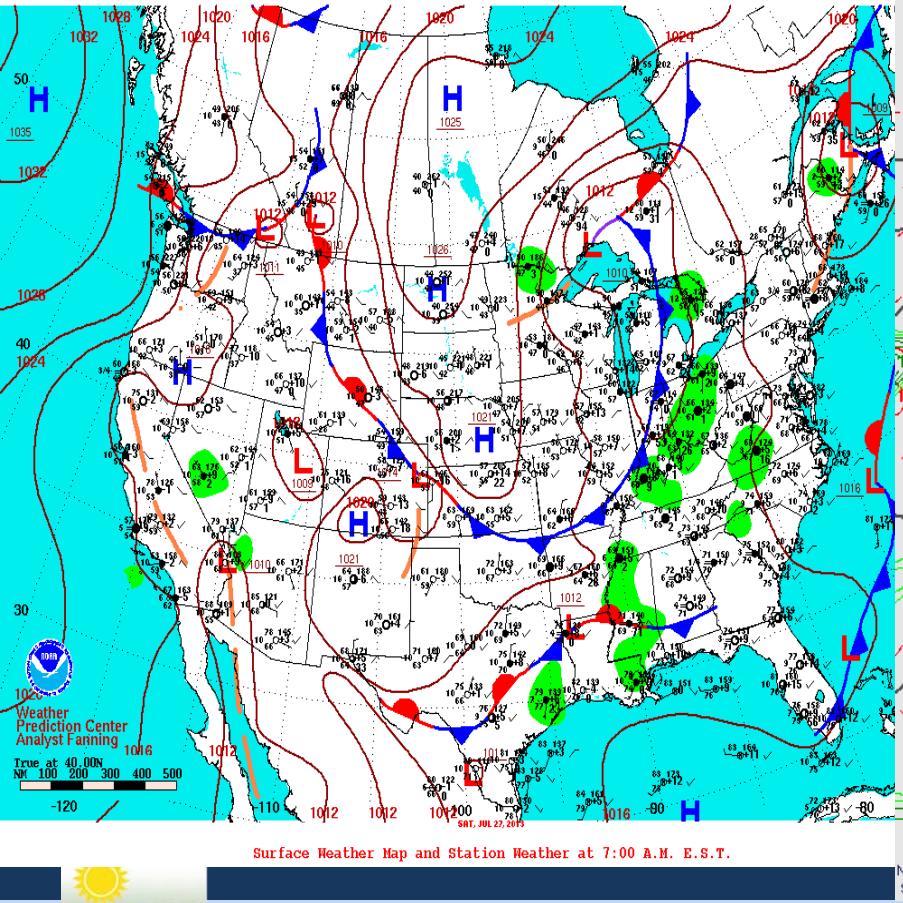
July 17-21 Multi-Day Event Conclusions

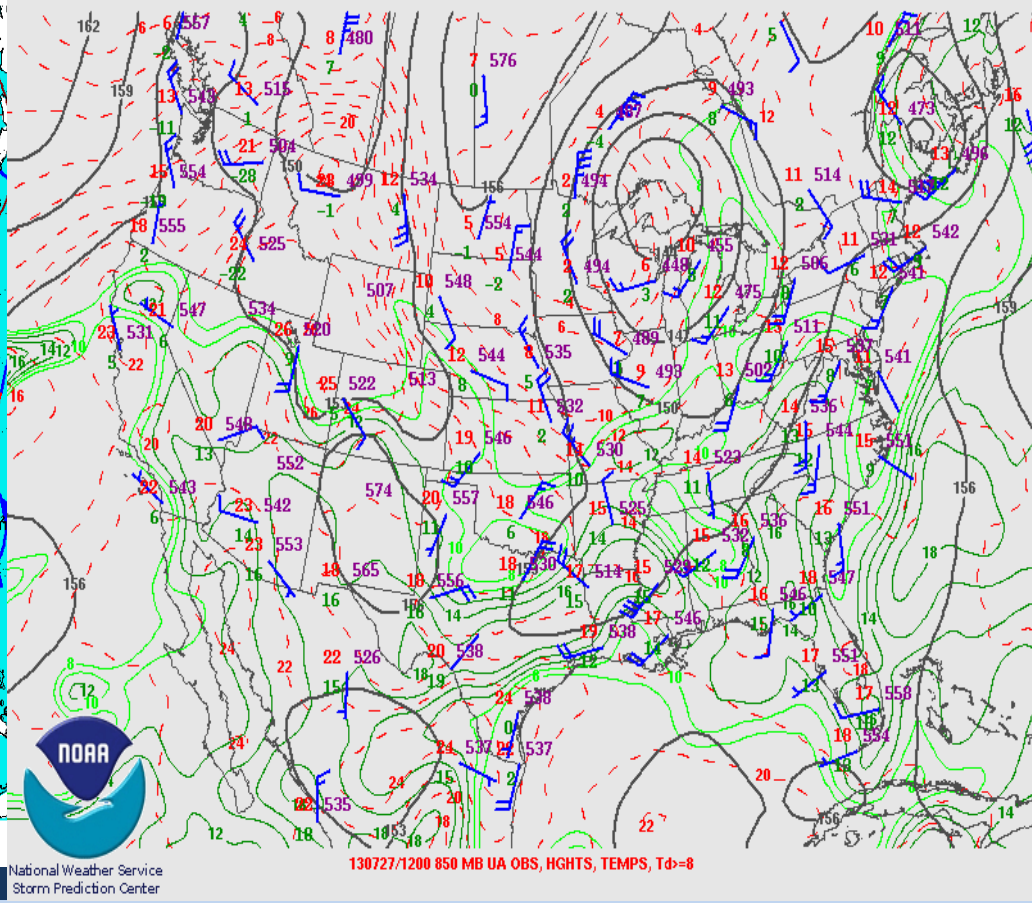
This episode is very similar to the big episode in June.

1. Jet stream 300mb map below retreats to the U.S.-Canadian Border,
2. The 850mb map, 20C+ air, shows the hot air streaming in below the jet axis
3. The surface analysis map shows the front to the N and a surface trough to converge air and build Ozone, w/o setting off thunderstorms
4. The surface pressure panel show the Bermuda High building westward across the SE, inducing the surface SW flow over CT

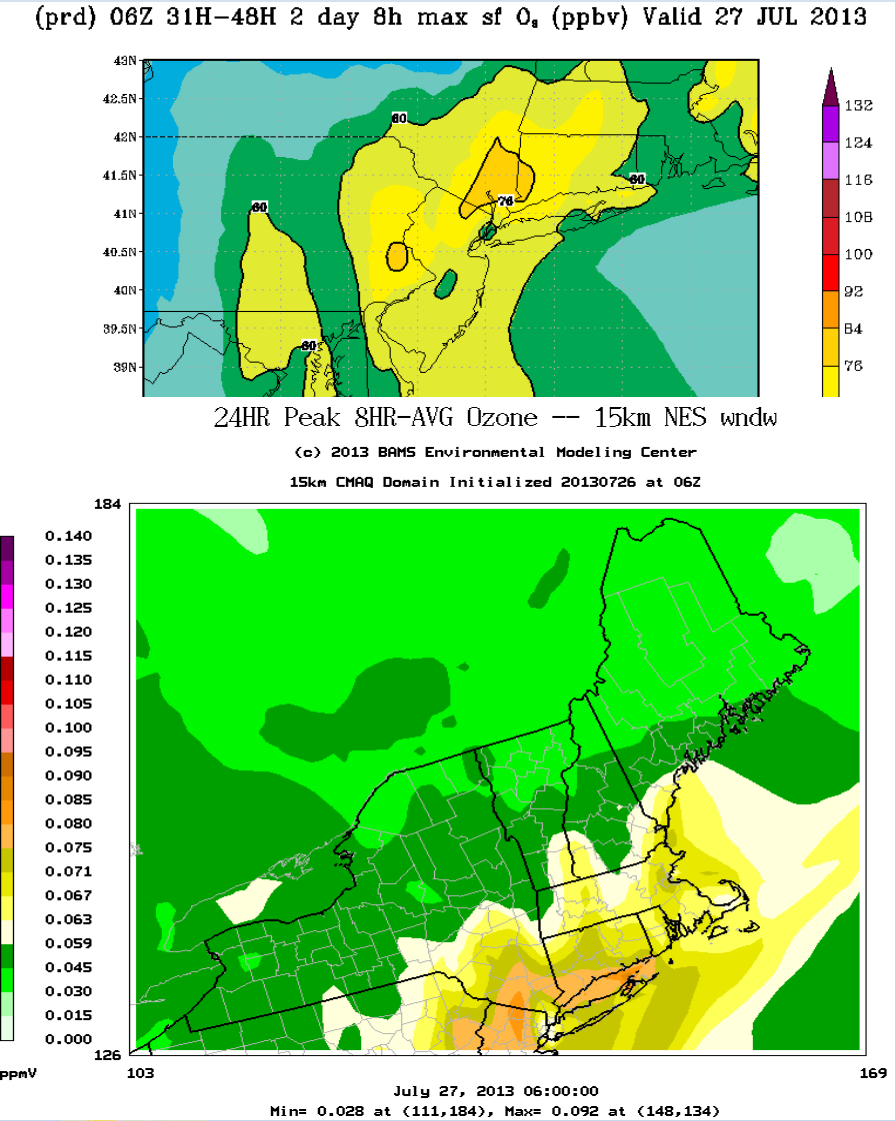
July 27th Met Analysis

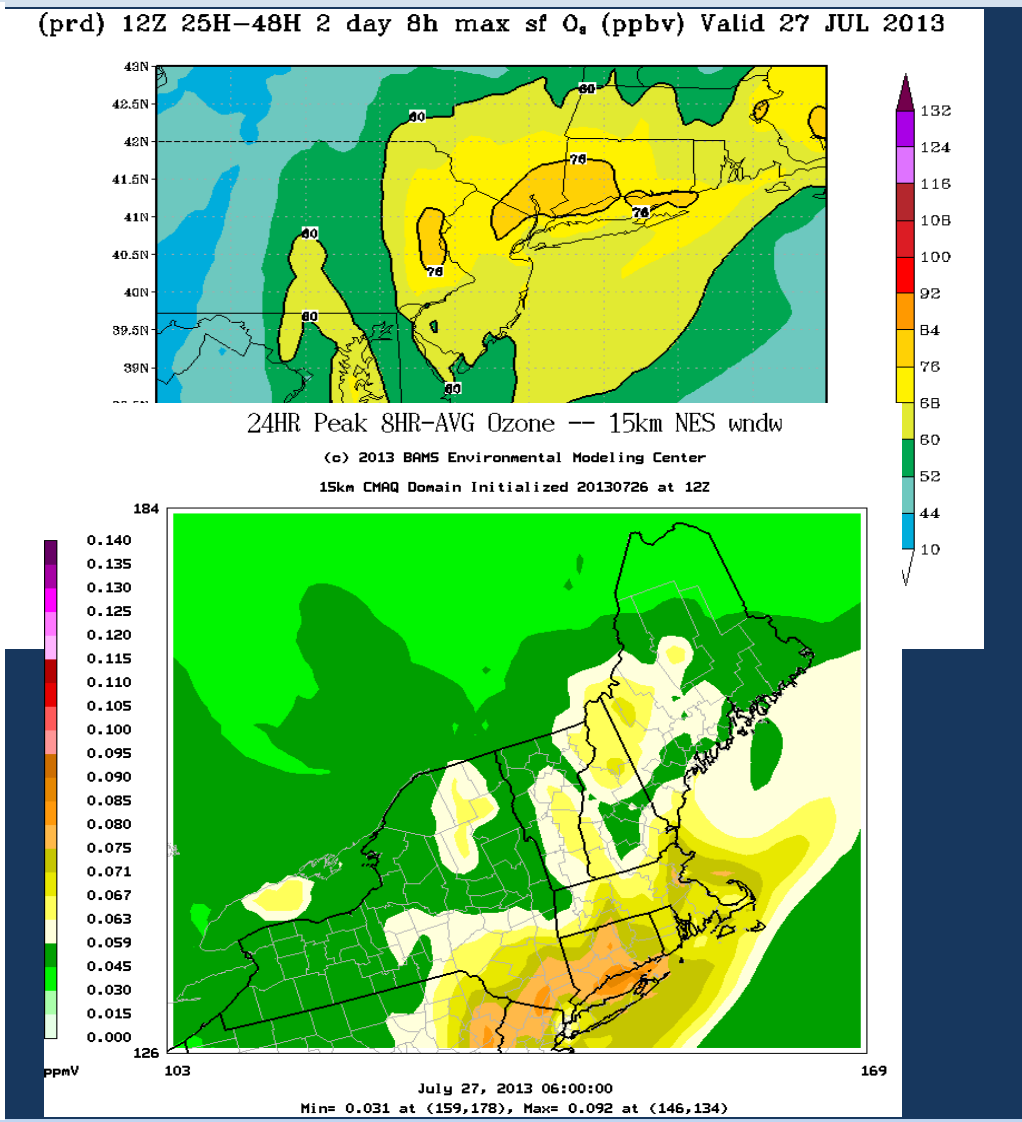
Met conditions did NOT support high levels of ozone (Mid-level wind SSW, southerly surface wind & temps in the 80's). BARONS and NOAA models trended higher for ground level ozone formation (12Z-071613 & 6Z-071713 model runs), as shown in the next slide. Danbury showed an 8-Hour Ozone Concentration reached 74 ppb by the afternoon, only by 2ppb below 76ppb!





July 27th Models' Over-prediction Event





August Observed Ozone Concentrations

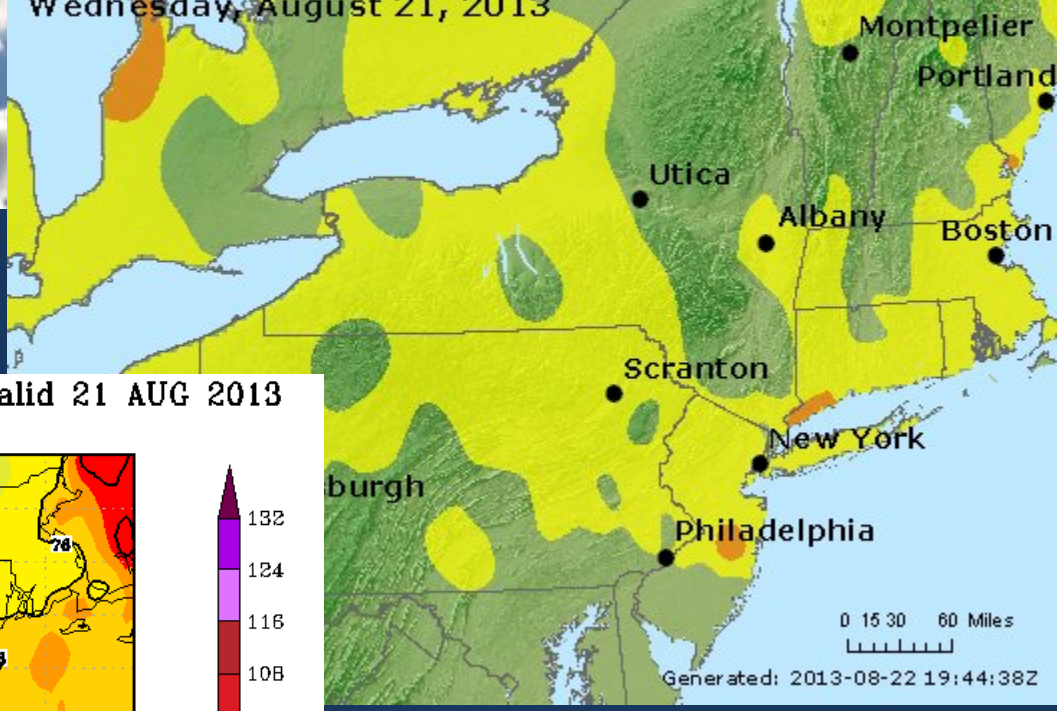
Connecticut Department of Energy & Environmental Protection
8-Hour Ozone Daily Maximums*
August 2013

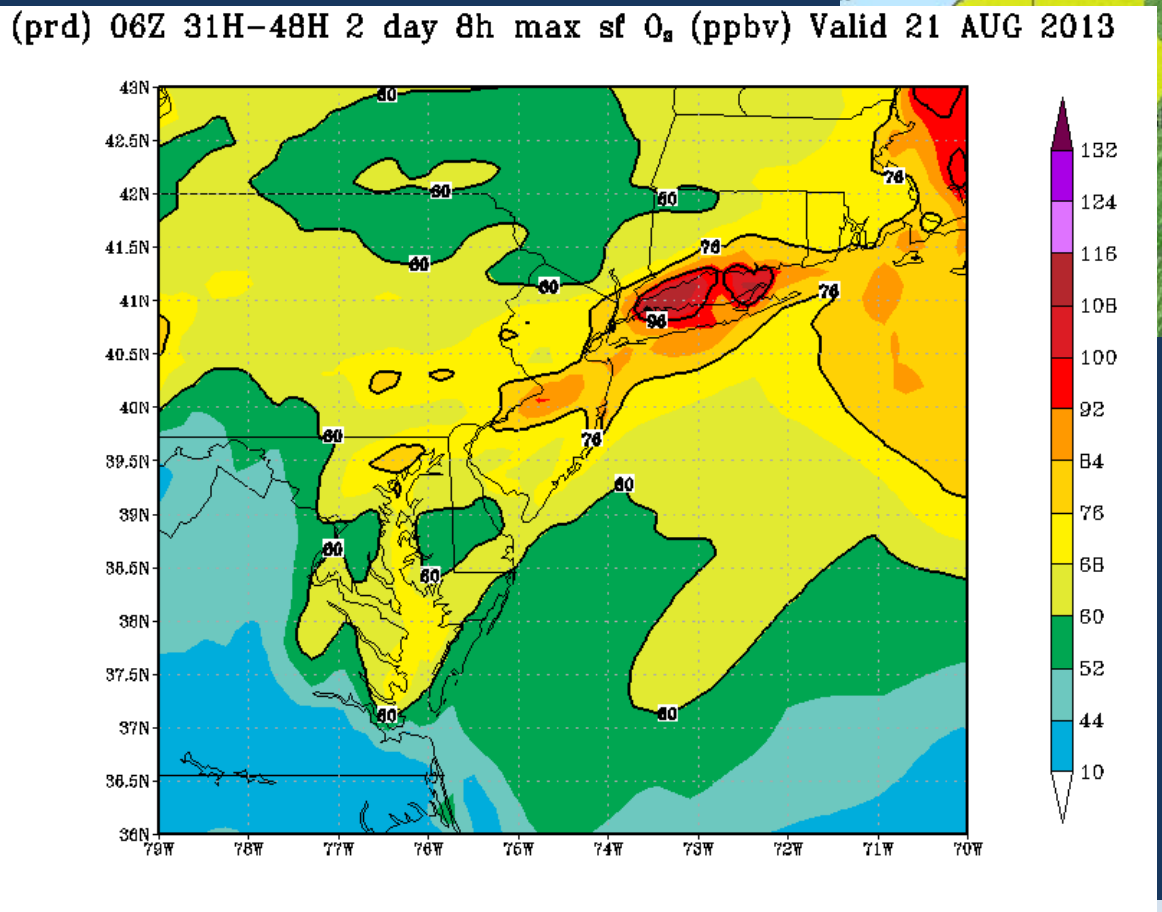
Site	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Cornwall	49	M	42	35	37	52	50	54	37	36	33	44	41	29	36	45	50	51	45	61	68	64	38	41	51	48	44	51	40	44	51
Danbury	49	44	42	32	33	58	53	46	37	39	34	46	46	29	M	42	49	48	48	63	64	37	34	38	44	39	41	51	42	47	57
East Hartford	48	43	42	31	38	48	53	46	25	37	29	51	42	29	32	41	45	44	42	56	57	40	35	39	45	32	49	44	39	45	46
Greenwich	55	59	47	37	37	60	51	41	47	45	43	47	52	33	39	55	54	53	59	63	82	32	34	46	61	53	46	47	49	60	53
Groton	50	63	52	33	44	51	56	38	31	50	39	41	38	32	42	43	54	47	57	70	70	40	38	39	51	50	47	48	38	52	40
Madison	60	66	55	37	42	57	54	42	41	54	51	46	46	27	47	50	55	53	69	67	67	47	37	45	51	54	46	55	41	57	44
Middletown	54	48	45	31	40	49	53	43	39	41	42	48	43	29	34	44	47	40	45	59	66	40	36	39	49	39	51	45	36	57	50
New Haven	52	48	42	33	38	52	57	28	39	44	56	48	48	33	37	49	56	54	52	63	74	38	34	37	38	39	48	55	44	62	54
Stafford	49	43	44	30	35	45	54	49	34	39	30	52	42	29	30	43	42	43	43	53	60	51	30	34	44	40	36	41	39	46	41
Stratford	61	69	51	35	38	59	58	43	49	47	54	56	55	30	42	54	56	55	65	72	75	44	31	45	58	54	43	56	51	63	54
Westport	56	61	49	35	38	60	53	42	52	M	M	48	50	33	39	55	52	52	58	64	82	40	31	46	63	44	45	48	46	67	56
# days > Federal Standard																					17										

Good (0-59 ppb)
Moderate (60-75 ppb)
Unhealthy for Sensitive Groups (76-95 ppb)
Unhealthy (96-115 ppb)
Very Unhealthy (116 > ppb)

Units - parts per billion (ppb)
Federal Standard = 75 ppb
M = missing data
* Data is preliminary and has not been quality assured

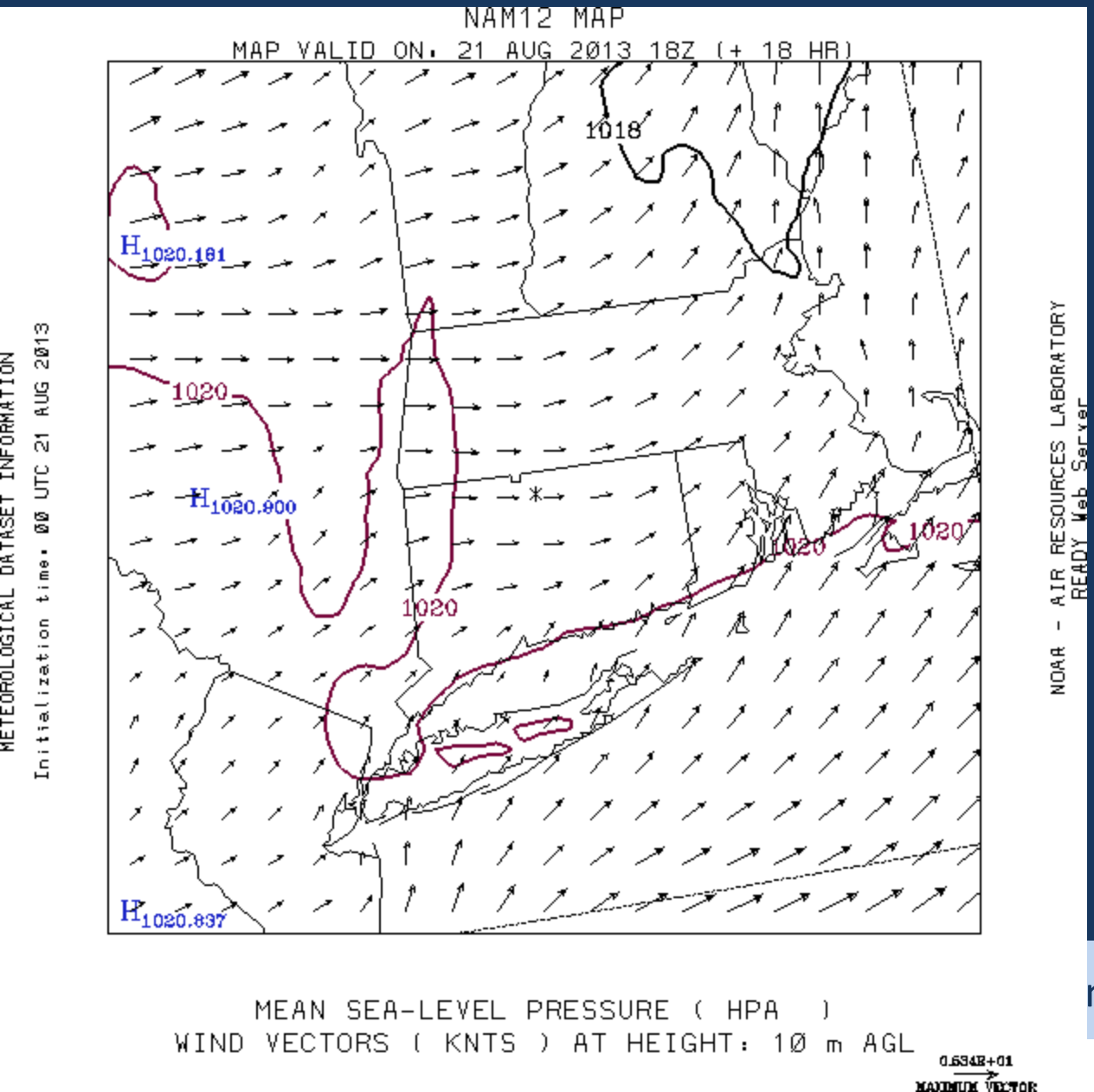
August 21, 2013





- NOAA Model (over) predicted significant event for NJ-NY-CT
- Even same day 12z similar!

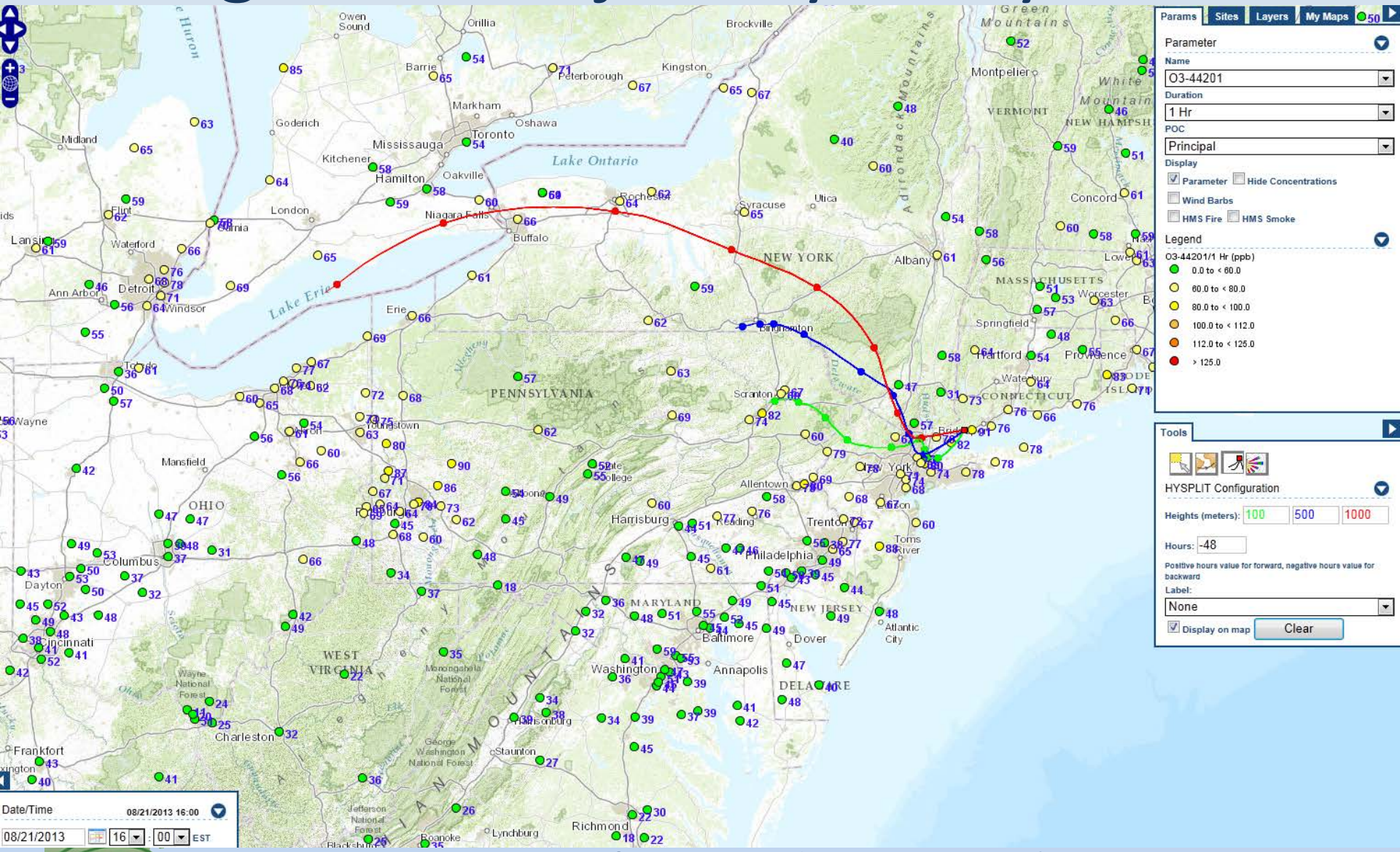
Surface Wind Field August 21, 2013



NAM wind flow prediction helps explain high ozone concentration along the CT coast and Long Island Sound

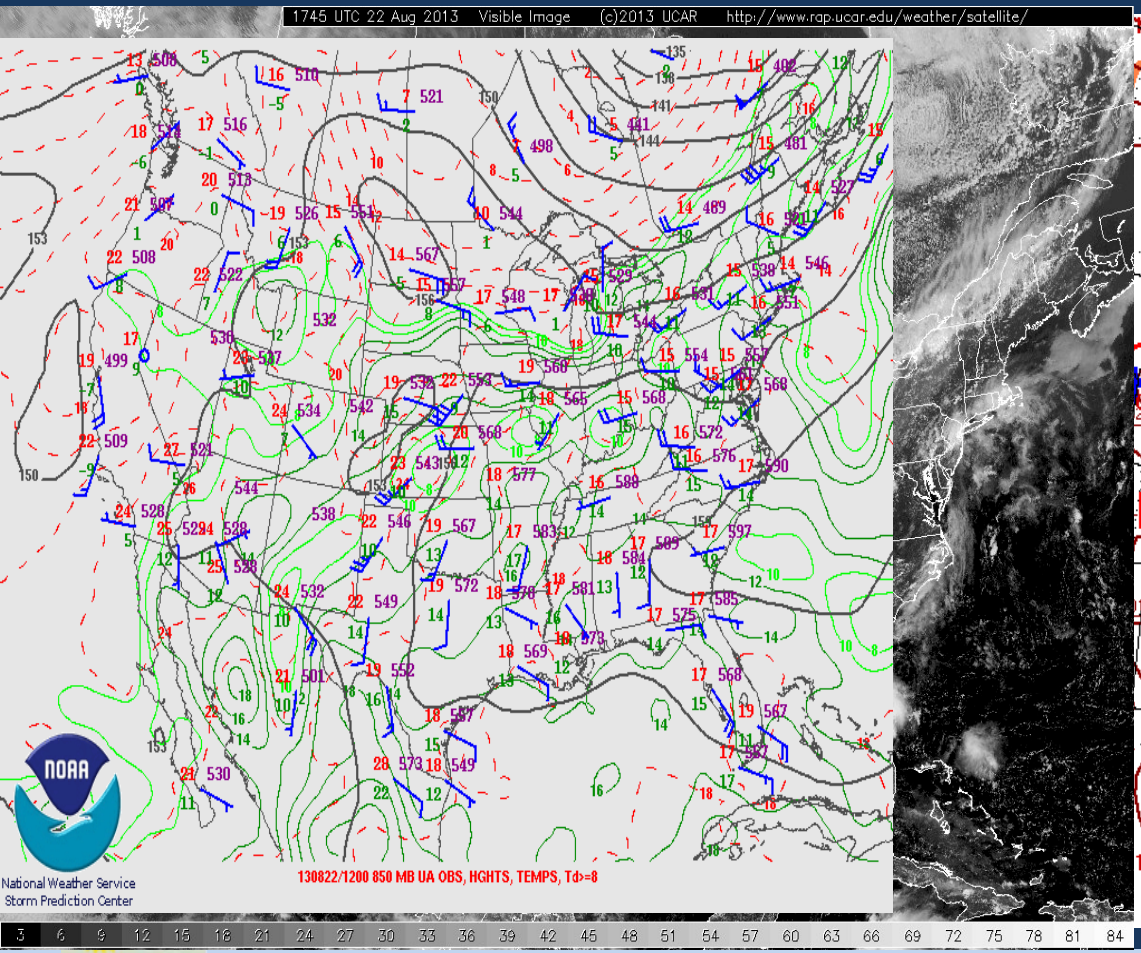
nmental Protection

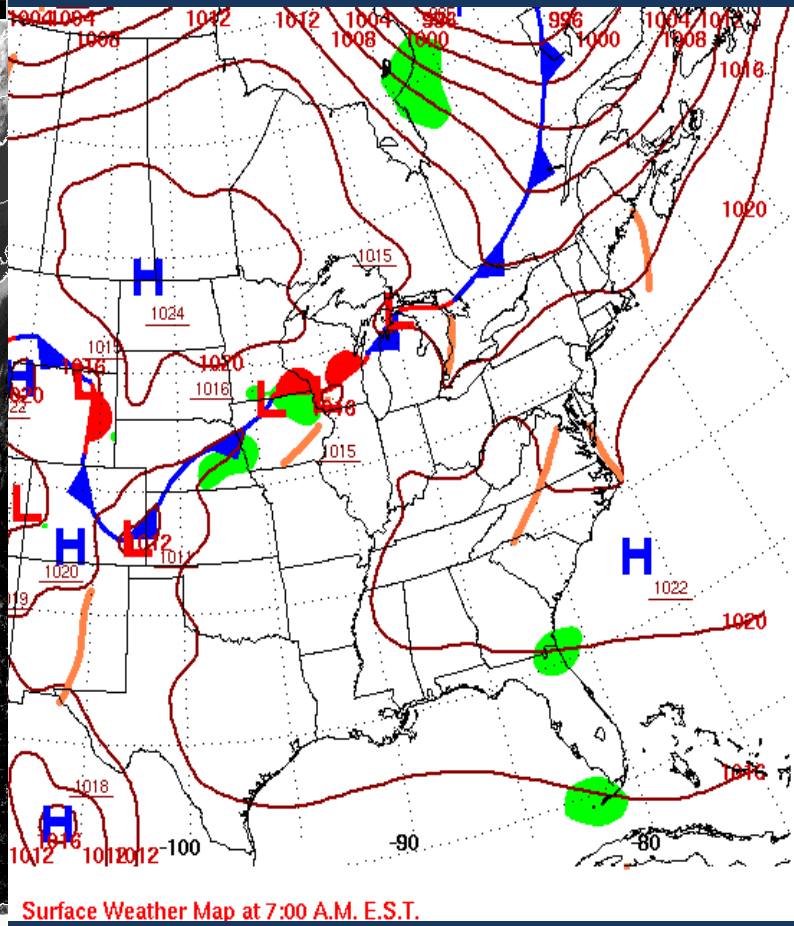
August 21 Trajectory Analysis



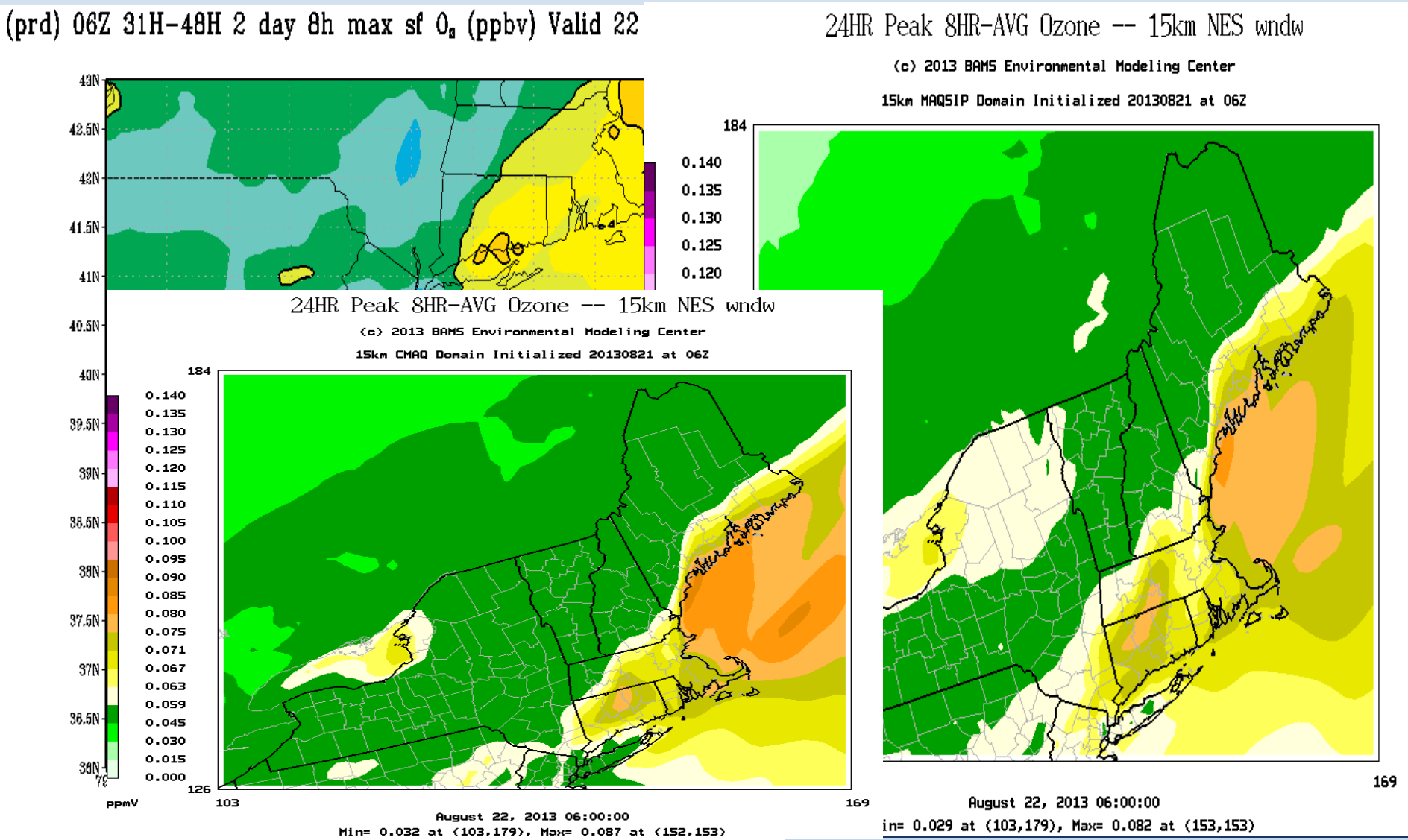
August 22nd The Cloudy Non-Event

Again, met conditions did NOT support high levels of ozone (wind direction and potential temperature conducive for Ozone Formation, BUT Pre-frontal trough caused clouds and showers). Thus, both the BARONS and NOAA models over-predicted by 15-20 ppb, misled forecaster to predict USG!





August 22 Cloudy Non-Event



September Observed 8-Hour Ozone Concentrations

Connecticut Department of Energy & Environmental Protection
8-Hour Ozone Daily Maximums*
September 2013

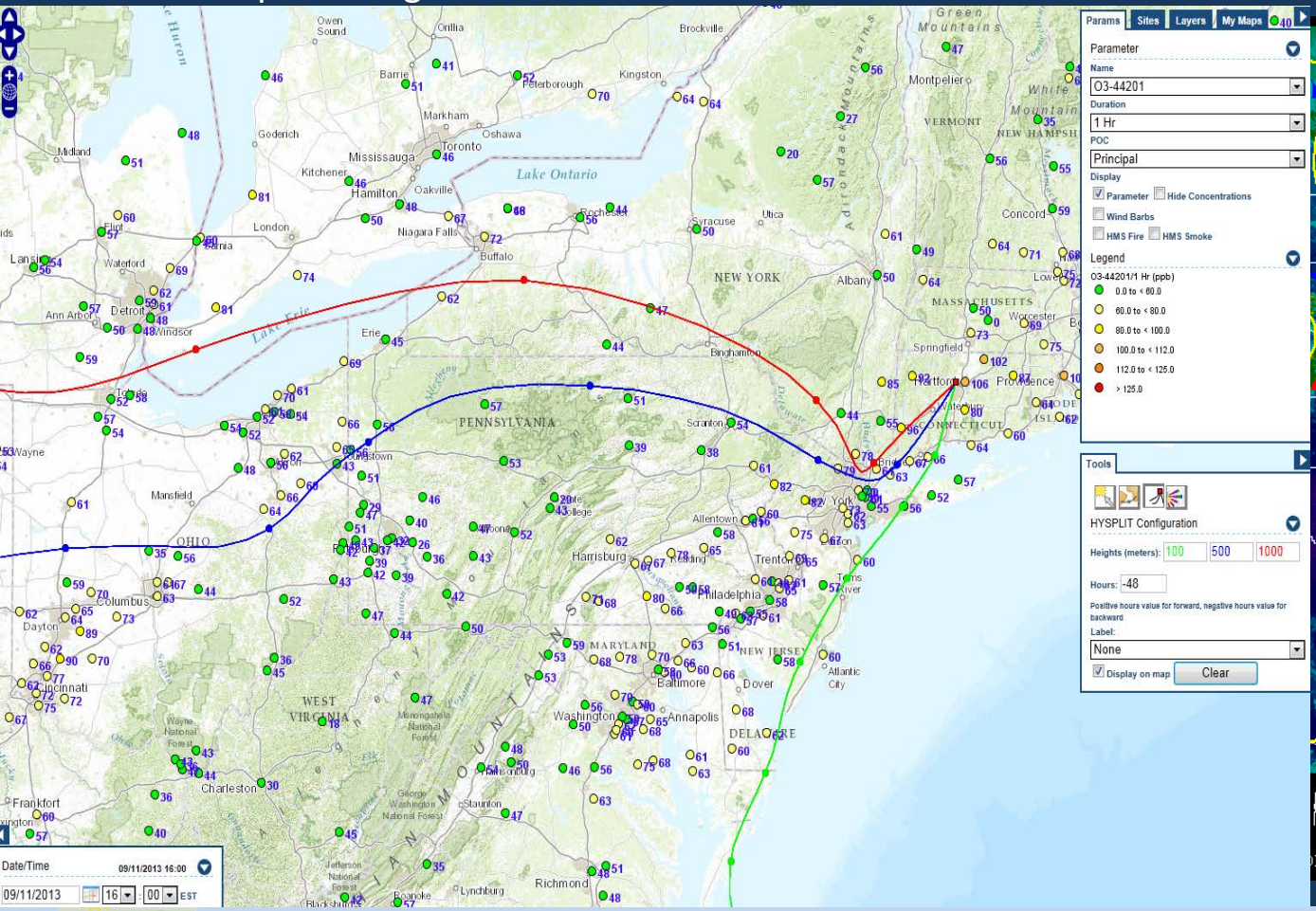
Site	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Cornwall	40	52	50	42	35	39	51	44	37	54	81	51	35	M	M	M	34	44	60	61	39	39	24	33	32	30	28	36	44	45
Danbury	46	45	30	39	32	37	48	40	35	46	88	55	26	18	33	28	30	40	56	67	34	29	23	30	30	27	21	33	40	37
East Hartford	39	38	28	36	34	34	50	34	37	38	86	57	30	18	32	32	31	39	55	66	36	33	25	32	31	31	21	31	36	38
Greenwich	45	43	39	48	39	45	59	47	39	48	66	53	30	24	42	37	35	40	58	63	41	40	30	34	34	34	26	34	42	48
Groton	31	33	36	47	35	41	59	42	36	38	67	44	41	19	37	32	35	43	58	62	39	39	27	32	35	29	27	36	37	44
Madison	36	38	38	53	36	45	63	45	39	44	66	52	40	21	44	35	35	51	63	66	42	41	26	35	39	30	28	36	39	44
Middletown	39	41	22	38	35	36	57	36	37	46	79	54	33	19	37	33	32	44	60	70	38	37	24	33	32	31	24	31	37	40
New Haven	40	41	32	43	39	42	62	43	39	45	55	52	37	22	43	38	35	47	62	67	M	39	28	34	29	32	27	33	38	49
Stafford	38	35	35	36	30	34	49	34	38	44	84	58	34	16	33	30	31	39	55	66	43	43	25	22	22	23	20	25	33	35
Stratford	42	44	35	52	37	45	65	47	40	48	67	55	36	20	46	38	35	48	69	69	46	40	27	36	36	37	27	36	44	50
Westport	44	41	36	48	37	43	63	46	40	51	79	58	33	23	41	36	37	43	64	68	45	38	28	35	33	30	25	34	M	44
# days > Federal Standard											18																			

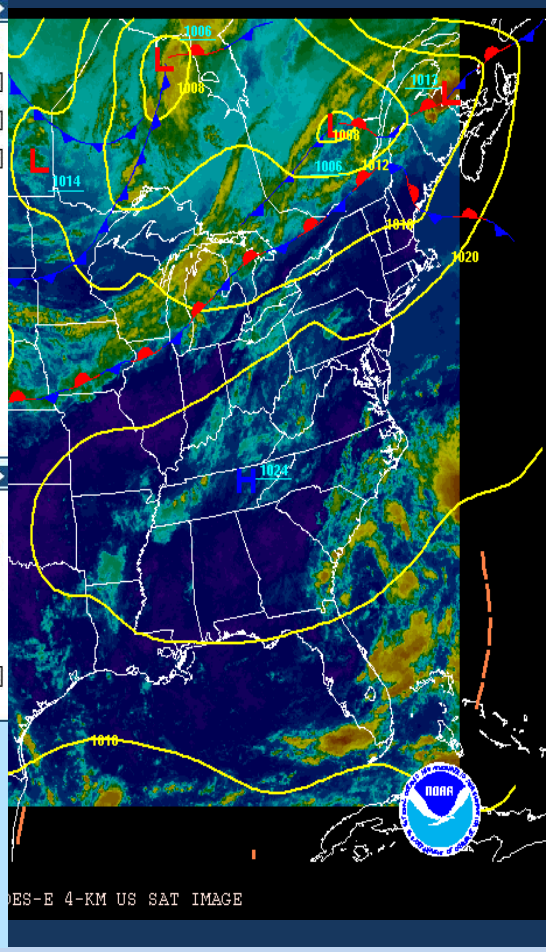
Good (0-59 ppb)
Moderate (60-75 ppb)
Unhealthy for Sensitive Groups (76-95 ppb)
Unhealthy (96-115 ppb)
Very Unhealthy (116 > ppb)

Units - parts per billion (ppb)
Federal Standard = 75 ppb
M = missing data
* Data is preliminary and has not been quality assured

September 11 The Last Event

Met conditions supported high levels of ozone (wind direction and potential temperature conducive for Ozone Formation). Thus, both the BARONS/NOAA models predicted the correct category for Ozone, as with the forecaster predicting USG!





Conclusions

- Many cases of prefrontal troughs with southwest winds along coast handled well by the NOAA model; not very well with Barons models
- We expected a few days with southerly winds to have more maritime 'clean' air, but westerly winds aloft mixed down converged across mid-Atlantic and intensified into Ct, during the afternoon hours.
- WNW winds aloft and at the surface; thus clean air was observed on a few days with temps >90°.
- Forecasting around the 75ppb NAAQS, has a been a bit more challenging in recent years: exceedances occur at lower maximum temperatures, and no exceedances when temps in the 90's, maximum 8-hour Ozone concentrations ranged from the 50's & 60's ppbs (GOOD to MODERATE AQI levels during first three (3) days of July heat wave

Conclusions

- This years' early heat waves has confirmed that transport from up-wind states such as New York, New Jersey and Pennsylvania causes high ozone levels in Connecticut on days when the wind is from the west aloft and S or SW at the surface even when the high temperatures do not reach the magical 90 degree mark!

Questions?

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