# Connecticut Department of Energy and Environmental Protection

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

# May 25-29, 2016 CT Ozone Exceedances

By Michael Geigert

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# Summary

- 8 exceedances days so far this year;
- 5 consecutives exceedance days May 25th -May 29th;
- All days exceeded last years' 75 ppb NAAQS, except May 29th
  1. May 25th : 11/12 monitors exceeded
  2. May 26th : 11/12 monitors exceeded
  3. May 27th : 2/12 monitors exceeded
  4. May 28th : 7/12 monitors exceeded
  5. May 29th : 1/12 monitors exceeded

# Ozone AQI Table for 2016

| AQI Category | Index Values | Breakpoints in the 2008 AQI (ppb, 8-hour average) | Updated Breakpoints (ppb, 8-hour average) |
|---|---|---|---|
| **Good** | 0 - 50 | 0-59 | 0-54 |
| **Moderate** | 51 - 100 | 60-75 | 55-70 |
| **Unhealthy for Sensitive Groups** | 101 – 150 | 76-95 | 71-85 |
| **Unhealthy** | 151 – 200 | 96-115 | 86-105 |
| **Very Unhealthy** | 201 – 300 | 116-374 | 106-200 |
| **Hazardous** | 301 –500 | 375 to the Significant Harm Level* | 201 to the Significant Harm Level* |

**The Significant Harm Level for ozone is 600 ppb, two-hour average*

# Ozone Table for May 2016

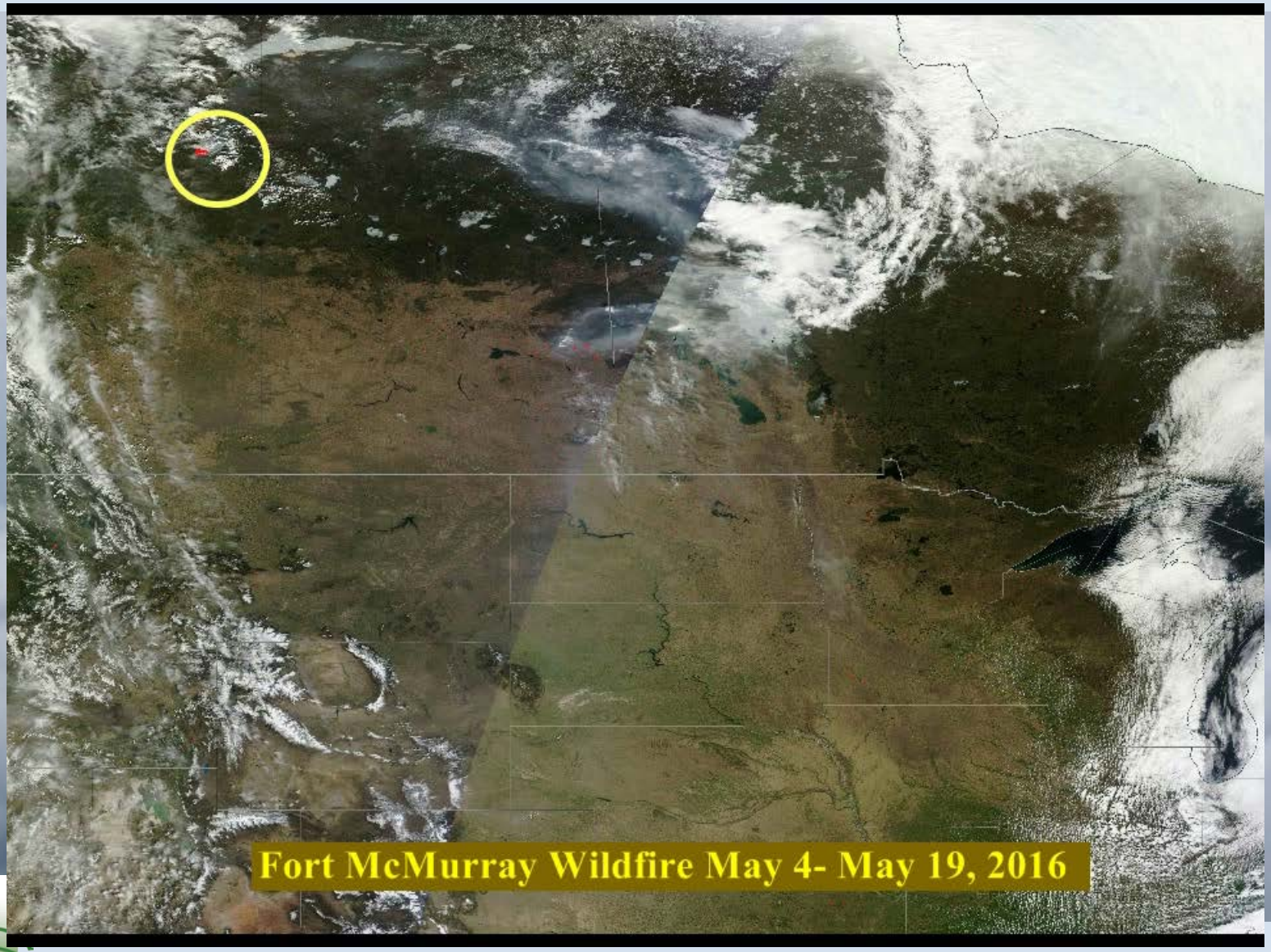
**Connecticut Department of Energy & Environmental Protection**
**8-Hour Ozone Daily Maximums***
**May 2016**

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Abington | 41 | 24 | 28 | 32 | M | M | 27 | 38 | 45 | 50 | 57 | 65 | 50 | 54 | 34 | 46 | 47 | 48 | 43 | 45 | M | 55 | 52 | 30 | 76 | 83 | 68 | 67 | 52 | 29 | 52 |
| Cornwall | 46 | 34 | 26 | 33 | 33 | 34 | 29 | 41 | 47 | 50 | 66 | 69 | 54 | 56 | 37 | M | 51 | 49 | 51 | 51 | 54 | 54 | 55 | 47 | 81 | 91 | 78 | 65 | 69 | 41 | 55 |
| Danbury | 41 | 22 | 19 | 29 | 31 | 27 | 23 | 40 | M | 50 | 53 | 69 | 48 | 57 | 38 | 46 | 49 | 51 | 50 | 48 | 49 | 57 | 56 | 38 | 82 | 99 | 81 | 81 | 73 | 46 | 57 |
| East Hartford | 43 | 18 | 25 | 33 | 30 | 35 | 23 | 39 | 47 | 50 | 57 | 66 | 46 | 55 | 34 | 46 | 48 | 49 | 42 | 49 | 49 | 54 | 52 | 27 | 75 | 93 | 70 | 81 | 66 | 36 | 49 |
| Greenwich | 48 | 31 | 34 | 38 | 34 | 36 | 28 | 46 | 61 | 40 | 54 | 70 | 49 | 59 | 38 | 51 | 43 | 47 | 51 | 58 | 49 | 55 | 67 | 48 | 89 | 91 | 63 | 82 | 59 | 49 | 67 |
| Groton | 41 | 33 | 29 | 35 | 30 | 33 | 41 | 41 | 54 | 49 | 54 | 64 | 44 | 54 | 36 | 49 | 50 | 45 | 44 | 54 | 48 | 55 | 58 | 28 | 87 | 80 | 54 | 60 | 51 | 24 | 48 |
| Madison | 41 | 32 | 32 | 34 | 28 | 32 | 34 | 38 | 52 | 43 | 49 | 62 | 46 | 53 | 38 | 49 | M | 45 | 46 | 55 | 47 | 49 | M | 30 | 89 | 86 | 56 | 63 | 48 | 22 | 50 |
| Middletown | 46 | 21 | 29 | 35 | 30 | 35 | 30 | 42 | 52 | 53 | 60 | 71 | M | 56 | 36 | 38 | 44 | 48 | 48 | 54 | 50 | 56 | 54 | 27 | 80 | 91 | 67 | 79 | 61 | 32 | 58 |
| New Haven | 42 | 21 | 27 | 30 | 26 | 31 | 23 | 38 | 49 | 35 | 43 | 70 | 47 | 49 | 37 | 45 | 38 | 41 | 46 | 48 | 49 | 57 | 48 | 29 | 63 | 84 | 65 | 73 | 54 | 29 | 51 |
| Stafford | 42 | 25 | 27 | 32 | 29 | 34 | 29 | 38 | 44 | 50 | 56 | 66 | 51 | 57 | 34 | 47 | 47 | 47 | 47 | 46 | 53 | 55 | 52 | 30 | 74 | 82 | 70 | 73 | 56 | 38 | M |
| Stratford | 46 | 30 | 35 | 37 | 30 | 35 | 28 | 41 | 53 | 42 | 47 | 62 | 48 | 55 | 37 | 47 | 43 | 46 | 50 | 54 | 49 | 54 | 58 | 42 | 89 | 76 | 59 | 70 | 47 | 32 | 58 |
| Westport | 40 | 28 | 26 | 32 | 30 | 32 | 24 | 41 | 56 | 40 | 53 | 69 | 48 | 57 | 36 | 47 | 41 | 47 | 51 | 56 | 45 | 58 | 62 | 28 | 87 | 90 | 61 | 81 | 58 | 38 | 64 |
| # days > Federal Standard | | | | | | | | | | | | 2 | | | | | | | | | | | | | 3 | 4 | 5 | 6 | 7 | | |

Good (0-54 ppb)
Moderate (55-70 ppb)
Unhealthy for Sensitive Groups (71-85 ppb)
Unhealthy (86-105 ppb)
Very Unhealthy (>106 ppb)

Units - parts per billion (ppb)
Federal Standard = 70 ppb
M = missing data
* Data is preliminary and has not been quality assured

# May 4th-19th, 2016 Alberta Wildfires

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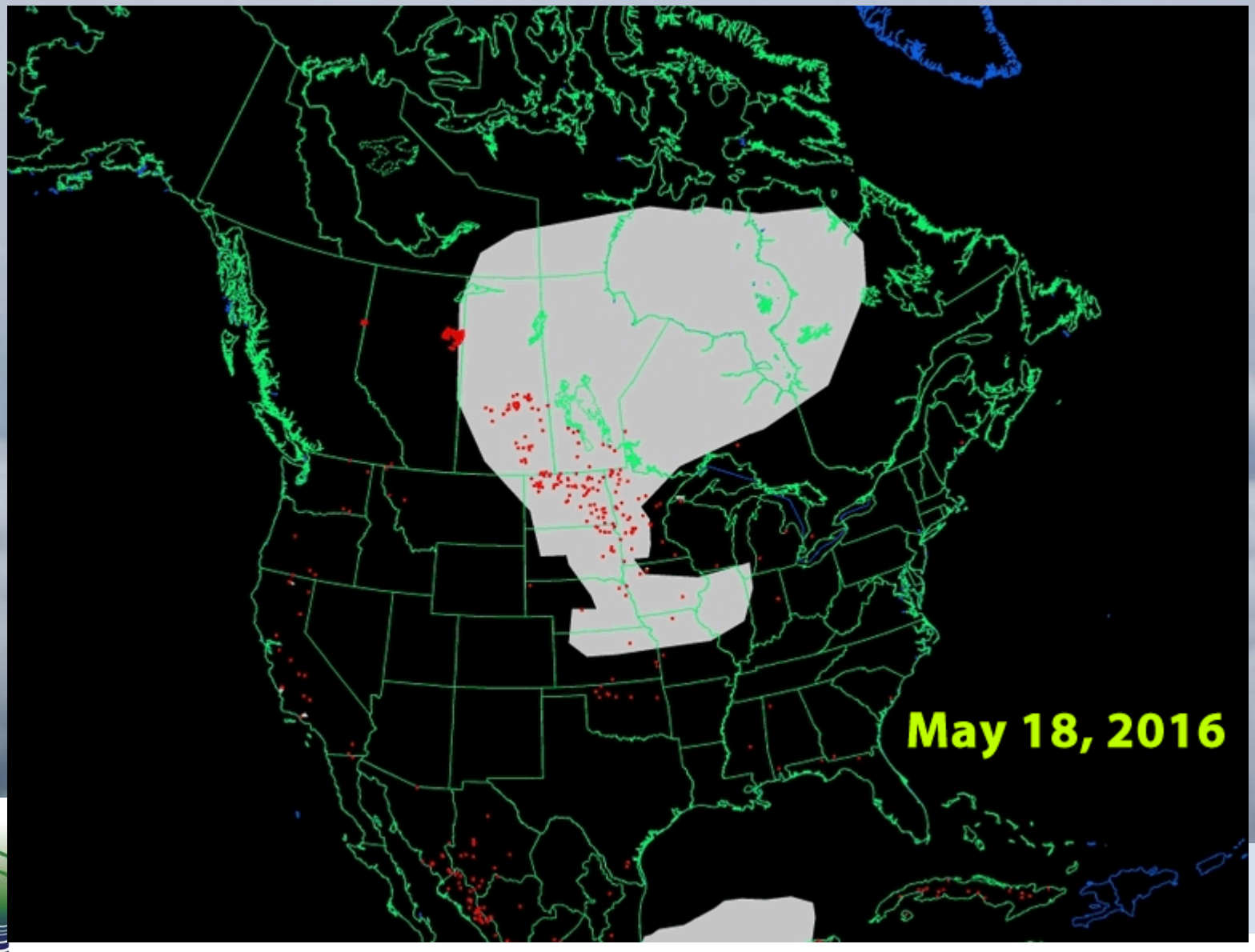
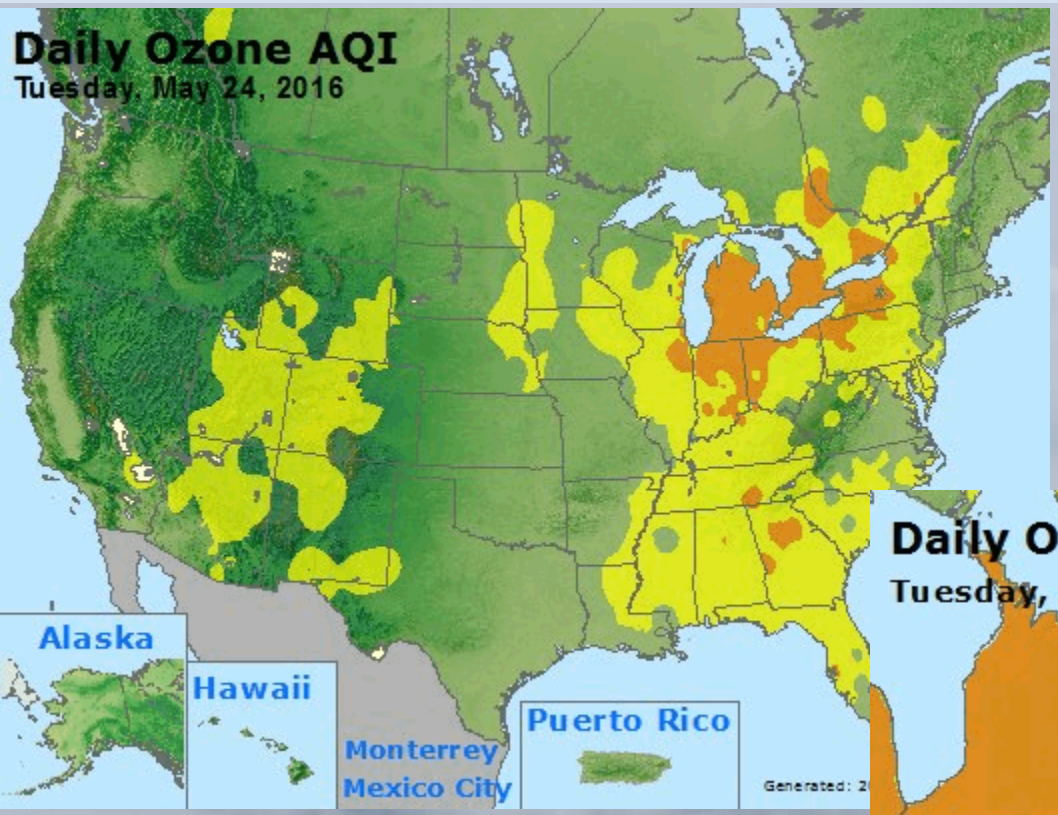
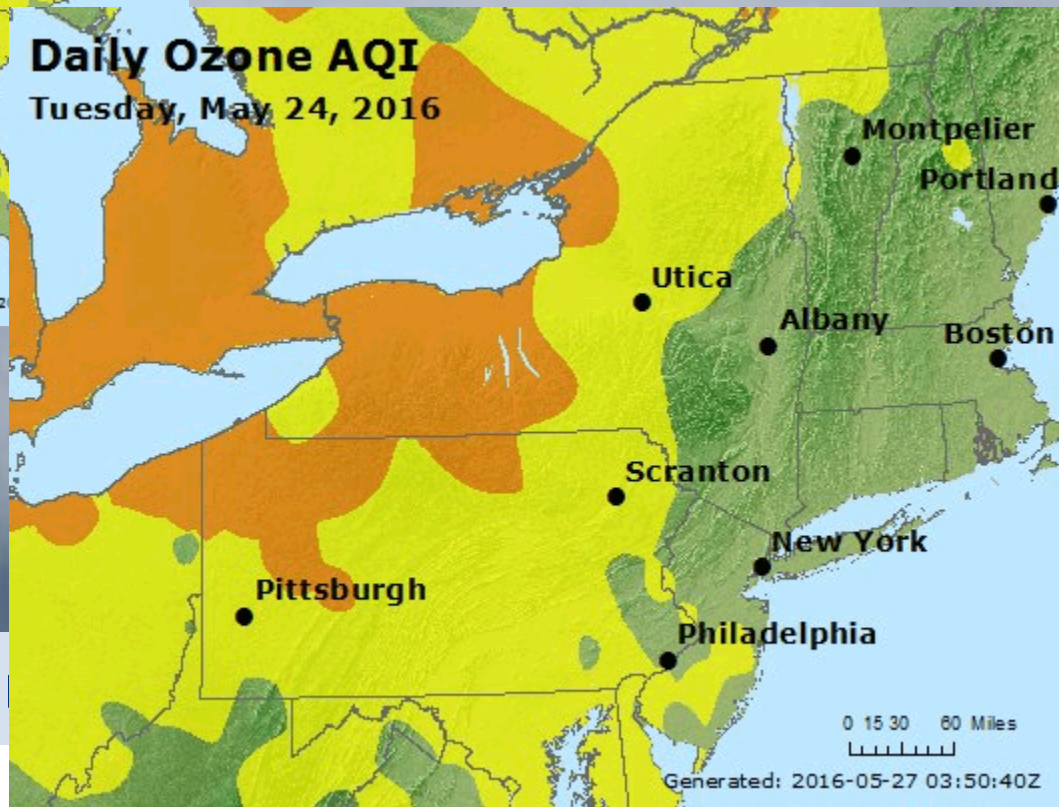
# May 18th-25th, 2016 Smoke Animation



# May 24th-29th, 2016 Ozone AQI Map Animation

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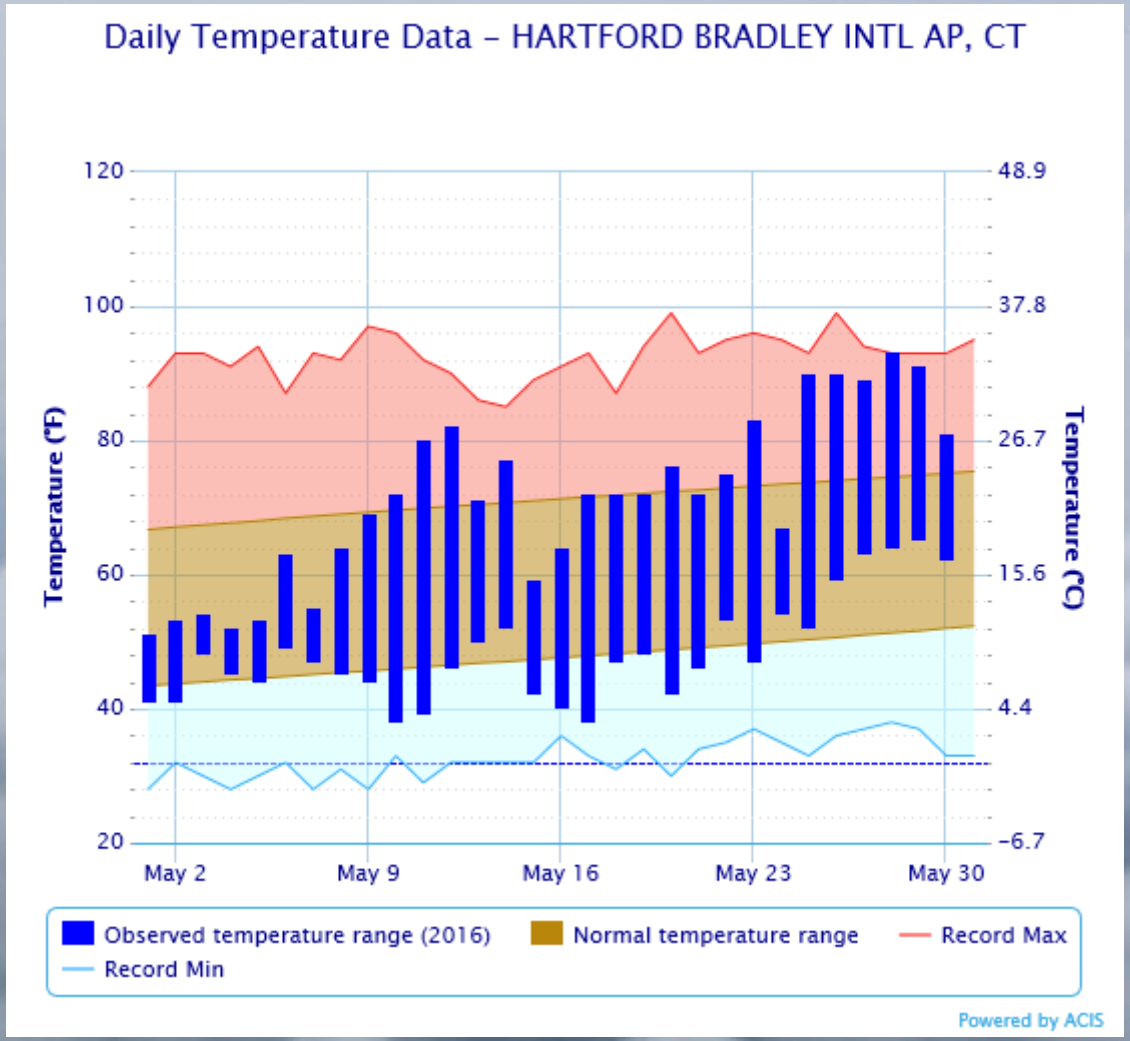
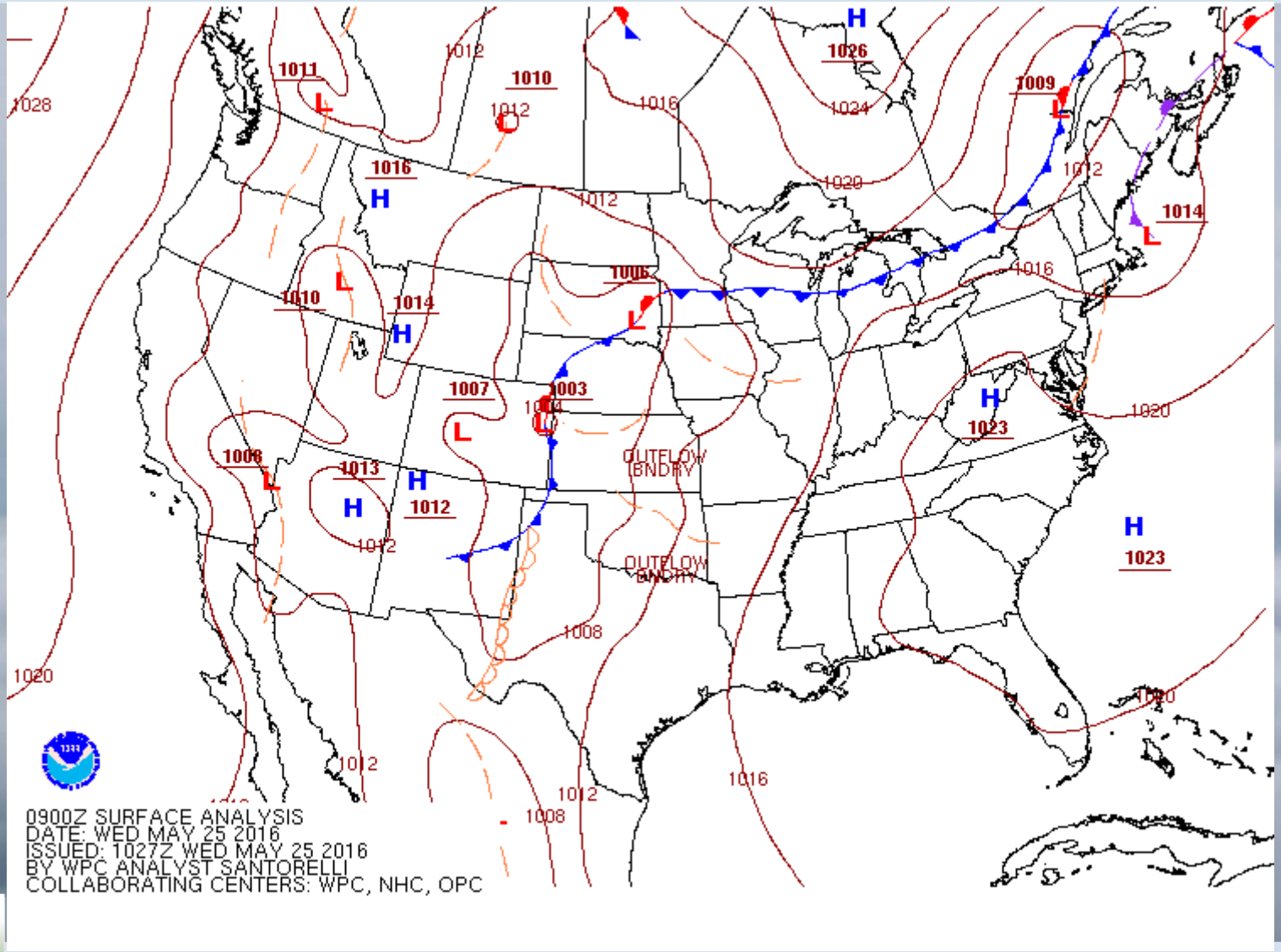
# May Temperatures for Bradley Airport CT




| Date | Maximum |
|---|---|
| 2016-05-01 | 51 |
| 2016-05-02 | 53 |
| 2016-05-03 | 54 |
| 2016-05-04 | 52 |
| 2016-05-05 | 53 |
| 2016-05-06 | 63 |
| 2016-05-07 | 55 |
| 2016-05-08 | 64 |
| 2016-05-09 | 69 |
| 2016-05-10 | 72 |
| 2016-05-11 | 80 |
| 2016-05-12 | 82 |
| 2016-05-13 | 71 |
| 2016-05-14 | 77 |
| 2016-05-15 | 59 |
| 2016-05-16 | 64 |
| 2016-05-17 | 72 |
| 2016-05-18 | 72 |
| 2016-05-19 | 72 |
| 2016-05-20 | 76 |
| 2016-05-21 | 72 |
| 2016-05-22 | 75 |
| 2016-05-23 | 83 |
| 2016-05-24 | 67 |
| 2016-05-25 | 90 |
| 2016-05-26 | 90 |
| 2016-05-27 | 89 |
| 2016-05-28 | 93 |
| 2016-05-29 | 91 |
| 2016-05-30 | 81 |
| 2016-05-31 | 86 |

# May 25, 2016 Surface Map Animation

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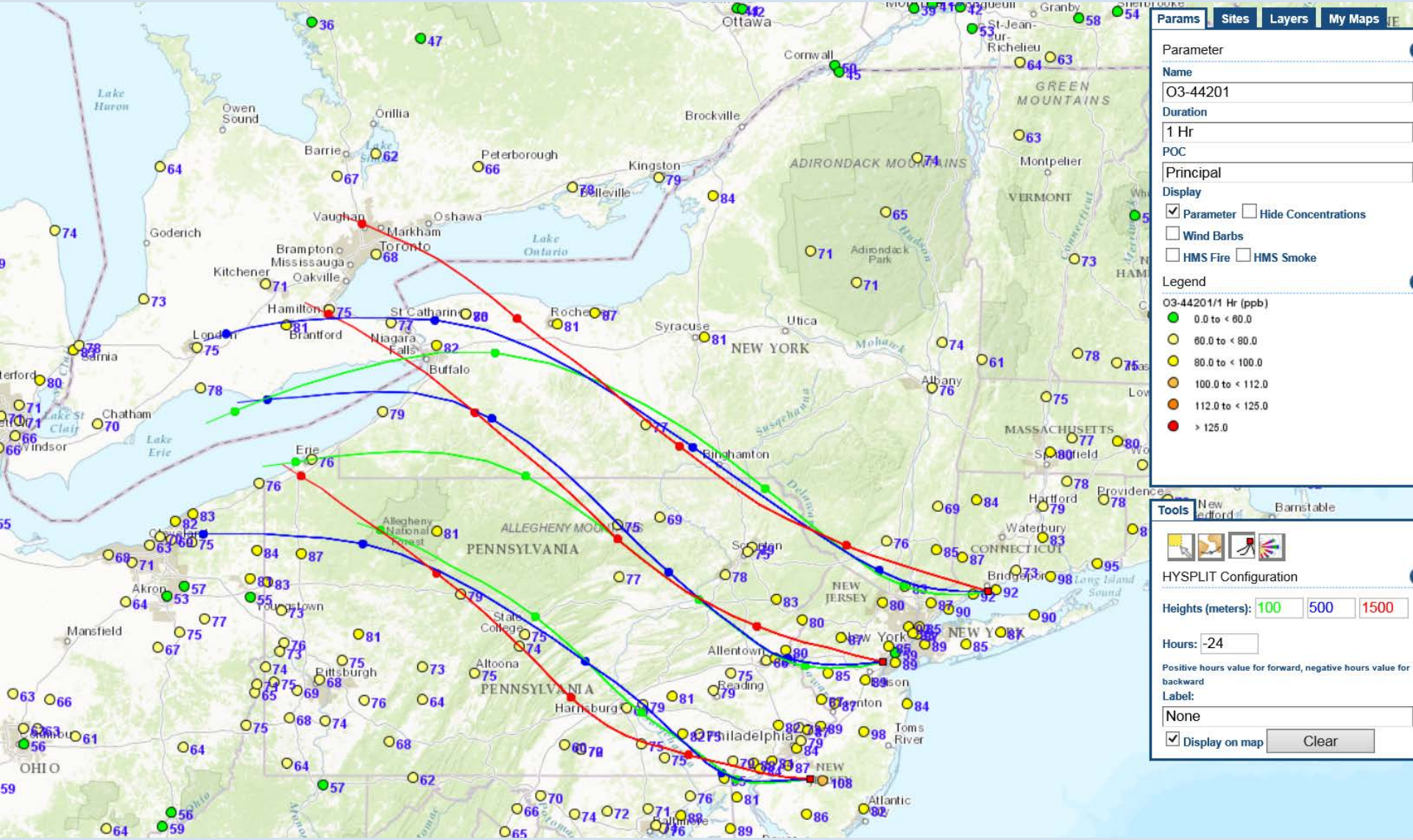
# May 25th Widespread OTR Exceedances

The largest number of exceedance sites in the OTR in many years;
Elevated Ozone was transported from Great Lakes area and augmented with ozone production along the I-95 corridor;
In OTR:

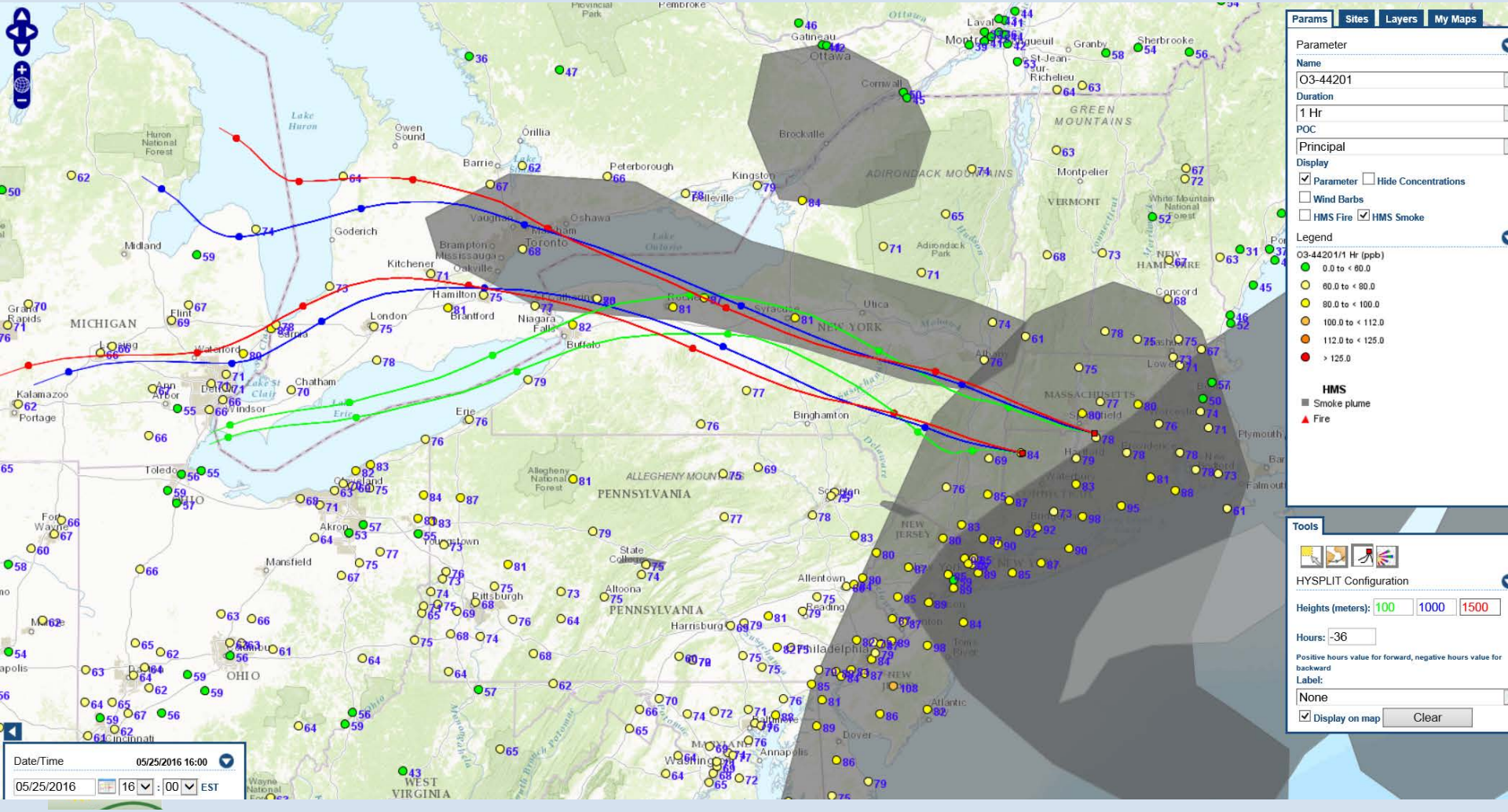
1. 121 sites above 70 ppb ozone NAAQS, 11 sites in CT
2. 83 sites above (2008) 75 ppb ozone NAAQS, 9 sites in CT
3. 14 sites above (1997) 84 ppb ozone NAAQS, 5 sites in CT

# 24-hr Back Trajectories 4:00 pm EST



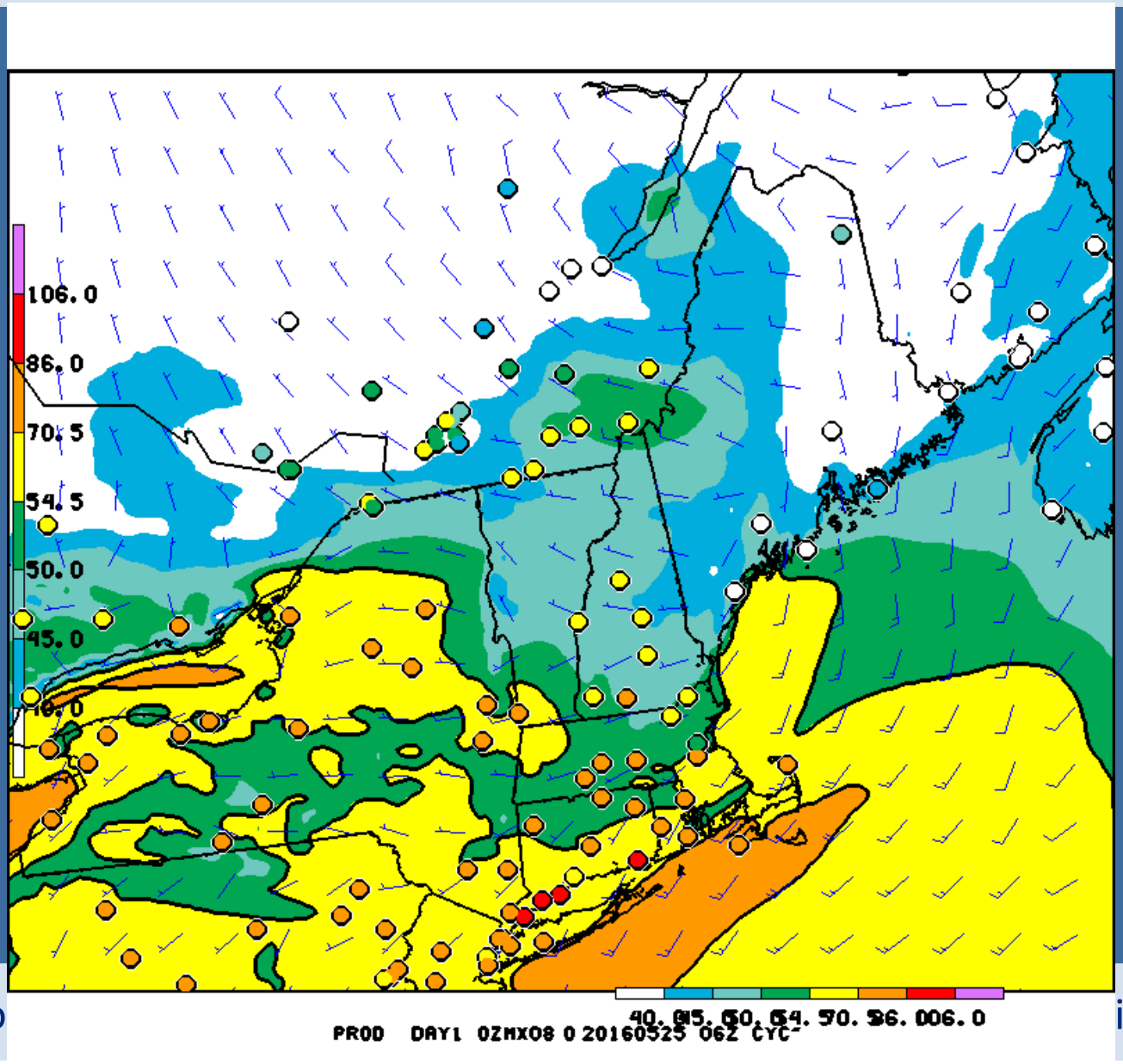

Long range transport from Michigan, with surface winds turning southwest during afternoon, mixed with I-95 corridor ozone and enhanced the ozone along the CT coast.

# 36-hr Back Trajectories 4:00 pm EST with Analyzed Smoke Plume

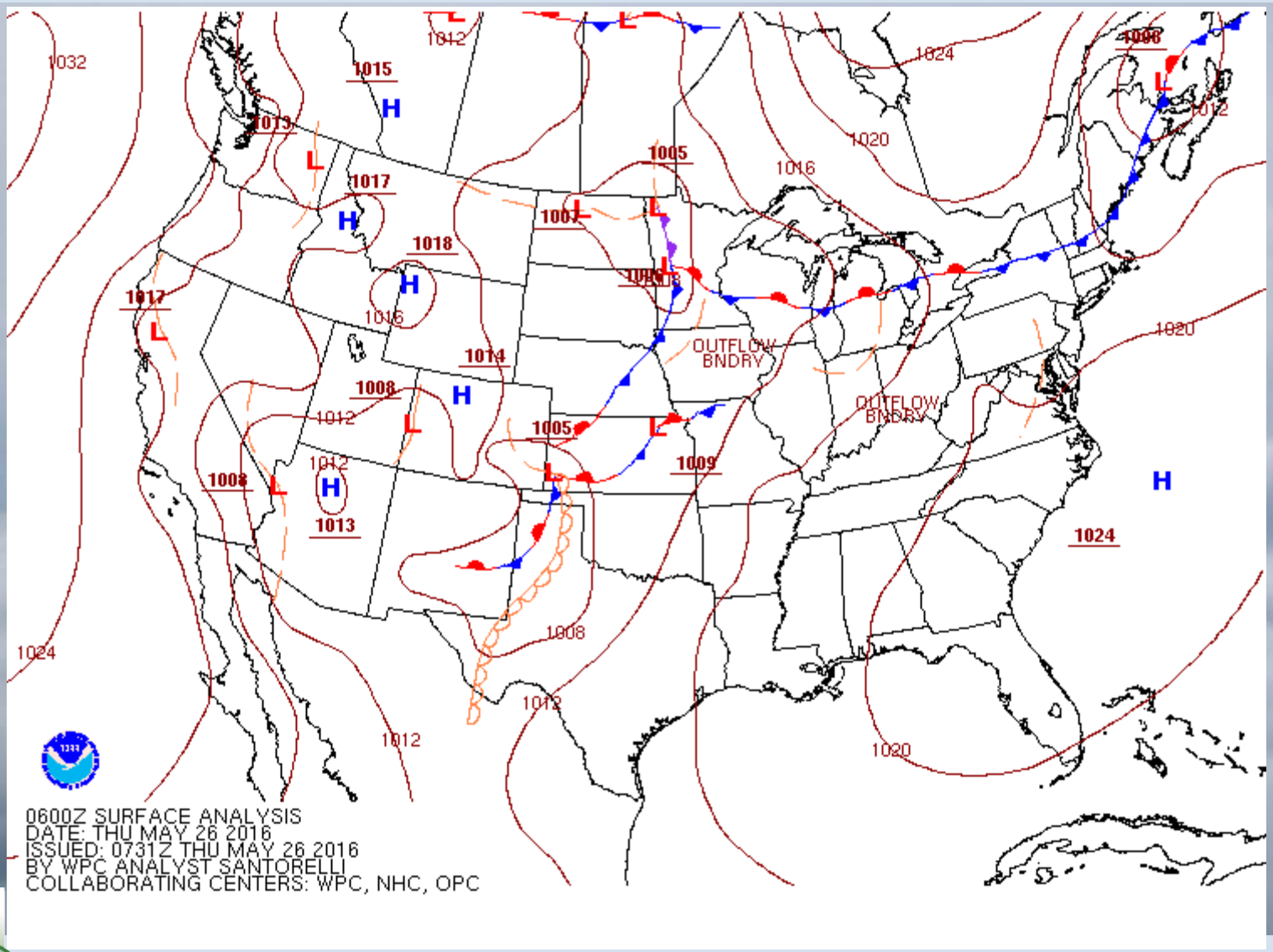



Long range transport from Michigan up to 1500 meters, appears to pass through smoke plume.

# NOAA Ozone Model May 25th, 2016



# May 26, 2016 Surface Map Animation

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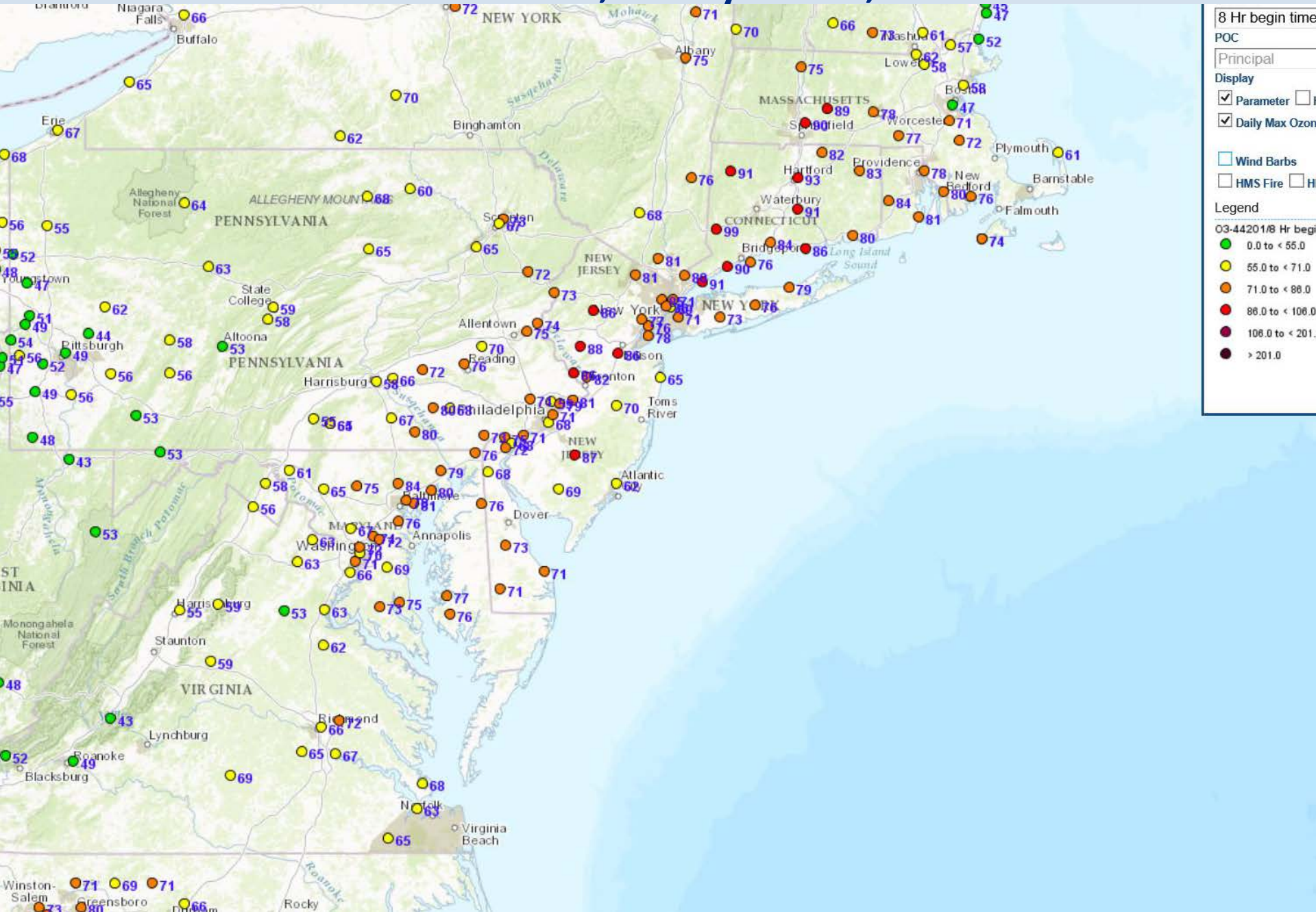
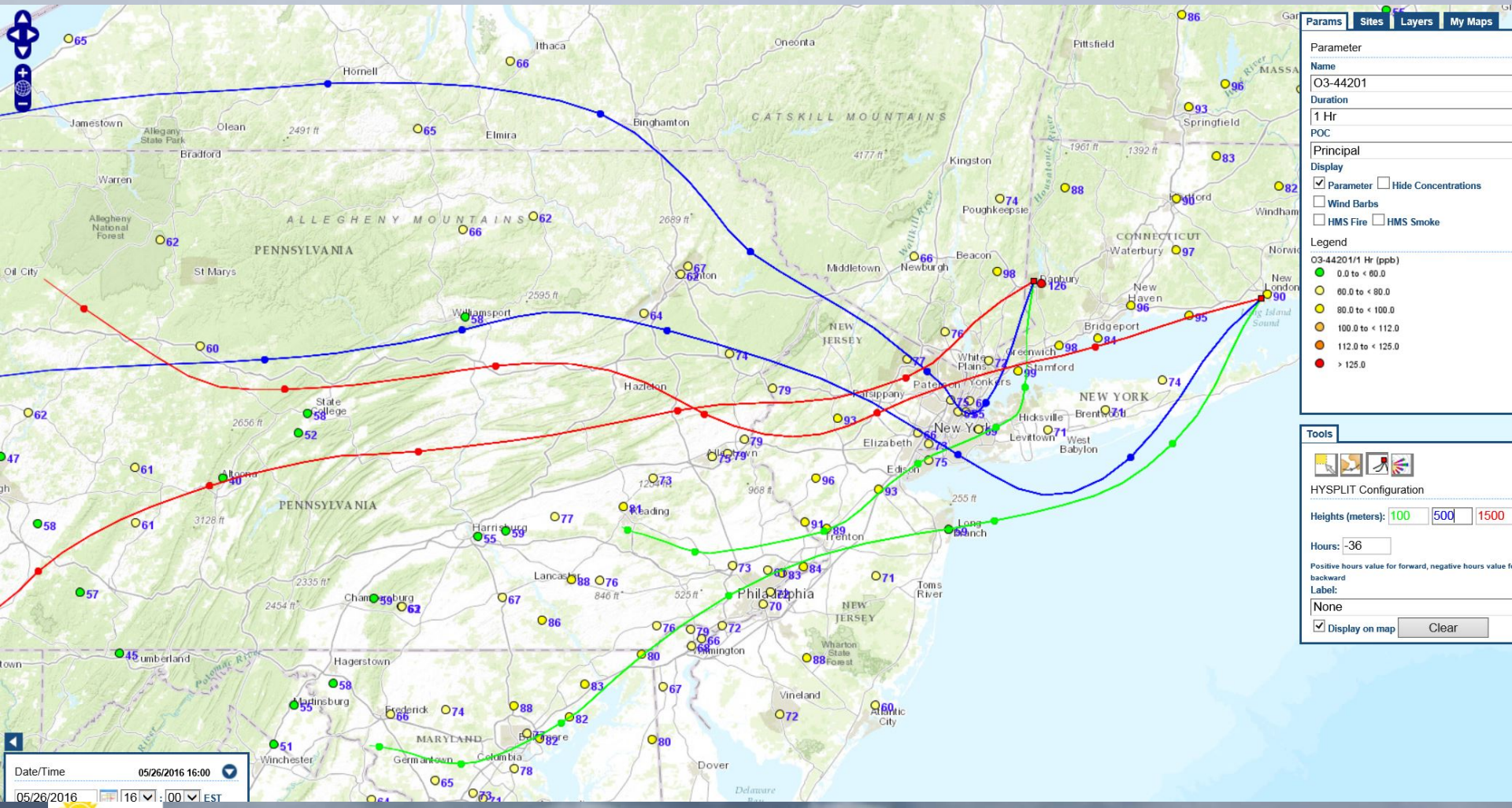
# Peak Ozone, May 26th, 2016



# 36-hour Back Trajectories, May 26th, 2016

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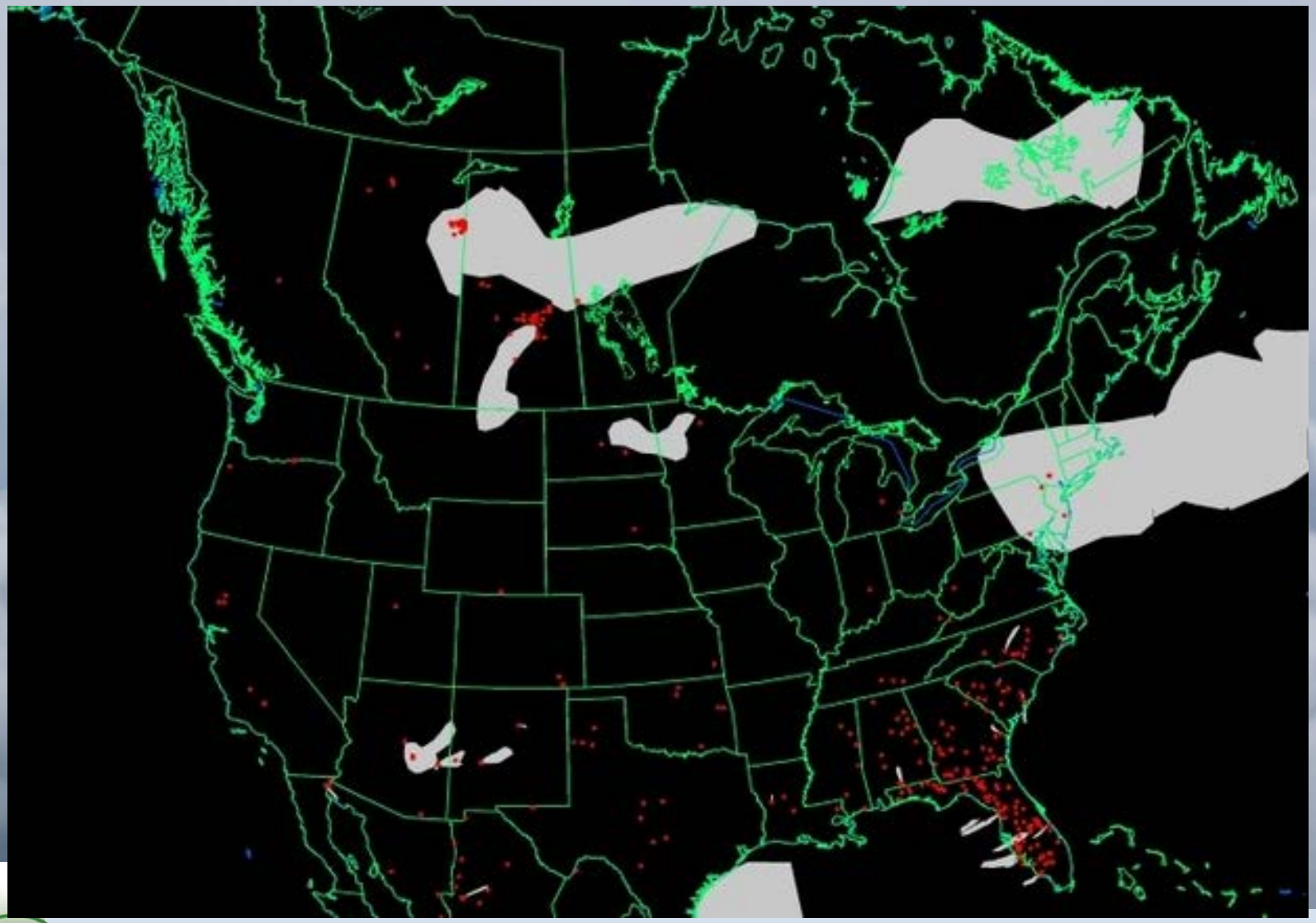
# Smoke Plume Analyzed on May 26th, 2016



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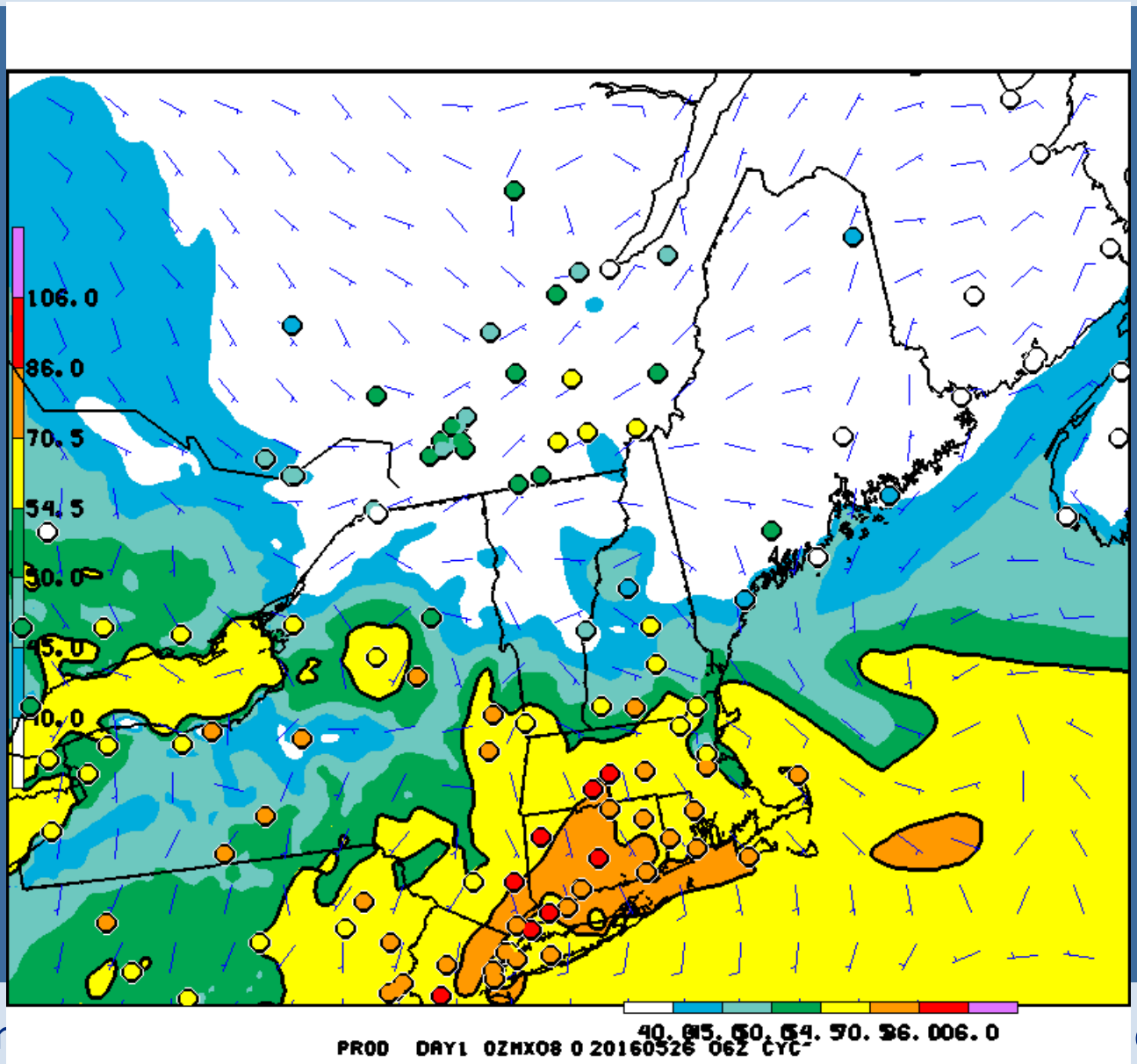
# NOAA Ozone Model May 26th, 2016

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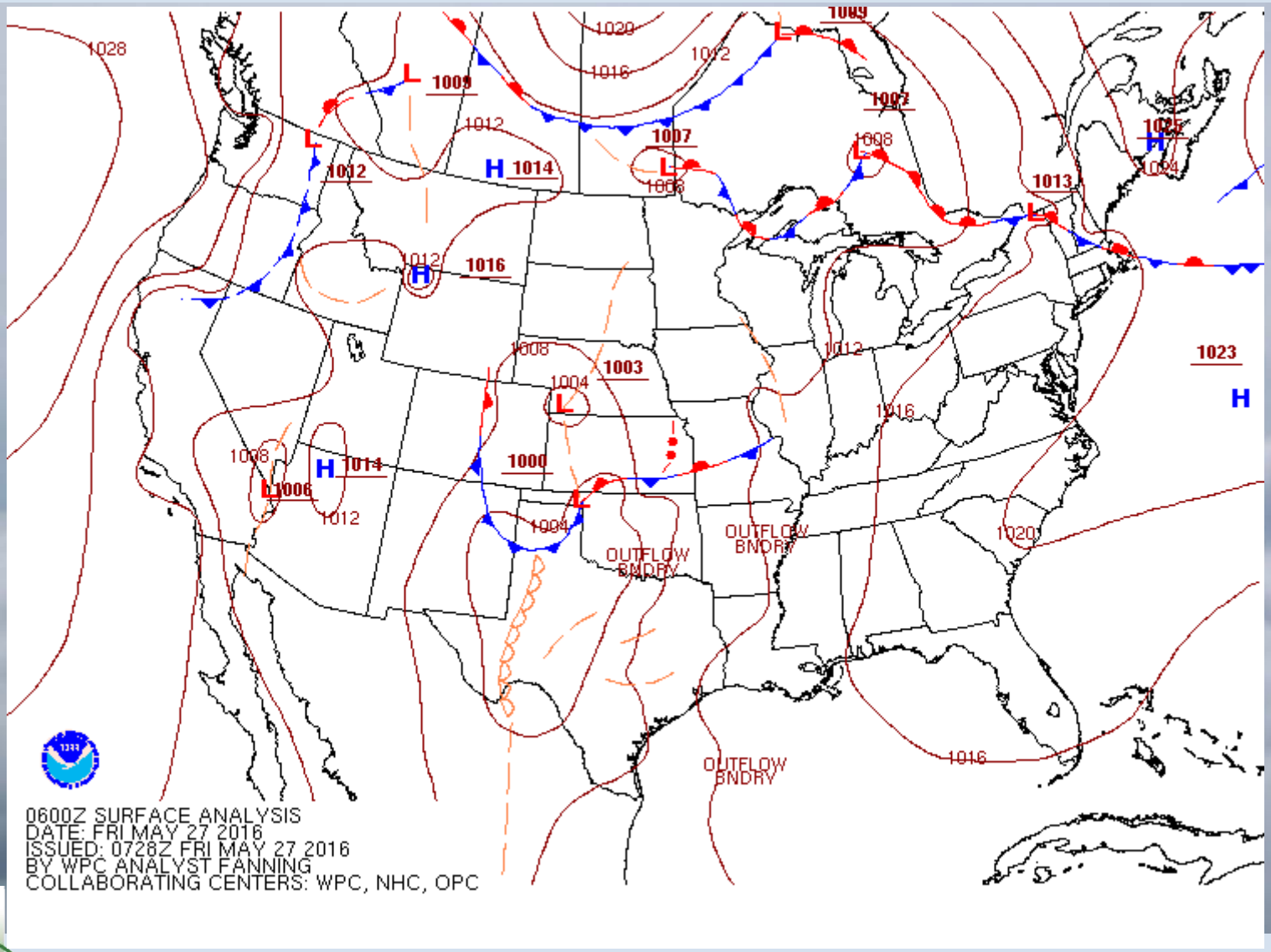
# May 27, 2016 Surface Map Animation

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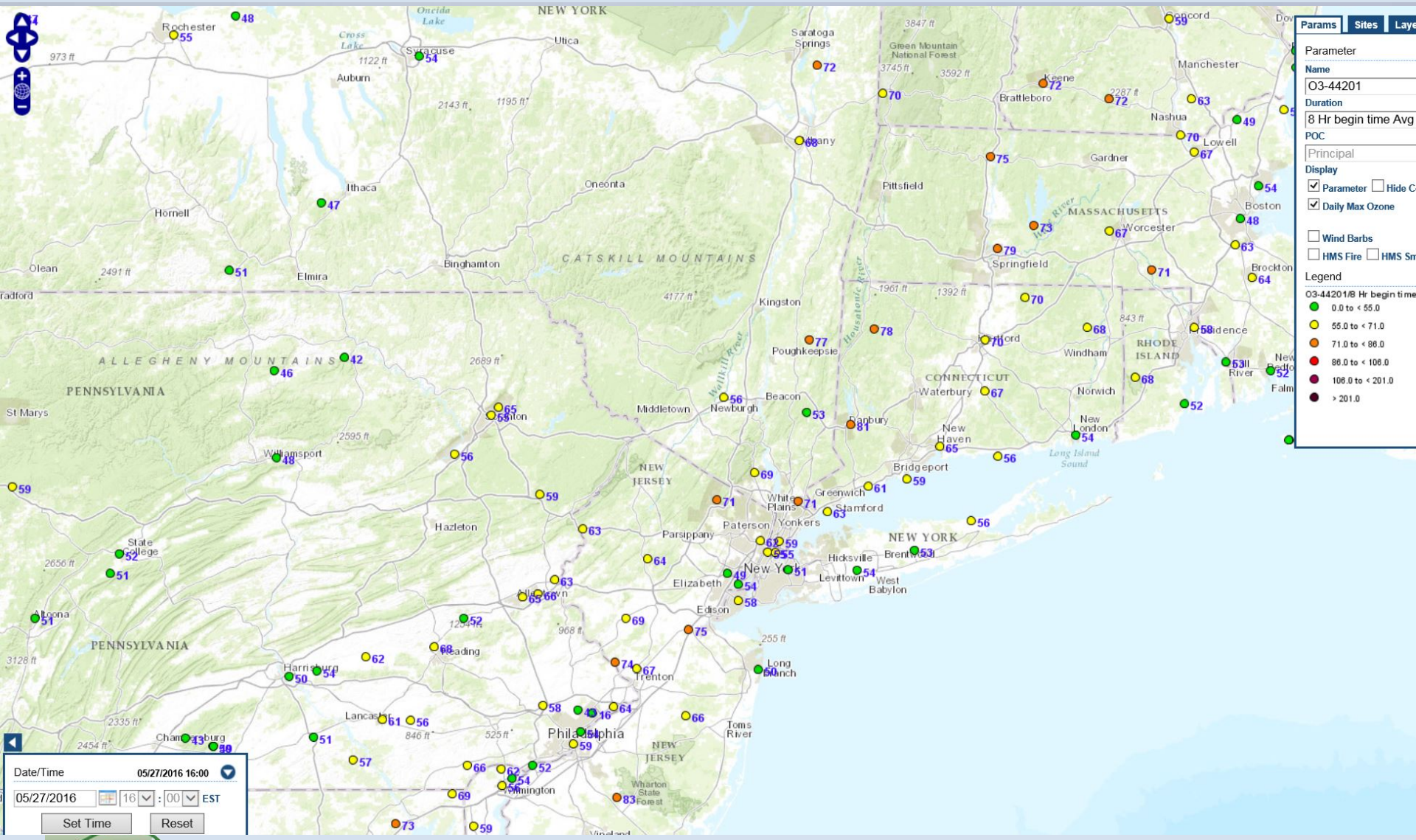
# May 27th, 2016 Smoke Plume

# Peak Ozone May 27th, 2016

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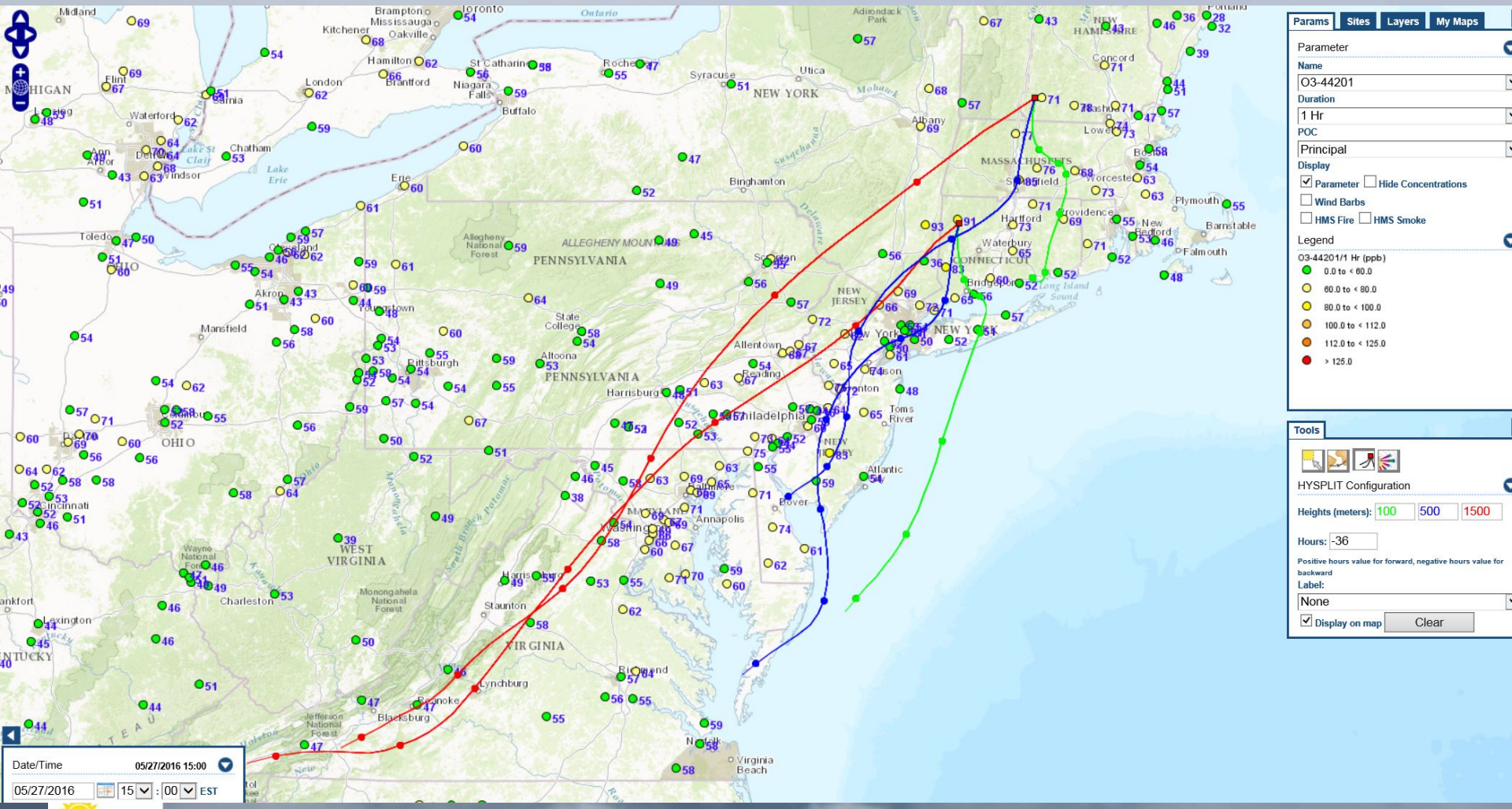
# 48-hr Back Trajectories May 27th, 2016

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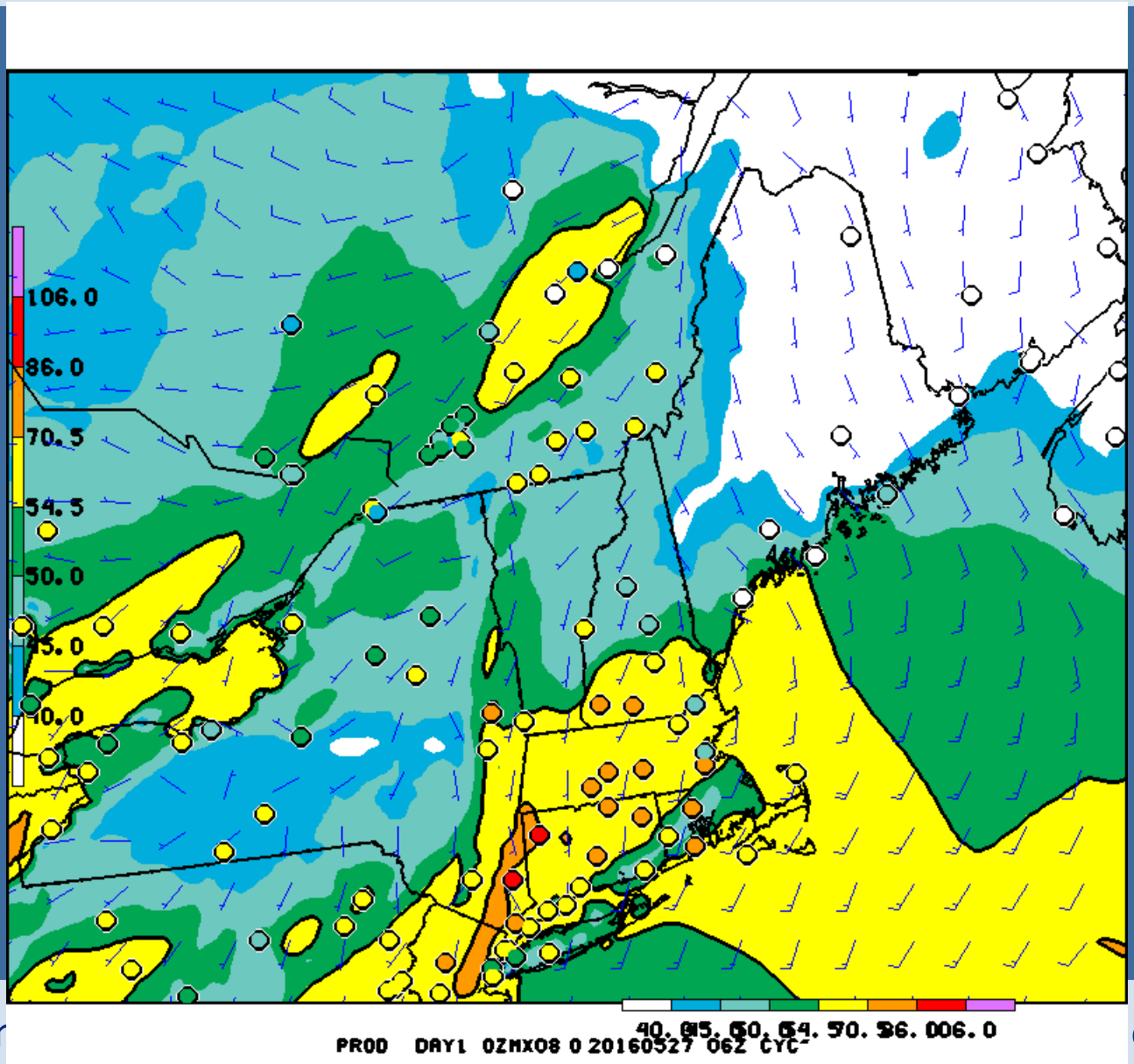
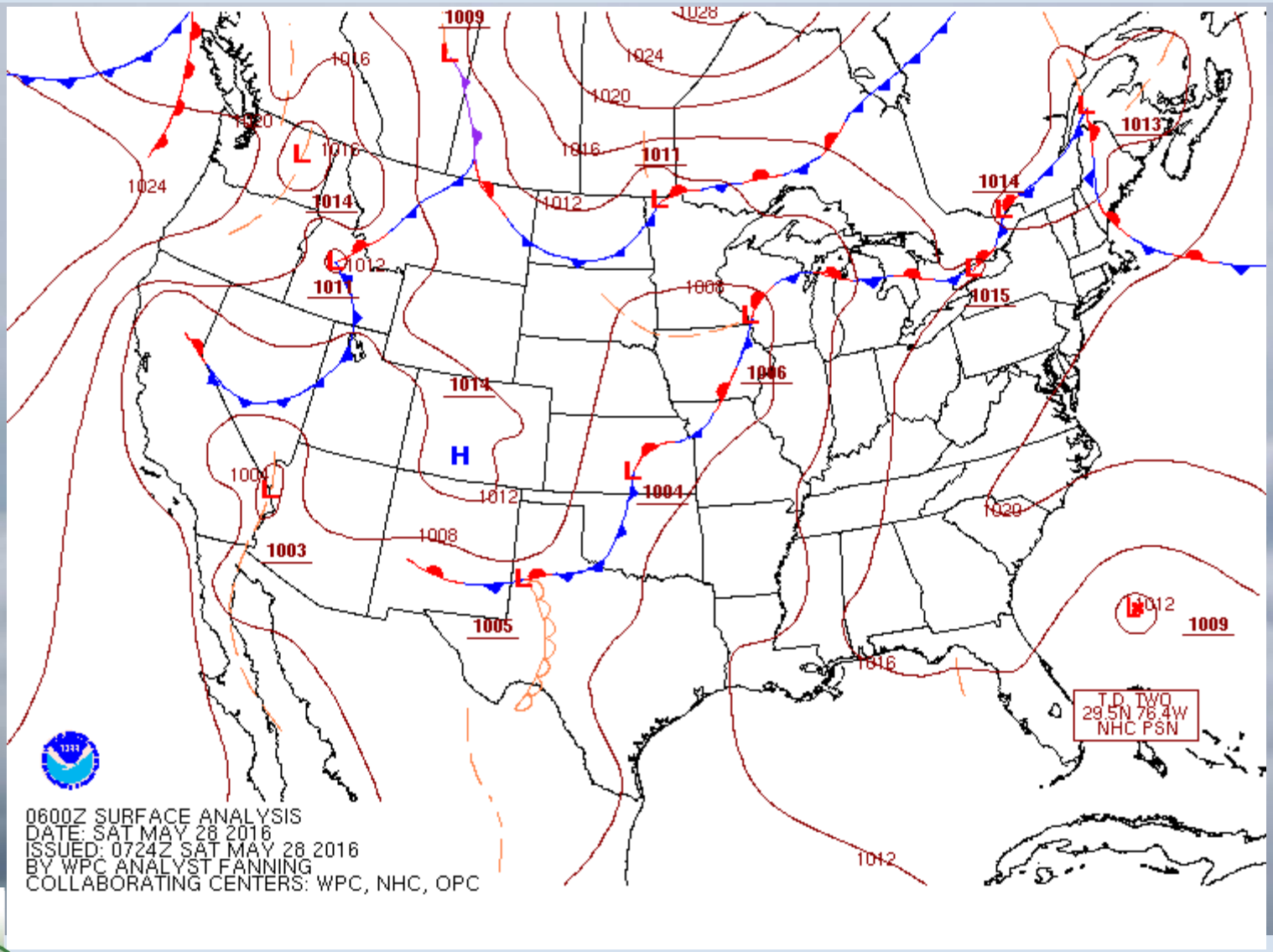
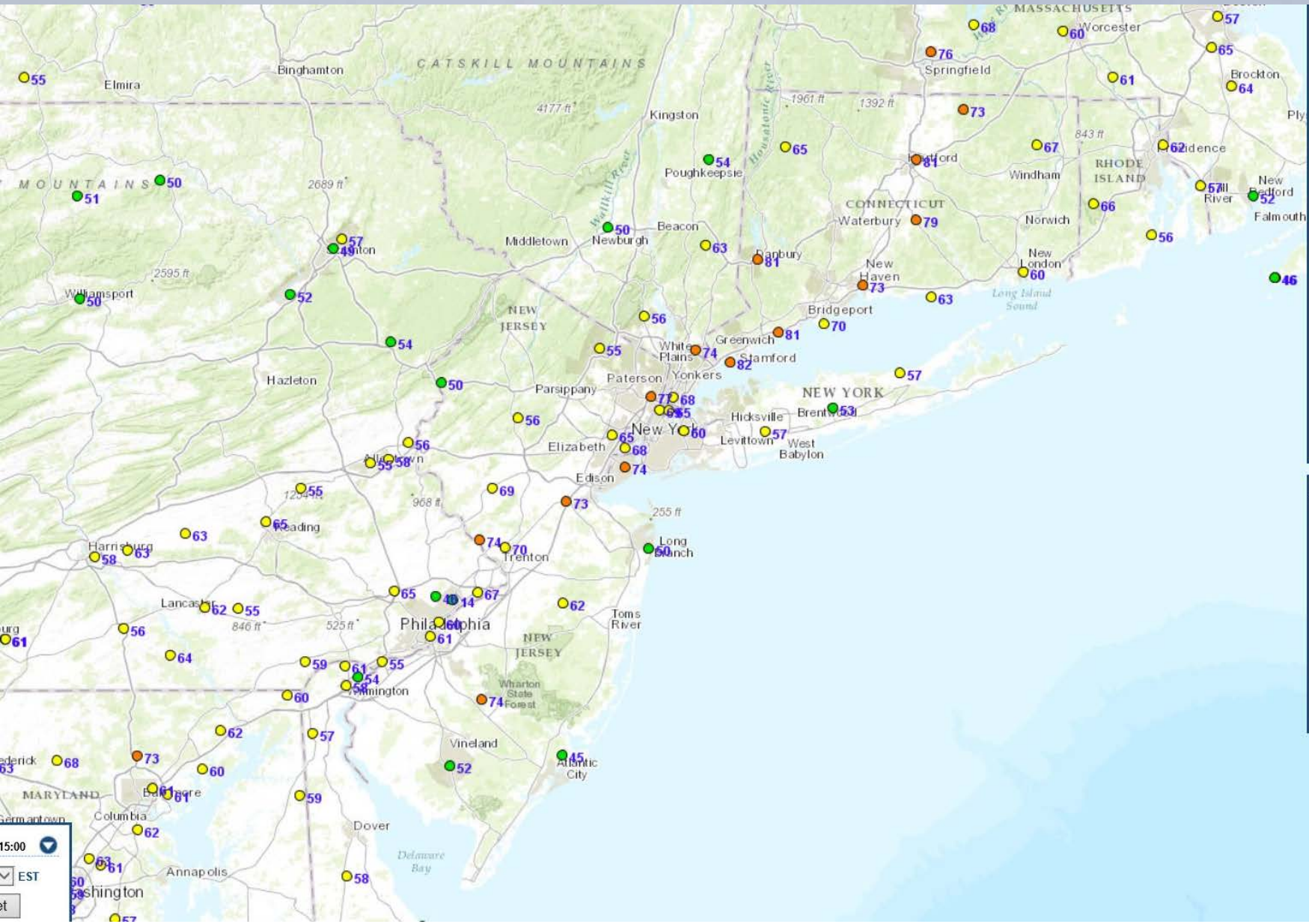
# NOAA Ozone Model May 27th, 2016



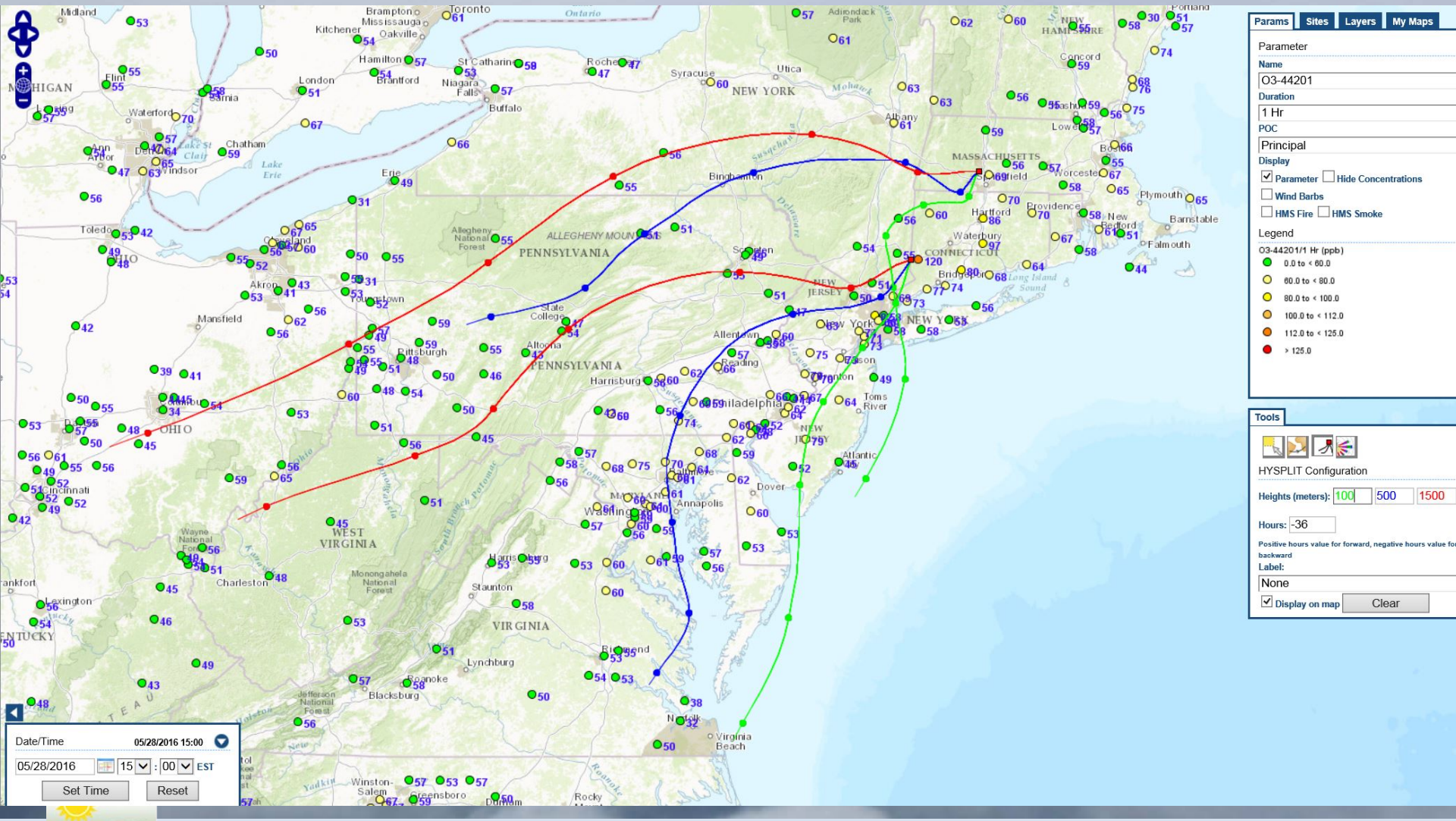
# May 28, 2016 Surface Map Animation



# Peak Ozone May 28, 2016



# 36-hr Back Trajectories May 28, 2016

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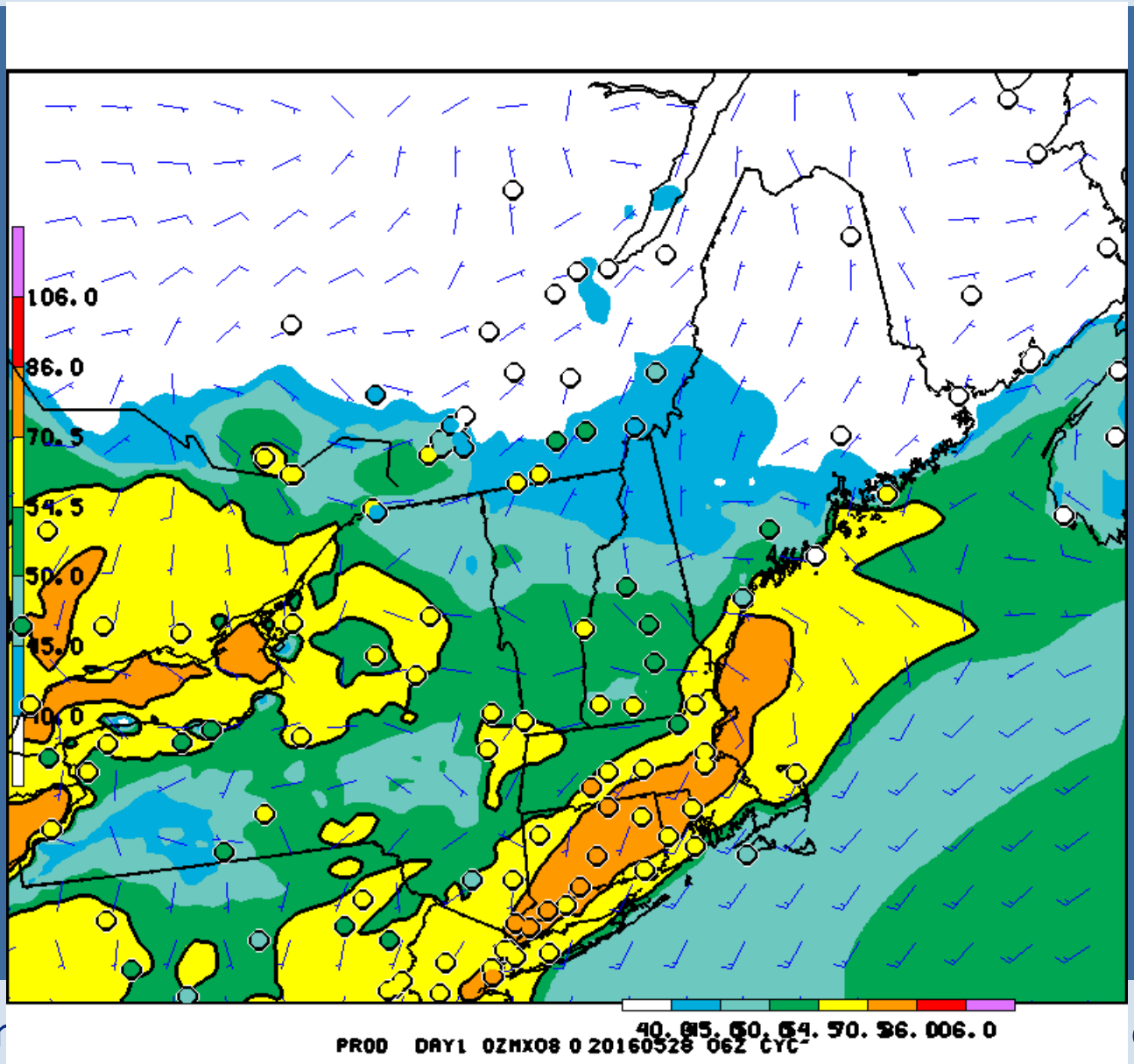
# NOAA Ozone Model May 28th, 2016

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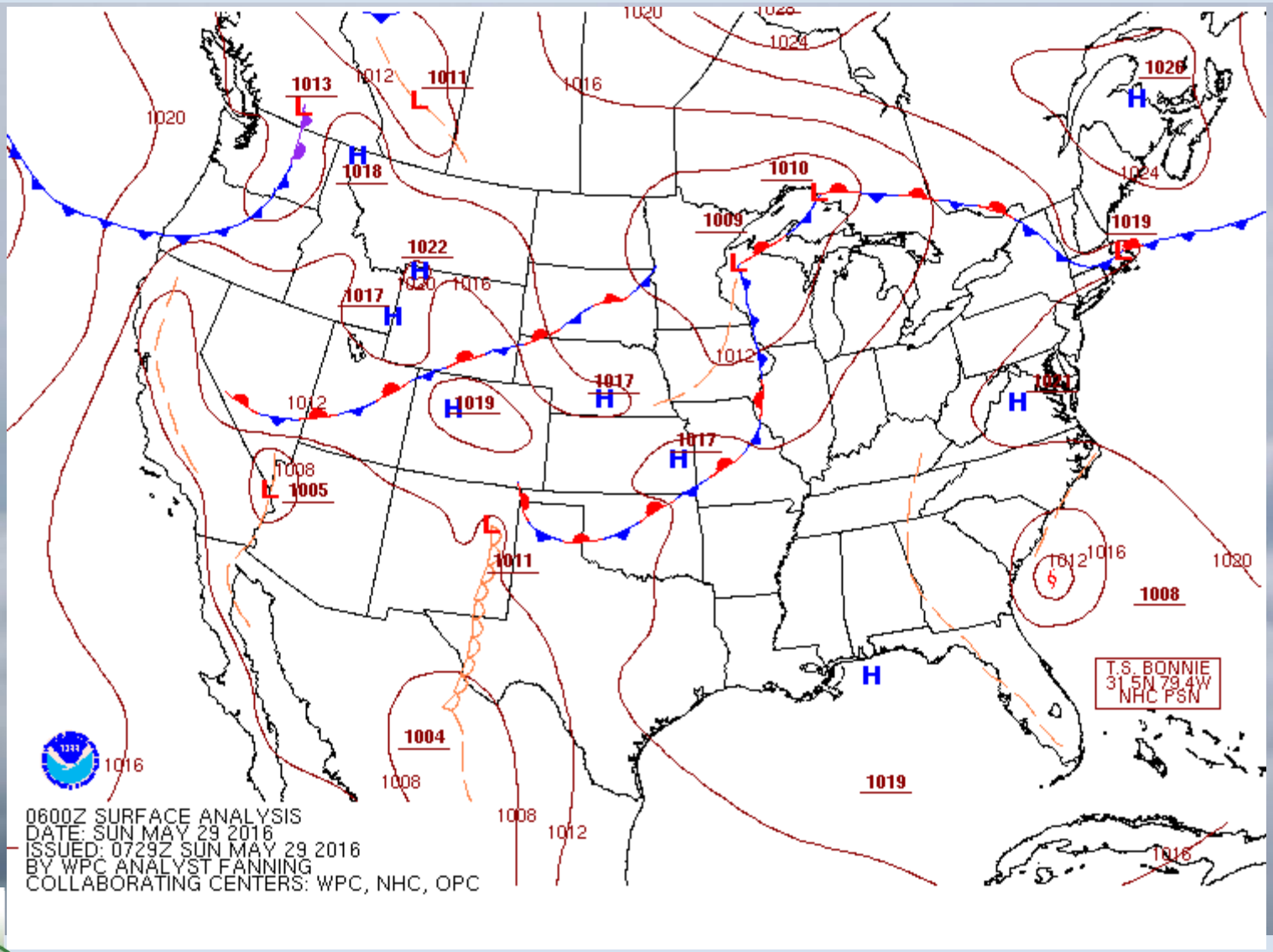
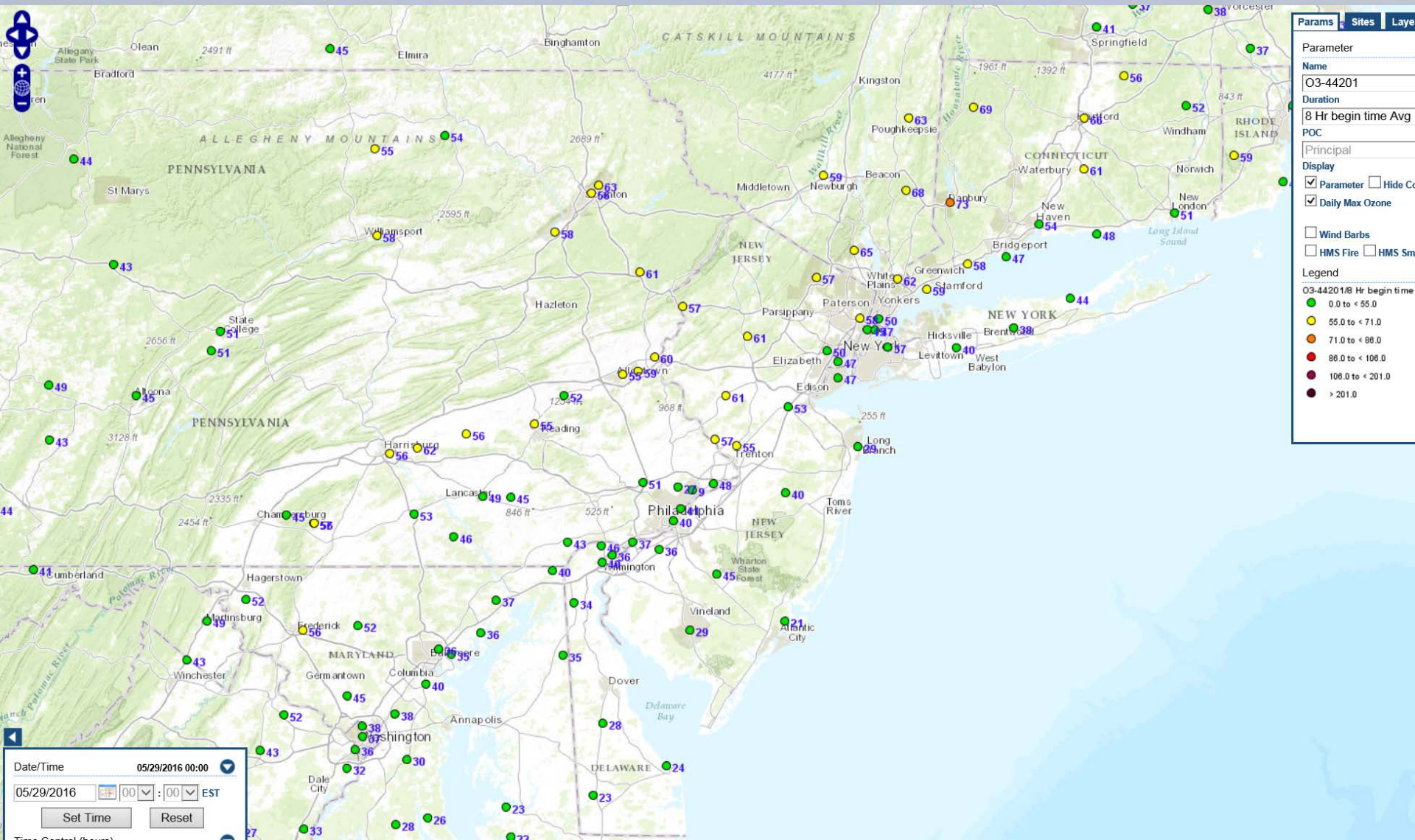
# May 29, 2016 Surface Map Animation

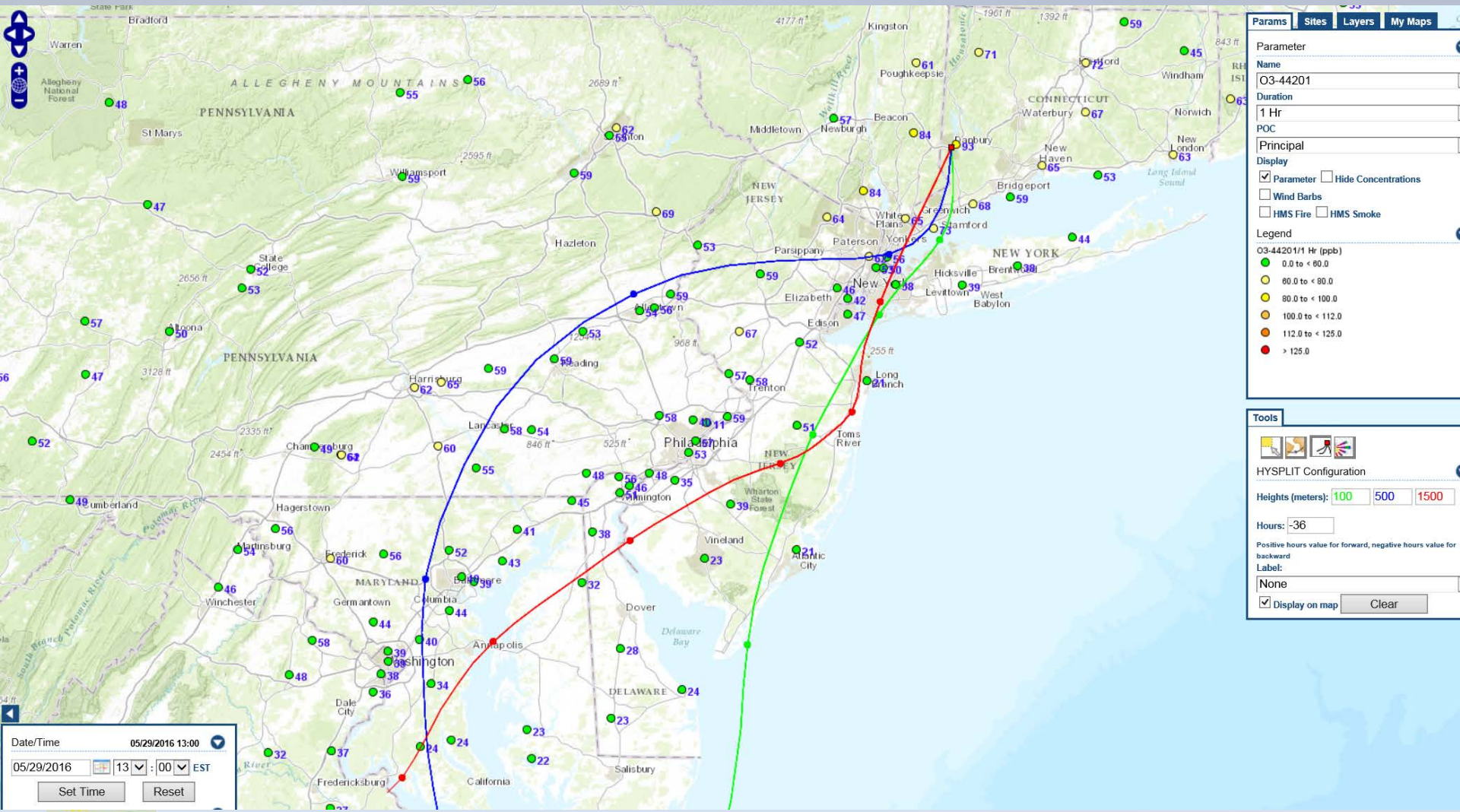


# May 29, 2016 Peak East Coast Ozone

- Good to Moderate levels, except USG for Danbury Connecticut.

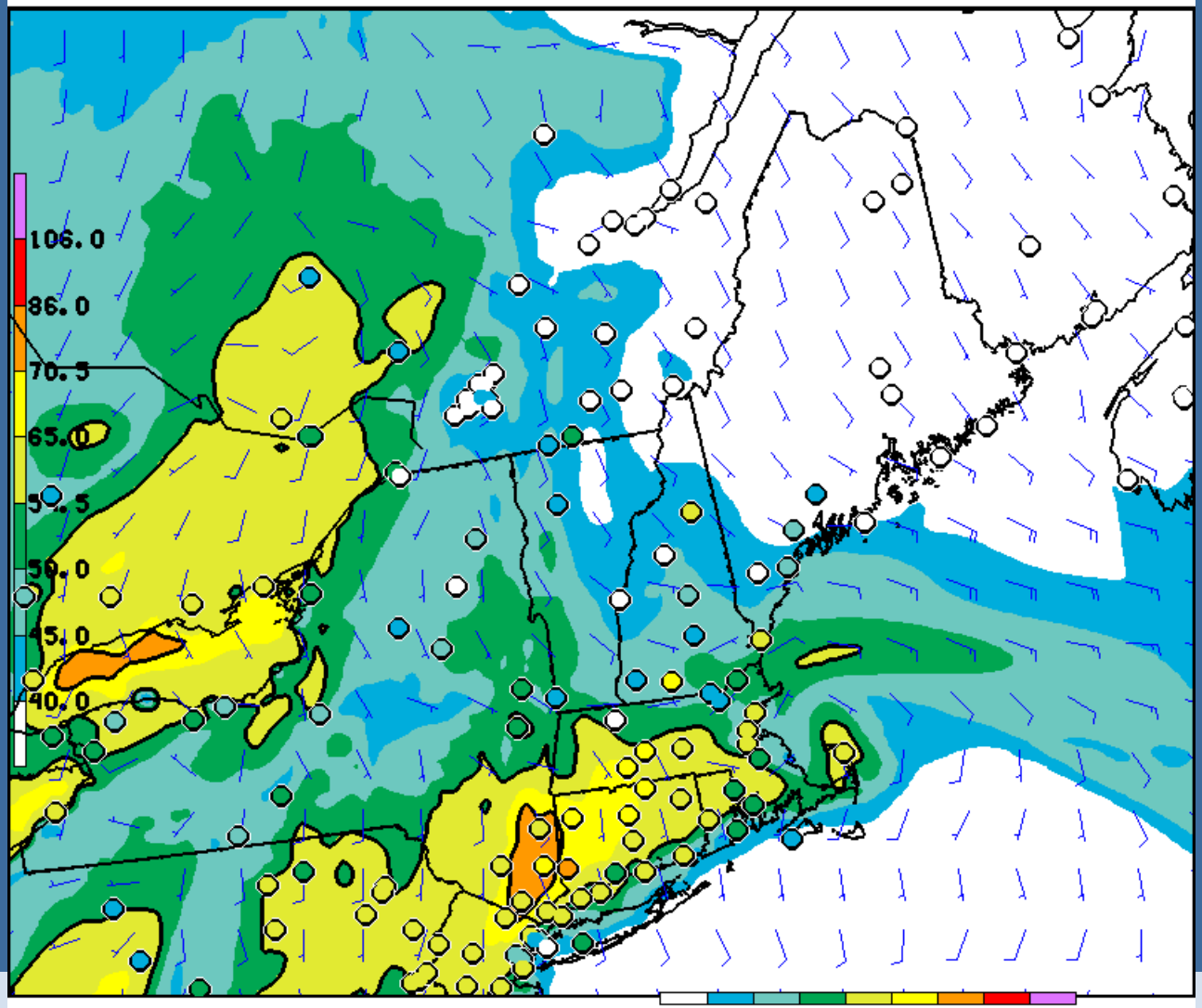


# 36-hr Back Trajectories 1:00 pm EST




The 100/500/1500 meters trajectories to Danbury traveled from between eastern NJ and Eastern PA with some influence from Washington DC the day before.

# NOAA Ozone Model May 29th, 2016



# Conclusions

- Anomalous early season multi-day event
- NOAA model suggests that precursors from wildfire smoke may have elevated ozone on May 25th-27th (NOAA model doesn't do smoke)
- Likely an exceptional event, easy to flag, but need to prove the impact!