Connecticut Department of Energy and Environmental Protection

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

May 2016 Canadian Wildfires Smoke Plume Impact on Connecticut

Michael Geigert
CTDEEP

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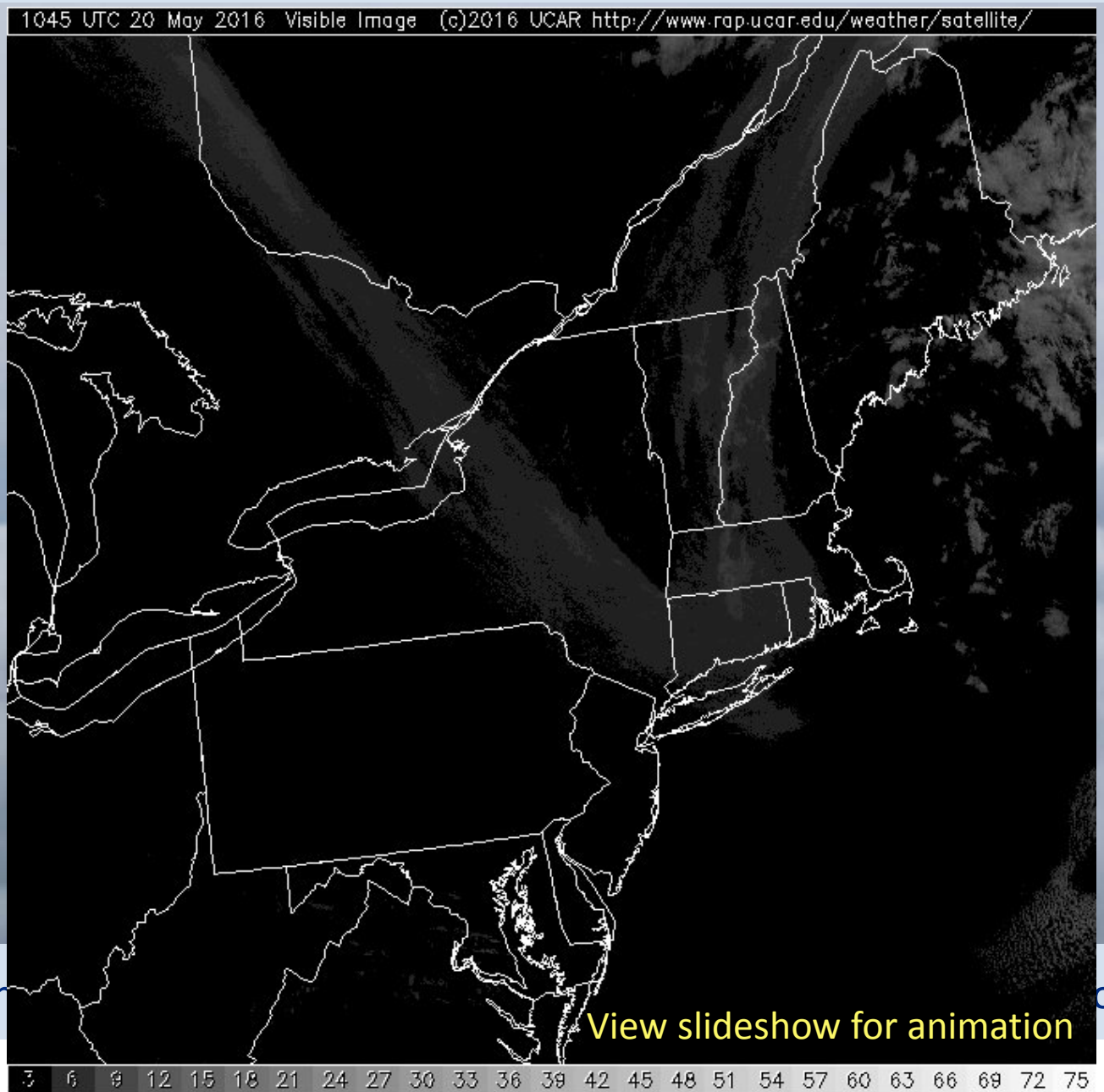
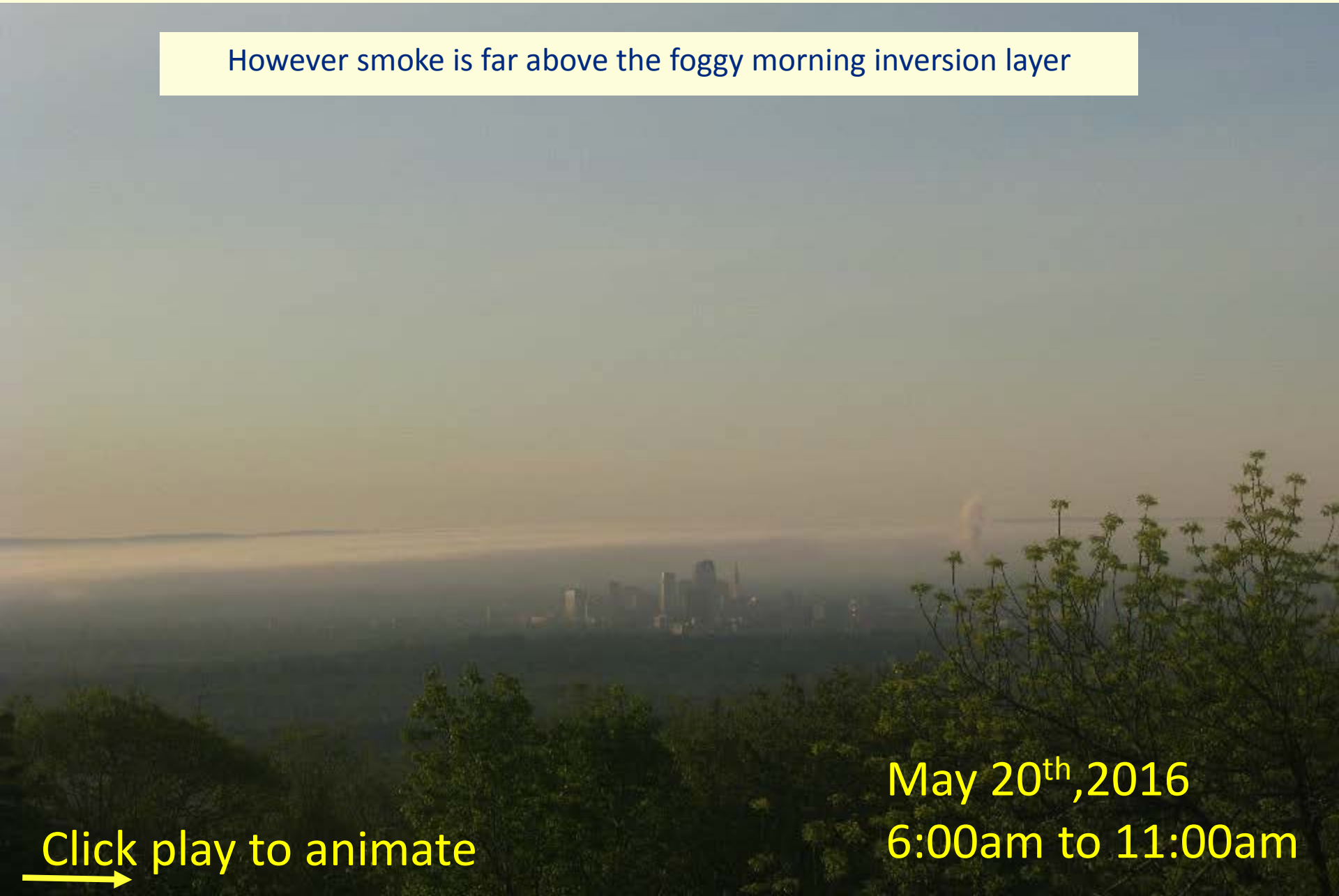
Smoke Plume Appears over CT on May 20th

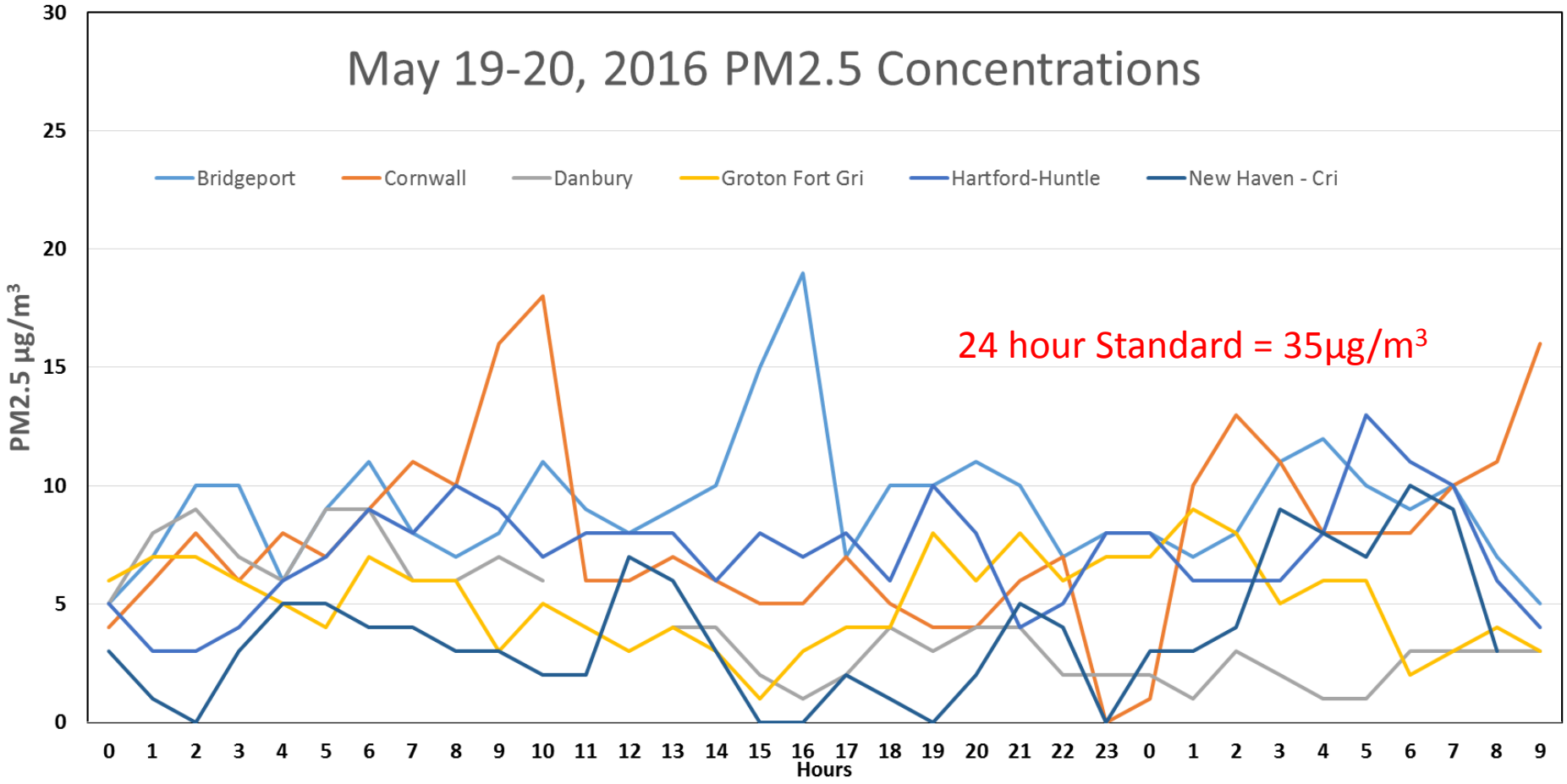


View slideshow for animation

Smoky sky is visible above Hartford

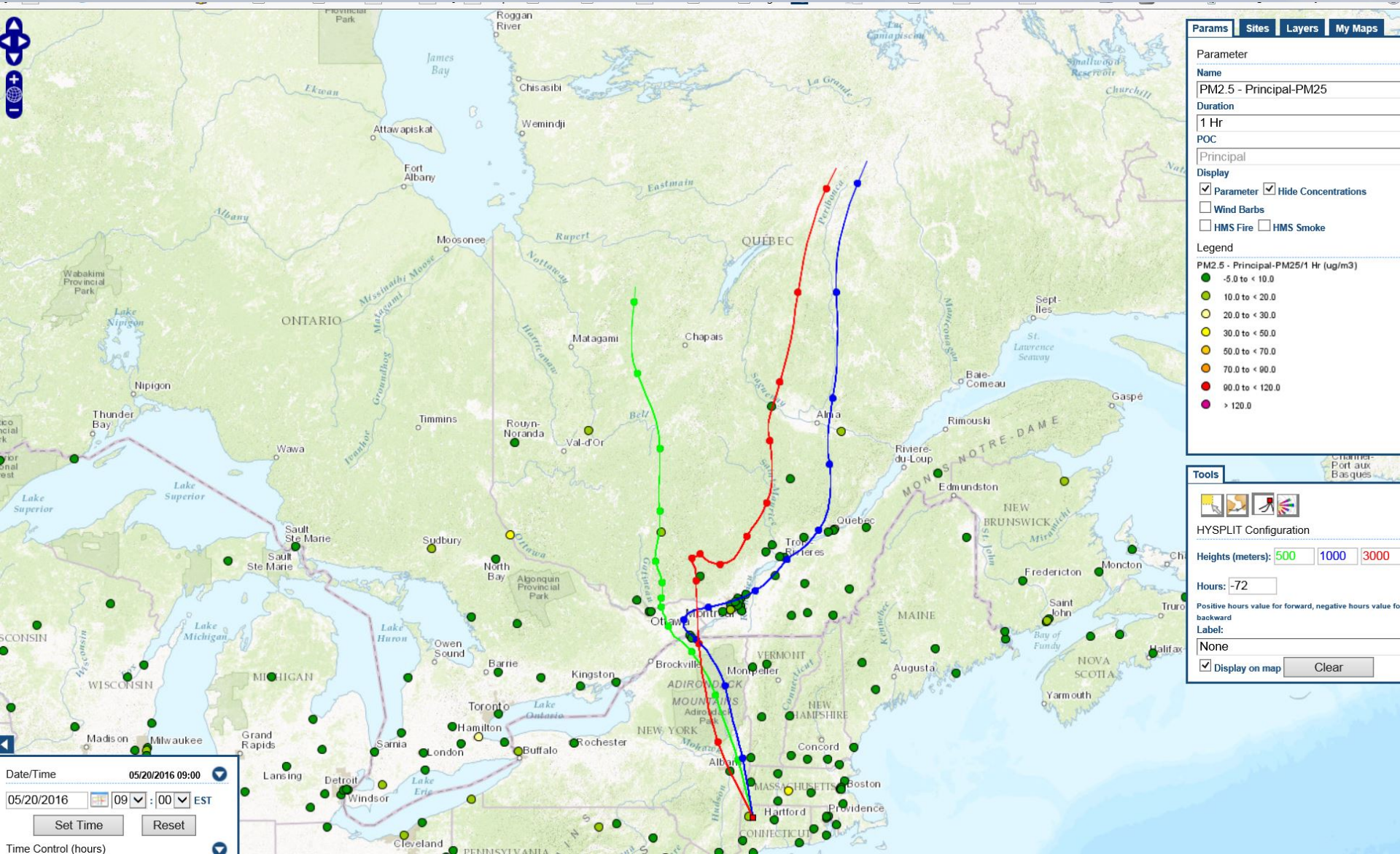


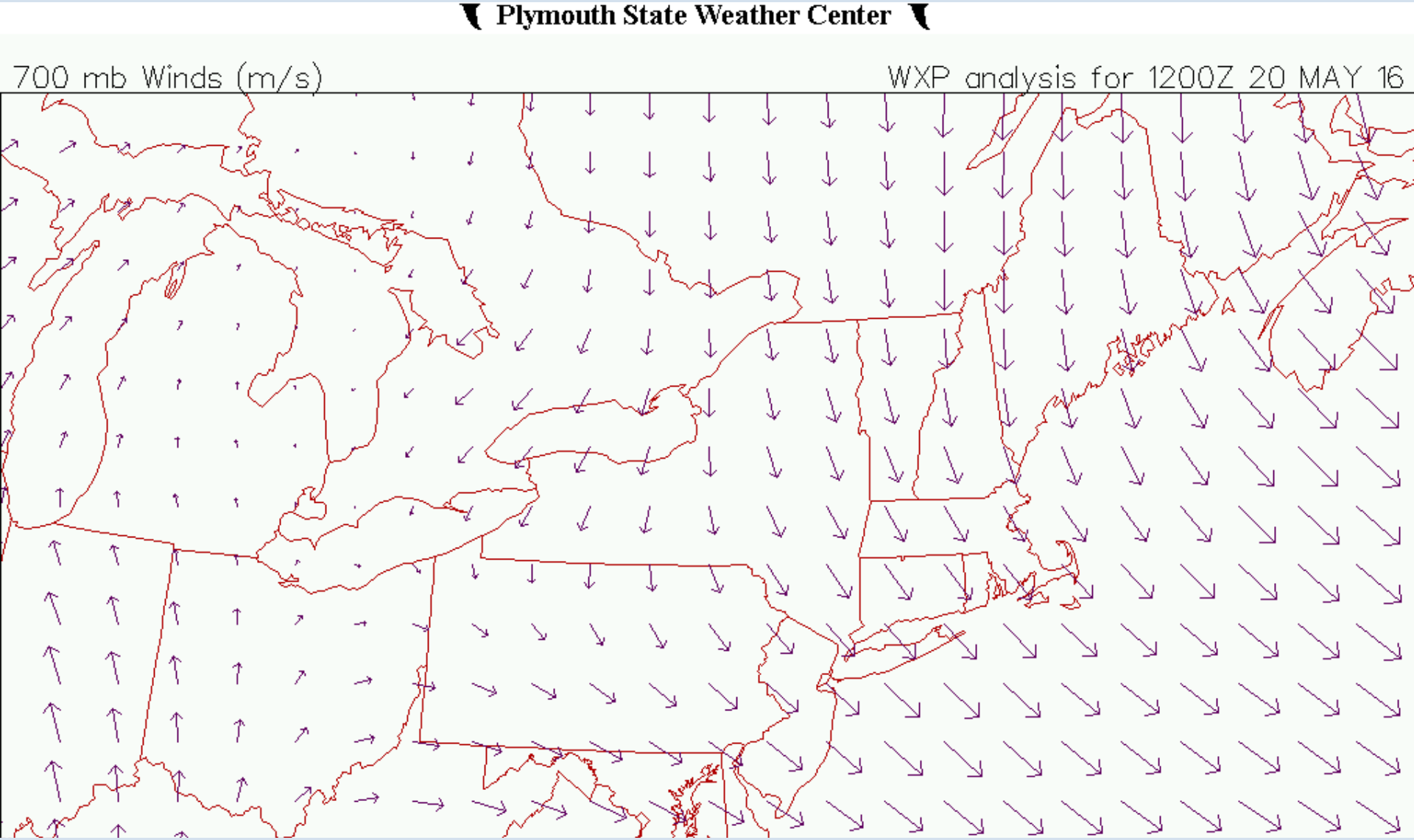
But PM2.5 levels remain relatively low…



72 hour Back Trajectories from Canada

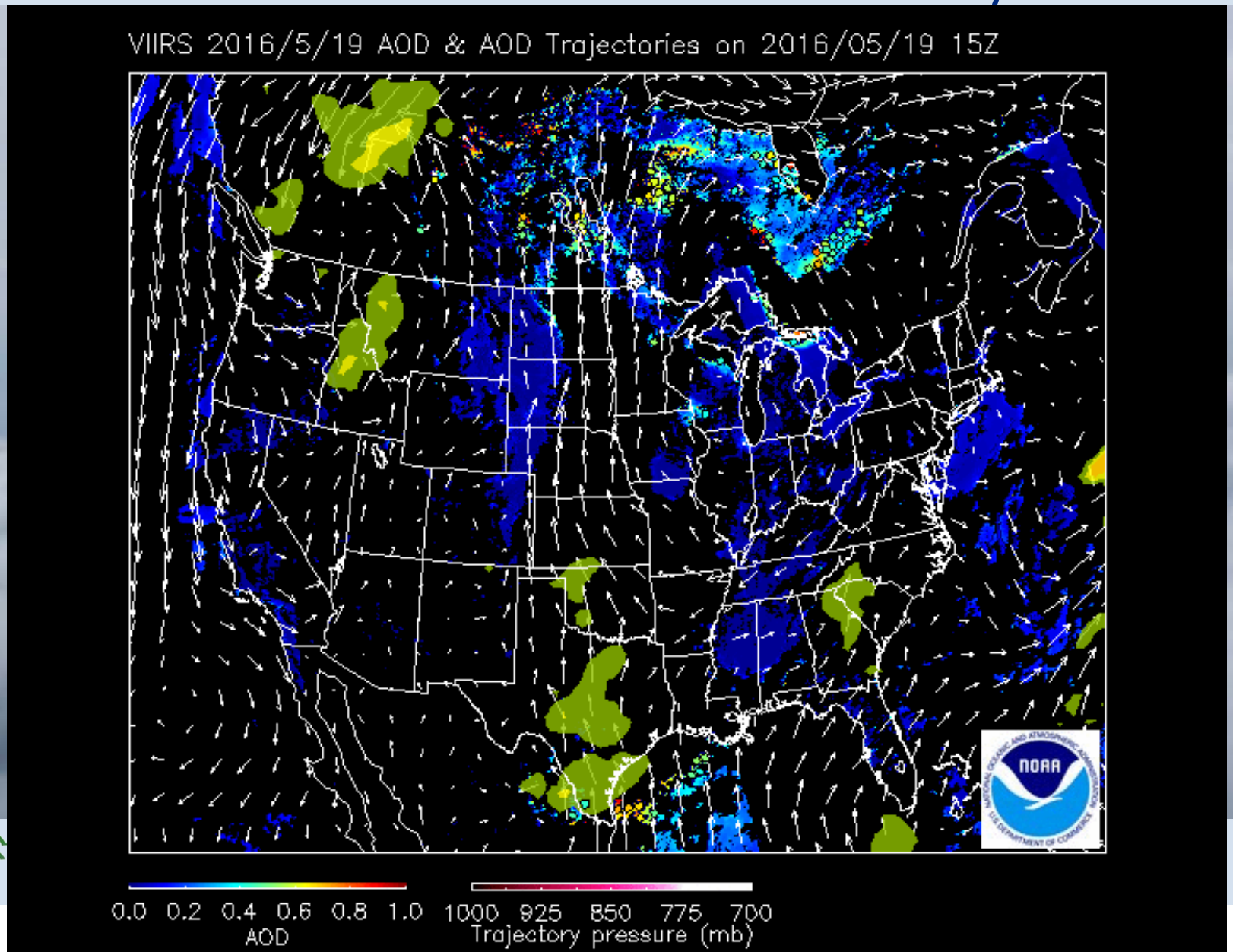
Winds from Eastern Canada transport portion of plume aloft over Connecticut



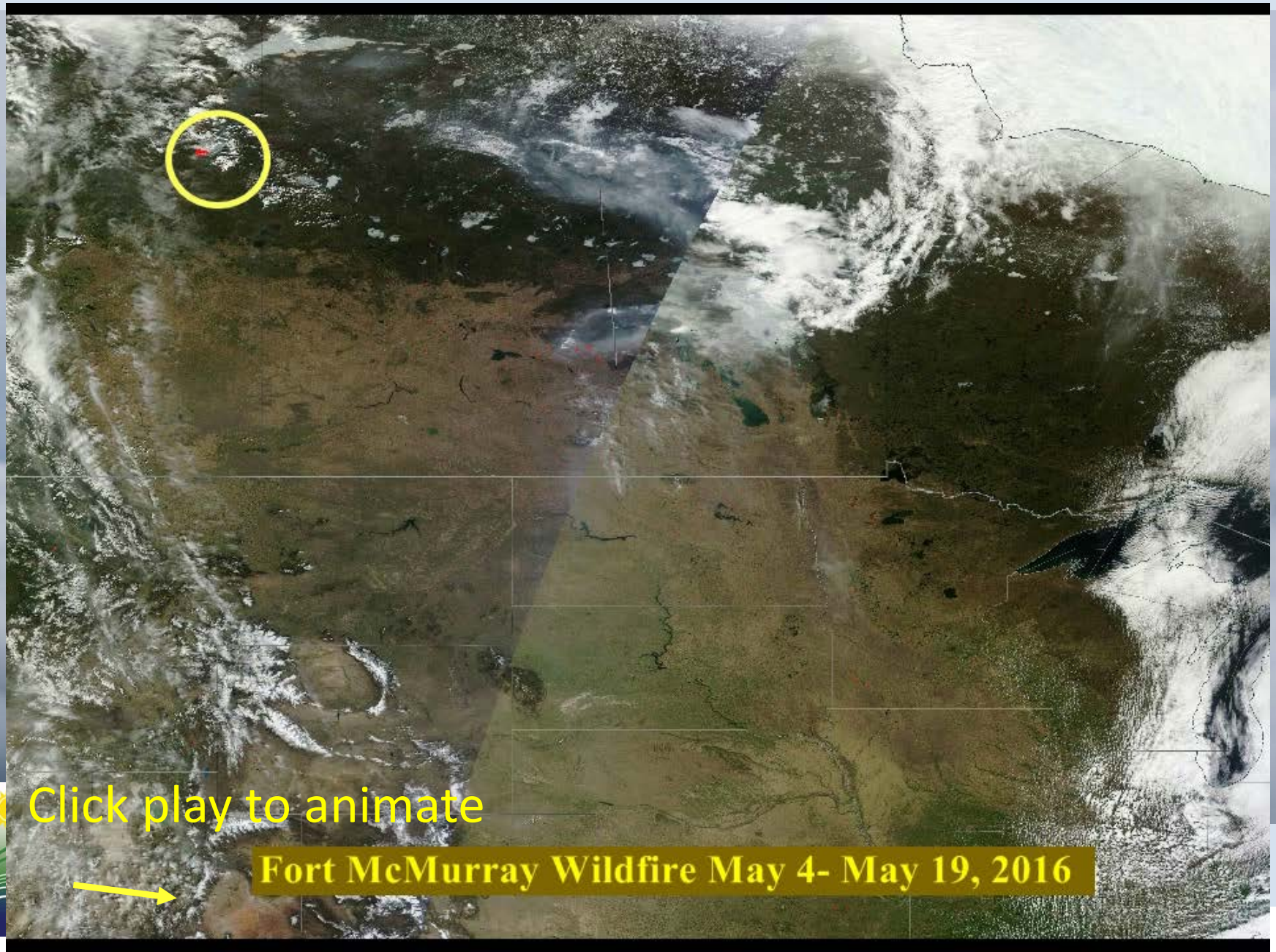


700 mb (~10,000 ft) wind flow follows the smoke plume transport

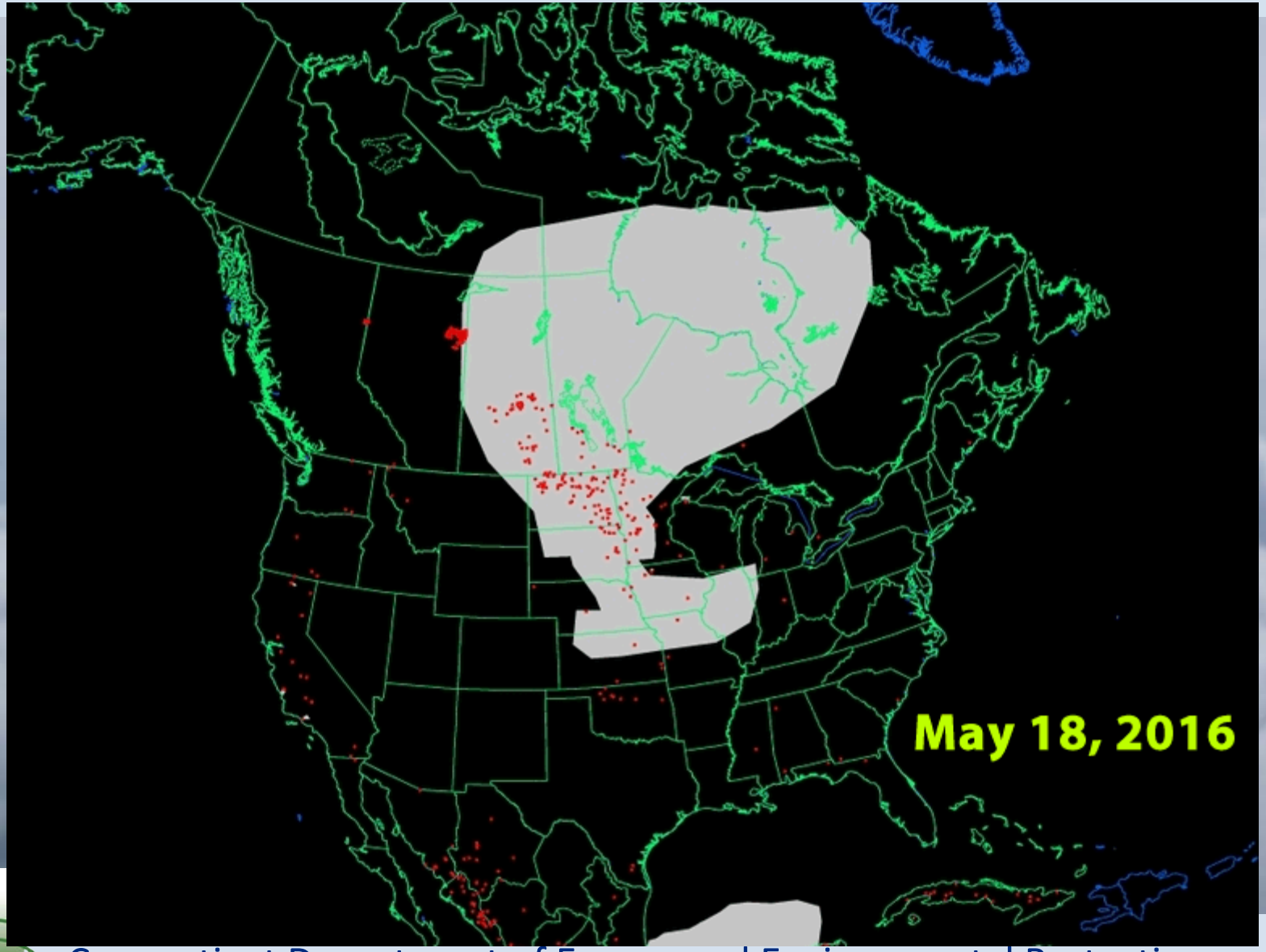
Forecast trajectories keep most of plume aloft (850mb) and to our north for the next few days



Video of Wildfire evolution since May 4th, 2016



Smoke Plume Animation from May 18th- May 25th



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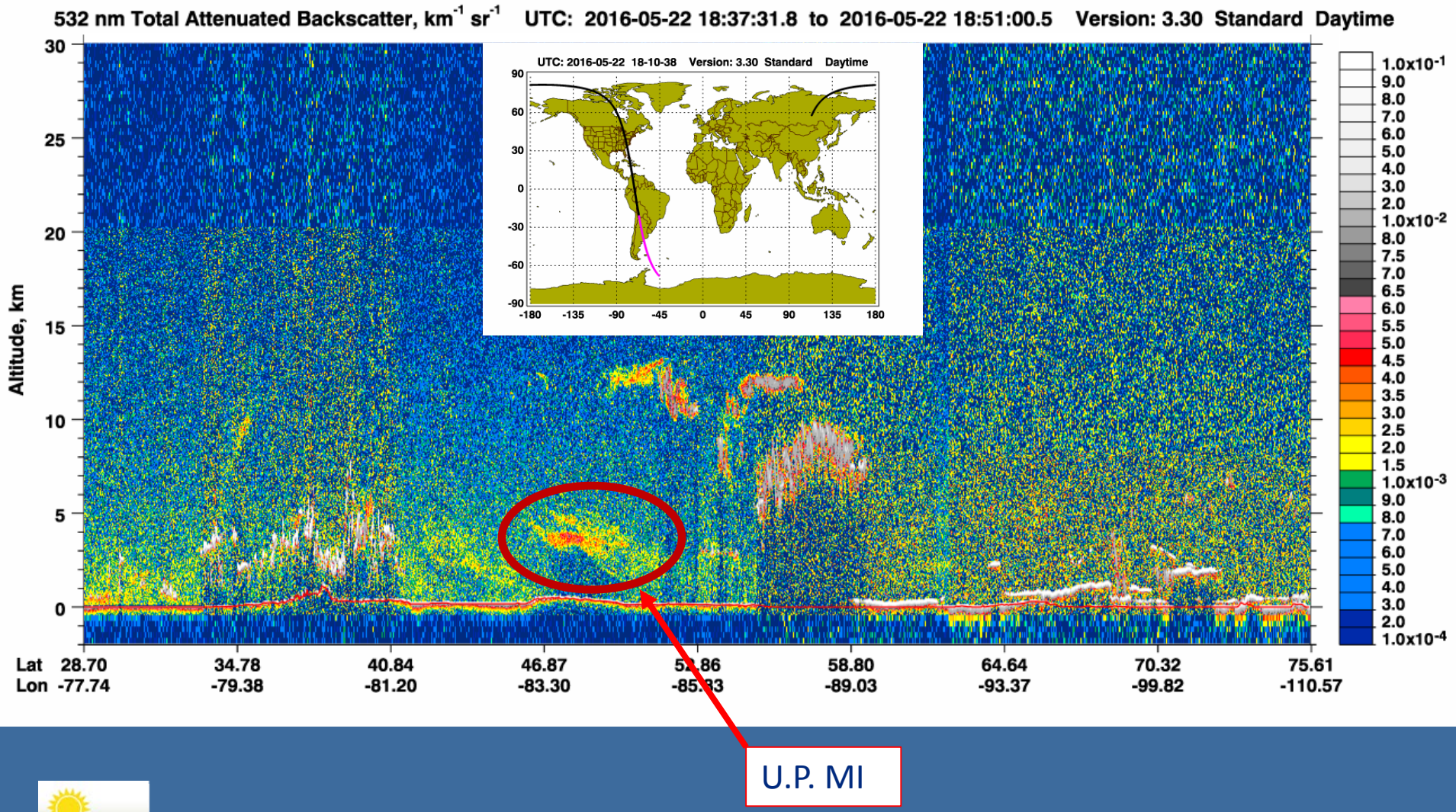
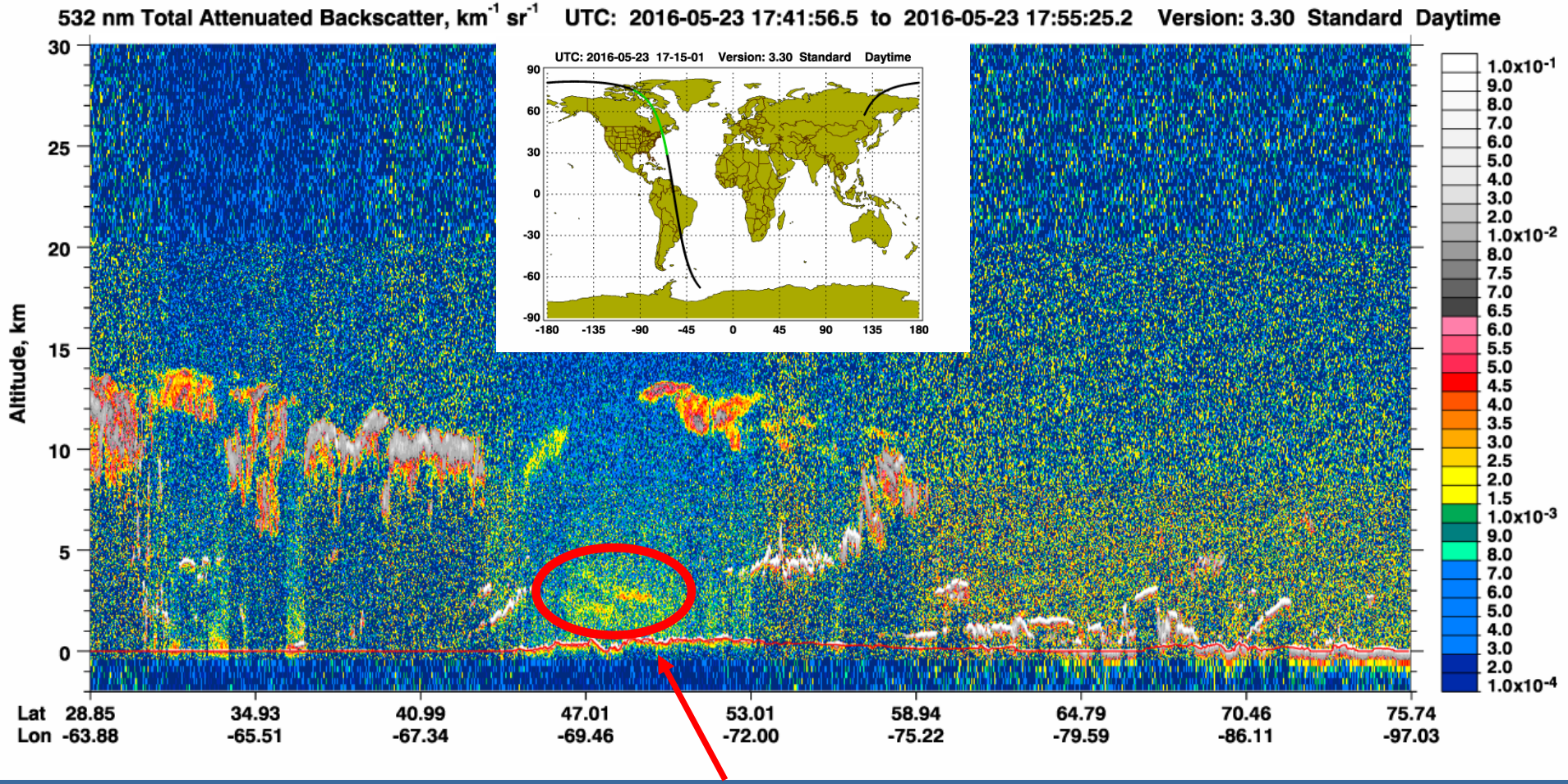
5/22/16


532 nm Total Attenuated Backscatter, km-1 sr-1 UTC: 2016-05-22 18:37:31.8 to 2016-05-22 18:51:00.5 Version: 3.30 Standard Daytime
UTC: 2016-05-22 18-10-38 Version: 3.30 Standard Daytime
Altitude, km
Lat 28.70 34.78 40.84 46.87 58.80 64.64 70.32 75.61
Lon -77.74 -79.38 -81.20 -83.30 -89.03 -93.37 -99.82 -110.57
U.P. MI

5/23/16



Quebec, Canada

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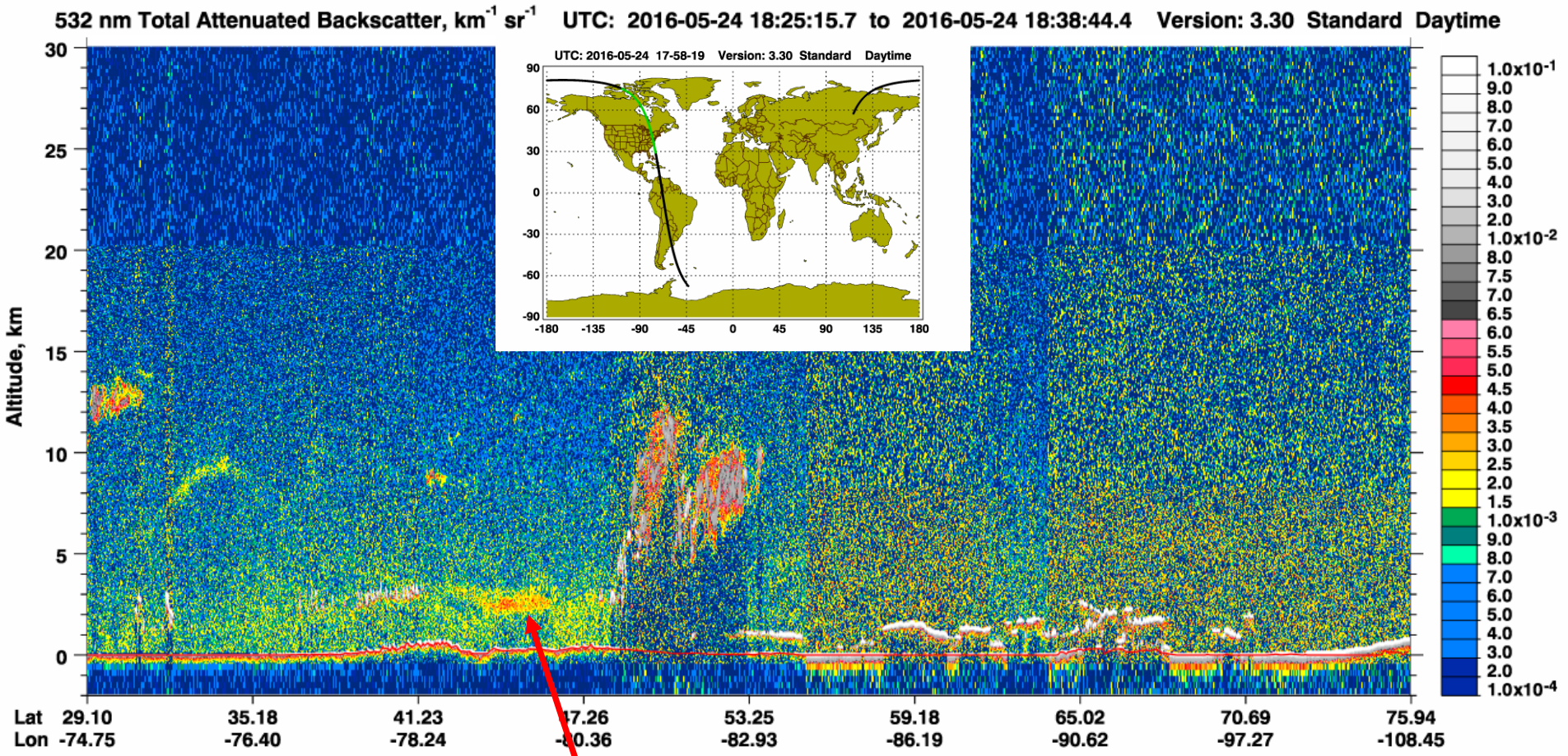
5/24/16



Ontario, Canada

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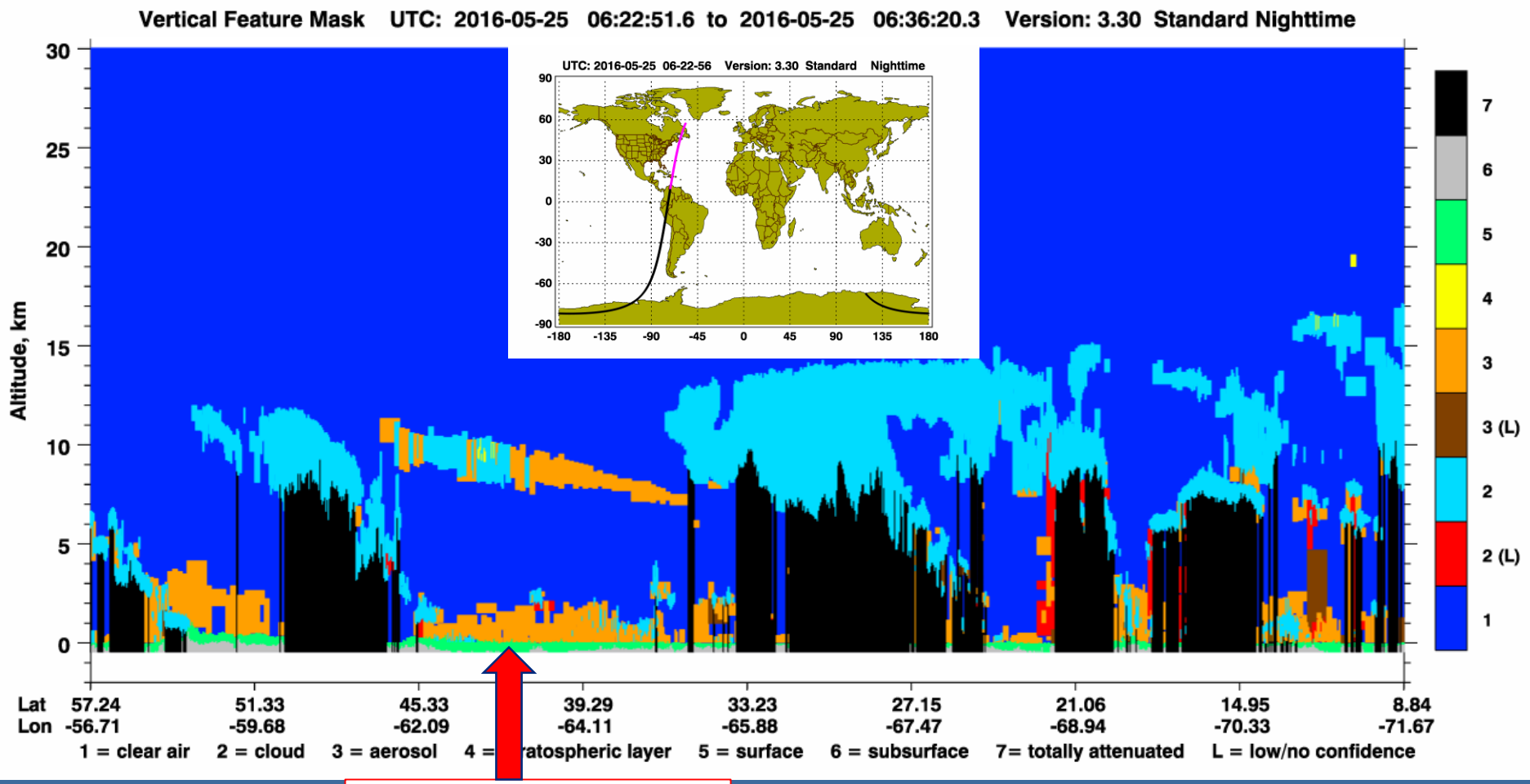
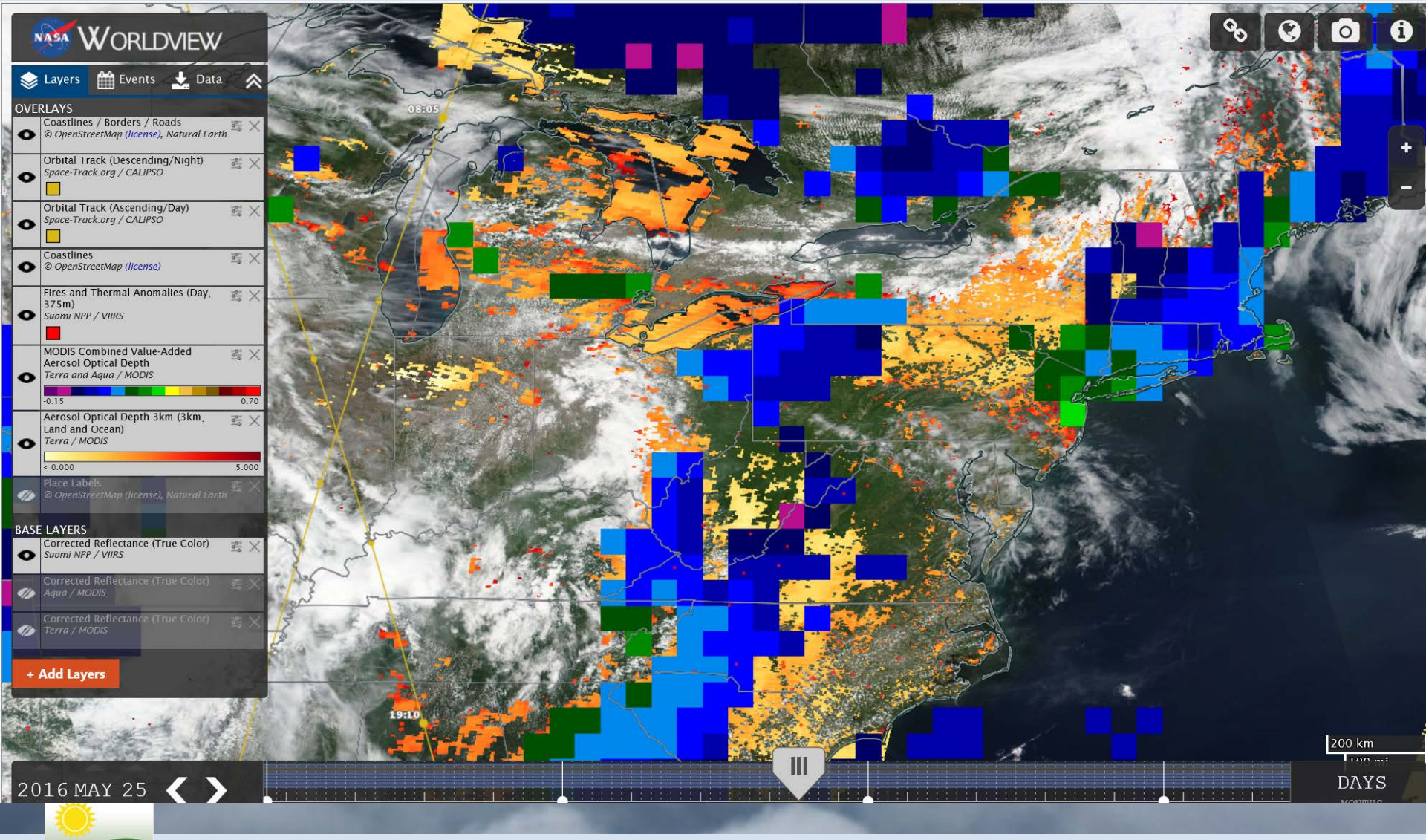
5/25/16 Calipso Aerosol Mask



Connecticut Latitude

May 25, 2016 ‘Value Added’ AOD



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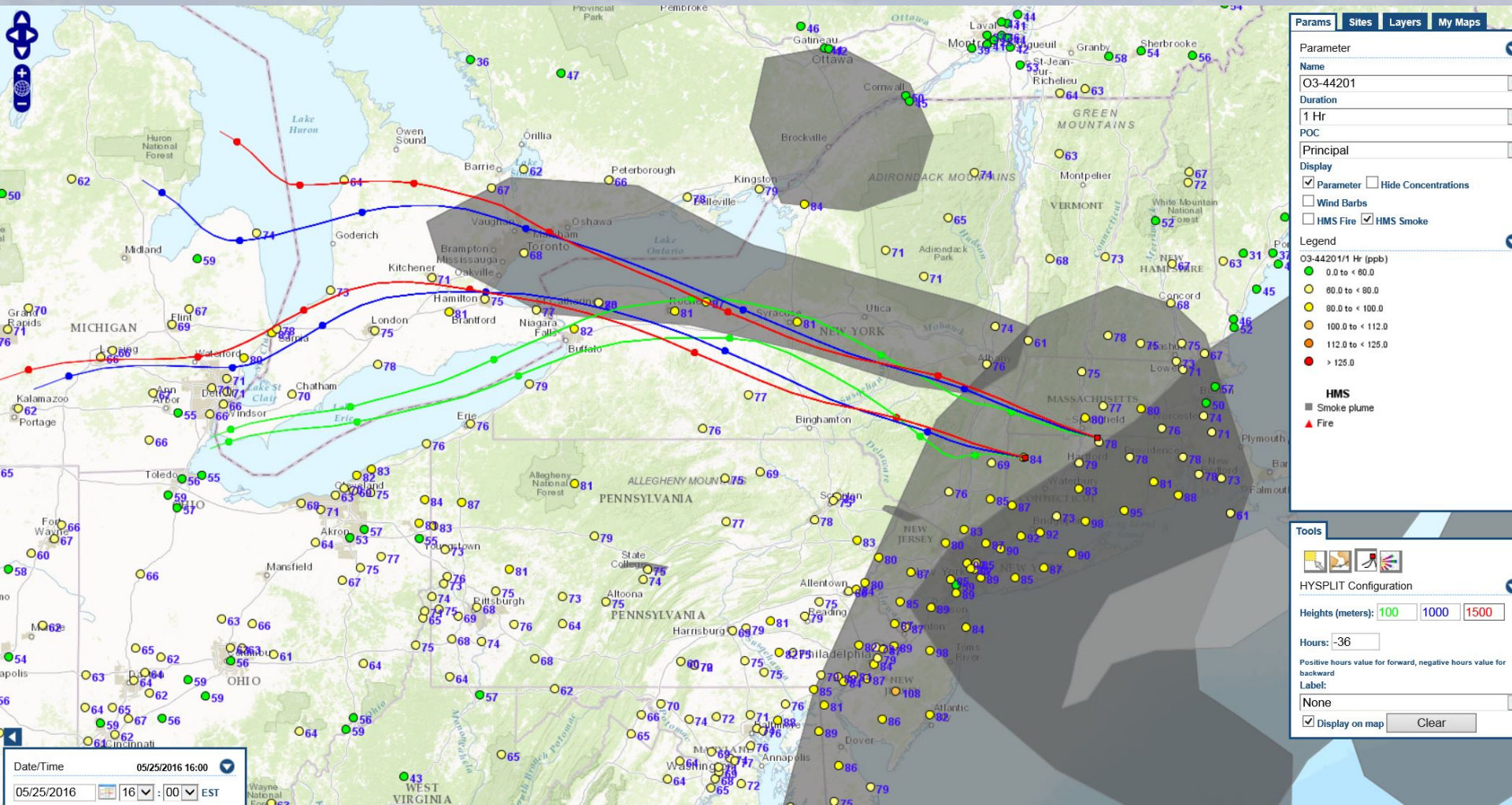
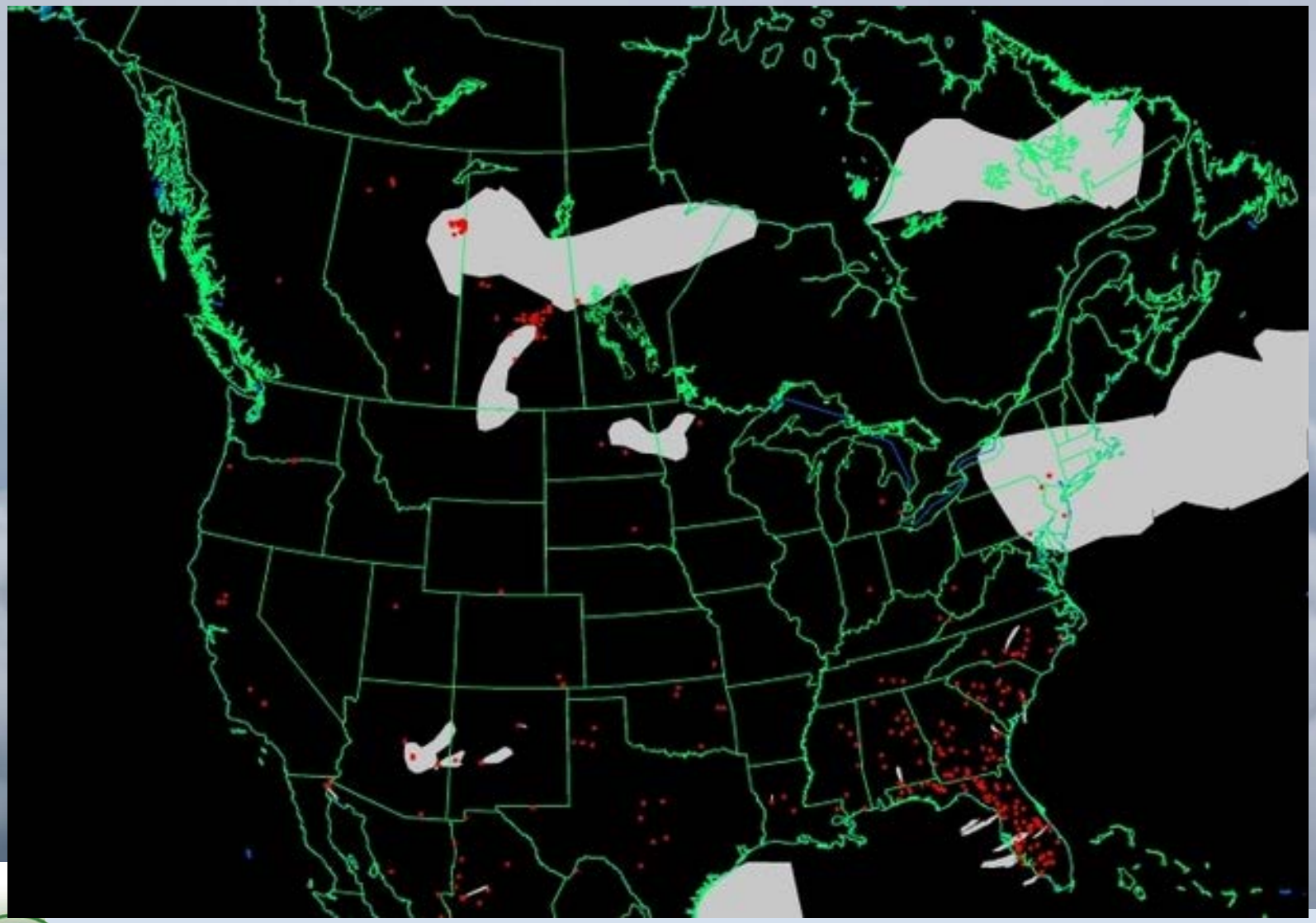
May 25th 36-hr Back Trajectories

- This was the beginning of a ‘smoke enhanced’ multi-day ozone event for Connecticut, which lasted 5 days



Smoke Plume Analyzed on May 26th, 2016



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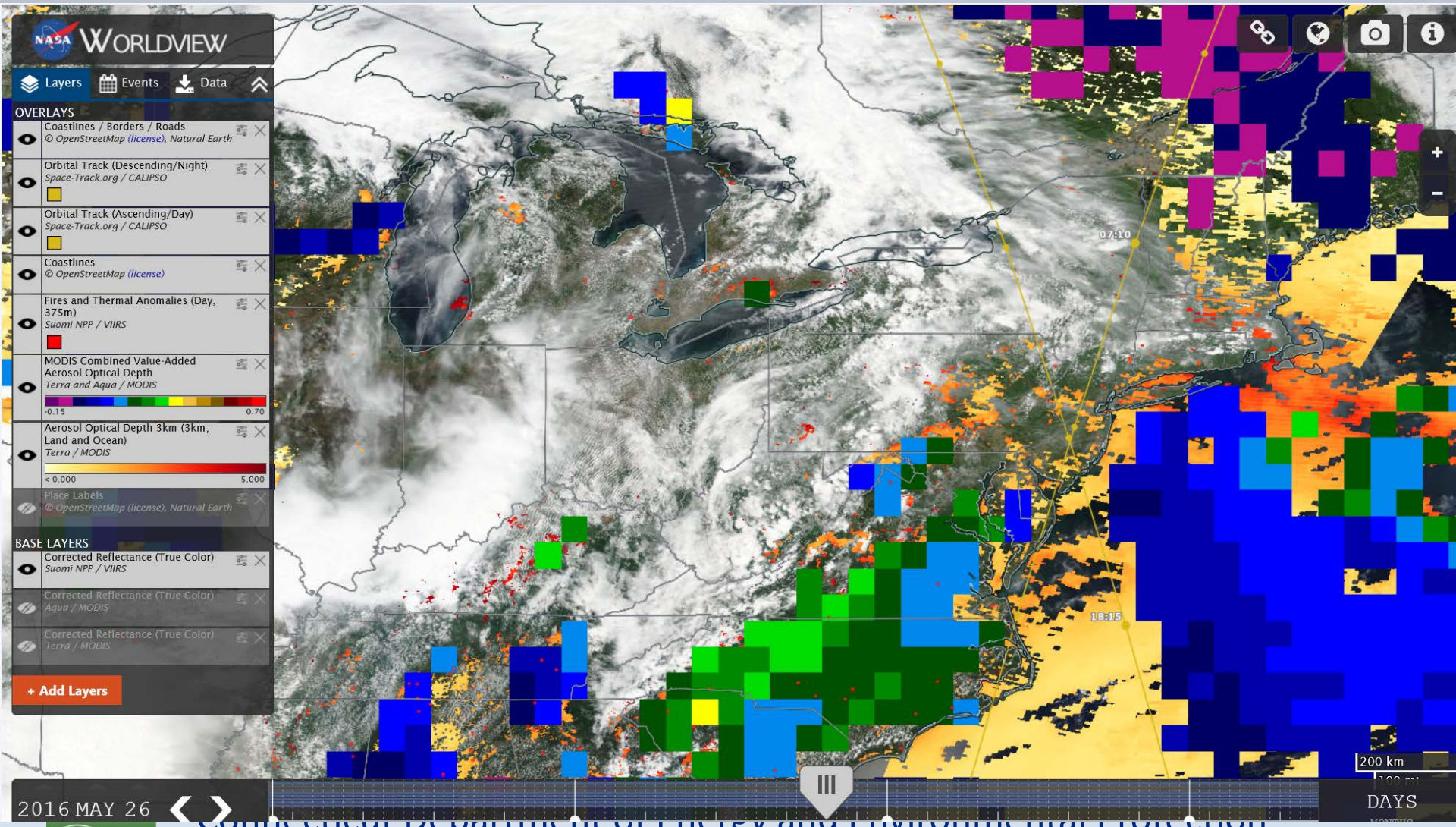
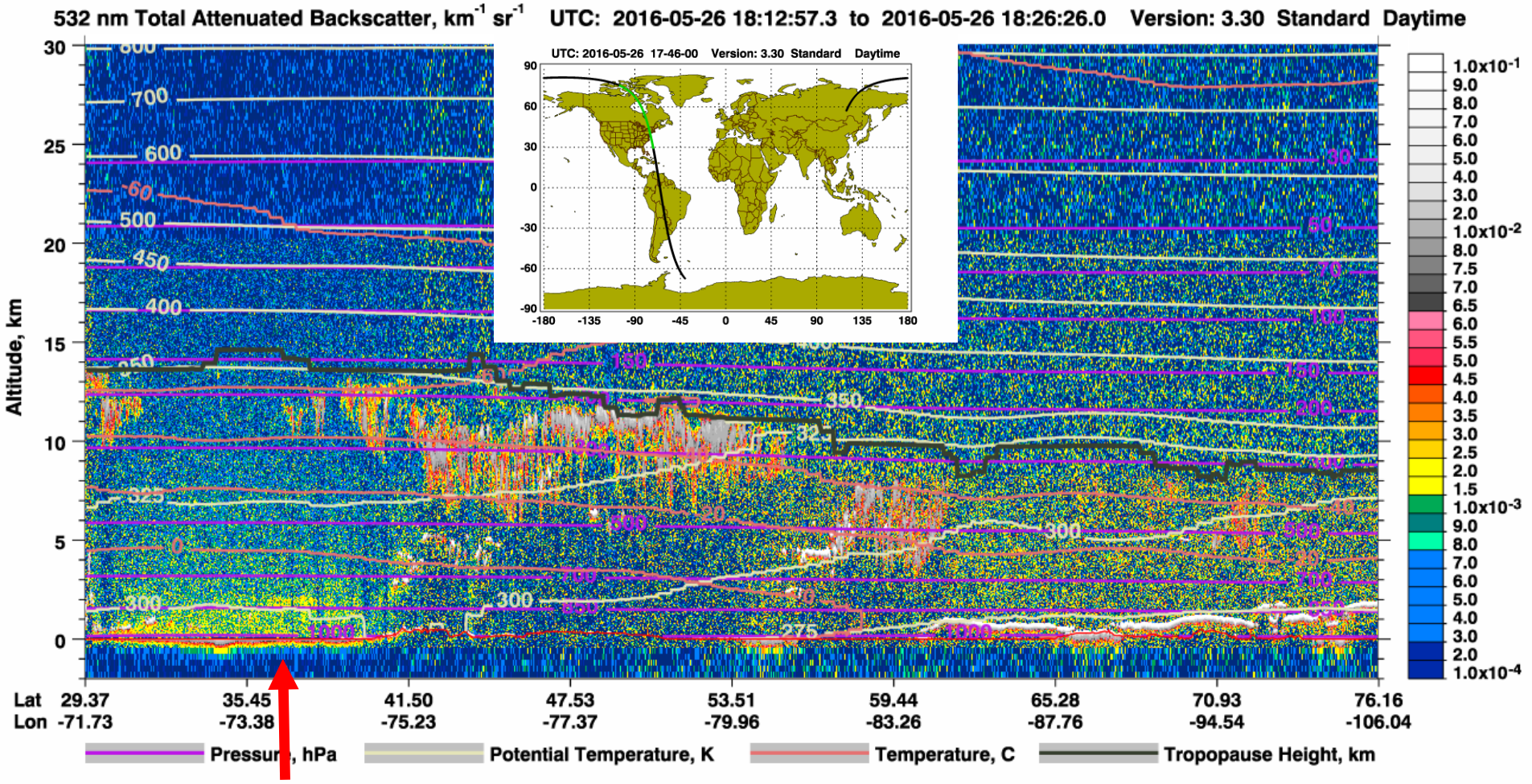
May 26th, 2016 AOD with Calipso Track



5/26/16



MD-NY

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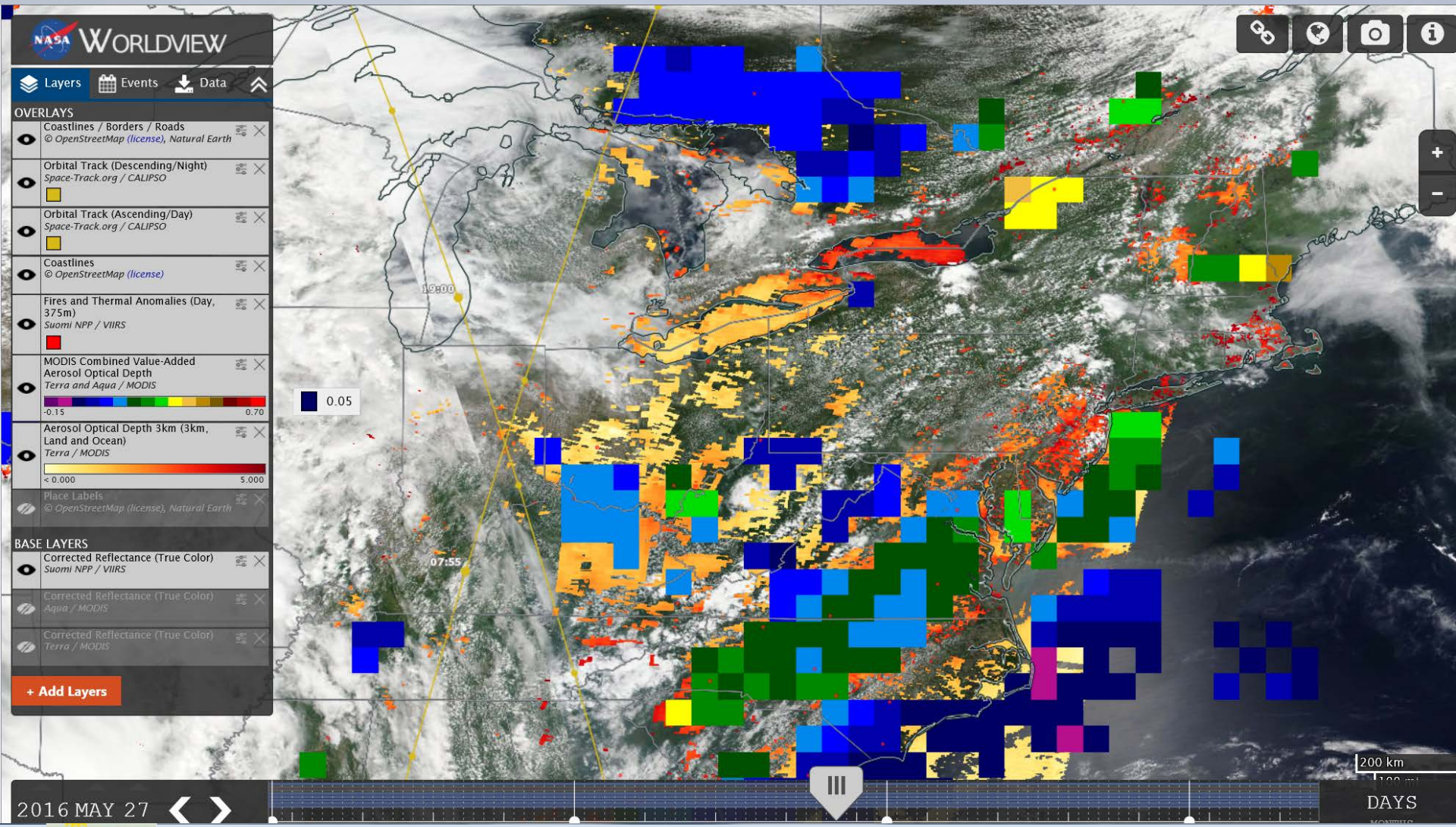
May 27th, 2016 Smoke Plume

May 27th, 2016 AOD with Calipso Track



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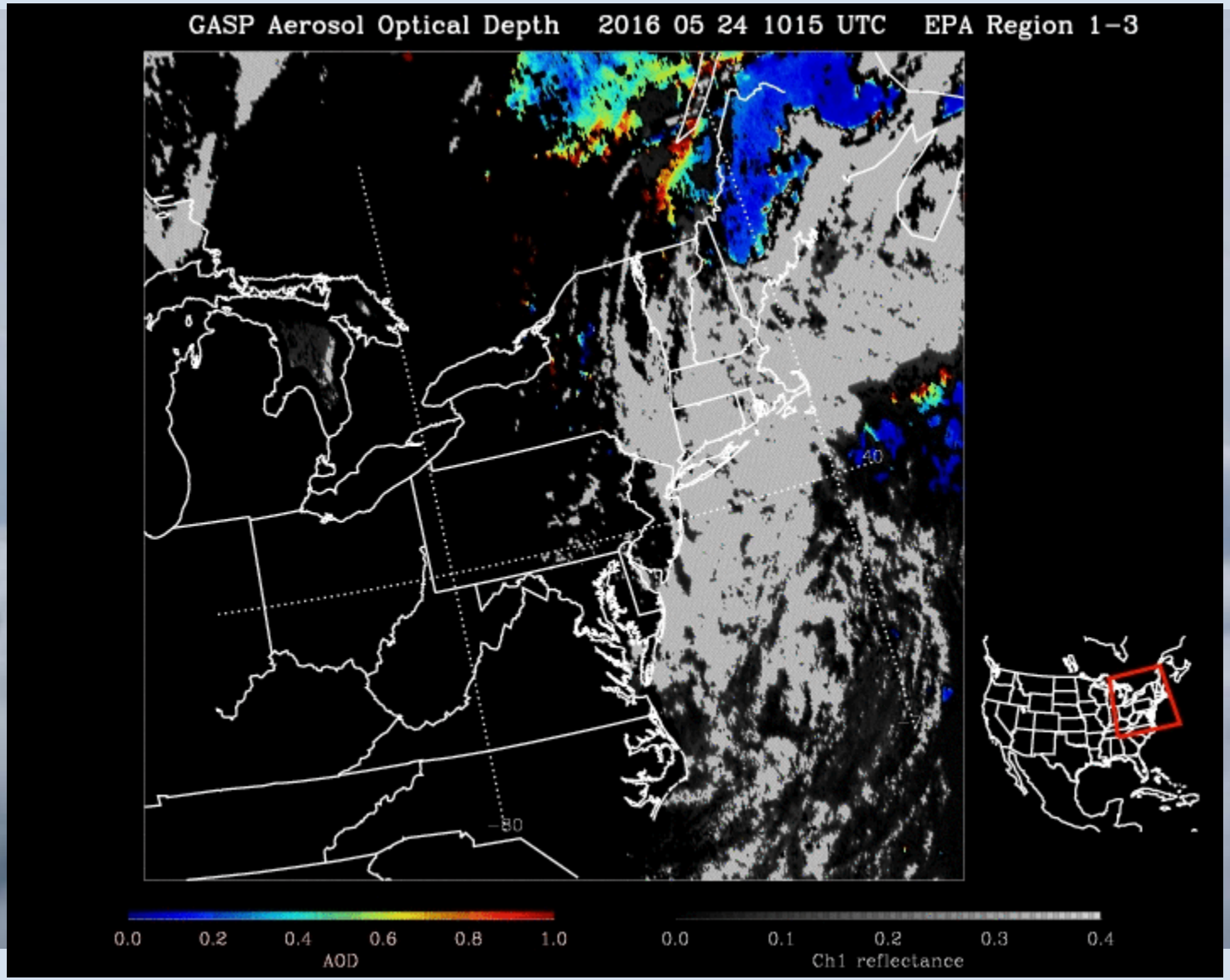
Using GASP for AOD: May 24th



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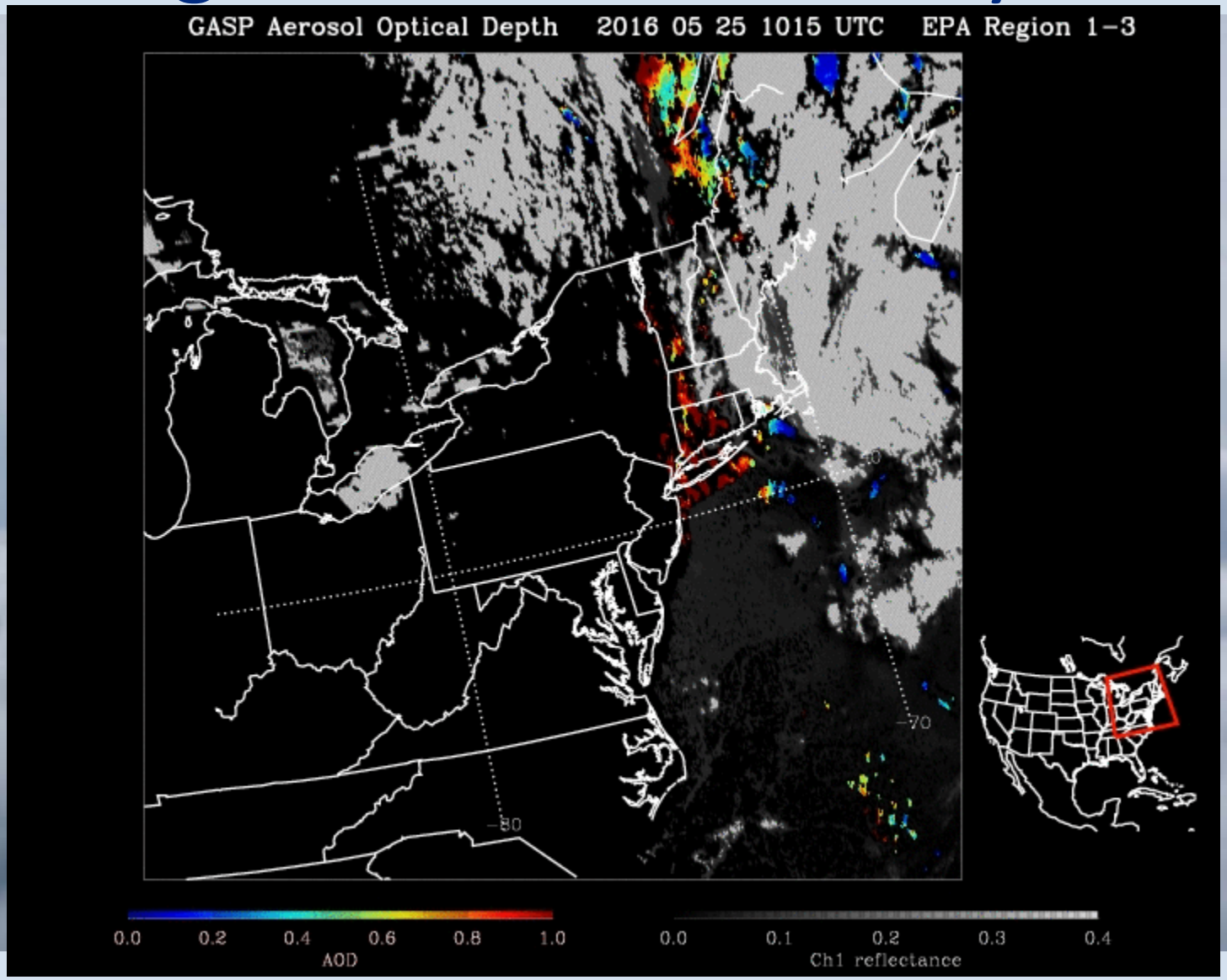
Using GASP for AOD: May 25th



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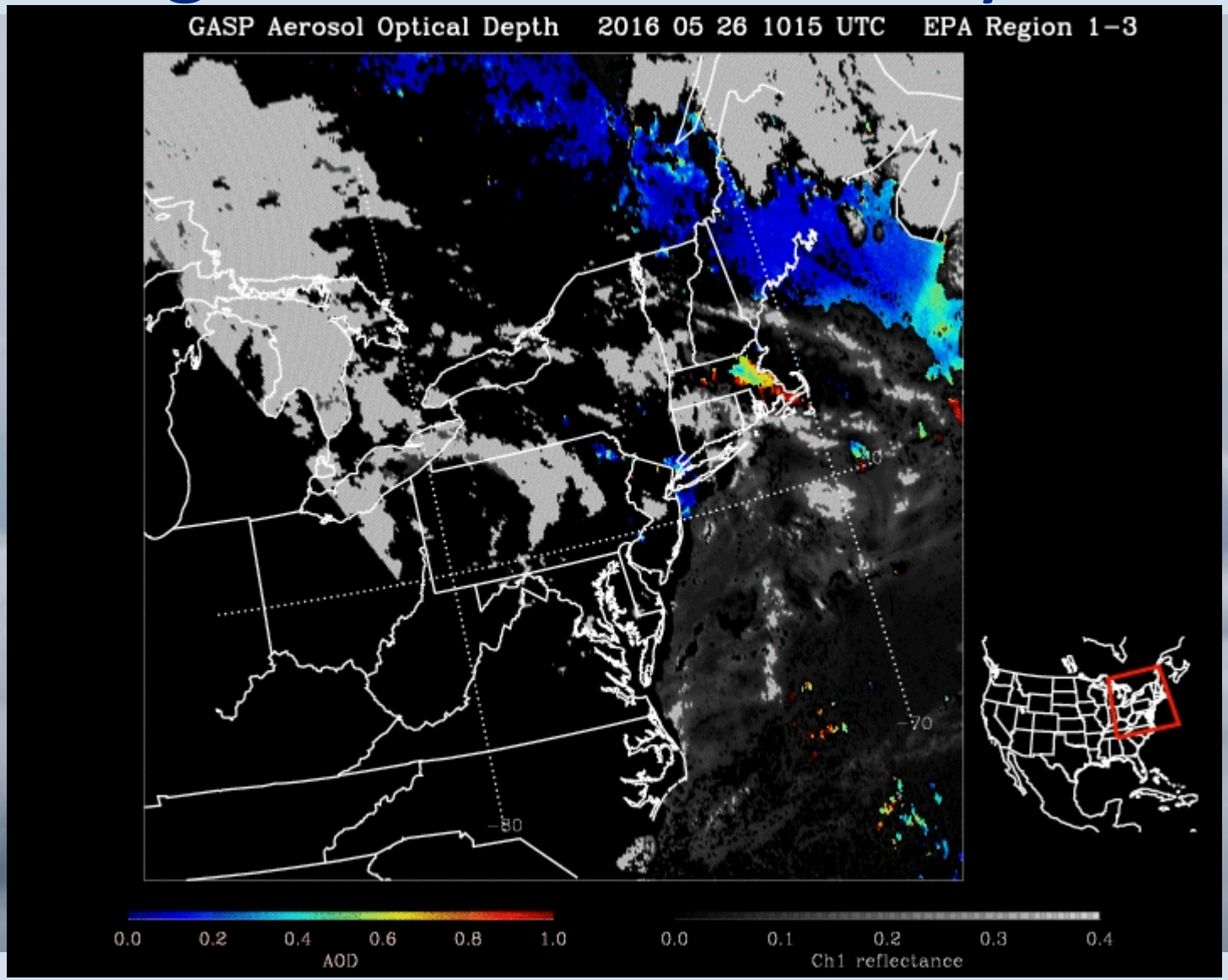
Using GASP for AOD: May 26th



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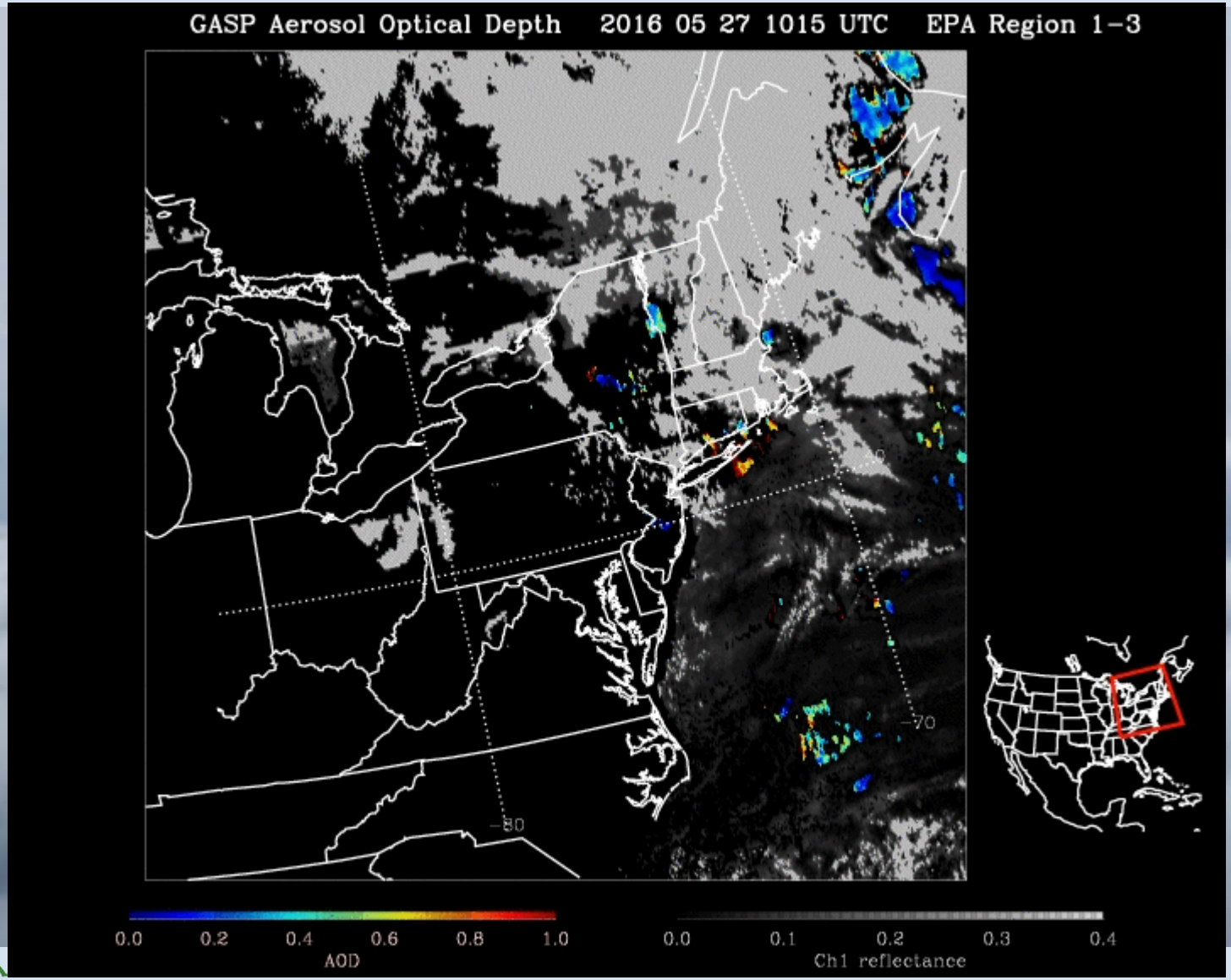
Using GASP for AOD: May 27th



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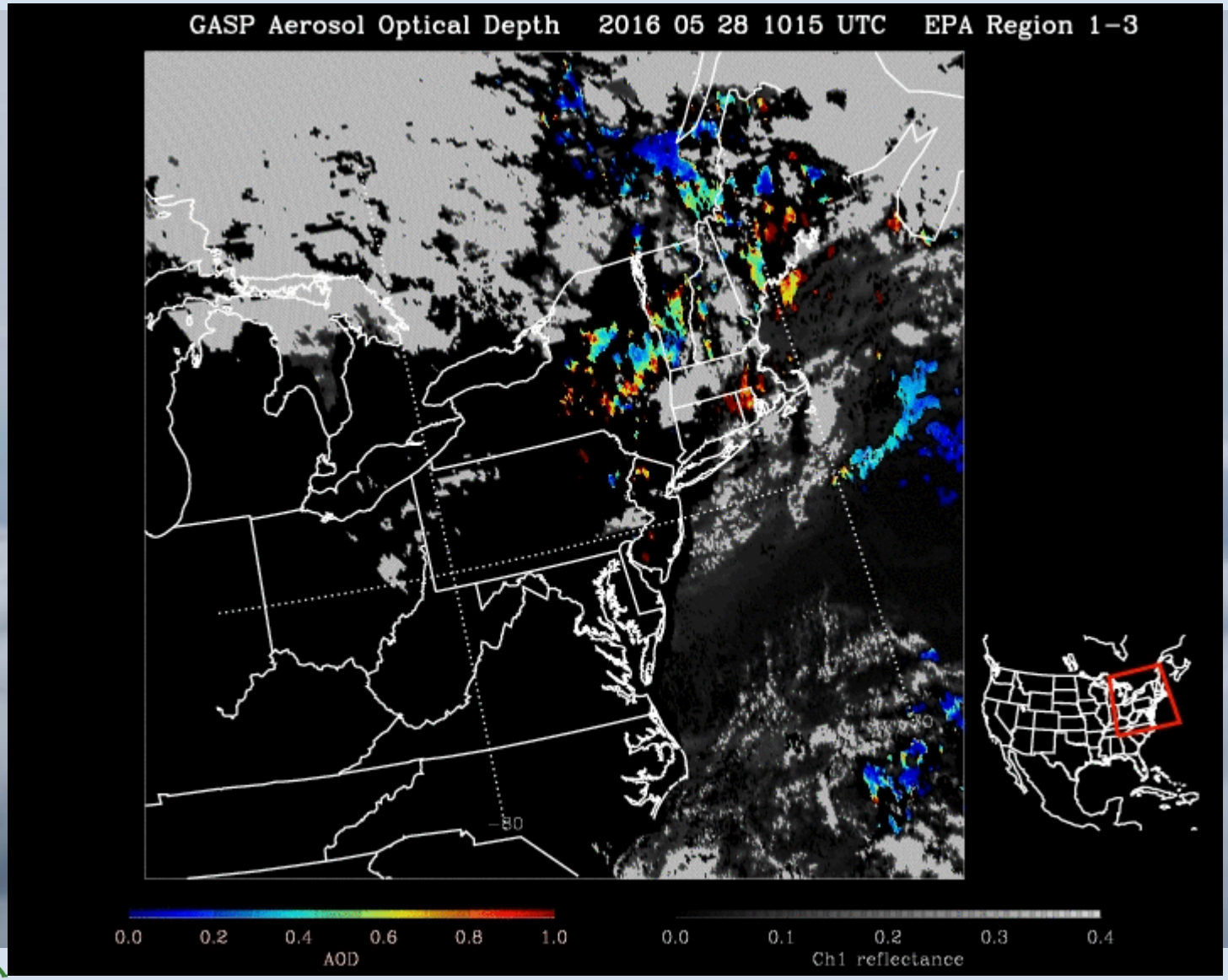
Using GASP for AOD: May 28th



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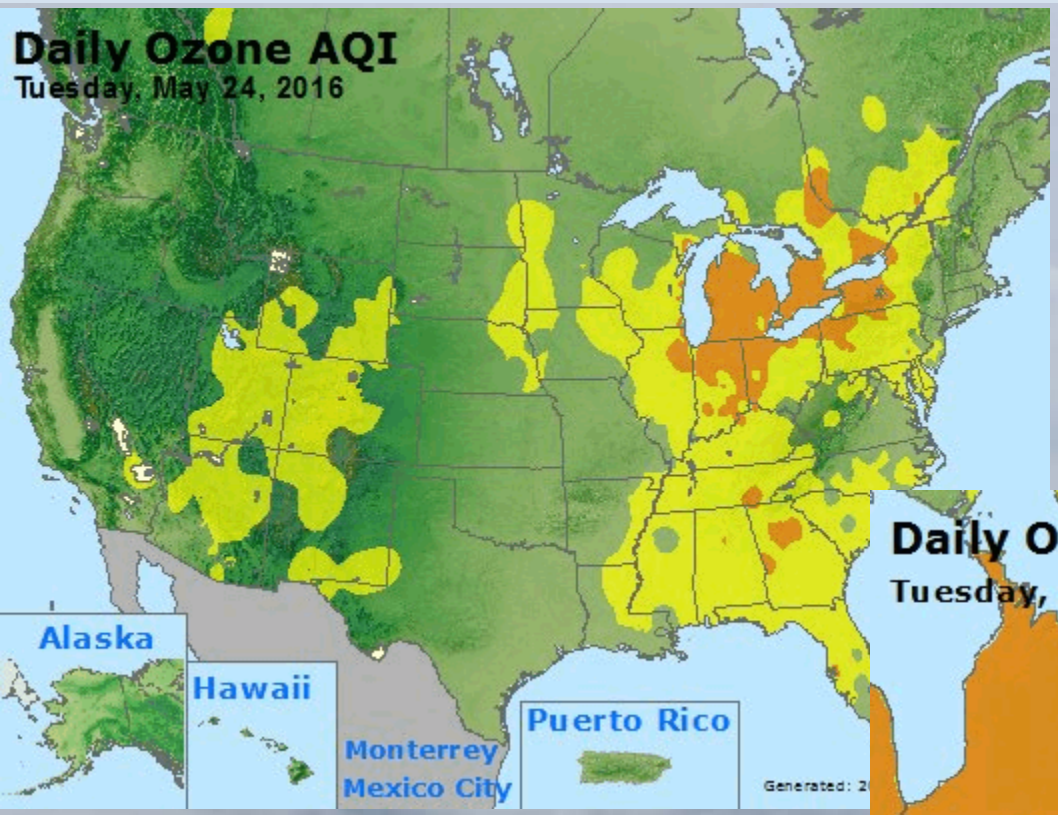
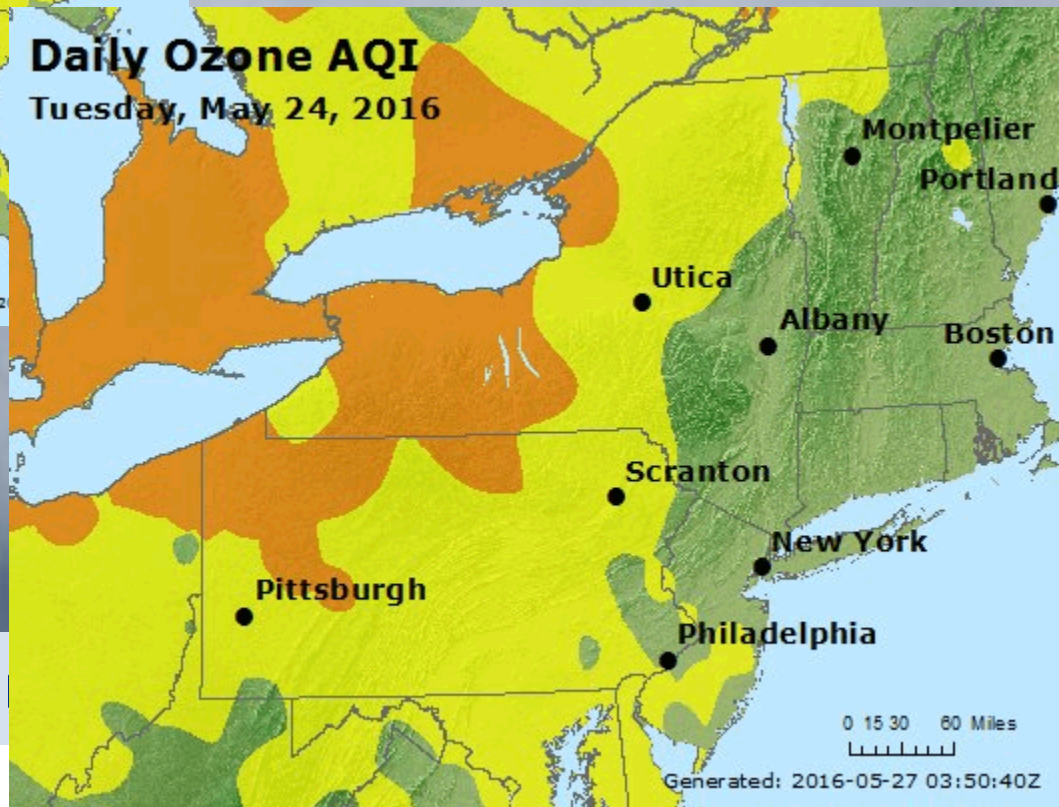
May 24th-29th, 2016 Ozone AQI Map Animation





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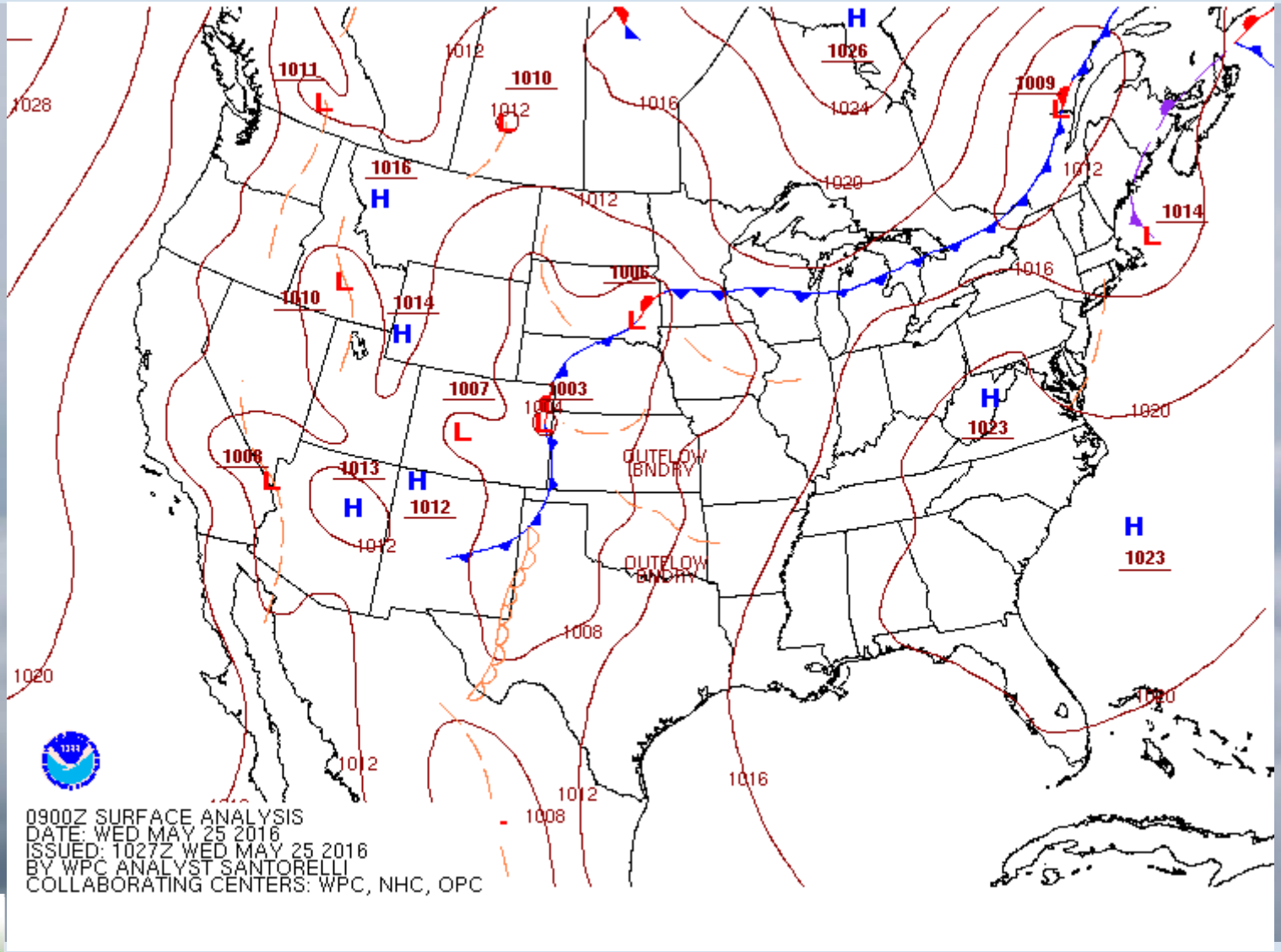
May 25, 2016 Surface Map Animation



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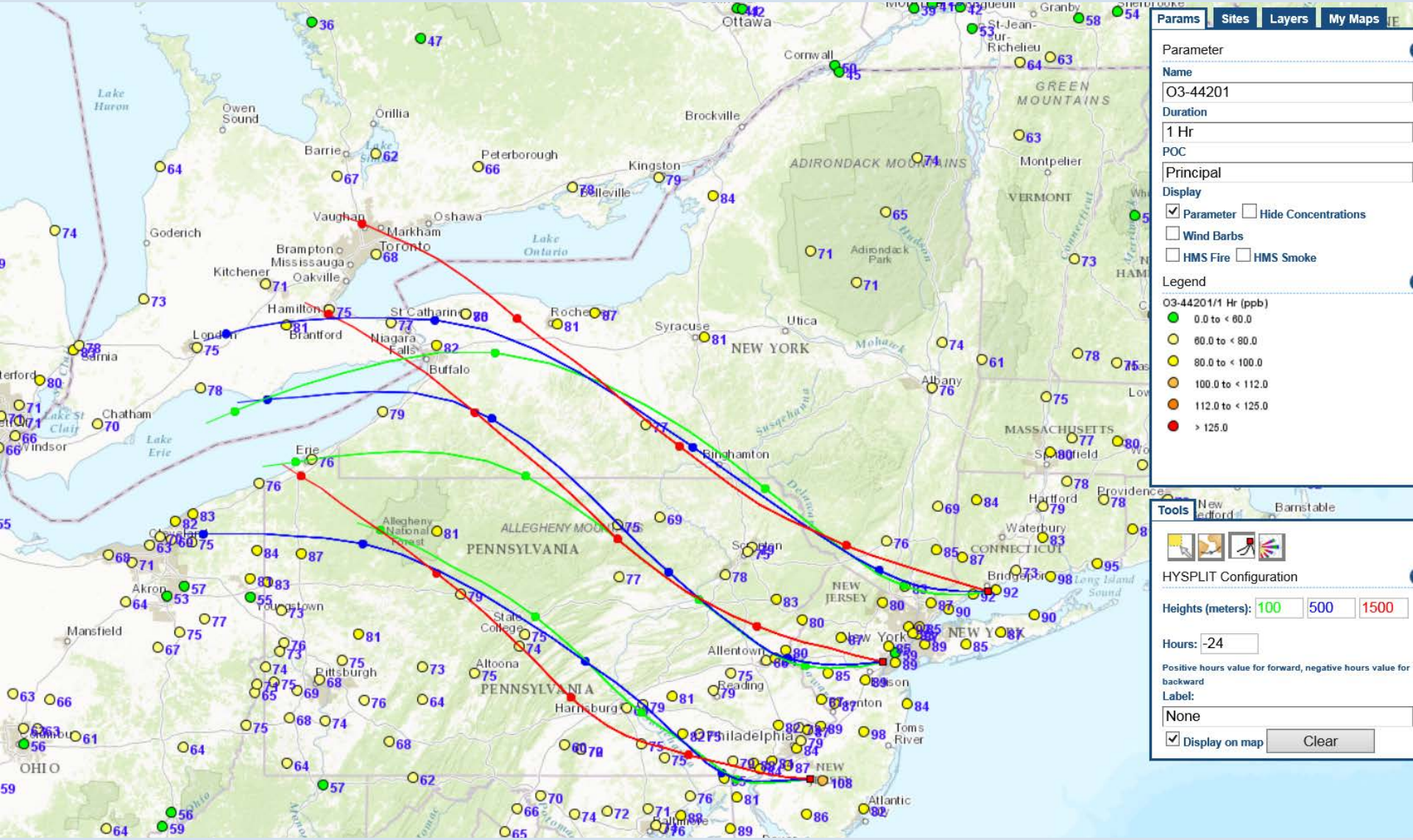
May 25th Widespread OTR Exceedances

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:

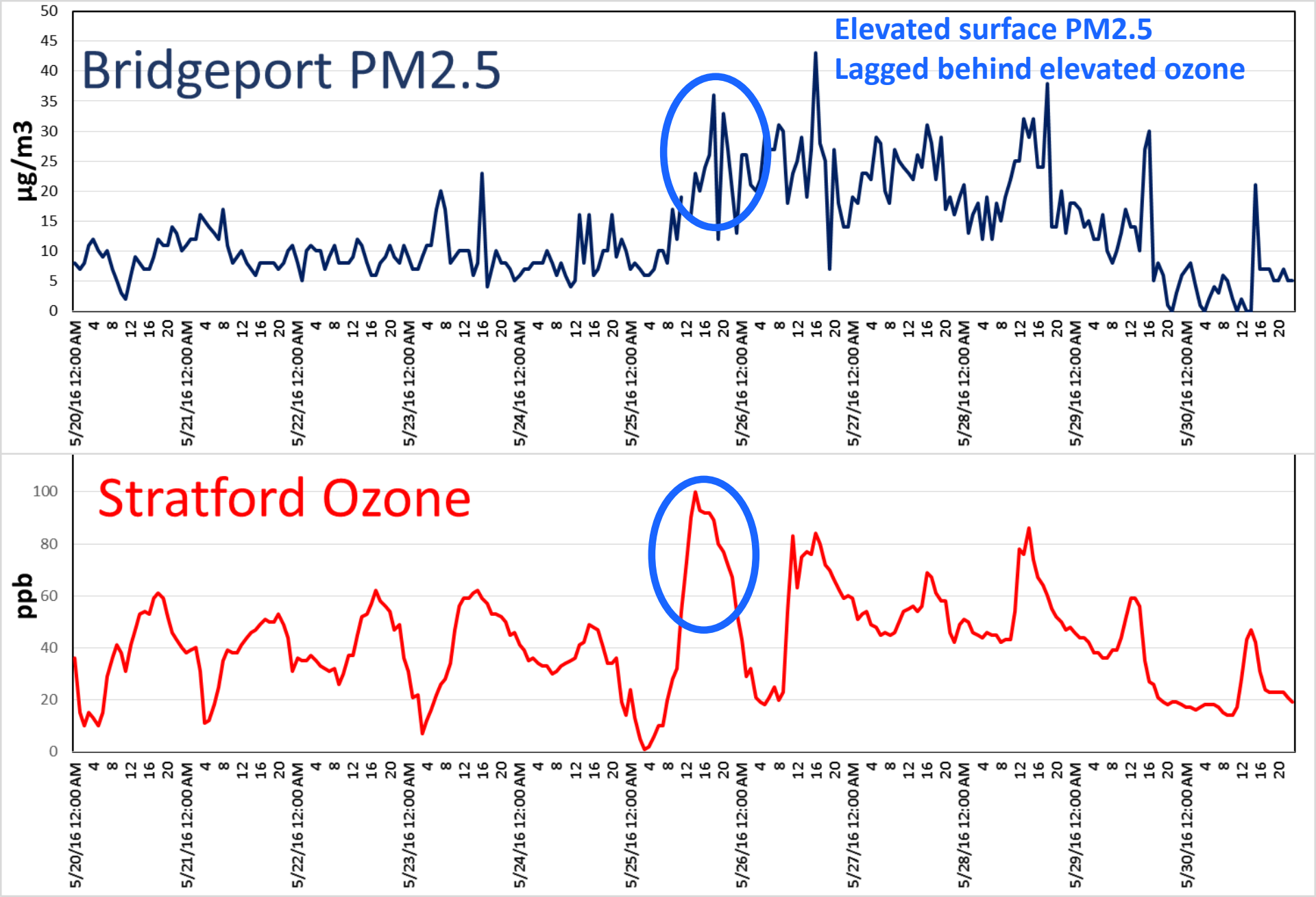
1. 121 sites above 70 ppb ozone NAAQS, 11 sites in CT
2. 83 sites above (2008) 75 ppb ozone NAAQS, 9 sites in CT
3. 14 sites above (1997) 84 ppb ozone NAAQS, 5 sites in CT

24-hr Back Trajectories 4:00 pm EST

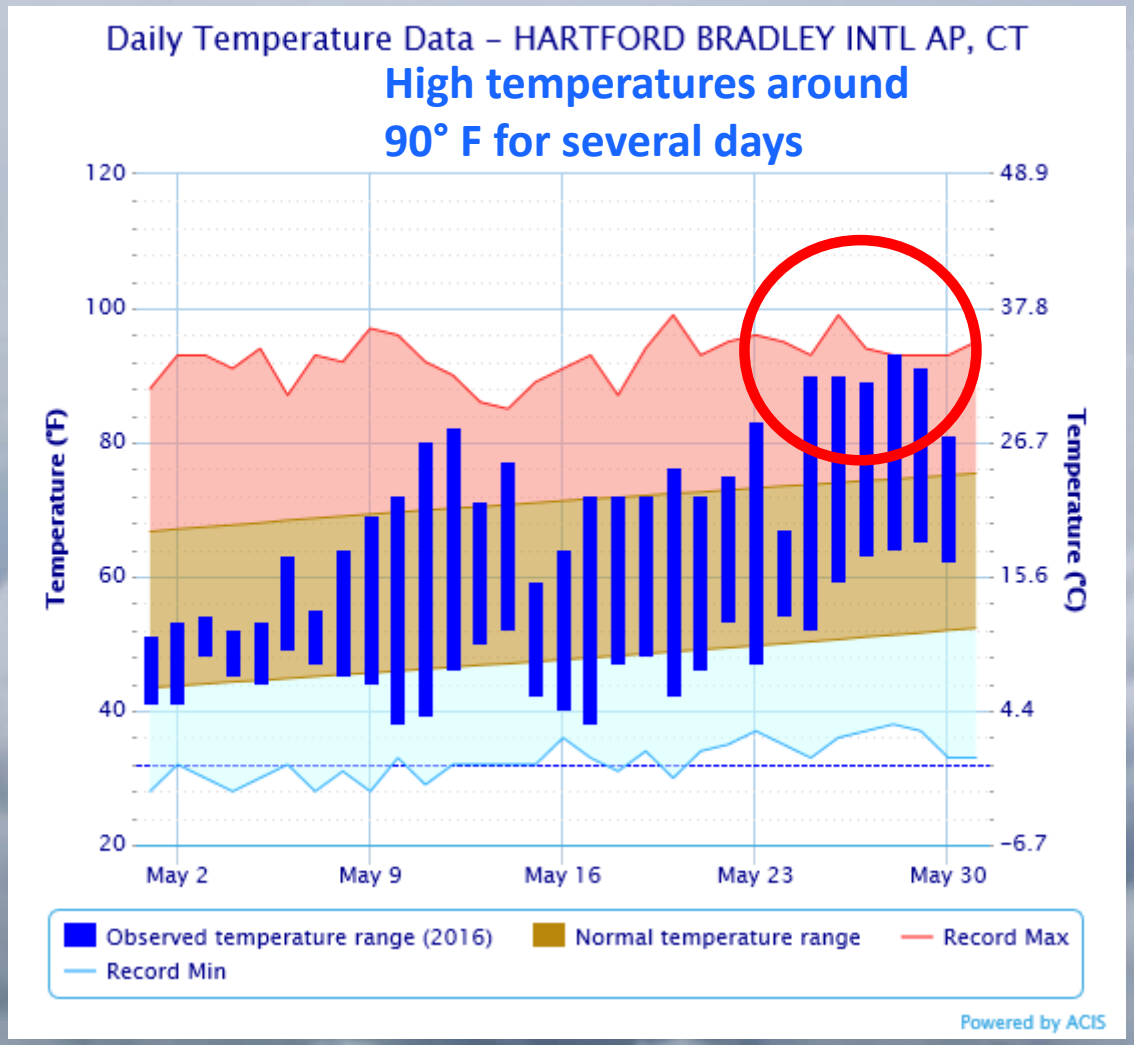


Long range transport from Michigan, with surface winds turning southwest during afternoon, mixed with I-95 corridor ozone and enhanced the ozone along the CT coast.

Elevated PM2.5 vs. Ozone

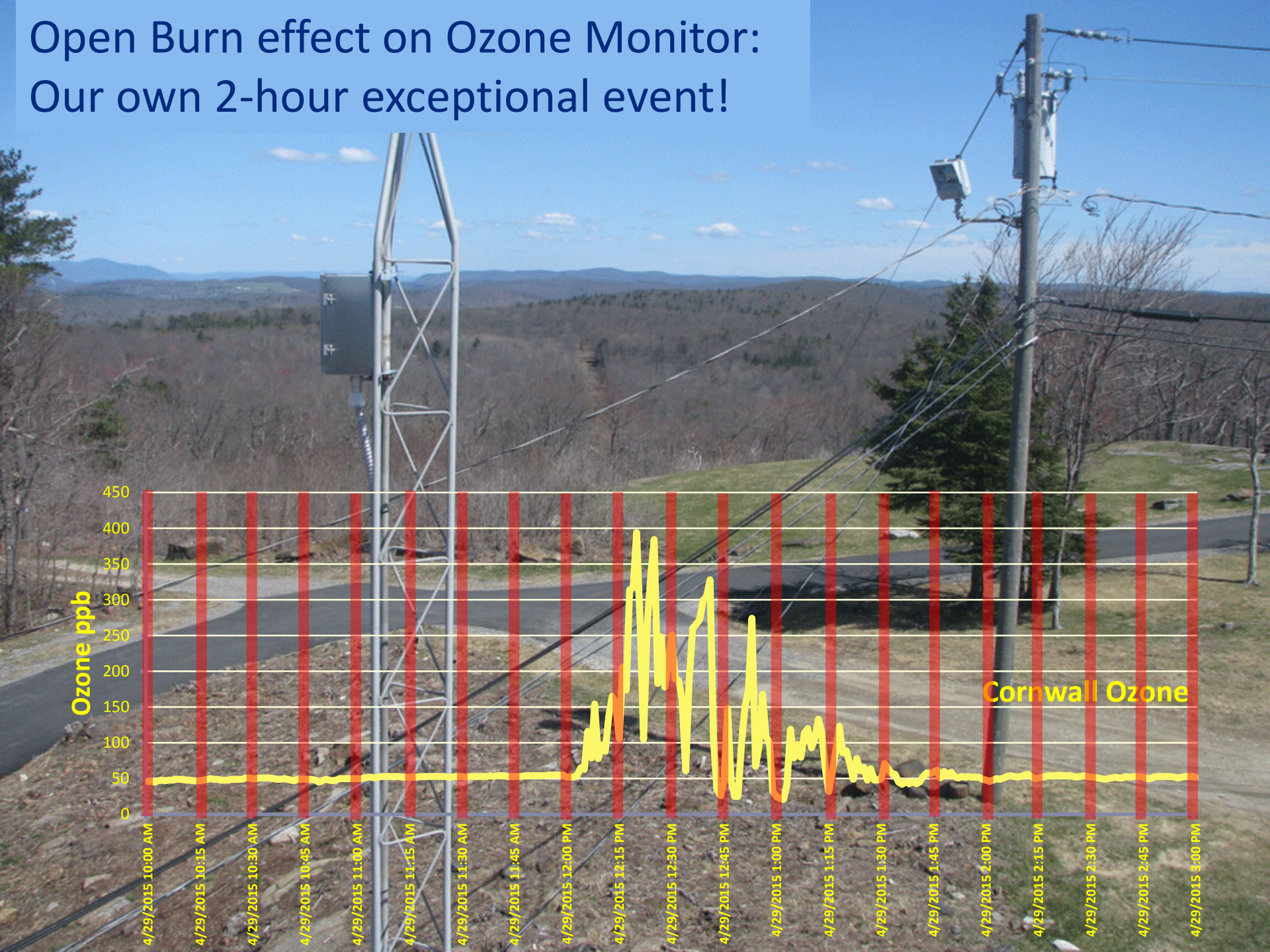


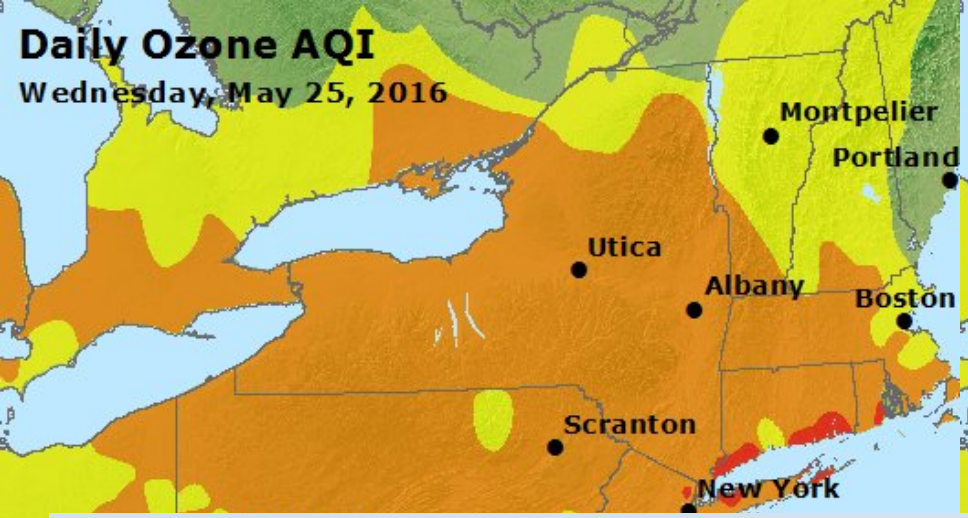
May Temperatures for Bradley Airport CT

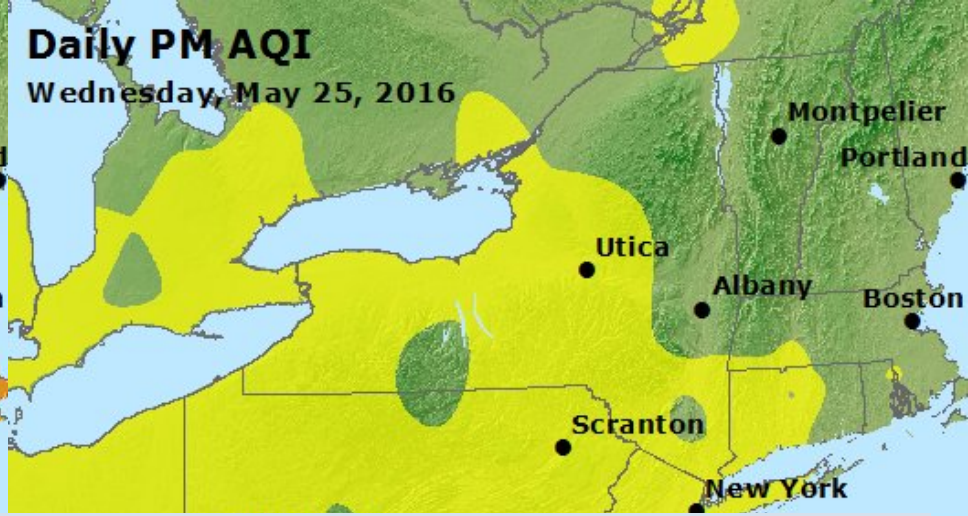


Date	Maximum
2016-05-01	51
2016-05-02	53
2016-05-03	54
2016-05-04	52
2016-05-05	53
2016-05-06	63
2016-05-07	55
2016-05-08	64
2016-05-09	69
2016-05-10	72
2016-05-11	80
2016-05-12	82
2016-05-13	71
2016-05-14	77
2016-05-15	59
2016-05-16	64
2016-05-17	72
2016-05-18	72
2016-05-19	72
2016-05-20	76
2016-05-21	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

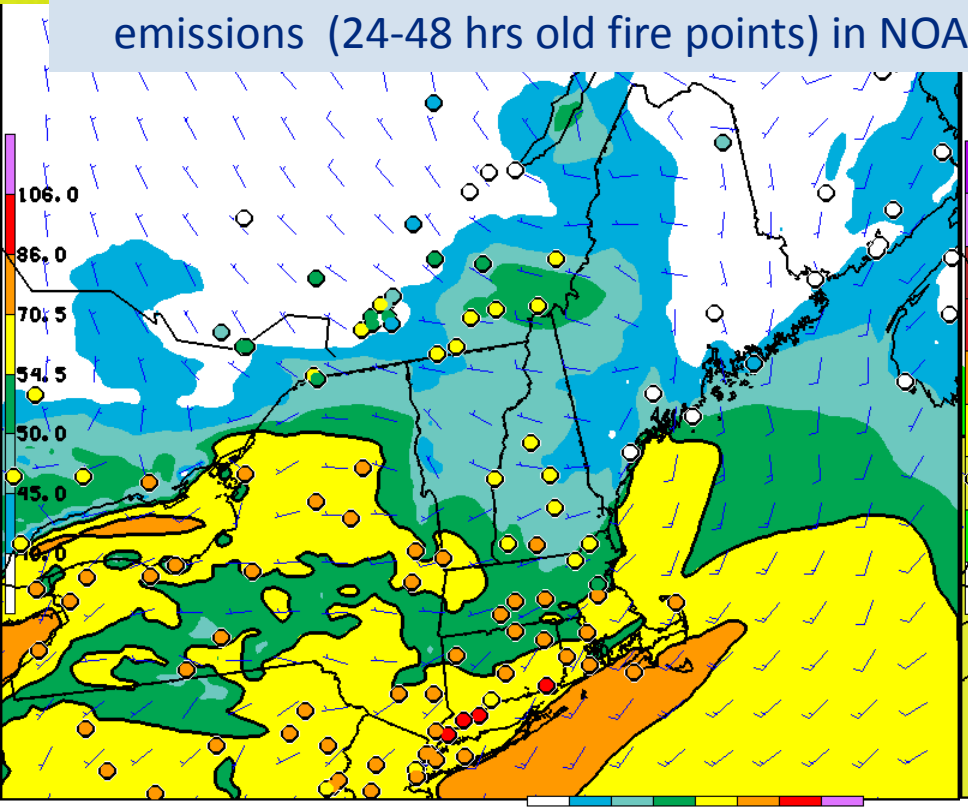
Open Burn effect on Ozone Monitor: Our own 2-hour exceptional event!

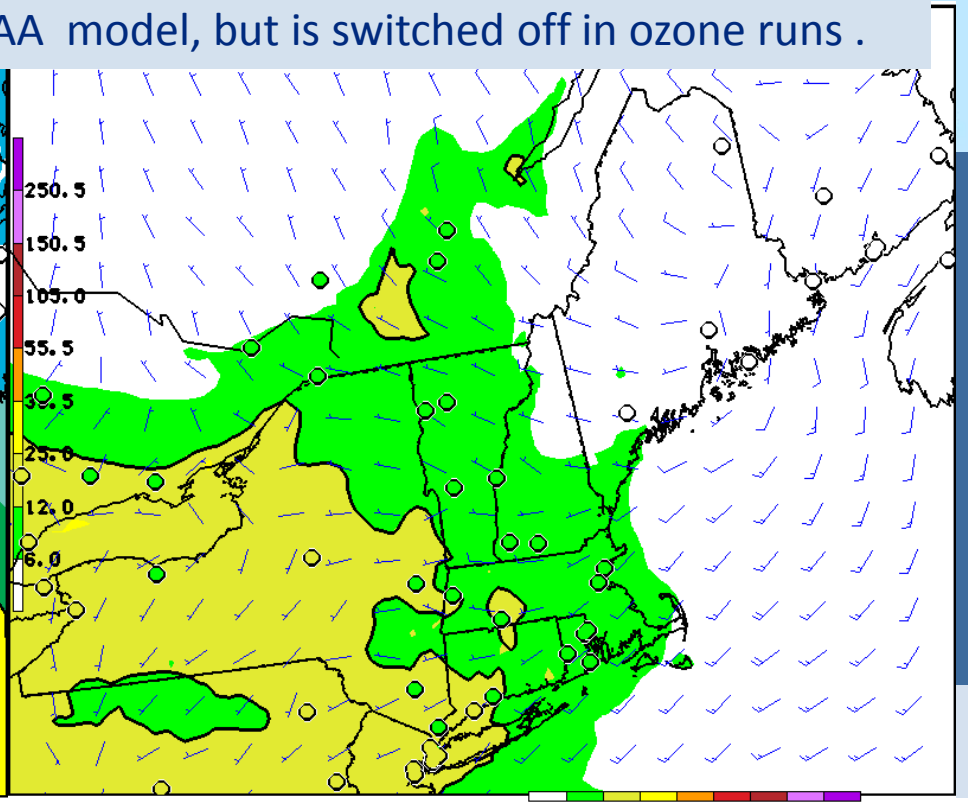






Incorporated NESIDS Hazard Mapping System "observed" wild fire near real-time smoke emissions (24-48 hrs old fire points) in NOAA model, but is switched off in ozone runs .





Conclusion

- The visible smoke plume first observed over CT on May 20th had little effect on air quality;
- The buildup of smoke transported from Canada over the Great Lakes caused high ozone there from May 24th-25th;
- This ozone was transported to the Northeast States on May 25-26, causing abnormally high ozone to be monitored.
- CT has flagged this as a possible exceptional event, but need to prove 'but for' unless the rule changes.
- The satellite products prove that the wildfire smoke impacted Connecticut, but how much did it increase the ozone?

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