GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

Transport of Smoke Plumes from Fires in Georgia

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HAQAST-Massachusetts
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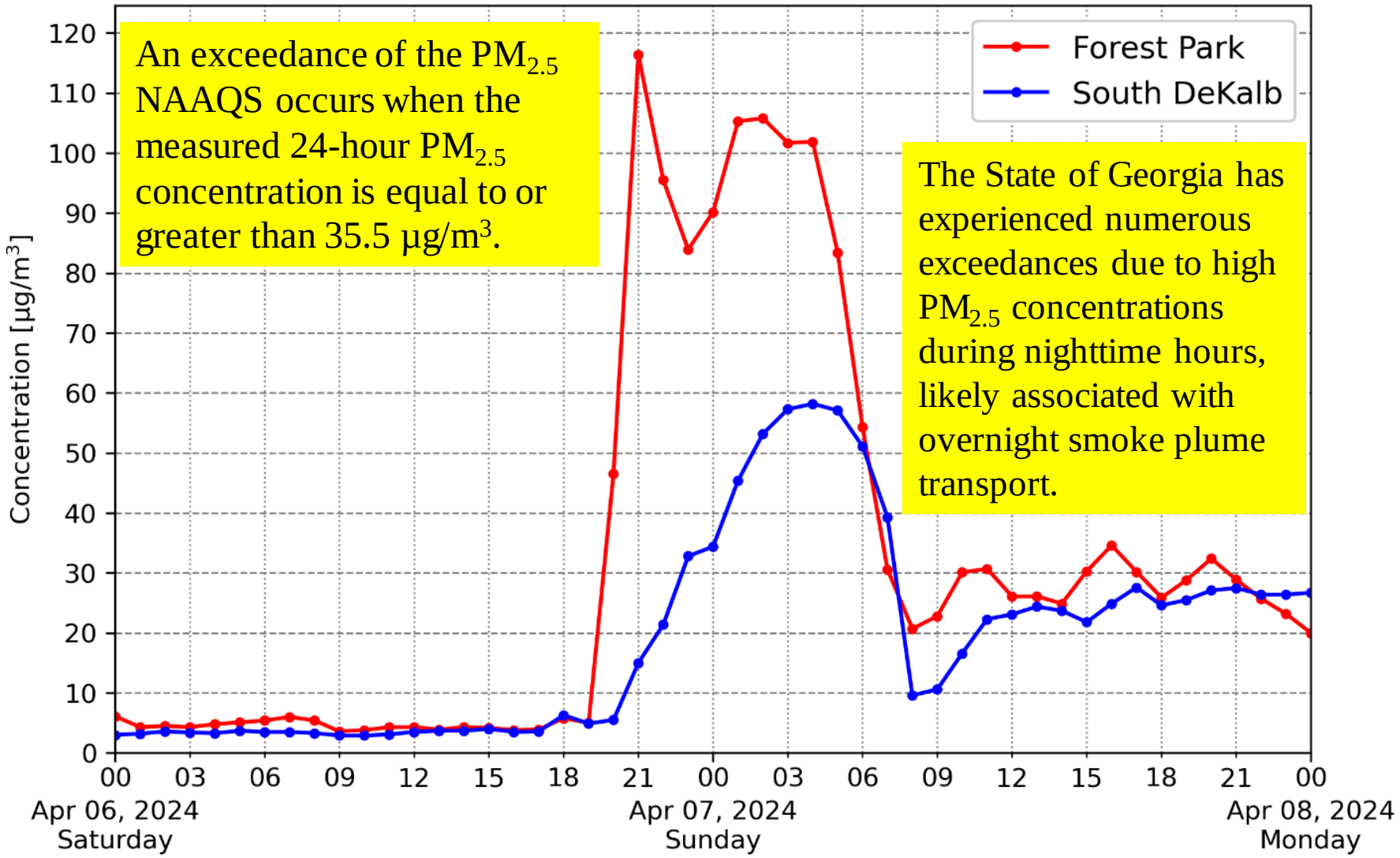
2024 PM NAAQS

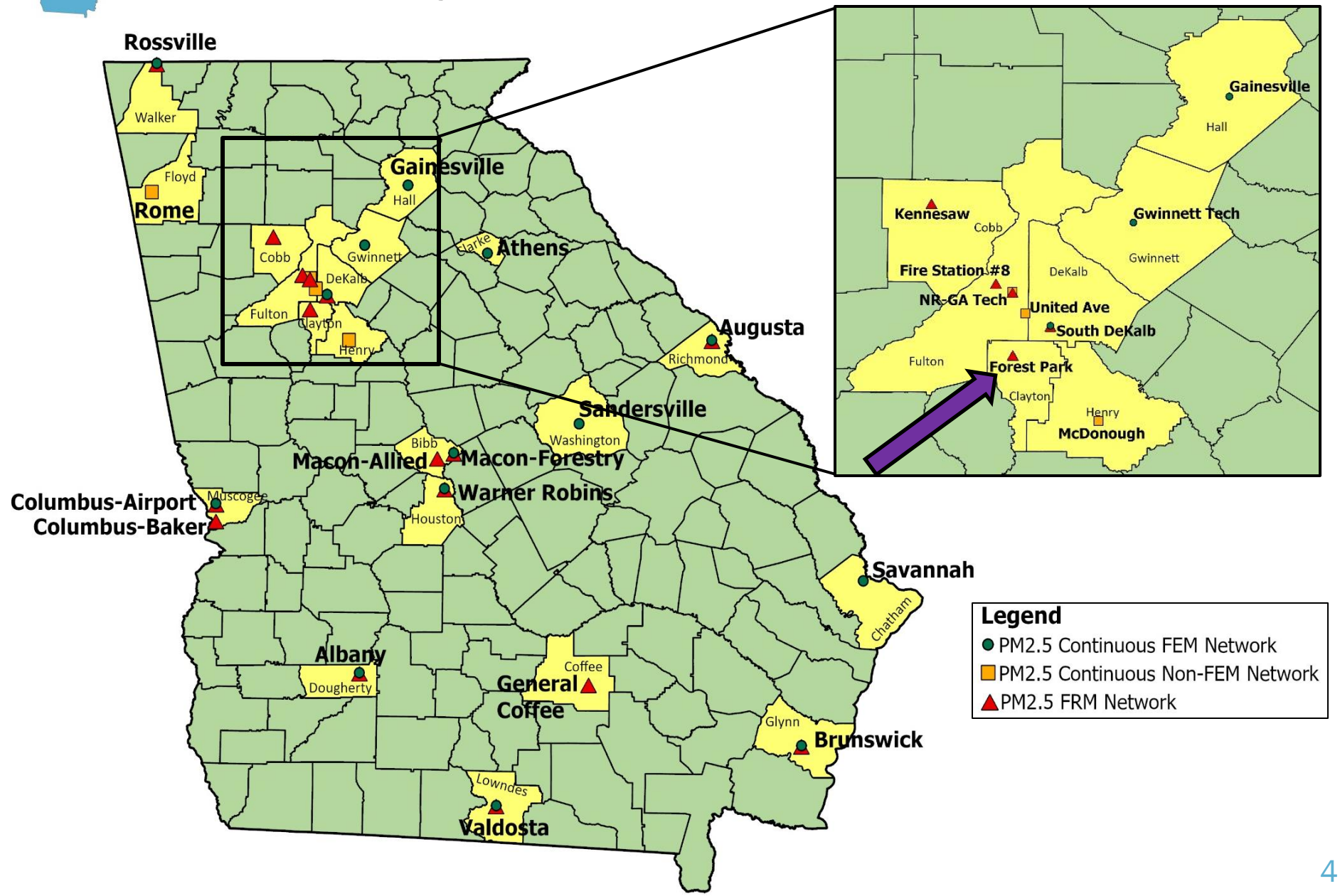
- The new annual $PM_{2.5}$ standard is 9.0 $\mu g/m^3$.
- The daily $PM_{2.5}$ standard is retained at 35 $\mu g/m^3$.
- The State of Georgia will need to work on numerous "Exceptional Event Demonstrations" since many exceedances are due to smoke from prescribed fires.
- Some cases including those with long-range transport will need to be examined with advanced tools.

FOREST PARK: APRIL 7, 2024

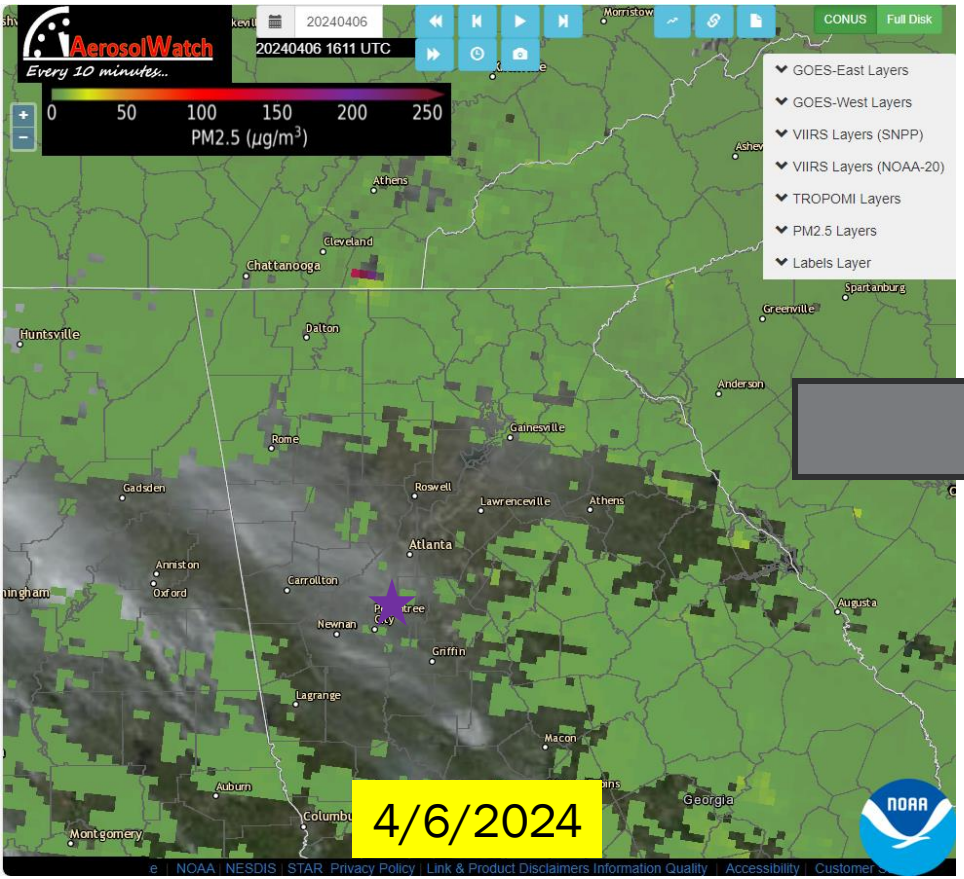


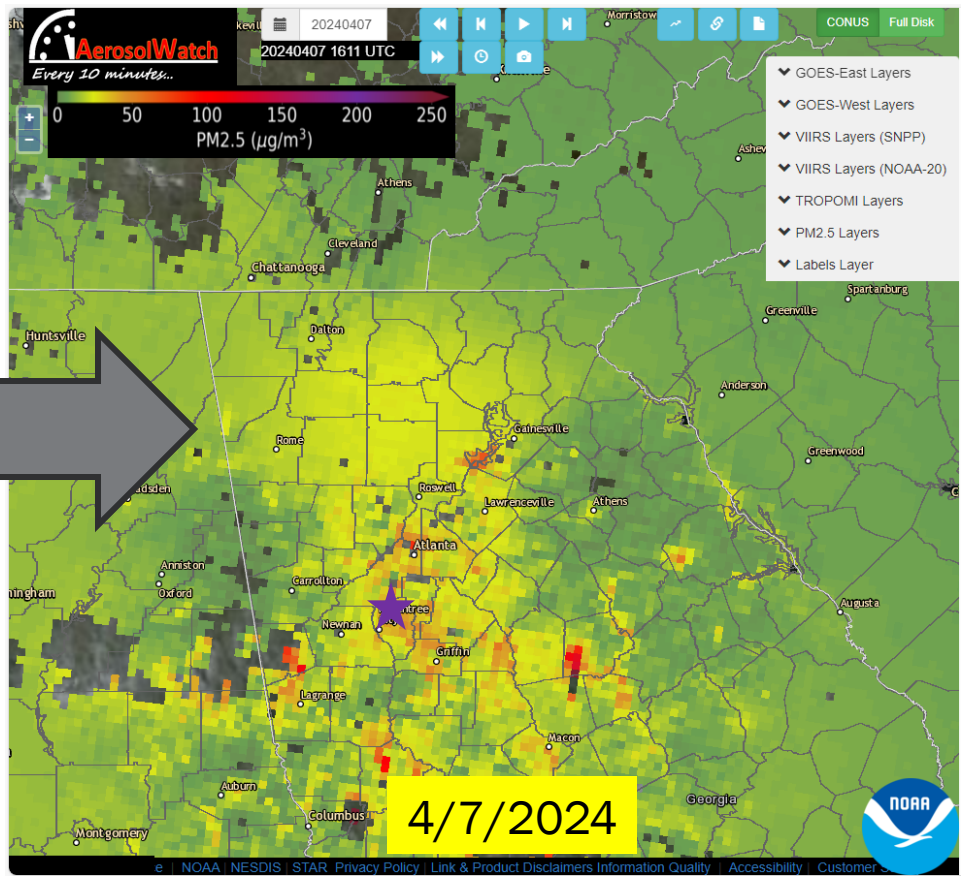
Daily Average Value: 46.4 µg/m³

$PM_{2.5}$ MONITOR LOCATIONS



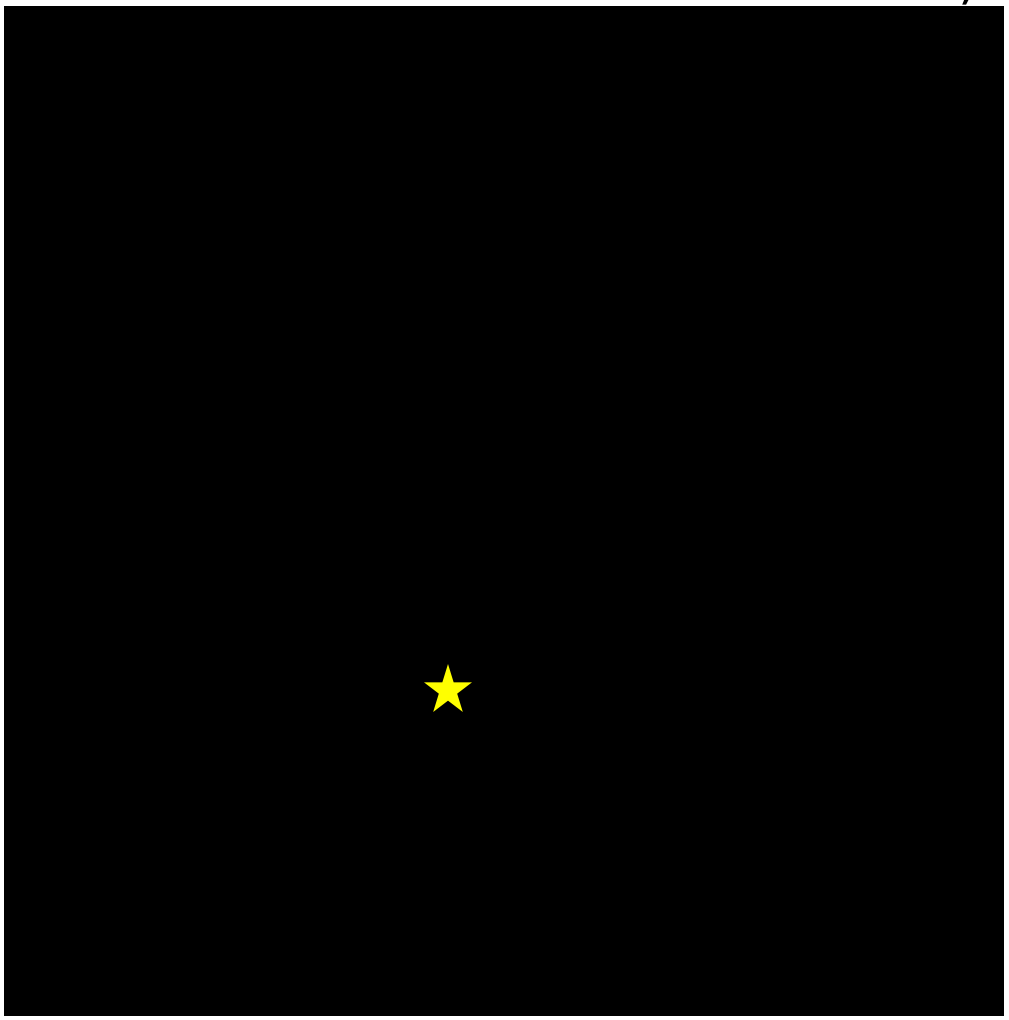
DAILY AOD-ESTIMATED $PM_{2.5}$



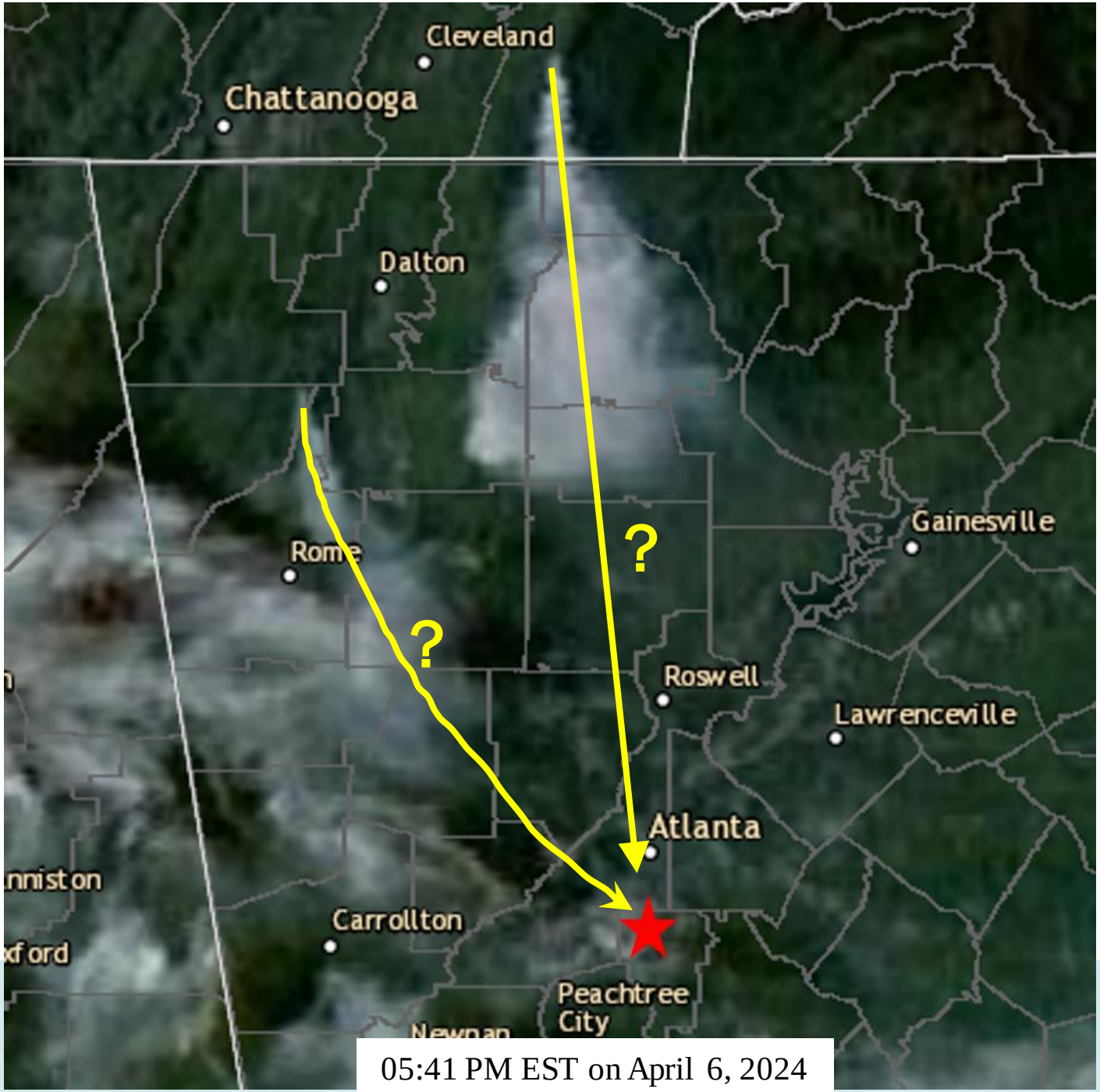


We need a way to explain what happened between April 6 and April 7.

GOES16 GEOCOLOR: APRIL 6, 2024

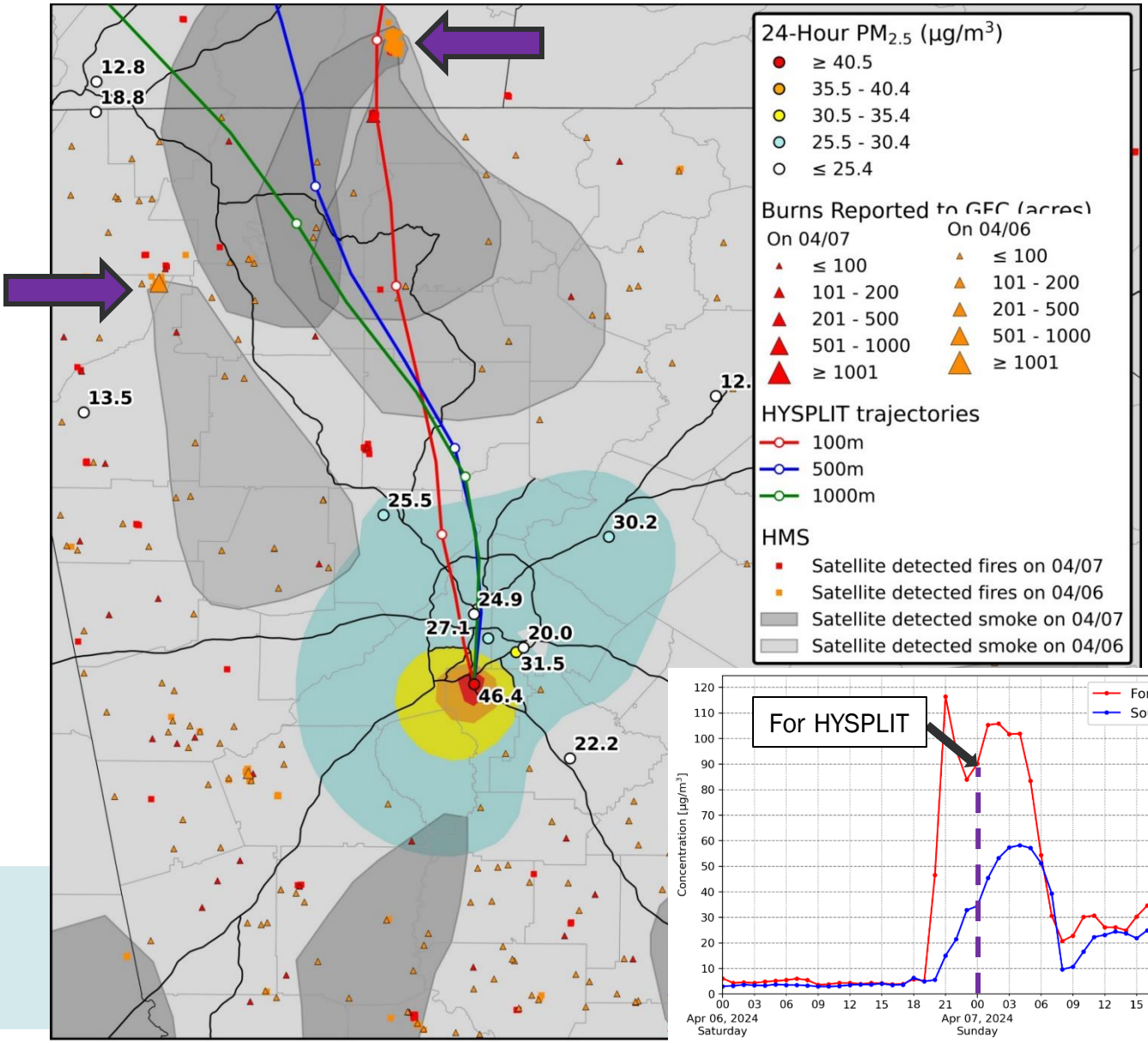


Which plume arrived at the Forest Park monitor?

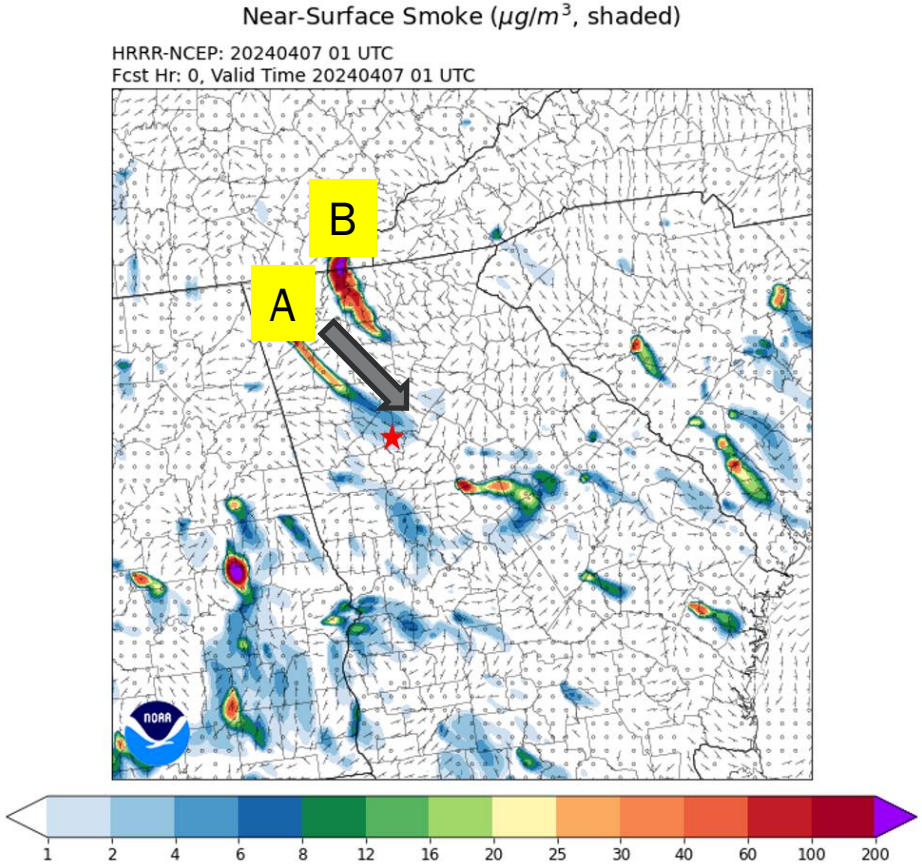


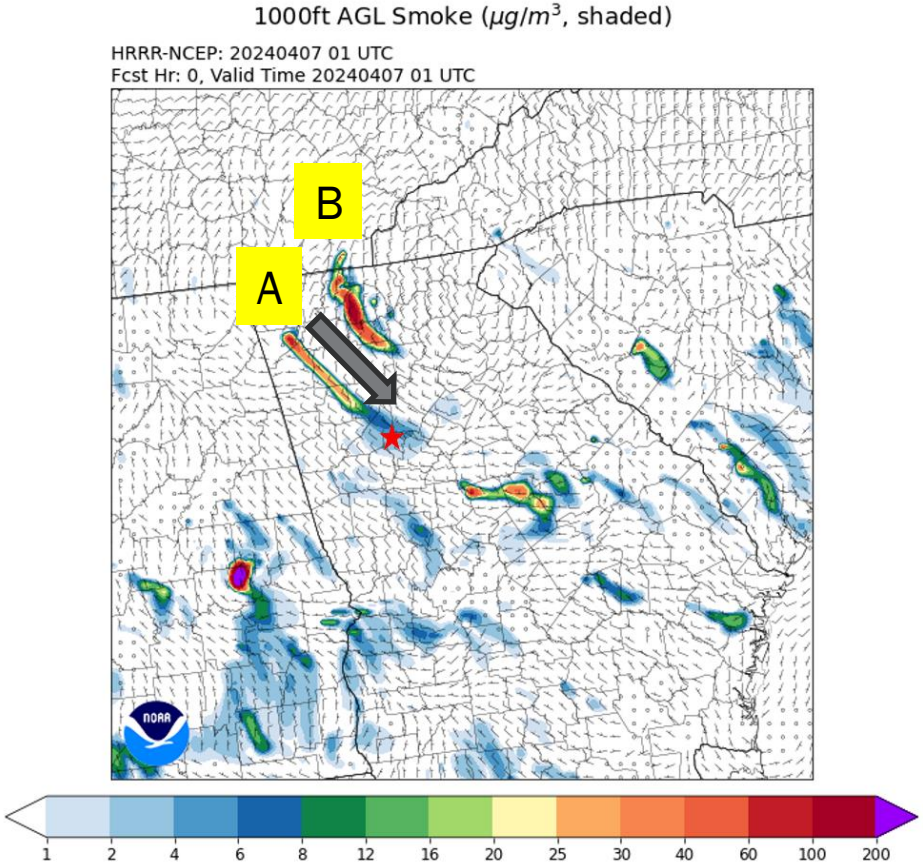
05:41 PM EST on April 6, 2024

“INTEGRATED” PLOT



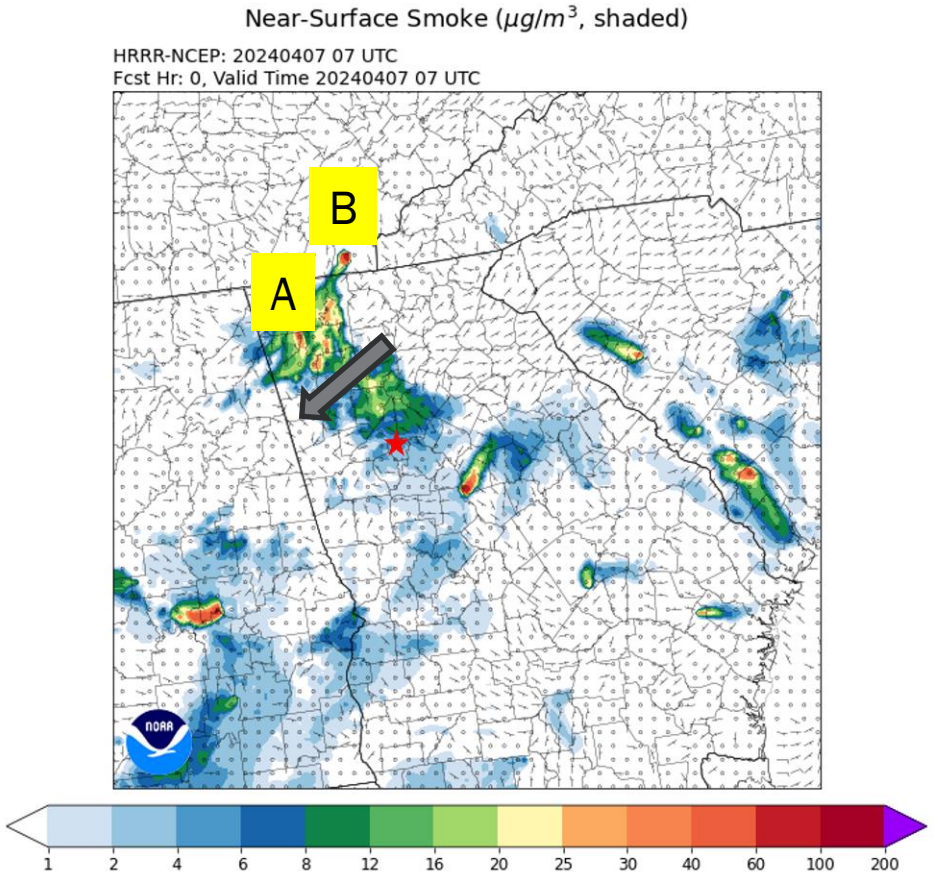
HRRR-SMOKE (8 PM EST ON APRIL 6, 2024)

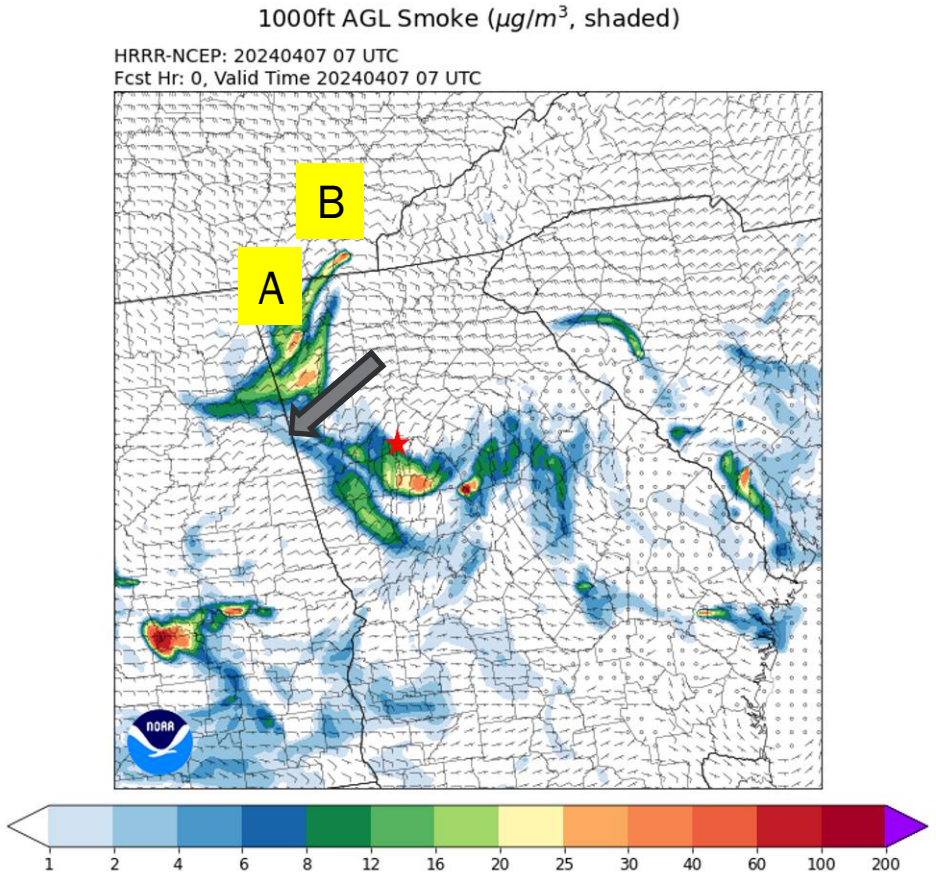




0 Forecast Hour
(i.e., the 1st time step for a 48-hour forecasting)

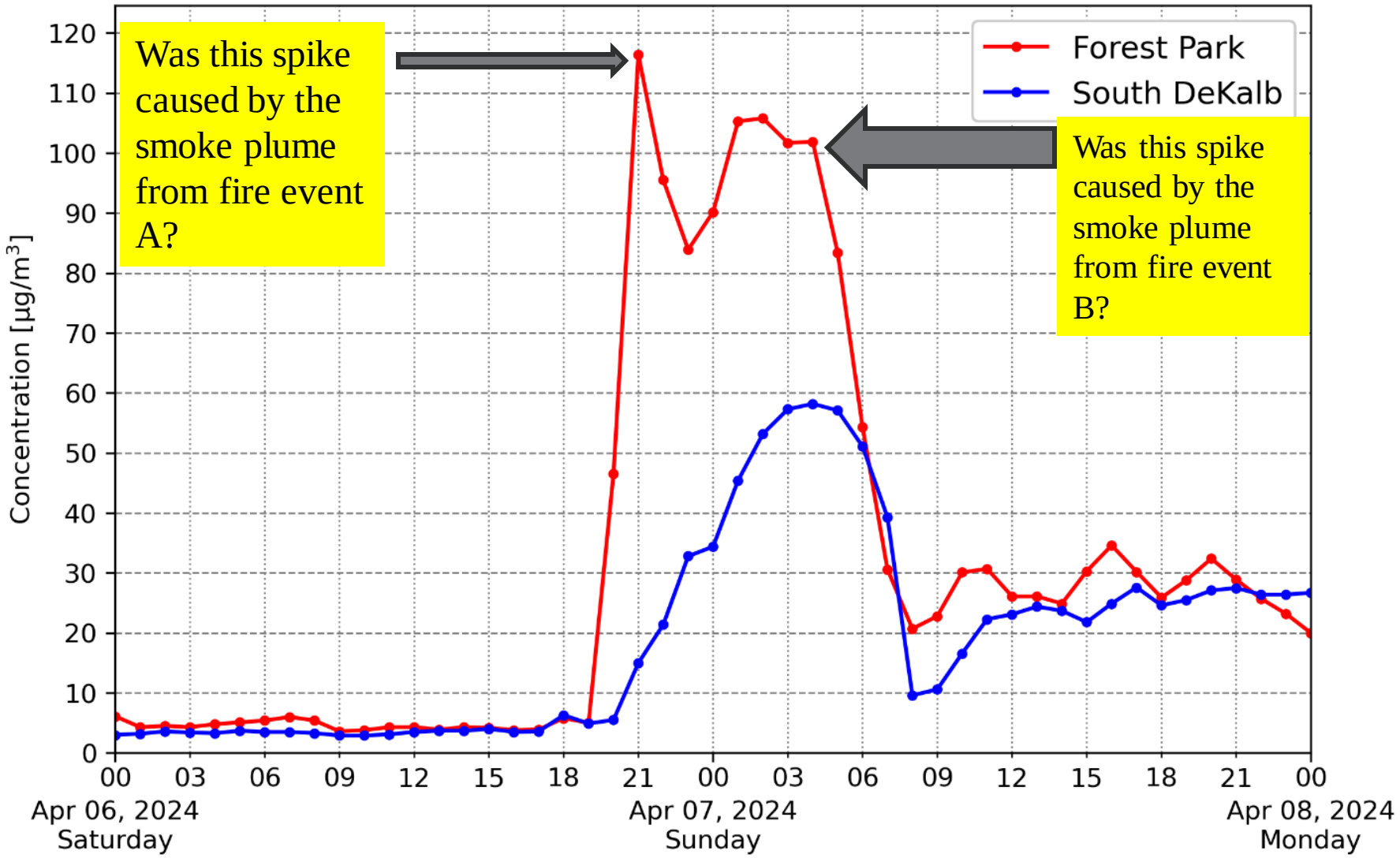
HRRR-SMOKE (2 AM EST ON APRIL 7, 2024)





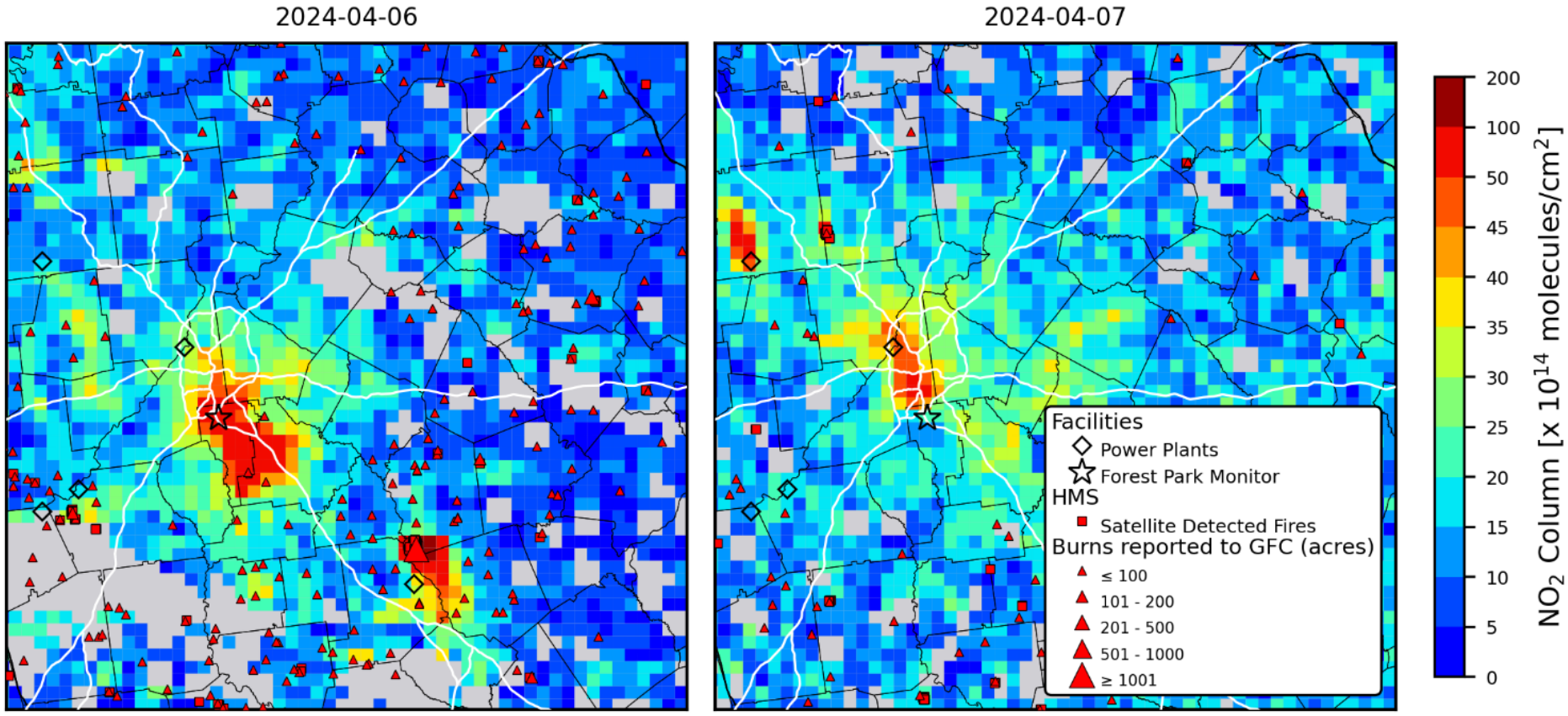
0 Forecast Hour
(i.e., the 1st time step for a 48-hour forecasting)

FOREST PARK: APRIL 7, 2024



Daily Average Value: 46.4 µg/m³

TROPOMI NO2 VCD



1:30 PM LST

TROPOMI could not capture what happened during the active smoke plume transport. In addition, there are other NO2 sources in the Metro Atlanta area.

NIGHTTIME AOD

For illustration purposes only. Not related to the Forest Park monitor.

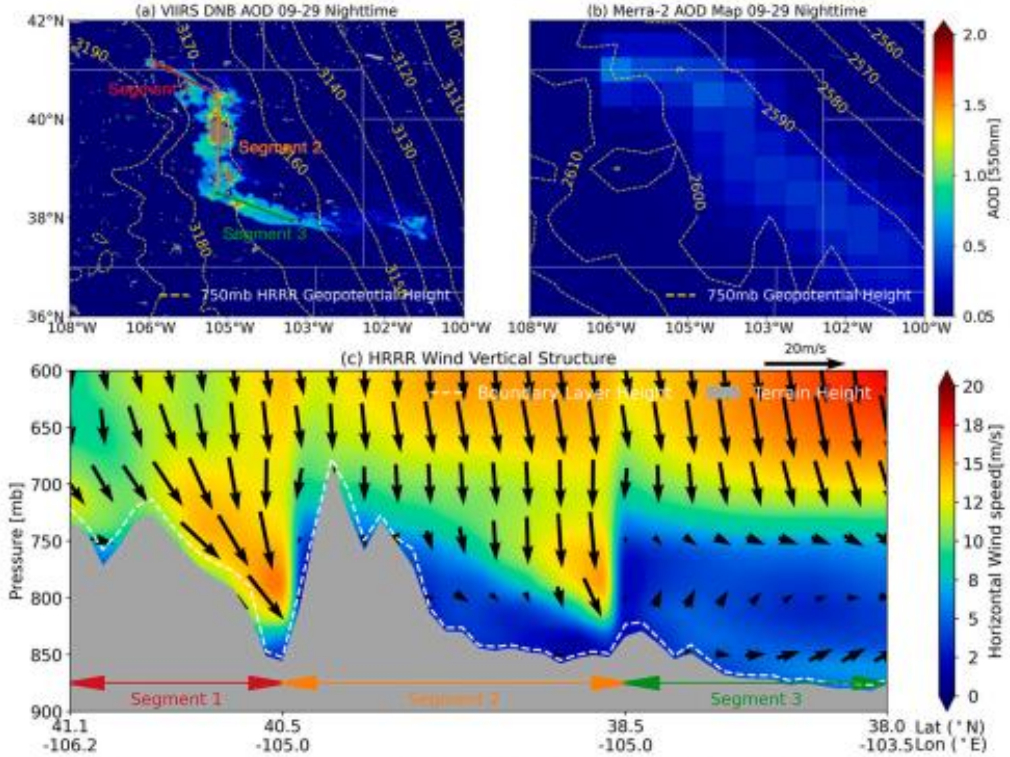


Fig. 10. Zoomed-in plot of the AOD map over the Colorado region (white boxes in Fig. 9). (a) DNB AOD map at midnight of Sept. 29th, 2020; (b) MERRA-2 AOD map at VIIRS overpass time; (c) HRRR wind profile at VIIRS overpass time. The yellow dashed line on the DNB AOD map is the 750 mb geopotential height (in unit of m) contour extracted from HRRR, while the yellow dashed line on the MERRA-2 map is the 750 mb geopotential height contour of MERRA-2. The L-shaped distribution of smoke layer in (a) is marked with three colored lines denoting three segments. Also shown is the horizonal wind vector in (c) at different pressure levels, with north pointing upward. Note that a small but eastward (pointing to the right-hand side) dominated wind was found in Segment 3 at and below the 750 mb pressure level, favoring the formation of the L shape of the AOD map. (For interpretation of the references to color in this figure legend, the reader is referred to the web version of this article.)

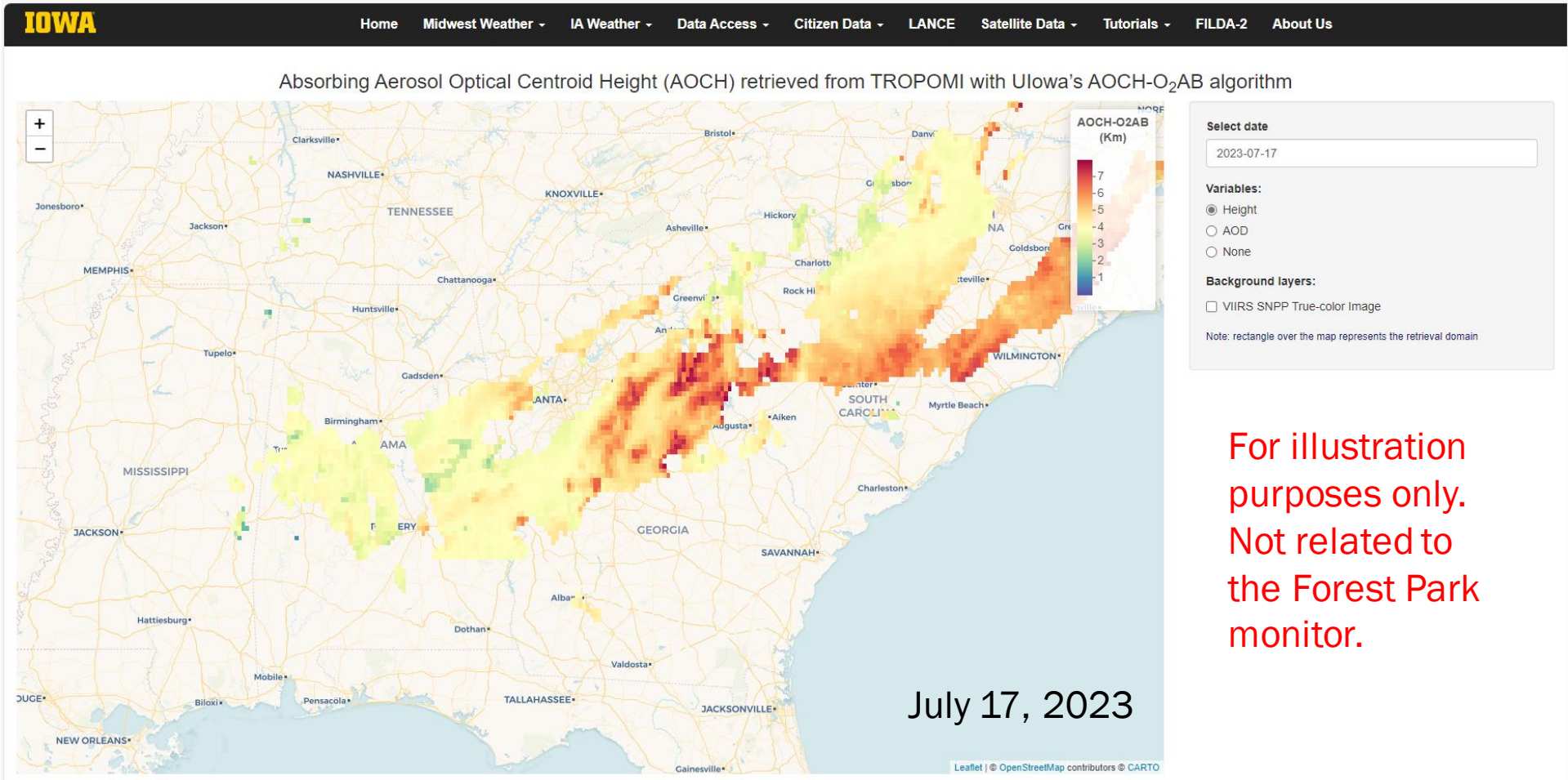
September 29, 2020 over Colorado

Courtesy: Dr. Jun Wang at U. of Iowa

Need a way to observe smoke plumes traveling during nighttime.

M. Zhou et al. (2021), https://arroma.uiowa.edu/docs/publication/paper_pdf/2021/1-s2.0-S0034425721004375-main.pdf

AOD CENTROID HEIGHT



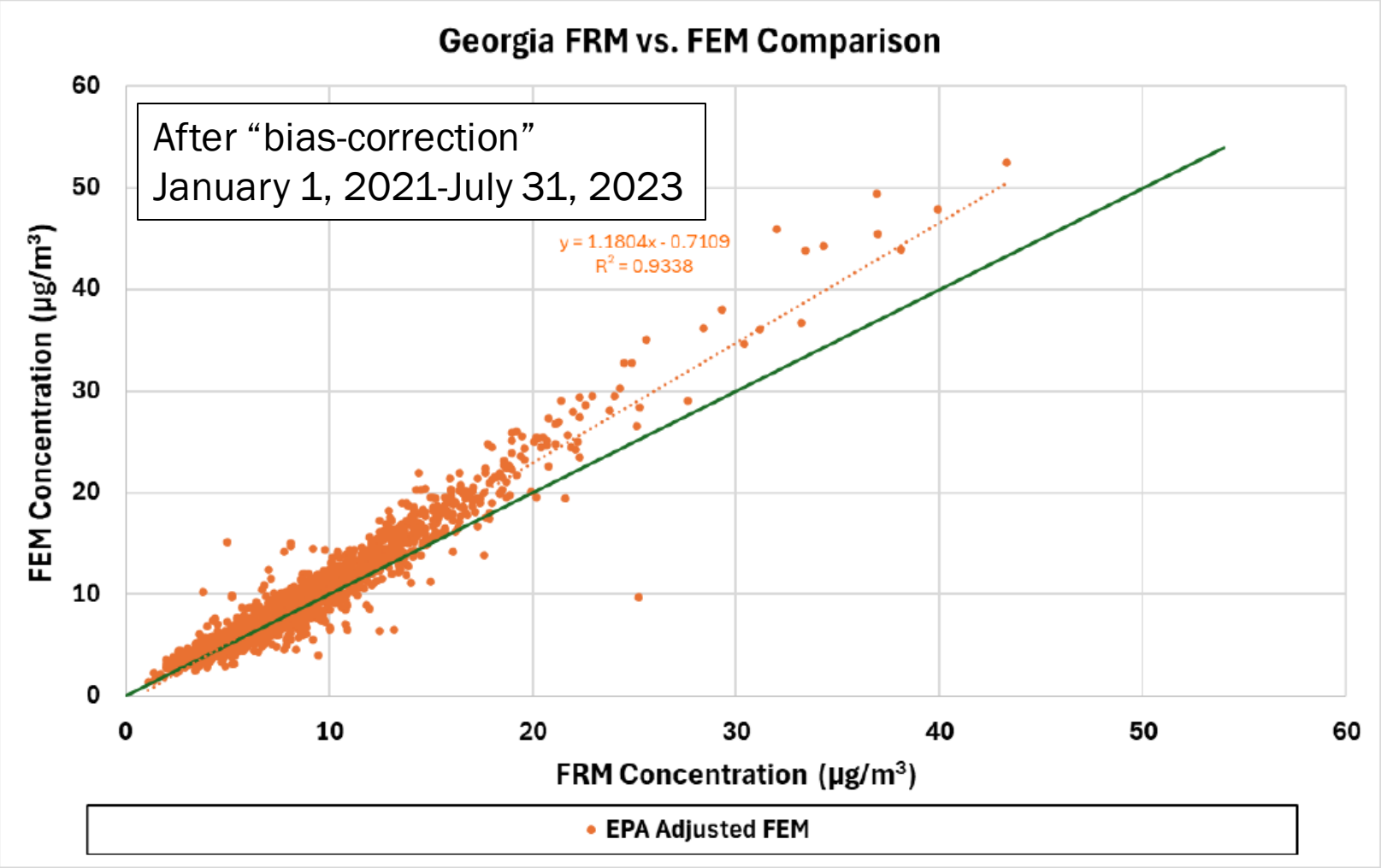
For illustration purposes only. Not related to the Forest Park monitor.

Courtesy: Dr. Jun Wang at U. of Iowa

A way to identify smoke plumes traveling aloft is needed.

http://esmc.uiowa.edu:3838/tropomi_aoch/

HEADS-UP: FEM BIAS-CORRECTION



Bias Correction on T-640/T-640x FEM Data will need to be examined further.

CONTACT INFORMATION

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