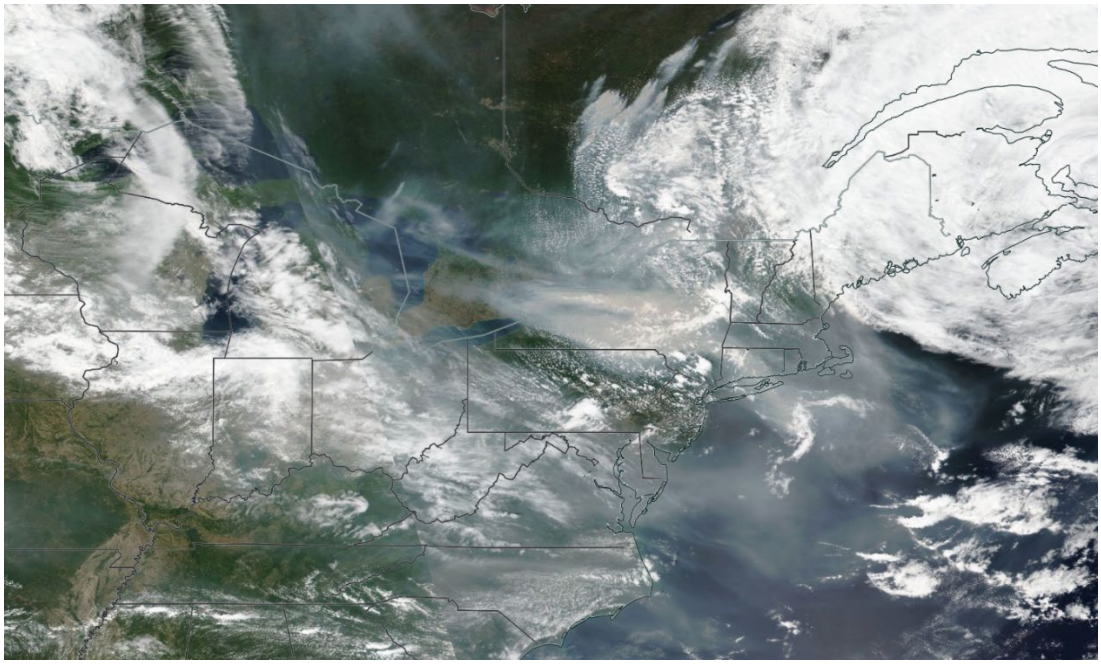
Final

Exceptional Events Demonstration to Support Attainment Designation Recommendations for the 2024 Annual $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS) for Mecklenburg and Davidson Counties, North Carolina

(June – July 2023 Canadian Wildfire Smoke Impacts)



Visible satellite imagery showing smoke across the eastern US on June 6th, 2023

Prepared by
North Carolina Department of Environmental Quality
Division of Air Quality

February 6, 2025

Preface: This document contains the State of North Carolina's Exceptional Events Demonstration to support the State's designation recommendations for the 2024 revised primary annual $PM_{2.5}$ National Ambient Air Quality Standard. Two $PM_{2.5}$ monitors in North Carolina have design values (based on certified monitoring data for 2021-2023) that exceed the revised standard of 9.0 µg/m^3. The two monitors are the Remount Road monitor (Air Quality System (AQS) ID# 371190045) located in Mecklenburg County and the Lexington Water Tower monitor (AQS ID# 370570002) located in Davidson County. Specifically, for these two monitors, this document provides technical documentation to support North Carolina's request to U.S. Environmental Protection Agency (EPA) to exclude $PM_{2.5}$ monitoring data for certain days in 2023 strongly influenced by Canadian Wildfire smoke. If approved by EPA, the design value for both monitors would be below the revised standard. This document has been prepared following the EPA Exceptional Events Rule (40 CFR 50.14(c)(3)) for submission of an Exceptional Events Demonstration.

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List of Acronyms

Acronym	Definition
AIR	Ambient Information Reporter [Tool]
AMP	Air Monitoring Program
AQ	Air Quality
AQI	Air Quality Index
AQP	Air Quality Portal
AQS	Air Quality System
CAA	Clean Air Act
CFR	Code of Federal Regulations
CIFFWC	Canadian Interagency Forest Fire Centre
CLT / KCLT	Charlotte Douglas International Airport
CWFIS	Canadian Wildland Fire Information System
CONUS	Continental United States
DV	Design Value
EDT	Eastern Daylight Time
EE	Exceptional Events
EPA	[United States] Environmental Protection Agency
EXX / KEXX	Davidson County Airport
FU	fumée [French], smoke [English]
H5	500 millibar geopotential height
hr	hour
HRRR	High Resolution Rapid Refresh model
HYSPLIT	Hybrid Single-Particle Lagrangian Integrated Trajectory model

Acronym	Definition
HZ	haze
JQF / KJQF	Concord Regional Airport
GSO / KGSO	Greensboro Airport
km	kilometer
KML	Keyhole Markup Language
m	meter
mb	millibar
METAR	Meteorological Aerodrome Report
NAAPS	Navy Aerosol Analysis and Prediction System
NAAQS	National Ambient Air Quality Standard
NAM	North American Mesoscale model
NC	North Carolina
NCAR	National Center for Atmospheric Research
NCDAQ	North Carolina Division of Air Quality
NCDEQ	North Carolina Department of Environmental Quality
NCEI	National Centers for Environmental Information
NCEP	National Centers for Environmental Protection
NCSCO	North Carolina State Climate Office
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
OSPO	Office of Satellite and Product Operations
$PM_{2.5}$	Particulate matter with an aerodynamic diameter ≤2.5 micrometers
RF	'Request Exclusion: Fire - Canadian' AQS flag
SM	statute miles
SELC	Southern Environmental Law Center
SPeCS	State Planning Electronic Collaboration System
U.S.	United States
USG	Unhealthy for Sensitive Groups
VA	Virginia
WPC	Weather Prediction Center
z	Zulu time
µg/m³	micrograms per cubic meter

Section I. Introduction

1.1 Overview

A record-breaking wildfire season in Canada and an anomalous synoptic weather pattern resulted in several widespread multi-day smoke intrusions into the United States in 2023. In North Carolina, the most impactful of these smoke intrusion events occurred in June and July, all of which resulted in numerous days of elevated concentrations of particulate matter with an aerodynamic diameter of less than or equal to 2.5 micrometers ($PM_{2.5}$) throughout the state.

In May of 2024, the U.S. Environmental Protection Agency (EPA) revised the primary annual $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS) from 12.0 micrograms per cubic meter ($\mu g/m^3$) to 9.0 $\mu g/m^3$. The following two North Carolina monitors have design values (based on certified monitoring data for 2021-2023) exceeding this revised standard: Remount Road (Air Quality System (AQS) ID# 371190045) located in Mecklenburg County and Lexington Water Tower (AQS ID# 370570002) located in Davidson County. All other monitoring sites in the state are currently meeting the 2024 revised primary annual $PM_{2.5}$ NAAQS.

The North Carolina Department of Environmental Quality (NCDEQ), Division of Air Quality (NCDAQ) prepared this Exceptional Events Demonstration per 40 CFR 50.14(c)(3) to show that many of the elevated $PM_{2.5}$ concentrations that occurred in June and July of 2023 are the result of "*unusual or naturally occurring events that can affect air quality but are not reasonably controllable using techniques that tribal, state, or local air agencies may implement in order to attain and maintain the [NAAQS]*".[1]

The NCDAQ requests that EPA concur with the exclusion from regulatory decisions the specified $PM_{2.5}$ concentrations in **Table 1** below that were influenced by smoke from the 2023 Canadian wildfires. By analyzing meteorological conditions and patterns that occurred during June and July of 2023, NCDAQ has identified four distinct multi-day events (categorized by *Event ID,* below) by which to group the days listed in **Table 1**, which are described in more detail in Section II. Narrative Conceptual Model.

***Table 1**: Regulatorily Significant 24-Hour Average PM2.5 Concentrations Requested for Exclusion by NCDAQ*

[1] United States Environmental Protection Agency (EPA), *Treatment of Air Quality Monitoring Data Influenced by Exceptional Events,* https://www.epa.gov/air-quality-analysis/treatment-air-quality-monitoring-data-influenced-exceptional-events

		Remount (AQS ID# 371190045) (Mecklenburg County)					Lexington (AQS ID# 370570002) (Davidson County)				
Event ID	Date	24-hr $PM_{2.5}$ Average ($\mu g/m^3$)	Historical Average* (2018-2022 Avg. Daily Conc.)	% Increase from Historical Average	EPA Tier Level / Threshold ($\mu g/m^3$)**		24-hr $PM_{2.5}$ Average ($\mu g/m^3$)	Historical Average* (2018-2022 Avg. Daily Conc.)	% Increase from Historical Average	EPA Tier Level / Threshold ($\mu g/m^3$)**	
1	6/6/2023	21.7	8.6	151.2 %	Tier 2	16.3	28.6	11.4	150.9 %	Tier 1	25.35
	6/7/2023	26.3	10.0	162.5 %	Tier 1	24.45	29.3	9.2	219.3 %	Tier 1	25.35
	6/8/2023	18.5	8.7	113.6 %	Tier 2	16.3	-	-	-	-	
	6/9/2023	23.7	7.7	208.6 %	Tier 2	16.3	23	8.1	184.0 %	Tier 2	16.9
	6/10/2023	24.3	7.5	224.0 %	Tier 2	16.3	22.5	7.7	192.2 %	Tier 2	16.9
	6/11/2023	-	-	-	-		19.2	9.1	110.4 %	Tier 2	16.9
2	6/17/2023	25.1	8.8	185.9 %	Tier 1	24.45	18.9	8.7	117.9 %	Tier 2	16.9
	6/18/2023	23.7	8.4	181.5 %	Tier 2	16.3	21.9	8.7	153.2 %	Tier 2	16.9
3	6/28/2023	20.2	11.1	82.3 %	Tier 2	16.3	20.5	14.4	42.4 %	Tier 2	16.9
	6/29/2023	37.7	9.0	318.9 %	Tier 1	24.45	45.7	10.7	326.3 %	Tier 1	25.35
	6/30/2023	29.4	9.9	197.0 %	Tier 1	24.45	32	10.8	197.4 %	Tier 1	25.35
	7/1/2023	20.8	7.3	183.4 %	Tier 2	16.3	18	7.6	137.5 %	Tier 2	17.8
4	7/17/2023	43	8.6	401.5 %	Tier 1	24.45	38.6	11.5	236.8 %	Tier 1	26.7
	7/18/2023	46.1	7.9	483.5 %	Tier 1	24.45	42.3	8.3	408.4 %	Tier 1	26.7

** The historical average is defined as the daily average $PM_{2.5}$ concentration over the previous 5-year period (2018-2022) on the given date (i.e., the past 5 June 6ths, the past 5 June 7ths, etc.).*

*** The EPA Tier Level determines the level of evidence required to establish a clear causal relationship in a wildland fire $PM_{2.5}$ Exceptional Events demonstration and was determined using EPA's Tiering Tool output as displayed in Appendix K: Monitoring Sites' Tiering Graphs. The threshold listed represents the minimum daily average concentration ($\mu g/m^3$) needed to meet the tier level listed for that specific monitor and month.*

1.2 Clean Air Act Requirements

The 2024 revised primary annual $PM_{2.5}$ NAAQS is met when the annual arithmetic mean concentration is less than or equal to 9.0 $\mu g/m^3$ (40 CFR § 50.20(b)). Promulgation of this revised standard started the designation recommendation process and states are required to submit their area recommendations by February 7th, 2025. As part of this process, the state of North Carolina is submitting this Exceptional Events Demonstration to request exclusion of data in **Table 1** from the 2021-2023 design value calculations that will be relied upon by the state in making its recommendation. (The exclusion of this data will also impact EPA's designation process as the events will also be part of the 2022-2024 design values that EPA will use to support its final designations by February 6, 2026.)

1.3 Exceptional Events Rule Requirements

The EPA's *Treatment of Data Influenced by Exceptional Events* (Exceptional Events Rule) lists the requirements that air agencies must meet when requesting EPA to exclude exceptional event-related ambient air concentration data recorded by regulatory monitors from regulatory determinations. The

following table lists the requirements found under 40 CFR § 50.14, the relevant section of this demonstration document, and a summary of the section's contents which satisfy that requirement.

***Table 2**: Summary of the Exceptional Events Rule elements used to demonstrate NCDAQ's findings*

Exceptional Events Rule Element	Regulatory Citation	NCDAQ Demonstration Section	Summary
Narrative conceptual model	40 CFR § 50.14(c)(3)(iv)(A)	II	This section describes the scope of the 2023 Canadian wildfire season, including the anomalous meteorological patterns that contributed to widespread drought and consequent fire activity. Included is a general description of each of the four exceptional events identified by NCDAQ.
Clear causal relationship and historical data analysis	40 CFR § 50.14(c)(3)(iv)(B) 40 CFR § 50.14(c)(3)(iv)(C)	III	This section provides detailed information for each of the identified exceptional events. Both elevated and surface level $PM_{2.5}$ pollution from the Canadian wildfire smoke impacted NC monitors and directly resulted in anomalous concentrations well-above the previous 5-year (2018-2022) daily average concentrations for the event days.
Not reasonably controllable or preventable	40 CFR § 50.14(c)(3)(iv)(D)	IV	The events satisfy this requirement because the wildfires originated outside NCDAQ's jurisdictional boundaries and were predominantly on wildlands.
Natural event or human activity unlikely to recur	40 CFR § 50.14(c)(3)(iv)(E)	V	The events satisfy this requirement because the wildfires were primarily ignited by lightning and were predominantly on wildlands.
Public notification / outreach	40 CFR § 50.14(c)(1)(i)	VI	NCDAQ promptly notified the public via several mediums when Canadian wildfire smoke was forecasted to impact the state. A description of various outreach methods is included for each of the identified exceptional events.

Exceptional Events Rule Element	Regulatory Citation	NCDAQ Demonstration Section	Summary
Initial notification and data flagging	40 CFR § 50.14(c)(2)(i)	VII	NCDAQ engaged in regular communication with EPA Region 4 throughout the initial notification process beginning in July 2024. The data in **Table 1** is currently flagged as "*RF*" in AQS.
Public comments	40 CFR § 50.14(c)(3)(v)(A) 40 CFR § 50.14(c)(3)(v)(B) 40 CFR § 50.14(c)(3)(v)(C)	VIII	The public comment period is being held Nov 20 -Dec 20, 2024. This section lists the public comments received during this period and addresses the comments that refuted or contradicted the findings of this demonstration.

1.4 Canadian Wildfire Impacts on $PM_{2.5}$ Design Values in North Carolina

Exclusion of the data in **Table 1** from the Remount Road and Lexington Water Tower monitoring sites' 2021-2023 $PM_{2.5}$ design values would result in statewide attainment of the 2024 revised primary annual $PM_{2.5}$ NAAQS.

1.5 Action Requested

This report meets all EPA demonstration requirements for exceptional events (see **Table 2**). Pursuant to federal regulations, NCDEQ requests EPA concur that the $PM_{2.5}$ concentrations shown in **Table 1** were caused by exceptional events and should be excluded from regulatory decisions regarding the revised 2024 Annual $PM_{2.5}$ NAAQS and any other applicable regulatory purposes (40 CFR § 50.14(b)). A copy of the AMP 350 report from EPA's AQS system is included in Appendix A: AMP 350 Reports and shows the data included in this demonstration currently has the *Request Exclusion: Fire - Canadian*, or "*RF*", flag applied.

Section II. Narrative Conceptual Model

This section satisfies the following federal requirement:

40 CFR § 50.14(c)(3)(iv)(A): A narrative conceptual model that describes the event(s) causing the exceedance or violation and a discussion of how emissions from the event(s) led to the exceedance or violation at the affected monitor(s).

The Exceptional Event Rule requires that demonstrations include a narrative conceptual model describing the event. This section will describe the 2023 Canadian wildfires that affected public health and impacted air quality monitors across North Carolina. It will also analyze the anomalous atmospheric circulations that drove the transportation of wildfire smoke into the state.

2.1 Record Setting 2023 Canadian Wildfire Season

The 2023 Canadian wildfire season - the result of intensifying, widespread spring drought across almost all the Canadian provinces - was unprecedented and record-shattering. Prolonged and widespread drought conditions set the stage, while a combination of human and natural (lightning strike) activity initiated more than 7,131 fires that burned 17.2 million hectares of land (see **Figure 1**). This amount doubled the previous record for acres burned, according to the Canadian Interagency Forest Fire Centre.[2]

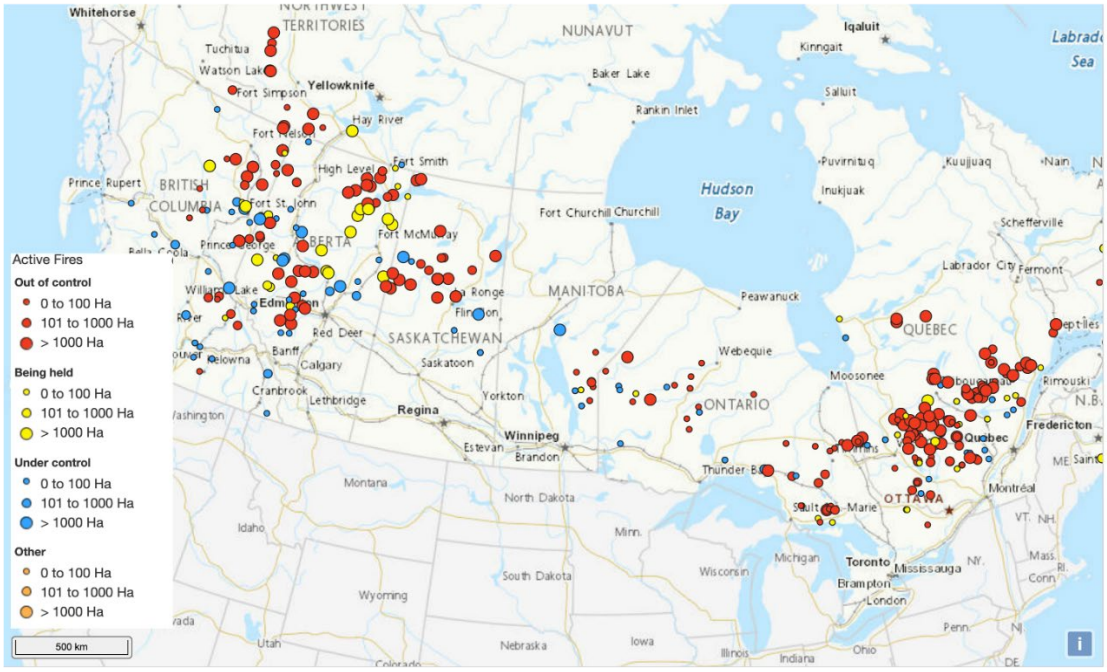


Figure 1*: Reported active fire locations across Canada, valid on June 6th, 2023. Source: CWFIS Interactive Map*[3]

The historic Canadian wildfire season and resulting intrusion of massive amounts of Canadian wildfire

[2] CIFFWC, *Canada Report - 2023 Fire Season*, https://ciffc.ca/sites/default/files/2024-03/03.07.24_CIFFC_2023CanadaReport%20(1).pdf

[3] Natural Resources Canada, *Interactive Map*, https://cwfis.cfs.nrcan.gc.ca/interactive-map

smoke into the contiguous United States (U.S.) was the culmination of several months of anomalous synoptic meteorological conditions across North America. A succession of atmospheric patterns first served as the catalyst for the intensifying drought[4] that resulted in the growing number of wildfires across Canada, then directly led to the large-scale transport of smoke into the eastern U.S.[5]. This resulted in a series of unprecedented air quality events from Maine to Florida, including North Carolina[6], during the months of June and July. Direct impacts from these wildfires to North Carolina's air quality first came in early June, as shown in **Figure 2**.

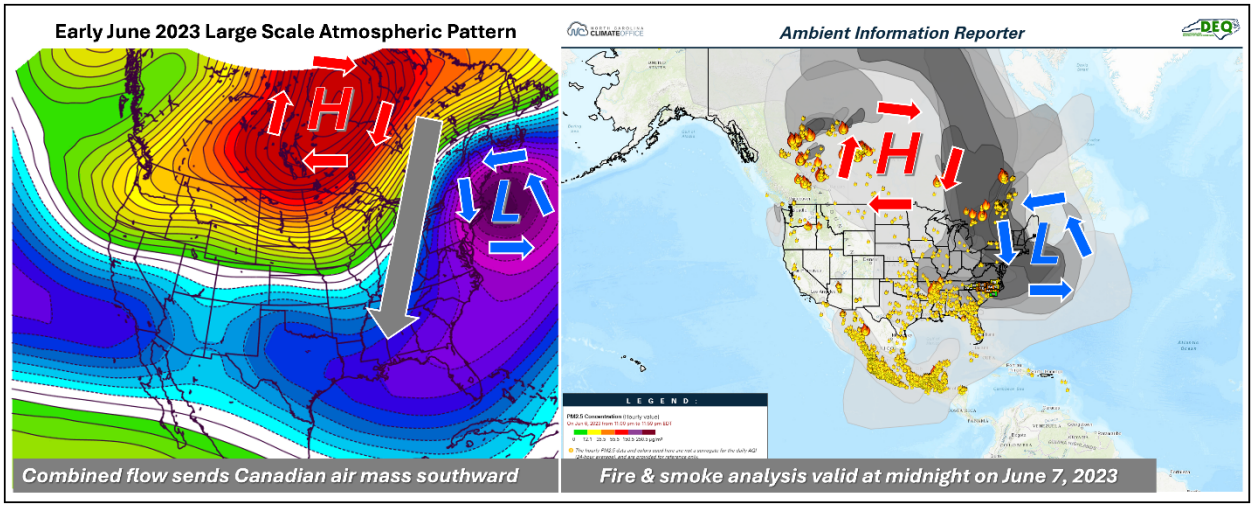


***Figure 2**: Early June 2023 500 millibar (mb) geopotential height anomalies (left) and NOAA OSPO fire and smoke satellite detects with 500 mb circulations overlaid for illustration (right).*

Canadian air masses were ever-present in the eastern U.S. during June 2023. As seen in **Figure 3**, many states recorded well below-normal temperatures for the month[7] due to the anomalous nature of the atmospheric regime that resulted in a persistent fetch of cooler-than-normal, but smokey, Canadian air into the region. This included North Carolina, which recorded its 13th-coldest June[8] in the past 129 years.

[4] Canadian Drought Monitor - June 30th, 2023, https://www.caar.org/wp-content/uploads/2023/08/Page5-main.jpg
[5] https://climate.ncsu.edu/wp-content/uploads/2023/06/500mb_heights_loop_Jun2023.gif
[6] Air Quality Blog – June 13th, 2023, https://airquality.climate.ncsu.edu/2023/06/13/rapid-reaction-smoky-skies-create-unhealthy-air-quality/
[7] National Centers for Environmental Information (NCEI), https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/statewide/mapping/110/tavg/202306/1/rank
[8] Air Quality Blog – July 10th, 2023, https://climate.ncsu.edu/blog/2023/07/smoke-and-storms-fill-the-skies-in-june/

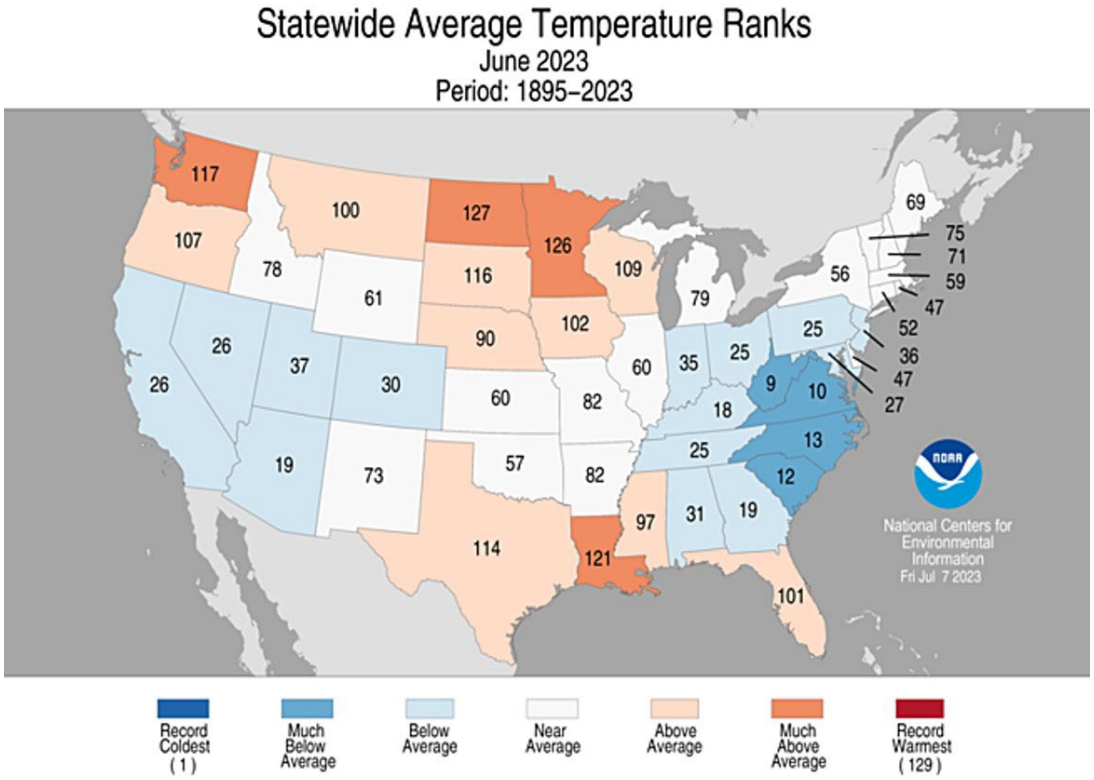


***Figure 3**: June 2023 statewide average temperature rankings show clear evidence of widespread below-normal temperatures due to frequent intrusions of Canadian air masses. Source: [NCEI](7)*

2.2 Canadian Wildfire Smoke Significantly Impacts North Carolina Air Quality

Based on our extensive analysis of the impacts of the 2023 Canadian wildfire smoke on North Carolina, we have elected to prepare an Exceptional Events demonstration package organized into four unique multi-day events that featured atmospherically significant activity that heralded the onset of Canadian wildfire smoke transport into the state and directly impacted both of our $PM_{2.5}$ monitors currently above the new annual $PM_{2.5}$ NAAQS.

2.2.1 Event ID #1 - June 6th through June 11th, 2023

The series of exceptional smoke transport events impacting North Carolina began in early June, starting on June 6th and continuing through June 11th, and featured an anomalously strong 500 mb (H5) high pressure that was anchored over central Canada (anomalous H5 ridging had been persistent for all of May[9] and led to the intensifying drought conditions) and was joined by an equally strong H5 trough of low pressure stationed just off the northeastern U.S. as shown in **Figure 4**, which contains the 500 mb geopotential height anomalies analysis compared to the 1991-2020 climatological normal for June 6th, provided by NCEP/NCAR reanalysis.

[9] https://climate.ncsu.edu/wp-content/uploads/2023/06/500mb_anomaly_May2023.png

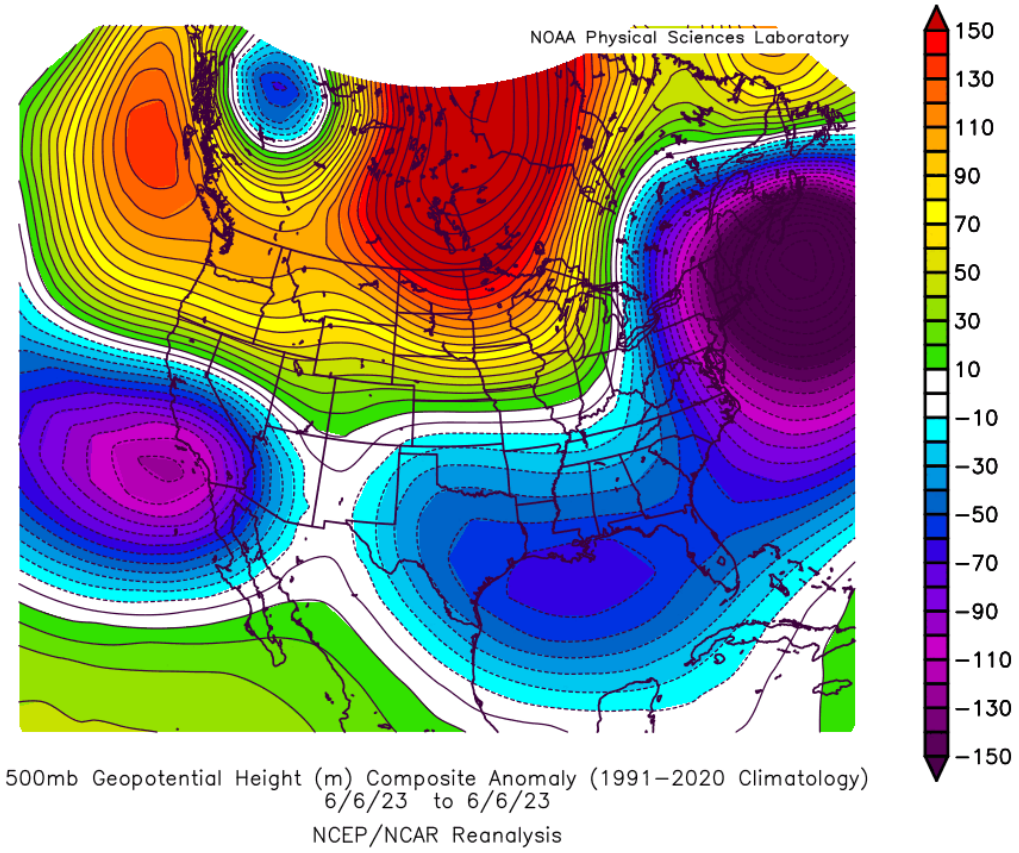


***Figure 4**: 500 mb geopotential height anomalies, valid June 6th, 2023, reveals an anomalous circulation pattern across the northern CONUS and southern Canada.*

The strong upper-level low was coupled to a strong surface low pressure system centered over Maine, with an attendant surface cold front that crossed North Carolina from the north[10], on the morning of June 7th as seen in **Figure 5**. The combined flow pattern around these upper-level circulations resulted in enhanced north-northwesterly[11] winds aloft and significant smoke transport from central and eastern Canada into North Carolina.

[10] NOAA/NWS/Weather Prediction Center, WPC surface analysis valid for 06/07/2023 at 15 UTC, https://www.wpc.ncep.noaa.gov/archives/web_pages/sfc/sfc_archive_maps.php?arcdate=06/07/2023&selmap=2023060715&maptype=namussfc

[11] NOAA/NWS/Storm Prediction Center, Mesoscale Analysis Archive, https://www.spc.noaa.gov/exper/ma_archive/action5.php?BASICPARAM=500mb.gif&STARTYEAR=2023&STARTMONTH=06&STARTDAY=06&STARTTIME=00&INC=48

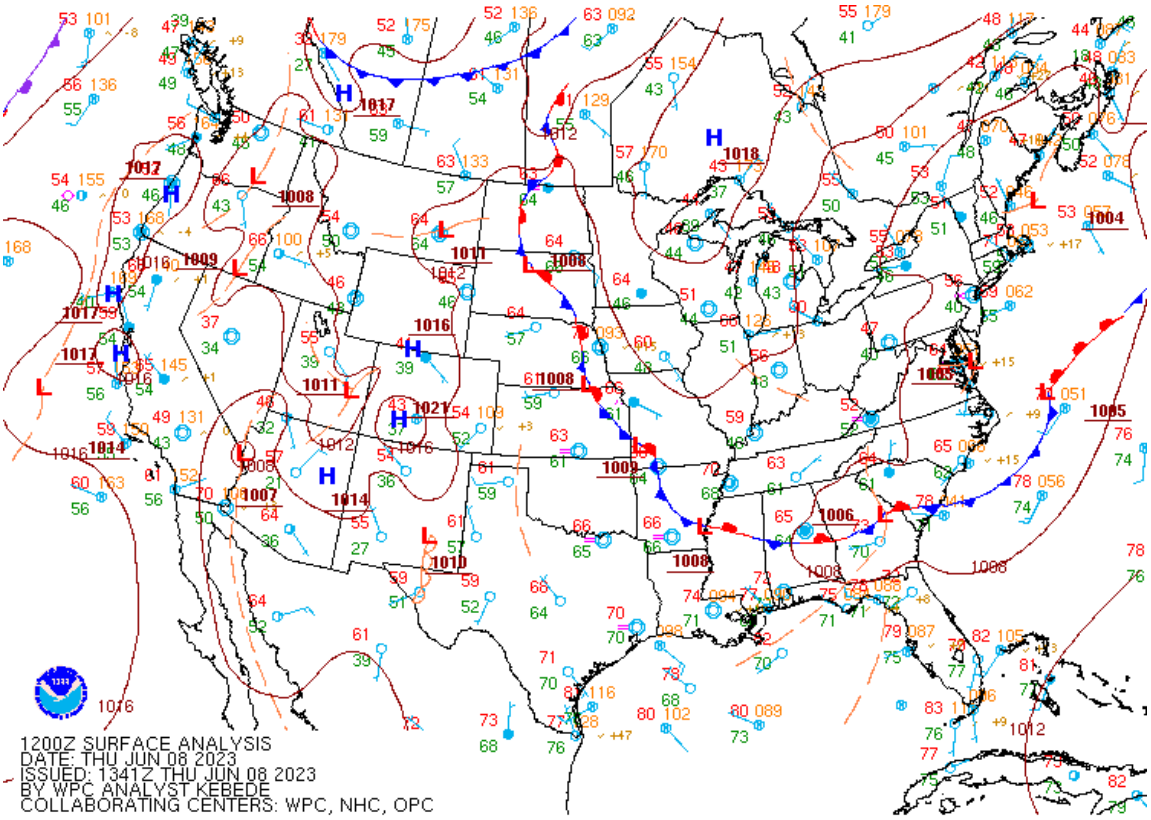


***Figure 5**: WPC surface analysis issued June 8th, 2023 at 8:00 am EDT, showing a cold front that had recently crossed North Carolina.*

Smoke aloft, which can be seen in **Figure 6** showing webcam imagery from Purchase Knob in the North Carolina mountains, mixed to the surface over North Carolina on June 6th. This preceded smoke and elevated $PM_{2.5}$ directly being transported into the state at the surface, which occurred behind the surface cold frontal passage on June 7th. The deposited smoke-laden and elevated $PM_{2.5}$ air mass stagnated over the area through June 11th as surface high pressure built into the region behind the front, resulting in subsidence, light winds and reduced air mass dispersion, trapping the polluted air mass in place.

***Figure 6**: (Left) Webcam image from Purchase Knob, NC on June 6th, 2023 shows significant smoke aloft present. (Right) Webcam image from Purchase Knob, NC on June 10th, 2024 shows a typical view on a clearer day. Source: National Park Service*

2.2.2 Event ID #2 - June 17th through June 18th, 2023

The second event, which occurred between June 17th and June 18th, was essentially a shorter duration repeat of the first event from a meteorological perspective. A strong H5 ridge, centered further north in central Canada, was again joined by a strong H5 low pressure that rotated across New England during the period.

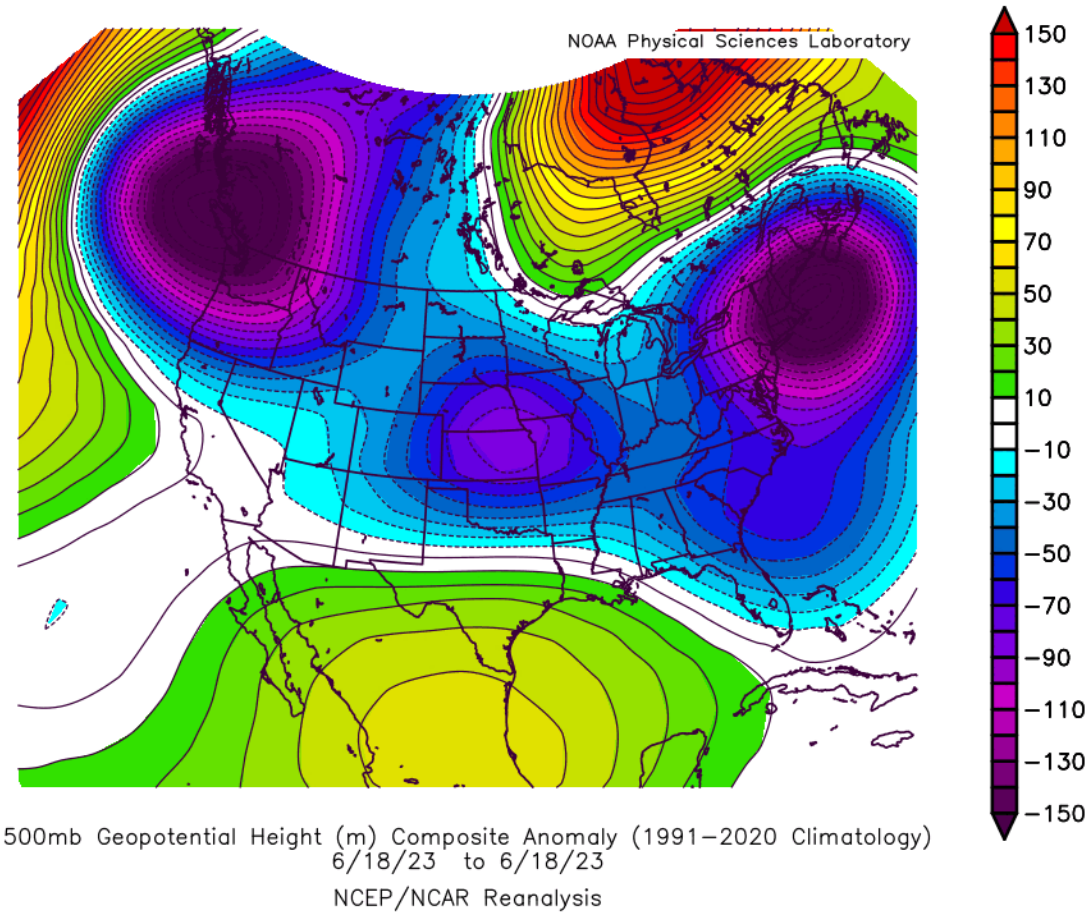


***Figure 7**: 500 mb geopotential height anomalies, valid June 18th, 2023, reveals an anomalous circulation pattern across the northern continental U.S. (CONUS) and southern Canada.*

Also similar to the first episode, this strong upper-level low was coupled to a strong surface low pressure that propelled a surface cold front across North Carolina[12] late on the evening of June 16th. As the base of the upper-level trough of low pressure rotated across the state, mid-level winds became strong out of the north-northwest[13], heralding the onset of smoke transport aloft into the region.

[12] Weather Prediction Center, https://www.wpc.ncep.noaa.gov/archives/sfc/2023/namussfc2023061703.gif
[13] NOAA/NWS/Storm Prediction Center, Mesoscale Analysis Archive, https://www.spc.noaa.gov/exper/ma_archive/action5.php?BASICPARAM=500mb.gif&STARTYEAR=2023&STARTMONTH=06&STARTDAY=16&STARTTIME=00&INC=48

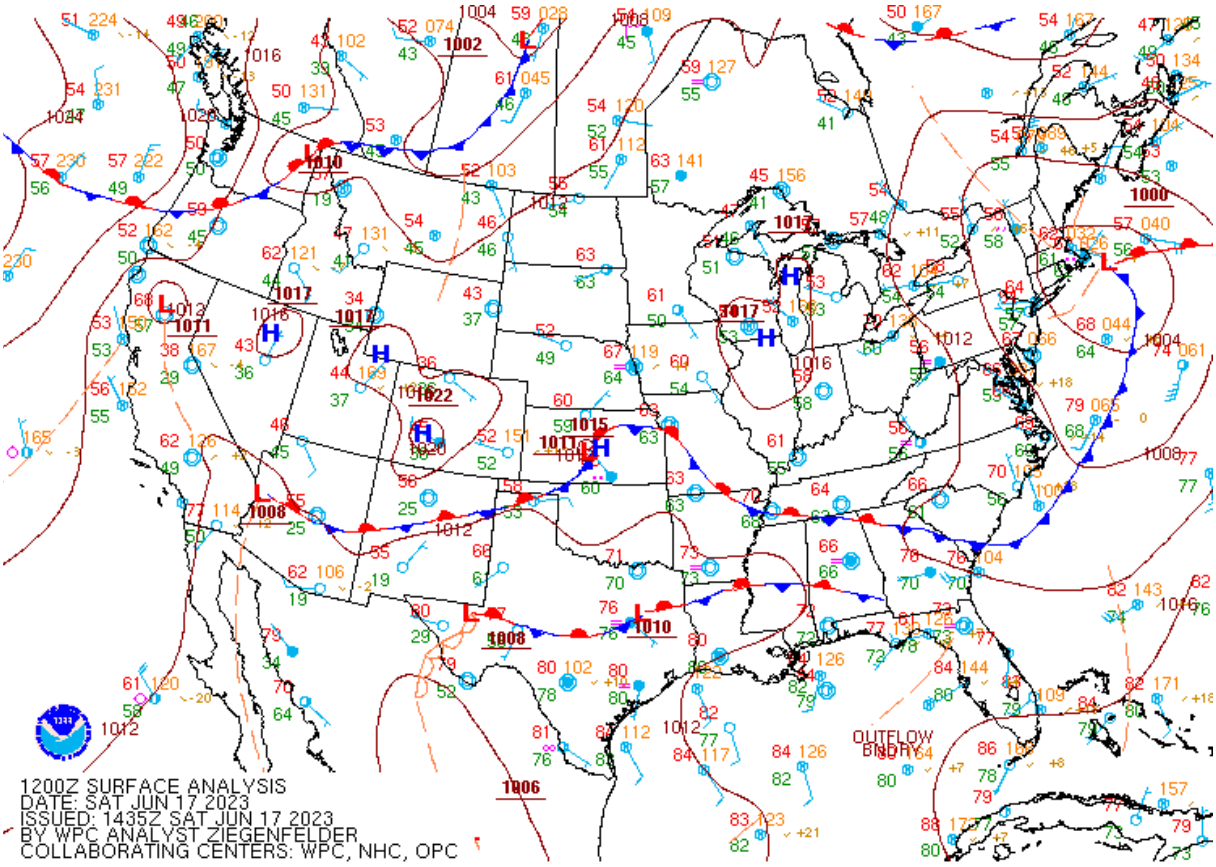


***Figure 8**: WPC surface analysis issued June 17th, 2023 at 8:00 am EDT, showing a cold front that had recently crossed North Carolina.*

Concomitantly, smoke transport mixing downward through the planetary boundary layer along with surface-level smoke and elevated fine particulates advecting into the region from the northwest again resulted in significantly elevated $PM_{2.5}$ levels across the state above typical levels.

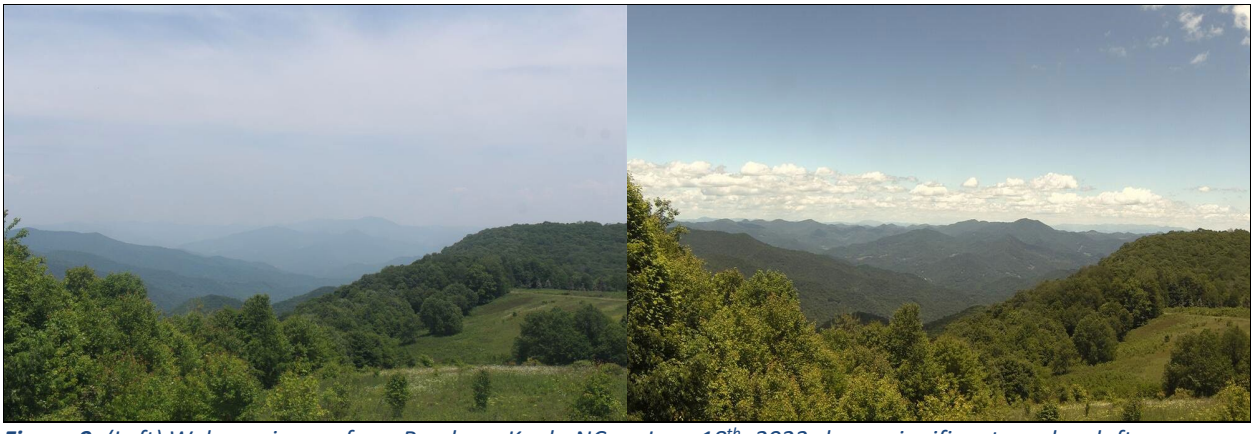


***Figure 9**: (Left) Webcam image from Purchase Knob, NC on June 18th, 2023 shows significant smoke aloft present. (Right) Webcam image from Purchase Knob, NC on June 10th, 2024 shows a typical view on a clearer day. Source: National Park Service*

2.2.3 Event ID #3 - June 28th through July 1st, 2023

The third event, which occurred between June 28th and July 1st, featured another variation of the persistent atmospheric flow regimes discussed in prior events, this time in the form of a Rex blocking pattern.[14] Persistent and recurrent upper-level ridging across Canada continued to exacerbate drought conditions and simultaneously trap Canadian wildfire smoke, while concurrent upper-level low pressure south of the ridge descended across the upper Midwest and then rotated eastward into New England[15] providing the transport mechanism for smoke penetration deep into the eastern and eventually southeastern U.S. during June and July 2023.

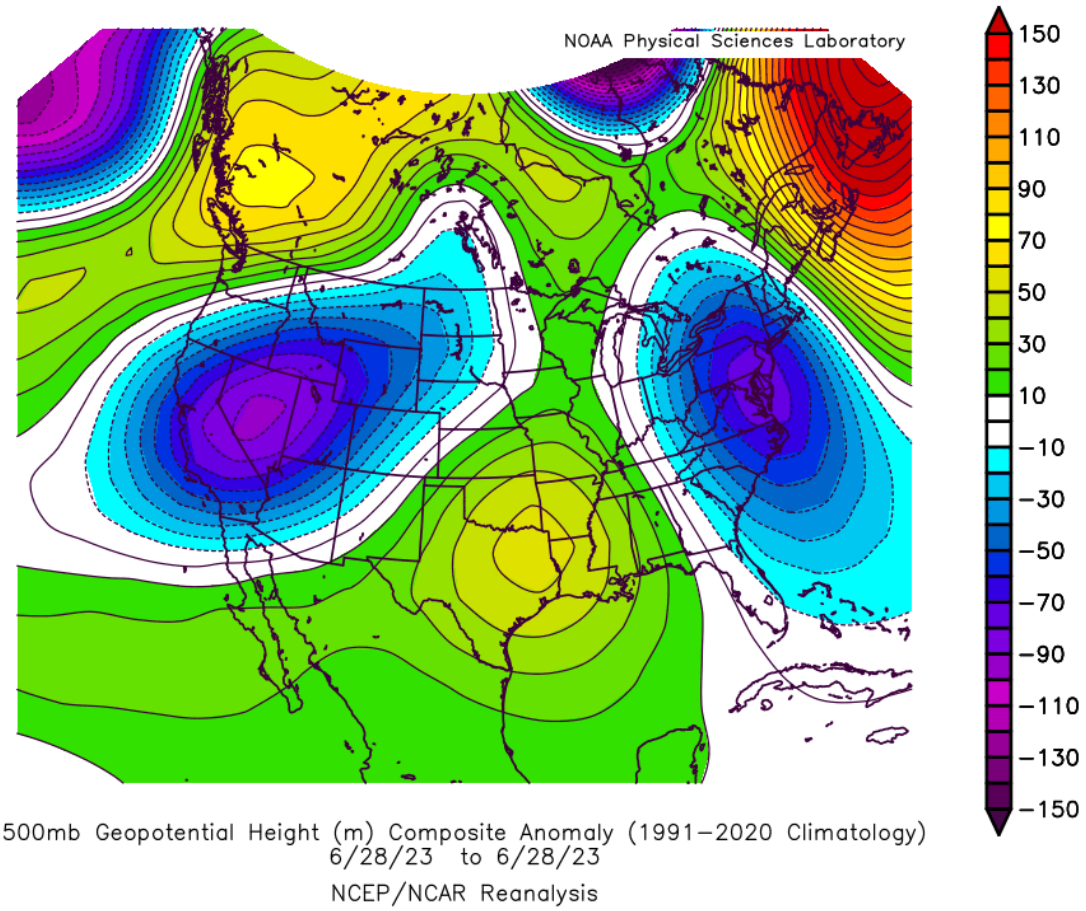


***Figure 10**: 500 mb geopotential height anomalies, valid June 28th, 2023 showing strong Rex block present over the eastern U.S.*

As the upper-level low, and surface low pressure, rotated eastward during the afternoon of June 27th, once again an attendant surface cold front swept across the state.[16] By the evening of June 28th,

[14] The Weather Network, https://www.theweathernetwork.com/en/news/science/explainers/what-is-omega-block-rex-block-upper-level-jet-stream-weather-pattern

[15] NOAA/NWS/Storm Prediction Center, Mesoscale Analysis Archive, https://www.spc.noaa.gov/exper/ma_archive/action5.php?BASICPARAM=500mb.gif&STARTYEAR=2023&STARTMONTH=06&STARTDAY=26&STARTTIME=00&INC=96

[16] Weather Prediction Center, https://www.wpc.ncep.noaa.gov/archives/sfc/2023/namussfc2023062718.gif

hourly fine particulate concentrations were rising above the Code Orange range.[17] On June 29th, 13 out of 21 sites across the state exceeded the daily standard[18], including one site in Forsyth County that recorded a daily average in the Code Red AQI range.

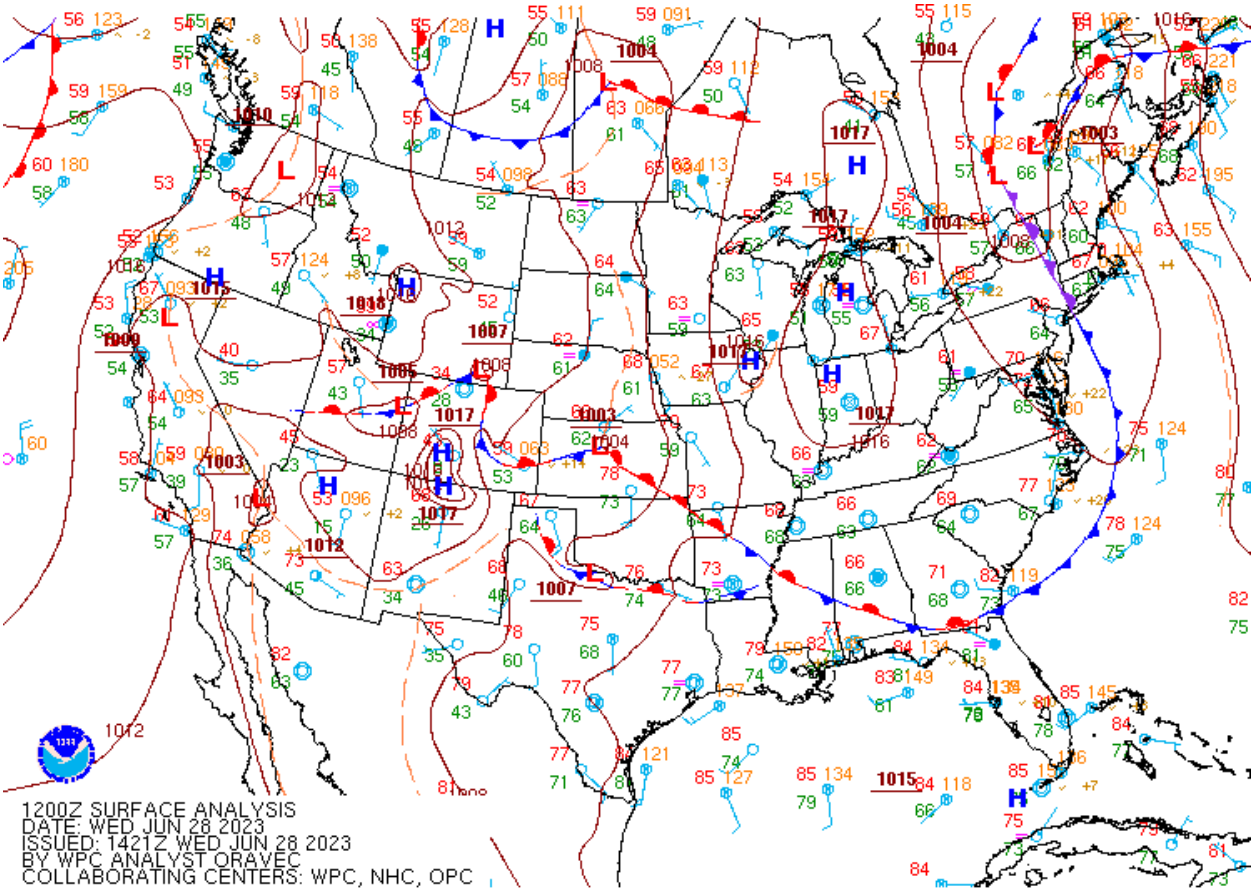


***Figure 11**: WPC surface analysis issued June 28th, 2023 at 8:00 am EDT, showing a cold front that had recently crossed North Carolina.*

Additional exceedances were recorded across the state on June 30th, and the smoke-laden air mass lingered over the state through July 1st as surface high pressure built into the region[19] behind the front, trapping the polluted air mass over the region.

[17] AIR Tool, https://airquality.climate.ncsu.edu/air/?tab=past&aggtype_past=hourly&date_past=2023-06-28&time_past=21&sync_past=0&dataset_past_point1=pm25%7Cinst_conc&fires_past=0&smoke_past=0&map_center=35.6,-80.3&map_zoom=8&map_bg=light&states=1&counties=1

[18] AIR Tool, https://airquality.climate.ncsu.edu/air/?tab=past&aggtype_past=daily&date_past=2023-06-29&time_past=10&sync_past=0&dataset_past_point1=pm25|24hr_conc&fires_past=0&smoke_past=0&map_center=37.486,-80.224&map_zoom=8&map_bg=light&states=1&counties=1

[19] Weather Prediction Center, https://www.wpc.ncep.noaa.gov/archives/web_pages/sfc/sfc_archive_maps.php?arcdate=06/30/2023&selmap=2023063000&maptype=namussfc

***Figure 12**: (Left) Webcam image from Purchase Knob, NC on June 29th, 2023 shows significant smoke aloft present. (Right) Webcam image from Purchase Knob, NC on June 10th, 2024 shows a typical view on a clearer day. Source: National Park Service*

2.2.4 Event ID #4 – July 17th through July 18th, 2023

The final event, which occurred between July 17th and July 18th, was the most severe smoke transport event presented in North Carolina's Exceptional Events Demonstration. The atmospheric pattern continued to feature the same anomalous circulations (strong upper-level high and upper-level low pressures) that resulted in decreased westerlies and a blocked jet stream that concurrently led to increased air mass stagnation and smoke transport in the downwind regions of the upper atmospheric pattern. Strong and widespread high pressure both aloft and at the surface remained over most of Canada during the period preceding the event, while a strong upper-level low began to descend southward into the northern Continental U.S. (CONUS) on July 15th and 16th.[20] Smoke wrapped into this upper-level low / trough resulted in a major intrusion of the ongoing Canadian wildfire smoke into the Great Lakes and Ohio Valley region as the core of the cyclonic circulation dug southward.

[20] NOAA/NWS/Storm Prediction Center, Mesoscale Analysis Archive, https://www.spc.noaa.gov/exper/ma_archive/action5.php?BASICPARAM=500mb.gif&STARTYEAR=2023&STARTMONTH=07&STARTDAY=17&STARTTIME=00&INC=-48

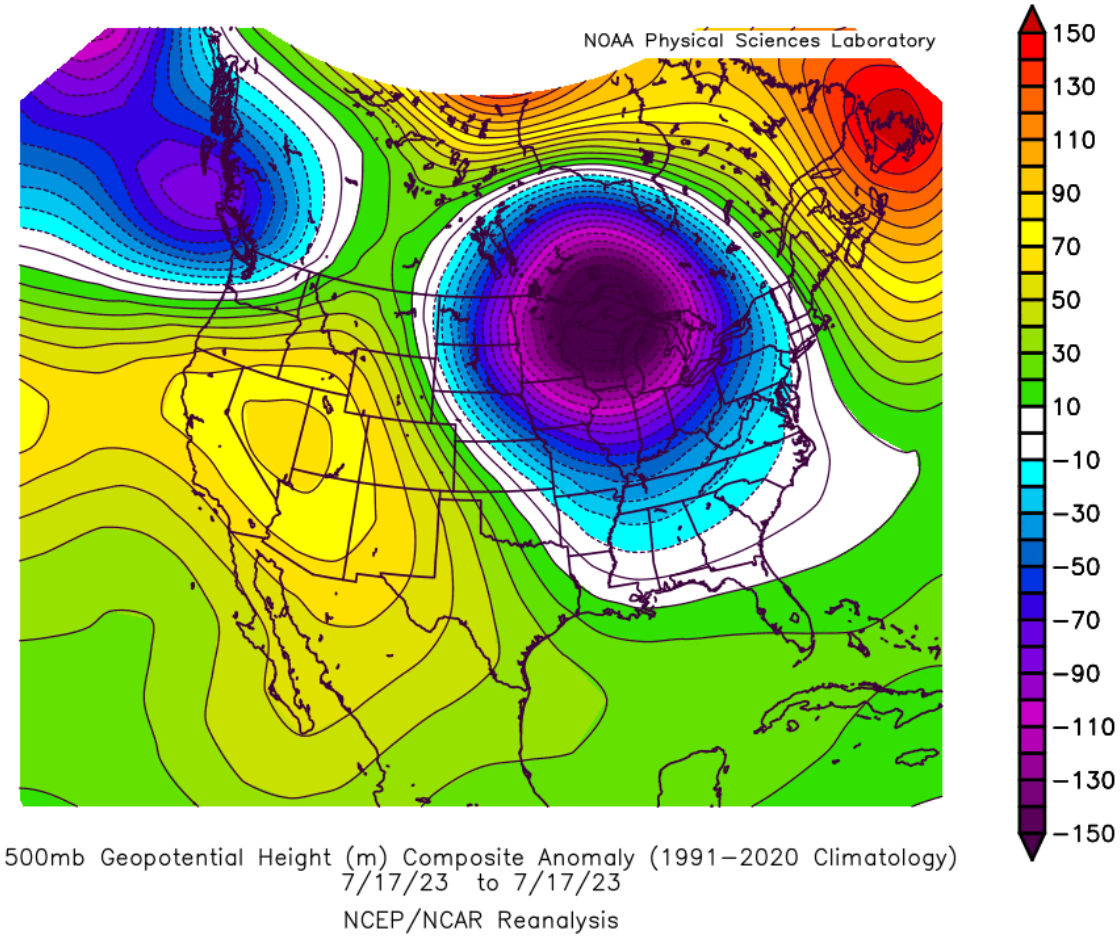


***Figure 13**: 500 mb geopotential height anomalies, valid July 17th, 2023 showing strong upper-level closed low over the Great Lakes region.*

As was the case with the other three other events, as the upper-level low and concurrent surface low pressure rotated eastward on July 16th into July 17th, an attendant surface cold front swept across the state.[21]

[21] Weather Prediction Center, https://www.wpc.ncep.noaa.gov/archives/sfc/2023/namussfc2023071706.gif

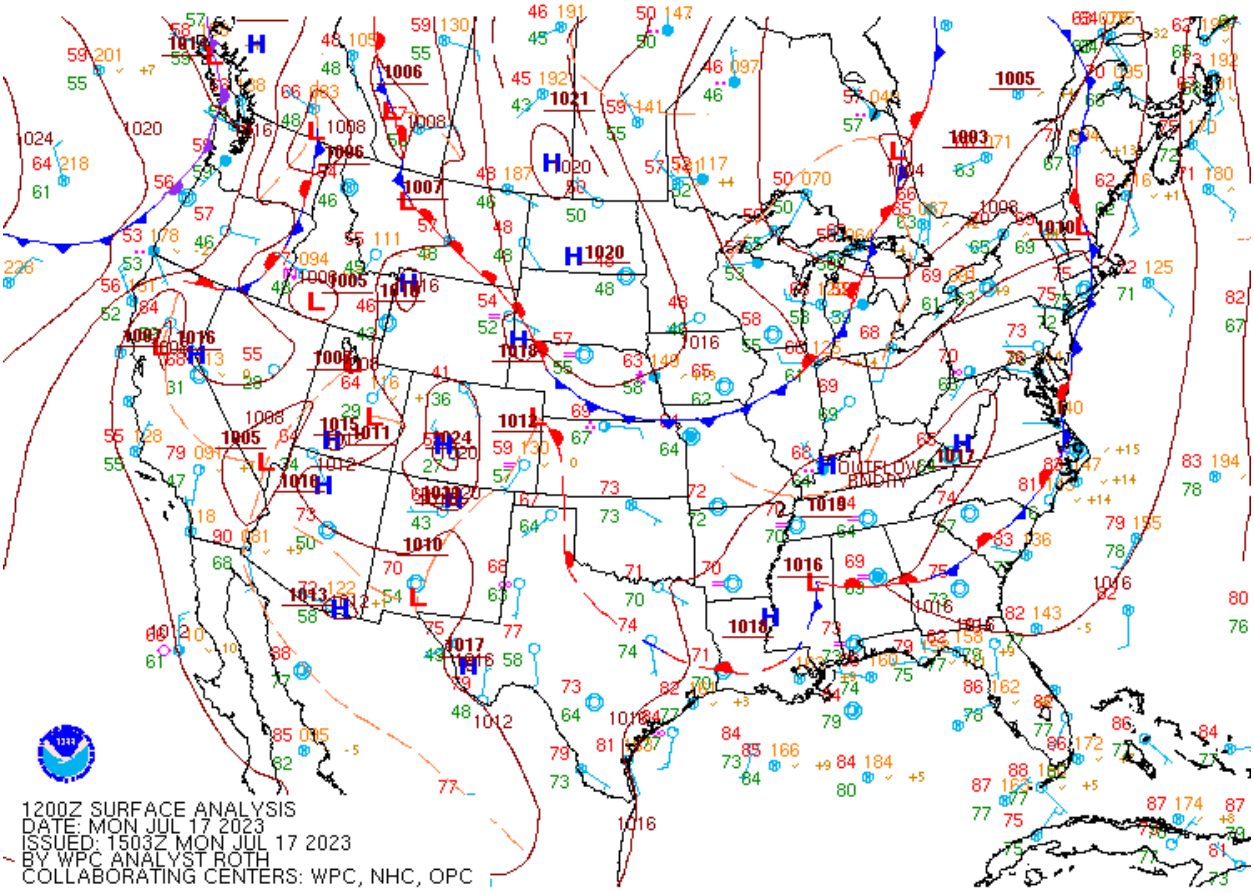


***Figure 14**: WPC surface analysis issued July 17th, 2023 at 8:00 am EDT, showing a cold front crossing North Carolina.*

On July 16th, all but one $PM_{2.5}$ monitoring site across North Carolina measured Code Green 24-hr. daily average concentrations[22], while sites in northwestern Kentucky and all of Indiana observed daily averages above 35.5 µg/m3. On July 17th, 11 out of the 12 sites in the western half of the state recorded daily average concentrations above 35.5 µg/m3[23], a clear indicator of the widespread polluted air mass that had swiftly advected into the state. As the smoke continued to transport from west to east across the state, air quality conditions deteriorated further on July 18th, when 16 out of 21 $PM_{2.5}$ monitoring sites across North Carolina exceeded the daily NAAQS.[24]

[22] AIR Tool, https://airquality.climate.ncsu.edu/air/?tab=past&aggtype_past=daily&date_past=2023-07-16&time_past=13&sync_past=0&dataset_past_point1=pm25|24hr_conc&fires_past=0&smoke_past=0&map_center=35.6,-80.3&map_zoom=8&map_bg=light&states=1&counties=1

[23] AIR Tool, https://airquality.climate.ncsu.edu/air/?tab=past&aggtype_past=daily&date_past=2023-07-17&time_past=13&sync_past=0&dataset_past_point1=pm25|24hr_conc&fires_past=0&smoke_past=0&map_center=35.6,-80.3&map_zoom=8&map_bg=light&states=1&counties=1

[24] AIR Tool, https://airquality.climate.ncsu.edu/air/?tab=past&aggtype_past=daily&date_past=2023-07-18&time_past=13&sync_past=0&dataset_past_point1=pm25|24hr_conc&fires_past=0&smoke_past=0&map_center=35.6,-80.3&map_zoom=8&map_bg=light&states=1&counties=1

***Figure 15**: (Left) Webcam image from Purchase Knob, NC on July 17th, 2023 shows significant smoke aloft present. (Right) Webcam image from Purchase Knob, NC on June 10th, 2024 shows a typical view on a clearer day. Source: National Park Service*

Section III. Clear Causal Relationship

This section satisfies the following federal requirements:

40 CFR § 50.14(c)(3)(iv)(B): A demonstration that the event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance or violation.

40 CFR § 50.14(c)(3)(iv)(C): Analyses comparing the claimed event-influenced concentration(s) to concentrations at the same monitoring site at other times to support the requirement at paragraph (c)(3)(iv)(B) of this section.

The Exceptional Event Rule requires that a clear causal relationship exists between the measured exceedances and the exceptional event to demonstrate that the proposed exceptional event caused a specific air pollution concentration at a particular air quality monitoring location. The analysis provided in this section is consistent with the clear causal relationship examples provided in the Final Rule on the Treatment of Data Influenced by Exceptional Events. Both elevated and surface level $PM_{2.5}$ pollution from the wildfire smoke impacted North Carolina ambient monitors and directly resulted in anomalous concentrations well-above the previous 5-year (2018-2022) daily average concentrations at the $PM_{2.5}$ monitors for the days in our demonstration.

While North Carolina believes that each Tier 2 day should be evaluated within the greater context of the meteorological / air quality events identified and analyzed in this section, in order to satisfy the requirement for Tier 2 days as listed in Section 5.4 of EPA's "$PM_{2.5}$ Wildland Fire Exceptional Events Tiering Document" at least two additional pieces of evidence have been provided -- determined on a day-by-day basis -- for each of the Tier 2 days in this demonstration.[25] These additional pieces of evidence include surface METARs (Meteorological Aerodrome Reports) from both the Charlotte/Douglas International Airport (CLT) and the Concord Regional Airport (JQF), which was the closest airport observing site that included manual (human) obscuration reports (though not at all times). Other observing sites closer to the air quality monitoring locations at Remount and Lexington such as the Charlotte/Douglas International Airport (CLT) or the Davidson County Airport (EXX) did not include these human reports. However, JQF is reasonably close (approximately 20 and 40 miles respectively) and thus representative of conditions at both locations. METARs provide a robust set of hourly surface observations at a location including relevant information for this demonstration such as surface visibility and obscurations (including smoke). Standard, clear surface visibility in METAR reports is 10 statute miles (SM) and as obscurations reduce visibilities below this, a visibility chart like the one shown below in **Figure 16** is used to determine the visibility by the observer. Any visibility below 7-8 SM indicates a significant obscuration.

[25] EPA, PM2.5 Wildland Fire Exceptional Events Tiering Document, EPA-457/R-24-001, April 2024, https://www.epa.gov/system/files/documents/2024-04/final-pm-fire-tiering-4-30-24.pdf.

3.3 Visibility Chart

As an aid for determining visibility around the station, all stations are required to have a visibility chart. And to be most useful, this chart should be posted near the point from which you observe visibility. This chart should list or otherwise indicate the location of all visibility markers, their distance from the station, and whether they are daytime or nighttime markers. It is also very important that this visibility chart be kept current. An example of the type of visibility chart used is shown in Exhibit 3-1.

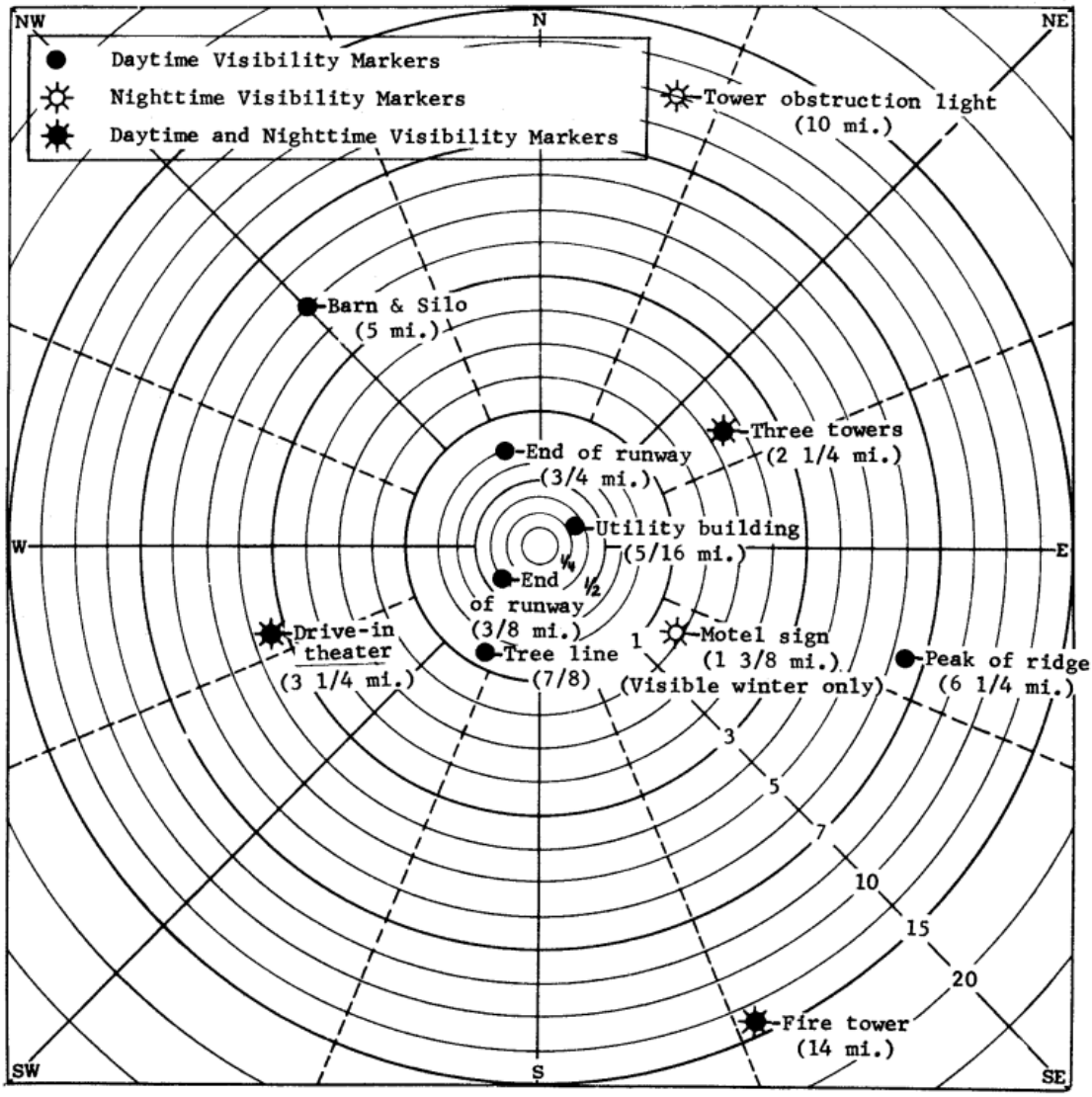


Exhibit 3-1. Visibility Chart

***Figure 16**: Example visibility chart used to determine visibility observations at airports. Typical visibility is 10 statute miles (SM), with lower values indicating increasing obscuration.*[26]

Also included as additional Tier 2 evidence on select days are observed upper air radiosonde

[26] https://www.weather.gov/media/surface/SFCTraining.pdf

sounding data in skew-t format from the Greensboro airport (KGSO) and both aerosol model guidance provided by the Naval Research Laboratory Marine Meteorology Division's Navy Aerosol Analysis and Prediction System (NAAPS) Global Aerosol Model and modeled near-smoke concentrations from NOAA's High Resolution Rapid Refresh (HRRR) smoke model.

3.1 Canadian Wildfires Clear Causal Relationship to Elevated $PM_{2.5}$ Observations in NC

As previously discussed, when the anomalous upper-level high pressure[27] built over Canada during April and May 2023, it resulted in record warm and dry conditions across the entire country. By late May 2023, a combination of unseasonably warm temperatures reaching into the 90s (depicted in red numbers in the station observations)[28] and dry weather across Quebec provided ideal conditions for wildfires to develop.[29] When thunderstorms did move through, lightning strikes ignited even more fires. In total, more than 150 wildfires in the province burned almost 400,000 acres just during the first week of June. From early June through mid-July 2023, North Carolina experienced 4 significant intrusions of smoke-laden Canadian air masses that directly resulted in widespread elevated $PM_{2.5}$ observations that otherwise would not have occurred in the absence of these events.

3.1.1 Event ID #1 - June 6th through June 11th, 2023

The first event in early June led to four days of 24-hour $PM_{2.5}$ averages that were classified as Tier 2 level at the Remount monitor and one day that was classified as Tier 1 level. For the Lexington monitor, three days were classified as Tier 2 and two days were classified as Tier 1. This is shown in **Table 3** below.

***Table 3**: Regulatorily Significant 24-Hour Average $PM_{2.5}$ Concentrations Requested for Exclusion for Event #1.*

		Remount (AQS ID# 371190045) (Mecklenburg County)					Lexington (AQS ID# 370570002) (Davidson County)				
Event ID	**Date**	**24-hr $PM_{2.5}$ Average ($\mu g/m^3$)**	**Historical Average* (2018-2022 Avg. Daily Conc.)**	**% Increase from Historical Average**	**EPA Tier Level / Threshold ($\mu g/m^3$)****		**24-hr $PM_{2.5}$ Average ($\mu g/m^3$)**	**Historical Average* (2018-2022 Avg. Daily Conc.)**	**% Increase from Historical Average**	**EPA Tier Level / Threshold ($\mu g/m^3$)****	
1	6/6/2023	21.7	8.6	151.2 %	Tier 2	16.3	28.6	11.4	150.9 %	Tier 1	25.35
	6/7/2023	26.3	10.0	162.5 %	Tier 1	24.45	29.3	9.2	219.3 %	Tier 1	25.35
	6/8/2023	18.5	8.7	113.6 %	Tier 2	16.3	-	-	-	-	
	6/9/2023	23.7	7.7	208.6 %	Tier 2	16.3	23	8.1	184.0 %	Tier 2	16.9
	6/10/2023	24.3	7.5	224.0 %	Tier 2	16.3	22.5	7.7	192.2 %	Tier 2	16.9
	6/11/2023	-	-	-	-		19.2	9.1	110.4 %	Tier 2	16.9

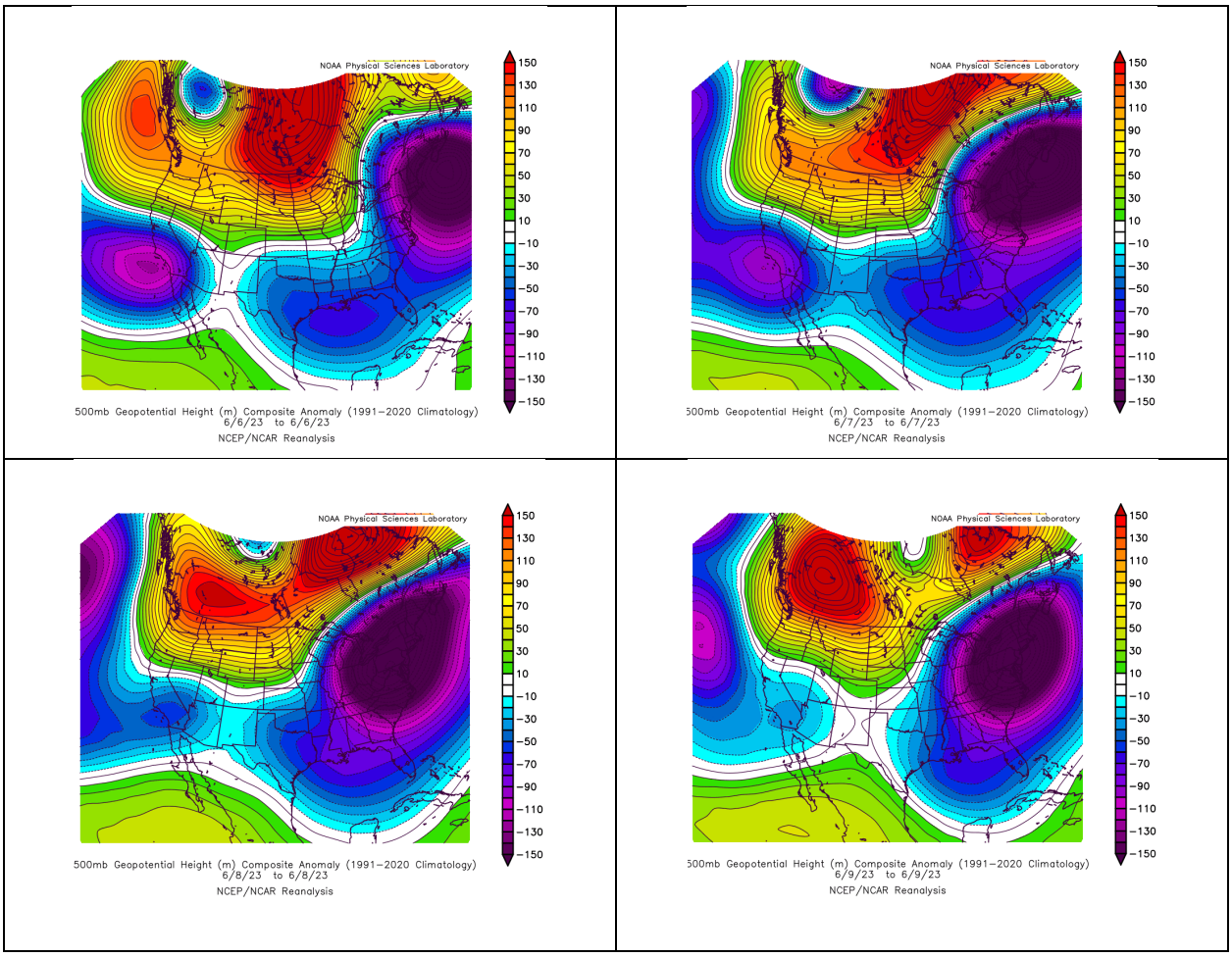
** The historical average is defined as the daily average $PM_{2.5}$ concentration over the previous 5-year period (2018-2022) on the given date (i.e., the past 5 June 6ths, the past 5 June 7ths, etc.).*

*** The EPA Tier Level determines the level of evidence required to establish a clear causal relationship in a wildland fire $PM_{2.5}$ Exceptional Events demonstration and was determined using EPA's Tiering Tool output as displayed in Appendix K: Monitoring Sites' Tiering Graphs. The threshold listed represents the minimum daily*

[27] https://climate.ncsu.edu/wp-content/uploads/2023/06/500mb_anomaly_May2023.png
[28] NOAA, https://climate.ncsu.edu/wp-content/uploads/2023/06/sfcmap_QC_2023-05-31_21Z.png
[29] NASA Earth Observatory, https://earthobservatory.nasa.gov/images/151430/fires-burn-across-quebec

average concentration (µg/m^3) needed to meet the tier level listed for that specific monitor and month.

This event was driven by a combination of smoke transport aloft and direct transport of a significantly elevated $PM_{2.5}$ air mass at the surface. Aloft, smoke was advected southward from Canada due to strong northerly winds in the mid-levels of the atmosphere along the eastern U.S., which was positioned between an anomalously strong upper-level high pressure (red shading) to the west and upper-level low pressure (purple shading) to the east as shown in **Figure 17**. This upper-level atmospheric pattern was slow to break down, resulting in a persistent fetch of upper-level northerly winds out of eastern Canada that continued to drive smoke into the eastern U.S.



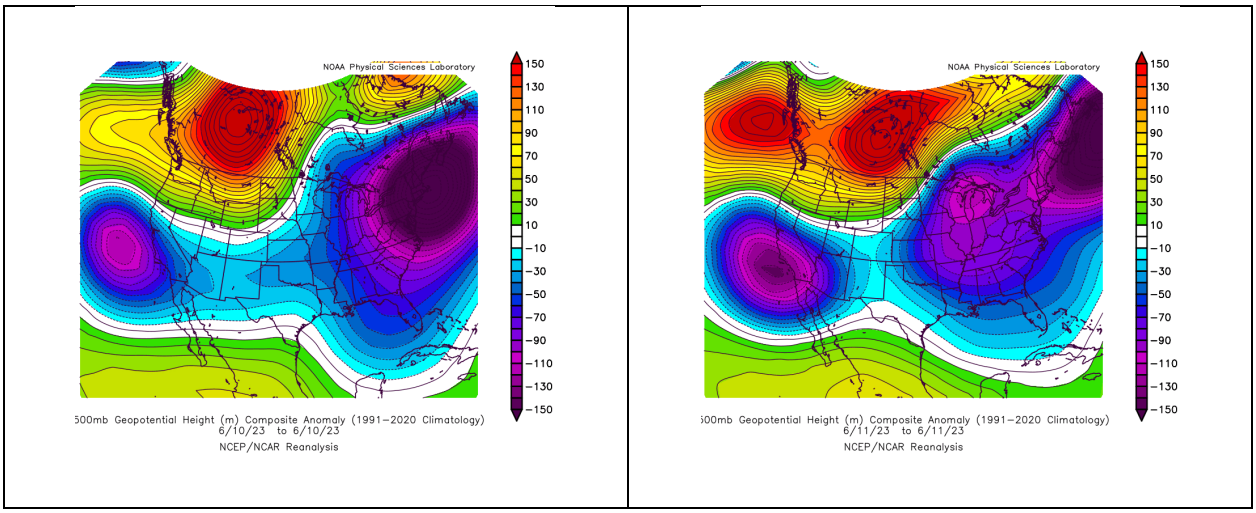


***Figure 17**: 500 mb geopotential height anomalies evolution from June 6th to June 11th, 2023.*

Smoke aloft was visible on satellite imagery over the Ohio Valley and Great Lakes on June 5th, 2023, as seen in **Figure 18**. By June 6th, as the upper-level low continued to provide northwesterly winds aloft, the smoke had blown over North Carolina, as seen in **Figure 19** and **Figure 20**.

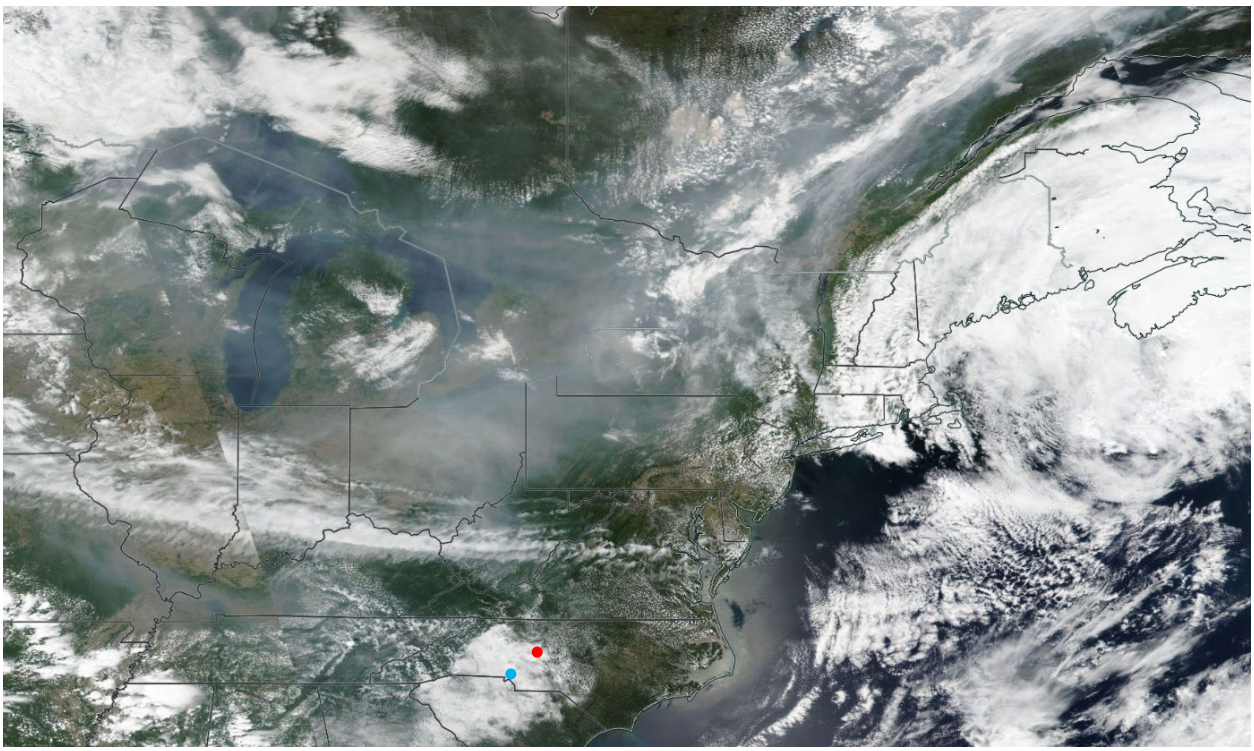


***Figure 18**: Visible satellite imagery showing smoke across the upper Midwest and Great Lakes on June 5th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

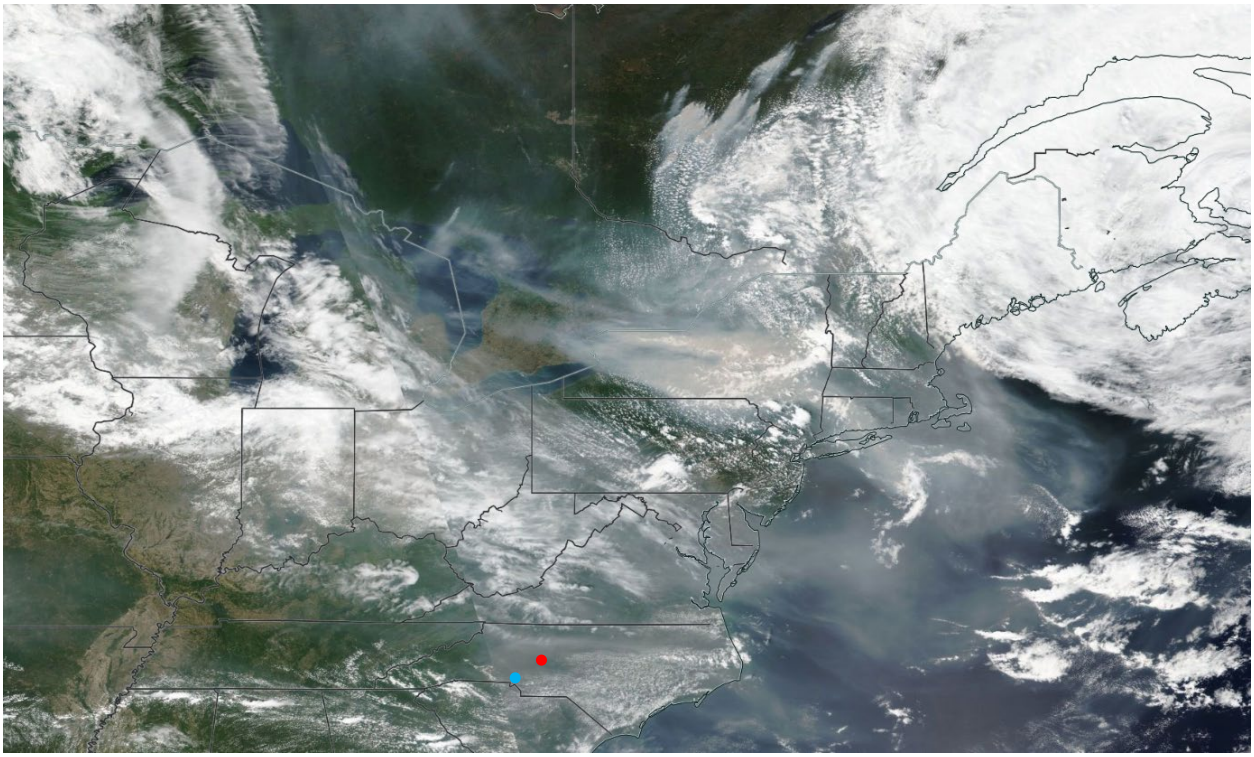


***Figure 19**: Visible satellite imagery showing smoke over the Mid-Atlantic, including NC, on June 6th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

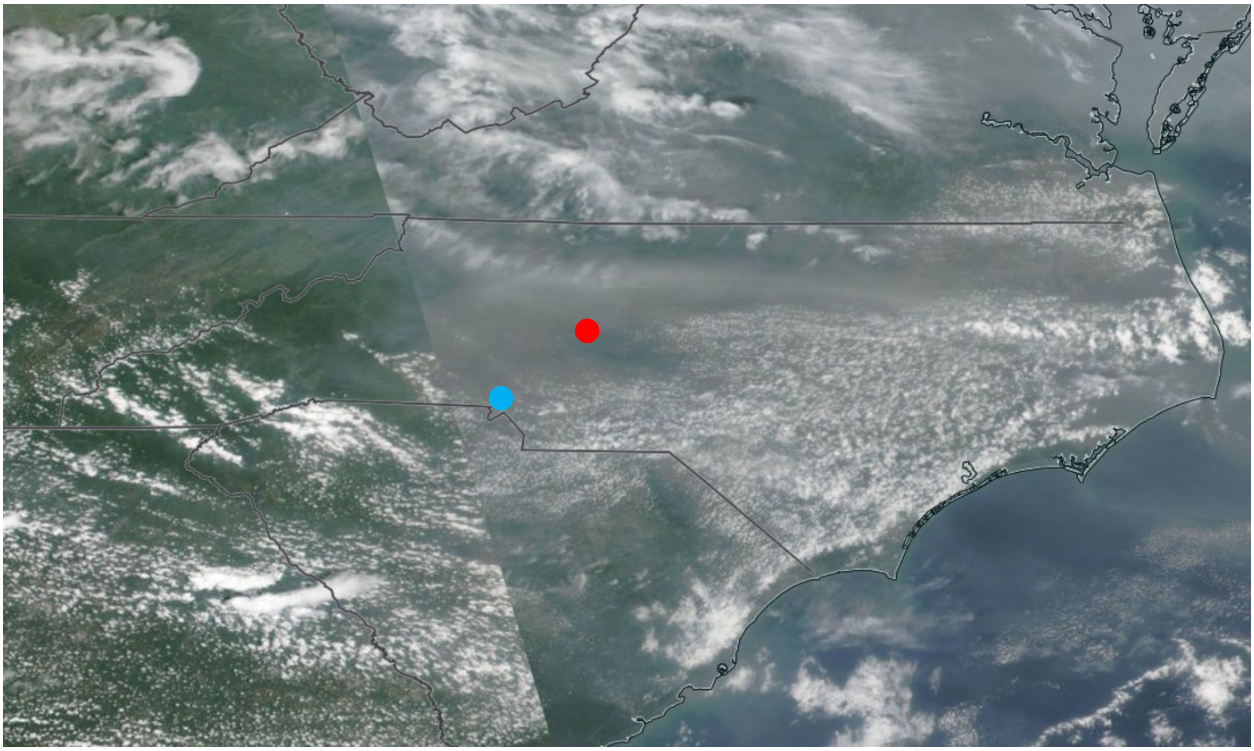


***Figure 20**: Visible satellite imagery showing smoke over the Mid-Atlantic, including NC, on June 6th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

Signaling the onset of the event, hourly $PM_{2.5}$ values began rising rapidly at both the Remount Road (**Figure 21**) and Lexington Water Tower (**Figure 22**) monitors during the afternoon and evening hours of June 6th. This rise occurred ahead of an approaching surface cold front, a clear indication of vertically downward mixing smoke and elevated fine particulate matter, rather than direct horizontal (surface-level) transport (to this point in time).

Additional Tier 2-level evidence of surface-level smoke on June 6th was evident in hourly METAR reports. Beginning with the 20:50 surface observation (and continuing through midnight) as seen in Appendix B, **Figure 120-B**, surface visibilities lowered to between 5 and 6 SM and smoke (code "FU", an abbreviation of the French word "fumée", which means smoke) was reported. Furthermore, both the HRRR Smoke and NAAPS aerosol models analysis (00 hour initialization) at 8:00 pm on June 6th indicated significant surface smoke greater than 32 µg/m^3 had spread over all of North Carolina as seen in Appendix B, **Figure 121-B** and **Figure 122-B**.

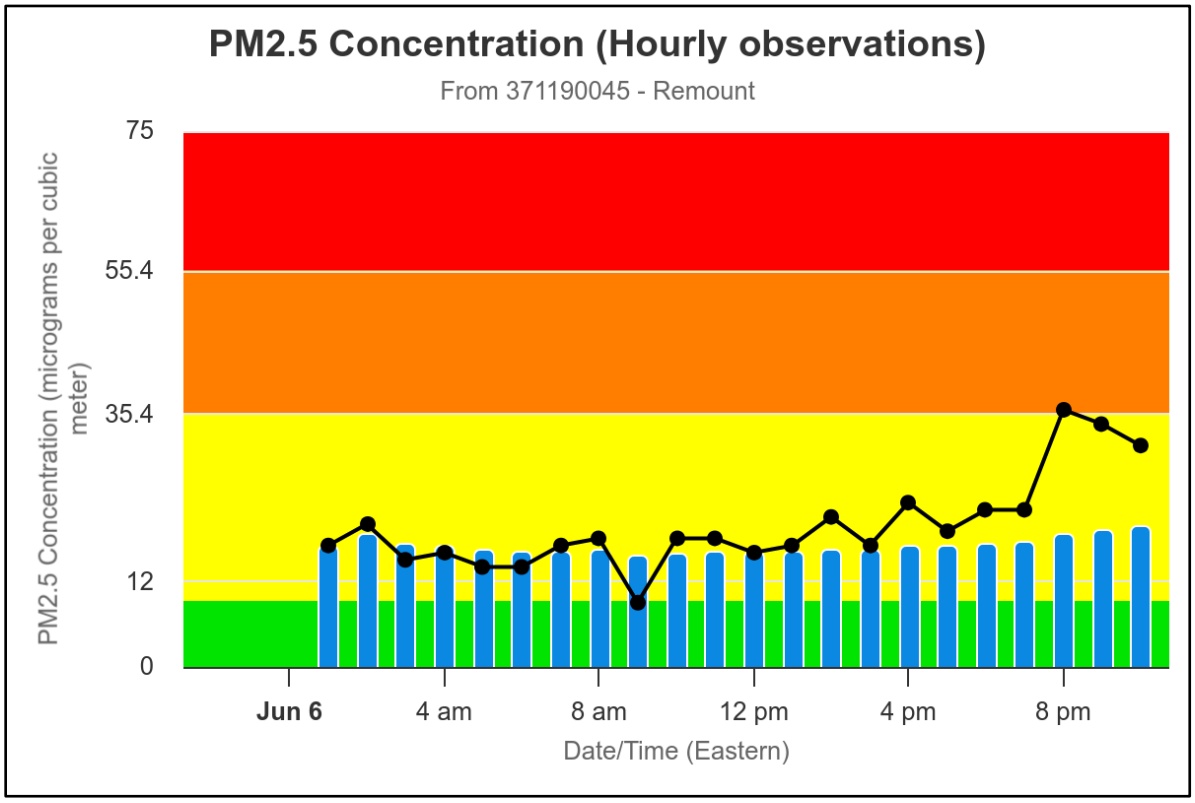


***Figure 21**: Hourly $PM_{2.5}$ observations (black line and dots) valid June 6th, 2023 at the Remount Road monitor. The blue bars represent the rolling daily average of hourly $PM_{2.5}$ observations up to and including the specific hour. The y-axis numerical labels and chart shading are the 24-hour average concentration breakpoints and color categories associated with the Air Quality Index (AQI).*

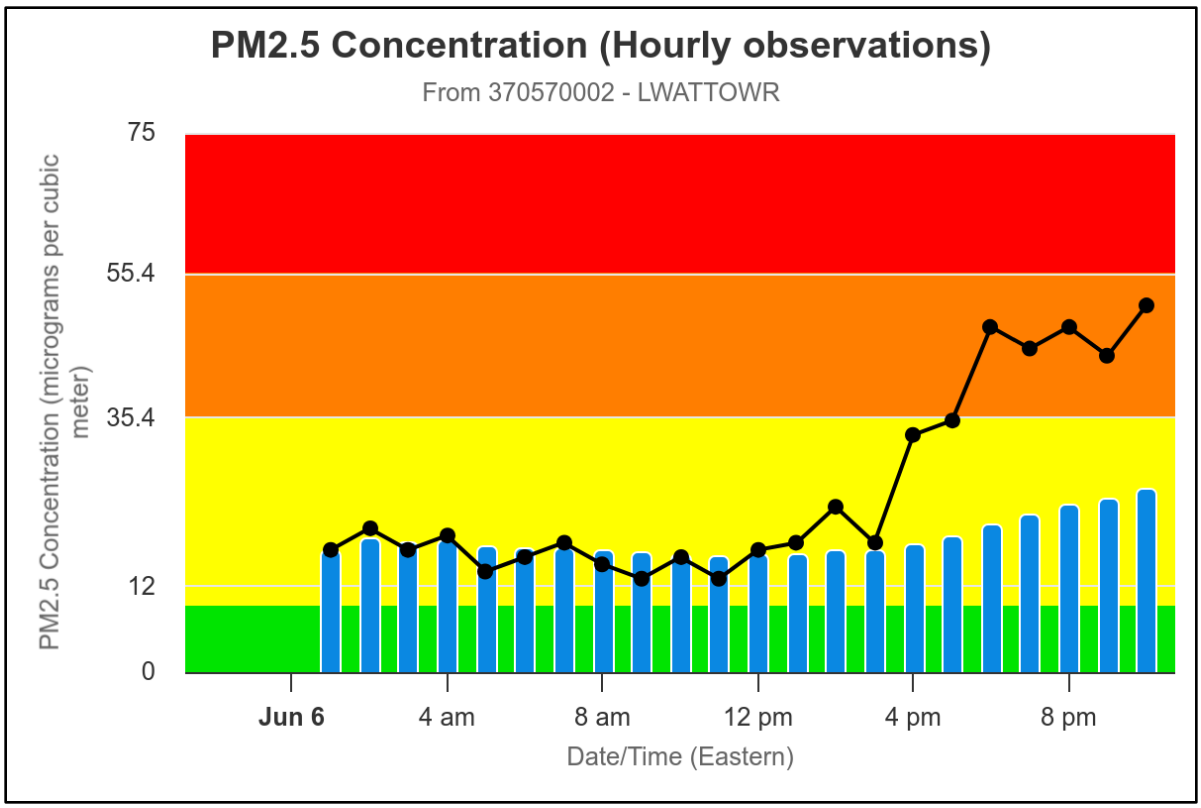


***Figure 22**: Hourly $PM_{2.5}$ observations (black line and dots) valid June 6th, 2023 at the Lexington Water Tower monitor. The blue bars represent the rolling daily average of hourly $PM_{2.5}$ observations up to and including the specific hour. The y-axis numerical labels and chart shading are the 24-hour average concentration breakpoints and color categories associated with the Air Quality Index (AQI).*

At the surface, as seen in **Figure 23** and **Figure 24**, a cold front swept across the state during the morning of June 7th. This resulted in a significantly elevated surface-level air mass of $PM_{2.5}$ moving into the region in tandem with the elevated smoke aloft vertically mixing to the surface during the afternoon hours.

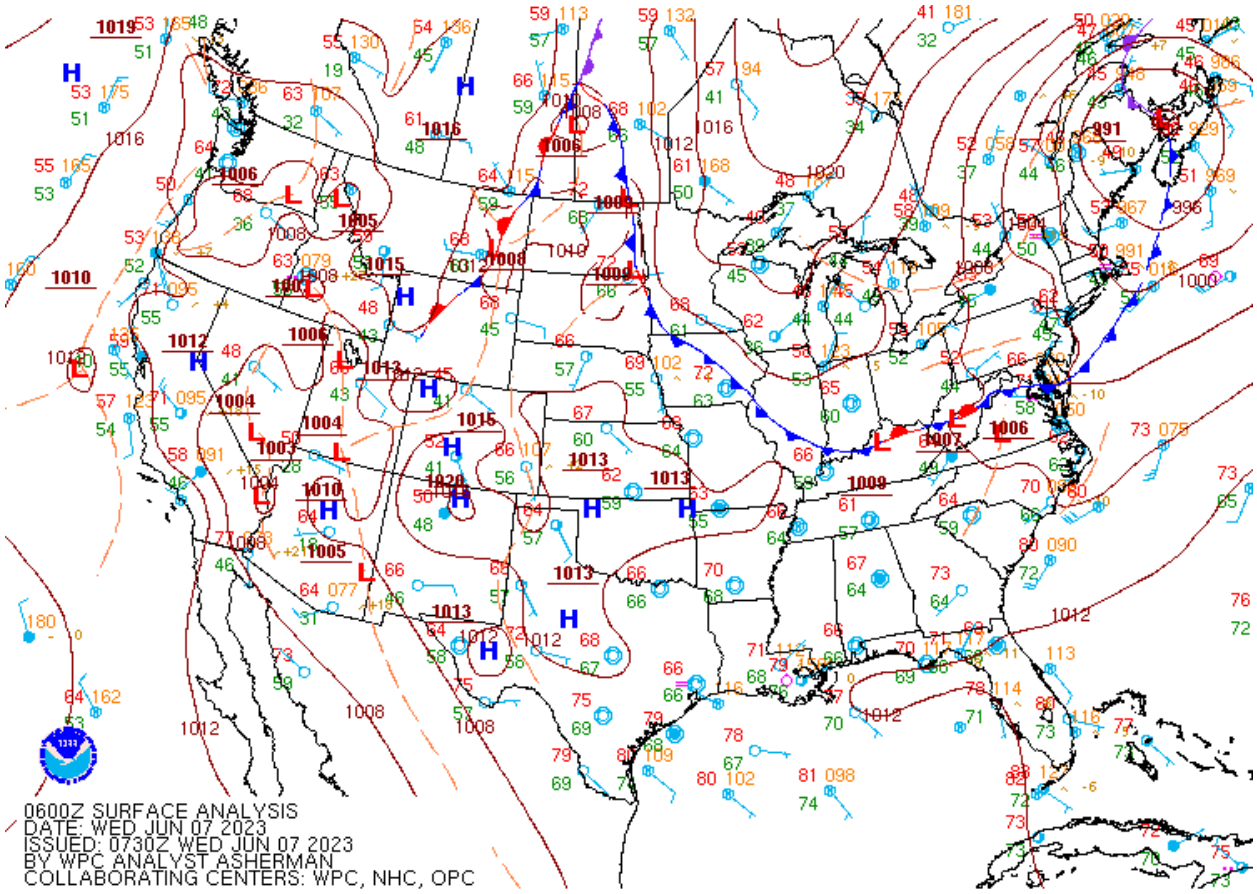


***Figure 23**: WPC surface analysis for June 7th, 2023 at 2:00 am EDT.*

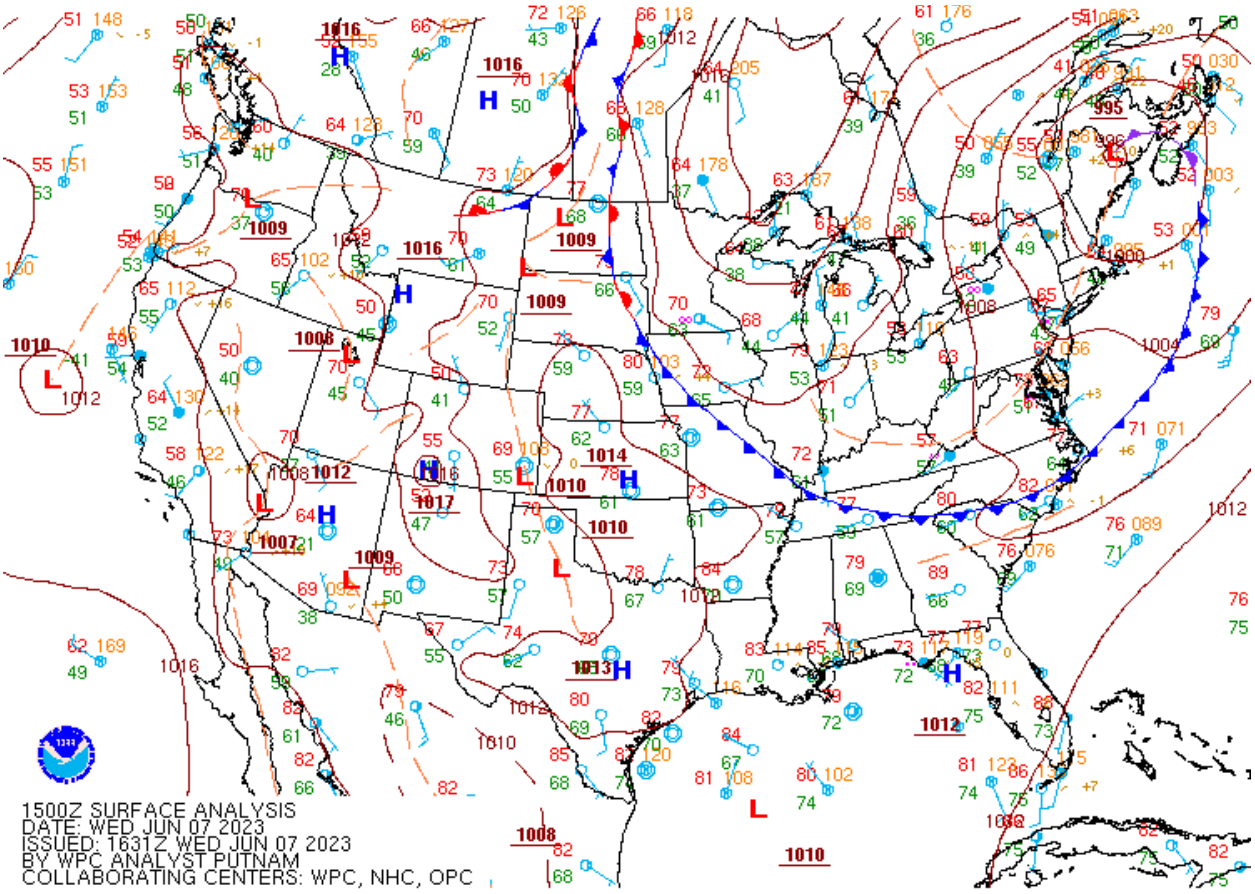


***Figure 24**: WPC surface analysis for June 7th, 2023 at 11:00 am EDT.*

Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model back trajectory analyses (using the North American Mesoscale (NAM) 12km domain via the AirNow-Tech Navigator[30]) show that the smokey air mass seen on visible satellite imagery moved into the state from the northwest. **Figure 25** shows the 24-hour back trajectories, ran from June 7th at both the Remount and Lexington monitors, originated in an air mass containing significantly elevated $PM_{2.5}$ levels on June 6th over northern Kentucky, southern Ohio, and central West Virginia. Resultantly, with continued northwesterly upper-level flow and behind a surface cold frontal passage, elevated $PM_{2.5}$ levels and reduced surface visibilities were observed across the state on June 7th as the polluted air mass moved into the state along the path of the back trajectories, as seen in **Figures 26** through **28**.

[30] AirNow Tech, https://airnowtech.org/index.cfm?page=login

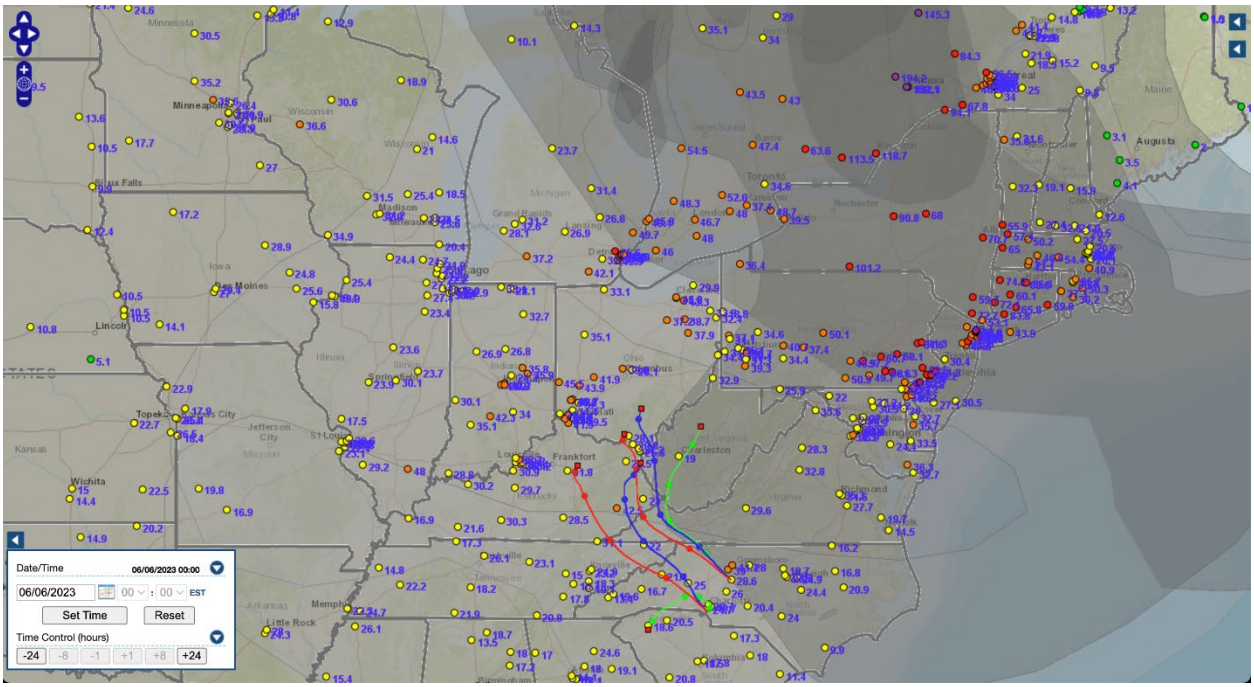


Figure 25**: 24-hr. avg. $PM_{2.5}$ concentrations valid on **June 6th, 2023**, NOAA OSPO satellite-derived smoke analysis and 24-hr. backward trajectories at 100 m (green line), 750 m (blue line) and 1500 m (red line) ending on **June 7th, 2023**. Red squares indicate air parcel location along back trajectory path on **June 6th, 2023.

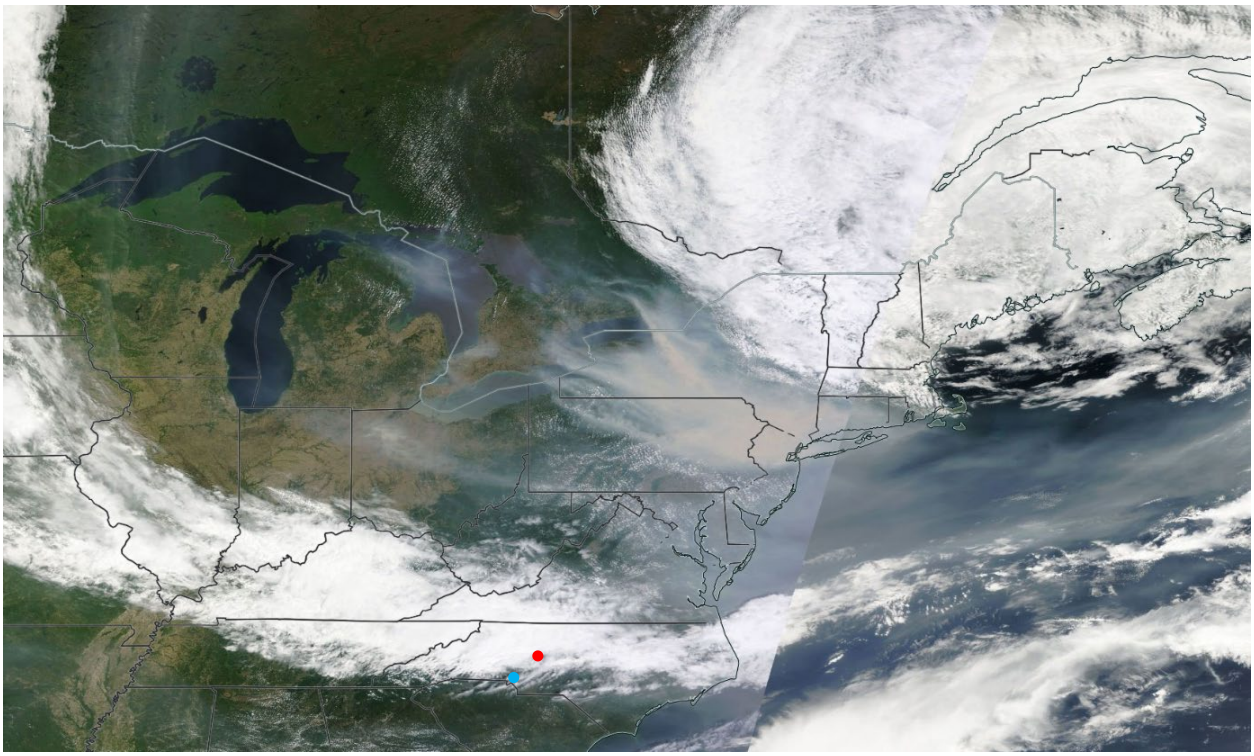


***Figure 26**: Visible satellite imagery showing smoke over the Mid-Atlantic, including NC, on June 7th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

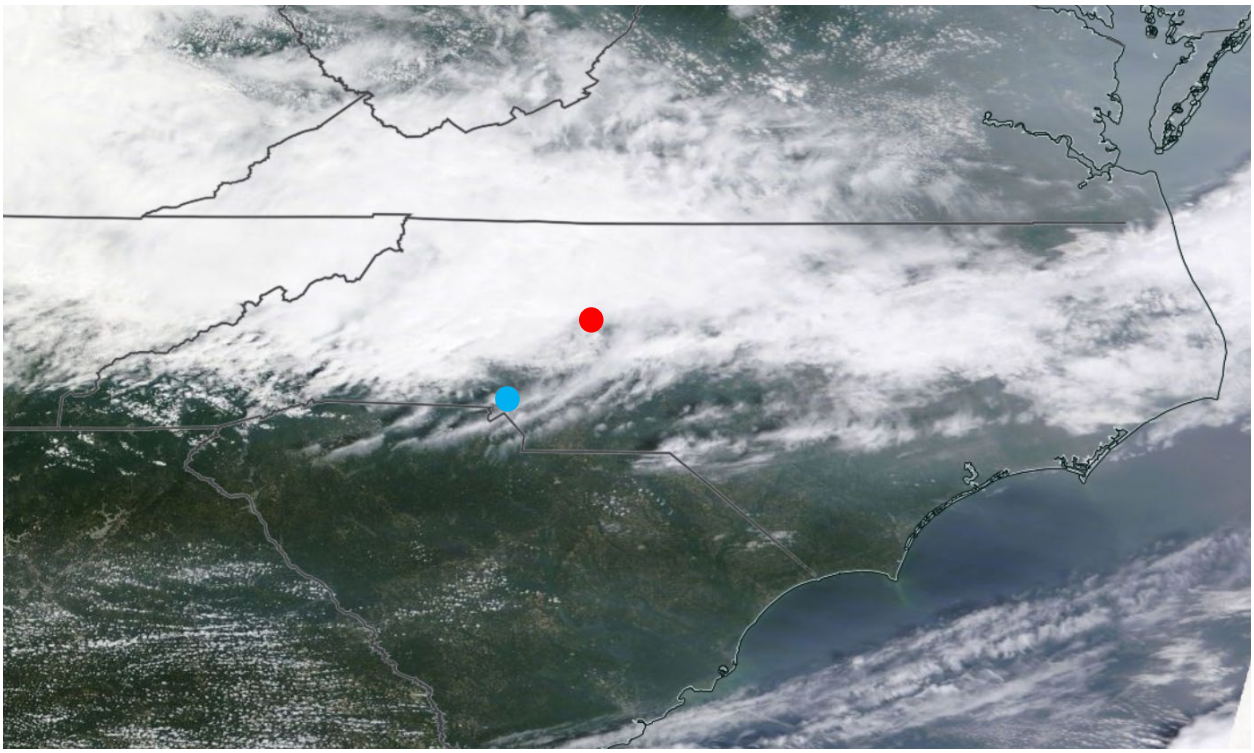


***Figure 27**: Visible satellite imagery showing smoke over the Mid-Atlantic, including NC, on June 7th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

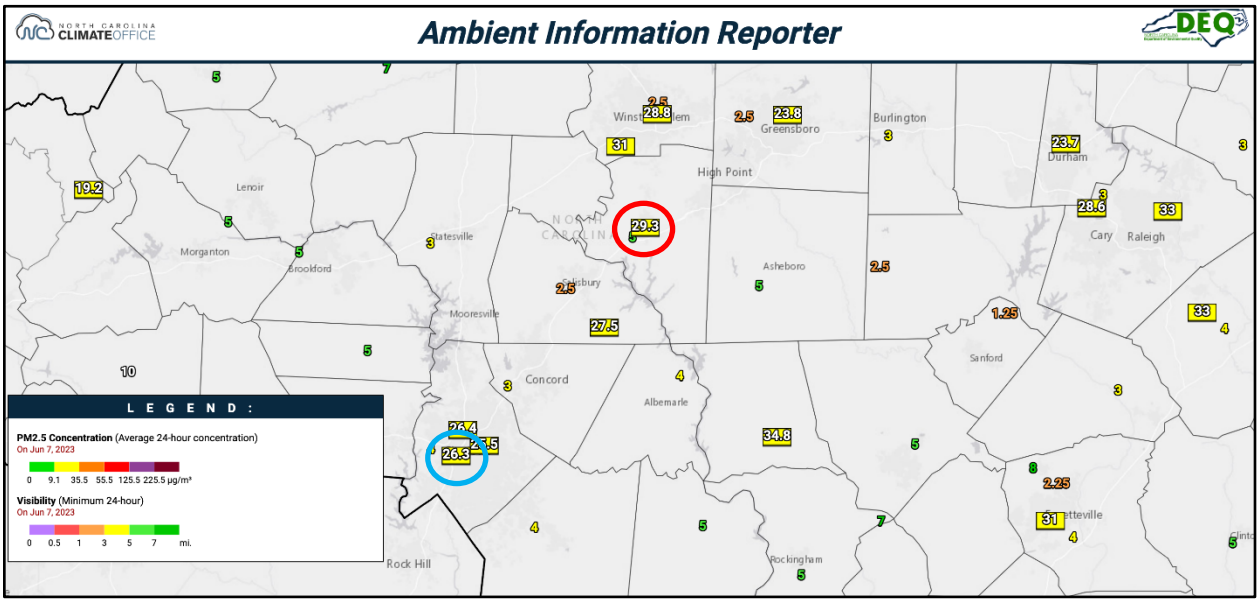


***Figure 28**: 24-hr. avg. $PM_{2.5}$ concentrations and minimum 24-hr. visibility from airport observing sites on June 7th, 2023. Minimum visibility can be used as a proxy for additional air quality monitors and when values fall below the standard 10 statue mile range, it is an indicator of an obscuration (such as smoke, dust, haze, etc.).*

Once the polluted air mass was deposited into North Carolina, surface high pressure began building into the state from the north and west, as seen in **Figure 29**. This promoted subsidence, light winds, reduced air mass dispersion and stronger nighttime surface temperature inversions, all of which worked to continue holding the polluted air mass in place. Concurrently, the upper-level low

continued to pump a smoke-laden, elevated $PM_{2.5}$ air mass into the state through June 11th as seen in **Figure 30** through **Figure 45.**

Additional Tier 2-level evidence of surface-level smoke and associated impacts on June 8th through June 11th was present in the observed GSO skew-t soundings throughout the period (Appendix C through F, **Figure 123-C** through **Figure 134-F**). A pronounced surface temperature inversion can be seen each morning in the soundings. This occurs when nocturnal surface radiation cools the near-surface temperature more than the air just above, resulting in a very narrow boundary layer of more dense, cold air that sits below the warmer, less dense air just above the surface (circled in red). This acts to trap the polluted surface air mass in place as winds (also seen in the sounding) are typically light to calm under the inversion. Nocturnal surface temperature inversions are expected with strong surface high pressure overhead and as explained previously, these temperature inversions concurrent with strong high pressure overhead traps smoke and fine particulates at the surface. This results in elevated overnight fine particulate levels significantly above what would have occurred without the presence of the deposited smoke-laden air mass. Furthermore, again both the HRRR Smoke and NAAPS aerosol models analysis (00 hr initialization) at 8:00 am on June 8th through June 11th analyzed significant surface smoke over North Carolina due to the lingering surface high pressure and resultant subsidence as seen in Appendix C through F, **Figure 123-C** through **Figure 134-F**.

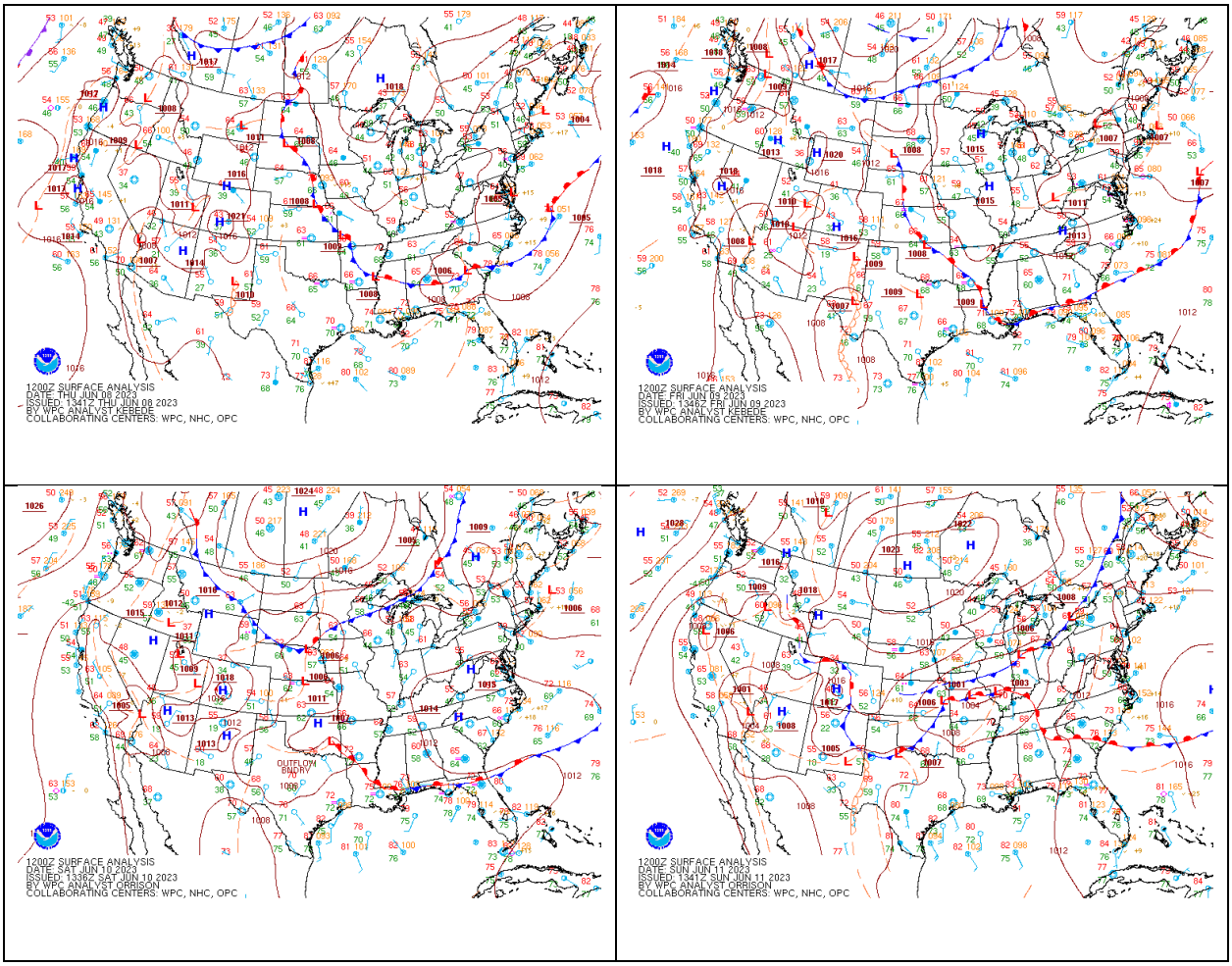


***Figure 29**: WPC 12z (8:00 am EDT) surface analysis evolution from June 8th through June 11th, 2023.*

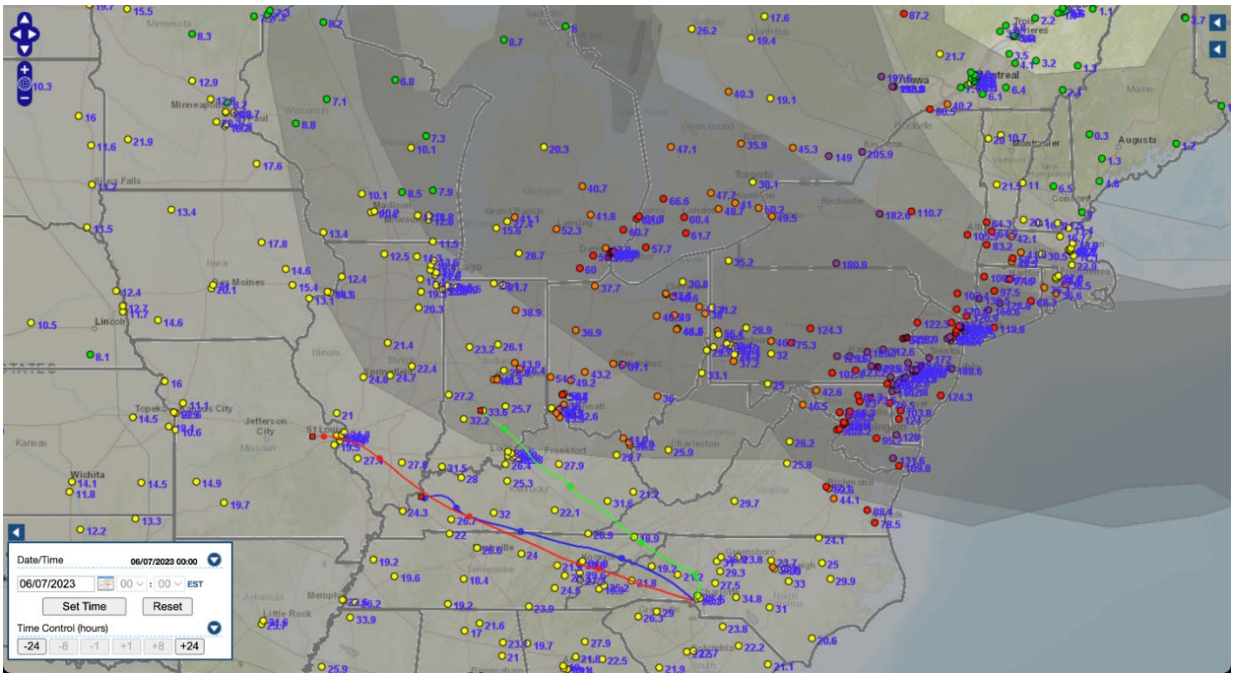


***Figure 30**: 24-hr. avg. $PM_{2.5}$ concentrations valid on **June 7th, 2023**, NOAA OSPO satellite-derived smoke analysis and 24-hr. backward trajectories at 100 m (green line), 750 m (blue line) and 1500 m (red line) ending on **June 8th, 2023**. Red squares indicate air parcel location along back trajectory path on **June 7th, 2023**.*

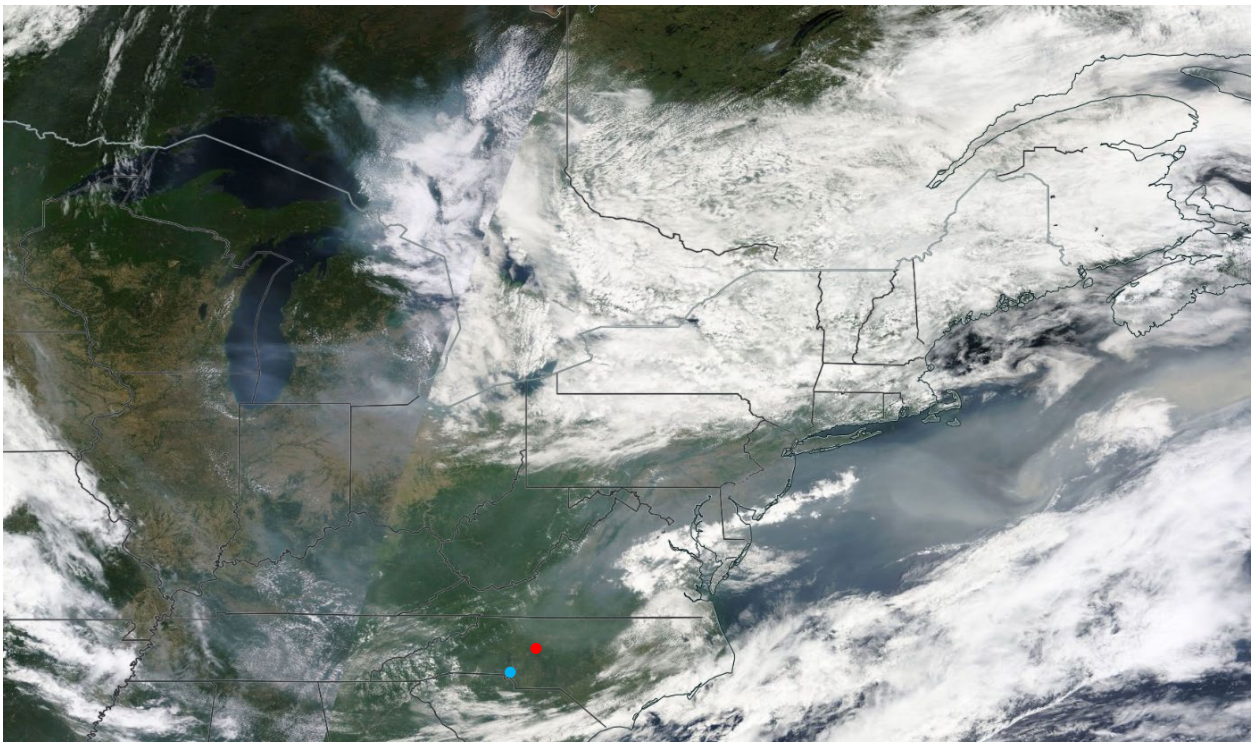


***Figure 31**: Visible satellite imagery showing smoke over the Mid-Atlantic, including NC, on June 8th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

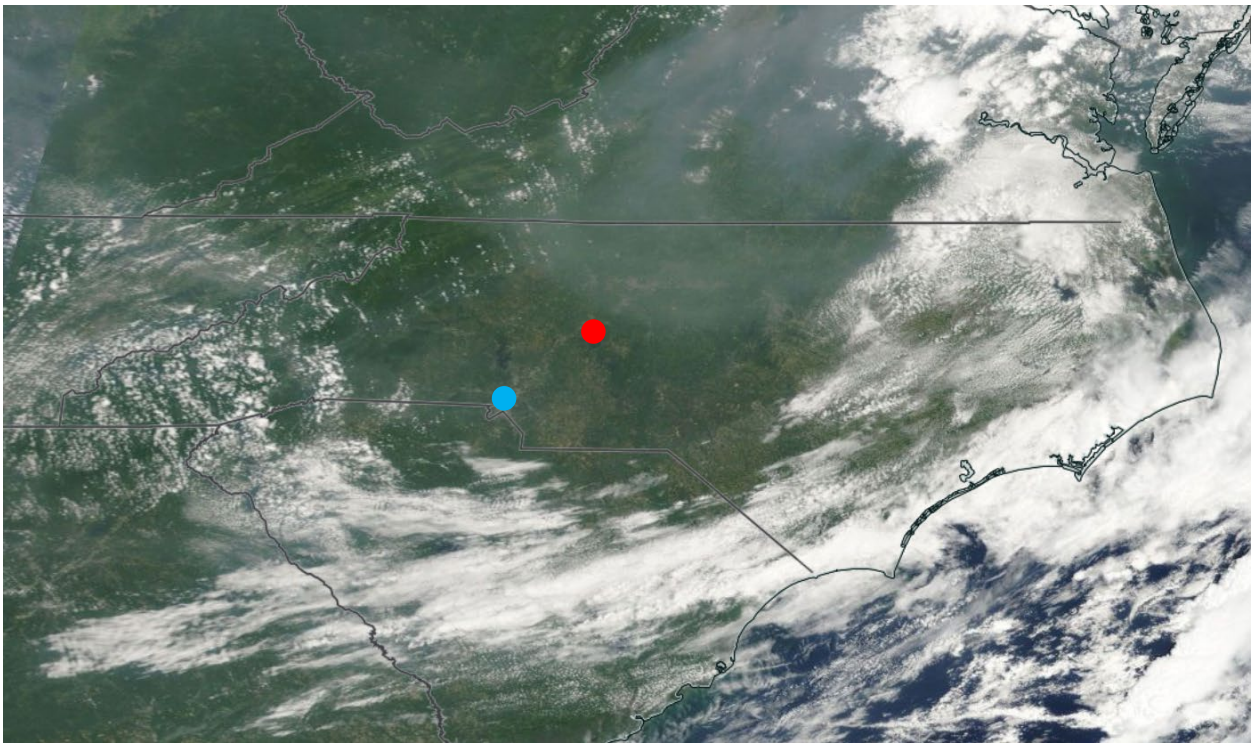


***Figure 32**: Visible satellite imagery showing smoke over the Mid-Atlantic, including NC, on June 8th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

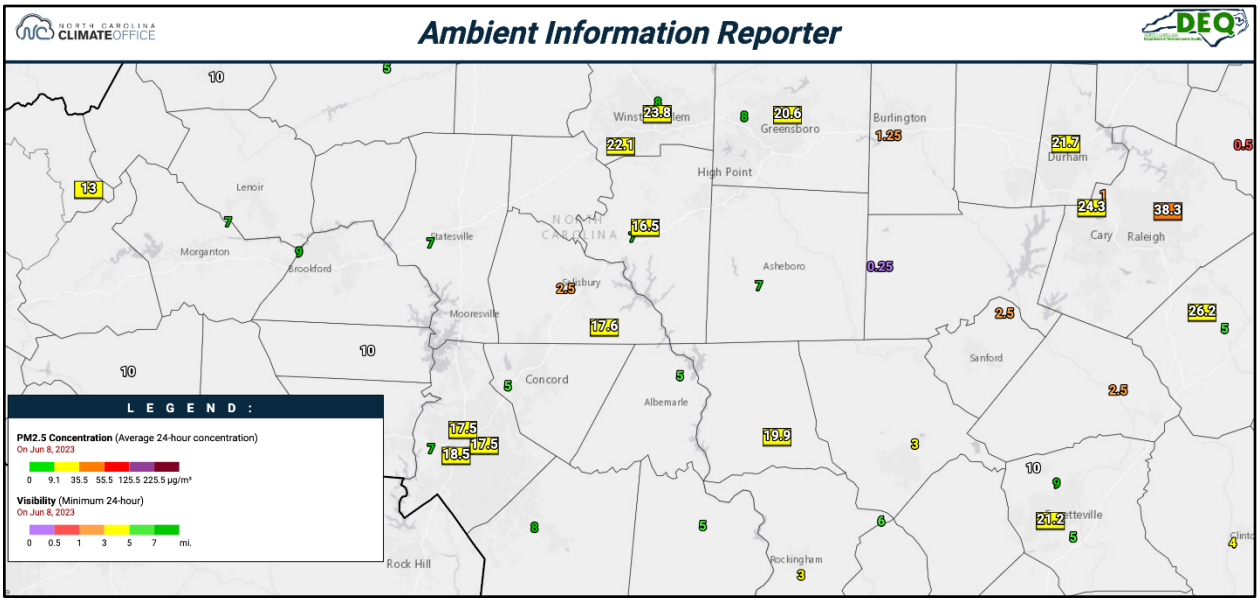


***Figure 33**: 24-hr. avg. $PM_{2.5}$ concentrations and minimum 24-hr. visibility from airport observing sites on June 8th, 2023. Minimum visibility can be used as a proxy for additional air quality monitors and when values fall below the standard 10 statue mile range, it is an indicator of an obscuration (such as smoke, dust, haze, etc.).*

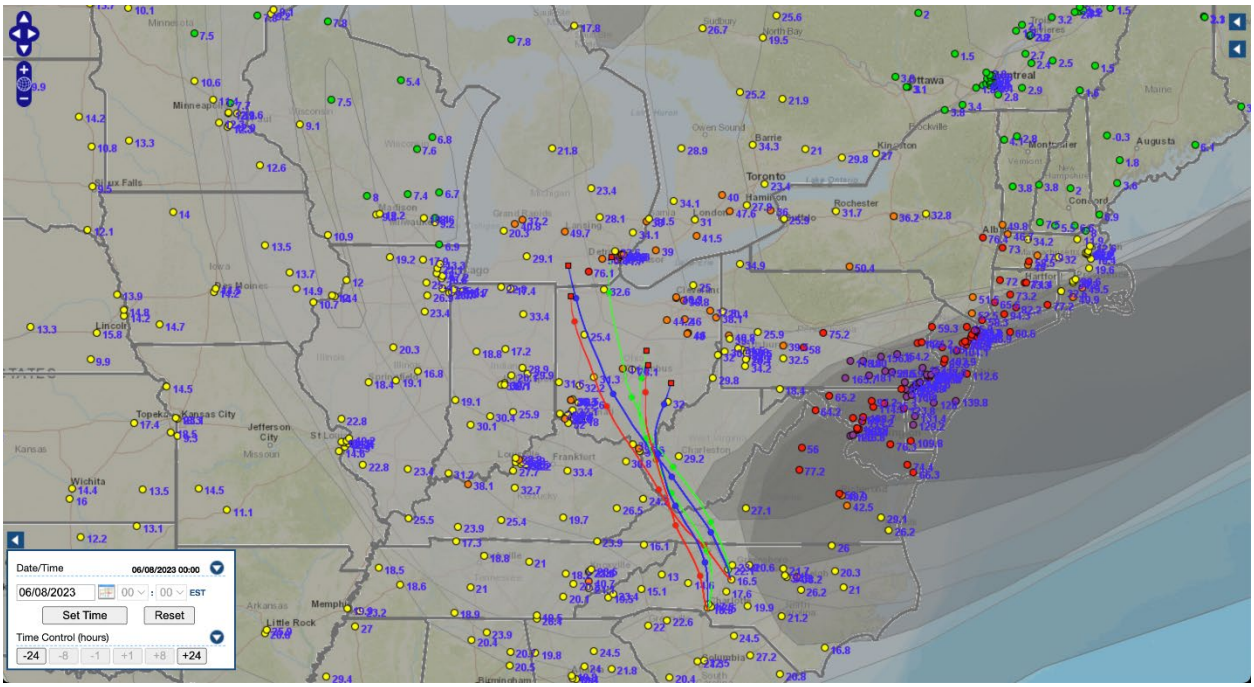


***Figure 34**: 24-hr. avg. $PM_{2.5}$ concentrations valid on **June 8th, 2023**, NOAA OSPO satellite-derived smoke analysis and 24-hr. backward trajectories at 100 m (green line), 750 m (blue line) and 1500 m (red line) ending on **June 9th, 2023**. Red squares indicate air parcel location along back trajectory path on **June 8th, 2023**.*

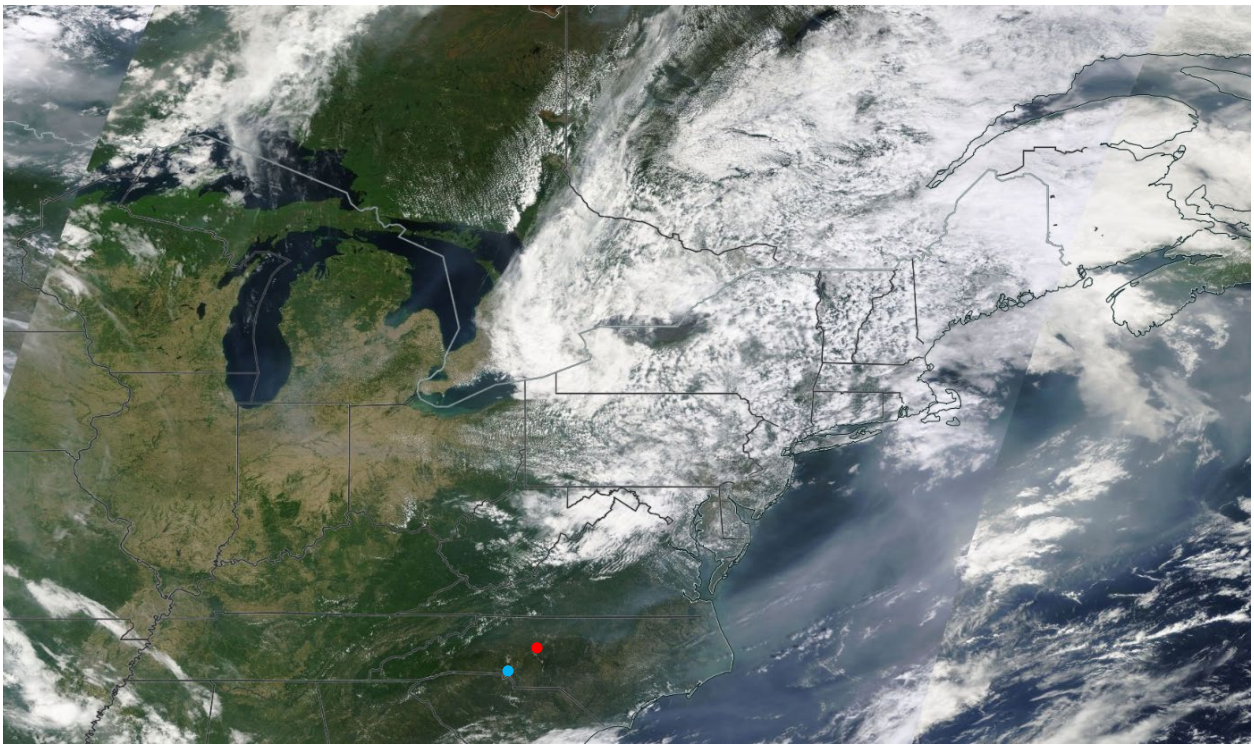


***Figure 35**: Visible satellite imagery showing smoke over the Mid-Atlantic, including NC, on June 9th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

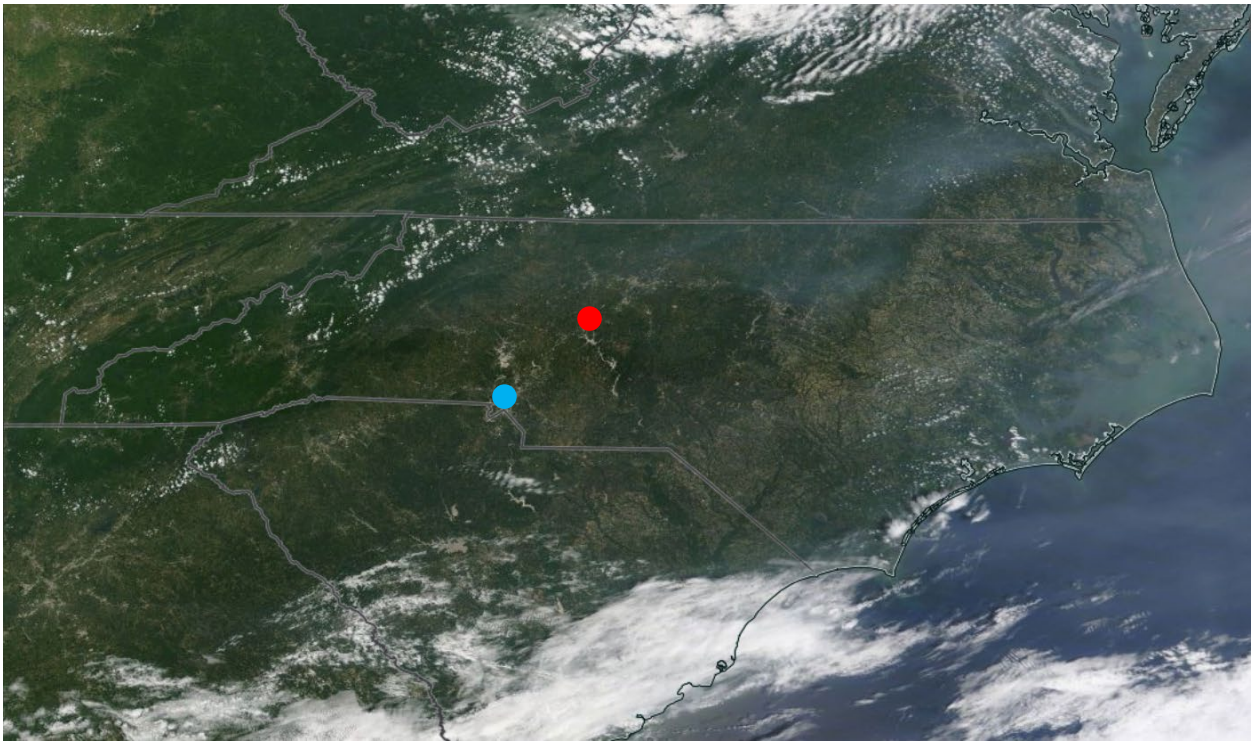


***Figure 36**: Visible satellite imagery showing smoke over the Mid-Atlantic, including NC, on June 9th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

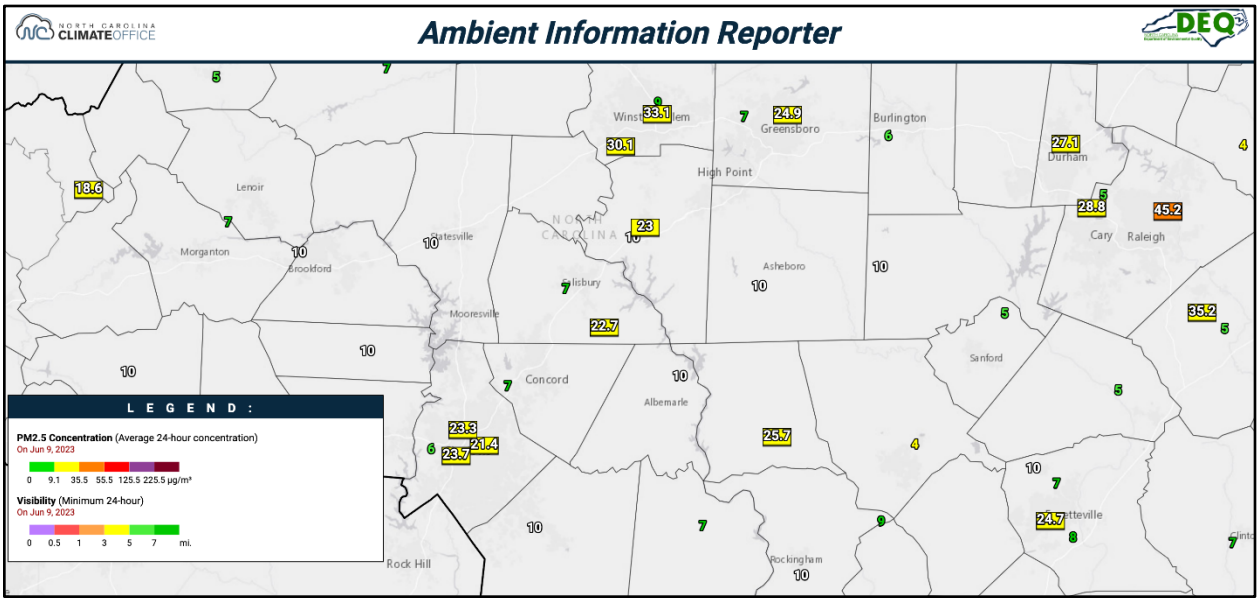


***Figure 37**: 24-hr. avg. $PM_{2.5}$ concentrations and minimum 24-hr. visibility from airport observing sites on June 9th, 2023. Minimum visibility can be used as a proxy for additional air quality monitors and when values fall below the standard 10 statue mile range, it is an indicator of an obscuration (such as smoke, dust, haze, etc.).*

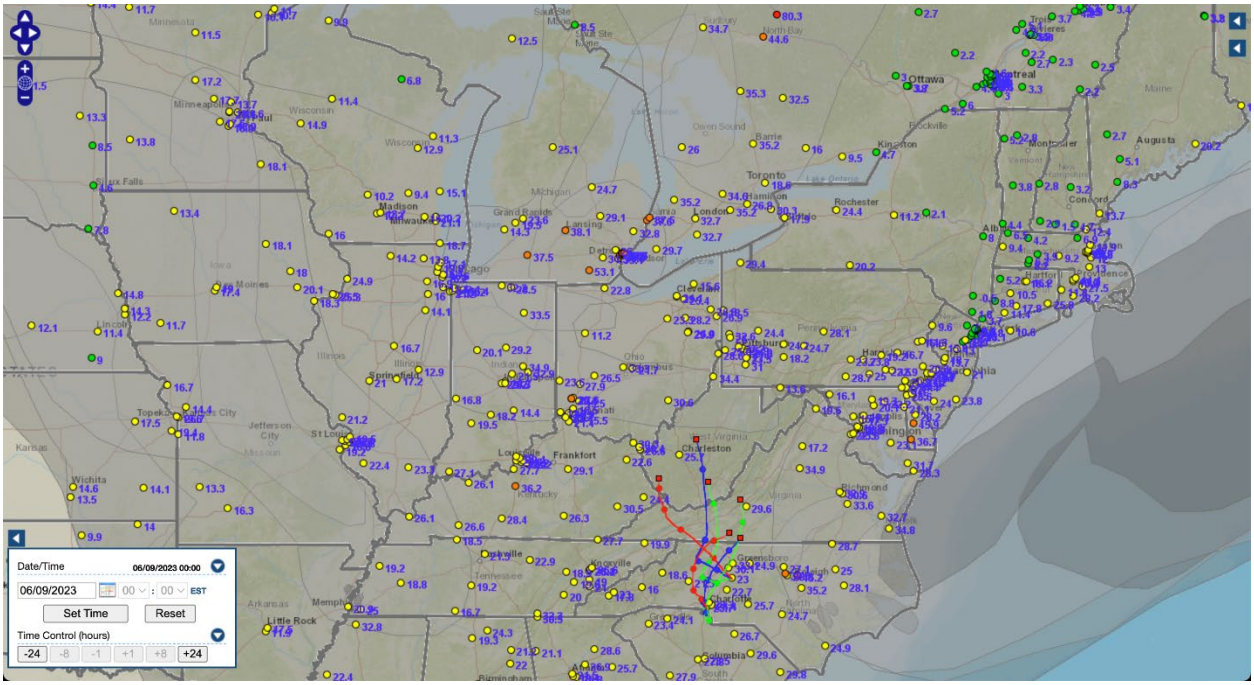


***Figure 38**: 24-hr. avg. $PM_{2.5}$ concentrations valid on **June 9th, 2023**, NOAA OSPO satellite-derived smoke analysis and 24-hr. backward trajectories at 100 m (green line), 750 m (blue line) and 1500 m (red line) ending on **June 10th, 2023**. Red squares indicate air parcel location along back trajectory path on **June 9th, 2023**.*

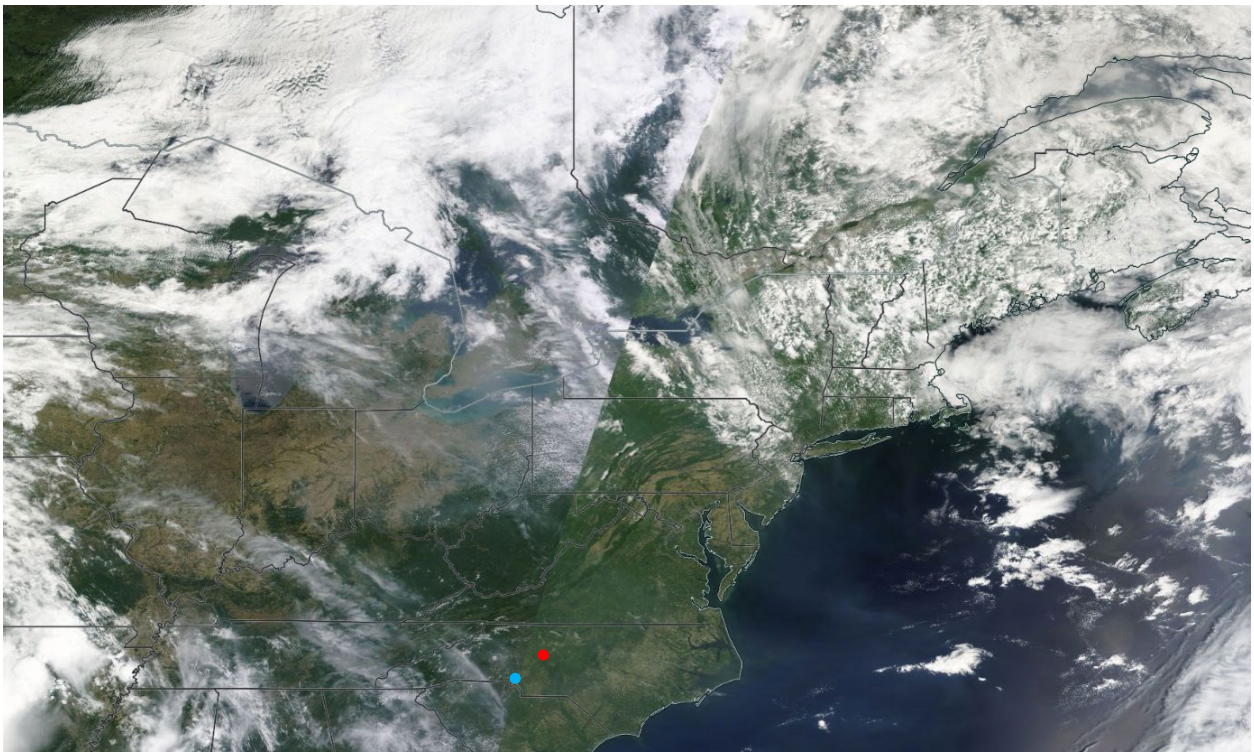


***Figure 39**: Visible satellite imagery showing smoke over the Mid-Atlantic, including NC, on June 10th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

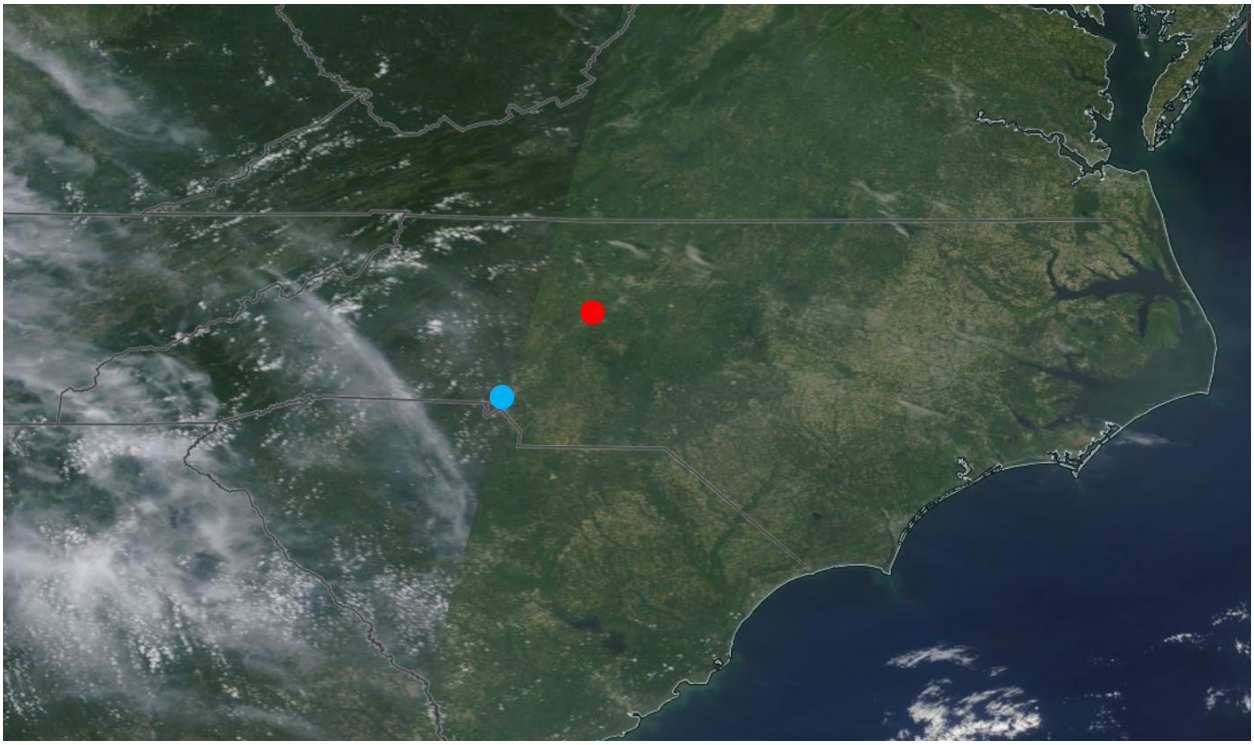


***Figure 40**: Visible satellite imagery showing smoke over the Mid-Atlantic, including NC, on June 10th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

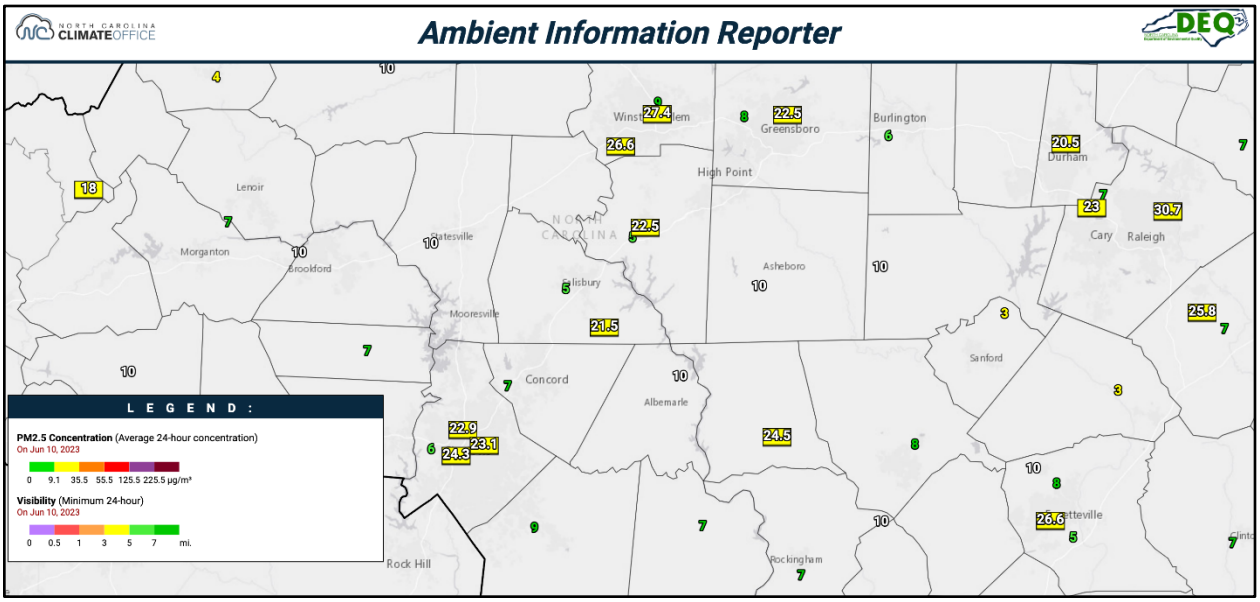


***Figure 41**: 24-hr. avg. $PM_{2.5}$ concentrations and minimum 24-hr. visibility from airport observing sites on June 10th, 2023. Minimum visibility can be used as a proxy for additional air quality monitors and when values fall below the standard 10 statue mile range, it is an indicator of an obscuration (such as smoke, dust, haze, etc.).*

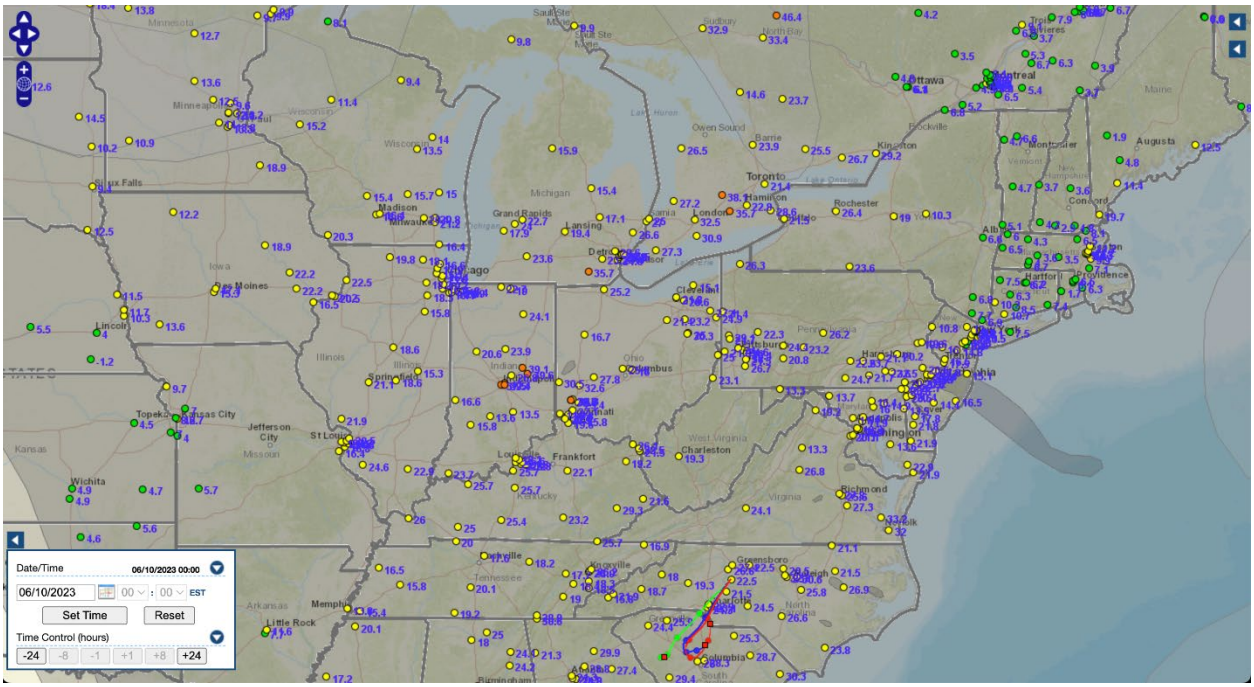


***Figure 42**: 24-hr. avg. $PM_{2.5}$ concentrations valid on **June 10th, 2023**, NOAA OSPO satellite-derived smoke analysis and 24-hr. backward trajectories at 100 m (green line), 750 m (blue line) and 1500 m (red line) ending on **June 11th, 2023**. Red squares indicate air parcel location along back trajectory path on **June 10th, 2023**.*

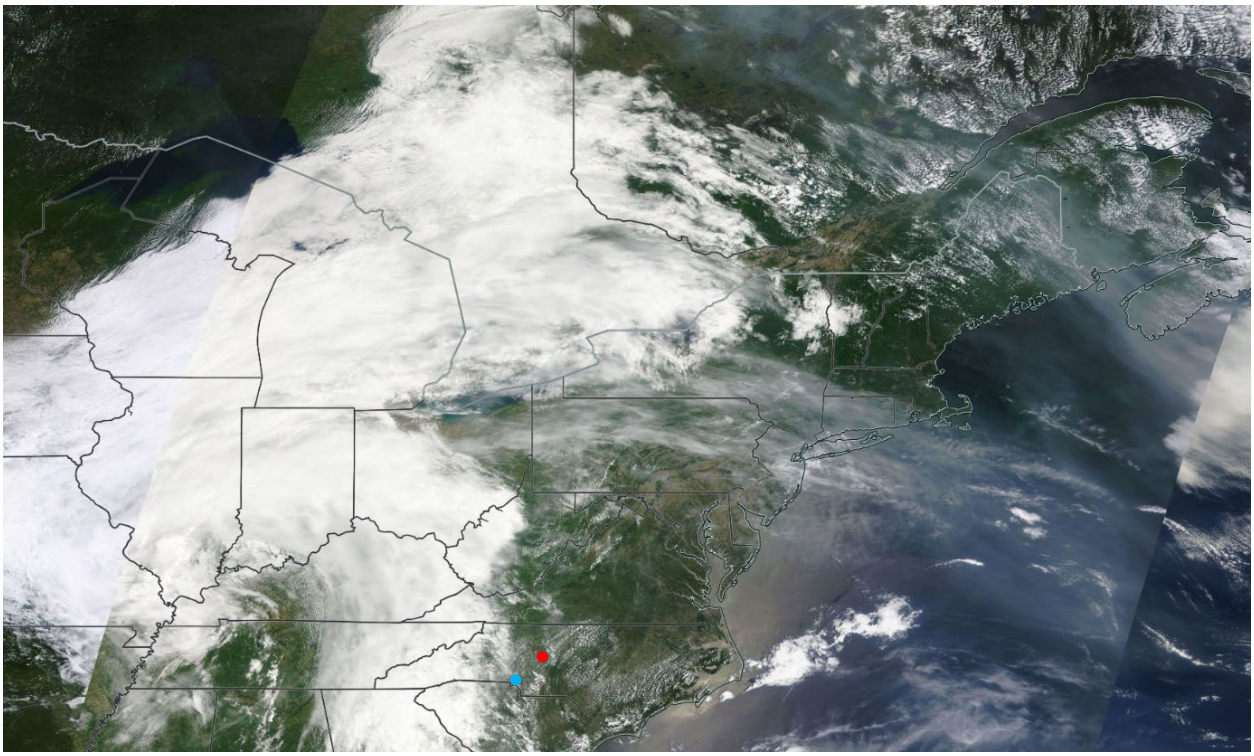


***Figure 43**: Visible satellite imagery showing smoke over the Mid-Atlantic, including NC, on June 11th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

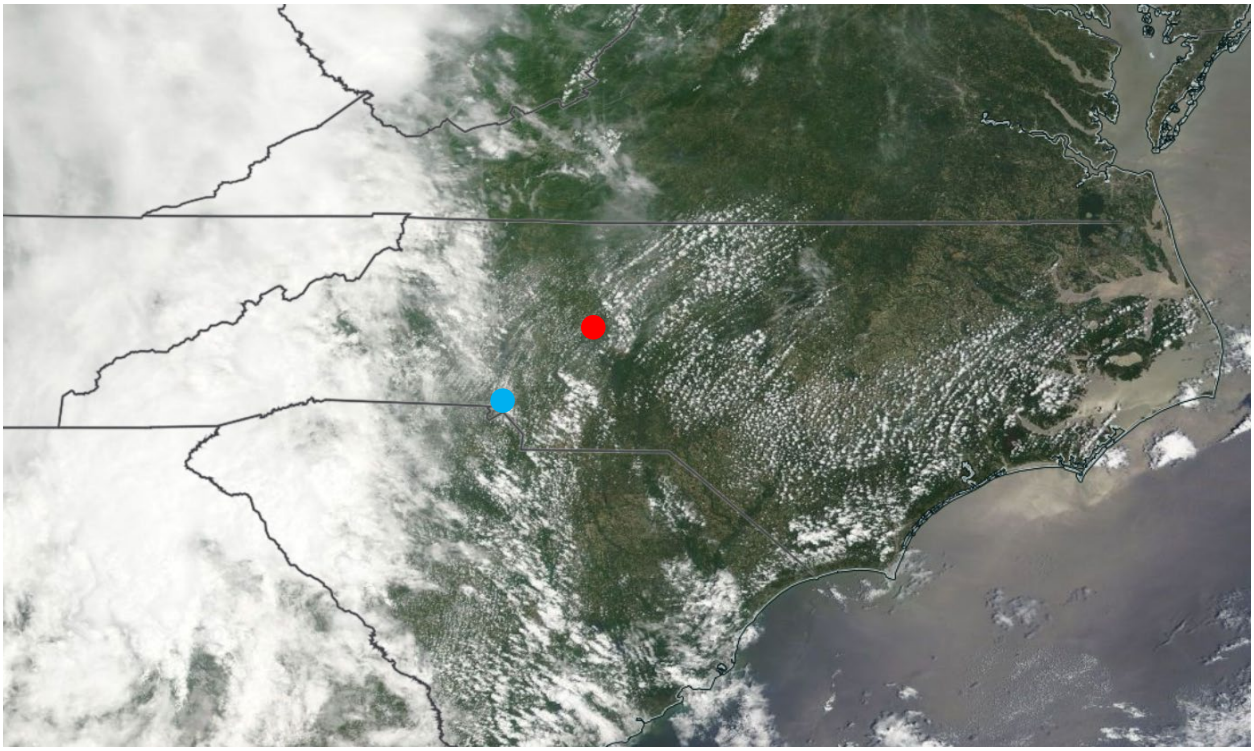


***Figure 44**: Visible satellite imagery showing smoke over the Mid-Atlantic, including NC, on June 11th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

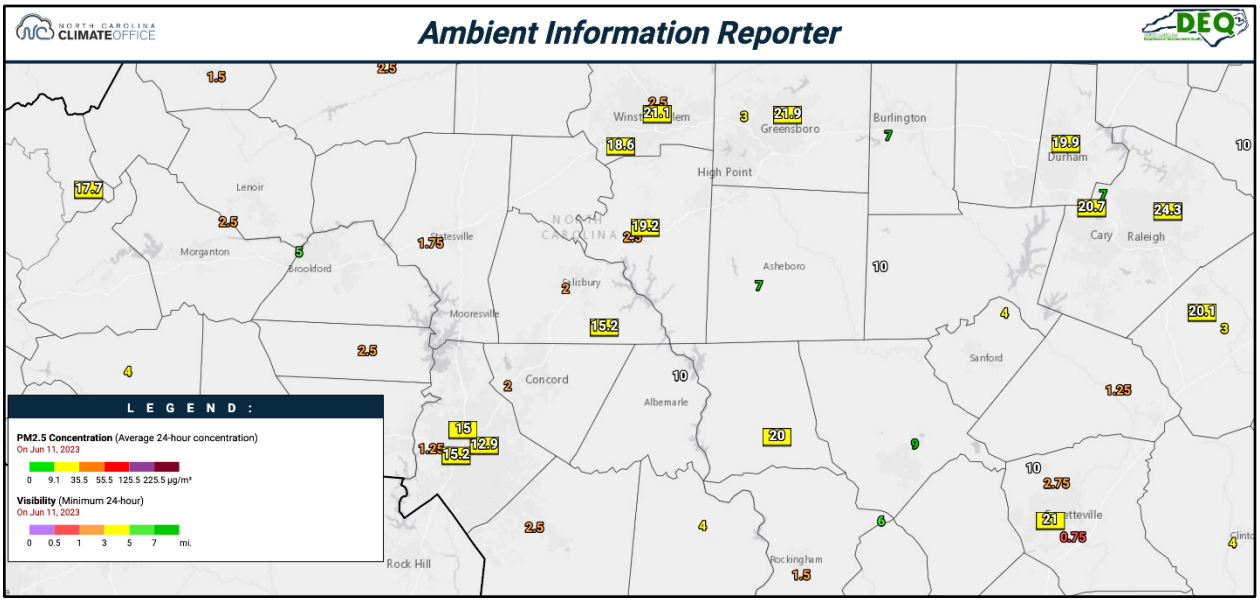


***Figure 45**: 24-hr. avg. $PM_{2.5}$ concentrations and minimum 24-hr. visibility from airport observing sites on June 11th, 2023. Minimum visibility can be used as a proxy for additional air quality monitors and when values fall below the standard 10 statue mile range, it is an indicator of an obscuration (such as smoke, dust, haze, etc.).*

3.1.2 Event ID #2 - June 17th through June 18th, 2023

The second event occurred in mid-June and led to one day of 24-hour $PM_{2.5}$ averages that were classified as Tier 2 level at the Remount monitor and one day that was classified as Tier 1 level. For

the Lexington monitor, both days were classified as Tier 2. This is shown in **Table 4** below.

***Table 4**: Regulatorily Significant 24-Hour Average $PM_{2.5}$ Concentrations Requested for Exclusion for Event #2.*

		Remount (AQS ID# 371190045) (Mecklenburg County)					Lexington (AQS ID# 370570002) (Davidson County)				
Event ID	**Date**	**24-hr $PM_{2.5}$ Average ($\mu g/m^3$)**	**Historical Average* (2018-2022 Avg. Daily Conc.)**	**% Increase from Historical Average**	**EPA Tier Level / Threshold ($\mu g/m^3$)****		**24-hr $PM_{2.5}$ Average ($\mu g/m^3$)**	**Historical Average* (2018-2022 Avg. Daily Conc.)**	**% Increase from Historical Average**	**EPA Tier Level / Threshold ($\mu g/m^3$)****	
2	6/17/2023	25.1	8.8	185.9 %	Tier 1	24.45	18.9	8.7	117.9 %	Tier 2	16.9
	6/18/2023	23.7	8.4	181.5 %	Tier 2	16.3	21.9	8.7	153.2 %	Tier 2	16.9

** The historical average is defined as the daily average $PM_{2.5}$ concentration over the previous 5-year period (2018-2022) on the given date (i.e., the past 5 June 6ths, the past 5 June 7ths, etc.).*

*** The EPA Tier Level determines the level of evidence required to establish a clear causal relationship in a wildland fire $PM_{2.5}$ Exceptional Events demonstration and was determined using EPA's Tiering Tool output as displayed in Appendix K: Monitoring Sites' Tiering Graphs. The threshold listed represents the minimum daily average concentration ($\mu g/m^3$) needed to meet the Tier level listed for that specific monitor and month.*

This second event was the result of another intrusion of Canadian wildfire smoke into North Carolina. The synoptic meteorological pattern associated with this transport event was mechanically equivalent to the first one – a strong upper-level low (**Figure 46**) and attendant surface low pressure system translated eastward into the northeastern U.S., resulting in north-northwesterly upper-level winds. Meanwhile at the surface, a cold front swept across the state and once again resulted in the transport of smoke both aloft and at the surface that led to anomalous $PM_{2.5}$ concentrations across the state, including at the Remount and Lexington monitoring sites.

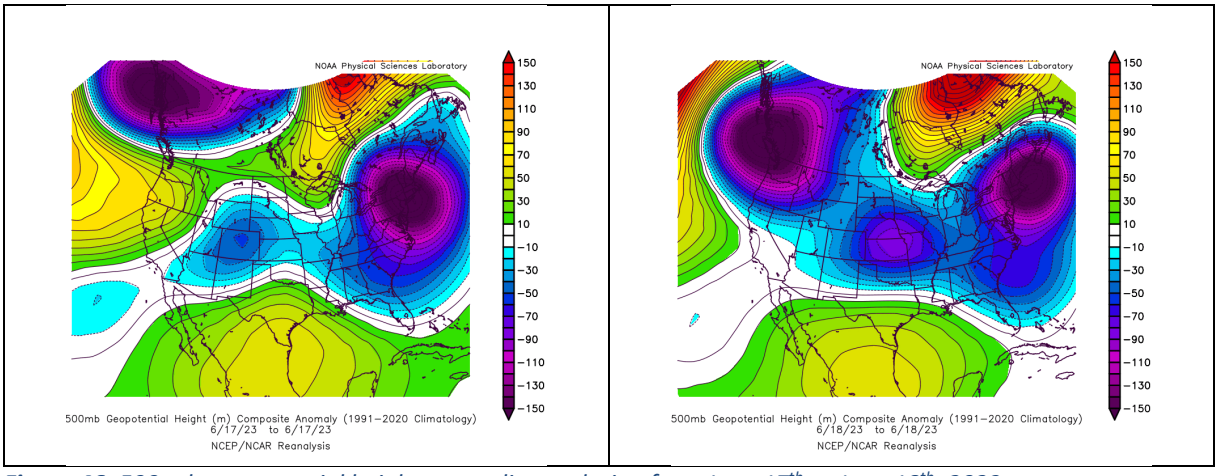


***Figure 46**: 500 mb geopotential height anomalies evolution from June 17th to June 18th, 2023.*

Smoke aloft was visible on satellite imagery over the Ohio Valley on June 15th and 16th, 2023 as seen in **Figure 47** and **Figure 48**. By June 17th, as the upper-level low rotated eastward, 500 mb winds over

the eastern U.S. backed to northwesterly[31], providing a path for the smoke to be blown southeastward.

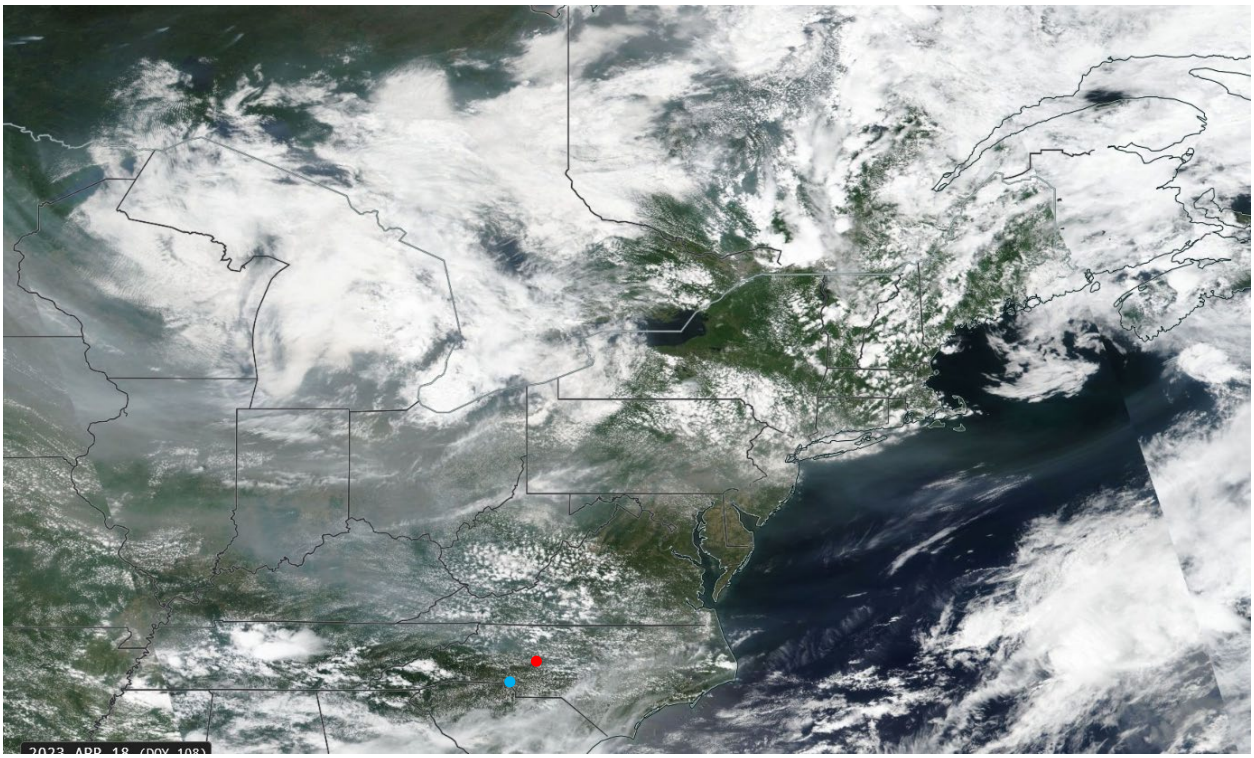


***Figure 47**: Visible satellite imagery showing smoke across the Ohio Valley on June 15th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

[31] NOAA/NWS/Storm Prediction Center, Mesoscale Analysis Archive, https://www.spc.noaa.gov/exper/ma_archive/action5.php?BASICPARAM=500mb.gif&STARTYEAR=2023&STARTMONTH=06&STARTDAY=16&STARTTIME=00&INC=48

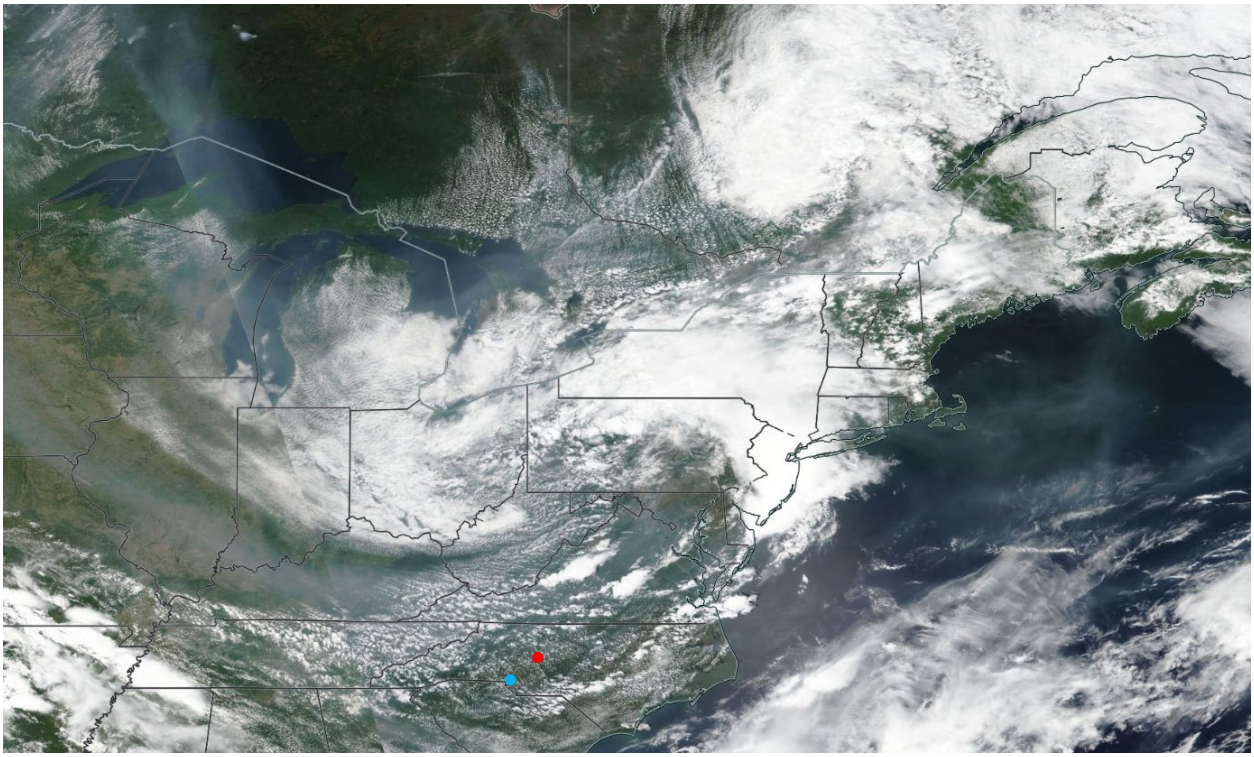


***Figure 48**: Visible satellite imagery showing smoke over the lower Ohio Valley on June 16th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

HYSPLIT back trajectories again reveal that the smokey air mass seen on visible satellite imagery in the preceding days moved into the state from the north and northwest. In **Figure 49**, the 24-hour back trajectories, ran from June 17th at both the Remount and Lexington monitors, originated in an air mass containing significantly elevated $PM_{2.5}$ levels on June 16th over much of the Upper Midwest and Ohio Valley. Once again, the polluted air mass aloft moved into the state along the path of the back trajectories but this time with significant surface-level transport heralding the onset of the event.

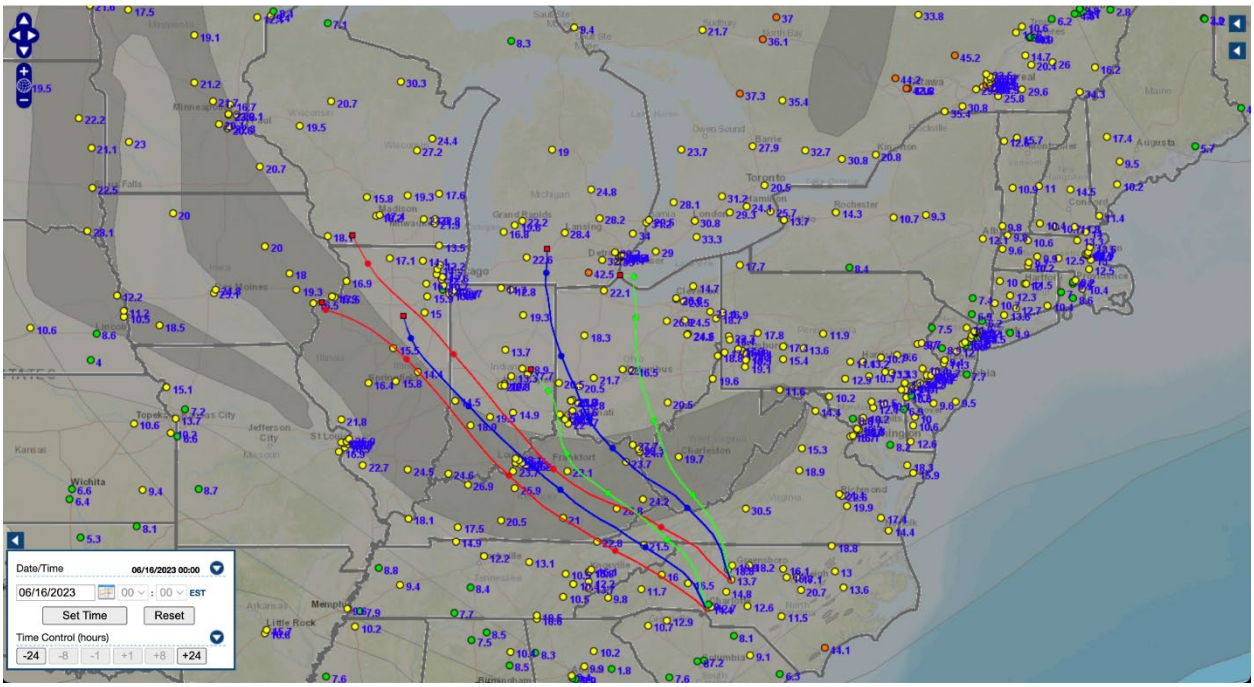


***Figure 49**: 24-hr. avg. $PM_{2.5}$ concentrations valid on **June 16th, 2023**, NOAA OSPO satellite-derived smoke analysis and 24-hr. backward trajectories at 100 m (green line), 750 m (blue line) and 1500 m (red line) ending on **June 17th, 2023**. Red squares indicate air parcel location along back trajectory path on **June 16th, 2023**.*

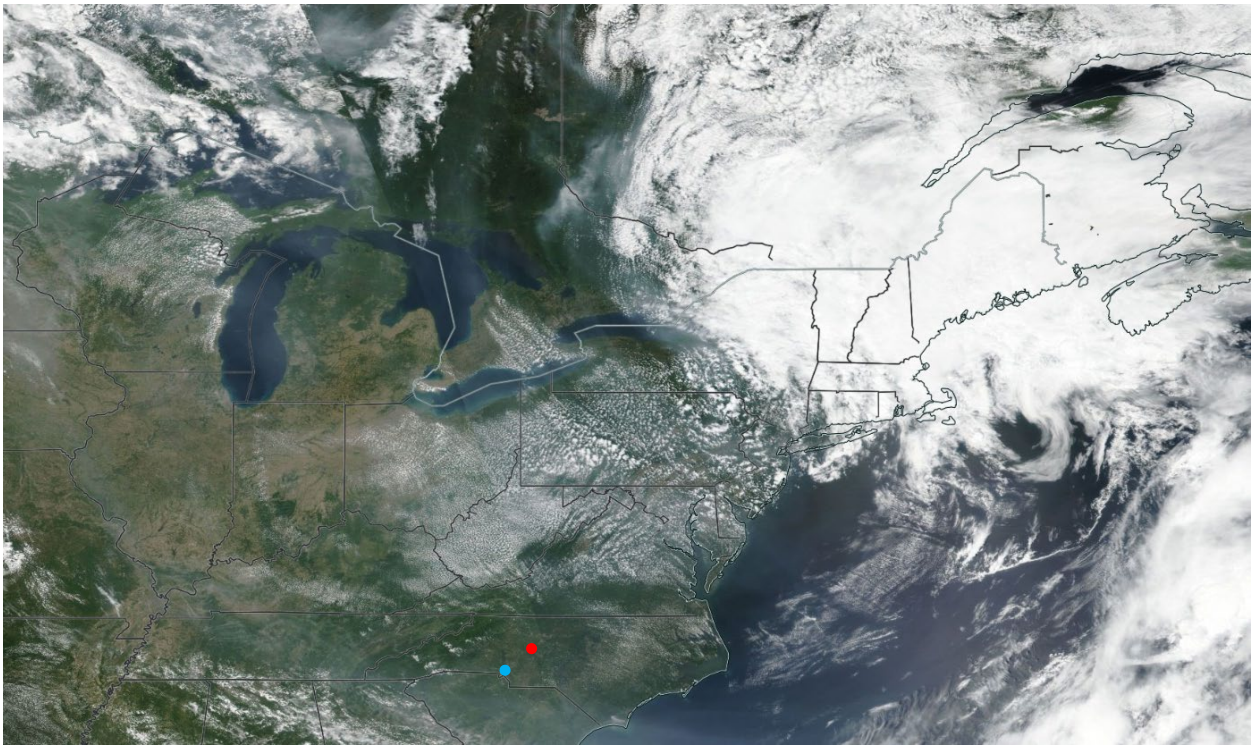


***Figure 50**: Visible satellite imagery showing smoke over the southeastern U.S. on June 17th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

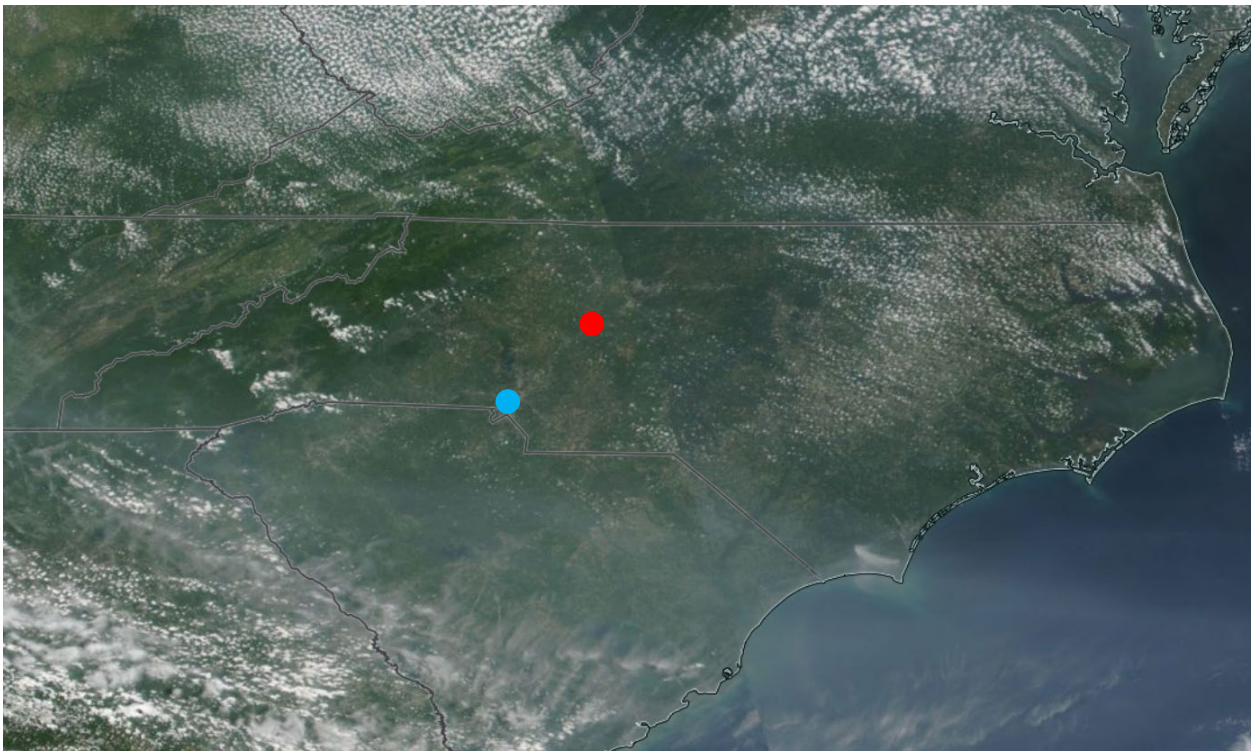


***Figure 51**: Visible satellite imagery showing smoke over the southeastern U.S., including NC, on June 17th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

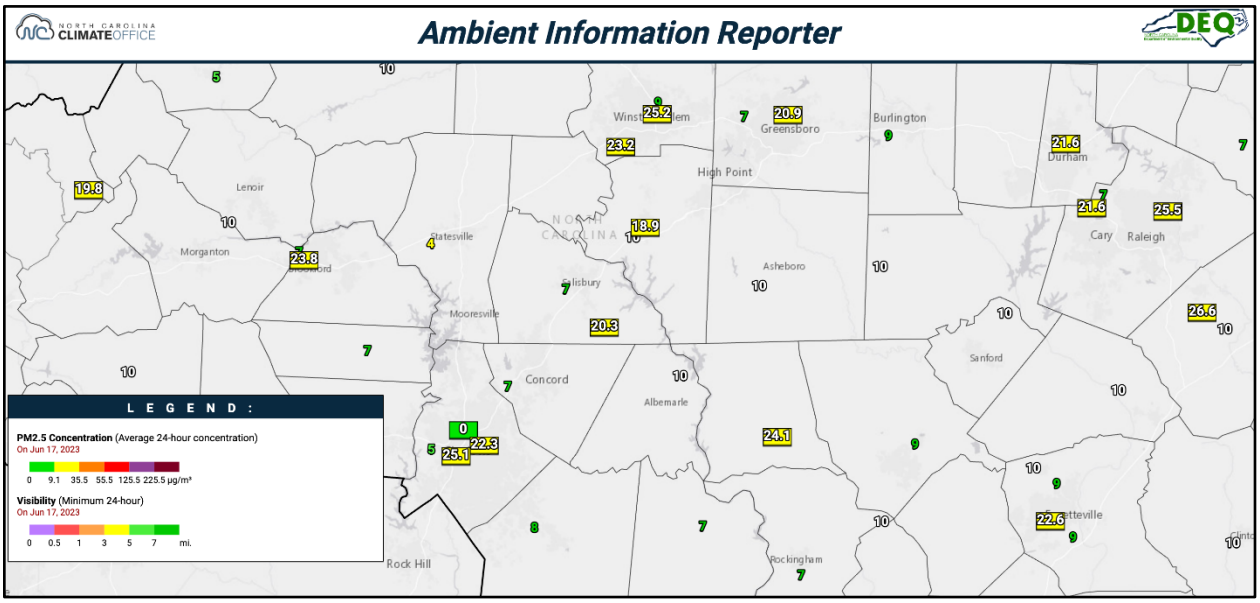


***Figure 52**: 24-hr. avg. $PM_{2.5}$ concentrations and minimum 24-hr. visibility from airport observing sites on June 17th, 2023. Minimum visibility can be used as a proxy for additional air quality monitors and when values fall below the standard 10 statue mile range, it is an indicator of an obscuration (such as smoke, dust, haze, etc.).*

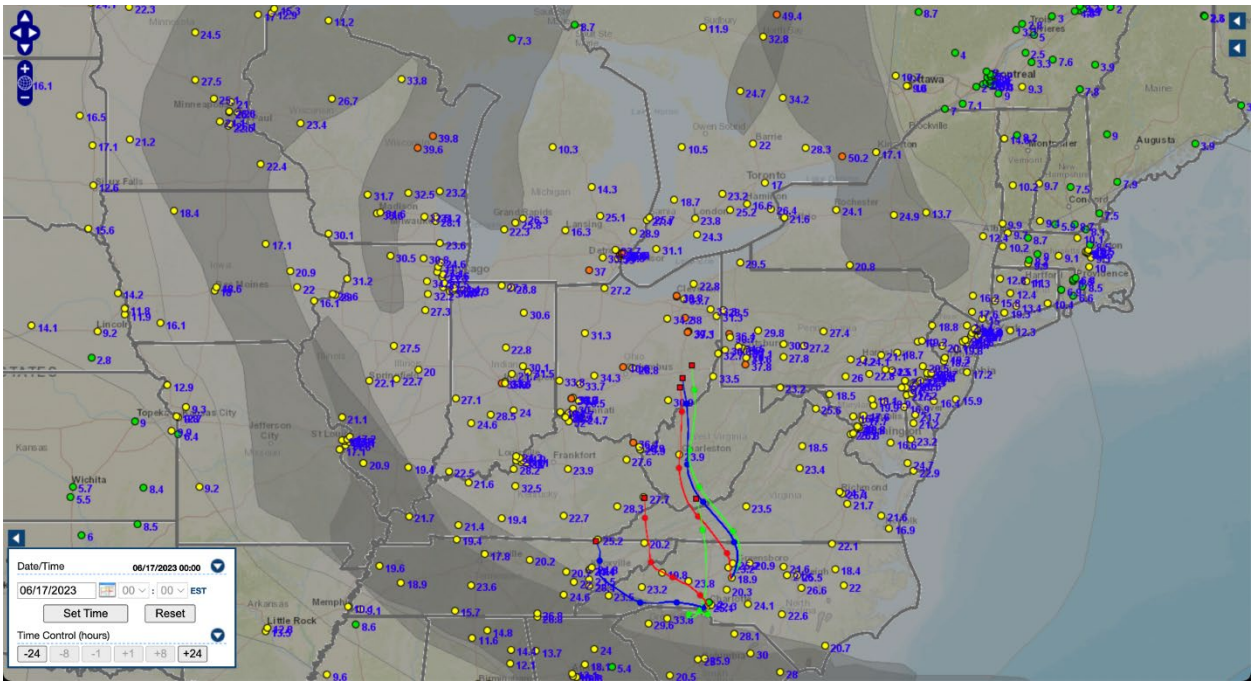


***Figure 53**: 24-hr. avg. $PM_{2.5}$ concentrations valid on **June 17th, 2023**, NOAA OSPO satellite-derived smoke analysis and 24-hr. backward trajectories at 100 m (green line), 750 m (blue line) and 1500 m (red line) ending on **June 18th, 2023**. Red squares indicate air parcel location along back trajectory path on **June 17th, 2023**.*

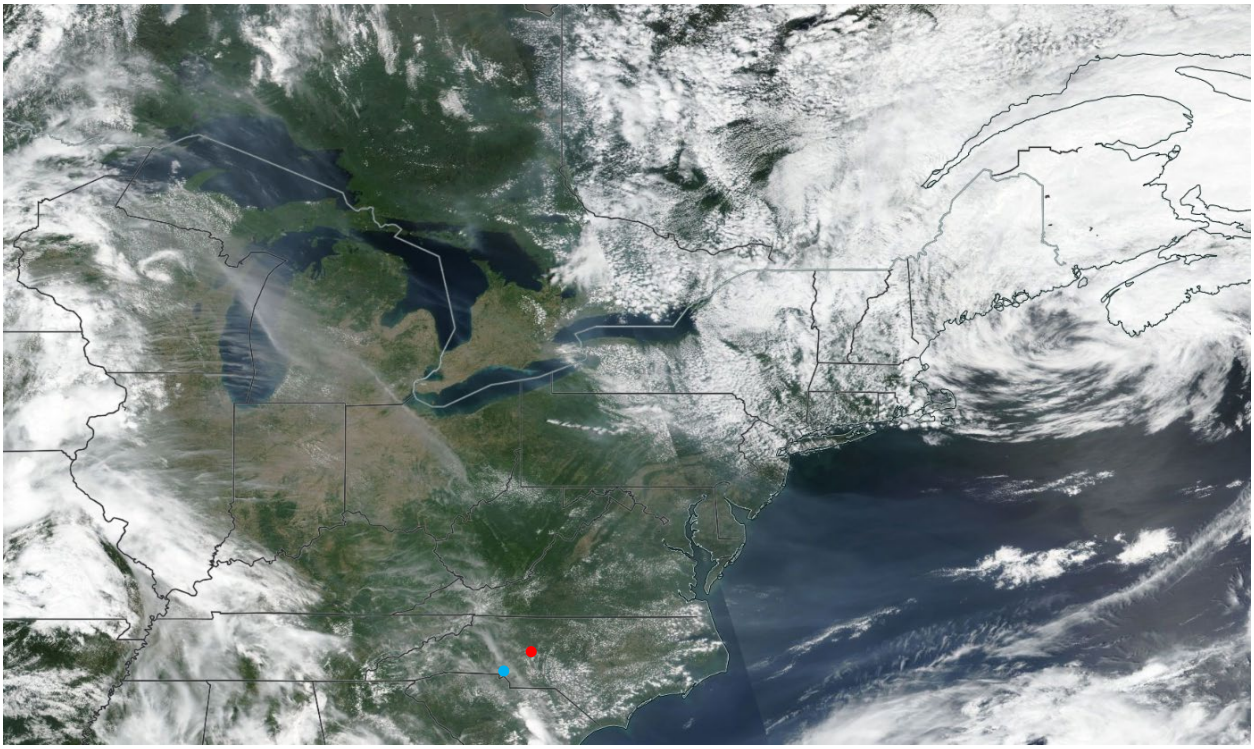


***Figure 54**: Visible satellite imagery showing patchy smoke over much of the eastern U.S. on June 18th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

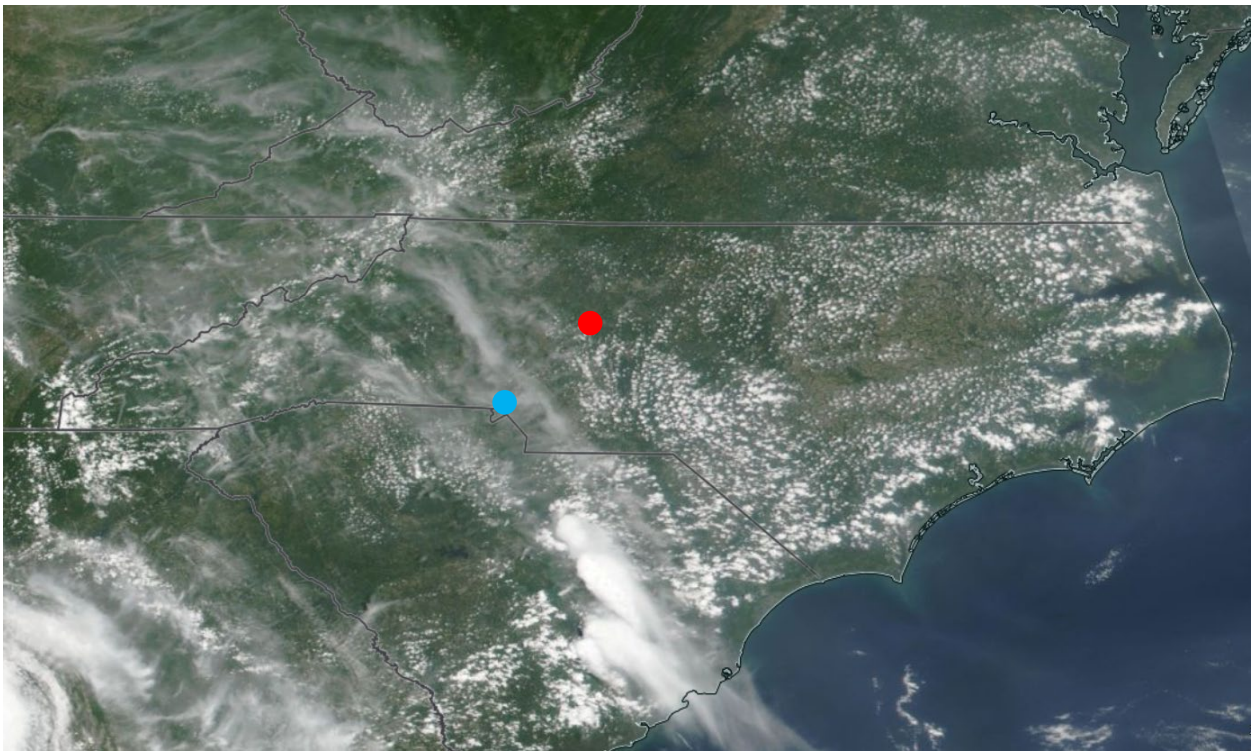


***Figure 55**: Visible satellite imagery showing patchy smoke over the southeastern U.S., including NC, on June 18th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

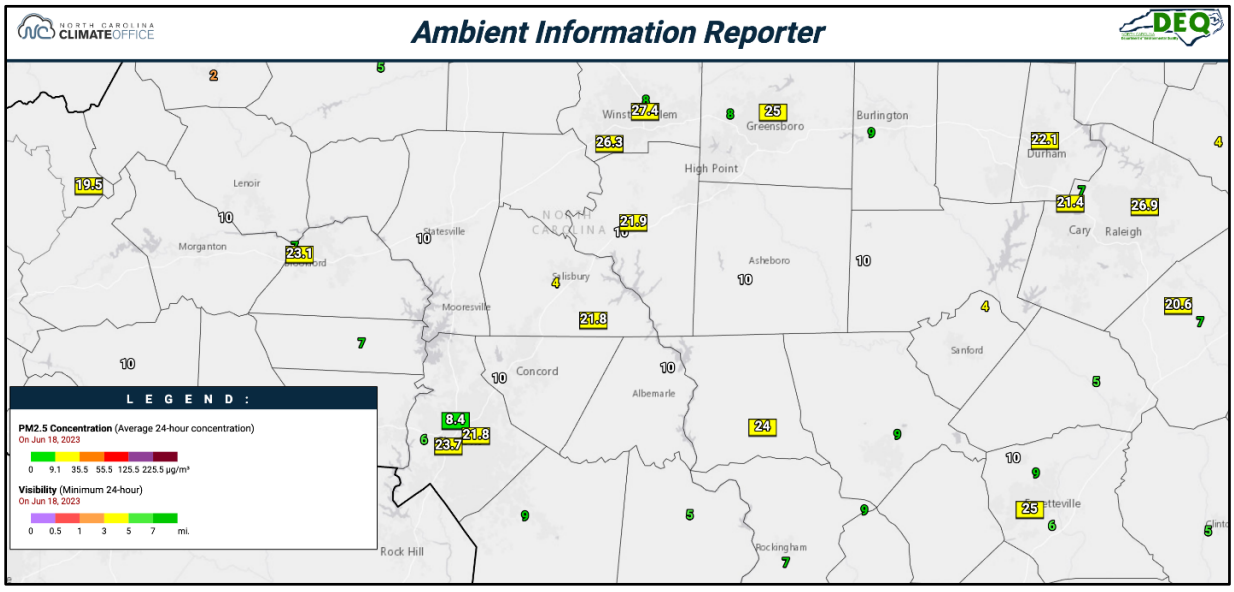


***Figure 56**: 24-hr. avg. $PM_{2.5}$ concentrations and minimum 24-hr. visibility from airport observing sites on June 18th, 2023. Minimum visibility can be used as a proxy for additional air quality monitors and when values fall below the standard 10 statue mile range, it is an indicator of an obscuration (such as smoke, dust, haze, etc.).*

In this event, the onset of significantly elevated $PM_{2.5}$ measurements at North Carolina monitoring sites directly coincided with the passage of a surface cold front across the state, which occurred during the evening of June 16th. Hourly $PM_{2.5}$ concentrations at both the Remount and Lexington

monitors began rising after 6:00 pm EDT on June 16th, as seen in **Figure 57** and **Figure 58.**

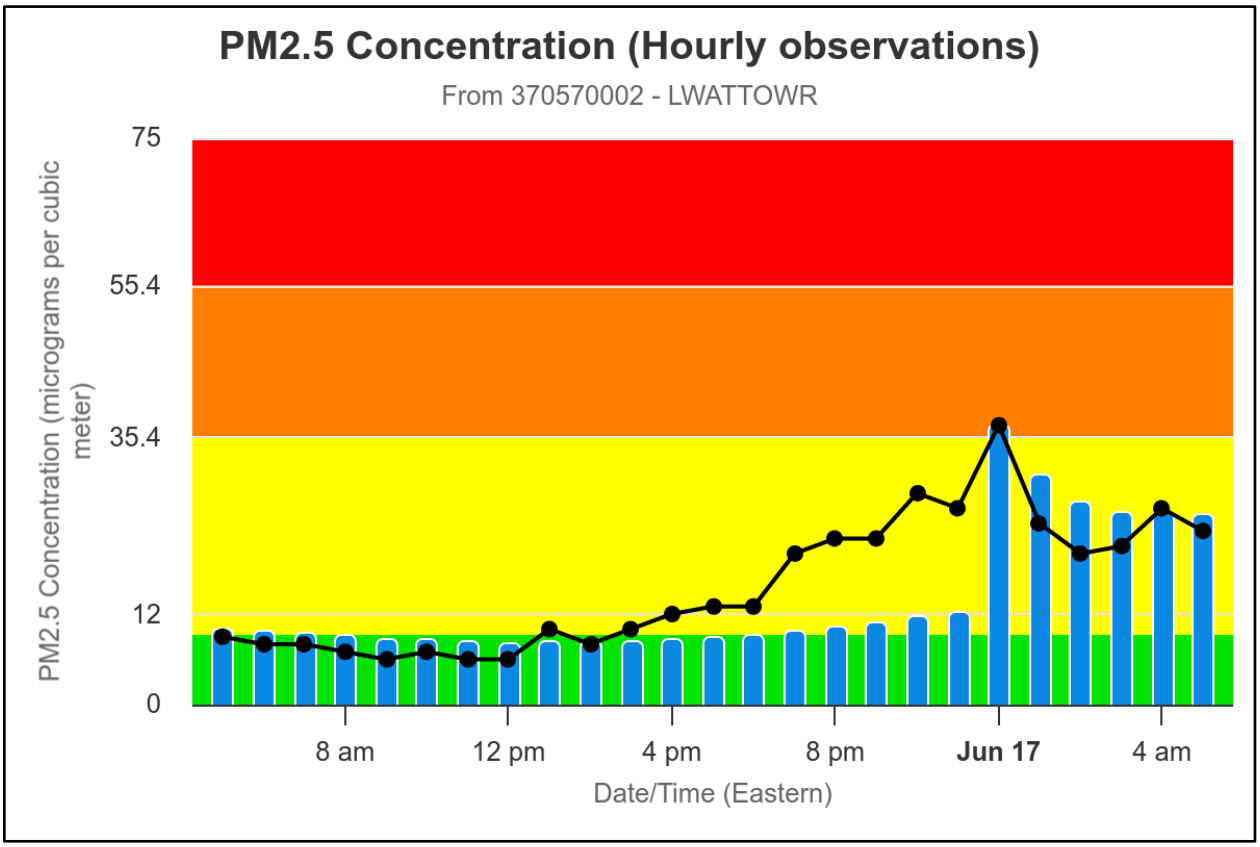


***Figure 57**: Hourly $PM_{2.5}$ observations (black line and dots) valid June 16th into June 17th, 2023 at the Lexington Water Tower monitor. The blue bars represent the rolling daily average of hourly $PM_{2.5}$ observations up to and including the specific hour. The y-axis numerical labels and chart shading are the 24-hour average concentration breakpoints and color categories associated with the Air Quality Index (AQI).*

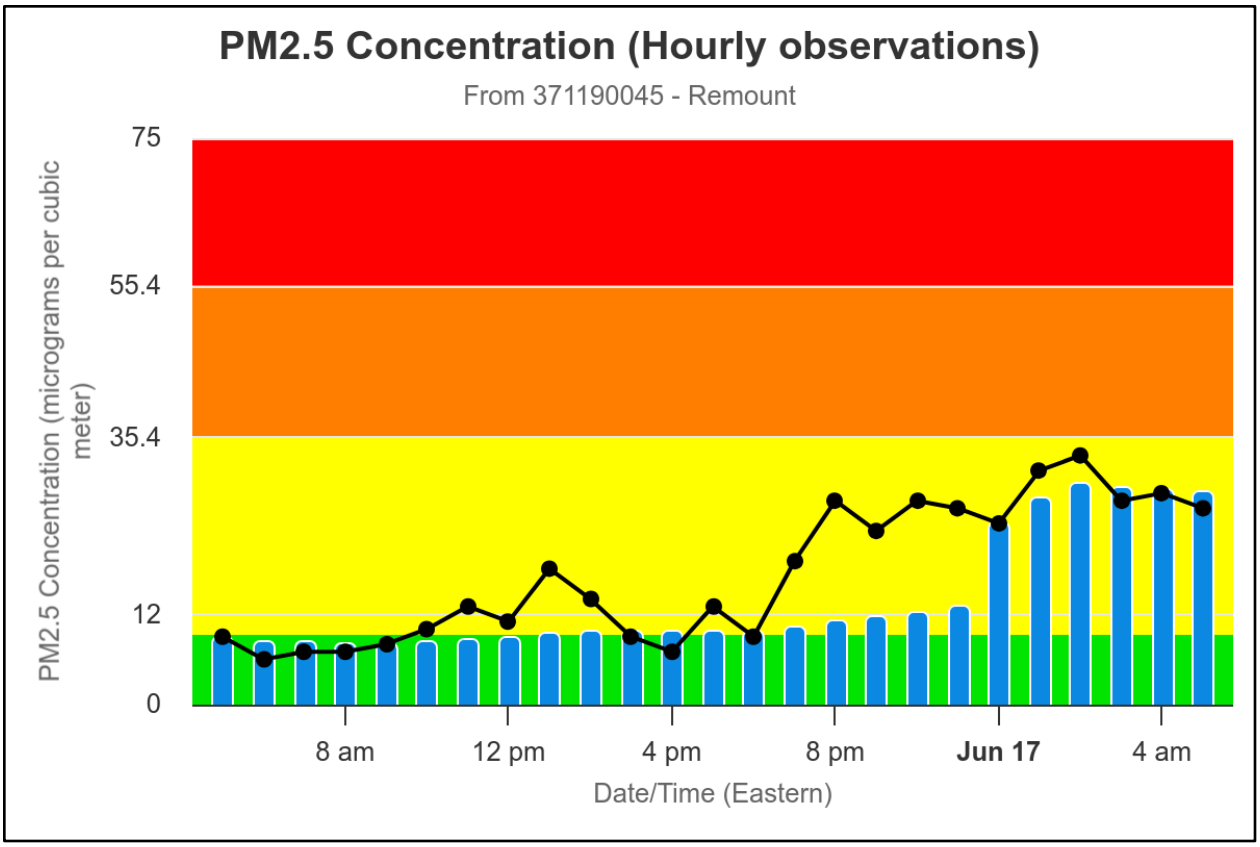


***Figure 58**: Hourly $PM_{2.5}$ observations (black line and dots) valid June 16th into June 17th, 2023 at the Remount Road monitor. The blue bars represent the rolling daily average of hourly $PM_{2.5}$ observations up to and including the specific hour. The y-axis numerical labels and chart shading are the 24-hour average concentration breakpoints and color categories associated with the Air Quality Index (AQI).*

Ahead of the surface cold front, analyzed by WPC at 5:00 pm EDT on June 16th to be located near the northwestern NC / southwestern VA border (**Figure 59**), $PM_{2.5}$ concentrations across the western NC Piedmont were in the 13 to 18 µg/m^3 range (**Figure 60**).

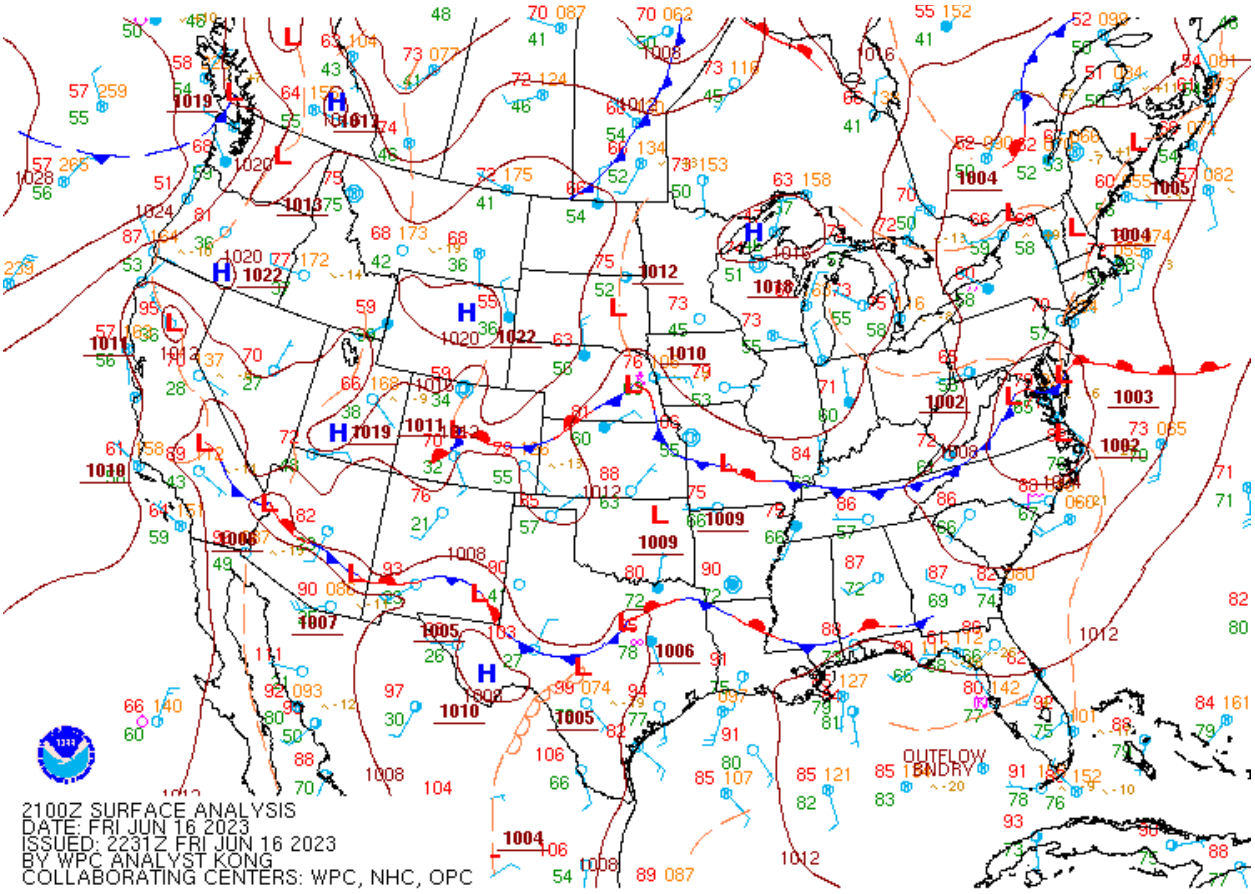


***Figure 59**: WPC surface analysis for June 16th, 2023 at 5:00 pm EDT.*

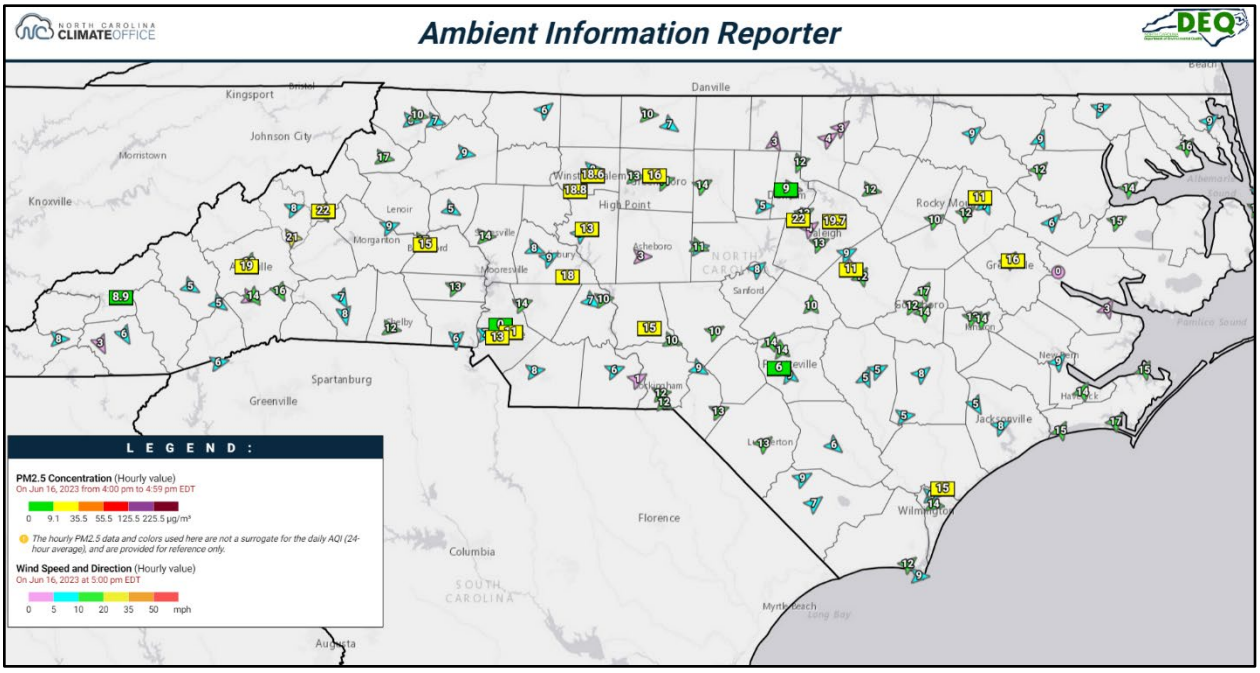


***Figure 60**: Hourly $PM_{2.5}$ concentrations, wind speed and direction observations at 5:00 pm EDT on June 16th, 2023.*

Immediately after the front had crossed the state during the late evening of June 16th, as seen in **Figure 61** showing the WPC 11:00 pm EDT analysis, hourly $PM_{2.5}$ concentrations across the western NC Piedmont rapidly rose into the 26 to 37 µg/m^3 range. This leaves little doubt that the onset of the second event was clearly and directly caused by the advection of a polluted air mass into the region behind the surface frontal passage.

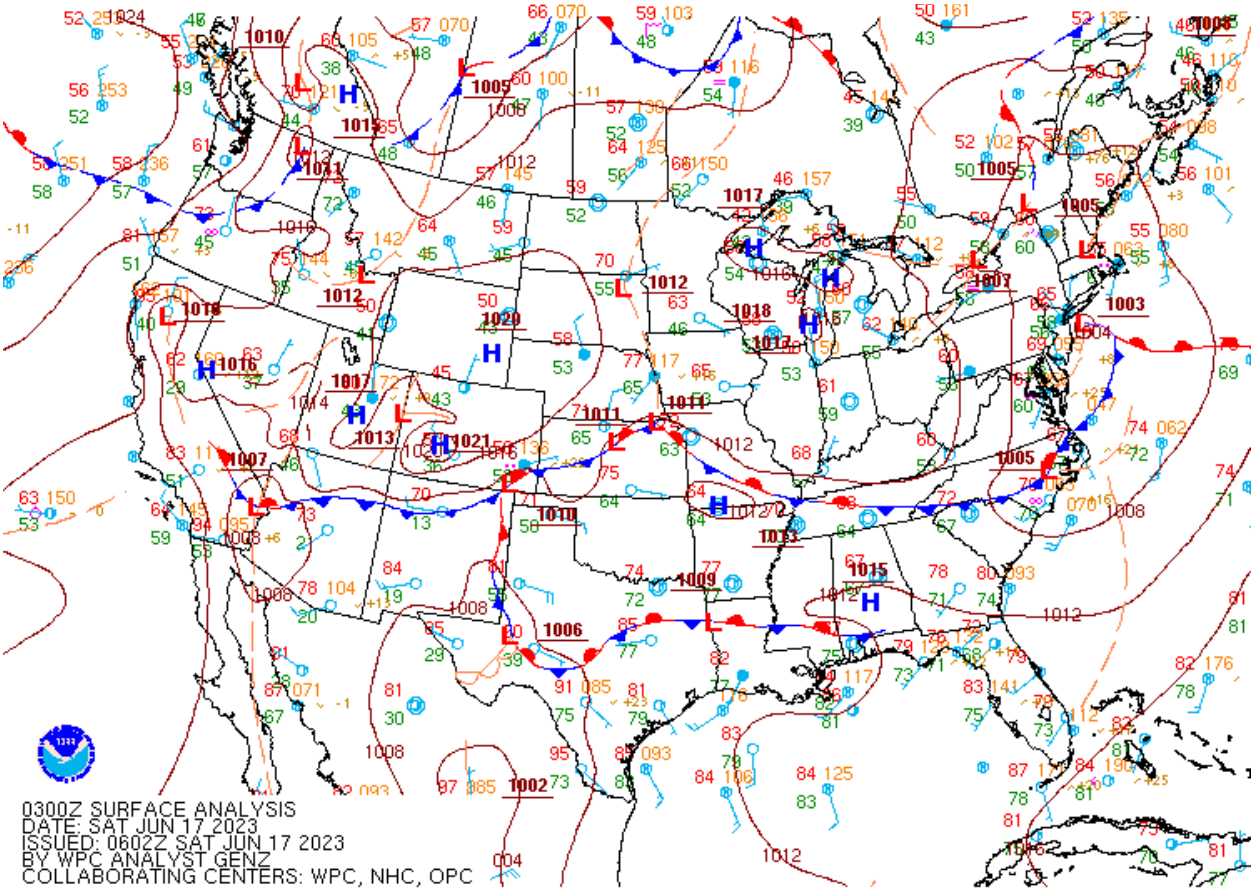


***Figure 61**: WPC surface analysis for June 16th, 2023 at 11:00 pm EDT (June 17th - 0003Z).*

Additional Tier 2-level evidence of surface-level smoke and associated impacts on June 17th through June 18th were directly reported this time in the Charlotte/Douglas International Airport (CLT) METARs as seen in appendix G and H, **Figure 136-G** and **Figure 139-H**. Numerous hours on both days contained sky condition reports of "HZ CLR" with visibility less than 7 SM, with dewpoints significantly lower than temperature (thus eliminating the possibility of fog). This was a clear indication of surface haze, and with the proof already provided earlier, it is clear this was from smoke. To further support this, we have also included the National Weather Service - Greenville Spartanburg's aviation forecast discussion from the evening of June 17th, where they explicitly mention that Canadian wildfire smoke has circulated into the forecast area, as seen in Appendix G, **Figure 135-G**. Finally, both the HRRR Smoke and the NAAPS aerosol models analysis (00 hr initialization) at 8:00 am on June 17th through June 18th analyzed surface smoke over North Carolina as seen in Appendix G and H: **Figure 137-G, Figure 138-G, Figure 140-H** and **Figure 141-H**.

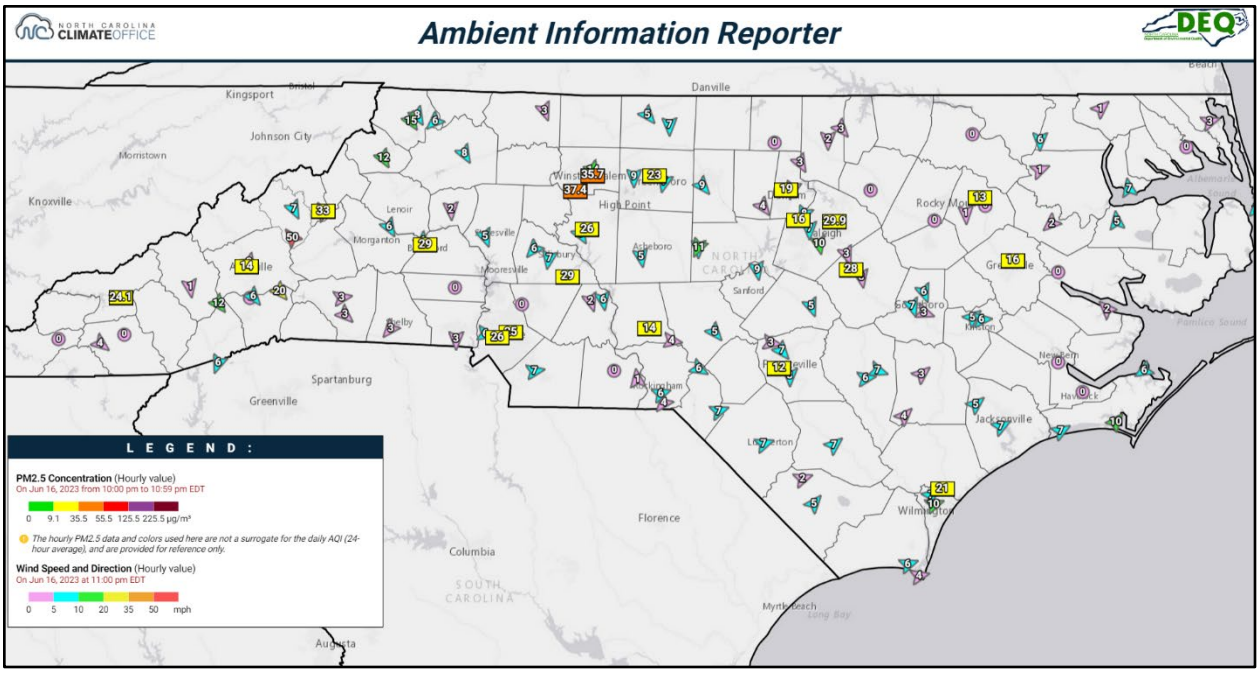


***Figure 62**: Hourly $PM_{2.5}$ concentrations, wind speed and direction observations at 11:00 pm EDT on June 16th, 2023.*

3.1.3 Event ID #3 - June 28th through July 1st, 2023

The third event occurred at the end of June and into the beginning of July and led to two days of 24-hour $PM_{2.5}$ averages that were classified as Tier 2 level at both the Remount and Lexington monitors and two days that were classified as Tier 1 level at each monitor. This is shown in **Table 5** below.

***Table 5**: Regulatorily Significant 24-Hour Average $PM_{2.5}$ Concentrations Requested for Exclusion for Event #3.*

		Remount (AQS ID# 371190045) (Mecklenburg County)					Lexington (AQS ID# 370570002) (Davidson County)				
Event ID	**Date**	**24-hr $PM_{2.5}$ Average (µg/m³)**	**Historical Average* (2018-2022 Avg. Daily Conc.)**	**% Increase from Historical Average**	**EPA Tier Level / Threshold (µg/m³)****		**24-hr $PM_{2.5}$ Average (µg/m³)**	**Historical Average* (2018-2022 Avg. Daily Conc.)**	**% Increase from Historical Average**	**EPA Tier Level / Threshold (µg/m³)****	
3	6/28/2023	20.2	11.1	82.3 %	Tier 2	16.3	20.5	14.4	42.4 %	Tier 2	16.9
	6/29/2023	37.7	9.0	318.9 %	Tier 1	24.45	45.7	10.7	326.3 %	Tier 1	25.35
	6/30/2023	29.4	9.9	197.0 %	Tier 1	24.45	32	10.8	197.4 %	Tier 1	25.35
	7/1/2023	20.8	7.3	183.4 %	Tier 2	16.3	18	7.6	137.5 %	Tier 2	17.8

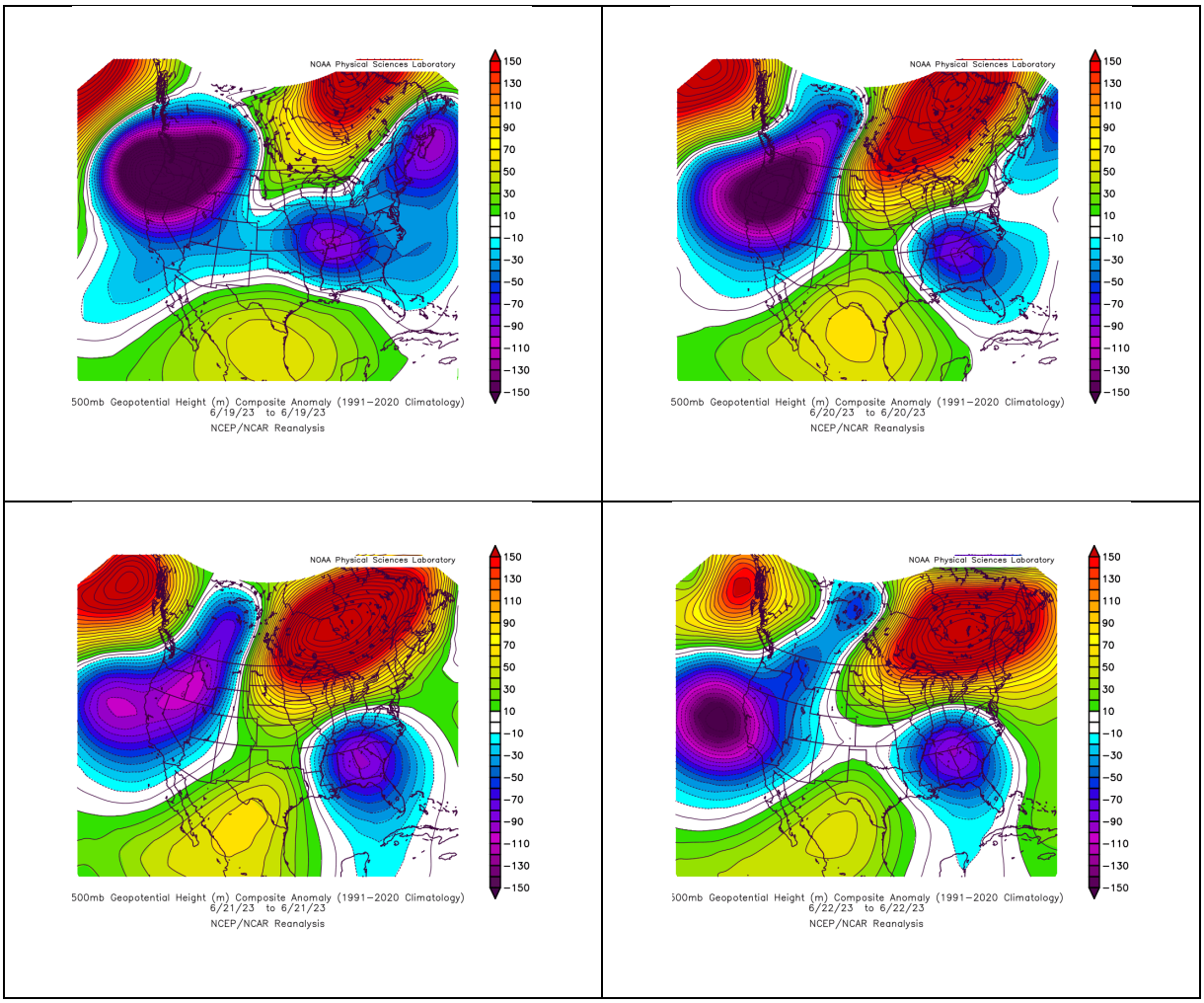
** The historical average is defined as the daily average $PM_{2.5}$ concentration over the previous 5-year period (2018-2022) on the given date (i.e., the past 5 June 6ths, the past 5 June 7ths, etc.).*

*** The EPA Tier Level determines the level of evidence required to establish a clear causal relationship in a wildland fire $PM_{2.5}$ Exceptional Events demonstration and was determined using EPA's Tiering Tool output as displayed in Appendix K: Monitoring Sites' Tiering Graphs. The threshold listed represents the minimum daily average concentration (µg/m³) needed to meet the Tier level listed for that specific monitor and month.*

This event was the result of another significant intrusion of Canadian wildfire smoke into North

Carolina which was driven by the anomalous atmospheric regime that dominated June and July 2023 across the eastern U.S. Preceding the onset of smoke transport into the state that started late in June, the period from June 19th through June 26th saw a strong Rex Block (strong high pressure located next to strong low pressure that creates a blocking pattern that can trap air masses, resulting in air mass stagnation) develop over southeastern Canada and the eastern U.S.

Strong, blocking high pressure exacerbated drought and wildfire conditions across Canada, while a trapped upper-level low underneath the upper-level high pressure held station over the eastern U.S., as seen in **Figure 63**. The anomalous blocking pattern allowed an intense area of smoke from the numerous ongoing wildfires to become trapped and continue to aggregate under the upper-level high over southeastern Canada through June 26th (**Figure 64**). The 7-day period from June 16th through June 26th set the stage for the transport of intense smoke and fine particulate matter into the eastern U.S., including North Carolina, at the end of June.



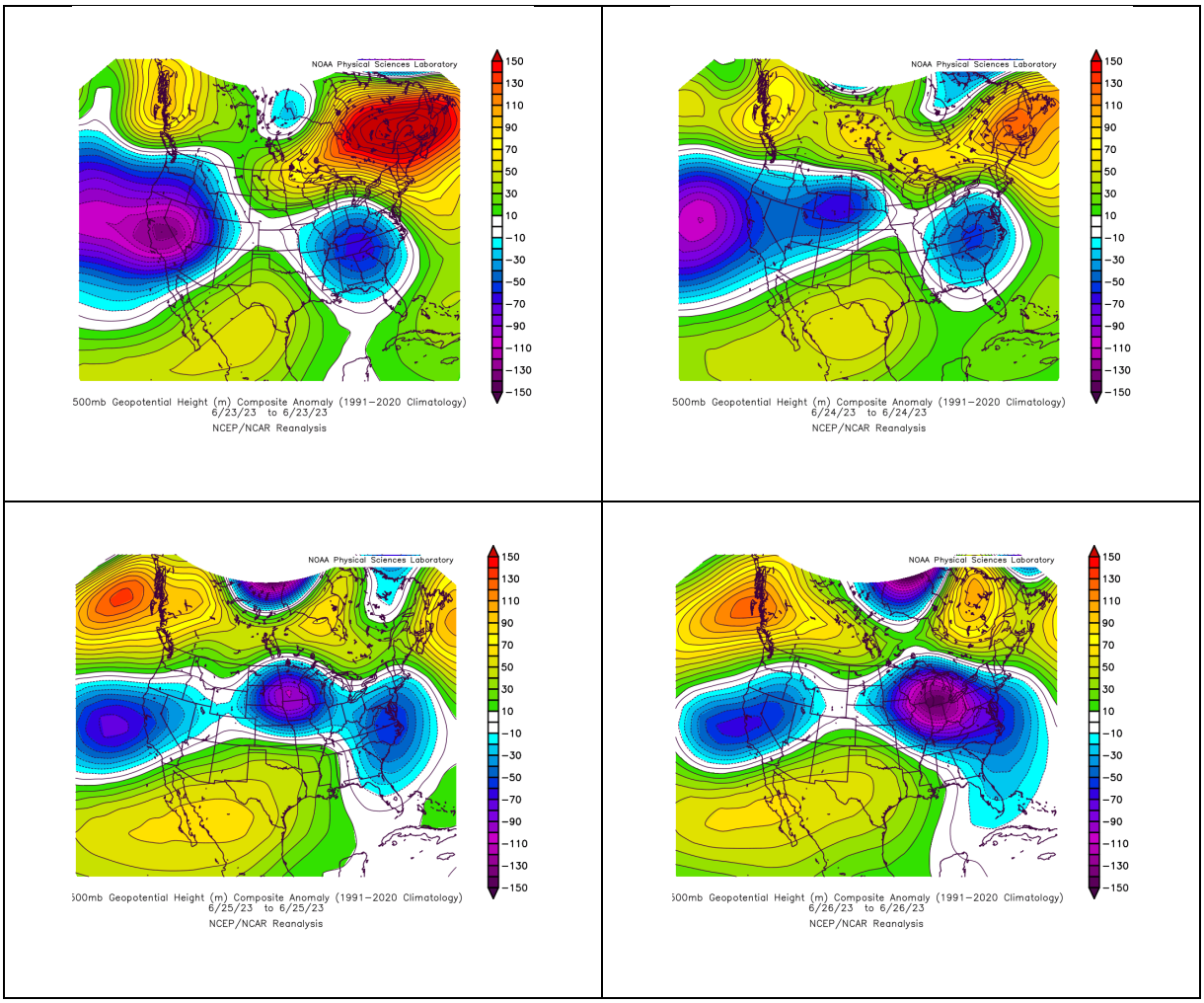


***Figure 63**: 500 mb geopotential height anomalies evolution from June 19th to June 26th, 2023.*

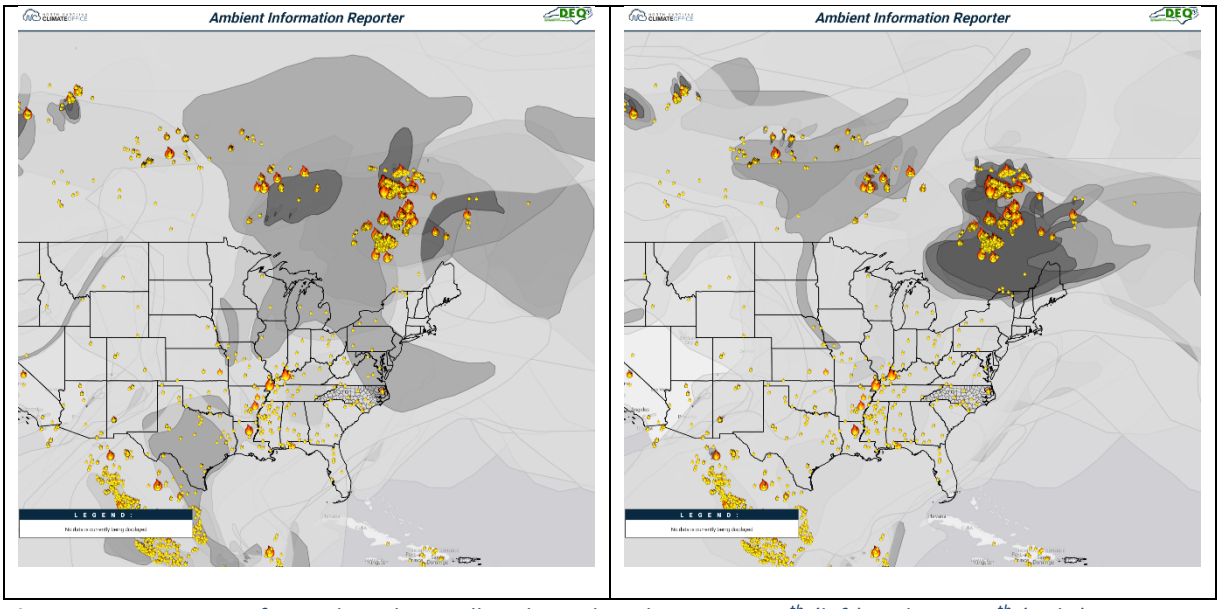


***Figure 64**: NOAA OSPO fire and smoke satellite-derived analyses. June 19th (left) and June 26th (right).*

Between June 26th and June 28th, a newly formed upper-level low initially over the Great Lakes rotated into the Mid-Atlantic, and once again pulled an attendant surface low and cold front eastward with it. The surface front crossed the state during the morning into the early afternoon of June 27th, as seen in **Figure 65** and **Figure 66**. Behind the front, a large swath of smoke can be seen in visible satellite imagery over the Great Lakes on June 27th in **Figure 67.**

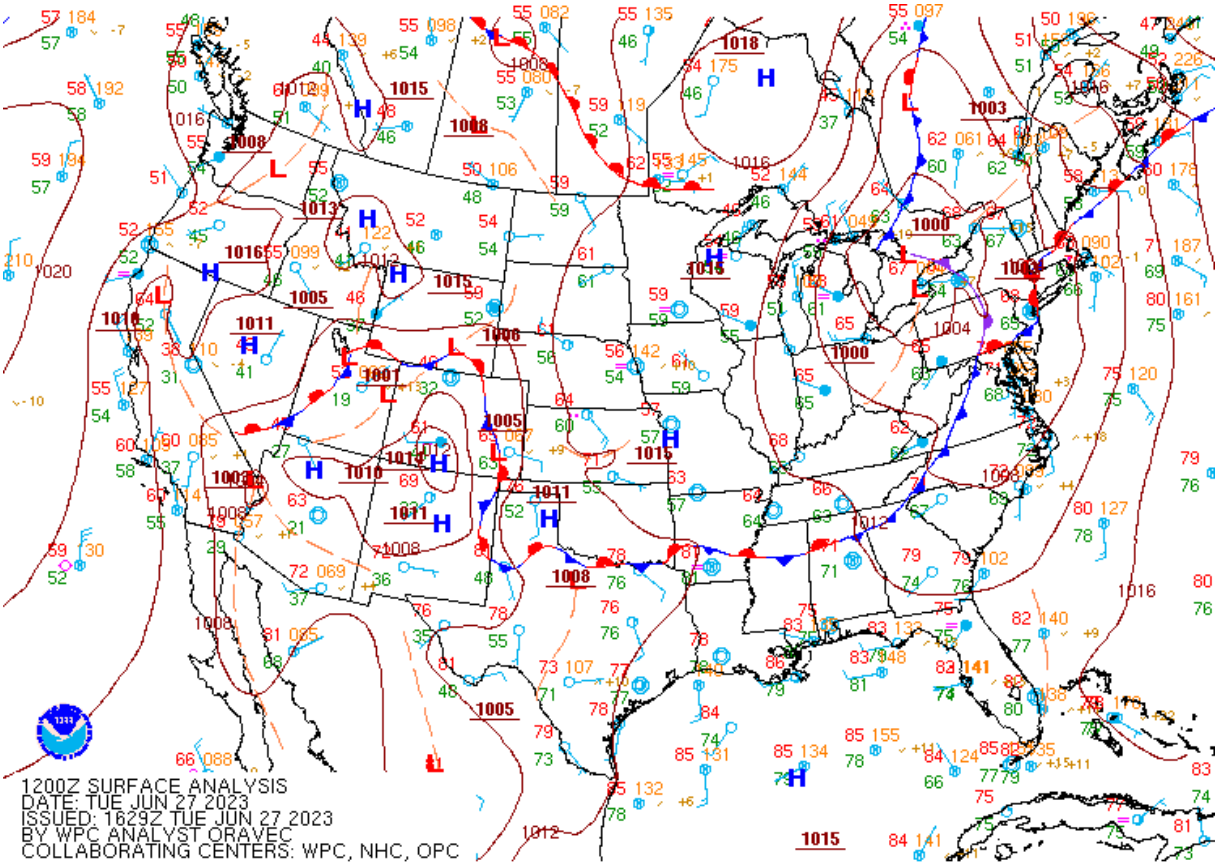


***Figure 65**: WPC surface analysis for June 27th, 2023 at 8:00 am EDT.*

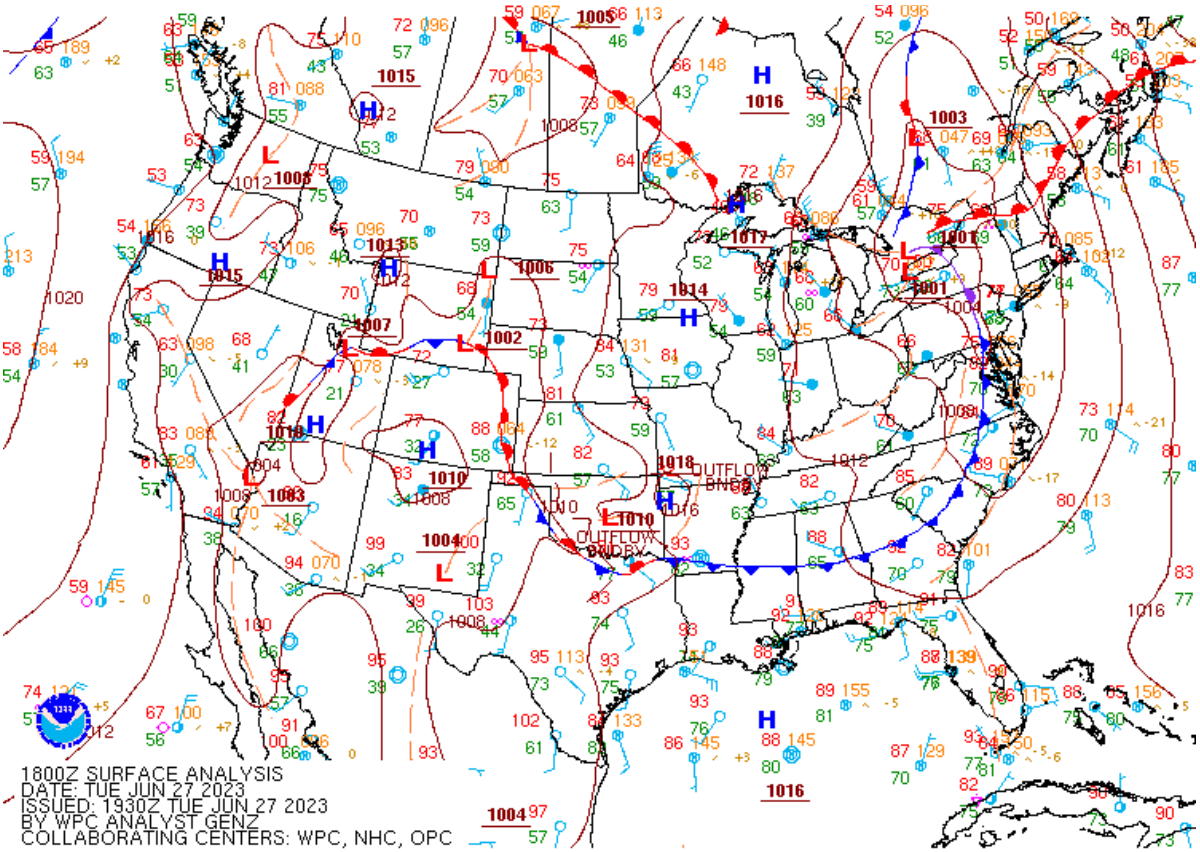


***Figure 66**: WPC surface analysis for June 27th, 2023 at 2:00 pm EDT.*

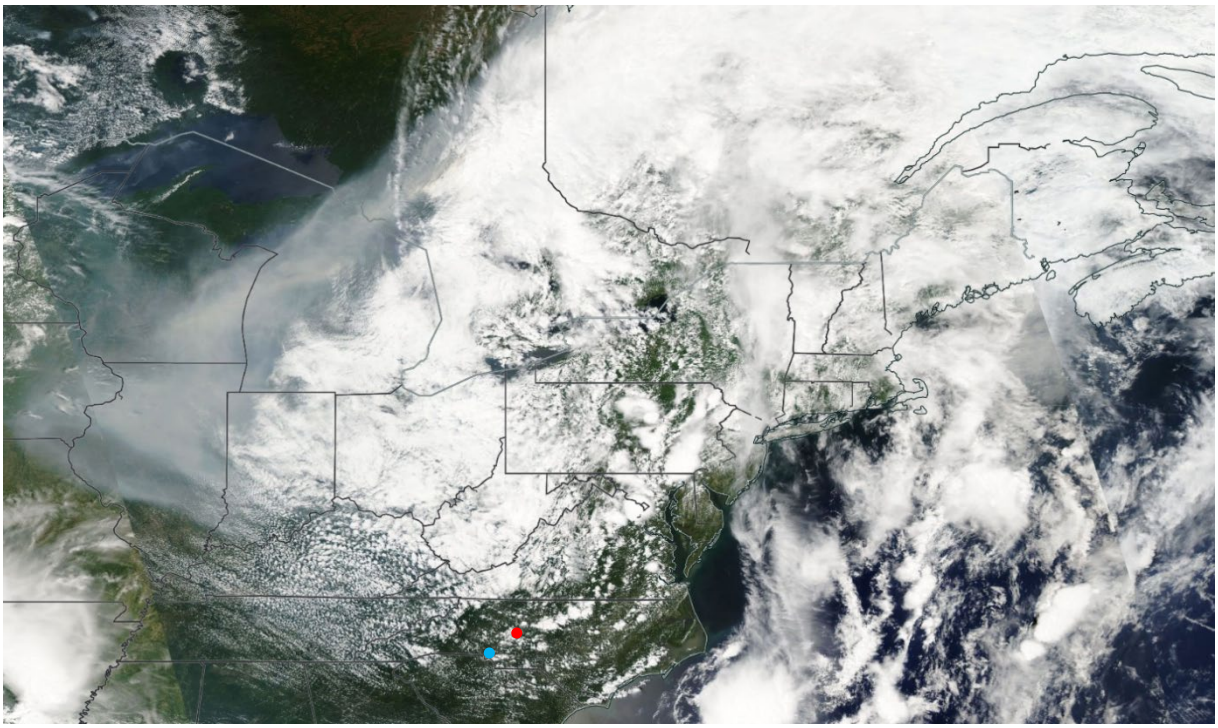


***Figure 67**: Visible satellite imagery reveals heavy smoke across Wisconsin, Michigan and Illinois while clouds mask additional smoke further east on June 27th, 2023. The red and blue circles show the approximate locations*

of the Lexington and Remount monitors, respectively.

By June 28th, the upper-level low had rotated into the Mid-Atlantic. Meanwhile, the upper-level high had begun to shift eastward in Canada (**Figure 69)**, which allowed the heavily smoke-laden air mass to drain southward in the upper-level trough over the eastern U.S.

Additional Tier 2 analysis - it is important to note, as evidenced in **Figure 68** below, that the later part of June 28th was strongly impacted by smoke as hourly $PM_{2.5}$ concentrations had elevated above 55 $\mu g/m_3$ in western NC and were rising into the 30 to 40 $\mu g/m_3$ range at 11:00 pm EDT across the western Piedmont. Hourly observations would surpass 50 $\mu g/m_3$ on the midnight, June 29th observation at monitors in Guilford and Forsyth Counties. Additionally, airport visibilities had lowered into the 4 to 7-mile range, another clear indicator that thicker smoke was being advected into the state. As seen in Appendix I, **Figure 142-I** the JQF's visibility had lowered to 7 SM beginning with the 19:50 observation and remained at this lowered visibility through midnight, which coincided with the rising PM2.5 concentrations as the heavier smoke advected into the region. Lastly, once again both the HRRR Smoke and NAAPs guidance analyzed heavy smoke over the region from 8:00 am on June 28th, as seen in Appendix I, **Figure 143-I** through **Figure 144-I**. Collectively, it is logical to deduce that the daily average $PM_{2.5}$ concentrations recorded at both the Remount and Lexington monitors on June 28th would have been significantly lower but for the significant amount of smoke that moved into the state during the evening.

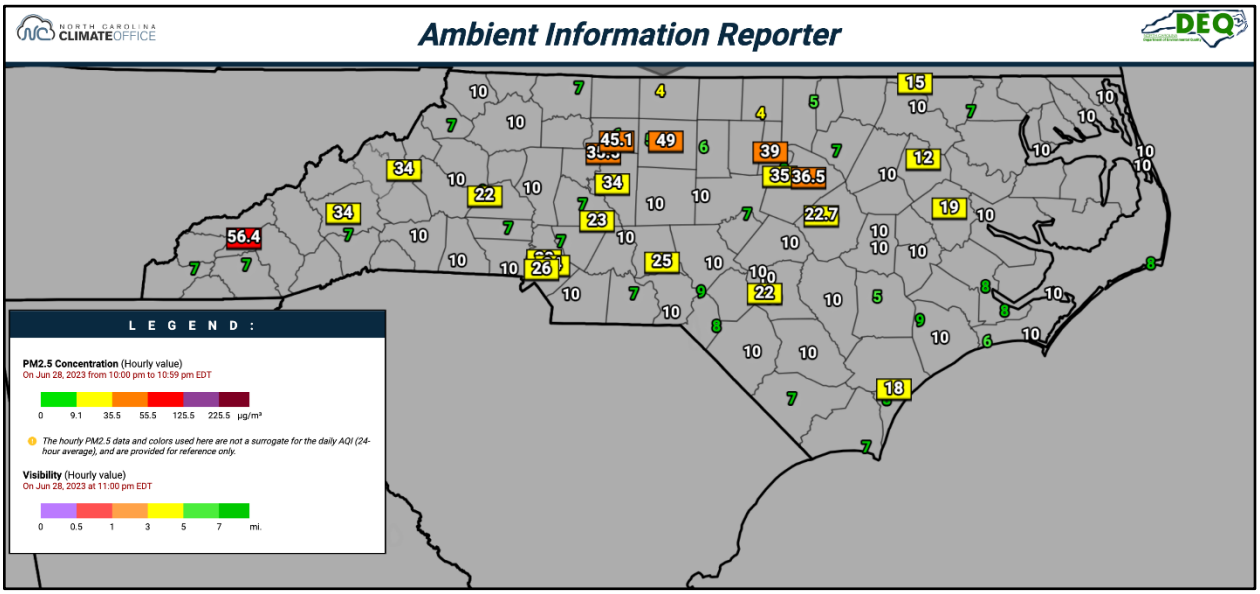


***Figure 68**: Hourly $PM_{2.5}$ and airport visibility observations on June 28th, 2023 at 11:00 pm EDT.*

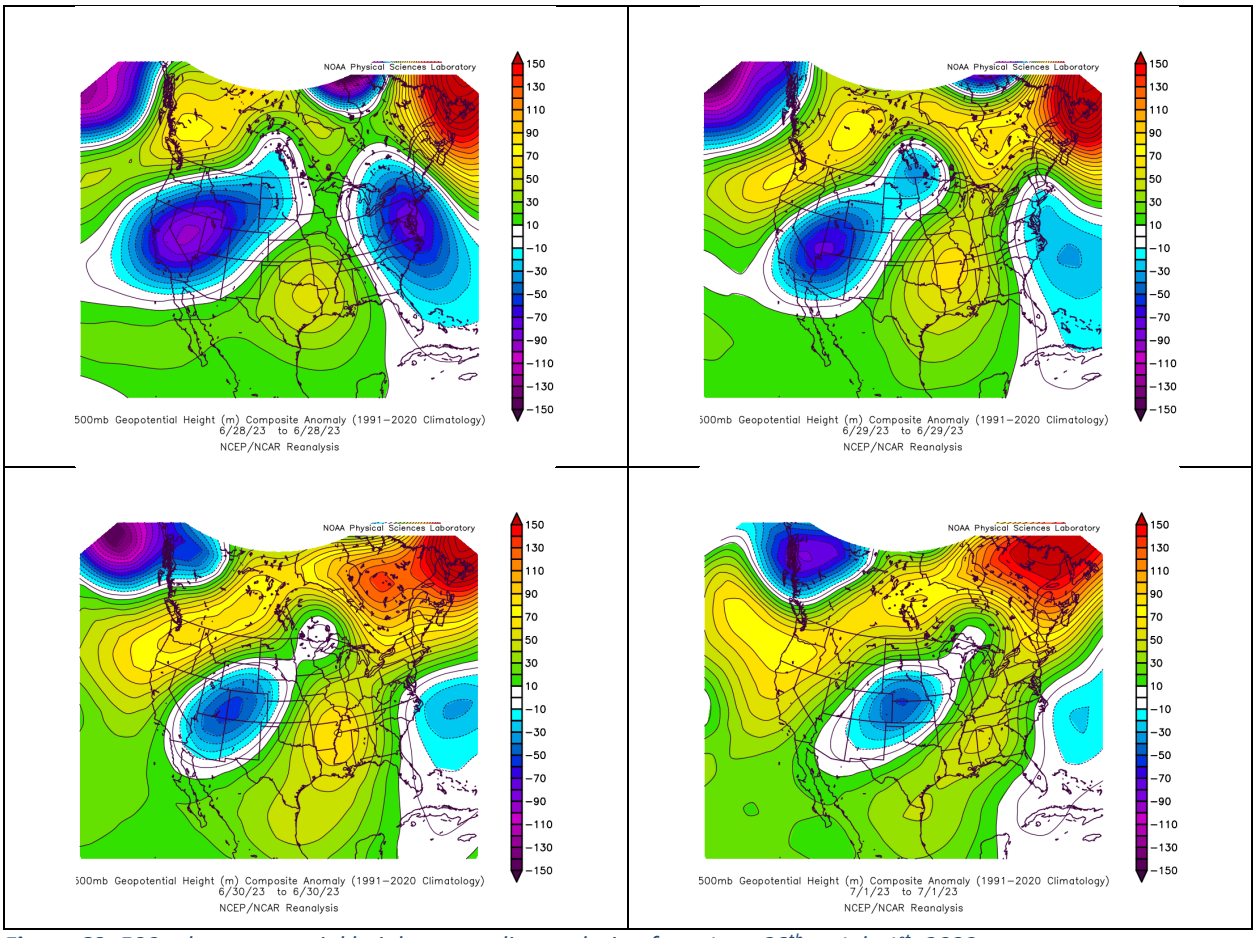


***Figure 69**: 500 mb geopotential height anomalies evolution from June 28th to July 1st, 2023.*

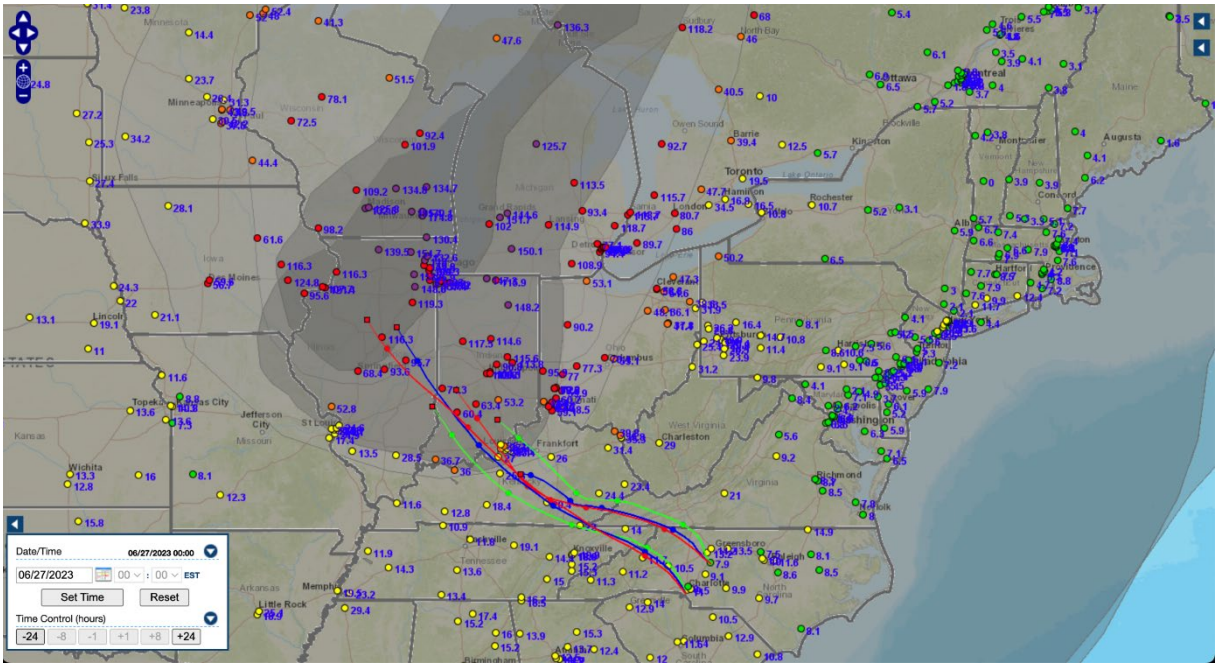


***Figure 70**: 24-hr. avg. $PM_{2.5}$ concentrations valid on **June 27th, 2023**, NOAA OSPO satellite-derived smoke analysis and 24-hr. backward trajectories at 100 m (green line), 750 m (blue line) and 1500 m (red line) ending*

*on **June 28th, 2023**. Red squares indicate air parcel location along back trajectory path on **June 27th, 2023**.*

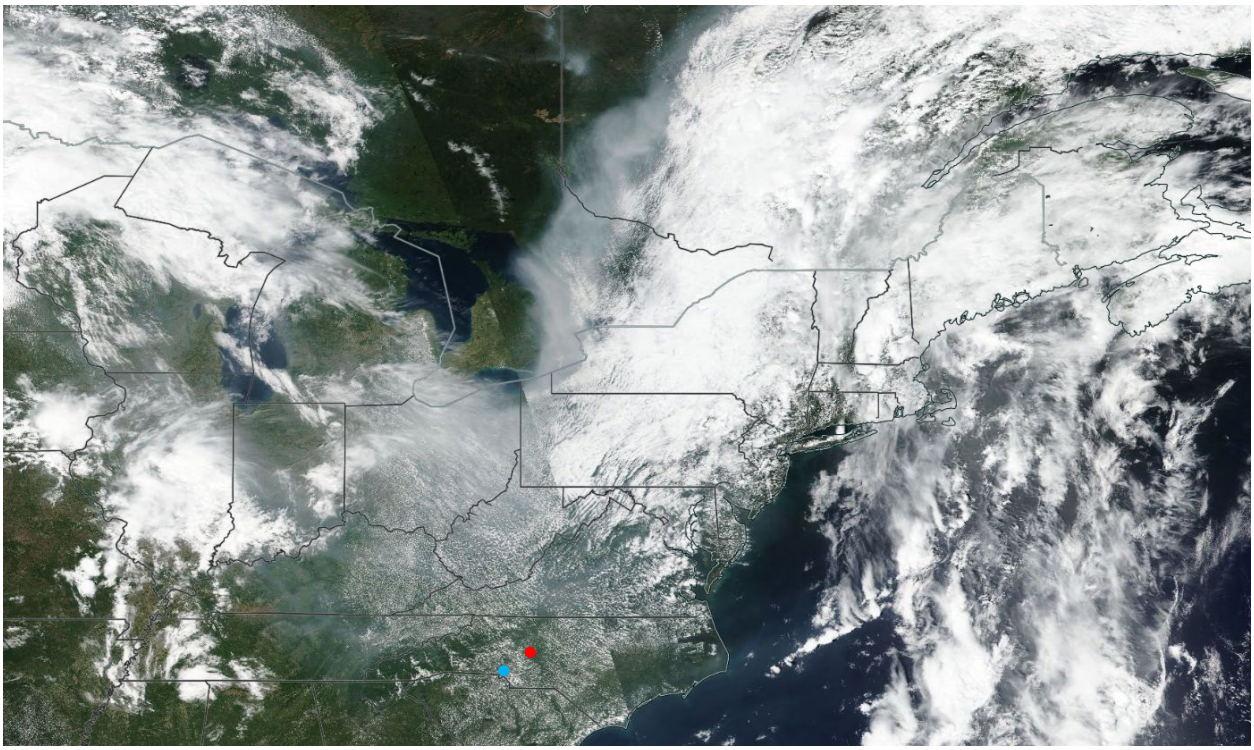


***Figure 71**: Visible satellite imagery reveals heavy smoke across the Ohio Valley, Mid-Atlantic and upper southeastern U.S., including North Carolina, on June 28th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

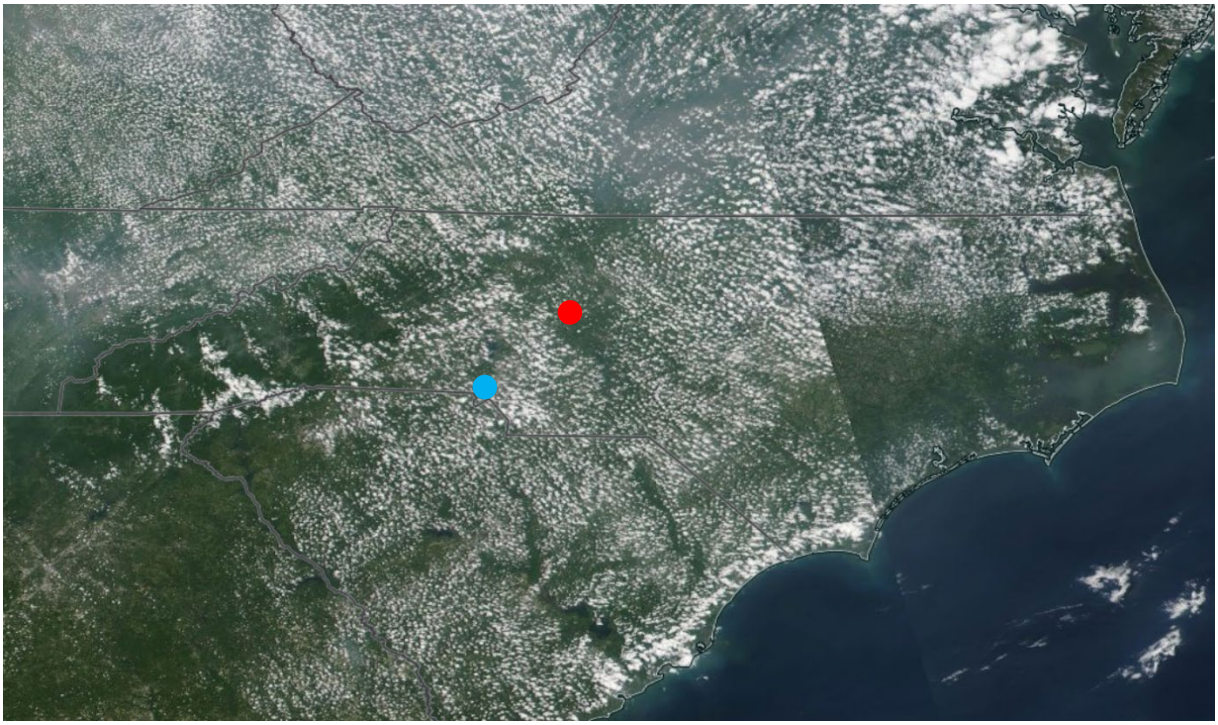


***Figure 72**: Visible satellite imagery reveals heavy smoke across the Ohio Valley, Mid-Atlantic and upper*

southeastern U.S., including North Carolina, on June 28th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.

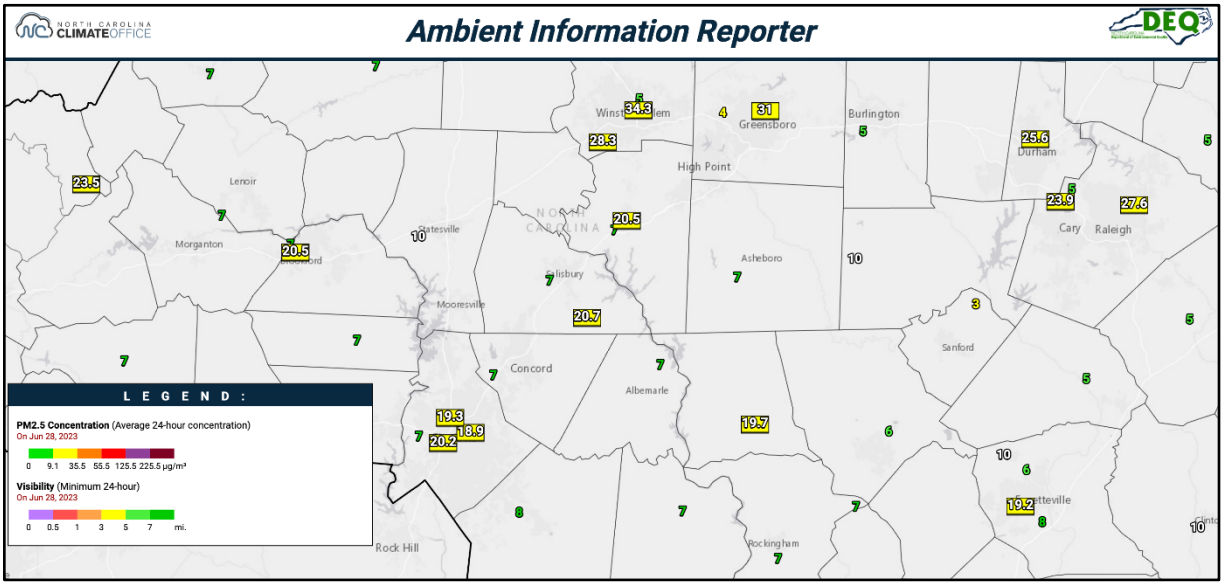


***Figure 73**: 24-hr. avg. $PM_{2.5}$ concentrations and minimum 24-hr. visibility from airport observing sites on June 28th, 2023. Minimum visibility can be used as a proxy for additional air quality monitors and when values fall below the standard 10 statue mile range, it is an indicator of an obscuration (such as smoke, dust, haze, etc.).*

By June 29th, a plume of the heaviest smoke laden air was being directly transported into North Carolina from the source of the heaviest fire and smoke activity over southeastern Canada, as seen in **Figure 74**. This analysis of a direct fetch of smoke from the origin source in Canada in concurrence with the onset of widespread exceedances at most North Carolina $PM_{2.5}$ monitoring sites provides evidence of the clear causal relationship that existed during the third event in North Carolina in late June into early July as seen in the remainder of our analyses in **Figure 75** through **Figure 87**.

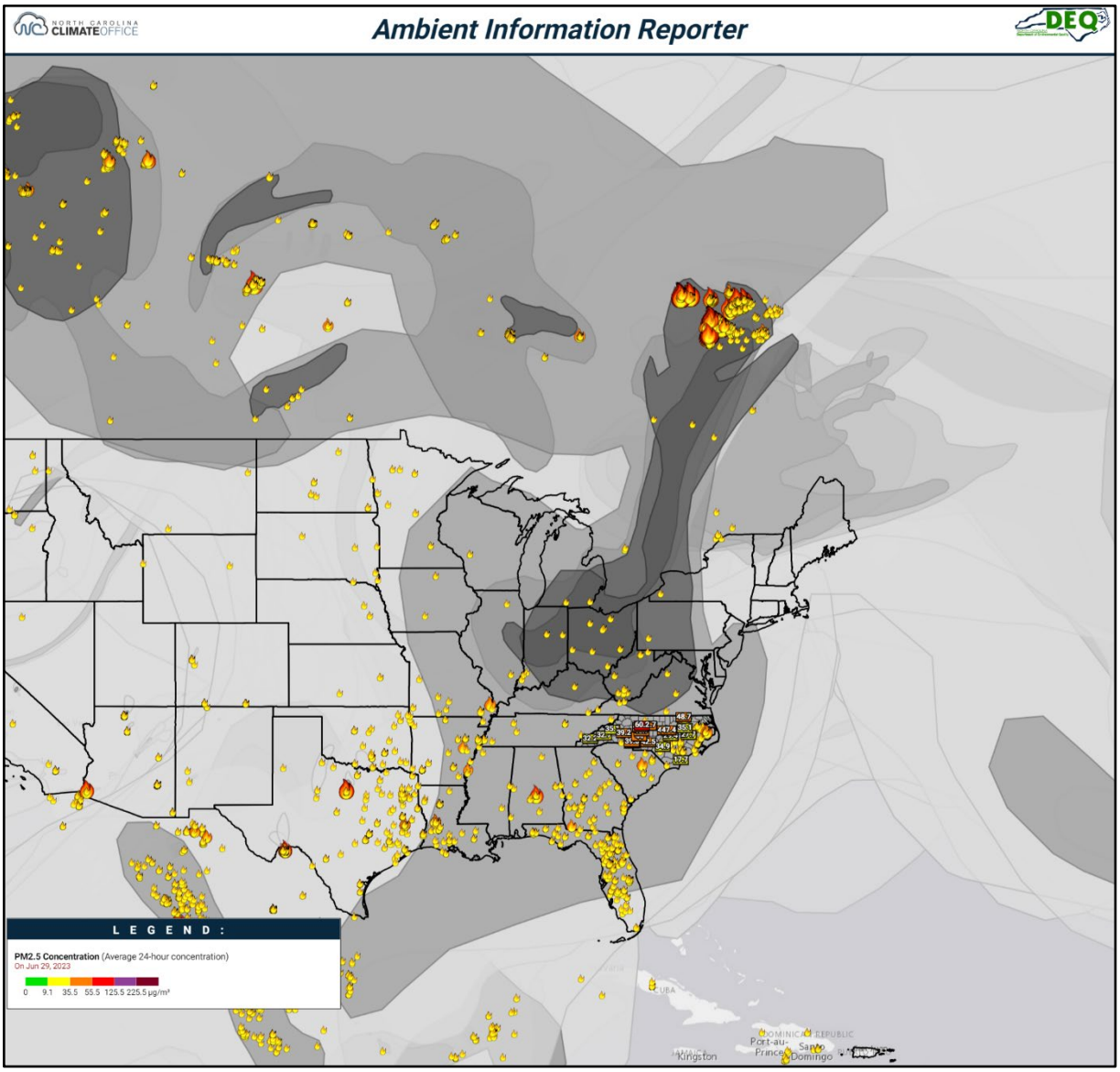


***Figure 74**: 24-hr. avg. $PM_{2.5}$ concentrations and NOAA OSPO fire and smoke satellite-derived analyses on June 29th.*

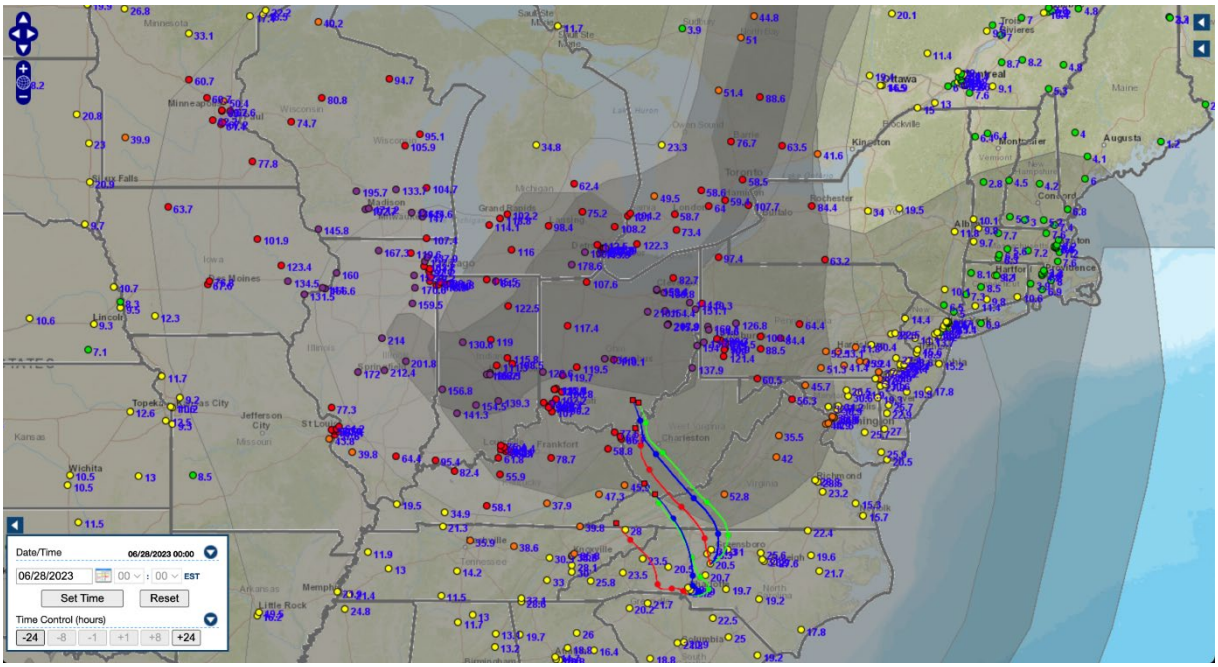


***Figure 75**: 24-hr. avg. $PM_{2.5}$ concentrations valid on **June 28th, 2023**, NOAA OSPO satellite-derived smoke analysis and 24-hr. backward trajectories at 100 m (green line), 750 m (blue line) and 1500 m (red line) ending on **June 29th, 2023**. Red squares indicate air parcel location along back trajectory path on **June 28th, 2023**.*

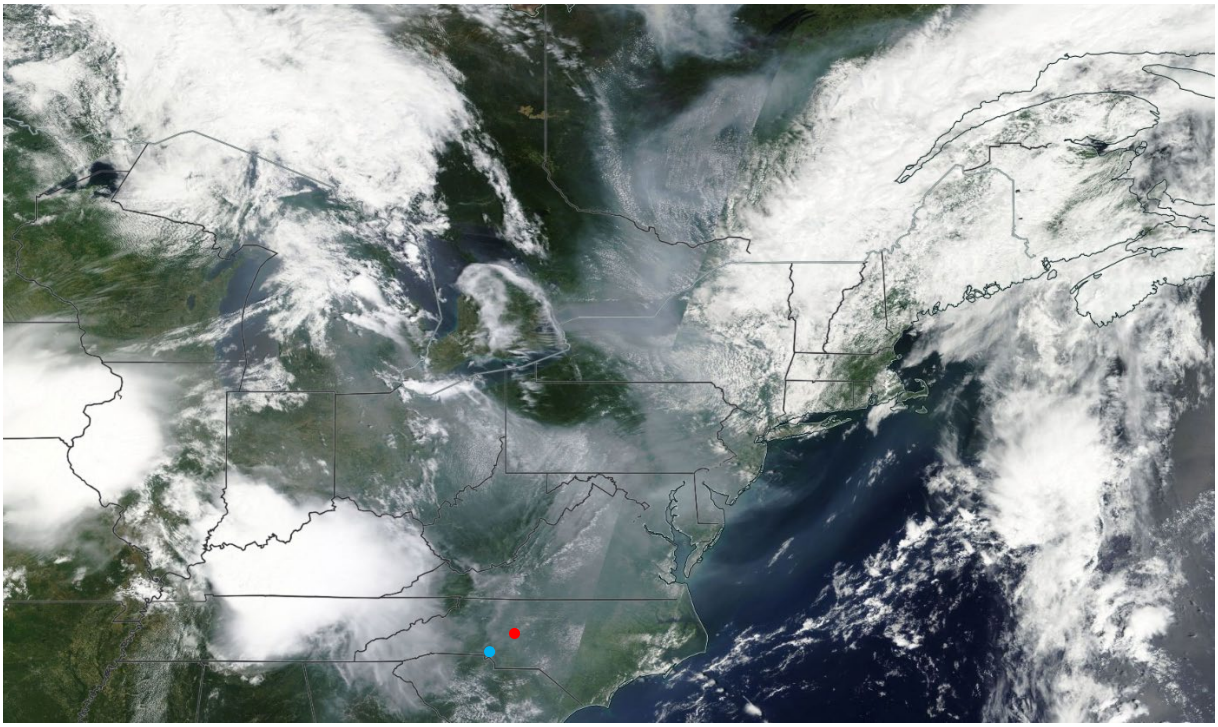


***Figure 76**: Visible satellite imagery reveals heavy smoke across the Ohio Valley, Mid-Atlantic and upper southeastern U.S., including North Carolina, on June 29th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

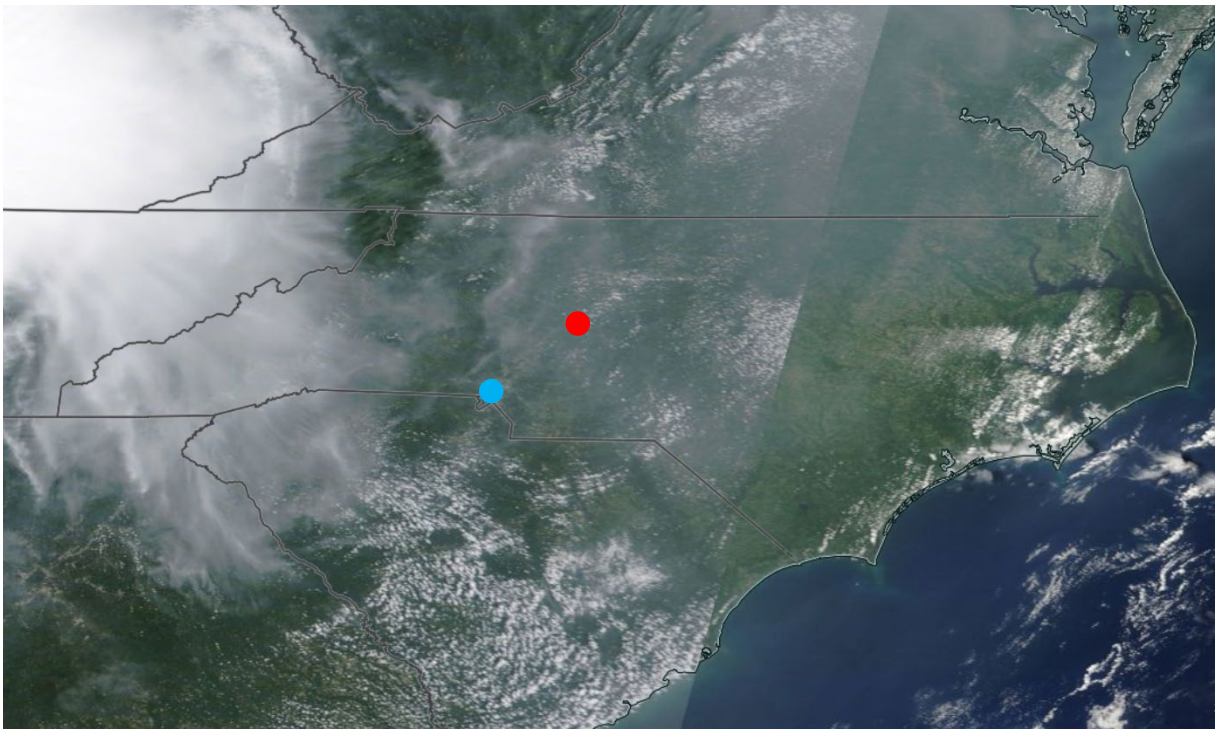


***Figure 77**: Visible satellite imagery reveals heavy smoke across the Ohio Valley, Mid-Atlantic and upper southeastern U.S., including North Carolina, on June 29th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

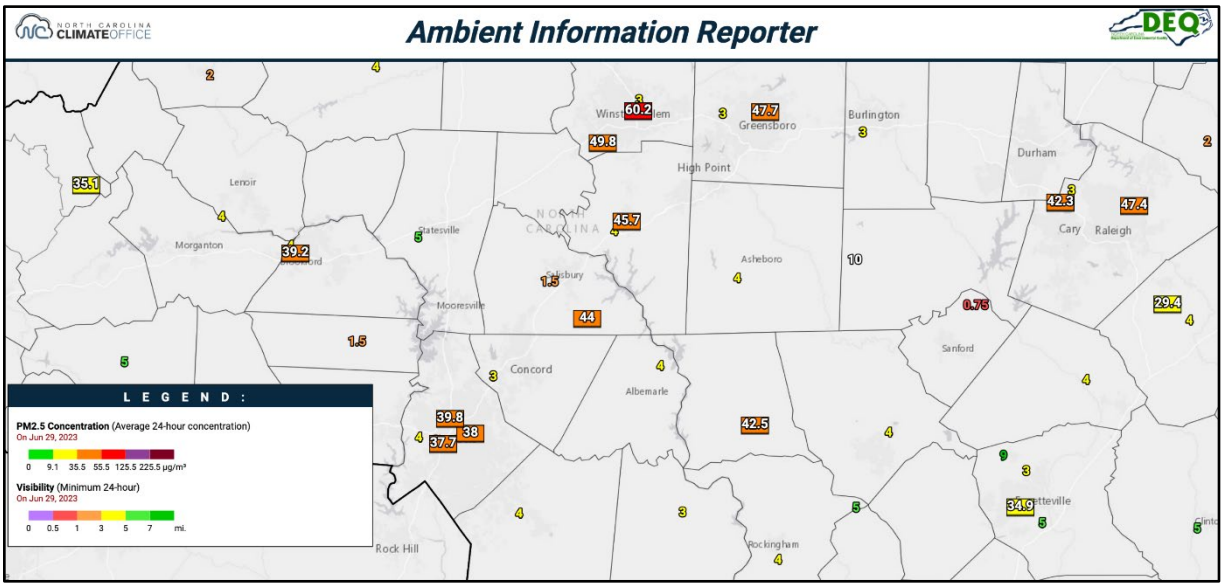


***Figure 78**: 24-hr. avg. $PM_{2.5}$ concentrations and minimum 24-hr. visibility from airport observing sites on June 29th, 2023. Minimum visibility can be used as a proxy for additional air quality monitors and when values fall below the standard 10 statue mile range, it is an indicator of an obscuration (such as smoke, dust, haze, etc.).*

Once the polluted air mass was deposited into the state, high pressure built into the region behind the surface cold front as seen in the daily WPC surface analysis evolution shown in **Figure 79.** With reduced dispersion, lighter winds and strong overnight temperature inversions, this acted to trap the elevated $PM_{2.5}$ air mass over the region through July 1st.

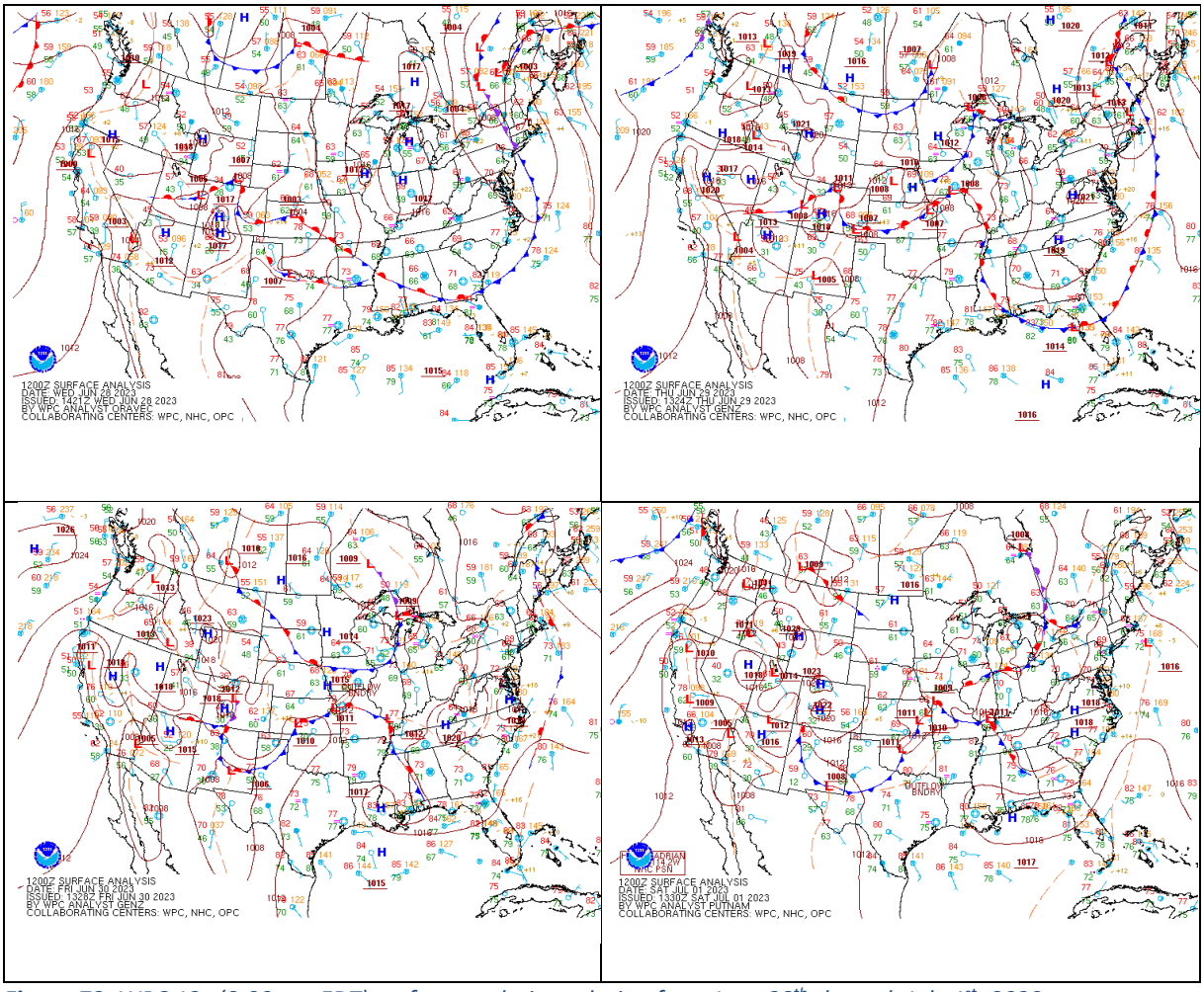


***Figure 79**: WPC 12z (8:00 am EDT) surface analysis evolution from June 28th through July 1st, 2023.*

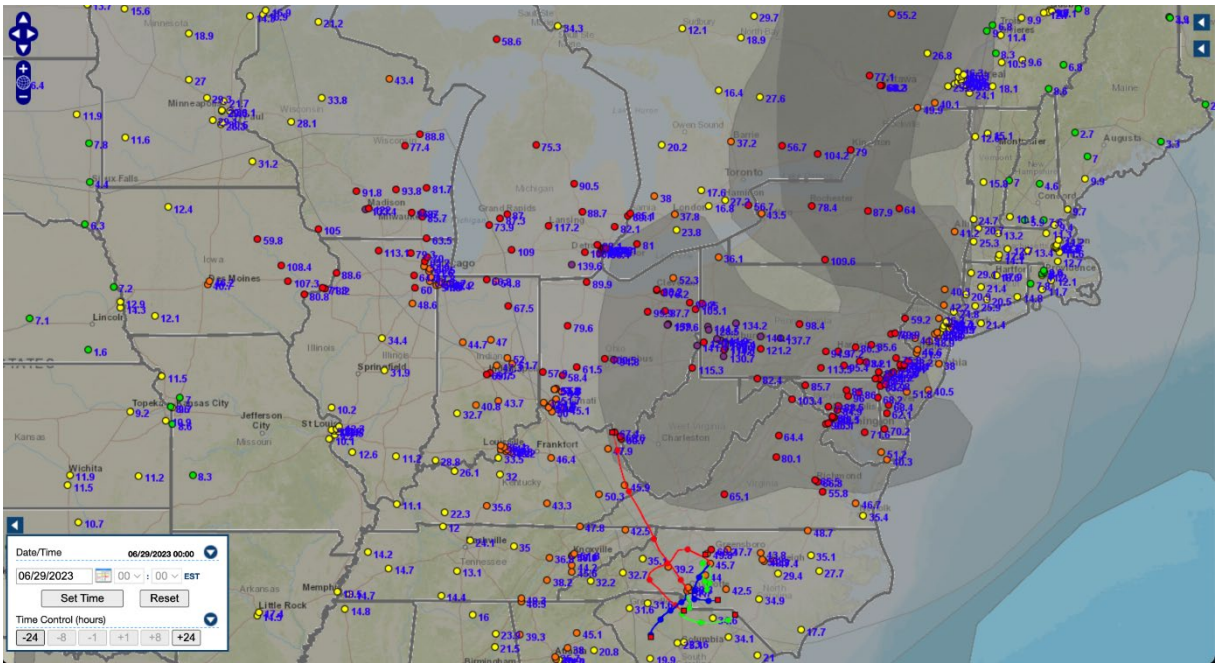


***Figure 80**: 24-hr. avg. $PM_{2.5}$ concentrations valid on **June 29th, 2023**, NOAA OSPO satellite-derived smoke analysis and 24-hr. backward trajectories at 100 m (green line), 750 m (blue line) and 1500 m (red line) ending on **June 30th, 2023**. Red squares indicate air parcel location along back trajectory path on **June 29th, 2023**.*

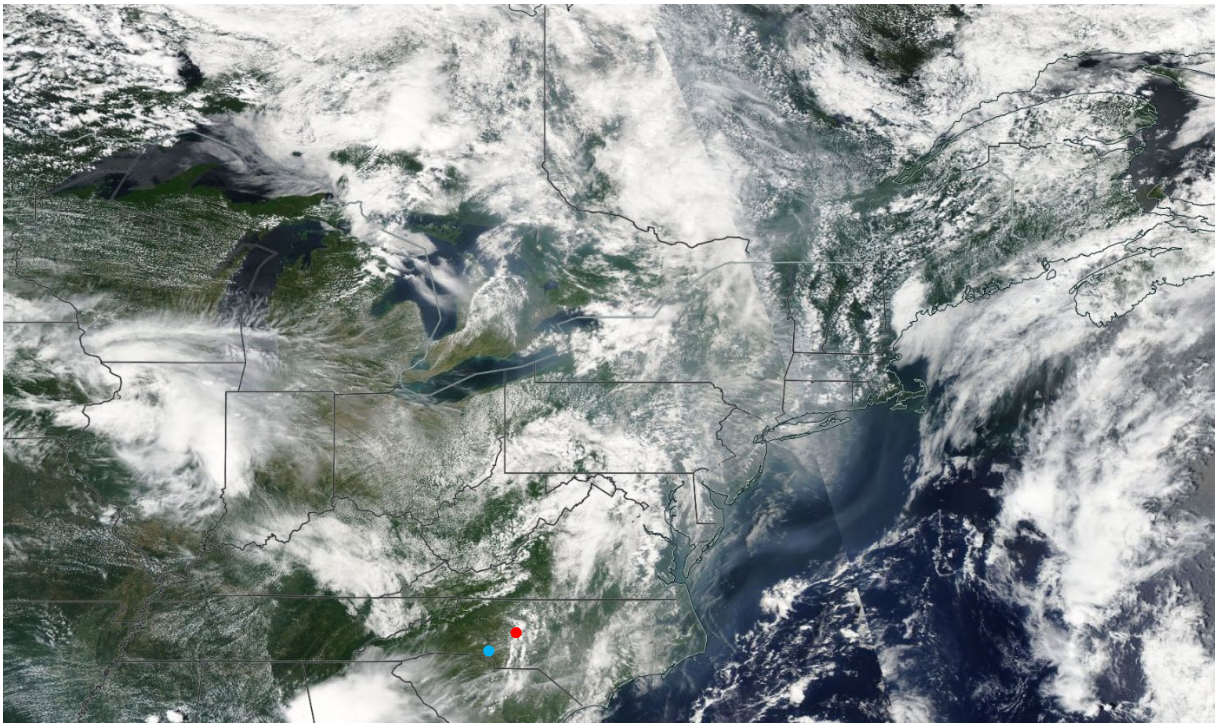


***Figure 81**: Visible satellite imagery reveals heavy smoke across the Ohio Valley, Mid-Atlantic and upper southeastern U.S., including North Carolina, on June 30th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

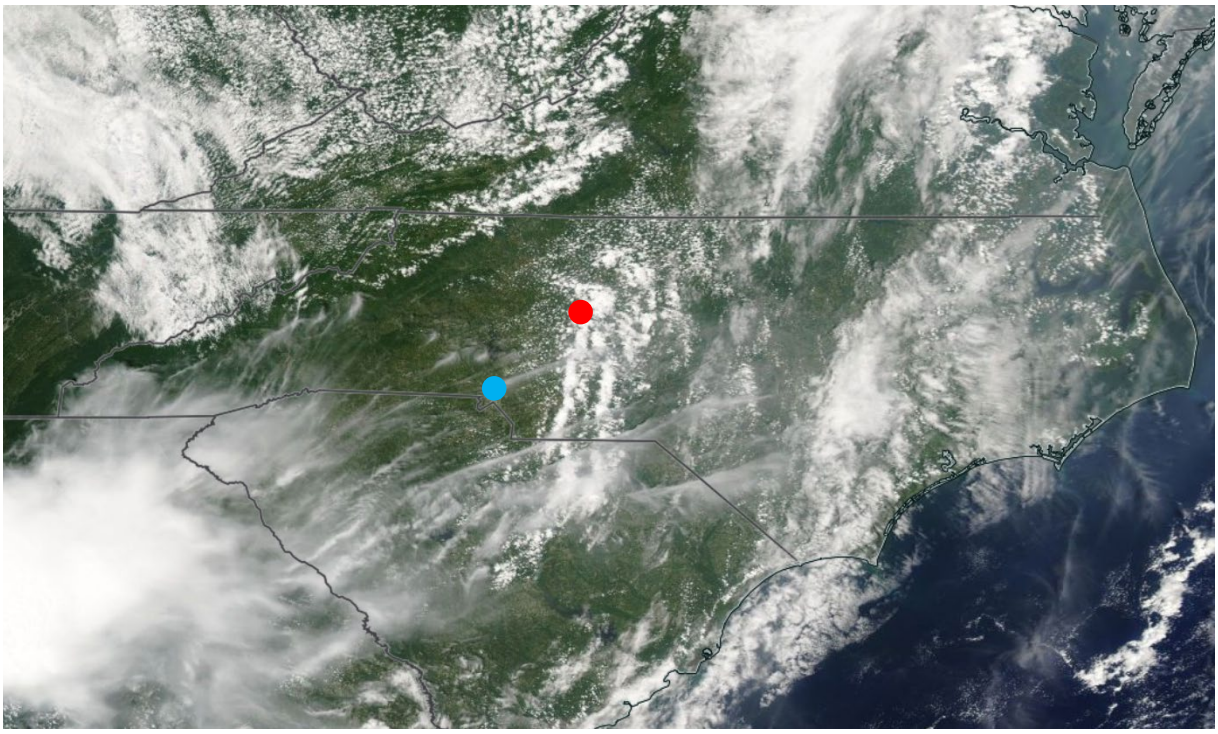


***Figure 82**: Visible satellite imagery reveals heavy smoke across the Ohio Valley, Mid-Atlantic and upper southeastern U.S., including North Carolina, on June 30th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

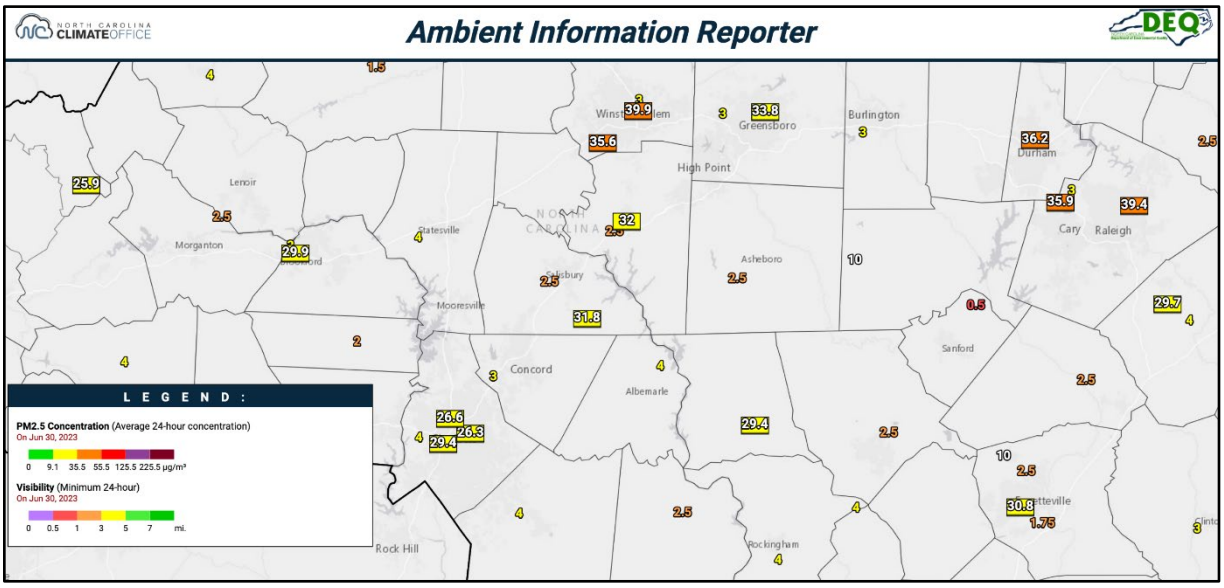


***Figure 83**: 24-hr. avg. $PM_{2.5}$ concentrations and minimum 24-hr. visibility from airport observing sites on June 30th, 2023. Minimum visibility can be used as a proxy for additional air quality monitors and when values fall below the standard 10 statue mile range, it is an indicator of an obscuration (such as smoke, dust, haze, etc.).*

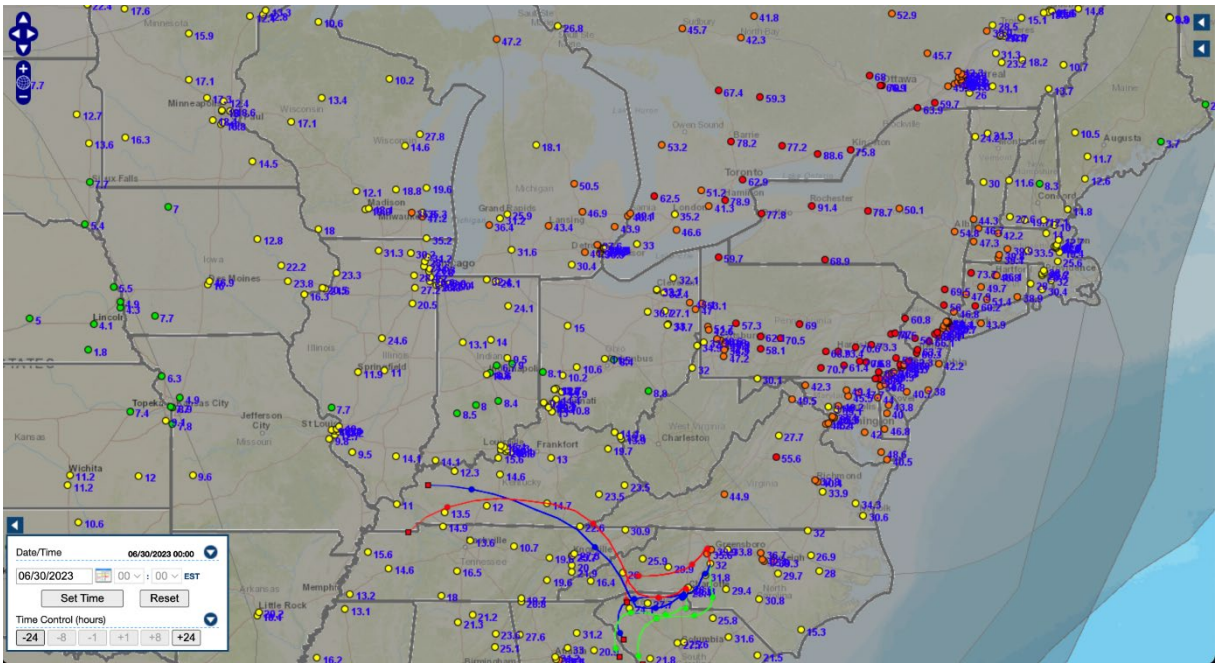


***Figure 84**: 24-hr. avg. $PM_{2.5}$ concentrations valid on **June 30th, 2023**, NOAA OSPO satellite-derived smoke analysis and 24-hr. backward trajectories at 100 m (green line), 750 m (blue line) and 1500 m (red line) ending on **July 1st, 2023**. Red squares indicate air parcel location along back trajectory path on **June 30th, 2023**.*

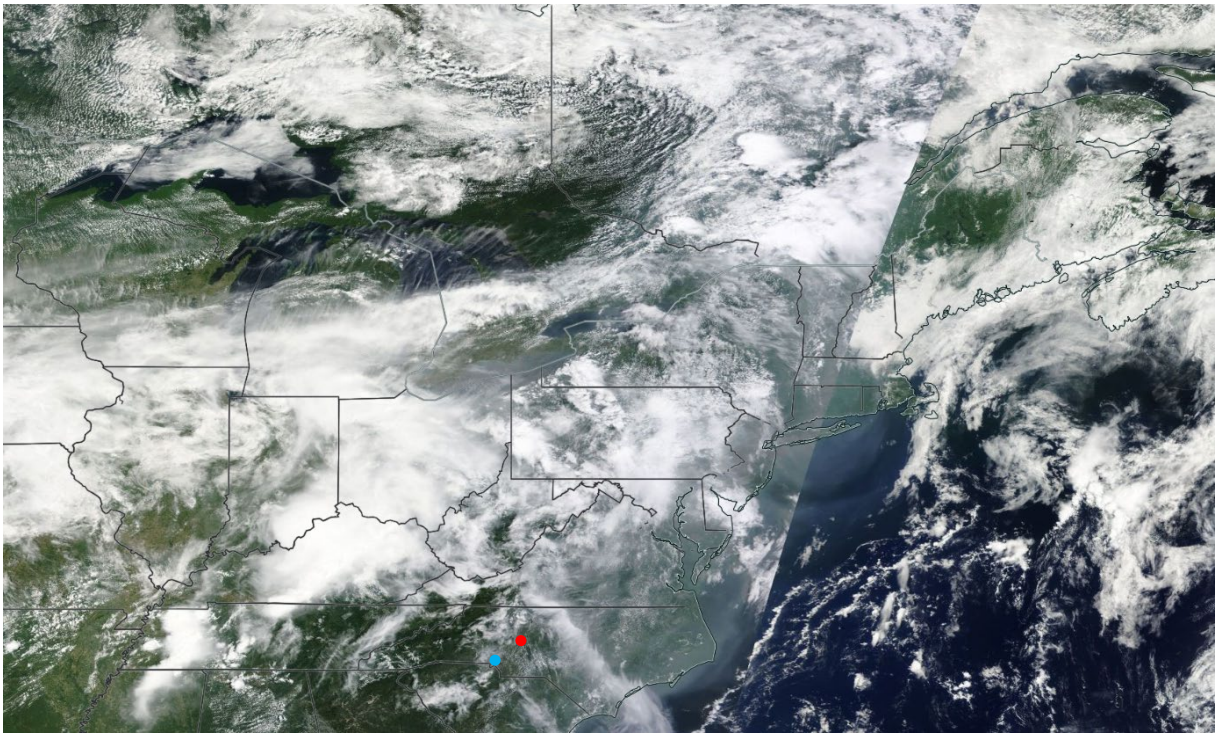


***Figure 85**: Visible satellite imagery reveals heavy smoke across the Ohio Valley, Mid-Atlantic and upper southeastern U.S., including North Carolina, on July 1st, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

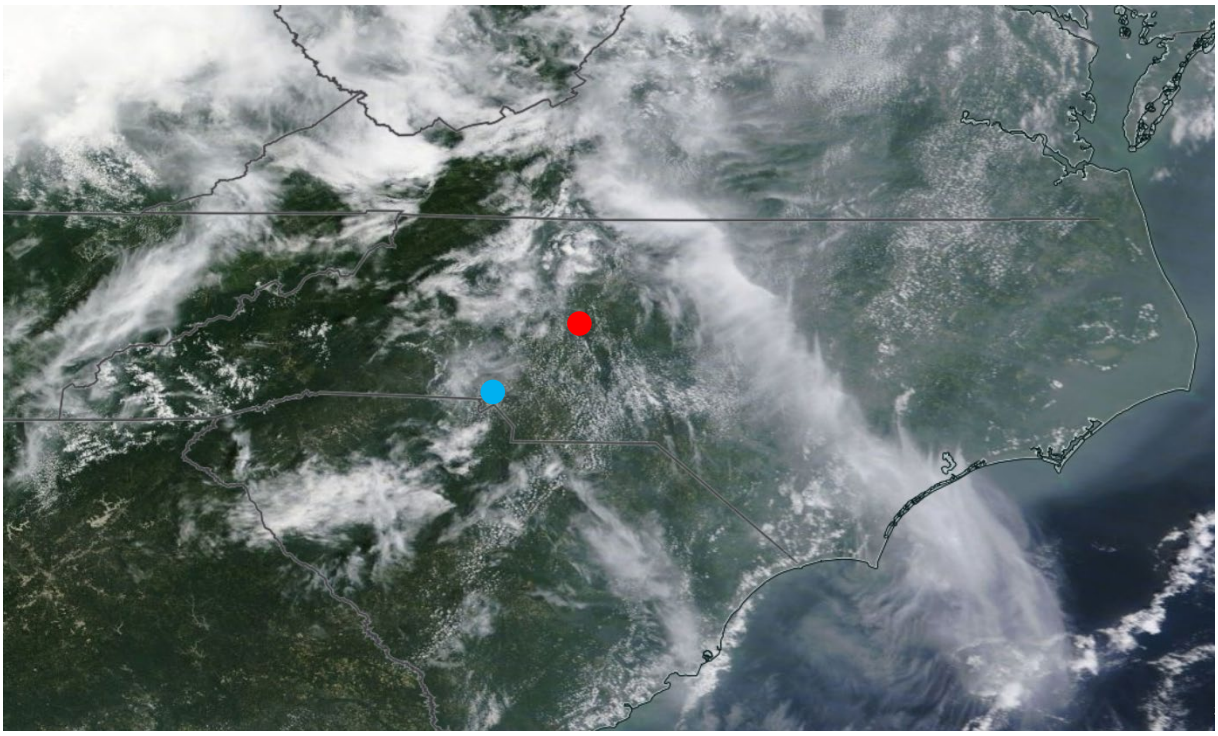


***Figure 86**: Visible satellite imagery reveals heavy smoke across the Ohio Valley, Mid-Atlantic and upper southeastern U.S., including North Carolina, on July 1st, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

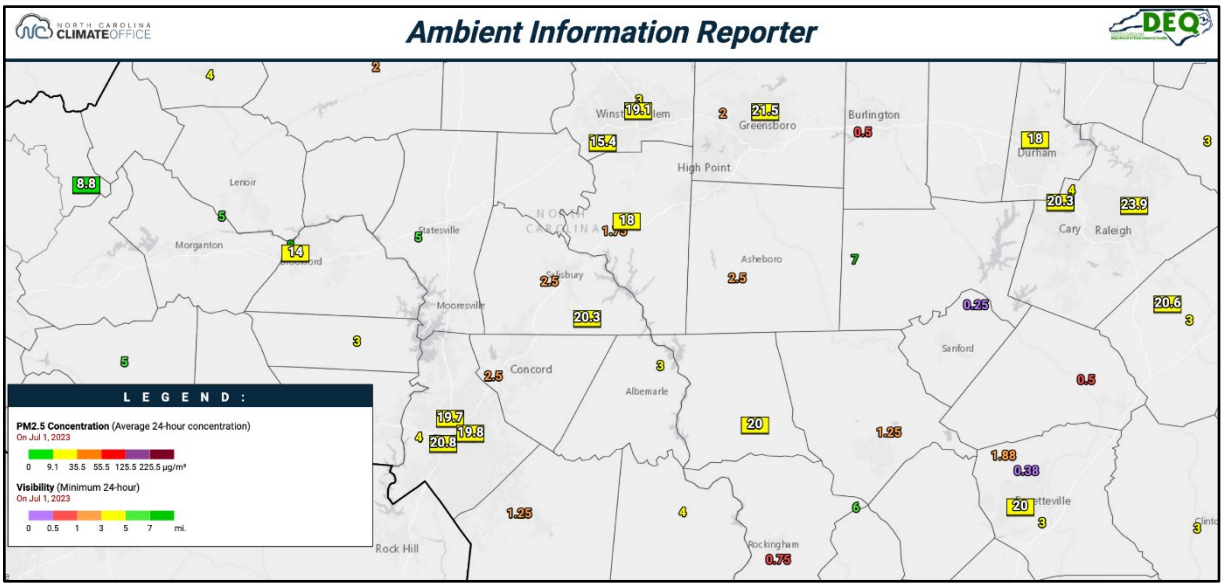


***Figure 87**: 24-hr. avg. $PM_{2.5}$ concentrations and minimum 24-hr. visibility from airport observing sites on July 1st, 2023. Minimum visibility can be used as a proxy for additional air quality monitors and when values fall below the standard 10 statue mile range, it is an indicator of an obscuration (such as smoke, dust, haze, etc.).*

Additional Tier 2-level evidence of surface-level smoke and associated impacts on July 1st once again presented itself in the hourly METAR observations from the JQF as seen in Appendix J, **Figure 145-J**. Numerous hours contained sky condition reports of "FUHZ" (smoke / haze) with visibility less than 7 SM, with dewpoints significantly lower than temperature (thus eliminating the possibility of fog).

Additionally, both the HRRR Smoke and the NAAPS aerosol model analysis (00 hr initialization) at 8:00 am on July 1st analyzed surface smoke over North Carolina as seen in Appendix J, **Figure 146-J** through **Figure 147-J**.

3.1.4 Event ID #4 - July 17th through July 18th, 2023

The fourth and final event included in North Carolina's 2023 exceptional event package, which occurred in mid-July, led to two days of 24-hour $PM_{2.5}$ averages that were classified as Tier 1 level at both the Remount and Lexington monitors. This is shown in **Table 6** below.

***Table 6**: Regulatorily Significant 24-Hour Average $PM_{2.5}$ Concentrations Requested for Exclusion for Event #4.*

		Remount (AQS ID# 371190045) (Mecklenburg County)					Lexington (AQS ID# 370570002) (Davidson County)				
Event ID	**Date**	**24-hr $PM_{2.5}$ Average ($\mu g/m^3$)**	**Historical Average* (2018-2022 Avg. Daily Conc.)**	**% Increase from Historical Average**	**EPA Tier Level / Threshold ($\mu g/m^3$)****		**24-hr $PM_{2.5}$ Average ($\mu g/m^3$)**	**Historical Average* (2018-2022 Avg. Daily Conc.)**	**% Increase from Historical Average**	**EPA Tier Level / Threshold ($\mu g/m^3$)****	
4	7/17/2023	43	8.6	401.5 %	Tier 1	24.45	38.6	11.5	236.8 %	Tier 1	26.7
	7/18/2023	46.1	7.9	483.5 %	Tier 1	24.45	42.3	8.3	408.4 %	Tier 1	26.7

** The historical average is defined as the daily average $PM_{2.5}$ concentration over the previous 5-year period (2018-2022) on the given date (i.e., the past 5 June 6ths, the past 5 June 7ths, etc.).*

*** The EPA Tier Level determines the level of evidence required to establish a clear causal relationship in a wildland fire $PM_{2.5}$ Exceptional Events demonstration and was determined using EPA's Tiering Tool output as displayed in Appendix K: Monitoring Sites' Tiering Graphs. The threshold listed represents the minimum daily average concentration ($\mu g/m^3$) needed to meet the Tier level listed for that specific monitor and month.*

This event again featured widespread exceedances of the daily $PM_{2.5}$ NAAQS. 16 out of 21 monitors in North Carolina's $PM_{2.5}$ ambient monitoring network measured daily concentrations above 35.5 $\mu g/m^3$ on July 18th. However, unlike the other three events, much of the smoke transported into North Carolina in mid-July 2023 was primarily sourced from northwestern Canada rather than eastern Canada.

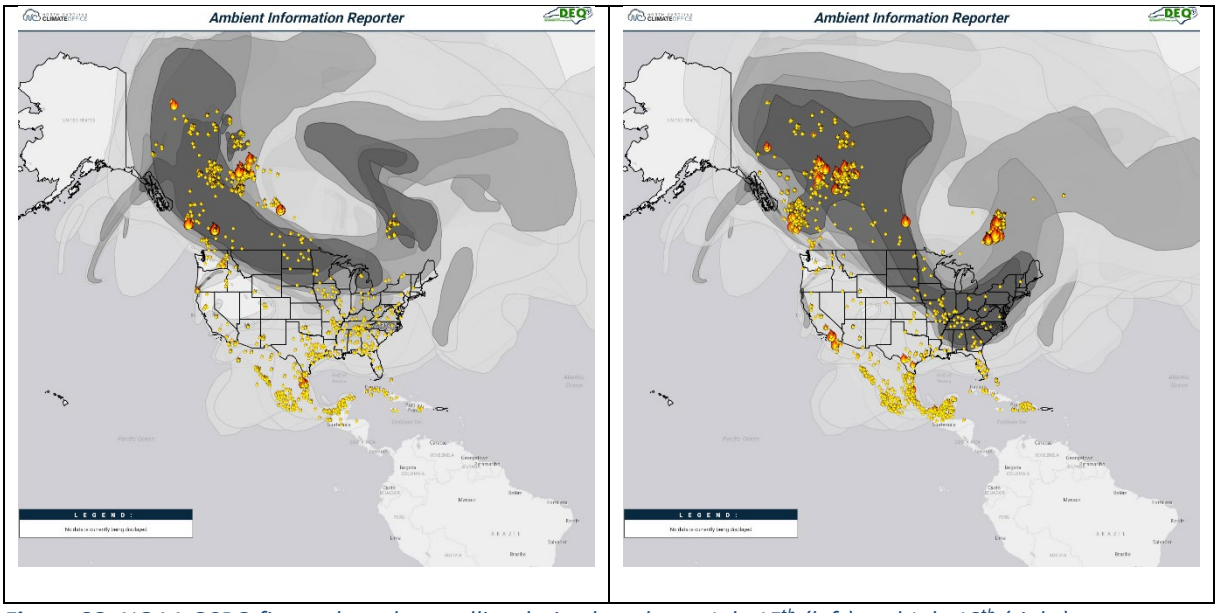
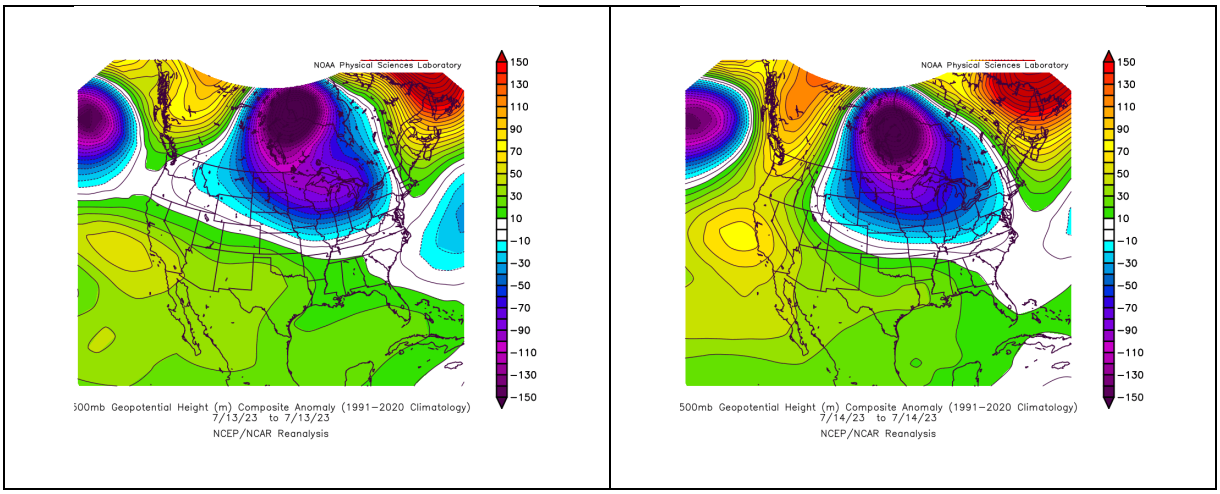


***Figure 88**: NOAA OSPO fire and smoke satellite-derived analyses. July 15th (left) and July 18th (right).*

By mid-July 2023, NC DAQ forecasters were experiencing meteorological déjà vu as yet again a variation of a familiar atmospheric pattern recurred with a strong upper-level high over southeastern Canada and a digging upper-level low gradually shifting southward into the Great Lakes (seen in **Figure 89**). This strong upper-level low resulted in another deep trough digging into the eastern U.S., with northwesterly flow aloft delivering one last major blast of Canadian wildfire smoke-laden air into the state.



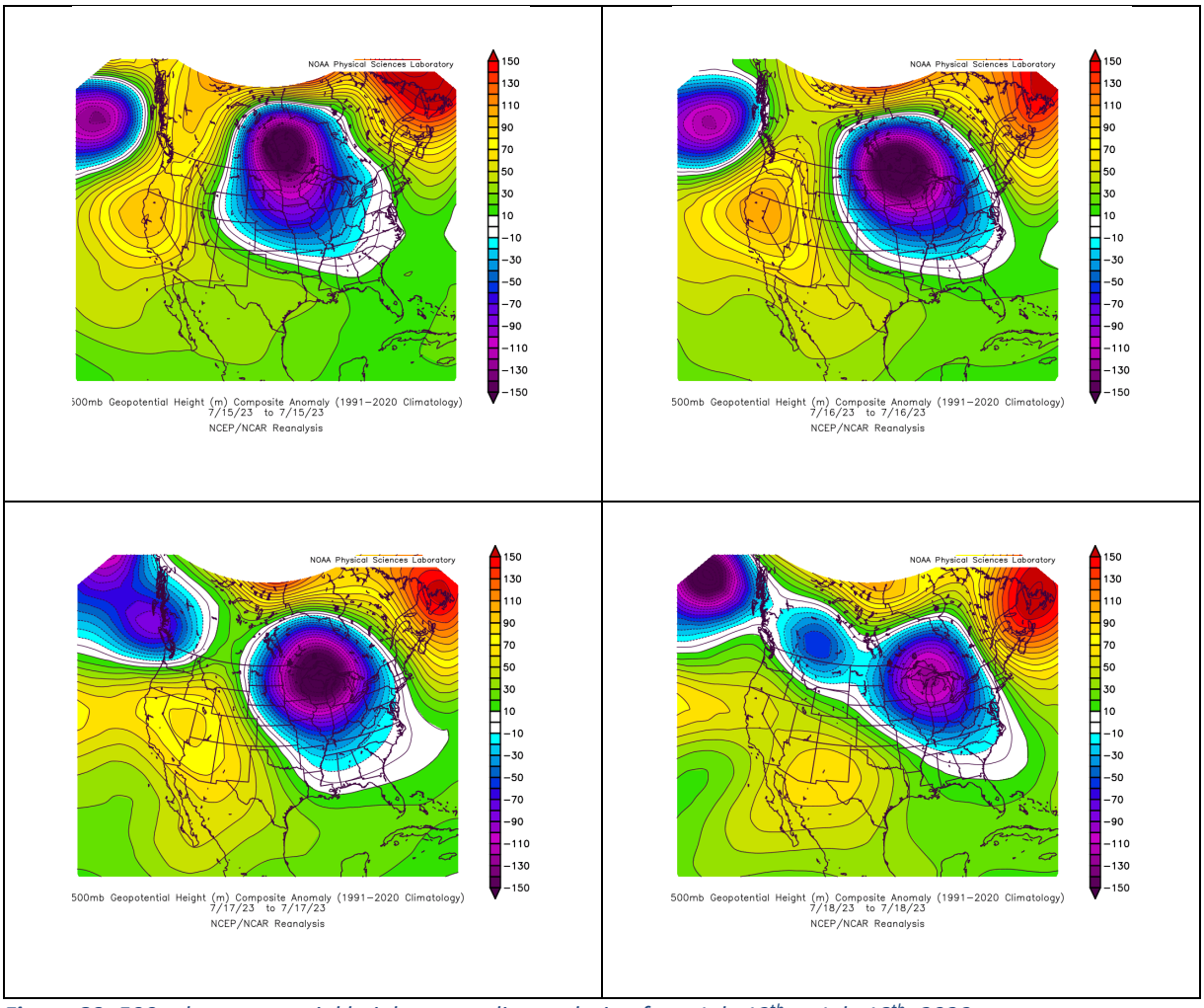


***Figure 89**: 500 mb geopotential height anomalies evolution from July 13th to July 18th, 2023.*

In a variation from the other events from a synoptic setup, the surface cold front that crossed the region during mid-July 2023 was tied to a weakening surface low pressure trough out ahead of the stacked, closed upper-level low / surface low system over the Upper Midwest on July 16th. The front was quasi-stationary on July 16th before slowly crossing the state during the late evening hours. The evolution of the frontal passage across North Carolina during the evening of July 16th into the early morning hours of July 17th is shown in **Figure 90** through **Figure 92** below.

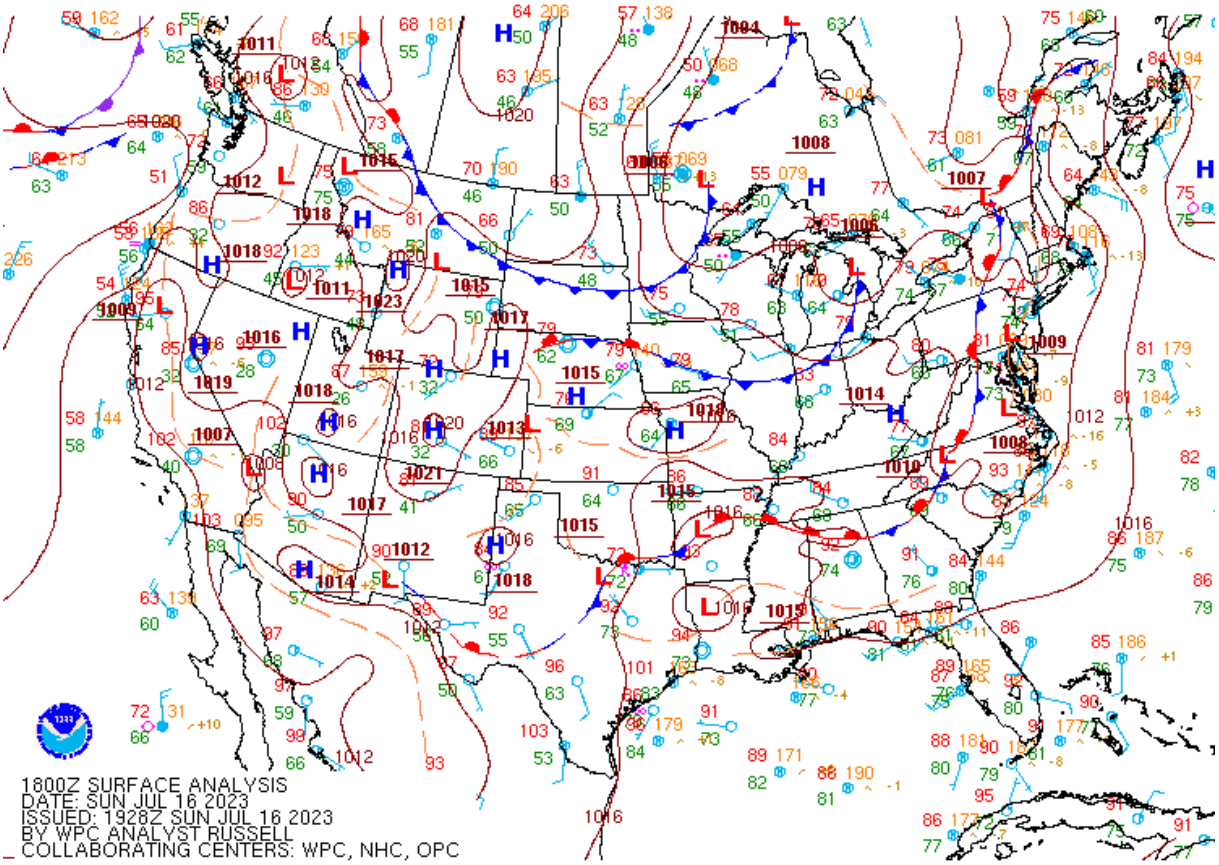


***Figure 90**: WPC surface analysis for July 16th, 2023 at 2:00 pm EDT.*

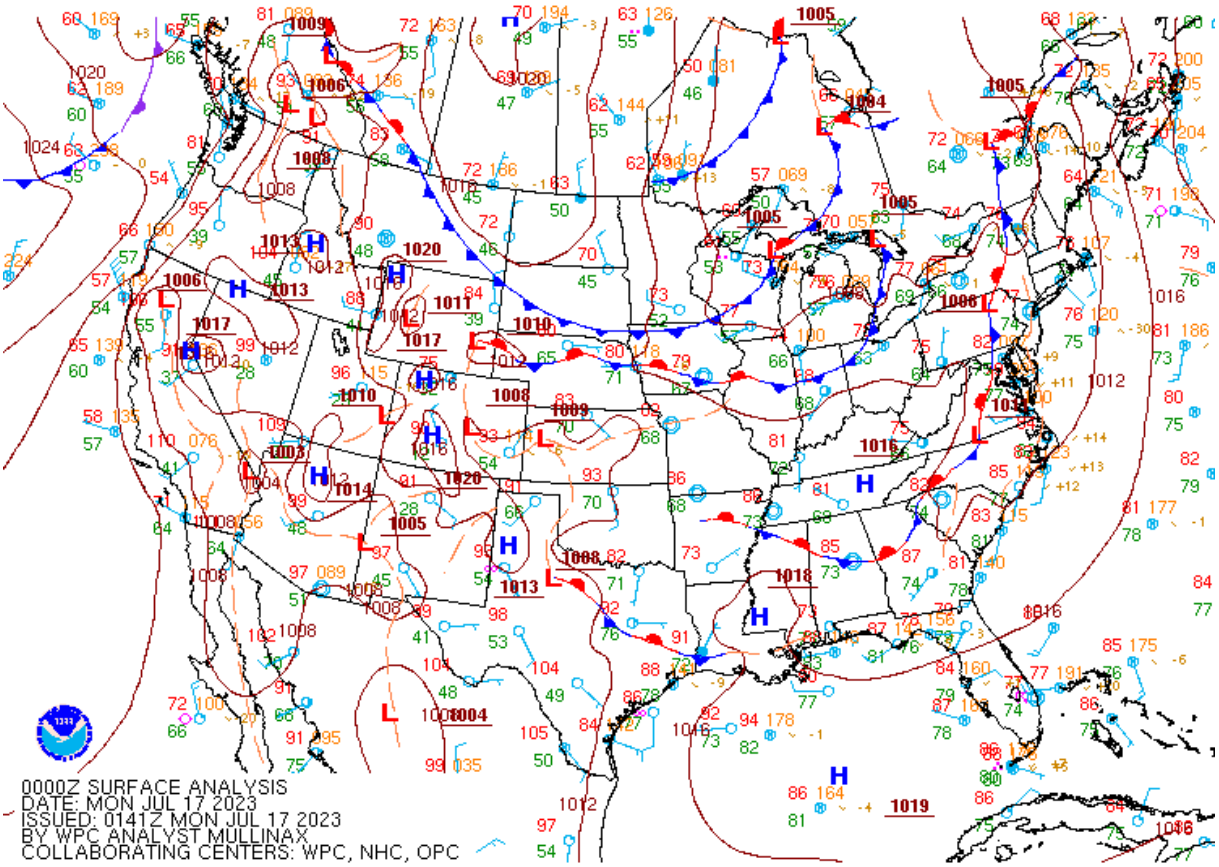


***Figure 91**: WPC surface analysis for July 16th, 2023 at 8:00 pm EDT (July 17th - 0000Z).*

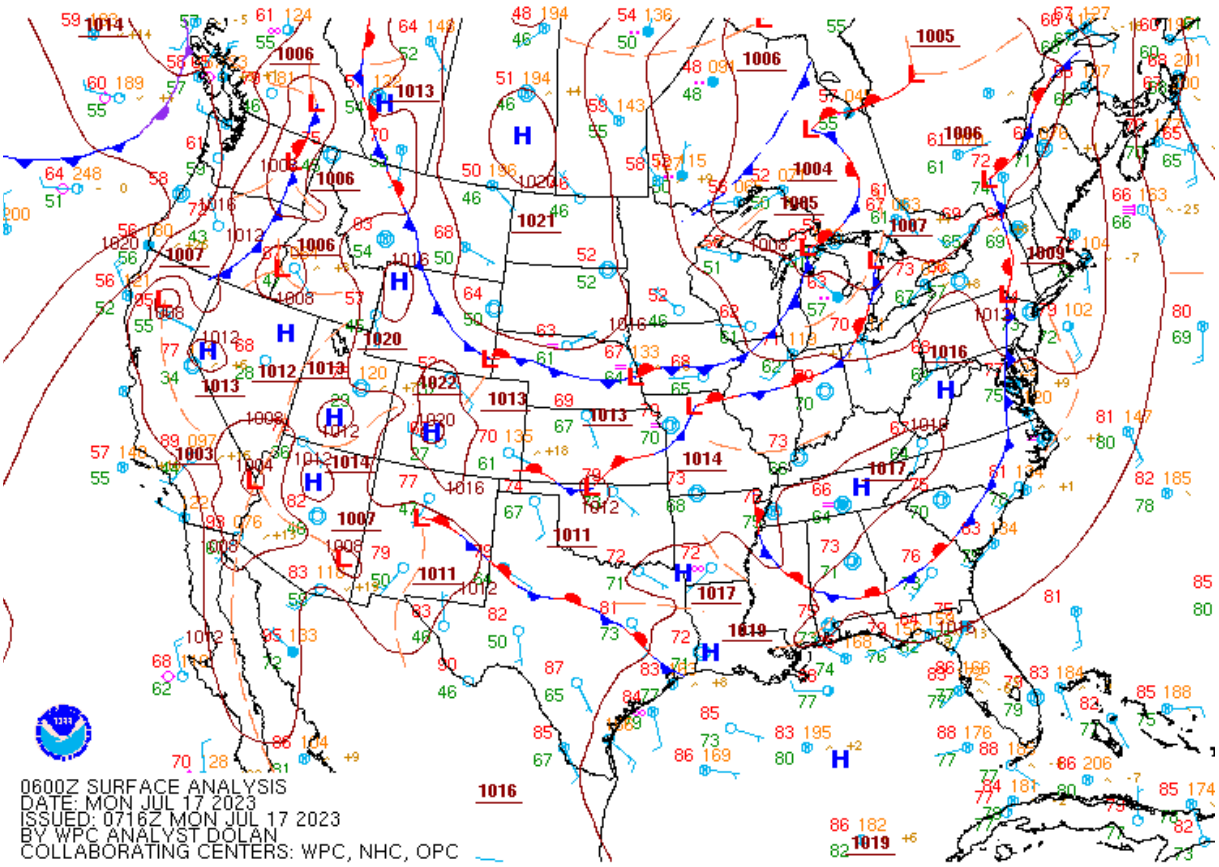


***Figure 92**: WPC surface analysis for July 17th, 2023 at 2:00 am EDT.*

Ahead of the surface front, heavy smoke could be seen on visible satellite imagery during the afternoon hours of July 16th across the Ohio and Tennessee Valleys **(Figure 93**). However, despite the correlation between the cold frontal passage / smoke location in this event, it appears that the primary driver of elevated smoke transport to the surface was downward mixing of smoke aloft.

Evidenced in the hourly observations on July 17th, seen in **Figure 94** and **Figure 95**, a significant spike in surface $PM_{2.5}$ concentrations was measured as the height of the planetary boundary layer increased with morning heating. Between 9:00 am and noon, fine particulate levels elevated rapidly at both sites, a clear indication of elevated smoke aloft mixing to the surface. $PM_{2.5}$ values continued to gradually increase on July 17th, eventually reaching the Code Red range for hourly concentrations at both the Remount and Lexington $PM_{2.5}$ monitors. Once the smoke-laden air mass was deposited into the state, hourly concentrations remain elevated for much of July 17th through July 18th, as evidenced in **Figure 96** through **Figure 103**.

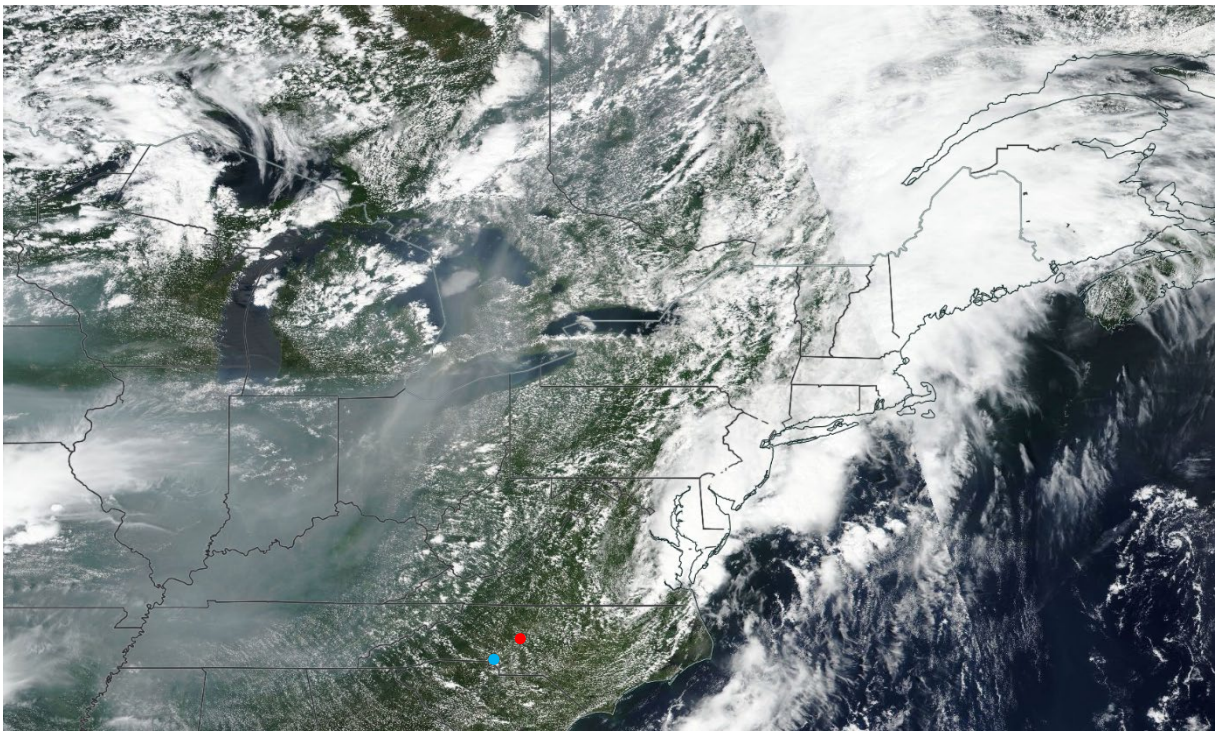


***Figure 93**: Visible satellite imagery reveals heavy smoke across the Ohio and Tennessee Valleys on July 16th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

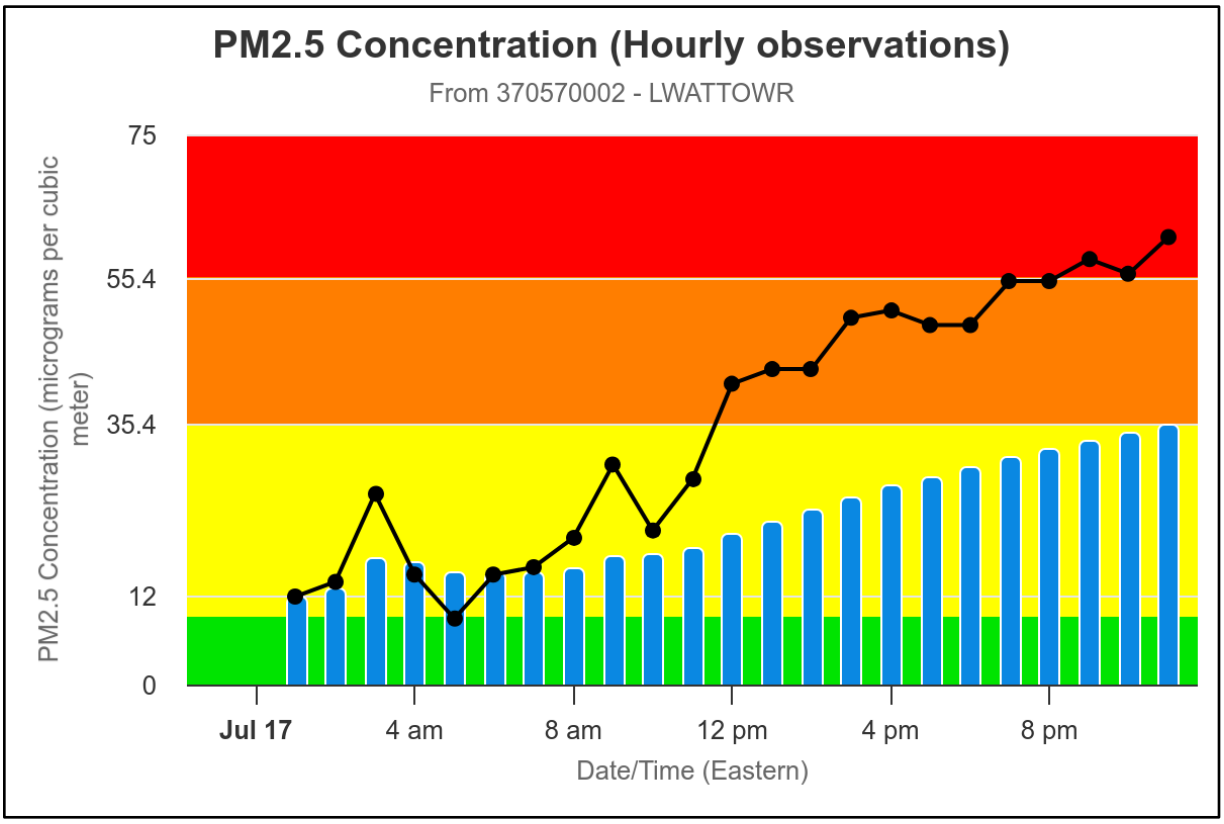


***Figure 94**: Hourly $PM_{2.5}$ observations (black line and dots) valid July 17th, 2023 at the Lexington Water Tower*

monitor. The blue bars represent the rolling daily average of hourly $PM_{2.5}$ observations up to and including the specific hour. The y-axis numerical labels and chart shading are the 24-hour average concentration breakpoints and color categories associated with the Air Quality Index (AQI).

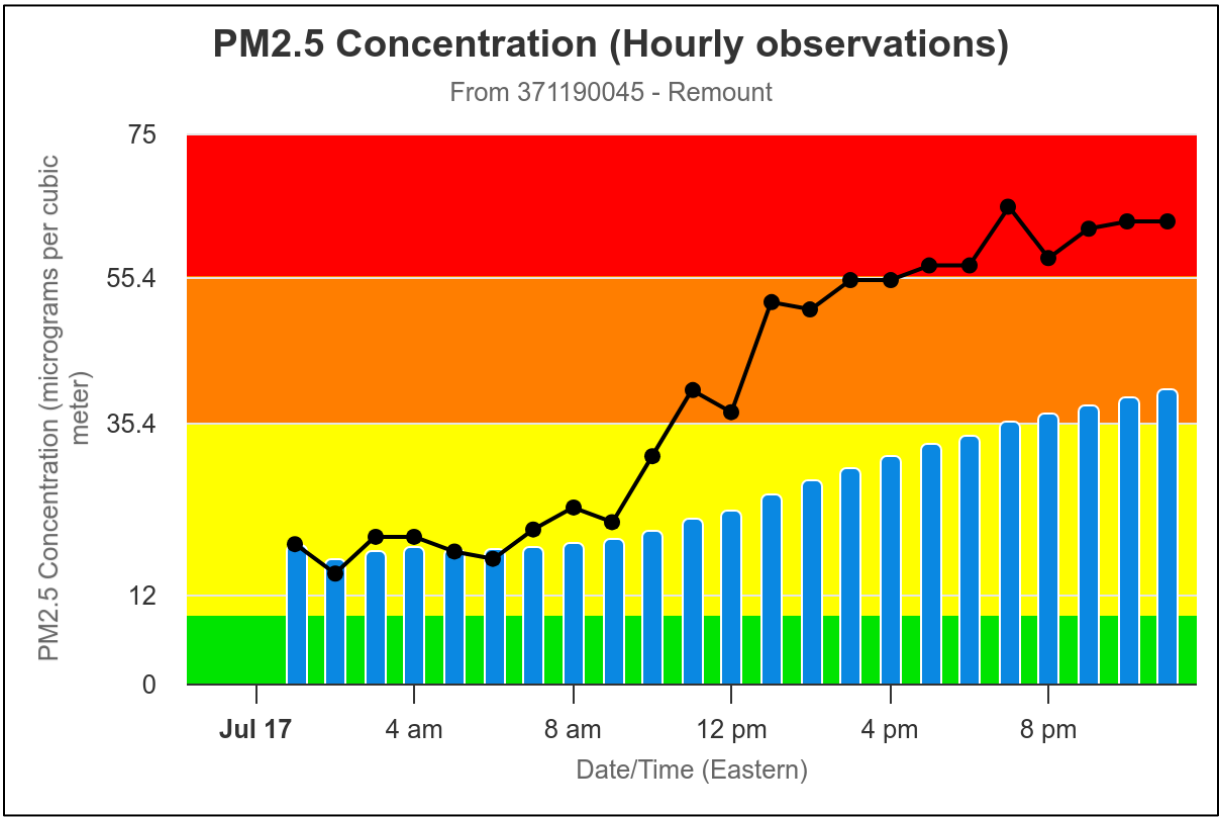


***Figure 95**: Hourly $PM_{2.5}$ observations (black line and dots) valid July 17th, 2023 at the Remount Road monitor. The blue bars represent the rolling daily average of hourly $PM_{2.5}$ observations up to and including the specific hour. The y-axis numerical labels and chart shading are the 24-hour average concentration breakpoints and color categories associated with the Air Quality Index (AQI).*

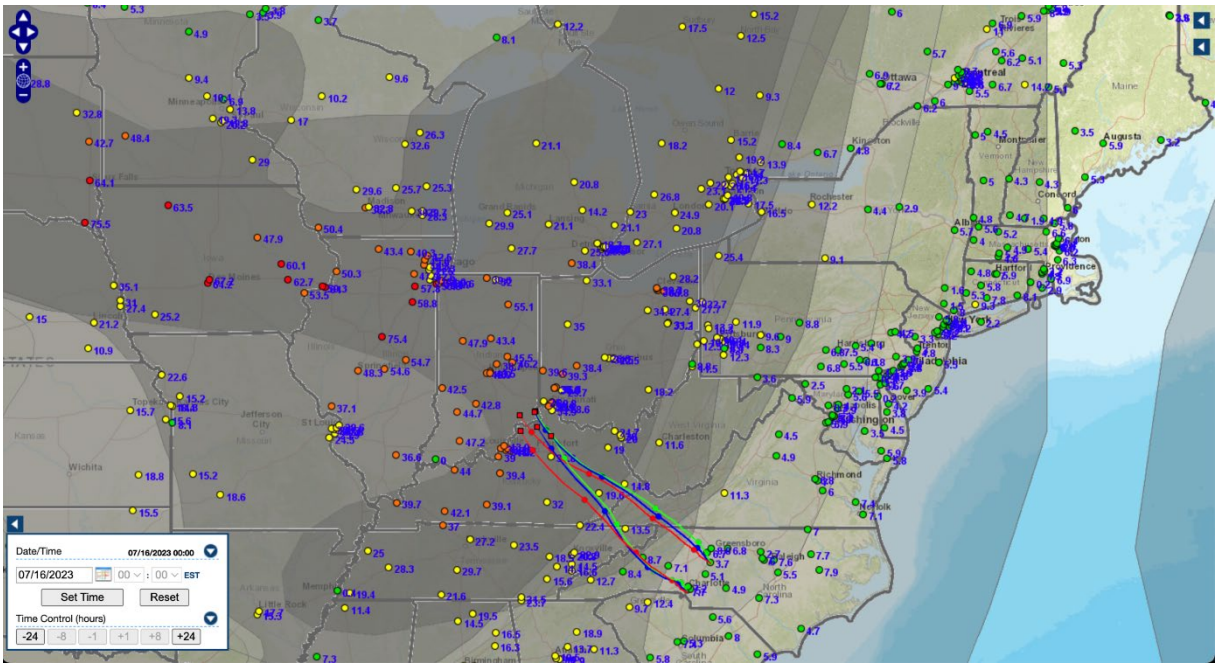


***Figure 96**: 24-hr. avg. $PM_{2.5}$ concentrations valid on **July 16th, 2023**, NOAA OSPO satellite-derived smoke analysis and 24-hr. backward trajectories at 100 m (green line), 750 m (blue line) and 1500 m (red line) ending on **July 17th, 2023**. Red squares indicate air parcel location along back trajectory path on **July 16th, 2023**.*

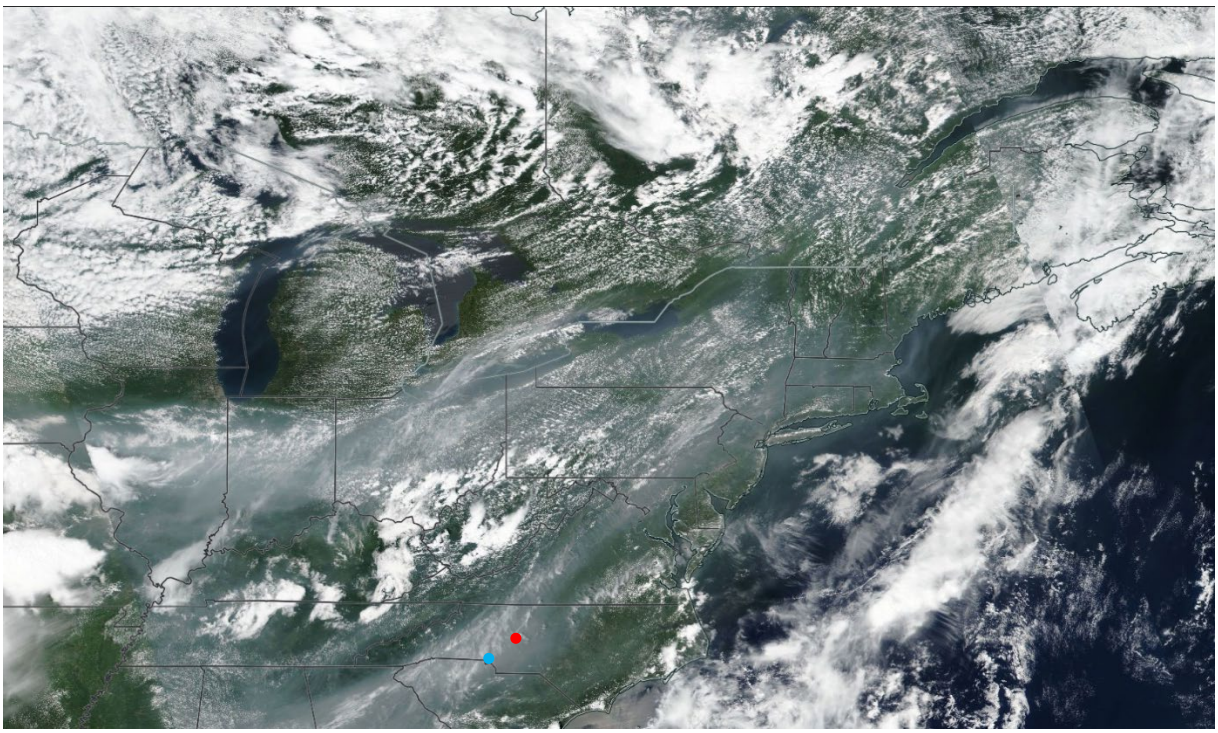


***Figure 97**: Visible satellite imagery reveals heavy smoke across the eastern U.S., including North Carolina, on July 17th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

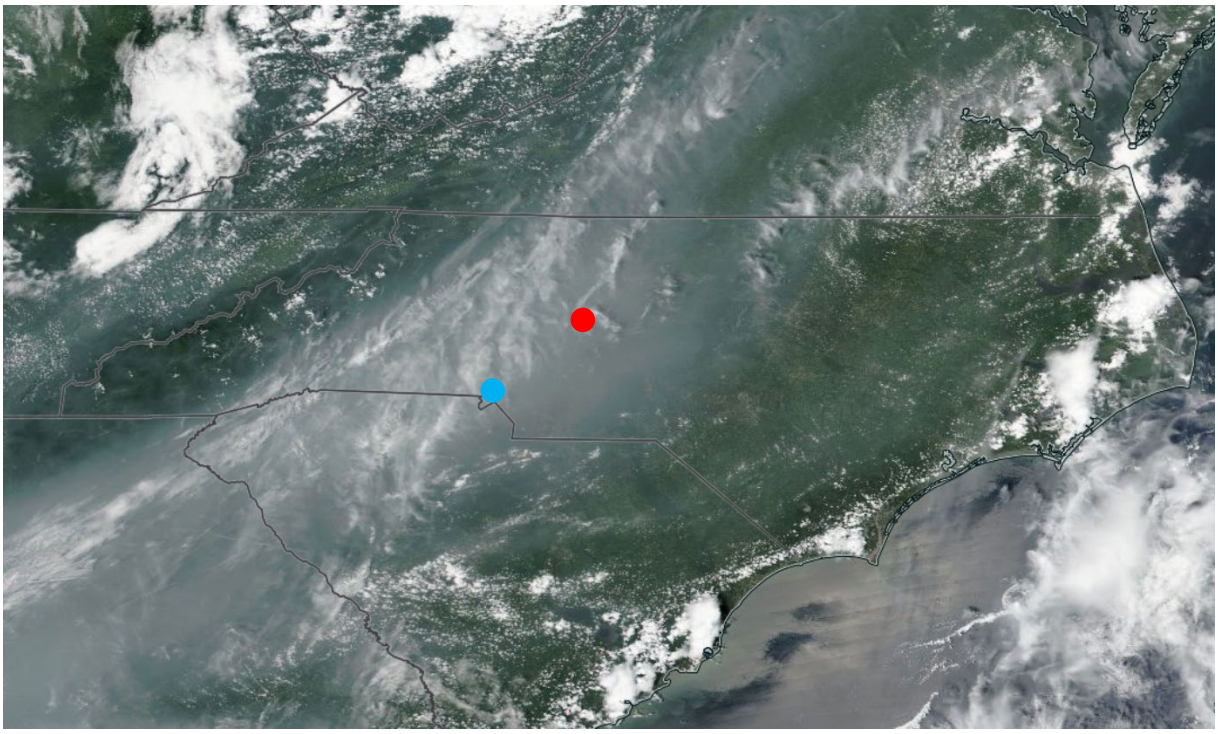


***Figure 98**: Visible satellite imagery reveals heavy smoke across the southeastern U.S., including North Carolina, on July 17th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

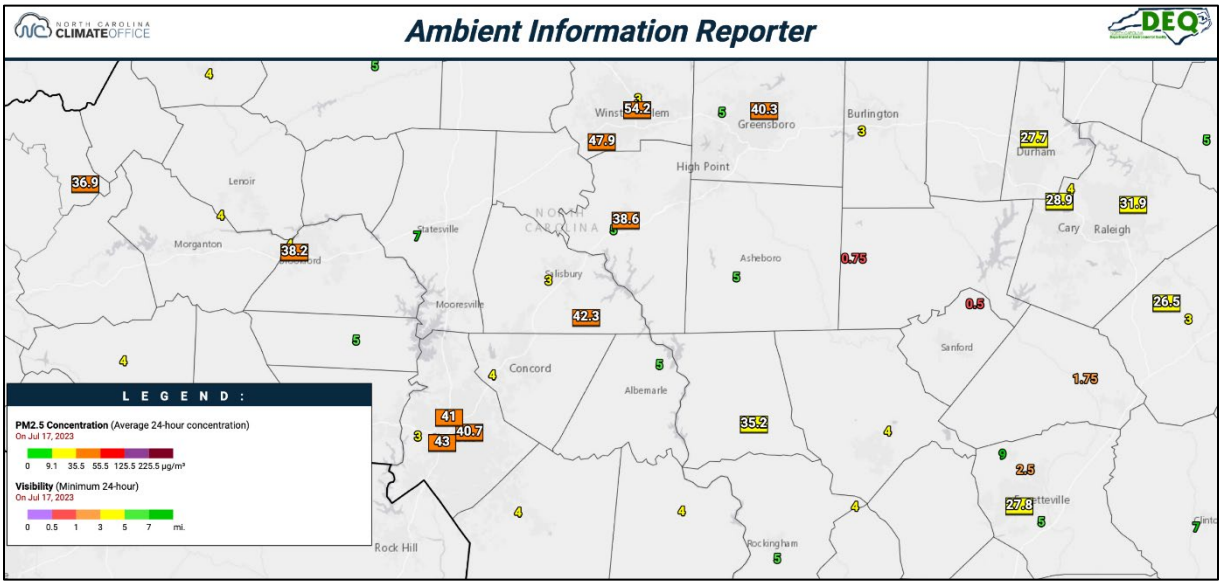


***Figure 99**: 24-hr. avg. $PM_{2.5}$ concentrations and minimum 24-hr. visibility from airport observing sites on July 17th, 2023. Minimum visibility can be used as a proxy for additional air quality monitors and when values fall below the standard 10 statue mile range, it is an indicator of an obscuration (such as smoke, dust, haze, etc.).*

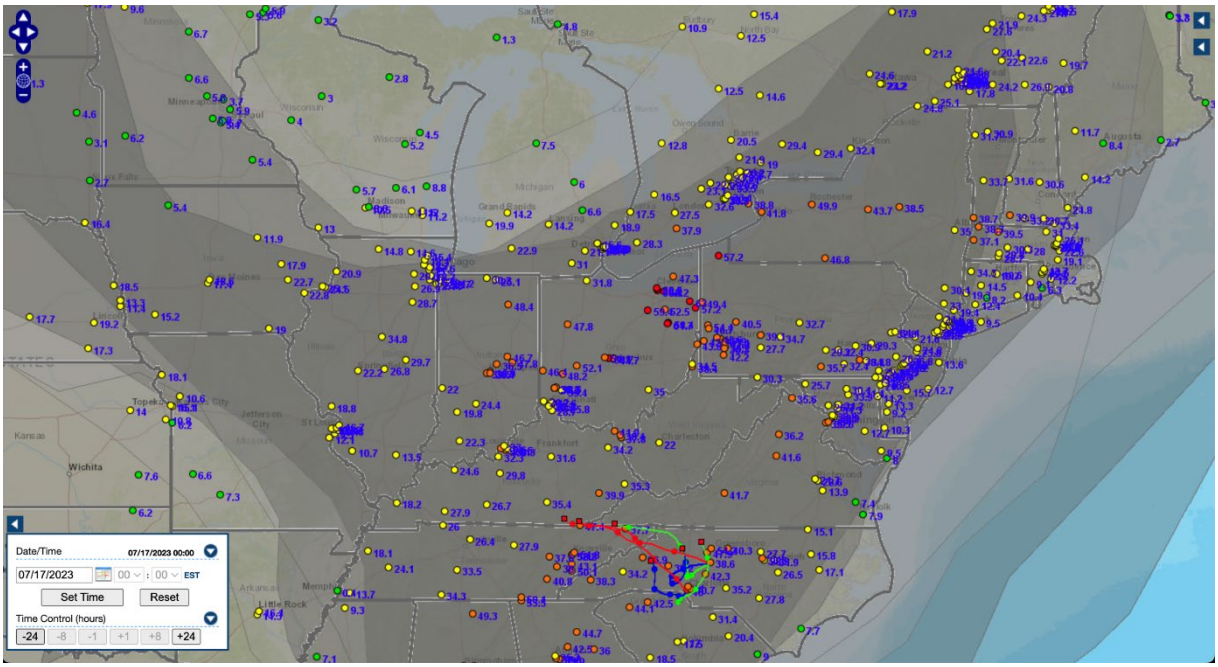


***Figure 100**: 24-hr. avg. $PM_{2.5}$ concentrations valid on **July 17th, 2023**, NOAA OSPO satellite-derived smoke analysis and 24-hr. backward trajectories at 100 m (green line), 750 m (blue line) and 1500 m (red line) ending on **July 18th, 2023**. Red squares indicate air parcel location along back trajectory path on **July 17th, 2023**.*

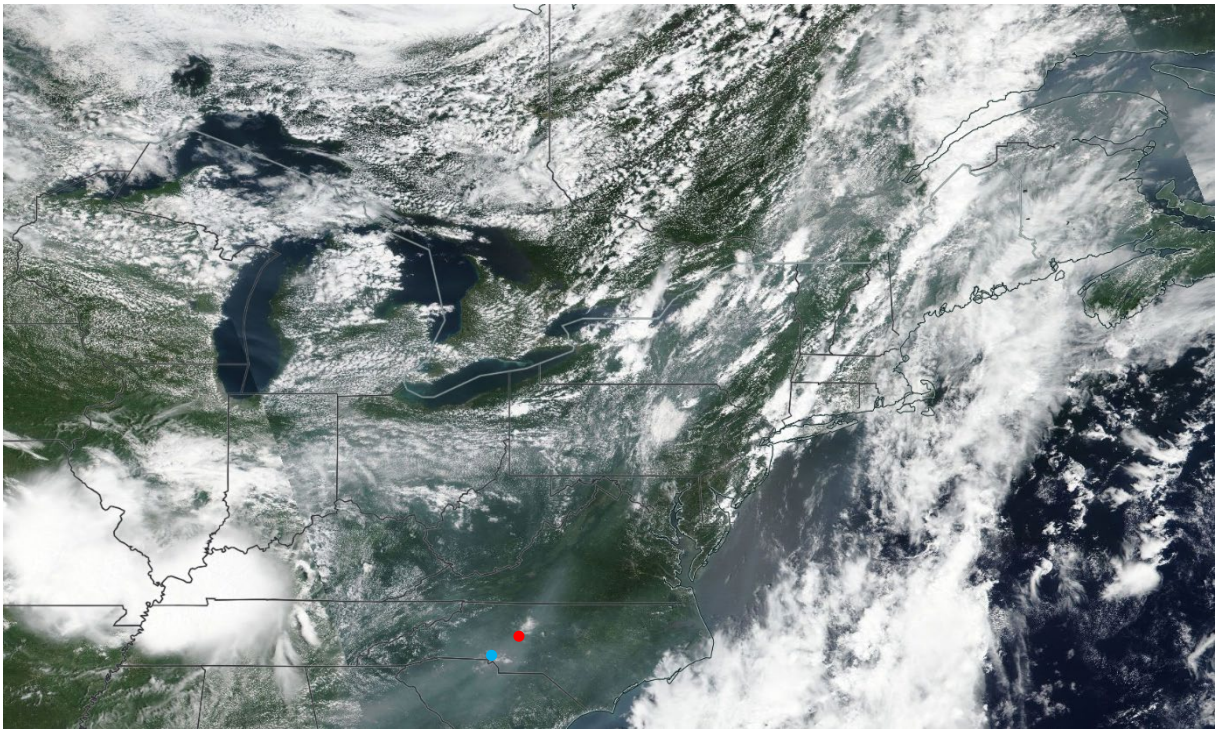


***Figure 101**: Visible satellite imagery reveals heavy smoke across the eastern U.S., including North Carolina, on July 18th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

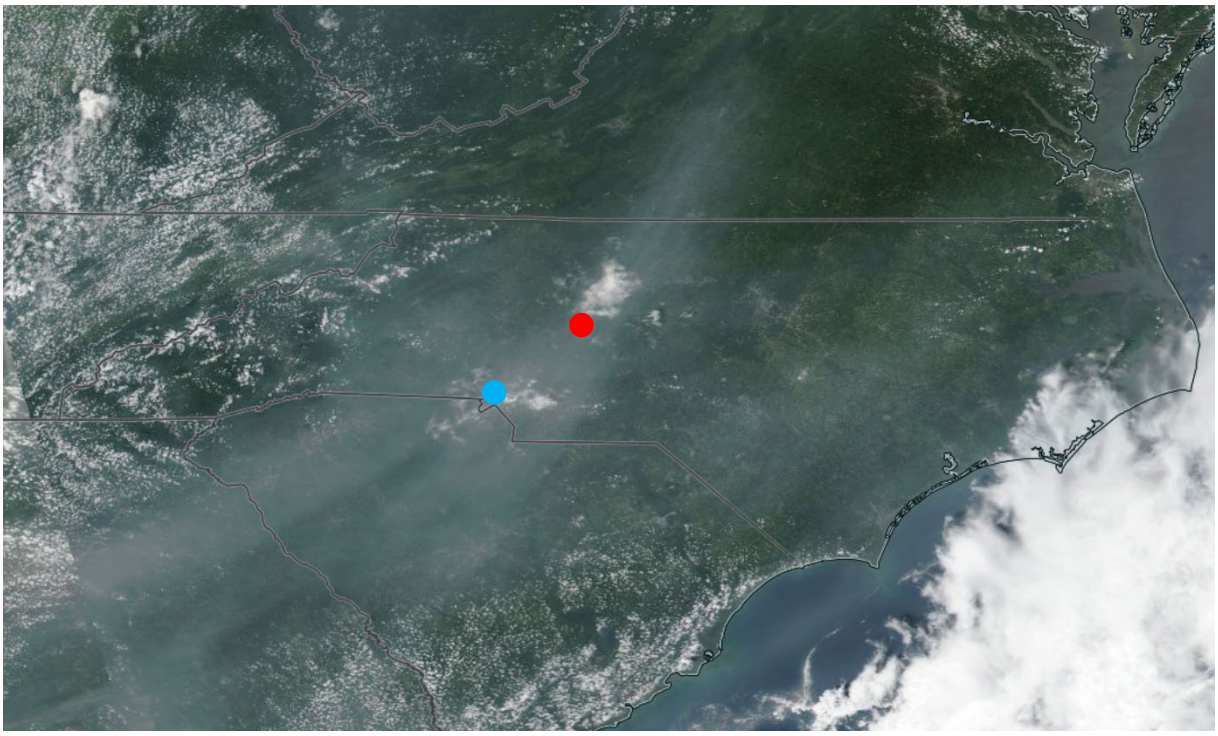


***Figure 102**: Visible satellite imagery reveals heavy smoke across the southeastern U.S., including North Carolina, on July 18th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

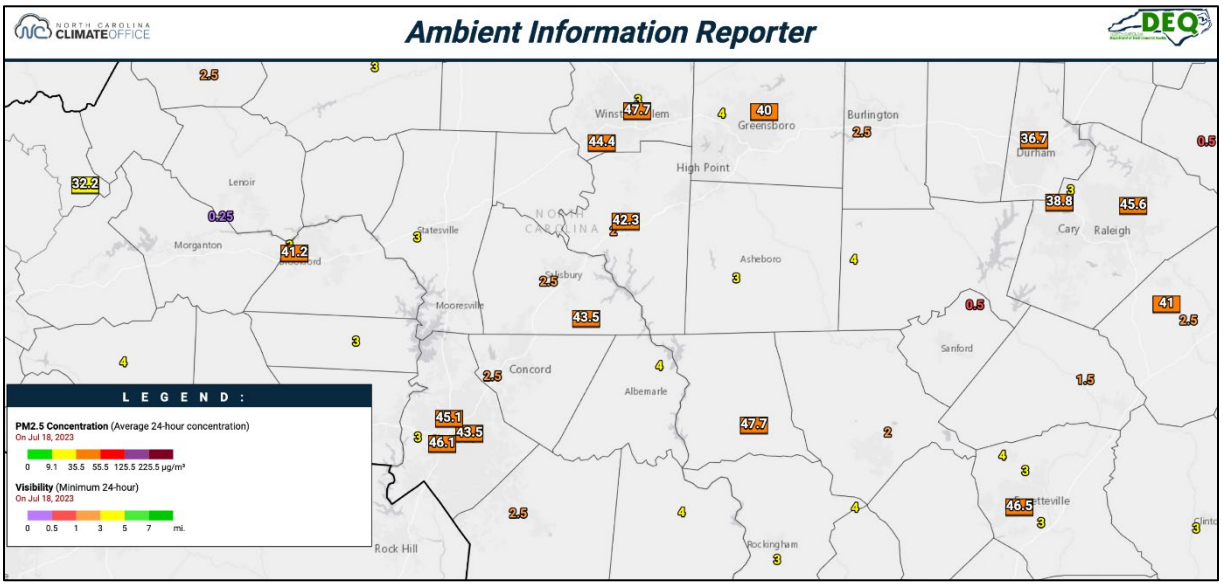


***Figure 103**: 24-hr. avg. $PM_{2.5}$ concentrations and minimum 24-hr. visibility from airport observing sites on July 18th, 2023. Minimum visibility can be used as a proxy for additional air quality monitors and when values fall below the standard 10 statue mile range, it is an indicator of an obscuration (such as smoke, dust, haze, etc.).*

3.2 Event-Influenced $PM_{2.5}$ Concentrations Analysis

As we demonstrated in Section II. Narrative Conceptual Model, the dominant atmospheric regime in June and July 2023 resulted in unusually strong and recurrent transport of Canadian air masses into

North Carolina. It is only logical to conclude that a clear causal relationship exists between those air masses -- originating from a region experiencing an unprecedented, record-shattering wildfire season -- and concurrent $PM_{2.5}$ exceedances of the daily NAAQS observed from Minnesota to Maine to Florida, including North Carolina's ambient monitoring network, that were well-above climatological normal measurements.

As seen below in **Figure 104** and **Figure 105**, both the Lexington Water Tower (Lexington) and Remount Road (Remount) $PM_{2.5}$ monitors measured concentrations on each day that are part of one of the four events in our exceptional event demonstration that were well-above the climatological normal value. Here, we define the climatological normal value as the daily average $PM_{2.5}$ concentration over the previous 5-year period (2018-2022) on the given date (i.e., the past 5 June 6ths, the past 5 June 7ths, etc.).

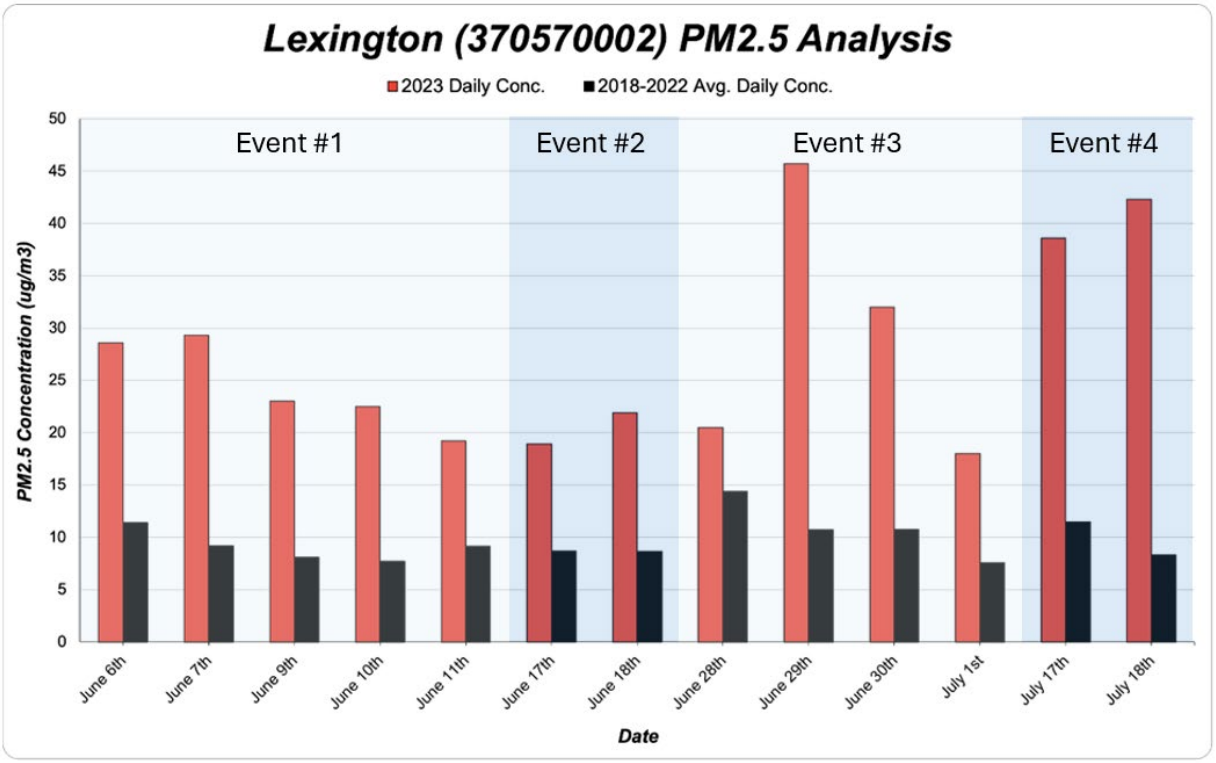


***Figure 104**: Comparison of 2023 Canadian wildfire-influenced event day measurements to historical normal at the Lexington Water Tower monitor.*

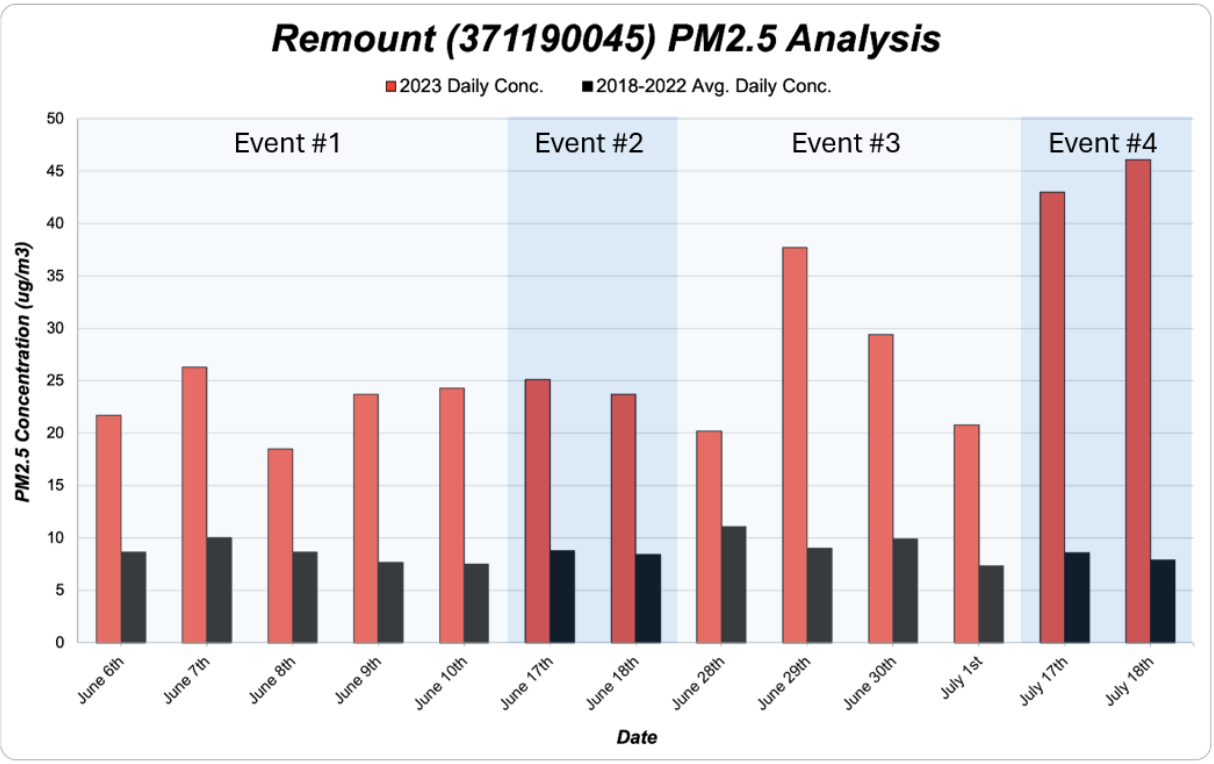


***Figure 105**: Comparison of 2023 Canadian wildfire-influenced event day measurements to historical normal at the Remount Road monitor.*

Continuing to focus on the daily climatological normal, as seen in **Table 7** and **Table 8** below, the percent increases on almost all of our proposed exceptional event days at both sites were over 100%, except for June 28th when smoke began to move into the region during the late evening. Additionally, all days in our demonstration were either Tier 1 or Tier 2 level days using the EPA's tiering tool as seen in Appendix K: Monitoring Sites' Tiering Graphs**.**

***Table 7**: $PM_{2.5}$ daily analysis of Canadian wildfire-influenced events at Remount Road monitor.*

Remount (371190045)							
Event ID	**Date**	**2023 Daily Conc. (µg/m³)**	**2018-2022 Avg. Daily Conc. (Climatological Normal)**	**Percent Increase from Climatological Normal**	**EPA Tier Level / Threshold (µg/m³)**		**AQS Data Flag(s)**
1	June 6th	21.7	8.6	151.2 %	Tier 2	16.3	RF
	June 7th	26.3	10.0	162.5 %	Tier 1	24.45	RF
	June 8th	18.5	8.7	113.6 %	Tier 2	16.3	RF
	June 9th	23.7	7.7	208.6 %	Tier 2	16.3	RF
	June 10th	24.3	7.5	224.0 %	Tier 2	16.3	RF
2	June 17th	25.1	8.8	185.9 %	Tier 1	24.45	4, RF, 2, 6
	June 18th	23.7	8.4	181.5 %	Tier 2	16.3	RF
3	June 28th	20.2	11.1	82.3 %	Tier 2	16.3	RF
	June 29th	37.7	9.0	318.9 %	Tier 1	24.45	4, RF, 2, 6
	June 30th	29.4	9.9	197.0 %	Tier 1	24.45	RF
	July 1st	20.8	7.3	183.4 %	Tier 2	16.3	RF

Remount (371190045)							
Event ID	Date	2023 Daily Conc. (µg/m³)	2018-2022 Avg. Daily Conc. (Climatological Normal)	Percent Increase from Climatological Normal	EPA Tier Level / Threshold (µg/m³)		AQS Data Flag(s)
4	July 17th	43	8.6	401.5 %	Tier 1	24.45	RF
	July 18th	46.1	7.9	483.5 %	Tier 1	24.45	RF

***Table 8**: $PM_{2.5}$ daily analysis of Canadian wildfire-influenced events at Lexington Water Tower monitor.*

Lexington (370570002)							
Event ID	Date	2023 Daily Conc.	2018-2022 Avg. Daily Conc. (Climatological Normal)	Percent Increase from Climatological Normal	EPA Tier Level / Threshold (µg/m³)		AQS Data Flag(s)
1	June 6th	28.6	11.4	150.9 %	Tier 1	25.35	RF
	June 7th	29.3	9.2	219.3 %	Tier 1	25.35	RF
	June 9th	23	8.1	184.0 %	Tier 2	16.9	RF
	June 10th	22.5	7.7	192.2 %	Tier 2	16.9	RF
	June 11th	19.2	9.1	110.4 %	Tier 2	16.9	2, 4, 6, RF
2	June 17th	18.9	8.7	117.9 %	Tier 2	16.9	2, 4, 6, RF
	June 18th	21.9	8.7	153.2 %	Tier 2	16.9	RF
3	June 28th	20.5	14.4	42.4 %	Tier 2	16.9	RF
	June 29th	45.7	10.7	326.3 %	Tier 1	25.35	2, 4, 6, RF
	June 30th	32	10.8	197.4 %	Tier 1	25.35	RF
	July 1st	18	7.6	137.5 %	Tier 2	17.8	RF
4	July 17th	38.6	11.5	236.8 %	Tier 1	26.7	2, 4, 6, RF
	July 18th	42.3	8.3	408.4 %	Tier 1	26.7	RF

This data provides evidence of a clear causal relationship between the atypical concentrations recorded at both Remount Road and Lexington Water Tower during the four events we have identified -- that significantly contributed to the 2021-2023 design values exceeding the new NAAQS -- and the Canadian wildfire smoke-laden air masses that concomitantly advected into the region during June and July 2023.

Section IV. Not Reasonably Controllable or Preventable

This section satisfies the following federal requirement:

40 CFR § 50.14(c)(3)(iv)(D): A demonstration that the event was both not reasonably controllable and not reasonably preventable.

40 CFR § 50.14 (a)(8)(vii) provides that "*the Administrator shall not require a State to provide case-specific justification to support the not reasonably controllable or preventable criterion for emissions-generating activity that occurs outside of the State's jurisdictional boundaries within which the concentration at issue was monitored.*" This was the case with the 2023 Canadian wildfires. No federal or North Carolina policy or regulatory action could have prevented the fires or the resulting smoke to cross international borders and enter the United States or North Carolina.

Further, 40 CFR § 50.14(b)(4) states that "*the Administrator will determine every wildfire occurring predominantly on wildland to have met the requirements identified in paragraph (c)(3)(iv)(D) of this section regarding the not reasonably controllable or preventable criterion.*" In the next section, Section V. Human Activity Unlikely to Recur at a Particular Location or Natural Event, NCDAQ asserts that the Canadian wildfires did occur predominantly on wildland.

Therefore, it is NCDAQ's conclusion that emissions from these wildfires were not reasonably controllable or preventable and they meet this criterion for treatment as an exceptional event.

Section V. Human Activity Unlikely to Recur at a Particular Location or Natural Event

This section satisfies the following federal requirement:

40 CFR § 50.14(c)(3)(iv)(E): A demonstration that the event was a human activity that is unlikely to recur at a particular location or was a natural event.

40 CFR § 50.1(n) defines a wildfire as "*any fire started by an unplanned ignition caused by lightning; volcanoes; other acts of nature; unauthorized activity; or accidental, human-caused actions, or a prescribed fire that has developed into a wildfire.* ***A wildfire that predominantly occurs on wildland is a natural event***."

40 CFR § 50.1(o) defines wildland as "*an area in which human activity and development are essentially non-existent, except for roads, railroads, power lines, and similar transportation facilities. Structures, if any, are widely scattered.*"

As detailed earlier in Section II. Narrative Conceptual Model, anomalous drought and heat set the stage in Canada for a prolific wildfire season by enhancing the flammability of fuel such as trees, underbrush, and grass. Lightning strikes from thunderstorm activity ignited that dry fuel, accounting for 59% of the wildfire ignitions during the 2023 season.[32] In terms of total area burned, lightning-caused wildfires accounted for 93% of the total acreage burned across Canada.[30]

Many of these wildfires burned in remote areas within Canada's enormous boreal forest on rugged terrain. This is supported by **Figure 106** which shows the active fires burning in Canada in early June overlayed with OpenStreetMap data via Natural Resources Canada. The green space, as denoted by the OpenStreetMap legend, is predominantly forest; Canada is the third-most forested country in the world and its boreal zone is the largest remaining intact forest on Earth.[33] Much of these areas can be considered wildland where little human activity and development exist.

"People around the world probably don't really comprehend just the scale of the forested area that we have," said Richard Carr, a physical scientist and fire research analyst with the Canadian Forest Service in Edmonton, "You can get into the northern parts of the provinces and the territories and there's places where you could drive for several hours without running across a town — just huge expanses of forest with not many people there. So trying to put a fire out in that takes a lot of time to get people and equipment into those areas, if it's even necessary." [31]

[32] Jain, P., Barber, Q.E., Taylor, S.W. *et al.* Drivers and Impacts of the Record-Breaking 2023 Wildfire Season in Canada. *Nat Commun* **15**, 6764 (2024). https://doi.org/10.1038/s41467-024-51154-7

[33] https://www.usatoday.com/story/news/nation/2024/07/20/canada-wildfires-smoke-united-states-michigan-climate-change/74479512007/

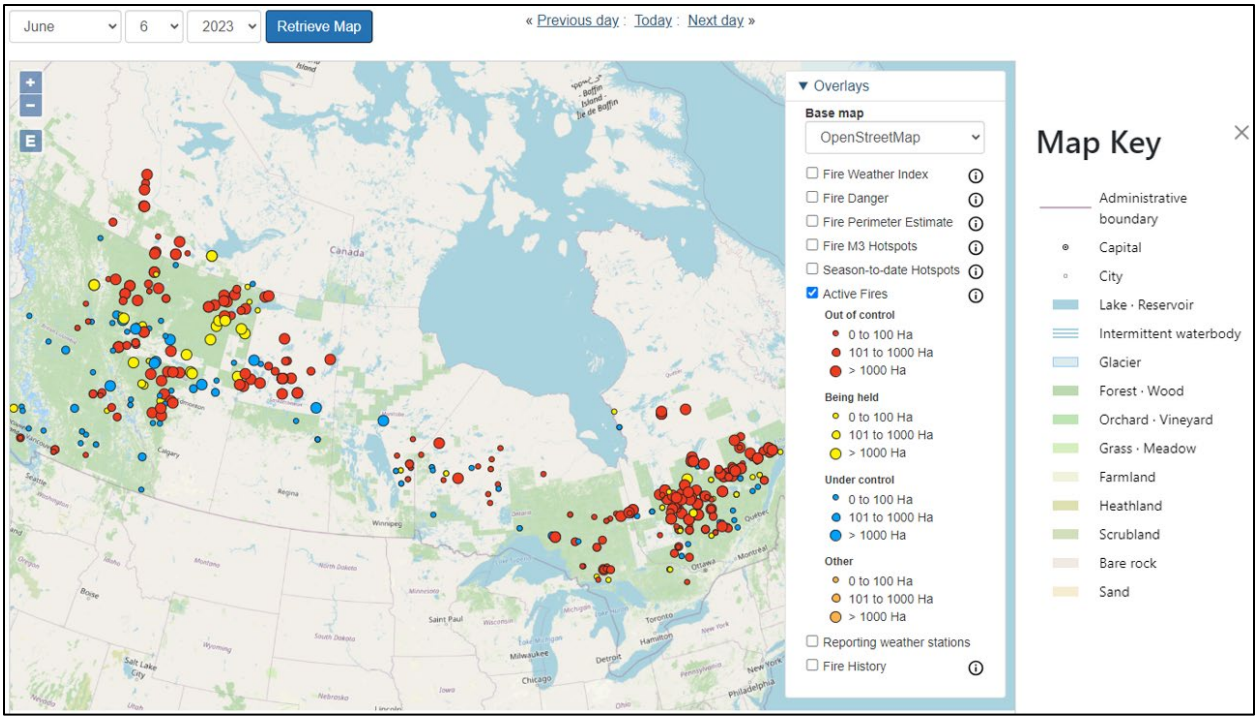


***Figure 106**: Active wildfires in early June 2023 via [Natural Resources Canada](#)[34] overlayed with land type data from OpenStreetMap.*

The 2023 Canadian wildfires qualify as a "natural event" because they were unplanned, mostly lightning-ignited fires predominantly on wildland, and for this reason NCDAQ has concluded that emissions from these wildfires meet this criterion for treatment as an exceptional event.

[34] CWFIS Interactive Map, https://cwfis.cfs.nrcan.gc.ca/interactive-map?zoom=1&center=248390.2717805435%2C570523.4527135696&month=6&day=6&year=2023#iMap

Section VI. Public Notification / Outreach

This section satisfies the following federal requirement:

40 CFR § 50.14(c)(1)(i): In accordance with the mitigation requirement at 40 CFR § 51.930(a)(1), all States and, where applicable, their political subdivisions must notify the public promptly whenever an event occurs or is reasonably anticipated to occur which may result in the exceedance of an applicable air quality standard.

The Exceptional Event Rule requires that the demonstration show that the public was notified promptly whenever an event occurs or is reasonably anticipated to occur which may result in the exceedance of an applicable air quality standard. This section documents the public outreach that was conducted before and during the 2023 Canadian wildfire smoke events that impacted air quality in North Carolina.

6.1 Overview

NCDAQ utilizes several mediums to relay air quality information to the public. This includes the Air Quality Portal (AQP)[35] and the Ambient Information Reporter Tool (AIR Tool)[36], two websites that were built from a collaborative effort between NCDAQ and the State Climate Office of North Carolina (NCSCO). The AQP is a comprehensive air quality information hub for North Carolina. The website provides the public with access to current, forecast, and historical air quality and weather information. In addition to this data, the website also provides educational resources and an air quality blog[37], which covers a wide range of air quality topics including analysis of specific air quality events that impacted the state such as the Canadian wildfire smoke episodes.

Current, forecast, and historical air quality data is available within the AQP through the AIR Tool. NCDAQ's team of meteorologists issue daily fine particulate and ground-level ozone air quality forecasts out four days (including the current day) for 91 of the state's 100 counties. The Forsyth County Office of Environmental Assistance and Protection issues a single regional forecast[38] for the nine counties in the Triad region. These forecasts are available within the AIR Tool and are also sent to and displayed on the EPA's AirNow mapping tool. Keyhole Markup Language (KML) files are also made available through the AQP for consumers to display air quality forecasts on their own platforms. Air quality alerts are also provided to the National Weather Service where they are disseminated through various channels to partners and the public.

NCDAQ operates social media accounts through which air quality information is shared to the public. It is also an active participant in the AirNow EnviroFlash notification system, which allows air quality forecasts and alerts to be sent through e-mail to subscribers. The Division also shares air quality information through media interviews and press releases.

[35] Air Quality Portal, https://airquality.climate.ncsu.edu/
[36] Ambient Information Reporter, https://airquality.climate.ncsu.edu/air/
[37] Air Quality Blog, https://airquality.climate.ncsu.edu/blog/
[38] Triad Air Quality Forecast, https://forsyth.cc/EAP/dailyforecast.aspx

Providing air quality information through several mediums allows it to be disseminated to a broader audience and for it to be consumed quicker, enabling more time for the public to make health-based decisions. This is especially important for events that are occurring, or will occur, that may exceed an applicable air quality standard.

For the multi-day events presented in this Exceptional Events Demonstration, NCDAQ utilized these tools and channels to bring awareness to the public regarding the wildfire smoke and associated poor air quality and health-risks.

6.1.1 Event ID #1 - June 6th through June 11th, 2023

The first event, spanning from June 6th to June 11th, included extensive efforts by NCDAQ to notify the public about poor air quality due to Canadian wildfire smoke. Examples of these efforts are provided in **Table 9**, which includes links to NCDAQ's forecasts, social media outreach and if applicable, press releases and media interviews.

Table 9*: For each day within Event #1, links are provided for the NCDAQ morning forecast as well as the previous afternoon forecast. Links to social media posts, press releases, and media interviews are also listed.*

Exceptional Event		Public Outreach				
ID	**Date**	**AQ Forecast (prev. afternoon)**	**AQ Forecast (morning)**	**Social Media**	**Press Release**	**Media Interview**
1	*6/6/2023*	Link	Link	Link	Link	-
	6/7/2023	Link	Link	Link	Link	Link Link Link
	6/8/2023	Link	Link	Link	Link	-
	6/9/2023	Link	Link	Link	-	-
	6/10/2023	Link	Link	Link	-	-
	6/11/2023	Link	Link	Link	-	-

NCDAQ began to notify the public on June 3rd about the potential for additional areas of wildfire smoke from Canadian wildfires to reach the state and impact air quality, three days prior to the first day in Event #1. The AQP afternoon forecast discussion on June 3rd [39] noted that *"Northerly upper level winds are likely to send additional areas of smoke from Canadian wildfires southward towards the region early next week"* and the initial forecast for June 6th reflected that concern with elevated 24-hour average fine particulates in the Code Yellow category. Subsequent forecast discussions leading up to June 6th included increasingly stronger verbiage around the wildfire smoke and impacts to air quality as confidence grew. On June 4th, [40] Code Orange levels for 24-hour average fine particulates were introduced into the forecast for June 7th across the northern half of the state, further underscoring that the wildfire smoke posed concerning health risks to the public. NCDAQ

[39] NCDAQ Forecast Discussion – June 3rd, 2023, https://airquality.climate.ncsu.edu/discussion/?view=past&date=2023-06-03&time=pm
[40] NCDAQ Forecast Discussion – June 4th, 2023, https://airquality.climate.ncsu.edu/discussion/?view=past&date=2023-06-04&time=pm

issued its first air quality alert[41] on June 6th for Code Orange air quality (**Figure 107**) for most of the state due to forecast elevated fine particulate matter from wildfire smoke.

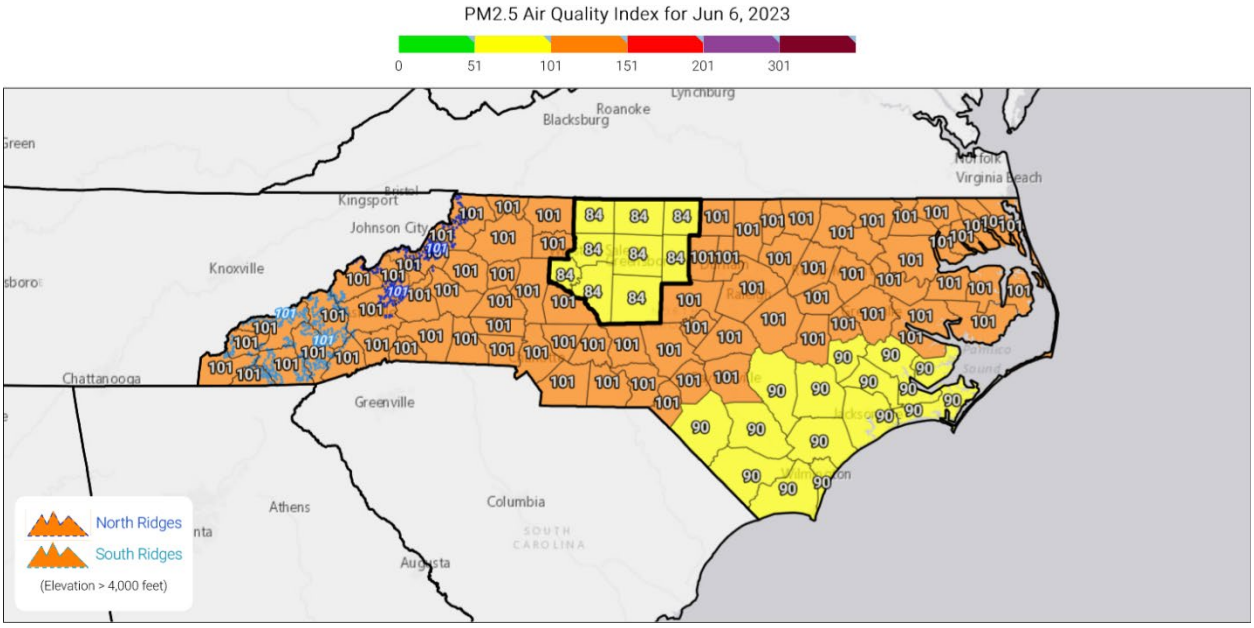


***Figure 107**: Code Orange air quality levels were forecast (as seen in the AQP) across much of the state on June 6th, prompting NCDAQ to issue its first Code Orange alert for Event #1.*

A Code Red air quality alert was issued for June 7th across much of the Piedmont and Code Orange was issued for the rest of the state, as seen in **Figure 110**. Code Orange alerts were issued daily for at least some portion of the state through June 9th due to elevated fine particulate matter.

To further put NCDAQ's public outreach efforts into perspective, web traffic to the AQP and associated webpages (**Figure 108** and **Figure 109**) substantially surpassed previous records. Over 160,000 pageviews occurred between June 5th and June 12th, with the majority of those happening between June 6th and June 8th (**Figure 108**). On June 7th, NCDAQ forecast discussions received over 5,000 views. This magnitude of viewership for NCDAQ's air quality forecasts was unprecedented.

[41] NCDAQ Forecast Discussion – June 6th, 2023, https://airquality.climate.ncsu.edu/discussion/?view=past&date=2023-06-06&time=pm

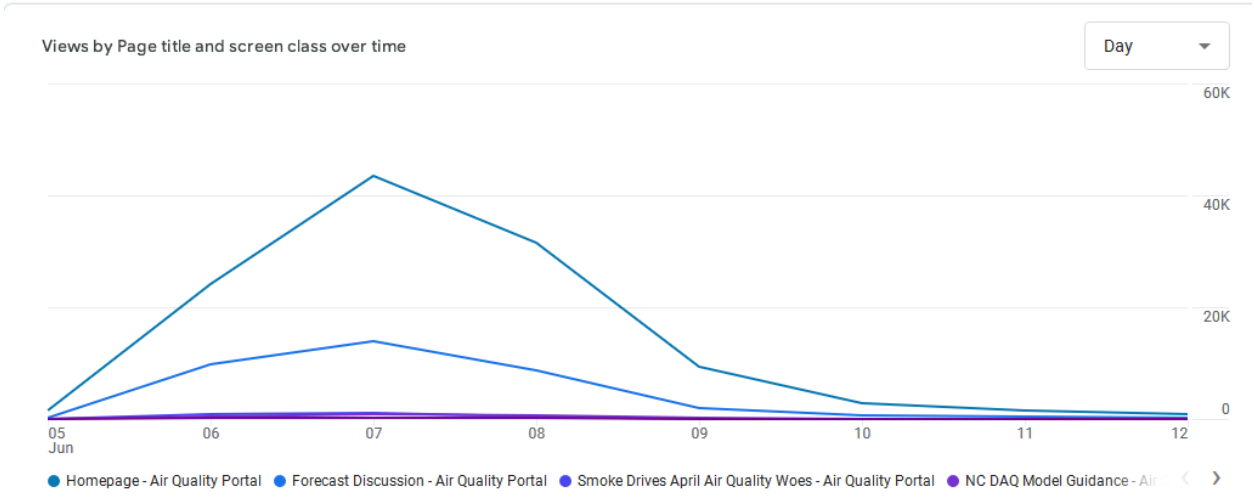


***Figure 108**: Daily pageviews for the AQP and associated webpages from June 5th to June 12th (Google Analytics).*

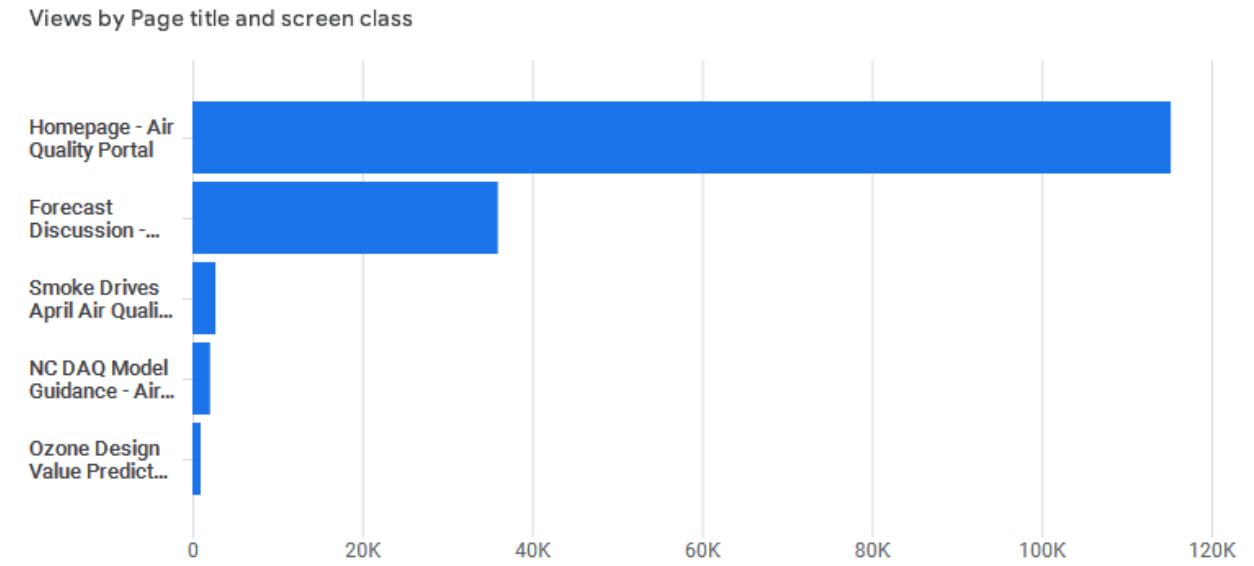
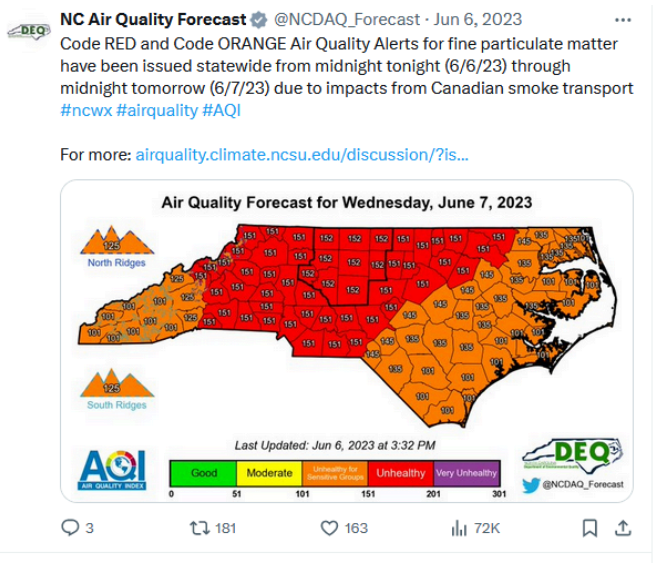


***Figure 109**: Individual AQP webpages and their total pageviews from June 5th to June 12th (Google Analytics).*

In addition to issuing forecasts in the AQP, NCDAQ was also active on social media. Every forecast issued was automatically posted to the NCDAQ X/Twitter account (**Figure 110**) and content was also posted on the Facebook account (**Figure 111**). Both platforms allowed followers to engage with and share the forecast information. This provided a great opportunity for staff at NCDAQ to answer any questions the public had regarding the forecast and to bring additional awareness on the concerning air quality and its impacts.



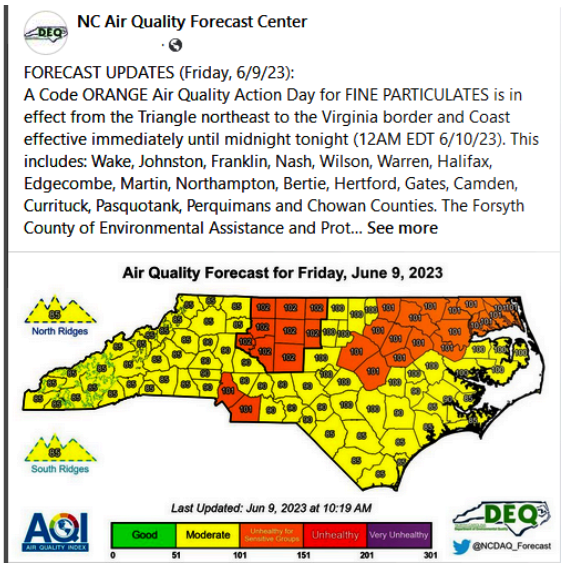


***Figure 110 (Left)**: NCDAQ June 7th forecast published on X/Twitter with over 72,000 impressions.*
***Figure 111 (Right):** NCDAQ June 9th forecast published on Facebook. NCDAQ utilized social media to bring more awareness to impacts of wildfire smoke on air quality across the state.*

Several press releases were issued by the NCDEQ between June 6th and June 8th, including one shown in **Figure 112**, and links to them are provided in **Table 9**. These gave additional notice to the public regarding the degraded air quality caused by the wildfire smoke and included detailed information on the impacts and ways for the public to take action to protect themselves. Spanish-translated versions were also made available to reach a larger audience.

***Figure 112**: Press releases were made available to the public to further draw attention to degraded air quality due to wildfire smoke.*

Staff within NCDAQ also participated in interviews with several television and newspaper outlets across the state. Soundbites and quotes from the staff were used within news coverage allowing NCDAQ to bring further awareness on the dangers that the wildfire smoke presented to the public's health.

6.1.2 Event ID #2 - June 17th through June 18th, 2023

The second event, spanning from June 17th to June 18th, was shorter than the first event. However, air quality was again degraded due to an intrusion of Canadian wildfire smoke and NCDAQ notified the public through several mediums. Examples of public outreach during this event are provided in **Table 10**, which includes links to NCDAQ's forecasts and social media posts.

***Table 10**: For each day within Event #2, links are provided for the NCDAQ morning forecast as well as the previous afternoon forecast. Links to social media posts, press releases, and media interviews are also listed.*

Exceptional Event		Public Outreach				
ID	**Date**	**AQ Forecast (prev. afternoon)**	**AQ Forecast (morning)**	**Social Media**	**Press Release**	**Media Interview**
2	*6/17/2023*	Link	Link	Link	-	-
	6/18/2023	Link	Link	Link	-	-

NCDAQ began to notify the public about the potential for wildfire smoke to impact air quality on June 14th, 3 days before the first day in Event #2. The AQP forecast discussion on June 14th [42]noted that "*Friday into Saturday, familiar north-northwesterly flow around familiar upper level low pressure to the north will likely drive renewed areas of smoke -- although not to the levels previously experienced last week -- into the region during this period. It appears likely that ozone and particle pollution levels will likely respond during the late week, and have slowly increased predicted values during this period.*"

Subsequent forecast discussions in the days leading up to and during the event also continued to mention elevated fine particulate matter due to Canadian wildfire smoke intrusions and the daily average fine particulate forecast was for at least Code Yellow conditions statewide for both days.

[42] NCDAQ Forecast Discussion – June 14th, 2023, https://airquality.climate.ncsu.edu/discussion/?view=past&date=2023-06-14&time=pm

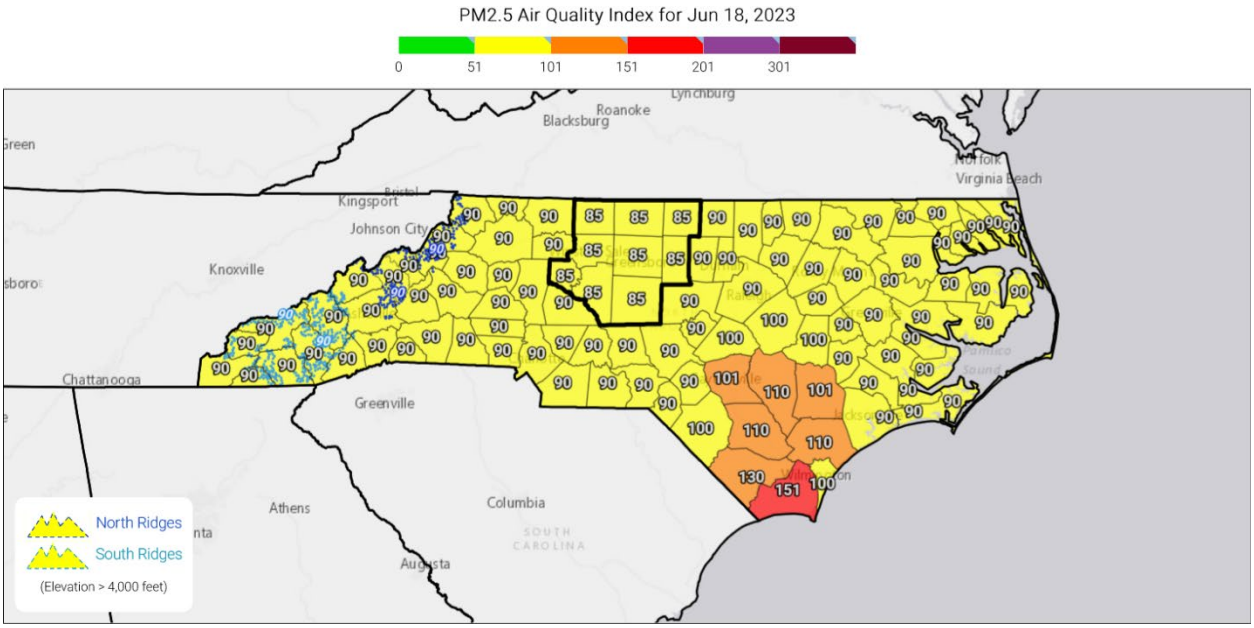


***Figure 113**: Upper Code Yellow air quality levels were forecast (as seen in the AQP on June 17th) across much of the state for the next day, June 18th due to an intrusion of Canadian wildfire smoke from the north and west. Code Orange and Red levels were forecast across the far southeastern portion of the state due to smoke from a localized wildfire.*

These forecasts were also posted to social media (X/Twitter) each day which provided another avenue for consumption by the public, bringing further awareness on the upcoming degraded air quality.

6.1.3 Event ID #3 - June 28th through July 1st, 2023

The third event lasted four days, spanning from June 28th to July 1st. Before and during the event, NCDAQ provided information to the public regarding the Canadian wildfire smoke and impacts to the air quality across the state. Examples of this public outreach are provided in **Table 11**, which includes links to NCDAQ's forecasts, social media outreach, and if applicable, press releases and media interviews.

***Table 11**: For each day within Event #3, links are provided for the NCDAQ morning forecast as well as the previous afternoon forecast Links to social media posts, press releases, and media interviews are also listed.*

Exceptional Event		Public Outreach				
ID	**Date**	**AQ Forecast (prev. afternoon)**	**AQ Forecast (morning)**	**Social Media**	**Press Release**	**Media Interview**
3	*6/28/2023*	Link	Link	Link	Link	-
	6/29/2023	Link	Link	Link	-	Link
	6/30/2023	Link	Link	Link	-	-
	7/1/2023	Link	Link	Link	-	-

Similar to the previous two events, NCDAQ first started discussing for the potential of degraded air quality due to Canadian wildfire smoke three days before the first day of Event #3. The forecast

discussion[43] from June 25th noted "*By Wednesday, current consensus of most smoke guidance is for another round of smoke-laden air to advect into the region.*" Based on this, the forecast for June 28th was for elevated daily average fine particulate matter in the Code Yellow range. NCDAQ continued to discuss and forecast the potential for wildfire smoke to impact the air quality across the state in the days leading up to the event. On June 27th, Code Orange for daily average fine particulate matter was introduced into the forecast[44] across much of the state for June 28th and June 29th. As a result, Code Orange alerts were issued for June 28th across a large section of the state.

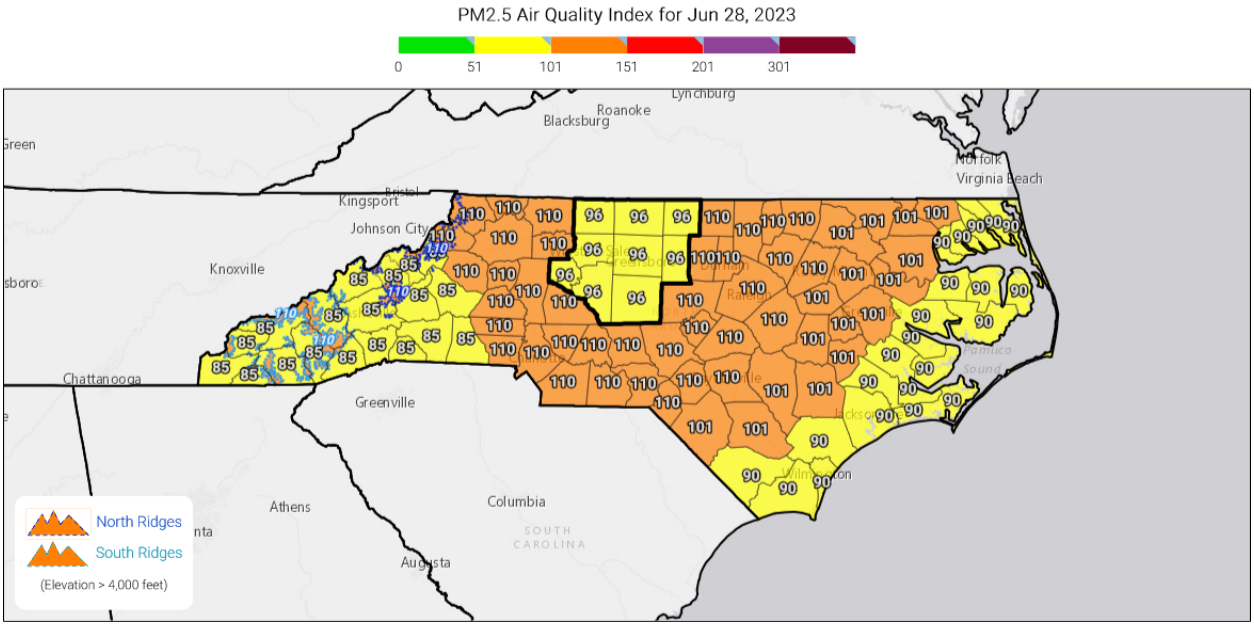


***Figure 114**: On June 27th, Code Orange daily average fine particulate levels were forecast for the next day (June 28th) due to Canadian wildfire smoke, prompting NCDAQ to issue Code Orange alerts.*

After analyzing observations, trends, and model data on the morning of June 29th, NCDAQ issued a Code Orange alert for fine particulates through midnight across the western two-thirds of the state. The forecast would be later upgraded to Code Red for the Triad region. With a stagnant airmass expected to remain in place, as noted in the forecast discussion, Code Orange alerts were issued again for June 30th across much of the interior. Daily average fine particulate levels were forecast to remain elevated for the days after, but gradually decreasing due to anticipated stormier weather and a wind shift. This continued to be the message in future forecasts towards the end of Event #3 and after, which informed the public on when better air quality would return. Between June 27th and July 2nd, the AQP and related webpages were viewed around 46,000 times, with the greatest viewership on June 29th.

To further bring awareness to the poor air quality impacting the state, NCDAQ posted forecasts on its social media channels (**Figure 115** and **Figure 116**), which included X/Twitter and Facebook. This allowed for the forecasts to be shared with a broader audience and enable the staff to communicate

[43] NCDAQ Forecast Discussion – June 25th, 2023, https://airquality.climate.ncsu.edu/discussion/?view=past&date=2023-06-25&time=pm
[44] NCDAQ Forecast Discussion – June 27th, 2023, https://airquality.climate.ncsu.edu/discussion/?view=past&date=2023-06-27&time=pm

with the pubic more directly and answer any questions.

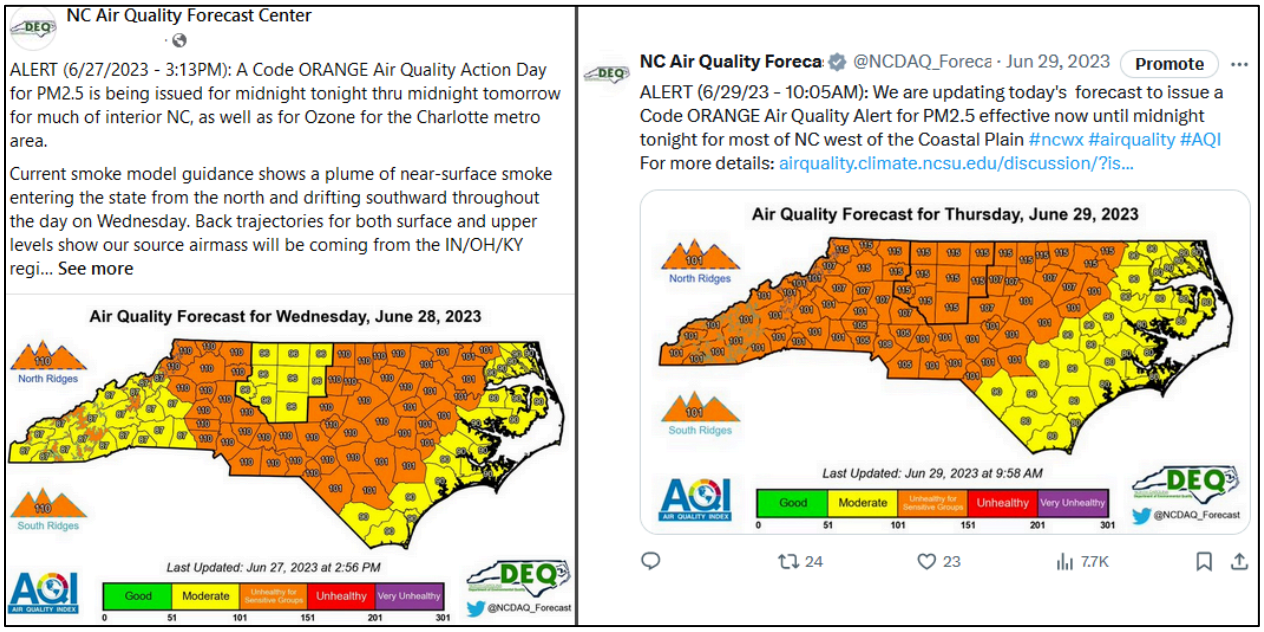


Figure 115 (Left): *NCDAQ alerted the public on Facebook that Code Orange alerts were being issued for June 28th.*

Figure 116 (Right)*: NCDAQ alerted the public on X/Twitter that the forecast for June 29th was being upgraded and Code Orange alerts were being issued.*

A press release (**Figure 117**) was also issued by the Department on June 28th detailing the unhealthy air quality that was probable across the state during the week. Links were provided to assist the public in learning more about the dangers of wildfire smoke and how they could take action to mitigate health impacts. Also included was a reminder about the prohibition of open burning during Code Orange Action days to lessen additional emission contributions. Staff at NCDAQ also spoke to local media across the state and were included in news articles.

Figure 117*: A press release was made available to the public on June 28th to further create awareness around the probable unhealthy air quality during the week.*

6.1.4 Event ID #4 – July 17th through July 18th, 2023

The fourth event, spanning from July 17th to July 18th, included extensive efforts of public outreach by NCDAQ regarding poor air quality due to Canadian wildfire smoke. Examples of these efforts are provided in **Table 12**, which includes links to NCDAQ's forecasts, social media outreach, and if applicable, press releases and media interviews.

***Table 12**: For each day within Event #4, links are provided for the NCDAQ morning forecast as well as the previous afternoon forecast. Links to social media posts, press releases, and media interviews are also listed.*

Exceptional Event		Public Outreach				
ID	**Date**	**AQ Forecast (prev. afternoon)**	**AQ Forecast (morning)**	**Social Media**	**Press Release**	**Media Interview**
4	*7/17/2023*	Link	Link	Link	Link	-
	7/18/2023	Link	Link	Link	-	Link

On July 14th, three days before the first day in Event #4, the NCDAQ forecast discussion[45] included concerns of potential wildfire smoke arriving by July 17th, noting *"smoke and meteorological guidance hints at the potential for more Canadian wildfire smoke intrusion into the mid-Atlantic region"*. The next day, concerns continued to grow that wildfire smoke was going to degrade air quality on July 17th so NCDAQ introduced Code Orange daily average fine particulate levels into the forecast[46] for the western third of the state. Most of this area was lowered to Code Yellow on July 16th, but at an Air Quality Index of 100, it was very close to the threshold of Code Orange (101). However, the Triad region's forecast[47] did remain at Code Orange. With smoke around and a favorable meteorological setup for a strong overnight inversion on July 18th, Code Orange was forecast for the western two-thirds of the state in the July 17th forecast product. Code Orange alerts for daily fine particulate matter were issued for this day. Between July 16th and July 19th, the AQP and related webpages were viewed around 25,000 times.

[45] NCDAQ Forecast Discussion – July 14th, 2023, https://airquality.climate.ncsu.edu/discussion/?view=past&date=2023-07-14&time=pm
[46] NCDAQ Forecast Discussion – July 15th, 2023, https://airquality.climate.ncsu.edu/discussion/?view=past&date=2023-07-15&time=pm
[47] NCDAQ Forecast Discussion – July 16th, 2023, https://airquality.climate.ncsu.edu/discussion/?view=past&date=2023-07-16&time=pm

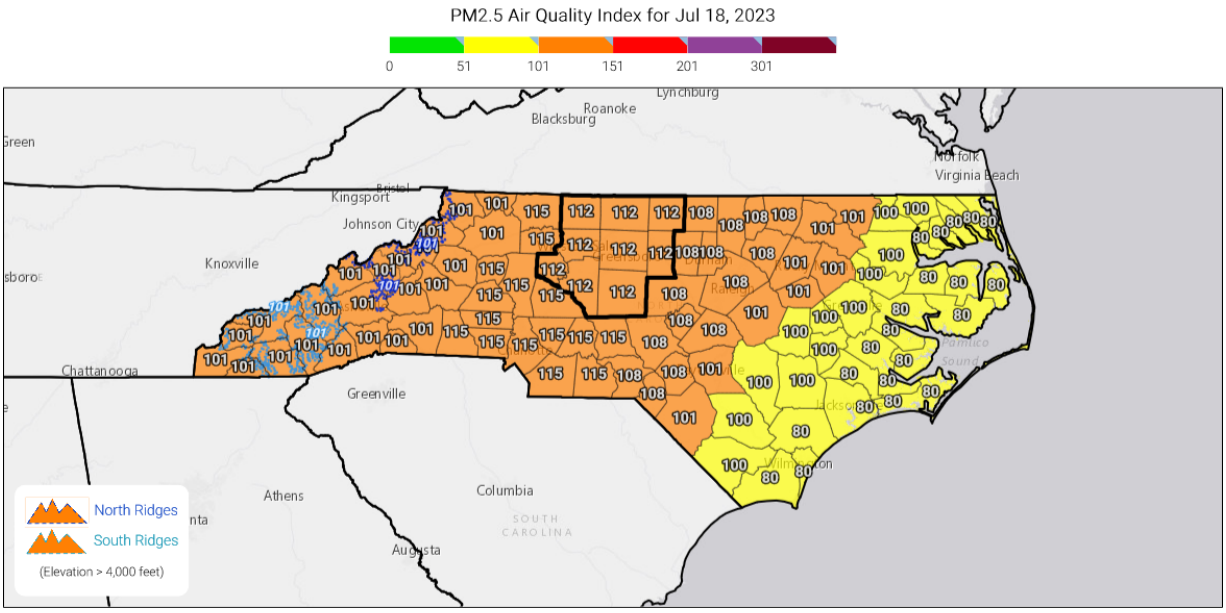


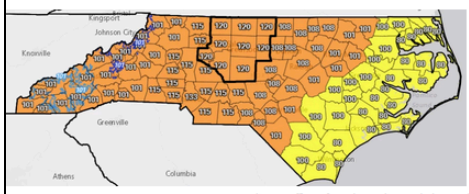
***Figure 118**: On July 17th, Code Orange daily average fine particulate levels were forecast for the next day (July 18th) due to Canadian wildfire smoke, prompting NCDAQ to issue Code Orange alerts.*

NCDAQ communicated these forecasts on social media through its X/Twitter and Facebook accounts and engaged with the public when they had questions. The Department also posted a press release about the unhealthy air quality which included links to resources for the public to stay safe. The staff also participated in interviews with local media (**Figure 119**), describing the forecast and educating the public on Code Orange Air Quality Action Days.

North Carolina's air quality keeps changing. Here's why.

WUNC | By Sophie Mallinson

Published July 18, 2023 at 6:27 PM EDT



State Climate Office Of North Carolina And The North Carolina Division Of Air Quality

A map of North Carolina counties, with Central and Western regions colored orange to indicate an air quality on July 18 that was unhealthy for some groups.

From moderate Code Yellow to hazardous Code Maroon alerts, the State Climate Office of North Carolina and state Division of Air Quality issue daily forecasts to tell residents when to limit time outdoors.

Shawn Taylor, a spokesperson for the NC Division of Air Quality, said smoke from the ongoing Canadian wildfires is worsening North Carolina's air quality by increasing the amount of fine particulate matter. That matter is made up of harmful microscopic particles smaller than the width of human hair.

According to Taylor, children, older adults and people with heart and lung conditions are more vulnerable to health concerns caused by such particles. That's why a Code Orange alert was issued Tuesday for most of North Carolina, cautioning those sensitive groups.

"Because the particles are so small, they can penetrate really deep in your lungs," Taylor said. "They can even get into your bloodstream, and that can be associated with a range of symptoms from an elevated heart rate, difficulty breathing, and other symptoms just associated with smoke: a burning sensation in your eyes or a runny nose."

To predict air quality, Taylor said meteorologists look to the Canadian wildfires for things like smoke generation and firefighting efforts, but an accurate local weather forecast can be crucial.

***Figure 119**: NCDAQ staff frequently participated in media interviews, such as this one with WUNC[48] on July 18th, before and during unhealthy air quality events caused by Canadian wildfire smoke. These provided another opportunity of public outreach to increase awareness around the smoke and impacts to air quality.*

[48] Mallinson, S. (2023, July 18). *North Carolina's air quality keeps changing. Here's why.* WUNC North Carolina Public Radio. Retrieved August 23, 2024, from https://www.wunc.org/environment/2023-07-18/north-carolinas-air-quality-keeps-changing-heres-why

Section VII. Initial Notification and Data Flagging

This section satisfies the following federal requirement:

40 CFR § 50.14(c)(2)(i): A State shall notify the Administrator of its intent to request exclusion of one or more measured exceedances of an applicable national ambient air quality standard as being due to an exceptional event by creating an initial event description and flagging the associated data that have been submitted to the AQS database and by engaging in the Initial Notification of Potential Exceptional Event process as follows:

> (A) The State and the appropriate EPA Regional office shall engage in regular communications to identify those data that have been potentially influenced by an exceptional event, to determine whether the identified data may affect a regulatory determination and to discuss whether the State should develop and submit an exceptional events demonstration according to the requirements in this section.

NCDAQ initiated communication with EPA Region 4 exceptional event staff via email on July 9th, 2024. The first virtual meeting with EPA staff was held on July 15th, 2024 during which the state of North Carolina's current status, analyses, and strategy for requesting data exclusion were shared and discussed. Communication via email and virtual meetings between these groups continued as needed throughout this initial process until a draft version of NCDAQ's initial notification letter was deemed sufficient by EPA Region 4 via email on September 6th, 2024.

On September 11th, 2024, NCDAQ submitted a letter to EPA Region 4 titled "*Initial Notification of Potential Exceptional Event Submission for the Revised Primary Annual $PM_{2.5}$ NAAQS,*" which is provided in Appendix L: Initial Notification Letter. This initial notification letter contains the specific dates and data listed in **Table 1** as well as a brief description of the anomalous conditions in Canada and large-scale weather patterns that caused each of the smoke intrusion events. The initial notification letter was submitted by email and online via the State Planning Electronic Collaboration System (SPeCS).

EPA Region 4 staff responded to the initial notification via email on November 1st, 2024 confirming that the initial notification meets the requirements of 40 CFR § 50.14(c)(2)(i) and it is appropriate for NCDAQ to submit a full demonstration.

All data listed in **Table 1** which NCDAQ is requesting be excluded from regulatory decisions has been flagged in the AQS system with the *Request Exclusion: Fire – Canadian* ("*RF*") flag.

Section VIII. Public Comments

This section satisfies the following federal requirements:

40 CFR § 50.14(c)(3)(v)(A): Document that the State followed the public comment process and that the comment period was open for a minimum of 30 days, which could be concurrent with the beginning of the Administrator's initial review period of the associated demonstration provided the State can meet all requirements in this paragraph

40 CFR § 50.14(c)(3)(v)(B): Submit the public comments it received along with its demonstration to the Administrator.

40 CFR § 50.14(c)(3)(v)(C): Address in the submission to the Administrator those comments disputing or contradicting factual evidence provided in the demonstration.

8.1 Public Comment Period

NCDAQ posted notice of this Exceptional Events demonstration on November 20th, 2024 on NCDAQ's website[49] for a public comment period of 30 days, which concluded on December 20th, 2024. More details about this public comment period can be found in Appendix M: Public Notice Summary, Comments Received, and Responses of this demonstration.

8.2 Public Comments Received and NCDAQ Responses

The public comment period elicited a total of four comments: one comment from a private citizen, two comments from business or industry organizations, and one comment from an environmental organization. Documentation of the comments received and NCDAQ's responses to the comments that disputed or contradicted the factual evidence provided in the demonstration can be found in Appendix M: Public Notice Summary, Comments Received, and Responses of this demonstration.

[49] https://www.deq.nc.gov/about/divisions/air-quality/air-quality-planning/attainment/2024-pm25-annual-standard/exceptional-events-demonstration-support-attainment-designation-recommendations-2024-annual-pm25

Appendix A: AMP 350 Reports

Air Quality System Raw Data Reports (AMP 350) that show the data that NCDAQ is requesting to be excluded from regulatory decisions has been flagged with *Request Exclusion: Fire - Canadian*, or "*RF*".

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

User ID: JPOPE

RAW DATA REPORT

Report Request ID: 2232968 Report Code: AMP350 Oct. 17, 2024

GEOGRAPHIC SELECTIONS

Tribal Code	State	County	Site	Parameter	POC	City	AQCR	UAR	CBSA	CSA	EPA Region
	37	119	0045								
	37	057	0002								

PROTOCOL SELECTIONS

Parameter Classification	Parameter	Method	Duration
CRITERIA	88101		

SELECTED OPTIONS

Option Type	Option Value
INCLUDE NULLS	YES
DAILY STATISTICS	MAXIMUM
UNITS	STANDARD
RAW DATA EVENTS	INCLUDE EVENTS
MERGE PDF FILES	YES
AGENCY ROLE	PQAO

SORT ORDER

Order	Column
1	STATE_CODE
2	COUNTY_CODE
3	SITE_ID
4	PARAMETER_CODE
5	POC

DATE CRITERIA

Start Date	End Date
2023 06 06	2023 06 11

APPLICABLE STANDARDS

Standard Description
PM25 Annual 2024

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
RAW DATA REPORT

Oct. 17, 2024

(88101) PM2.5 - Local Conditions

SITE ID: 37-057-0002 POC: 1
COUNTY: (057) Davidson
CITY: (38060) Lexington
SITE ADDRESS: 938 S.SALISBURY ST
SITE COMMENTS: SITE LOCATED AT WATER TOWER AT CORNER HWY 8 & MAIN ST.
MONITOR COMMENTS: ID2=409

STATE: (37) North Carolina
AQCR: (136) NORTHERN PIEDMONT
URBANIZED AREA: (0000) NOT IN AN URBAN AREA
LAND USE: COMMERCIAL
LOCATION SETTING: URBAN AND CENTER CITY

CAS NUMBER:
LATITUDE: 35.8145
LONGITUDE: -80.2627
UTM ZONE:
UTM NORTHING:
UTM EASTING:
ELEVATION-MSL: 241
PROBE HEIGHT: 2

SUPPORT AGENCY: (0776) North Carolina Dept Of Environmental Quality
MONITOR TYPE: SLAMS
COLLECTION AND ANALYSIS METHOD: (145) R & P Model 2025 PM-2.5 Sequential
PQAO: (0776) North Carolina Dept Of Environmental Quality

REPORT FOR: 2023

DURATION: 24 HOUR
UNITS: Micrograms/cubic meter (LC)
MIN DETECTABLE: 2

MONTH

Day	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11						18.3 rf						
12												
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29												
30												
31												
NO.:	0	0	0	0	0	1	0	0	0	0	0	0
MAX:						18.3						
MEAN:						18.30						

ANNUAL OBSERVATIONS: 1 ANNUAL MEAN: 18.30 ANNUAL MAX: 18.3

Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional review are shown in lower case. An asterisk ("*") indicates that the region has reviewed the value and does not concur with the qualifier.

(88101) PM2.5 - Local Conditions

SITE ID: 37-057-0002 POC: 3
COUNTY: (057) Davidson
CITY: (38060) Lexington
SITE ADDRESS: 938 S.SALISBURY ST
SITE COMMENTS: SITE LOCATED AT WATER TOWER AT CORNER HWY 8 & MAIN ST.
MONITOR COMMENTS: ID2=409

STATE: (37) North Carolina
AQCR: (136) NORTHERN PIEDMONT
URBANIZED AREA: (0000) NOT IN AN URBAN AREA
LAND USE: COMMERCIAL
LOCATION SETTING: URBAN AND CENTER CITY

CAS NUMBER:
LATITUDE: 35.8145
LONGITUDE: -80.2627
UTM ZONE:
UTM NORTHING:
UTM EASTING:
ELEVATION-MSL: 241
PROBE HEIGHT: 2.4

SUPPORT AGENCY: (0776) North Carolina Dept Of Environmental Quality
MONITOR TYPE: SLAMS
COLLECTION AND ANALYSIS METHOD: (170) Met One BAM-1020 Mass Monitor w/VS
PQAO: (0776) North Carolina Dept Of Environmental Quality

REPORT FOR: JUNE 2023

DURATION: 1 HOUR
UNITS: Micrograms/cubic meter (LC)
MIN DETECTABLE: 5

DAY	HOUR 0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	OBS	MAXIMUM
1																									0	
2																									0	
3																									0	
4																									0	
5																									0	
6	20.0rf	17.0rf	19.0rf	14.0rf	16.0rf	18.0rf	15.0rf	13.0rf	16.0rf	13.0rf	17.0rf	18.0rf	23.0rf	18.0rf	33.0rf	35.0rf	48.0rf	45.0rf	48.0rf	44.0rf	51.0rf	48.0rf	50.0rf	48.0rf	24	51.0
7	47.0rf	48.0rf	42.0rf	43.0rf	51.0rf	48.0rf	45.0rf	47.0rf	46.0rf	45.0rf	36.0rf	26.0rf	22.0rf	15.0rf	14.0rf	10.0rf	9.0rf	16.0rf	20.0rf	11.0rf	17.0rf	13.0rf	17.0rf	16.0rf	24	51.0
8	13.0IF	21.0IF	14.0IF	12.0IF	13.0IF	9.0IF	14.0IF	15.0IF	15.0IF	14.0IF	AV	16.0IF	19.0IF	17.0IF	16.0IF	14.0IF	13.0IF	13.0IF	24.0IF	21.0IF	24.0IF	25.0IF	21.0IF	18.0IF	23	25.0
9	21.0rf	20.0rf	19.0rf	24.0rf	19.0rf	19.0rf	21.0rf	18.0rf	21.0rf	21.0rf	23.0rf	21.0rf	14.0rf	21.0rf	22.0rf	32.0rf	25.0rf	21.0rf	26.0rf	24.0rf	27.0rf	34.0rf	28.0rf	32.0rf	24	34.0
10	31.0rf	28.0rf	34.0rf	27.0rf	31.0rf	30.0rf	27.0rf	28.0rf	23.0rf	22.0rf	22.0rf	18.0rf	13.0rf	20.0rf	16.0rf	19.0rf	18.0rf	14.0rf	15.0rf	19.0rf	19.0rf	25.0rf	23.0rf	20.0rf	24	34.0
11	32.0rf	32.0rf	23.0rf	30.0rf	29.0rf	29.0rf	32.0rf	27.0rf	26.0rf	20.0rf	16.0rf	8.0rf	15.0rf	18.0rf	23.0rf	25.0rf	14.0rf	20.0rf	12.0rf	9.0rf	8.0rf	5.0rf	5.0rf	5.0rf	24	32.0
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31																									0	
NO.:	6	6	6	6	6	6	6	6	6	6	5	6	6	6	6	6	6	6	6	6	6	6	6	6		
MAX:	47.0	48.0	42.0	43.0	51.0	48.0	45.0	47.0	46.0	45.0	36.0	26.0	23.0	21.0	33.0	35.0	48.0	45.0	48.0	44.0	51.0	48.0	50.0	48.0		
AVG:	27.33	27.67	25.17	25.00	26.50	25.50	25.67	24.67	24.50	22.50	22.80	17.83	17.67	18.17	20.67	22.50	21.17	21.50	24.17	21.33	24.33	25.00	24.00	23.17		

MONTHLY OBSERVATIONS: 143 MONTHLY MEAN: 23.29 MONTHLY MAX: 51.0

Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional review are shown in lower case. An asterisk ("*") indicates that the region has reviewed the value and does not concur with the qualifier.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
RAW DATA REPORT

Oct. 17, 2024

(88101) PM2.5 - Local Conditions

SITE ID: 37-119-0045 POC: 3
COUNTY: (119) Mecklenburg
CITY: (12000) Charlotte
SITE ADDRESS: 1030 Remount Road
SITE COMMENTS:
MONITOR COMMENTS:

STATE: (37) North Carolina
AQCR: (167) METROPOLITAN CHARLOTTE
URBANIZED AREA: (1510) CHARLOTTE, NC
LAND USE: INDUSTRIAL
LOCATION SETTING: URBAN AND CENTER CITY

CAS NUMBER:
LATITUDE: 35.213171
LONGITUDE: -80.874084
UTM ZONE:
UTM NORTHING:
UTM EASTING:
ELEVATION-MSL: 194
PROBE HEIGHT: 2

SUPPORT AGENCY: (0669) Mecklenburg County Air Quality
MONITOR TYPE: SLAMS
COLLECTION AND ANALYSIS METHOD: (209) Met One BAM-1022 Mass Monitor w/ V
PQAO: (0669) Mecklenburg County Air Quality

REPORT FOR: JUNE 2023

DURATION: 1 HOUR
UNITS: Micrograms/cubic meter (LC)
MIN DETECTABLE: 5

DAY	HOUR 0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	OBS	MAXIMUM
1																									0	
2																									0	
3																									0	
4																									0	
5																									0	
6	20.0rf	15.0rf	16.0rf	14.0rf	14.0rf	17.0rf	18.0rf	9.0rf	18.0rf	18.0rf	16.0rf	17.0rf	21.0rf	17.0rf	23.0rf	19.0rf	22.0rf	22.0rf	36.0rf	34.0rf	31.0rf	33.0rf	39.0rf	34.0rf	24	39.0
7	39.0rf	37.0rf	40.0rf	40.0rf	36.0rf	38.0rf	36.0rf	36.0rf	38.0rf	28.0rf	28.0rf	26.0rf	29.0rf	24.0rf	24.0rf	20.0rf	10.0rf	11.0rf	15.0rf	14.0rf	16.0rf	17.0rf	15.0rf	15.0rf	24	40.0
8	13.0rf	14.0rf	11.0rf	13.0rf	11.0rf	12.0rf	10.0rf	11.0rf	12.0rf	21.0rf	26.0rf	24.0rf	24.0rf	16.0rf	23.0rf	21.0rf	25.0rf	18.0rf	16.0rf	22.0rf	21.0rf	27.0rf	28.0rf	25.0rf	24	28.0
9	23.0rf	24.0rf	21.0rf	24.0rf	23.0rf	26.0rf	21.0rf	25.0rf	22.0rf	25.0rf	22.0rf	19.0rf	20.0rf	17.0rf	20.0rf	19.0rf	24.0rf	24.0rf	25.0rf	28.0rf	30.0rf	30.0rf	29.0rf	29.0rf	24	30.0
10	33.0rf	31.0rf	33.0rf	33.0rf	31.0rf	27.0rf	31.0rf	27.0rf	25.0rf	24.0rf	19.0rf	17.0rf	20.0rf	19.0rf	18.0rf	17.0rf	19.0rf	16.0rf	18.0rf	19.0rf	22.0rf	26.0rf	33.0rf	27.0rf	24	33.0
11	22.0IF	26.0IF	24.0IF	25.0IF	25.0IF	22.0IF	22.0IF	27.0IF	18.0IF	18.0IF	18.0IF	14.0IF	16.0IF	26.0IF	3.0IF	5.0IF	3.0IF	5.0IF	11.0IF	6.0IF	6.0IF	11.0IF	7.0IF	7.0IF	24	27.0
12																									0	
13																									0	
14																									0	
15																									0	
16																									0	
17																									0	
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24																									0	
25																									0	
26																									0	
27																									0	
28																									0	
29																									0	
30																									0	
31																									0	
NO.:	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6		
MAX:	39.0	37.0	40.0	40.0	36.0	38.0	36.0	36.0	38.0	28.0	28.0	26.0	29.0	26.0	24.0	21.0	25.0	24.0	36.0	34.0	31.0	33.0	39.0	34.0		
AVG:	25.00	24.50	24.17	24.83	23.33	23.67	23.00	22.50	22.17	22.33	21.50	19.50	21.67	19.83	18.50	16.83	17.17	16.00	20.17	20.50	21.00	24.00	25.17	22.83		

MONTHLY OBSERVATIONS: 144 MONTHLY MEAN: 21.67 MONTHLY MAX: 40.0

Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional review are shown in lower case. An asterisk ("*") indicates that the region has reviewed the value and does not concur with the qualifier.

QUALIFIER CODES:

Qualifier Code	Qualifier Description	Qualifier Type
AV	Power Failure.	NULL
IF	Fire - Canadian.	INFORM
rf	Fire - Canadian.	REQEXC

Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional concurrence are shown in lower case.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

User ID: JPOPE

RAW DATA REPORT

Report Request ID: 2232976 Report Code: AMP350 Oct. 17, 2024

GEOGRAPHIC SELECTIONS

Tribal Code	State	County	Site	Parameter	POC	City	AQCR	UAR	CBSA	CSA	EPA Region
	37	119	0045								
	37	057	0002								

PROTOCOL SELECTIONS

Parameter Classification	Parameter	Method	Duration
CRITERIA	88101		

SELECTED OPTIONS

Option Type	Option Value
INCLUDE NULLS	YES
DAILY STATISTICS	MAXIMUM
UNITS	STANDARD
RAW DATA EVENTS	INCLUDE EVENTS
MERGE PDF FILES	YES
AGENCY ROLE	PQAO

SORT ORDER

Order	Column
1	STATE_CODE
2	COUNTY_CODE
3	SITE_ID
4	PARAMETER_CODE
5	POC

DATE CRITERIA

Start Date	End Date
2023 06 17	2023 06 18

APPLICABLE STANDARDS

Standard Description
PM25 Annual 2024

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
RAW DATA REPORT

Oct. 17, 2024

(88101) PM2.5 - Local Conditions

SITE ID: 37-057-0002 POC: 1
COUNTY: (057) Davidson
CITY: (38060) Lexington
SITE ADDRESS: 938 S.SALISBURY ST
SITE COMMENTS: SITE LOCATED AT WATER TOWER AT CORNER HWY 8 & MAIN ST.
MONITOR COMMENTS: ID2=409

STATE: (37) North Carolina
AQCR: (136) NORTHERN PIEDMONT
URBANIZED AREA: (0000) NOT IN AN URBAN AREA
LAND USE: COMMERCIAL
LOCATION SETTING: URBAN AND CENTER CITY

CAS NUMBER:
LATITUDE: 35.8145
LONGITUDE: -80.2627
UTM ZONE:
UTM NORTHING:
UTM EASTING:
ELEVATION-MSL: 241
PROBE HEIGHT: 2

SUPPORT AGENCY: (0776) North Carolina Dept Of Environmental Quality
MONITOR TYPE: SLAMS
COLLECTION AND ANALYSIS METHOD: (145) R & P Model 2025 PM-2.5 Sequential
PQAO: (0776) North Carolina Dept Of Environmental Quality

REPORT FOR: 2023

DURATION: 24 HOUR
UNITS: Micrograms/cubic meter (LC)
MIN DETECTABLE: 2

MONTH

Day	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
1												
2												
3												
4												
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6												
7												
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9												
10												
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12												
13												
14												
15												
16												
17						19.1 rf						
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20												
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24												
25												
26												
27												
28												
29												
30												
31												
NO.:	0	0	0	0	0	1	0	0	0	0	0	0
MAX:						19.1						
MEAN:						19.10						

ANNUAL OBSERVATIONS: 1 ANNUAL MEAN: 19.10 ANNUAL MAX: 19.1

Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional review are shown in lower case. An asterisk ("*") indicates that the region has reviewed the value and does not concur with the qualifier.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
RAW DATA REPORT

Oct. 17, 2024

(88101) PM2.5 - Local Conditions

SITE ID: 37-057-0002 POC: 3
COUNTY: (057) Davidson
CITY: (38060) Lexington
SITE ADDRESS: 938 S.SALISBURY ST
SITE COMMENTS: SITE LOCATED AT WATER TOWER AT CORNER HWY 8 & MAIN ST.
MONITOR COMMENTS: ID2=409

STATE: (37) North Carolina
AQCR: (136) NORTHERN PIEDMONT
URBANIZED AREA: (0000) NOT IN AN URBAN AREA
LAND USE: COMMERCIAL
LOCATION SETTING: URBAN AND CENTER CITY

CAS NUMBER:
LATITUDE: 35.8145
LONGITUDE: -80.2627
UTM ZONE:
UTM NORTHING:
UTM EASTING:
ELEVATION-MSL: 241
PROBE HEIGHT: 2.4

SUPPORT AGENCY: (0776) North Carolina Dept Of Environmental Quality
MONITOR TYPE: SLAMS
COLLECTION AND ANALYSIS METHOD: (170) Met One BAM-1020 Mass Monitor w/VS
PQAO: (0776) North Carolina Dept Of Environmental Quality

REPORT FOR: JUNE 2023

DURATION: 1 HOUR
UNITS: Micrograms/cubic meter (LC)
MIN DETECTABLE: 5

DAY	HOUR 0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	OBS	MAXIMUM
1																									0	
2																									0	
3																									0	
4																									0	
5																									0	
6																									0	
7																									0	
8																									0	
9																									0	
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11																									0	
12																									0	
13																									0	
14																									0	
15																									0	
16																									0	
17	20.0rf	21.0rf	26.0rf	23.0rf	19.0rf	16.0rf	21.0rf	19.0rf	21.0rf	14.0rf	17.0rf	16.0rf	16.0rf	18.0rf	19.0rf	16.0rf	14.0rf	15.0rf	17.0rf	17.0rf	17.0rf	21.0rf	27.0rf	25.0rf	24	27.0
18	23.0rf	28.0rf	24.0rf	23.0rf	23.0rf	19.0rf	21.0rf	24.0rf	22.0rf	18.0rf	19.0rf	19.0rf	18.0rf	16.0rf	19.0rf	25.0rf	19.0rf	20.0rf	18.0rf	23.0rf	24.0rf	28.0rf	28.0rf	26.0rf	24	28.0
19																									0	
20																									0	
21																									0	
22																									0	
23																									0	
24																									0	
25																									0	
26																									0	
27																									0	
28																									0	
29																									0	
30																									0	
31																									0	
NO.:	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		
MAX:	23.0	28.0	26.0	23.0	23.0	19.0	21.0	24.0	22.0	18.0	19.0	19.0	18.0	18.0	19.0	25.0	19.0	20.0	18.0	23.0	24.0	28.0	28.0	26.0		
AVG:	21.50	24.50	25.00	23.00	21.00	17.50	21.00	21.50	21.50	16.00	18.00	17.50	17.00	17.00	19.00	20.50	16.50	17.50	17.50	20.00	20.50	24.50	27.50	25.50		

MONTHLY OBSERVATIONS: 48 MONTHLY MEAN: 20.46 MONTHLY MAX: 28.0

Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional review are shown in lower case. An asterisk ("*") indicates that the region has reviewed the value and does not concur with the qualifier.

(88101) PM2.5 - Local Conditions

SITE ID: 37-119-0045 POC: 1
COUNTY: (119) Mecklenburg
CITY: (12000) Charlotte
SITE ADDRESS: 1030 Remount Road
SITE COMMENTS:
MONITOR COMMENTS:

STATE: (37) North Carolina
AQCR: (167) METROPOLITAN CHARLOTTE
URBANIZED AREA: (1510) CHARLOTTE, NC
LAND USE: INDUSTRIAL
LOCATION SETTING: URBAN AND CENTER CITY

CAS NUMBER:
LATITUDE: 35.213171
LONGITUDE: -80.874084
UTM ZONE:
UTM NORTHING:
UTM EASTING:
ELEVATION-MSL: 194
PROBE HEIGHT: 2

SUPPORT AGENCY: (0669) Mecklenburg County Air Quality
MONITOR TYPE: SLAMS
COLLECTION AND ANALYSIS METHOD: (145) R & P Model 2025 PM-2.5 Sequential
PQAO: (0669) Mecklenburg County Air Quality

REPORT FOR: 2023

DURATION: 24 HOUR
UNITS: Micrograms/cubic meter (LC)
MIN DETECTABLE: 2

MONTH

Day	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
16												
17						22.9 rf						
18												
19												
20												
21												
22												
23												
24												
25												
26												
27												
28												
29												
30												
31												
NO.:	0	0	0	0	0	1	0	0	0	0	0	0
MAX:						22.9						
MEAN:						22.90						

ANNUAL OBSERVATIONS: 1 ANNUAL MEAN: 22.90 ANNUAL MAX: 22.9

Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional review are shown in lower case. An asterisk ("*") indicates that the region has reviewed the value and does not concur with the qualifier.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
RAW DATA REPORT

Oct. 17, 2024

(88101) PM2.5 - Local Conditions

SITE ID: 37-119-0045 POC: 3
COUNTY: (119) Mecklenburg
CITY: (12000) Charlotte
SITE ADDRESS: 1030 Remount Road
SITE COMMENTS:
MONITOR COMMENTS:

STATE: (37) North Carolina
AQCR: (167) METROPOLITAN CHARLOTTE
URBANIZED AREA: (1510) CHARLOTTE, NC
LAND USE: INDUSTRIAL
LOCATION SETTING: URBAN AND CENTER CITY

CAS NUMBER:
LATITUDE: 35.213171
LONGITUDE: -80.874084
UTM ZONE:
UTM NORTHING:
UTM EASTING:
ELEVATION-MSL: 194
PROBE HEIGHT: 2

SUPPORT AGENCY: (0669) Mecklenburg County Air Quality
MONITOR TYPE: SLAMS
COLLECTION AND ANALYSIS METHOD: (209) Met One BAM-1022 Mass Monitor w/ V
PQAO: (0669) Mecklenburg County Air Quality

REPORT FOR: JUNE 2023

DURATION: 1 HOUR
UNITS: Micrograms/cubic meter (LC)
MIN DETECTABLE: 5

DAY	HOUR 0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	OBS	MAXIMUM
1																									0	
2																									0	
3																									0	
4																									0	
5																									0	
6																									0	
7																									0	
8																									0	
9																									0	
10																									0	
11																									0	
12																									0	
13																									0	
14																									0	
15																									0	
16																									0	
17	33.0rf	27.0rf	28.0rf	26.0rf	27.0rf	26.0rf	26.0rf	31.0rf	23.0rf	19.0rf	20.0rf	20.0rf	19.0rf	21.0rf	23.0rf	25.0rf	23.0rf	22.0rf	20.0rf	23.0rf	24.0rf	34.0rf	31.0rf	33.0rf	24	34.0
18	31.0rf	23.0rf	25.0rf	26.0rf	23.0rf	20.0rf	20.0rf	21.0rf	26.0rf	19.0rf	20.0rf	18.0rf	23.0rf	21.0rf	24.0rf	28.0rf	28.0rf	21.0rf	27.0rf	28.0rf	29.0rf	25.0rf	23.0rf	21.0rf	24	31.0
19																									0	
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25																									0	
26																									0	
27																									0	
28																									0	
29																									0	
30																									0	
31																									0	
NO.:	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		
MAX:	33.0	27.0	28.0	26.0	27.0	26.0	26.0	31.0	26.0	19.0	20.0	20.0	23.0	21.0	24.0	28.0	28.0	22.0	27.0	28.0	29.0	34.0	31.0	33.0		
AVG:	32.00	25.00	26.50	26.00	25.00	23.00	23.00	26.00	24.50	19.00	20.00	19.00	21.00	21.00	23.50	26.50	25.50	21.50	23.50	25.50	26.50	29.50	27.00	27.00		

MONTHLY OBSERVATIONS: 48 MONTHLY MEAN: 24.46 MONTHLY MAX: 34.0

Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional review are shown in lower case. An asterisk ("*") indicates that the region has reviewed the value and does not concur with the qualifier.

QUALIFIER CODES:

Qualifier Code	Qualifier Description	Qualifier Type
rf	Fire - Canadian.	REQEXC

Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional concurrence are shown in lower case.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

User ID: JPOPE

RAW DATA REPORT

Report Request ID: 2232978 Report Code: AMP350 Oct. 17, 2024

GEOGRAPHIC SELECTIONS

Tribal Code	State	County	Site	Parameter	POC	City	AQCR	UAR	CBSA	CSA	EPA Region
	37	119	0045								
	37	057	0002								

PROTOCOL SELECTIONS

Parameter Classification	Parameter	Method	Duration
CRITERIA	88101		

SELECTED OPTIONS

Option Type	Option Value
INCLUDE NULLS	YES
DAILY STATISTICS	MAXIMUM
UNITS	STANDARD
RAW DATA EVENTS	INCLUDE EVENTS
MERGE PDF FILES	YES
AGENCY ROLE	PQAO

SORT ORDER

Order	Column
1	STATE_CODE
2	COUNTY_CODE
3	SITE_ID
4	PARAMETER_CODE
5	POC

DATE CRITERIA

Start Date	End Date
2023 06 28	2023 07 01

APPLICABLE STANDARDS

Standard Description
PM25 Annual 2024

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
RAW DATA REPORT

Oct. 17, 2024

(88101) PM2.5 - Local Conditions

SITE ID: 37-057-0002 POC: 1
COUNTY: (057) Davidson
CITY: (38060) Lexington
SITE ADDRESS: 938 S.SALISBURY ST
SITE COMMENTS: SITE LOCATED AT WATER TOWER AT CORNER HWY 8 & MAIN ST.
MONITOR COMMENTS: ID2=409

STATE: (37) North Carolina
AQCR: (136) NORTHERN PIEDMONT
URBANIZED AREA: (0000) NOT IN AN URBAN AREA
LAND USE: COMMERCIAL
LOCATION SETTING: URBAN AND CENTER CITY

CAS NUMBER:
LATITUDE: 35.8145
LONGITUDE: -80.2627
UTM ZONE:
UTM NORTHING:
UTM EASTING:
ELEVATION-MSL: 241
PROBE HEIGHT: 2

SUPPORT AGENCY: (0776) North Carolina Dept Of Environmental Quality
MONITOR TYPE: SLAMS
COLLECTION AND ANALYSIS METHOD: (145) R & P Model 2025 PM-2.5 Sequential
PQAO: (0776) North Carolina Dept Of Environmental Quality

REPORT FOR: 2023

DURATION: 24 HOUR
UNITS: Micrograms/cubic meter (LC)
MIN DETECTABLE: 2

Day	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
1												
2												
3												
4												
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6												
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18												
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22												
23												
24												
25												
26												
27												
28												
29						45.0 rf						
30												
31												
NO.:	0	0	0	0	0	1	0	0	0	0	0	0
MAX:						45.0						
MEAN:						45.00						

ANNUAL OBSERVATIONS: 1 ANNUAL MEAN: 45.00 ANNUAL MAX: 45.0

Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional review are shown in lower case. An asterisk ("*") indicates that the region has reviewed the value and does not concur with the qualifier.

(88101) PM2.5 - Local Conditions

SITE ID: 37-057-0002 POC: 3
COUNTY: (057) Davidson
CITY: (38060) Lexington
SITE ADDRESS: 938 S.SALISBURY ST
SITE COMMENTS: SITE LOCATED AT WATER TOWER AT CORNER HWY 8 & MAIN ST.
MONITOR COMMENTS: ID2=409

STATE: (37) North Carolina
AQCR: (136) NORTHERN PIEDMONT
URBANIZED AREA: (0000) NOT IN AN URBAN AREA
LAND USE: COMMERCIAL
LOCATION SETTING: URBAN AND CENTER CITY

CAS NUMBER:
LATITUDE: 35.8145
LONGITUDE: -80.2627
UTM ZONE:
UTM NORTHING:
UTM EASTING:
ELEVATION-MSL: 241
PROBE HEIGHT: 2.4

SUPPORT AGENCY: (0776) North Carolina Dept Of Environmental Quality
MONITOR TYPE: SLAMS
COLLECTION AND ANALYSIS METHOD: (170) Met One BAM-1020 Mass Monitor w/VS
PQAO: (0776) North Carolina Dept Of Environmental Quality

REPORT FOR: JUNE 2023

DURATION: 1 HOUR
UNITS: Micrograms/cubic meter (LC)
MIN DETECTABLE: 5

DAY	HOUR 0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	OBS	MAXIMUM
1																									0	
2																									0	
3																									0	
4																									0	
5																									0	
6																									0	
7																									0	
8																									0	
9																									0	
10																									0	
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25																									0	
26																									0	
27																									0	
28	14.0rf	15.0rf	14.0rf	13.0rf	11.0rf	14.0rf	16.0rf	23.0rf	18.0rf	26.0rf	21.0rf	18.0rf	25.0rf	22.0rf	20.0rf	25.0rf	19.0rf	20.0rf	19.0rf	26.0rf	25.0rf	34.0rf	28.0rf	28.0rf	24	34.0
29	30.0rf	33.0rf	27.0rf	36.0rf	43.0rf	56.0rf	58.0rf	60.0rf	58.0rf	51.0rf	41.0rf	52.0rf	51.0rf	53.0rf	46.0rf	48.0rf	42.0rf	40.0rf	46.0rf	44.0rf	44.0rf	42.0rf	48.0rf	48.0rf	24	60.0
30	43.0rf	44.0rf	41.0rf	44.0rf	42.0rf	43.0rf	42.0rf	44.0rf	45.0rf	42.0rf	45.0rf	35.0rf	28.0rf	34.0rf	24.0rf	30.0rf	26.0rf	21.0rf	24.0rf	16.0rf	18.0rf	14.0rf	14.0rf	11.0rf	24	45.0
31																									0	
NO.:	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3		
MAX:	43.0	44.0	41.0	44.0	43.0	56.0	58.0	60.0	58.0	51.0	45.0	52.0	51.0	53.0	46.0	48.0	42.0	40.0	46.0	44.0	44.0	42.0	48.0	48.0		
AVG:	29.00	30.67	27.33	31.00	32.00	37.67	38.67	42.33	40.33	39.67	35.67	35.00	34.67	36.33	30.00	34.33	29.00	27.00	29.67	28.67	29.00	30.00	30.00	29.00		

MONTHLY OBSERVATIONS: 72 MONTHLY MEAN: 32.79 MONTHLY MAX: 60.0

Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional review are shown in lower case. An asterisk ("*") indicates that the region has reviewed the value and does not concur with the qualifier.

(88101) PM2.5 - Local Conditions

SITE ID: 37-057-0002 POC: 3
COUNTY: (057) Davidson
CITY: (38060) Lexington
SITE ADDRESS: 938 S.SALISBURY ST
SITE COMMENTS: SITE LOCATED AT WATER TOWER AT CORNER HWY 8 & MAIN ST.
MONITOR COMMENTS: ID2=409

STATE: (37) North Carolina
AQCR: (136) NORTHERN PIEDMONT
URBANIZED AREA: (0000) NOT IN AN URBAN AREA
LAND USE: COMMERCIAL
LOCATION SETTING: URBAN AND CENTER CITY

CAS NUMBER:
LATITUDE: 35.8145
LONGITUDE: -80.2627
UTM ZONE:
UTM NORTHING:
UTM EASTING:
ELEVATION-MSL: 241
PROBE HEIGHT: 2.4

SUPPORT AGENCY: (0776) North Carolina Dept Of Environmental Quality
MONITOR TYPE: SLAMS
COLLECTION AND ANALYSIS METHOD: (170) Met One BAM-1020 Mass Monitor w/VS
PQAO: (0776) North Carolina Dept Of Environmental Quality

REPORT FOR: JULY 2023

DURATION: 1 HOUR
UNITS: Micrograms/cubic meter (LC)
MIN DETECTABLE: 5

DAY	HOUR 0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	OBS	MAXIMUM
1	8.0rf	16.0rf	15.0rf	14.0rf	19.0rf	19.0rf	27.0rf	33.0rf	30.0rf	27.0rf	29.0rf	19.0rf	25.0rf	16.0rf	21.0rf	16.0rf	16.0rf	19.0rf	15.0rf	10.0rf	8.0rf	9.0rf	13.0rf	10.0rf	24	33.0
2																									0	
3																									0	
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30																									0	
31																									0	
NO.:	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
MAX:	8.0	16.0	15.0	14.0	19.0	19.0	27.0	33.0	30.0	27.0	29.0	19.0	25.0	16.0	21.0	16.0	16.0	19.0	15.0	10.0	8.0	9.0	13.0	10.0		
AVG:	8.00	16.00	15.00	14.00	19.00	19.00	27.00	33.00	30.00	27.00	29.00	19.00	25.00	16.00	21.00	16.00	16.00	19.00	15.00	10.00	8.00	9.00	13.00	10.00		

MONTHLY OBSERVATIONS: 24 MONTHLY MEAN: 18.08 MONTHLY MAX: 33.0

Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional review are shown in lower case. An asterisk ("*") indicates that the region has reviewed the value and does not concur with the qualifier.

(88101) PM2.5 - Local Conditions

SITE ID: 37-119-0045 POC: 1
COUNTY: (119) Mecklenburg
CITY: (12000) Charlotte
SITE ADDRESS: 1030 Remount Road
SITE COMMENTS:
MONITOR COMMENTS:

STATE: (37) North Carolina
AQCR: (167) METROPOLITAN CHARLOTTE
URBANIZED AREA: (1510) CHARLOTTE, NC
LAND USE: INDUSTRIAL
LOCATION SETTING: URBAN AND CENTER CITY

CAS NUMBER:
LATITUDE: 35.213171
LONGITUDE: -80.874084
UTM ZONE:
UTM NORTHING:
UTM EASTING:
ELEVATION-MSL: 194
PROBE HEIGHT: 2

SUPPORT AGENCY: (0669) Mecklenburg County Air Quality
MONITOR TYPE: SLAMS
COLLECTION AND ANALYSIS METHOD: (145) R & P Model 2025 PM-2.5 Sequential
PQAO: (0669) Mecklenburg County Air Quality

REPORT FOR: 2023

DURATION: 24 HOUR
UNITS: Micrograms/cubic meter (LC)
MIN DETECTABLE: 2

MONTH

Day	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
1												
2												
3												
4												
5												
6												
7												
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29						34.5 rf						
30												
31												
NO.:	0	0	0	0	0	1	0	0	0	0	0	0
MAX:						34.5						
MEAN:						34.50						

ANNUAL OBSERVATIONS: 1 ANNUAL MEAN: 34.50 ANNUAL MAX: 34.5

Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional review are shown in lower case. An asterisk ("*") indicates that the region has reviewed the value and does not concur with the qualifier.

(88101) PM2.5 - Local Conditions

SITE ID: 37-119-0045 POC: 3
COUNTY: (119) Mecklenburg
CITY: (12000) Charlotte
SITE ADDRESS: 1030 Remount Road
SITE COMMENTS:
MONITOR COMMENTS:

STATE: (37) North Carolina
AQCR: (167) METROPOLITAN CHARLOTTE
URBANIZED AREA: (1510) CHARLOTTE, NC
LAND USE: INDUSTRIAL
LOCATION SETTING: URBAN AND CENTER CITY

CAS NUMBER:
LATITUDE: 35.213171
LONGITUDE: -80.874084
UTM ZONE:
UTM NORTHING:
UTM EASTING:
ELEVATION-MSL: 194
PROBE HEIGHT: 2

SUPPORT AGENCY: (0669) Mecklenburg County Air Quality
MONITOR TYPE: SLAMS
COLLECTION AND ANALYSIS METHOD: (209) Met One BAM-1022 Mass Monitor w/ V
PQAO: (0669) Mecklenburg County Air Quality

REPORT FOR: JUNE 2023

DURATION: 1 HOUR
UNITS: Micrograms/cubic meter (LC)
MIN DETECTABLE: 5

DAY	HOUR 0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	OBS	MAXIMUM
1																									0	
2																									0	
3																									0	
4																									0	
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28	16.0rf	20.0rf	22.0rf	23.0rf	19.0rf	16.0rf	20.0rf	21.0rf	22.0rf	24.0rf	23.0rf	21.0rf	16.0rf	20.0rf	17.0rf	15.0rf	20.0rf	17.0rf	18.0rf	20.0rf	15.0rf	26.0rf	27.0rf	27.0rf	24	27.0
29	22.0rf	24.0rf	28.0rf	27.0rf	28.0rf	27.0rf	40.0rf	51.0rf	60.0rf	60.0rf	52.0rf	49.0rf	36.0rf	37.0rf	43.0rf	34.0rf	32.0rf	32.0rf	31.0rf	32.0rf	36.0rf	43.0rf	40.0rf	41.0rf	24	60.0
30	42.0rf	43.0rf	40.0rf	40.0rf	39.0rf	38.0rf	38.0rf	37.0rf	34.0rf	29.0rf	34.0rf	30.0rf	27.0rf	22.0rf	13.0rf	11.0rf	12.0rf	AN	AN	21.0rf	20.0rf	26.0rf	28.0rf	24.0rf	22	43.0
31																									0	
NO.:	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	3	3	3	3	3		
MAX:	42.0	43.0	40.0	40.0	39.0	38.0	40.0	51.0	60.0	60.0	52.0	49.0	36.0	37.0	43.0	34.0	32.0	32.0	31.0	32.0	36.0	43.0	40.0	41.0		
AVG:	26.67	29.00	30.00	30.00	28.67	27.00	32.67	36.33	38.67	37.67	36.33	33.33	26.33	26.33	24.33	20.00	21.33	24.50	24.50	24.33	23.67	31.67	31.67	30.67		

MONTHLY OBSERVATIONS: 70 MONTHLY MEAN: 29.11 MONTHLY MAX: 60.0

Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional review are shown in lower case. An asterisk ("*") indicates that the region has reviewed the value and does not concur with the qualifier.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
RAW DATA REPORT

Oct. 17, 2024

(88101) PM2.5 - Local Conditions

SITE ID: 37-119-0045 POC: 3
COUNTY: (119) Mecklenburg
CITY: (12000) Charlotte
SITE ADDRESS: 1030 Remount Road
SITE COMMENTS:
MONITOR COMMENTS:

STATE: (37) North Carolina
AQCR: (167) METROPOLITAN CHARLOTTE
URBANIZED AREA: (1510) CHARLOTTE, NC
LAND USE: INDUSTRIAL
LOCATION SETTING: URBAN AND CENTER CITY

CAS NUMBER:
LATITUDE: 35.213171
LONGITUDE: -80.874084
UTM ZONE:
UTM NORTHING:
UTM EASTING:
ELEVATION-MSL: 194
PROBE HEIGHT: 2

SUPPORT AGENCY: (0669) Mecklenburg County Air Quality
MONITOR TYPE: SLAMS
COLLECTION AND ANALYSIS METHOD: (209) Met One BAM-1022 Mass Monitor w/ V
PQAO: (0669) Mecklenburg County Air Quality

REPORT FOR: JULY 2023

DURATION: 1 HOUR
UNITS: Micrograms/cubic meter (LC)
MIN DETECTABLE: 5

DAY	HOUR 0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	OBS	MAXIMUM
1	20.0rf	22.0rf	28.0rf	27.0rf	27.0rf	30.0rf	26.0rf	28.0rf	AV	AV	AV	22.0rf	18.0rf	18.0rf	24.0rf	24.0rf	23.0rf	17.0rf	11.0rf	7.0rf	11.0rf	19.0rf	18.0rf	18.0rf	21	30.0
2																									0	
3																									0	
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NO.:	1	1	1	1	1	1	1	1				1	1	1	1	1	1	1	1	1	1	1	1	1		
MAX:	20.0	22.0	28.0	27.0	27.0	30.0	26.0	28.0				22.0	18.0	18.0	24.0	24.0	23.0	17.0	11.0	7.0	11.0	19.0	18.0	18.0		
AVG:	20.00	22.00	28.00	27.00	27.00	30.00	26.00	28.00				22.00	18.00	18.00	24.00	24.00	23.00	17.00	11.00	7.00	11.00	19.00	18.00	18.00		

MONTHLY OBSERVATIONS: 21 MONTHLY MEAN: 20.86 MONTHLY MAX: 30.0

Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional review are shown in lower case. An asterisk ("*") indicates that the region has reviewed the value and does not concur with the qualifier.

QUALIFIER CODES:

Qualifier Code	Qualifier Description	Qualifier Type
AN	Machine Malfunction.	NULL
AV	Power Failure.	NULL
rf	Fire - Canadian.	REQEXC

Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional concurrence are shown in lower case.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

User ID: JPOPE

RAW DATA REPORT

Report Request ID: 2232981 Report Code: AMP350 Oct. 17, 2024

GEOGRAPHIC SELECTIONS

Tribal Code	State	County	Site	Parameter	POC	City	AQCR	UAR	CBSA	CSA	EPA Region
	37	119	0045								
	37	057	0002								

PROTOCOL SELECTIONS

Parameter Classification	Parameter	Method	Duration
CRITERIA	88101		

SELECTED OPTIONS

Option Type	Option Value
INCLUDE NULLS	YES
DAILY STATISTICS	MAXIMUM
UNITS	STANDARD
RAW DATA EVENTS	INCLUDE EVENTS
MERGE PDF FILES	YES
AGENCY ROLE	PQAO

SORT ORDER

Order	Column
1	STATE_CODE
2	COUNTY_CODE
3	SITE_ID
4	PARAMETER_CODE
5	POC

DATE CRITERIA

Start Date	End Date
2023 07 17	2023 07 18

APPLICABLE STANDARDS

Standard Description
PM25 Annual 2024

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
RAW DATA REPORT

Oct. 17, 2024

(88101) PM2.5 - Local Conditions

SITE ID: 37-057-0002 POC: 1
COUNTY: (057) Davidson
CITY: (38060) Lexington
SITE ADDRESS: 938 S.SALISBURY ST
SITE COMMENTS: SITE LOCATED AT WATER TOWER AT CORNER HWY 8 & MAIN ST.
MONITOR COMMENTS: ID2=409

STATE: (37) North Carolina
AQCR: (136) NORTHERN PIEDMONT
URBANIZED AREA: (0000) NOT IN AN URBAN AREA
LAND USE: COMMERCIAL
LOCATION SETTING: URBAN AND CENTER CITY

CAS NUMBER:
LATITUDE: 35.8145
LONGITUDE: -80.2627
UTM ZONE:
UTM NORTHING:
UTM EASTING:
ELEVATION-MSL: 241
PROBE HEIGHT: 2

SUPPORT AGENCY: (0776) North Carolina Dept Of Environmental Quality
MONITOR TYPE: SLAMS
COLLECTION AND ANALYSIS METHOD: (145) R & P Model 2025 PM-2.5 Sequential
PQAO: (0776) North Carolina Dept Of Environmental Quality

REPORT FOR: 2023

DURATION: 24 HOUR
UNITS: Micrograms/cubic meter (LC)
MIN DETECTABLE: 2

MONTH

Day	JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
1												
2												
3												
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5												
6												
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31												
NO.:	0	0	0	0	0	0	1	0	0	0	0	0
MAX:							41.2					
MEAN:							41.20					

ANNUAL OBSERVATIONS: 1 ANNUAL MEAN: 41.20 ANNUAL MAX: 41.2

Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional review are shown in lower case. An asterisk ("*") indicates that the region has reviewed the value and does not concur with the qualifier.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
RAW DATA REPORT

Oct. 17, 2024

(88101) PM2.5 - Local Conditions

SITE ID: 37-057-0002 POC: 3
COUNTY: (057) Davidson
CITY: (38060) Lexington
SITE ADDRESS: 938 S.SALISBURY ST
SITE COMMENTS: SITE LOCATED AT WATER TOWER AT CORNER HWY 8 & MAIN ST.
MONITOR COMMENTS: ID2=409

STATE: (37) North Carolina
AQCR: (136) NORTHERN PIEDMONT
URBANIZED AREA: (0000) NOT IN AN URBAN AREA
LAND USE: COMMERCIAL
LOCATION SETTING: URBAN AND CENTER CITY

CAS NUMBER:
LATITUDE: 35.8145
LONGITUDE: -80.2627
UTM ZONE:
UTM NORTHING:
UTM EASTING:
ELEVATION-MSL: 241
PROBE HEIGHT: 2.4

SUPPORT AGENCY: (0776) North Carolina Dept Of Environmental Quality
MONITOR TYPE: SLAMS
COLLECTION AND ANALYSIS METHOD: (170) Met One BAM-1020 Mass Monitor w/VS
PQAO: (0776) North Carolina Dept Of Environmental Quality

REPORT FOR: JULY 2023

DURATION: 1 HOUR
UNITS: Micrograms/cubic meter (LC)
MIN DETECTABLE: 5

DAY	HOUR 0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	OBS	MAXIMUM
1																									0	
2																									0	
3																									0	
4																									0	
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17	14.0rf	26.0rf	15.0rf	9.0rf	15.0rf	16.0rf	20.0rf	30.0rf	21.0rf	28.0rf	41.0rf	43.0rf	43.0rf	50.0rf	51.0rf	49.0rf	49.0rf	55.0rf	55.0rf	58.0rf	56.0rf	61.0rf	65.0rf	58.0rf	24	65.0
18	60.0rf	60.0rf	57.0rf	55.0rf	58.0rf	56.0rf	58.0rf	52.0rf	57.0rf	43.0rf	25.0rf	16.0rf	26.0rf	26.0rf	24.0rf	34.0rf	32.0rf	42.0rf	36.0rf	39.0rf	39.0rf	39.0rf	39.0rf	43.0rf	24	60.0
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NO.:	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		
MAX:	60.0	60.0	57.0	55.0	58.0	56.0	58.0	52.0	57.0	43.0	41.0	43.0	43.0	50.0	51.0	49.0	49.0	55.0	55.0	58.0	56.0	61.0	65.0	58.0		
AVG:	37.00	43.00	36.00	32.00	36.50	36.00	39.00	41.00	39.00	35.50	33.00	29.50	34.50	38.00	37.50	41.50	40.50	48.50	45.50	48.50	47.50	50.00	52.00	50.50		

MONTHLY OBSERVATIONS: 48 MONTHLY MEAN: 40.50 MONTHLY MAX: 65.0

Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional review are shown in lower case. An asterisk ("*") indicates that the region has reviewed the value and does not concur with the qualifier.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AIR QUALITY SYSTEM
RAW DATA REPORT

Oct. 17, 2024

(88101) PM2.5 - Local Conditions

SITE ID: 37-119-0045 POC: 3
COUNTY: (119) Mecklenburg
CITY: (12000) Charlotte
SITE ADDRESS: 1030 Remount Road
SITE COMMENTS:
MONITOR COMMENTS:

STATE: (37) North Carolina
AQCR: (167) METROPOLITAN CHARLOTTE
URBANIZED AREA: (1510) CHARLOTTE, NC
LAND USE: INDUSTRIAL
LOCATION SETTING: URBAN AND CENTER CITY

CAS NUMBER:
LATITUDE: 35.213171
LONGITUDE: -80.874084
UTM ZONE:
UTM NORTHING:
UTM EASTING:
ELEVATION-MSL: 194
PROBE HEIGHT: 2

SUPPORT AGENCY: (0669) Mecklenburg County Air Quality
MONITOR TYPE: SLAMS
COLLECTION AND ANALYSIS METHOD: (209) Met One BAM-1022 Mass Monitor w/ V
PQAO: (0669) Mecklenburg County Air Quality

REPORT FOR: JULY 2023

DURATION: 1 HOUR
UNITS: Micrograms/cubic meter (LC)
MIN DETECTABLE: 5

DAY	HOUR 0000	0100	0200	0300	0400	0500	0600	0700	0800	0900	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900	2000	2100	2200	2300	OBS	MAXIMUM
1																									0	
2																									0	
3																									0	
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17	15.0rf	20.0rf	20.0rf	18.0rf	17.0rf	21.0rf	24.0rf	22.0rf	31.0rf	40.0rf	37.0rf	52.0rf	51.0rf	55.0rf	55.0rf	57.0rf	57.0rf	65.0rf	58.0rf	62.0rf	63.0rf	63.0rf	64.0rf	65.0rf	24	65.0
18	68.0rf	66.0rf	64.0rf	64.0rf	61.0rf	57.0rf	57.0rf	50.0rf	47.0rf	46.0rf	46.0rf	44.0rf	47.0rf	42.0rf	38.0rf	28.0rf	34.0rf	29.0rf	32.0rf	40.0rf	33.0rf	35.0rf	37.0rf	42.0rf	24	68.0
19																									0	
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31																									0	
NO.:	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2		
MAX:	68.0	66.0	64.0	64.0	61.0	57.0	57.0	50.0	47.0	46.0	46.0	52.0	51.0	55.0	55.0	57.0	57.0	65.0	58.0	62.0	63.0	63.0	64.0	65.0		
AVG:	41.50	43.00	42.00	41.00	39.00	39.00	40.50	36.00	39.00	43.00	41.50	48.00	49.00	48.50	46.50	42.50	45.50	47.00	45.00	51.00	48.00	49.00	50.50	53.50		

MONTHLY OBSERVATIONS: 48 MONTHLY MEAN: 44.56 MONTHLY MAX: 68.0

Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional review are shown in lower case. An asterisk ("*") indicates that the region has reviewed the value and does not concur with the qualifier.

QUALIFIER CODES:

Qualifier Code	Qualifier Description	Qualifier Type
rf	Fire - Canadian.	REQEXC

Note: Qualifier codes with regional concurrence are shown in upper case, and those without regional concurrence are shown in lower case.

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Appendix B: Additional Tier 2 Evidence for 6/6/2023

station	valid	metar
JQF	2023-06-06 00:50	KJQF 060050Z 00000KT 10SM BKN042 21/18 A2995
JQF	2023-06-06 01:50	KJQF 060150Z 00000KT 10SM CLR 20/17 A2996
JQF	2023-06-06 02:50	KJQF 060250Z 00000KT 10SM CLR 18/17 A2997
JQF	2023-06-06 04:20	KJQF 060420Z AUTO 00000KT 7SM CLR 17/16 A2997 RMK AO2
JQF	2023-06-06 04:40	KJQF 060440Z AUTO 00000KT 7SM CLR 17/16 A2997 RMK AO2
JQF	2023-06-06 05:00	KJQF 060500Z AUTO 00000KT 7SM CLR 17/16 A2997 RMK AO2
JQF	2023-06-06 05:20	KJQF 060520Z AUTO 00000KT 7SM SCT037 17/16 A2997 RMK AO2
JQF	2023-06-06 05:40	KJQF 060540Z AUTO 00000KT 7SM SCT037 17/16 A2997 RMK AO2
JQF	2023-06-06 06:00	KJQF 060600Z AUTO 00000KT 5SM BR CLR 17/16 A2996 RMK AO2 LTG DSNT W
JQF	2023-06-06 06:20	KJQF 060620Z AUTO 00000KT 2 1/2SM BR CLR 16/15 A2996 RMK AO2
JQF	2023-06-06 06:40	KJQF 060640Z AUTO 00000KT 4SM BR CLR 16/16 A2996 RMK AO2
JQF	2023-06-06 07:00	KJQF 060700Z AUTO 00000KT 2 1/2SM BR SCT030 16/15 A2996 RMK AO2 VIS 1V5
JQF	2023-06-06 07:20	KJQF 060720Z AUTO 00000KT 5SM BR SCT030 16/15 A2996 RMK AO2 LTG DSNT SW
JQF	2023-06-06 07:40	KJQF 060740Z AUTO 00000KT 3SM BR BKN030 16/16 A2995 RMK AO2
JQF	2023-06-06 08:00	KJQF 060800Z AUTO 00000KT 5SM BR OVC030 17/16 A2995 RMK AO2 LTG DSNT S
JQF	2023-06-06 08:20	KJQF 060820Z AUTO 00000KT 5SM BR OVC030 17/17 A2995 RMK AO2 LTG DSNT SW
JQF	2023-06-06 08:40	KJQF 060840Z AUTO 00000KT 7SM BKN029 OVC035 17/17 A2994 RMK AO2
JQF	2023-06-06 09:00	KJQF 060900Z AUTO 00000KT 4SM BR SCT027 BKN037 17/16 A2994 RMK AO2
JQF	2023-06-06 09:20	KJQF 060920Z AUTO 00000KT 5SM BR BKN027 17/16 A2994 RMK AO2
JQF	2023-06-06 09:40	KJQF 060940Z AUTO 00000KT 2SM BR SCT027 BKN037 16/16 A2994 RMK AO2
JQF	2023-06-06 10:00	KJQF 061000Z AUTO 00000KT 5SM BR SCT039 16/16 A2994 RMK AO2
JQF	2023-06-06 10:20	KJQF 061020Z AUTO 00000KT 5SM BR BKN026 BKN039 16/16 A2994 RMK AO2
JQF	2023-06-06 10:40	KJQF 061040Z AUTO 00000KT 5SM BR SCT026 OVC039 17/16 A2994 RMK AO2
JQF	2023-06-06 10:50	KJQF 061050Z 00000KT 4SM BR BKN024 OVC037 17/17 A2994
JQF	2023-06-06 11:00	KJQF 061100Z AUTO 00000KT 5SM BR BKN026 BKN033 OVC039 17/16 A2994 RMK AO2
JQF	2023-06-06 11:50	KJQF 061150Z 00000KT 7SM OVC028 19/18 A2994
JQF	2023-06-06 12:50	KJQF 061250Z 00000KT 7SM OVC023 21/19 A2994
JQF	2023-06-06 13:50	KJQF 061350Z 28004KT 10SM CLR 23/18 A2993
JQF	2023-06-06 14:50	KJQF 061450Z 31006KT 10SM SCT022 24/18 A2993
JQF	2023-06-06 15:50	KJQF 061550Z 29005KT 10SM SCT022 26/19 A2992
JQF	2023-06-06 16:50	KJQF 061650Z 28003KT 10SM FEW022 27/17 A2991
JQF	2023-06-06 17:50	KJQF 061750Z 32008KT 10SM SCT041 27/15 A2989
JQF	2023-06-06 18:50	KJQF 061850Z 32008KT 10SM SCT041 28/15 A2988
JQF	2023-06-06 19:50	KJQF 061950Z 35008G15KT 10SM CLR 28/11 A2986
JQF	2023-06-06 20:50	KJQF 062050Z 01010G15KT **6SM FU** BR CLR 28/07 A2984
JQF	2023-06-06 21:50	KJQF 062150Z 02006G12KT **5SM FU** BR CLR 28/09 A2983
JQF	2023-06-06 22:50	KJQF 062250Z 36004G12KT **5SM FU** BR CLR 27/09 A2982
JQF	2023-06-06 23:50	KJQF 062350Z 05004KT **5SM FU** BR CLR 26/11 A2983

***Figure 120-B**: Hourly METAR reports from Concord Regional Airport (KJQF) on June 6th, 2023. "FU" is abbreviation for smoke.*

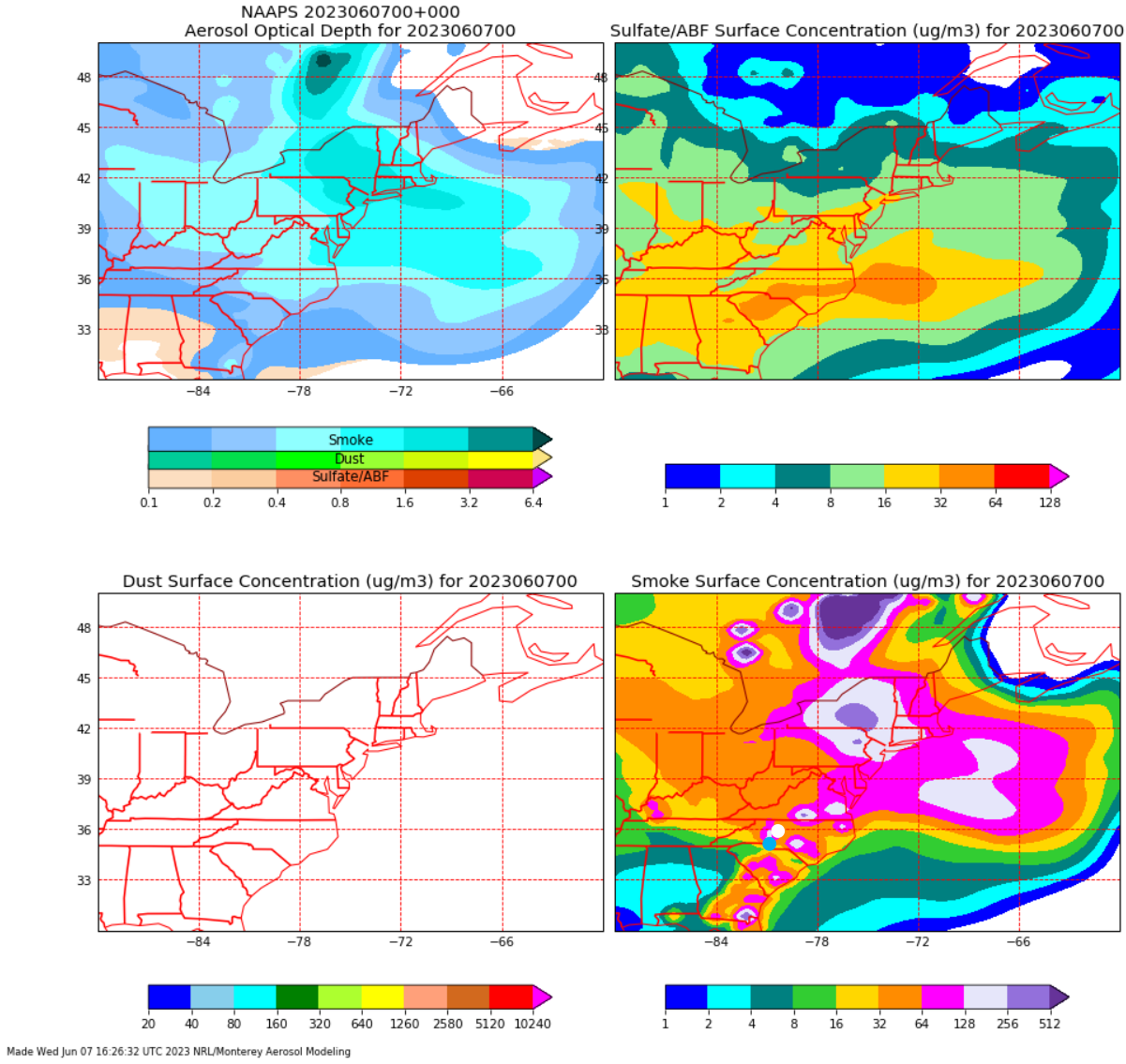

***Figure 121-B**: NAAPs Global Aerosol Model initialization / analysis at 8:00 pm on June 6th, 2023. The white and blue circles on the bottom right plot show the approximate locations of the Lexington and Remount monitors, respectively.*

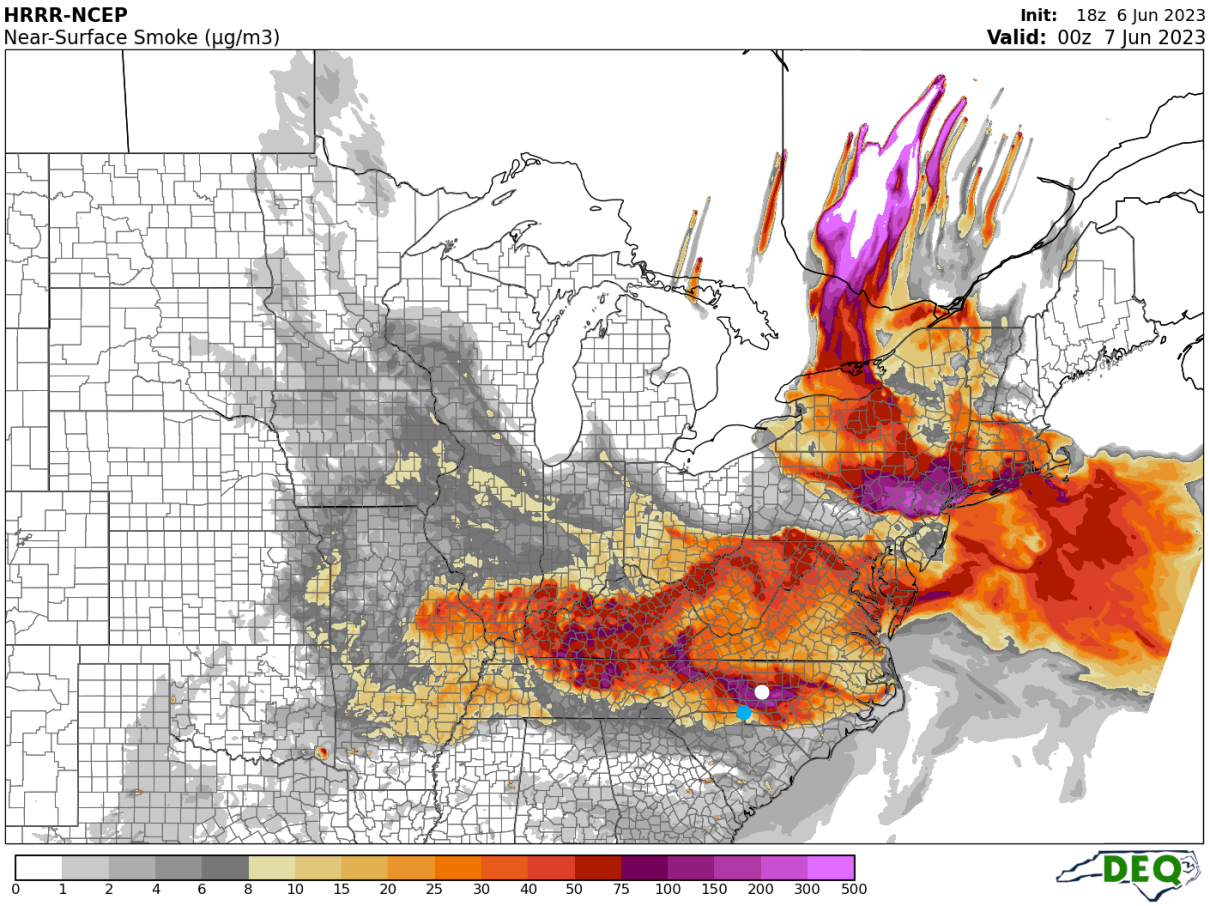

***Figure 122-B**: HRRR-NCEP Smoke model output, initialized at 2:00 pm June 6th, showing near-surface smoke at 8:00 pm on June 6th. The white and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

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Appendix C: Additional Tier 2 Evidence for 6/8/2023

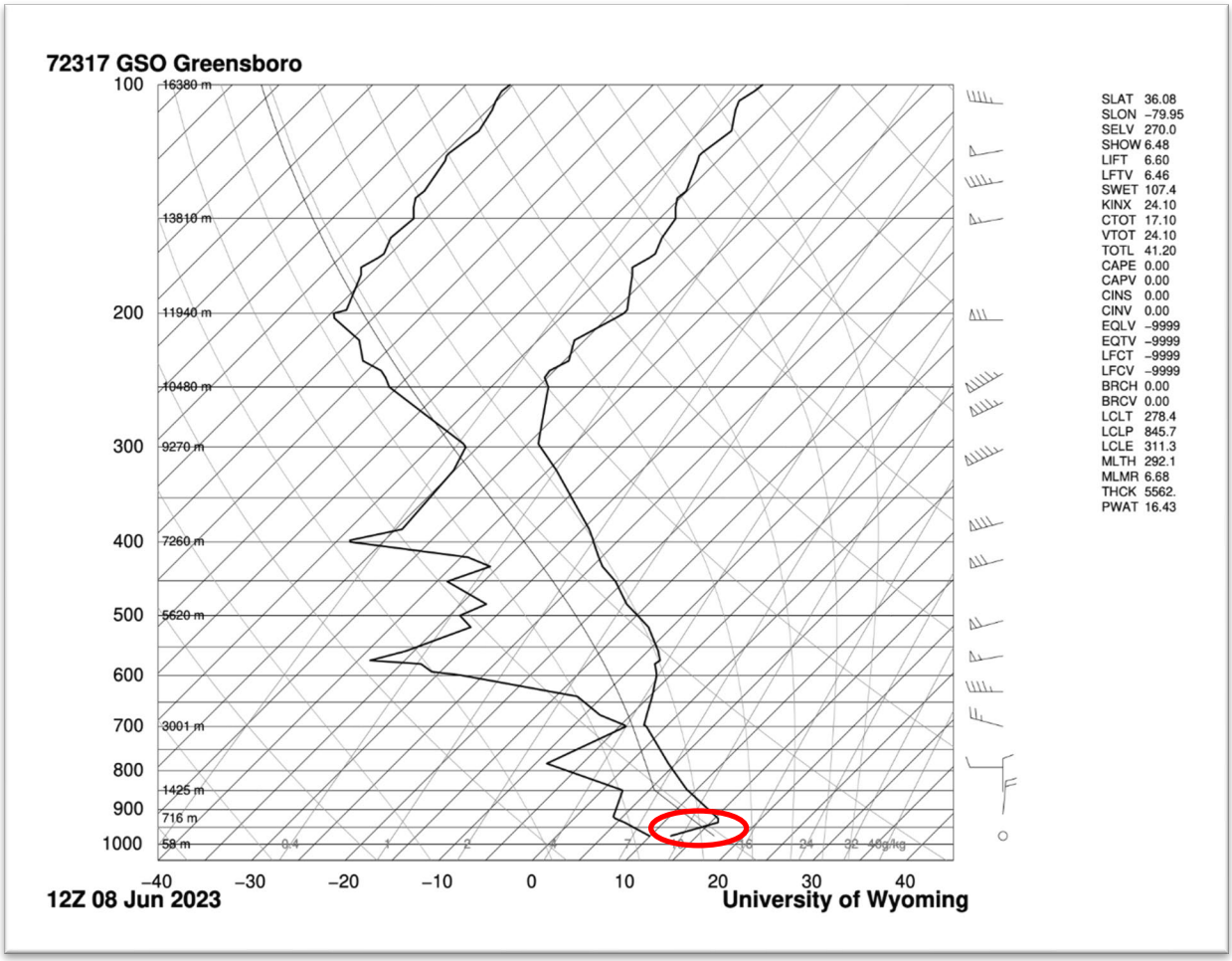

***Figure 123-C**: KGSO 8:00 am, June 8th, 2023 observed radiosonde sounding. Strong surface temperature inversion circled in red.*

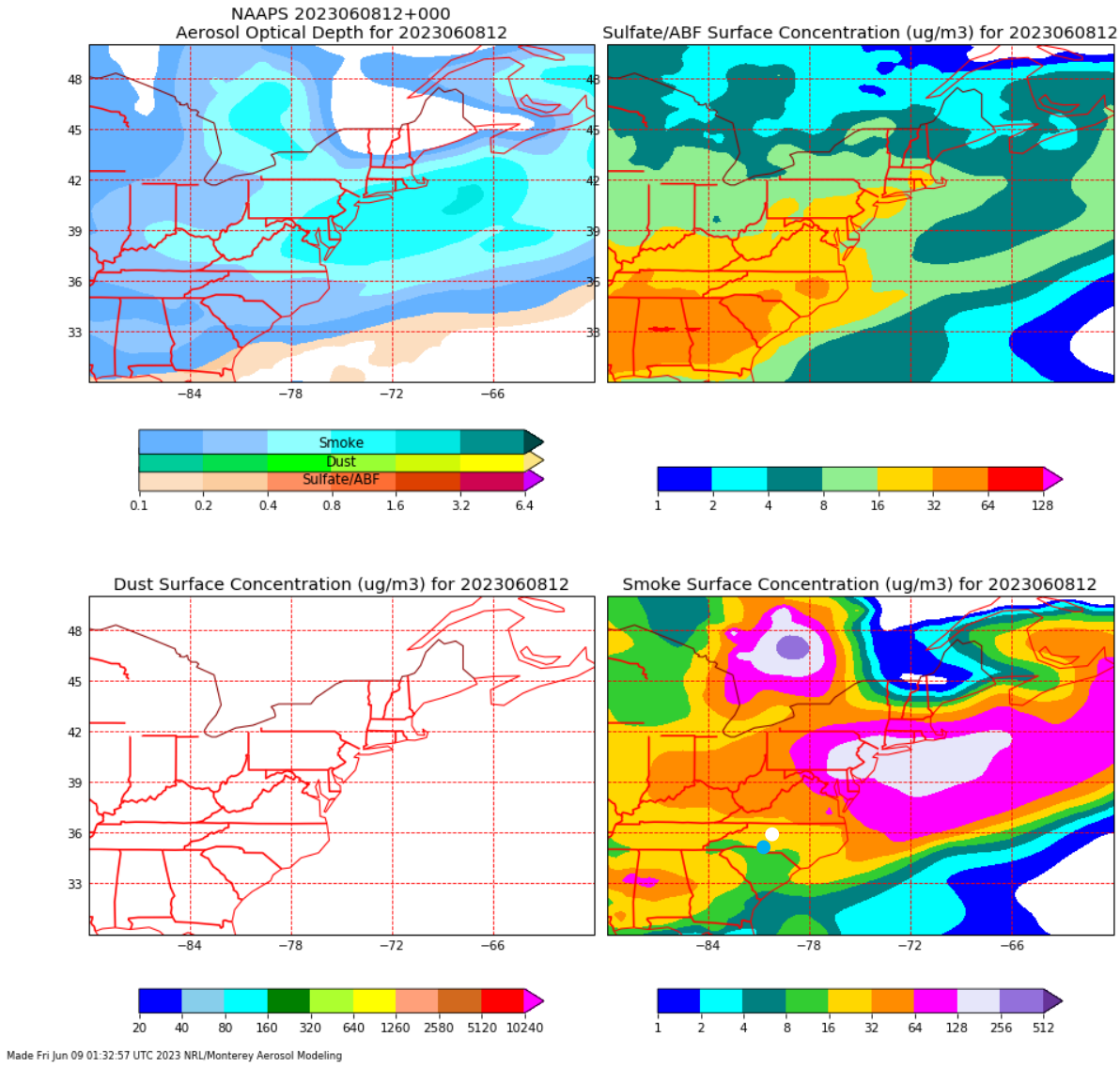

***Figure 124-C**: NAAPs Global Aerosol Model initialization / analysis at 8:00 am on June 8th, 2023. The white and blue circles on the bottom right plot show the approximate locations of the Lexington and Remount monitors, respectively.*

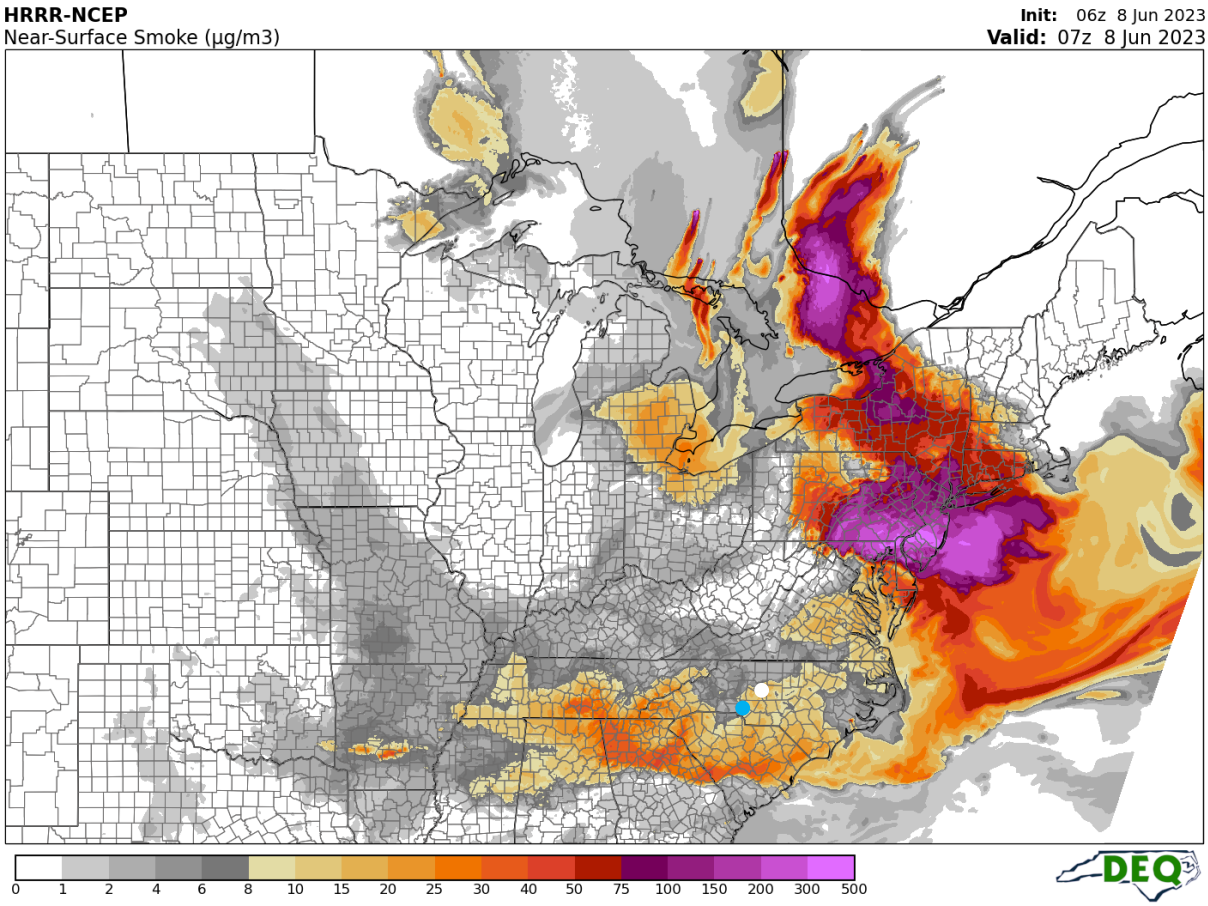

***Figure 125-C**: HRRR-NCEP Smoke model output, initialized at 2:00 am June 8th, showing near-surface smoke at 3:00 am on June 8th. The white and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

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Appendix D: Additional Tier 2 Evidence for 6/9/2023

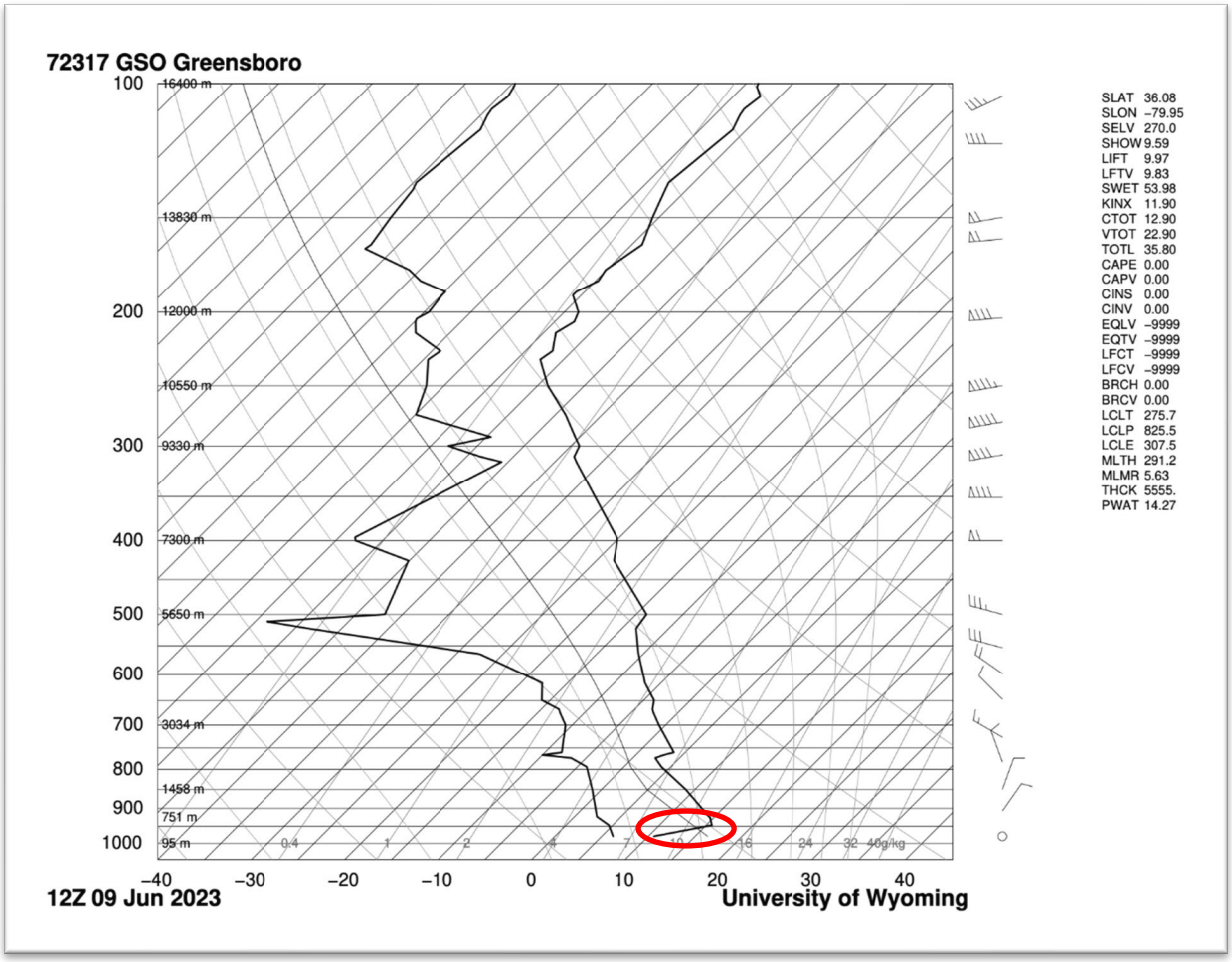

***Figure 126-D**: KGSO 8:00 am, June 9th, 2023 observed radiosonde sounding. Strong surface temperature inversion circled in red.*

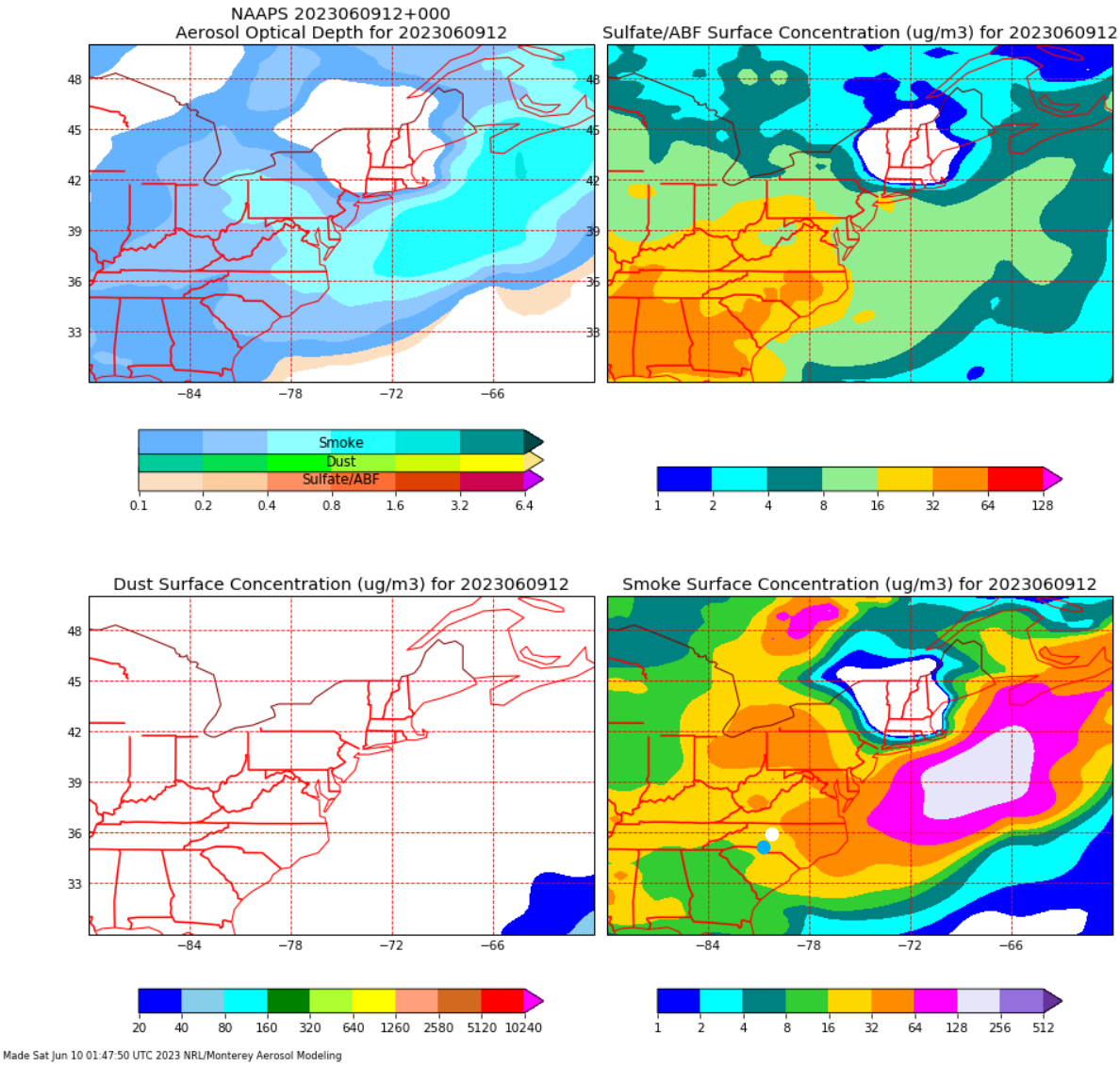

***Figure 127-D**: NAAPs Global Aerosol Model initialization / analysis at 8:00 am on June 9th, 2023. The white and blue circles on the bottom right plot show the approximate locations of the Lexington and Remount monitors, respectively.*

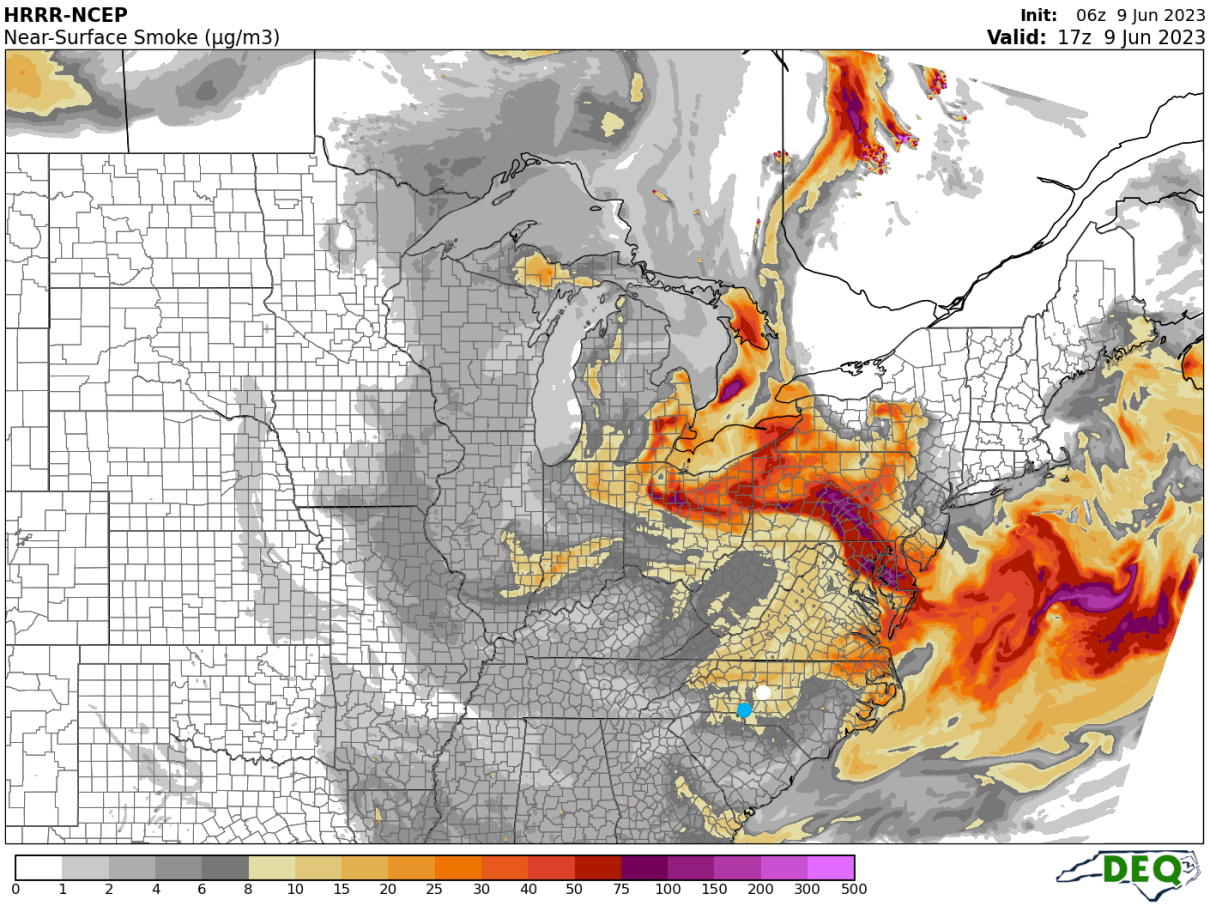

***Figure 128-D**: HRRR-NCEP Smoke model output, initialized at 2:00 am June 9th, showing near-surface smoke at 1:00 pm on June 9th. The white and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

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Appendix E: Additional Tier 2 Evidence for 6/10/2023

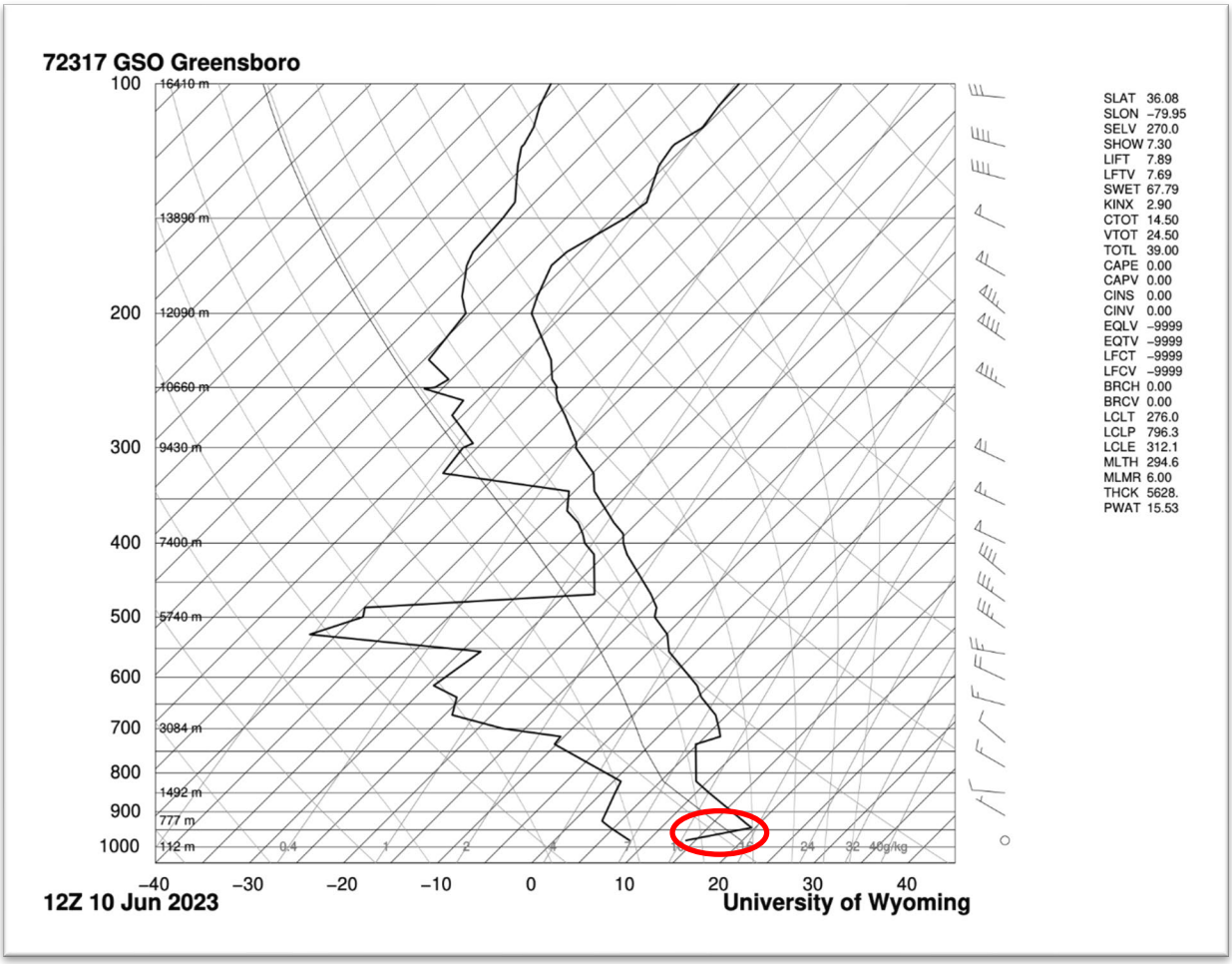

***Figure 129-E**: KGSO 8:00 am, June 10th, 2023 observed radiosonde sounding. Strong surface temperature inversion circled in red.*

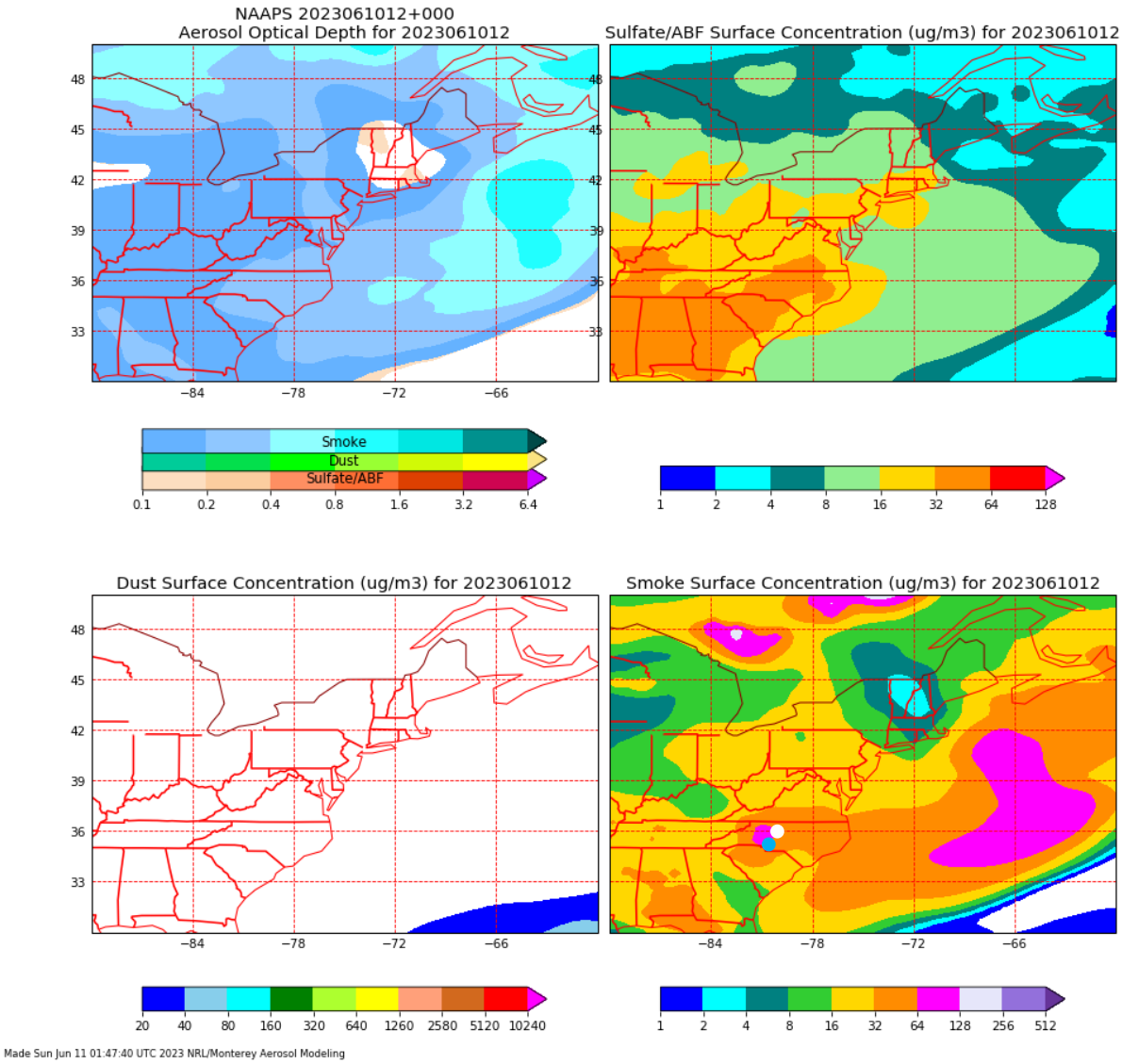

***Figure 130-E**: NAAPs Global Aerosol Model initialization / analysis at 8:00 am on June 10th, 2023. The white and blue circles on the bottom right plot show the approximate locations of the Lexington and Remount monitors, respectively.*

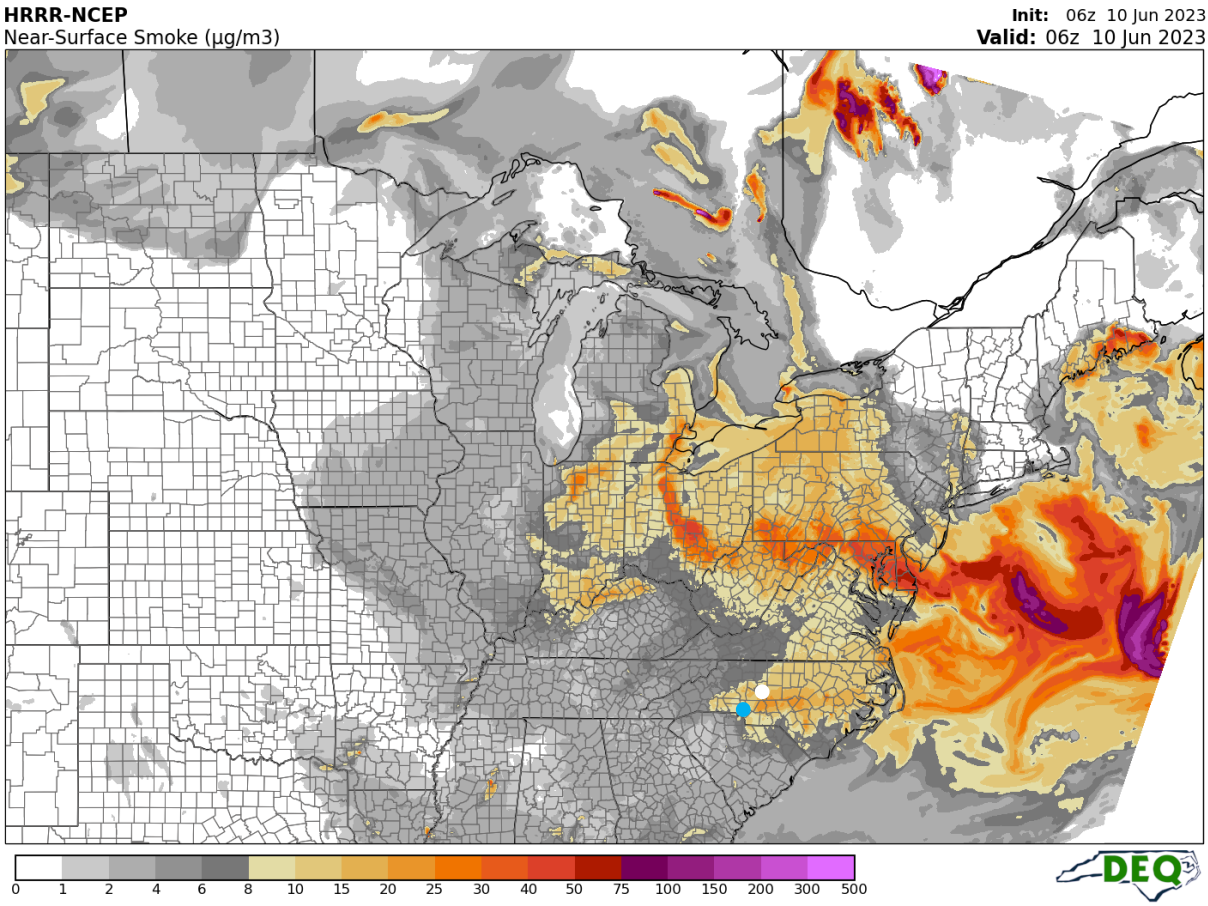

***Figure 131-E**: HRRR-NCEP Smoke model output, initialized at 2:00 am June 10th, showing near-surface smoke at 2:00 am on June 10th. The white and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

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Appendix F: Additional Tier 2 Evidence for 6/11/2023

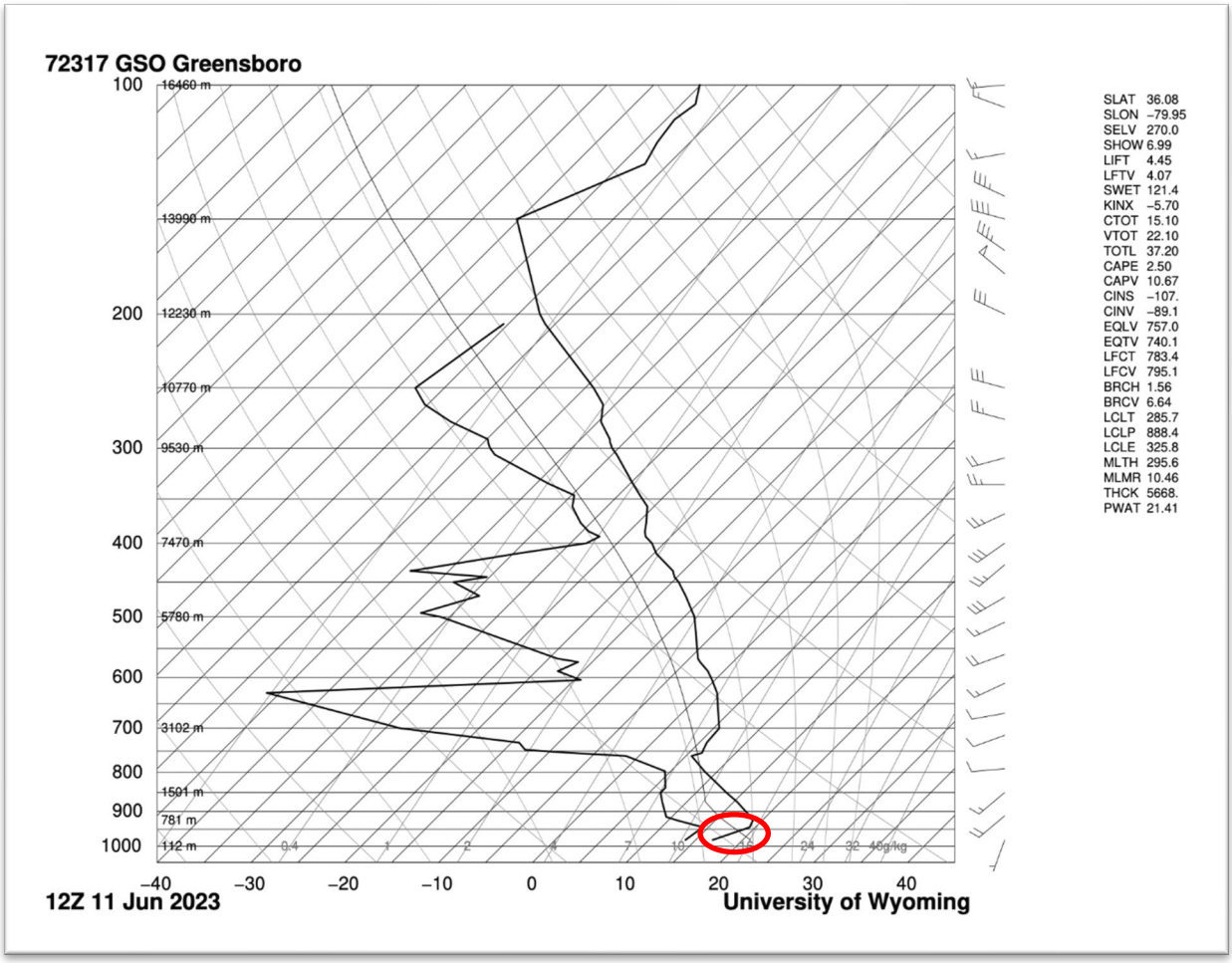

***Figure 132-F**: KGSO 8:00 am, June 11th, 2023 observed radiosonde sounding. Strong surface temperature inversion circled in red.*

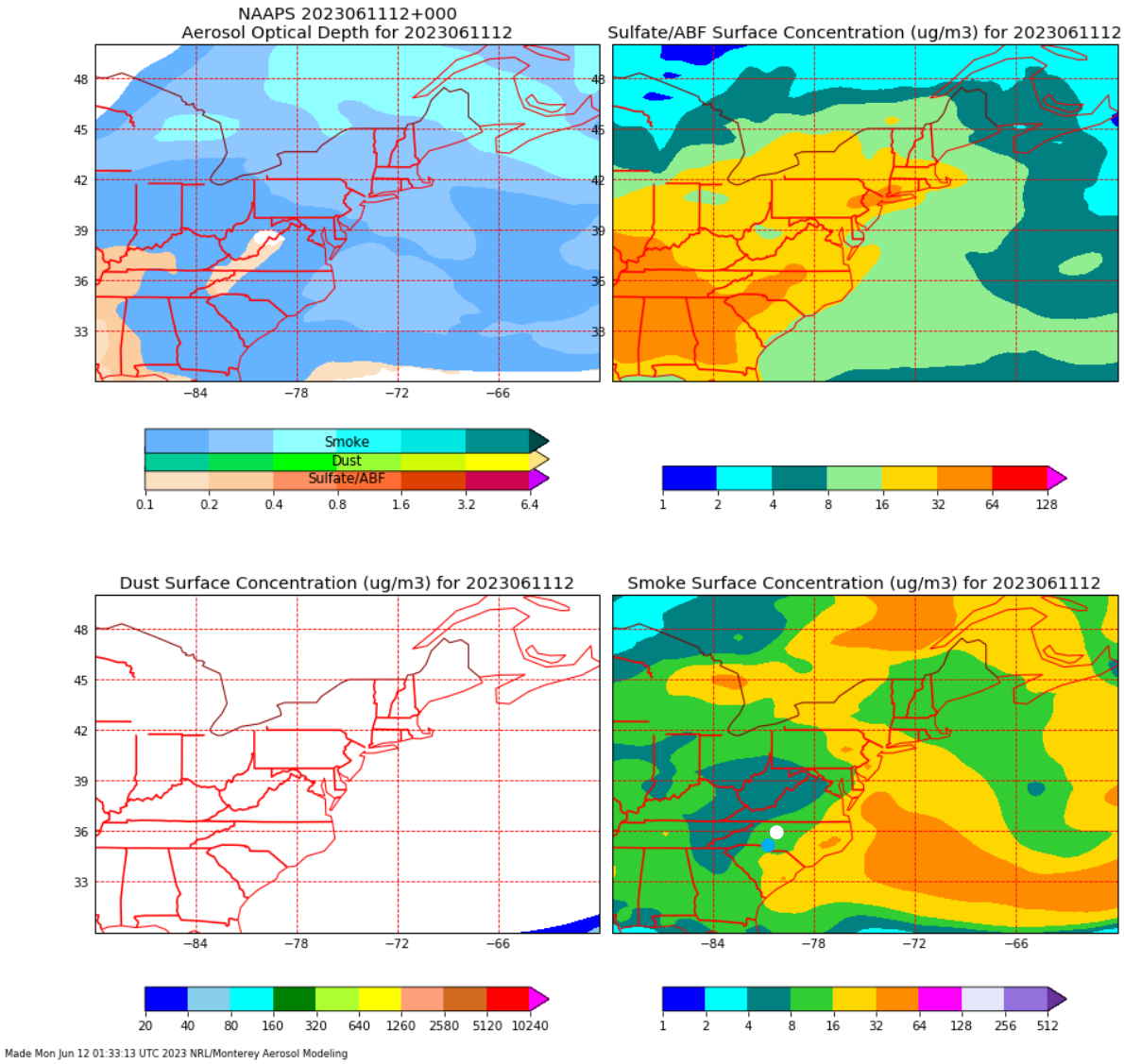

***Figure 133-F**: NAAPs Global Aerosol Model initialization / analysis at 8:00 am on June 11th, 2023. The white and blue circles on the bottom right plot show the approximate locations of the Lexington and Remount monitors, respectively.*

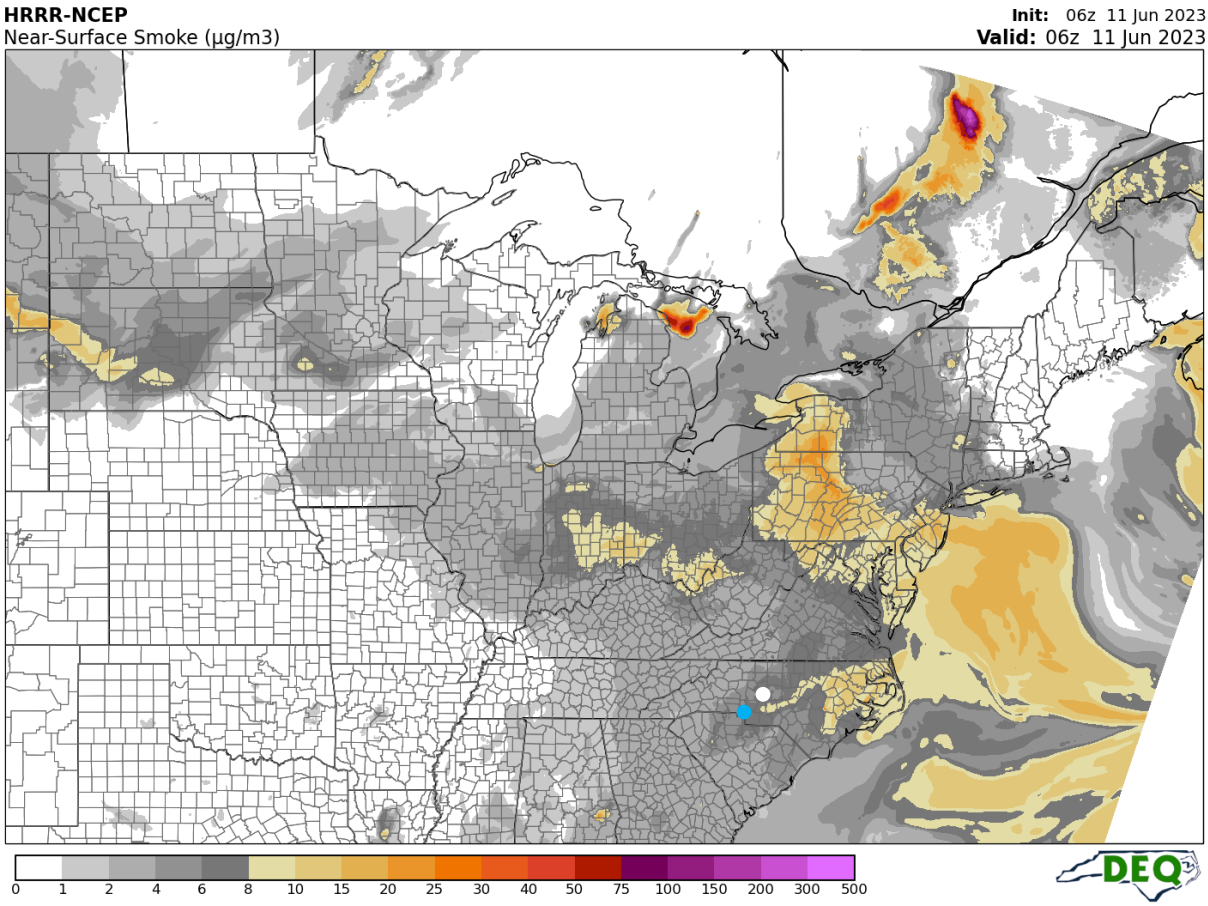

***Figure 134-F**: HRRR-NCEP Smoke model output, initialized at 2:00 am June 11th, showing near-surface smoke at 2:00 am on June 11th. The white and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

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Appendix G: Additional Tier 2 Evidence for 6/17/2023

"AVIATION /20Z SATURDAY THROUGH THURSDAY/... At KCLT and elsewhere: ***Smoke from Canadian wildfires is once again circulating into the Terminal Forecast Area****, and has resulted in some brief reduction to MVFR visby in a few areas so far today. This trend could continue/resume, especially overnight into early Sunday, but this is far from certain, and have opted for a VFR/convection- free forecast in light of a dry low level air mass."*

Figure 135-G*: NWS GSP Aviation Forecast Discussion on June 17th, 2023.*

station	valid	metar
CLT	2023-06-17 00:52	KCLT 170052Z 24004KT 8SM FEW250 27/15 A2974 RMK AO2 SLP074 T02670150
CLT	2023-06-17 01:52	KCLT 170152Z 21005KT 8SM CLR 26/15 A2977 RMK AO2 SLP085 T02560150
CLT	2023-06-17 02:52	KCLT 170252Z 28005KT 8SM FEW075 24/16 A2980 RMK AO2 SLP097 T02390161 53028
CLT	2023-06-17 03:52	KCLT 170352Z 01006KT 8SM FEW075 23/16 A2982 RMK AO2 SLP103 T02280161
CLT	2023-06-17 04:52	KCLT 170452Z 01008KT **6SM HZ** CLR 23/13 A2983 RMK AO2 SLP104 T02330133 403220194
CLT	2023-06-17 05:52	KCLT 170552Z 03006KT **6SM HZ** CLR 22/12 A2983 RMK AO2 SLP106 T02170117 10289 20217 51008
CLT	2023-06-17 06:52	KCLT 170652Z 03004KT 7SM CLR 21/11 A2985 RMK AO2 SLP111 T02060111
CLT	2023-06-17 07:52	KCLT 170752Z 01006KT 7SM CLR 19/11 A2985 RMK AO2 SLP114 T01890106
CLT	2023-06-17 08:52	KCLT 170852Z 24003KT 7SM CLR 18/12 A2986 RMK AO2 SLP115 T01830117 51009
CLT	2023-06-17 09:52	KCLT 170952Z 28003KT **6SM HZ** CLR 17/12 A2987 RMK AO2 SLP121 T01720122
CLT	2023-06-17 10:52	KCLT 171052Z 00000KT **5SM HZ** CLR 17/13 A2990 RMK AO2 SLP129 T01720128
CLT	2023-06-17 11:52	KCLT 171152Z 36004KT **5SM HZ** CLR 19/13 A2991 RMK AO2 SLP134 T01940133 10217 20161 53018
CLT	2023-06-17 12:52	KCLT 171252Z 02005KT **6SM HZ** CLR 22/13 A2992 RMK AO2 SLP139 T02170133
CLT	2023-06-17 13:52	KCLT 171352Z 03007KT 7SM CLR 23/13 A2992 RMK AO2 SLP138 T02330128
CLT	2023-06-17 14:52	KCLT 171452Z 34007KT 8SM CLR 25/13 A2992 RMK AO2 SLP137 T02500128 50003
CLT	2023-06-17 15:52	KCLT 171552Z VRB03KT 8SM CLR 27/13 A2992 RMK AO2 SLP136 T02670128
CLT	2023-06-17 16:52	KCLT 171652Z 00000KT 8SM CLR 26/12 A2990 RMK AO2 SLP132 T02560122
CLT	2023-06-17 17:52	KCLT 171752Z 28006KT 8SM FEW050 27/13 A2989 RMK AO2 SLP128 T02720128 10278 20194 58009
CLT	2023-06-17 18:52	KCLT 171852Z 16005KT 8SM FEW050 27/13 A2988 RMK AO2 SLP123 T02720128
CLT	2023-06-17 19:52	KCLT 171952Z 23005KT 7SM FEW055 29/13 A2987 RMK AO2 SLP121 T02890133
CLT	2023-06-17 20:52	KCLT 172052Z VRB04KT 7SM FEW060 29/13 A2985 RMK AO2 SLP115 T02940128 58013
CLT	2023-06-17 21:52	KCLT 172152Z 31004KT 7SM CLR 29/13 A2984 RMK AO2 SLP111 T02940128
CLT	2023-06-17 22:52	KCLT 172252Z 25003KT 7SM CLR 28/14 A2984 RMK AO2 SLP111 T02830139
CLT	2023-06-17 23:52	KCLT 172352Z 24004KT 7SM CLR 27/14 A2984 RMK AO2 SLP112 T02720139 10294 20272 55003

Figure 136-G*: Hourly METAR reports from Charlotte/Douglas International Airport (KCLT) on June 17th, 2023. "HZ" is abbreviation for haze.*

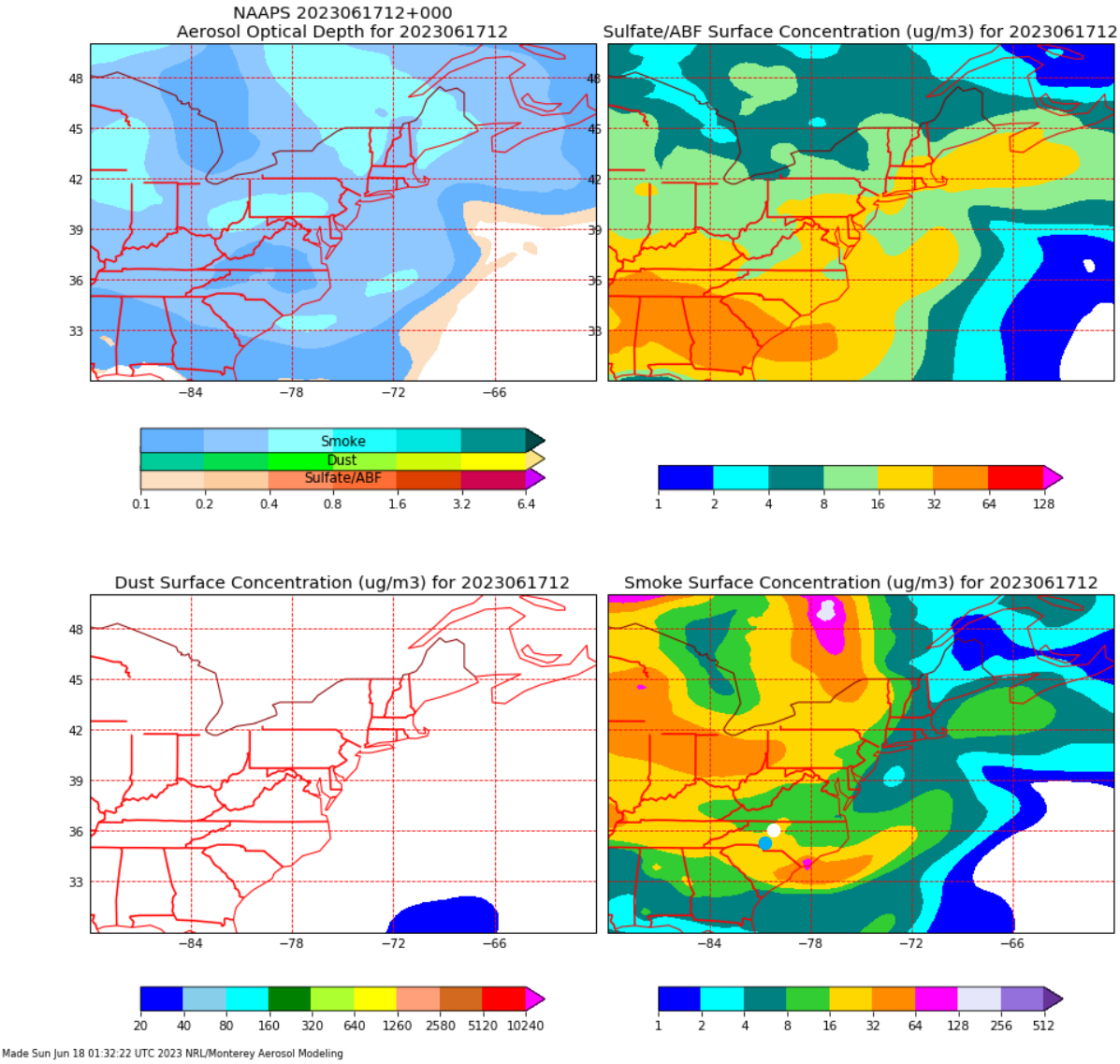

***Figure 137-G**: NAAPs Global Aerosol Model initialization / analysis at 8:00 am on June 17th, 2023. The white and blue circles on the bottom right plot show the approximate locations of the Lexington and Remount monitors, respectively.*

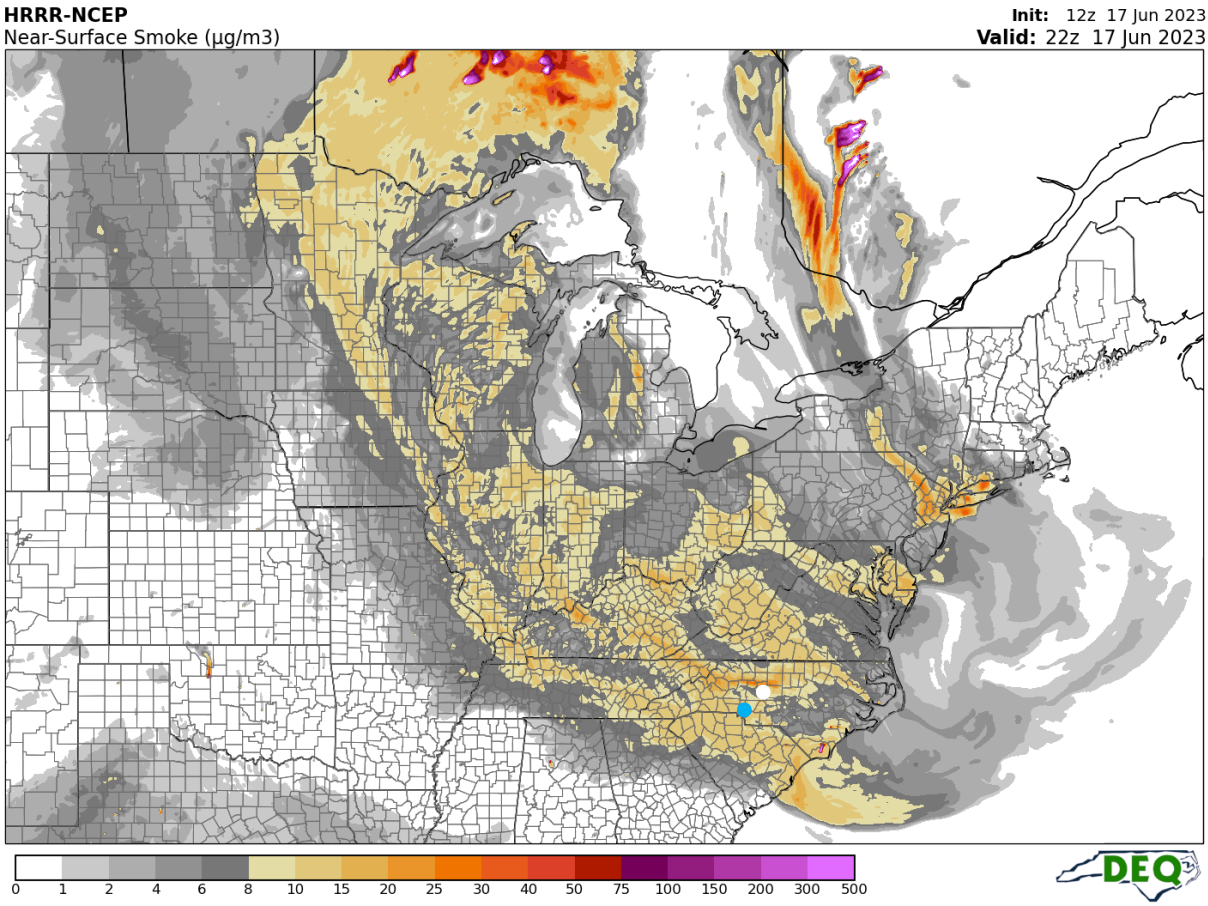

***Figure 138-G**: HRRR-NCEP Smoke model output, initialized at 8:00 am June 17th, showing near-surface smoke at 6:00 pm on June 17th. The white and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

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Appendix H: Additional Tier 2 Evidence for 6/18/2023

station	valid	metar
CLT	2023-06-18 00:52	KCLT 180052Z 21003KT 7SM FEW055 26/14 A2986 RMK AO2 SLP119 T02610144
CLT	2023-06-18 01:52	KCLT 180152Z 00000KT 7SM CLR 24/16 A2989 RMK AO2 SLP127 T02390156
CLT	2023-06-18 02:52	KCLT 180252Z 14003KT 7SM FEW075 25/15 A2991 RMK AO2 SLP133 T02500150 51022
CLT	2023-06-18 03:52	KCLT 180352Z 12003KT 7SM FEW070 23/15 A2991 RMK AO2 SLP134 T02330150
CLT	2023-06-18 04:52	KCLT 180452Z 00000KT 7SM FEW070 23/14 A2991 RMK AO2 SLP135 T02280144 402940161
CLT	2023-06-18 05:52	KCLT 180552Z 03008KT 8SM CLR 22/13 A2991 RMK AO2 SLP133 T02170133 10272 20200 58001
CLT	2023-06-18 06:52	KCLT 180652Z 04008KT 8SM CLR 22/12 A2990 RMK AO2 SLP131 T02170117
CLT	2023-06-18 07:52	KCLT 180752Z 03005KT 8SM CLR 21/12 A2990 RMK AO2 SLP130 T02060117
CLT	2023-06-18 08:52	KCLT 180852Z 34003KT 8SM CLR 19/12 A2991 RMK AO2 SLP133 T01890122 55000
CLT	2023-06-18 09:52	KCLT 180952Z 04005KT 8SM SCT060 19/12 A2992 RMK AO2 SLP138 T01890117
CLT	2023-06-18 10:52	KCLT 181052Z 07006KT 7SM FEW060 20/12 A2992 RMK AO2 SLP136 T02000117
CLT	2023-06-18 11:52	KCLT 181152Z 35005KT **6SM HZ** CLR 19/13 A2994 RMK AO2 SLP143 T01940133 10222 20183 53010
CLT	2023-06-18 12:52	KCLT 181252Z 36005KT 7SM FEW055 FEW250 22/13 A2996 RMK AO2 SLP151 T02170133
CLT	2023-06-18 13:52	KCLT 181352Z 04006KT 7SM FEW060 FEW250 24/13 A2996 RMK AO2 SLP153 T02390133
CLT	2023-06-18 14:52	KCLT 181452Z 08006KT 7SM FEW060 FEW250 26/13 A2995 RMK AO2 SLP147 T02560133 50004
CLT	2023-06-18 15:52	KCLT 181552Z 04004KT 8SM FEW065 SCT250 28/14 A2995 RMK AO2 SLP146 T02780139
CLT	2023-06-18 16:52	KCLT 181652Z 15004KT 8SM SCT250 28/13 A2994 RMK AO2 SLP143 T02830133
CLT	2023-06-18 17:52	KCLT 181752Z VRB05KT 8SM SCT060 SCT075 BKN250 29/13 A2992 RMK AO2 SLP138 T02940133 10300 20194 58009
CLT	2023-06-18 18:52	KCLT 181852Z 21009KT 8SM FEW060 BKN250 30/14 A2990 RMK AO2 SLP130 T03000144
CLT	2023-06-18 19:52	KCLT 181952Z VRB04KT 8SM FEW060 BKN250 30/15 A2989 RMK AO2 SLP125 T03000150
CLT	2023-06-18 20:52	KCLT 182052Z VRB04KT 7SM SCT060 BKN250 31/15 A2987 RMK AO2 SLP120 T03110150 56017
CLT	2023-06-18 21:52	KCLT 182152Z 28004KT **6SM HZ** SCT065 SCT200 BKN250 31/16 A2986 RMK AO2 SLP117 T03110161
CLT	2023-06-18 22:52	KCLT 182252Z 27004KT 7SM FEW060 FEW200 BKN250 31/16 A2985 RMK AO2 SLP114 T03060161
CLT	2023-06-18 23:52	KCLT 182352Z 36004KT 7SM FEW060 BKN250 28/16 A2986 RMK AO2 SLP119 T02830161 10317 20283 55003

***Figure 139-H**: Hourly METAR reports from Charlotte/Douglas International Airport (KCLT) on June 18th, 2023. "HZ" is abbreviation for haze.*

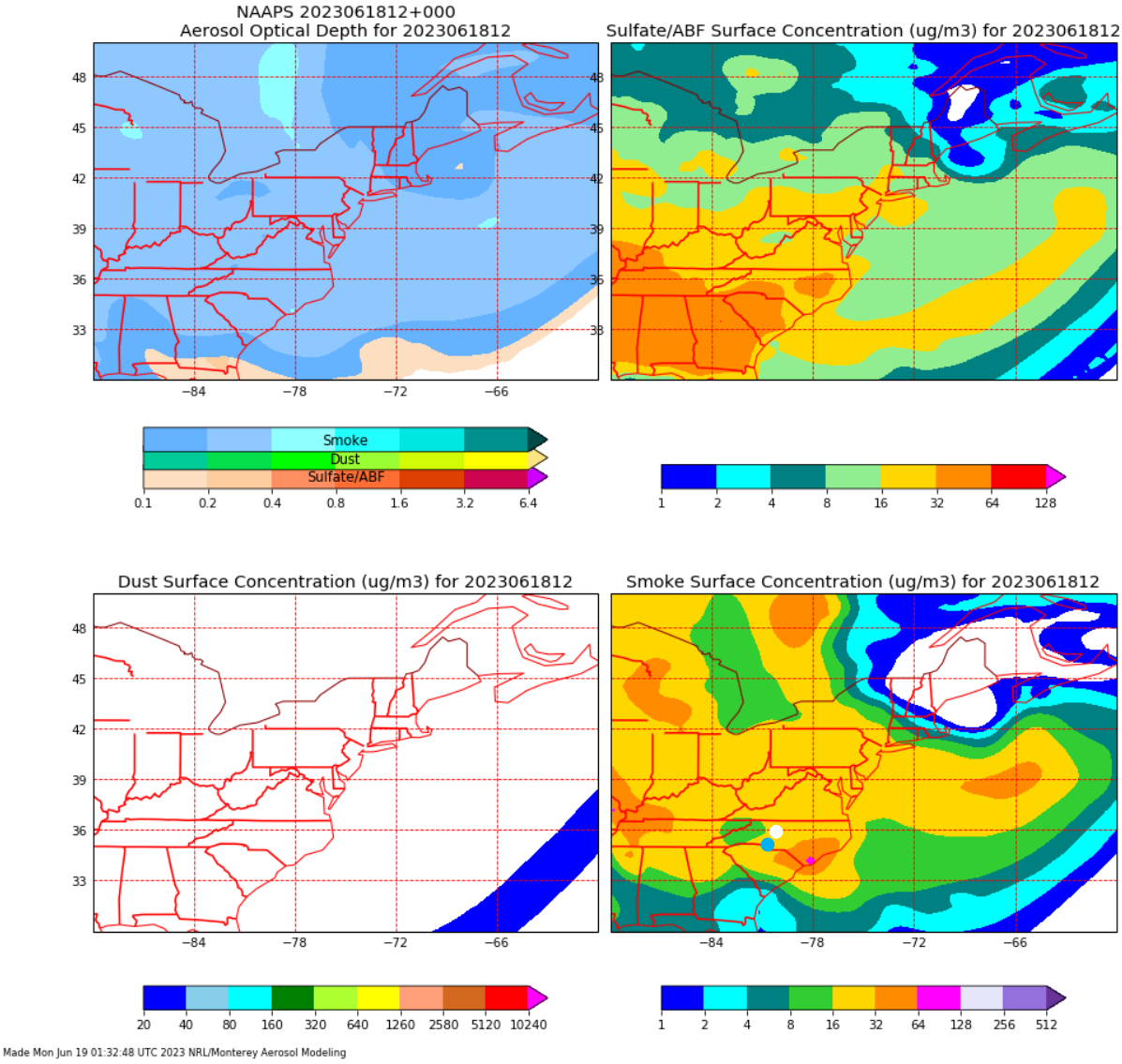

***Figure 140-H**: NAAPs Global Aerosol Model initialization / analysis at 8:00 am on June 18th, 2023. The white and blue circles on the bottom right plot show the approximate locations of the Lexington and Remount monitors, respectively.*

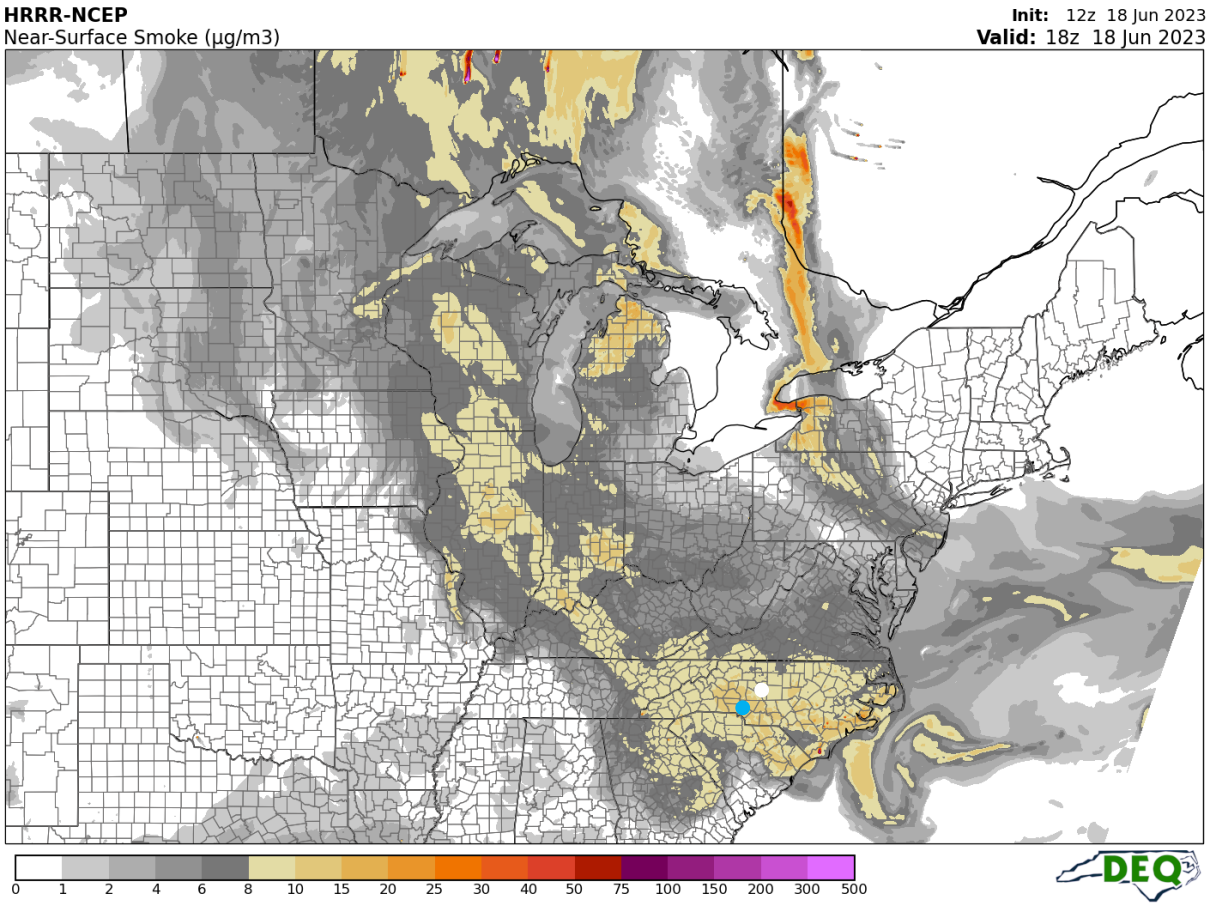

***Figure 141-H**: HRRR-NCEP Smoke model output, initialized at 8:00 am June 18th, showing near-surface smoke at 2:00 pm on June 18th. The white and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

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Appendix I: Additional Tier 2 Evidence for 6/28/2023

station	valid	metar
JQF	2023-06-28 00:50	KJQF 280050Z 00000KT 10SM CLR 26/17 A2985
JQF	2023-06-28 01:50	KJQF 280150Z 00000KT 10SM CLR 23/18 A2988
JQF	2023-06-28 02:50	KJQF 280250Z 00000KT 10SM CLR 23/18 A2990
JQF	2023-06-28 04:20	KJQF 280420Z AUTO 32005KT 10SM BKN110 23/17 A2993 RMK AO2
JQF	2023-06-28 04:40	KJQF 280440Z AUTO 32005KT 10SM BKN100 23/17 A2993 RMK AO2
JQF	2023-06-28 05:00	KJQF 280500Z AUTO 31005KT 10SM BKN100 22/17 A2993 RMK AO2
JQF	2023-06-28 05:20	KJQF 280520Z AUTO 31004KT 10SM BKN110 22/17 A2993 RMK AO2
JQF	2023-06-28 05:40	KJQF 280540Z AUTO 32005KT 10SM BKN110 22/17 A2993 RMK AO2
JQF	2023-06-28 06:00	KJQF 280600Z AUTO 33004KT 10SM SCT100 22/17 A2993 RMK AO2
JQF	2023-06-28 06:20	KJQF 280620Z AUTO 00000KT 10SM CLR 21/17 A2993 RMK AO2
JQF	2023-06-28 06:40	KJQF 280640Z AUTO 00000KT 10SM SCT075 20/17 A2993 RMK AO2
JQF	2023-06-28 07:00	KJQF 280700Z AUTO 00000KT 10SM CLR 20/17 A2993 RMK AO2
JQF	2023-06-28 07:20	KJQF 280720Z AUTO 00000KT 10SM CLR 19/17 A2993 RMK AO2
JQF	2023-06-28 07:40	KJQF 280740Z AUTO 00000KT 10SM CLR 20/17 A2992 RMK AO2
JQF	2023-06-28 08:00	KJQF 280800Z AUTO 00000KT 10SM CLR 19/16 A2992 RMK AO2
JQF	2023-06-28 08:20	KJQF 280820Z AUTO 00000KT 10SM CLR 19/17 A2992 RMK AO2
JQF	2023-06-28 08:40	KJQF 280840Z AUTO 00000KT 10SM CLR 18/17 A2992 RMK AO2
JQF	2023-06-28 09:00	KJQF 280900Z AUTO 00000KT 10SM CLR 18/17 A2992 RMK AO2
JQF	2023-06-28 09:20	KJQF 280920Z AUTO 00000KT 10SM CLR 18/16 A2993 RMK AO2
JQF	2023-06-28 09:40	KJQF 280940Z AUTO 00000KT 10SM CLR 18/16 A2993 RMK AO2
JQF	2023-06-28 10:00	KJQF 281000Z AUTO 00000KT 10SM CLR 17/16 A2994 RMK AO2
JQF	2023-06-28 10:20	KJQF 281020Z AUTO 00000KT 10SM CLR 18/16 A2994 RMK AO2
JQF	2023-06-28 10:40	KJQF 281040Z AUTO 00000KT 7SM CLR 18/16 A2995 RMK AO2
JQF	2023-06-28 10:50	KJQF 281050Z 00000KT 10SM CLR 18/17 A2996
JQF	2023-06-28 11:00	KJQF 281100Z AUTO 00000KT 10SM CLR 17/17 A2996 RMK AO2
JQF	2023-06-28 11:50	KJQF 281150Z 00000KT 10SM CLR 22/17 A2998
JQF	2023-06-28 12:50	KJQF 281250Z 02004KT 10SM CLR 24/17 A3000
JQF	2023-06-28 13:50	KJQF 281350Z 03004KT 10SM CLR 26/18 A3001
JQF	2023-06-28 14:50	KJQF 281450Z 00000KT 10SM CLR 27/16 A3001
JQF	2023-06-28 15:50	KJQF 281550Z 01006KT 10SM CLR 28/17 A3001
JQF	2023-06-28 16:50	KJQF 281650Z 00000KT 10SM CLR 29/17 A3001
JQF	2023-06-28 17:50	KJQF 281750Z 32008KT 10SM CLR 29/17 A2999
JQF	2023-06-28 18:50	KJQF 281850Z 27005KT 10SM CLR 30/17 A2998
JQF	2023-06-28 19:50	KJQF 281950Z 35004KT **7SM** CLR 30/17 A2998
JQF	2023-06-28 20:50	KJQF 282050Z 35004KT **7SM** CLR 31/15 A2995
JQF	2023-06-28 21:50	KJQF 282150Z 36005KT **7SM** SCT060 31/17 A2996
JQF	2023-06-28 22:50	KJQF 282250Z 01003KT **7SM** CLR 29/18 A2995
JQF	2023-06-28 23:50	KJQF 282350Z 05003KT **7SM** CLR 29/18 A2997

***Figure 142-I**: Hourly METAR reports from Concord Regional Airport (KJQF) on June 28th, 2023.*

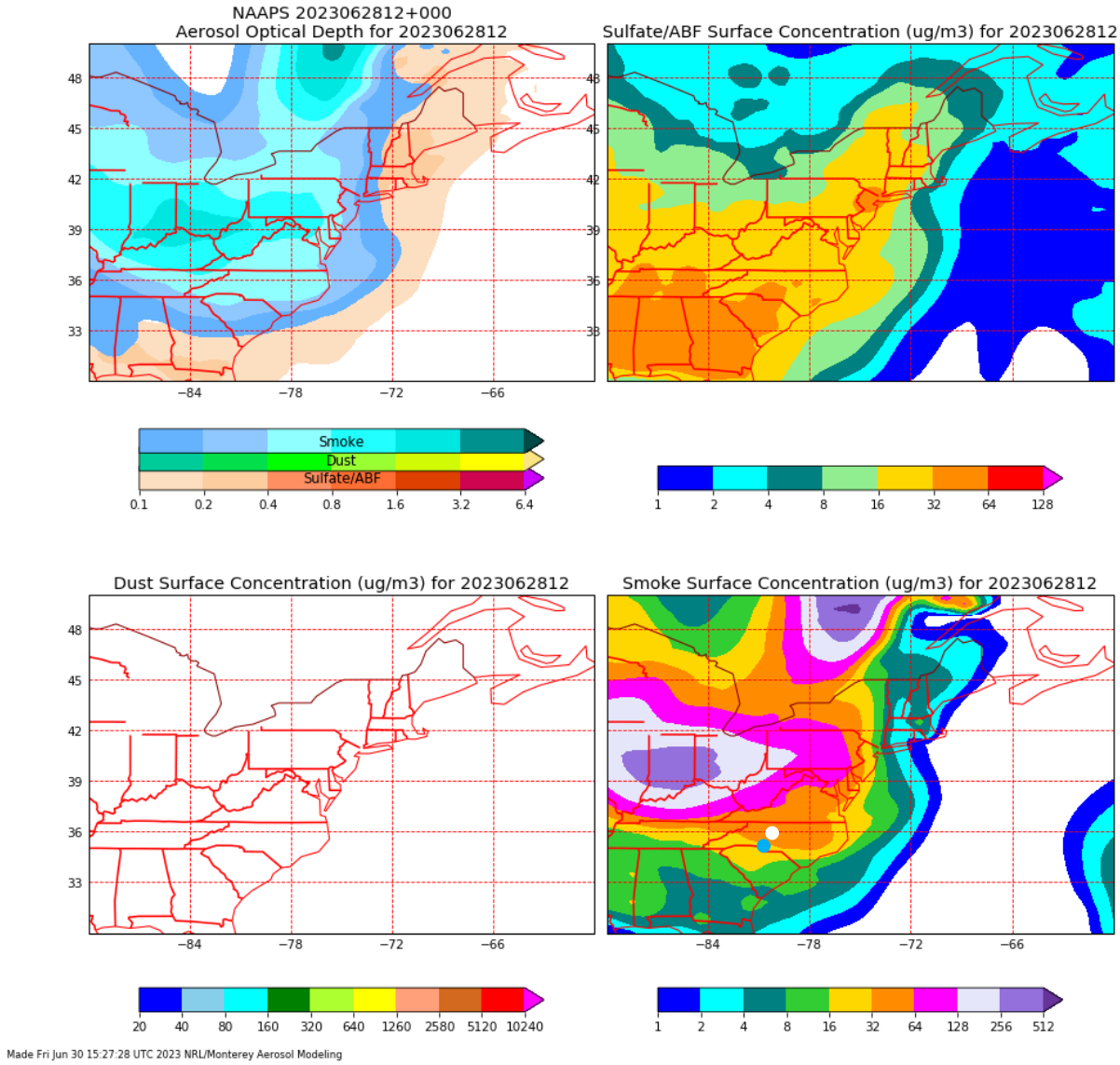

***Figure 143-I**: NAAPs Global Aerosol Model initialization / analysis at 8:00 am on June 28th, 2023. The white and blue circles on the bottom right plot show the approximate locations of the Lexington and Remount monitors, respectively.*

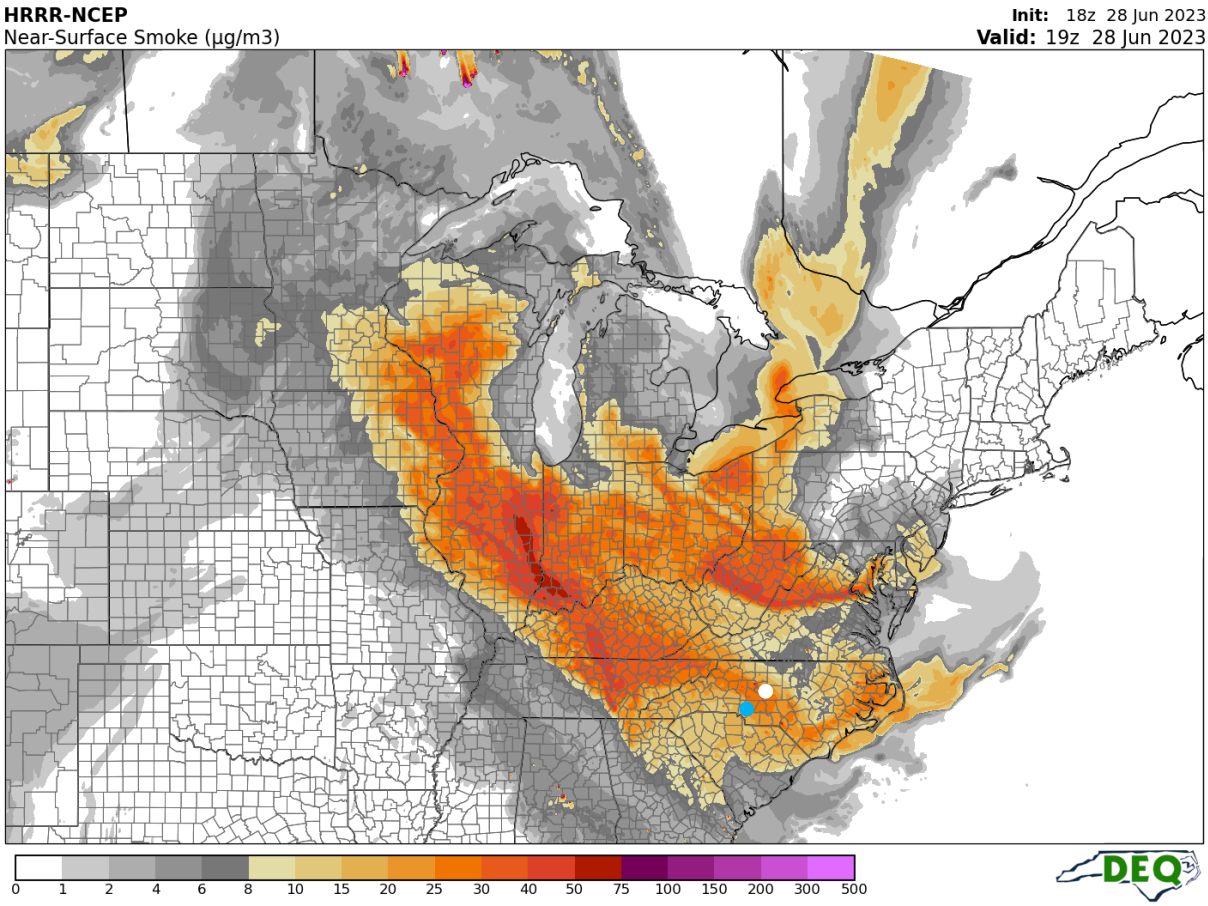

***Figure 144-I**: HRRR-NCEP Smoke model output, initialized at 2:00 pm June 28th, showing near-surface smoke at 3:00 pm on June 28th. The white and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

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Appendix J: Additional Tier 2 Evidence for 7/1/2023

station	valid	metar
JQF	2023-07-01 00:50	KJQF 010050Z 00000KT 10SM CLR 26/19 A3002
JQF	2023-07-01 01:50	KJQF 010150Z 00000KT 10SM CLR 26/22 A3003
JQF	2023-07-01 02:50	KJQF 010250Z 00000KT 10SM CLR 26/22 A3005
JQF	2023-07-01 04:20	KJQF 010420Z AUTO 00000KT 10SM CLR 24/22 A3006 RMK AO2
JQF	2023-07-01 04:40	KJQF 010440Z AUTO 12004KT 10SM CLR 24/21 A3005 RMK AO2
JQF	2023-07-01 05:00	KJQF 010500Z AUTO 00000KT 10SM CLR 23/21 A3005 RMK AO2
JQF	2023-07-01 05:20	KJQF 010520Z AUTO 00000KT 10SM CLR 23/21 A3005 RMK AO2
JQF	2023-07-01 05:40	KJQF 010540Z AUTO 00000KT 10SM CLR 23/21 A3005 RMK AO2
JQF	2023-07-01 05:55	KJQF 010555Z AUTO 00000KT 7SM CLR 23/21 A3005 RMK AO2
JQF	2023-07-01 06:20	KJQF 010620Z AUTO 00000KT 7SM CLR 22/21 A3004 RMK AO2
JQF	2023-07-01 06:40	KJQF 010640Z AUTO 00000KT 7SM CLR 22/21 A3003 RMK AO2
JQF	2023-07-01 07:00	KJQF 010700Z AUTO 13003KT 7SM CLR 22/21 A3003 RMK AO2
JQF	2023-07-01 07:20	KJQF 010720Z AUTO 00000KT 7SM CLR 22/21 A3003 RMK AO2
JQF	2023-07-01 07:40	KJQF 010740Z AUTO 00000KT 7SM CLR 22/21 A3003 RMK AO2
JQF	2023-07-01 08:00	KJQF 010800Z AUTO 00000KT 5SM BR CLR 22/21 A3003 RMK AO2
JQF	2023-07-01 08:20	KJQF 010820Z AUTO 00000KT 5SM BR CLR 22/21 A3003 RMK AO2
JQF	2023-07-01 08:40	KJQF 010840Z AUTO 00000KT 5SM BR CLR 22/21 A3003 RMK AO2
JQF	2023-07-01 09:00	KJQF 010900Z AUTO 00000KT 4SM BR CLR 22/21 A3003 RMK AO2
JQF	2023-07-01 09:20	KJQF 010920Z AUTO 00000KT 4SM BR CLR 22/21 A3003 RMK AO2
JQF	2023-07-01 09:40	KJQF 010940Z AUTO 00000KT 4SM BR CLR 22/21 A3003 RMK AO2
JQF	2023-07-01 10:00	KJQF 011000Z AUTO 00000KT 3SM BR CLR 21/21 A3003 RMK AO2
JQF	2023-07-01 10:20	KJQF 011020Z AUTO 00000KT 3SM BR CLR 21/21 A3004 RMK AO2
JQF	2023-07-01 10:40	KJQF 011040Z AUTO 00000KT 2 1/2SM BR CLR 21/20 A3005 RMK AO2
JQF	2023-07-01 10:55	KJQF 011055Z 00000KT **7SM FUHZ** CLR 22/21 A3004
JQF	2023-07-01 11:00	KJQF 011100Z AUTO 00000KT 2 1/2SM BR CLR 21/21 A3004 RMK AO2
JQF	2023-07-01 11:50	KJQF 011150Z 00000KT **7SM FUHZ** CLR 23/22 A3007
JQF	2023-07-01 12:50	KJQF 011250Z 00000KT **6SM HZ** CLR 24/22 A3007
JQF	2023-07-01 13:59	KJQF 011359Z 00000KT **6SM HZ** CLR 28/22 A3009
JQF	2023-07-01 14:50	KJQF 011450Z 00000KT 7SM CLR 29/22 A3008
JQF	2023-07-01 15:59	KJQF 011559Z 00000KT 7SM CLR 31/22 A3007
JQF	2023-07-01 16:50	KJQF 011650Z 18005KT 8SM BKN032 31/22 A3007
JQF	2023-07-01 17:50	KJQF 011750Z 17004KT 8SM BKN045 31/22 A3006
JQF	2023-07-01 18:50	KJQF 011850Z 00000KT 7SM SCT044 BKN050 32/22 A3004
JQF	2023-07-01 19:50	KJQF 011950Z 19007KT 7SM SCT044 33/22 A3001
JQF	2023-07-01 20:50	KJQF 012050Z 22007KT 7SM SCT046 33/22 A2999
JQF	2023-07-01 21:50	KJQF 012150Z 22005KT 7SM SCT046 32/21 A2997
JQF	2023-07-01 22:50	KJQF 012250Z 29005KT 7SM BKN046 31/22 A3000
JQF	2023-07-01 23:50	KJQF 012350Z 00000KT 10SM CLR 24/22 A2999

***Figure 145-J**: Hourly METAR reports from Concord Regional Airport (KJQF) on July 1st, 2023."FU" is abbreviation for smoke. "HZ" is abbreviation for haze.*

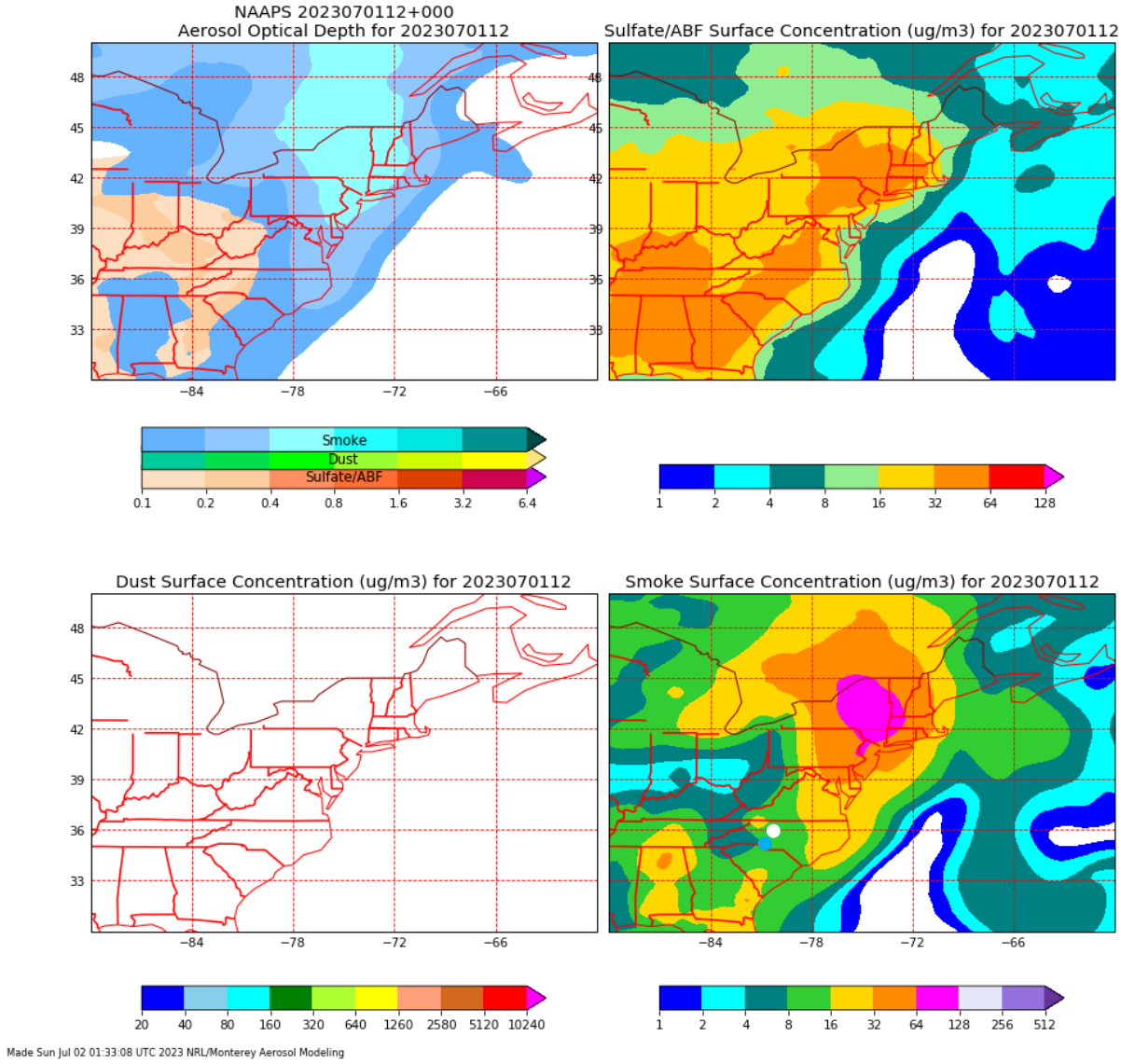

***Figure 146-J**: NAAPs Global Aerosol Model initialization / analysis at 8:00 am on July 1st, 2023. The white and blue circles on the bottom right plot show the approximate locations of the Lexington and Remount monitors, respectively.*

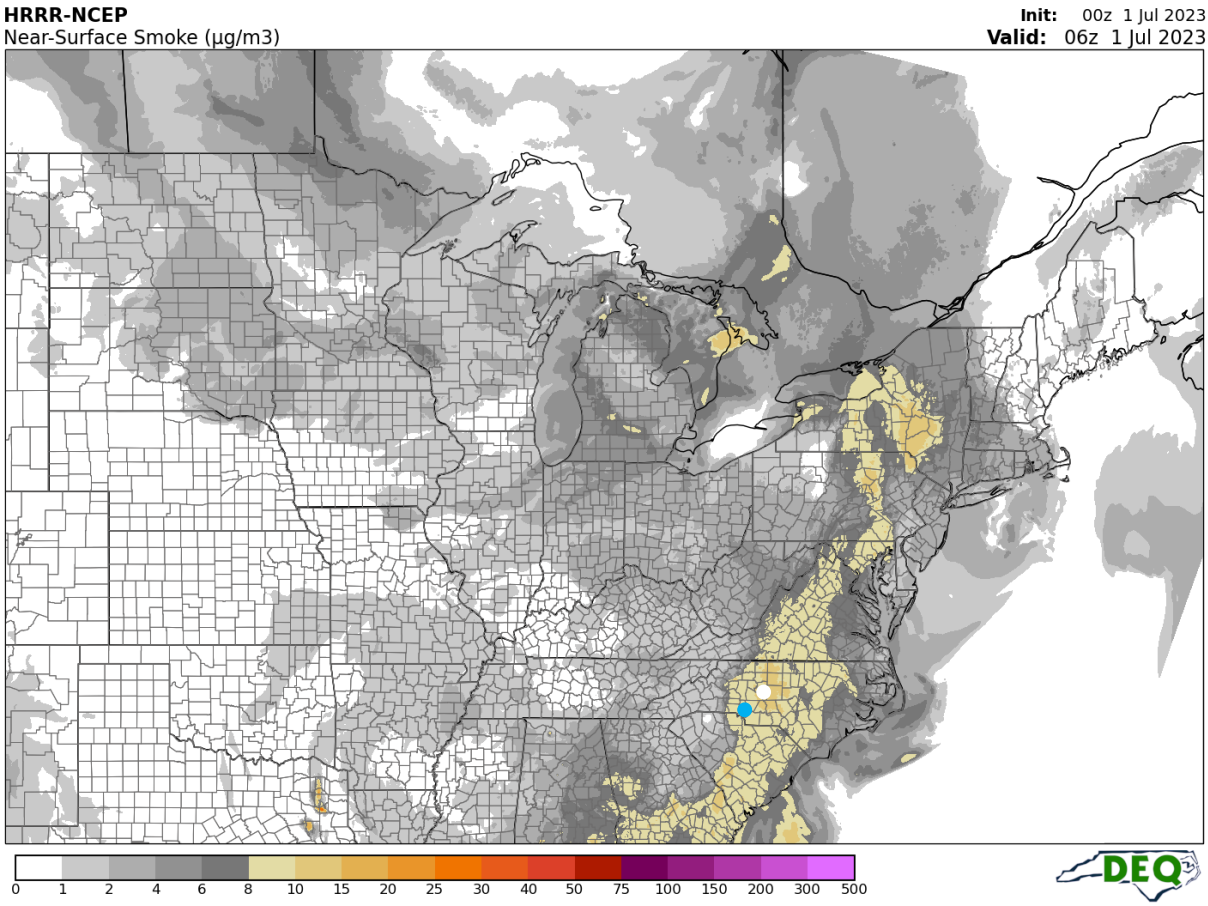

***Figure 147-J**: HRRR-NCEP Smoke model output, initialized at 8:00 pm June 30th, showing near-surface smoke at 2:00 am on July 1st. The white and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.*

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Appendix K: Monitoring Sites' Tiering Graphs

All graphs courtesy of EPA's $PM_{2.5}$ Tiering Tool for Exceptional Events Analysis.[50]

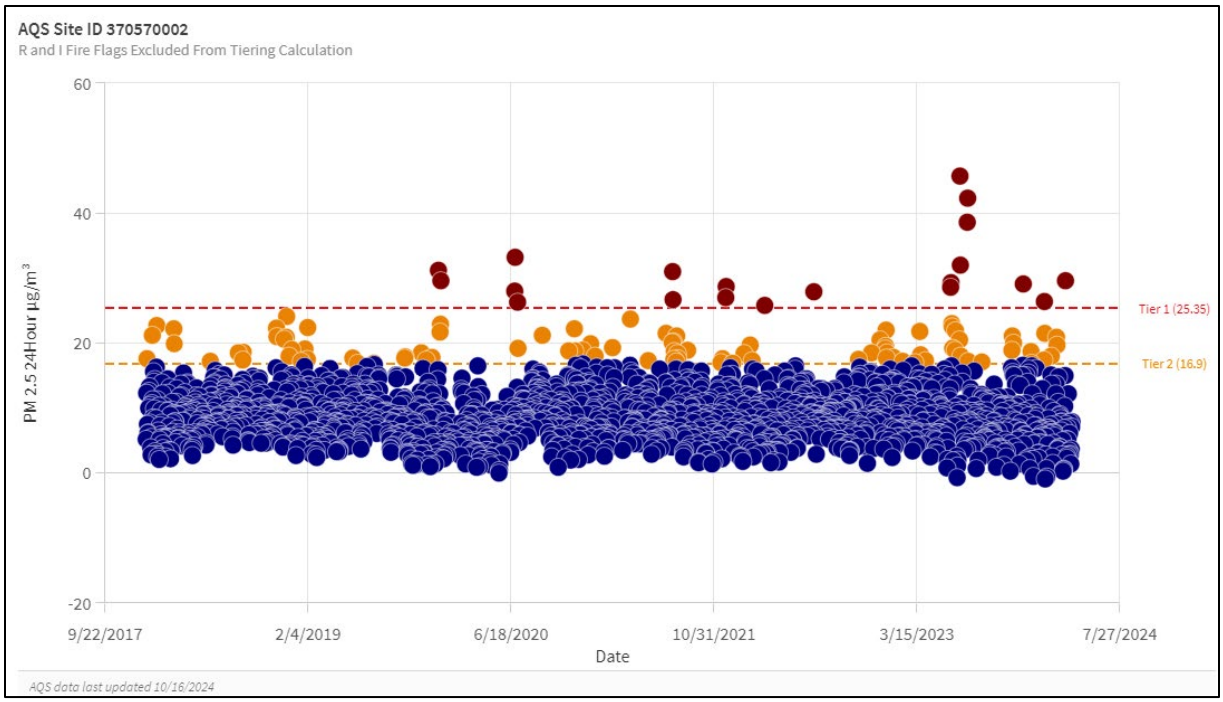

***Figure 148-K**: Tiering Graph for the Lexington Monitor for June Exceptional Events. Daily average $PM_{2.5}$ values equal to or greater than 25.35 µg/m³ are considered Tier 1. Values less than 25.35 µg/m³ but equal to or greater than 16.9 µg/m³ are considered Tier 2. Values less than 16.9 µg/m³ are considered Tier 3.*

[50] EPA, *PM2.5 Tiering Tool – for Exceptional Events Analysis*, https://www.epa.gov/air-quality-analysis/pm25-tiering-tool-exceptional-events-analysis

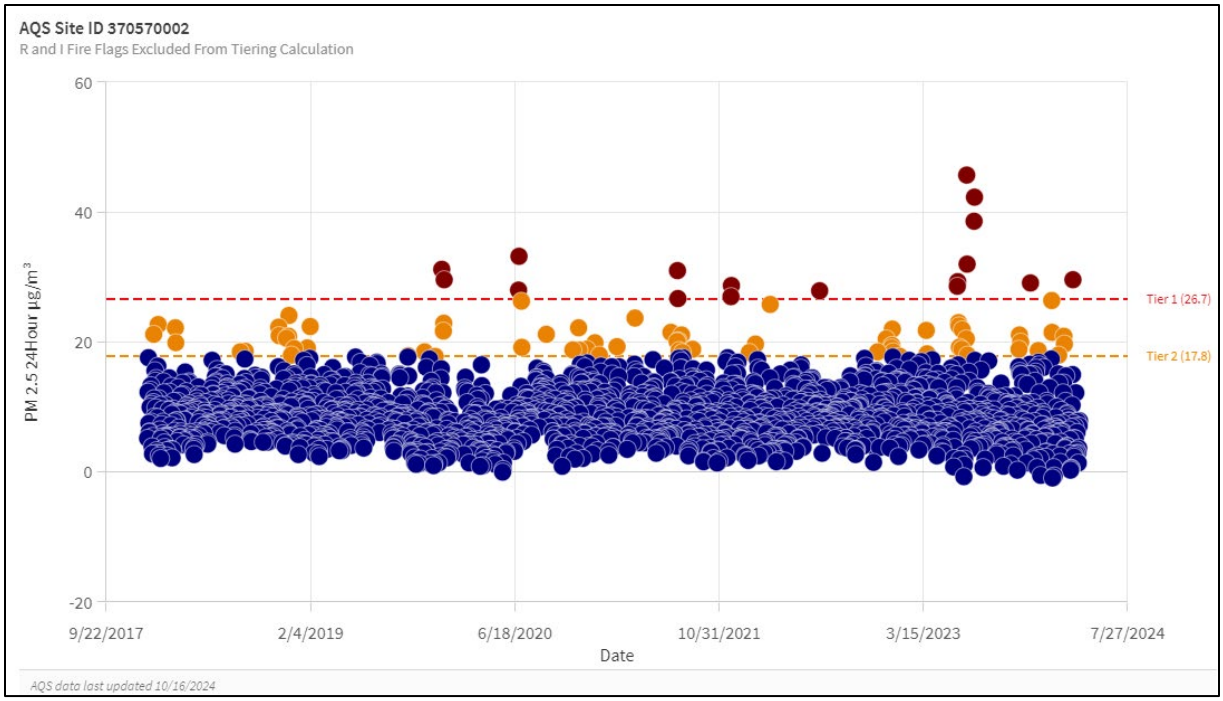

***Figure 149-K**: Tiering Graph for the Lexington Monitor for July Exceptional Events. Daily average $PM_{2.5}$ values equal to or greater than 26.7 µg/m³ are considered Tier 1. Values less than 26.7 µg/m³ but equal to or greater than 17.8 µg/m³ are considered Tier 2. Values less than 17.8 µg/m³ are considered Tier 3.*

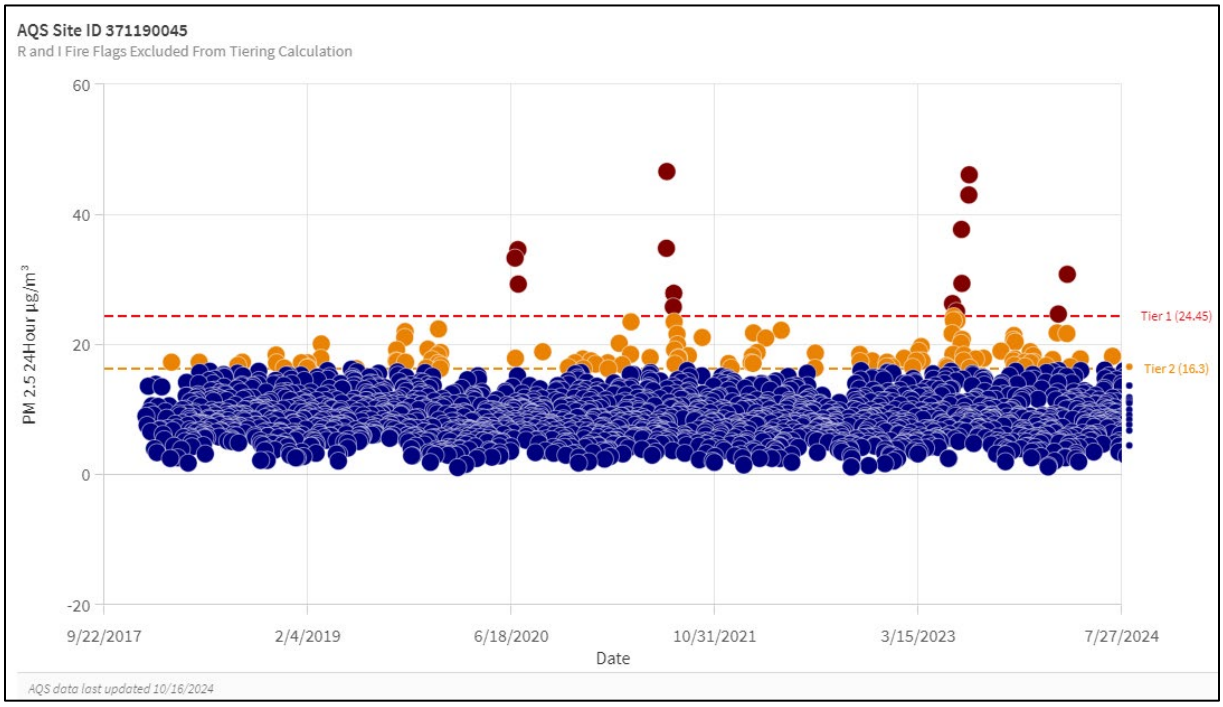

***Figure 150-K**: Tiering Graph for the Remount Monitor for June Exceptional Events. Daily average $PM_{2.5}$ values equal to or greater than 24.45 µg/m³ are considered Tier 1. Values less than 24.25 µg/m³ but equal to or greater than 16.3 µg/m³ are considered Tier 2. Values less than 16.3 µg/m³ are considered Tier 3.*

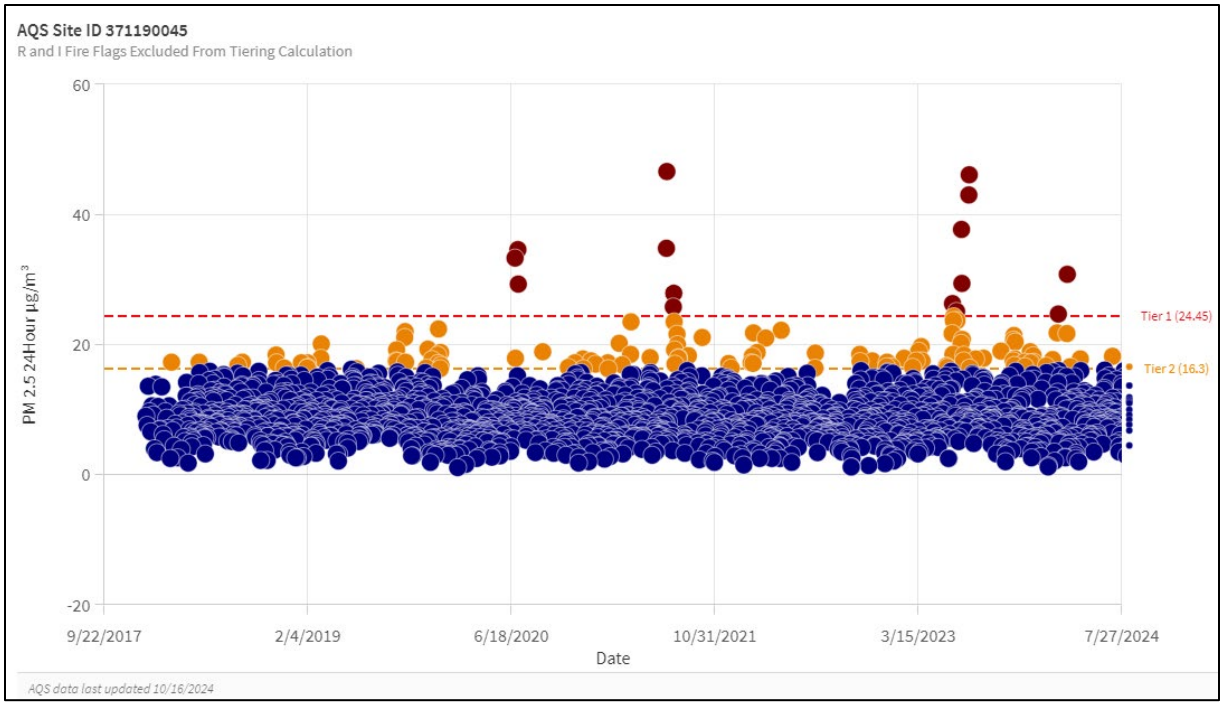

Figure 151-K: Tiering Graph for the Remount Monitor for July Exceptional Events. Daily average $PM_{2.5}$ values equal to or greater than 24.25 µg/m^3 are considered Tier 1. Values less than 24.25 µg/m^3 but equal to or greater than 16.3 µg/m^3 are considered Tier 2. Values less than 16.3 µg/m^3 are considered Tier 3.

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Appendix L: Initial Notification Letter

From:	Palmer, Darren
To:	Strait, Randy P
Cc:	Abraczinskas, Michael; Hartsfield, Taylor; Diaz, Denisse; Benjamin, Lynorae; Freund, Weston (he/him/his); Spann, Jane; Gillam, Rick; Jarvis, Simone (she/her/hers); Lusky, Katy; Rhodes, Leslie; Manning, Tammy; Kreuser, Sara I; McLamb, Bradley N; Root, Jordan D; Butler, Patrick; Pope, Jeremy B
Subject:	[External] RE: Initial Notification of Potential Exceptional Event Submission for the Revised Primary Annual PM2.5 NAAQS
Date:	Friday, November 1, 2024 12:14:52 PM
Attachments:	image001.png

Randy, this email is to confirm that we have received your Initial Notification and that it meets the Initial Notification requirements of 40 CFR 50.14(c)(2)(i). We believe it is appropriate for your agency to submit a full demonstration for these event days.

It was really good to talk to y'all yesterday to discuss our comments about your draft exceptional event demonstration. We appreciate your and your staff's time and we both thought the call was very helpful. Rick will follow up in a separate email on the one or two remaining items we left hanging. Let us know if you have any add'l questions or concerns.

Hope everyone has a great weekend!

Darren Palmer
Acting Supervisor
USEPA - Region 4 | Air & Radiation Division | Air Data & Analysis Section
(404) 562-9052 | https://epa.gov/region4

From: Strait, Randy P <randy.strait@deq.nc.gov>
Sent: Wednesday, September 11, 2024 5:22 PM
To: Gettle, Jeaneanne <Gettle.Jeaneanne@epa.gov>
Cc: michael.abraczinskas@deq.nc.gov; taylor.hartsfield@deq.nc.gov; Diaz, Denisse <Diaz.Denisse@epa.gov>; Benjamin, Lynorae <benjamin.lynorae@epa.gov>; Freund, Weston (he/him/his) <Freund.Weston@epa.gov>; Spann, Jane <Spann.Jane@epa.gov>; Palmer, Darren <Palmer.Darren@epa.gov>; Gillam, Rick <Gillam.Rick@epa.gov>; Jarvis, Simone (she/her/hers) <Jarvis.Simone@epa.gov>; Adams, Evan (he/him/his) <adams.evan@epa.gov>; Lusky, Katy <Lusky.Kathleen@epa.gov>; Leslie Rhodes <leslie.rhodes@mecklenburgcountync.gov>; Manning, Tammy <tammy.manning@deq.nc.gov>; Kreuser, Sara I <Sara.Kreuser@deq.nc.gov>; McLamb, Bradley N <bradley.mclamb@deq.nc.gov>; Root, Jordan D <jordan.root@deq.nc.gov>; Butler, Patrick <patrick.butler@deq.nc.gov>; Pope, Jeremy B <Jeremy.Pope@deq.nc.gov>
Subject: Initial Notification of Potential Exceptional Event Submission for the Revised Primary Annual PM2.5 NAAQS

Dear Ms. Gettle,

On behalf of Director Michael Abraczinskas, please find attached North Carolina's "Initial Notification of Potential Exceptional Event Submission for the Revised Primary Annual PM2.5 NAAQS." We have submitted the attached file to EPA's State Planning Electronic Collaboration System (SPeCS).

We appreciate the help we received from your staff in preparing this submittal. Please let us know if you have any questions.

Thank you,
Randy

Randy Strait
Chief, Planning Section, Division of Air Quality
North Carolina Department of Environmental Quality
Office: (919) 707-8721 | Cell: (919) 724-8080
randy.strait@deq.nc.gov — **New address**

ROY COOPER
Governor
ELIZABETH S. BISER
Secretary
MICHAEL ABRACZINSKAS
Director

NORTH CAROLINA
Environmental Quality

September 11, 2024

Jeaneanne Gettle, Acting Regional Administrator
USEPA Region 4
Atlanta Federal Center
61 Forsyth Street, SW
Atlanta, GA 30303-8960

Subject: Initial Notification of Potential Exceptional Event Submission for the Revised Primary Annual $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS)

Dear Ms. Gettle:

In accordance with section (40 CFR 50.14(c)(2)) of the Exceptional Events (EE) rule, I am pleased to submit for the United States Environmental Protection Agency's (EPA) review and comment North Carolina's "Initial Notification of Potential Exceptional Event" demonstration. On behalf of North Carolina's Governor, the North Carolina Department of Environmental Quality (DEQ), Division of Air Quality (DAQ) intends to submit the EE demonstration in support of its designation recommendations for the revised primary annual $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS) due to EPA by February 7, 2025.

Based on certified monitoring data for 2021-2023, the DAQ has concluded that Canadian wildfire smoke-laden air masses during the summer of 2023 caused two $PM_{2.5}$ monitors in North Carolina to measure design values slightly above the revised standard. These two monitors: Remount Road (371190045), located in Mecklenburg County and Lexington Water Tower (370570002), located in Davidson County, are depicted as yellow rectangles with a rounded Design Value of 9.2 micrograms per cubic meter ($\mu g/m^3$) in Figure 1. Note that the Canadian wildfire smoke contributed to elevated design values for many other monitors in North Carolina; however, the design values are below the revised NAAQS and therefore not eligible for inclusion in an EE demonstration at this time.

The attachment to this letter documents four multiple-day events in June and July of 2023 the DAQ intends to include in its EE demonstration because of the significant impact of Canadian wildfire smoke on the design values for the two monitors. The documentation in the attachment has been prepared following the EE rule and consultation with EPA staff. Please advise me if we need to provide additional documentation regarding this "Initial Notification of Potential Exceptional Event" demonstration.

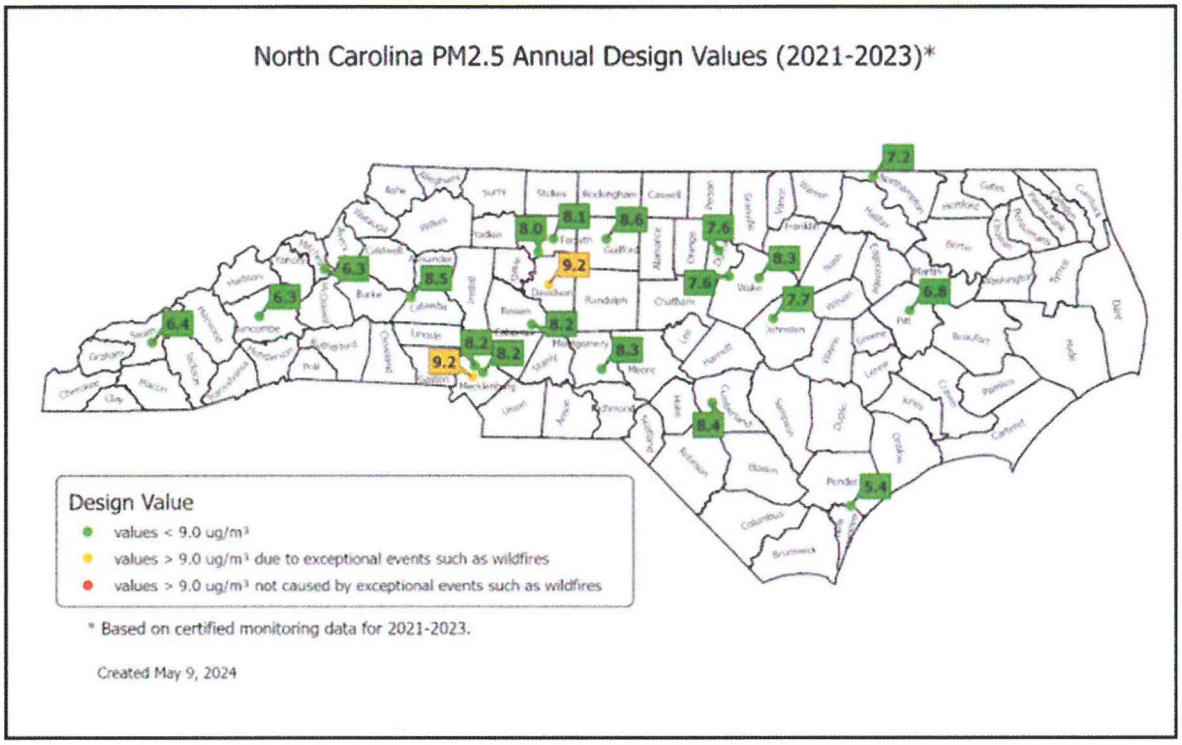

Figure 1. Map of North Carolina $PM_{2.5}$ Monitors and 2021-2023 Design Values ($\mu g/m^3$)

If you should have any questions, please contact Randy Strait of my staff at (919) 707-8721 or randy.strait@deq.nc.gov.

Sincerely,

Michael A. Abraczinskas, Director
Division of Air Quality, NCDEQ

MAA/rps
Attachment

cc: Denisse Diaz, USEPA
Lynorae Benjamin, USEPA
Jane Spann, USEPA
Weston Freund, USEPA
Evan Adams, USEPA
Simone Jarvis, USEPA
Katy Lusky, USEPA
Darren Palmer, USEPA
Rick Gillam, USEPA
Taylor Hartsfield, DAQ
Randy Strait, DAQ
Tammy Manning, DAQ
Bradley McLamb, DAQ
Sara Kreuser, DAQ
Patrick Butler, DAQ
Jeremy Pope, DAQ
Leslie Rhodes, Mecklenburg County Air Quality Agency

Attachment

North Carolina Exceptional Events Demonstration Initial Notification

Overview

This attachment provides a brief overview of atmospheric patterns that transported Canadian wildfire smoke to the U.S. and North Carolina in the summer of 2023, identifies four multiple-day events the DAQ proposes to include in North Carolina's Exceptional Events (EE) demonstration, and provides a succinct summary of how Canadian wildfire smoke significantly elevated $PM_{2.5}$ concentrations above the revised annual $PM_{2.5}$ NAAQS at two monitors in North Carolina. Without the influence of Canadian wildfire smoke, the DAQ believes the design values for the two monitors would be below the standard.

2023 Canadian Wildfire Fire Smoke Impacts on the U.S. and North Carolina

The 2023 Canadian wildfire season - the result of intensifying, widespread spring drought across almost all the Canadian provinces - was unprecedented and record-shattering. A total of 7,131 fires burned 42.5 million acres (17.2 million hectares) of land, doubling the previous record for acres burned, according to the Canadian Interagency Forest Fire Centre.[1] The resulting intrusion of massive amounts of Canadian wildfire smoke into the contiguous United States was the culmination of several months of anomalous synoptic meteorological conditions across North America. A succession of atmospheric patterns first served as the catalyst for the intensifying drought that resulted in the growing number of wildfires across Canada and then directly led to the large-scale transport of smoke into the eastern U.S.[2,3] This resulted in numerous exceptional air quality events from Maine to Florida, including North Carolina, during the months of June and July.[4]

Canadian air masses were frequent in the eastern U.S. during June 2023. Many states recorded well below-normal temperatures for the month, due to the anomalous nature of the atmospheric regime that resulted in a persistent fetch of cooler-than-normal, but smoky, Canadian air into the region.[5] This included North Carolina, which recorded its 13th-coldest June in the past 129 years.[6]

Despite experiencing numerous rounds of Canadian wildfire smoke-laden air masses during the summer of 2023, only two $PM_{2.5}$ monitors in North Carolina were driven (slightly) above the new annual $PM_{2.5}$ NAAQS set by the EPA on May 6, 2024. These two monitors: Remount Road (371190045), located in Mecklenburg County and Lexington Water Tower (370570002), located in Davidson County.

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[1] Canadian Interagency Forest Fire Centre, 2023 Fire Season, https://ciffc.ca/sites/default/files/2024-03/03.07.24_CIFFC_2023CanadaReport (1).pdf.
[2] Canadian Drought Monitor, Conditions as of June 30, 2023, https://www.caar.org/wp-content/uploads/2023/08/Page5-main.jpg.
[3] North Carolina State Climate Office, 500 mb Heights (dm) / Temperature Humidity (%), June 6-12, 2023, 500mb_heights_loop_Jun2023.gif (1024×1024) (ncsu.edu).
[4] North Carolina Air Quality Portal, Rapid Reaction: Smoky Skies Create Unhealthy Air Quality, June 13, 2023 | Air Quality Blog, https://airquality.climate.ncsu.edu/2023/06/13/rapid-reaction-smoky-skies-create-unhealthy-air-quality/.
[5] National Centers for Environmental Information, https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/statewide/mapping/110/tavg/202306/1/rank.
[6] North Carolina State Climate Office, Smoke and Storms Fill the Skies in June, July 10, 2023 | Climate Blog, Climate Summary, https://climate.ncsu.edu/blog/2023/07/smoke-and-storms-fill-the-skies-in-june/.

Days Proposed for Inclusion in the EE Demonstration

Based on the North Carolina Division of Air Quality's (DAQ) extensive analysis of the impacts of the 2023 Canadian wildfire smoke on the state, we propose to submit an EE demonstration for the Remount Road and Lexington Water Tower $PM_{2.5}$ monitors. Table 1 presents data for four unique multiple-day events that feature atmospherically significant activity that heralded the onset of Canadian wildfire smoke transport into the state and directly impacted both monitors to the extent that the design values for the monitors exceeded the revised annual $PM_{2.5}$ NAAQS. The data for each event in Table 1 are organized by color-coordinated, alternating, row colors (light/dark tan) for each event. In the columns, we begin with EE IDs (1-4). Next, each date contained in an event is in the second column, followed by additional data for each date including: a hyperlink to our daily air quality forecast from the afternoon prior to the event (column 3), a hyperlink to the next morning's updated discussion (column 4), a hyperlink to a Twitter post for each day's forecast (column 5), and a hyperlink to the daily 24-hr. $PM_{2.5}$ statewide observations in our Ambient Information Reporter tool (column 6). The next section of columns contains monitor-specific data starting with the Remount Road monitor: 24-hr. $PM_{2.5}$ average (column 7), the 5-year (2018-2022) date-specific average (this is the climatological daily average concentration over the previous 5-year period on the given date, i.e., the past 5 June 6ths, the past 5 June 7ths, etc.) (column 8), EPA tier level (column 9) and the Air Quality System (AQS) data flags (column 10). The same type of data is then presented for the Lexington Water Tower monitor in columns 11-14.

Event 1 (June 6 – June 11, 2023)

The series of exceptional smoke transport events impacting North Carolina began in early June, starting on June 6th and continuing through June 11th, and featured an anomalously strong 500mb (H5) ridge that was anchored over central Canada (anomalous H5 ridging had been persistent for all of May and led to intensifying drought conditions) and was joined by equally strong H5 low pressure stationed just off the northeastern U.S.[7] This strong upper-level low was coupled to a strong surface low pressure system centered over Maine, with an attendant surface cold front that crossed the state from the north on the morning of June 7th.[8] The combined flow pattern around these upper-level circulations resulted in enhanced north-northwesterly winds aloft and significant smoke transport from central and eastern Canada into North Carolina.[9] Smoke aloft mixed to the surface initially on June 6th, before smoke was directly transported into the state at the surface behind the frontal passage from an area of elevated $PM_{2.5}$ to the north and northwest beginning on June 7th. The polluted air mass stagnated over the area through June 11th as surface high pressure built into the region behind the front. This resulted in subsidence, light winds, and reduced air mass dispersion which trapped the polluted air mass in place.

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[7] North Carolina State Climate Office, 500mb_anomaly_May2023.png (900×512) (ncsu.edu).
[8] National Oceanic and Atmospheric Administration (NOAA), National Weather Service (NWS), Weather Prediction Center, WPC surface analysis valid for 06/07/2023 at 15 UTC, https://www.wpc.ncep.noaa.gov/archives/web_pages/sfc/sfc_archive_maps.php?arcdate=06/07/2023&selmap=2023060715&maptype=namussfc.
[9] NOAA, NWS, Storm Prediction Center, Mesoscale Analysis Archive, https://www.spc.noaa.gov/exper/ma_archive/action5.php?BASICPARAM=500mb.gif&STARTYEAR=2023&STARTMONTH=06&STARTDAY=06&STARTTIME=00&INC=48.

Table 1. Summary of Canadian Wildfire Events Proposed for Inclusion in the Exceptional Events Demonstration

Exceptional Event		DAQ Statewide Data				Remount (371190045) Current 21-23 DV: 9.24 Adjusted 21-23 DV: 9.01				Lexington (370570002) Current 21-23 DV: 9.15 Adjusted 21-23 DV: 8.92			
ID	Date	AQ Forecast (prev. afternoon)	AQ Forecast (morning)	Outreach (X, formerly Twitter)	Observ-ations	24-hr. $PM_{2.5}$ Avg.	5-Year (2018-2022) Daily Average	Tier Level	Data Flag(s)*	24-hr. $PM_{2.5}$ Avg.	5-Year (2018-2022) Daily Average	Tier Level	Data Flag(s)*
1	6/6/2023	Link	Link	Link	Link	21.7	8.6	Tier 2	RF	28.6	11.4	Tier 1	RF
	6/7/2023	Link	Link	Link	Link	26.3	10.0	Tier 1	RF	29.3	9.2	Tier 1	RF
	6/8/2023	Link	Link	Link	Link	18.5	8.7	Tier 2	RF	-	-	-	-
	6/9/2023	Link	Link	Link	Link	23.7	7.7	Tier 1	RF	23	8.1	Tier 2	RF
	6/10/2023	Link	Link	Link	Link	24.3	7.5	Tier 1	RF	22.5	7.7	Tier 2	RF
	6/11/2023	Link	Link	Link	Link	-	-	-	-	19.2	9.1	Tier 2	2, 4, 6, RF
2	6/17/2023	Link	Link	Link	Link	25.1	8.8	Tier 1	4, RF, 2, 6	18.9	8.7	Tier 2	2, 4, 6, RF
	6/18/2023	Link	Link	Link	Link	23.7	8.4	Tier 1	RF	21.9	8.7	Tier 2	RF
3	6/28/2023	Link	Link	Link	Link	20.2	11.1	Tier 2	RF	20.5	14.4	Tier 2	RF
	6/29/2023	Link	Link	Link	Link	37.7	9.0	Tier 1	4, RF, 2, 6	45.7	10.7	Tier 1	2, 4, 6, RF
	6/30/2023	Link	Link	Link	Link	29.4	9.9	Tier 1	RF	32	10.8	Tier 1	RF
	7/1/2023	Link	Link	Link	Link	20.8	7.3	Tier 2	RF	18	7.6	Tier 2	RF
4	7/17/2023	Link	Link	Link	Link	43	8.6	Tier 1	RF	38.6	11.5	Tier 1	2, 4, 6, RF
	7/18/2023	Link	Link	Link	Link	46.1	7.9	Tier 1	RF	42.3	8.3	Tier 1	RF

* Note that in AQS, the DAQ will change the flag for each day from Informational Canadian Wildfire (IF) to Request Exclusion Canadian wildfire (RF) prior to submitting North Carolinas Exceptional Events Demonstration to EPA.

Event 2 (June 17 – 18, 2023)

The second event, which occurred between June 17th and June 18th, was essentially a shorter duration repeat of the first event from a meteorological perspective. A strong H5 ridge, centered further north in central Canada, was again joined by strong H5 low pressure that rotated across New England during the period. Also similar to the first episode, this strong upper-level low was coupled to a strong surface low pressure system that propelled a surface cold front across North Carolina late on the evening of June 16th.[10] As the base of the upper-level trough of low pressure rotated across the state, mid-level winds became strong out of the north-northwest, heralding the onset of smoke transport aloft into the region.[11] Concomitantly, smoke transport mixing downward through the planetary boundary layer along with surface-level smoke and elevated fine particulates advecting into the region from the northwest resulted in $PM_{2.5}$ levels across the state again elevating significantly above background levels.

Event 3 (June 28 – July 1, 2023)

The third event, which occurred between June 28th and July 1st, featured another variation of the persistent atmospheric flow regimes discussed in prior events, this time in the form of a Rex blocking pattern.[12] Persistent and recurrent upper-level ridging across Canada continued to exacerbate drought conditions and simultaneously trap Canadian wildfire smoke. Concurrent upper-level low pressure south of the ridge descended across the upper Midwest and then rotated eastward into New England providing the transport mechanism for smoke penetration deep into the eastern and eventually southeastern U.S. during June and July 2023.[13] As the upper-level low, and surface low pressure, rotated eastward during the afternoon of June 27th, once again an attendant surface cold front swept across the state.[14] By the evening of June 28th, hourly fine particulate concentrations were rising above the Code Orange range.[15] On June 29th, 13 out of 21 sites across the state exceeded the daily standard, including one site in Forsyth County that recorded a daily average in the Code Red AQI range.[16] Additional exceedances were recorded across the state on

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[10] NOAA, NWS, Weather Prediction Center, National Centers for Environmental Prediction, 0300Z Surface Analysis, June 17, 2023, https://www.wpc.ncep.noaa.gov/archives/sfc/2023/namussfc2023061703.gif.
[11] NOAA, NWS, Storm Prediction Center, Mesoscale Analysis Archive, June 16-18, 2023, https://www.spc.noaa.gov/exper/ma_archive/action5.php?BASICPARAM=500mb.gif&STARTYEAR=2023&STARTMONTH=06&STARTDAY=16&STARTTIME=00&INC=48.
[12] The Weather Network, How Omega blocks and Rex blocks can affect Canada's Weather, https://www.theweathernetwork.com/en/news/science/explainers/what-is-omega-block-rex-block-upper-level-jet-stream-weather-pattern.
[13] NOAA, NWS, Weather Prediction Center, Mesoscale Analysis Archive, June 26-30, 2023, https://www.spc.noaa.gov/exper/ma_archive/action5.php?BASICPARAM=500mb.gif&STARTYEAR=2023&STARTMONTH=06&STARTDAY=26&STARTTIME=00&INC=96.
[14] NOAA, NWS, Weather Prediction Center, National Centers for Environmental Prediction, 1800Z Surface Analysis, June 27, 2023, https://www.wpc.ncep.noaa.gov/archives/sfc/2023/namussfc2023062718.gif.
[15] North Carolina Ambient Information Reporter, PM2.5 (Hourly) concentrations on Wednesday, June 28, 2023 at 9:00 pm, https://airquality.climate.ncsu.edu/air/?tab=past&aggtype_past=hourly&date_past=2023-06-28&time_past=21&sync_past=0&dataset_past_point1=pm25%7Cinst_conc&fires_past=0&smoke_past=0&map_center=35.6,-80.3&map_zoom=8&map_bg=light&states=1&counties=1.
[16] North Carolina Ambient Information Reporter, PM2.5 (Avg. 24-hr. concentration) on Thursday, June 29, 2023, https://airquality.climate.ncsu.edu/air/?tab=past&aggtype_past=daily&date_past=2023-06-29&time_past=21&sync_past=0&dataset_past_point1=pm25%7C24hr_conc&fires_past=0&smoke_past=0&map_center=35.6,-80.3&map_zoom=8&map_bg=light&states=1&counties=1.

June 30th, and the smoke-laden air mass lingered over the state through July 1st as surface high pressure built into the region behind the front, trapping the polluted air mass over the region.[17]

Event 4 (July 17 – 18, 2023)

The fourth event, which occurred between July 17th and July 18th, was the most severe smoke transport event for North Carolina in 2023. The atmospheric pattern continued to feature the same anomalous circulations (strong upper-level ridge of high pressure and strong upper-level low). Strong and widespread ridging remained over most of Canada during the period preceding the event, while a strong upper-level low began to descend southward into the northern continental U.S. (CONUS) on July 15th and 16th.[18] Smoke wrapped into this upper-level low / trough resulted in a major intrusion of the ongoing Canadian wildfire smoke into the Great Lakes and Ohio Valley region as the core of the cyclonic circulation dug southward. On July 16th, all but one $PM_{2.5}$ monitoring site across North Carolina measured Code Green 24-hr. daily average concentrations, while sites in northwestern Kentucky and all of Indiana observed daily averages above 35.5 $\mu g/m^3$.[19] On July 17th, 11 out of the 12 sites in the western half of the state recorded daily average concentrations above 35.5 $\mu g/m^3$, a clear indicator of the widespread polluted air mass that had swiftly advected into the state.[20] As the smoke continued to transport from west to east across the state, conditions deteriorated further on July 18th, when 16 out of 21 $PM_{2.5}$ monitoring sites across North Carolina exceeded the 24-hour daily NAAQS.[21]

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[17] NOAA, NWS, Weather Prediction Center, WPC surface analysis valid for 06/30/2023 at 00 UTC, https://www.wpc.ncep.noaa.gov/archives/web_pages/sfc/sfc_archive_maps.php?arcdate=06/30/2023&selmap=2023063000&maptype=namussfc.

[18] NOAA, NWS, Storm Prediction Center, Mesoscale Analysis Archive, July 15-17, 2023, https://www.spc.noaa.gov/exper/ma_archive/action5.php?BASICPARAM=500mb.gif&STARTYEAR=2023&STARTMONTH=07&STARTDAY=17&STARTTIME=00&INC=-48.

[19] North Carolina Ambient Information Reporter, PM2.5 (Avg. 24-hr. concentration) on Sunday, July 16, 2023, https://airquality.climate.ncsu.edu/air/?tab=past&aggtype_past=daily&date_past=2023-07-16&time_past=13&sync_past=0&dataset_past_point1=pm25%7C24hr_conc&fires_past=0&smoke_past=0&map_center=35.6,-80.3&map_zoom=8&map_bg=light&states=1&counties=1.

[20] North Carolina Ambient Information Reporter, PM2.5 (Avg. 24-hr. concentration) on Monday, July 17, 2023, https://airquality.climate.ncsu.edu/air/?tab=past&aggtype_past=daily&date_past=2023-07-17&time_past=13&sync_past=0&dataset_past_point1=pm25%7C24hr_conc&fires_past=0&smoke_past=0&map_center=35.6,-80.3&map_zoom=8&map_bg=light&states=1&counties=1.

[21] North Carolina Ambient Information Reporter, PM2.5 (Avg. 24-hr. concentration) on Tuesday, July 18, 2023, https://airquality.climate.ncsu.edu/air/?tab=past&aggtype_past=daily&date_past=2023-07-18&time_past=13&sync_past=0&dataset_past_point1=pm25%7C24hr_conc&fires_past=0&smoke_past=0&map_center=35.6,-80.3&map_zoom=8&map_bg=light&states=1&counties=1.

Appendix M: Public Notice Summary, Comments Received, and Responses

Introduction and Summary of Public Comment Period

On November 20th, 2024, the NCDAQ issued a public notice announcement (see **Attachment 5** to this appendix), in accordance with 40 CFR § 51.102, indicating that the pre-hearing draft of the Exceptional Events demonstration was available for public comment and posted on the NCDAQ website[51] for review. The documents were also made available for in-person review during normal business hours at the NCDAQ Central Office in Raleigh and the NCDAQ Regional Offices in Mooresville and Winston-Salem. The public comment period was open from Wednesday, November 20th, 2024, through Friday, December 20th, 2024. Public comments were accepted if received via postal mail, email, or voicemail.

The public notice announcement indicated that anyone may request a public hearing by December 13th, 2024, and, if requested by this date, the public hearing would be held on December 20th, 2024. The public notice included the hearing date, time, location, and methods to access the hearing. The NCDAQ did not receive a request for a public hearing; therefore, the public hearing was canceled.

In addition to posting on NCDAQ's website, the public notice announcement was sent to a number of email distribution lists managed by NCDAQ, which include numerous stakeholders from industry and environmental groups. NCDAQ has found that sending the public notice announcements to these groups is more effective than publishing the notices in a few local newspapers and is consistent with the requirements described in the April 6th, 2011, memorandum, *"Regional Consistency for the Administrative Requirements of the State Implementation Plan Submittals and the Use of Letter Notices."*[52] NCDAQ also issued a press release on November 21st, 2024, announcing the public comment period; a second release on December 6th, 2024, extending the date for requesting a public hearing from December 4th to December 13th; and subsequently a third release on December 17th, 2024, to remind the public that the comment period was to close on December 20th, 2024, and that the public hearing was canceled because NCDAQ did not receive a request for a public hearing. These press releases were distributed to local and state news media and all public subscribers of NCDEQ's press release distribution list. The press releases were also posted to NCDEQ's website and social media channels.

The following is a summary of the pertinent comments raised during the public comment period and NCDAQ's responses.

Comments Submitted by Members of the Public Supporting the Exceptional Events Demonstration

[51] https://www.deq.nc.gov/about/divisions/air-quality/air-quality-planning/attainment/2024-pm25-annual-standard/exceptional-events-demonstration-support-attainment-designation-recommendations-2024-annual-pm25

[52] https://www3.epa.gov/ttn/naaqs/aqmguide/collection/cp2/20110406_mccabe_regional_consistancy_admin_requirements.pdf

Two organizations, North Carolina Manufacturers Alliance and Midwest Ozone Group, submitted comments in support of the proposed demonstration. These comments were submitted by email and are provided in **Attachments 1 and 2** to this appendix, respectively.

NCDAQ response: The NCDAQ acknowledges these supportive comments. No revisions are required to the proposed Exceptional Events demonstration.

Comments Submitted by Members of the Public Requesting Changes to the Exceptional Events Demonstration

One environmental organization, Southern Environmental Law Center (SELC), submitted comments via email which are provided in **Attachment 3** to this appendix.

NCDAQ reviewed each comment and evaluated if the comment warranted revisions to the technical analysis as well as the conclusions presented in the Exceptional Events demonstration. As a result of this review of comments, NCDAQ has concluded that no revisions are needed to the technical analysis or conclusions. Substantive comments received by NCDAQ are summarized below, followed by NCDAQ's response to each comment.

SELC Comments

"DAQ has not established a "clear causal relationship" between the Canadian wildfires and the monitored exceedances for several of the days the agency proposes to exclude," based on the following three items:

1. **The narrative conceptual model describing the meteorological conditions that resulted in smoke impacts does not support excluding the data collected on June 6th, 2023.**

This comment includes several paragraphs of discussion and explanation which is included in its entirety in **Attachment 3** of this appendix. The comment has been distilled to requested action items from the commenter for NCDAQ's response:

> *In the absence of a narrative conceptual model that explains "how emissions from the event(s) led to the exceedance or violation at the affected monitor(s)" on June 6th, DAQ cannot meet even the first step of showing that the monitored exceedances on that date were directly due to the Canadian wildfires. It is apparent that $PM_{2.5}$ concentrations were already elevated in Mecklenburg and Davidson Counties before the wildfire smoke was transported to the state. These elevated concentrations were subsequently exacerbated by wildfire smoke that was transported into the state by the north-northwesterly winds caused by the cold front that started crossing into the state "on the morning of June 7th." Accordingly, DAQ should remove June 6th from the list of dates for which the agency requests exclusion of monitoring data.*

NCDAQ Response:
As stated in section 6.1.1 Event ID #1 - June 6th through June 11th, 2023, beginning on June 3rd, NCDAQ forecasters predicted that a heavily smoke-laden air mass would move into the state on June 6th. As seen in Appendix B, multiple smoke model analyses and surface observations corroborate that this did occur. Additionally, as seen in **Figure 152-M** and **Figure 153-M** below, the forecasters'

narrative conceptual model is corroborated by back trajectory analysis and satellite-detected smoke that provides additional evidence that the heavily polluted, smoke-laden air mass to the northwest of North Carolina in the days preceding moved into the state on June 6th and began to mix downward to the surface during the afternoon and evening hours. Widespread reduced surface visibilities, seen in **Figure 154-M** below, occurred concurrently with rising $PM_{2.5}$ concentrations during the afternoon and evening of June 6th, a clear indicator of increasing surface smoke.

No alternative explanation was provided to refute the forecasters' consistent pre-event forecasts and post-event analysis for this episode that would explain what would have caused these widespread (not just North Carolina, but all of the eastern U.S.) anomalous $PM_{2.5}$ concentrations. If it were not Canadian wildfire smoke, which was irrefutably seen on satellite observations and reported on surface observations less than 50 miles from each location, then there should be some obvious explanation for what was causing the haze. Canadian wildfire smoke that we predicted days in advance and discussed publicly on our website and social media consistently aligns with the post-event narrative and clear causal analysis provided in this demonstration. There is no evidence that anything other than Canadian wildfire smoke caused the widespread hourly $PM_{2.5}$ concentrations measured in the Code Orange and Code Red range across the eastern seaboard, including North Carolina, on June 6th, 2023.

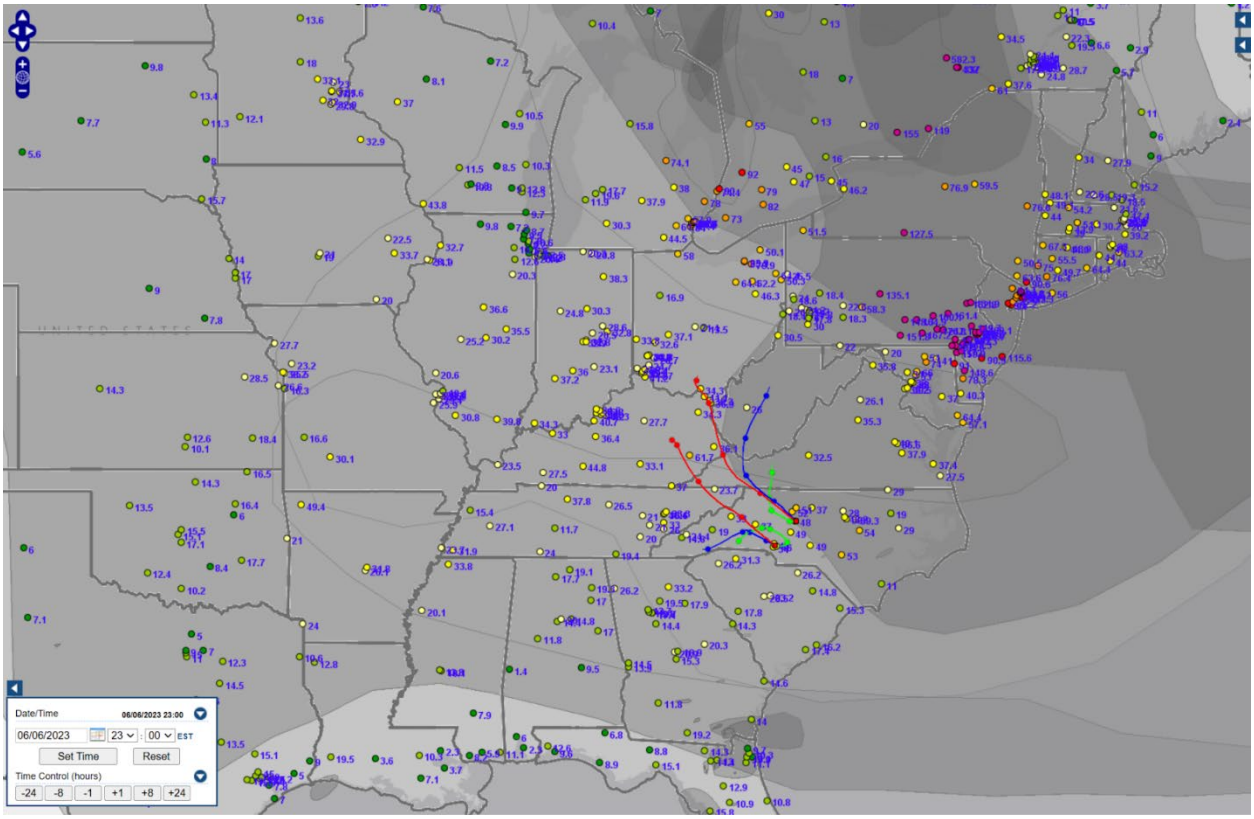


***Figure 152-M**: 11:00 pm $PM_{2.5}$ concentrations valid on June 6th, 2023, NOAA OSPO satellite-derived smoke analysis and 24-hr. backward trajectories at 100 m (green line), 750 m (blue line) and 1500 m (red line) showing overhead air mass originated from the smoke-laden air mass to the northwest 24 hours earlier.*

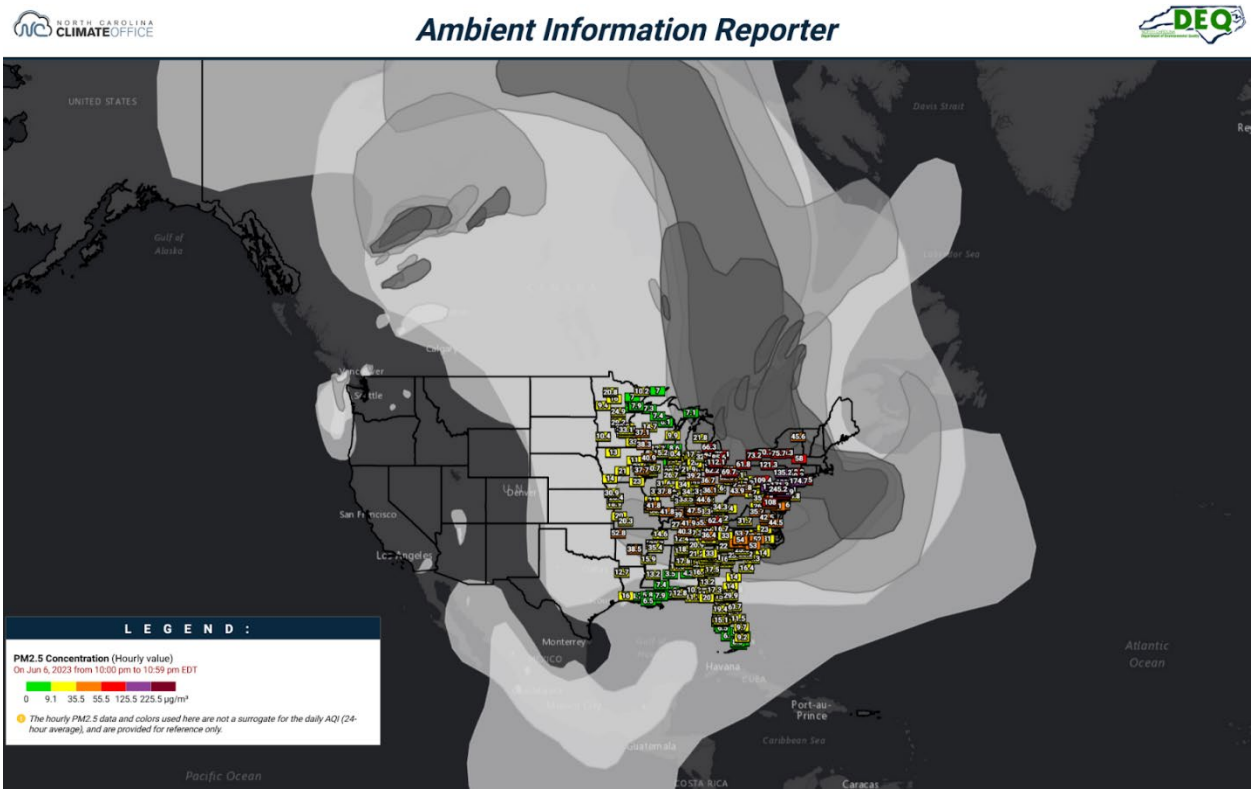


***Figure 153-M**: 24-hr. avg. $PM_{2.5}$ concentrations and NOAA OSPO smoke satellite-derived analysis on June 6th, 2023.*

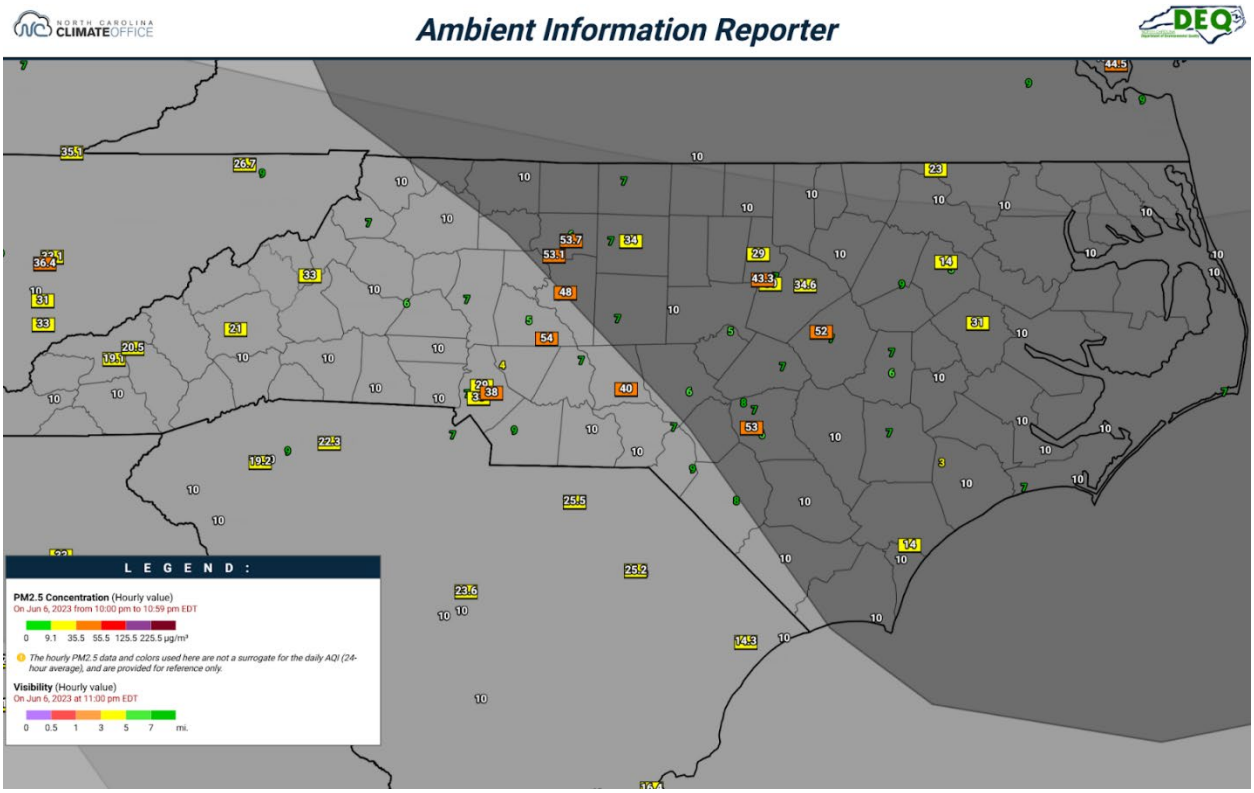


***Figure 154-M**: 11:00 pm hourly average $PM_{2.5}$ concentrations and hourly visibility from airport observing sites*

on June 6th, 2023. Minimum visibility can be used as a proxy for additional air quality monitors and when values fall below the standard 10 SM range, it is an indicator of an obscuration (such as smoke, dust, haze, etc.).

2. The satellite imagery and surface observations relied upon by DAQ do not support excluding the data collected on June 8–10th, 2023

This comment includes several paragraphs of discussion and explanation which is included in its entirety in **Attachment 3** to this appendix. The comment has been distilled to requested action items from the commenter for NCDAQ's response:

> *DAQ should revise the Draft EE Demonstration to remove its request to exclude the data from those dates. At a minimum, DAQ must provide substantially more evidence to support a demonstration of a causal relationship between the Canadian wildfires and the monitored exceedances on those dates.*

NCDAQ Response:
Regarding the satellite imagery, smoke is visible across the entire state in all of the visible satellite images provided. In some areas over the state, smoke is thicker and may be more obvious to the eye. However, each satellite image at a minimum shows a smoky haze over the entire state and may require extra scrutiny of the image to observe this. The absence of thicker, more apparent smoke over a particular area does not mean the absence of smoke entirely. To illustrate this further, **Figure 155-M, 156-M,** and **157-M** show the satellite image from each respective day compared to a clearer day. When carefully analyzing both side-by-side, the smoky haze over the state each day becomes more apparent. This is also supported by the NOAA OSPO satellite-derived smoke analysis for each date, which are **Figures 34, 38,** and **42** in the Exceptional Events demonstration as well as the near-surface smoke output from the HRRR model in **Figures 125-C, 128-D,** and **131-E**.

Regarding the surface observations, NCDAQ noted in the beginning of Section III. Clear Causal Relationship that one of the main reasons as to why weather monitoring data from JQF was used as supporting evidence was because it was the closest site to both air quality monitors that had manual (human) obscuration and visibility reporting. Visibility is one of the most difficult parameters to automate and therefore, manual reports tend to represent a more accurate depiction of conditions compared to automated reports. Thus, priority was given to observation sites that had manual reporting.

NCDAQ concluded that despite JQF being approximately 20 and 40 miles away from the air quality monitors, data from JQF could still provide supporting evidence that smoke was present near or at the surface of the air quality monitoring sites.

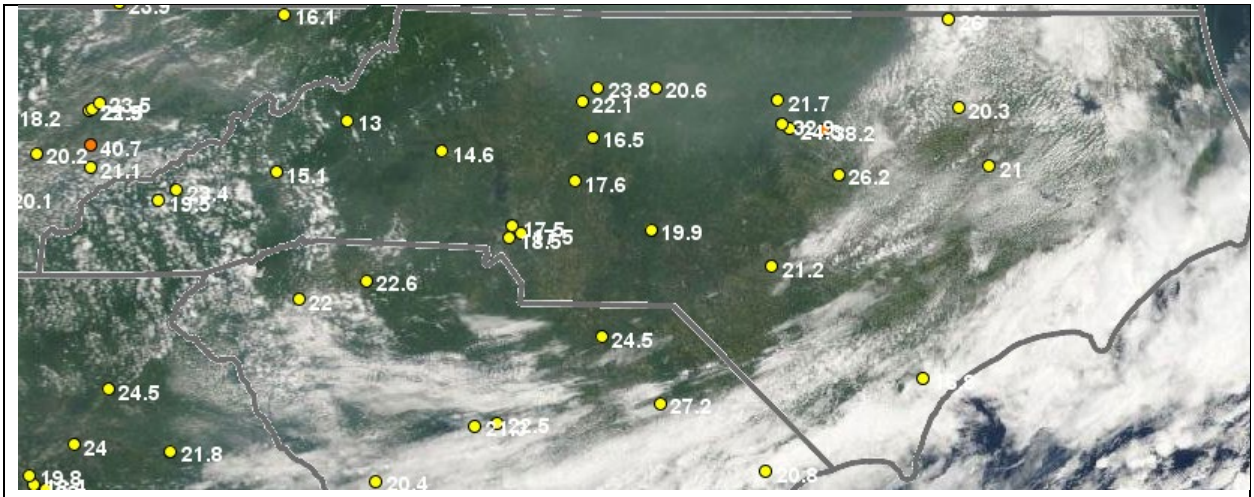
This conclusion was reached through the following reasoning and analysis:

1. The elevation of the JQF location (215 m) and the elevation of the Remount (194 m) and Lexington (241 m) locations are similar and thus elevation differences have negligible impact on climate differences at each location.
2. As noted in section 3.1.1 Event ID #1 - June 6th through June 11th, 2023, a cold front passed through the state near the beginning of Event #1 and high pressure built in across the state afterwards. The surface analysis evolution from June 8th through June 11th, provided in **Figure 29**, shows high pressure and the absence of frontal or "airmass" boundaries across the state

for each day indicating that the airmass at JQF and the airmass at both the Remount and Lexington monitors were very similar.

3. Observed sounding data from GSO, shown in **Figure 167-M, 168-M** and **169-M** , shows a well-mixed boundary layer each day. Given this and point #2, a similar atmospheric profile and mixing was likely present at JQF and at the air quality monitoring sites.
4. Smoke was visible in satellite imagery across the entire state each day. NOAA OSPO satellite-derived smoke analysis as well as near-surface smoke data from the HRRR also support this.
5. Visibility at JQF was obstructed at times during the days of June 8th through June 10th, as highlighted in **Figure 158-M, 159-M,** and **160-M** . Smoke was also reported for several hours on June 8th.

Thus, because the surface observations from JQF showed obscured visibility and smoke at times, and the airmass, mixing profile, and satellite smoke coverage were similar across the entire region, NCDAQ concludes that this information supports excluding the data collected on June 8–10th, 2023. In addition to surface data from JQF, NCDAQ also provided daily minimum surface visibility measurements in **Figures 33, 37,** and **41** from other weather reporting sites across the state. Detailed hourly surface data from two of those sites, CLT and GSO (Greensboro, Piedmont Triad Regional Airport), are provided in **Figure 161-M** through **Figure 166-M** as additional supporting evidence alongside the satellite imagery. Reduced visibility was reported each day at both observational sites, similar to JQF.



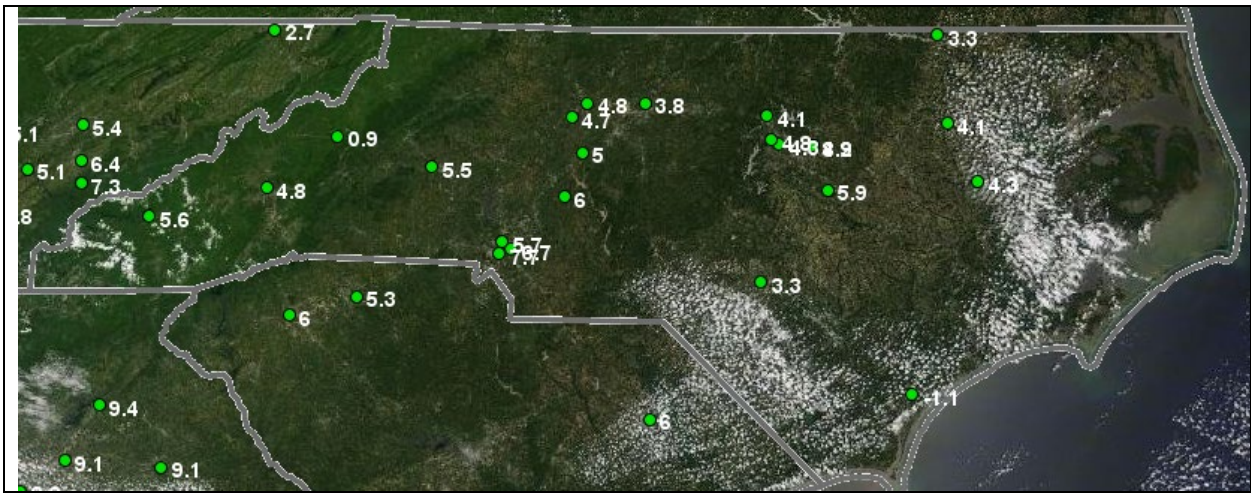


***Figure 155-M**: Visible satellite imagery from June 8th, 2023 (Top), showing a smoky haze across the entire state, and June 1st, 2020 (Bottom), a clearer day for reference. Daily average fine particulate data is also plotted on each image with color-coding to indicate the AQI.*

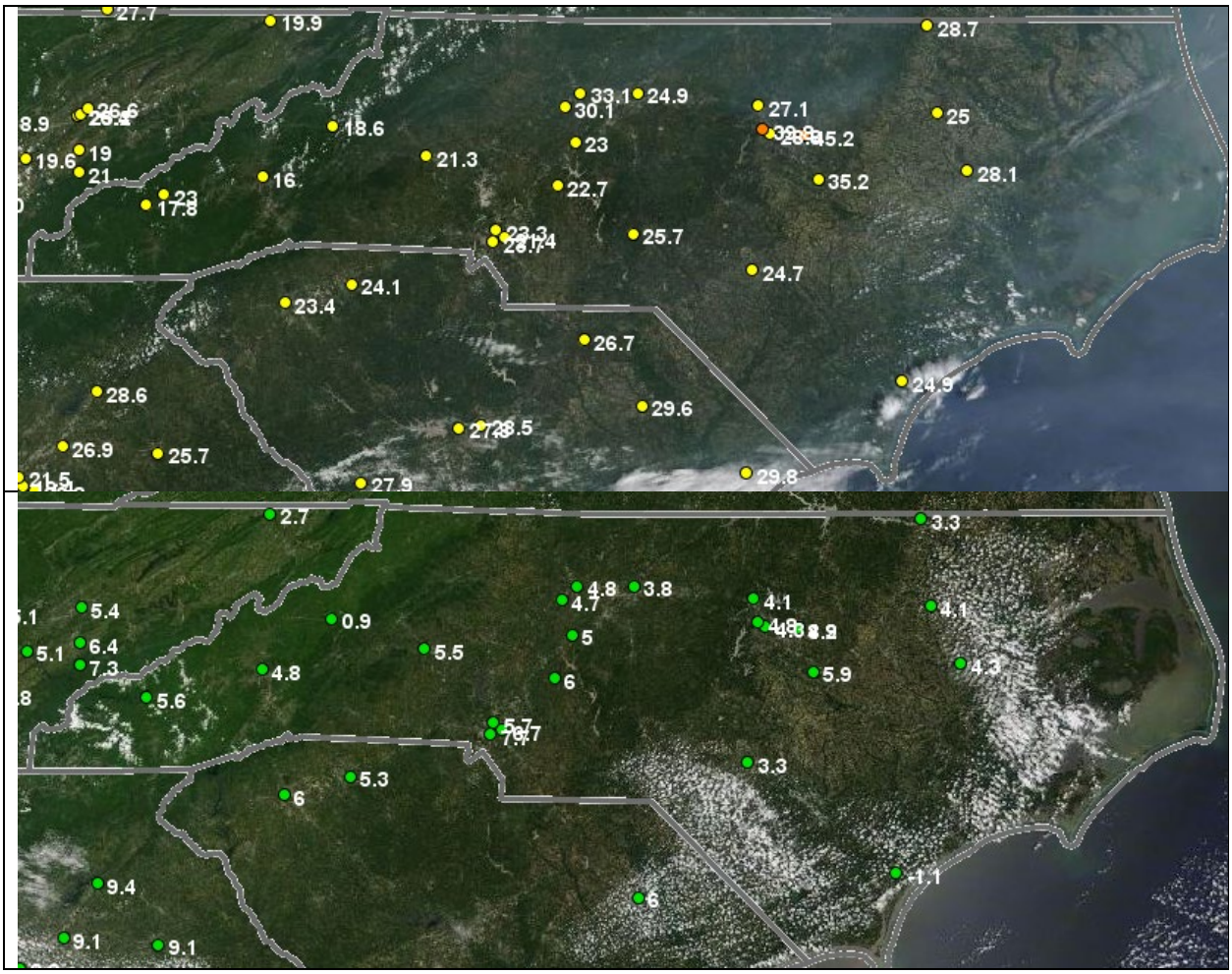


***Figure 156-M**: Visible satellite imagery from June 9th, 2023 (Top), showing a smoky haze across the entire state, and June 1st, 2020 (Bottom), a clearer day for reference. Daily average fine particulate data is also plotted on each image with color-coding to indicate the AQI.*

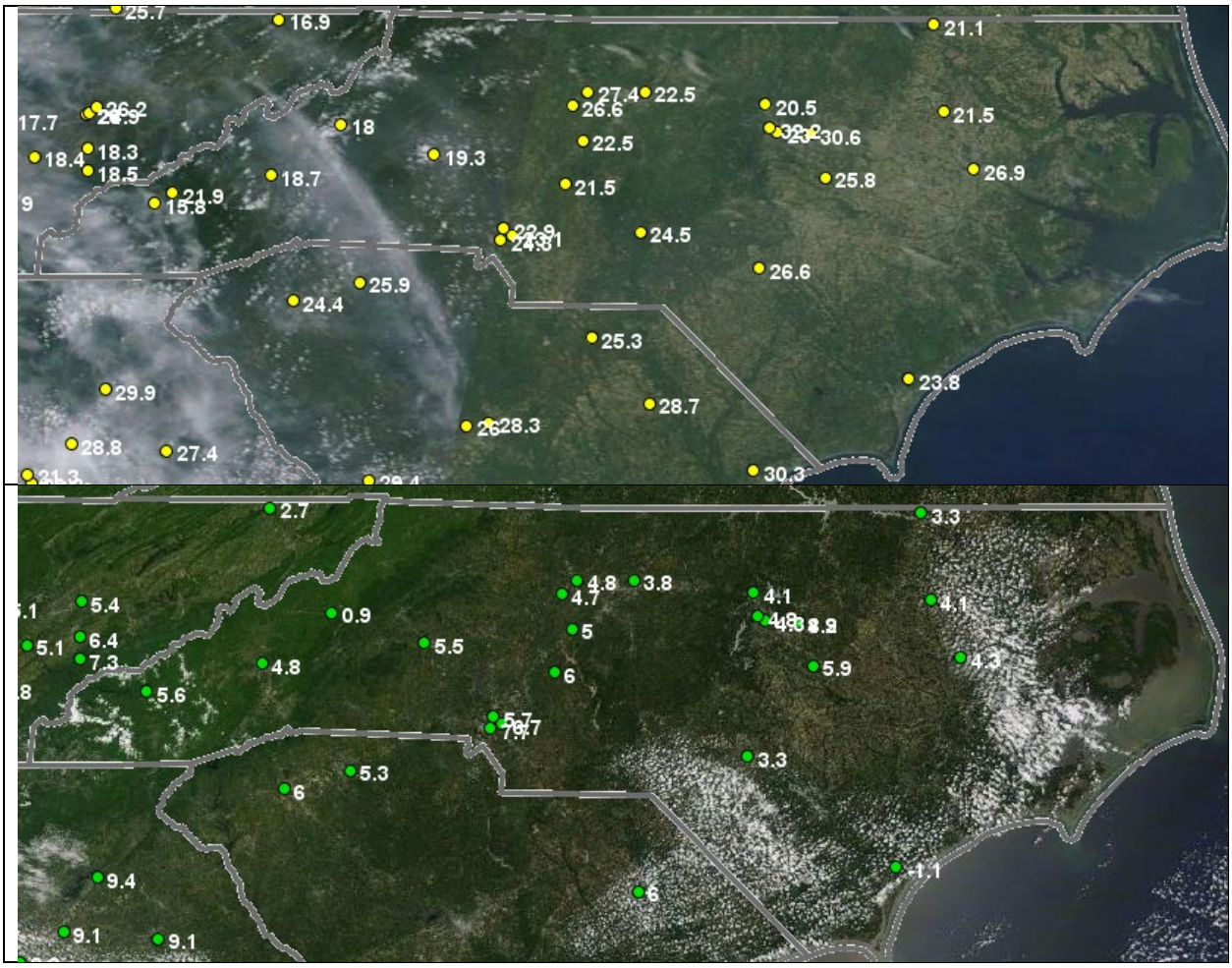


***Figure 157-M**: Visible satellite imagery from June 10th, 2023 (Top), showing a smoky haze across the entire state, and June 1st, 2020 (Bottom), a clearer day for reference. Daily average fine particulate data is also plotted on each image with color-coding to indicate the AQI.*

JQF,2023-06-08 00:50,KJQF 080050Z 00000KT 6SM DZ FU BR SCT070 18/17 A2976
JQF,2023-06-08 01:50,KJQF 080150Z 00000KT 7SM BKN100 OVC120 18/17 A2975
JQF,2023-06-08 02:50,KJQF 080250Z 00000KT 7SM BKN100 18/17 A2976
JQF,2023-06-08 04:20,KJQF 080420Z AUTO 36003KT 7SM SCT060 OVC070 17/17 A2975 RMK AO2
JQF,2023-06-08 04:40,KJQF 080440Z AUTO 32003KT 10SM OVC070 17/16 A2975 RMK AO2
JQF,2023-06-08 05:20,KJQF 080520Z AUTO 00000KT 10SM SCT060 OVC090 17/16 A2975 RMK AO2
JQF,2023-06-08 05:40,KJQF 080540Z AUTO 00000KT 10SM SCT090 SCT120 17/17 A2975 RMK AO2
JQF,2023-06-08 06:00,KJQF 080600Z AUTO 00000KT 5SM BR SCT090 BKN120 17/16 A2975 RMK AO2
JQF,2023-06-08 06:20,KJQF 080620Z AUTO 00000KT 7SM OVC090 17/16 A2975 RMK AO2
JQF,2023-06-08 06:40,KJQF 080640Z AUTO 00000KT 5SM BR OVC090 17/16 A2975 RMK AO2
JQF,2023-06-08 07:00,KJQF 080700Z AUTO 00000KT 5SM BR BKN090 OVC120 17/16 A2974 RMK AO2
JQF,2023-06-08 07:20,KJQF 080720Z AUTO 00000KT 10SM BKN090 OVC120 16/16 A2973 RMK AO2
JQF,2023-06-08 07:40,KJQF 080740Z AUTO 00000KT 10SM BKN080 BKN120 16/15 A2973 RMK AO2
JQF,2023-06-08 08:00,KJQF 080800Z AUTO 00000KT 10SM BKN080 16/15 A2974 RMK AO2
JQF,2023-06-08 08:20,KJQF 080820Z AUTO 00000KT 10SM OVC080 16/15 A2973 RMK AO2
JQF,2023-06-08 08:40,KJQF 080840Z AUTO 00000KT 10SM OVC080 16/15 A2974 RMK AO2
JQF,2023-06-08 09:00,KJQF 080900Z AUTO 00000KT 10SM OVC080 16/14 A2974 RMK AO2
JQF,2023-06-08 09:20,KJQF 080920Z AUTO 00000KT 10SM OVC080 16/15 A2974 RMK AO2
JQF,2023-06-08 09:40,KJQF 080940Z AUTO 00000KT 10SM OVC080 16/15 A2975 RMK AO2
JQF,2023-06-08 10:00,KJQF 081000Z AUTO 21003KT 10SM OVC090 16/15 A2977 RMK AO2
JQF,2023-06-08 10:20,KJQF 081020Z AUTO 00000KT 10SM OVC090 16/15 A2977 RMK AO2
JQF,2023-06-08 10:40,KJQF 081040Z AUTO 00000KT 10SM OVC080 16/15 A2977 RMK AO2
JQF,2023-06-08 10:50,KJQF 081050Z 00000KT 7SM OVC080 17/14 A2978
JQF,2023-06-08 11:00,KJQF 081100Z AUTO 00000KT 10SM OVC080 16/14 A2978 RMK AO2
JQF,2023-06-08 11:50,KJQF 081150Z 00000KT 7SM OVC080 17/15 A2980
JQF,2023-06-08 12:50,KJQF 081250Z 32006KT **7SM HZ** BKN080 17/14 A2980
JQF,2023-06-08 13:50,KJQF 081350Z 01008KT **7SM HZ** CLR 21/12 A2981
JQF,2023-06-08 14:50,KJQF 081450Z 36006KT **7SM FU** CLR 22/10 A2980
JQF,2023-06-08 15:50,KJQF 081550Z 01010G18KT **7SM FU** CLR 23/07 A2980
JQF,2023-06-08 16:50,KJQF 081650Z 04010G22KT **7SM FU** CLR 24/07 A2980
JQF,2023-06-08 17:50,KJQF 081750Z 36010G18KT **7SM FU** CLR 24/06 A2979
JQF,2023-06-08 18:50,KJQF 081850Z 36008G19KT **7SM FU** CLR 25/06 A2979
JQF,2023-06-08 19:55,KJQF 081955Z 24009G16KT **7SM FU** SCT080 26/06 A2977
JQF,2023-06-08 20:50,KJQF 082050Z 34007G14KT **7SM FU** SCT090 26/05 A2977
JQF,2023-06-08 21:51,KJQF 082151Z 36005G12KT **7SM FU** CLR 26/04 A2977
JQF,2023-06-08 22:52,KJQF 082252Z 01006KT **7SM FU** CLR 24/04 A2978
JQF,2023-06-08 23:53,KJQF 082353Z 00000KT **7SM FU** SCT110 21/08 A2980

***Figure 158-M**: Hourly METAR reports from Concord Regional Airport (KJQF) on June 8th, 2023. "FU" is abbreviation for smoke. "HZ" is abbreviation for haze. Visibility was measured at 7 SM, below the standard of 10 SM, indicating that an obscuration was limiting visibility.*

JQF,2023-06-09 00:50,KJQF 090050Z 00000KT 10SM BKN110 18/10 A2982
JQF,2023-06-09 01:50,KJQF 090150Z 00000KT 10SM SCT100 18/09 A2985
JQF,2023-06-09 02:50,KJQF 090250Z 00000KT 10SM BKN100 16/11 A2986
JQF,2023-06-09 04:20,KJQF 090420Z AUTO 00000KT 10SM CLR 14/10 A2986 RMK AO2
JQF,2023-06-09 04:40,KJQF 090440Z AUTO 00000KT 10SM SCT100 15/08 A2986 RMK AO2
JQF,2023-06-09 05:00,KJQF 090500Z AUTO 00000KT 10SM SCT100 15/08 A2986 RMK AO2
JQF,2023-06-09 05:20,KJQF 090520Z AUTO 00000KT 10SM CLR 13/08 A2986 RMK AO2
JQF,2023-06-09 05:40,KJQF 090540Z AUTO 00000KT 10SM CLR 13/09 A2986 RMK AO2
JQF,2023-06-09 06:00,KJQF 090600Z AUTO 00000KT 10SM CLR 12/10 A2986 RMK AO2
JQF,2023-06-09 06:20,KJQF 090620Z AUTO 00000KT 10SM SCT095 12/08 A2986 RMK AO2
JQF,2023-06-09 06:40,KJQF 090640Z AUTO 00000KT 10SM CLR 12/08 A2986 RMK AO2
JQF,2023-06-09 07:00,KJQF 090700Z AUTO 36003KT 10SM CLR 11/08 A2985 RMK AO2
JQF,2023-06-09 07:20,KJQF 090720Z AUTO 00000KT 10SM CLR 11/08 A2986 RMK AO2
JQF,2023-06-09 07:40,KJQF 090740Z AUTO 00000KT 10SM CLR 10/08 A2985 RMK AO2
JQF,2023-06-09 08:00,KJQF 090800Z AUTO 00000KT 10SM CLR 10/08 A2986 RMK AO2
JQF,2023-06-09 08:20,KJQF 090820Z AUTO 00000KT 10SM CLR 10/09 A2986 RMK AO2
JQF,2023-06-09 08:40,KJQF 090840Z AUTO 00000KT 10SM CLR 10/08 A2987 RMK AO2
JQF,2023-06-09 09:00,KJQF 090900Z AUTO 00000KT 10SM SCT095 10/08 A2987 RMK AO2
JQF,2023-06-09 09:20,KJQF 090920Z AUTO 34003KT 10SM SCT095 10/08 A2987 RMK AO2
JQF,2023-06-09 09:40,KJQF 090940Z AUTO 00000KT 10SM SCT095 10/08 A2988 RMK AO2
JQF,2023-06-09 10:00,KJQF 091000Z AUTO 00000KT 10SM SCT095 10/08 A2988 RMK AO2
JQF,2023-06-09 10:20,KJQF 091020Z AUTO 00000KT 10SM SCT095 10/09 A2988 RMK AO2
JQF,2023-06-09 10:40,KJQF 091040Z AUTO 00000KT 10SM SCT095 10/08 A2989 RMK AO2
JQF,2023-06-09 10:50,KJQF 091050Z 00000KT **7SM** CLR 10/08 A2989
JQF,2023-06-09 11:00,KJQF 091100Z AUTO 00000KT 10SM CLR 10/08 A2989 RMK AO2
JQF,2023-06-09 11:50,KJQF 091150Z 00000KT **7SM** CLR 14/09 A2991
JQF,2023-06-09 12:50,KJQF 091250Z 00000KT **7SM** CLR 17/10 A2992
JQF,2023-06-09 13:51,KJQF 091351Z 01006KT **7SM** CLR 20/08 A2993
JQF,2023-06-09 14:52,KJQF 091452Z 36006KT **7SM** CLR 22/07 A2993
JQF,2023-06-09 15:50,KJQF 091550Z 36006KT **7SM** CLR 23/06 A2993
JQF,2023-06-09 16:50,KJQF 091650Z 30006KT **7SM** CLR 24/06 A2991
JQF,2023-06-09 17:50,KJQF 091750Z 30006KT **7SM** CLR 25/07 A2990
JQF,2023-06-09 18:55,KJQF 091855Z 34006KT **7SM** CLR 25/06 A2989
JQF,2023-06-09 19:50,KJQF 091950Z 01004G16KT **7SM** CLR 26/07 A2988
JQF,2023-06-09 20:50,KJQF 092050Z 04004G16KT **7SM** CLR 26/07 A2987
JQF,2023-06-09 21:50,KJQF 092150Z 00000KT **7SM** CLR 26/07 A2987
JQF,2023-06-09 22:50,KJQF 092250Z 00000KT **7SM** CLR 25/07 A2987
JQF,2023-06-09 23:55,KJQF 092355Z 00000KT **7SM** CLR 23/11 A2989

***Figure 159-M**: Hourly METAR reports from Concord Regional Airport (KJQF) on June 9th, 2023. Visibility was measured at 7 SM, below the standard of 10 SM, indicating that an obscuration was limiting visibility.*

JQF,2023-06-10 00:50,KJQF 100050Z 00000KT **7SM** CLR 19/12 A2990
JQF,2023-06-10 01:50,KJQF 100150Z 00000KT **7SM** CLR 18/11 A2992
JQF,2023-06-10 02:50,KJQF 100250Z 00000KT **7SM** CLR 16/11 A2983
JQF,2023-06-10 04:20,KJQF 100420Z AUTO 00000KT 10SM OVC085 15/12 A2994 RMK AO2
JQF,2023-06-10 04:40,KJQF 100440Z AUTO 00000KT 10SM OVC085 15/11 A2994 RMK AO2
JQF,2023-06-10 05:00,KJQF 100500Z AUTO 00000KT 10SM BKN085 16/11 A2994 RMK AO2
JQF,2023-06-10 05:20,KJQF 100520Z AUTO 00000KT 10SM SCT085 15/11 A2994 RMK AO2
JQF,2023-06-10 05:45,KJQF 100545Z AUTO 00000KT 10SM CLR 15/11 A2993 RMK AO2
JQF,2023-06-10 06:00,KJQF 100600Z AUTO 00000KT 10SM CLR 14/11 A2993 RMK AO2
JQF,2023-06-10 06:20,KJQF 100620Z AUTO 00000KT 10SM CLR 15/12 A2993 RMK AO2
JQF,2023-06-10 06:40,KJQF 100640Z AUTO 00000KT 10SM CLR 13/11 A2993 RMK AO2
JQF,2023-06-10 07:05,KJQF 100705Z AUTO 00000KT 10SM CLR 13/11 A2993 RMK AO2
JQF,2023-06-10 07:25,KJQF 100725Z AUTO 00000KT 10SM CLR 13/11 A2993 RMK AO2
JQF,2023-06-10 07:40,KJQF 100740Z AUTO 00000KT 10SM CLR 13/12 A2993 RMK AO2
JQF,2023-06-10 08:00,KJQF 100800Z AUTO 00000KT 10SM CLR 13/11 A2993 RMK AO2
JQF,2023-06-10 08:20,KJQF 100820Z AUTO 00000KT 10SM CLR 13/11 A2993 RMK AO2
JQF,2023-06-10 08:40,KJQF 100840Z AUTO 00000KT 10SM CLR 12/11 A2993 RMK AO2
JQF,2023-06-10 09:00,KJQF 100900Z AUTO 00000KT 10SM CLR 12/11 A2993 RMK AO2
JQF,2023-06-10 09:25,KJQF 100925Z AUTO 00000KT 7SM CLR 12/11 A2994 RMK AO2
JQF,2023-06-10 09:40,KJQF 100940Z AUTO 00000KT 7SM CLR 12/11 A2994 RMK AO2
JQF,2023-06-10 10:05,KJQF 101005Z AUTO 00000KT 7SM CLR 11/11 A2995 RMK AO2
JQF,2023-06-10 10:25,KJQF 101025Z AUTO 00000KT 7SM CLR 11/11 A2995 RMK AO2
JQF,2023-06-10 10:45,KJQF 101045Z AUTO 00000KT 10SM CLR 12/11 A2996 RMK AO2
JQF,2023-06-10 10:50,KJQF 101050Z 00000KT 7SM CLR 12/12 A2996
JQF,2023-06-10 11:05,KJQF 101105Z AUTO 00000KT 10SM CLR 12/11 A2996 RMK AO2
JQF,2023-06-10 11:51,KJQF 101151Z 00000KT **7SM** CLR 17/14 A2996
JQF,2023-06-10 12:50,KJQF 101250Z 00000KT **7SM** CLR 20/13 A2998
JQF,2023-06-10 13:50,KJQF 101350Z 00000KT **7SM** CLR 23/13 A2998
JQF,2023-06-10 14:50,KJQF 101450Z 00000KT **7SM** CLR 26/09 A2998
JQF,2023-06-10 15:50,KJQF 101550Z 00000KT **7SM** CLR 27/09 A2997
JQF,2023-06-10 16:07,KJQF 101607Z 22009KT **7SM** CLR 27/08 A2997
JQF,2023-06-10 16:50,KJQF 101650Z 23010KT **7SM** SCT075 27/08 A2997
JQF,2023-06-10 17:50,KJQF 101750Z 23008KT 10SM SCT080 28/08 A2995
JQF,2023-06-10 18:50,KJQF 101850Z 27006KT 10SM CLR 28/09 A2994
JQF,2023-06-10 19:50,KJQF 101950Z 21009G16KT 10SM SCT075 29/09 A2993
JQF,2023-06-10 20:50,KJQF 102050Z 23008G17KT 10SM SCT080 28/09 A2992
JQF,2023-06-10 21:50,KJQF 102150Z 24007G17KT 10SM CLR 28/09 A2992
JQF,2023-06-10 22:50,KJQF 102250Z 26006KT 10SM CLR 27/09 A2992
JQF,2023-06-10 23:50,KJQF 102350Z 25005KT 10SM CLR 26/09 A2992

***Figure 160-M**: Hourly METAR reports from Concord Regional Airport (KJQF) on June 10th, 2023. Visibility was measured at 7 SM, below the standard of 10 SM, indicating that an obscuration was limiting visibility.*

KCLT 080052Z 16003KT 10SM FEW070 BKN110 OVC140 19/16 A2972 RMK AO2 RAE31 SLP073 P0001 T01940161
KCLT 080152Z 00000KT 10SM BKN090 BKN110 OVC140 19/16 A2973 RMK AO2 SLP075 T01890161
KCLT 080252Z 00000KT 9SM FEW080 OVC100 18/17 A2973 RMK AO2 RAB06E16 SLP074 P0000 60001 T01830167 55001
KCLT 080352Z 26004KT 8SM SCT065 OVC090 18/17 A2973 RMK AO2 RAB0256E06 SLP074 P0000 T01830167
KCLT 080452Z 00000KT 10SM SCT080 OVC100 18/16 A2973 RMK AO2 SLP075 T01830156 402780150
KCLT 080552Z 30003KT 10SM OVC110 18/16 A2972 RMK AO2 SLP072 60001 T01780156 10194 20178 58002
KCLT 080652Z 31003KT 10SM FEW085 FEW120 17/15 A2971 RMK AO2 SLP069 T01720150
KCLT 080752Z 00000KT 10SM OVC080 17/15 A2971 RMK AO2 SLP069 T01720150
KCLT 080852Z 25004KT 10SM OVC080 17/15 A2973 RMK AO2 SLP075 T01670150 53001
KCLT 080952Z 29004KT 10SM OVC080 17/15 A2975 RMK AO2 SLP081 T01670150
KCLT 081052Z 30004KT 10SM OVC070 17/14 A2976 RMK AO2 SLP085 T01670144
KCLT 081152Z 34006KT 10SM OVC070 17/14 A2977 RMK AO2 SLP088 70004 T01720139 10178 20167 51013
KCLT 081252Z 33006KT 10SM FEW075 BKN100 18/14 A2978 RMK AO2 SLP093 T01780139
KCLT 081352Z 35007KT **9SM** FEW110 21/13 A2978 RMK AO2 SLP093 T02060128
KCLT 081452Z 01009KT 340V040 **8SM** FEW035 22/11 A2978 RMK AO2 SLP091 T02220111 50004
KCLT 081552Z 36008KT **7SM** FEW050 24/07 A2978 RMK AO2 SLP093 T02390067
KCLT 081652Z 01010KT **8SM** FEW060 24/07 A2978 RMK AO2 SLP090 T02440072
KCLT 081752Z 32008G16KT 290V350 **8SM** FEW065 25/07 A2976 RMK AO2 SLP085 T02500067 10250 20172 58004
KCLT 081852Z 34007KT **8SM** SCT070 25/06 A2976 RMK AO2 SLP085 T02500061
KCLT 081952Z 32009G15KT **8SM** FEW070 26/07 A2975 RMK AO2 SLP080 T02610067
KCLT 082052Z 01007KT **7SM** FEW080 26/07 A2975 RMK AO2 SLP079 T02610067 56006
KCLT 082152Z 34006KT **8SM** FEW080 26/06 A2975 RMK AO2 SLP079 T02610056
KCLT 082252Z VRB06KT **8SM** BKN100 25/06 A2976 RMK AO2 SLP083 T02500056
KCLT 082352Z 36005KT **8SM** BKN100 23/07 A2978 RMK AO2 SLP091 T02280072 10261 20228 53010

***Figure 161-M**: Hourly METAR reports from Charlotte Douglas International Airport (CLT) on June 8th, 2023. Visibility was measured between 7 and 9 SM at times, which is below the standard of 10 SM, indicating that an obscuration was limiting visibility.*

KCLT 090052Z 35004KT **8SM** BKN090 BKN110 22/09 A2980 RMK AO2 SLP098 T02170089
KCLT 090152Z 01005KT **9SM** SCT090 BKN110 20/08 A2982 RMK AO2 SLP105 T02000083
KCLT 090252Z 35004KT **9SM** BKN100 19/09 A2984 RMK AO2 SLP112 T01890089 52021
KCLT 090352Z 33004KT **9SM** SCT110 17/09 A2984 RMK AO2 SLP111 T01720094
KCLT 090452Z 34004KT **8SM** BKN100 17/10 A2983 RMK AO2 SLP109 T01670100 402610167
KCLT 090552Z 00000KT **9SM** SCT100 16/09 A2983 RMK AO2 SLP110 T01610094 10228 20161 55001
KCLT 090652Z 00000KT **8SM** FEW100 15/09 A2983 RMK AO2 SLP108 T01500089
KCLT 090752Z 32004KT **8SM** SCT095 14/09 A2983 RMK AO2 SLP109 T01390089
KCLT 090852Z 34003KT **8SM** SCT100 13/09 A2984 RMK AO2 SLP114 T01280089 53003
KCLT 090952Z 33004KT **8SM** SCT100 13/08 A2985 RMK AO2 SLP118 T01280083
KCLT 091052Z 33005KT **6SM HZ** SCT095 13/08 A2987 RMK AO2 SLP123 T01330083
KCLT 091152Z 33006KT **7SM** FEW100 15/08 A2988 RMK AO2 SLP129 T01500083 10161 20122 53014
KCLT 091252Z 35006KT **8SM** SCT095 18/09 A2990 RMK AO2 SLP133 T01830089
KCLT 091352Z 34007KT **8SM** FEW095 21/07 A2990 RMK AO2 SLP134 T02060072
KCLT 091452Z 35007KT **9SM** CLR 23/08 A2990 RMK AO2 SLP134 T02280083 50006
KCLT 091552Z VRB03KT **9SM** CLR 23/05 A2990 RMK AO2 SLP133 T02330050
KCLT 091652Z 11004KT 10SM CLR 23/06 A2988 RMK AO2 SLP127 T02330056
KCLT 091752Z 33009KT 10SM CLR 25/05 A2987 RMK AO2 SLP124 T02500050 10256 20150 58009
KCLT 091852Z VRB06KT 10SM FEW080 26/06 A2987 RMK AO2 SLP121 T02610056
KCLT 091952Z 33004G14KT **9SM** FEW080 26/07 A2985 RMK AO2 SLP117 T02610067
KCLT 092052Z 00000KT **9SM** FEW080 26/07 A2985 RMK AO2 SLP115 T02610072 56009
KCLT 092152Z 34004KT **9SM** CLR 26/07 A2984 RMK AO2 SLP114 T02610072
KCLT 092252Z 33004KT **8SM** FEW075 26/08 A2985 RMK AO2 SLP116 T02560078
KCLT 092352Z 00000KT **8SM** CLR 24/09 A2986 RMK AO2 SLP120 T02440089 10267 20244 53005

***Figure 162-M**: Hourly METAR reports from Charlotte Douglas International Airport (CLT) on June 9th, 2023. Visibility was measured between 7 and 9 SM at times, which is below the standard of 10 SM, indicating that an obscuration was limiting visibility.*

KCLT 100052Z 00000KT **8SM** FEW070 23/08 A2988 RMK AO2 SLP125 T02330083
KCLT 100152Z 19003KT **9SM** CLR 23/08 A2990 RMK AO2 SLP131 T02280078
KCLT 100252Z 15003KT **8SM** FEW080 20/11 A2991 RMK AO2 SLP135 T02000106 51016
KCLT 100352Z 00000KT **8SM** SCT085 17/12 A2991 RMK AO2 SLP137 T01720117
KCLT 100452Z 00000KT **8SM** FEW085 17/11 A2991 RMK AO2 SLP137 T01670106 402670122
KCLT 100552Z 30003KT **8SM** CLR 16/11 A2990 RMK AO2 SLP135 T01560111 10244 20156 58001
KCLT 100652Z 00000KT **7SM** CLR 16/12 A2990 RMK AO2 SLP134 T01560122
KCLT 100752Z 00000KT **7SM** CLR 14/12 A2990 RMK AO2 SLP133 T01440117
KCLT 100852Z 00000KT **7SM** CLR 14/11 A2991 RMK AO2 SLP137 T01390111 53002
KCLT 100952Z 00000KT **7SM** FEW250 14/11 A2992 RMK AO2 SLP141 T01390111
KCLT 101052Z 31003KT 6SM BR FEW250 13/11 A2993 RMK AO2 SLP146 T01330111
KCLT 101152Z 35003KT **6SM** HZ FEW250 17/12 A2994 RMK AO2 SLP146 T01720122 10172 20133 51009
KCLT 101252Z 32003KT **7SM** FEW250 21/12 A2996 RMK AO2 SLP151 T02060122
KCLT 101352Z VRB03KT **8SM** FEW250 23/11 A2996 RMK AO2 SLP151 T02330106
KCLT 101452Z 26003KT **9SM** FEW250 26/09 A2996 RMK AO2 SLP151 T02560094 50006
KCLT 101552Z VRB06KT 10SM FEW060 FEW250 27/08 A2995 RMK AO2 SLP150 T02670083
KCLT 101652Z 24007KT 200V260 10SM FEW070 FEW250 27/09 A2995 RMK AO2 SLP148 T02720089
KCLT 101752Z 25007G16KT 10SM SCT075 SCT250 28/09 A2994 RMK AO2 SLP144 T02830094 10283 20172 58007
KCLT 101852Z 26008KT 10SM SCT075 SCT250 28/09 A2992 RMK AO2 SLP139 T02830094
KCLT 101952Z VRB04KT 10SM FEW075 SCT250 29/09 A2991 RMK AO2 SLP135 T02890094
KCLT 102052Z 25006KT **9SM** FEW075 BKN250 28/09 A2990 RMK AO2 SLP132 T02780089 56012
KCLT 102152Z 25004KT **9SM** FEW070 BKN250 28/10 A2989 RMK AO2 SLP130 T02830100
KCLT 102252Z 27003KT **9SM** FEW070 BKN250 27/12 A2989 RMK AO2 SLP130 T02670117
KCLT 102352Z 26003KT **8SM** FEW070 BKN250 26/12 A2990 RMK AO2 SLP131 T02560122 10294 20256 55000

***Figure 163-M**: Hourly METAR reports from Charlotte Douglas International Airport (CLT) on June 10th, 2023. Visibility was measured between 6 and 9 SM at times, which is below the standard of 10 SM, indicating that an obscuration was limiting visibility.*

KGSO 080054Z 26004KT 7SM OVC090 17/16 A2971 RMK AO2 SLP054 T01720161
KGSO 080154Z 29006KT 9SM OVC100 17/16 A2972 RMK AO2 SLP057 T01720156
KGSO 080254Z 29005KT 9SM SCT110 17/15 A2972 RMK AO2 SLP057 T01670150 50003
KGSO 080354Z 29006KT 7SM FEW110 15/14 A2971 RMK AO2 SLP056 T01500139
KGSO 080454Z 30005KT 10SM SCT110 15/13 A2970 RMK AO2 SLP052 T01500133 401890144
KGSO 080554Z 33005KT 10SM SCT110 14/13 A2970 RMK AO2 SLP053 T01440133 10178 20144 56005
KGSO 080654Z 31006KT 10SM FEW110 14/12 A2970 RMK AO2 SLP051 T01390122
KGSO 080754Z 33004KT 10SM FEW250 13/12 A2968 RMK AO2 SLP045 T01330117
KGSO 080854Z 32006KT 10SM CLR 13/11 A2969 RMK AO2 SLP046 T01330106 55005
KGSO 080954Z 00000KT 10SM FEW120 13/10 A2971 RMK AO2 SLP055 T01280100
KGSO 081054Z 31004KT **8SM** SCT090 13/10 A2973 RMK AO2 SLP062 T01330100
KGSO 081154Z 00000KT **8SM** SCT085 15/10 A2974 RMK AO2 SLP065 70023 T01500100 10150 20117 51018
KGSO 081254Z 31008KT **8SM** BKN085 BKN120 17/11 A2976 RMK AO2 SLP071 T01670106
KGSO 081354Z 32010KT **8SM** FEW090 19/10 A2976 RMK AO2 SLP071 T01890100
KGSO 081454Z 35006KT **8SM** CLR 21/09 A2976 RMK AO2 SLP069 T02060089 50005
KGSO 081554Z 34009KT **8SM** FEW050 22/08 A2976 RMK AO2 SLP069 T02170083
KGSO 081654Z 33011G16KT **9SM** FEW060 22/05 A2975 RMK AO2 SLP067 T02220050
KGSO 081754Z 32010G20KT 290V360 10SM FEW070 23/05 A2974 RMK AO2 SLP064 T02280050 10233 20156 58005
KGSO 081854Z 33008KT 10SM SCT070 24/04 A2974 RMK AO2 SLP063 T02390044
KGSO 081954Z VRB05KT 10SM SCT080 23/04 A2973 RMK AO2 SLP061 T02330044
KGSO 082054Z 36007KT 10SM SCT080 24/05 A2974 RMK AO2 SLP062 T02390050 55002
KGSO 082154Z 34004KT 10SM SCT085 23/03 A2974 RMK AO2 SLP065 T02280033
KGSO 082254Z 36004KT 10SM FEW085 23/03 A2975 RMK AO2 SLP067 T02330028
KGSO 082354Z 36003KT **8SM** FEW090 21/04 A2977 RMK AO2 SLP074 T02110044 10244 20211 53012

***Figure 164-M**: Hourly METAR reports from Greensboro, Piedmont Triad Regional Airport (GSO) on June 8th, 2023. Visibility was measured between 8 and 9 SM at times, which is below the standard of 10 SM, indicating that an obscuration was limiting visibility.*

KGSO 090054Z 32004KT **8SM** FEW090 18/07 A2979 RMK AO2 SLP080 T01830072
KGSO 090154Z 33003KT **9SM** FEW090 17/07 A2981 RMK AO2 SLP088 T01670072
KGSO 090254Z 00000KT 10SM FEW090 16/06 A2983 RMK AO2 SLP094 T01610061 53019
KGSO 090354Z 33003KT 10SM CLR 14/06 A2983 RMK AO2 SLP093 T01440056
KGSO 090454Z 33003KT 10SM CLR 15/04 A2982 RMK AO2 SLP089 T01500044 402440117
KGSO 090554Z 00000KT 10SM CLR 14/04 A2982 RMK AO2 SLP090 T01390044 10217 20133 55004
KGSO 090654Z 00000KT 10SM CLR 14/04 A2982 RMK AO2 SLP090 T01390039
KGSO 090754Z 00000KT 10SM CLR 13/04 A2982 RMK AO2 SLP089 T01330039
KGSO 090854Z 00000KT 10SM CLR 12/04 A2983 RMK AO2 SLP093 T01220044 53003
KGSO 090954Z 00000KT **9SM** FEW250 11/05 A2984 RMK AO2 SLP099 T01110050
KGSO 091054Z 00000KT **7SM** CLR 11/06 A2986 RMK AO2 SLP105 T01060061
KGSO 091154Z 00000KT **7SM** CLR 15/08 A2987 RMK AO2 SLP107 T01500078 10150 20100 51013
KGSO 091254Z 35004KT **7SM** CLR 18/08 A2988 RMK AO2 SLP112 T01780078
KGSO 091354Z 01004KT **9SM** CLR 20/07 A2989 RMK AO2 SLP113 T02000072
KGSO 091454Z 07006KT **9SM** CLR 21/07 A2988 RMK AO2 SLP112 T02110072 50005
KGSO 091554Z VRB06KT 10SM CLR 23/06 A2988 RMK AO2 SLP112 T02280061
KGSO 091654Z 04006KT 10SM FEW065 23/07 A2987 RMK AO2 SLP106 T02280067
KGSO 091754Z VRB03KT 10SM FEW070 23/06 A2986 RMK AO2 SLP104 T02330061 10239 20156
58008
KGSO 091854Z 33009KT **9SM** FEW075 24/07 A2985 RMK AO2 SLP100 T02440067
KGSO 091954Z 30008KT **9SM** FEW070 24/07 A2984 RMK AO2 SLP098 T02390072
KGSO 092054Z 28005KT **9SM** FEW070 24/07 A2983 RMK AO2 SLP095 T02390067 58008
KGSO 092154Z 30005KT 10SM FEW070 25/07 A2983 RMK AO2 SLP094 T02500072
KGSO 092254Z 31006KT **9SM** FEW070 24/07 A2984 RMK AO2 SLP098 T02390067
KGSO 092354Z 30003KT **9SM** FEW070 23/07 A2985 RMK AO2 SLP100 T02330072 10250 20228
53005

***Figure 165-M**: Hourly METAR reports from Greensboro, Piedmont Triad Regional Airport (GSO) on June 9th, 2023. Visibility was measured between 7 and 9 SM at times, which is below the standard of 10 SM, indicating that an obscuration was limiting visibility.*

KGSO 100054Z 24004KT **9SM** FEW070 21/09 A2987 RMK AO2 SLP105 T02060089
KGSO 100154Z 00000KT 10SM FEW070 20/09 A2988 RMK AO2 SLP112 T02000089
KGSO 100254Z 00000KT **9SM** CLR 18/10 A2990 RMK AO2 SLP118 T01780100 53018
KGSO 100354Z 00000KT **9SM** FEW250 16/11 A2991 RMK AO2 SLP119 T01610111
KGSO 100454Z 00000KT **8SM** FEW250 15/11 A2990 RMK AO2 SLP118 T01500106 402500100
KGSO 100554Z 00000KT **8SM** FEW250 16/11 A2989 RMK AO2 SLP114 T01560106 10233 20150
58004
KGSO 100654Z 00000KT 10SM FEW250 14/11 A2989 RMK AO2 SLP115 T01440106
KGSO 100754Z 00000KT 10SM FEW250 14/10 A2990 RMK AO2 SLP116 T01440100
KGSO 100854Z 00000KT 10SM FEW250 13/10 A2990 RMK AO2 SLP118 T01330100 53003
KGSO 100954Z 00000KT 10SM FEW250 13/08 A2992 RMK AO2 SLP122 T01330083
KGSO 101054Z 00000KT **9SM** BKN250 14/08 A2992 RMK AO2 SLP125 T01440083
KGSO 101154Z 00000KT 10SM BKN250 18/11 A2993 RMK AO2 SLP128 T01780106 10178 20122
51010
KGSO 101254Z 00000KT 10SM SCT250 21/11 A2994 RMK AO2 SLP129 T02110106
KGSO 101354Z 00000KT 10SM SCT250 23/10 A2995 RMK AO2 SLP131 T02280100
KGSO 101454Z VRB03KT 10SM FEW250 24/07 A2995 RMK AO2 SLP131 T02440067 51004
KGSO 101554Z 28009KT 10SM FEW250 26/08 A2994 RMK AO2 SLP129 T02560078
KGSO 101654Z 29010KT 10SM FEW050 FEW250 26/09 A2993 RMK AO2 SLP126 T02560089 $
KGSO 101754Z 23003G15KT 10SM FEW050 FEW250 26/09 A2992 RMK AO2 SLP123 T02610089
10267 20178 57008 $
KGSO 101854Z 00000KT 10SM FEW070 FEW250 27/09 A2991 RMK AO2 SLP119 T02670089 $
KGSO 101954Z 23012G16KT 10SM SCT070 SCT250 27/09 A2990 RMK AO2 SLP114 T02720094 $
KGSO 102054Z 21009G15KT 10SM FEW075 SCT250 27/10 A2989 RMK AO2 SLP111 T02720100
56012 $
KGSO 102154Z 25012KT 10SM FEW070 BKN250 27/09 A2988 RMK AO2 SLP110 T02670094 $
KGSO 102254Z 25008KT 10SM OVC250 26/10 A2988 RMK AO2 SLP111 T02610100 $
KGSO 102354Z 24005KT 10SM OVC250 24/11 A2989 RMK AO2 SLP112 T02440111 10278 20244
53001 $

***Figure 166-M**: Hourly METAR reports from Greensboro, Piedmont Triad Regional Airport (GSO) on June 10th,*

2023. Visibility was measured between 8 and 9 SM at times, which is below the standard of 10 SM, indicating that an obscuration was limiting visibility.

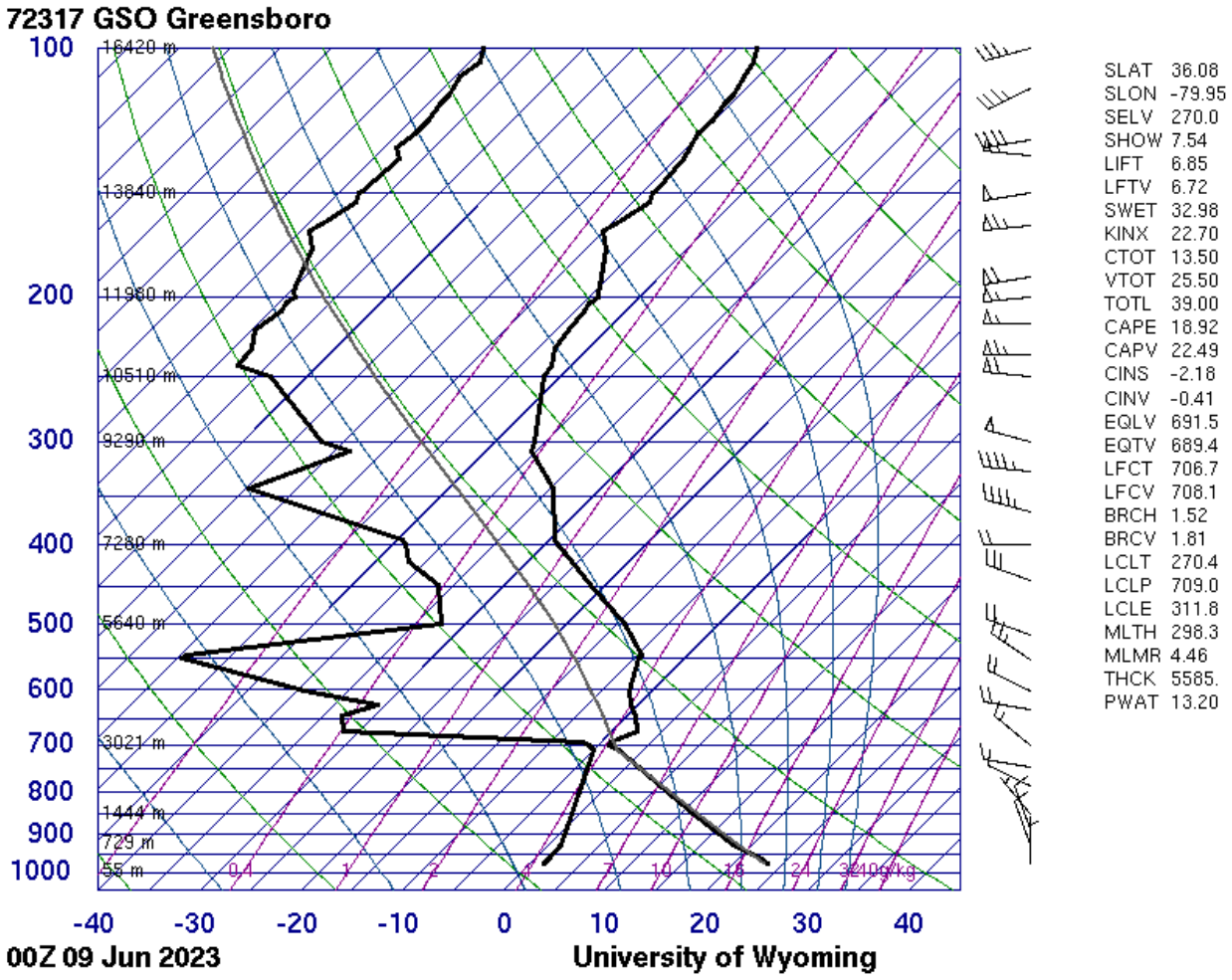


***Figure 167-M**: KGSO 8:00 pm, June 8th, 2023, observed radiosonde sounding. This sounding shows a well-mixed boundary layer up to near 700 mb.*

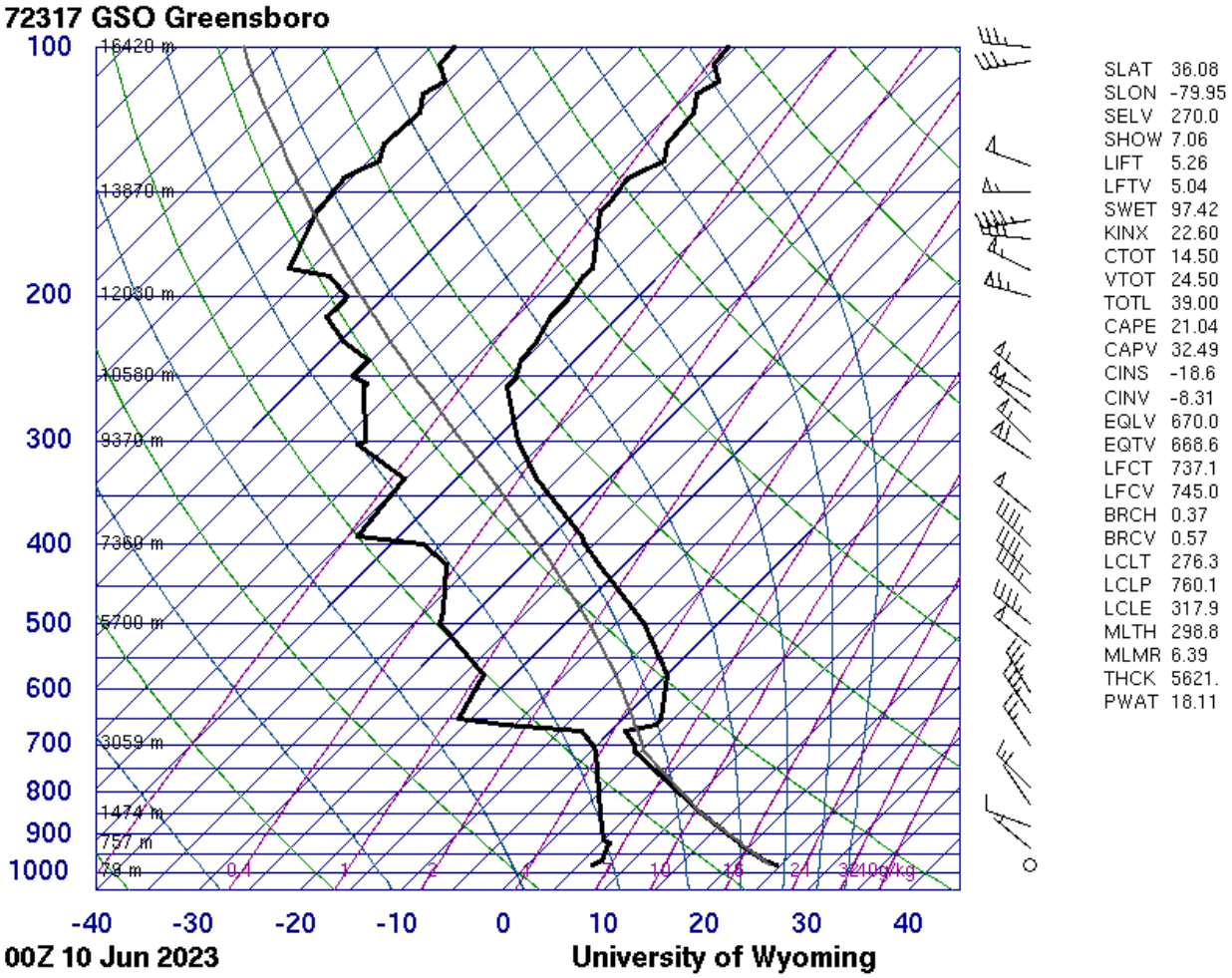


***Figure 168-M**: KGSO 8:00 pm, June 9th, 2023, observed radiosonde sounding. This sounding shows a well-mixed boundary layer up to near 750 mb.*

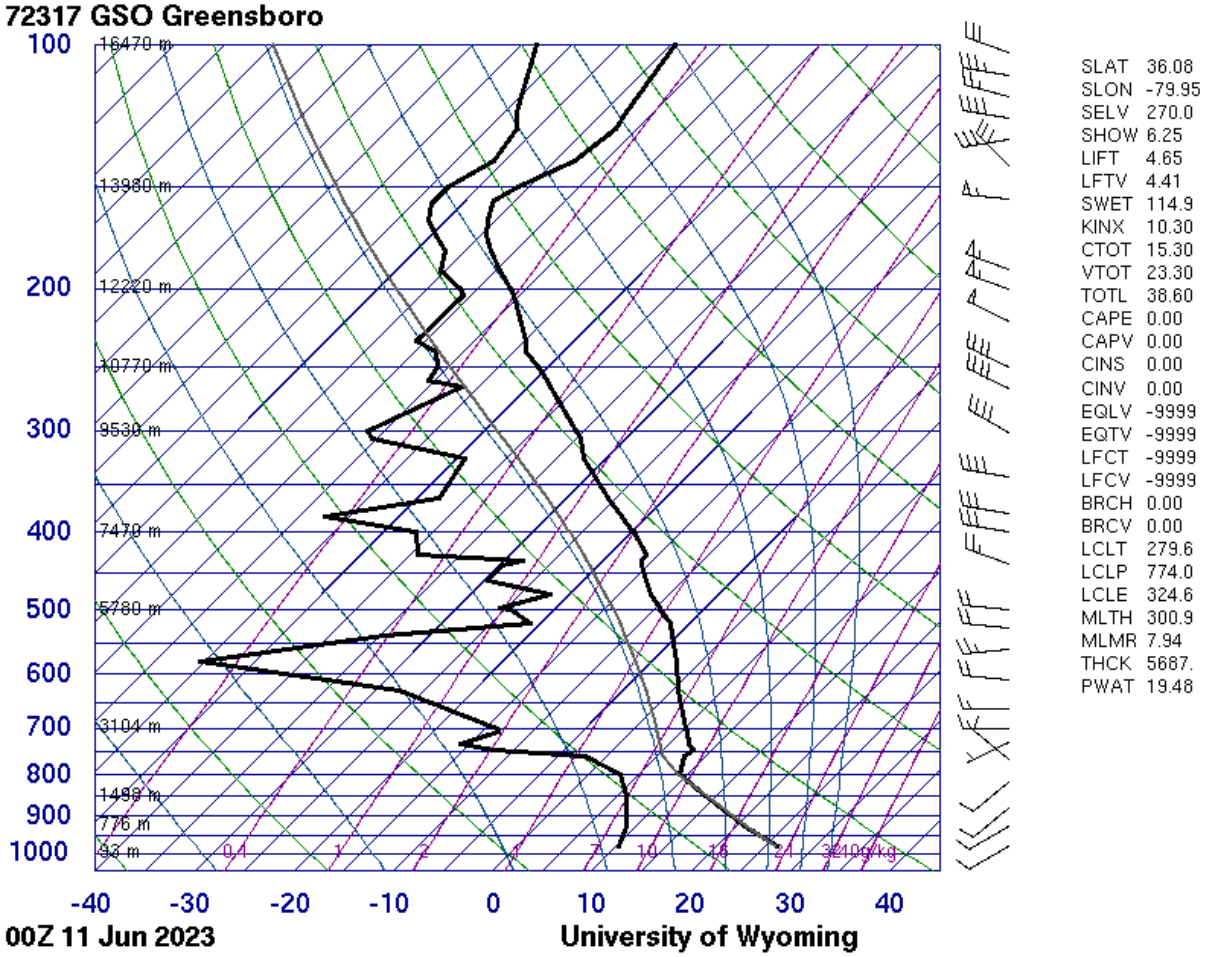


***Figure 169-M**: KGSO 8:00 pm, June 10th, 2023, observed radiosonde sounding. This sounding shows a well-mixed boundary layer up to near 800 mb.*

3. The comparison to historical emissions data does not support excluding the data collected on several of the dates DAQ proposes to exclude.

This comment includes several paragraphs of discussion and explanation which is included in its entirety in **Attachment 3** of this appendix. The comment has been distilled to requested action items from the commenter for NCDAQ's response:

> *SELC recommends that DAQ revise the Draft EE Demonstration to remove all of the dates on which this analysis shows the increase over historical emissions was less than 25%:*
> *- Remount station: June 8, June 28, and July 1*
> *- Lexington station: June 9–11, June 17–18, June 28, and July 1*
> *At a minimum, DAQ should not request exclusion of data from the Lexington station for the dates on which this analysis shows the increase over historical emissions was less than 5% or even negative: June 11 (3.78%), June 17 (2.16%), and July 1 (-2.7%).*
>
> *DAQ's comparative analysis fails to account for the broader trend in historical emissions data. In particular, DV for Remount has steadily increased over the past 10 years and Lexington has*

slightly increased. Because this comparative analysis to historical emissions data undermines the evidence. DAQ has proposed submitting to EPA to support its request for exclusion of data, DAQ should revise the Draft EE Demonstration to remove its request to exclude data from the dates classified as Tier 2 exceedances. At a minimum, DAQ must provide substantially more evidence to support a demonstration of a clear causal relationship between the Canadian wildfires and the monitored exceedances on those dates.

NCDAQ Response:
Per 40 CFR § 50.14(c)(3)(iv)(C) of the Exceptional Events Rule, the demonstration must include *"Analyses comparing the claimed event-influenced concentration(s) to concentrations at the same monitoring site at other times... The Administrator shall not require a State to prove a specific percentile point in the distribution of data.*" Analyzing and considering broader historical *trends* is not a requirement of the Exceptional Events Rule. By including a day-specific climatological comparison rather than an annual percentile comparison, we are able to separate any past day-specific activity influences that were not part of the 2023 Canadian wildfire-influenced days (i.e. Fourth of July fireworks, annual prescribed burn activity, or other past instances of large-scale smoke transport into the state). When taken in context and looked at holistically with the narrative and conceptual model, this method supplements the EPA's tiering data and provides a more complete analysis of the anomalous data recorded on each individual day in the demonstration.

As stated in the Draft EE Demonstration in Section 1.4 Canadian Wildfire Impacts on $PM_{2.5}$ Design Values in North Carolina, excluding the requested exceptional event-influenced days will result in a design value below 9.0 µg/m^3 for both monitoring sites, which definitively proves that these areas would have been in attainment with the revised 2024 standard in the absence of the 2023 Canadian wildfire smoke intrusions. NCDAQ has properly identified all Tier 2 days by following EPA guidance[53] and has fulfilled all the Tier 2 evidentiary requirements set forth in Section 5.4 of EPA's *$PM_{2.5}$ Wildland Fire Exceptional Events Tiering Document*. When considered altogether, the various data provided support a weight of evidence conclusion that these days were influenced by wildfire.

Other Comments Outside of the Scope of the Exceptional Events Demonstration

One private citizen submitted comments via email which are provided in **Attachment 4** to this appendix.

NCDAQ reviewed each comment and evaluated if the comment warranted revisions to the technical analysis as well as the conclusions presented in the Exceptional Events demonstration. As a result of this review of comments, NCDAQ has concluded that no revisions are needed to the technical analysis or conclusions. The comments received by NCDAQ are summarized below, followed by NCDAQ's response to each comment.

James Linville Comments

Comment: *Air quality in North Carolina is intermittently bad and sometimes routinely bad. I do not support any further lessening of air quality in North Carolina. The wildfires out west should not be used as an excuse to pollute more. Our local air quality is not as clean as it could be and should be. Sound stewardship of our resources is generally absent. Instead of burning, trees and leaves should be used for beneficial purposes like mulch or at least burned hot enough to avoid air quality issues.*

[53] EPA, $PM_{2.5}$ Wildland Fire Exceptional Events Tiering Document, April 2024 https://www.epa.gov/system/files/documents/2024-04/final-pm-fire-tiering-4-30-24.pdf

Educate the public.

NCDAQ Response: This comment is beyond the scope of the Exceptional Events Demonstration. Note that North Carolina has been in attainment with all NAAQS including the fine particulate matter standards since August 24, 2015.

Comment: *The smoke events from western and Canadian fires are relatively minor when compared to local particulate pollution that is being done legally and illegally (if there is an illegal way anymore). The scale and type of burning today would not have been lawful a few years ago. Our legislature wants to promote sprawl and unmitigated growth. They have little, if any, regard for the public's health, well-being, and our natural resources. They do not understand that more development and more people inadvertently create much more pollution.*
NCDAQ Response: This comment is beyond the scope of the Exceptional Events Demonstration. Note that the open burning of vegetative debris, when allowed, must comply with the air quality rules in 15A NCAC 2D .1900 to protect North Carolina's air quality.

Comment: *The air quality data reported by local and state regulators can be substantially skewed by the selection of where monitoring sites are located. Citizens living near the Davidson County line, but in Forsyth County suffer from various smoke events that are unmonitored. Southerly winds carry the stench of High Point's land fill which is indicative of air quality being affected by issues from Davidson County's direction. This skewing should be evaluated by federal regulators and others who are charged with maintaining our air quality, health, and well-being before giving a free ride to additional and/or more cumulative particulates.*
NCDAQ Response: Responding to comments about the siting of monitoring stations is beyond the scope of the Exceptional Event Demonstration. The siting of monitoring stations is based on strict federal criteria found in 40 CFR Part 58 and is reviewed and approved by EPA annually as documented in the North Carolina Annual Network Plan.[54]

Comment: *A few years ago in North Carolina, there were limits on the size of limbs that could be burned during land clearing. Today, the entire tree can be burned thanks to politically connected and often totally absent business owners. Money speaks louder than citizen's needs. Even farmland clearing is done with fire and smoldering trees. It seems now that the whole forest can be piled up and burned. Leaves are legal to burn too. A pile of leaves can be piled up, lit on a Friday, and allowed to smolder for the entire weekend. Regulators do not work weekends. This smoke can fill up a valley. People who do this burning are either purely ignorant of cleaner burning methods, they don't live in the area, or they simply don't care about their fellow citizens. The burners do not understand what they are harming their neighbors, especially the elderly and veterans who suffer from respiratory ailments caused by their military service. Supporting the disabled, the elderly, and our veterans should include helping them breathe healthier air.*

NCDAQ Response: Responding to comments about the open burning regulation is beyond the scope of the Exceptional Events demonstration. All revisions to regulations are subject to review and approval by the Environmental Management Committee (EMC), after public notice and comment, and the Rules Review Commission.

Comment: *In closing, the State of North Carolina should anticipate that our climate is changing.*

[54] https://www.deq.nc.gov/about/divisions/air-quality/air-quality-monitoring/annual-network-plan.

Hurricane Helene is a prime example. The State should anticipate that we will have more fires out west, not fewer. The State should act preemptively to mitigate air quality issues by taking better steps to reduce air pollution that is home grown. If our air quality were improved, it's likely the western and Canadian fires would not have created any particulate spikes. These fires and smoke originated thousands of miles from the State of North Carolina. We should start planning for increased particulate loads carried on prevailing western winds. We should recognize we will have higher potential risks for inversions in the piedmont of North Carolina too.

NCDAQ Response: This comment is beyond the scope of the Exceptional Events Demonstration.

Attachments

1) Written comments received from the North Carolina Manufacturers Alliance
2) Written comments received from the Midwest Ozone Group
3) Written comments received from the Southern Environmental Law Center
4) Written comments received from Mr. James Linville
5) Public Notice Announcement and Press Releases by the North Carolina Department of Environmental Quality

Attachment 1 to Appendix M: Written comments received from the North Carolina Manufacturers Alliance

December 20, 2024

Tammy Manning
NC Division of Air Quality
1641 Mail Service Center
Raleigh, NC 27699-1641

RE: Comments on the November 2024 DAQ Exceptional Events Demonstration to Support Attainment Designation Recommendations for the 2024 Annual $PM_{2.5}$ NAAQS

The North Carolina Manufacturers Alliance ("NCMA") respectfully submits these comments on the North Carolina Division of Air Quality's (NC DAQ's) draft "Exceptional Events Demonstration to Support Attainment Designation Recommendations for the 2024 Annual Particulate Matter less than 2.5 microns in Diameter ($PM_{2.5}$) National Ambient Air Quality Standard (NAAQS) for Mecklenburg and Davidson Counties." NCMA is a non-profit organization with a diverse membership base that includes chemical, pharmaceutical, wood products, adhesives, heavy equipment, heavy duty vehicles, furniture, and steel.

North Carolina manufacturers are committed to compliance with air permit requirements and maintaining clean air in our state. As mentioned in your November 21, 2024 invitation to comment on the Exceptional Events Demonstration, North Carolinians are breathing the cleanest air in decades and $PM_{2.5}$ emissions have decreased over the past several years, in part due to changes that NC manufacturers have made at their facilities to reduce emissions.

NCMA agrees with NC DAQ that an exceptional events analysis is warranted and that monitor data influenced by Canadian wildfire smoke in June and July 2023 should be removed from the data set used to determine NAAQS attainment status. NC counties should not be designated nonattainment based on monitor data that exceeded the revised $PM_{2.5}$ NAAQS for reasons beyond our control.

Per the U.S. Environmental Protection Agency (EPA), the Clean Air Act (CAA) recognizes that it may not be appropriate to use monitoring data influenced by exceptional events when making certain regulatory determinations.[1] EPA's Exceptional Events Rule (40 CFR 50.14) is meant to avoid imposing unreasonable planning requirements on air quality agencies related to violations of the NAAQS due to unusual events (e.g., wildfires) that affect air quality but are not reasonably controllable.[2] Removing exceptional events from the record allows for a more accurate understanding of typical ambient conditions such that the airshed can be more realistically represented. Fully researching and documenting these events to establish causality is important to ensure that only those events that don't typically occur are considered for removal from the ambient data for the purpose of establishing the attainment status of the area where the monitor is located. The Canadian wildfires of 2023 meet the criteria in CAA Section 319(b) because the event affected air quality in NC on specific days in June and July 2023, it was not reasonably controllable or preventable, and

[1] 81 Fed. Reg. 68216
[2] https://www.epa.gov/air-quality-analysis/treatment-air-quality-monitoring-data-influenced-exceptional-events

it was an unusual natural event. The detailed exceptional events demonstration drafted by NC DAQ meets each of the rule elements required for exclusion of monitor data from a NAAQS attainment demonstration.

There is no reason for EPA to impose the burden of $PM_{2.5}$ nonattainment on either NC DAQ or industry. The only reason that two NC monitors (Mecklenburg and Davidson Counties) have design values that exceed the 2024 annual $PM_{2.5}$ NAAQS is due to exceptional events (intrusion of Canadian wildfire smoke into the NC airshed), as documented by NC DAQ. Ambient concentrations of $PM_{2.5}$ in these counties between 2018-2022 were all lower than the 2023 days NC DAQ proposes to exclude.

We would also like to note our support for further exclusion of atypical events from monitor design values in attainment areas for purposes of establishing a representative background value for air dispersion modeling demonstrations. There may be events other than the Canadian wildfires that are atypical and we would want to exclude any atypical events from all monitors, not just in Mecklenburg and Davidson Counties. This concept is supported by the recently updated EPA document "Guidance on Developing Background Concentrations for Use in Modeling Demonstrations."[3] This document indicates that atypical events may include but are not limited to construction, roadway repairs, forest fires, or unusual agricultural activities.

Thank you for your consideration of these comments in support of NC DAQ's exceptional events demonstration. Please feel free to contact me at david.haines@myncma.org if you have questions or need more information.

Sincerely,

David E. Haines

David E. Haines II
President

[3] https://www.epa.gov/system/files/documents/2024-11/background-concentrations.pdf

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Attachment 2 to Appendix M: Written comments received from the Midwest Ozone Group

STEPTOE & JOHNSON PLLC
ATTORNEYS AT LAW

Huntington Center, Suite 2200
41 South High Street
Columbus, Ohio 43215
614-221-5100
Fax 614-221-0952
www.steptoe-johnson.com

Writer's Contact Information
317-946-9882
skipp.kropp@steptoe-johnson.com

December 20, 2024

Ms. Tammy Manning
NC Division of Air Quality
1641 Mail Service Center
Raleigh, NC 27699-1641

Re: Exceptional Events Demonstration to Support Attainment Designation Recommendations for the 2024 Annual $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS) for Mecklenburg and Davidson Counties, North Carolina (June – July 2023 Canadian Wildfire Smoke Impacts)

Dear Ms. Manning:

The Midwest Ozone Group[1]("MOG") is pleased to provide comments in support of this proposed demonstration and the use of the data involved in support of other demonstrations related to the events involved.

[1] The membership of the Midwest Ozone Group includes: Ameren, American Electric Power, American Forest & Paper Association, American Iron and Steel Institute, American Wood Council, Appalachian Region Independent Power Producers Association, Associated Electric Cooperative, Berkshire Hathaway Energy, Big Rivers Electric Corp., Buckeye Power, Inc., Citizens Energy Group, City Water, Light & Power (Springfield IL), Cleveland-Cliffs Inc., Council of Industrial Boiler Owners, Duke Energy Corp., East Kentucky Power Cooperative, ExxonMobil, FirstEnergy Corp., Indiana Energy Association, Indiana-Kentucky Electric Corporation, Indiana Municipal Power Agency, Indiana Utility Group, Hoosier Energy REC, inc., LGE/ KU, Marathon Petroleum Company, National Lime Association, North American Stainless, Nucor Corporation, Ohio Utility Group, Ohio Valley Electric Corporation, Olympus Power, Steel Manufacturers Association, and Wabash Valley Power Alliance.

While the Clean Air Act (the "Act") requires States to meet certain air quality standards, the Act also recognizes that exceptional events, including wildfires and prescribed burns, may sometimes prevent that from happening. Exceptional events can cause air quality monitoring data to exceed permissible concentrations of a pollutant, also called an exceedance. When that happens, the Act directs the Administrator of the United States Environmental Protection Agency (USEPA) to exclude that data from further consideration if the state demonstrates to USEPA's satisfaction that the event caused the exceedance.

On November 20, 2024, the North Carolina Department of Environmental Quality Division of Air Quality (NCDAQ) issued a public notice regarding the availability for comment of a proposed draft "Pre-hearing Draft of the Exceptional Events Demonstration to Support Attainment Designation Recommendations for the 2024 Annual $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS) for Mecklenburg and Davidson Counties." The deadline for the submittal of comments is December 20, 2024.

The proposed exceptional events demonstration details the $PM_{2.5}$ episodes occurring in the state of North Carolina in June and July of 2023. The proposed demonstration specifically addresses the $PM_{2.5}$ episodes occurring at two monitors, the Remount Road monitor (Air Quality System (AQS) ID# 371190045) located in Mecklenburg County and the Lexington Water Tower monitor (AQS ID# 370570002) located in Davidson County. Specifically, for these two monitors, proposed demonstration provides technical documentation to support North Carolina's request to U.S. Environmental Protection Agency (EPA) to exclude $PM_{2.5}$ monitoring data for certain days in 2023 strongly influenced by Canadian Wildfire smoke.

The following comments are offered on behalf of MOG in support of this proposed exceptional events demonstration and the demonstrations of other states seeking to recognize the same events.[2]

MOG is an affiliation of companies and associations that draws upon its collective resources to seek solutions to the development of legally and technically sound air quality programs that may impact on their facilities, their employees, their communities, their contractors, and the consumers of their products. MOG's primary efforts are to work with policy makers in evaluating air quality policies by encouraging the use of sound science. MOG has been actively engaged in a variety

[2] These comments were prepared with the technical assistance of Alpine Geophysics, LLC.

of issues and initiatives related to the development and implementation of air quality policy, including the development of transport rules (including exceptional events demonstrations, implementation of NAAQS standards, nonattainment designations, petitions under Sections 126, 176A and 184(c) of the Clean Air Act ("CAA"), NAAQS implementation guidance, the development of Good Neighbor State Implementation Plans ("SIPs"), the development of greenhouse gas and Mercury and Air Toxics Standards Rules and related regional haze issues. MOG Members and Participants own and operate numerous stationary sources that are affected by air quality requirements including the $PM_{2.5}$ NAAQS.

By way of background, when amending the Clean Air Act in 2005, Congress intended to provide regulatory relief for NAAQS nonattainment resulting from exceptional events negatively affecting air quality that were outside of a state's control. That concern led to enactment of provisions specifically establishing the process by which USEPA could exclude air quality monitoring data directly related to an exceptional event. *See* 42. U.S.C. § 7619. Subsequently, USEPA promulgated the exceptional events rule. 40 C.F.R. § 50.14. Under the exceptional events rule, USEPA excludes "any data of concentration of a pollutant above the NAAQS (exceedances) if the air quality was influenced by exceptional events." *Bahr v. Regan,* 6 F.4th 1059, 1066 (9th Cir. 2021) (cleaned up).

A state requesting data exclusion under the exceptional events rule must demonstrate "to the Administrator's satisfaction that such event caused a specific air pollution concentration at a particular air quality monitoring location." 40 C.F.R. § 50.14(a)(1)(ii). That demonstration must include certain regulatory required information:

> (A) A narrative conceptual model that described the event(s) causing the exceedance or violation and a discussion of how emissions form the event(s) led to the exceedance or violation at the affected monitor(s);
>
> (B) A demonstration that the event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance or violation;
>
> (C) Analyses comparing the claimed event-influenced concentration(s) to concentrations at the same monitoring site at other times to support the requirement at paragraph (c)(3)(iv)(B) of this section. The Administrator shall not require a State to prove a specific percentile point in the distribution of data;

(D) A demonstration that the event was both not reasonably controllable and not reasonably preventable; and

(E) A demonstration that the event was a human activity that is unlikely to recur at a particular location or was a natural event.

40 C.F.R. § 50.14(c)(3)(iv).

A state must also comply with pre-request requirements, which include notifying USEPA of the intent to request exclusion, flagging data to be excluded, engaging in public comments, and implementing mitigation measures. See 40 C.F.R. § 50.14(c)(2)(i); 40 C.F.R. § 50.14(c)(3)(v); 40 C.F.R. § 51.930. In short, there are three core statutory elements: (1) a clear causal relationship; (2) a showing that the event was not controllable, and (3) a showing that the event was human activity unlikely to recur a particular location or was a natural event.

Depending on the circumstances of a particular exceptional event, a particular tier of evidence is required to provide a compelling case to USEPA to exclude data under the Exceptional Events Rule. In instances where a state provides sufficient evidence to showcase that a given event is indeed an irregularity, USEPA will make a concurring determination and issue an exclusion of that specific event from the dataset. 40 C.F.R. 50.14(c)(2)(ii).

Wildland fires make up 44% of primary $PM_{2.5}$ emissions. See 89 Fed. Reg. 16214. As such, these events can cause exceedances that impact design values in a particular area.

USEPA has recognized that these particular events are exceptional and that states may request to exclude them from the dataset, given that a sufficient evidentiary standard is met. *Id*; see generally, 81 Fed. Reg. 68216. There are several tiers of evidentiary showings related to $PM_{2.5}$ demonstrations. These three tiers create a ladder of increasing evidentiary burdens on the states to convince USEPA that an event merits exclusion.

- Tier 1 clear causal analyses are intended for wildland fire events that cause unambiguous $PM_{2.5}$ impacts well above historical 24-hour concentrations, thus requiring less evidence to establish a clear causal relationship.

- Tier 2 clear causal analyses are likely appropriate when the impacts of the wildland fire on $PM_{2.5}$ concentrations are less distinguishable from historical 24-hour concentrations, and require more evidence, than Tier 1 analyses.

- Tier 3 clear causal analyses should be used for events in which the relationship between the wildland fire and $PM_{2.5}$ 24-hour concentrations are more complicated than a Tier 2 analysis, when 24-hour $PM_{2.5}$ concentrations are near or within the range of historical concentrations, and thus require more evidence to establish the clear causal relationship than Tier 2 or Tier 1.

U.S. Environmental Protection Agency, *$PM_{2.5}$ Wildland Fire Exceptional Events Tiering Document* (April 2024) at 5. It is important to note that the overall processes for exceptional event demonstrations for wildfire ozone and wildland fire $PM_{2.5}$ are the same. See *id*. at 6.

MOG agrees that the proposed NCDAQ demonstration shows that the levels of $PM_{2.5}$ concentration measured at the Remount Road monitor (Air Quality System (AQS) ID# 371190045) located in Mecklenburg County and the Lexington Water Tower monitor (AQS ID# 370570002) located in Davidson County during these events were highly unusual because the measured $PM_{2.5}$ concentration exceedances for those monitors during the four episodes were more than 1.5 times the most recent 5-year monthly specific 98th percentile for 24-hour $PM_{2.5}$ data, as identified in the Environmental Protection Agency's Tiering Tool.[3]

MOG notes that the proposed demonstration shows that the Canadian wildfire event affected the Remount Road monitor located in Mecklenburg County and the Lexington Water Tower monitor located in Davidson County during each of the four documented episodes. This caused average $PM_{2.5}$ concentrations at those two monitors to experience multiple daily Tier 1 and 2 level exceedances as defined in EPA's Tiering Tool during the relevant periods and as seen in NCDAQ's demonstration and presented in Figures 1 and 2 below.

[3] U.S. Environmental Protection Agency. "Tiering Tool – for Exceptional Events Analysis". Air Quality Analysis. U.S. Environmental Protection Agency, March 26, 2024, https://www.epa.gov/air-quality-analysis/tiering-tool-exceptional-events-analysis

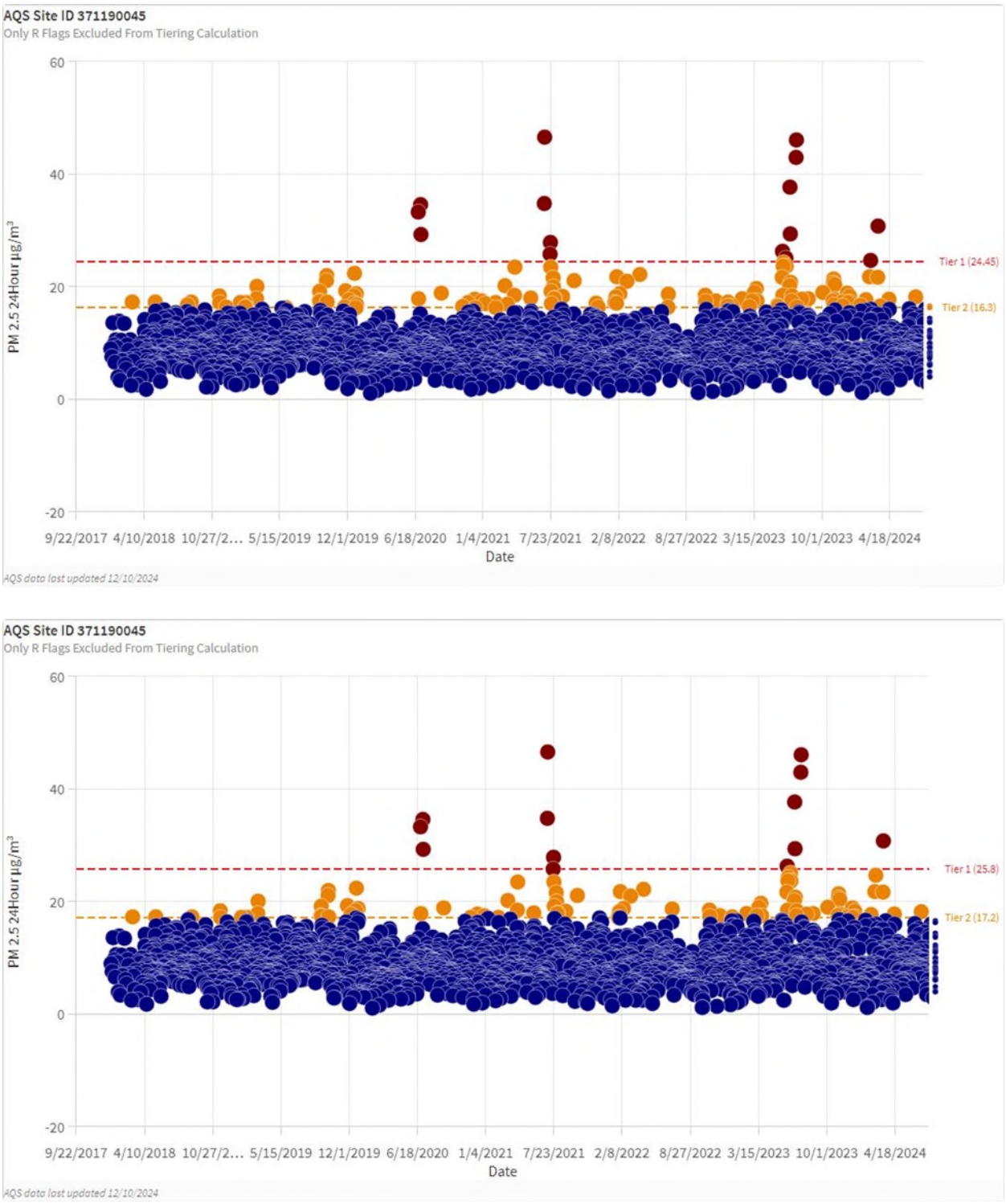
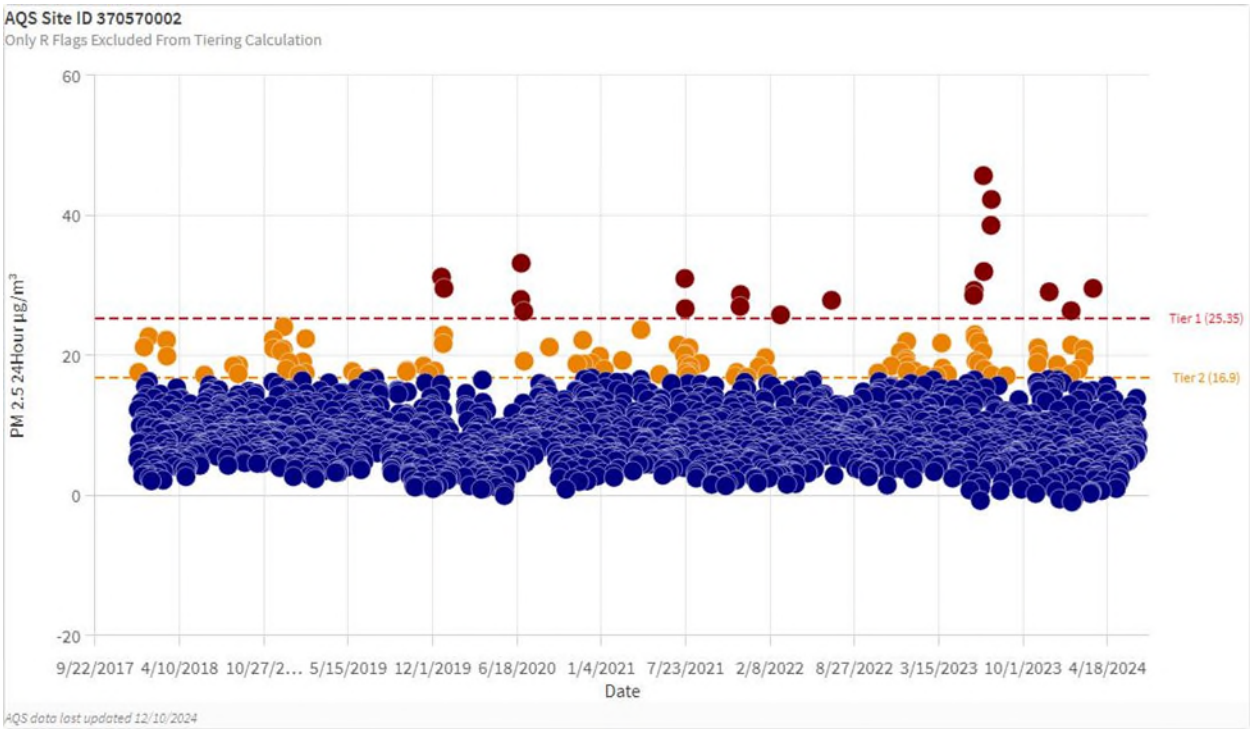


Figure 1. Tiering Graph for the Remount Road Monitor (371190045) for June (top) and July (bottom) Tier 1 and Tier 2 Exceptional Events levels.



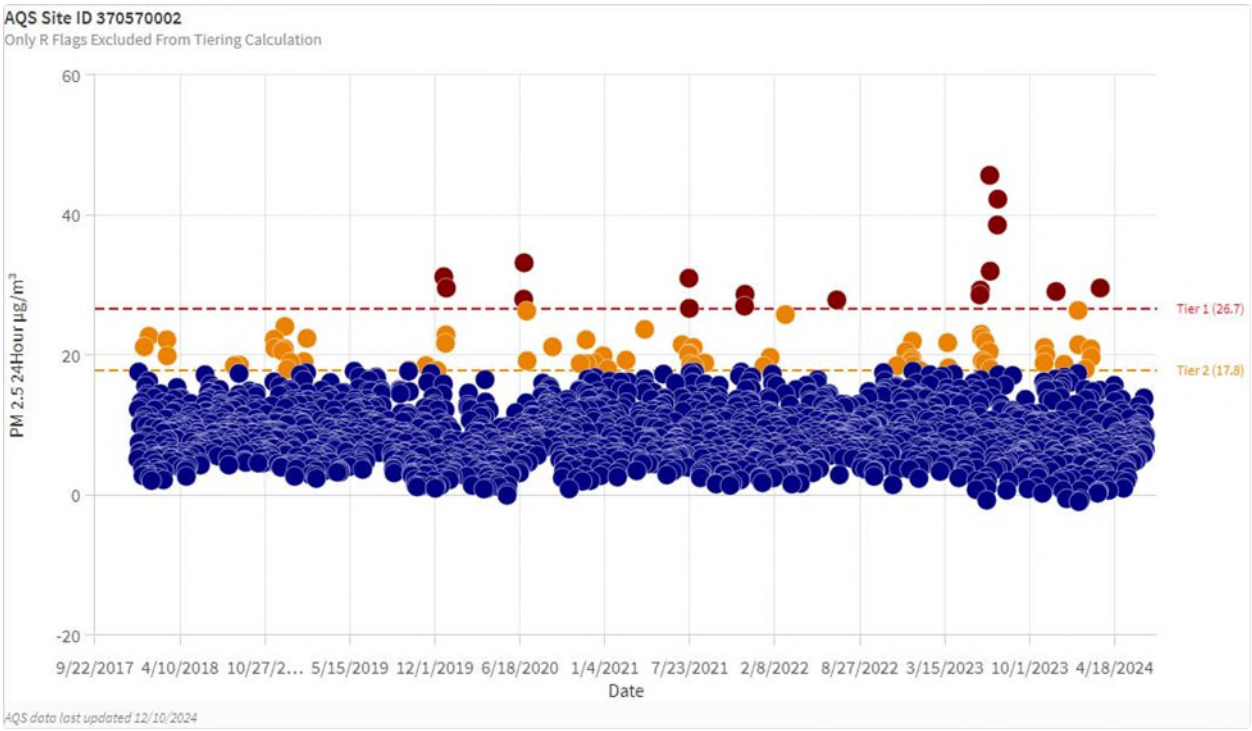


Figure 2. Tiering Graph for the Lexington Monitor (370570002) for June (top) and July (bottom) Tier 1 and Tier 2 Exceptional Events levels.

MOG fully supports the NCDAQ request that the USEPA Administrator excludes the ambient $PM_{2.5}$ concentrations measured at the Remount Road monitor located in Mecklenburg County and the Lexington Water Tower monitor monitoring sites from calculation of annual $PM_{2.5}$ design values and from other regulatory determinations.

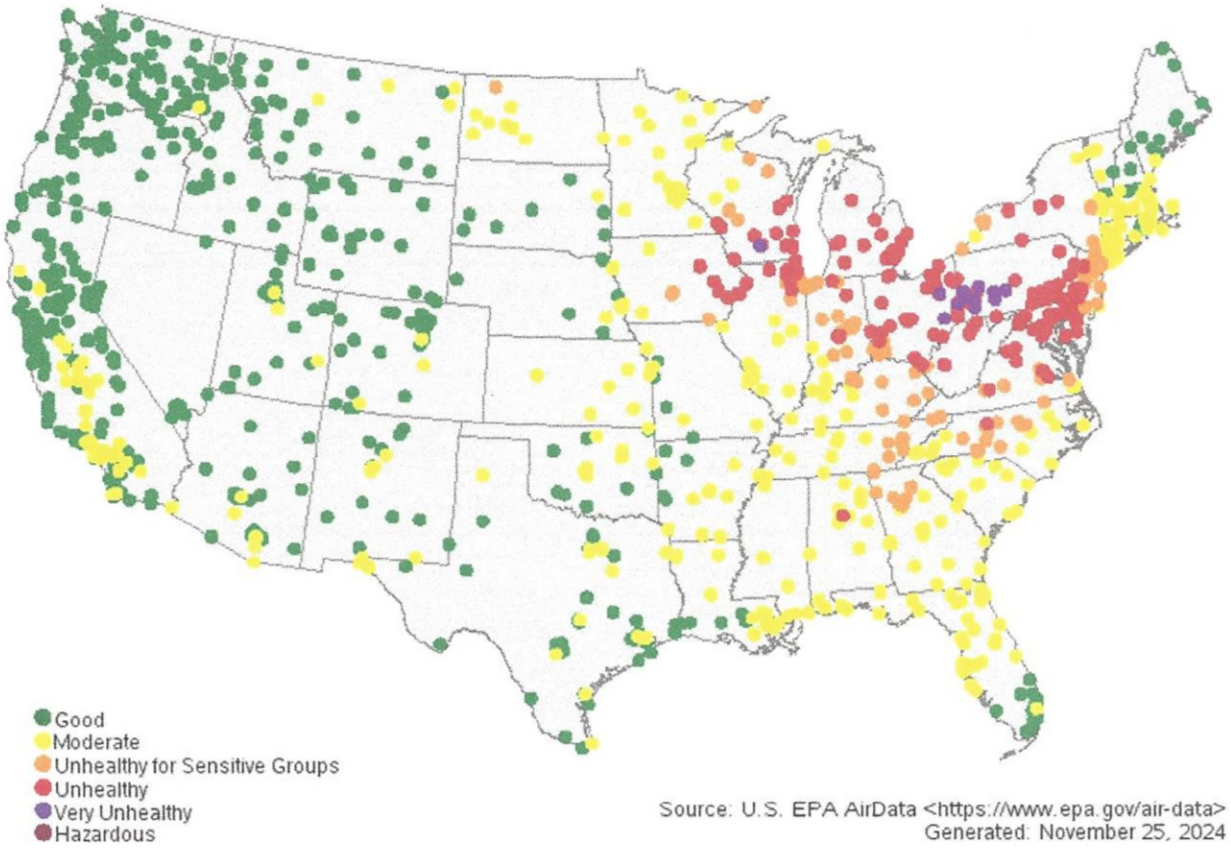
As set forth in its proposed demonstration, NCDAQ has shown that transported smoke from the 2023 Canadian Wildfires on wildlands caused the $PM_{2.5}$ exceedances at the Remount Road monitor located in Mecklenburg County and the Lexington Water Tower monitor located in Davidson County. NCDAQ correctly notes that exclusion of the data on the relevant dates would result in statewide attainment of the 2024 revised primary annual $PM_{2.5}$ NAAQS.

The proposed demonstration goes on to address such remaining factors as a narrative conceptual model describing the event as not reasonably controllable and not caused by human activity and satisfies requirements related to notification of the public of the events and participation of the public in the submission of this request.

The monitor and episode days that are carefully addressed in the proposed NCDAQ demonstration are far from the only ones that have influenced air quality during those time frames. Many $PM_{2.5}$ monitors in the same area also observed 24-hour average $PM_{2.5}$ concentrations at significantly elevated levels on the same exclusion dates, as well as on days around these dates. As has been noted, additional days, even if not currently 'regulatorily significant,' may in the future be relevant and significant not only to North Carolina but also to other states. USEPA should consider allowing this proposed demonstration to stand for those additional monitors and days, as needed.

Air quality data and maps demonstrate that air quality during these identified episodes also had significant impact on multiple other monitors in the Midwest, northeast, and MidAtlantic US. Below is a $PM_{2.5}$ air quality index plot from the June 29, 2023 date that illustrates that multiple monitors in these regions are also likely to have Tier 1 threshold exceedances of current or future regulatory significance during this and other exceedance episodes.

PM2.5 AQI Values by site on 06/29/2023



MOG urges USEPA to accept other demonstrations that may utilize this technical work to demonstrate wildfire influence on other regional monitors during the same episodes of record.

MOG appreciates this opportunity to offer comments in support of the proposed NCDAQ exceptional events demonstration for the exceedances of the 2023 Annual $PM_{2.5}$ NAAQS at the Remount Road monitor (Air Quality System (AQS) ID# 371190045) and the Lexington Water Tower monitor (AQS ID# 370570002) due to smoke from Canadian Wildfires. MOG also appreciates the opportunity to express support for consideration of this data in the development of demonstrations by other states related to these events. Congress has made it clear that data of the nature described in this proposed demonstration cannot and should not be used to implement a National Ambient Air Quality Standard and other matters of regulatory significance.

Very truly yours,

Edward L. Kropp
Legal Counsel
Midwest Ozone Group

Attachment 3 to Appendix M: Written comments received from the Southern Environmental Law Center

SOUTHERN ENVIRONMENTAL LAW CENTER

601 West Rosemary Street, Suite 220
Chapel Hill, NC 27516

Telephone 919-967-1450
Facsimile 919-929-9421

December 20, 2024

VIA ELECTRONIC MAIL (daq.publiccomments@deq.nc.gov**)**

Tammy Manning
NC Division of Air Quality
1641 Mail Service Center
Raleigh, NC 27699-1641

RE: Comments on Pre-Hearing Draft of the *Exceptional Events Demonstration to Support Attainment Designation Recommendations for the 2024 Annual $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS) for Mecklenburg and Davidson Counties, North Carolina (June–July 2023 Canadian Wildfire Smoke Impacts)*

Dear Ms. Manning,

The North Carolina Division of Air Quality ("DAQ") has solicited public comments on the pre-hearing draft of the agency's *Exceptional Events Demonstration to Support Attainment Designation Recommendations for the 2024 Annual $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS) for Mecklenburg and Davidson Counties, North Carolina (June–July 2023 Canadian Wildfire Smoke Impacts)* ("Draft EE Demonstration"). The Southern Environmental Law Center (SELC) respectfully submits the following comments detailing our concerns with the Draft EE Demonstration. Specifically, the Draft EE Demonstration does not provide adequate justification regarding the exclusion of air quality monitoring data for several of the days that DAQ has proposed excluding. Because the exclusion of this data is specifically intended to avoid a nonattainment designation and the series of pollution reduction measures that such a designation would require, this error exposes the people of Mecklenburg and Davidson Counties to excessive levels of fine particle pollution while stripping these areas of the environmental protections necessary to achieve clean air going forward.

INTRODUCTION

Fine particle pollution causes serious health problems.[1] Fine particles in the air we breathe can penetrate deep into the lungs, leading to asthma attacks, missed workdays, heart attacks, costly emergency room visits, and premature death.[2] In fact, fine particles cause more detrimental health effects than any other pervasive pollutant in the United States.[3] People most at risk from particle pollution are those already suffering from pre-existing health hardships, and vulnerable populations such as communities of color, low-income communities, children, and older adults.[4] To combat these health burdens, the U.S. Environmental Protection Agency (EPA) recently strengthened the annual health-based national ambient air quality standard (NAAQS) for fine particulate matter ($PM_{2.5}$) from 12 to 9 micrograms per cubic meter ($\mu g/m^3$).[5] The updated standard will prevent up to 4,500 early deaths and generate as much as $46 billion in net health benefits in 2032.[6]

To deliver these health benefits to the people of North Carolina, it is crucial that DAQ accurately identifies areas that are not meeting the new national standard. Without proper nonattainment designations, the people of North Carolina will bear the burden of excess pollution while being robbed of protections provided by the Clean Air Act to help areas move into attainment. Artificially avoiding nonattainment designations will only harm people most in need of environmental protection.

Areas with fine particle levels above the national standard, such as Mecklenburg and Davidson counties, can avoid nonattainment designations only in limited circumstances where

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[1] EPA, *Final Rule to Strengthen the National Air Quality Health Standard for Particulate Matter, Fact Sheet* (Feb. 2024), https://www.epa.gov/system/files/documents/2024-02/pm-naaqs-overview.pdf.

[2] EPA, *EPA finalizes stronger standards for harmful soot pollution, significantly increasing health and clean air protections for families, workers, and communities* (Feb. 7, 2024), https://www.epa.gov/newsreleases/epa-finalizes-stronger-standards-harmful-soot-pollution-significantly-increasing#:~:text=By%20strengthening%20the%20annual%20health,to%204%2C500%20premature%20deaths%20and.

[3] California Air Resources Board, *Inhalable Particulate Matter and Health ($PM_{2.5}$ and PM_{10})*, https://ww2.arb.ca.gov/resources/inhalable-particulate-matter-and-health#:~:text=In%20addition%2C%20of%20all%20of,Global%20Burden%20of%20Disease%20Project (last visited Dec. 18, 2024).

[4] EPA, EJScreen Indicators Overview – Particulate Matter 2.5 ($PM_{2.5}$), https://www.epa.gov/ejscreen/ejscreen-indicators-overview-particulate-matter-25-pm25#:~:text=Children%2C%20older%20adults%2C%20people%20with,parts%20of%20the%20United%20States (last updated July 30, 2024).

[5] EPA, Reconsideration of the National Ambient Air Quality Standards for Particulate Matter, 89 Fed. Reg. 16,202 (Mar. 6, 2024).

[6] EPA, *Final Rule to Strengthen the National Air Quality Health Standard for Particulate Matter, Fact Sheet* (Feb. 2024), https://www.epa.gov/system/files/documents/2024-02/pm-naaqs-overview.pdf.

the agency fully demonstrates that the exceedances would not have occurred but for an "exceptional event," such as a wildfire.[7] Among other things, the agency must develop a narrative conceptual model showing how the exceptional event "led to the exceedance" and make a rigorous evidentiary showing that there is a "clear causal relationship" between the exceptional event and the exceedance.[8] It is not enough that an exceptional event contributed to an exceedance; the agency must show that the exceedance was "directly due" to the exceptional event.[9] In other words, it must show that the area would have been in compliance in the absence of the exceptional event.[10] The evidence needed to support this showing is elevated for monitored exceedances classified as "Tier 2," where the impacts of the exceptional event are ambiguous.[11] The limited circumstances under which an exceptional event can be used to skirt a nonattainment designation are in keeping with the mandates of the Clean Air Act provisions governing exceptional events: "the principle that protection of public health is the highest priority" and "the principle that each State must take necessary measures to safeguard public health regardless of the source of the air pollution."[12]

As detailed below, DAQ has not made the necessary showing that "exceptional events" should excuse unsafe levels of particle pollution in Mecklenburg and Davidson counties. In the absence of additional evidence regarding the nature and extent of smoke impacts on certain days identified herein, DAQ has not adequately demonstrated that the Canadian wildfires directly impacted the two air quality monitoring stations at issue on all of the days the agency has proposed excluding.

I. DAQ has not established a "clear causal relationship" between the Canadian wildfires and the monitored exceedances for several of the days the agency proposes to exclude.

For several of the dates at issue, DAQ has not met its burden of demonstrating "that emissions from wildfires caused a specific air pollution concentration in excess of one or more

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[7] 42 U.S.C. § 7619(b); 40 C.F.R. § 50.14(a)(1)(ii) (explaining that a state may request EPA "to exclude data showing *exceedances or violations* of any national ambient air quality standard that are *directly due* to an exceptional event") (emphasis added); 89 Fed. Reg. at 16,366-37.
[8] 40 C.F.R. § 50.14(c)(3)(iv)(B); *id.* § 50.14(c)(3)(iv)(A); EPA, $PM_{2.5}$ Wildland Fire Exceptional Events Tiering Document at 5 (Apr. 2024), *final-pm-fire-tiering-4-30-24.pdf ("EPA Guidance").
[9] 40 C.F.R. § 50.14(a)(1)(ii).
[10] *Id.*
[11] EPA Guidance at 5.
[12] 42 U.S.C. § 7619(b).

national ambient air quality standard at a particular air quality monitoring location" or that the agency's request to exclude data "otherwise satisfies the requirements" of the Exceptional Events Rule.[13] First, DAQ's narrative conceptual model fails to support a finding that wildfire smoke from Canada was actually "transported to the monitor[s]" on June 6, 2023, the day before a cold front caused north-northwesterly winds to carry smoke into North Carolina. Second, DAQ's reliance on satellite imagery showing relatively clear skies, in combination with unreliable surface observations taken 20–40 miles away, undermines the agency's basis for excluding the data collected on June 8–10, 2023.

Finally, DAQ's comparative analysis of historical emissions relies upon a very narrow universe of data that fails to account for day-to-day variability in emissions. When the data from June and July of 2023 are compared against the "minimum annual 98th percentile for 24-hour $PM_{2.5}$ data for the most recent 5-year period," consistent with EPA guidance, the same method of analysis reveals that the increase over historical emissions is not nearly as significant as DAQ claims—and in one case reveals a decrease relevant to historical emissions. SELC's comparative analysis also demonstrates that $PM_{2.5}$ concentrations at the Remount and Lexington stations have been near (and even above) the revised NAAQS for several years and are steadily increasing. This casts doubt on DAQ's claim that these areas would have been in compliance with the revised NAAQS in the absence of the Canadian wildfires. Instead, it is likely that the wildfire smoke merely exacerbated an existing pollution problem.

DAQ must revise the Draft EE Demonstration to resolve these deficiencies. Unless the agency is able to provide substantially more evidence to overcome the flaws in its attempt to demonstrate a clear causal relationship between the Canadian wildfires and the monitored exceedances on all of the days it seeks to exclude, DAQ should narrow its request for exclusion of data to include only those days for which the narrative conceptual model, historical comparative analysis, and additional evidence clearly support a finding that the exceedances were directly caused by an exceptional event.

[13] 40 C.F.R. § 50.14(b)(4).

A. The narrative conceptual model describing the meteorological conditions that resulted in smoke impacts does not support excluding the data collected on June 6, 2023.

The EE Demonstration must include a "narrative conceptual model that describes the event(s) causing the exceedance or violation and a discussion of how emissions from the event(s) led to the exceedance or violation at the affected monitor(s)."[14] DAQ's narrative conceptual model is set forth in Section II of the Draft EE Demonstration.[15] This section describes four distinct periods of time, or events, during which specific weather patterns and meteorological conditions resulted in the transport of smoke from the Canadian wildfires into Mecklenburg and Davidson Counties. All four of these events followed the same general pattern. First, an "anomalously strong" high pressure system developed over Canada, while an "equally strong" low pressure system developed over the United States.[16] This caused a "surface cold front" to cross into North Carolina, which in turn led to "north-northwesterly winds" that transported smoke from Canada into Mecklenburg and Davidson Counties.[17]

For three of these four events, DAQ has proposed excluding data beginning on the day *after* the cold front started moving into the state:

- "Event ID #2 – *June 17th* through June 18th, 2023": "[T]his strong upper-level low was coupled to a strong surface low pressure that propelled a surface cold front across North Carolina late *on the evening of June 16th*."[18]
- "Event ID #3 – *June 28th* through July 1st, 2023": "As the upper-level low, and surface low pressure, rotated eastward *during the afternoon of June 27th,* once again an attendant surface cold front swept across the state."[19]
- "Event ID #4 – *July 17th* through July 18th, 2023": "[A]s the upper-level low and concurrent surface low pressure rotated eastward *on July 16th* into July 17th, an attendant surface cold front swept across the state."[20]

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[14] 40 CFR § 50.14(c)(3)(iv)(A).
[15] *See* N.C. Div. of Air Quality, *Exceptional Events Demonstration to Support Attainment Designation Recommendations for the 2024 Annual $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS) for Mecklenburg and Davidson Counties, North Carolina (June–July 2023 Canadian Wildfire Smoke Impacts)* (Nov. 20, 2024) ("Draft EE Demonstration") at 5–17.
[16] *Id.* at 7; *see also id.* at 10, 12, 14.
[17] *Id.* at 8; *see also id.* at 10, 12, 15.
[18] *Id.* at 10 (emphasis added).
[19] *Id.* at 12 (emphasis added).
[20] *Id.* at 14–15 (emphasis added).

In contrast, for the first event, DAQ has proposed excluding data beginning on the day *before* the cold front started moving into the state:

- "Event ID #1 – *June 6th* through June 11th, 2023": "The strong upper-level low was coupled to a strong surface low pressure system centered over Maine, with an attendant surface cold from that crossed North Carolina from the north, *on the morning of June 7th*."[21]

The consistent sequence of meteorological changes during each of the four events reveals that the monitored exceedances on June 6 were not the result of wildfire smoke being transported from Canada by north-northwesterly winds resulting from a cold front crossing the state. Although the data recorded at the Lexington station on June 6 is categorized as a Tier 1 exceedance, DAQ must still provide "evidence that smoke was transported to the monitor" in order to demonstrate a clear causal relationship.[22] DAQ's narrative conceptual model utterly fails to support a finding that wildfire smoke from Canada was actually "transported to the [Lexington] monitor" on June 6, a day before the cold front began crossing the state.

In addition, the data recorded at the Remount station on June 6 is categorized as a Tier 2 exceedance, meaning that "the impacts of the wildland fire on $PM_{2.5}$ concentrations are less distinguishable from historical 24-hour concentrations."[23] As a result, DAQ must provide even "more evidence" to demonstrate a clear causal relationship as needed to exclude this data.[24] In particular, DAQ must establish that the smoke was "transported to the [Remount] monitor" *and* that the smoke "directly affected the monitor."[25] Again, DAQ's narrative conceptual model utterly fails to support either of these findings.

In the absence of a narrative conceptual model that explains "*how* emissions from the event(s) led to the exceedance or violation at the affected monitor(s)"[26] on June 6, DAQ cannot meet even the first step of showing that the monitored exceedances on that date were directly due to the Canadian wildfires. It is apparent that $PM_{2.5}$ concentrations were already elevated in Mecklenburg and Davidson Counties before the wildfire smoke was transported to the state.[27]

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[21] *Id.* at 7–8 (emphasis added).
[22] EPA Guidance at 12.
[23] *Id.* at 5.
[24] *Id.*
[25] *Id.* at 12.
[26] 40 CFR § 50.14(c)(3)(iv)(A) (emphasis added).
[27] *See* Section I.C, *infra.* (Figures 5 and 6).

These elevated concentrations were subsequently exacerbated by wildfire smoke that was transported into the state by the north-northwesterly winds caused by the cold front that started crossing into the state "on the morning of June 7th."[28] Accordingly, DAQ should remove June 6 from the list of dates for which the agency requests exclusion of monitoring data.

B. The satellite imagery and surface observations relied upon by DAQ do not support excluding the data collected on June 8–10, 2023.

DAQ's EE Demonstration must include a "demonstration that the event affected air quality in such a way that there exists a *clear causal relationship* between the specific event and the monitored exceedance or violation."[29] To assist states in preparing such a demonstration for "fire-related" exceptional events, EPA has identified "analytical 'tiers' and associated levels of evidence appropriate to show the clear causal relationship criterion."[30] At a minimum, regardless of the applicable tier, the state must provide "evidence that smoke was transported to the monitor."[31] EPA's guidance specifies that this evidence may be in the form of "[t]rajectories linking fire with the monitor (forward and backward), considering height of trajectories," or "[s]atellite evidence *in combination with* surface measurements."[32]

For Tier 2 exceedances—"when the impacts of the wildland fire on $PM_{2.5}$ concentrations are less distinguishable from historical 24-hour concentrations"—the state must perform a more robust analysis supported by at least "two additional pieces of evidence," including evidence that the wildfire smoke "directly affected the monitor."[33]

DAQ's attempt to demonstrate a "clear causal relationship" is set forth in Section III of the Draft EE Demonstration.[34] This section relies on a series of figures depicting geopotential height anomalies and smoke trajectories, satellite imagery, and surface observation records.

While the satellite imagery appears to support the demonstration of a causal relationship between the Canadian wildfires and monitored exceedances on *some* of the days the agency has proposed excluding,[35] this imagery seriously undermines DAQ's attempt to prove such a causal

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[28] Draft EE Demonstration at 7–8.
[29] 40 CFR § 50.14(c)(3)(iv)(B) (emphasis added).
[30] EPA Guidance at 3.
[31] *Id.* at 12.
[32] *Id.* at 20.
[33] *Id.* at 5, 12, 20.
[34] Draft EE Demonstration at 18–81.
[35] *See, e.g., id.* at 29 (fig. 27, satellite imagery for June 7, 2023), 64 (fig. 82, satellite imagery for June 30, 2023), and 76 (fig. 98, satellite imagery for July 17, 2023).

relationship exists for a number of the other days the agency seeks to exclude. In particular, the satellite imagery for June 8–10, 2023, shows there was very little (if any) visible smoke in the areas surrounding the Remount and Lexington monitors on those days.

The Draft EE Demonstration relies on the following satellite imagery to support its request to exclude data collected on June 8–10:

Figure 1: Satellite Imagery for June 8, 2023[36]

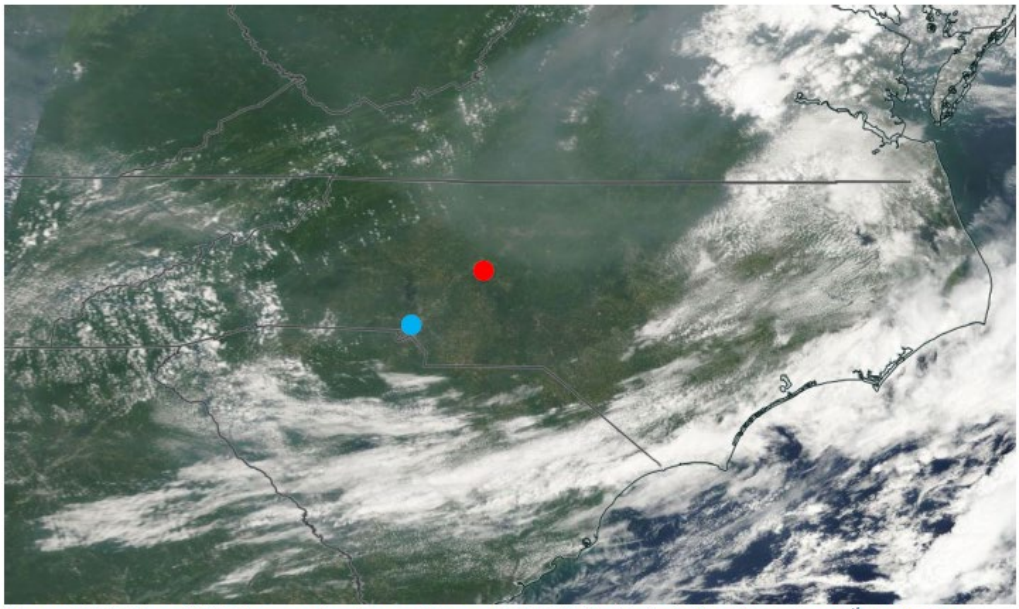

Figure 32: Visible satellite imagery showing smoke over the Mid-Atlantic, including NC, on June 8th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.

[36] *Id.* at 32.

Figure 2: Satellite Imagery for June 9, 2023[37]

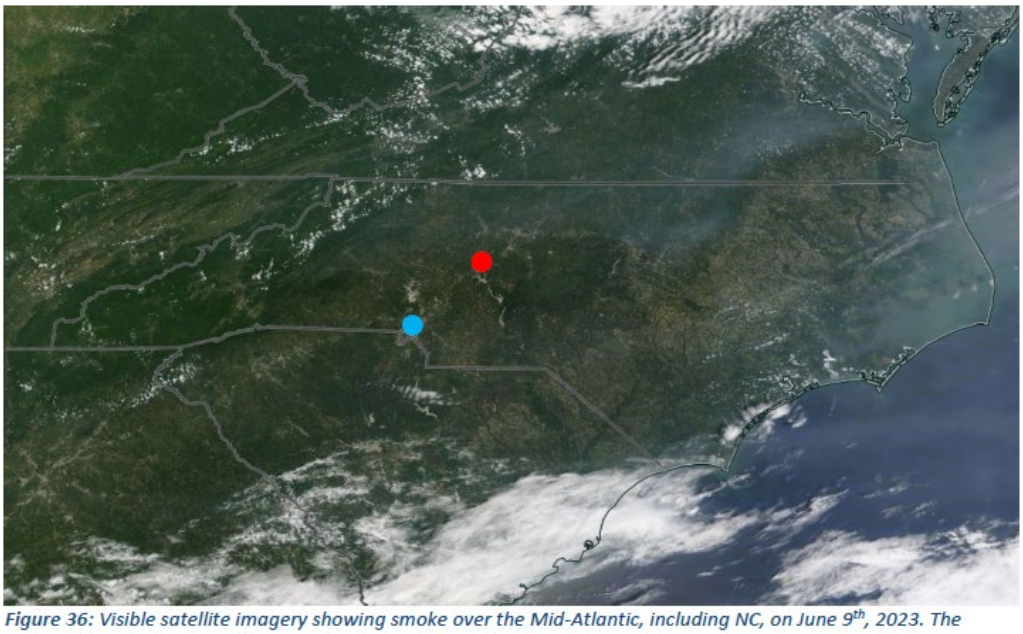

Figure 36: Visible satellite imagery showing smoke over the Mid-Atlantic, including NC, on June 9th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.

Figure 3: Satellite Imagery for June 10, 2023[38]

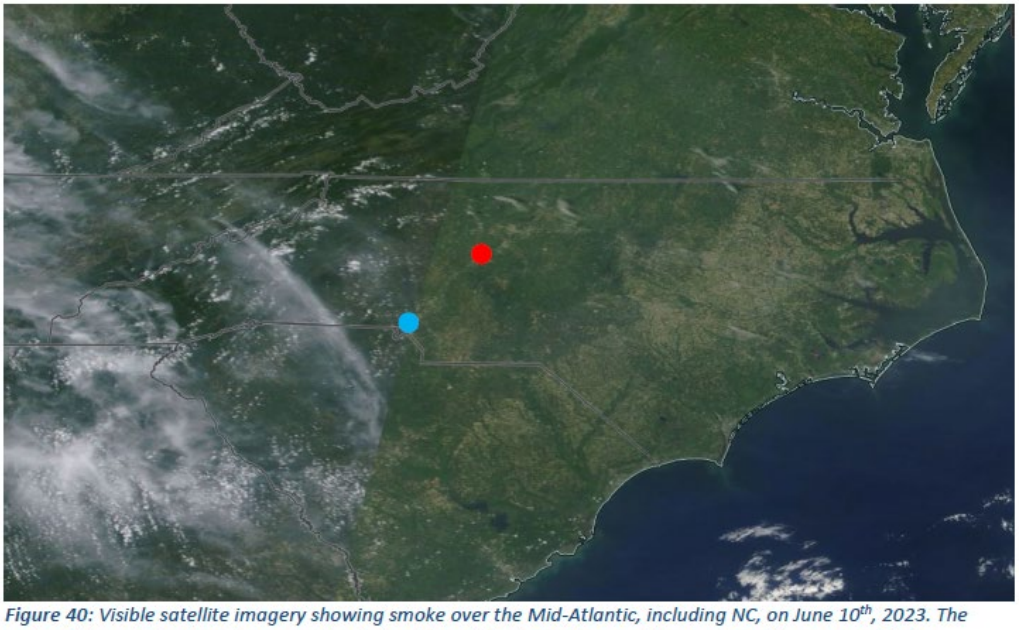

Figure 40: Visible satellite imagery showing smoke over the Mid-Atlantic, including NC, on June 10th, 2023. The red and blue circles show the approximate locations of the Lexington and Remount monitors, respectively.

[37] *Id.* at 34.
[38] *Id.* at 36.

Especially when compared to the satellite imagery for some of the other dates DAQ has proposed excluding,[39] these images show relatively clear skies surrounding the Remount and Lexington monitors.

Moreover, when a state relies upon satellite imagery to demonstrate a clear causal relationship, that imagery must be provided "in combination with surface measurements."[40] The satellite imagery for June 8–10 is particularly unpersuasive when considered in combination with the surface observations relied upon by DAQ. These surface observations were taken at the Charlotte/Douglas International Airport (CLT) and the Concord Regional Airport (JQF). However, there were no "manual (human) obscuration reports" taken at CLT, and manual observations were not taken "at all times" at JFQ.[41] Moreover, the manual observations at JQF likely do not provide reliable evidence regarding visibility conditions at the specific locations of the monitors at issue. As DAQ acknowledges, those observations were made "approximately 20 and 40 miles respectively" away from the Lexington and Remount monitors.[42] Given that "clear surface visibility. . . is 10 statute miles,"[43] it is unclear how visual observations made 20–40 miles away can be a source of reliable evidence to support the demonstration of a clear causal relationship.

Taken together, the satellite imagery showing relatively clear skies and the sporadic surface observations taken 20–40 miles away undermine DAQ's basis for excluding the data collected on June 8–10, 2023. Accordingly, DAQ should revise the Draft EE Demonstration to remove its request to exclude the data from those dates. At a minimum, DAQ must provide substantially more evidence to support a demonstration of a causal relationship between the Canadian wildfires and the monitored exceedances on those dates.

C. The comparison to historical emissions data does not support excluding the data collected on several of the dates DAQ proposes to exclude.

In order to "support" the demonstration of a clear causal relationship between the Canadian wildfires and the monitored exceedances, the EE Demonstration must include "[a]nalyses comparing the claimed event-influenced concentration(s) to concentrations at the

[39] *See, e.g.*, *id.* at 29 (fig. 27, satellite imagery for June 7, 2023), 64 (fig. 82, satellite imagery for June 30, 2023), and 76 (fig. 98, satellite imagery for July 17, 2023).
[40] EPA Guidance at 20.
[41] Draft EE Demonstration at 18.
[42] *Id.*
[43] *Id.*

same monitoring site at other times."[44] DAQ's comparative analysis is set forth in Subsection 3.2 of the Draft EE Demonstration.[45] This subsection compares the monitored exceedances from June and July of 2023 against "the daily average $PM_{2.5}$ concentration over the previous 5-year period (2018 – 2022) *on the given date* (i.e., the past 5 June 6ths, the past 5 June 7ths, etc.)."[46]

Although DAQ's comparative analysis appears to support the demonstration of a causal relationship between the Canadian wildfires and monitored exceedances on *some* of the days the agency has proposed excluding,[47] this analysis shows that the percent increase over historical data was not nearly as significant for several of the other days the agency seeks to exclude.[48] For example, the percent increase exceeded 400% on July 17 and July 18 but was less than 100% on June 28.[49] Indeed, on June 28, the percent increase over historical data at the Lexington station was only 42.4%.[50]

Moreover, DAQ's comparative analysis relies on the use of average concentrations calculated from historical emissions data that were recorded "on the given date."[51] This very narrow universe of data used for comparison fails to account for day-to-day variability in historical emissions and likely resulted in DAQ overestimating the relative increases for the concentrations recorded in June and July of 2023. In contrast, EPA's method for calculating tier thresholds properly accounts for temporal variability in emissions data by using "the most recent 5-year *month-specific* 98th percentile for 24-hour $PM_{2.5}$ data" or "the minimum *annual* 98th percentile for 24-hour $PM_{2.5}$ data for the most recent 5-year period."[52]

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[44] 40 CFR § 50.14(c)(3)(iv)(C).
[45] Draft EE Demonstration at 78–81.
[46] *Id.* at 79 (emphasis added).
[47] For example, Tables 7 and 8 show that $PM_{2.5}$ concentrations increased by more than 300% over the average concentration from the previous 5-year period on June 29 (318.9% increase at the Remount station and 326.3% at the Lexington station), July 17 (401.5% increase at the Remount station) and July 18 (483.5% increase at the Remount station and 408.4% increase at the Lexington station). *See id.* at 80–81.
[48] Fo example, Tables 7 and 8 show that $PM_{2.5}$ concentrations increased by less than 150% on June 8 (113.6% increase at the Remount station), June 11 (110.4% increase at the Lexington station), June 17 (117.9% increase at the Lexington station), June 28 (82.3% increase at the Remount station and 42.4% increase at the Lexington station), and July 1 (137.5% increase at the Lexington Station). *See id.*
[49] On July 17, the Remount station recorded an increase of 401.5%, and on July 18, the Remount station recorded an increase of 483.5% and the Lexington station recorded an increase of 408.4%. *See id.* at 81. In contrast, on June 28, the Remount station recorded an increase of 82% and the Lexington station recorded an increase of just 42.4%. *See id.* at 80–81.
[50] *See id.* at 81.
[51] *Id.* at 79.
[52] EPA Guidance at 6.

According to EPA's database of historical design values for $PM_{2.5}$,[53] the "minimum annual 98th percentile for 24-hour $PM_{2.5}$ data for the most recent 5-year period" is 18.5 µg/m³ for the Lexington station and 16.8 µg/m³ for the Remount station:

Table 1: Annual 98th Percentile Values for 24-hour $PM_{2.5}$

	98th Percentile Value (µg/m3)					
Local Site Name	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**
Lexington Water Tower	20.6	18.5	19.2	21.1	18.5	23.0
Remount	16.8	18.4	17.2	21.1	17.5	23.7

When compared against these values, the concentrations recorded in June and July of 2023 represent a substantially smaller percentage increase over historical emissions:

Table 2: Historical Comparison, Remount Station

	24-hr $PM_{2.5}$ Data		
Date	**24-hr Avg. (µg/m³)**	**Min. 5-yr Annual 98th Percentile (µg/m³)**	**Percent Increase over Historical**
6/6/2023	21.7	16.8	29.17%
6/7/2023	26.3	16.8	56.55%
6/8/2023	18.5	16.8	10.12%
6/9/2023	23.7	16.8	41.07%
6/10/2023	24.3	16.8	44.64%
6/17/2023	25.1	16.8	49.40%
6/18/2023	23.7	16.8	41.07%
6/28/2023	20.2	16.8	20.24%
6/29/2023	37.7	16.8	124.40%
6/30/2023	29.4	16.8	75.00%
7/1/2023	20.8	16.8	23.81%
7/17/2023	43.0	16.8	155.95%
7/18/2023	46.1	16.8	174.40%

[53] EPA, *$PM_{2.5}$ Design Values, 2023 (xlsx)*, Tbl. 5b (Aug. 9, 2024), https://www.epa.gov/system/files/documents/2024-08/pm25_designvalues_2021_2023_final_08_08_24_0.xlsx; EPA, *$PM_{2.5}$ Design Values, 2020 (xlsx)*, Tbl. 5b (May 24, 2021), https://www.epa.gov/sites/default/files/2021-05/pm25_designvalues_2018_2020_final_05_24_21.xlsx.

Table 3: Historical Comparison, Lexington Station

	24-hr $PM_{2.5}$ Data		
Date	**24-hr Avg. ($\mu g/m^3$)**	**Min. 5-yr Annual 98th Percentile ($\mu g/m^3$)**	**Percent Increase over Historical**
6/6/2023	28.6	18.5	54.59%
6/7/2023	29.3	18.5	58.38%
6/9/2023	23.0	18.5	24.32%
6/10/2023	22.5	18.5	21.62%
6/11/2023	19.2	18.5	3.78%
6/17/2023	18.9	18.5	2.16%
6/18/2023	21.9	18.5	18.38%
6/28/2023	20.5	18.5	10.81%
6/29/2023	45.7	18.5	147.03%
6/30/2023	32.0	18.5	72.97%
7/1/2023	18.0	18.5	**-2.70%**
7/17/2023	38.6	18.5	108.65%
7/18/2023	42.3	18.5	128.65%

As shown by Tables 2 and 3, the $PM_{2.5}$ concentrations recorded at both stations reflected an increase of more than 100% over historical emissions on only three of the dates DAQ has proposed excluding: June 29, July 17, and July 18.

In contrast, at the Remount station, the increase over historical emissions was less than 50% for eight of the dates DAQ seeks to exclude: June 6, June 8–10, June 17–18, June 28, and July 1. On June 8, June 28, and July 1, the percentage increase was less than 25%. Indeed, on June 8, the percentage increase at the Remount station was a mere 10.12%.

Similarly, at the Lexington station, the increase over historical emissions was less than 25% for seven of the dates DAQ seeks to exclude: June 9–11, June 17–18, June 28, and July 1. On June 11 and June 17, the percentage increase was less than 4%. Most notably, on July 1, $PM_{2.5}$ concentrations recorded at the Lexington station reflected a *decrease* of 2.7% relative to the lowest 98th percentile value from the previous five years.

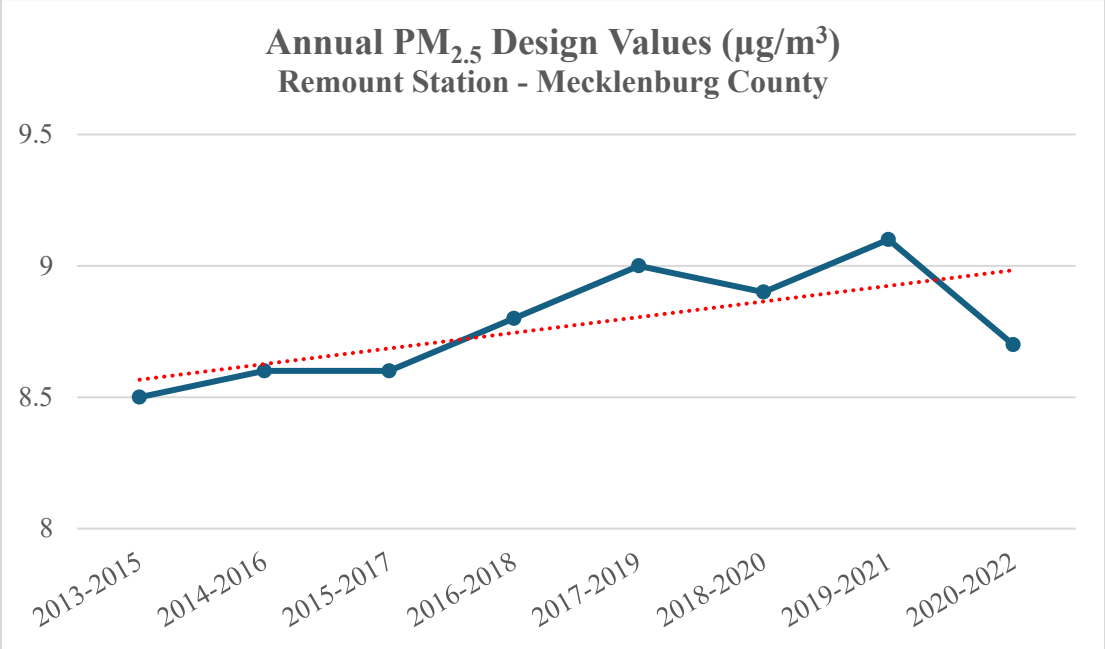
SELC recommends that DAQ revise the Draft EE Demonstration to remove all of the dates on which this analysis shows the increase over historical emissions was less than 25%:

- Remount station: June 8, June 28, and July 1
- Lexington station: June 9–11, June 17–18, June 28, and July 1

At a minimum, DAQ should not request exclusion of data from the Lexington station for the dates on which this analysis shows the increase over historical emissions was less than 5% or even negative: June 11 (3.78%), June 17 (2.16%), and July 1 (-2.7%).

Finally, DAQ's comparative analysis fails to account for the broader trend in historical emissions data. In particular, the design value for $PM_{2.5}$ at the Remount station has steadily increased over the past 10 years, as shown by the trendline in the following graph:

Figure 5: Historical $PM_{2.5}$ Design Values, Remount Station

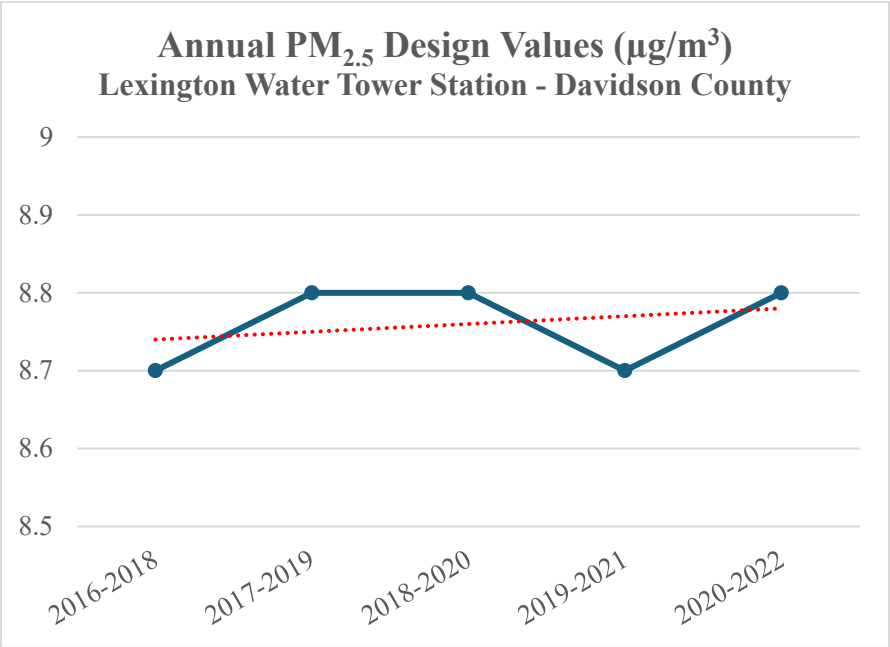


Notably, this trendline reveals a steady increase in $PM_{2.5}$ concentrations over the past decade, even when the highest and most recent design value (9.2 µg/m^3 in 2021–2023) is excluded.

This clear upward trend in $PM_{2.5}$ emissions at the Remount station strongly indicates that the 9.2 µg/m^3 design value for 2021–2023 is not merely an anomaly caused entirely by wildfire smoke transported from Canada in the summer of 2023. Clearly, baseline $PM_{2.5}$ concentrations in this area have been near (and even above) 9.0 µg/m^3 for several years—and steadily increasing.

Similarly, the design value for $PM_{2.5}$ at the Lexington station has steadily hovered just below 9.0 µg/m^3 with a slight upward trend over the past 5 years, as shown by the trendline in the following graph:

Figure 6: Historical $PM_{2.5}$ Design Values, Lexington Station



Again, this trendline reveals a slight increase in $PM_{2.5}$ concentrations over the past five years, even when the highest and most recent design value (9.2 µg/m^3 in 2021–2023) is excluded.

Since fine particle levels recorded by these monitors were already elevated and have been increasing over the past 10 years, DAQ's Draft EE Demonstration does not definitively show that these areas would have been in compliance with the NAAQS in the absence of the wildfire smoke. Indeed, the entire state of North Carolina experienced similar levels of smoke impacts from the Canadian wildfires in the summer of 2023;[54] nevertheless, the $PM_{2.5}$ design values for

[54] *See, e.g.*, Draft EE Demonstration at 39 ("[A] cold front swept across the state and once again resulted in the transport of smoke both aloft and at the surface that led to anomalous $PM_{2.5}$ concentrations *across the state, including* at the Remount and Lexington monitoring sites."); *id.* at 86 ("Code Orange levels for 24-hour average fine particulates were introduced into the forecast for June 7th *across the northern half of the state*."); *id.* at 91 ("NCDAQ provided information to the public regarding the Canadian wildfire smoke and impacts to the air quality *across the state*."); *id.* at 92 ("Code Orange alerts were issued for June 28th *across a large section of the state*."); *id.* at 92 ("NCDAQ issued a Code Orange alert for fine particulates through midnight *across the western two-thirds of the state*.").

the vast majority of air quality monitoring stations throughout the state have remained below the new standard.[55]

Because this comparative analysis to historical emissions data undermines the evidence DAQ has proposed submitting to EPA to support its request for exclusion of data, DAQ should revise the Draft EE Demonstration to remove its request to exclude data from the dates classified as Tier 2 exceedances. At a minimum, DAQ must provide substantially more evidence to support a demonstration of a clear causal relationship between the Canadian wildfires and the monitored exceedances on those dates.

CONCLUSION

For the foregoing reasons, SELC respectfully requests that DAQ revise the Draft EE Demonstration to ensure that its request for exclusion of air quality monitoring data includes only those days for which the agency has provided an adequate narrative conceptual model and sufficient evidence to demonstrate a clear causal relationship between the Canadian wildfires and the monitored exceedances of the $PM_{2.5}$ NAAQS.

Respectfully submitted,

/s/ Caroline Cress
Caroline Cress*
Myra Blake
Senior Attorneys
SOUTHERN ENVIRONMENTAL LAW CENTER
601 W. Rosemary Street, Ste. 220
Chapel Hill, NC 27516
(919) 967-1450
ccress@selcnc.org
mblake@selcnc.org
** Attorney is licensed in Washington State*

[55] *See id.* at Appendix L, pg. 3 ("Note that the Canadian wildfire smoke contributed to elevated design values for many other monitors in North Carolina; however, the design values are below the revised NAAQS."); *see id.* at Appendix L, fig. 1 (showing 19 air quality monitors across North Carolina with 2021-2023 design values below 9.0 $\mu g/m^3$).

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Attachment 4 to Appendix M: Written comments received from Mr. James Linville

From: River Rat Ron
To: SVC_DEQ.DAQ.publiccomments
Subject: [External] "EE Demonstration"
Date: Friday, December 20, 2024 9:46:54 AM

To Whom It May Concern:

Air quality in North Carolina is intermittently bad and sometimes routinely bad. I do not support any further lessening of air quality in North Carolina. The wildfires out west should not be used as an excuse to pollute more. Our local air quality is not as clean as it could be and should be. Sound stewardship of our resources is generally absent. Instead of burning, trees and leaves should be used for beneficial purposes like mulch or at least burned hot enough to avoid air quality issues. Educate the public.

The smoke events from western and Canadian fires are relatively minor when compared to local particulate pollution that is being done legally and illegally (if there is an illegal way anymore). The scale and type of burning today would not have been lawful a few years ago. Our legislature wants to promote sprawl and unmitigated growth. They have little, if any, regard for the public's health, well-being, and our natural resources. They do not understand that more development and more people inadvertently create much more pollution.

The air quality data reported by local and state regulators can be substantially skewed by the selection of where monitoring sites are located. Citizens living near the Davidson County line, but in Forsyth County suffer from various smoke events that are unmonitored. Southerly winds carry the stench of High Point's land fill which is indicative of air quality being affected by issues from Davidson County's direction. This skewing should be evaluated by federal regulators and others who are charged with maintaining our air quality, health, and well-being before giving a free ride to additional and/or more cumulative particulates.

A few years ago in North Carolina, there were limits on the size of limbs that could be burned during land clearing. Today, the entire tree can be burned thanks to politically connected and often totally absent business owners. Money speaks louder than citizen's needs. Even farmland clearing is done with fire and smoldering trees. It seems now that the whole forest can be piled up and burned. Leaves are legal to burn too. A pile of leaves can be piled up, lit on a Friday, and allowed to smolder for the entire weekend. Regulators do not work weekends. This smoke can fill up a valley. People who do this burning are either purely ignorant of cleaner burning methods, they don't live in the area, or they simply don't care about their fellow citizens. The burners do not understand what they are harming their neighbors, especially the elderly and veterans who suffer from respiratory ailments caused by their military service. Supporting the disabled, the elderly, and our veterans should include helping them breathe healthier air.

In closing, the State of North Carolina should anticipate that our climate is changing. Hurricane Helene is a prime example. The State should anticipate that we will have more fires out west, not fewer. The State should act preemptively to mitigate air quality issues by taking better steps to reduce air pollution that is home grown. If our air quality were improved, it's

likely the western and Canadian fires would not have created any particulate spikes. These fires and smoke originated thousands of miles from the State of North Carolina. We should start planning for increased particulate loads carried on prevailing western winds. We should recognize we will have higher potential risks for inversions in the piedmont of North Carolina too.

James Linville
3855 Idlewild Road
Kernersville, NC 27284
336-769-9427

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Attachment 5 to Appendix M: Public Notice Announcement and Press Releases by the North Carolina Department of Environmental Quality

NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY
PUBLIC NOTICE

PURPOSE:

The North Carolina Department of Environmental Quality, Division of Air Quality (DAQ), hereby gives notice regarding its pre-hearing draft of the *Exceptional Events Demonstration to Support Attainment Designation Recommendations for the 2024 Annual $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS) for Mecklenburg and Davidson Counties, North Carolina (June – July 2023 Canadian Wildfire Smoke Impacts)*.

Based on certified monitoring data for 2021-2023, the Remount Road monitor (371190045) in Mecklenburg County and Lexington Water Tower monitor (370570002) in Davidson County have a rounded design value of 9.2 micrograms per cubic meter. DAQ reviewed the monitoring data and determined that Canadian wildfire smoke-laden air masses significantly increased $PM_{2.5}$ concentrations measured by these two monitors during four multi-day events in June and July of 2023. These events were significant enough to increase the three-year average design value for each of the two $PM_{2.5}$ monitors to slightly above the revised standard.

In accordance with EPA's Exceptional Events Rule (40 CFR 50.14(c)(3)), the DAQ prepared this Exceptional Events demonstration to show that Canadian wildfire smoke significantly increased $PM_{2.5}$ concentrations during four events. If it were not for these exceptional events, the design value for each monitor would be below the revised standard. Based on the technical analyses presented in the Exceptional Events demonstration, the DAQ is requesting that EPA exclude days highly impacted by Canadian wildfire smoke from the design value for each monitor to show attainment of the revised primary annual $PM_{2.5}$ standard. This document has been prepared to support the State of North Carolina's designation recommendations for the 2024 revised primary annual $PM_{2.5}$ NAAQS. The DAQ intends to submit a final version of this pre-hearing draft for incorporation into North Carolina's State Implementation Plan through EPA's State Planning Electronic Collaboration System (SPeCS) web application after considering relevant public comments.

COMMENT PROCEDURES:

Any person wishing to comment may submit a written statement for inclusion in the record of proceedings regarding the pre-hearing draft of the *Exceptional Events Demonstration to Support Attainment Designation Recommendations for the 2024 Annual $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS) for Mecklenburg and Davidson Counties, North Carolina (June – July 2023 Canadian Wildfire Smoke Impacts)*. A public hearing will be held on Friday, December 20, 2024, if requested by Wednesday, November 4, 2024. Written comments should be submitted electronically to daq.publiccomments@deq.nc.gov or postmarked no later than Friday, December 20, 2024. (Please type "EE Demonstration" in the subject line)

PUBLIC HEARING INFORMATION:

December 20, 2024, at 3:00 p.m.
DEQ Green Square Office Building, 1st Floor Coastal Plains Conference Room (#1107)
217 West Jones Street, Raleigh, NC 27603; or
Cisco WebEx, Digital Hearing Link: https://tinyurl.com/6uzawjhw
Event password: AirQuality
Audio conference: To receive a call back, provide your phone number when you join the event, or call the number below and enter the access code.
US TOLL +1-415-655-0003, Access code: 2432 678 0383

*If you wish to speak at the digital public hearing, you must register, provide the required information, and follow instructions on ways to join the public hearing. Registration must be completed by 1:00 p.m. on December 20, 2024. To register, please click the following link: https://forms.office.com/g/j0qLaVTQ6t.

*For instructions on ways to join the public hearing, please refer to the following link: https://www.deq.nc.gov/about/boards-and-commissions/how-attend-webex-meeting

*If you have technical difficulties, the following automated voicemail has been set up to receive your verbal comments: 919-707-8495

Si necesita esta información en español, comuníquese con Shawn Taylor llamando al 919-707-8446 o enviando un correo electrónico Shawn.Taylor@deq.nc.gov.

All persons interested in these matters are invited to attend the public hearing.

Any person desiring to comment is requested to submit a written statement for inclusion in the record of proceedings at the public hearing. Please note that the hearing officer may limit the length of oral presentations if many people wish to speak. The public comment period is open beginning November 20, 2024, through December 20, 2024. To be included in the hearing record, all comments must be postmarked, emailed, or received by the Division (if delivering in person) no later than December 20, 2024.

INFORMATION: Copies of the Pre-hearing Draft of the *Exceptional Events Demonstration to Support Attainment Designation Recommendations for the 2024 Annual $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS) for Mecklenburg and Davidson Counties, North Carolina (June – July 2023 Canadian Wildfire Smoke Impacts)* may be downloaded from the DAQ website at https://www.deq.nc.gov/PM2.5ExceptionalEventsDemonstration.

Alternatively, comments or requests for a public hearing can be mailed to:

Tammy Manning
NC Division of Air Quality
1641 Mail Service Center
Raleigh, NC 27699-1641
919-707-8717 Phone
daq.publiccomments@deq.nc.gov
(Please type "EE Demonstration" in the subject line)

Copies of the proposals may also be reviewed at the following regional offices of the North Carolina Department of Environmental Quality, Division of Air Quality offices:

Mooresville Regional Office	(704) 235-2100
Winston-Salem Regional Office	(336) 776-9800

Date: 11/20/24

Michael A. Abraczinskas, DAQ Director

NORTH CAROLINA
Department of Environmental Quality
DEQ
ROY COOPER
Governor
MARY PENNY KELLEY
Secretary

Nov. 21, 2024

Public Invited to Comment on DAQ Exceptional Events Demonstration Analyzing 2023 Canadian Wildfire Particulate Matter Impacts

RALEIGH – The North Carolina Department of Environmental Quality's Division of Air Quality (DAQ) is accepting public comments on an analysis of smoke impacts in North Carolina from the 2023 Canadian wildfires. This analysis, called an Exceptional Events Demonstration, is intended to support DAQ's recommendation that the state be designated in attainment with a stricter air quality standard for fine particulate matter.

The Exceptional Events Demonstration is available on the Division's website for public review through Dec. 20, 2024. The Division will also hold a public hearing on that date, if it receives a request to do so.

Fine particulate matter, or $PM_{2.5}$, is any extremely small particle emitted by manmade (cars, industry, fires) or natural (wildfire smoke, dust, plants, animals) sources. Breathing air with high levels of $PM_{2.5}$ for extended periods is linked to health effects including shortness of breath and heart conditions.

After reviewing the latest scientific evidence, the Environmental Protection Agency in May tightened the annual standard for $PM_{2.5}$ from 12.0 micrograms per cubic meter of air to 9.0 micrograms per cubic meter. EPA says that the revised standard will save lives, reduce cases of asthma, prevent lost workdays and save billions in public health spending, especially in communities of color and other vulnerable populations.

North Carolinians are breathing the cleanest air in decades. North Carolina has seen a 49% decline in $PM_{2.5}$ emissions between 1990 and 2020, and maintained statewide compliance with the previous $PM_{2.5}$ standard. Based on air quality monitoring data from 2021-2023, 19 out of 21 monitoring sites in North Carolina are meeting the revised standard.

However, monitoring sites in Mecklenburg and Davidson counties were slightly above the revised standard due to influences of Canadian wildfire smoke in 2023. EPA has yet to make the final determination as to which areas of North Carolina will be designated in attainment with the revised $PM_{2.5}$ standard, and will base its determination on air quality data from 2022-2024.

DAQ plans to recommend that EPA designate all of North Carolina as in attainment with the revised $PM_{2.5}$ standard, because the Canadian wildfires were exceptional events outside of the state's control. This would allow DAQ to focus on pollution reduction strategies that are within its control to ensure ongoing attainment with the revised standard.

To support that recommendation, the state prepared an Exceptional Events Demonstration that clearly shows that for both the Davidson and Mecklenburg county monitors, Canadian wildfire smoke negatively impacted air quality data. Because this exceptional event was outside the control of the state, a small number of days in June and July 2024 can be removed from the calculation when determining compliance with the revised $PM_{2.5}$ standard, if EPA approves the Exceptional Events Demonstration. Exceptional Events Demonstrations are authorized under the Clean Air Act and EPA governs how states can use these provisions.

The public is invited to review the Division's analysis and submit comments. All comments received by Dec. 20, 2024, will be reviewed and considered.

A hybrid public hearing will be held in Raleigh on Dec. 20 if the Division receives a request to hold such a hearing on or before Dec. 4. If the Division does not receive a request to hold a public hearing by this date, the public hearing will be cancelled.

Speaker signup will be available upon arrival at the public hearing. To register to speak virtually at the hearing, please fill out this online form. Please indicated in your registration if you require live Spanish interpretation services. More information is in the public notice.

Comments and requests for a public hearing can be made via email to daq.publiccomments@deq.nc.gov (please type "EE Demonstration" in the subject line) or left via voicemail by calling 919-707-8495. Comments can also be mailed to:

Tammy Manning
NC Division of Air Quality
1641 Mail Service Center
Raleigh, NC 27699-1641

The Division of Air Quality must submit the Exceptional Events Demonstration to EPA by Feb. 7, 2025. EPA would then have until Feb. 6, 2026, to make final attainment decisions.

More information about the revised $PM_{2.5}$ standard is on DAQ's website.

If you need this information in Spanish or another language, please call 919-707-8446 or email Shawn.Taylor@deq.nc.gov.

Si necesita más información en español o en otro idioma, llame al 919-707-8446 o envíe un correo electrónico a Shawn.Taylor@deq.nc.gov.

For More Information
Contact: Shawn Taylor
Phone: 919.707.8446

NORTH CAROLINA
Department of Environmental Quality
DEQ
ROY COOPER
Governor
MARY PENNY KELLEY
Secretary

27 de noviembre de 2024

Se invita al público a proporcionar comentarios sobre la demostración de eventos excepcionales de la DAQ que analiza los impactos de las partículas de los incendios forestales de Canadá en 2023

RALEIGH – La División de Calidad del Aire (DAQ, por sus siglas en inglés) del Departamento de Calidad Medioambiental de Carolina del Norte está aceptando comentarios públicos sobre un análisis de los impactos del humo en Carolina del Norte a causa de los incendios forestales canadienses de 2023. Este análisis, denominado Demostración de Eventos Excepcionales, pretende respaldar la recomendación de la DAQ de que el estado sea designado en cumplimiento de una norma de calidad del aire más estricta para las partículas finas.

La demostración de eventos excepcionales está disponible para revisión pública en la página web de la División hasta el 20 de diciembre de 2024. La División también celebrará una audiencia pública en esa fecha, si recibe una solicitud para ello.

Las partículas finas, o $PM_{2.5}$, son cualquier partícula extremadamente pequeña emitida por fuentes artificiales (automóviles, industria, incendios) o naturales (humo de los incendios forestales, polvo, plantas, animales). Respirar aire con altos niveles de $PM_{2.5}$ durante periodos prolongados está relacionado con efectos sobre la salud, como dificultades respiratorias y enfermedades cardiacas.

Después de revisar las últimas pruebas científicas, la Agencia de Protección Ambiental (EPA, por sus siglas en Inglés) endureció en mayo la norma anual para las $PM_{2.5}$ de 12.0 microgramos por metro cúbico de aire a 9.0 microgramos por metro cúbico. La EPA afirma que la norma revisada salvará vidas, reducirá los casos de asma, evitará la pérdida de días de trabajo y ahorrará miles de millones en gastos de salud pública, especialmente en las comunidades de color y otras poblaciones vulnerables.

Los habitantes de Carolina del Norte respiran el aire más limpio en décadas. Carolina del Norte ha registrado un descenso del 49 % en emisiones de $PM_{2.5}$ entre 1990 y 2020 y ha cumplido con la norma anterior de $PM_{2.5}$. Con base en los datos del monitoreo de la calidad del aire del 2021-2023, 19 de los 21 sitios de monitoreo de Carolina del Norte cumplen con la nueva norma.

Sin embargo, los sitios de monitoreo en los condados de Mecklenburg y Davidson estuvieron apenas por encima de la nueva norma como consecuencia de los incendios forestales de Canadá en 2023. La EPA aún tiene que tomar la determinación final sobre qué zonas de Carolina del Norte serán designadas en cumplimiento de la norma

revisada de $PM_{2.5}$, y basará su determinación en los datos de calidad del aire de 2022-2024.

La DAQ planea recomendar a la EPA que designe a todo Carolina del Norte como en cumplimiento de la norma revisada de $PM_{2.5}$ porque los incendios forestales canadienses fueron acontecimientos excepcionales fuera del control del estado. Esto le permite al DEQ concentrarse en estrategias para reducir la contaminación que están dentro de su control para garantizar el cumplimiento continuo de la nueva norma.

Para apoyar esa recomendación, el estado preparó una Demostración de Eventos Excepcionales que muestra claramente que, tanto para los monitores del condado de Davidson como para los del condado de Mecklenburg, el humo de los incendios forestales canadienses tuvo un impacto negativo en los datos de calidad del aire. Debido a que este evento excepcional estaba fuera del control del estado, un pequeño número de días en junio y julio de 2024 pueden eliminarse del cálculo a la hora de determinar el cumplimiento de la norma revisada sobre $PM_{2.5}$, si la EPA aprueba la Demostración de Eventos Excepcionales. Las Demostraciones de Eventos Excepcionales están autorizadas por la Ley de Aire Limpio y la EPA regula el modo en que los estados pueden utilizar estas disposiciones.

Se invita al público a revisar el análisis de la División y a enviar sus comentarios. Se revisarán y tendrán en cuenta todos los comentarios recibidos hasta el 20 de diciembre de 2024.

Se celebrará una audiencia pública híbrida en Raleigh el 20 de diciembre si la División recibe una solicitud para celebrar dicha audiencia el 4 de diciembre o antes. Si la División no recibe una solicitud para celebrar una audiencia pública antes de esta fecha, la audiencia pública será cancelada.

La inscripción de oradores estará disponible a su llegada a la audiencia pública. Para inscribirse para hablar virtualmente en la audiencia, rellene este formulario en línea. Indique en su inscripción si necesita servicios de interpretación en directo al español. Encontrará más información en el aviso público.

Los comentarios y solicitudes de audiencia pública pueden hacerse por correo electrónico a daq.publiccomments@deq.nc.gov [escriba “EE Demonstration” (Demostración de EE) en el asunto] o déjelo en el buzón de voz llamando al 919-707-8495. Los comentarios también pueden enviarse por correo a la atención de:

Tammy Manning
NC Division of Air Quality
1641 Mail Service Center
Raleigh, NC 27699-1641

La División de Calidad del Aire debe presentar la Demostración de Eventos Excepcionales a la EPA antes del 7 de febrero de 2025. La EPA tendría entonces hasta el 6 de febrero de 2026 para tomar las decisiones finales de cumplimiento.

Más información sobre la norma de $PM_{2.5}$ revisada en el sitio web de la DAQ.

Si necesita más información en español o en otro idioma, llame al 919-707-8446 o envíe un correo electrónico a Shawn.Taylor@deq.nc.gov.

Para obtener más información

Contacto: Shawn Taylor
Teléfono: 919.707.8446

NORTH CAROLINA
Department of Environmental Quality
DEQ
ROY COOPER
Governor
MARY PENNY KELLEY
Secretary

Dec. 6, 2024

REMINDER: Public Invited to Comment on DAQ Exceptional Events Demonstration Analyzing 2023 Canadian Wildfire Particulate Matter Impacts

RALEIGH – The North Carolina Department of Environmental Quality's Division of Air Quality (DAQ) is accepting public comments on an analysis of smoke impacts in North Carolina from the 2023 Canadian wildfires. This analysis, called an Exceptional Events Demonstration, is intended to support DAQ's recommendation that the state be designated in attainment with a stricter air quality standard for fine particulate matter.

The Exceptional Events Demonstration is available on the Division's website for public review through Dec. 20, 2024. The Division will also hold a public hearing on that date, if it receives a request to do so.

Fine particulate matter, or $PM_{2.5}$, is any extremely small particle emitted by manmade (cars, industry, fires) or natural (wildfire smoke, dust, plants, animals) sources. Breathing air with high levels of $PM_{2.5}$ for extended periods is linked to health effects including shortness of breath and heart conditions.

After reviewing the latest scientific evidence, the Environmental Protection Agency in May tightened the annual standard for $PM_{2.5}$ from 12.0 micrograms per cubic meter of air to 9.0 micrograms per cubic meter. EPA says that the revised standard will save lives, reduce cases of asthma, prevent lost workdays and save billions in public health spending, especially in communities of color and other vulnerable populations.

North Carolinians are breathing the cleanest air in decades. North Carolina has seen a 49% decline in $PM_{2.5}$ emissions between 1990 and 2020, and maintained statewide compliance with the previous $PM_{2.5}$ standard. Based on air quality monitoring data from 2021-2023, 19 out of 21 monitoring sites in North Carolina are meeting the revised standard.

However, monitoring sites in Mecklenburg and Davidson counties were slightly above the revised standard due to influences of Canadian wildfire smoke in 2023. EPA has yet to make the final determination as to which areas of North Carolina will be designated in attainment with the revised $PM_{2.5}$ standard, and will base its determination on air quality data from 2022-2024.

DAQ plans to recommend that EPA designate all of North Carolina as in attainment with the revised $PM_{2.5}$ standard, because the Canadian wildfires were exceptional events

outside of the state's control. This would allow DAQ to focus on pollution reduction strategies that are within its control to ensure ongoing attainment with the revised standard.

To support that recommendation, the state prepared an Exceptional Events Demonstration that clearly shows that for both the Davidson and Mecklenburg county monitors, Canadian wildfire smoke negatively impacted air quality data. Because this exceptional event was outside the control of the state, a small number of days in June and July 2024 can be removed from the calculation when determining compliance with the revised $PM_{2.5}$ standard, if EPA approves the Exceptional Events Demonstration. Exceptional Events Demonstrations are authorized under the Clean Air Act and EPA governs how states can use these provisions.

The public is invited to review the Division's analysis and submit comments. All comments received by Dec. 20, 2024, will be reviewed and considered.

A hybrid public hearing will be held in Raleigh on Dec. 20 if the Division receives a request to hold such a hearing on or before Dec. 13. **(NOTE:** This is an extension of the original Dec. 4 deadline to request a public hearing previously announced). If the Division does not receive a request to hold a public hearing by this date, the public hearing will be cancelled.

Speaker signup will be available upon arrival at the public hearing. To register to speak virtually at the hearing, please fill out this online form. Please indicated in your registration if you require live Spanish interpretation services. More information is in the public notice.

Comments and requests for a public hearing can be made via email to daq.publiccomments@deq.nc.gov (please type "EE Demonstration" in the subject line) or left via voicemail by calling 919-707-8495. Comments can also be mailed to:

Tammy Manning
NC Division of Air Quality
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The Division of Air Quality must submit the Exceptional Events Demonstration to EPA by Feb. 7, 2025. EPA would then have until Feb. 6, 2026, to make final attainment decisions.

More information about the revised $PM_{2.5}$ standard is on DAQ's website.

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6 de diciembre de 2024

RECORDATORIO: Se invita al público a proporcionar comentarios sobre la demostración de eventos excepcionales de la DAQ que analiza los impactos de las partículas de los incendios forestales de Canadá en 2023

RALEIGH – La División de Calidad del Aire (DAQ, por sus siglas en inglés) del Departamento de Calidad Medioambiental de Carolina del Norte está aceptando comentarios públicos sobre un análisis de los impactos del humo en Carolina del Norte a causa de los incendios forestales canadienses de 2023. Este análisis, denominado Demostración de Eventos Excepcionales, pretende respaldar la recomendación de la DAQ de que el estado sea designado en cumplimiento de una norma de calidad del aire más estricta para las partículas finas.

La demostración de eventos excepcionales está disponible para revisión pública en la página web de la División hasta el 20 de diciembre de 2024. La División también celebrará una audiencia pública en esa fecha, si recibe una solicitud para ello.

Las partículas finas, o $PM_{2.5}$, son cualquier partícula extremadamente pequeña emitida por fuentes artificiales (automóviles, industria, incendios) o naturales (humo de los incendios forestales, polvo, plantas, animales). Respirar aire con altos niveles de $PM_{2.5}$ durante periodos prolongados está relacionado con efectos sobre la salud, como dificultades respiratorias y enfermedades cardiacas.

Después de revisar las últimas pruebas científicas, la Agencia de Protección Ambiental (EPA, por sus siglas en Inglés) endureció en mayo la norma anual para las $PM_{2.5}$ de 12.0 microgramos por metro cúbico de aire a 9.0 microgramos por metro cúbico. La EPA afirma que la norma revisada salvará vidas, reducirá los casos de asma, evitará la pérdida de días de trabajo y ahorrará miles de millones en gastos de salud pública, especialmente en las comunidades de color y otras poblaciones vulnerables.

Los habitantes de Carolina del Norte respiran el aire más limpio en décadas. Carolina del Norte ha registrado un descenso del 49 % en emisiones de $PM_{2.5}$ entre 1990 y 2020 y ha cumplido con la norma anterior de $PM_{2.5}$. Con base en los datos del monitoreo de la calidad del aire del 2021-2023, 19 de los 21 sitios de monitoreo de Carolina del Norte cumplen con la nueva norma.

Sin embargo, los sitios de monitoreo en los condados de Mecklenburg y Davidson estuvieron apenas por encima de la nueva norma como consecuencia de los incendios

forestales de Canadá en 2023. La EPA aún tiene que tomar la determinación final sobre qué zonas de Carolina del Norte serán designadas en cumplimiento de la norma revisada de $PM_{2.5}$, y basará su determinación en los datos de calidad del aire de 2022-2024.

La DAQ planea recomendar a la EPA que designe a todo Carolina del Norte como en cumplimiento de la norma revisada de $PM_{2.5}$ porque los incendios forestales canadienses fueron acontecimientos excepcionales fuera del control del estado. Esto le permite al DEQ concentrarse en estrategias para reducir la contaminación que están dentro de su control para garantizar el cumplimiento continuo de la nueva norma.

Para apoyar esa recomendación, el estado preparó una Demostración de Eventos Excepcionales que muestra claramente que, tanto para los monitores del condado de Davidson como para los del condado de Mecklenburg, el humo de los incendios forestales canadienses tuvo un impacto negativo en los datos de calidad del aire. Debido a que este evento excepcional estaba fuera del control del estado, un pequeño número de días en junio y julio de 2024 pueden eliminarse del cálculo a la hora de determinar el cumplimiento de la norma revisada sobre $PM_{2.5}$, si la EPA aprueba la Demostración de Eventos Excepcionales. Las Demostraciones de Eventos Excepcionales están autorizadas por la Ley de Aire Limpio y la EPA regula el modo en que los estados pueden utilizar estas disposiciones.

Se invita al público a revisar el análisis de la División y a enviar sus comentarios. Se revisarán y tendrán en cuenta todos los comentarios recibidos hasta el 20 de diciembre de 2024.

Se celebrará una audiencia pública híbrida en Raleigh el 20 de diciembre si la División recibe una solicitud para celebrar dicha audiencia el 13 de diciembre o antes. Si la División no recibe una solicitud para celebrar una audiencia pública antes de esta fecha, la audiencia pública será cancelada.

La inscripción de oradores estará disponible a su llegada a la audiencia pública. Para inscribirse para hablar virtualmente en la audiencia, rellene este formulario en línea. Indique en su inscripción si necesita servicios de interpretación en directo al español. Encontrará más información en el aviso público.

Los comentarios y solicitudes de audiencia pública pueden hacerse por correo electrónico a daq.publiccomments@deq.nc.gov [escriba “EE Demonstration” (Demostración de EE) en el asunto] o déjelo en el buzón de voz llamando al 919-707-8495. Los comentarios también pueden enviarse por correo a la atención de:

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Dec. 17, 2024

REMINDER: Public Invited to Comment on DAQ Exceptional Events Demonstration Analyzing 2023 Canadian Wildfire Particulate Matter Impacts

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To support that recommendation, the state prepared an Exceptional Events Demonstration that clearly shows that for both the Davidson and Mecklenburg county monitors, Canadian wildfire smoke negatively impacted air quality data. Because this exceptional event was outside the control of the state, a small number of days in June and July 2024 can be removed from the calculation when determining compliance with the revised $PM_{2.5}$ standard, if EPA approves the Exceptional Events Demonstration. Exceptional Events Demonstrations are authorized under the Clean Air Act and EPA governs how states can use these provisions.

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17 de diciembre de 2024

RECORDATORIO: Se invita al público a proporcionar comentarios sobre la demostración de eventos excepcionales de la DAQ que analiza los impactos de las partículas de los incendios forestales de Canadá en 2023

RALEIGH – La División de Calidad del Aire (DAQ, por sus siglas en inglés) del Departamento de Calidad Medioambiental de Carolina del Norte está aceptando comentarios públicos sobre un análisis de los impactos del humo en Carolina del Norte a causa de los incendios forestales canadienses de 2023. Este análisis, denominado Demostración de Eventos Excepcionales, pretende respaldar la recomendación de la DAQ de que el estado sea designado en cumplimiento de una norma de calidad del aire más estricta para las partículas finas.

La demostración de eventos excepcionales está disponible para revisión pública en la página web de la División hasta el 20 de diciembre de 2024. (La División ha cancelado la audiencia pública para esa fecha porque no se recibió ninguna solicitud para llevarla a cabo.)

Las partículas finas, o $PM_{2.5}$, son cualquier partícula extremadamente pequeña emitida por fuentes artificiales (automóviles, industria, incendios) o naturales (humo de los incendios forestales, polvo, plantas, animales). Respirar aire con altos niveles de $PM_{2.5}$ durante periodos prolongados está relacionado con efectos sobre la salud, como dificultades respiratorias y enfermedades cardiacas.

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revisada de $PM_{2.5}$, y basará su determinación en los datos de calidad del aire de 2022-2024.

La DAQ planea recomendar a la EPA que designe a todo Carolina del Norte como en cumplimiento de la norma revisada de $PM_{2.5}$ porque los incendios forestales canadienses fueron acontecimientos excepcionales fuera del control del estado. Esto le permite al DEQ concentrarse en estrategias para reducir la contaminación que están dentro de su control para garantizar el cumplimiento continuo de la nueva norma.

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