GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

Canadian Wildfire Exceptional Event Demonstration for the 2024 Annual $PM_{2.5}$ NAAQS at Forest Park, GA in 2023-2025

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November 2, 2026

TABLE OF CONTENTS

1. INTRODUCTION **1**
2. NARRATIVE CONCEPTUAL MODEL **2**
3. PUBLIC NOTIFICATION **3**
4. CLEAR CAUSAL RELATIONSHIP AND SUPPORTING ANALYSES **6**
5. NOT REASONABLY CONTROLLABLE OR PREVENTABLE **9**
6. HUMAN ACTIVITY UNLIKELY TO RECUR AT A PARTICULAR LOCATION OR NATURAL EVENT **9**
7. PUBLIC COMMENT PERIOD **10**
APPENDIX A: ACTIVE WILDFIRES IN CANADA **11**
APPENDIX B: HMS SMOKE AND ACTIVE FIRES **16**
APPENDIX C: HYSPLIT BACK-TRAJECTORY MAPS **21**
APPENDIX D: $PM_{2.5}$ SURFACE CONCENTRATIONS IN THE SOUTHEAST **26**
APPENDIX E: HOURLY $PM_{2.5}$ TIME SERIES **31**
APPENDIX F: UPPER AIR MAPS **36**

1. Introduction

The current annual and 24-hour $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS) are 9.0 $\mu g/m^3$ and 35 $\mu g/m^3$, respectively. Federal Reference Method (FRM) monitors collect $PM_{2.5}$ samples for 24 hours on filters while Federal Equivalent Method (FEM) monitors measure hourly $PM_{2.5}$ concentrations continuously. For the purpose of this document, an "exceedance" is defined as a measured 24-hour $PM_{2.5}$ concentration that is greater than the level (9.0 $\mu g/m^3$) of the 2024 annual $PM_{2.5}$ NAAQS. Please note that "exceedance" as defined in this document (based on an averaging time of 24-hours) is not an actual exceedance of the 2024 annual $PM_{2.5}$ NAAQS since an exceedance of a NAAQS must be based on the averaging time for the NAAQS (in this case, annual) in addition to the level of the NAAQS (in this case, 9.0 $\mu g/m^3$).

From January 9, 1999, to February 20, 2024, a $PM_{2.5}$ FRM monitor collected data at the Forest Park site [Air Quality System (AQS) ID: 13-063-0091] on a one-in-three day schedule. From February 21, 2024, to July 21, 2024, a continuous $PM_{2.5}$ FEM monitor replaced the $PM_{2.5}$ FRM monitor. On July 22, 2024, the $PM_{2.5}$ FRM monitor was redeployed on a one-in-three day schedule and replaced the continuous $PM_{2.5}$ FEM monitor. The Atlanta-Sandy Springs-Roswell Metropolitan Statistical Area (MSA) is designated attainment for the 2012 $PM_{2.5}$ NAAQS.

This document discusses 11 different days from 2023-2025 that qualify for exceptional event demonstrations (Table 1) for the Forest Park air monitoring site located in Forest Park (Clayton County) in the state of Georgia, all of which were due to Canadian wildfires. Of the events listed in Table 1, six were submitted in a previous demonstration and either concurred or deferred. These 11 exceedances resulted from the transport of wildfire smoke that originated in Canada. Therefore, they qualify for removal under the Exceptional Events Rule (EER). Design values (DVs) of the Forest Park site with and without U.S. Environmental Protection Agency (EPA) concurrence are shown in Table 2. DVs are calculated using 24-hour $PM_{2.5}$ measurements from 2023-2025. For each year, these measurements are first averaged into quarterly values, then to a yearly value. The average of these yearly values is reported as the DV. Inclusion of these events produces a DV of 9.2 $\mu g/m^3$, which violates the 2024 $PM_{2.5}$ annual NAAQS; however, exclusion reduces the DV to 9.0 $\mu g/m^3$.

On July 30, 2025, and September 3, 2026, the Georgia Environmental Protection Division (EPD) submitted an Initial Notification for these events to EPA. The request indicated that the data identified in Table 1 were impacted by smoke from Canadian wildfires and asked for review of the events under the case-by-case provision at 40 CFR 50.14(a)(1)(i)(F). Georgia EPD formally requests that EPA reconsider the four deferred days that were officially submitted for approval on September 19, 2025, and concur with the exclusion of the deferred and new events listed in Table 1.

Table 1. Exceedances observed at the Forest Park site in Forest Park, GA in 2023-2025 that qualify for removal under the EER.

#	Date	24-hour $PM_{2.5}$ ($\mu g/m^3$)	Tier	Cause of Exceedance	Status
1	06/05/23	14.9	3	Canadian Wildfires	New
2	06/08/23	20.4	2	Canadian Wildfires	Concurred
3	06/11/23	14.9	3	Canadian Wildfires	New
4	06/17/23	14.6	3	Canadian Wildfires	New
5	06/29/23	34.2	1	Canadian Wildfires	Concurred
6	07/20/23	16.6	2	Canadian Wildfires	Deferred
7	07/26/23	16.6	2	Canadian Wildfires	Deferred
8	07/29/23	13.8	3	Canadian Wildfires	New
9	08/22/23	18.4	2	Canadian Wildfires	Deferred
10	08/25/23	19.3	2	Canadian Wildfires	Deferred
11	06/03/25	21.3	2	Canadian Wildfires	New

Table 2. DVs at the Forest Park site for the 2024 annual $PM_{2.5}$ NAAQS.

Monitor Site (AQS ID)	2023-2025 DV without EPA Concurrence ($\mu g/m^3$)	2023-2025 DV with EPA Concurrence ($\mu g/m^3$)
Forest Park (13-063-0091)	9.2	9.0

EPA has outlined requirements for demonstrations of wildfire events in the 2016 document *Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations* and, pertinent to this demonstration, the 2024 supplementary document *$PM_{2.5}$ Wildland Fire Exceptional Events Tiering Document*. This demonstration will describe how the proposed wildfire events meet the requirements of the EER as described in regulation and the guidance documents, as applicable. Analysis in this document is provided only for exceedances not submitted in a previous demonstration.

2. Narrative Conceptual Model

The EER requires that demonstrations include a narrative conceptual model describing the events. This section describes the 2023 and 2025 Canadian wildfires that impacted the air quality monitor in Forest Park, GA. Estimates from the National Oceanic and Atmospheric Administration (NOAA) Hybrid Single-Particle Lagrangian Integrated Trajectory model (HYSPLIT) model are used to describe the transport of wildfire smoke to the area and around the state which ultimately led to enhancements of $PM_{2.5}$ concentrations that exceeded the NAAQS level.

Canadian wildfires during the 2023 and 2025 wildfire seasons were well documented and impacted much of the geography of the United States. The 2023 season started ahead of the typical Canadian wildfire season, lasting from mid-April to late October (seasons are usually from May – September)[1]. The 2025 wildfire season lasted from mid-May to late October. Temperatures and land aridity across Canada were unusually high during both years. In 2023,

[1] https://doi.org/10.1038/s41467-024-51154-7

this resulted in the burning of a record-breaking amount of land area (≥156,000 km^2)[2]. In 2025, the land area burned (≥73,000 km^2) was the second most, only behind the 2023 season[3]. The land area burned during either season far exceeded the average[4] of 21,000 km^2. During 2023, the most active burns were situated in the eastern province of Quebec in June and July, and then in the western provinces of Alberta, Saskatchewan, and British Columbia. During 2025, the most active burns were in British Columbia and Alberta in June, and then spread to the Yukon, Northwest Territories, Saskatchewan, and Manitoba.

Figures in Appendix A are provided to show active Canadian wildfires on the days of the exceedances and for three days beforehand via the Natural Resources Canada Interactive Map[5]. On the dates listed in Table 1 (Figures A1-A5), when the exceedances were recorded by the relevant site, Canadian wildfires were on-going across the country. In 2023, the majority of these fires each consumed >1,000 hectares and in 2025, the majority consumed 100-1,000 hectares. These fires were similarly as intense in their respective years up to three days prior to the recorded exceptional events.

Shown in Section 4, these wildfires resulted in the United States being blanketed in smoke and impacted $PM_{2.5}$ surface level concentrations across the country. Pertinent to this demonstration, concentrations were impacted across the southeast of the country, often simultaneously and in conjunction with the arrival of air masses either from Canada or circulated from smoke-laden areas within the United States. Air mass back-trajectories from NOAA's HYSPLIT model indicate that the plumes responsible for the summertime events were emitted from fires in the Canadian provinces of British Columbia, Alberta, Saskatchewan, the Northwest Territories, and Quebec. They then traveled along multiple routes either originating in Canada or by circulating smoke from Canadian wildfires from other (western and/or midwestern) regions of the United States.

This conceptual model describes how emissions from wildfires in Canada and environmental conditions contributed to the events dated in Table 1. Smoke emissions transported to the Forest Park site enhanced observed $PM_{2.5}$ concentrations and caused an exceedance. Georgia EPD requests EPA's concurrence on these dates for exclusion from regulatory decision making, specifically state attainment determinations.

3. Public Notification

As described in 40 CFR 51.930(a), states requesting to exclude data due to exceptional events must take appropriate and reasonable actions to protect public health from exceedances or violations of the NAAQS. These include providing for, at a minimum, prompt public notification whenever concentrations are expected to exceed a NAAQS, public education on actions individuals may take to reduce exposures to unhealthy air quality during events, and implementation of appropriate measures to protect public health from event-caused exceedances or violations of the NAAQS.

[2] https://doi.org/10.1007/s00376-023-3241-0
[3] https://cfs.cloud.nrcan.gc.ca/statsprofile/disturbance/wildland-fires.html
[4] https://cwfis.cfs.nrcan.gc.ca/ha/nfdb
[5] https://cwfis.cfs.nrcan.gc.ca/interactive-map

With respect to public notification, Georgia EPD, in conjunction with the Georgia Institute of Technology, provides a daily forecast email that includes messaging concerning health advisories and smog alerts to Georgia Commute Options and the Atlanta Regional Commission for distribution. Each forecast email includes a reminder stating: "If you see or smell smoke and have respiratory concerns you may need to move indoors, close windows and doors. You can see the current air quality at https://airgeorgia.org or https://www.airnow.gov to help you determine when to continue outdoor activities." In addition, the Georgia EPD Ambient Air Monitoring Program website[6] provides near real-time ambient air concentrations of multiple criteria pollutants (O_3, $PM_{2.5}$, SO_2, NO_2, and CO) across the state.

With respect to public education, the Georgia EPD website[7] has a link to EPA's AirNow Fire and Smoke Map[8], EPA's AirNow When Smoke is in the Air[9], EPA's AirNow Prepare for Fire Season[10], and the EPA's Smoke-Ready Toolbox for Wildfires, EPA's Wildfire Smoke: A Guide for Public Health Officials, and EPA's Prepare for Wildfire Smoke Factsheet[11]. These websites identify several protective measures that individuals should take to reduce smoke exposure as needed, including limiting outdoor activities, avoiding strenuous outdoor activity and remaining indoors, and considering temporarily relocating or closing all doors and windows during smoke events.

Outside Georgia EPD, there was additional notification provided by various news outlets to the public about the potential for elevated air quality impacts from Canadian wildfires. Some examples include:

- https://www.wsbtv.com/news/local/atlanta/expect-flight-delays-into-atlanta-thanks-canada-wildfire-smoke/RX2WTAWHTBGEVGQAMWFRLYCEJU/ (North Georgia/Metro Atlanta, 6/7/2023)
- https://www.13wmaz.com/article/weather/smoke-from-wildfire-to-central-georgia/93-87f7b552-98fd-4b86-8f99-94140c76d38d (Macon/Central Georgia, 6/7/2023)
- https://www.youtube.com/watch?v=sZkxex_jpQw (Central Georgia, 6/7/2023)
- https://www.wsbradio.com/weather/wildfire-smoke-drifting-south-canada-into-north-georgia/OKNENTCA6JGGJPYQ76VCO6LF5Q/ (Metro Atlanta/Birmingham, Alabama, 6/7/2023)
- https://www.gpb.org/news/the-picture-show/2023/06/07/photos-extreme-canadian-wildfire-smoke-shrouds-parts-of-us (North and South Carolina, 6/7/2023)
- https://www.atlantanewsfirst.com/2023/06/08/air-quality-georgia-will-smoke-wildfires-reach-us/ (Greater Metro Atlanta, 6/8/2023)
- https://patch.com/georgia/atlanta/code-orange-alert-what-know-air-quality-ga (Atlanta, 6/8/2023)
- https://www.walb.com/2023/06/08/canadian-wildfire-smoke-arrives-south-ga-effects-are-minimal/ (Albany/South Georgia, 6/8/2023)

[6] https://airgeorgia.org/
[7] https://epd.georgia.gov/air-protection-branch/open-burning-rules-georgia
[8] https://fire.airnow.gov/
[9] https://www.airnow.gov/wildfires/when-smoke-is-in-the-air/
[10] https://www.airnow.gov/sites/default/files/2020-10/prepare-for-fire-season.pdf
[11] https://www.epa.gov/air-research/smoke-ready-toolbox-wildfires

- https://abcnews.go.com/US/canadian-wildfire-dangers-prompt-proactive-mitigation-government-experts/story?id=100478859 (Predicts plume will migrate to Georgia, 7/1/2023)
- https://www.11alive.com/article/weather/stormtracker/wildfire-smoke-north-georgia/85-b4670fee-4608-4f99-9904-bbdbcf924375 (North Georgia, 7/17/2023)
- https://foxchattanooga.com/weather/stormtrack-9-blog/canadian-wildfire-smoke-impacts-tennessee-georgia-air-quality-once-again (Chattanooga, 7/17/2023)
- https://www.nytimes.com/2023/07/18/us/smoke-wildfires-nc-georgia.html (Georgia, 7/18/2023)
- https://www.fox5atlanta.com/news/code-orange-alert-metro-atlanta-canadian-wildfire-smoke (Georgia, 7/18/2023)
- https://www.atlantanewsfirst.com/2023/07/18/canadian-wildfires-bring-poor-air-quality-north-georgia/ (Metro Atlanta/North Georgia, 7/18/2023)
- https://www.cnn.com/2023/07/17/weather/canada-wildfires-shatter-burning-records/index.html (North Georgia, 7/18/2023)
- https://www.iqair.com/us/newsroom/atlanta-air-quality-alert (Atlanta 7/18/2023)
- https://www.houstonchronicle.com/news/houston-texas/environment/article/houston-pollution-canadian-wildfire-saharan-dust-18206844.php (Atlanta/Georgia, 7/18/2023)
- https://www.wsfa.com/2023/07/18/details-behind-canadian-wildfire-smoke-alabamas-sky/ (Montgomery/Alabama, 7/18/2023)
- https://news.gatech.edu/news/2023/07/19/canadian-wildfire-smoke-affects-atlanta-2 (Atlanta, 7/19/2023)
- https://www.gpb.org/news/2023/07/26/macon-had-georgias-worst-air-quality-last-week-thanks-canadian-wildfires-heat-dome (Macon, 7/26/2023)
- https://www.savannahnow.com/story/weather/2023/10/03/savannah-ga-air-quality-canadian-wildfire-smoke-moves-down-u-s-coast/71045920007/ (Savannah, 10/3/2023)
- https://www.gpb.org/news/2023/10/04/have-you-noticed-haze-in-the-air-heres-why-georgia-dealing-smoke (South/Middle Georgia, 10/4/2023)

Examples from 2025 include:

- https://www.foxweather.com/extreme-weather/fires-smoke-air-quality-alert (Atlanta / Middle Georgia, 6/2/2025)
- https://www.augustachronicle.com/story/news/2025/06/02/georgia-skies-hazy-from-canada-wildfires-sunday-monday-what-we-know/83987691007/ (East Middle Georgia, 6/2/2025)
- https://www.wtoc.com/2025/06/02/smoke-canadian-wildfires-impact-air-quality-georgia-south-carolina/ (East Georgia, 6/2/2025)
- https://www.11alive.com/article/weather/weather-impact/wildfires-smoke-hazy-skies-south-georgia/85-f089dc4f-f2ca-4434-bb94-7294847e6544 (Atlanta / Middle Georgia, 6/3/2025)
- https://www.reuters.com/sustainability/climate-energy/canadian-wildfire-smoke-spreads-across-third-us-2025-06-04/ (Georgia, 6/4/2025)

4. Clear Causal Relationship and Supporting Analyses

This section addresses the EER requirements at 40 CFR 50.14(c)(3)(iv)(B) by showing that the events affected air quality in such a way that there exists a clear, causal relationship between the specific events and the monitored exceedance, and at 40 CFR 50.14(c)(3)(iv)(C) by providing analyses comparing the claimed event-influenced concentrations to concentrations at the same monitoring site at other times. The *Guidance on the Preparation of Exceptional Events Demonstrations for Wildfire Events that May Influence Ozone Concentrations* and *$PM_{2.5}$ Wildland Fire Exceptional Events Tiering Document* outlines the expected components of a clear causal relationship portion of a demonstration. These include evidence that emissions from wildfires were transported to the site, evidence that wildfire emissions affected the monitor, and a comparison of the event-related concentration to historical concentrations.

Figures B1-B5 (Appendix B) show smoke from the NOAA Hazard Mapping System (HMS), plotted via the AirNow Navigator[12]. Active fires and smoke are shown for the day the event was registered as well as up to three days beforehand. During the exceptional events, smoke pervaded the air throughout much of the eastern half of the United States, if not the entire country.

The historical data analysis section of this demonstration focuses on 2021-2025 $PM_{2.5}$ FRM data at the Forest Park site. Table 3 contains a comparison of exceptional event concentrations to historic 2021-2025 concentrations for the site. Generally, the exceptional event concentrations are 40-60% higher than the 5-year annual average, quarterly average, and monthly average, and in one case double or more than double.

Table 3. Comparison of exceptional event concentrations to historic 2021-2025 concentrations at the Forest Park site.

EE Date	EE Concentration ($\mu g/m^3$)	5-Year Annual Average ($\mu g/m^3$)	5-Year Quarterly Average ($\mu g/m^3$)	5-Year Monthly Average ($\mu g/m^3$)	Ratio EE to 5-Year Annual Average	Ratio EE to 5-Year Quarterly Average	Ratio EE to 5-Year Monthly Average
06/05/23	14.9	9.0	9.46	10.50	1.6	1.6	1.4
06/11/23	14.9	9.0	9.46	10.50	1.6	1.6	1.4
06/17/23	14.6	9.0	9.46	10.50	1.6	1.5	1.4
07/29/23	13.8	9.0	9.22	9.79	1.5	1.5	1.4
06/03/25	21.3	9.0	9.46	10.50	2.4	2.3	2.0

Figure 1 plots the 24-hour $PM_{2.5}$ concentrations for 2021-2025. Exceedances caused by wildfires are delineated by marker shape and color. One of the selected exceptional events is above the Tier 2 threshold of 15.7 $\mu g/m^3$, and the remaining four fall just below the Tier 2 threshold placing them within the Tier 3 range. Tier 2 events are greater than or equal to a threshold of the minimum annual 98th percentile for 24-hour $PM_{2.5}$ data over the previous 5-years, but less than 1.5 times this threshold, per the EPA's Tiering Tool. Tier 3 events fall below the Tier 2 threshold.

[12] https://airnowtech.org/navigator/

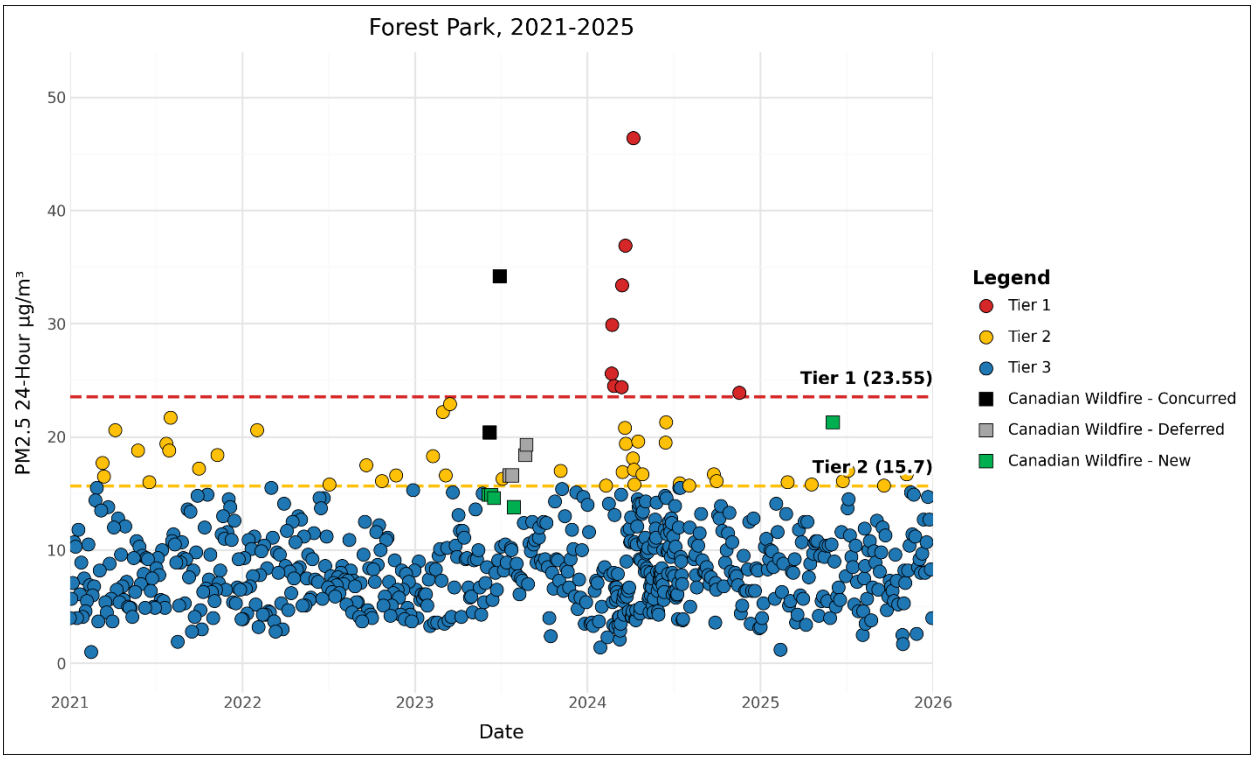


Figure 1. 24-hour $PM_{2.5}$ concentrations for 2021-2025 observed at the Forest Park site. Days not submitted for exceptional events are demarcated by color with Tier 1 in red, Tier 2 in yellow, and Tier 3 in blue. Canadian wildfires (squares) are additionally differentiated by color according to their status (Table 1).

Maps from the AirNow Navigator are provided in Appendix C for each exceedance event in Table 3. The maps include NOAA HMS satellite detected fires, HMS smoke plumes, 24-hour rolling average $PM_{2.5}$ concentrations (including the time shown in the figure panel and the 23 hours following it) across the United States, and HYSPLIT back-trajectories. These trajectories originate at the Forest Park site's geographic location and extend 72 hours back in time. Three different starting times were modeled with HYSPLIT for each day: (1) midnight at the start of the exceedance day, (2) noon of the exceedance day, and (3) midnight at the end of the exceedance day. Each trajectory starts at a different elevation above ground level (100 m, 1500 m, and 3000 m). The 1500 m and 3000 m tails are used to estimate the trajectories of smoke transported over a long range. The 100 m tail, nearer to the surface, is used to show local transport. Additionally, these values are chosen to estimate vertical transport near-surface and up to several hundred meters above the planetary boundary layer. Figures in Appendix D are provided to show ground level, daily $PM_{2.5}$ concentrations, and air quality indices (AQIs) in the southeast of the United States. Figures in Appendix E show hourly $PM_{2.5}$ time series for both the event day and the day before. Since the Forest Park site does not measure hourly $PM_{2.5}$, the figures contain hourly $PM_{2.5}$ time series for the nearby South DeKalb site which measured very similar 24-hour $PM_{2.5}$ concentrations on all new exceptional event days included in this demonstration. Figures in Appendix F show upper air maps from the Storm Prediction Center[13]

[13] https://www.spc.noaa.gov/obswx/maps/

for the event day and three days prior. Maps are displayed at pressures of either 850 millibar (mb), equivalent to 1170-1590 m above mean sea level (MSL), or 700 mb, equivalent to 2350-3150 m MSL[14], at 00 Coordinated Universal Time (UTC) and 12 UTC for each day. These pressure values are chosen to correspond with the 1500-m and 3000-m heights of the HYSPLIT trajectories. A specific pressure value is determined on a case-by-case basis depending on how clearly the corresponding upper air maps explain the sequence of events that led to the relevant exceedance.

June 5, 2023

Fires in Canada had been on-going for months at the time the exceedance was measured, and their emissions were likely mixed throughout the air column. From Figure E1, $PM_{2.5}$ concentrations were elevated above the 9.0 $\mu g/m^3$ standard throughout the event day and the day prior. Shown in Figure C1, back-trajectories indicate that the smoke plume traveled from the northeast of the continent. The plume detected by the monitor is a mixture of emissions from fires in Quebec. The back-trajectories converge spatially approximately 24 hours before descending to near-surface level where observed, daily $PM_{2.5}$ concentrations increased to 14.9 $\mu g/m^3$. Figure D1 shows that this enhancement occurred synchronously with elevated concentrations reported by monitors across the southeast, which follows from the large blanket of smoke over this region (Figure B1).

June 11, 2023

Fires in Canada had been on-going for months at the time the exceedance was measured, and their emissions were likely mixed throughout the air column. From Figure E2, $PM_{2.5}$ concentrations were elevated above the 9.0 $\mu g/m^3$ standard throughout the event day and the day prior. Shown in Figure C2, back-trajectories indicate that the smoke plume traveled through the Midwest of the United States. As a result, the plume detected by the monitor is a mixture of emissions from fires in British Columbia, Ontario, and Quebec. The back-trajectories converge spatially approximately 12 hours before descending to near-surface level where observed, daily $PM_{2.5}$ concentrations increased to 14.9 $\mu g/m^3$. Figure D2 shows that this enhancement occurred synchronously with elevated concentrations reported by monitors across the southeast, which follows from the large blanket of smoke over this region (Figure B2).

June 17, 2023

Fires in Canada had been on-going for months at the time the exceedance was measured, and their emissions were likely mixed throughout the air column. From Figure E3, $PM_{2.5}$ concentrations were elevated above the 9.0 $\mu g/m^3$ standard throughout the event day and from 04:00 AM – 10:00 AM EST and after 04:00 PM EST on the day prior. Shown in Figure C3, back-trajectories indicate that the smoke plume traveled through the Midwest of the United States. As a result, the plume detected by the monitor is a mixture of emissions from fires in British Columbia, Ontario, and Quebec. The back-trajectories converge spatially approximately 12 hours before descending to near-surface level where observed, daily $PM_{2.5}$ concentrations increased to 14.6 $\mu g/m^3$. Figure D3 shows that this enhancement occurred synchronously with elevated concentrations reported by monitors across the southeast, which follows from the large blanket of smoke over this region (Figure B3).

[14] https://www.noaa.gov/jetstream/upper-air-charts

July 29, 2023

Fires in Canada had been on-going for months at the time the exceedance was measured, and their emissions were likely mixed throughout the air column. Wildfires were active mostly in western Canada at this time. From Figure E4, $PM_{2.5}$ concentrations were elevated above the 9.0 $\mu g/m^3$ standard throughout the event day and the day prior. Shown in Figure C4, the back-trajectories indicate that a synoptic-scale, clockwise vortex circulated wildfire smoke over the south of the United States, primarily impacting monitors in the south and the southeast. This is corroborated by the wind barbs in Figures F1-F4 (spanning a period of July 26-29), which show an eastward advection of air masses from northwest Canada to the east coast of the U.S., and that this vortex formed more than 3 days ahead of the exceedance. As a result, the plume detected by the monitor is a mixture of emissions from fires in the provinces of the Northwest Territories, British Columbia, Alberta, and Saskatchewan. The observed, daily $PM_{2.5}$ concentration increased to 13.8 $\mu g/m^3$. Figure D4 shows that this enhancement occurred synchronously with elevated concentrations reported by monitors across Alabama, Tennessee, and north Georgia, which follows from the large blanket of smoke over this region (Figure B4).

June 3, 2025

Fires in Canada had been on-going for a month at the time the exceedance was measured, and their emissions were likely mixed throughout the air column. From Figure E5, $PM_{2.5}$ concentrations were elevated above the 9.0 $\mu g/m^3$ standard throughout the event day and the day prior. Shown in Figure C5, back-trajectories indicate that the smoke plume traveled from the northwest of the continent through the Midwest of the United States. The plume detected by the monitor is a mixture of emissions from fires in Saskatchewan and the Northwest Territories. The back-trajectories converge spatially approximately 6 hours before descending to near-surface level where observed, daily $PM_{2.5}$ concentrations increased to 21.3 $\mu g/m^3$. Figure D5 shows that this enhancement occurred synchronously with elevated concentrations reported by monitors across the southeast, which follows from the large blanket of smoke over this region (Figure B5).

The comparisons and analyses provided in this demonstration support Georgia EPD's position that the fire event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance for the dates described in Table 1 and thus satisfies the clear causal relationship criterion.

5. Not reasonably Controllable or Preventable

This section satisfies the EER requirements at 40 CFR 50.14(c)(3)(iv)(A), CFR 50.1(j), 40 CFR 50.14(c)(3)(iv)(D), and 40 CFR 50.14(b)(4): The event was caused by a natural event; an exceptional event is one that is not reasonably controllable or preventable. Stated in section 40 CFR 50.14 (a)(8)(vii), 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.

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

This section satisfies the EER requirement at 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. The definition of wildfire in the EER is: "…any fire started by an unplanned ignition caused by lightning; accidental, human causes actions, or a prescribed fire that has developed into a wildfire. A wildfire that predominately occurs on wildland is a natural event." As stated in sections 2 and 4, the origin and evolution of the wildfires described in this demonstration occurred in Canada.

Based on the documentation provided in Sections 2 and 4 of this demonstration, these events qualify as natural events as they spread uncontrolled through remote, natural (i.e., non-agricultural or silvicultural) lands. The National Aeronautics and Space Administration and the Canadian Interagency Forest Fire Centre noted that many of the 2023 and 2025 Canadian fires were ignited by summer lightning storms and largely burned in deeply wooded areas[15,16]. EPA generally considers the emissions of $PM_{2.5}$ from wildfires to meet the regulatory definition of a natural event, defined as one "in which human activity plays little or no direct causal role" (40 CFR 50.1(k)). As Georgia EPD has shown that the demonstrated exceedances resulted from natural events, they should be considered for treatment as exceptional events.

7. Public Comment Period

Georgia EPD held a public comment period beginning September 4, 2026, to receive public input regarding the Exceptional Event Demonstration. Notification of the public comment period was posted on the Georgia EPD website and emailed to interested stakeholders. Public comments received are included in Appendix G of this demonstration, along with Georgia EPD's responses to these comments in Appendix H.

[15] https://earthobservatory.nasa.gov/images/151985/tracking-canadas-extreme-2023-fire-season
[16] https://ciffc.net/situation/2025-08-03

Appendix A: Active Wildfires in Canada

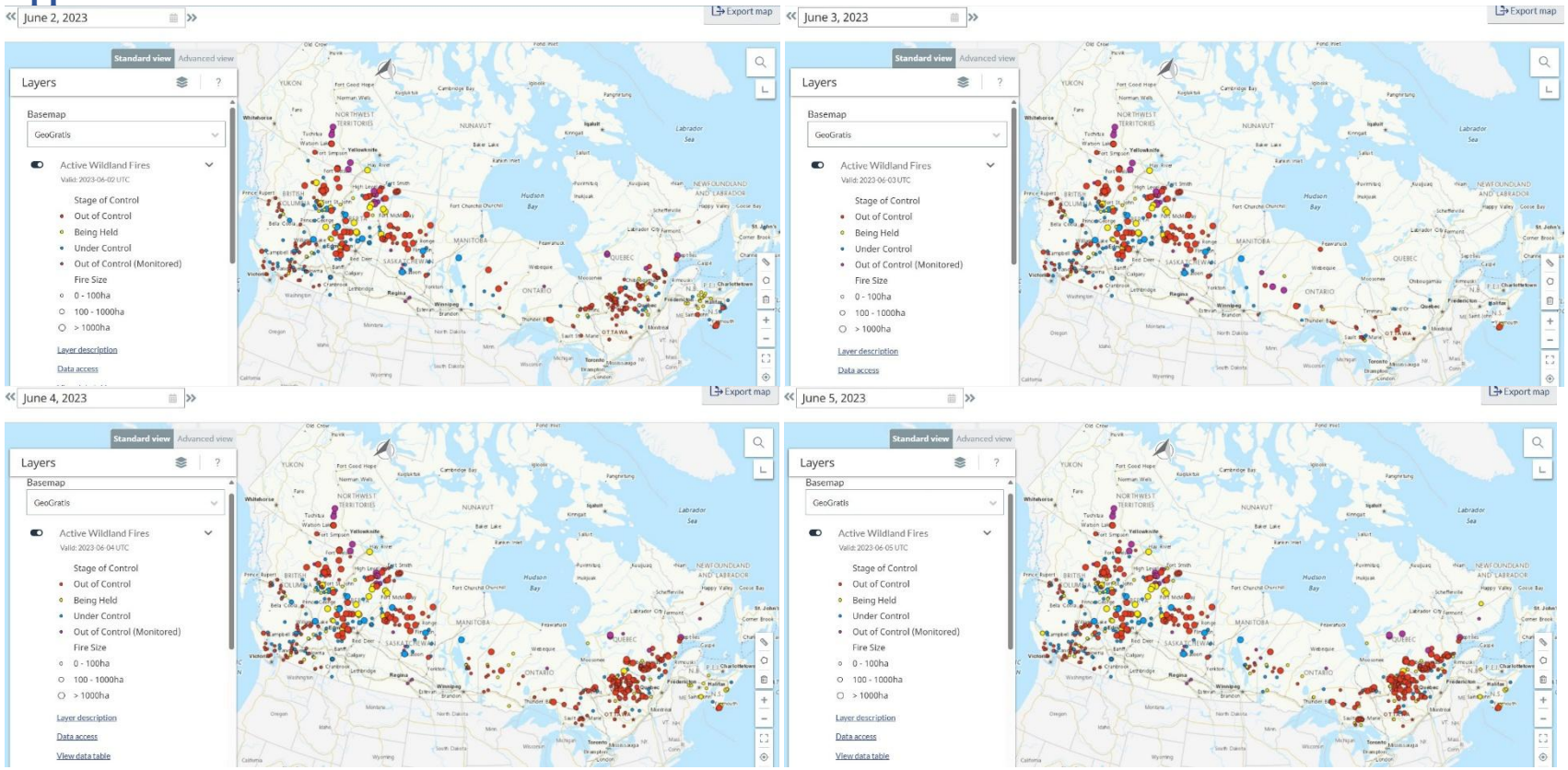


Figure A1. Active wildfires in Canada on June 2-5, 2023.

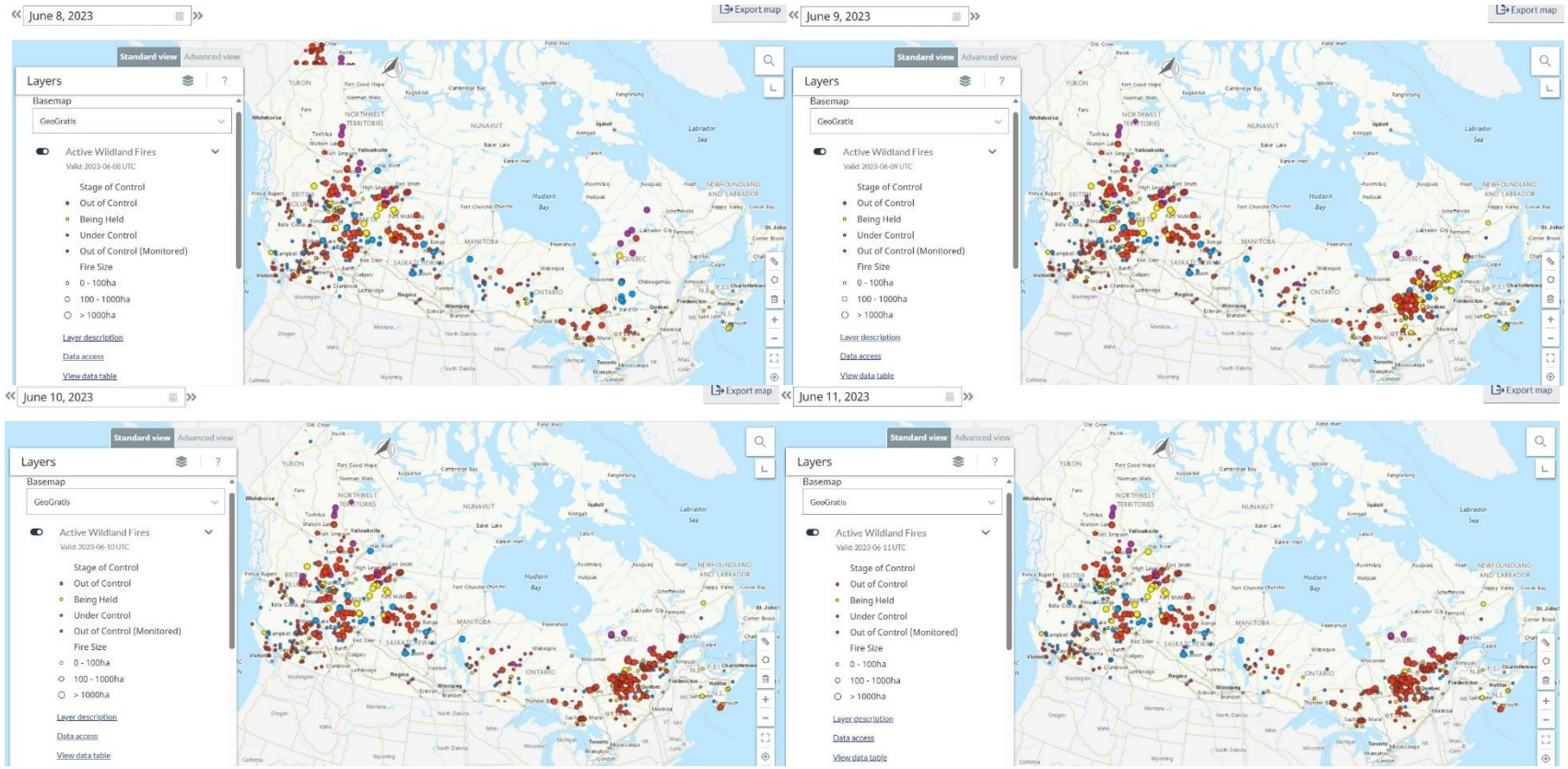


Figure A2. Active wildfires in Canada on June 8-11, 2023.

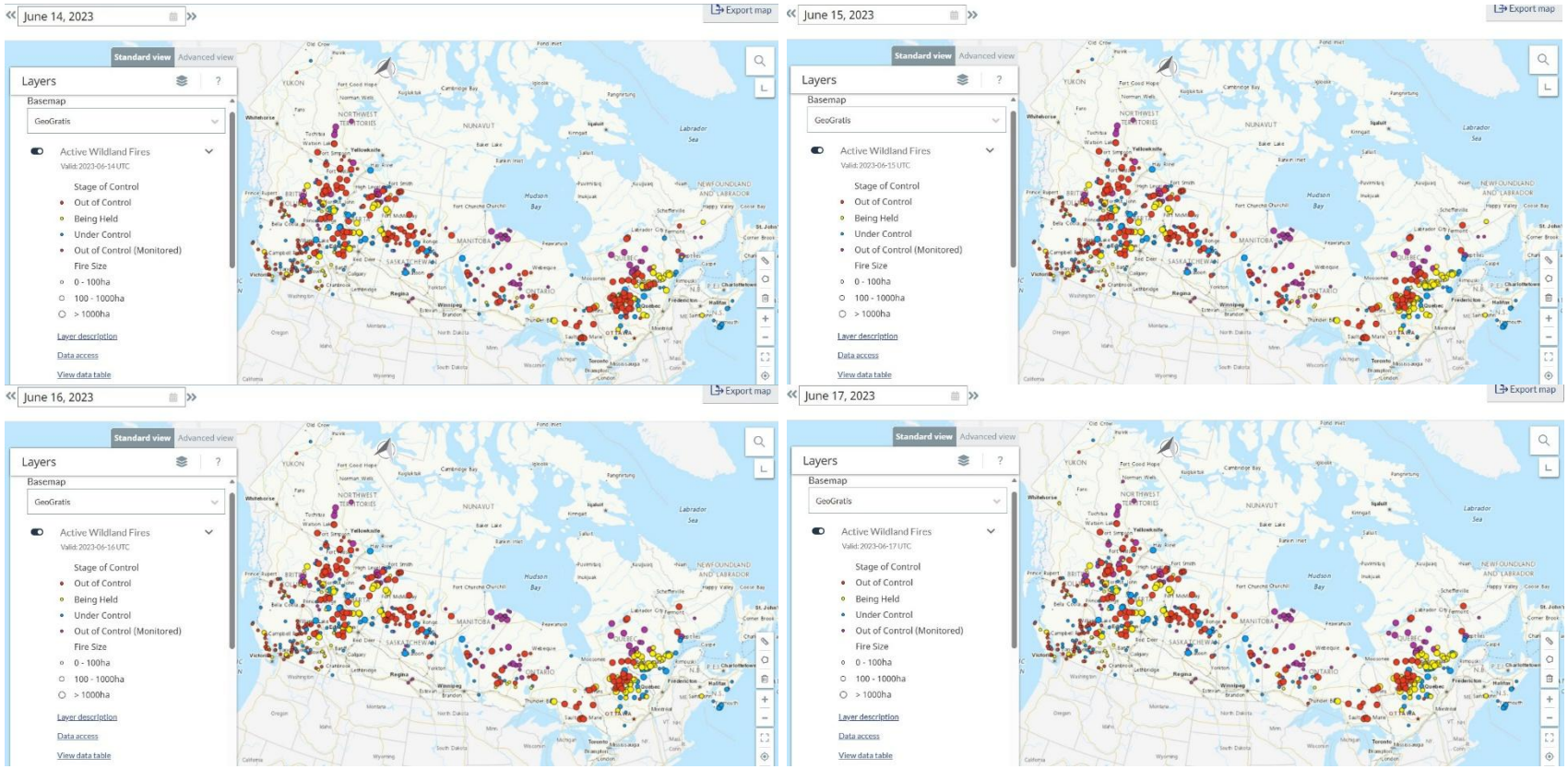


Figure A3. Active wildfires in Canada on June 14-17, 2023.

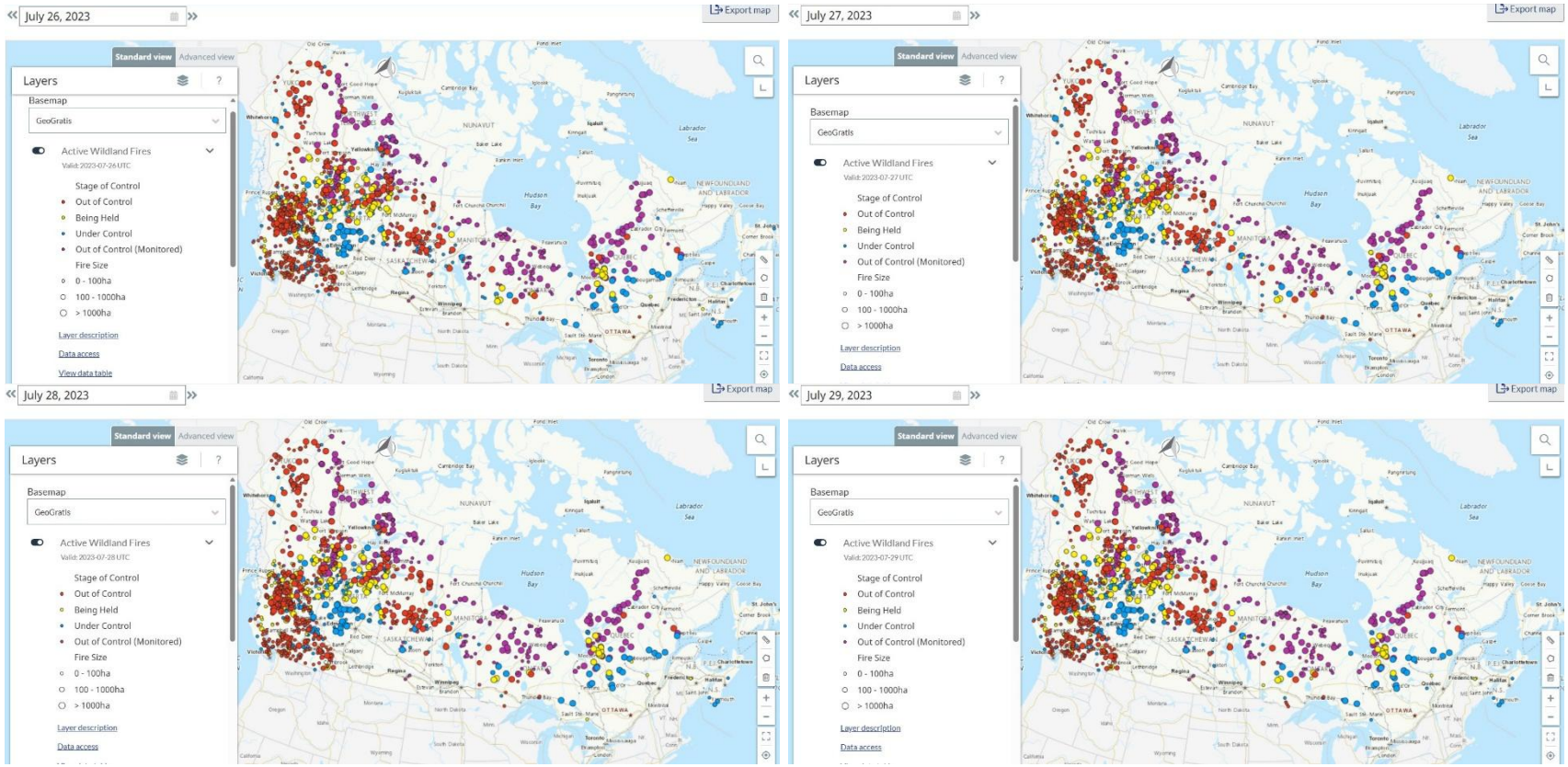


Figure A4. Active wildfires in Canada on July 26-29, 2023.

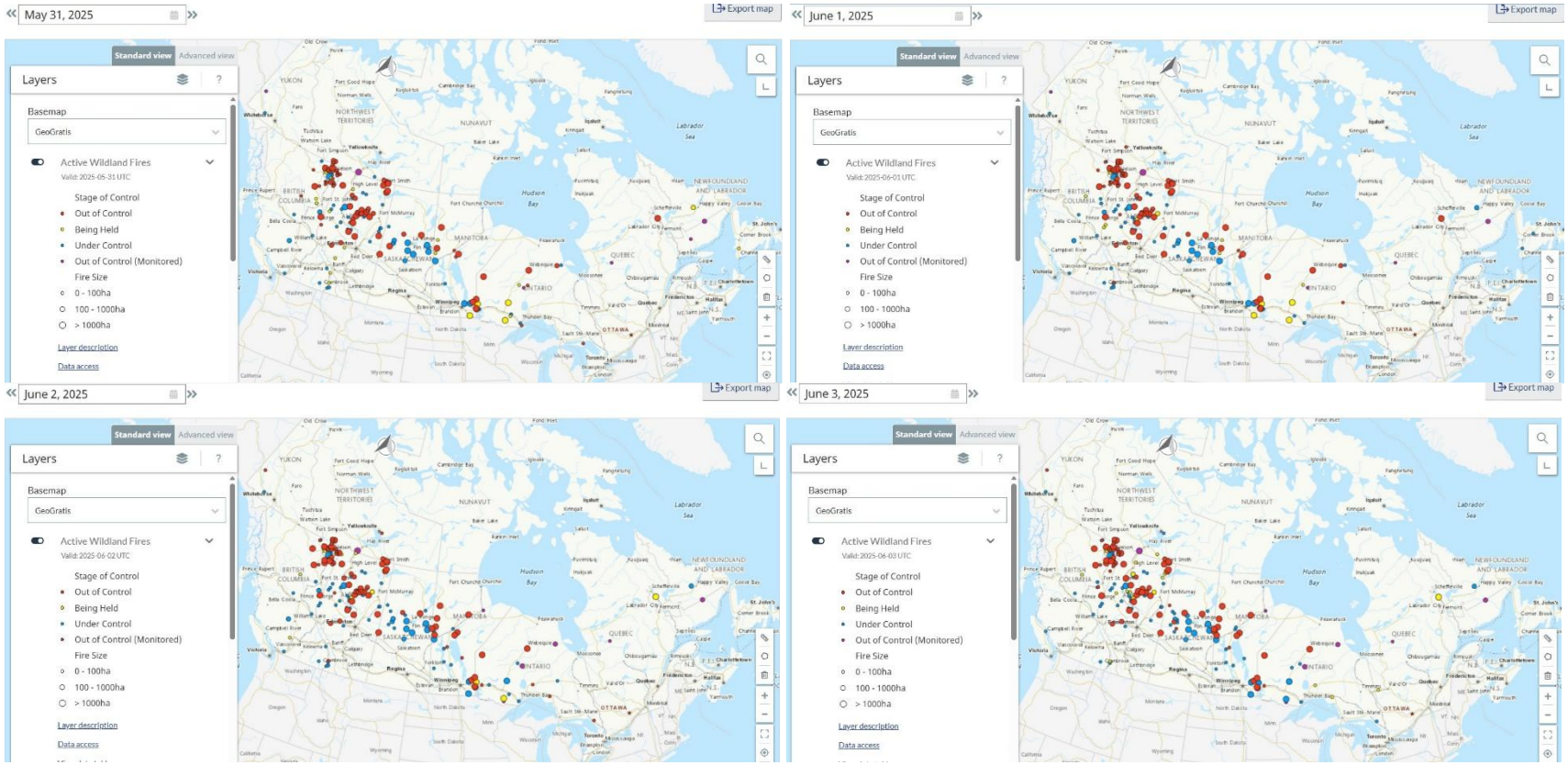


Figure A5. Active wildfires in Canada on May 31 - June 3, 2025.

Appendix B: HMS Smoke and Active Fires

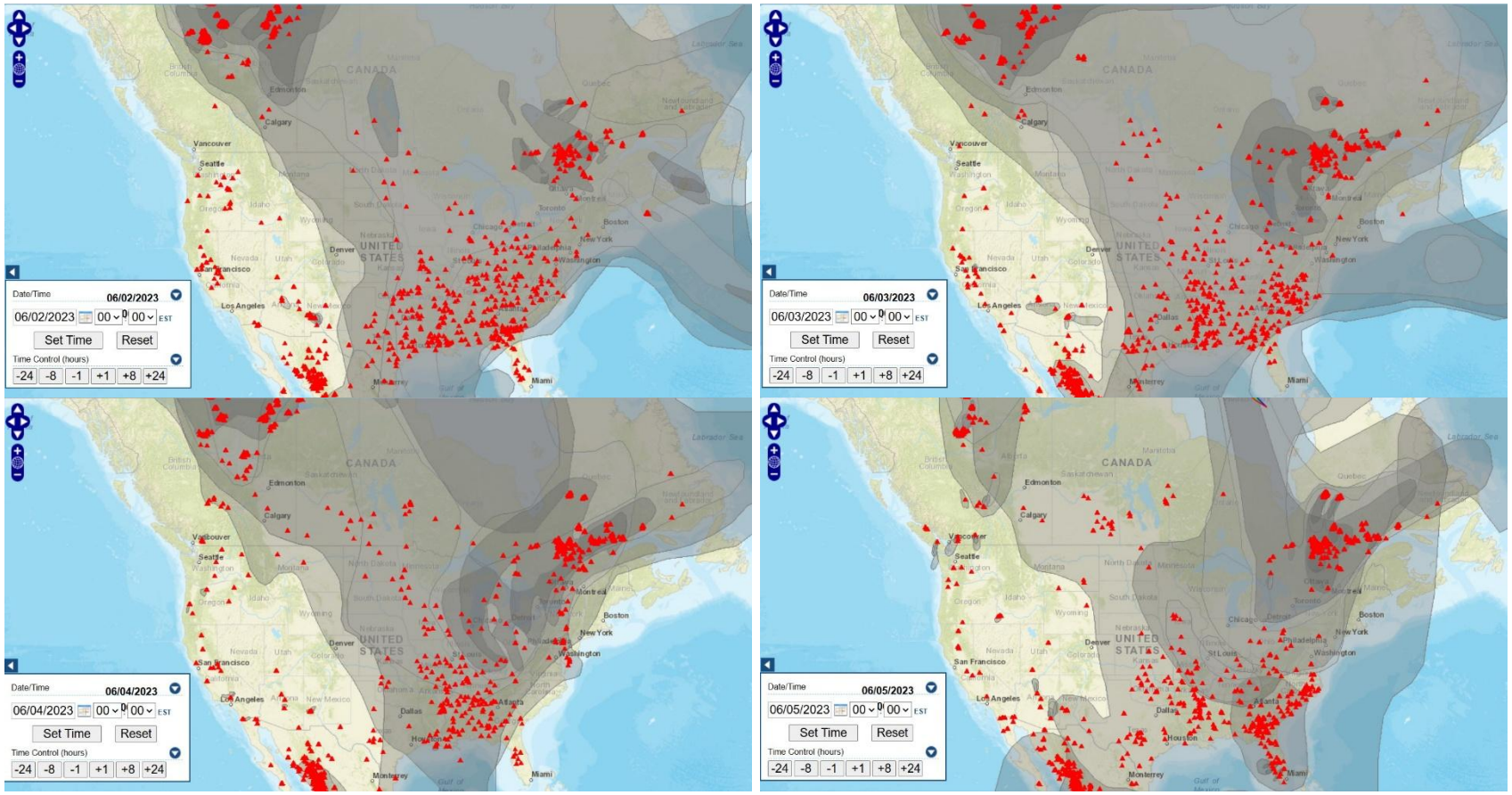


Figure B1. Map from the AirNow Navigator showing active fires (red) and smoke (grey) on June 2-5, 2023, plotted using the NOAA HMS over North America.

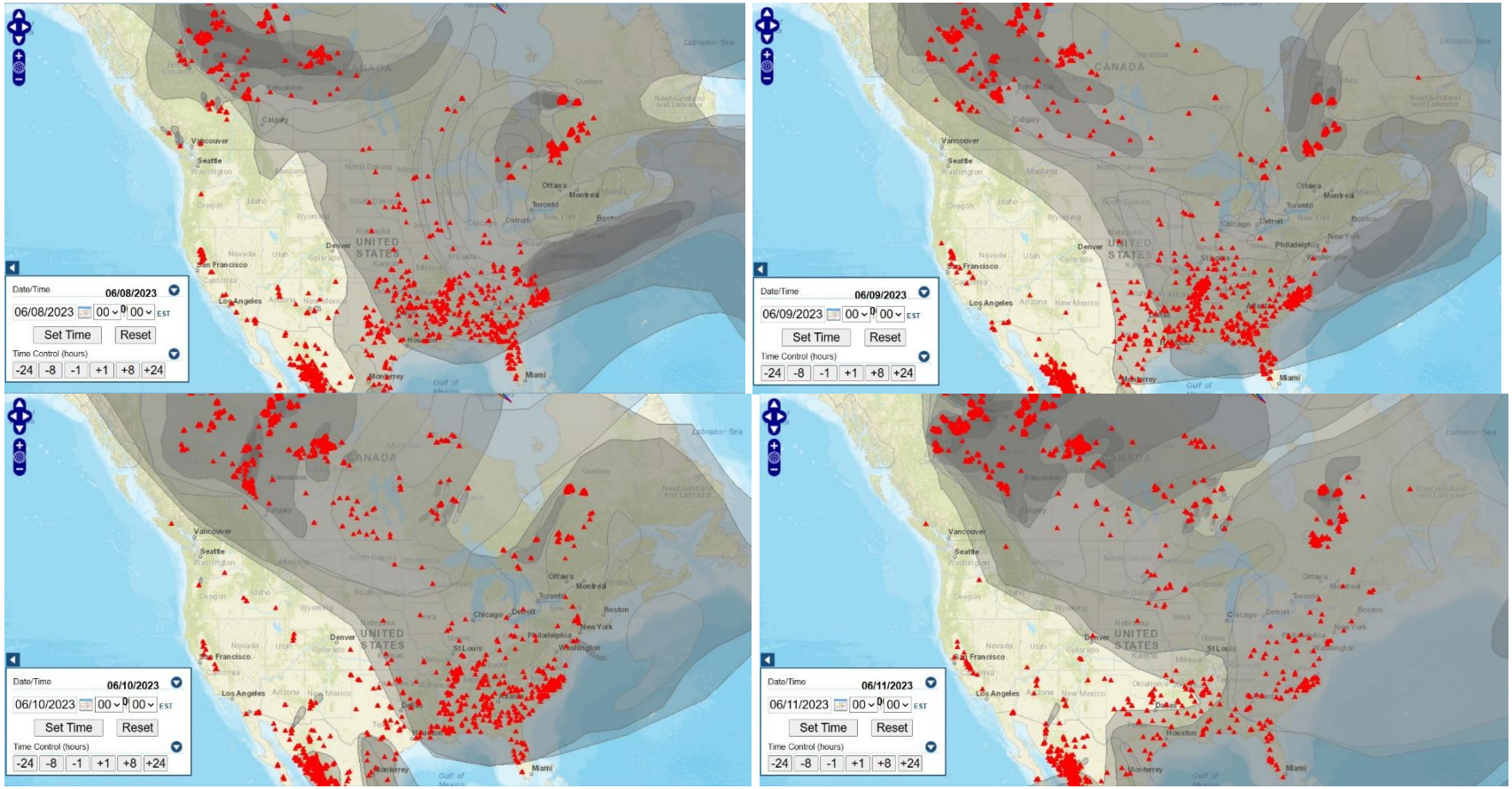


Figure B2. Map from the AirNow Navigator showing active fires (red) and smoke (grey) on June 8-11, 2023, plotted using the NOAA HMS over North America.

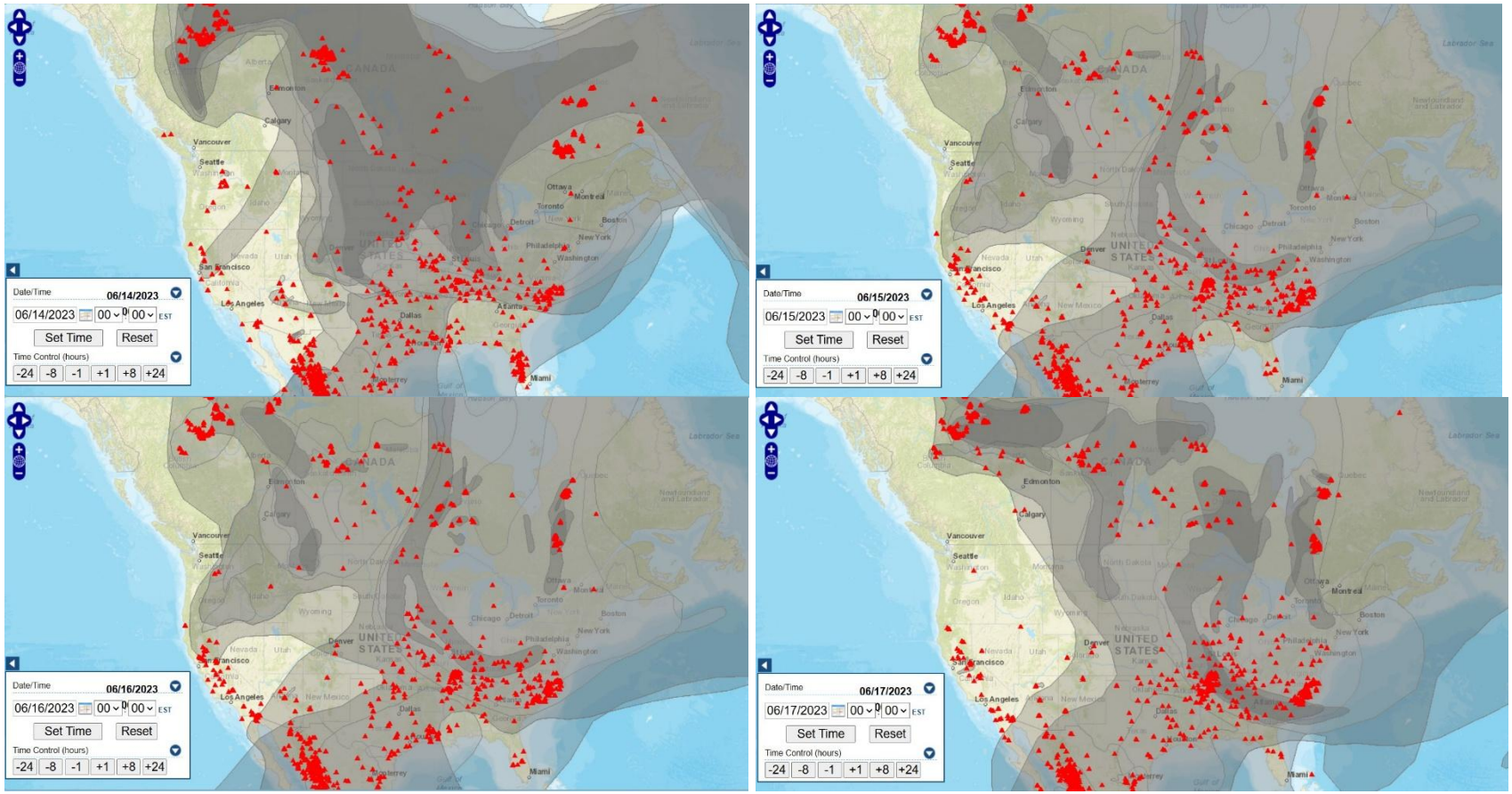


Figure B3. Map from the AirNow Navigator showing active fires (red) and smoke (grey) on June 14-17, 2023, plotted using the NOAA HMS over North America.

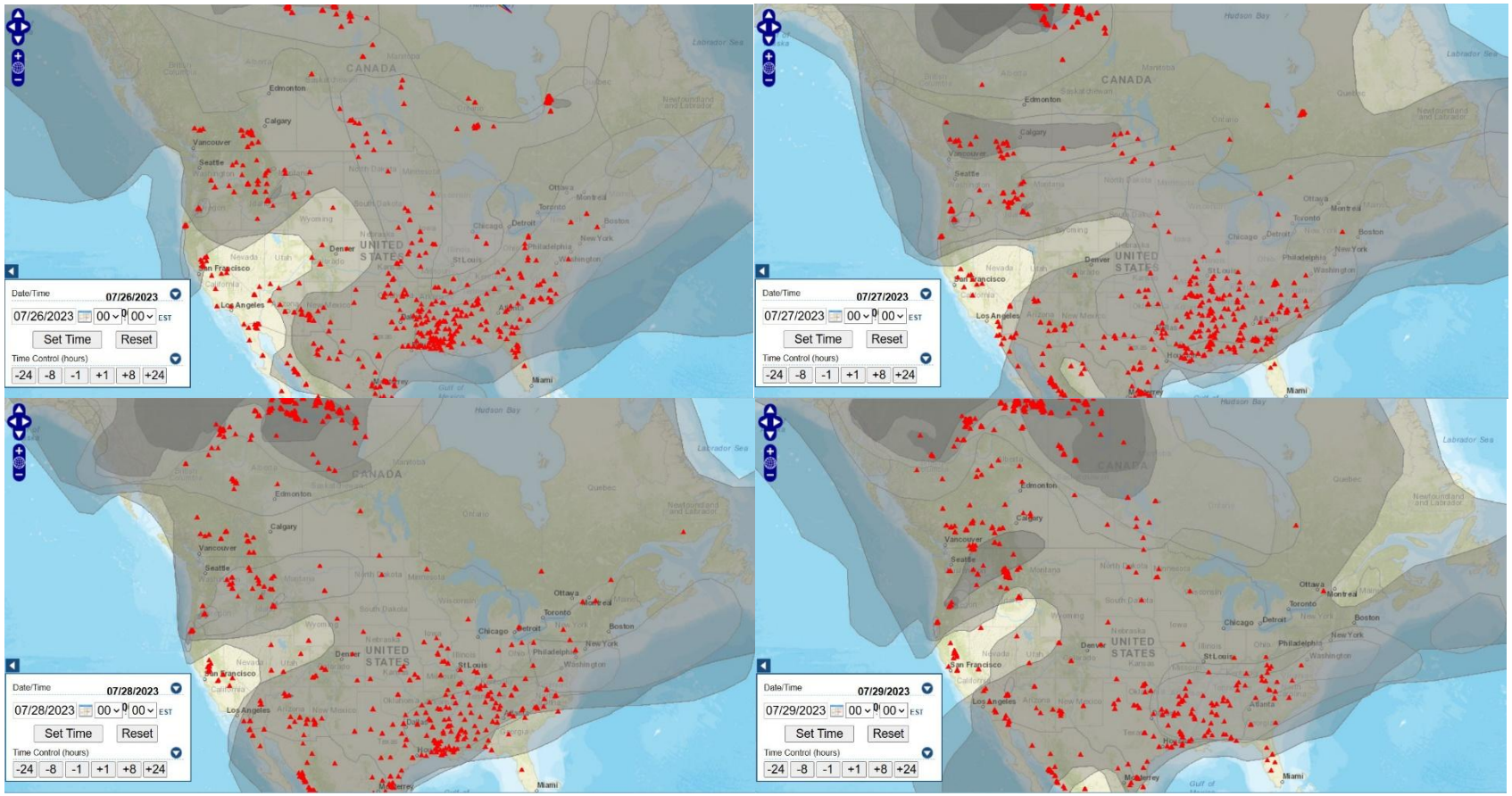


Figure B4. Map from the AirNow Navigator showing active fires (red) and smoke (grey) on July 26-29, 2023, plotted using the NOAA HMS over North America.

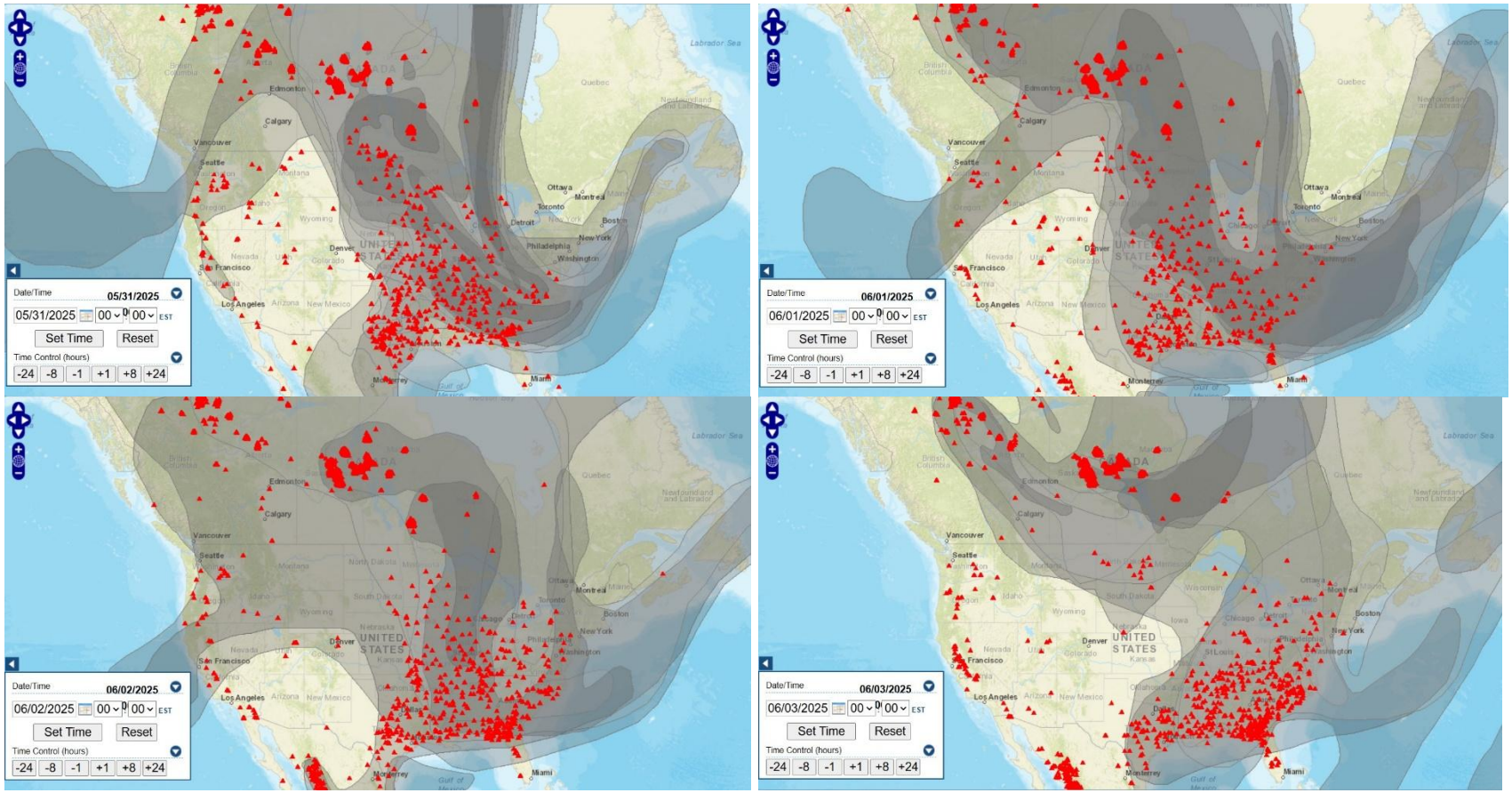


Figure B5. Map from the AirNow Navigator showing active fires (red) and smoke (grey) on May 31 - June 3, 2025, plotted using the NOAA HMS over North America.

Appendix C: HYSPLIT Back-Trajectory Maps

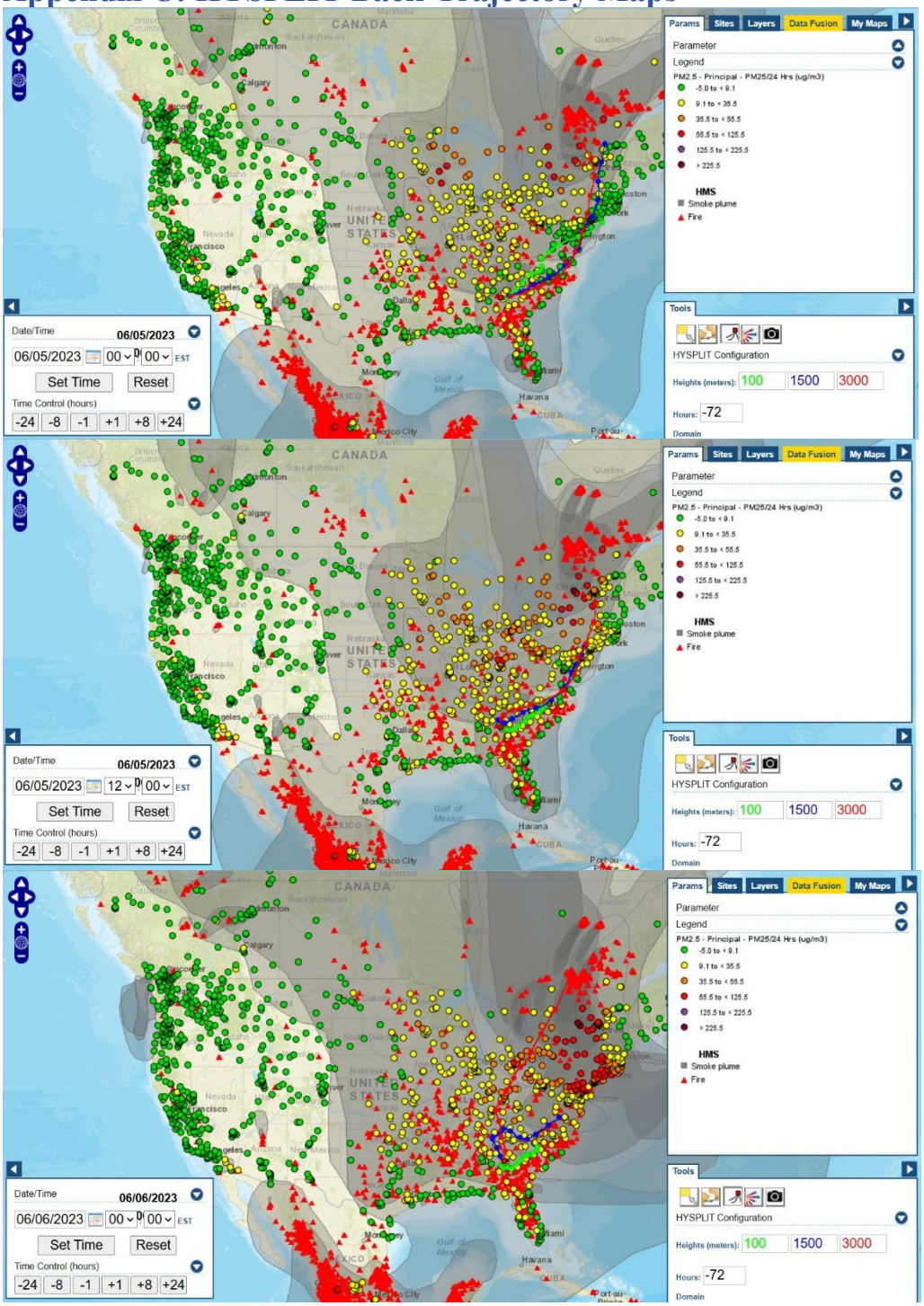


Figure C1. Map of HMS smoke plumes (grey polygons) and fires (red triangles), daily $PM_{2.5}$ concentrations (circles), and HYSPLIT back-trajectories of release heights at 100 m (green lines), 1500 m (blue lines), and 3000 m (red lines) for 0 AM EST on June 5, 2023 (top), 12 PM EST on June 5, 2023 (middle), and 0 AM EST on June 6, 2023 (bottom).

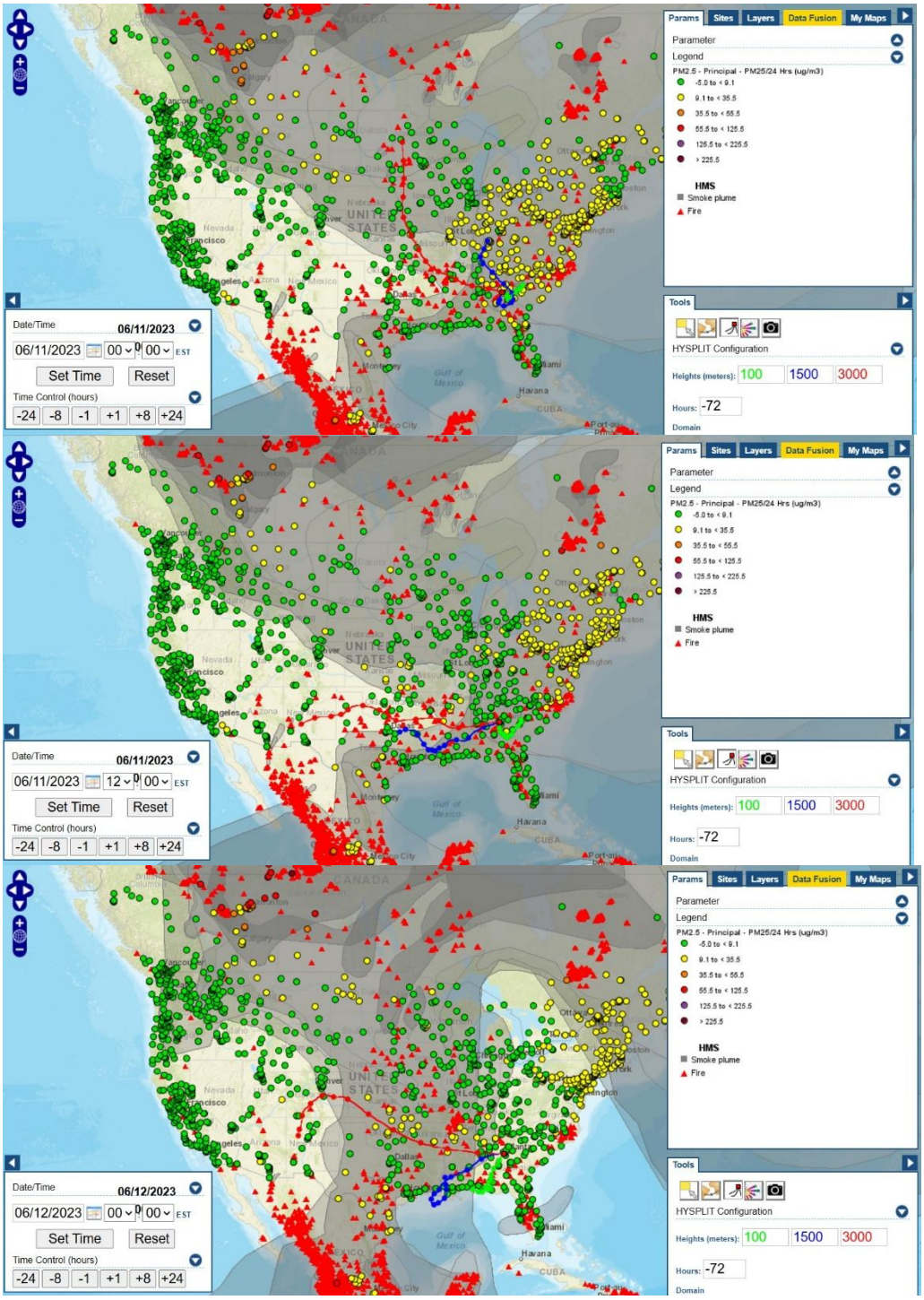


Figure C2. Map of HMS smoke plumes (grey polygons) and fires (red triangles), daily $PM_{2.5}$ concentrations (circles), and HYSPLIT back-trajectories of release heights at 100 m (green lines), 1500 m (blue lines), and 3000 m (red lines) for 0 AM EST on June 11, 2023 (top), 12 PM EST on June 11, 2023 (middle), and 0 AM EST on June 12, 2023 (bottom).

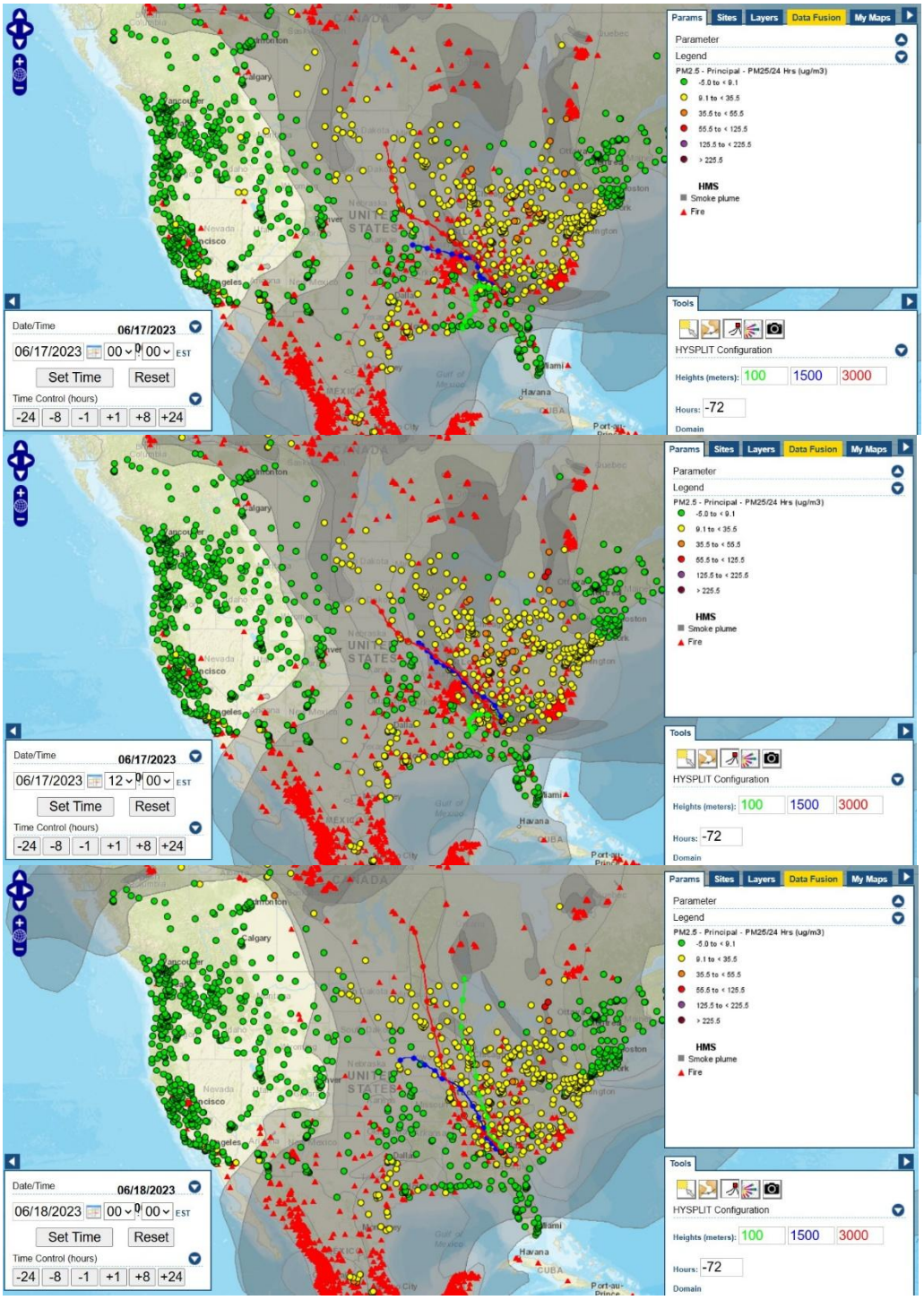


Figure C3. Map of HMS smoke plumes (grey polygons) and fires (red triangles), daily $PM_{2.5}$ concentrations (circles), and HYSPLIT back-trajectories of release heights at 100 m (green lines), 1500 m (blue lines), and 3000 m (red lines) for 0 AM EST on June 17, 2023 (top), 12 PM EST on June 17, 2023 (middle), and 0 AM EST on June 18, 2023 (bottom).

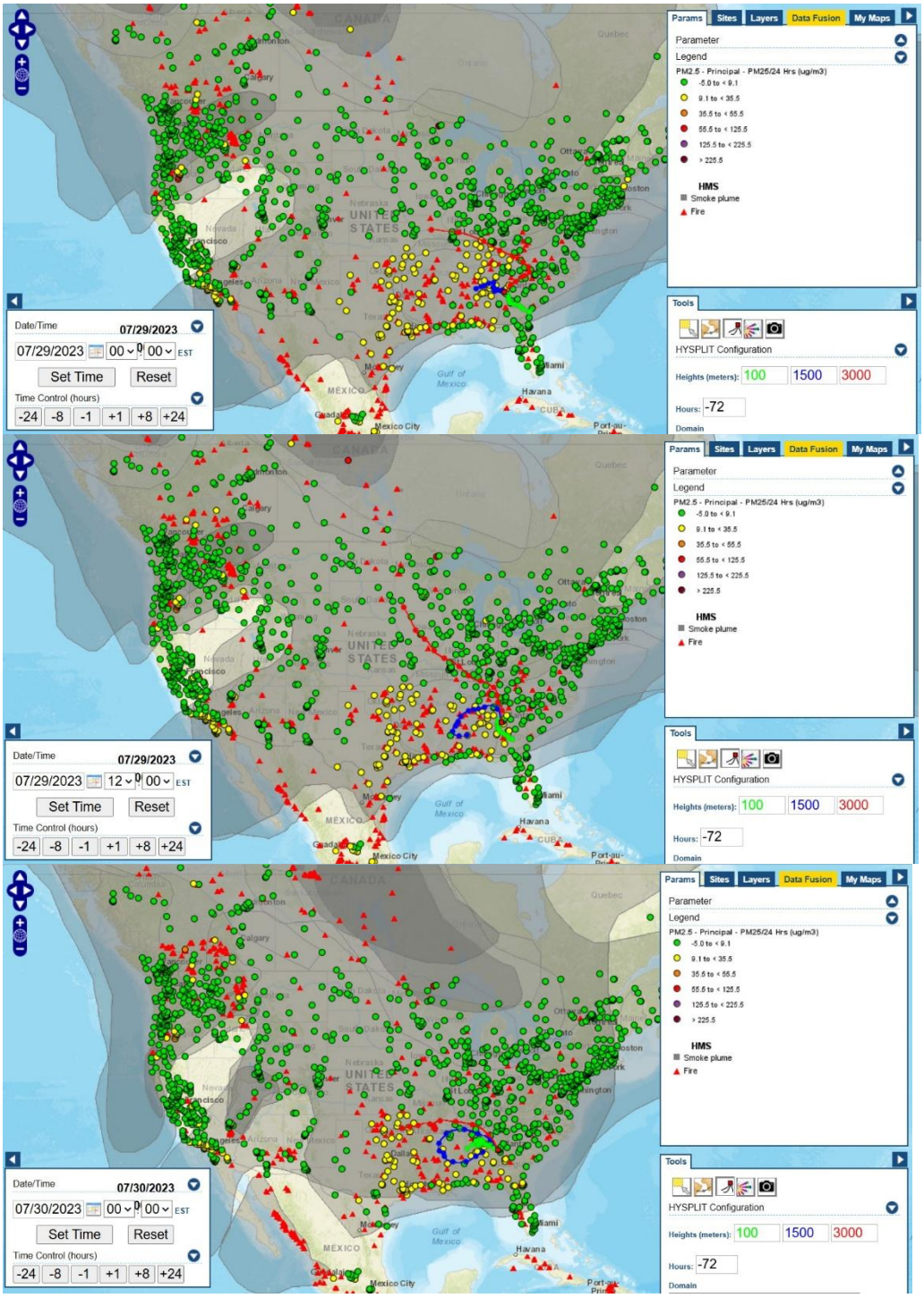


Figure C4. Map of HMS smoke plumes (grey polygons) and fires (red triangles), daily $PM_{2.5}$ concentrations (circles), and HYSPLIT back-trajectories of release heights at 100 m (green lines), 1500 m (blue lines), and 3000 m (red lines) for 0 AM EST on July 29, 2023 (top), 12 PM EST on July 29, 2023 (middle), and 0 AM EST on July 30, 2023 (bottom).

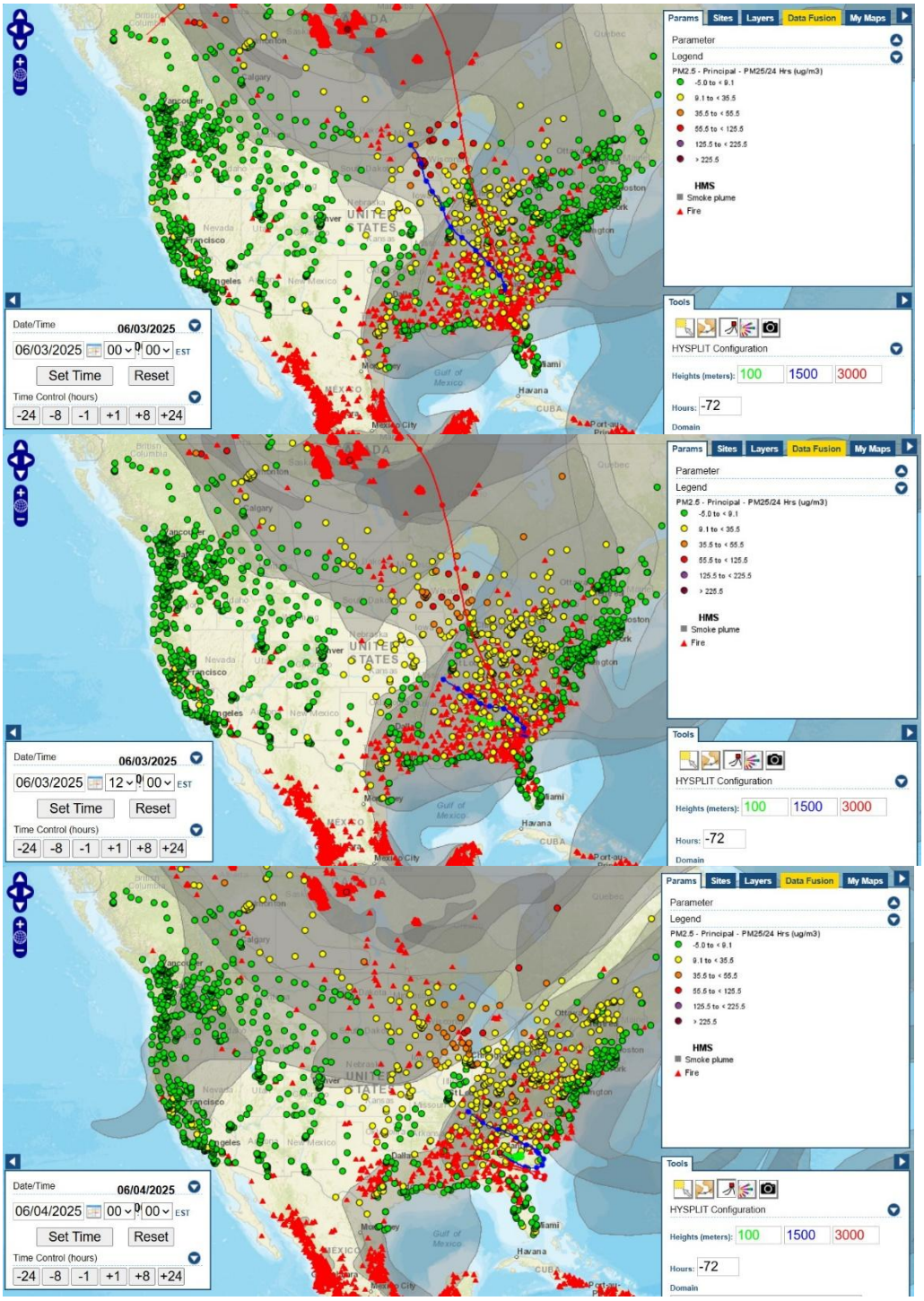
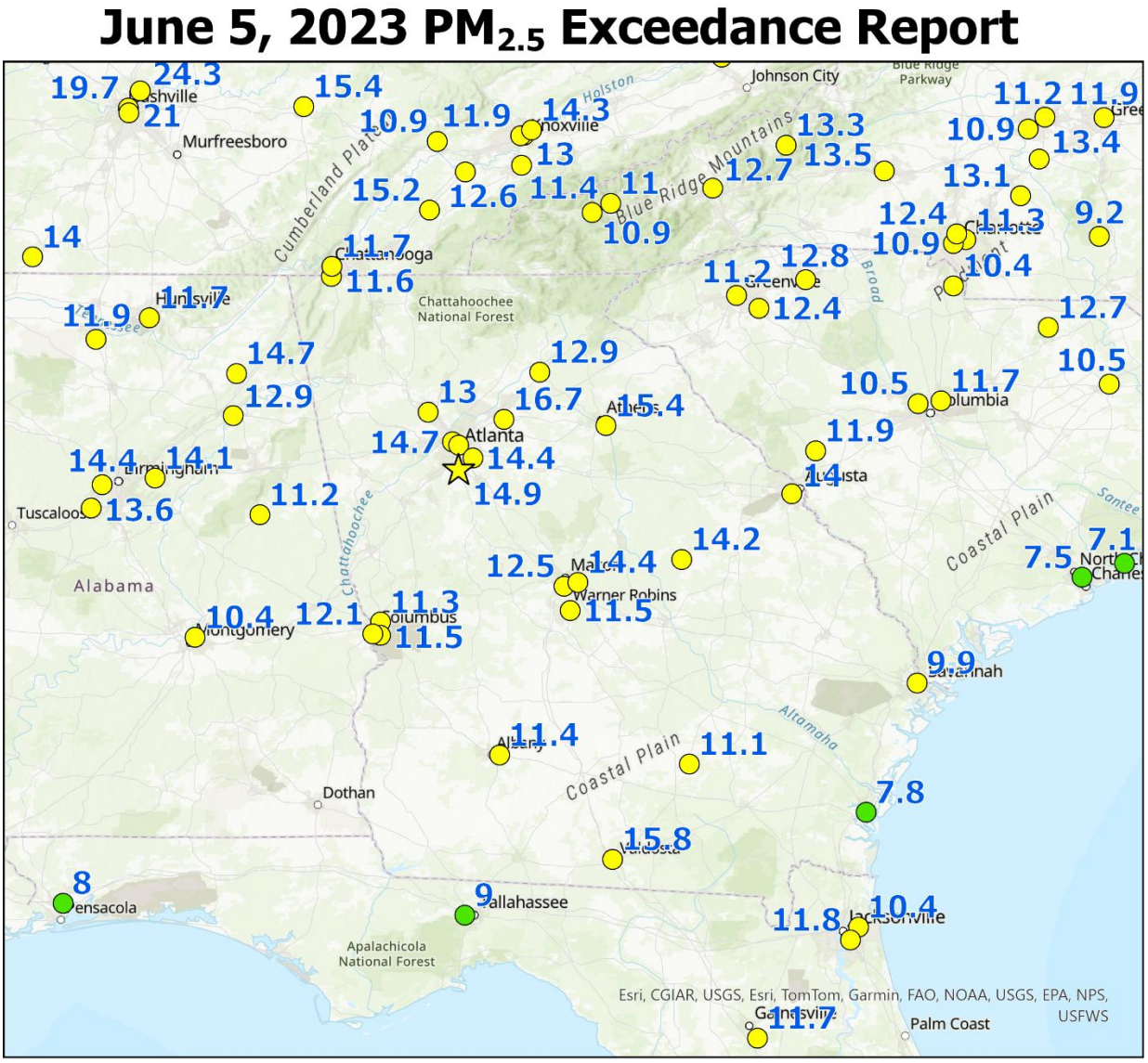


Figure C5. Map of HMS smoke plumes (grey polygons) and fires (red triangles), daily $PM_{2.5}$ concentrations (circles), and HYSPLIT back-trajectories of release heights at 100 m (green lines), 1500 m (blue lines), and 3000 m (red lines) for 0 AM EST on June 3, 2025 (top), 12 PM EST on June 3, 2025 (middle), and 0 AM EST on June 4, 2025 (bottom).

Appendix D: $PM_{2.5}$ Surface Concentrations in the Southeast



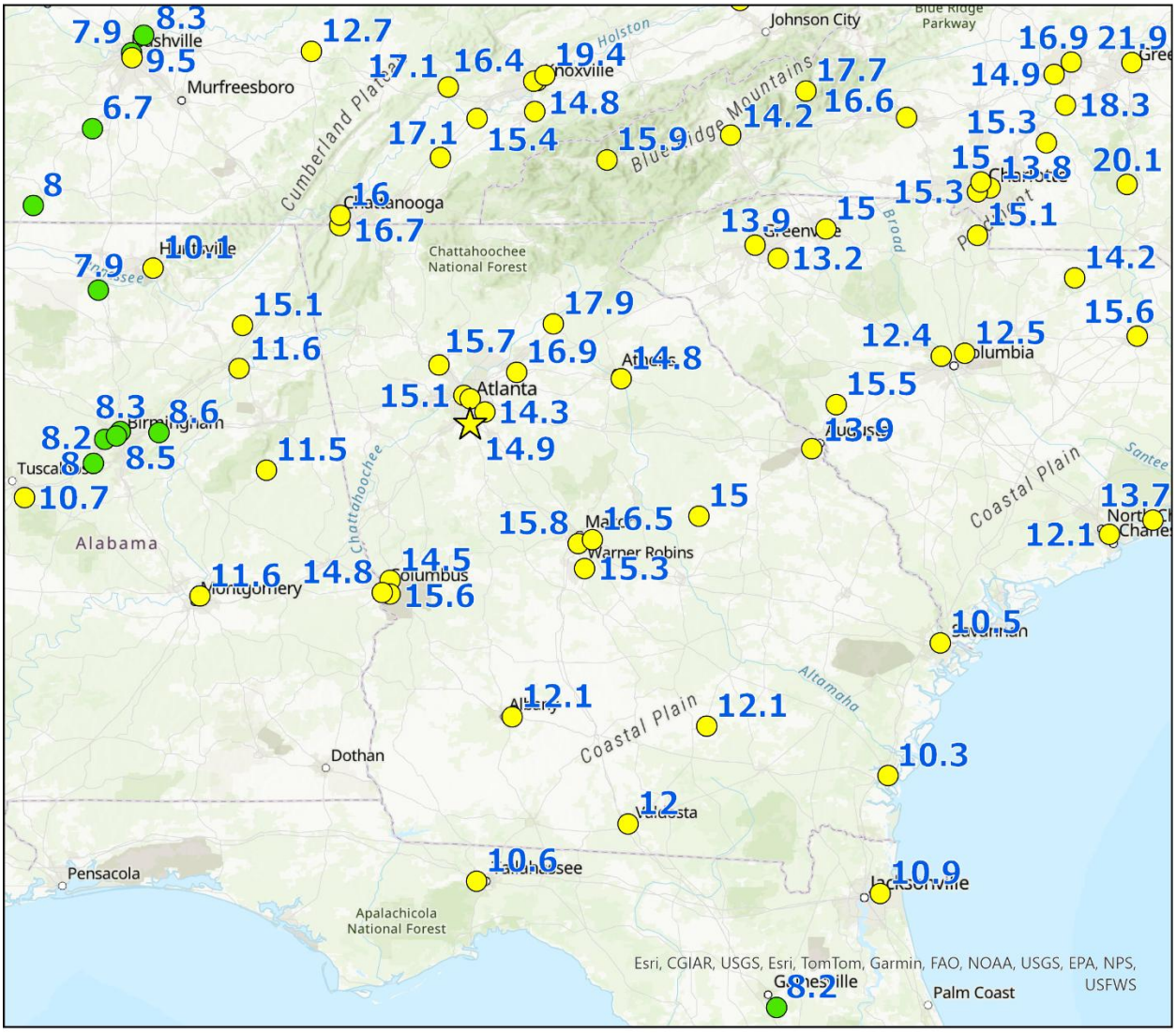
AQI category - 24-hr average $PM_{2.5}$

FINAL

- Good (0-9 ug/m^3)
- Moderate (9.1-35.4 ug/m^3)
- Unhealthy for sensitive (35.5-55.4 ug/m^3)
- Unhealthy (55.5-150.4 ug/m^3)
- Very unhealthy (150.4-250.4 ug/m^3)
- Hazardous (>250.4 ug/m^3)

Figure D1. Surface level, daily $PM_{2.5}$ concentrations on June 5, 2023, across the southeast. The Forest Park site is represented by a star. Numerous sites measured concentrations that exceeded the level of annual $PM_{2.5}$ NAAQS.

June 11, 2023 $PM_{2.5}$ Exceedance Report



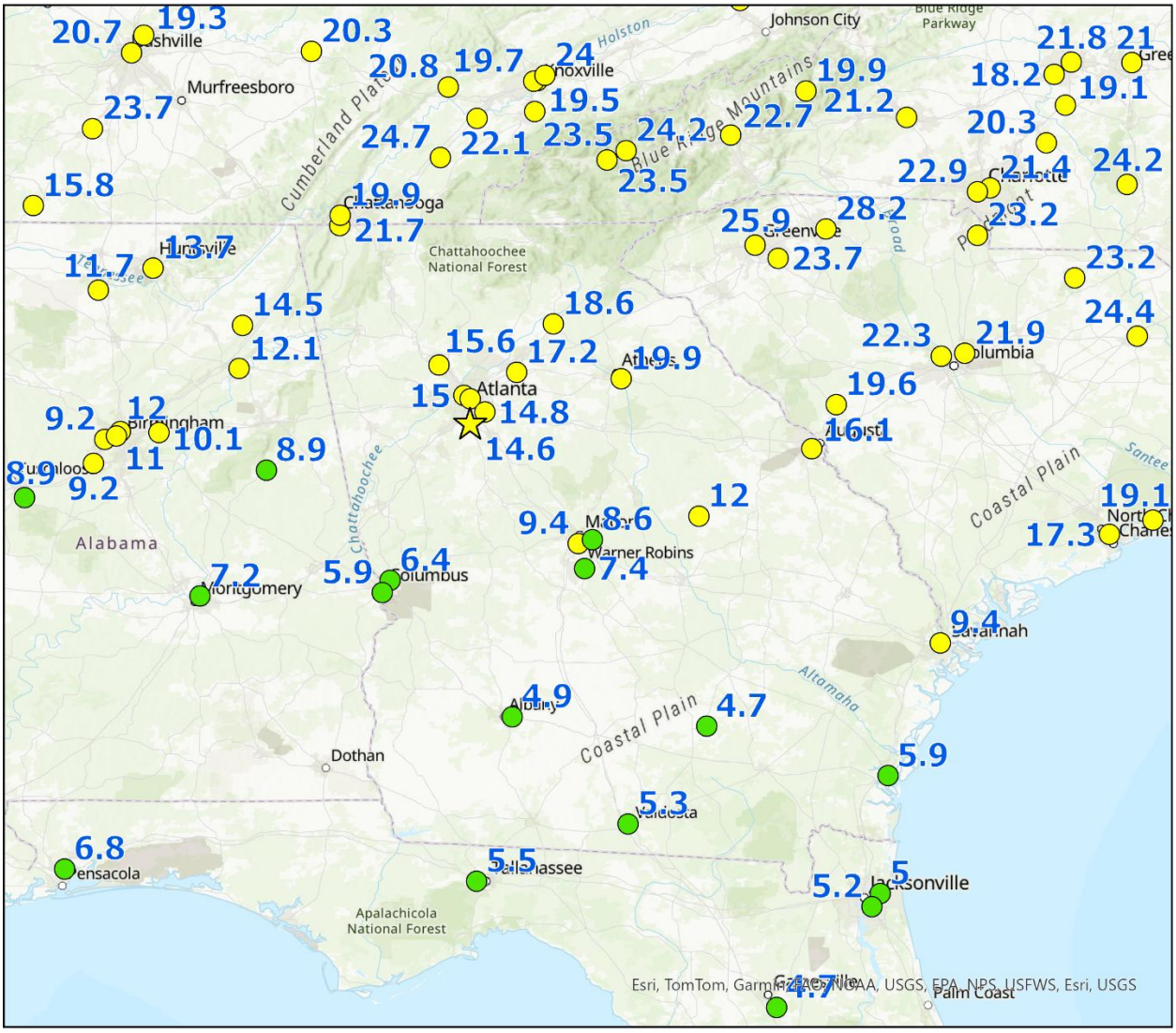
AQI category - 24-hr average $PM_{2.5}$

FINAL

- Good (0-9 ug/m^3)
- Moderate (9.1-35.4 ug/m^3)
- Unhealthy for sensitive (35.5-55.4 ug/m^3)
- Unhealthy (55.5-150.4 ug/m^3)
- Very unhealthy (150.4-250.4 ug/m^3)
- Hazardous (>250.4 ug/m^3)

Figure D2. Surface level, daily $PM_{2.5}$ concentrations on June 11, 2023, across the southeast. The Forest Park site is represented by a star. Numerous sites measured concentrations that exceeded the level of annual $PM_{2.5}$ NAAQS.

June 17, 2023 $PM_{2.5}$ Exceedance Report



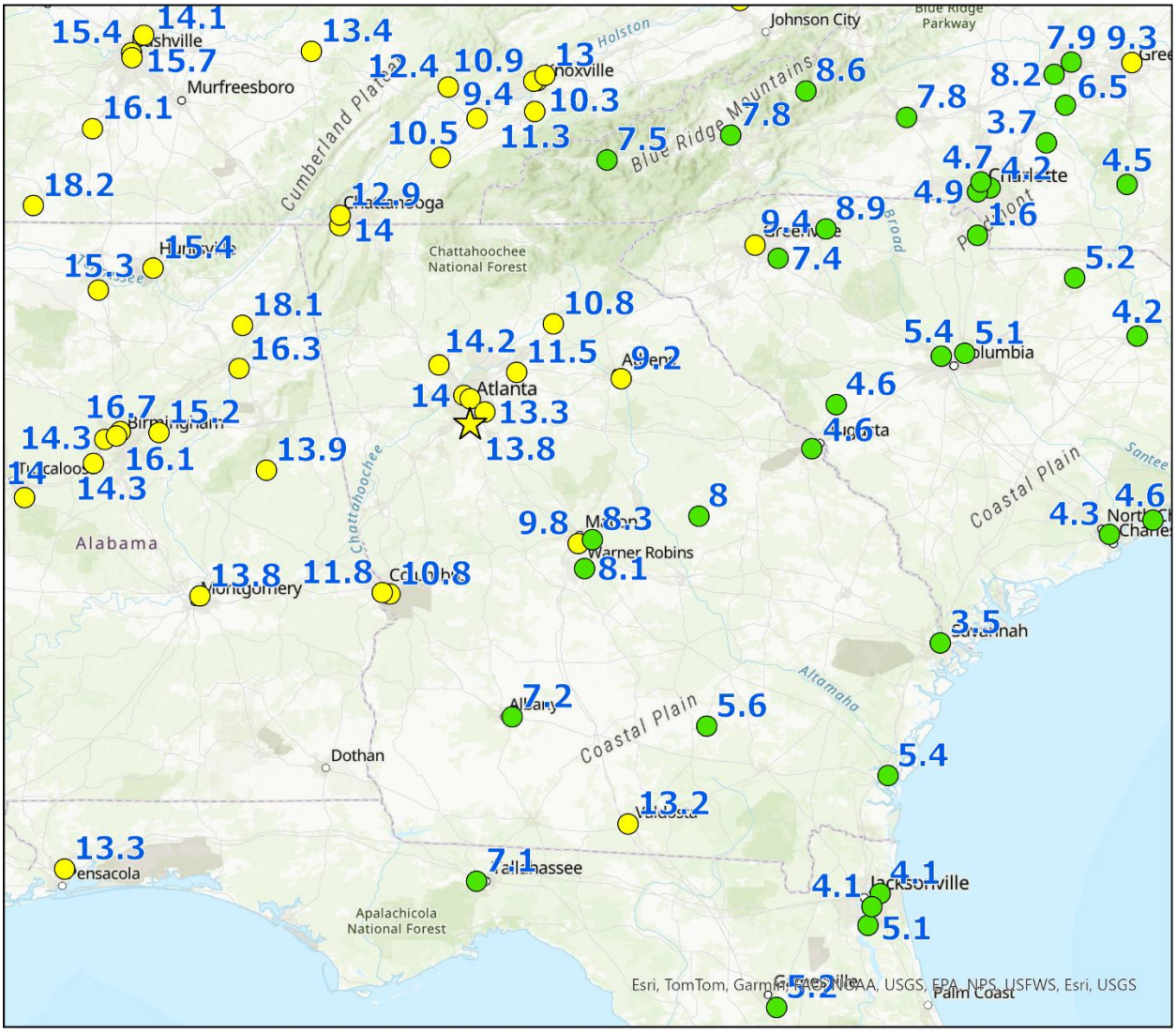
AQI category - 24-hr average $PM_{2.5}$

FINAL

- Good (0-9 ug/m^3)
- Moderate (9.1-35.4 ug/m^3)
- Unhealthy for sensitive (35.5-55.4 ug/m^3)
- Unhealthy (55.5-150.4 ug/m^3)
- Very unhealthy (150.4-250.4 ug/m^3)
- Hazardous (>250.4 ug/m^3)

Figure D3. Surface level, daily $PM_{2.5}$ concentrations on June 17, 2023, across the southeast. The Forest Park site is represented by a star. Numerous sites measured concentrations that exceeded the level of annual $PM_{2.5}$ NAAQS.

July 29, 2023 $PM_{2.5}$ Exceedance Report



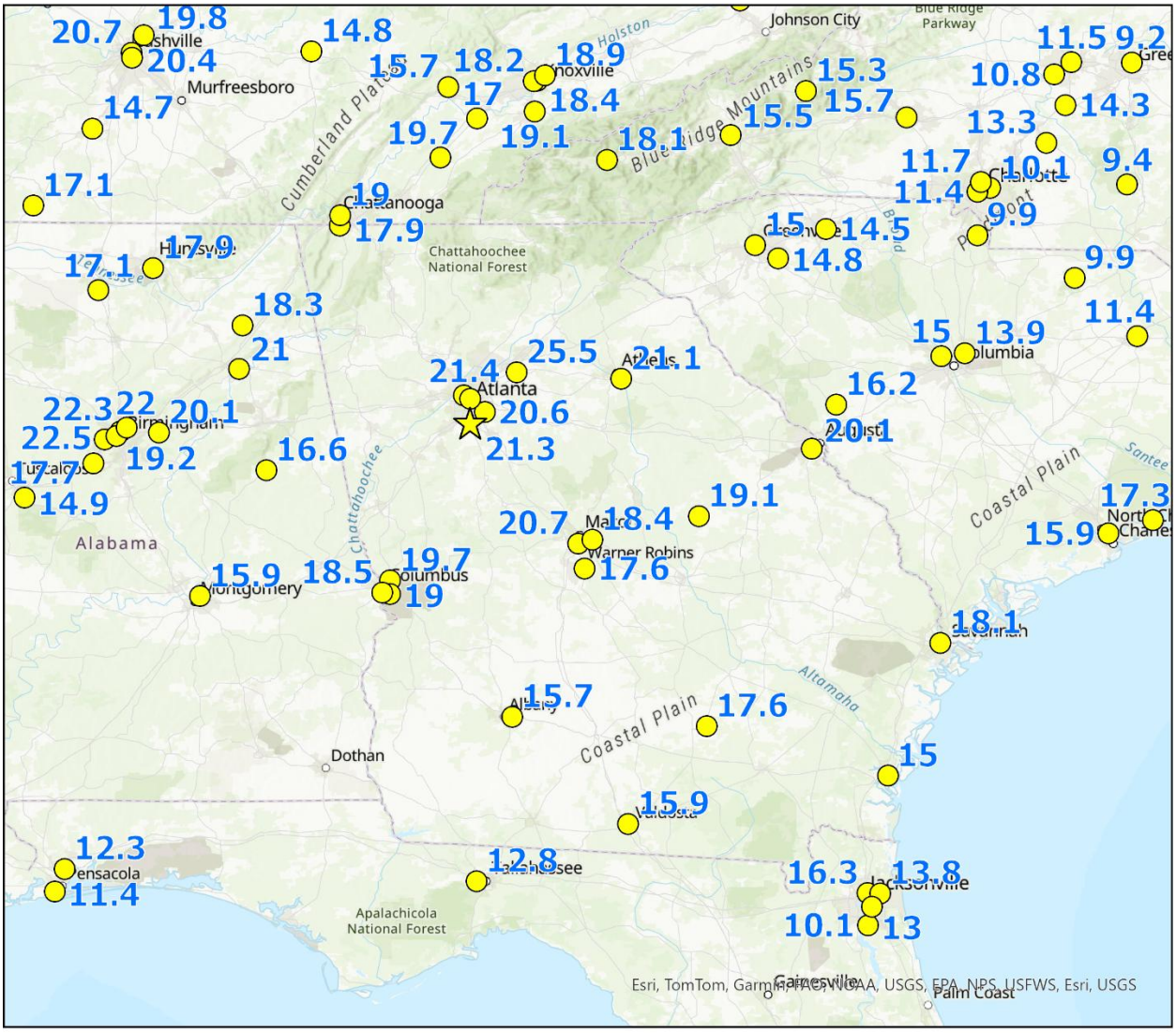
AQI category - 24-hr average $PM_{2.5}$

FINAL

- Good (0-9 ug/m^3)
- Moderate (9.1-35.4 ug/m^3)
- Unhealthy for sensitive (35.5-55.4 ug/m^3)
- Unhealthy (55.5-150.4 ug/m^3)
- Very unhealthy (150.4-250.4 ug/m^3)
- Hazardous (>250.4 ug/m^3)

Figure D4. Surface level, daily $PM_{2.5}$ concentrations on July 29, 2023, across the southeast. The Forest Park site is represented by a star. Numerous sites measured concentrations that exceeded the level of annual $PM_{2.5}$ NAAQS.

June 3, 2025 $PM_{2.5}$ Exceedance Report



AQI category - 24-hr average $PM_{2.5}$

FINAL

- Good (0-9 ug/m^3)
- Moderate (9.1-35.4 ug/m^3)
- Unhealthy for sensitive (35.5-55.4 ug/m^3)
- Unhealthy (55.5-150.4 ug/m^3)
- Very unhealthy (150.4-250.4 ug/m^3)
- Hazardous (>250.4 ug/m^3)

Figure D5. Surface level, daily $PM_{2.5}$ concentrations on June 3, 2025, across the southeast. The Forest Park site is represented by a star. Numerous sites measured concentrations that exceeded the level of annual $PM_{2.5}$ NAAQS.

Appendix E: Hourly $PM_{2.5}$ Time Series

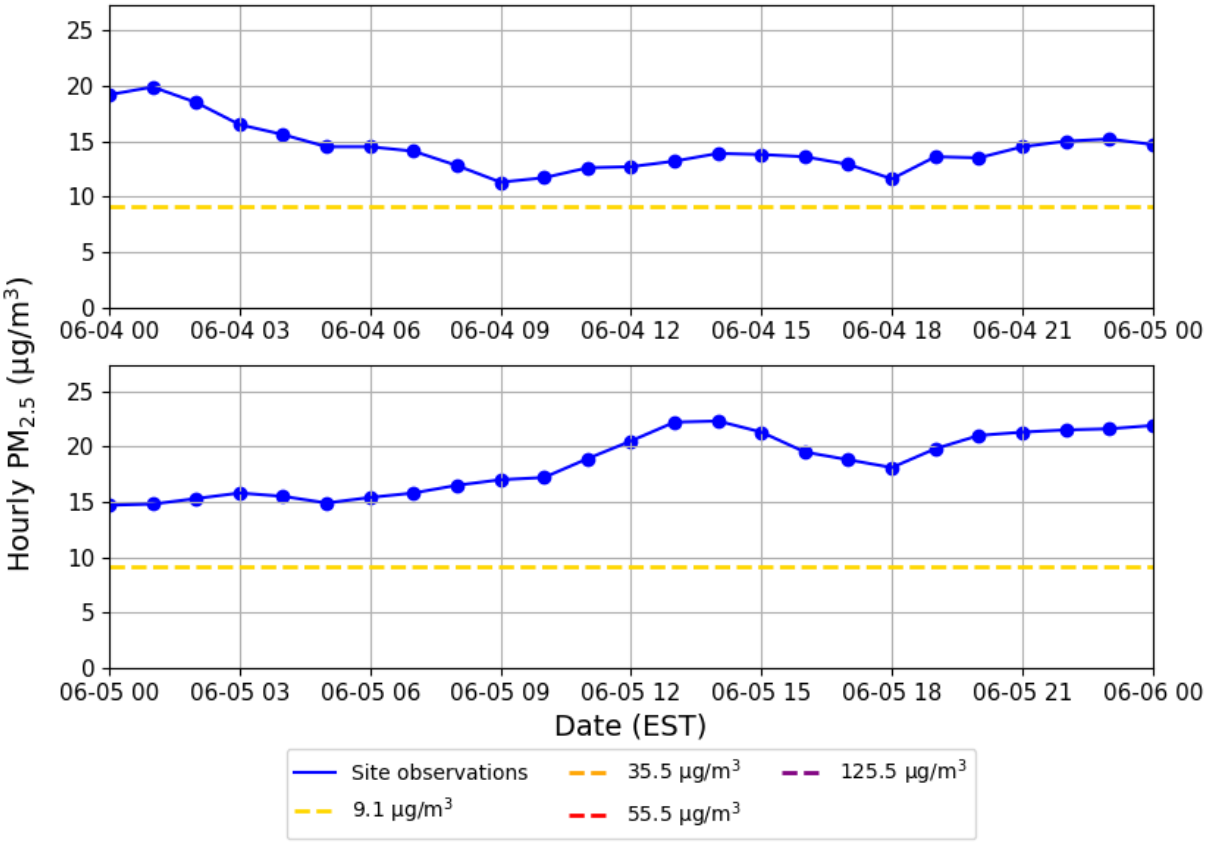


Figure E1. Hourly $PM_{2.5}$ concentrations at the Forest Park site (data from the nearby South DeKalb site is used as a proxy) on June 4-5, 2023. The solid, dotted line shows observations, and the dashed lines show AQI tiers for the 2024 $PM_{2.5}$ NAAQS.

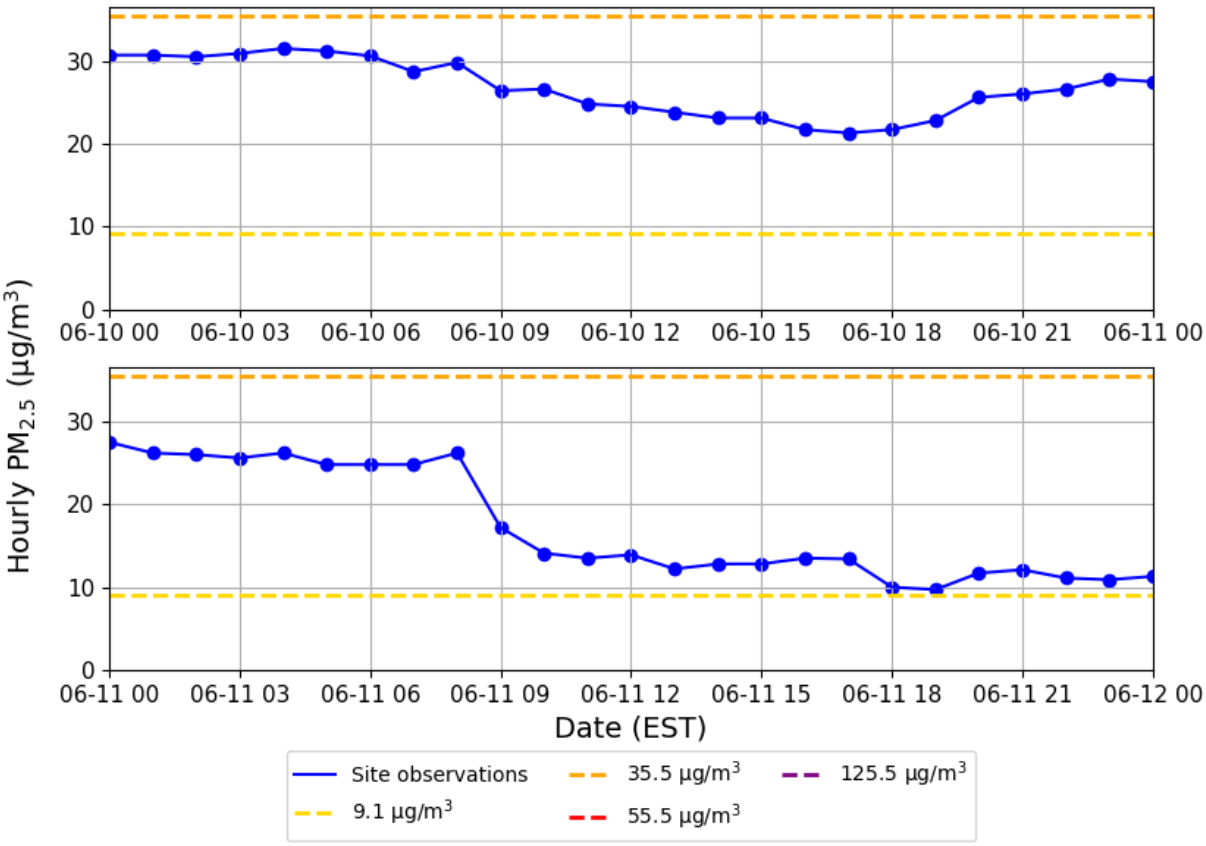


Figure E2. Hourly $PM_{2.5}$ concentrations at the Forest Park site (data from the nearby South DeKalb site is used as a proxy) on June 10-11, 2023. The solid, dotted line shows observations, and the dashed lines show AQI tiers for the 2024 $PM_{2.5}$ NAAQS.

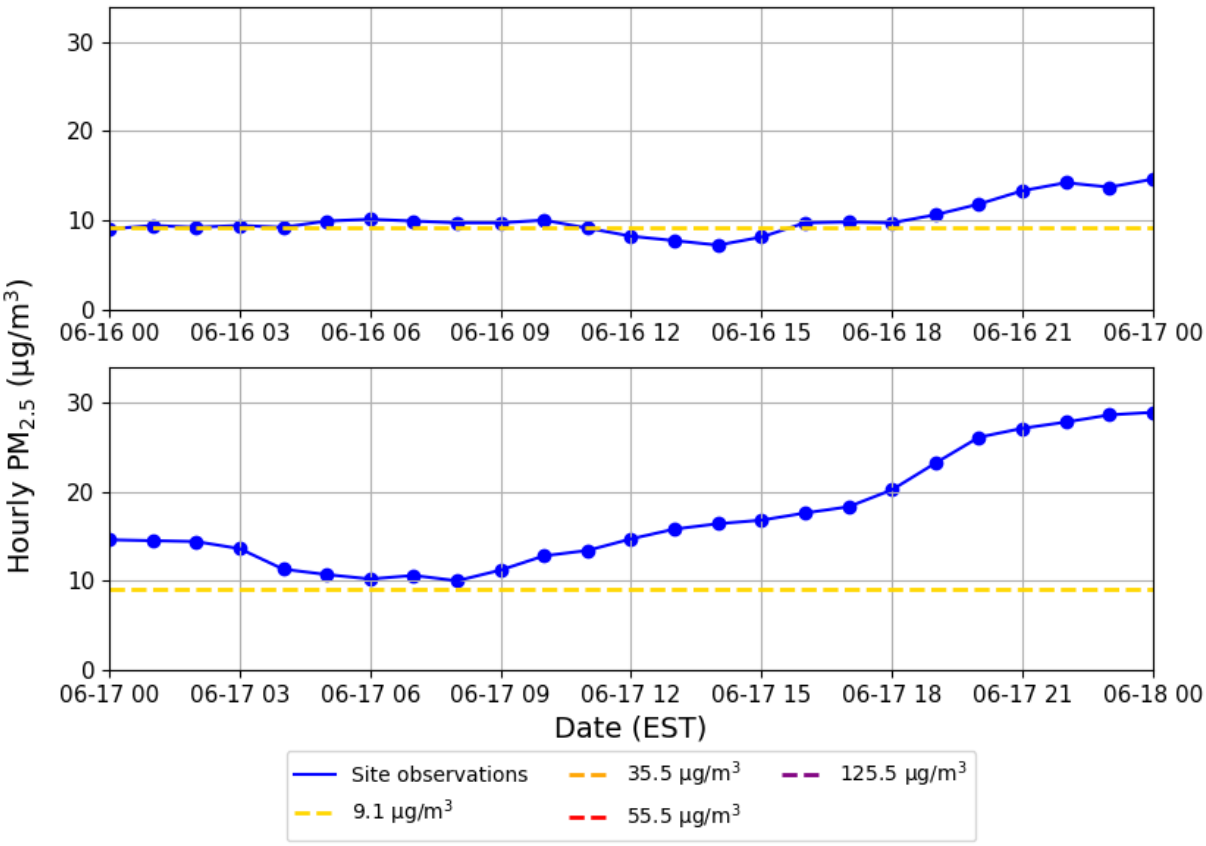


Figure E3. Hourly $PM_{2.5}$ concentrations at the Forest Park site (data from the nearby South DeKalb site is used as a proxy) on June 16-17, 2023. The solid, dotted line shows observations, and the dashed lines show AQI tiers for the 2024 $PM_{2.5}$ NAAQS.

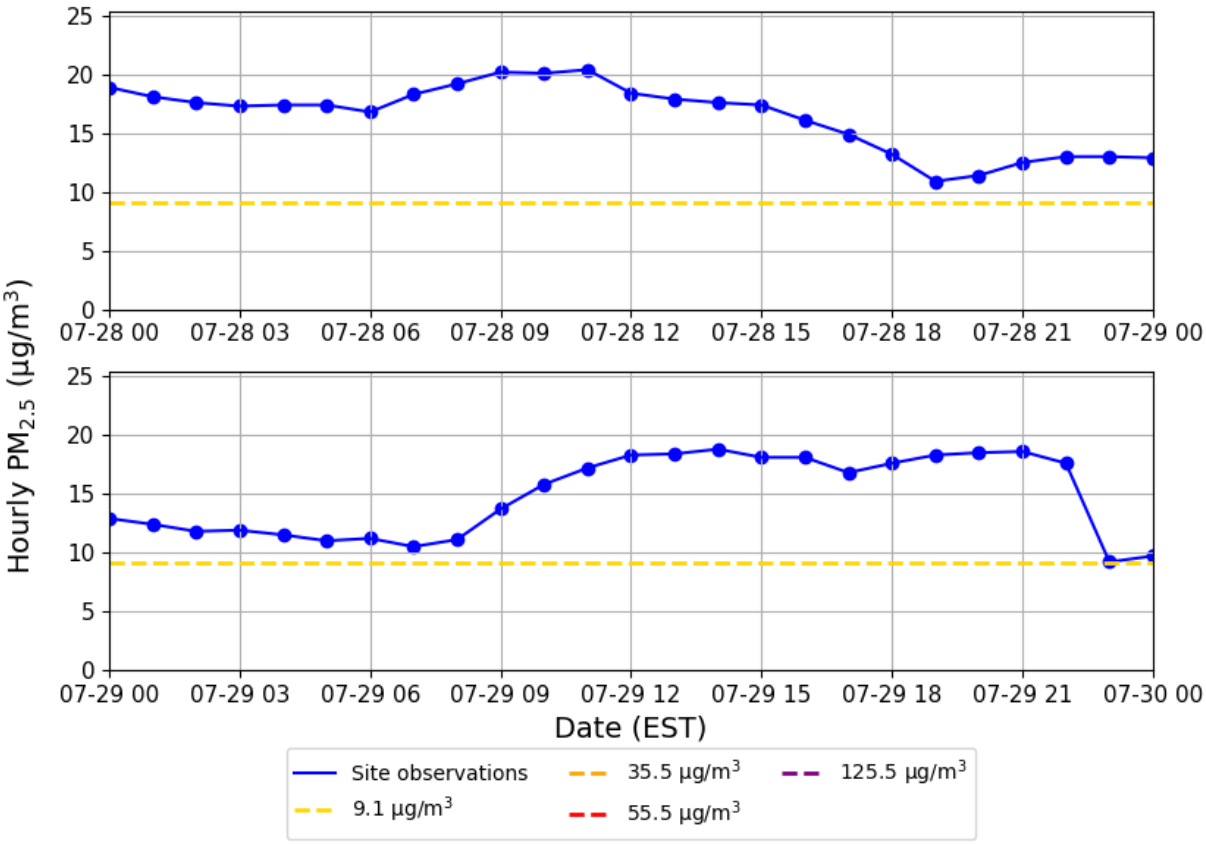


Figure E4. Hourly $PM_{2.5}$ concentrations at the Forest Park site (data from the nearby South DeKalb site is used as a proxy) on July 28-29, 2023. The solid, dotted line shows observations, and the dashed lines show AQI tiers for the 2024 $PM_{2.5}$ NAAQS.

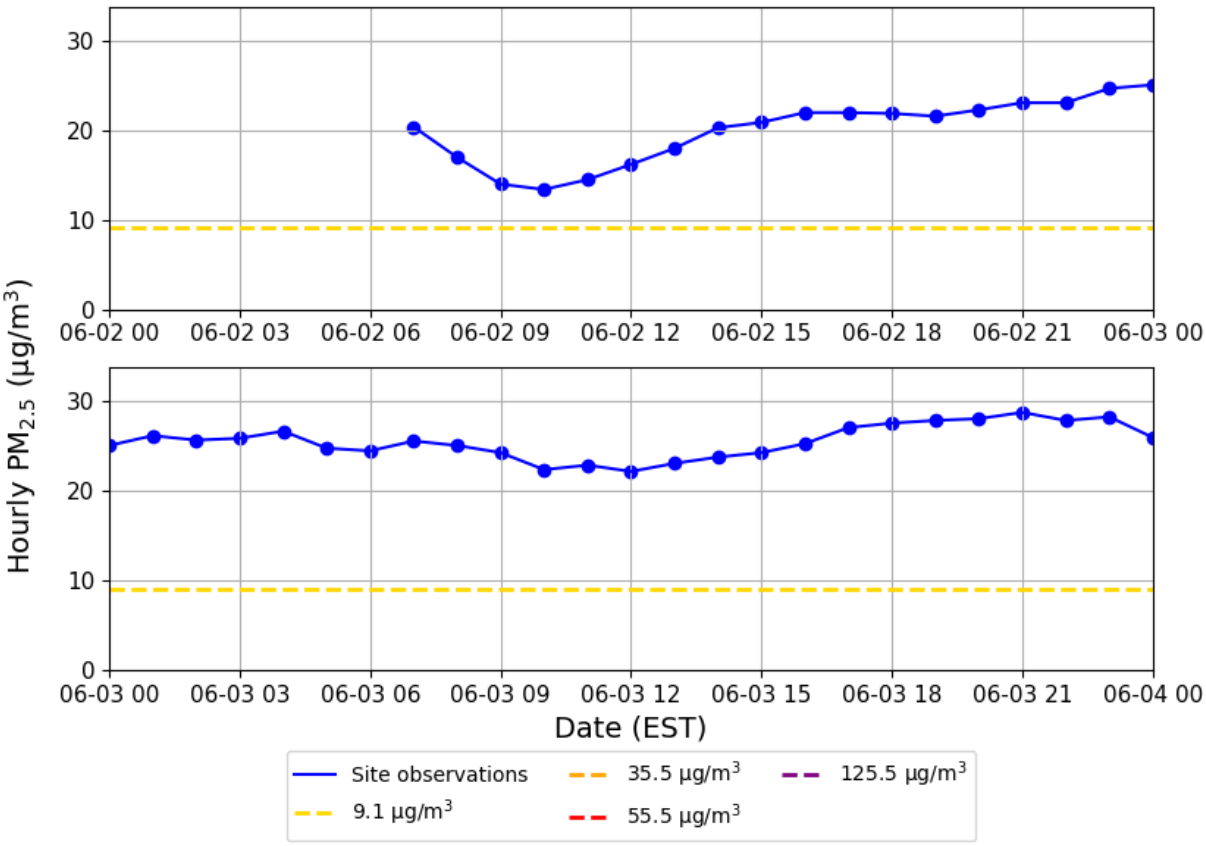


Figure E5. Hourly $PM_{2.5}$ concentrations at the Forest Park site (data from the nearby South DeKalb site is used as a proxy) on June 2-3, 2025. The solid, dotted line shows observations, and the dashed lines show AQI tiers for the 2024 $PM_{2.5}$ NAAQS.

Appendix F: Upper Air Maps

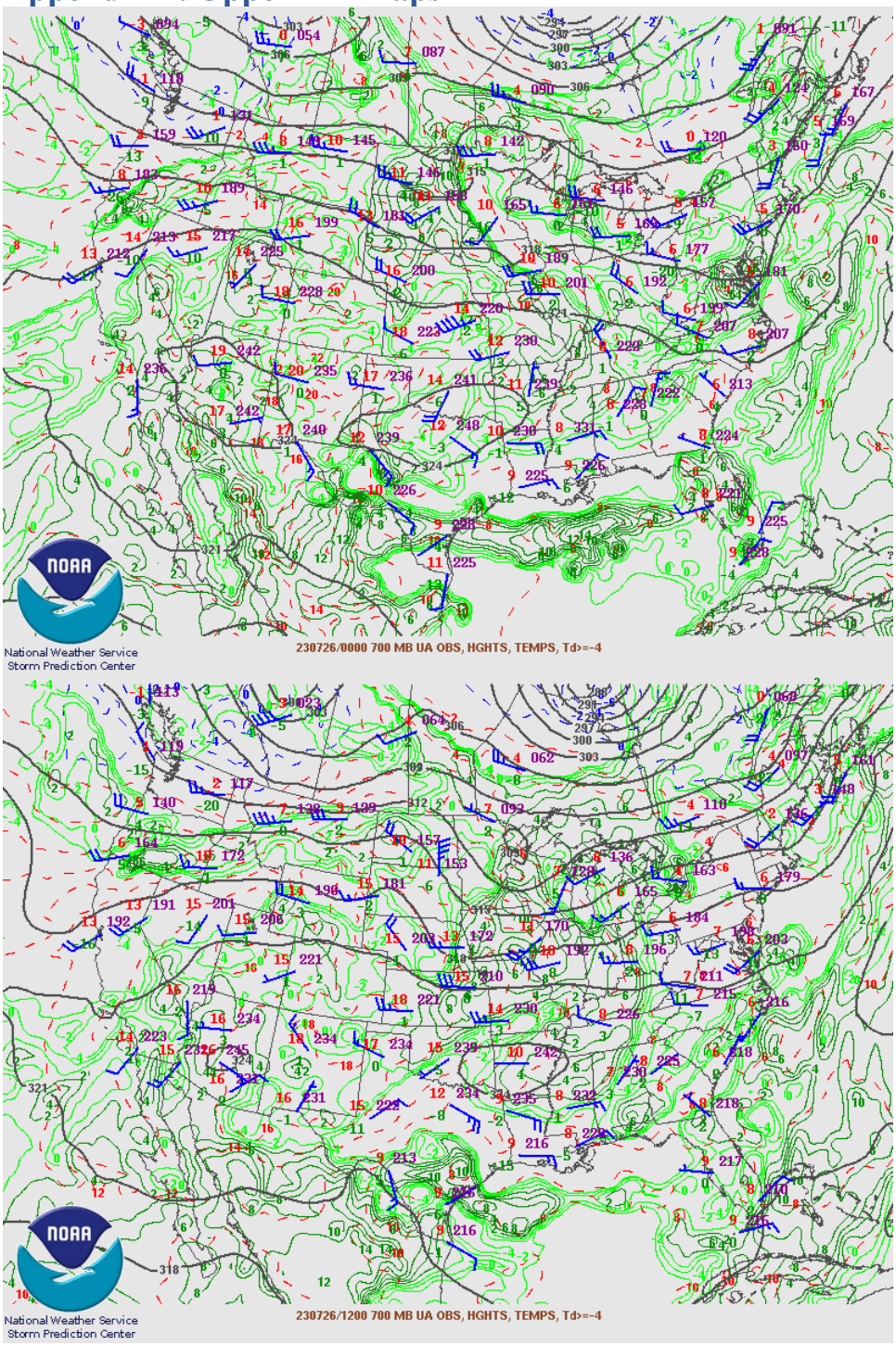


Figure F1. Storm Prediction Center upper air maps for July 26, 2023, at 00 UTC (top) and at 12 UTC (bottom). Maps are generated at a pressure of 700 mb (altitude of 2350-3150 m MSL). Wind barbs (degrees from north, knots) are plotted in blue, isotherms (degrees Celsius (°C)) in red, isodrosotherms (°C) in green contours, and isoheights (m MSL) in dark grey.

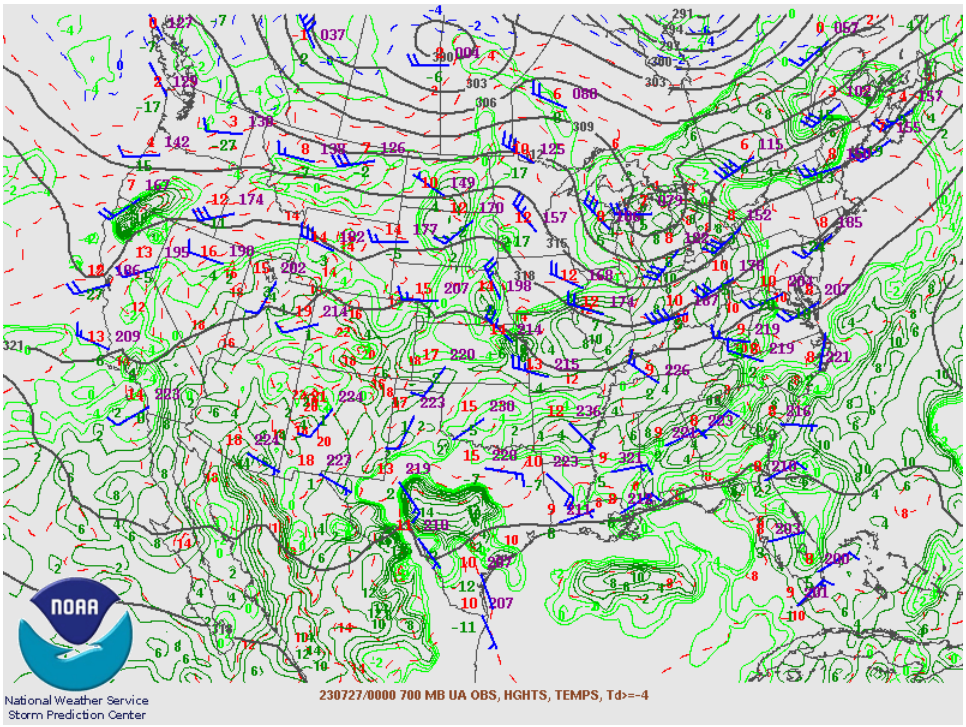


Figure F2. Storm Prediction Center upper air maps for July 27, 2023 at 00 UTC. The 12 UTC map is unavailable for this day. The map is generated at a pressure of 700 mb (altitude of 2350-3150 m MSL). Wind barbs (degrees from north, knots) are plotted in blue, isotherms (°C) in red, isodrosotherms (°C) in green contours, and isoheights (m MSL) in dark grey.

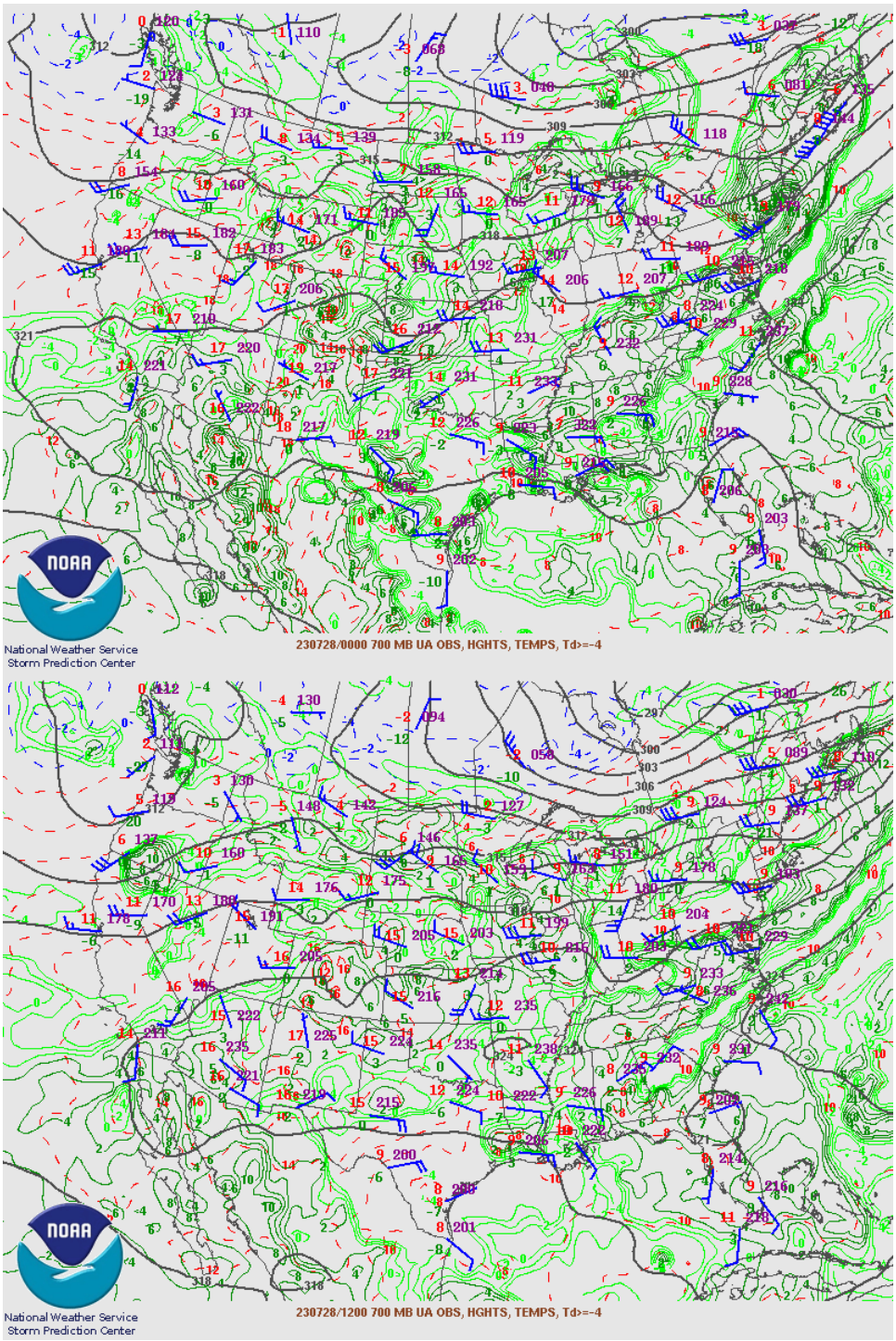


Figure F3. Storm Prediction Center upper air maps for July 28, 2023, at 00 UTC (top) and at 12 UTC (bottom). Maps are generated at a pressure of 700 mb (altitude of 2350-3150 m MSL). Wind barbs (degrees from north, knots) are plotted in blue, isotherms (°C) in red, isodrosotherms (°C) in green contours, and isoheights (m MSL) in dark grey.

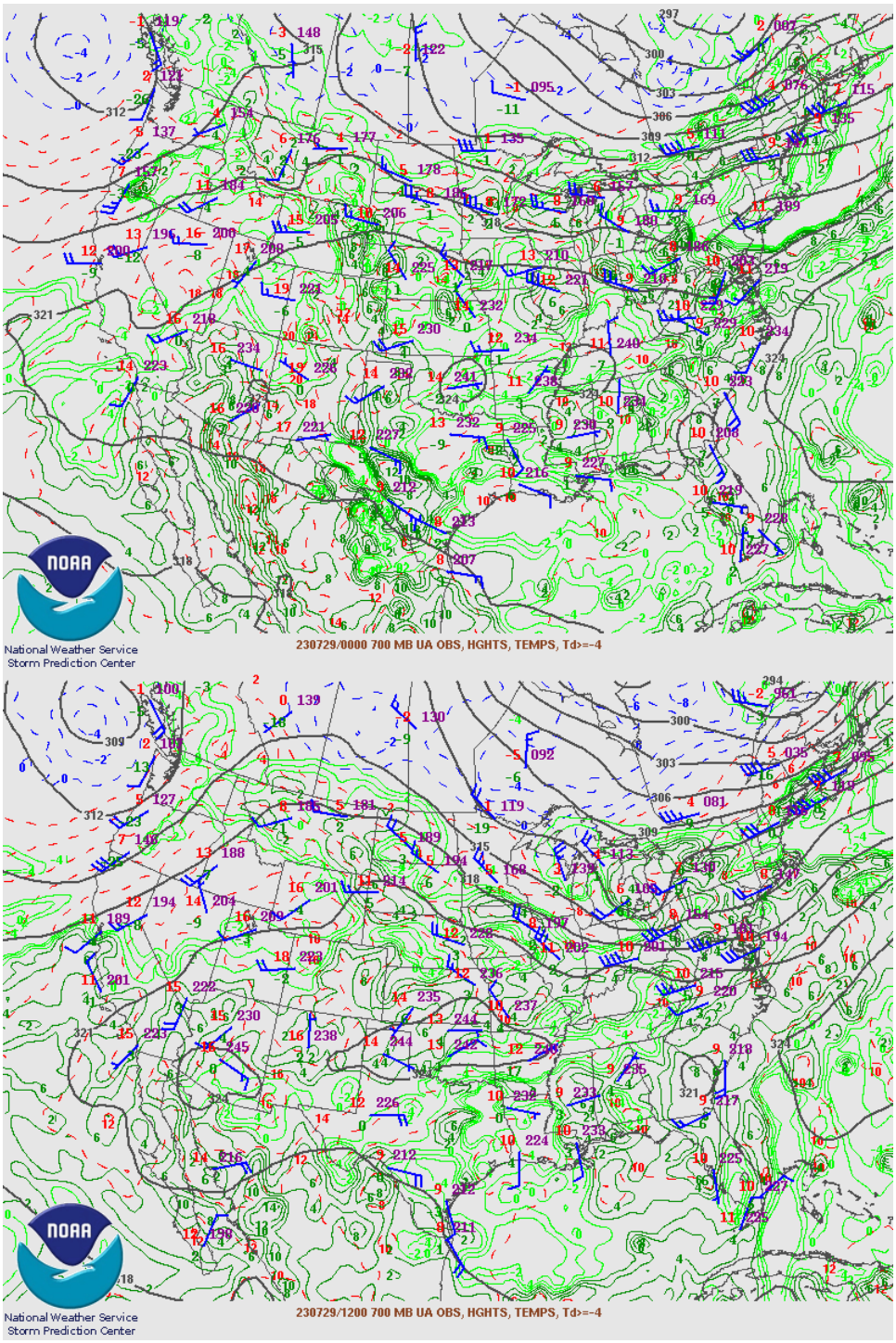


Figure F4. Storm Prediction Center upper air maps for July 29, 2023, at 00 UTC (top) and at 12 UTC (bottom). Maps are generated at a pressure of 700 mb (altitude of 2350-3150 m MSL). Wind barbs (degrees from north, knots) are plotted in blue, isotherms (°C) in red, isodrosotherms (°C) in green contours, and isoheights (m MSL) in dark grey.