



Ajax Analytics

WITH



Colorado State University

FOR

THE CITY AND COUNTY OF BROOMFIELD

Q2 2025

QUARTERLY OIL AND GAS AIR QUALITY MONITORING REPORT

TABLE OF CONTENTS

ABOUT THIS DOCUMENT 3

ABOUT THIS PROGRAM..... 4

MONITORING APPROACH..... 4

MONITORING SYSTEMS AND METRICS 5

MONITORING SITES 6

1. SUMMARY OF MONITORING DATA 8

1.1 SUMMARY OF WEEKLY MONITORING DATA 9

1.2 SUMMARY OF SHORT-TERM MONITORING DATA 14

1.3 WEEKLY CANISTER DATA ANALYSIS..... 16

1.4 REGIONAL PARTICULATE MATTER ANALYSIS 19

2. CONCLUSIONS..... 24

ABOUT THIS DOCUMENT

This report addresses the period from October 4, 2018, through June 30, 2025, with focus on the period from April to June (Q2) 2025.

This document IS designed to:

Be consumable by the general public

The reader should not need an atmospheric science or statistics background to take something away from this report.

Convey main points concisely

We balance the need to communicate, be transparent, and support the data analysis with the goal of being a consumable and readable report.

Share facts about the information collected by Ajax Analytics & CSU

We work to provide education and context for readers who do not have experience interpreting scientific data. We work to avoid being misleading about what the data are telling us.

This document IS NOT designed to:

Provide specific reasons for the measured values

We value scientific integrity, and we cannot always point to a direct cause for the measurements, patterns, or changes. The data are presented to help inform, guide further investigation, and narrow the possible reasons for the measured pollutant levels.

Replace academic or regulatory agency monitoring or reports

Our data and analyses do identify questions that can be explored in more depth. Our measurements often observe air quality in areas without other existing measurements. We do receive peer-input prior to publishing these reports, though this report is not equivalent to a peer-reviewed journal article.

ABOUT THIS PROGRAM

Monitoring Approach

The objectives of the Broomfield oil and gas air quality monitoring (AQM) program include monitoring the air quality in the community and around oil and gas operations. We continue to work to identify emission sources and compare data to established health guidelines.

The complete monitoring program has been carefully designed to include multiple technologies that complement each other. The monitoring network provides excellent time coverage, useful and high-quality data, and enables accurate modeling at a reasonable cost. Monitoring stations are designed for efficiency and mobility, allowing us to relocate individual sites for more complete spatial coverage.

The comprehensive monitoring approach includes:

- internet connected sensor systems with 10-second time resolution output– useful for air quality event detection and spatial analysis,
- whole air canister samples automatically triggered by the real-time sensor systems upon recognition of an air quality event – useful for short-term impact assessment during pollutant events,
- week-long whole air canister samples at select sites, deployed on set schedules – useful for high-quality long-term data with continuity throughout the program,
- two trailer-based reference-grade air quality monitoring stations that measure continuous methane, criteria pollutants, and Volatile Organic Compounds (VOCs) 10 minutes out of each hour (operated by a separate Broomfield vendor, Boulder AIR, and reported separately).

Monitoring Systems and Metrics

The program monitors for volatile organic compounds, air toxics, criteria air pollutants, and local meteorology.

Table 1: Parameters Measured within the Monitoring Network

Monitoring System	Metrics Measured			Performance Expectations	Recording Resolution	Reporting Resolution
Sensit SPOD Monitoring System						
	TVOC Indicator			PID 10.6 eV w/ ~ .5 ppb sensitivity across a subset of hundreds of VOCs	10 second (avg. of 1 second polling)	1 minute (avg. of 10 second recorded data)
	Particulate Matter 1.0			optical sensor w/ full range of ambient PM concentrations with limited accuracy		
	Particulate Matter 2.5			optical sensor w/ full range of ambient PM concentrations with +/- 10% accuracy		
	Particulate Matter 10			optical sensor w/ full range of ambient PM concentrations with limited accuracy		
	Wind Speed			High quality ultrasonic wind speed readings		
	Wind Direction			High quality ultrasonic wind direction readings (manually oriented)		
	Temperature			High quality temperature measurement		
	Pressure			High quality atomospheric pressure measurement		
	Humidity			High quality relative humidity measurement		
	+ triggered whole air canister samples					
Whole Air Canister Sample with Lab Analysis						
	methane	c-2-butene	2-methylheptane	sub-ppb sensitivity best possible accuracy (+/- 3%) reference-quality measurements	Weekly samples: 7 continuous days	Trigger samples: 1 minute
	benzene	cyclopentane	3-methylheptane			
	ethylbenzene	t-2-pentene	n-octane			
	toluene	1-pentene	styrene			
	o-xylene	cis-2-pentene	n-nonane			
	m+p-xylene	n-hexane	isopropylbenzene			
	ethane	isoprene	n-propylbenzene			
	i-pentane	2,4 dimethylpentane	3-ethyltoluene		Grab samples: 1 minute	
	n-pentane	n-heptane	4-ethyltoluene			
	i-butane	cyclohexane	1,3,5-trimethylbenzene			
	n-butane	2,3-dimethylpentane	2-ethyltoluene			
	ethene	2-methylhexane	1,2,4-trimethylbenzene			
	propane	3-methylhexane	n-decane			
	propene	2,2,4-trimethylpentane	1,2,3-trimethylbenzene			
	ethyne	methylcyclohexane	1,3-diethylbenzene			
	t-2-butene	2,3,4-trimethylpentane	1,4-diethylbenzene			
	1-butene	trichloroethylene	tetrachloroethylene			

Monitoring Sites

In Q2 2025, the Ajax Analytics monitoring network consisted of eight monitoring sites, most of which featured multiple sampling methods. These sites were strategically placed to triangulate oil and gas emission areas, capture background ambient air quality away from direct emission sources, and monitor air quality in areas where people live, work, and spend time.

Figure 1 shows the locations of these monitoring sites and the technologies deployed at each site as of the end of the quarter.



	Continuous Real-Time Sensor
	Continuous Real-Time Sensor with Continuous Weekly Canister Sampling
	Continuous Weekly Canister Sampling

Figure 1: Map of Broomfield Monitoring Network. The latest monitoring network map can be viewed online with Google Earth here: <https://drive.google.com/open?id=1qUFSI79nkVpjOQzScfs8Zyqnr8jibHpZ&usp=sharing>

KEY TAKEAWAYS FROM THIS QUARTER

1. Weekly volatile organic compound (VOC) measurements collected across all monitoring sites during this period were below the chronic health guideline values (HGVs) published by the Colorado Department of Public Health and Environment (CDPHE).

Note: Week-long canister samples are suitable for comparison with chronic health guidelines, whereas 1-minute canister results cannot be directly compared to acute health guidelines, which are generally based on a minimum one-hour exposure.

2. While most VOC metrics remained within expected ambient levels, increases in straight-chain alkanes and aromatic hydrocarbons, compounds characteristic of petroleum-derived emissions, were consistently observed across monitoring locations in both triggered canister and weekly canister data. These patterns suggest ongoing oil and gas-related emissions activity or other industrial sources.
3. The Q2 2025 average weekly concentration for TVOC_CSU49 was 9.04 ppb.

1. SUMMARY OF MONITORING DATA

This section presents summary concentration data from the monitoring program.

Q2 2025 Sampling by the Numbers

- **96.1% sensor uptime** from the sites monitored with continuous real-time sensor systems in Q2.

Uptime is calculated for the network as: (the number of 1-minute measurements collected / the number of 1-minute measurements expected)

- *April Uptime Percentage: 94.1%*
- *May Uptime Percentage: 99.8 %*
- *June Uptime Percentage: 94.3 %*
- **65, 1-week duration, whole air canister samples** from the 5 sites monitored with weekly canister samples. The Broomfield program has analyzed 2,657 1-week whole air canister samples through Q2 2025.
- **21 valid triggered whole air canister samples** in the quarter. The Broomfield program has analyzed 218 triggered whole air canister samples through Q2 2025.

1.1 Summary of Weekly Monitoring Data

TVOC

Figure 2 presents the network-wide total volatile organic compounds (TVOC) measured by weekly canister samples (solid purple line), with the network minimum (dotted green line) and maximum (dotted red line) values also shown. The timing of oil and gas operations, pre-production (dark green bars) and production (light green bars), is highlighted to identify trends. The Total VOC metric (TVOC_CSU49) represents the sum of 49 volatile organic compounds in parts-per-billion (ppb), excluding methane and ethane, and offers insight into the scale and variability of emissions across the monitoring network.

Historically, the program has documented cycles of oil and gas development, where pre-production periods are associated with sharp increases in peak weekly VOC concentrations and wider ranges between maximum and minimum values. These fluctuations reflect both spatial differences across sampling sites and changes in emission sources and meteorological influences.

Since the conclusion of major pre-production activities in Q1 2023, weekly VOC concentrations have generally stabilized, trending toward background levels typical of the Colorado Front Range. However, short-term elevations above baseline averages often tied to maintenance or equipment malfunctions, are expected to continue intermittently.

Throughout Q2 there were many short-term plume events, particularly in May and June, that coincided with an elevation in the average weekly TVOC concentration beginning in mid-May. From April 1st – May 22nd, the average TVOC_CSU49 weekly concentration was 6.63 ppb. This increased to 12.90 ppb during the remainder of the quarter, nearly doubling. The maximum TVOC_CSU49 weekly canister concentration was 20.44 ppb, measured at the Interchange 1 monitoring station during the week of May 29th. The average weekly TVOC_CSU49 concentration for Q2 was 9.04 ppb, an overall decrease from the Q1 average of 11.83 ppb. TVOC concentrations are typically higher in the winter when shallow mixed surface layers trap surface emissions and limit dispersion.

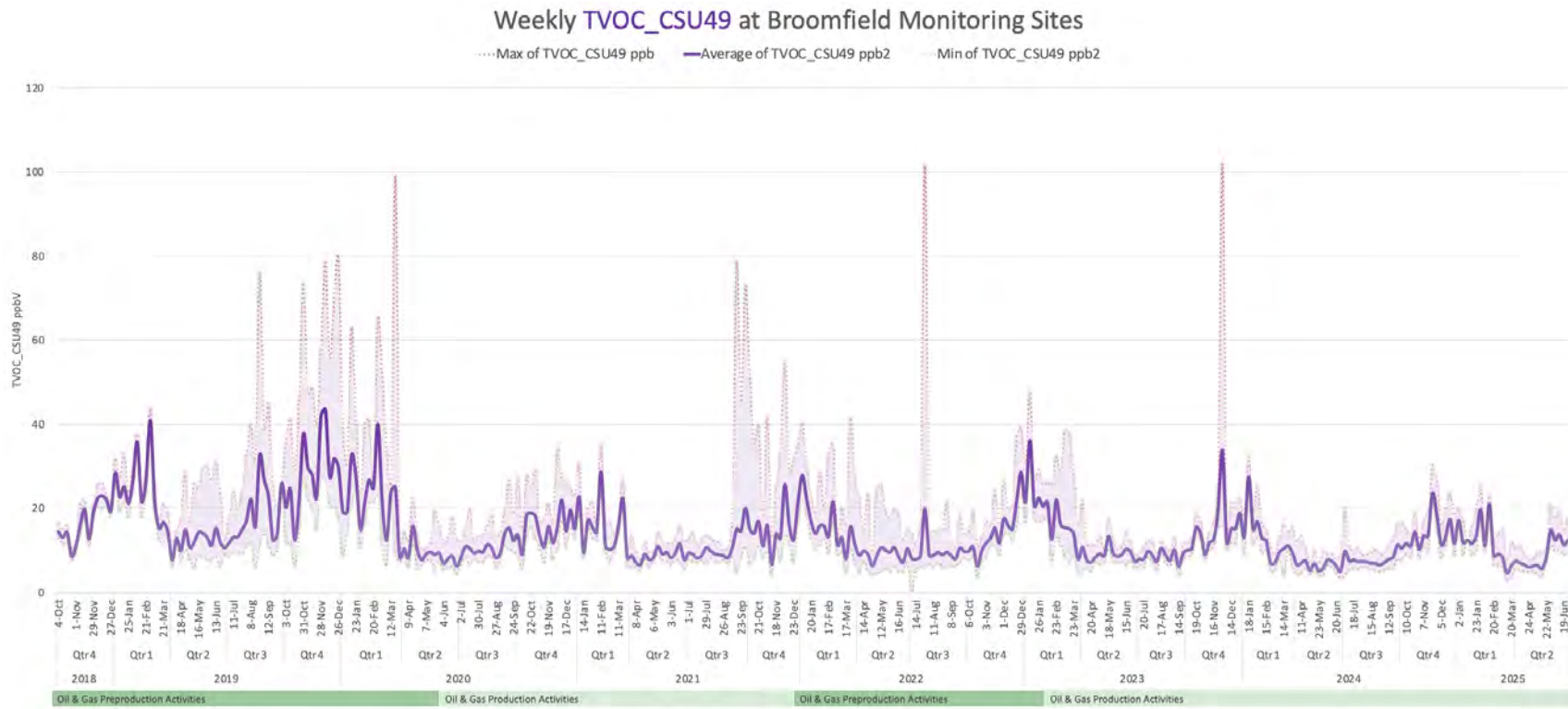


Figure 2: Weekly TVOC concentration average (purple), maximum (red), and minimum (green) across all 1-week canister sampling sites in the Broomfield monitoring network over time

Benzene

Benzene is an air pollutant emitted from both oil and gas sources and other sources (e.g., traffic, combustion, fires, fuel evaporation) and has defined minimum risk levels (MRLs). Benzene concentration health guidelines are defined by the Agency for Toxic Substance and Disease Registry (ATSDR) as 3 parts per billion (ppb) for chronic exposure and 9 ppb for acute exposure. Benzene is watched closely because it has the lowest health guideline value among commonly observed VOCs and is a known human carcinogen.

Average weekly benzene concentrations have been generally consistent throughout the quarter with some changes in the maximum concentrations near the end of June. The Q2 2025 weekly benzene average was measured at 0.10 ppb. The highest maximum benzene concentration was recorded the week of June 19th, measuring a concentration of 0.32 ppb at the Livingston 1 monitoring station. The weekly average benzene concentration measured across the sampling network has continued to remain below the Health Guideline Values, with values ranging between 0.09 and 0.21 ppb throughout the history of the program.

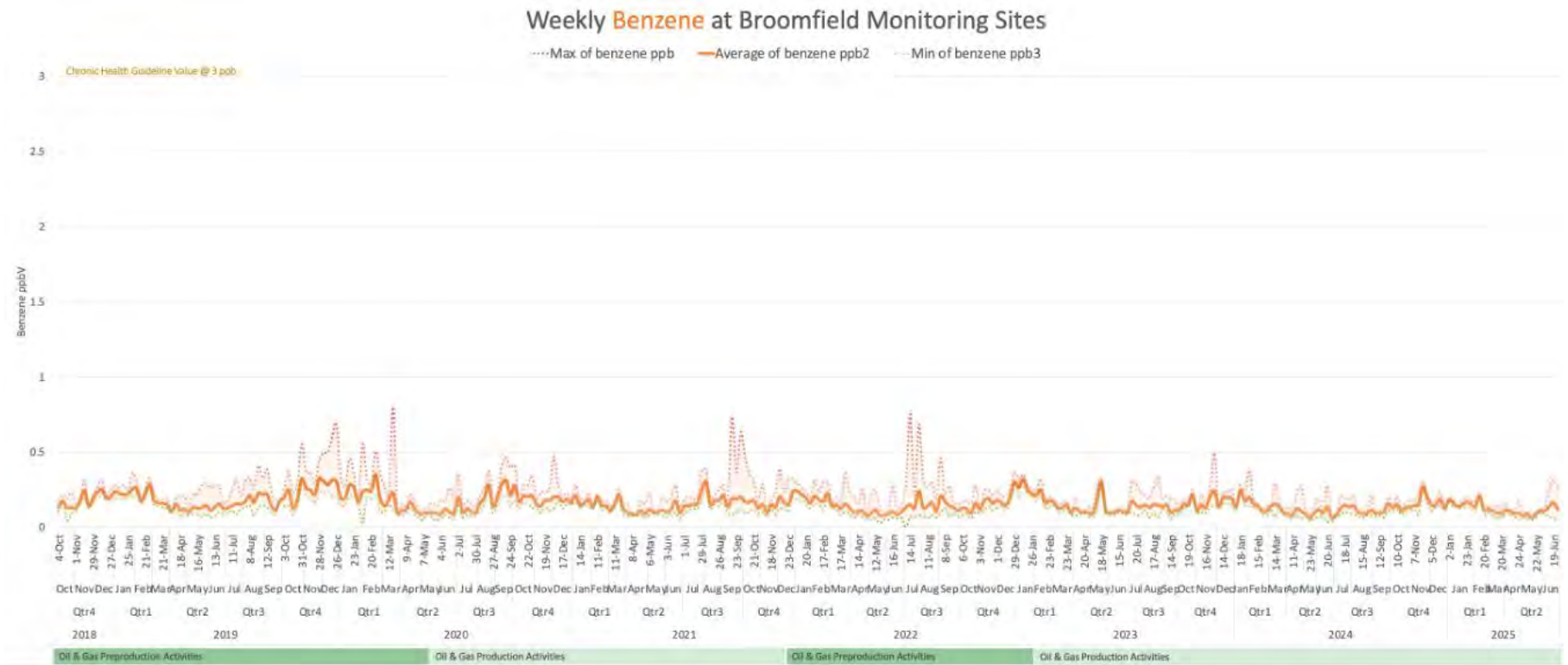


Figure 3: 7-Day benzene sample minimum (green), average (orange), maximum (red).

BTEX

The sum of benzene, toluene, ethylbenzene, and xylenes (BTEX) is a combined air pollutant group with multiple sources. Measurements can reflect emissions from oil and gas activity at sites near an active well pad and are often influenced by other combustion sources such as traffic. The weekly BTEX concentration was 0.37 in Q2, a slight decrease from the Q1 average concentration of 0.46 ppb.

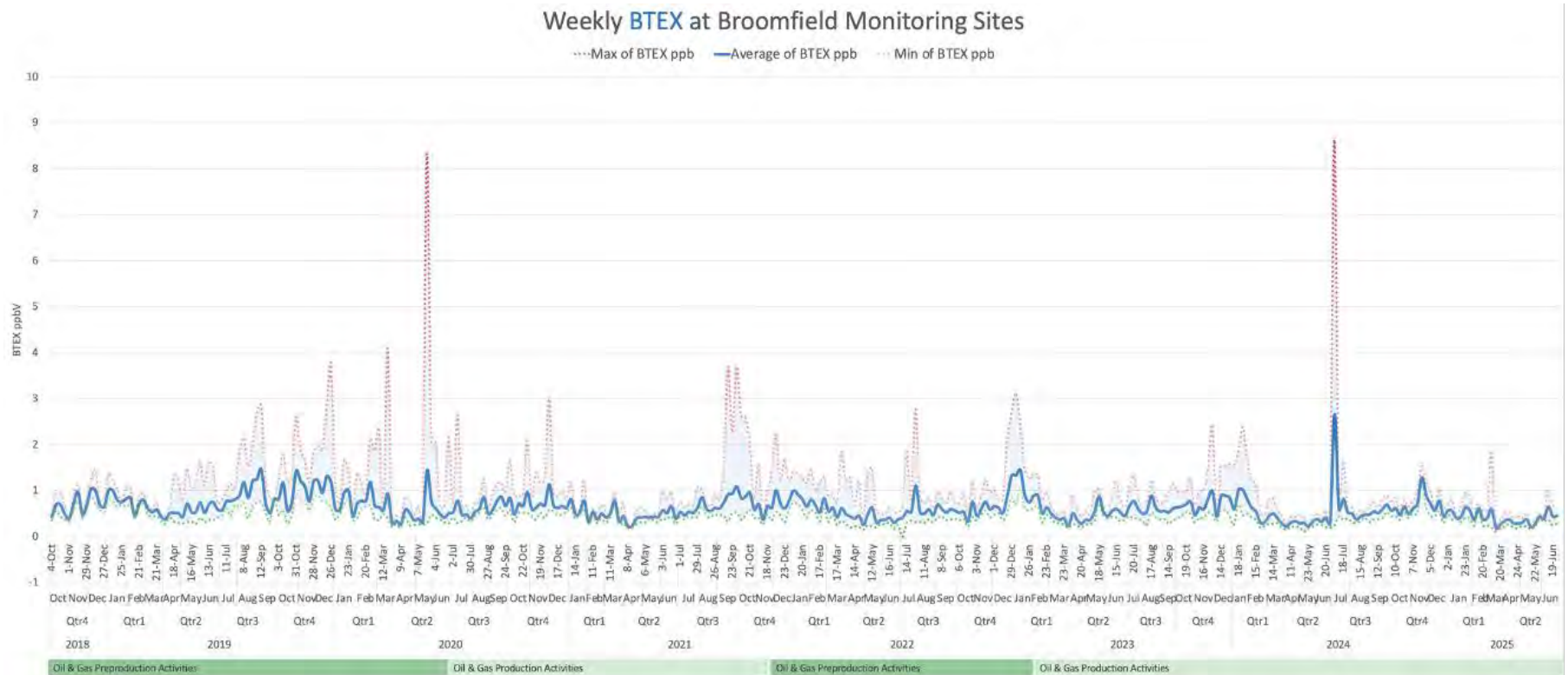


Figure 4: Weekly BTEX sample minimum (green), average (blue), maximum (red).

Methane

Methane is very prevalent in the atmosphere, measured in parts-per-million, rather than parts-per-billion like other VOCs. Methane is closely watched as it is a potent greenhouse gas.

In Figure 5, a wider range between monitoring sites is indicative of a localized methane source, while a narrow range is indicative of consistent regional background methane concentrations. Smaller sources of methane can be difficult to detect, as small local increases can be difficult to separate from regular fluctuations in the background concentration. The Front Range Landfill located in Erie, ~2-miles North of Broomfield, is one of the most

prevalent and consistent sources of methane in the local region; the broader region also sees large emissions from oil and gas operations across the DJ Basin and large animal feeding operations.

The average methane concentration for Q2 2025 was 2.06 ppm, consistent with background concentrations for the region.

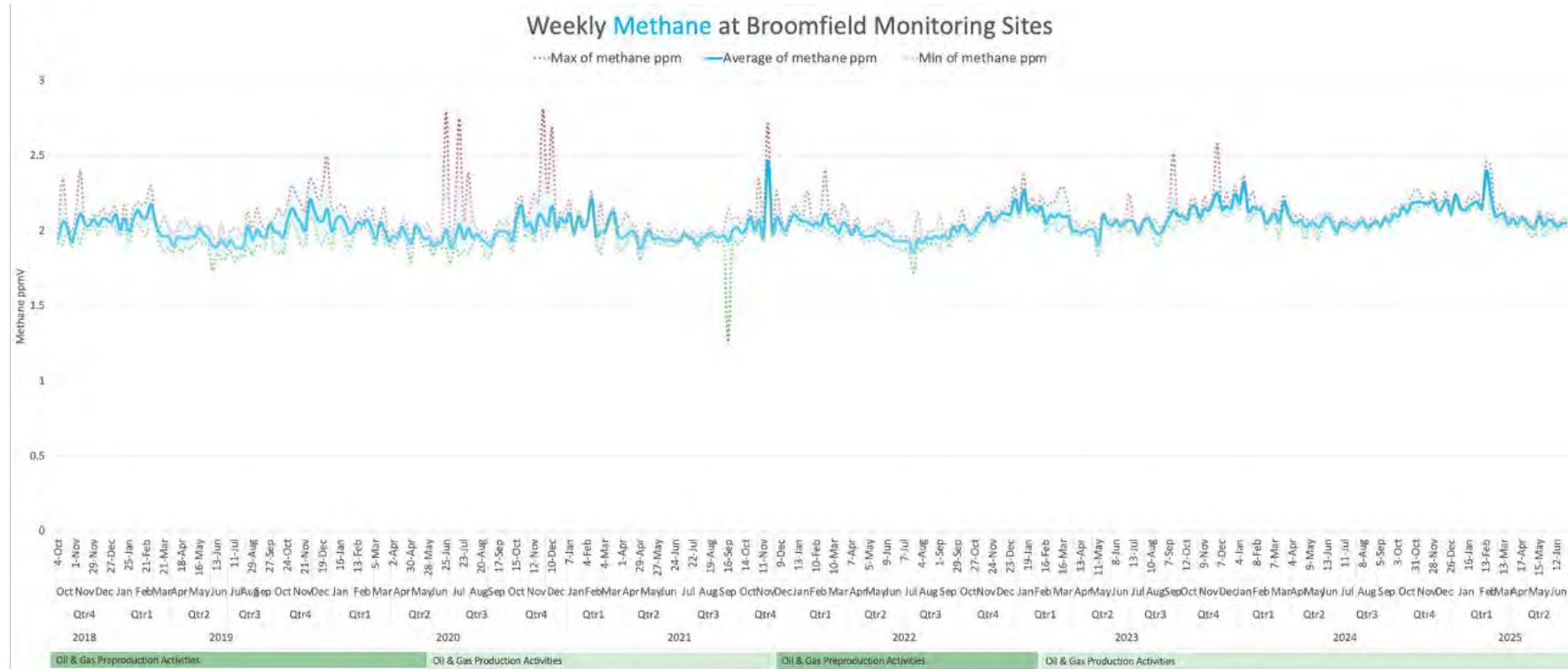


Figure 5: Weekly methane sample minimum (green), average (blue), maximum (red).

1.2 Summary of Short-Term Monitoring Data

The monitoring area includes a combination of urban activity, residential neighborhoods, and industrial oil & gas development. It is important to note that these short-term measurements cannot be compared to acute health guideline values without estimating the hourly concentration. Most health

guideline definitions require a minimum duration of exposure at a certain concentration. Acute health guideline durations are typically defined for 1-hour of exposure or greater while the triggering samples are collected only over a 1-minute window of time.

The continuous sensor systems auto-triggered 23 canister samples in Q2 2025, 2 of which could not be analyzed due to trigger mechanical failures. Therefore, 21 events were able to be characterized by lab-analysis. Table 2 below presents key metrics for the triggered canisters along with 1-hour concentration estimates for select compounds. The highest benzene concentration (114.8 ppb) was measured in a plume detected near the United 2 pad. This plume intercepted the sensor for 10 minutes and the 1-hour estimated benzene concentration for this event was 15.6 ppb, exceeding the ATSDR 9 ppb HGV for acute exposure.

TABLE 2: AUTO-TRIGGERED CANISTER SAMPLES IN Q2 2025

Event Date	Monitoring Site	Triggering TVOC Indicator (mV)	Event Max TVOC Indicator (mV)	Observed Duration	Measured TVOC (ppb)	Measured BTEX (ppb)	Measured Benzene (ppb)	1-hr Benzene Estimate (ppb)	Weekly Average Measured TVOC (ppb)
4/24/25 11:44 pm	Northwest Parkway 4	500	1,020	34 h	6.6	0.61	0.12	0.14	5.93
4/25/25 2:56 am	Northwest Parkway 4	800	1,020	34 h	6.5	0.58	0.23	0.26	5.93
4/25/25 9:32 am	Northwest Parkway 4	800	1,020	34 h	7.1	0.60	0.16	0.16	5.93
*4/25/25 11:53 pm	Northwest Parkway 4	500	1,020	34 h	N/A	N/A	N/A	N/A	5.93
4/30/25 7:52 pm	Northwest Parkway 4	500	593	1 m	5.7	0.25	0.08	0.16	5.93
*5/1/25 8:23 am	Livingston 4	500	680	2.5 h	N/A	N/A	N/A	N/A	6.3
5/7/25 4:15 am	Northwest Parkway 4	500	1,914	5 m	29148.0	0.83	0.18	0.16	6.3
5/7/25 4:15 am	Northwest Parkway 4	800	1,914	5 m	2464.8	4.98	1.92	0.28	6.3
6/3/25 9:04 am	United 2	500	3,288	30 h	11.6	2.17	1.25	0.48	14.78
6/3/25 9:04 am	United 2	800	3,288	30 h	8.2	0.46	0.20	0.18	14.8
6/5/25 9:29 am	United 2	500	2,284	30 h	10.0	0.30	0.13	0.17	12.4

6/5/25 9:29 am	United 2	800	2,284	30 h	9.5	0.47	0.14	0.17	12.4
6/3/25 7:40 pm	Northwest Parkway 4	500	1,059	10 m	3.5	0.24	0.16	0.16	12.4
6/3/25 7:41 pm	Northwest Parkway 4	800	1,059	10 m	27.4	1.87	0.94	0.20	12.4
6/16/25 3:46 pm	United 2	500	2,035	10 m	3159.3	1,435.2	114.8	15.6	13.7
6/16/25 3:46 pm	United 2	800	2,035	10 m	658.1	289.2	18.48	1.5	13.7
6/17/25 4:02 am	Northwest Parkway 4	500	964	4 m	12.5	1.94	0.19	0.16	13.7
6/17/25 4:02 am	Northwest Parkway 4	800	964	4 m	11.0	1.06	0.22	0.16	13.7
6/17/25 2:00 pm	Northwest Parkway 4	500	1,115	5 m	2.7	0.23	0.10	0.16	13.7
6/17/25 2:00 pm	Northwest Parkway 4	800	1,115	5 m	9.7	0.69	0.10	0.16	13.7
6/20/25 12:37 pm	Livingston 4	500	510	30 m	81.6	8.39	1.38	0.22	13.7
6/25/25 7:19 pm	Northwest Parkway 4	500	977	1 h	6.71	0.512	0.10	0.15	11.25
6/25/25 7:19 pm	Northwest Parkway 4	800	977	1 h	9.45	1.0	0.15	0.16	11.25

*Triggered canisters could not be analyzed due to mechanical failures of the canister inlets. *THE ONE HOUR ESTIMATING MODEL USED FOR THESE CALCULATIONS HAS BEEN PUBLISHED HERE: AJAX ANALYTICS, INC., & BUCK, B. (2025). METHOD FOR VOC CONCENTRATION ESTIMATES FROM PID SIGNALS WITH TRIGGERED WHOLE-AIR CANISTER SAMPLES. AJAX ANALYTICS, INC. [HTTPS://DOI.ORG/10.5281/ZENODO.15150148](https://doi.org/10.5281/ZENODO.15150148)*

1.3 Weekly Canister Data Analysis

The monitoring data from Q2 saw an increase in triggered canister events, with consistent patterns of increases in Heavy VOC compounds. Taking a closer look at the weekly canister data and historical network data, we identify a regional increase in similar compounds throughout Q2 2025. As seen in Figure 6, box and whisker plots for Heavy VOC compounds throughout 2024 and 2025 show significant Q2 2025 increases, particularly in the June 2025 distributions. The historical network average for Heavy VOCs since the end of pre-production operations in early 2023 is 0.41 ppb. The June 2025 average was 0.67 ppb, with a maximum measurement of 2.1 ppb observed during the week of June 12th.

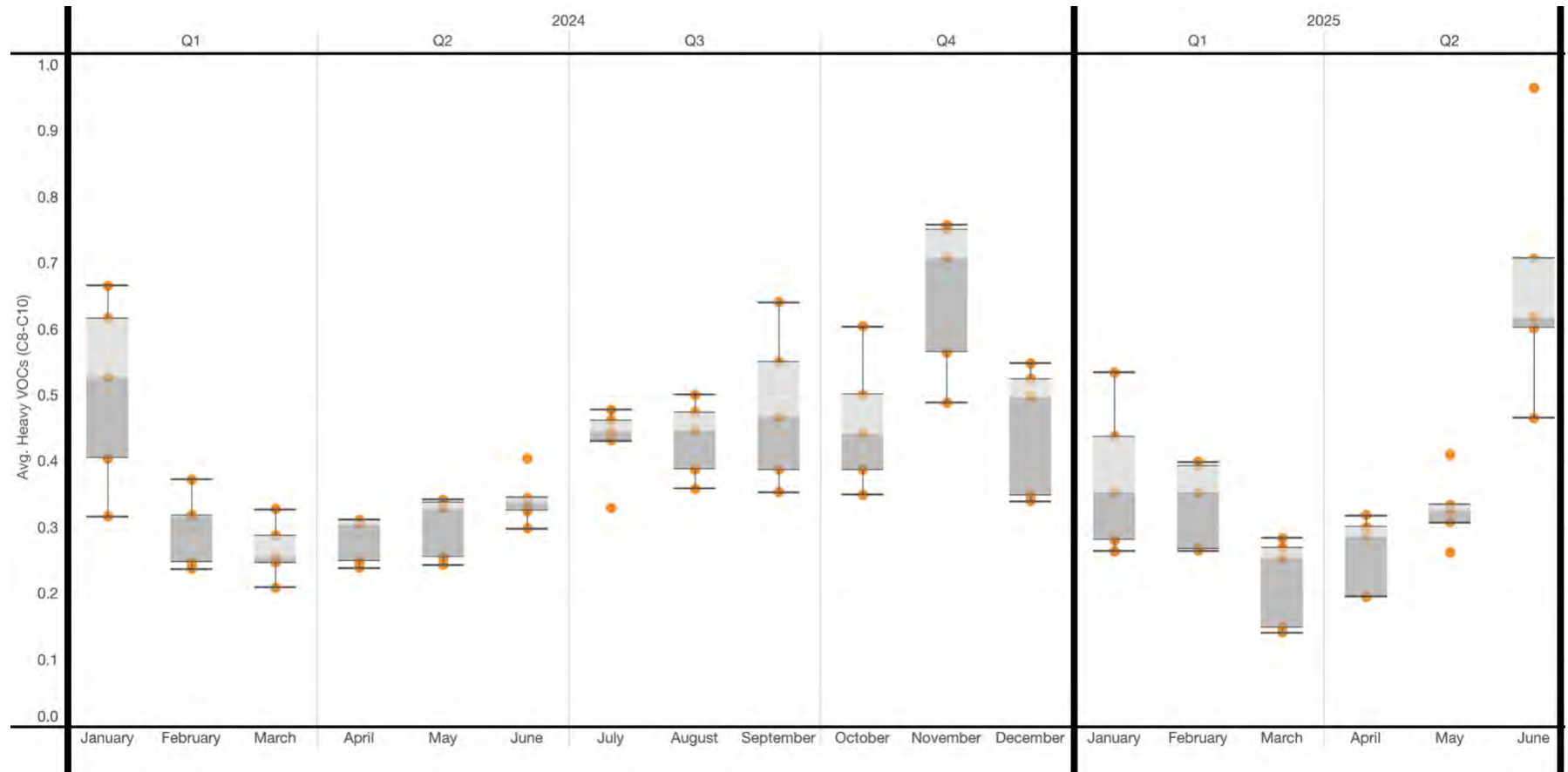


FIGURE 6: BOX AND WHISKER PLOTS OF HEAVY VOC CONCENTRATION DISTRIBUTIONS THROUGHOUT 2024 AND 2025. THE BOX REPRESENTS THE 2ND AND 3RD QUANTILES OF THE DATA. THE WHISKERS EXTEND 1.5 TIMES THE INTERQUARTILE RANGE.

There are 23 individual compounds that make up the classification Heavy VOCs shown in Table 3 below. There were elevations in 4 individual Heavy VOC compounds throughout Q2; isopropylbenzene, n-octane, n-nonane, and n-decane. These elevations are displayed in Figure 7 and compared to Q1 and Q2 2024 concentrations for both historical and seasonal context. For context with respect to health guideline values for these compounds, the observed concentrations in the weekly canister data are well below the 1-hour acute exposure limit for each compound, as described in Figure 7.

TABLE 3: COMPOUNDS INCLUDED IN THE CLASSIFICATION OF HEAVY VOCs.

2,2,4-trimethylpentane	isopropylbenzene
methylcyclohexane	n-propylbenzene
2,3,4-trimethylpentane	3-ethyltoluene
toluene	4-ethyltoluene
2-methylheptane	1,3,5-trimethylbenzene
3-methylheptane	2-ethyltoluene
n-octane	1,2,4-trimethylbenzene
ethylbenzene	n-decane
m+p-xylene	1,2,3-trimethylbenzene
styrene	1,3-diethylbenzene
o-xylene	1,4-diethylbenzene
n-nonane	

The distributions of Heavy VOC compound increases show that the Q2 increases are not likely related to seasonal patterns. For example, the January 2021 distributions are in some cases more increased than those in June 2025. This combination of straight-chain alkanes and aromatic hydrocarbons is characteristic of petroleum-derived emissions. Potential sources include evaporative losses from gasoline or diesel fuel, venting from oil and gas condensate tanks, fuel storage and handling operations, or industrial processes involving hydrocarbon solvents. The concurrent increases in weekly canister and triggered canister data across these compounds suggest a common and consistent oil & gas-related source rather than a series of isolated occurrences.

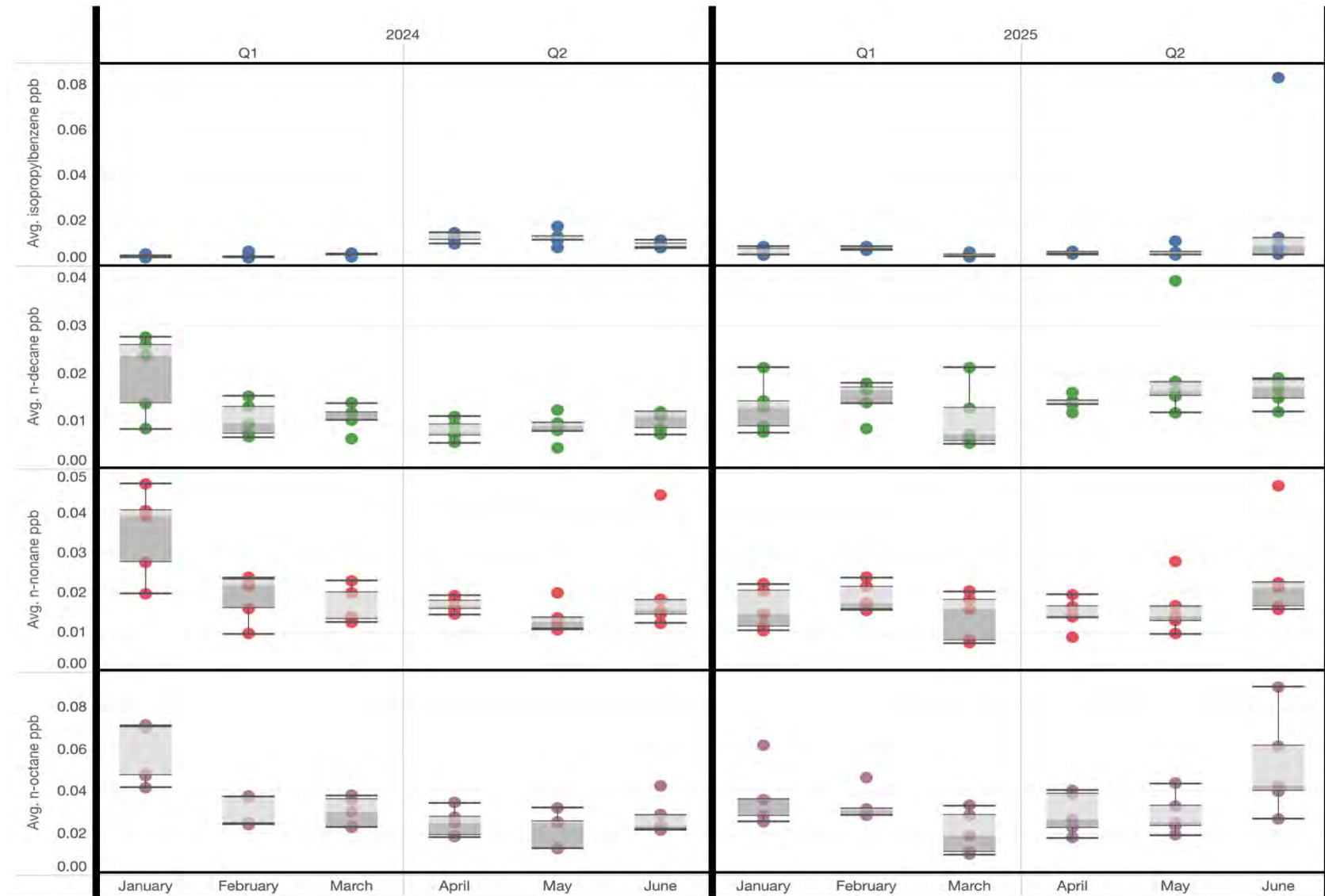


Figure 7: Heavy VOC concentrations for Q1 and Q2 of 2024 and 2025, broken down into four compounds: isopropylbenzene, n-decane, n-nonane, and n-octane. The respective HGVs for these compounds are 510 ppb, 1,000 ppb, 3,000 ppb, and 4,100 ppb.

1.4 Regional Particulate Matter Analysis

PM_{2.5} refers to fine particulate matter with a diameter of 2.5 micrometers or smaller. Due to the small size, these particles are often of concern due to the airborne risk of penetrating deep into the respiratory tract and even entering the cardiovascular system. PM_{2.5} originates from various sources, including combustion processes, industrial emissions, vehicle exhaust, and natural events such as wildfires. A large portion of PM_{2.5} is typically found in the atmosphere as a result of oxidation and gas-particle partitioning of gaseous pollutant emissions, including nitrogen oxides, sulfur dioxide, and organic compounds. Monitoring and controlling PM_{2.5} levels is critical for protecting public health and improving air quality.

In this analysis, we've compared Broomfield PM concentrations to those measured by various CDPHE programs from the surrounding regions along the Front Range. We've looked at stations with available PM_{2.5} data within a 15 square mile area surrounding the City and County of Broomfield. Please note that due to the size and lack of PM sensor data available, Weld County was not included in this analysis.

For our 3 PM_{2.5} monitoring stations in Broomfield, the data was collected using Plantower PMS7003 laser PM_{2.5} sensors connected to Sensit Technologies SPOD Air Quality Monitors. For the Broomfield stations, data was collected at 10-second intervals, averaged over 1-minute. While these images provide a general glance into the air qualities of the surrounding counties, due to the use of different equipment and data resolutions, the maps provide a generalized look into Front Range air quality, rather than a concrete comparison.

PM_{2.5} values are averaged using data from all available monitoring stations within each county and interpreted according to county boundaries. Please note that PM_{2.5} concentrations can vary significantly at both local and regional levels, and even within a county, levels may fluctuate slightly depending on emissions near a specific location. Overall, PM_{2.5} levels in Broomfield, while measuring slightly higher than surrounding counties, are generally in a similar range compared to nearby counties. The slight elevations are within the uncertainty of the measurement method. It is also important to recognize that the stations measuring PM in Broomfield are near active oil and gas production facilities, while the other CDPHE sensors are located in common "background" locations. Across all counties, June showed higher PM_{2.5} averages compared to April and May.

The analysis shows that Broomfield's PM levels are very similar to those in surrounding counties. While Broomfield monitors PM near oil and gas activity and measured slightly higher values compared to "background" locations in other counties, the differences are very small and inconsequential. In fact, the data show that all counties experienced higher PM in June compared to April and May. Overall, PM_{2.5} levels across the Front Range, including Broomfield, remain within ranges, reflect expected seasonal variations, and do not raise health concerns. PM_{2.5} concentrations along the Front Range, including the slightly elevated values observed in Broomfield, remain well within Air Quality Index (AQI) ranges that do not indicate any health concerns, despite the slightly higher averages measured in June. Any differences between counties appear minor, and measured PM_{2.5} averages are not at levels considered a risk to public health.

PM 2.5 Averages ($\mu\text{g}/\text{m}^3$) April

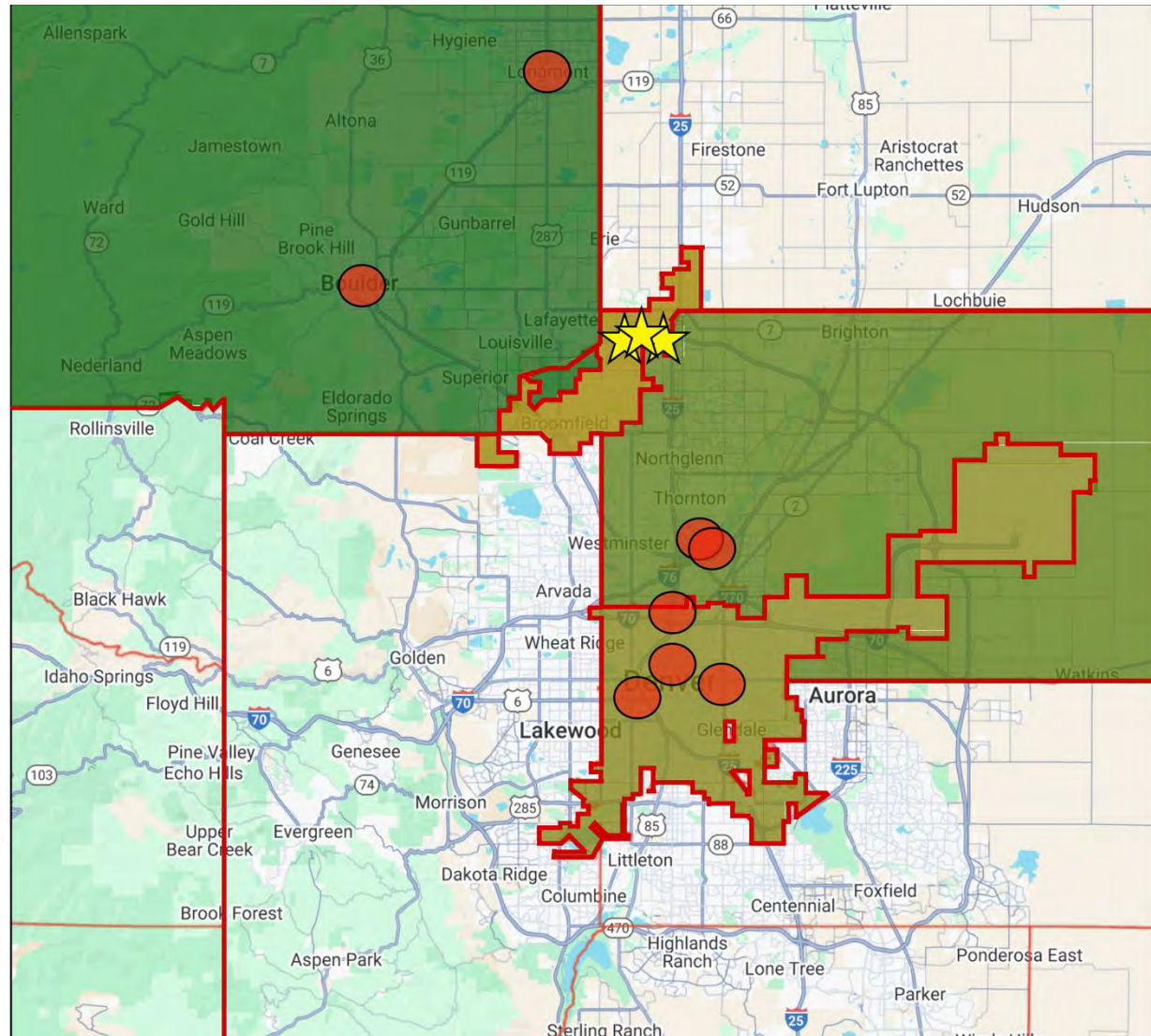
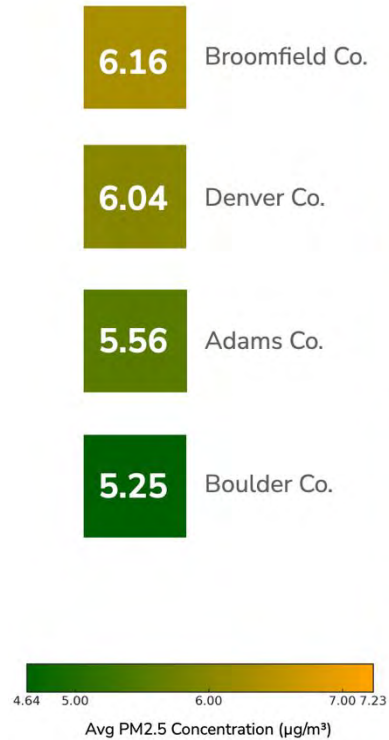


Figure 8: April county-wide PM_{2.5} average concentrations as measured by 3 Ajax stations in Broomfield County (Interchange 1, Northwest Parkway 3, Livingston 4), 2 CDPHE stations in Boulder County (Longmont-Municipal, Boulder-CU/Athens) 2 CDPHE stations in Adams County (Welby, Adams Birch Street), 4 CDPHE stations in Denver County (I-25 Globeville, I-25-Denver, CAMP, National Jewish Hospital). Red circles represent CDPHE stations. Yellow stars represent Ajax stations.

PM 2.5 Averages ($\mu\text{g}/\text{m}^3$) May

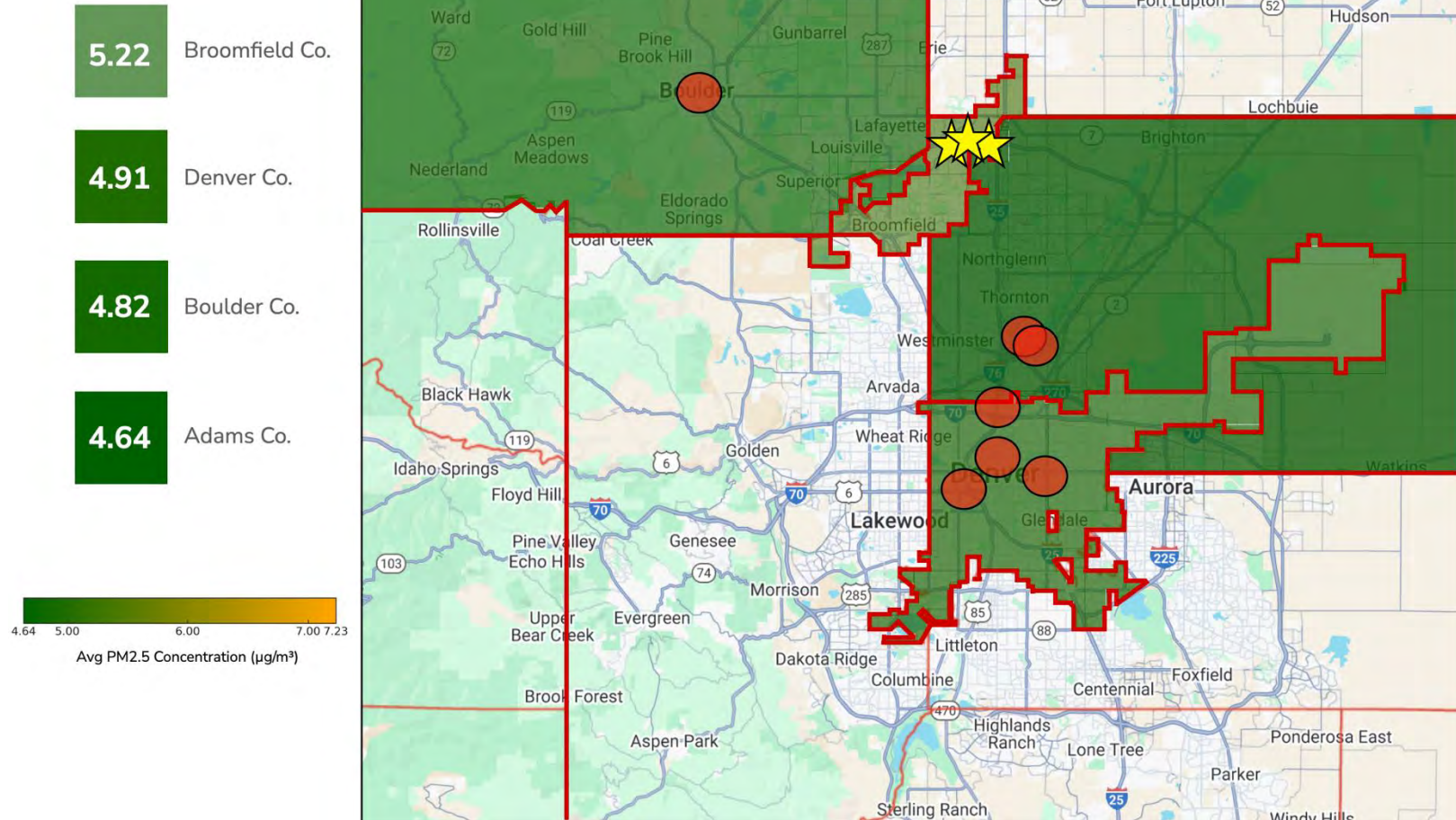


Figure 9: May county-wide PM_{2.5} average concentrations as measured by 3 Ajax stations in Broomfield County (Interchange 1, Northwest Parkway 3, Livingston 4), 2 CDPHE stations in Boulder County (Longmont-Municipal, Boulder-CU/Athens) 2 CDPHE stations in Adams County (Welby, Adams Birch Street), 4 CDPHE stations in Denver County (I-25 Globeville, I-25-Denver, CAMP, National Jewish Hospital). Red circles represent CDPHE stations. Yellow stars represent Ajax stations.

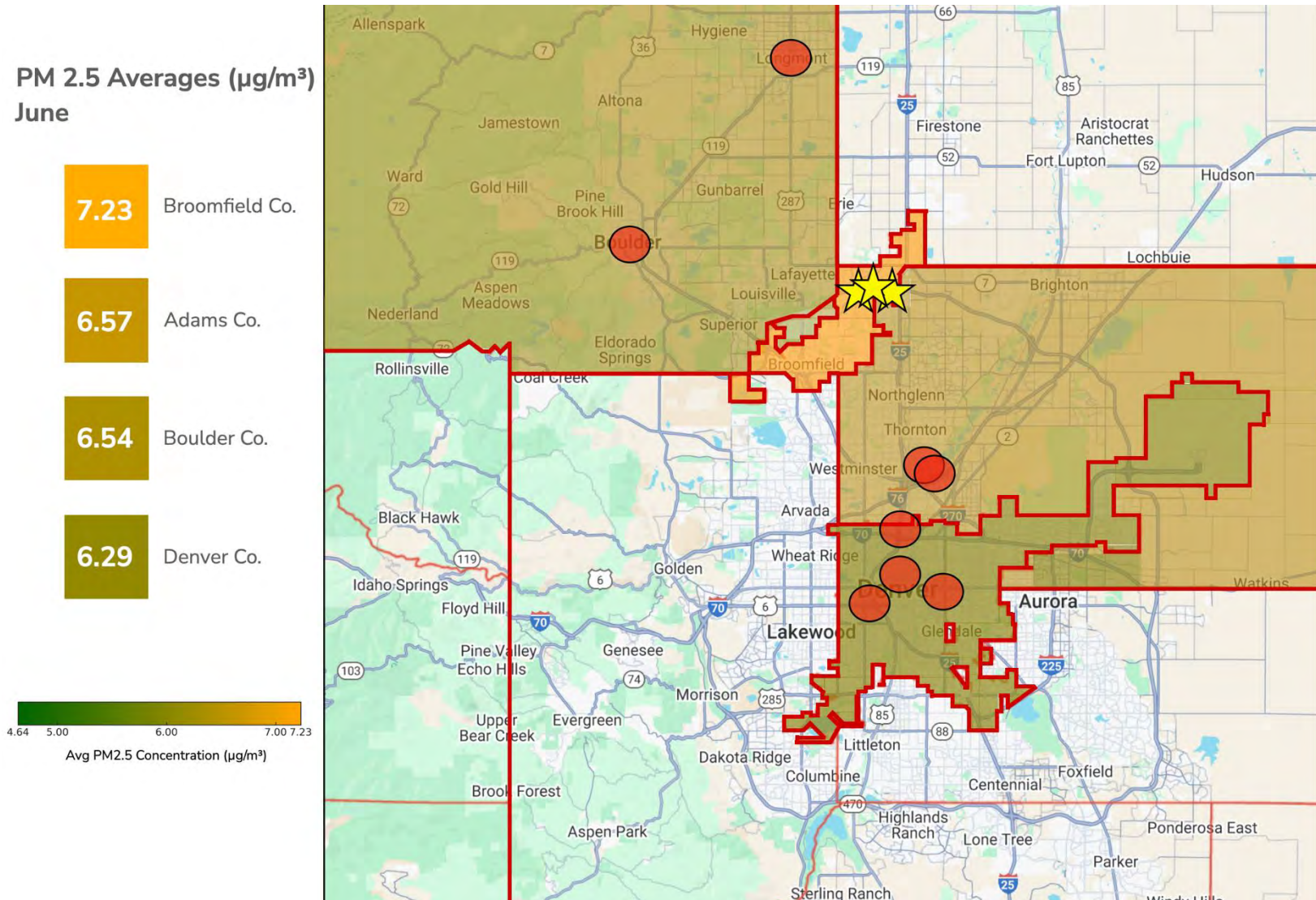


Figure 10: June county-wide PM_{2.5} average concentrations as measured by 3 Ajax stations in Broomfield County (Interchange 1, Northwest Parkway 3, Livingston 4), 2 CDPHE stations in Boulder County (Longmont-Municipal, Boulder-CU/Athens) 2 CDPHE stations in Adams County (Welby, Adams Birch Street), 4 CDPHE stations in Denver County (I-25 Globeville, I-25-Denver, CAMP, National Jewish Hospital). Red circles represent CDPHE stations. Yellow stars represent Ajax stations.

2. CONCLUSIONS

Broomfield's monitoring network continues to provide high-resolution air quality data that enhances our ability to identify emission sources and evaluate variations between monitoring sites. Updates to monitoring technologies have expanded the quality and comparability of these datasets, supporting more robust analyses.

This quarter, 21 short-term VOC events were recorded. Increases in straight-chain alkanes and aromatic hydrocarbons, compounds characteristic of petroleum-derived emissions, were consistently observed across monitoring locations in both triggered canister and weekly canister data. These patterns suggest ongoing oil and gas-related activity or other industrial sources.

The continued development of this long-term dataset is critical for regulatory, industrial, and scientific stakeholders. It provides evidence to support standards from agencies such as the EPA and Colorado's Air Pollution Control Division, while also offering insight to guide best practices that can reduce emissions from both oil and gas operations and other urban sources.

Looking ahead, these datasets will be leveraged to conduct deeper trend analyses, assess the effectiveness of emission reduction strategies, and refine source attribution methods. This forward-focused approach ensures that Broomfield's monitoring program not only documents current conditions but actively contributes to shaping cleaner practices in the future.