

Exceptional Events Waiver Request

For PM_{2.5} Events During the 2023 and 2023 Wildland Fire Seasons in the Fairbanks North Star Borough, Alaska

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Introduction

The Fairbanks North Star Borough (FNSB) covers an area of 7,361 square miles and has a population of approximately 95,356 residents¹. Fairbanks is situated on the banks of the Chena River in the upper Tanana Valley in the interior region of Alaska. North of the FNSB are low hills that border the Tanana Valley (Figure 1). Interior Alaska experiences average winter temperatures ranging between -2°F and -19°F and average summer temperatures ranging between 53°F and 72°F. Temperatures have been recorded as low as -78°F in mid-winter, and as high as 93°F in summer. Average annual precipitation is 11.3 inches and ice fog is common during the winter. The extremes in day length in the FNSB range from 21 hours of direct sunlight between May 10 and August 2 to less than four hours of direct sunlight between November 18 and January 24.

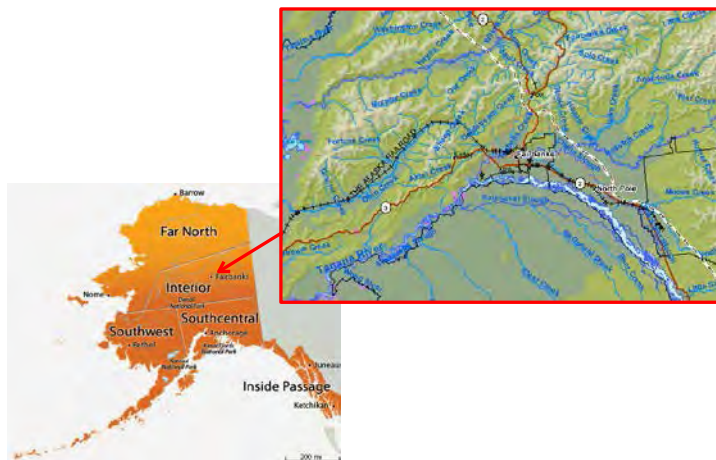


Figure 1. Map of Alaska and inset showing Tanana Valley, Fairbanks, and North Pole.

In December of 2009, the Environmental Protection Agency (EPA) designated 244 square miles (3.3%) of the FNSB as a PM_{2.5} non-attainment area (Figure 2). This area encompasses the cities of Fairbanks and North Pole with an estimated population of over 83,000 residents (83.3% of FNSB). During the summer months (May through September), the main source of elevated PM_{2.5} concentrations is smoke from wildland fires. During the winter months (October through March), local home heating emissions are the dominant PM_{2.5} source², to a much greater extent than industrial or mobile source emissions.

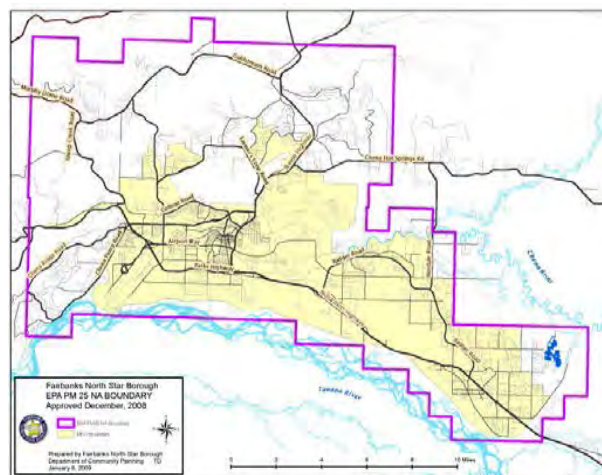


Figure 2. Map of PM_{2.5} non-attainment area in Fairbanks North Star Borough; purple lines indicate boundary.

¹ <https://censusreporter.org/profiles/05000US02090-fairbanks-north-star-borough-ak/>

² <http://dec.alaska.gov/air/anpms/communities/fbks-particulate-matter/>

In the summers of 2022 and 2023, the Fairbanks North Star Borough's 24-hour average PM_{2.5} nonattainment area experienced high levels of PM_{2.5} due to wildland fires. As a response, the Alaska Department of Environmental Conservation (DEC) has drafted this document for an Exceptional Event Waiver Request (EEWR). This waiver seeks to omit the elevated PM_{2.5} levels resulting from wildland fire emissions during regulatory assessments, in line with Section 319(b)(3)(B) of the Clean Air Act.

During the 2022 and 2023 wildland fire seasons, the Alaska Department of Environmental Conservation (DEC) Air Quality Program operated three official monitoring stations using both Federal Reference Method (FRM) PM_{2.5} monitors and Beta Attenuation Monitors (BAM). The FRM measures daily average PM_{2.5} concentrations, while BAM monitors offer hourly averages, allowing for the display of Air Quality Index (AQI) information on DEC's website.

The continuous BAM analyzer data is primarily utilized by DEC to issue air quality advisories and to initiate burn restrictions during winter for the FNSB nonattainment area. The EEWR incorporates data from BAM monitors from the regulatory sites as supplementary information. In 2023 the A-Street site BAM was switched to a FEM, all other BAMs were operated as non-FEMs.

Monitors included in the EEWR are:

- Fairbanks A-Street Site (AQS Site ID 02-090-0040) with:
 - a. FRM 02-090-0040-88101-1 (measured every day)
 - b. BAM 02-090-0034-88501-3 (hourly readings) in 2022
 - c. BAM 02-090-0034-88101-3 (hourly readings) in 2023

- Fairbanks NCore Site (AQS Site ID 02-090-0034) with:
 - a. FRM 02-090-0034-88101-1 (measured day)
 - b. FRM 02-090-0034-88101-2 (measured every third day)
 - c. BAM 02-090-0034-88501-3 (hourly readings)

- Hurst Road Site (AQS Site ID 02-090-0035) with:
 - a. FRM 02-090-0035-88101-1 (measured every day)
 - b. FRM 02-090-0035-88101-2 (measured every third day)
 - c. BAM 02-090-0035-88501-3 (hourly readings)

All monitors recorded several instances where the daily PM_{2.5} concentrations exceeded either the 24-hour average National Ambient Air Quality Standard (NAAQS) of 35 µg/m³ or the annual

This includes multiple exceedances due to the nature of the events in 2022 and 2023. It is impossible to attribute individual exceedances to specific fires; instead, the wildland fire seasons in 2022 and 2023 are treated as two wildland fire season events. Both events are combined in this EEWL due to the upcoming designation due to the revised annual PM_{2.5} NAAQS. This EEWL follows the steps outlined in the Exceptional Events Rule, finalized in 2016, and includes the elements required in 40 CFR 50.14(c)(3)(iv):

- 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).
- 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.
- 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.
- A demonstration that the event was both not reasonably controllable and not reasonably preventable.
- A demonstration that the event was a human activity that is unlikely to recur at a particular location or was a natural event.

Conceptual Model

2022 Wildland Fire Season

The event began in mid to late May 2022 and lasted through the middle of July. All wildland fires depicted in Figure 3, the 2022 Fire Complex Map, were caused by lightning. Thirty-one of the thirty six fires depicted ignited between June 19-29, 2022. During the 2022 wildland fire season, the fire complex to the west of the FNSB burned at varying intensities. The dry conditions and gradient wind flow patterns significantly contributed to the production and transport of smoke throughout Interior Alaska.

Out of the 50 fires within a 200 km radius of the Fairbanks NCore monitor, 20 were of notable size and were active smoke producers. While a few were located within 100 km, most fires to the west were located approximately 200 km or farther away from the FNSB nonattainment area. Aside from the lightning strikes that ignited all the fires, the westerly low and mid-level wind flow was a significant factor in transporting smoke, leading to elevated $PM_{2.5}$ concentrations in FNSB. When winds transitioned from the east or when a frontal system passed over the Interior, FNSB's $PM_{2.5}$ concentrations dropped to more typical summertime levels. Figure 3 illustrates the fire perimeters from late May to mid-July that contributed to the FNSB increases in $PM_{2.5}$ levels. Figure 4 illustrates the prescribed fire perimeters during May 2022.

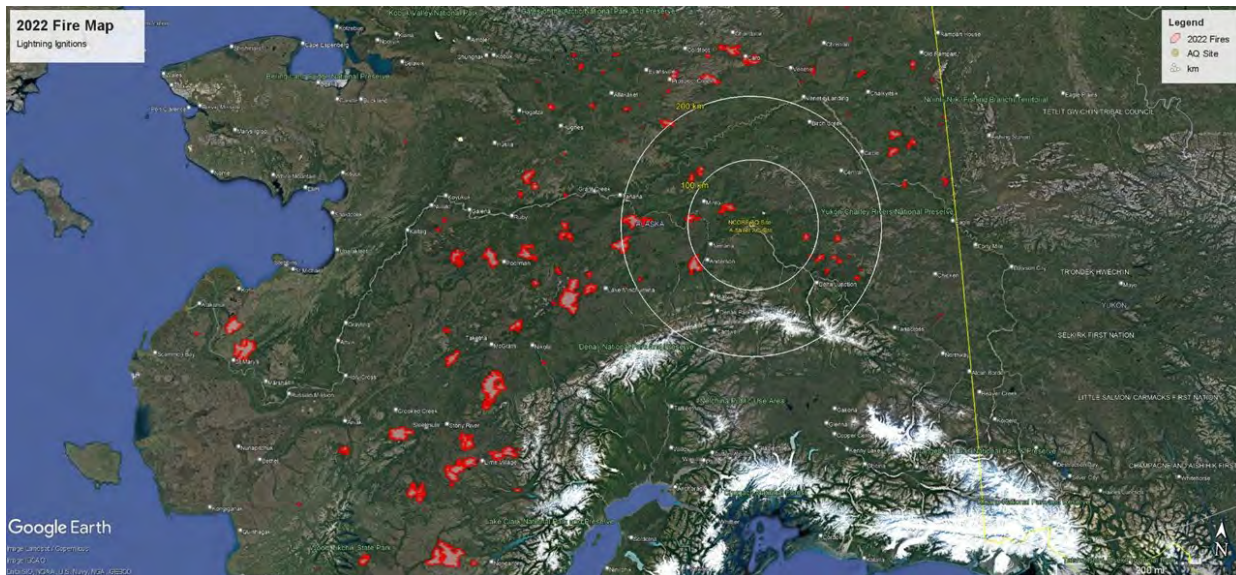


Figure 3. Interior wildland fires during the May-July event are outlined in red. The shaded fire plots are estimated from satellite burn scars during the 2022 fire season.

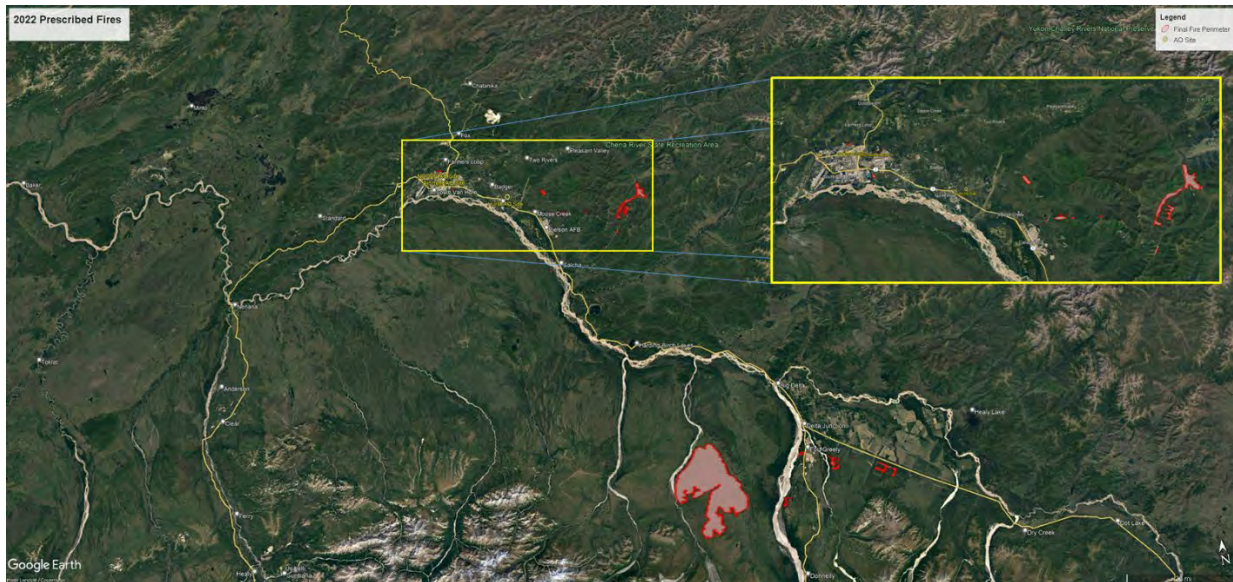


Figure 4. Prescribed fires during the month of May are outlined in red. The shaded fire plots are estimated from satellite burn scars during the 2022 fire season.

DEC staff collected daily samples from the Federal Reference Method (FRM) monitors at the three monitoring locations within the nonattainment area. These samples document the smoke impact resulting from the wildland fire event. Between June 12 and July 12, 2022, the FRM monitors located at the Fairbanks NCore, Fairbanks A-Street, and North Pole Hurst Road sites reported increased $PM_{2.5}$ concentrations on 31 sample days. (Table 2)

Although not every 24-hour concentration exceeded the 24-hour National Ambient Air Quality Standard (NAAQS) of $35 \mu\text{g}/\text{m}^3$, each day recorded at least one site with $PM_{2.5}$ concentrations exceeding the annual NAAQS of $9 \mu\text{g}/\text{m}^3$, which is higher than usual for summer conditions without wildland fires. In the nonattainment area, during summer months without wildland fires, the peak 24-hour average $PM_{2.5}$ concentrations typically range between 3 and $6 \mu\text{g}/\text{m}^3$.

Table 2. 2022 FRM/BAM PM_{2.5} concentrations in µg/m³ at the NCore, A-Street and Hurst Road sites

May									June									July								
24-Hour PM _{2.5} Concentrations (µg/m ³)									24-Hour PM _{2.5} Concentrations (µg/m ³)									24-Hour PM _{2.5} Concentrations (µg/m ³)								
Date	NCore FRM 1	NCore FRM 2	NCore BAM	A-St FRM	A-St BAM	HURST FRM 1	HURST FRM 2	HURST BAM	Date	NCore FRM 1	NCore FRM 2	NCore BAM	A-St FRM	A-St BAM	HURST FRM 1	HURST FRM 2	HURST BAM	Date	NCore FRM 1	NCore FRM 2	NCore BAM	A-St FRM	A-St BAM	HURST FRM 1	HURST FRM 2	HURST BAM
1	3.1		2.2	3.3		6.6			1	5.8	5.7	5.9	5.5	3.8	9	9.1	9.3	1	73.1	71.8	73.5	65.8	69.5	55.7	56	62.4
2	3.2	AF	2	2.8		5.4	AF		2	4.3		3.2	3.7	3	AF		6.9	2	58.4		62.5	46.8	50.7	60.3		68
3	2.5	AF	0.8	2.7	2.8	4.3			3	4.6		4	4.5	4.9	AF		8.5	3	65.8		68.8	65.4		87.2		97
4	2.3		1.5	2.6	1	AF			4	2.3	2.4	1.7	2.1	0.2	AF	AF	5	4	67.4	AF	70.3	64		67.1	67.4	76
5	2.6	2.5	1.9	2.8	2.2	AF	AF		5	1.8		0.8	1.7	0	4.5		4.5	5	107.1		112.2	105.7		102.6		115.7
6	2.4			2.7	2.5	AF			6	2.6		2.3	2.4	2.2	4.3		4.7	6	76.3		78.6	AF	78.1	72.5		81.3
7	2.1			3.2	3.5	2.1		3.8	7	2.8	3.2	1.8	1.9	1.6	4.2	4.2	5.9	7	56.9	57.9	61.7	57	63.2	66	66.6	77.7
8	2.2	2.9		2.3	-0.4	2.2	2	3	8	1.4		-0.1	1.1	0.3	3.7		2.8	8	30.2		31.5	AF	33.7	32.4		37.8
9	1			0.9	-0.4	1.2		1.9	9	1.3		-0.3	1	0.2	2.2		2	9	142.3		139.7	140.3	145.5	108.2		117.9
10	0.9			1	0.7	0.6		1.7	10	1.7	1.5	0.4	1.3	0	AF	AF	6	10	AF	71.2	71.8	AF	72.5	61.1	61.6	67.8
11	0.9	1.8		1.9	-0.1	2.4	2.6	3.5	11	4.6		3.1	4.5	3.8	6		7.1	11	AF		50.8	AF	49.4	46.2		50
12	0.4			AF	1.1	3.6		4.7	12	54		54.4	52.5	54.5	48.7		54.2	12	46.5		47.8	45.7	46.9	44.7		50.5
13	1.6		-0.2	AF	1.2	AF		0.6	13	64.1	AF	64.5	62.8	64.2	61.8	60.6	67.6	13	27.1	27.3	28	27.2	29.5	27	26.1	33.3
14	1.4	AF	1.1	AF	1.3	AF	AF	3.3	14	35	36.1	35.4	35	37	35.8		40.9	14	3.6		3.3	4.1	4.2	6.7		10.3
15	1.5		0.5	AF	0.2	AF		2.5	15	21		21.9	20.8	21.7	21.5		24.7	15	9		9.1	8.8	9.3	10.2		12.8
16	1.7		1.2	AF	1.8	1.6		1.7	16	13.8	14.2	13.7	13.2	12.1	15.6	15.6	18.4	16	1.2	1.2	1.1	1.2	1.9	1.4	1.6	2.7
17	0	1.8	1	1.8	1.7	1.5	1.6	1.4	17	6.7		6.3	6.3	5.7	8.8		10.4	17	1.3		0.5	1.5	1.2	1.7		3.6
18	2.9		1	1.6	-0.1	2.6		2.3	18	10.8		10.2	10.3	10.1	10.5		13.3	18	1.6		1.5	1.5	2.3	1.5		3.7
19	4.3		2.5	2.6	1.3	3.9		5.1	19	8.2	8.4	8.8	8.5	9.2	6.9	7.1	9	19	1.3	1.2	1.8	1.1	2	1.7	1.7	4
20	5	AF	3.6	5.1	4	9.5	AF	9.9	20	5.3		5.3	5.4	5.6	5.2		7.9	20	1.3		1	1.3	2.2	1.2		2
21	2.3		4	5.1	4.5	8.1		8	21	6.6		7	5.7	6.7	TS		9.7	21	1.6		0.6	1.4	2.4	2.3		4.6
22	1.3		0.8	2.4	0.3	2.7		1.7	22	24.1	24.9	25.5	23.7	30.9	25	25.2	30.4	22	1	1.1	0.1	0.9	2.1	0.8	1	2.2
23	AF	AF	-0.2	2	0.4	2.9	AF	3.5	23	33.5		40.3	32.9	36.5	18.2		22.1	23	1.3		1	1.3	0.2	2.8		5.1
24	AN	3	2.1	2.8	1.4	3		3.4	24	46.2		51.2	40.7	43	23.3		27.8	24	2.3		0.7	2.4	3	5.8		8.7
25	4		3.1	4	3.5	5.5		6.7	25	103	104.3	108.2	103.3	110.2	44.2	44.4	50.3	25	4.2	AF	3.7	3.3	3.8	4.8	5	7.2
26	4.1	AF	3.5	4.2	4.4	3.9	4.1	4.2	26	66.1		67.3	64.1	66.1	50.9		57.1	26	0.9	7.8	0.4	1	2.1	1		2.9
27	3.1	3.4	2.5	3	2.8	5.7		6.2	27	110.1		112.5	104.2	108.9	84.2		93.7	27	1.5		0.7	1.3	1.9	1.3		3.7
28	3.8		3.6	3.8	3.2	9.6		10.3	28	216.8	230.2	208	215.6	198.8	174.8	176.1	175.2	28	1.8	AF	0.1	1.6	2.5	3.5	3.6	6.5
29	4.1	4.2	4.4	3.9	4	6.7	6.7	7.5	29	AF		60.6	AF	61.8	AF		56.8	29	2.7		1.7	2.3	2.7	8.3		13
30	3.7		2.5	3.8	3.2	8		10.4	30	94.5		92.2	84.2	89.9	75.5		84.3	30	4.7		4.1	4.3	4.7	5		6.7
31	5.4		5	5.2	4.3	13.5		13.8										31	3.6	3.3	3.4	3.4	3.2	4.4	TS	6.8

*AF – Incomplete sampling

Data in red indicate exceedances of the 24-hour NAAQS

During this timeframe, DEC flagged all daily concentrations that exceeded the updated annual NAAQS of 9 µg/m³. Some wildland fires affecting Interior Alaska started in early June and persisted throughout the entire event period. As shown in Figure 5, spikes in PM_{2.5} were correlated with the period when fires in the interior were most active, strongly indicating the western fire complex from mid-June through mid-July as the source of the exceedance. Given that smoke from multiple fires led to the elevated PM_{2.5} concentrations, DEC treated all the days in 2022 mentioned in Table 1 as a single event. Daily PM_{2.5} concentrations varied with fire growth/suppression and meteorological conditions, with wind direction being the most important component. Although the PM_{2.5} concentrations varied, the cause of the elevated PM_{2.5} levels throughout the entire period was wildland fire smoke. See the Clear Causal Relationship section for a detailed breakout of fire area and smoke (PM_{2.5}) activity.

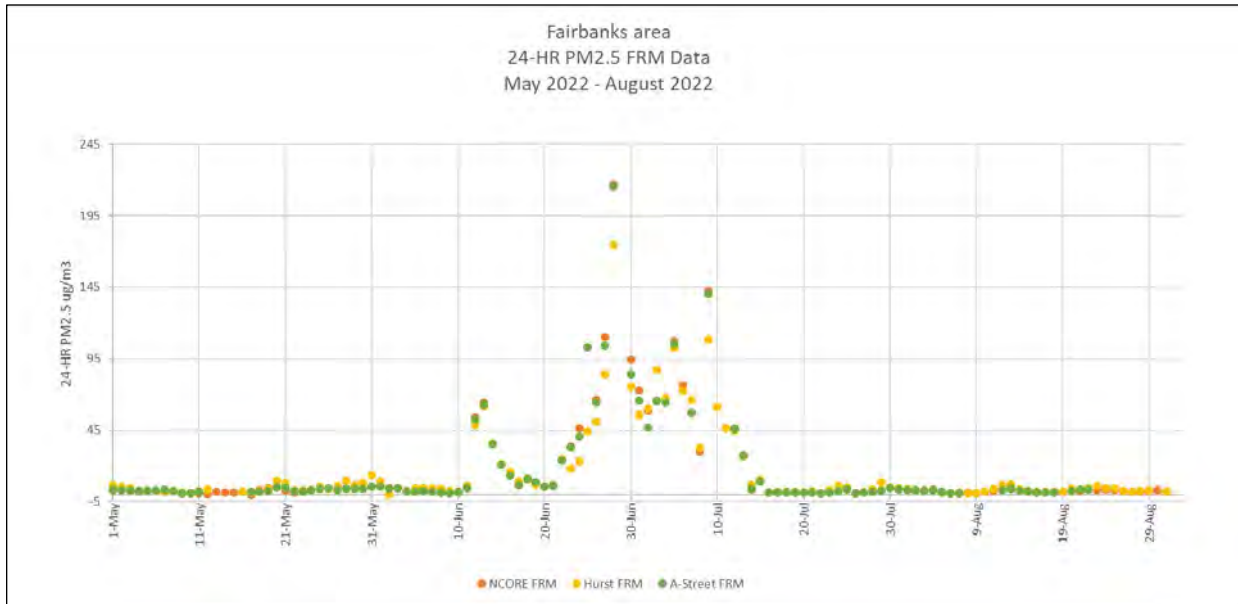


Figure 5. Fairbanks area 24-hr PM_{2.5} concentrations for May through August 2022

Meteorology

The 2022 weather during the wildland fire season in Alaska was marked by extreme variability, beginning with an unusually dry period followed by a sharp shift to wetter and cooler conditions. The season started with a dry and dramatic onset in Southwest Alaska, which expanded into the Interior, resulting in significant wildfire activity. However, by mid-July, the weather dramatically changed, with widespread rainfall and cooler temperatures moving in from the Bering Sea and Gulf of Alaska, effectively ending the fire season by the end of July.

The early part of the season, from April through June, was notably dry across Alaska, leading to the development of drought conditions, particularly in Southcentral Alaska, which experienced its driest conditions on record. The dry spell continued into June, with temperatures remaining unusually warm, and June itself setting records for dryness in many parts of the state. The first significant outbreak of thunderstorms occurred in early June, further exacerbating the fire situation with numerous lightning strikes igniting new fires.

July continued with warm and dry weather initially, but a major thunderstorm outbreak in early July led to even more wildfire activity. However, by mid-July, a significant weather shift occurred as a broad area of low pressure brought in cool and moist air, resulting in frequent rains and colder temperatures that persisted through the remainder of the summer.

By August, the active wildfire season had largely ended, with only minimal fire activity occurring as the state transitioned into a cooler and wetter pattern that lasted through September. The dramatic weather shift from extreme dryness to wetness was unprecedented, with the second half of the summer receiving more than four times the precipitation compared to the first half, a record-breaking reversal that effectively brought the fire season to an early close.

The monthly meteorological condition descriptions below from the Alaska Climate Research Center³ focus on Fairbanks and McGrath. McGrath is located 440 km (273 Miles) to the southwest of FNSB nestled up against the Kuskokwim Mountains. McGrath's and Fairbank's meteorology are the most representative of 2022 conditions contributing to the ample fuels that drove the 2022 wildfire season. Table 3 gives a daily breakdown of Fairbanks International Airport and McGrath meteorology, max temperature and precipitation totals for each day, June through August.

May 2022:

May 2022 for Fairbanks, deviated from recent meteorological mean maximum temperature at 59.5°F, which was 3.5°F cooler than the average recorded between 1991 and 2020. Despite the cooler average, temperatures still reached a significant 79.0°F on the 31st, illustrating variability and extremes possible even in cooler months. The month began with a 28.0°F, close to monthly highs, on the 1st. Notably, Fairbanks experienced a precipitation tally of 1.1 inches in May, surpassing the normal by 0.6 inches. Increased rainfall can potentially reduce immediate fire risk by moistening the soil and vegetation. However, it's essential to note that if followed by prolonged dry spells, this can also lead to rapid vegetation growth which, when dried, could serve as ample fuel for wildfires later in the season.

In May 2022, McGrath experienced a mean maximum temperature of 62.8°F, showcasing warmth that was conducive to drying out vegetation early in the season. Temperatures ranged from a high of 76°F to a low of 27°F. However, the most concerning factor was the severely deficient precipitation. McGrath recorded only 0.04" of rain for the month, a sharp contrast to the average May norm of 0.9". This lack of moisture, combined with the elevated temperatures, created an environment highly favorable for the development of wildfires. Dry conditions reduce the moisture content in vegetation, making it more susceptible to ignition and rapid spread. With only one day of measurable precipitation recorded, McGrath entered the fire season with conditions primed for increased wildfire activity, highlighting the critical need for early-season preparedness and fire mitigation efforts.

June 2022:

June 2022 in Fairbanks experienced warmer conditions with temperatures trending higher than the averages between 1991 and 2020. The mean maximum temperature was recorded at 74°F, marking an increase of 3°F above the average. The heat peaked on the 26th, reaching 82.0°F, while the coolest day was 42.0°F on the 11th. June was drier than usual; the city received a total of just 0.5 inches of rain throughout the month, falling short of the average by 0.9 inches. Such reduced rainfall in tandem with above-average temperatures elevates the risk for wildfires. Dry conditions can lead to parched

³ <https://akclimate.org/data/monthly-reports>

landscapes, making the environment more susceptible to ignition.

For McGrath, June continued the trend of above-average temperatures. Temperatures ranged between a maximum of 80°F and minimum of 41°F, with a mean maximum temperature of 62.9°F. Lack of precipitation was of notable concern: Only 0.19 inches of rainfall were recorded throughout June, considerably short of the expected average of 1.7 inches, with only four days of measurable precipitation throughout the entire month.

July 2022:

July 2022 in Fairbanks continued the trend of warmer-than-average conditions, albeit with a more subtle deviation. The mean maximum temperature of 73.4°F was 1.4°F above the average from 1991 to 2020. The month started with a significant heatwave, with temperatures up to 86.0°F on the 1st. In contrast, the lowest temperature was 41.0°F on the 29th. July's precipitation patterns intensified concerns for the fire season. With a total rainfall of only 0.5 inches, Fairbanks experienced a significant deficit of 1.7 inches below the average. Such consistently dry conditions, paired with sporadic high temperatures, can rapidly dehydrate vegetation, making them prime fuel for potential wildfires.

McGrath July temperatures were slightly below the average but still on the warmer side. The mean maximum temperature for the month was recorded at 72.3°F, just shy of the recorded July average of 60.8°F. The temperatures ranged between a high of 83°F and a low of 41°F. Precipitation levels continued to be a concern. The region only received 1.81 inches of rain, significantly less than the expected July average of 2.5 inches. This amounted to 12 days of measurable precipitation throughout the month. This shortfall in rainfall, even though temperatures were marginally below average, elevated the region's wildfire risks.

August 2022:

In Fairbanks, the warmer trend continued in August, with temperatures consistently above the average. The mean maximum temperature was 68.8°F, marking a 1.8°F rise above the average from 1991 to 2020. The monthly high was 79.0°F on the 12th, while the temperature dipped to its lowest at 39.0°F on the 10th. Precipitation data for August further emphasized the prevailing dry conditions. The area recorded a total rainfall of 1.4 inches, a shortfall of 0.7 inches from the average. The persistent warmth, combined with reduced precipitation, amplifies the area's wildfire risk. Vegetation, already strained from previous dry months, is at an elevated risk of acting as wildfire fuel.

In McGrath, August brought a slight reprieve in terms of temperatures, with the monthly mean maximum recorded at 60.9°F. The temperatures fluctuated between a high of 75°F and a low of 34°F. In terms of precipitation, McGrath experienced 3.49 inches of rain over 20 days of measurable

precipitation, which was slightly above the expected August average of 2.9 inches. The increased rainfall in August, coupled with the slightly cooler temperatures, brought some relief to the heightened wildfire risks that were observed in the previous months. The moisture content in the soil and vegetation likely increased, reducing the chances of wildfires.

September 2022:

In Fairbanks, September 2022 signaled the end of a notably warmer fire season. The month's mean maximum temperature was recorded at 56.5°F, 0.5°F above the established average from 1991 to 2020. The temperatures varied from a high of 65.0°F on the 12th to a low of 30.0°F on the 28th. Precipitation in September was 1.4 inches of rainfall, a slight surplus of 0.1 inches over the average. This increase in moisture, although modest, combined with the cooling temperatures to reduce the lingering wildfire threats, thereby marking the culmination of the fire season.

September in McGrath also showed a notable drop in mean maximum temperature, 54.1°F, but was considerably warmer than the average of 46.0°F for this month. The temperatures varied between a high of 64°F and a low of 31°F. As for precipitation, McGrath accumulated 2.82 inches of rain throughout the month, slightly surpassing the typical September average of 2.5 inches. This was distributed over 20 days of measurable rainfall. The consistent and slightly higher-than-average rainfall in September, combined with declining temperatures, marked a transition towards more humid and cooler conditions. These factors played a crucial role in minimizing the wildfire risks and eventually bringing the fire season to its end.

Table 3. 2022 Daily precipitation, Fairbanks Intl. Airport and McGrath, AK

Date	Precip		Date	Precip		Date	Precip	
June	FNSB	McGrath	July	FNSB	McGrath	Aug	FNSB	McGrath
1	0.00	0.00	1	0.00	0.00	1	0.02	0.00
2	0.00	0.00	2	0.00	0.00	2	0.21	0.00
3	0.00	0.00	3	0.00	0.00	3	0.01	0.08
4	0.00	0.00	4	0.00	0.00	4	0.01	0.00
5	0.00	0.00	5	0.00	0.00	5	0.13	0.01
6	0.00	0.00	6	0.00	0.00	6	0.29	0.11
7	0.00	0.00	7	0.00	0.00	7	0.15	0.18
8	0.00	0.00	8	0.00	0.00	8	0.03	0.41
9	0.00	0.00	9	0.00	0.00	9	0.14	0.24
10	0.00	0.00	10	0.04	0.00	10	0.00	0.00
11	0.00	0.00	11	0.00	0.00	11	0.00	0.00
12	0.00	0.00	12	0.00	0.00	12	0.00	0.00
13	0.00	0.00	13	0.00	0.05	13	0.00	0.00
14	0.00	0.00	14	0.09	0.00	14	0.00	0.00
15	0.00	0.00	15	0.00	0.01	15	0.00	0.00
16	0.00	0.00	16	0.05	0.38	16	0.19	0.00
17	0.00	0.03	17	0.03	0.43	17	0.00	0.23
18	0.00	0.00	18	0.01	0.14	18	0.00	0.15
19	0.00	0.05	19	0.01	0.21	19	0.12	0.06
20	0.35	0.04	20	0.15	0.08	20	0.01	0.11
21	0.18	0.07	21	0.00	0.00	21	0.00	0.07
22	0.00	0.00	22	0.00	0.00	22	0.01	0.01
23	0.00	0.00	23	0.00	0.00	23	0.00	0.00
24	0.00	0.00	24	0.00	0.00	24	0.00	0.00
25	0.00	0.00	25	0.00	0.00	25	0.00	0.00
26	0.00	0.00	26	0.00	0.00	26	0.00	0.18
27	0.00	0.00	27	0.00	0.00	27	0.04	0.36
28	0.00	0.00	28	0.11	0.00	28	0.04	0.01
29	0.00	0.00	29	0.00	0.00	29	0.01	0.28
30	0.00	0.00	30	0.00	0.00	30	0.00	0.00
			31	0.00	0.00	31	0.00	0.18
Total								
	0.53	0.19		0.49	1.30		1.41	2.67
Precip Norms								
	1.37	1.52		2.16	2.38		1.88	2.80
Above								
Below	-61.31%	-87.50%		-77.31%	-45.38%		-25.00%	-4.64%
Avg								

2023 Wildland Fire Season

In 2023, the event began in mid- to late July 2023 and extended through mid-August. All wildland fires depicted in Figure 6, the 2023 Fire Complex Map, were caused by lightning. Each of the 58 fires within a 200 km radius of the NCore monitor illustrated in Figure 6 ignited in July 2023. During the 2023 wildland fire season, the fire complexes located southeast and southwest of the FNSB burned with varying intensities. Gradient wind flow patterns significantly influenced the production and transport of smoke across Interior Alaska. Among the 58 fires within a 200 km radius, 13 were of notable size and were active smoke producers. Besides the lightning strikes that ignited all the fires, the smoke carried by gradient low- and mid-level wind flow was a key factor contributing to elevated PM_{2.5} concentrations measured in FNSB nonattainment area. During late evening and early morning stagnant conditions, smoke settled in the Tanana Flats, impacting the nonattainment area. However, when a frontal system passed over the Interior, PM_{2.5} concentrations in Fairbanks area decreased to more typical summertime levels.



Figure 6. Interior wildland fires during the July-August event are outlined in red. The shaded fire plots are estimated from satellite burn scars during the 2023 fire season.

DEC staff collected daily samples from the Federal Reference Method (FRM) monitor at the three monitoring locations within the nonattainment area. These samples document the smoke impact resulting from the wildland fire event. Between July 24 and August 19, 2023, the FRM monitors located at the Fairbanks NCore, Fairbanks A-Street, and North Pole Hurst Road sites reported increased PM_{2.5} concentrations on 21 sample days (Table 4).

While not every 24-hour concentration exceeded the 24-hour National Ambient Air Quality Standard (NAAQS) of 35 $\mu\text{g}/\text{m}^3$, each day recorded at least one site with PM_{2.5} concentrations exceeding the annual NAAQS of 9 $\mu\text{g}/\text{m}^3$, which is higher than usual for summer conditions without wildland fires.

In Fairbanks, during summer months without wildland fires, the peak 24-hour average PM_{2.5} concentrations typically range between 3 and 6 µg/m³. Figure 6 illustrates the fire parameters from late July to mid-August that contributed to the increased PM_{2.5} concentrations in the nonattainment area.

Table 4. 2023 FRM/BAM PM_{2.5} concentrations in µg/m³ at the NCore, A-Street and Hurst Road sites

July									August								
24-Hour PM _{2.5} Concentrations (µg/m ³)									24-Hour PM _{2.5} Concentrations (µg/m ³)								
Date	NCore FRM 1	NCore FRM 2	NCore BAM	A-St FRM	A-St BAM	HURST FRM 1	HURST FRM 2	HURST BAM	Date	NCore FRM 1	NCore FRM 2	NCore BAM	A-St FRM	A-St BAM	HURST FRM 1	HURST FRM 2	HURST BAM
1	2.3		1.8	2.6	0.8	2.9		1.6	1	7.3	5.9	4.7	5.4	5.4	10.5	10.3	9.6
2	2.6	2.5	2.5	2.8	1.8	6.6	6.8	5.3	2	7.1		6.1	7.4	6.6	17		15.1
3	3.2		2.7	2.9	2.6	4.7		3.4	3	17.4		17.7	18	17.7	43.5		45.8
4	1.7		0.8	1	0.3	3.5		2.1	4	27	27	27.1	25.8	21.3	35	34.1	30.5
5	2	1.8	1.4	1.9	1.1	6	5.9	4.5	5	46.5		47.1	45.8	45.2	56.1		56.4
6	4.8		4.5	3.4	1.7	5.6		3.5	6	107.7		107.2	108.5	109.2	120.3		122.5
7	3.8		3.5	3.4	3.7	2.4		0	7	156.2		137.5		143.7	141.6	140.5	141.7
8	1.2	1.2	0.8	1.2	0.6	1.5	1.6	0	8	88.2	60.6	57.7	57.9	53.7	62.6		54.5
9	2.8		1.7	2.8	1.2	2.9		0	9	83.1		81.1	82.8	81.2	100.2		99
10	2.4		2.6	2.5	1.7	3.6		0.2	10	110.3	113.5	98.9	108.2	105.4	82.7	95	92
11	1.8	2.1	1.7	2.1	1.3	2.8	2.3	0	11	30.8		28.1	29.2	28.1	32		30.2
12	1.6		1.4	1.1	0.7	1.9		0	12	21		18.7	21.8	20.5	11.7		8.7
13	3.1		1.5	2.9	2.8	3.3		0	13	3.8	4.9	2.8	3.4	2.6	4.5	4.5	1.5
14	3	3.3	2.8	3.2	2.8	3.4	3.8	0.5	14	6.5		6	6.5	5	5.7		2.3
15	4.6		2.7	3.9	3.4	4.3		0.8	15	10		8.5	9	8.7	9.1		7
16	2.9		2.2	2	1.5	3.5		1	16	6.8	6.9	6.2	7.1	6		6.2	1.4
17	2		1.7	1.7	1.7	2.6	2.3	0	17	2.4		1.2	2.6	3.1			1.7
18	1.9	2.2	2.3	1.8	2	2.6		0	18	6.8		6	6.6	7.5	7.1		1.3
19	7.3		5.5	7.1	7.3	7		4.7	19	6.9	7.1	6	7	6.8	6.1	9.5	4.3
20	5.8	5.9	4.6	5.5	5.6	5	5.3	1.4	20	7		6.4	7	7.5	4.8		2.9
21	3.7		2.9	3.8	3.6	4.6		1.2	21	5.3		3.5	5.1	4.7	8.1		1.4
22	4.6		3.5	4.7	3.8	6.7		3.9	22	8.5	8.8	8.2	8.3	8.6	0.2	2.1	5.1
23	8.7	8.6	8.4	8	7.8	10	9.8	7.1	23	6.6		7.3	6.2	6	5.3		2.5
24	18.1		18.4	18.3	16.1	18.6		14.9	24	5.1		4.9	4.6	4.1	3.9		0
25	14.5		13.5	14	13.9	15.3		12.1	25	2.6	2.8	2.5	2.4	1.6	3.1	8.5	0
26	18.3	18.6	17.9	17.4	19	19	18.5	16.3	26	2.6		2.1	2.6	1.4	4		0.3
27	19.2		19	18.4	18.3	16.1		13.4	27	1.9		2	2.2	1.8	3.3		0
28	26.2		24.8	25.7	26.1	31.1		29.2	28	2	2.4	1.1	2.1	1.7	2.1	3.3	0
29	8.2	8.3	8.4	8.3	9.3	13.4		12.3	29	3.6		2.5	3.5	2.6	2.5		0
30	2.4		2	2.7	2.4	11		9.7	30	2.6		3.2	2.2	1.6	2.8		0
31	5.4		4.8	4.5	4.1	7.2		3.6	31	1.9	3.7	0.8	1.7	1.3	1.7	1.8	0

Data in red indicate exceedances of the 24-hour NAAQS

During this timeframe, DEC flagged all daily concentrations that exceeded the updated annual NAAQS of $9 \mu\text{g}/\text{m}^3$. Some wildland fires affecting Alaska's interior started in early June and persisted throughout the entire event period. As shown in Figure 7, spikes in $\text{PM}_{2.5}$ were correlated with the period when fires in the interior were most active, strongly indicating the western fire complex from mid-June through mid-July as the source of the exceedance. Given that smoke from multiple fires led to the elevated $\text{PM}_{2.5}$ concentrations, DEC treated all the days in 2023 mentioned in Table 1 as a single event. Daily $\text{PM}_{2.5}$ concentrations varied with fire growth/suppression and meteorological conditions, with wind direction being the most important factor. Although the $\text{PM}_{2.5}$ concentrations varied, the cause of the elevated $\text{PM}_{2.5}$ levels throughout the entire period was wildland fire smoke. See the Clear Causal Relationship section for a detailed breakout of fire area and smoke ($\text{PM}_{2.5}$) activity.

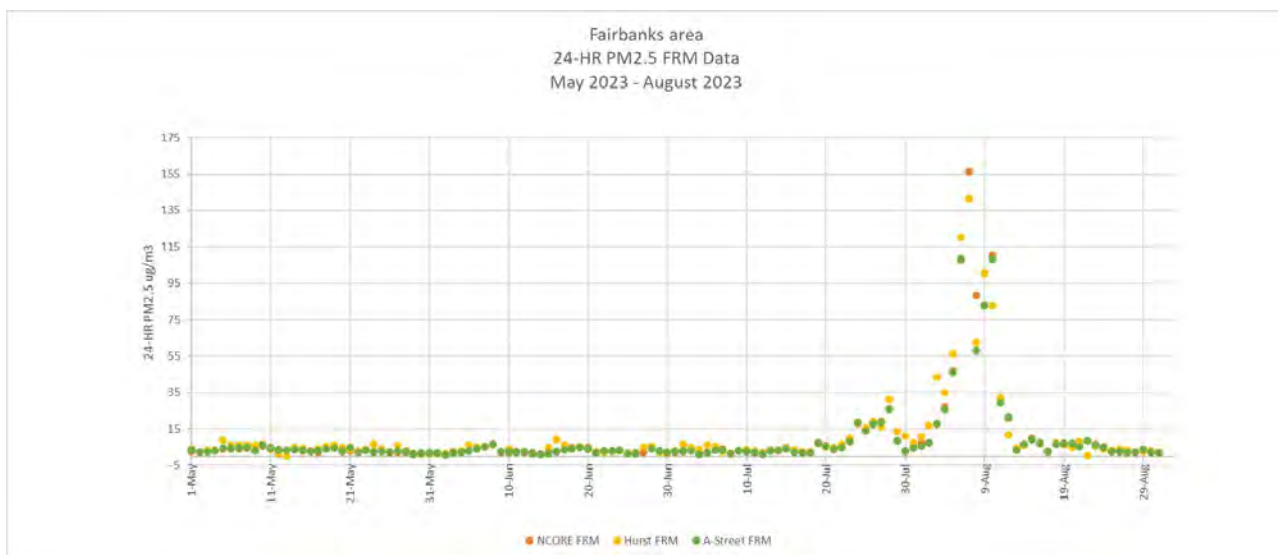


Figure 7. Fairbanks area 24-hr $\text{PM}_{2.5}$ May through August 2023

Meteorology

The 2023 fire weather season in Alaska was marked by a series of distinct meteorological patterns that influenced wildfire activity. After a cold April, May temperatures returned to near-normal across the state, with many areas receiving normal or above-normal rainfall. This combination of typical temperatures and comparatively high rainfall, particularly in the Interior and Southwest Alaska, resulted in low burnability of sub-surface fuels, leading to minimal wildfire activity.

June saw somewhat cooler-than-normal temperatures across much of mainland Alaska, particularly in the Interior, Southcentral, and Southwest regions. These cooler conditions delayed the warming and drying of subsurface fuels, further suppressing significant wildfire behavior. Despite some areas in the southeastern Interior which experienced drier conditions, the overall impact on wildfire activity remained minimal.

July brought a warming trend across much of Alaska, with significant warm anomalies over the central and eastern Interior. The combination of higher temperatures and low precipitation in these regions set the stage for increased wildfire activity. Although lightning activity remained relatively low through mid-July, a significant outbreak of over 20,000 lightning strikes on July 24-25 triggered numerous wildland fires, particularly in areas where fuels had become sufficiently dry.

In late July and early August, the persistence of dry conditions and Chinook wind events, contributed to the spread of wildland fires across the southern Interior. By mid-August, however, temperatures began to cool, and many areas received wetting rains, leading to wildfire activity tapering off by the end of the month.

Overall, Alaska's 2023 wildfire season was characterized by a late surge in fire activity, with significant acreage burned in late July and August after a relatively quiet early season. Data for Fairbanks and Delta Junction monthly meteorological conditions below are from the Alaska Climate Research Center⁴. Delta Junction, Alaska, is located about 95 miles southeast of Fairbanks in the interior of the state. It lies near the base of the Alaska Range, which rises roughly 30 miles to the south. The Tanana Hills are located approximately 20 miles to the northwest, while the White Mountains are around 60 miles north of Fairbanks.

May 2023:

May 2023 in Fairbanks was characterized by warm and dry conditions, normally signaling an early start to the fire season. The mean maximum temperature for the month was 62.5°F, with the highest temperature reaching 80°F. These temperatures were significantly warmer than average, indicating a trend towards hotter conditions as the region headed into summer. Precipitation for May 2023 was notably sparse, with only 0.28 inches of rain recorded over five days during the month. The highest single-day precipitation was just 0.10 inches, and no snowfall occurred during the month. This lack of moisture left the soil and vegetation dry, increasing the potential for wildfires.

In Delta Junction, May 2023 displayed a mix of warm temperatures and substantial precipitation. The mean maximum temperature for the month was 57.6°F, with the highest temperature reaching 76°F and the lowest maximum recorded at 42°F. These temperatures, while warm, were not extreme and suggest a relatively moderate start to the season. In contrast to the temperatures, the total precipitation for May was notably high, with Delta Junction receiving 1.90 inches of rain over six days with measurable precipitation. The highest single-day rainfall was 0.53 inches, indicating periods of significant moisture.

⁴ <https://akclimate.org/data/monthly-reports>

June 2023:

In Fairbanks, the trend of warm temperatures continued in June, with a mean maximum temperature of 70.3°F. The highest temperature for the month was 80°F, while the lowest maximum temperature recorded was 49°F. These warmer-than-usual conditions further underscore the increasing heat as the summer progressed. In terms of precipitation, Fairbanks received a total of 1.66 inches of rain over 11 days with measurable precipitation. The highest single-day precipitation was 0.58 inches, with an average daily precipitation of 0.06 inches. Although this amount of rainfall approaches typical levels for June, the combination of earlier dry conditions from May and continued warm temperatures means that vegetation may have been drying out more rapidly, increasing the risk of wildfires.

June 2023 in Delta Junction brought warmer temperatures with a mean maximum of 67.8°F. The highest temperature for the month reached 77°F, while the lowest maximum was 52°F. These temperatures indicate a warming trend as summer progressed, which is typical for this time of year. However, June also saw a notable decrease in precipitation compared to May. The total precipitation for the month was just 0.55 inches, spread over eight days with measurable rainfall. The highest single-day rainfall was 0.27 inches, which is relatively modest. This reduction in rainfall, coupled with the warmer temperatures, likely began to dry out the vegetation that had previously been moistened in May.

July 2023:

July 2023 in Fairbanks was marked by high temperatures and limited rainfall, conditions that significantly elevated the fire risk in the region. The mean maximum temperature for the month was 77.2°F, with the highest temperature soaring to 90°F. Even the lowest maximum temperature was relatively warm at 66°F, indicating consistently high temperatures throughout the month. Precipitation was scarce, with Fairbanks receiving only 0.70 inches of rain over the course of seven days with measurable precipitation. The highest single-day precipitation was just 0.29 inches. The combination of high temperatures and minimal rainfall left the region exceptionally dry, further exacerbating the potential for wildfires.

July 2023 in Delta Junction also saw a significant rise in temperatures, with the mean maximum temperature reaching 74.9°F. The highest temperature recorded was 87°F, and the lowest maximum temperature was 61°F. These warm temperatures are indicative of peak summer conditions, which can contribute to drying out vegetation and increasing the risk of wildfires. Precipitation in July was relatively limited, with the area receiving only 0.88 inches of rain over five days with measurable precipitation. The highest single-day rainfall was 0.49 inches, but the overall lower frequency and amount of precipitation likely meant that the environment became increasingly dry as the month progressed.

August 2023:

In August 2023 Fairbanks saw a slight moderation in temperatures compared to July, but conditions remained warm overall. The mean maximum temperature for the month was 69.6°F, with the highest temperature reaching 84°F and the lowest maximum at 56°F. These temperatures, while not as extreme as those in July, continued to maintain an elevated level of warmth. In terms of precipitation, Fairbanks received a total of 1.83 inches of rain over 15 days with measurable precipitation. The highest single-day rainfall was 0.45 inches, and no snowfall occurred during the month. The increase in the number of rainy days and the overall higher precipitation compared to previous months provided some much-needed moisture to the region.

August 2023 in Delta Junction brought slightly cooler temperatures compared to July, with a mean maximum temperature of 68.6°F. The highest temperature recorded for the month was 82°F, while the lowest maximum temperature was 56°F. These temperatures, while cooler than July, still reflect the warm conditions typical of late summer. Precipitation during August was limited, with only 0.76 inches of rain recorded over nine days with measurable precipitation. The highest single-day rainfall was 0.31 inches. This level of precipitation, while providing some moisture, was likely insufficient to fully mitigate the effects of the warmer temperatures earlier in the season.

September 2023:

September 2023 in Fairbanks marked the beginning of cooler and wetter conditions as the region transitioned into autumn. The mean maximum temperature for the month was 52.6°F, with the highest temperature recorded at 70°F and the lowest maximum at 39°F. These cooler temperatures signaled the end of the summer heat and a gradual shift away from the peak fire season. In terms of precipitation, Fairbanks received a total of 0.92 inches of rain over 12 days with measurable precipitation. The highest single-day rainfall was 0.16 inches, and there was no snowfall during the month. While the amount of rainfall was lower than in August, the cooler temperatures helped to reduce the overall fire risk. The cooler, wetter conditions helped to dampen any remaining dry vegetation, decreasing the likelihood of fire outbreaks.

September 2023 in Delta Junction also marked the transition into cooler autumn conditions, with a significant drop in temperatures compared to the summer months. The mean maximum temperature for the month was 49.3°F, with the highest temperature recorded at 60°F and the lowest maximum at 36°F. These cooler temperatures are typical for the onset of fall and signify a reduction in the overall fire risk as the season progresses. Precipitation levels increased in September, with Delta Junction receiving a total of 1.38 inches of rain over 13 days with measurable precipitation. The highest single-day rainfall was 0.35 inches, indicating more consistent moisture throughout the month. The combination of cooler temperatures and increased precipitation helped to further dampen the landscape, reducing the likelihood of wildfires ignition.

Table 5. 2023 Daily precipitation, Fairbanks Intl Airport. and Delta Junction, AK

Date	Precip		Date	Precip		Date	Precip	
June	FNSB	DJ	July	FNSB	DJ	Aug	FNSB	DJ
1	0.00	0.10	1	0.00	0.00	1	0.00	0.00
2	0.18	0.00	2	0.00	0.00	2	0.00	0.00
3	0.03	0.03	3	0.00	0.00	3	0.00	0.00
4	0.00	0.00	4	0.00	0.00	4	0.00	0.00
5	0.00	0.00	5	0.00	0.00	5	0.00	0.00
6	0.00	0.00	6	0.00	0.00	6	0.00	0.00
7	0.00	0.00	7	0.01	0.00	7	0.00	0.00
8	0.05	0.07	8	0.31	0.00	8	0.01	0.01
9	0.01	0.00	9	0.00	0.07	9	0.39	0.25
10	0.00	0.00	10	0.00	0.00	10	0.01	0.00
11	0.00	0.00	11	0.00	0.00	11	0.10	0.06
12	0.00	0.00	12	0.01	0.00	12	0.00	0.00
13	0.00	0.00	13	0.08	0.00	13	0.00	0.00
14	0.00	0.00	14	0.00	0.00	14	0.00	0.00
15	0.00	0.01	15	0.07	0.33	15	0.00	0.00
16	0.00	0.00	16	0.08	0.26	16	0.00	0.07
17	0.01	0.00	17	0.00	0.00	17	0.45	0.33
18	0.17	0.01	18	0.00	0.00	18	0.01	0.00
19	0.00	0.03	19	0.00	0.08	19	0.00	0.00
20	0.01	0.00	20	0.00	0.00	20	0.00	0.01
21	0.03	0.09	21	0.14	0.00	21	0.46	0.00
22	0.03	0.00	22	0.00	0.00	22	0.16	0.00
23	0.58	0.00	23	0.00	0.00	23	0.00	0.00
24	0.11	0.00	24	0.00	0.14	24	0.01	0.02
25	0.00	0.00	25	0.00	0.00	25	0.09	0.00
26	0.00	0.00	26	0.00	0.00	26	0.02	0.00
27	0.00	0.00	27	0.00	0.00	27	0.00	0.00
28	0.00	0.00	28	0.00	0.00	28	0.00	0.00
29	0.17	0.04	29	0.00	0.00	29	0.07	0.02
30	0.28	0.27	30	0.00	0.00	30	0.00	0.00
			31	0.00	0.00	31	0.02	0.00
Total	1.66	0.65		0.70	0.88		1.80	0.77
Precip Norms	1.37	2.31		2.16	2.62		1.88	1.92
Above Avg	21.17%	-71.86%		-67.59%	-66.41%		-4.26%	-59.90%

The Event Was Natural

When the meteorological conditions are favorable and dry fuels are available as they were in 2022 and 2023, wildland fires are a common occurrence in Alaska. On average, 932,823 acres burn annually. More than 90% of the area consumed lies in Interior Alaska, where the summers are relatively warm and dry. Most wildland fires are ignited by lightning and periodically burn spruce, birch, and cottonwood dominated forests.

2022 Fire Season

The 2022 fire season in Alaska was significantly driven by natural events, particularly lightning starts. The season began with exceptionally dry conditions across much of the state, creating a highly flammable environment. This dry spell, which persisted from April through June, set the stage for the first major lightning outbreaks in early June. During these events, thousands of cloud-to-ground lightning strikes were recorded, igniting numerous wildland fires across the state. The dry fuels, combined with the natural ignition sources from lightning, led to rapid fire growth, with over 1.85 million acres burned by the end of June.

As the season progressed into July, another significant lightning event occurred, adding even more wildfires to the already active landscape. These natural ignitions played a central role in the scale and intensity of the 2022 fire season. However, the impact of these fires was eventually mitigated by a dramatic shift in weather patterns by mid-July. The arrival of cooler and wetter conditions, driven by large-scale weather systems from the Bering Sea and Gulf of Alaska, effectively ended the fire season by reducing the potential for new lightning starts and dampening existing fires.

In summary, the 2022 fire season in Alaska was heavily influenced by natural lightning events, which ignited wildfires across a dry and receptive landscape. The season was ultimately curtailed by a shift to cooler and wetter weather, which diminished the effects of further lightning activity.

2023 Fire Season

July's weather was notably warm across most of Alaska, with particularly dry conditions in the eastern Interior, Copper River Basin, and Panhandle. This warm trend, which encompassed nearly all of Alaska except the Lower Yukon Valley and Southcentral, was significant, especially in northern Alaska and the central and eastern Interior. The combination of high temperatures and low precipitation in these regions set the stage for more severe wildfire conditions by the end of the month.

During July, precipitation levels were below average in much of the Interior. By the morning of July 24th, the total area burned was at a record low of 1,892 acres. On that same day a notable weather shift occurred. While thunderstorms are typically most frequent in the Interior from late May to early July, the largest single day of lightning strikes for Alaska's 2023 season was recorded from 6:00 am on July 24th to 6:00 am on July 25th, with over 20,000 strikes detected across the state and in the

Yukon (Figure 8). Given the preceding warm and dry weather, this surge of lightning ignited numerous new wildfires.

The widespread lightning strikes over areas with dry and warm conditions led to the ignition of the largest wildfires that demanded management by crews for the remainder of the season. These included the Anderson Complex, Lost Horse Creek Fire, McCoy Creek Fire, and the Pogo Mine Road Fire. These significant fires were all located on state land in the southern Interior, mainly in the Middle Tanana Valley, where the driest fuels were found.

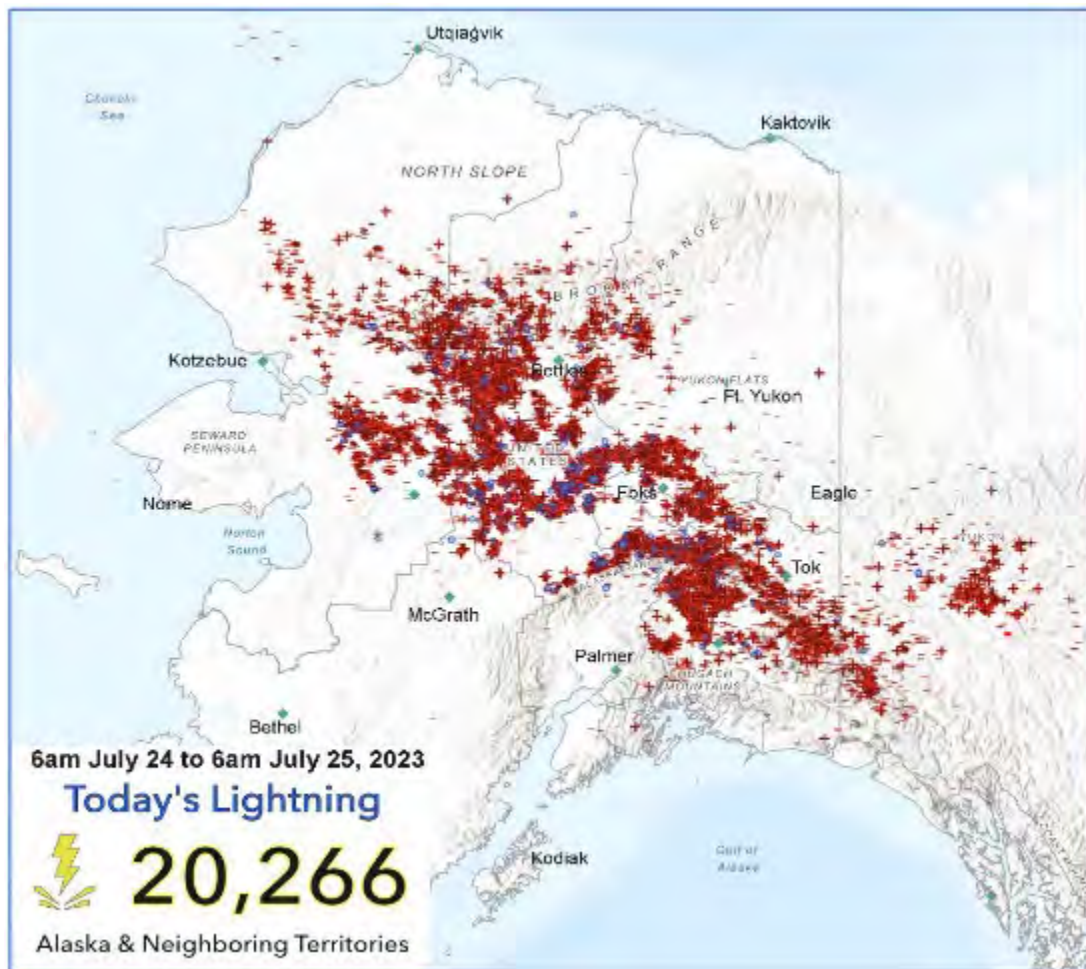


Figure 8: Lightning Map, July 24-25, 2023

Numerous Red Flag Warnings were issued by the National Weather Service in late July and early August due to continued lightning activity over flammable fuels and Chinook wind events through the Alaska Range passes. Once substantial fires had started in the southern Interior, the southerly Chinook winds through these passes became particularly significant. The Initial Spread Index (ISI), a fire weather index that illustrates the effect of wind on wildfire behavior, showed high values across the state on August 6th during a typical Chinook wind event. The ISI combines the effects of wind speed and fine fuel moisture content to predict the rate at which the fire will spread immediately after ignition, as well as the potential speed of fire growth in its early stages.

The Event Was Not Reasonably Controllable or Preventable

The events described above were not reasonably controllable or preventable by the State for several reasons. First, authority over fire protection areas is split into three major jurisdictions (Figure 9) so that smoke from fires outside of the state’s jurisdiction can impact state lands. Second, the events were caused by meteorological events over which the State has no reasonable control. Tables 6-8 show the breakdown of Landowners and Management Options for 2022 and 2023.

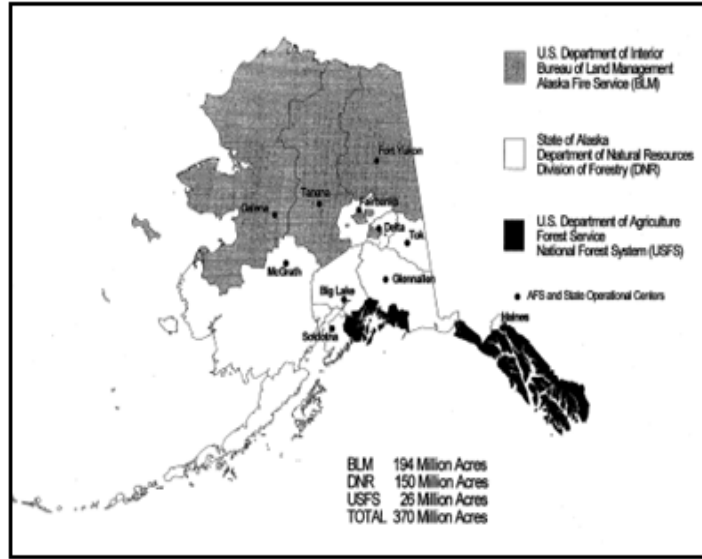


Figure 9. Alaska Wildland Fire Protection Areas

Alaska Fire Service and military units work together on control measures as it is known that live fire training will occasionally ignite fires. Control measures include prescribed burns in the spring to reduce fuel loads and to isolate or “blackline” all the training areas, and, on days with live fire training, coordination with AFS and military responders.

Table 6: Landowner activity for 2022 and 2023

Landowner Agency	2022 Fires	2022 Acres	2023 Fires	2023 Acres
State of Alaska	172	1,819,446	129	213,014
BLM	66	699,868	34	8,951
US Fish & Wildlife	49	368,971	19	6,799
Alaska Native Claims Settlement Act	61	182,235	29	2,708
National Park Service	14	28,817	6	1,230
Bureau of Indian Affairs	2	3,929	11	36
Private	171	3,354	90	818
Department of Defence	17	667	15	62,206
County	17	60	11	36
US Forest Service	15	5	3	<1
City	6	4	6	3

Two primary factors contribute to an extensive fire season in Alaska: dry meteorological conditions and ignition sources. The dominant factor—dry meteorological conditions—cannot be effectively controlled or mitigated. The meteorological patterns in 2022 were marked by extremes, ranging from record cold and dry conditions to periods of intense heat and aridity. In contrast, the 2023 fire season was characterized by predominantly wet conditions until the occurrence of late-season ignitions. These late ignitions were triggered by over 20,000 lightning strikes within a two-day period in areas of the southeastern interior where fuels had dried.

Table 7. AFS Protection Fires and Acres Burned by Zone and Management Option for 2022

BLM Alaska Fire Service Protection Fires and Acres Burned by Zone and Management Option										
Zone	Critical		Full		Modified		Limited		Totals	
	Fires	Acres	Fires	Acres	Fires	Acres	Fires	Acres	Fires	Acres
Galena	0	0	7	98,487	4	2,273	31	377,444	42	478,204
Military	0	0	3	<0	0	0	13	144	16	144
Tanana	0	0	10	31,433	13	33,764	48	631,689	71	696,886
Upper Yukon	0	0	16	19,059	3	3,395	48	334,304	67	356,758
Totals	5	35	36	148,979	20	39,432	140	1,343,581	196	1,531,992

State of Alaska Fires and Acres Burned by Management Option										
Area	Critical		Full		Modified		Limited		Totals	
	Fires	Acres	Fires	Acres	Fires	Acres	Fires	Acres	Fires	Acres
Anch/Mat-su	104	40	15	72	3	16	3	5	125	133
Copper River	7	1	2	1	1	<1	3	188	13	190
Delta	6	23	11	29,338	0	15,790	6	2,259	23	47,410
Fairbanks	30	14	16	59,159	1	56,114	4	48,306	51	163,593
Kenai/Kodiak	61	25	7	1	0	0	0	0	68	26
Southwest	1	1	20	28,628	5	212,341	32	1,119,615	61	1,360,585
Tok	7	2	9	120	1	11	5	2,269	22	2,402
Totals	216	106	106	117,319	11	284,272	53	1,172,642	363	1,574,339

USDA Forest Service Fires and Acres Burned by Management Option										
Forest	Critical		Full		Modified		Limited		Totals	
	Fires	Acres	Fires	Acres	Fires	Acres	Fires	Acres	Fires	Acres
Chugach N.F.	7	5	5	1	3	3	1	1	16	10
Tongass N.F.	5	1	6	<1	2	<	2	1	15	2
Totals	12	6	11	1	5	3	3	2	31	12

0 indicates less than .5 acres burned

Table 8. AFS Protection Fires and Acres Burned by Zone and Management Option for 2023

BLM Alaska Fire Service Protection Fires and Acres Burned by Zone and Management Option										
Zone	Critical		Full		Modified		Limited		Totals	
	Fires	Acres	Fires	Acres	Fires	Acres	Fires	Acres	Fires	Acres
Galena	0	0	2	13	2	175	7	2,328	11	2,517
Military	1	<1	4	<1	0	0	10	74,928	15	74,928
Tanana	0	0	7	158	4	634	29	57,700	40	58,494
Upper Yukon	1	6	3	298	3	2	41	15,996	47	16,303
Totals	2	6	16	469	9	811	87	150,952	113	152,242
State of Alaska Fires and Acres Burned by Management Option										
Area	Critical		Full		Modified		Limited		Totals	
	Fires	Acres	Fires	Acres	Fires	Acres	Fires	Acres	Fires	Acres
Anch/Mat-su	33	9	4	<1	0	0	0	0	37	9
Copper River	4	<1	5	4	1	<1	1	5	11	10
Delta	12	1,253	15	21,586	3	34,858	5	4,864	35	62,562
Fairbanks	26	28	30	35,913	4	7,555	5	36,656	65	80,153
Kenai/Kodiak	44	9	3	1	0	0	0	0	47	10
Southwest	1	1	1	13	0	0	0	0	2	14
Tok	12	1	5	132	1	27	5	594	23	754
Totals	132	1,301	106	57,649	9	42,440	16	42,119	220	143,512
USDA Forest Service Fires and Acres Burned by Management Option										
Forest	Critical		Full		Modified		Limited		Totals	
	Fires	Acres	Fires	Acres	Fires	Acres	Fires	Acres	Fires	Acres
Chugach N.F.	2	<1	1	<1	0	0	0	0	3	1
Tongass N.F.	0	0	3	9	3	<1	0	0	6	9
Totals	2	0	4	9	3	0	0	0	9	10
0 indicates less than .5 acres burned										

Control Efforts:

Before the onset of the summer fire season, preventative measures were undertaken in the vicinity of Fairbanks. In alignment with the Alaska Enhanced Smoke Management Plan (ESMP) and DEC 18 AAC 50, Air Quality Control, the AFS executed mitigation efforts by conducting prescribed burns on the military reservation ranges.

The Stuart Creek 2 and Mississippi regions are designated military training areas where live fire exercises take place throughout the year. Since these exercises can act as potential ignition sources, these regions undergo burning or "black-lining" every spring. Black-lining is a technique where the outer edges of a designated area are deliberately burned. Should a fire spark within the training zone, this charred perimeter ensures the fire remains contained within the black-lined boundary.

The arid conditions, the prevalence of natural ignition sources like lightning, combined with Alaska's vast and remote landscape, make it exceptionally challenging to manage wildfires. Given Alaska's isolation and rugged terrain, firefighting becomes not only costly but also time intensive. In many cases, fires are merely observed rather than actively combated due to these challenges (as noted by NOAA in their 1999 report on U.S. critical weather patterns). Indeed, many such fires aren't subdued by human efforts but are naturally doused by wetter weather conditions.

In response to these unique challenges, Alaska's state authorities, federal land agencies, and indigenous tribes collaboratively formulated the Alaska Interagency Wildland Fire Management Plan (AIWFMP). This comprehensive plan mandates an annual review by land managers and owners, assessing the fire protection requisites for territories under their jurisdiction. Based on this evaluation, lands are classified under Critical, Full, Modified, or Limited management categories. The categorization is influenced by the directives of land managers/owners, the inherent value of the assets to be safeguarded, and broader land and resource management goals.

The fire management tactics employed differ based on the category: from aggressive initial responses and ongoing suppression in Critical and Full management zones to mere monitoring in the Limited zones. This structured approach ensures that:

- People, personal property, and key resources are provided apt protection in line with available firefighting assets.
- The firefighting expenditures align with the intrinsic value of the assets being safeguarded.
- Land overseers can effectively meet their specified management goals.

Furthermore, the AIWFMP acknowledges the ecological significance of fires sparked by lightning in the boreal forest and arctic tundra ecosystems. Total suppression of such fires is not only ecologically misaligned but also financially impractical. While the natural role of fires in these ecosystems is recognized, it is also balanced against the imperative to safeguard human lives, health, personal assets, infrastructure, and select natural and cultural treasures.

During intensified fire seasons, firefighting resources might become scarce due to engagement in multiple initial responses or in combating expansive fires. Prioritizing territories before the fire season, as per the AIWFMP, helps dictate the allocation of firefighting forces, thereby enhancing the financial and operational efficiency of wildfire management.

A significant part of the state has been categorized under Modified or Limited management. The Modified management approach offers maximum flexibility to land managers and owners. Its primary goal is to amplify protection during times of high fire danger, when there's a significant likelihood of fire spreading, and the chances of containment are minimal. However, as fire threats

reduce, this approach offers lesser protection. The Modified option aims to strike a balance between suppressing fire and managing costs, rather than merely minimizing fire damage. It's a middle ground between Full and Limited management.

The Limited management approach, on the other hand, suggests minimal fire intervention. It is employed in areas where the expense of fire suppression might surpass the resource's value, where fire suppression could harm the environment more than the fire itself, or where excluding fire could harm ecosystems that rely on it. This strategy aims to reduce both immediate and long-term suppression costs and risks. It acknowledges that in certain conditions, fires might surpass the designated boundaries despite suppression efforts. Some areas within the Limited management might need higher protection, and suitable suppression measures will be applied accordingly without undermining the broader strategy.

DEC has initiated various fire prevention and public health protection strategies. Before the fire season kicks in, measures are taken as per the Alaska Enhanced Smoke Management Plan (ESMP) and DEC 18 AAC 50 for air quality. DEC oversees smoke management in Alaska with the help of ESMP, ensures controlled burns align with state air quality norms, and approves land clearing requests. The ESMP emphasizes that evaluating smoke emission dispersion is crucial for effective management. Projects involving controlled burns on land over 40 acres annually require an approved permit. Moreover, the Responsible Authority must inform DEC a day before the burn, get a favorable forecast from the National Weather Service, and gain approval from a DEC meteorologist. While these burns help in reducing fire fuel, they don't eradicate the threat entirely.

DEC also issues Air Quality Advisories as per DEC 18 AAC 50 to safeguard public health during low air quality periods. Between June 6 and July 15, 2022, 28 advisories were released due to wildfire smoke. Between June 12 and July 9, 2015, 8 advisories were issued for regions including Fairbanks. More advisories were sent out for other regions including Western Interior, Southwest, and Southcentral Alaska. For a detailed breakdown, refer to Appendix B.

The Event Affected Air Quality

The PM_{2.5} 24-hour concentrations measured at the Fairbanks NCore, A-Street, and North Pole Hurst Road primary monitors reflect the unusual fire conditions during the events. Table 9 lists the 24-hour PM_{2.5} concentrations of samples collected by the FRM and BAM monitors from May through July 2022 while Table 10 lists the 24-hour PM_{2.5} concentrations of samples collected by the FRM and BAM monitors from July through August 2023. Summer 2023 PM_{2.5} concentrations were significantly higher than the annual summer average (June 1-August 31) of 4.5µg/m³ for 1999-2019, without wildland fire smoke. In 2022, the smoke and PM_{2.5} levels varied due to changes in fire spread, suppression efforts, and shallow, surface-based inversions. This prolonged exposure resulted in twenty three 24-hour PM_{2.5} exceedances, and FNSB also recorded eleven days over the 9 µg/m³ annual PM_{2.5}. For 2023, the short fire season resulted in seven 24-hour PM_{2.5} exceedances in early August 2023 and recorded fifteen days over the 9 µg/m³ annual PM_{2.5} standard in July and August 2023.

Table 9. 2022 NCore, A-Street, and Hurst Road 24-hour PM_{2.5} concentrations

May-22								Jun-22								Jul-22																					
24-Hour PM _{2.5} Concentrations (µg/m ³)								24-Hour PM _{2.5} Concentrations (µg/m ³)								24-Hour PM _{2.5} Concentrations (µg/m ³)																					
Date	NCore FRM 1	NCore FRM 2	NCore BAM	A-St FRM	A-St BAM	HURST FRM 1	HURST FRM 2	HURST BAM	Date	NCore FRM 1	NCore FRM 2	NCore BAM	A-St FRM	A-St BAM	HURST FRM 1	HURST FRM 2	HURST BAM	Date	NCore FRM 1	NCore FRM 2	NCore BAM	A-St FRM	A-St BAM	HURST FRM 1	HURST FRM 2	HURST BAM											
20	5		3.6	5.1	4	9.5		9.9	12	54		54.4	52.5	54.5	48.7		54.2	1	73.1	71.8	73.5	65.8	69.5	55.7	56	62.4											
31	5.4		5	5.2	4.3	13.5		13.8	13	64.1	AF	64.5	62.8	64.2	61.8	60.6	67.6	2	58.4		62.5	46.8	50.7	60.3		68											
<p>Black Bolded Values indicate an exceedance of the Annual NAAQS (9 µg/m³)</p> <p>Red Bolded Values indicate an exceedance of the 24-hour NAAQS (35 µg/m³)</p> <p>23 days over 35.5 8 Days over 9 < 35.5</p> <p>31 Days Total</p>									14	35	36.1	35.4	35	37	35.8		40.9	3	65.8		68.8	65.4			87.2									97			
									15	21		21.9	20.8	21.7	21.5		24.7	4	67.4		70.3	64				67.1	67.4							76			
									16	13.8	14.2	13.7	13.2	12.1	15.6	15.6	18.4	5	107.1		112.2	105.7				102.6									115.7		
									18	10.8		10.2	10.3	10.1	10.5		13.3	6	76.3		78.6		78.1	72.5		81.3									81.3		
									22	24.1	24.9	25.5	23.7	30.9	25	25.2	30.4	7	56.9	57.9	61.7	57	63.2	66	66.6	77.7											
									23	33.5		40.3	32.9	36.5	18.2		22.1	8	30.2		31.5		33.7	32.4	37.8												
									24	46.2		51.2	40.7	43	23.3		27.8	9	142.3		139.7	140.3	145.5	108.2		117.9											
									25	103	104.3	108.2	103.3	110.2	44.2	44.4	50.3	10		71.2	71.8		72.5	61.1	61.6	67.8											
									26	66.1		67.3	64.1	66.1	50.9		57.1	11			50.8		49.4	46.2		50											
									27	110.1		112.5	104.2	108.9	84.2		93.7	12	46.5		47.8	45.7	46.9	44.7		50.5											
									28	216.8	230.2	208	215.6	198.8	174.8	176.1	175.2	13	27.1	27.3	28	27.2	29.5	27	26.1	33.3											
									29			60.6		61.8			56.8	15	9		9.1	8.8	9.3	10.2		12.8											
									30	94.5		92.2	84.2	89.9	75.5		84.3																				

Table 10. 2023 NCore, A-Street, and Hurst Road 24-Hour PM_{2.5} concentrations

July 2023									August 2023								
24-Hour PM _{2.5} Concentrations (µg/m ³)									24-Hour PM _{2.5} Concentrations (µg/m ³)								
Date	NCore FRM 1	NCore FRM 2	NCore BAM	A-St FRM	A-St BAM	HURST FRM 1	HURST FRM 2	HURST BAM	Date	NCore FRM 1	NCore FRM 2	NCore BAM	A-St FRM	A-St BAM	HURST FRM 1	HURST FRM 2	HURST BAM
24	18.1	18.6	18.4	18.3	16.1	18.6	18.5	14.9	1	7.3	5.9	4.8	5.4	5.4	10.5	10.3	9.7
25	14.5		13.5	14	13.9	15.3		12.1	2	7.1		6.2	7.4	6.7	17		15.2
26	18.3		18	17.4	19.1	19		16.3	3	17.4		17.8	18	17.7	43.5		45.9
27	19.2		19.1	18.4	18.3	16.1		13.4	4	27	27.0	27.2	25.8	21.3	35	34.1	30.6
28	26.2		24.8	25.7	26.2	31.1		29.3	5	46.5		47.1	45.8	45.2	56.1		56.4
29	8.2	8.3	8.4	8.3	9.4	13.4		12.4	6	107.7		107.3	108.5	109.2	120.3		122.5
30	2.4		2.1	2.7	2.4	11		9.7	7	156.2		137.5		143.8	141.6	140.5	141.8
<p>Black Bolded Values indicate an exceedance of the Annual NAAQS (9 µg/m³)</p> <p>Red Bolded Values indicate an exceedance of the 24-hour NAAQS (35 µg/m³)</p> <p>7 days over 35.5 14 Days over 9 < 35.5</p> <p>21 Days Total</p>									8	88.2	60.6	57.7	57.9	53.8	62.6		54.6
									9	83.1		81.2	82.8	81.3	100.2		99
									10	110.3	113.5	98.9	108.2	105.4	82.7	95	92
									11	30.8		28.2	29.2	28.1	32		30.2
									12	21		18.7	21.8	20.6	11.7		8.8
									15	10.0		8.5	9.0	8.8	9.1		7.0
									19	6.9	7.9	6	7.0	6.9	6.1	9.5	4.3

PM_{2.5} Concentrations Exceeded Historical Fluctuations

Summertime PM_{2.5} concentrations in the interior of Alaska are directly related to wildfires. Analysis of the FRM filter data from Fairbanks State Office Building (SOB), NCore, and the North Pole Hurst Road sites showed an average summertime 24-hour PM_{2.5} concentration of 3.6 µg/m³ when wildfires were excluded. This value was computed by averaging all data for June through August 2000 through 2021 after removing any data impacted by wildland fire smoke, flagged in AQS as exceptional event or unreliable. When comparing mean concentrations for June through August of the last ten years with low wildland fire activity, average PM_{2.5} concentrations range from 3.2 µg/m³ to 4.7 µg/m³ depending on the monitoring site, with a combined average of 3.8 µg/m³ (Table 11). Table 11 calculations can be viewed in Appendix A. The years included in the analysis are those with annual burned acreage of less than one million acres. 2021 was excluded as well, even though the annual acreage burned was below one million due to the proximity of the fires to the FNSB monitoring sites.

Table 11. Low Fire Years Summer Mean Concentrations

FRM		2006	2007	2008	2011	2012	2014	2016	2017	2018	2020	Avg
SOB	mean	5.3	4.1	2.9	3.5	2.0	2.9	2.7	4.7	5.0	N/A	3.7
NCore	mean	NA	NA	NA	3.1	3.6	2.9	2.8	4.1	4.9	3.2	3.5
Hurst Road	mean	NA	NA	NA	NA	4.7	NA	3.0	5.2	6.3	4.0	4.6
A-Street	mean	NA	NA	NA	NA	NA	NA	NA	NA	NA	3.2	3.2

Wildfires occur in Alaska every year, primarily between June and September. In the last 24 years, the average annual acreage burned by wildfire in Alaska is 1,508,4459 acres. However, the annual acreage burnt can vary greatly, from as low as 103,299 acres in 2008, to 6,523,816 acres in 2004 (Table 12). The number of wildfires and the area burned each year vary with meteorological conditions and locations of fires. Wildfires are at a minimum during years of wet meteorological conditions and can be quite extensive in years with dry to exceptionally dry conditions. Long periods of dry conditions in May, June, and July 2022 set the extensive 2022 fire season in motion by allowing extensive areas of wildlands to accumulate fire fuels. The high fuel loads and dry conditions led to wildfires when an ignition source was added. The 2023 season was looking to be a mild year, but a late July weather system filled with widespread thunderstorms ignited the dry fuels in the Tanana Flats region within 200 km of FNSB.

The 2022 Fire Season

The 2022 fire season in Alaska had an unusually early start, driven by a combination of factors that created ideal conditions for wildfires. The season began aggressively in late April, particularly in Southwest Alaska, where an uncharacteristically thin snowpack had already melted, leaving the tundra dry and highly flammable. This early snowmelt was due to an unusual winter in which much of the precipitation fell as rain instead of snow, reducing the snowpack and leading to drier conditions earlier than usual.

By May, the situation across Alaska became increasingly conducive to wildfire ignitions. Southcentral Alaska, for example, experienced near-zero rainfall for the entire month, pushing the region into drought conditions. The dry and warm weather persisted into June, with the state setting new records for the driest conditions in nearly a century across a broad swath of its mainland. These conditions created an environment where vegetation, both on the surface and below, was highly susceptible to ignition.

The early start to the fire season was significantly impacted by the first major lightning events in May and June. The initial thunderstorms in May, though not producing widespread lightning, still sparked some fires. However, it was the early June lightning outbreak, with nearly 5,000 cloud-to-ground strikes, that really ignited the season. These natural ignitions, combined with the already dry and warm conditions, led to rapid fire spread across the state. By the end of June, over 1.85 million acres had burned, marking one of the most intense early seasons on record.

The 2023 Fire Season

The late start to the 2023 fire season in Alaska was primarily due to a combination of cold temperatures in April and cooler-than-normal conditions in June, which delayed the seasonal warming and drying of the landscape. These cooler conditions, particularly across the Interior, Southcentral, and Southwest regions, kept sub-surface fuels moist and less prone to ignition. Additionally, normal to above-normal rainfall in May further contributed to keeping the fuels wet, making it difficult for fires to start and spread.

The delayed onset of significant wildfire activity persisted until late July. The key factor that led to the eventual ignition of wildfires was the shift in weather patterns during July, which brought warmer and drier conditions to much of Alaska. As temperatures rose, particularly in the central and eastern Interior, and precipitation levels dropped, the fuels became increasingly dry and susceptible to burning.

The major turning point came on July 24-25, when a significant lightning outbreak occurred, with over 20,000 strikes detected across the state. This lightning event, occurring in areas where fuels had

Table. 12 Wildfire History 2000-2023

Year	Acres burned	# Fires
2000	756,296	369
2001	218,113	351
2002	2,186,682	544
2003	602,146	465
2004	6,523,816	696
2005	4,649,597	624
2006	270,539	305
2007	649,411	506
2008	103,299	368
2009	2,951,592	527
2010	1,125,419	688
2011	293,018	515
2012	286,888	418
2013	1,320,752	612
2014	293,202	377
2015	5,150,673	766
2016	500,949	572
2017	652,904	353
2018	411,176	362
2019	2,589,893	719
2020	181,253	340
2021	254,500	389
2022	3,182,976	590
2023	295,764	343
Avg.	1,508,459	497

finally dried out, ignited numerous new wildfires. The combination of dry fuels, warm temperatures, and an unusually high amount of lightning activity created the conditions necessary for these late-season fires to start and spread rapidly. This surge in wildfire activity marked the beginning of the most active period of the fire season, despite its delayed start.

Figure 10 shows a comparison of the PM_{2.5} concentrations for each fire season for the years 2000 to 2023. DEC defined the fire season as the period from June 1 through August 31 for each year since these dates included all PM_{2.5} exceedances and the major fire periods. “Fire years” are those years where many fires occur on more than one occasion during the year. These fires impact the PM_{2.5} concentrations in FNSB. The summer of 2004 was the worst fire year since record keeping began in Alaska. If the 2004 data were displayed completely in Figure 10, the upper (green) box would be over 300 and the whisker would be well over 700. This would make all other years of data virtually unreadable due to their disproportionately small size when displayed.

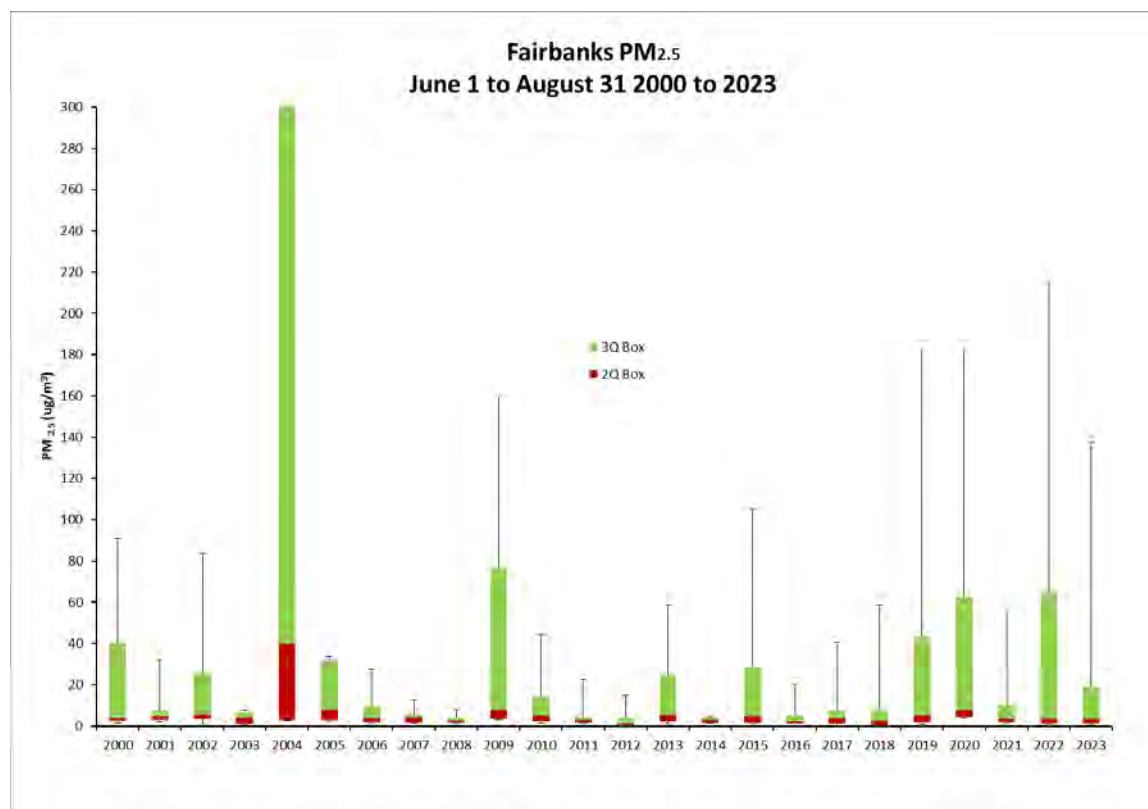


Figure 10. Fairbanks PM_{2.5} for the fire seasons year 2000-2023. The upper box (green) represents data from the median to the 90th percentile. The lower (red) boxes represent data from the median down to the 10th percentile. The “whiskers” indicate the values between the top (bottom) of the box, 90th (10th) percentile to the highest (lowest) values.

2023 had a fewer number of fires and therefore lower PM_{2.5} concentrations than many other fire years during this period. 2001, 2003, 2008, 2011, 2012, 2014, 2016, 2020, and 2021 were years with few or small fires. The acreage burned in 2023 was below average, with numerous fires within

proximity to Fairbanks.

Clear Causal Relationship

2022 Wildland Fire Season

This section establishes the clear causal relationship between the smoke from the wildland fires in the Interior of Alaska during the summer of 2022 and the PM_{2.5} concentrations in FNSB measured between May 20, 2022, and July 14, 2022. The following section describes the major fires impacting air quality in FNSB during these periods. This includes a daily description of fire locations, measured PM_{2.5} concentrations, Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) backward trajectory forecasts, meteorological observations, and other pertinent data for each day as needed to show the origin and extent of fire smoke. These products are arranged in chronological order on a day-to-day basis and shown for each day of the event. Along with these products, a narrative details the daily changes.

The dry and hot conditions as discussed in the meteorology section above set the stage for rapid spread of fires throughout Alaska. On June 12, 2022, the Alaska Fire Service, Predictive Services Branch issued the first of three “Fuels and Fire Behavior Advisory”. The last advisory was issued on July 9, 2022. Parts of those advisories are quoted below (Complete advisory is available in Appendix B):

Fuels and Fire Behavior Advisories

Southwest and Central Interior Alaska Valid: June 12 – June 25, 2022

Subject: Exceptional landscape flammability and widespread ongoing large fire growth.

Discussion: The Buildup Index (BUI) is the best indicator of seasonal severity and overall flammability of fuels in Alaska. It represents deeper drying in the duff layers and greater fuel availability. Large fire growth occurs from mid-June to mid-July surrounding the summer solstice when long days and rapid drying can produce elevated BUI levels. Southwest Alaska normally experiences shorter periods of high flammability as they are prone to intermittent rain due to marine influences. Beginning in the middle of May, southwest Alaska has experienced continued hot, dry, and windy conditions, drying out fuels, retarding green-up and producing significant large fire growth. Many fires in southwest Alaska have experienced exceptionally large fire growth over the last week, which is unusual for the area.

Interior, Southwest, and Southcentral Alaska

Valid: June 25 – July 8, 2022

Subject: Exceptional landscape flammability and widespread ongoing large fire growth.

Discussion: The Buildup Index (BUI) is the best indicator of seasonal severity and overall flammability of fuels in Alaska. It represents deeper drying in the duff layers and greater fuel availability. Large fire growth occurs from mid-June to mid-July surrounding the summer solstice when long days and rapid drying can produce elevated BUIs. Southwest Alaska normally experiences shorter periods of high flammability but has had numerous fires burning since the end of May. By mid-June fire activity began to spread eastward in the Interior. Numerous fires are now burning in the central Interior. The area of activity is expected to expand eastward into the Yukon Flats. Southcentral has been drying rapidly and BUIs are now at record levels.

Interior and Southcentral Alaska

Valid: July 8 – July 22, 2022

Subject: Exceptional landscape flammability and widespread ongoing large fire growth.

Discussion: The Buildup Index (BUI) is the best indicator of seasonal severity and overall flammability of fuels in Alaska. It represents deeper drying in the duff layers and greater fuel availability. Large fire growth occurs from mid-June to mid-July surrounding the summer solstice when long days and rapid drying can produce elevated BUIs. Southwest Alaska experienced an exceptionally busy June with over one million acres burned. By mid-June fire activity began to spread eastward across the Interior. Numerous fires are now burning in the central and eastern Interior. Southcentral has been drying rapidly and BUIs are now at record levels.

Description of Major Fires:

In 2022, there were 590 wildland fires in Alaska with a total of 3,182,976 acres burned. The total acreage is well over the average acreage burned annually in Alaska for the last 23 years. The elevated PM_{2.5} levels measured in Fairbanks in the summer of 2022 were related to the location of the fires in relation to Fairbanks and the number of fires that occurred.

Figure 11 illustrates the proximity of fires to Fairbanks. Significant fire activity in southwest Alaska, shown in Figure 11B, was triggered by lightning strikes in the first week of June. Despite their considerable distance, smoke from these fires enveloped the Alaska Range to the east and drifted over the Tanana Flats, resulting in notably high PM_{2.5} levels in FNSB early in the fire season. Figure 11A highlights fires within 200 km of FNSB. Due to the location of the fires, shifts in wind direction consistently resulted in elevated PM_{2.5} levels affecting FNSB. Figure 12 provides

a summary of fires that exceeded 1000 acres within 200 km of FNSB and the total acreage burned by each at the end of the fire season.

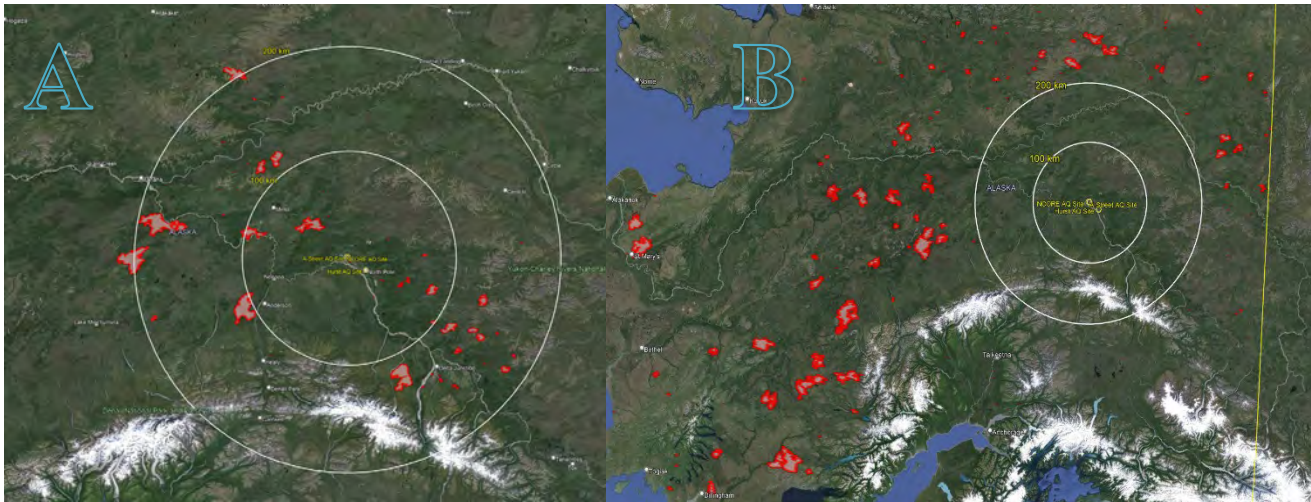


Figure 11. Wildland fires that impacted FNSB in the summer of 2022. Google Earth image A. are all fires within 200 km and Google Earth image B. are the fires outside of 200 km.

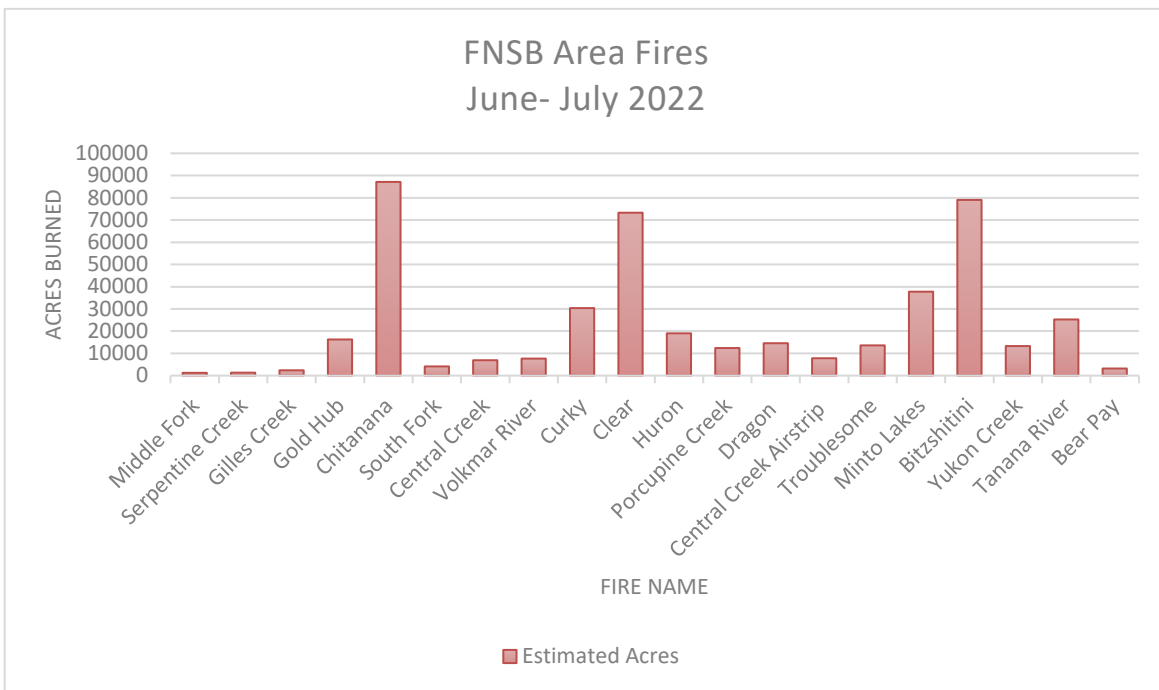


Figure 12. Fires over 1000 acres, within 200 km of FNSB.

Daily Breakdown of the Event:

The daily fluctuations in PM_{2.5} concentrations in Fairbanks from May 20 to July 14 are analyzed using terrain maps, satellite imagery, and modeling. For each day, the analysis incorporates AICC Situation Reports (Appendix G), Moderate Resolution Imaging Spectroradiometer (MODIS) satellite images, HYSPLIT model forecasts presented on terrain maps and MODIS imagery, along with hourly PM_{2.5} readings. These assessments are supported by observational data, meteorological insights, and information on firefighting efforts.

PM_{2.5} concentration data primarily come from the Fairbanks NCore, A-Street and Hurst Road FRM. All primary FRM samplers operate on a daily sampling schedule collecting 24-hour averaged filter samples. Secondary data are gathered from a co-located FRM operating on a 1-in-3 day sampling schedule at the NCore and Hurst Road sites. Additionally, continuous PM_{2.5} measurements are obtained from a beta attenuation monitor (BAM) co-located at all sites.

All weather observation data were downloaded from the National Climate Data Center (NCDC) and were subject to their quality control (<http://www7.ncdc.noaa.gov/CDO/dataproduct>). The MODIS imagery was downloaded from either http://www.arl.noaa.gov/HYSPLIT_info.php or <https://worldview.earthdata.nasa.gov/>. The HYSPLIT model information and model runs are available online from http://www.arl.noaa.gov/HYSPLIT_info.php.

PM_{2.5} data underwent quality assurance and control by DEC staff to ensure they meet the requirements as defined in the State Quality Assurance Plan. DEC provides oversight of FNSB data collection, processing, and quality assurance and certifies all Fairbanks data entered in AQS, EPA's national ambient air monitoring database.

All days with PM_{2.5} concentrations above 9 µg/m³ from May 20 and 31, June 15-16, 18 and 22-23, and July 8, 13 and 15, 2022 are being submitted as one exceptional event. The cause of the increased PM_{2.5} concentrations throughout the entire period was wildfire smoke. Daily PM_{2.5} concentrations varied with meteorological conditions and fire development or suppression. Wind direction (WD) and fire location were the most important components with which to predict high PM_{2.5} concentrations. The following 2022 daily data can be referenced in Appendix C, 2022 Daily Data.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - May 20, 2022

AICC Fire Report Summary:

- **New Fires:** 6 new fires reported.
- **Total Fires Statewide:** 24 fires burning.
- **Acres Burned:** 11,354 acres, with a 24-hour increase of 0 acres.

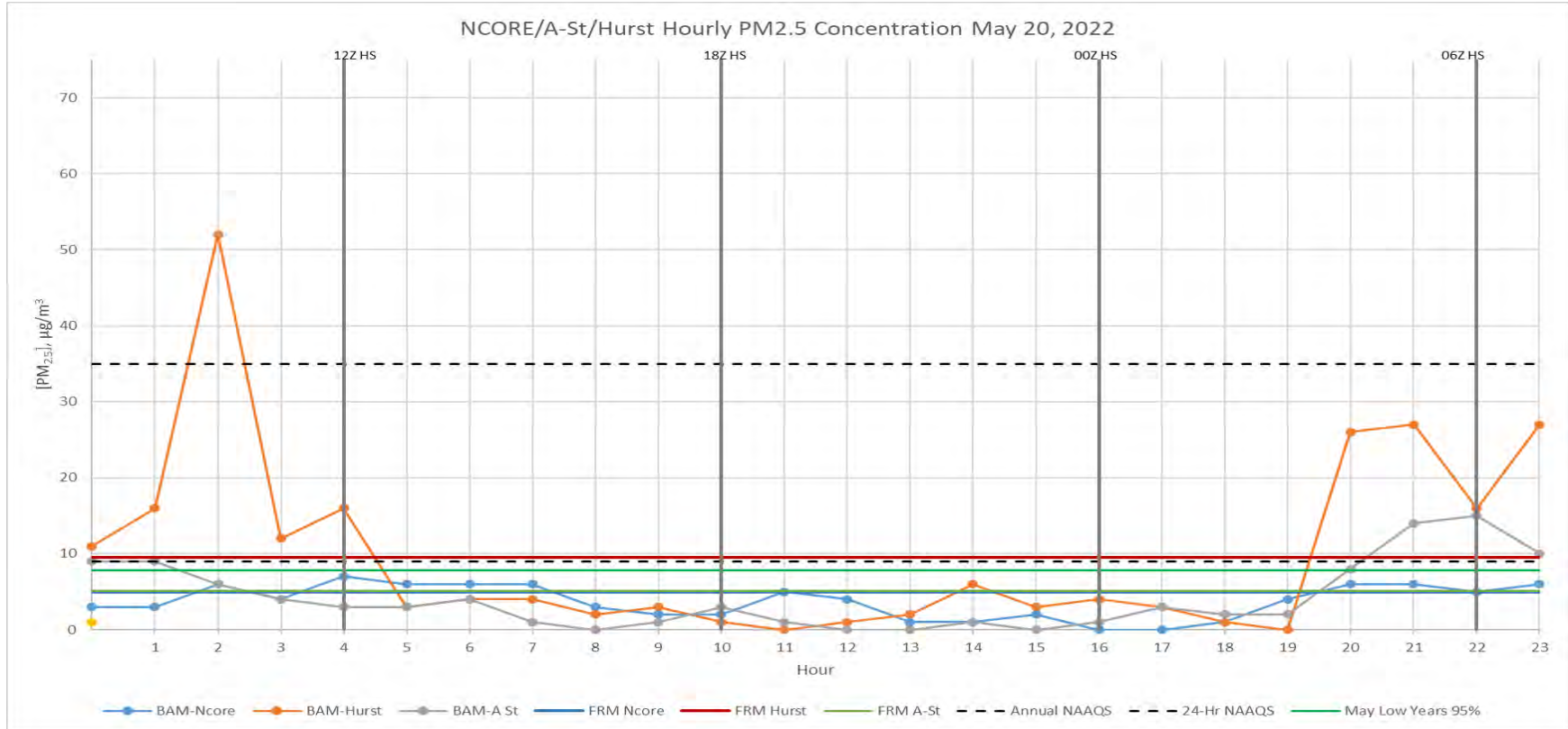


Figure 13: FNSB PM_{2.5} concentrations for May 20, 2022.

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on May 20, 2022. The data include readings from both BAM and FRM instruments at each site.

Early Morning Spike: The BAM-Hurst Road site shows a significant spike in PM_{2.5} concentration around 2:00 AM, reaching just above 50 µg/m³. This is notably higher than other sites and suggests a localized pollution event or influx of smoke.

Midday Low: PM_{2.5} concentrations drop significantly after the morning spike, remaining relatively low throughout the late morning and early afternoon across all sites.

Evening Increase: Another increase in PM_{2.5} levels is observed in the evening, particularly at the BAM-Hurst Road site, with concentrations rising above 20 µg/m³.

Overall Trend: While the BAM-Hurst Road site experiences notable peaks, the overall PM_{2.5} concentrations across all sites generally remain below the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³). The annual NAAQS limit (represented by the dashed black line at 9 µg/m³) is exceeded only briefly during the early morning peak.

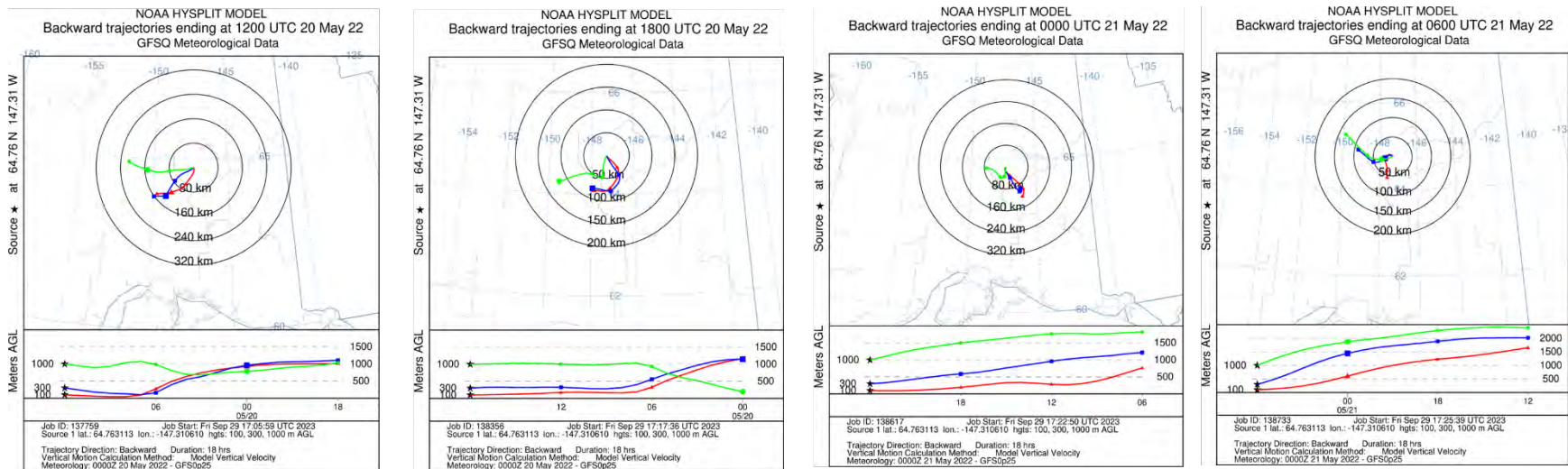


Figure 14: NOAA HYSPLIT model backward trajectories for May 20, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for May 20-21, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The vertical profile below the map provides a detailed view of the altitude changes over time. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, May 20, 2022):** This image shows the backward trajectory ending early morning. The trajectories at 100m (Red), 300m (Blue) indicate the air masses originated from the southwest and the 1000m (Green) originating from the west, converging towards the target location. The vertical profile below the map provides a detailed view of the altitude changes over time
- **Image 2 (18:00 UTC, May 20, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the northwest, northeast, and east at varying altitudes, providing clues about potential pollutant sources upwind.
- **Image 3 (00:00 UTC, May 21, 2022):** The third image displays the backward trajectory ending early afternoon. It shows a consistent pattern with the earlier images, with air parcels tracing back to sources located northeast and southeast, indicating continued influence from these directions.
- **Image 4 (06:00 UTC, May 21, 2022):** The final image in this series illustrates the backward trajectory ending early in the morning of May 21. The convergence of air parcels from the north and east aligns with the previous observations, reinforcing the pattern of pollutant transport from these regions.



Figure 15: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for May 20, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 4 (00:00 UTC, May 21, 2022): Late-night trajectories indicate air parcels arriving from the northwest and south. **Smoke Transport:** The imagery shows smoke being transported from fires in the northwest and southeast. The consistent wind pattern during this time has resulted in the sustained movement of smoke towards the Fairbanks area, potentially affecting local air quality.

Table 13. Hourly surface observation for Fort Wainwright AAF, May 20, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	Dpt (F)
PAFB	05/20/2022 00:58 AKDT	3	50	**	**	10	45	36
PAFB	05/20/2022 01:58 AKDT	7	90	**	**	10	42	33
PAFB	05/20/2022 02:58 AKDT	7	80	**	**	10	41	34
PAFB	05/20/2022 03:58 AKDT	7	70	**	**	10	39	33
PAFB	05/20/2022 04:58 AKDT	7	80	**	**	10	39	33
PAFB	05/20/2022 05:58 AKDT	7	70	**	**	10	40	33
PAFB	05/20/2022 06:58 AKDT	6	80	**	**	10	43	33
PAFB	05/20/2022 07:58 AKDT	3	120	**	**	10	48	34
PAFB	05/20/2022 08:58 AKDT	0	0	**	**	10	52	31
PAFB	05/20/2022 09:58 AKDT	0	0	**	**	10	56	33
PAFB	05/20/2022 10:58 AKDT	0	0	**	**	10	59	32
PAFB	05/20/2022 11:58 AKDT	0	0	**	**	10	61	32
PAFB	05/20/2022 12:58 AKDT	3	180	**	**	10	65	32
PAFB	05/20/2022 13:58 AKDT	0	0	**	**	10	67	31
PAFB	05/20/2022 14:58 AKDT	6	260	**	**	10	69	29
PAFB	05/20/2022 15:58 AKDT	7	240	**	**	10	70	27
PAFB	05/20/2022 16:58 AKDT	5	200	**	**	10	70	28
PAFB	05/20/2022 17:58 AKDT	5	210	**	**	10	71	29
PAFB	05/20/2022 18:58 AKDT	5	170	**	**	10	72	29
PAFB	05/20/2022 19:58 AKDT	0	0	**	**	9	72	29
PAFB	05/20/2022 20:58 AKDT	5	170	**	**	9	71	30
PAFB	05/20/2022 21:58 AKDT	0	0	**	**	9	69	31
PAFB	05/20/2022 22:58 AKDT	0	0	**	**	7	61	39
PAFB	05/20/2022 23:58 AKDT	0	0	**	**	9	53	40

Surface observations: The surface observations on May 20, 2022, show periods of reduced visibility in the evening due to smoke, with visibility dropping below 10 statute miles. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating smoke transport into the Fairbanks area at different times of the day.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - May 31, 2022

AICC Fire Report Summary:

- **New Fires:** 6 new fires reported.
- **Total Fires Statewide:** 37 fires burning.
- **Acres Burned:** 13,010 acres, with a 24-hour increase of 1,501 acres.

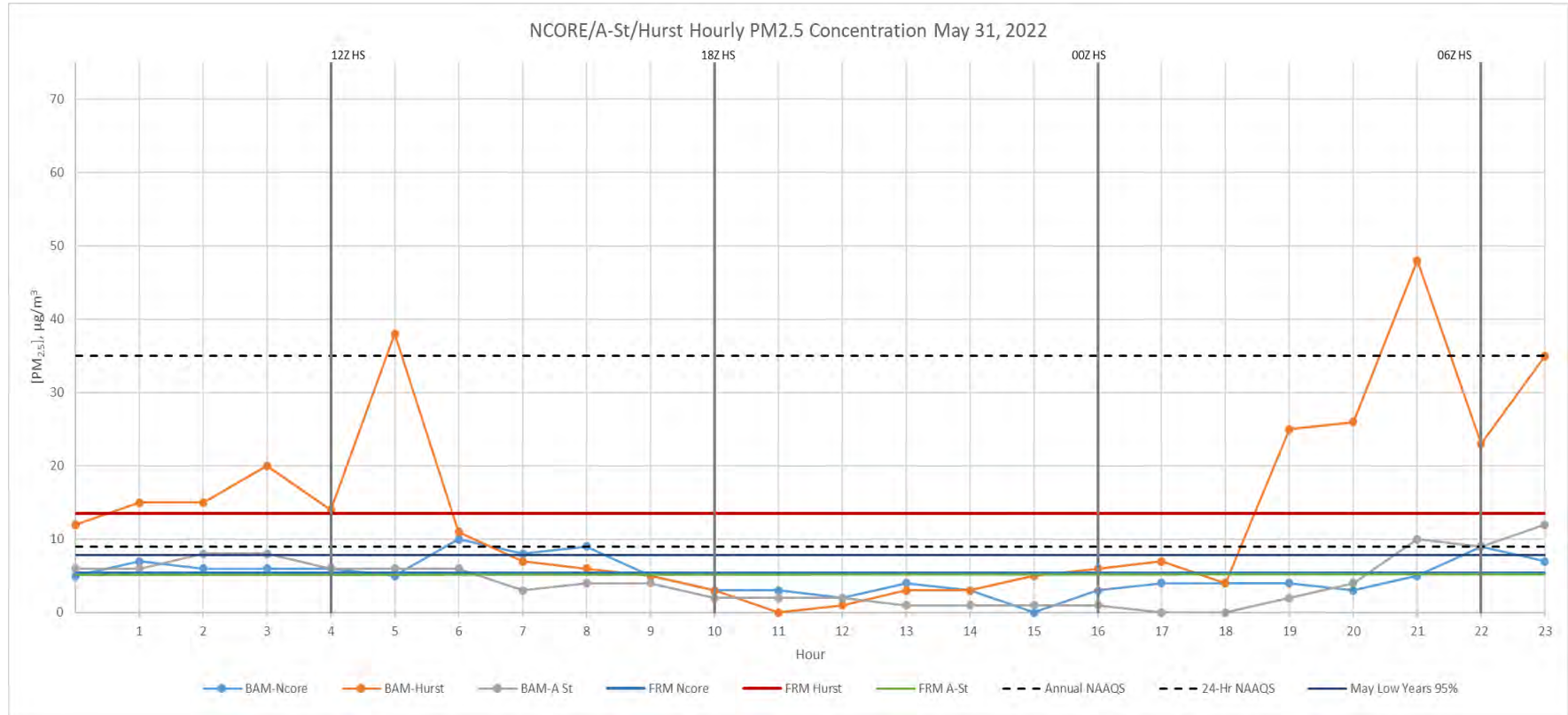


Figure 16: FNSB PM_{2.5} concentrations for May 31, 2022.

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on May 31, 2022. The data include readings from both BAM and FRM instruments at each site.

Early Morning Spike: The PM_{2.5} concentrations at the BAM-Hurst Road site remain relatively stable in the early hours, with a notable increase around 5:00 AM, reaching approximately 40 µg/m³. Other sites show lower and more consistent levels.

Midday Low: Concentrations drop significantly after the morning peak, with levels remaining below 10 µg/m³ at most sites throughout the late morning and afternoon.

Evening Increase: There is a noticeable increase in PM_{2.5} levels in the evening at the BAM-Hurst Road site, with concentrations rising sharply after 9:00 PM, peaking at above 40 µg/m³.

Overall Trend: The BAM-Hurst Road site experiences notable peaks in PM_{2.5} concentrations, while the NCore and A-Street sites maintain lower and more stable readings. The overall PM_{2.5} concentrations across all sites generally remain below the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³). The annual NAAQS limit (represented by the dashed black line at 9 µg/m³) is exceeded during the early morning and evening peaks at the BAM-Hurst Road site.

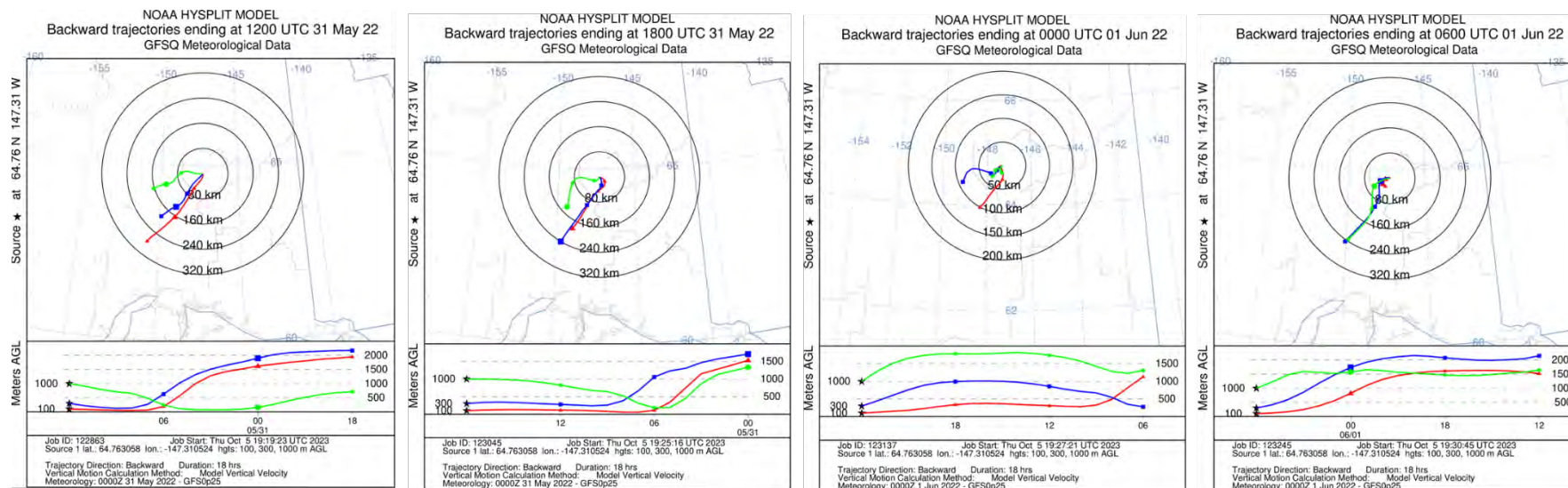


Figure 17: NOAA HYSPLIT model backward trajectories for May 31-June 1, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for May 31-June 1, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The vertical profile below the map provides a detailed view of the altitude changes over time. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, May 31, 2022):** This image shows the backward trajectory ending early morning. The trajectories at 100m (Red), 300m (Blue), and 1000m (Green) indicate the air masses originated from southwest through west, converging towards the target location. The vertical profile below the map provides a detailed view of the altitude changes over time
- **Image 2 (18:00 UTC, May 31, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the south and southeast at varying altitudes, providing clues about potential pollutant sources upwind.
- **Image 3 (00:00 UTC, June 1, 2022):** The third image displays the backward trajectory ending early afternoon. It shows a consistent pattern with the earlier images, with air parcels tracing back to sources located southeast and east, indicating continued influence from these directions.
- **Image 4 (06:00 UTC, June 1, 2022):** The final image in this series illustrates the backward trajectory ending early in the morning of June 1. The convergence of air parcels from the east and northeast aligns with the previous observations, reinforcing the pattern of pollutant transport from these regions.



Figure 18: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for May 31, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 1 (11:00 UTC, May 31, 2022): Late-morning trajectories indicate air parcels arriving from the southwest and west.

Smoke Transport: The imagery shows smoke being transported from fires in the southwest and west. The wind patterns during this time have resulted in the movement of smoke towards the Fairbanks area, potentially affecting local air quality.

Table 14. Hourly surface observation for Fort Wainwright AAF, May 31, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	05/31/2022 00:58 AKDT	3	110	**	**	9	53	40
PAFB	05/31/2022 01:58 AKDT	6	80	**	**	10	51	39
PAFB	05/31/2022 02:58 AKDT	3	60	**	**	10	49	39
PAFB	05/31/2022 03:58 AKDT	5	70	**	**	10	48	38
PAFB	05/31/2022 04:58 AKDT	3	70	**	**	10	48	38
PAFB	05/31/2022 05:58 AKDT	6	80	**	**	9	48	37
PAFB	05/31/2022 06:58 AKDT	6	70	**	**	10	50	38
PAFB	05/31/2022 07:58 AKDT	5	90	**	**	10	54	39
PAFB	05/31/2022 08:58 AKDT	0	0	**	**	8	59	40
PAFB	05/31/2022 09:58 AKDT	0	0	**	**	10	62	37
PAFB	05/31/2022 10:58 AKDT	3	160	**	**	10	66	38
PAFB	05/31/2022 11:58 AKDT	0	0	**	**	10	69	35
PAFB	05/31/2022 12:58 AKDT	5	190	**	**	10	72	33
PAFB	05/31/2022 13:58 AKDT	3	120	**	**	10	75	28
PAFB	05/31/2022 14:58 AKDT	6	240	**	**	10	75	25
PAFB	05/31/2022 15:58 AKDT	0	0	**	**	10	76	28
PAFB	05/31/2022 16:58 AKDT	**	**	**	**	**	**	**
PAFB	05/31/2022 17:58 AKDT	3	170	**	**	10	77	28
PAFB	05/31/2022 18:58 AKDT	7	200	**	**	10	77	29
PAFB	05/31/2022 19:58 AKDT	0	0	**	**	9	76	30
PAFB	05/31/2022 20:58 AKDT	3	170	**	**	10	76	32
PAFB	05/31/2022 21:58 AKDT	3	140	**	**	9	73	40
PAFB	05/31/2022 22:58 AKDT	0	0	**	**	7	66	45
PAFB	05/31/2022 23:58 AKDT	0	0	**	**	10	58	42

Surface observations: The surface observations from May 31 to June 1, 2022, show periods of reduced visibility due to smoke, particularly in the morning and evening hours. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating smoke transport into the Fairbanks area at different times of the day.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - June 12, 2022

AICC Fire Report Summary:

- **New Fires:** 3 new fires reported.
- **Total Fires Statewide:** 85 fires burning.
- **Acres Burned:** 461,305,7 acres, with a 24-hour increase of 147,248 acres.

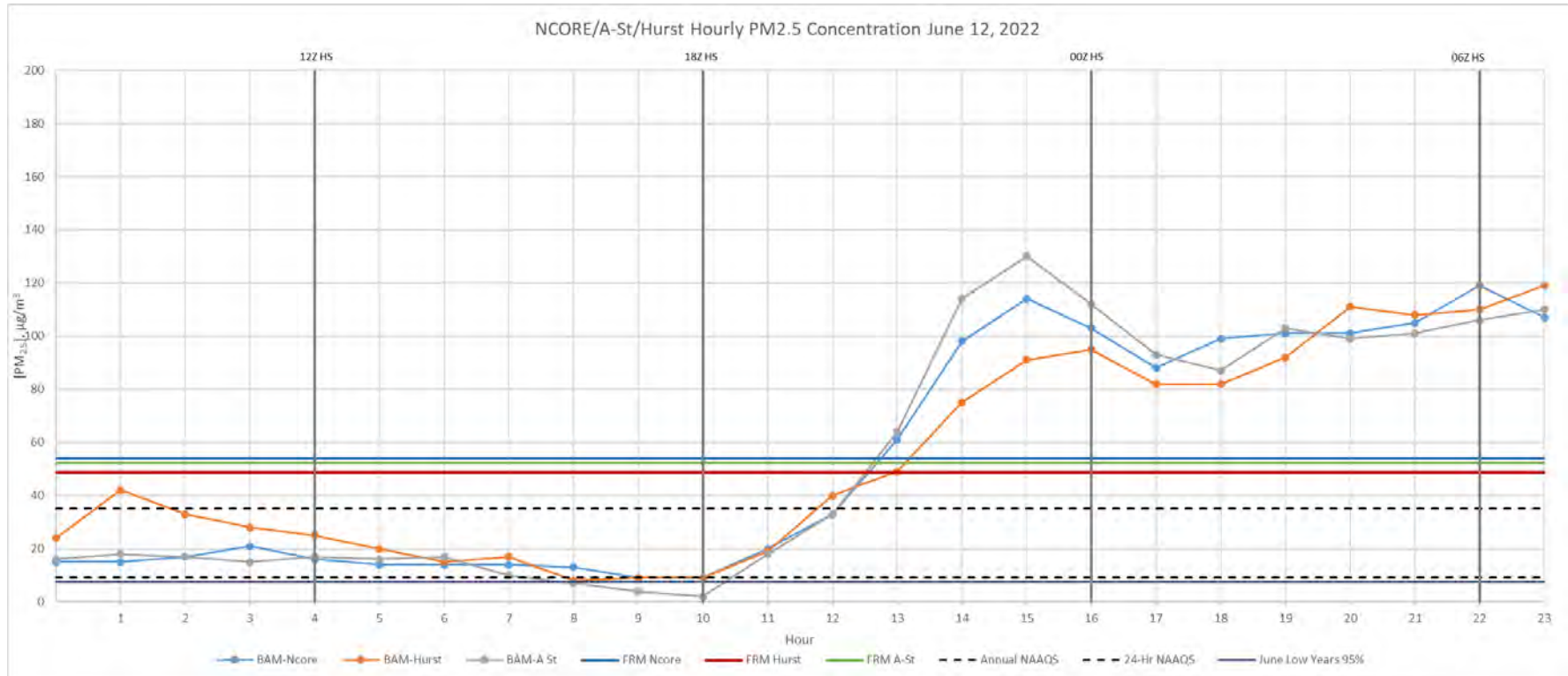


Figure 19: FNSB PM_{2.5} concentrations for June 12, 2022.

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on June 12, 2022. The data include readings from both BAM and FRM instruments at each site. The data include readings from both BAM and FRM instruments at each site.

Early Morning Spike: The PM_{2.5} concentrations at the BAM-Hurst Road site are relatively high in the early hours, with a peak around 1:00 AM, reaching approximately 45 µg/m³. Other sites show lower levels, maintaining below 20 µg/m³.

Midday Low: Concentrations drop significantly during the late morning and early afternoon, remaining below 10 µg/m³ across all sites.

Afternoon Increase: There is a noticeable increase in PM_{2.5} levels starting from around 2:00 PM, with concentrations rising sharply across all sites, particularly at the BAM-A St site, which peaks at around 130 µg/m³.

Overall Trend: The BAM-A St site experiences a significant peak in PM_{2.5} concentrations in the afternoon, while the NCore and BAM-Hurst Road sites also show elevated levels, though less pronounced. The overall PM_{2.5} concentrations across all sites generally remain below the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) for much of the day. However, the afternoon and evening peaks at the BAM-A St site exceed the 24-hour NAAQS limit, and the early morning levels at BAM-Hurst Road and evening levels at all sites exceed the annual NAAQS limit (represented by the dashed black line at 9 µg/m³).

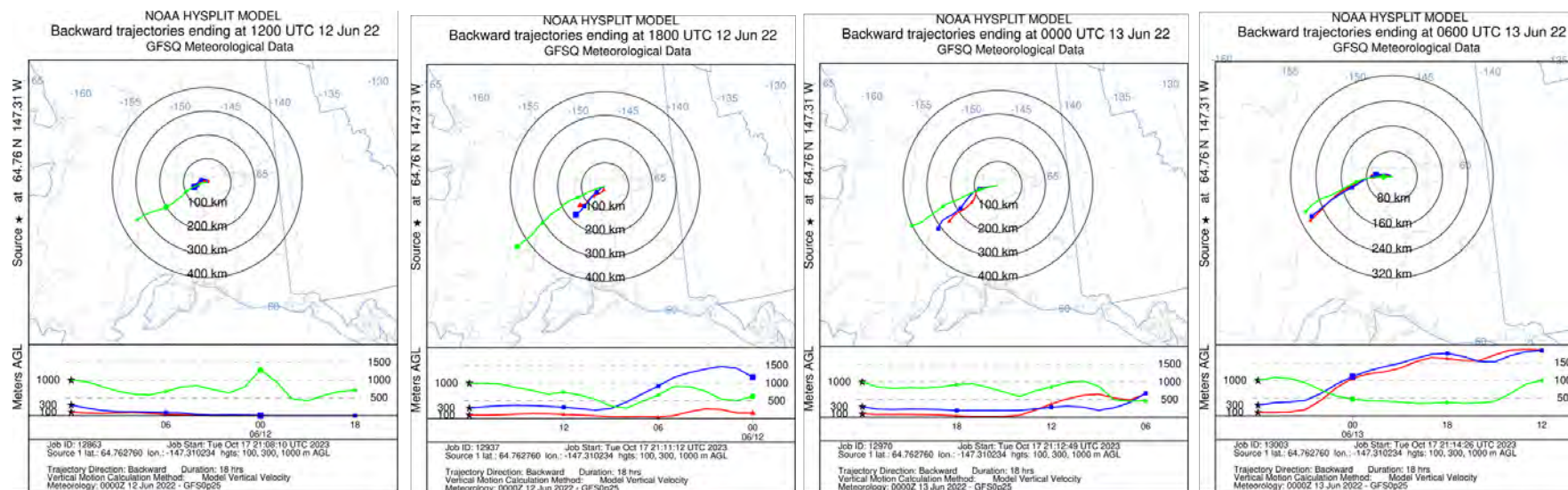


Figure 20: NOAA HYSPLIT model backward trajectories for June 12, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for June 12 to June 13, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The vertical profile below the map provides a detailed view of the altitude changes over time. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, June 12, 2022):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m (Red), 300m (Blue), and 1000m (Green) indicate the air masses originated from the southwest, converging towards the target location. The vertical profile below the map provides a detailed view of the altitude changes over time
- **Image 2 (18:00 UTC, June 12, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the northwest and north at varying altitudes, providing clues about potential pollutant sources upwind.
- **Image 3 (00:00 UTC, June 13, 2022):** The third image displays the backward trajectory ending early afternoon. It shows a consistent pattern with the earlier images, with air parcels tracing back to sources located north and northwest, indicating continued influence from these directions.
- **Image 4 (06:00 UTC, June 13, 2022):** The final image in this series illustrates the backward trajectory ending early in the morning of June 13. The convergence of air parcels from the north and northwest aligns with the previous observations, reinforcing the pattern of pollutant transport from these regions.

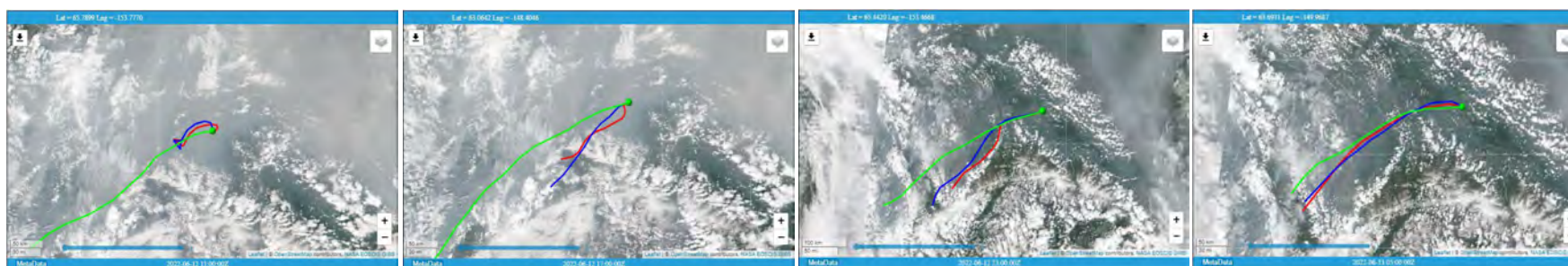


Figure 21: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for June 12 to June 13, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 2 (17:00 UTC, June 12, 2022): This image shows the backward trajectory ending in the late afternoon. The air parcels' pathways highlight significant movement from the west and northwest. **Smoke Transport:** The imagery shows smoke plumes moving from fires located southwest of Fairbanks. The change in wind direction has likely facilitated the transport of smoke from these fires, contributing to elevated PM_{2.5} levels.

Table 15. Hourly surface observation for Fairbanks International Airport, June 12, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/12/2022 00:53 AKDT	0	0	**	**	10	56	39
PAFA	06/12/2022 01:53 AKDT	0	0	**	**	10	51	41
PAFA	06/12/2022 02:53 AKDT	0	0	**	**	10	49	41
PAFA	06/12/2022 03:53 AKDT	3	30	**	**	10	48	39
PAFA	06/12/2022 04:53 AKDT	7	40	**	**	10	46	39
PAFA	06/12/2022 05:53 AKDT	6	50	**	**	10	45	38
PAFA	06/12/2022 06:53 AKDT	3	50	**	**	10	48	40
PAFA	06/12/2022 07:53 AKDT	6	50	**	**	10	48	40
PAFA	06/12/2022 08:53 AKDT	0	0	**	**	10	50	41
PAFA	06/12/2022 09:53 AKDT	0	0	**	**	10	52	41
PAFA	06/12/2022 10:53 AKDT	0	0	**	**	10	55	42
PAFA	06/12/2022 11:53 AKDT	0	0	**	**	10	58	43
PAFA	06/12/2022 12:53 AKDT	3	50	**	**	10	61	43
PAFA	06/12/2022 13:53 AKDT	0	0	**	7 (Smoke)	5	63	43
PAFA	06/12/2022 14:53 AKDT	0	0	**	7 (Smoke)	4	66	44
PAFA	06/12/2022 15:53 AKDT	3	70	**	7 (Smoke)	2	68	40
PAFA	06/12/2022 16:53 AKDT	0	0	**	7 (Smoke)	2	68	38
PAFA	06/12/2022 17:53 AKDT	3	250	**	7 (Smoke)	2	68	40
PAFA	06/12/2022 18:53 AKDT	0	0	**	7 (Smoke)	2	68	42
PAFA	06/12/2022 19:53 AKDT	0	0	**	7 (Smoke)	2	67	42
PAFA	06/12/2022 20:53 AKDT	0	0	**	7 (Smoke)	2	66	44
PAFA	06/12/2022 21:53 AKDT	0	0	**	7 (Smoke)	3	63	47
PAFA	06/12/2022 22:53 AKDT	3	30	**	7 (Smoke)	2	61	45
PAFA	06/12/2022 23:53 AKDT	6	10	**	7 (Smoke)	2	53	47

Surface observations: The surface observations from June 12, 2022, show periods of reduced visibility due to smoke, particularly in the late afternoon and evening hours. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating smoke transport into the Fairbanks area at different times of the day.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - June 13, 2022

AICC Fire Report Summary:

- **New Fires:** 2 new fires reported.
- **Total Fires Statewide:** 85 fires burning.
- **Acres Burned:** 678,522 acres, with a 24-hour increase of 92,788 acres.

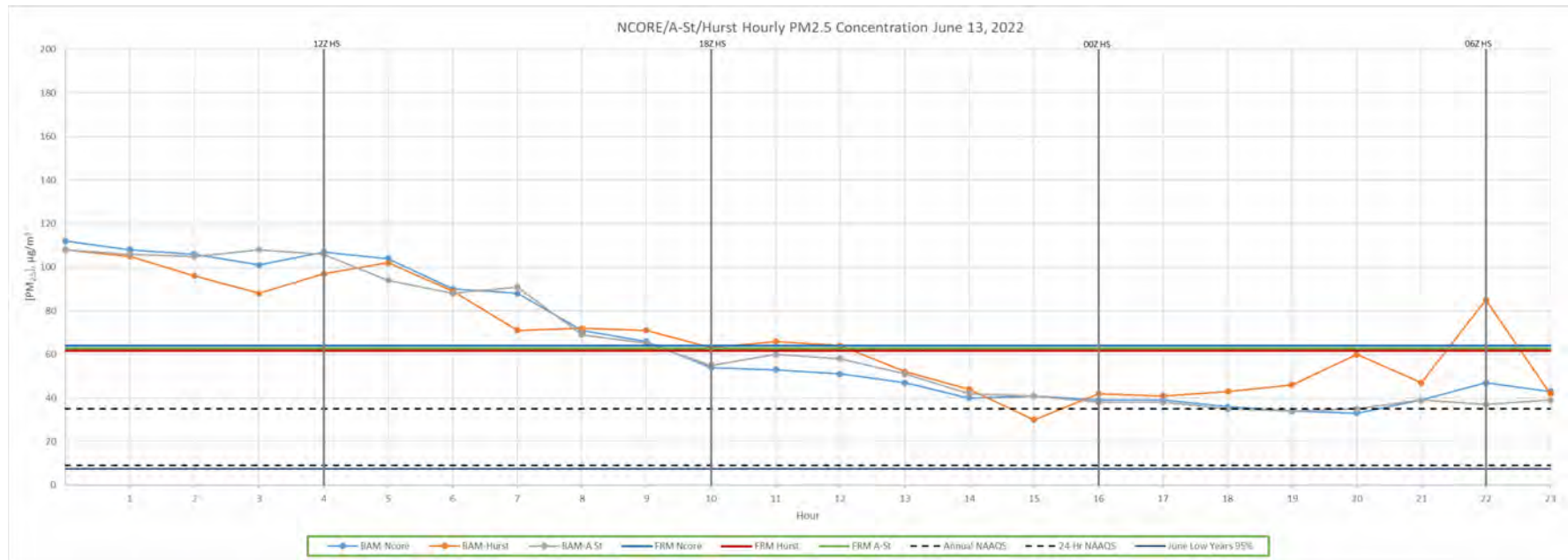


Figure 22: FNSB_{2.5} concentrations for June 13, 2022.

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on June 13, 2022. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations are relatively high during the early morning hours, with levels exceeding 100 µg/m³ across all sites.

Midday Levels: Concentrations show a gradual decline throughout the late morning and early afternoon, dropping below 100 µg/m³ by noon.

Afternoon to Evening: PM_{2.5} levels continue to decrease, reaching their lowest point around 3:00 PM. However, there is a noticeable spike in concentrations at the BAM-Hurst site around 10:00 PM, reaching just over 80 µg/m³.

Overall Trend: The PM_{2.5} concentrations on June 13, 2022, start at high levels during the early morning, exceeding the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) and the annual NAAQS limit (represented by the solid black line at 9 µg/m³) across all sites. As the day progresses, the concentrations gradually decline but remain elevated, particularly in the evening. The BAM-Hurst Road site experiences a notable peak around 10:00 PM, indicating a potential localized pollution event or change in wind patterns affecting smoke transport. Overall, the PM_{2.5} levels are consistently high throughout the day, highlighting periods of poor air quality.

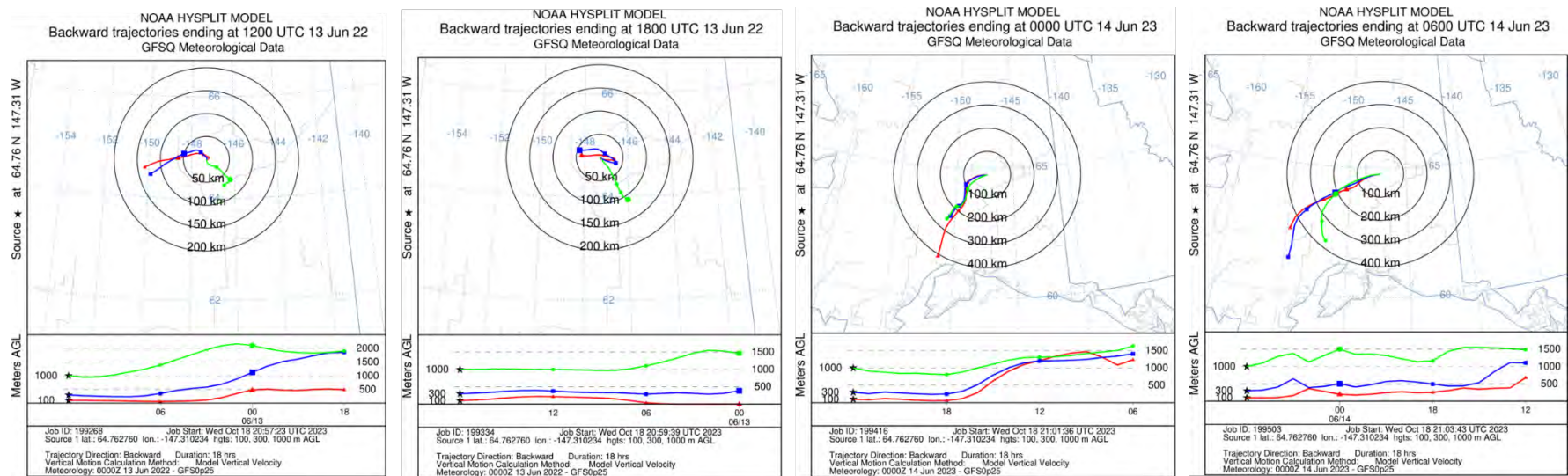


Figure 23: NOAA HYSPLIT model backward trajectories for June 13, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for June 13 to June 14, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, June 13, 2022):** This image shows the backward trajectory ending at noon. The trajectories at 100m (Red), 300m (Blue), and 1000m (Green) indicate the air masses originated from different directions, converging towards the target location. The vertical profile below the map provides a detailed view of the altitude changes over time.
- **Image 2 (18:00 UTC, June 13, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the west and southeast at varying altitudes, providing clues about potential pollutant sources upwind.
- **Image 3 (00:00 UTC, June 14, 2022):** The third image displays the backward trajectory ending early afternoon. It shows a consistent pattern with the earlier images, with air parcels tracing back to sources located to the southwest, indicating continued influence from these directions.
- **Image 4 (06:00 UTC, June 14, 2022):** The final image in this series illustrates the backward trajectory ending early in the morning of June 14. The convergence of air parcels from the southwest aligns with the previous observations, reinforcing the pattern of pollutant transport from these regions.

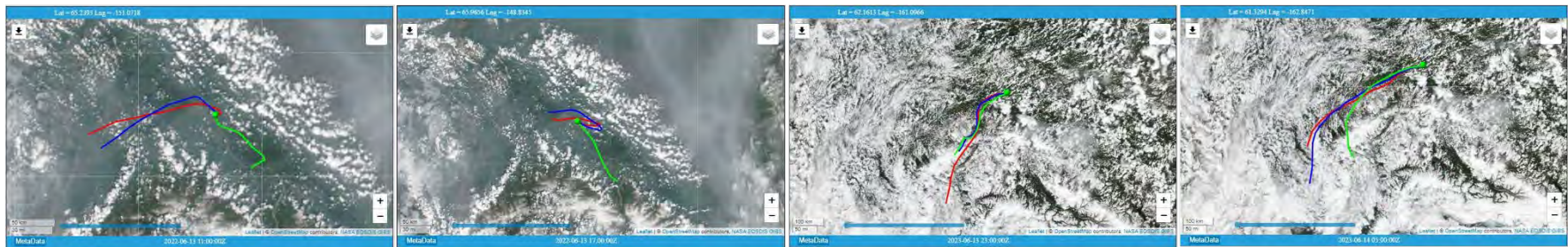


Figure 24: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for June 13 to June 14, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 1 (11:00 UTC, June 13, 2022): This image shows the backward trajectory ending in the late morning. The air parcels' trajectories pathways indicate the air masses originated from different directions, with significant influence from the southeast and west. **Smoke Transport:** The MODIS imagery reveals smoke plumes aligning with these trajectories, suggesting that smoke from surrounding fires is being transported towards Fairbanks.

Table 16. Hourly surface observation for Fairbanks International Airport, June 13, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/13/2022 00:53 AKDT	0	0	**	7 (Smoke)	2	53	45
PAFA	06/13/2022 01:53 AKDT	3	350	**	7 (Smoke)	2	53	43
PAFA	06/13/2022 02:53 AKDT	6	20	**	7 (Smoke)	2	49	42
PAFA	06/13/2022 03:53 AKDT	3	180	**	7 (Smoke)	2	50	43
PAFA	06/13/2022 04:53 AKDT	3	80	**	7 (Smoke)	2	48	42
PAFA	06/13/2022 05:53 AKDT	3	80	**	7 (Smoke)	2	48	42
PAFA	06/13/2022 06:53 AKDT	5	20	**	7 (Smoke)	2	49	43
PAFA	06/13/2022 07:53 AKDT	3	30	**	7 (Smoke)	2	52	43
PAFA	06/13/2022 08:53 AKDT	3	40	**	7 (Smoke)	2	56	43
PAFA	06/13/2022 09:53 AKDT	5		**	7 (Smoke)	2	59	44
PAFA	06/13/2022 10:53 AKDT	6	70	**	7 (Smoke)	2	63	44
PAFA	06/13/2022 11:53 AKDT	8	50	**	7 (Smoke)	3	68	41
PAFA	06/13/2022 12:53 AKDT	6	110	**	7 (Smoke)	4	70	38
PAFA	06/13/2022 13:53 AKDT	7	10	**	7 (Smoke)	3	72	42
PAFA	06/13/2022 14:53 AKDT	5	50	**	7 (Smoke)	4	74	37
PAFA	06/13/2022 15:53 AKDT	5	30	**	7 (Smoke)	7	75	39
PAFA	06/13/2022 16:53 AKDT	7	300	**	7 (Smoke)	6	75	38
PAFA	06/13/2022 17:53 AKDT	0	0	**	7 (Smoke)	6	76	38
PAFA	06/13/2022 18:53 AKDT	3	**	**	7 (Smoke)	6	75	37
PAFA	06/13/2022 19:53 AKDT	0	0	**	7 (Smoke)	6	74	38
PAFA	06/13/2022 20:53 AKDT	0	0	**	7 (Smoke)	6	75	37
PAFA	06/13/2022 21:53 AKDT	0	0	**	7 (Smoke)	6	71	46
PAFA	06/13/2022 22:53 AKDT	0	0	**	7 (Smoke)	6	67	46
PAFA	06/13/2022 23:53 AKDT	0	0	**	7 (Smoke)	6	62	46

Surface observations: The surface observations from June 13, 2022, show reduced visibility due to smoke throughout the day. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating smoke transport into the Fairbanks area at different times of the day.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - June 14, 2022

AICC Fire Report Summary:

- **New Fires:** 2 new fires reported.
- **Total Fires Statewide:** 85 fires burning.
- **Acres Burned:** 771,310 acres, with a 24-hour increase of 217,216 acres.

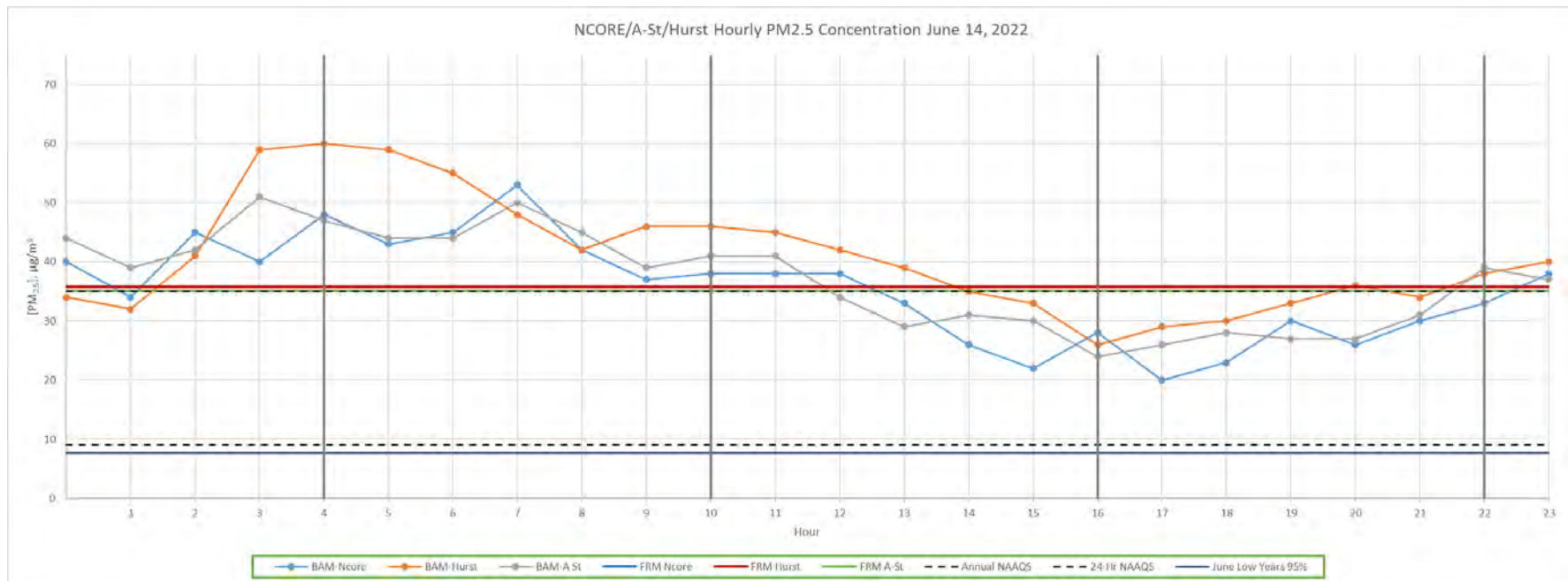


Figure 25: FNSB PM_{2.5} concentrations for June 14, 2022

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on June 14, 2022. The data include readings from both BAM and FRM instruments at each site.

The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: PM_{2.5} concentrations are relatively high during the early morning hours, with levels exceeding 60 µg/m³ at the BAM-Hurst site and around 50 µg/m³ at the other sites.

Midday Levels: Concentrations show a gradual decline throughout the late morning and early afternoon, dropping below 40 µg/m³ by 3:00 PM.

Afternoon to Evening: PM_{2.5} levels remain relatively stable and lower during the afternoon, maintaining around 30 to 40 µg/m³. There is a slight increase in the evening, with levels rising to around 40 to 50 µg/m³.

Overall Trend: The PM_{2.5} concentrations on June 14, 2022, start at high levels during the early morning, exceeding the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) and the annual NAAQS limit (represented by the dashed black line at 9 µg/m³) across all sites. As the day progresses, the concentrations gradually decline but remain elevated, particularly in the early morning and evening. The overall PM_{2.5} levels are consistently high throughout the day, highlighting periods of poor air quality.

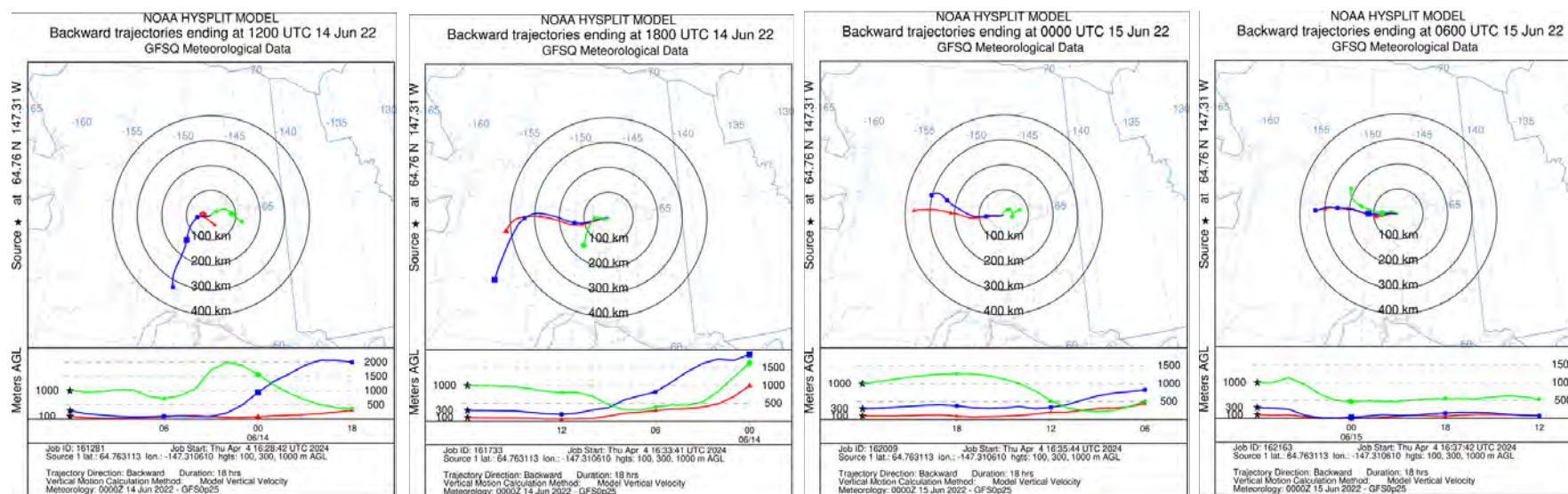


Figure 26: NOAA HYSPLIT model backward trajectories for June 14, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for June 14 to June 15, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, June 14, 2022):** This image shows the backward trajectory ending early morning. The trajectories at 100m, 300m, and 1000m indicate the air masses originated from different directions, converging towards the target location. The vertical profile below the map provides a detailed view of the altitude changes over time.
- **Image 2 (18:00 UTC, June 14, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the west and southwest at varying altitudes, providing clues about potential pollutant sources upwind.
- **Image 3 (00:00 UTC, June 15, 2022):** The third image displays the backward trajectory ending early afternoon. It shows a consistent pattern with the earlier images, with air parcels tracing back to sources located to the west, indicating continued influence from these directions.
- **Image 4 (06:00 UTC, June 15, 2022):** The final image in this series illustrates the backward trajectory ending early in the morning of June 15. The convergence of air parcels from the west aligns with the previous observations, reinforcing the pattern of pollutant transport from these regions.

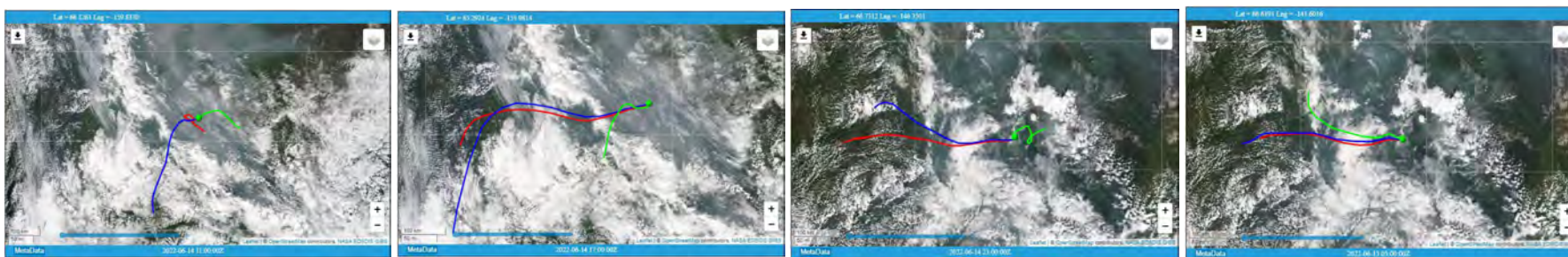


Figure 27: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for June 14 to June 15, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 2 (17:00 UTC, June 14, 2022): This image shows the backward trajectory ending late morning. The air parcels' pathways highlight significant movement from the southwest and west. **Smoke Transport:** The imagery shows smoke plumes moving from fires surrounding Fairbanks. The change in wind direction has likely facilitated the transport of smoke from these fires, contributing to elevated PM_{2.5} levels.

Table 17. Hourly surface observation for Fairbanks International Airport, June 14, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/14/2022 00:53 AKDT	0	0	**	7 (Smoke)	6	58	43
PAFA	06/14/2022 01:53 AKDT	6	200	**	7 (Smoke)	6	60	44
PAFA	06/14/2022 02:53 AKDT	7	200	**	7 (Smoke)	5	56	43
PAFA	06/14/2022 03:53 AKDT	0	0	**	7 (Smoke)	4	53	44
PAFA	06/14/2022 04:53 AKDT	5	210	**	7 (Smoke)	5	52	42
PAFA	06/14/2022 05:53 AKDT	0	0	**	7 (Smoke)	5	53	43
PAFA	06/14/2022 06:53 AKDT	6	50	**	7 (Smoke)	5	53	44
PAFA	06/14/2022 07:53 AKDT	0	0	**	7 (Smoke)	6	54	44
PAFA	06/14/2022 08:53 AKDT	0	0	**	7 (Smoke)	6	57	44
PAFA	06/14/2022 09:53 AKDT	3	290	**	7 (Smoke)	6	59	45
PAFA	06/14/2022 10:53 AKDT	5	170	**	7 (Smoke)	6	60	46
PAFA	06/14/2022 11:53 AKDT	6	170	**	7 (Smoke)	7	62	46
PAFA	06/14/2022 12:53 AKDT	0	0	**	7 (Smoke)	7	65	47
PAFA	06/14/2022 13:53 AKDT	8	190	**	7 (Smoke)	7	66	47
PAFA	06/14/2022 14:53 AKDT	8	170	**	7 (Smoke)	7	68	47
PAFA	06/14/2022 15:53 AKDT	6	170	**	7 (Smoke)	7	70	47
PAFA	06/14/2022 16:53 AKDT	7	170	**	7 (Smoke)	6	71	46
PAFA	06/14/2022 17:53 AKDT	3	210	**	7 (Smoke)	6	72	45
PAFA	06/14/2022 18:53 AKDT	5	200	**	7 (Smoke)	7	72	45
PAFA	06/14/2022 19:53 AKDT	8	230	16	7 (Smoke)	7	71	46
PAFA	06/14/2022 20:53 AKDT	10	250	**	7 (Smoke)	7	68	47
PAFA	06/14/2022 21:53 AKDT	3	220	**	7 (Smoke)	7	66	46
PAFA	06/14/2022 22:53 AKDT	6	220	**	7 (Smoke)	7	65	45
PAFA	06/14/2022 23:53 AKDT	7	230	**	7 (Smoke)	6	61	48

Surface observations: The surface observations from June 14, 2022, show consistent reduced visibility due to smoke throughout the period. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - June 15, 2022

AICC Fire Report Summary:

- **New Fires:** 3 new fires reported.
- **Total Fires Statewide:** 86 fires burning.
- **Acres Burned:** 835,369 acres, with a 24-hour increase of 64,059 acres.

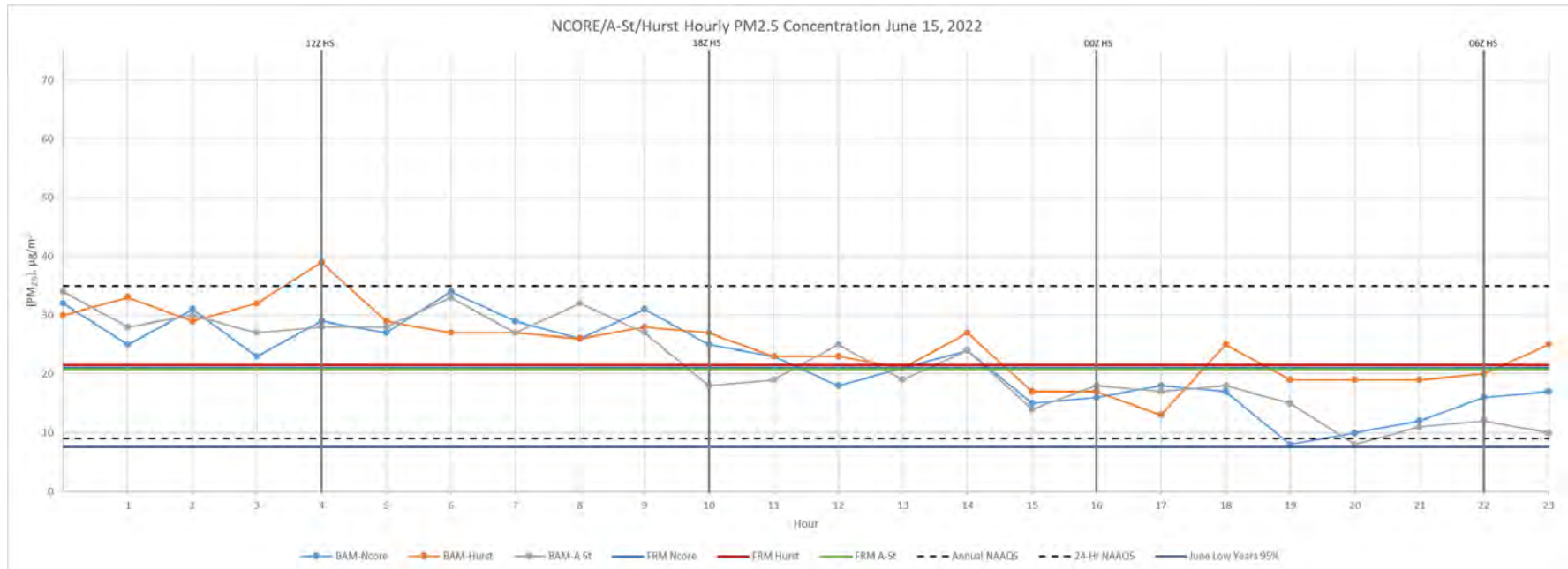


Figure 28: FNSB PM_{2.5} concentrations for June 15, 2022

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on June 15, 2022. The data include readings from both BAM and FRM instruments at each site. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: PM_{2.5} concentrations are relatively consistent during the early morning hours, with levels around 30 to 40 µg/m³.

Midday Levels: Concentrations show some variability but generally remain around 30 to 40 µg/m³, with a notable peak at the BAM-Hurst Road site around 4:00 AM, reaching about 40 µg/m³.

Afternoon to Evening: PM_{2.5} levels continue to exhibit slight fluctuations, with a decrease in concentrations around 3:00 PM, dropping below 20 µg/m³. There is a slight increase in the evening, with levels rising to around 20 µg/m³.

Overall Trend: The PM_{2.5} concentrations on June 15, 2022, show relatively stable levels throughout the day, generally hovering around the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) and above the annual NAAQS limit (represented by the dashed black line at 9 µg/m³) across all sites. As the day progresses, the concentrations exhibit minor fluctuations but remain within a narrow range. The overall PM_{2.5} levels indicate moderate air quality concerns, with periods of elevated concentrations, particularly in the early morning and evening.

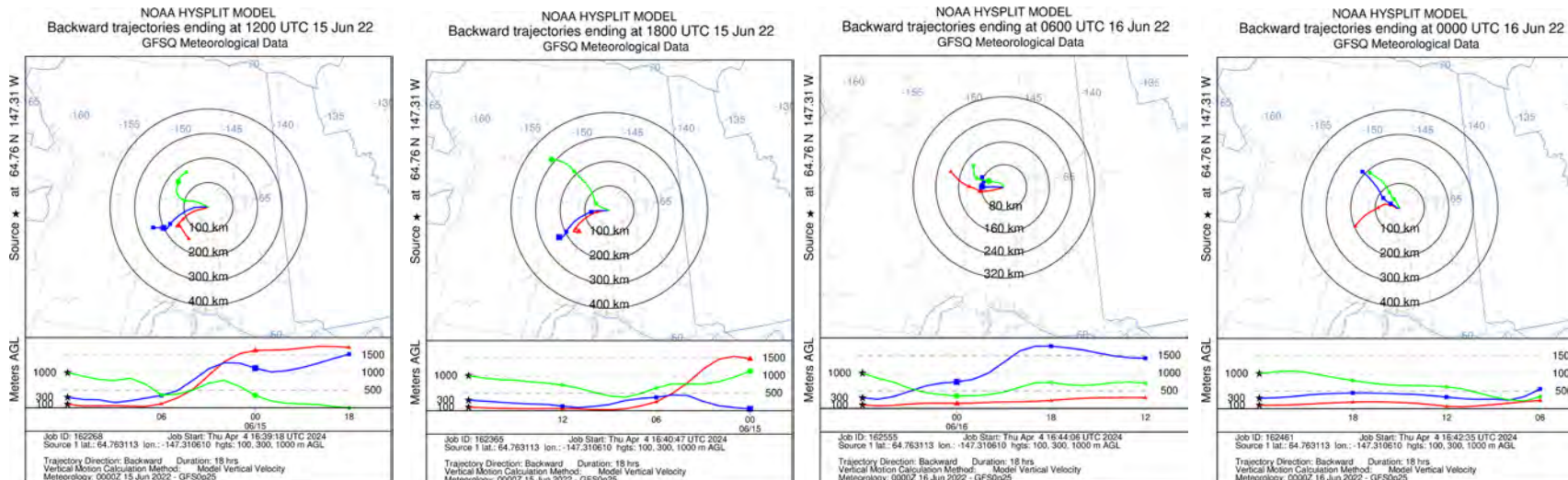


Figure 29: NOAA HYSPLIT model backward trajectories for June 15, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for June 15 to June 16, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, June 15, 2022):** This image shows the backward trajectory ending early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the west, converging towards the target location. The vertical profile below the map shows that the air parcels maintained relatively low altitudes throughout their path, suggesting the transport of smoke and pollutants from nearby sources in these directions.
- **Image 2 (18:00 UTC, June 15, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the west to northwest at varying altitudes, with the 100m and 300m trajectories coming from the northwest and the 1000m trajectory from the north. This indicates the potential for pollutants from these regions to affect air quality in Fairbanks.
- **Image 3 (00:00 UTC, June 16, 2022):** The third image displays the backward trajectory ending early afternoon. It shows air parcels tracing back to sources located west. The air parcels' vertical profile suggests a consistent influence from these directions, potentially transporting smoke into the target area.
- **Image 4 (06:00 UTC, June 16, 2022):** The final image in this series illustrates the backward trajectory ending in the late evening. The convergence of air parcels from the west and northwest aligns with the previous observations, with all three trajectories (100m, 300m, and 1000m) showing transport from these regions. The vertical profile shows the parcels maintaining low to moderate altitudes, reinforcing the pattern of pollutant transport from these areas.



Figure 30: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for June 15 to June 16, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 2 (17:00 UTC, June 15, 2022): This image shows the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the southwest and northwest at varying altitudes, with the 100m and 300m trajectories coming from the southwest and the 1000m trajectory from the northwest. **Smoke Transport:** The imagery shows smoke plumes moving from fires surrounding Fairbanks. The change in wind direction has likely facilitated the transport of smoke from these fires, contributing to elevated PM_{2.5} levels.

Table 18. Hourly surface observation for Fairbanks International Airport, June 15, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/15/2022 00:53 AKDT	7	200	**	7 (Smoke)	6	59	48
PAFA	06/15/2022 01:53 AKDT	7	190	**	7 (Smoke)	7	55	48
PAFA	06/15/2022 02:53 AKDT	8	210	**	7 (Smoke)	7	54	48
PAFA	06/15/2022 03:53 AKDT	3	220	**	7 (Smoke)	7	53	47
PAFA	06/15/2022 04:53 AKDT	0	0	**	7 (Smoke)	6	50	46
PAFA	06/15/2022 05:53 AKDT	0	0	**	7 (Smoke)	6	52	47
PAFA	06/15/2022 06:53 AKDT	0	0	**	7 (Smoke)	7	54	48
PAFA	06/15/2022 07:53 AKDT	0	0	**	7 (Smoke)	7	54	48
PAFA	06/15/2022 08:53 AKDT	0	0	**	7 (Smoke)	7	56	48
PAFA	06/15/2022 09:53 AKDT	0	0	**	7 (Smoke)	7	56	48
PAFA	06/15/2022 10:53 AKDT	0	0	**	7 (Smoke)	7	58	49
PAFA	06/15/2022 11:53 AKDT	3	200	**	7 (Smoke)	8	61	48
PAFA	06/15/2022 12:53 AKDT	3	**	**	7 (Smoke)	9	64	47
PAFA	06/15/2022 13:53 AKDT	8	180	**	7 (Smoke)	9	66	48
PAFA	06/15/2022 14:53 AKDT	8	200	**	7 (Smoke)	9	68	48
PAFA	06/15/2022 15:53 AKDT	7	**	**	7 (Smoke)	9	70	48
PAFA	06/15/2022 16:53 AKDT	6	220	**	7 (Smoke)	9	71	46
PAFA	06/15/2022 17:53 AKDT	8	190	**	7 (Smoke)	9	72	47
PAFA	06/15/2022 18:53 AKDT	8	270	**	**	10	72	45
PAFA	06/15/2022 19:53 AKDT	14	10	**	**	10	69	45
PAFA	06/15/2022 20:53 AKDT	10	10	**	**	10	65	47
PAFA	06/15/2022 21:53 AKDT	7	30	**	**	10	63	48
PAFA	06/15/2022 22:53 AKDT	6	350	**	**	10	61	47
PAFA	06/15/2022 23:53 AKDT	6	360	**	**	10	58	46

Surface observations: The surface observations from June 15, 2022, show consistent reduced visibility due to smoke throughout the period. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - June 16, 2022

AICC Fire Report Summary:

- **New Fires:** 5 new fires reported.
- **Total Fires Statewide:** 90 fires burning.
- **Acres Burned:** 863,842 acres, with a 24-hour increase of 28,473 acres.

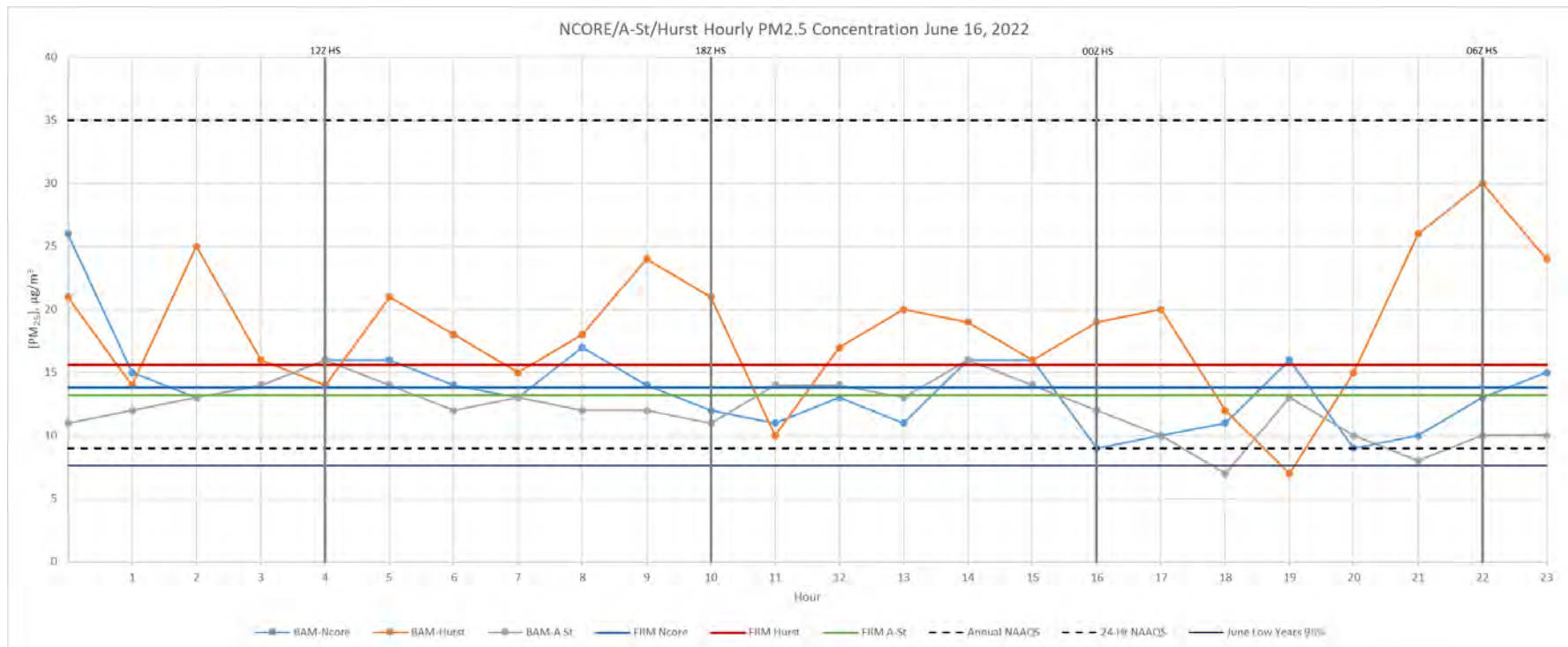


Figure 31: FNSB PM_{2.5} concentrations for June 16, 2022

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on June 16, 2022. The data include readings from both BAM and FRM instruments at each site. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: PM_{2.5} concentrations are relatively consistent during the early morning hours, with levels ranging from 15 to 25 µg/m³.

Midday Levels: Concentrations show some variability but generally remain around 15 to 20 µg/m³, with a notable peak at the BAM-Hurst Road site around 10:00 AM, reaching about 25 µg/m³

Afternoon to Evening: PM_{2.5} levels continue to exhibit fluctuations, with a decrease in concentrations around noon and early afternoon, dropping below 15 µg/m³. There is a slight spike in the evening, with levels rising to around 30 µg/m³ at the BAM-Hurst Road site around 10:00 PM.

Overall Trend: The PM_{2.5} concentrations on June 16, 2022, show variable levels throughout the day, generally hovering around the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) and above the annual NAAQS limit (represented by the dashed black line at 9 µg/m³) across all sites. As the day progresses, the concentrations exhibit minor fluctuations but remain within a narrow range. The overall PM_{2.5} levels indicate moderate air quality concerns, with periods of elevated concentrations, particularly in the early morning and late evening.

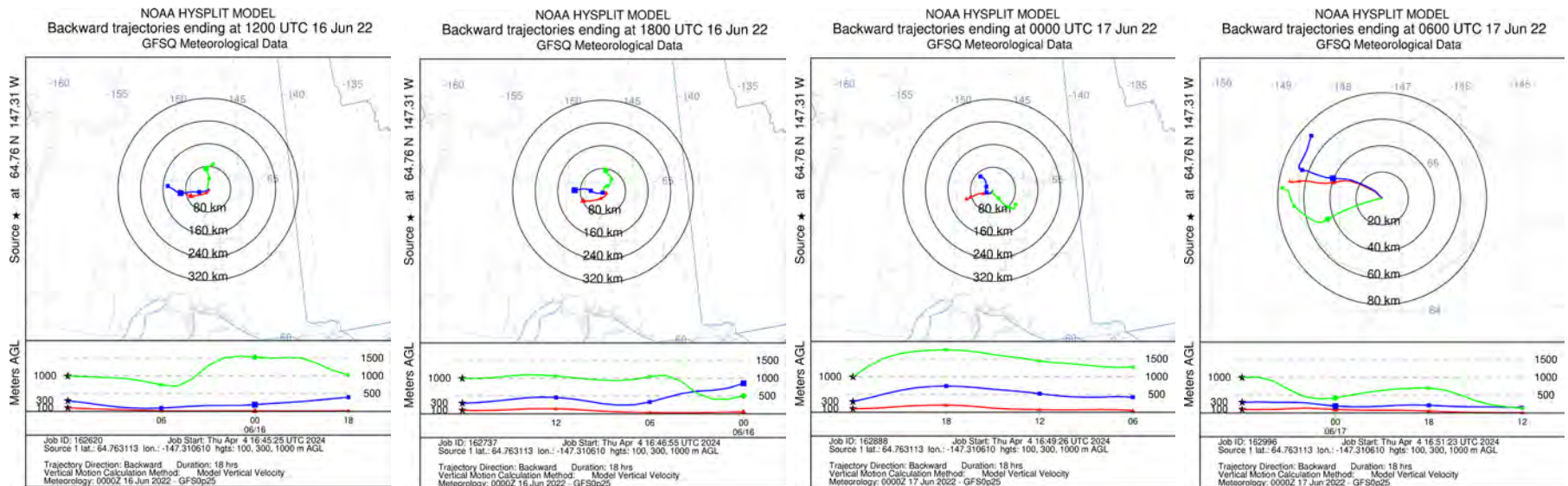


Figure 32: NOAA HYSPLIT model backward trajectories for June 16, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for June 16 to June 17, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, June 16, 2022):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the west and north, converging towards the target location. The vertical profile below the map shows that the air parcels maintained relatively low altitudes throughout their path, suggesting the transport of smoke and pollutants from nearby sources in these directions.
- **Image 2 (18:00 UTC, June 16, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight slight movement from the west and north at varying altitudes, with the 100m and 300m trajectories coming from the west and the 1000m trajectory from the north. This indicates the potential for pollutants from these regions to affect air quality in Fairbanks.
- **Image 3 (00:00 UTC, June 17, 2022):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located southwest through northwest, with the 100m trajectory coming from the southwest and the 300m from the northwest and 1000m trajectories from the southeast. The air parcels' vertical profile suggests a consistent influence from these directions, potentially transporting smoke into the target area.
- **Image 4 (06:00 UTC, June 17, 2022):** The final image in this series illustrates the backward trajectory ending in the late evening. The convergence of air parcels from the west aligns with the previous observations, with all three trajectories (100m, 300m, and 1000m) showing transport from this region. The vertical profile shows the parcels maintaining low to moderate altitudes, reinforcing the pattern of pollutant transport from these areas.

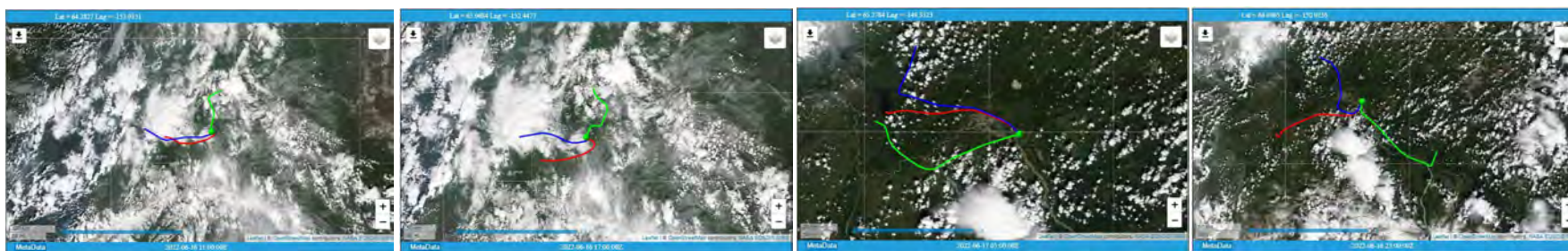


Figure 33: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for June 16 to June 17, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 2 (17:00 UTC, June 16, 2022): The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the southwest and north at varying altitudes, with the 100m and 300m trajectories coming from the southwest and the 1000m trajectory from the north. This indicates the potential for pollutants from these regions to affect air quality in FNSB.

Table 19. Hourly surface observation for Fairbanks International Airport, June 16, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/16/2022 00:53 AKDT	3	310	**	**	10	56	47
PAFA	06/16/2022 01:53 AKDT	0	0	**	**	10	56	46
PAFA	06/16/2022 02:53 AKDT	0	0	**	**	10	55	47
PAFA	06/16/2022 03:53 AKDT	3	30	**	**	10	53	46
PAFA	06/16/2022 04:53 AKDT	6	40	**	**	10	52	47
PAFA	06/16/2022 05:53 AKDT	6	50	**	**	10	53	47
PAFA	06/16/2022 06:53 AKDT	6	20	**	**	10	54	47
PAFA	06/16/2022 07:53 AKDT	0	0	**	**	10	57	48
PAFA	06/16/2022 08:53 AKDT	0	0	**	**	10	59	48
PAFA	06/16/2022 09:53 AKDT	5	210	**	**	10	60	48
PAFA	06/16/2022 10:53 AKDT	7	230	**	**	10	60	50
PAFA	06/16/2022 11:53 AKDT	5	**	**	**	10	65	49
PAFA	06/16/2022 12:53 AKDT	6	250	**	**	10	68	49
PAFA	06/16/2022 13:53 AKDT	0	0	**	**	10	70	49
PAFA	06/16/2022 14:53 AKDT	0	0	**	**	10	70	45
PAFA	06/16/2022 15:53 AKDT	7	200	**	**	10	70	47
PAFA	06/16/2022 16:53 AKDT	6	190	**	**	10	70	45
PAFA	06/16/2022 17:53 AKDT	7	200	**	**	10	72	49
PAFA	06/16/2022 18:53 AKDT	6	210	**	**	10	71	48
PAFA	06/16/2022 19:53 AKDT	6	220	**	**	10	71	46
PAFA	06/16/2022 20:53 AKDT	8	40	**	**	10	65	49
PAFA	06/16/2022 21:53 AKDT	7	360	**	**	10	66	49
PAFA	06/16/2022 22:53 AKDT	5	330	**	**	10	63	49
PAFA	06/16/2022 23:53 AKDT	0	0	**	**	10	59	48

Surface observations: The surface observations from June 16, 2022, show no reduced visibility due to smoke throughout the period. PM_{2.5} concentrations were not thick enough for the airport RAWS to detect.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - June 18, 2022

AICC Fire Report Summary:

- **New Fires:** 11 new fires reported.
- **Total Fires Statewide:** 102 fires burning.
- **Acres Burned:** 1,005,195 acres, with a 24-hour increase of 88,316 acres.

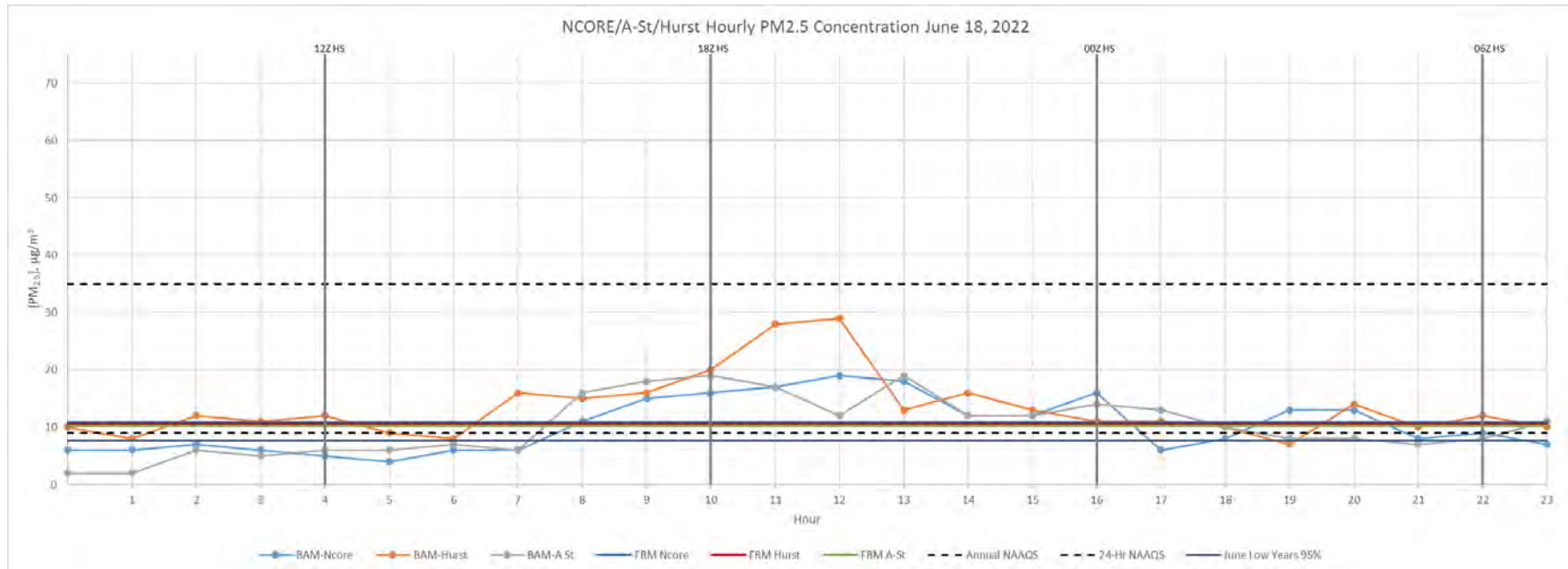


Figure 34: FNSB PM_{2.5} concentrations for June 18, 2022

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on June 18, 2022. The data include readings from both BAM and FRM instruments at each site. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: PM_{2.5} concentrations are relatively low during the early morning hours, generally staying below 15 µg/m³.

Midday Levels: Concentrations show a slight increase around midday, with levels peaking at approximately 30 µg/m³ at the BAM-Hurst Road site around 11:00 AM.

Afternoon to Evening: PM_{2.5} levels remain relatively stable throughout the afternoon and evening, with minor fluctuations. Concentrations generally hover around 10 to 15 µg/m³.

Overall Trend: The PM_{2.5} concentrations on June 18, 2022, show relatively low levels throughout the day, staying well below the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) but above the annual NAAQS limit (represented by the dashed black line at 9 µg/m³) across all sites. The overall PM_{2.5} levels indicate good air quality, with minor increases around midday but no significant peaks that would cause concern. This suggests a minimal impact from smoke or other pollutants on this day.

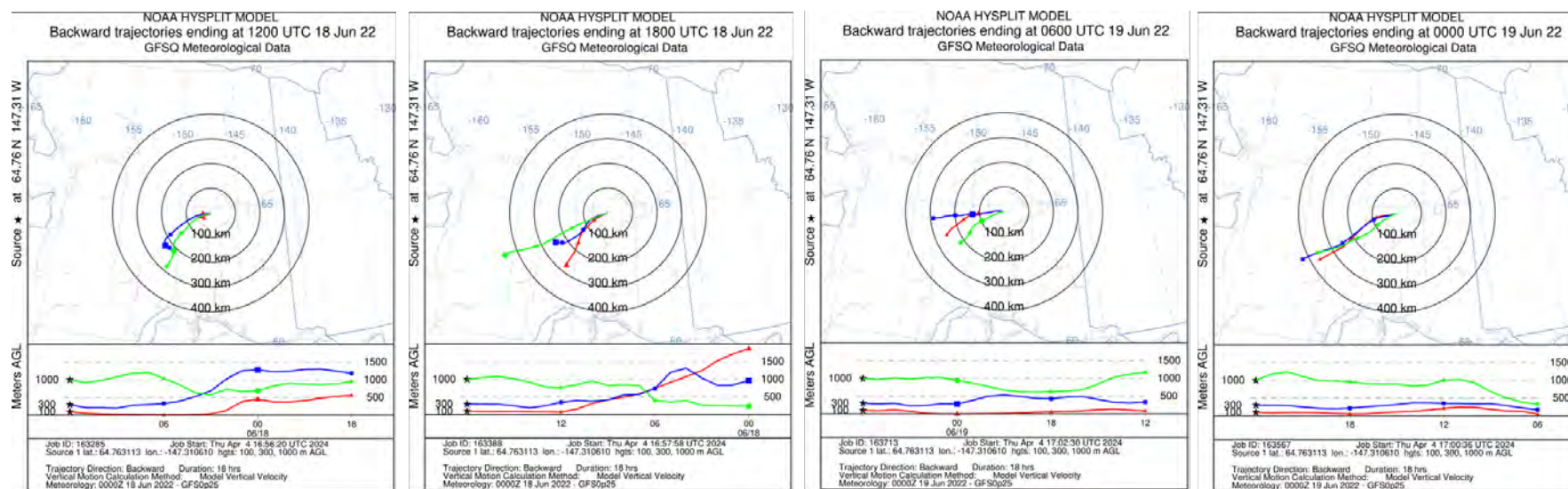


Figure 35: NOAA HYSPLIT model backward trajectories for June 18, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for June 18 to June 19, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, June 18, 2022):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the southwest, converging towards the target location. The

vertical profile below the map shows that the air parcels maintained relatively low altitudes throughout their path, suggesting the transport of smoke and pollutants from nearby sources in these directions.

- **Image 2 (18:00 UTC, June 18, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the southwest at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from the southwest. This indicates the potential for pollutants from these regions to affect air quality in Fairbanks.
- **Image 3 (00:00 UTC, June 19, 2022):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the southwest, with the 100m, 300m, and 1000m trajectories all coming from the same direction. The air parcels' vertical profile suggests a consistent influence from these directions, potentially transporting smoke into the target area.
- **Image 4 (06:00 UTC, June 19, 2022):** The final image in this series illustrates the backward trajectory ending in the late evening. The convergence of air parcels from the southwest aligns with the previous observations, with all three trajectories (100m, 300m, and 1000m) showing transport from these regions. The vertical profile shows the parcels maintaining low to moderate altitudes, reinforcing the pattern of pollutant transport from these areas.

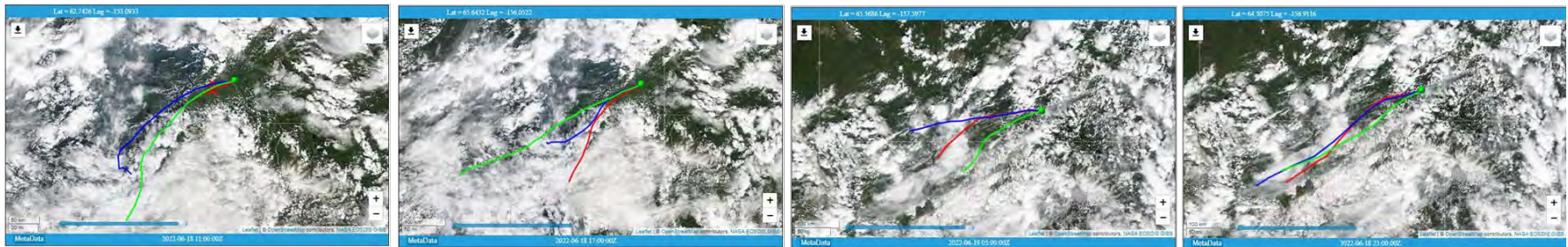


Figure 36: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for June 18 to June 19, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 2 (17:00 UTC, June 18, 2022): This image shows the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the southwest at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from the southwest. **Smoke Transport:** The imagery shows light smoke plumes moving from fires located southwest of Fairbanks. The consistent wind pattern has facilitated the transport of smoke from these fires, contributing to the slightly elevated PM_{2.5} levels.

Table 20. Hourly surface observation for Fairbanks International Airport, June 18, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/18/2022 00:53 AKDT	5	160	**	**	10	58	47
PAFA	06/18/2022 01:53 AKDT	0	0	**	**	10	55	47
PAFA	06/18/2022 02:53 AKDT	0	0	**	**	10	57	48
PAFA	06/18/2022 03:53 AKDT	3	190	**	**	10	53	48
PAFA	06/18/2022 04:53 AKDT	0	0	**	**	10	53	48
PAFA	06/18/2022 05:53 AKDT	0	0	**	**	10	55	48
PAFA	06/18/2022 06:53 AKDT	3	170	**	**	10	55	47
PAFA	06/18/2022 07:53 AKDT	8	240	**	**	10	61	47
PAFA	06/18/2022 08:53 AKDT	6	230	**	**	10	63	47
PAFA	06/18/2022 09:53 AKDT	8	200	**	**	10	65	48
PAFA	06/18/2022 10:53 AKDT	7	180	**	**	10	67	49
PAFA	06/18/2022 11:53 AKDT	8	230	**	7 (Smoke)	9	68	49
PAFA	06/18/2022 12:53 AKDT	8	280	**	7 (Smoke)	9	71	48
PAFA	06/18/2022 13:53 AKDT	7	250	**	7 (Smoke)	9	68	47
PAFA	06/18/2022 14:53 AKDT	12	250	**	7 (Smoke)	9	71	45
PAFA	06/18/2022 15:53 AKDT	7	**	**	**	10	71	45
PAFA	06/18/2022 16:53 AKDT	9	230	**	**	10	72	45
PAFA	06/18/2022 17:53 AKDT	0	0	**	**	10	70	46
PAFA	06/18/2022 18:53 AKDT	6	220	**	**	10	70	42
PAFA	06/18/2022 19:53 AKDT	5		**	**	10	71	45
PAFA	06/18/2022 20:53 AKDT	8	360	**	**	10	67	47
PAFA	06/18/2022 21:53 AKDT	8	360	**	**	10	64	46
PAFA	06/18/2022 22:53 AKDT	3	50	**	**	10	62	48
PAFA	06/18/2022 23:53 AKDT	0	0	**	**	10	62	50

Surface observations: The surface observations from June 18, 2022, show a few hours of reduced visibility due to smoke in early afternoon. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - June 22, 2022

AICC Fire Report Summary:

- **New Fires:** 19 new fires reported.
- **Total Fires Statewide:** 133 fires burning.
- **Acres Burned:** 1,148,847 acres, with a 24-hour increase of 81,922 acres.

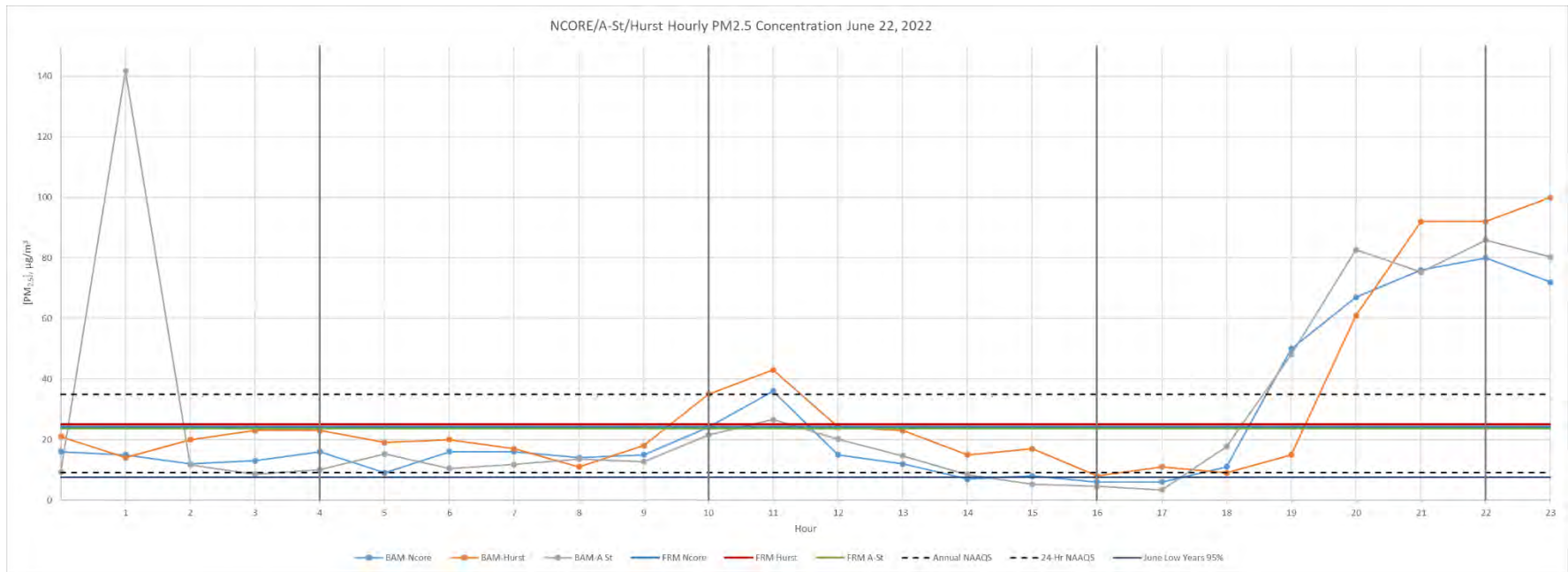


Figure 37: FNSB PM_{2.5} concentrations for June 22, 2022

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on June 22, 2022. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: There is a significant spike in PM_{2.5} concentration at the BAM-A-Street site around 1:00 AM, reaching approximately 140 µg/m³. This is followed by a sharp decline, with levels stabilizing around 20 µg/m³.

Midday Levels: PM_{2.5} concentrations remain relatively stable throughout the morning and early afternoon, generally staying below 20 µg/m³ with a slight peak around 11:00 AM.

Afternoon to Evening: Concentrations start to rise significantly in the late afternoon and evening, with levels peaking again at around 60 µg/m³ to 80 µg/m³ at the BAM-Hurst Road, BAM-NCore and BAM-A-Street sites by 10:00 PM.

Overall Trend: The PM_{2.5} concentrations on June 22, 2022, show two notable peaks – one in the early morning and another in the late evening. The early morning spike at the A-Street site exceeds both the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) and the annual NAAQS limit (represented by the dashed black line at 9 µg/m³). The late evening rise in concentrations indicates a significant increase in particulate matter, likely influenced by changing wind patterns and potential smoke transport from nearby fires. The overall PM_{2.5} levels indicate periods of poor air quality, especially during the early morning and late evening hours.

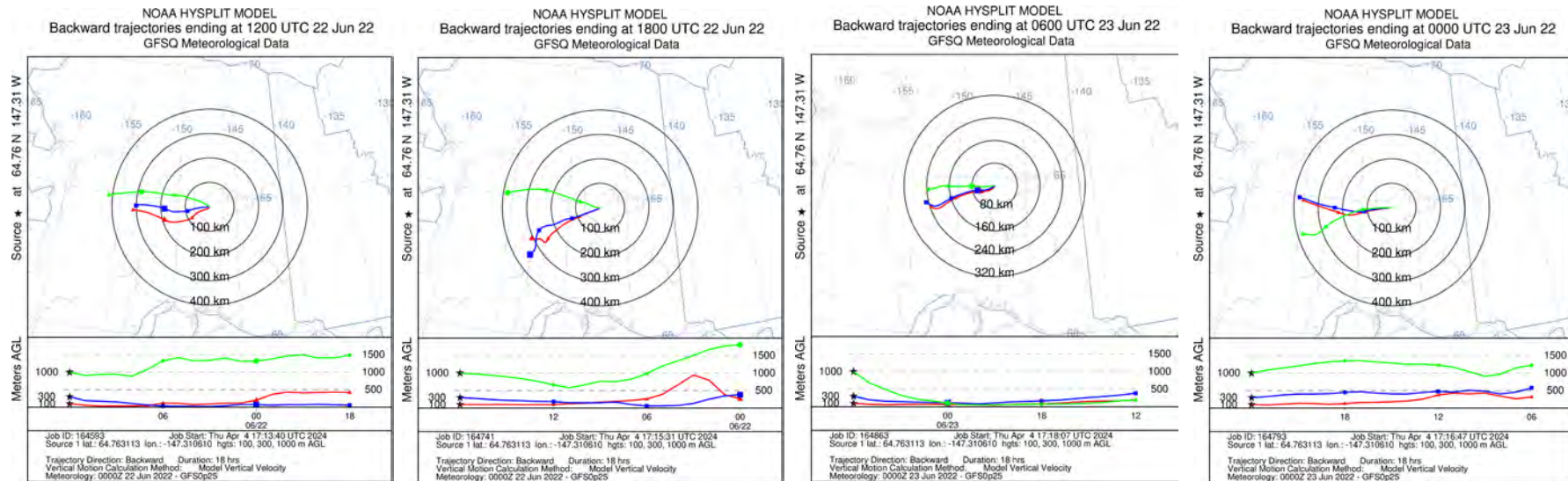


Figure 38: NOAA HYSPLIT model backward trajectories for June 22, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for June 22 to June 23, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, June 22, 2022):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m , 300m, and 1000m indicate that the air parcels originated from the west, converging towards the target location. The vertical profile below the map shows that the air parcels maintained relatively low altitudes throughout their path.
- **Image 2 (18:00 UTC, June 22, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the southwest at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from the southwest.
- **Image 3 (00:00 UTC, June 23, 2022):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the southwest, with the 100m, 300m, and 1000m trajectories all coming from the same direction.
- **Image 4 (06:00 UTC, June 23, 2022):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels coming from the southwest.



Figure 39: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for June 22 to June 23, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 2 (17:00 UTC, June 22, 2022): The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the southwest at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from the southwest. **Smoke Transport:** The MODIS imagery shows smoke plumes consistent with the southwest-originating trajectories, indicating continued smoke transport towards Fairbanks.

Table 21. Hourly surface observation for Fairbanks International Airport, June 22, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/22/2022 00:53 AKDT	7	210	**	**	10	63	48
PAFA	06/22/2022 01:53 AKDT	7	190	**	**	10	60	49
PAFA	06/22/2022 02:53 AKDT	6	140	**	**	10	56	49
PAFA	06/22/2022 03:53 AKDT	0	0	**	**	10	54	49
PAFA	06/22/2022 04:53 AKDT	5	60	**	**	10	55	50
PAFA	06/22/2022 05:53 AKDT	0	0	**	**	10	55	50
PAFA	06/22/2022 06:53 AKDT	0	0	**	**	10	58	50
PAFA	06/22/2022 07:53 AKDT	3	40	**	**	10	60	50
PAFA	06/22/2022 08:53 AKDT	5	160	**	**	10	61	51
PAFA	06/22/2022 09:53 AKDT	0	0	**	**	9	63	51
PAFA	06/22/2022 10:53 AKDT	3	120	**	**	9	66	52
PAFA	06/22/2022 11:53 AKDT	9	80	**	**	8	70	53
PAFA	06/22/2022 12:53 AKDT	10	310	**	**	8	74	43
PAFA	06/22/2022 13:53 AKDT	6	**	**	**	8	75	44
PAFA	06/22/2022 14:53 AKDT	6	250	**	**	10	75	44
PAFA	06/22/2022 15:53 AKDT	5	**	**	**	10	76	44
PAFA	06/22/2022 16:53 AKDT	6	**	**	**	10	77	45
PAFA	06/22/2022 17:53 AKDT	3	190	**	**	10	76	45
PAFA	06/22/2022 18:53 AKDT	7	**	**	**	10	77	42
PAFA	06/22/2022 19:53 AKDT	8	360	**	**	9	75	46
PAFA	06/22/2022 20:53 AKDT	9	330	**	**	7	73	42
PAFA	06/22/2022 21:53 AKDT	3	360	**	7 (Smoke)	6	69	41
PAFA	06/22/2022 22:53 AKDT	0	0	**	7 (Smoke)	5	67	43
PAFA	06/22/2022 23:53 AKDT	0	0	**	7 (Smoke)	5	64	45

Surface observations: The surface observations from June 22, 2022, show a few hours of reduced visibility due to smoke in late evening. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - June 23, 2022

AICC Fire Report Summary:

- **New Fires:** 3 new fires reported.
- **Total Fires Statewide:** 134 fires burning.
- **Acres Burned:** 1,165,038 acres, with a 24-hour increase of 16,191 acres.

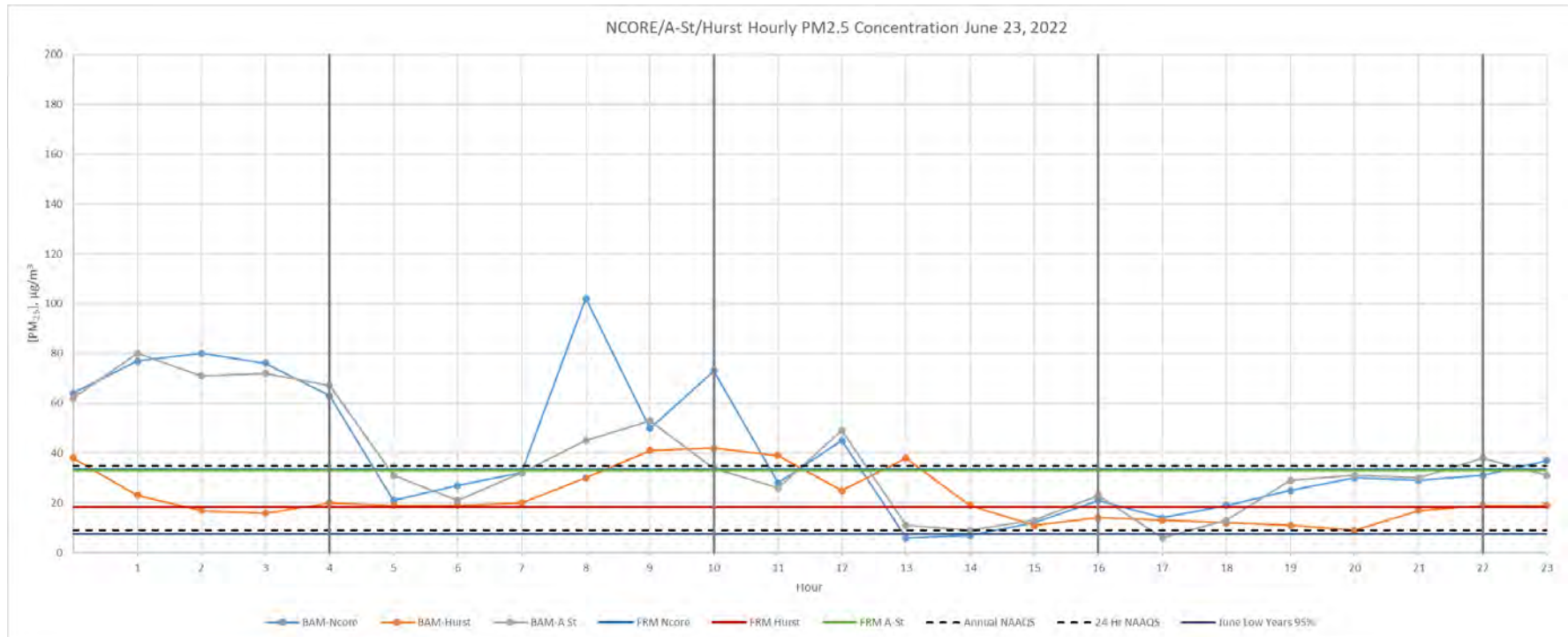


Figure 40: FNSB PM_{2.5} concentrations for June 23, 2022

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on June 23, 2022. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: There is a significant spike in PM_{2.5} concentration at the BAM-NCore and BAM-A-Street sites around 1:00 AM, reaching approximately 80 µg/m³. This is followed by a sharp decline, with levels stabilizing around 20 µg/m³.

Midday Levels: PM_{2.5} concentrations remain relatively fluid throughout the morning and early afternoon, ranging from 60 µg/m³ to 20 µg/m³.

Afternoon to Evening: Concentrations start to rise in the late afternoon and evening, with levels peaking again at around 40 µg/m³ at the BAM-Hurst Road site by 10:00 PM.

Overall Trend: The PM_{2.5} concentrations on June 23, 2022, show a notable peak in the early morning, particularly at the NCore site. This early morning spike exceeds both the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) and the annual NAAQS limit (represented by the dashed black line at 9 µg/m³). The PM_{2.5} levels remain relatively low throughout the rest of the day, with slight fluctuations but staying within acceptable limits. The overall PM_{2.5} levels indicate periods of poor air quality during the early morning hours.

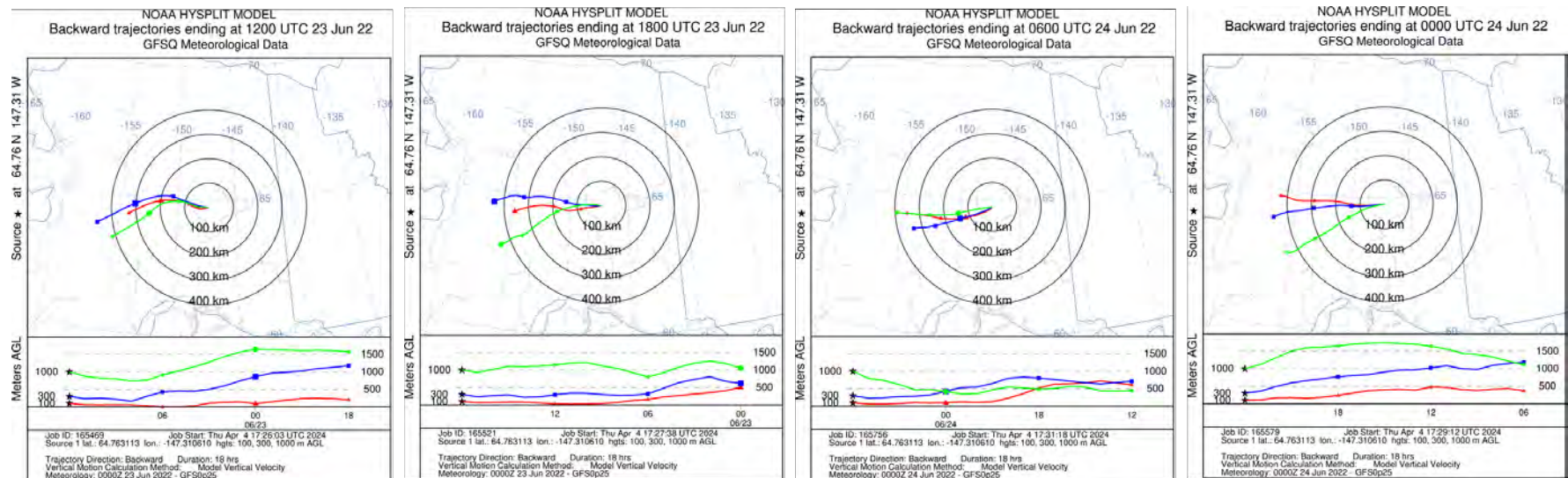


Figure 41: NOAA HYSPLIT model backward trajectories for June 23, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for June 23 to June 24, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, June 23, 2022):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the west and southwest, converging towards the target location.
- **Image 2 (18:00 UTC, June 23, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the west at varying altitudes, with the 100m and 300m trajectories originating from the west, and the 1000m trajectory coming from the southwest.
- **Image 3 (00:00 UTC, June 24, 2022):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the southwest for the 100m trajectory, while the 300m and 1000m trajectories originate from the west.
- **Image 4 (06:00 UTC, June 24, 2022):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels coming from the west at 100m and 300m, while the 1000m trajectory originates from the southwest.

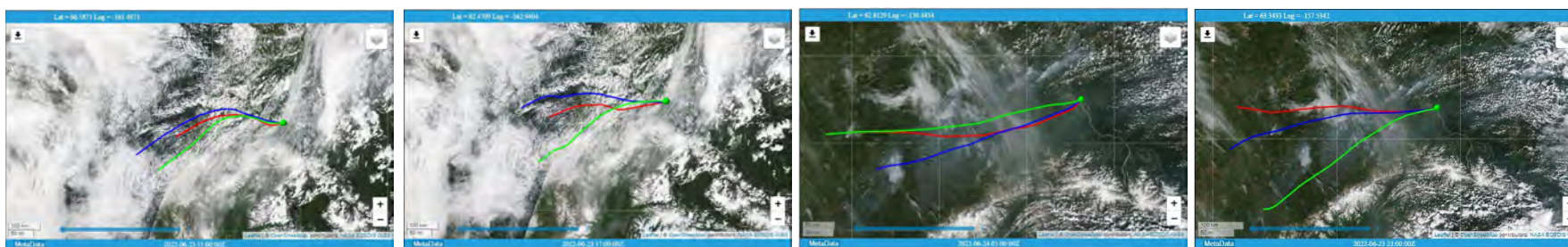


Figure 42: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for June 23 to June 24, 2024. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 2 (17:00 UTC, June 23, 2022): The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the southwest at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from southwest to west. **Smoke Transport:** The MODIS imagery shows thin layers of smoke mixed with clouds to the southwest, consistent with the trajectories of the air parcels, indicating potential transport of smoke towards the target location.

Table 22. Hourly surface observation for Fairbanks International Airport, June 23, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/23/2022 00:53 AKDT	3	220	**	7 (Smoke)	4	63	46
PAFA	06/23/2022 01:53 AKDT	5	210	**	7 (Smoke)	2	64	46
PAFA	06/23/2022 02:53 AKDT	0	0	**	7 (Smoke)	3	61	46
PAFA	06/23/2022 03:53 AKDT	0	0	**	7 (Smoke)	3	61	50
PAFA	06/23/2022 04:53 AKDT	3	360	**	7 (Smoke)	6	60	48
PAFA	06/23/2022 05:53 AKDT	8	160	**	**	7	58	51
PAFA	06/23/2022 06:53 AKDT	5	210	**	**	7	58	50
PAFA	06/23/2022 07:53 AKDT	6	200	**	**	7	58	50
PAFA	06/23/2022 08:53 AKDT	0	0	**	**	7	59	50
PAFA	06/23/2022 09:53 AKDT	0	0	**	**	8	61	48
PAFA	06/23/2022 10:53 AKDT	7	**	**	**	7	62	48
PAFA	06/23/2022 11:53 AKDT	7	230	**	**	8	64	45
PAFA	06/23/2022 12:53 AKDT	5	230	**	**	9	63	45
PAFA	06/23/2022 13:53 AKDT	13	270	18	**	10	65	43
PAFA	06/23/2022 14:53 AKDT	8	260	**	**	10	67	45
PAFA	06/23/2022 15:53 AKDT	14	290	**	**	10	67	45
PAFA	06/23/2022 16:53 AKDT	8	230	**	**	10	67	44
PAFA	06/23/2022 17:53 AKDT	10	240	**	**	10	69	43
PAFA	06/23/2022 18:53 AKDT	9	260	**	**	10	68	43
PAFA	06/23/2022 19:53 AKDT	7	260	**	**	10	67	43
PAFA	06/23/2022 20:53 AKDT	3	250	**	**	10	66	43
PAFA	06/23/2022 21:53 AKDT	0	0	**	**	10	64	44
PAFA	06/23/2022 22:53 AKDT	0	0	**	**	10	60	49
PAFA	06/23/2022 23:53 AKDT	0	0	**	**	10	57	49

Surface observations: The surface observations from June 23, 2022, show a few hours of reduced visibility due to smoke in morning hours. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - June 24, 2022

AICC Fire Report Summary:

- **New Fires:** 9 new fires reported.
- **Total Fires Statewide:** 139 fires burning.
- **Acres Burned:** 1,165,038 acres, with a 24-hour increase of 55,866 acres.
-

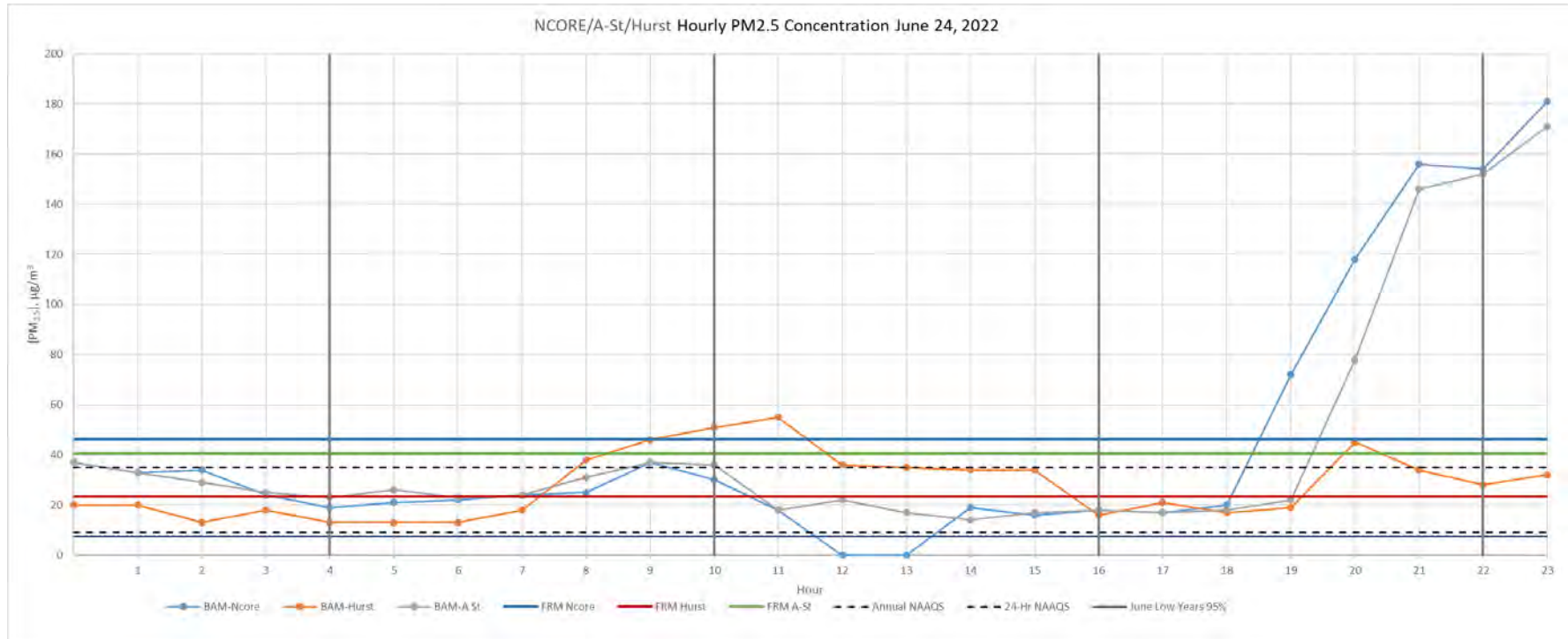


Figure 43: FNSB PM_{2.5} concentrations for June 24, 2022

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on June 24, 2022. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations are relatively stable in the early morning hours, with all sites reporting values below 40 µg/m³.

Midday Levels: The PM_{2.5} concentrations show some variability during the midday hours, with peaks around 60 µg/m³ at the BAM-Hurst Road site. The NCore and A-Street sites maintain lower levels, generally staying below 20 µg/m³.

Afternoon to Evening: There is a significant rise in PM_{2.5} concentrations in the late afternoon and evening. The concentrations at the BAM-NCore and BAM-A-Street sites start to increase around 6:00 PM, peaking at approximately 180 µg/m³ and 170 µg/m³, respectively, by 12:00 AM.

Overall Trend: The PM_{2.5} concentrations on June 24, 2022, show a notable peak in the late evening, with significant increases in particulate matter at the BAM-NCore and BAM-A-Street sites. The early morning and midday hours exhibit relatively stable and lower PM_{2.5} levels. The overall trend indicates that air quality deteriorated significantly in the late evening, with PM_{2.5} concentrations exceeding both the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) and the annual NAAQS limit (represented by the dashed black line at 9 µg/m³). The evening spike suggests potential influences from changes in wind patterns and smoke transport from nearby fires.

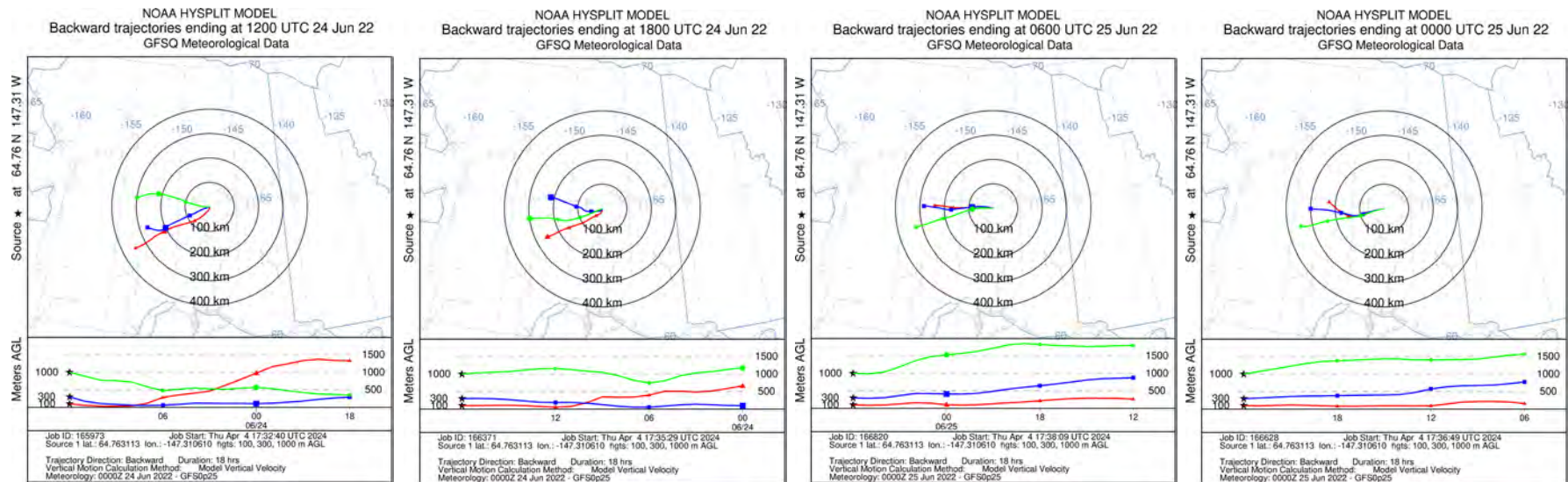


Figure 44: NOAA HYSPLIT model backward trajectories for June 24, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for June 24 to June 25, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, June 24, 2022):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the southwest and west, converging towards the target location.
- **Image 2 (18:00 UTC, June 24, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the west at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from a westerly component.
- **Image 3 (00:00 UTC, June 25, 2022):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the west, with the 100m, 300m, and 1000m trajectories all coming from the same direction.
- **Image 4 (06:00 UTC, June 25, 2022):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels coming from the west.

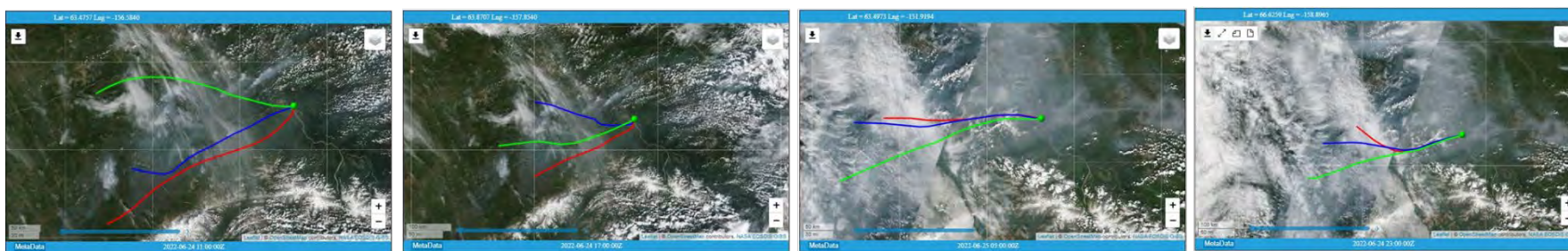


Figure 45: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for June 24 to June 25, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 3 (00:00 UTC, June 25, 2022): The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the west, with the 100m, 300m, and 1000m trajectories all coming from the same direction. **Smoke Transport:** The MODIS imagery highlights smoke plumes following these trajectories, suggesting that smoke from the west is being transported towards Fairbanks.

Table 23. Hourly surface observations for Fairbanks International Airport, June 24, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/24/2022 00:53 AKDT	0	0	**	**	10	55	48
PAFA	06/24/2022 01:53 AKDT	0	0	**	**	10	52	46
PAFA	06/24/2022 02:53 AKDT	0	0	**	7 (Smoke)	8	52	46
PAFA	06/24/2022 03:53 AKDT	5	40	**	7 (Smoke)	9	51	45
PAFA	06/24/2022 04:53 AKDT	5	40	**	7 (Smoke)	9	51	45
PAFA	06/24/2022 05:53 AKDT	3	60	**	7 (Smoke)	9	50	45
PAFA	06/24/2022 06:53 AKDT	3	50	**	7 (Smoke)	9	52	46
PAFA	06/24/2022 07:53 AKDT	3	70	**	7 (Smoke)	9	54	46
PAFA	06/24/2022 08:53 AKDT	3	70	**	**	10	56	46
PAFA	06/24/2022 09:53 AKDT	3	140	**	**	10	59	47
PAFA	06/24/2022 10:53 AKDT	3	140	**	**	10	62	47
PAFA	06/24/2022 11:53 AKDT	3	180	**	**	10	66	48
PAFA	06/24/2022 12:53 AKDT	6	250	**	**	10	70	46
PAFA	06/24/2022 13:53 AKDT	3	130	**	**	10	70	44
PAFA	06/24/2022 14:53 AKDT	5	200	**	**	10	72	44
PAFA	06/24/2022 15:53 AKDT	3	**	**	**	10	73	44
PAFA	06/24/2022 16:53 AKDT	5	150	**	**	10	74	44
PAFA	06/24/2022 17:53 AKDT	0	0	**	**	10	74	43
PAFA	06/24/2022 18:53 AKDT	6	230	**	**	10	75	45
PAFA	06/24/2022 19:53 AKDT	3	180	**	**	10	75	45
PAFA	06/24/2022 20:53 AKDT	3	190	**	7 (Smoke)	8	73	45
PAFA	06/24/2022 21:53 AKDT	8	10	**	7 (Smoke)	1	69	45
PAFA	06/24/2022 22:53 AKDT	0	0	**	7 (Smoke)	1	68	45
PAFA	06/24/2022 23:53 AKDT	3	280	**	7 (Smoke)	2	64	49

Surface observations: The surface observations from June 24, 2022, show hours of slightly reduced visibility due to smoke in morning hours and significantly reduced visibility due to smoke in the late evening. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - June 25, 2022

AICC Fire Report Summary:

- **New Fires:** 6 new fires reported.
- **Total Fires Statewide:** 143 fires burning.
- **Acres Burned:** 1,226,905 acres, with a 24-hour increase of 26,288 acres.

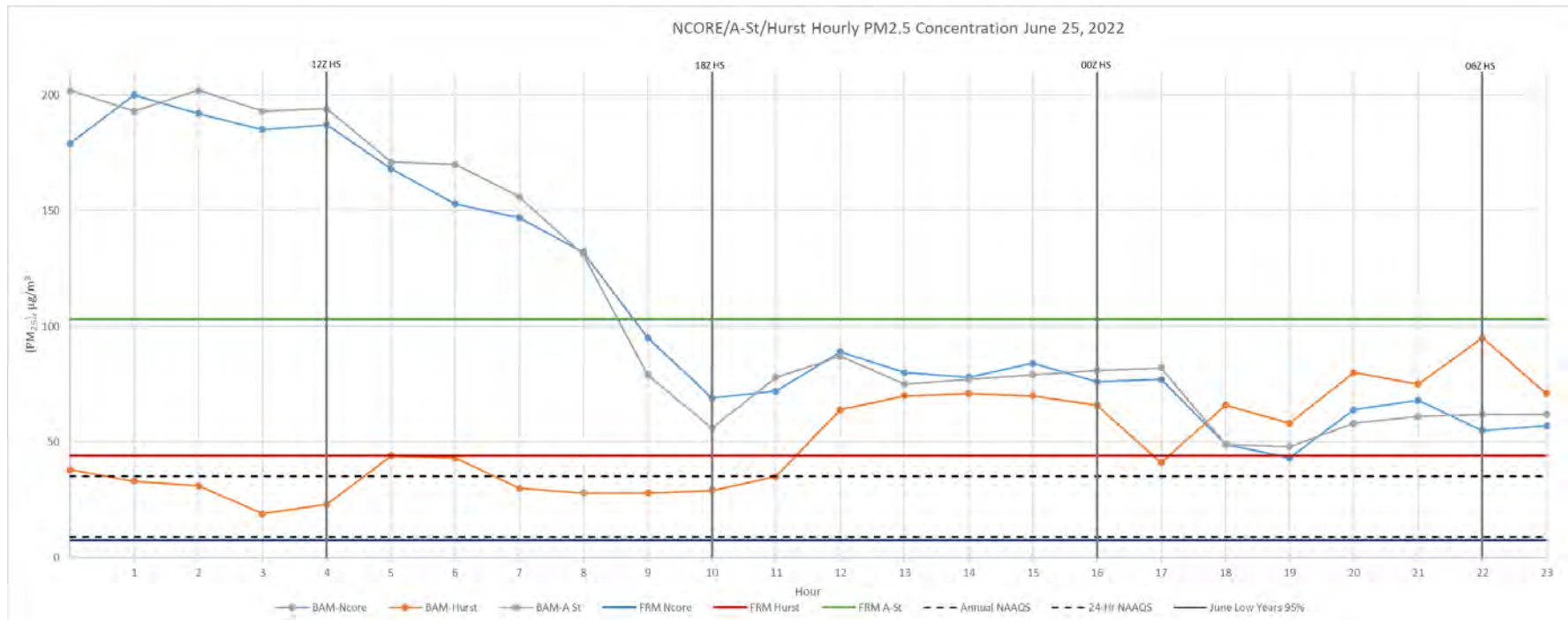


Figure 46: FNSB PM_{2.5} concentrations for June 25, 2022

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on June 25, 2022. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations are relatively high in the early morning hours, with the BAM-NCore and A-Street sites reporting values around 200 µg/m³. These levels begin to decrease gradually as the morning progresses.

Midday Levels: The PM_{2.5} concentrations show a significant decrease during the midday hours, with levels dropping to around 100 µg/m³ at the NCore and A-Street sites. The Hurst Road site maintains lower levels, generally staying below 50 µg/m³.

Afternoon to Evening: The PM_{2.5} concentrations remain relatively stable during the afternoon and early evening, with levels fluctuating around 50 µg/m³ to 70 µg/m³. There is a slight increase observed around 10:00 PM at the Hurst Road site, reaching approximately 80 µg/m³.

Overall Trend: The PM_{2.5} concentrations on June 25, 2022, show a notable peak in the early morning, followed by a steady decline throughout the day. The overall trend indicates that air quality improved during the midday and afternoon hours, but the levels remained above the annual NAAQS limit (represented by the dashed black line at 9 µg/m³) throughout the day. The early morning spike suggests potential influences from smoke transport, which decreased as the day progressed.

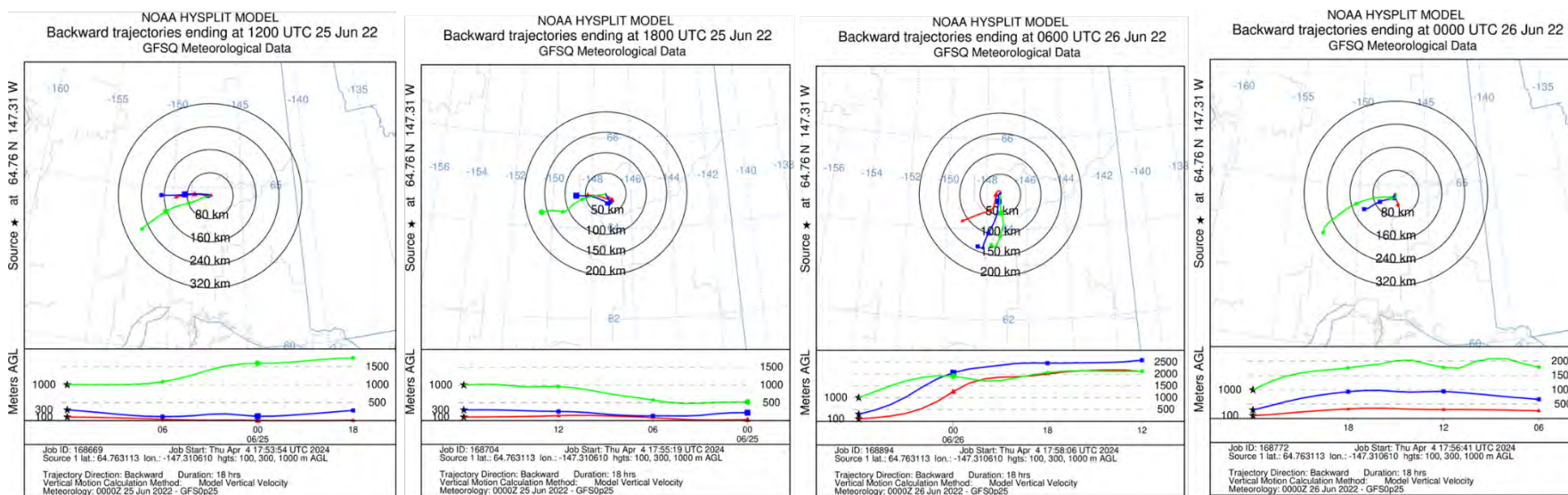


Figure 47: NOAA HYSPLIT model backward trajectories for June 25, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for June 25 to June 26, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, June 25, 2022):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the southwest and west, converging towards the target location.
- **Image 2 (18:00 UTC, June 25, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the west at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from a westerly component
- **Image 3 (00:00 UTC, June 25, 2022):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the south, with the 100m, 300m, and 1000m trajectories all coming from the same direction.
- **Image 4 (06:00 UTC, June 26, 2022):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels at 100m coming from the south, and the 30m and 1000m originating from the southwest.

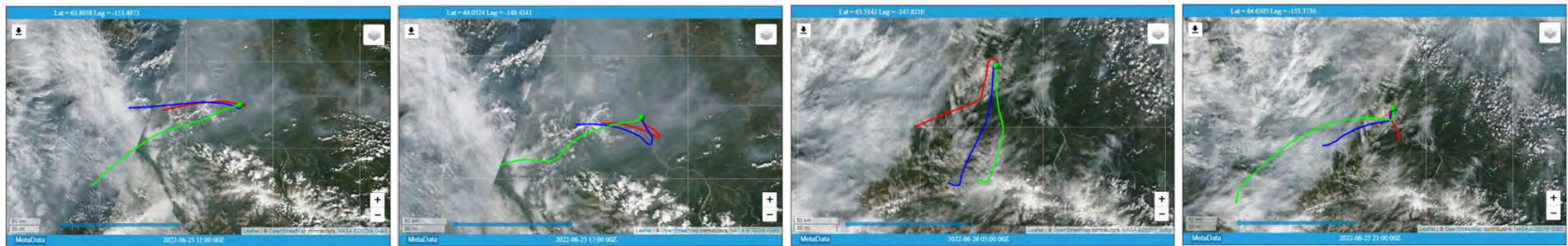


Figure 48: MODIS Imagery with HYSPLIT Overlay

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for June 25 to June 26, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 2 (17:00 UTC, June 25, 2022): The air parcels' pathways highlight significant movement from the west at varying altitudes. The 100m, 300m, and 1000m trajectories all originate from a westerly component. **Smoke Transport:** The MODIS imagery shows smoke plumes in the direction of the trajectories, suggesting continued smoke transport from the west.

Table 24. Hourly surface observations for Fairbanks International Airport, June 25, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/25/2022 00:53 AKDT	3	10	**	7 (Smoke)	2	61	49
PAFA	06/25/2022 01:53 AKDT	0	0	**	7 (Smoke)	1	59	47
PAFA	06/25/2022 02:53 AKDT	6	60	**	7 (Smoke)	1	56	46
PAFA	06/25/2022 03:53 AKDT	0	0	**	7 (Smoke)	1	57	45
PAFA	06/25/2022 04:53 AKDT	5	70	**	7 (Smoke)	1	52	45
PAFA	06/25/2022 05:53 AKDT	3	60	**	7 (Smoke)	1	53	45
PAFA	06/25/2022 06:53 AKDT	3	50	**	7 (Smoke)	2	55	47
PAFA	06/25/2022 07:53 AKDT	5	40	**	7 (Smoke)	2	59	47
PAFA	06/25/2022 08:53 AKDT	3	70	**	7 (Smoke)	3	62	48
PAFA	06/25/2022 09:53 AKDT	0	0	**	7 (Smoke)	3	65	49
PAFA	06/25/2022 10:53 AKDT	5	30	**	7 (Smoke)	3	68	48
PAFA	06/25/2022 11:53 AKDT	0	0	**	7 (Smoke)	3	71	49
PAFA	06/25/2022 12:53 AKDT	0	0	**	7 (Smoke)	3	74	49
PAFA	06/25/2022 13:53 AKDT	0	0	**	7 (Smoke)	3	76	44
PAFA	06/25/2022 14:53 AKDT	0	0	**	7 (Smoke)	4	78	45
PAFA	06/25/2022 15:53 AKDT	0	0	**	7 (Smoke)	4	78	44
PAFA	06/25/2022 16:53 AKDT	3	160	**	7 (Smoke)	3	79	45
PAFA	06/25/2022 17:53 AKDT	0	0	**	7 (Smoke)	3	79	45
PAFA	06/25/2022 18:53 AKDT	3	160	**	7 (Smoke)	4	79	46
PAFA	06/25/2022 19:53 AKDT	0	0	**	7 (Smoke)	6	78	46
PAFA	06/25/2022 20:53 AKDT	0	0	**	7 (Smoke)	6	76	48
PAFA	06/25/2022 21:53 AKDT	3	320	**	7 (Smoke)	5	74	55
PAFA	06/25/2022 22:53 AKDT	0	0	**	7 (Smoke)	4	70	54
PAFA	06/25/2022 23:53 AKDT	0	0	**	7 (Smoke)	5	67	52

Surface observations: The surface observations from June 25, 2022, show hours of reduced visibility throughout the day. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - June 26, 2022

AICC Fire Report Summary:

- **New Fires:** 5 new fires reported.
- **Total Fires Statewide:** 140 fires burning.
- **Acres Burned:** 1,358,187.8 acres, with a 24-hour increase of 131,283 acres.

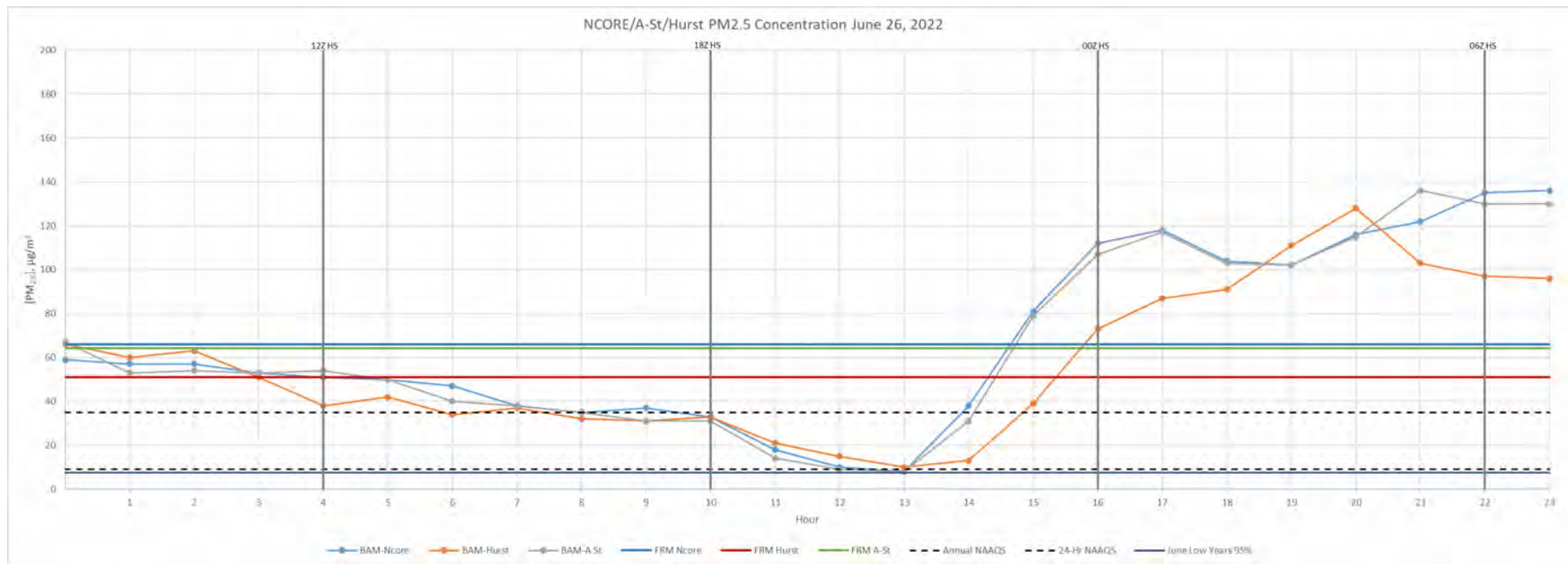


Figure 49: FNSB PM_{2.5} concentrations for June 26, 2022

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on June 26, 2022. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations are relatively high in the early morning hours, with all three sites reporting values around 60 µg/m³. These levels begin to decrease gradually as the morning progresses.

Midday Levels: The PM_{2.5} concentrations show a significant decrease during the midday hours, with levels dropping to around 10 µg/m³ at all sites.

Afternoon to Evening: The PM_{2.5} concentrations begin to climb during the afternoon and early evening, with levels fluctuating around 100 µg/m³ to 140 µg/m³.

Overall Trend: The PM_{2.5} concentrations on June 26, 2022, show a notable peak in the early morning, followed by a steady decline throughout the day. The overall trend indicates that air quality improved during the midday hours, but the levels climbed above the 24-hr NAAQS limit (represented by the solid black line at 35 µg/m³) throughout the day. The late afternoon spike suggests potential influences from smoke transport.

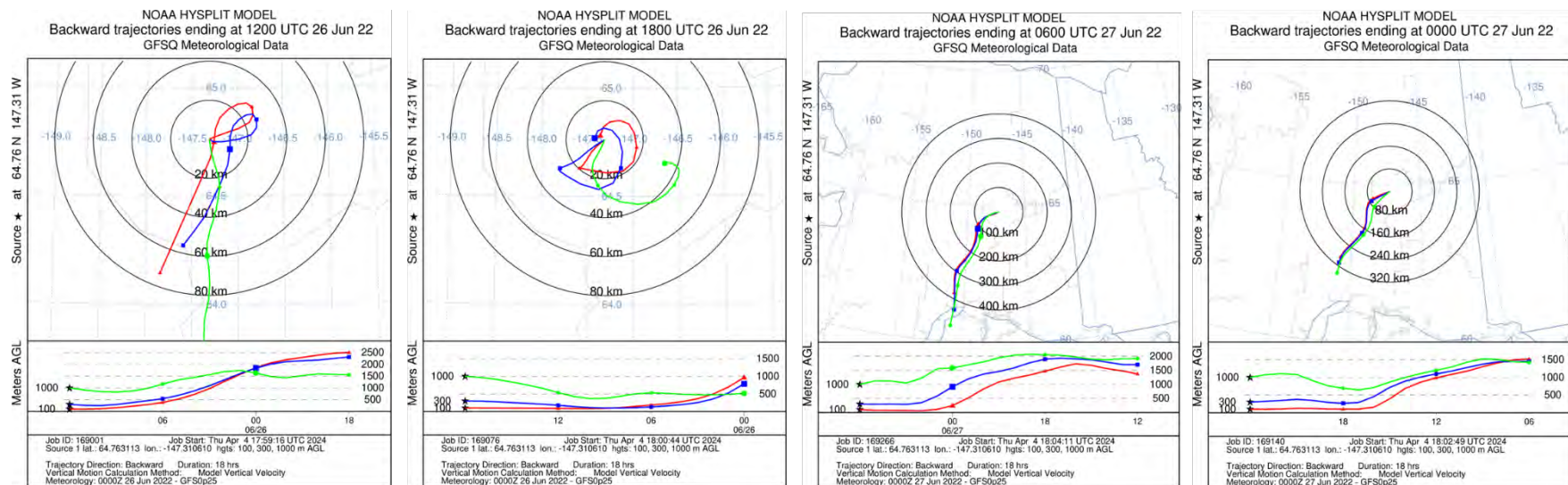


Figure 50: NOAA HYSPLIT model backward trajectories for June 26, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for June 26 to June 27, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, June 26, 2022):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the south, converging towards the target location.
- **Image 2 (18:00 UTC, June 26, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight circular parcel movement from the east through south with varying altitudes, with the 100m, 300m and 1000m, all originating from a southerly component
- **Image 3 (00:00 UTC, June 27, 2022):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the south, with the 100m, 300m, and 1000m trajectories all coming from the same direction.
- **Image 4 (06:00 UTC, June 27, 2022):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels at 100m coming from the south, and the 300m and 1000m trajectories originating from the southwest.

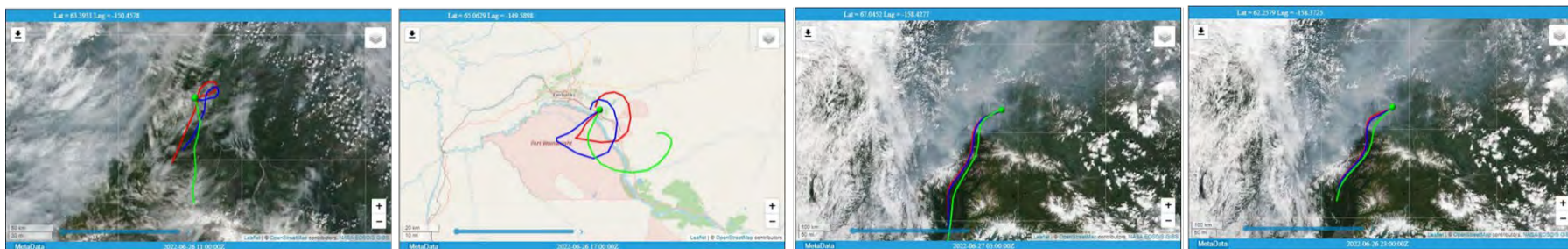


Figure 51: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for June 26 to June 27, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 3 (00:00 UTC, June 27, 2022): The air parcels' pathways highlight significant movement from the south at varying altitudes. The 100m, 300m, and 1000m trajectories all originate from a southerly component. **Smoke Transport:** The MODIS imagery shows smoke plumes in the southwest through north. This suggests that smoke from fires to the southwest and west is being transported towards Fairbanks.

Table 25. Hourly surface observations for Fairbanks International Airport, June 26, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/26/2022 00:53 AKDT	0	0	**	7 (Smoke)	4	62	56
PAFA	06/26/2022 01:53 AKDT	3	60	**	7 (Smoke)	4	60	51
PAFA	06/26/2022 02:53 AKDT	0	0	**	7 (Smoke)	5	60	49
PAFA	06/26/2022 03:53 AKDT	3	170	**	7 (Smoke)	6	57	52
PAFA	06/26/2022 04:53 AKDT	6	40	**	7 (Smoke)	6	54	48
PAFA	06/26/2022 05:53 AKDT	0	0	**	7 (Smoke)	7	56	48
PAFA	06/26/2022 06:53 AKDT	3	40	**	7 (Smoke)	7	58	50
PAFA	06/26/2022 07:53 AKDT	8	60	**	7 (Smoke)	7	62	50
PAFA	06/26/2022 08:53 AKDT	5	70	**	7 (Smoke)	7	64	50
PAFA	06/26/2022 09:53 AKDT	3	**	**	7 (Smoke)	6	67	52
PAFA	06/26/2022 10:53 AKDT	0	0	**	7 (Smoke)	6	70	49
PAFA	06/26/2022 11:53 AKDT	7	260	**	7 (Smoke)	6	75	47
PAFA	06/26/2022 12:53 AKDT	7	240	**	7 (Smoke)	8	75	42
PAFA	06/26/2022 13:53 AKDT	3	130	**	7 (Smoke)	9	77	44
PAFA	06/26/2022 14:53 AKDT	5	260	**	**	10	77	46
PAFA	06/26/2022 15:53 AKDT	5	220	**	7 (Smoke)	2	78	47
PAFA	06/26/2022 16:53 AKDT	5	230	**	7 (Smoke)	2	79	49
PAFA	06/26/2022 17:53 AKDT	7	290	**	7 (Smoke)	2	81	49
PAFA	06/26/2022 18:53 AKDT	3	280	**	7 (Smoke)	3	81	46
PAFA	06/26/2022 19:53 AKDT	7	340	**	7 (Smoke)	2	79	46
PAFA	06/26/2022 20:53 AKDT	5	330	**	7 (Smoke)	3	78	48
PAFA	06/26/2022 21:53 AKDT	3	310	**	7 (Smoke)	3	77	48
PAFA	06/26/2022 22:53 AKDT	0	0	**	7 (Smoke)	3	70	57
PAFA	06/26/2022 23:53 AKDT	0	0	**	7 (Smoke)	3	68	57

Surface observations: The surface observations from June 26, 2022, show hours of reduced visibility throughout the day. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - June 27, 2022

AICC Fire Report Summary:

- **New Fires:** 5 new fires reported.
- **Total Fires Statewide:** 144 fires burning.
- **Acres Burned:** 1,378,300 acres, with a 24-hour increase of 20,112 acres.

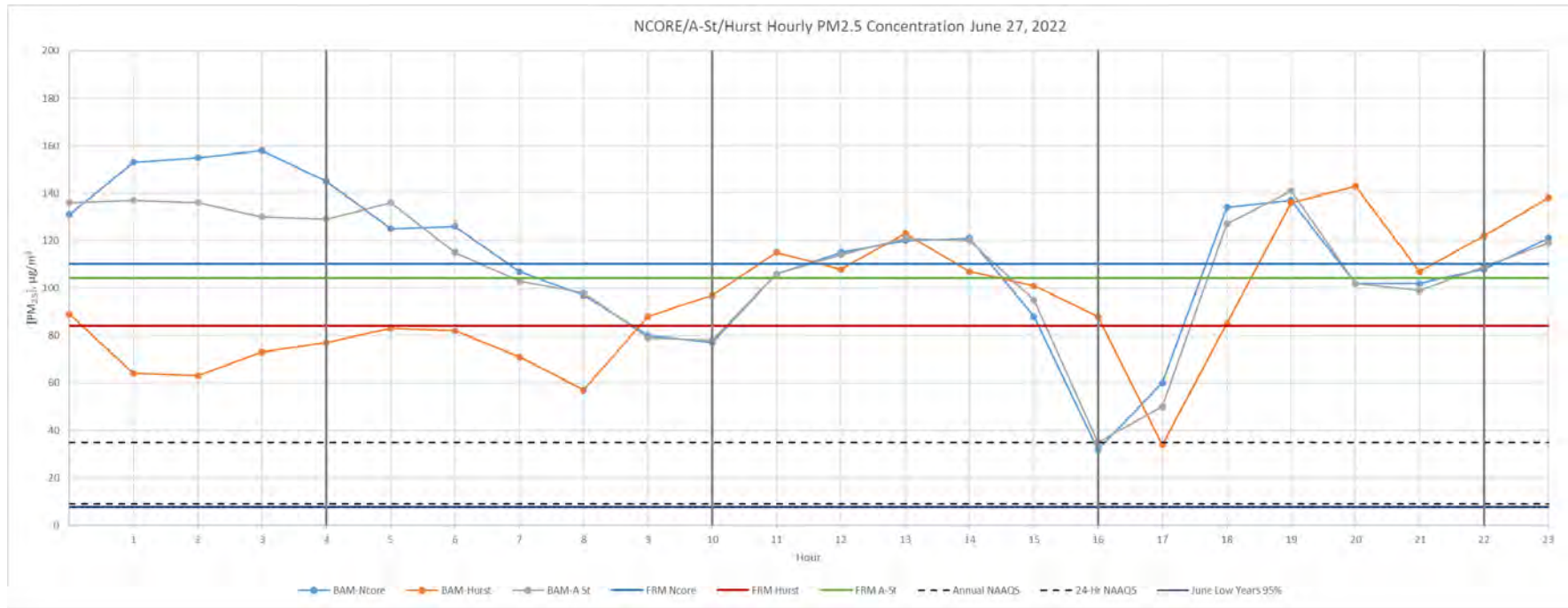


Figure 52: FNSB PM_{2.5} concentrations for June 27, 2022

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on June 27, 2022. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations are relatively high in the early morning hours, with the BAM-NCore and A-Street sites reporting values around 160 µg/m³. These levels begin to decrease gradually as the morning progresses.

MIDDAY Levels: The PM_{2.5} concentrations show a significant decrease during the midday hours, with levels dropping to around 100 µg/m³ at the NCore and A-Street sites. The Hurst Road site maintains lower levels, generally staying below 70 µg/m³.

Afternoon to Evening: The PM_{2.5} concentrations remain relatively stable during the afternoon with the exception of a dip in concentrations at 4:00 pm, with levels fluctuating around 40 µg/m³. There is a slight increase observed around 8:00 PM at all sites, with concentrations reaching approximately 140 µg/m³.

Overall Trend: The PM_{2.5} concentrations on June 27, 2022, show a notable peak in the early morning, followed by a weak decline throughout the day. The overall trend indicates that air quality stayed the same all day. The levels stayed above the 24-hr NAAQS limit (represented by the solid black line at 35 µg/m³) throughout the day.

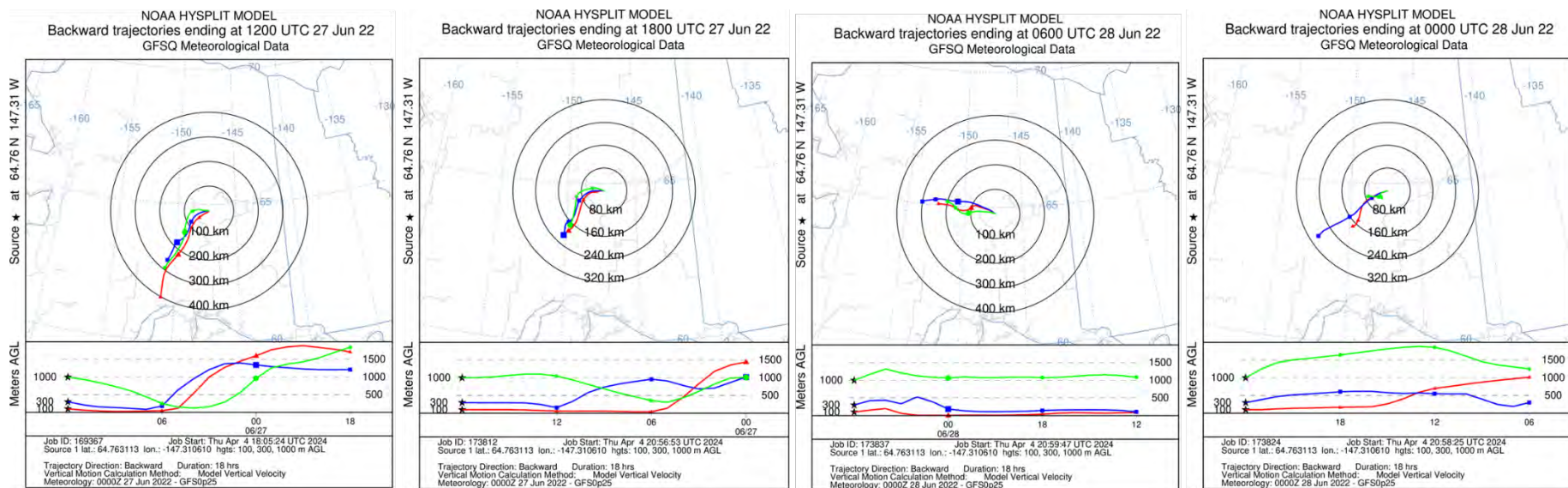


Figure 53: NOAA HYSPLIT model backward trajectories for June 27, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for June 27 to June 28, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, June 27, 2022):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the southwest, converging towards the target location.
- **Image 2 (18:00 UTC, June 27, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the southwest at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from the southwest.
- **Image 3 (00:00 UTC, June 28, 2022):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the west, with the 100m, 300m, and 1000m trajectories all coming from the west.
- **Image 4 (06:00 UTC, June 28, 2022):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels at 100m, 300m, and 1000m all coming from the southwest.

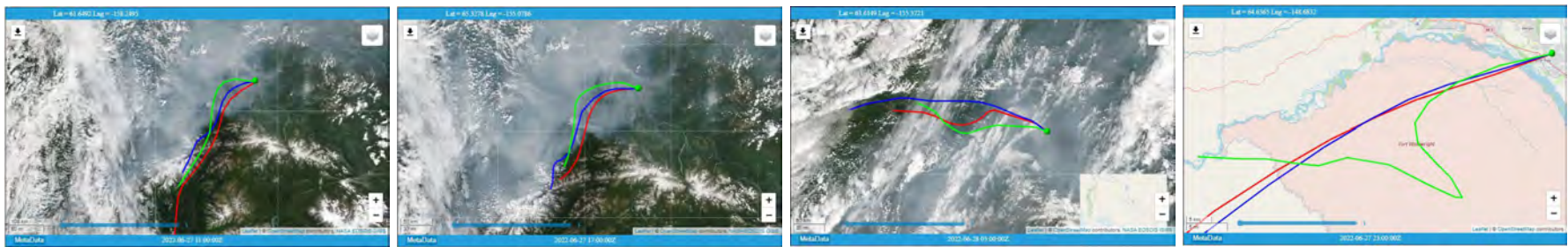


Figure 54: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for June 27 to June 28, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 2 (18:00 UTC, June 27, 2022): The air parcels' pathways continue to show significant movement from the southwest. The 100m, 300m, and 1000m trajectories all indicate a southwest origin. **Smoke Transport:** The MODIS imagery reveals smoke plumes following these trajectories, indicating ongoing smoke transport from the southwest into the area.

Table 26. Hourly surface observations for Fairbanks International Airport, June 27, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/27/2022 00:53 AKDT	0	0	**	7 (Smoke)	3	63	53
PAFA	06/27/2022 01:53 AKDT	3	90	**	7 (Smoke)	3	59	52
PAFA	06/27/2022 02:53 AKDT	3	60	**	7 (Smoke)	2	57	50
PAFA	06/27/2022 03:53 AKDT	5	40	**	7 (Smoke)	2	54	49
PAFA	06/27/2022 04:53 AKDT	0	0	**	7 (Smoke)	2	55	48
PAFA	06/27/2022 05:53 AKDT	6	60	**	7 (Smoke)	2	55	48
PAFA	06/27/2022 06:53 AKDT	0	0	**	7 (Smoke)	2	58	48
PAFA	06/27/2022 07:53 AKDT	0	0	**	7 (Smoke)	2	60	50
PAFA	06/27/2022 08:53 AKDT	0	0	**	7 (Smoke)	2	62	50
PAFA	06/27/2022 09:53 AKDT	0	0	**	7 (Smoke)	2	64	49
PAFA	06/27/2022 10:53 AKDT	3	160	**	7 (Smoke)	2	66	50
PAFA	06/27/2022 11:53 AKDT	3	170	**	7 (Smoke)	2	70	52
PAFA	06/27/2022 12:53 AKDT	0	0	**	7 (Smoke)	2	73	51
PAFA	06/27/2022 13:53 AKDT	0	0	**	7 (Smoke)	2	76	52
PAFA	06/27/2022 14:53 AKDT	7	**	**	7 (Smoke)	2	78	48
PAFA	06/27/2022 15:53 AKDT	7	240	**	7 (Smoke)	2	78	45
PAFA	06/27/2022 16:53 AKDT	8	250	**	7 (Smoke)	5	80	44
PAFA	06/27/2022 17:53 AKDT	7	250	**	7 (Smoke)	6	79	41
PAFA	06/27/2022 18:53 AKDT	12	270	**	7 (Smoke)	3	77	44
PAFA	06/27/2022 19:53 AKDT	7	280	**	7 (Smoke)	2	75	49
PAFA	06/27/2022 20:53 AKDT	6	240	**	7 (Smoke)	3	74	49
PAFA	06/27/2022 21:53 AKDT	5	**	**	7 (Smoke)	3	72	48
PAFA	06/27/2022 22:53 AKDT	0	0	**	7 (Smoke)	3	65	49
PAFA	06/27/2022 23:53 AKDT	7	280	**	7 (Smoke)	2	68	48

Surface observations: The surface observations from June 27, 2022, show hours of reduced visibility throughout the day. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - June 28, 2022

AICC Fire Report Summary:

- **New Fires:** 3 new fires reported.
- **Total Fires Statewide:** 143 fires burning.
- **Acres Burned:** 1,399,670 acres, with a 24-hour increase of 21,370 acres.

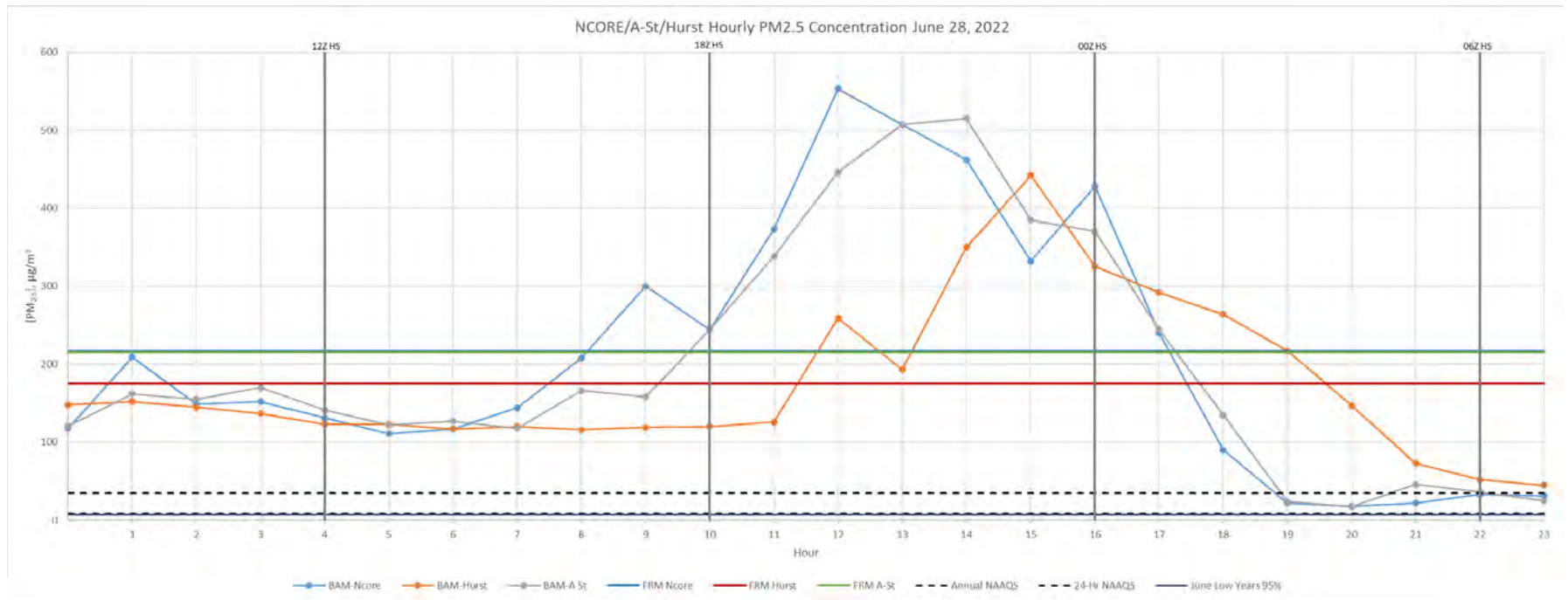


Figure 55: FNSB PM_{2.5} concentrations for June 28, 2022

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on June 28, 2022. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations are relatively stable in the early morning hours, with all sites reporting values below 200 µg/m³. There is a slight peak at the NCore site around 1:00 AM, reaching approximately 200 µg/m³.

Midday Levels: The PM_{2.5} concentrations show significant variability during the midday hours, with peaks around 400 µg/m³ at the A-Street site. The Hurst Road site maintains lower levels, generally staying below 200 µg/m³.

Afternoon to Evening: There is a significant rise in PM_{2.5} concentrations in the late afternoon and evening. The concentrations at the all three sites start to increase around 11:00 AM, peaking at approximately 500 µg/m³ and 550 µg/m³.

Overall Trend: The PM_{2.5} concentrations on June 28, 2022, show notable peaks in the afternoon, with significant increases in particulate matter at all sites. The early morning and midday hours exhibit relatively stable and lower PM_{2.5} levels compared to the daily highs. The overall trend indicates that air quality deteriorated significantly in the afternoon, with PM_{2.5} concentrations exceeding both the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) and the annual NAAQS limit (represented by the dashed black line at 9 µg/m³). The afternoon spike suggests potential influences from changes in wind patterns and smoke transport from nearby fires.

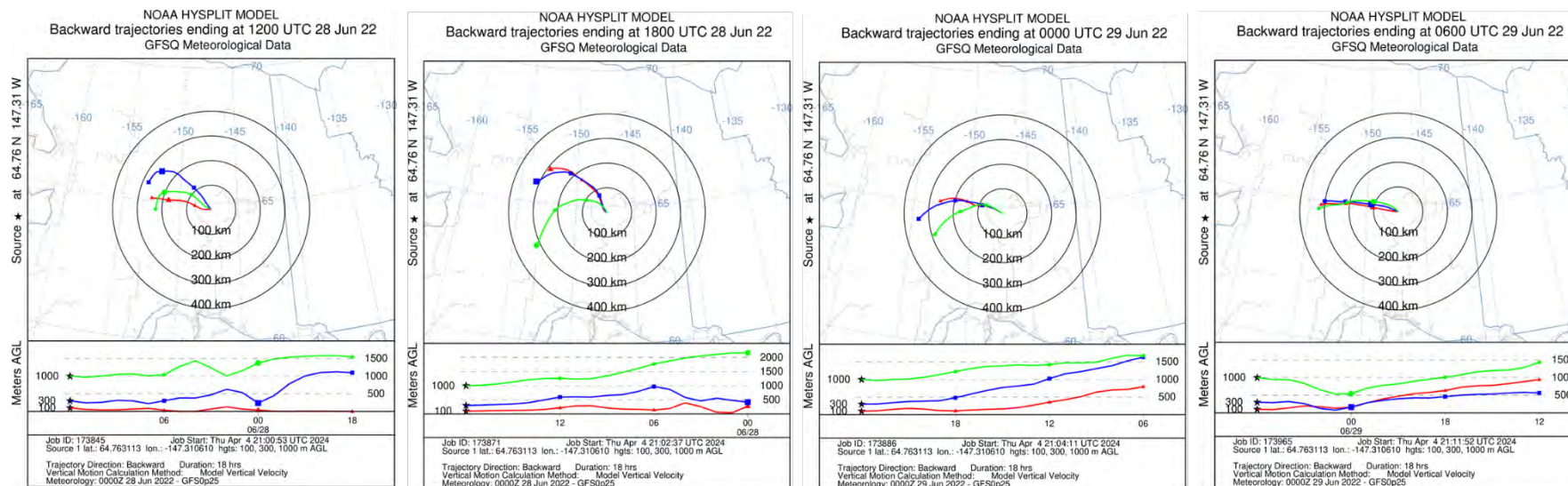


Figure 56: NOAA HYSPLIT model backward trajectories for June 28, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for June 28 to June 29, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, June 28, 2022):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the west and northwest, converging towards the target location.
- **Image 2 (18:00 UTC, June 28, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the southwest through northwest at varying altitudes.
- **Image 3 (00:00 UTC, June 29, 2022):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the west, with the 100m, 300m, and 1000m trajectories all coming from the west.
- **Image 4 (06:00 UTC, June 29, 2022):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels at 100m, 300m, and 1000m all coming from the west.

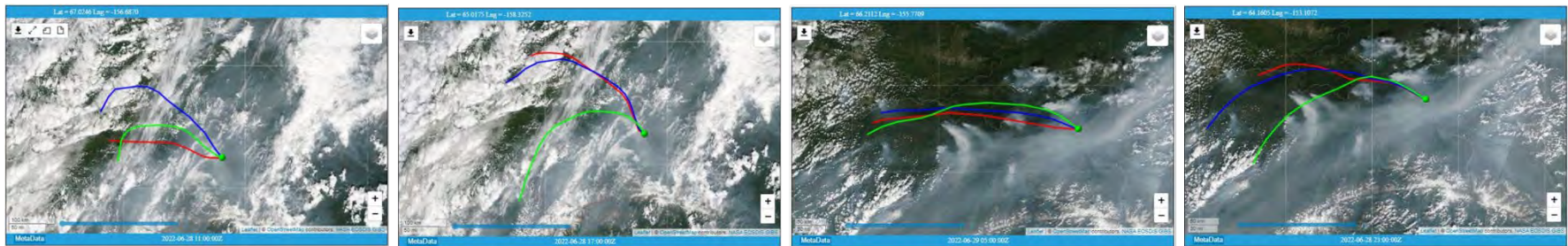


Figure 57: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for June 28 to June 29, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 2 (18:00 UTC, June 28, 2022): The air parcels' pathways continue to show significant movement from the southwest and northeast. The 100m and 300m trajectories indicate a northwest origin and the 1000m trajectory indicating a southwest origin.

Smoke Transport: The MODIS imagery reveals smoke plumes surrounding all trajectories, indicating ongoing smoke transport into the area.

Table 27. Hourly surface observations for Fairbanks International Airport, June 28, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/28/2022 00:53 AKDT	0	0	**	7 (Smoke)	3	65	49
PAFA	06/28/2022 01:53 AKDT	0	0	**	7 (Smoke)	3	62	49
PAFA	06/28/2022 02:53 AKDT	5	130	**	7 (Smoke)	2	59	50
PAFA	06/28/2022 03:53 AKDT	7	170	**	7 (Smoke)	2	57	48
PAFA	06/28/2022 04:53 AKDT	0	0	**	7 (Smoke)	2	56	49
PAFA	06/28/2022 05:53 AKDT	0	0	**	7 (Smoke)	2	56	50
PAFA	06/28/2022 06:53 AKDT	0	0	**	7 (Smoke)	2	57	51
PAFA	06/28/2022 07:53 AKDT	0	0	**	7 (Smoke)	2	57	50
PAFA	06/28/2022 08:53 AKDT	0	0	**	7 (Smoke)	2	59	51
PAFA	06/28/2022 09:53 AKDT	0	0	**	7 (Smoke)	2	61	52
PAFA	06/28/2022 10:53 AKDT	3	250	**	7 (Smoke)	1	66	54
PAFA	06/28/2022 11:53 AKDT	6	250	**	7 (Smoke)	1	70	53
PAFA	06/28/2022 12:53 AKDT	6	260	**	7 (Smoke)	1	70	51
PAFA	06/28/2022 13:53 AKDT	5	**	**	7 (Smoke)	1	73	49
PAFA	06/28/2022 14:53 AKDT	9	270	**	7 (Smoke)	3	75	49
PAFA	06/28/2022 15:53 AKDT	8	300	**	7 (Smoke)	3	75	48
PAFA	06/28/2022 16:53 AKDT	10	280	**	7 (Smoke)	2	75	47
PAFA	06/28/2022 17:53 AKDT	8	290	**	7 (Smoke)	2	74	47
PAFA	06/28/2022 18:53 AKDT	8	300	**	7 (Smoke)	4	74	45
PAFA	06/28/2022 19:53 AKDT	8	290	**	7 (Smoke)	6	74	46
PAFA	06/28/2022 20:53 AKDT	6	250	**	7 (Smoke)	7	72	46
PAFA	06/28/2022 21:53 AKDT	5	240	**	7 (Smoke)	7	70	46
PAFA	06/28/2022 22:53 AKDT	3	**	**	7 (Smoke)	7	69	46
PAFA	06/28/2022 23:53 AKDT	3	230	**	7 (Smoke)	9	69	44

Surface observations: The surface observations from June 28, 2022, show hours of reduced visibility throughout the day. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - June 29, 2022

AICC Fire Report Summary:

- **New Fires:** 3 new fires reported.
- **Total Fires Statewide:** 143 fires burning.
- **Acres Burned:** 1,521,765 acres, with a 24-hour increase of 122,095 acres.

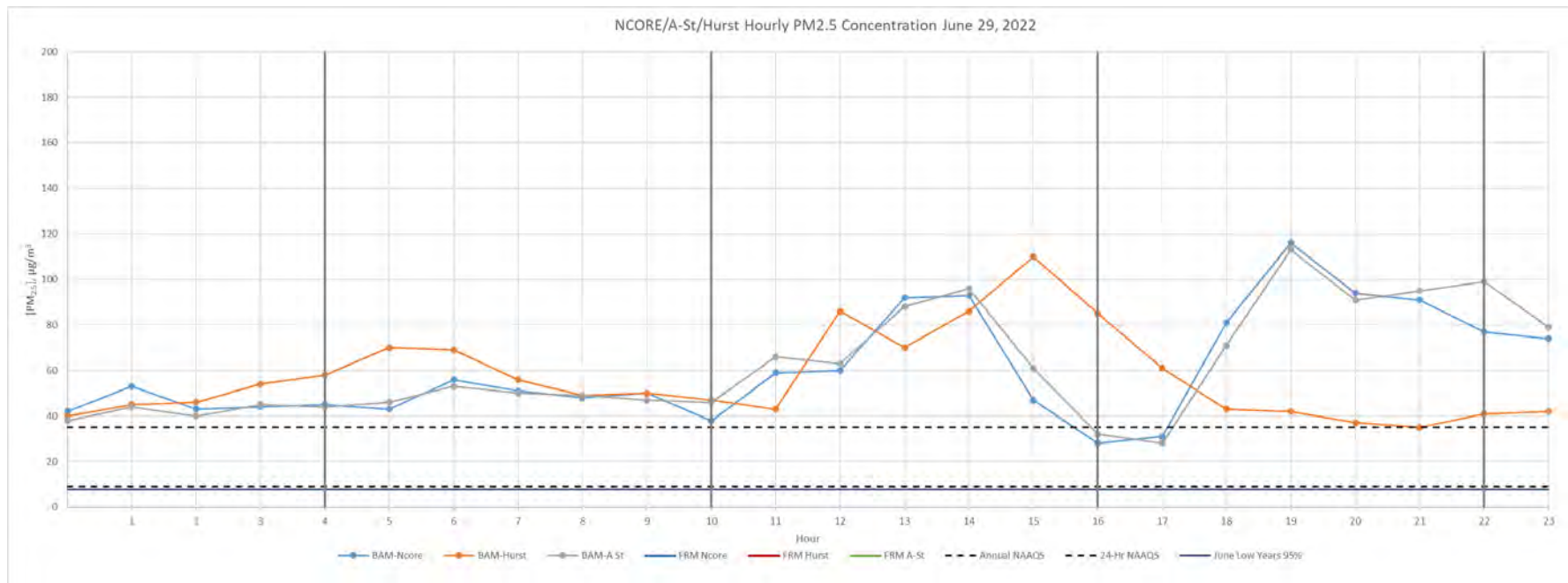


Figure 58: FNSB PM_{2.5} concentrations for June 29, 2022

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on June 29, 2022. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations are relatively stable in the early morning hours, with all sites reporting values around 50 µg/m³. There is a slight peak at the BAM-Hurst Road site around 5:00 AM, reaching approximately 75 µg/m³.

Midday Levels: The PM_{2.5} concentrations show significant variability during the midday hours, with peaks between 90 µg/m³ and 110 µg/m³ at all sites

Afternoon to Evening: There is a significant rise in PM_{2.5} concentrations in the late afternoon and evening. The concentrations at the BAM-NCore and BAM-A-Street sites start to increase around 6:00 PM, peaking at approximately 120 µg/m³.

Overall Trend: The PM_{2.5} concentrations on June 29, 2022, show notable peaks in the afternoon, with significant increases in particulate matter all sites. The early morning and midday hours exhibit relatively stable and lower PM_{2.5} levels. The overall trend indicates that air quality deteriorated significantly in the afternoon, with PM_{2.5} concentrations exceeding both the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) and the annual NAAQS limit (represented by the dashed black line at 9 µg/m³). The afternoon spike suggests potential influences from changes in wind patterns and smoke transport from nearby fires.

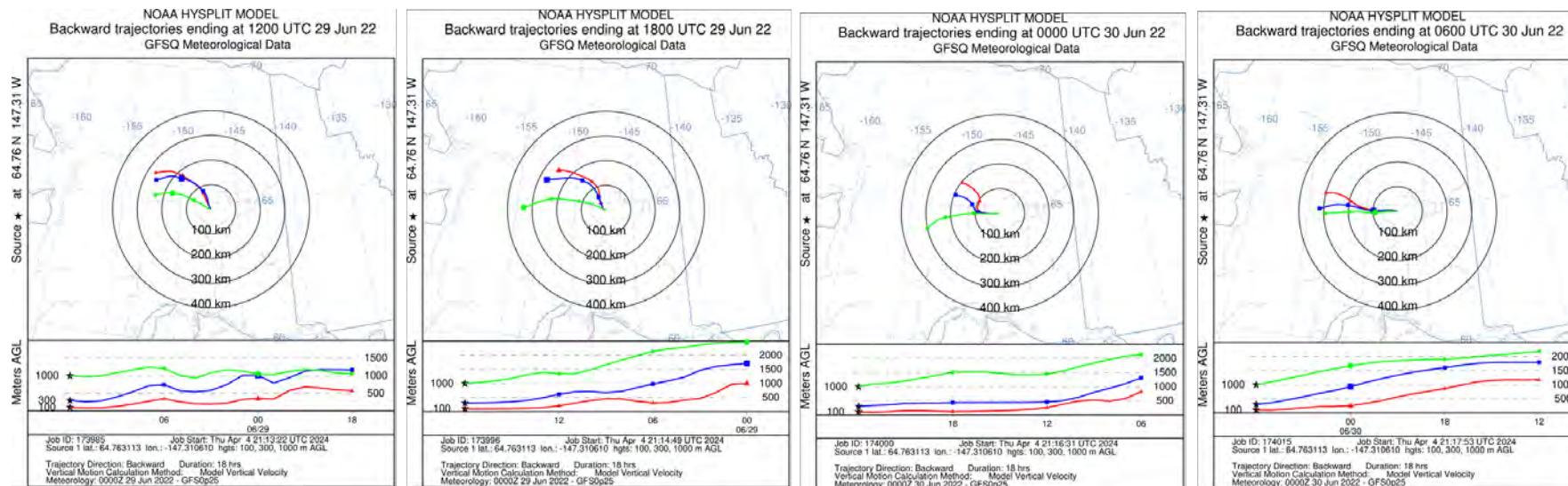


Figure 59: NOAA HYSPLIT model backward trajectories for June 29, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for June 29 to June 30, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, June 28, 2022):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the northwest, converging towards the target location.
- **Image 2 (18:00 UTC, June 28, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the west through northwest at varying altitudes.
- **Image 3 (00:00 UTC, June 29, 2022):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the northwest, with the 100m and 300m, with the 1000m trajectories coming from the west.
- **Image 4 (06:00 UTC, June 29, 2022):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels at 100m, 300m, and 1000m all coming from the west.

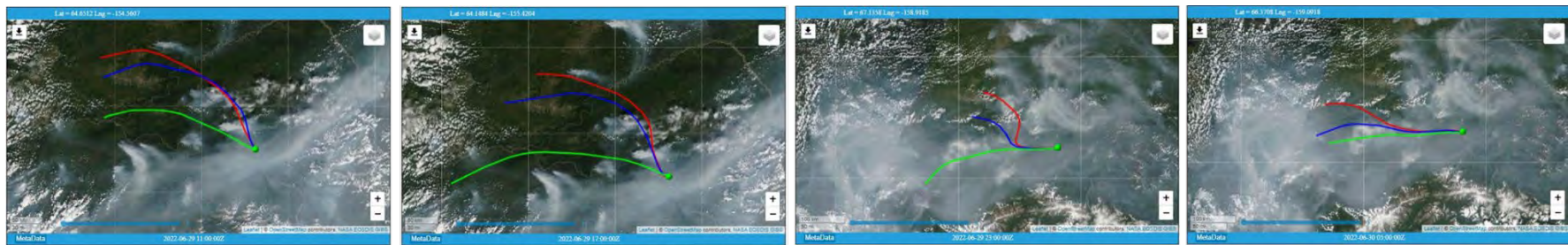


Figure 60: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for June 29 to June 30, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 2 (18:00 UTC, June 29, 2022): The air parcels' pathways continue to show significant movement from the west through northwest. The 100m and 300m trajectories indicate a northwest origin and the 1000m trajectory indicating a west origin. **Smoke Transport:** The MODIS imagery reveals smoke plumes in all four quadrants surrounding FNSB, indicating ongoing smoke transport into the area.

Table 28. Hourly surface observations for Fairbanks International Airport, June 29, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/29/2022 00:53 AKDT	0	0	**	7 (Smoke)	9	65	45
PAFA	06/29/2022 01:53 AKDT	6	360	**	7 (Smoke)	5	61	46
PAFA	06/29/2022 02:53 AKDT	5	50	**	7 (Smoke)	5	57	46
PAFA	06/29/2022 03:53 AKDT	3	60	**	7 (Smoke)	6	58	46
PAFA	06/29/2022 04:53 AKDT	0	0	**	7 (Smoke)	6	56	48
PAFA	06/29/2022 05:53 AKDT	0	0	**	7 (Smoke)	6	55	49
PAFA	06/29/2022 06:53 AKDT	0	0	**	7 (Smoke)	6	57	49
PAFA	06/29/2022 07:53 AKDT	0	0	**	7 (Smoke)	7	56	50
PAFA	06/29/2022 08:53 AKDT	0	0	**	7 (Smoke)	7	60	49
PAFA	06/29/2022 09:53 AKDT	0	0	**	7 (Smoke)	7	61	51
PAFA	06/29/2022 10:53 AKDT	0	0	**	7 (Smoke)	7	64	50
PAFA	06/29/2022 11:53 AKDT	5	200	**	7 (Smoke)	6	68	50
PAFA	06/29/2022 12:53 AKDT	7	200	**	7 (Smoke)	6	71	50
PAFA	06/29/2022 13:53 AKDT	7	**	**	7 (Smoke)	3	73	48
PAFA	06/29/2022 14:53 AKDT	7	220	**	7 (Smoke)	2	74	44
PAFA	06/29/2022 15:53 AKDT	7	**	**	7 (Smoke)	4	75	46
PAFA	06/29/2022 16:53 AKDT	9	270	**	7 (Smoke)	7	76	46
PAFA	06/29/2022 17:53 AKDT	7	280	**	7 (Smoke)	7	77	46
PAFA	06/29/2022 18:53 AKDT	8	290	**	7 (Smoke)	7	76	45
PAFA	06/29/2022 19:53 AKDT	7	280	**	7 (Smoke)	3	75	46
PAFA	06/29/2022 20:53 AKDT	6	250	**	7 (Smoke)	3	74	46
PAFA	06/29/2022 21:53 AKDT	0	0	**	7 (Smoke)	3	72	49
PAFA	06/29/2022 22:53 AKDT	0	0	**	7 (Smoke)	3	65	56
PAFA	06/29/2022 23:53 AKDT	0	0	**	7 (Smoke)	3	60	53

Surface observations: The surface observations from June 29, 2022, show hours of reduced visibility throughout the day. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - June 30, 2022

AICC Fire Report Summary:

- **New Fires:** 10 new fires reported.
- **Total Fires Statewide:** 156 fires burning.
- **Acres Burned:** 1,646,731 acres, with a 24-hour increase of 247,061 acres.

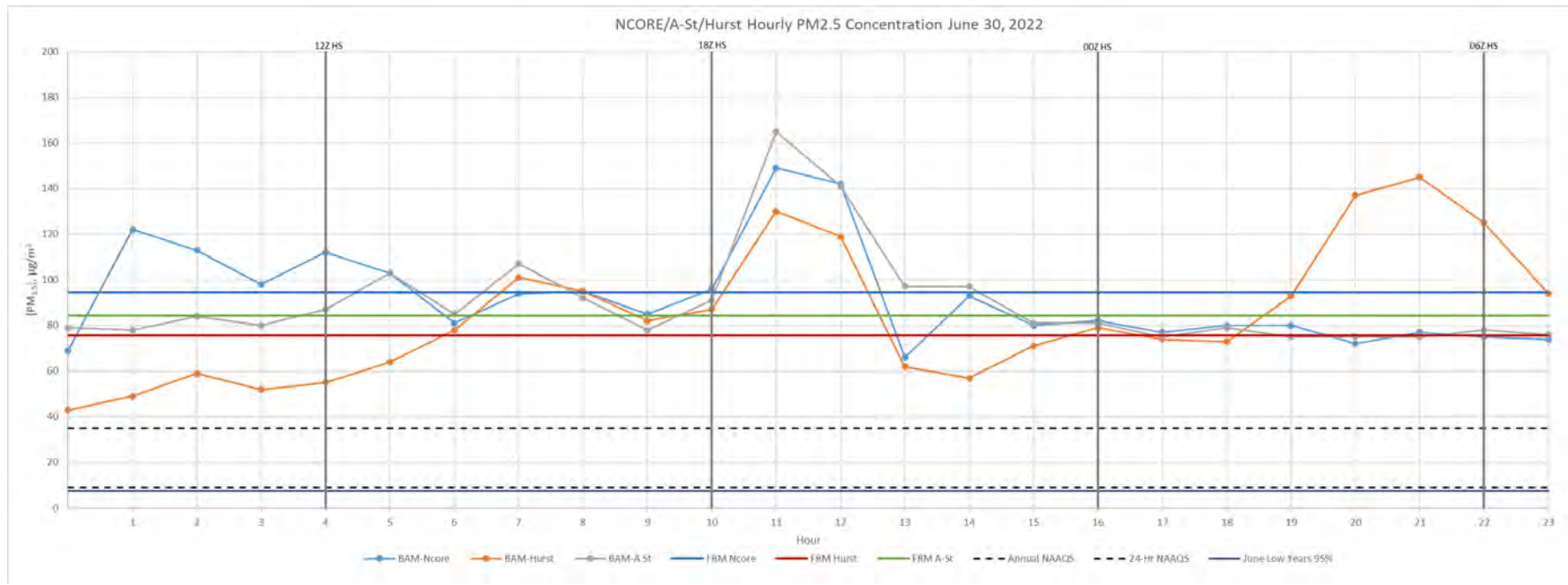


Figure 61: FNSB PM_{2.5} concentrations for June 30, 2022

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on June 30, 2022. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations are relatively stable in the early morning hours, with all sites reporting values between 40 µg/m³ and 120 µg/m³. There is a slight peak at the BAM-NCore site around 1:00 AM, reaching approximately 120 µg/m³.

Midday Levels: The PM_{2.5} concentrations remain consistent during the midday hours, with peaks around 160 µg/m³ at the BAM-A-Street site. The BAM-Hurst Road and BAM-NCore sites maintain lower levels, generally staying between 130-150 µg/m³.

Afternoon to Evening: There is steady PM_{2.5} concentrations in the late afternoon and evening. The concentrations at the BAM-NCore and BAM-A-Street sites hover around 80 µg/m³, with BAM-Hurst Road site peaking at approximately 140 µg/m³, by 9:00 PM.

Overall Trend: The PM_{2.5} concentrations on June 30, 2022, show notable peaks midday, with significant increases in particulate matter at the A-Street site. All sites exhibited relatively high PM_{2.5} levels throughout the day. The overall trend indicates that air quality was very poor, with PM_{2.5} concentrations exceeding both the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) and the annual NAAQS limit (represented by the dashed black line at 9 µg/m³). The late evening spike suggests potential influences from changes in wind patterns and smoke transport from nearby fires.

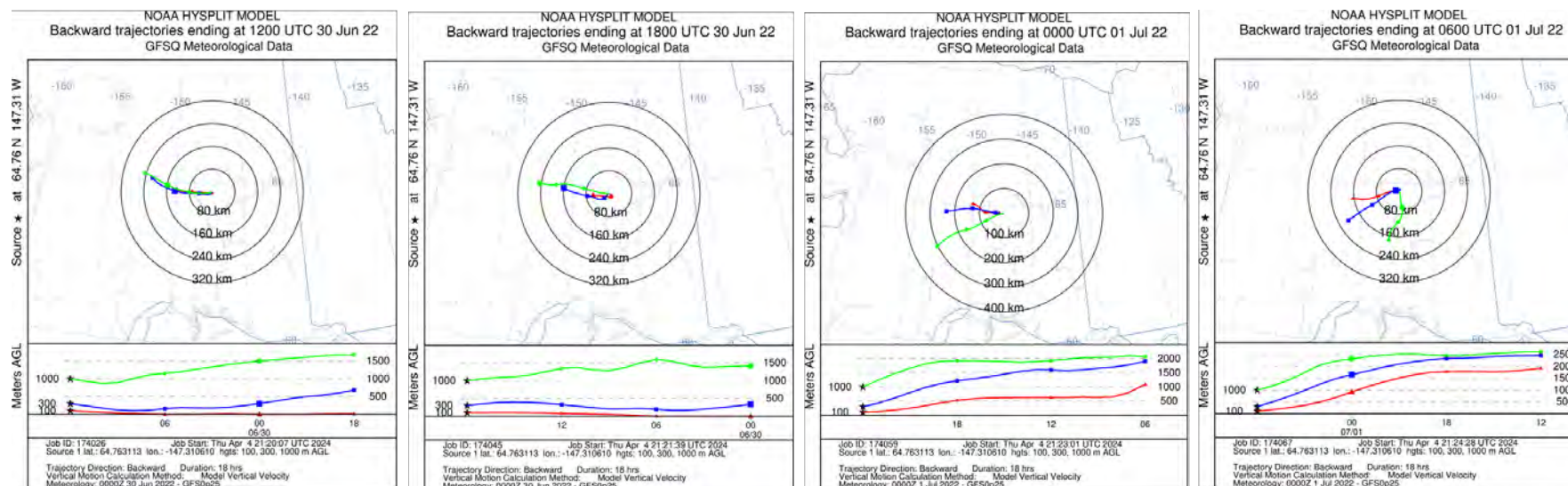


Figure 62: NOAA HYSPLIT model backward trajectories for June 30, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for June 30 to July 1, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, June 30, 2022):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the west, converging towards the target location.
- **Image 2 (18:00 UTC, June 30, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the west at varying altitudes.
- **Image 3 (00:00 UTC, July 1, 2022):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the west, with the 100m, 300m, and 1000m trajectories all coming from the west.
- **Image 4 (06:00 UTC, July 1, 2022):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels at 100m and 300m originating from the west and the 1000m all coming from the south.

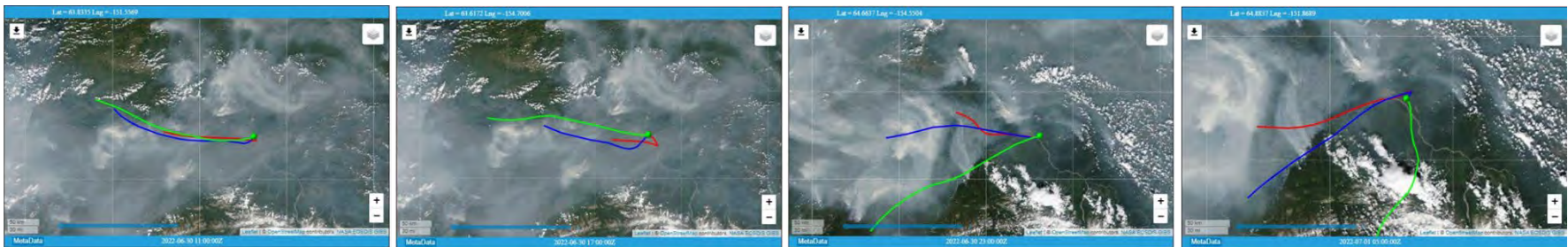


Figure 63: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for June 30 to July 1, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 2 (18:00 UTC, June 30, 2022): The air parcels' pathways continue to show significant movement from the west. **Smoke Transport:** The MODIS imagery reveals smoke plumes surrounding all trajectories, indicating ongoing smoke transport into the area.

Table 29. Hourly surface observations for Fairbanks International Airport, June 30, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	06/30/2022 00:53 AKDT	3	170	**	7 (Smoke)	3	59	52
PAFA	06/30/2022 01:53 AKDT	0	0	**	7 (Smoke)	2	57	51
PAFA	06/30/2022 02:53 AKDT	3	10	**	7 (Smoke)	2	53	46
PAFA	06/30/2022 03:53 AKDT	3	330	**	7 (Smoke)	2	54	46
PAFA	06/30/2022 04:53 AKDT	3	360	**	7 (Smoke)	2	54	47
PAFA	06/30/2022 05:53 AKDT	5	40	**	7 (Smoke)	2	53	46
PAFA	06/30/2022 06:53 AKDT	3	40	**	7 (Smoke)	2	54	47
PAFA	06/30/2022 07:53 AKDT	3	50	**	7 (Smoke)	2	57	48
PAFA	06/30/2022 08:53 AKDT	0	0	**	7 (Smoke)	2	59	49
PAFA	06/30/2022 09:53 AKDT	3	20	**	7 (Smoke)	2	63	49
PAFA	06/30/2022 10:53 AKDT	3	90	**	7 (Smoke)	2	66	50
PAFA	06/30/2022 11:53 AKDT	0	0	**	7 (Smoke)	2	69	50
PAFA	06/30/2022 12:53 AKDT	0	0	**	7 (Smoke)	2	71	49
PAFA	06/30/2022 13:53 AKDT	0	0	**	7 (Smoke)	2	74	50
PAFA	06/30/2022 14:53 AKDT	0	0	**	7 (Smoke)	3	77	47
PAFA	06/30/2022 15:53 AKDT	0	0	**	7 (Smoke)	3	78	46
PAFA	06/30/2022 16:53 AKDT	5	40	**	7 (Smoke)	3	79	49
PAFA	06/30/2022 17:53 AKDT	0	0	**	7 (Smoke)	3	80	50
PAFA	06/30/2022 18:53 AKDT	0	0	**	7 (Smoke)	3	80	49
PAFA	06/30/2022 19:53 AKDT	0	0	**	7 (Smoke)	3	78	49
PAFA	06/30/2022 20:53 AKDT	3	120	**	7 (Smoke)	3	77	51
PAFA	06/30/2022 21:53 AKDT	0	0	**	7 (Smoke)	3	75	51
PAFA	06/30/2022 22:53 AKDT	0	0	**	7 (Smoke)	3	70	53
PAFA	06/30/2022 23:53 AKDT	3	20	**	7 (Smoke)	3	67	52

Surface observations: The surface observations from June 30, 2022, show hours of reduced visibility throughout the day. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - July 1, 2022

AICC Fire Report Summary:

- **New Fires:** 6 new fires reported.
- **Total Fires Statewide:** 149 fires burning.
- **Acres Burned:** 1,852,451 acres, with a 24-hour increase of 205,720 acres.

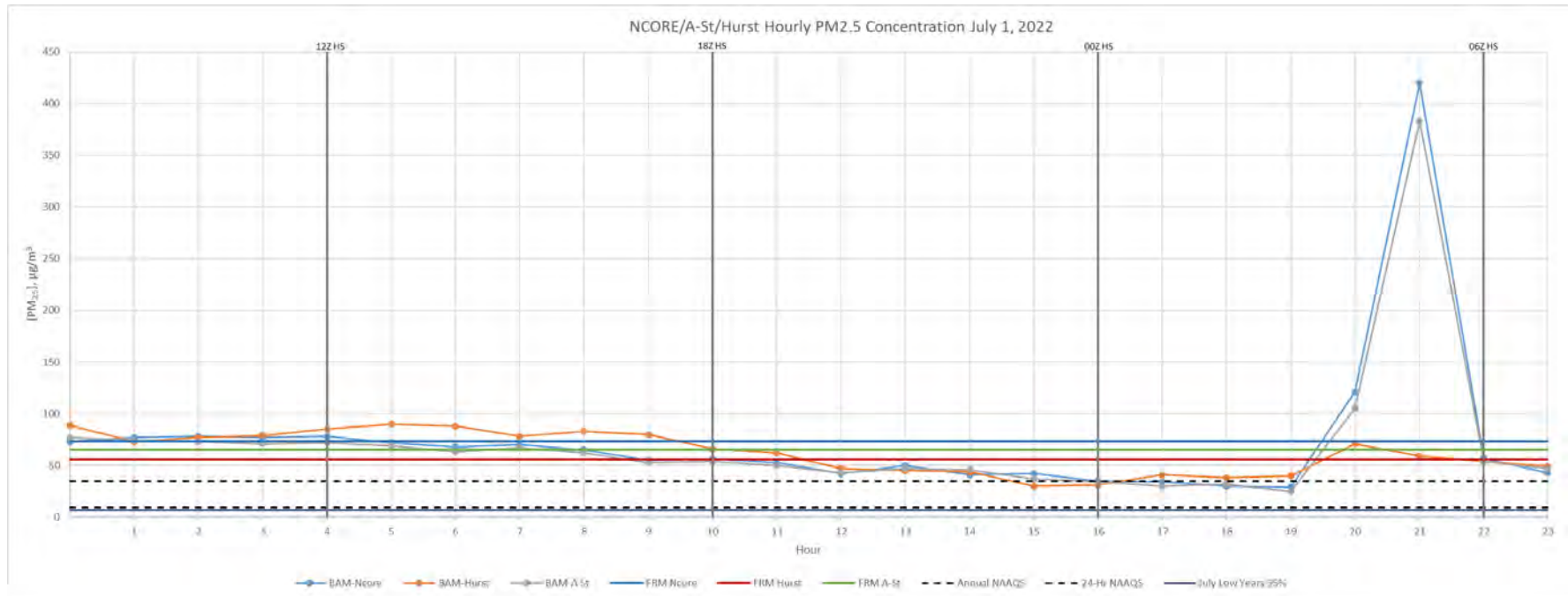


Figure 64: FNSB PM_{2.5} concentrations for July 1, 2022

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on July 1, 2022. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations are relatively stable in the early morning hours, with all sites reporting values near 80 µg/m³.

Midday Levels: The PM_{2.5} concentrations lower slightly during the midday hours, with lows around 50 µg/m³ at all sites.

Afternoon to Evening: There is steady PM_{2.5} concentrations in the late afternoon and early evening. At approximately 9:00 PM, concentrations at the BAM-NCore and BAM-A-Street sites spike sharply to about 400 µg/m³, with the BAM-Hurst Road site remaining steady at approximately 75 µg/m³.

Overall Trend: The PM_{2.5} concentrations on July 1, 2022, remain steady until midday, then show a gradual decrease in particulate matter at all sites. The early morning and midday hours exhibit relatively stable and lower PM_{2.5} levels. The overall trend indicates that air quality was improving in the afternoon, with PM_{2.5} concentrations still exceeding both the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) and the annual NAAQS limit (represented by the dashed black line at 9 µg/m³). The late evening spike suggests potential influences from changes in wind patterns and smoke transport from nearby fires.

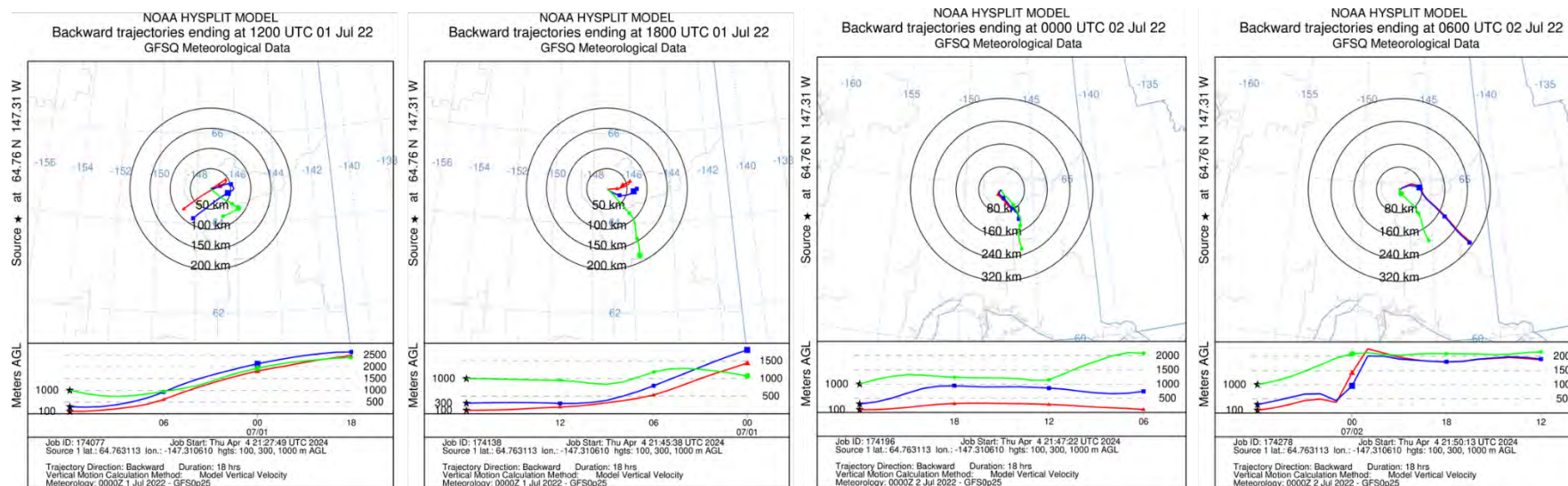


Figure 65: NOAA HYSPLIT model backward trajectories for July 1, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for July 1 to July 2, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, July 1, 2022):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate erratic parcels (generally suggesting some sort of pattern change) originated from all directions during the parcel movement, converging towards the target location.
- **Image 2 (18:00 UTC, July 1, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight movement from the east at the 100m and 300m levels, with the 1000m parcel originating from the south.
- **Image 3 (00:00 UTC, July 2, 2022):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the southeast, with the 100m, 300m, and 1000m trajectories all coming from the southeast.
- **Image 4 (06:00 UTC, July 2, 2022):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels at 100m, 300m, and 1000m originating from the southeast.



Figure 66: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for July 1 to July 2, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 2 (18:00 UTC, July 1, 2022): The air parcels' pathways continue to show movement from the east through southeast, over visible fires. **Smoke Transport:** The MODIS imagery reveals smoke plumes surrounding all trajectories, indicating ongoing smoke transport into the area.

Table 30. Hourly surface observations for Fairbanks International Airport, July 1, 2022

PAFA	07/01/2022 00:53 AKDT	0	0	**	7 (Smoke)	3	63	50
PAFA	07/01/2022 01:53 AKDT	0	0	**	7 (Smoke)	3	62	52
PAFA	07/01/2022 02:53 AKDT	3	90	**	7 (Smoke)	3	59	52
PAFA	07/01/2022 03:53 AKDT	0	0	**	7 (Smoke)	3	58	51
PAFA	07/01/2022 04:53 AKDT	7	40	**	7 (Smoke)	3	56	48
PAFA	07/01/2022 05:53 AKDT	5	50	**	7 (Smoke)	3	58	49
PAFA	07/01/2022 06:53 AKDT	3	70	**	7 (Smoke)	3	60	49
PAFA	07/01/2022 07:53 AKDT	0	0	**	7 (Smoke)	3	64	50
PAFA	07/01/2022 08:53 AKDT	0	0	**	7 (Smoke)	3	66	51
PAFA	07/01/2022 09:53 AKDT	0	0	**	7 (Smoke)	3	69	52
PAFA	07/01/2022 10:53 AKDT	0	0	**	7 (Smoke)	4	72	53
PAFA	07/01/2022 11:53 AKDT	0	0	**	7 (Smoke)	4	75	54
PAFA	07/01/2022 12:53 AKDT	3	**	**	7 (Smoke)	5	77	53
PAFA	07/01/2022 13:53 AKDT	0	0	**	7 (Smoke)	5	80	54
PAFA	07/01/2022 14:53 AKDT	0	0	**	7 (Smoke)	5	82	52
PAFA	07/01/2022 15:53 AKDT	0	0	**	7 (Smoke)	6	83	50
PAFA	07/01/2022 16:53 AKDT	0	0	**	7 (Smoke)	6	84	50
PAFA	07/01/2022 17:53 AKDT	0	0	**	7 (Smoke)	6	84	48
PAFA	07/01/2022 18:53 AKDT	6	240	**	7 (Smoke)	6	84	49
PAFA	07/01/2022 19:53 AKDT	3	220	**	7 (Smoke)	6	85	49
PAFA	07/01/2022 20:53 AKDT	3	230	**	7 (Smoke)	6	83	51
PAFA	07/01/2022 21:53 AKDT	3	310	**	7 (Smoke)	1	79	55
PAFA	07/01/2022 22:53 AKDT	0	0	**	7 (Smoke)	1	74	60
PAFA	07/01/2022 23:53 AKDT	5	100	**	7 (Smoke)	3	73	54

Surface observations: The surface observations from July 1, 2022, show hours of reduced visibility throughout the day. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - July 2, 2022

AICC Fire Report Summary:

- **New Fires:** 8 new fires reported.
- **Total Fires Statewide:** 164 fires burning.
- **Acres Burned:** 1,939,985 acres, with a 24-hour increase of 87,534 acres.

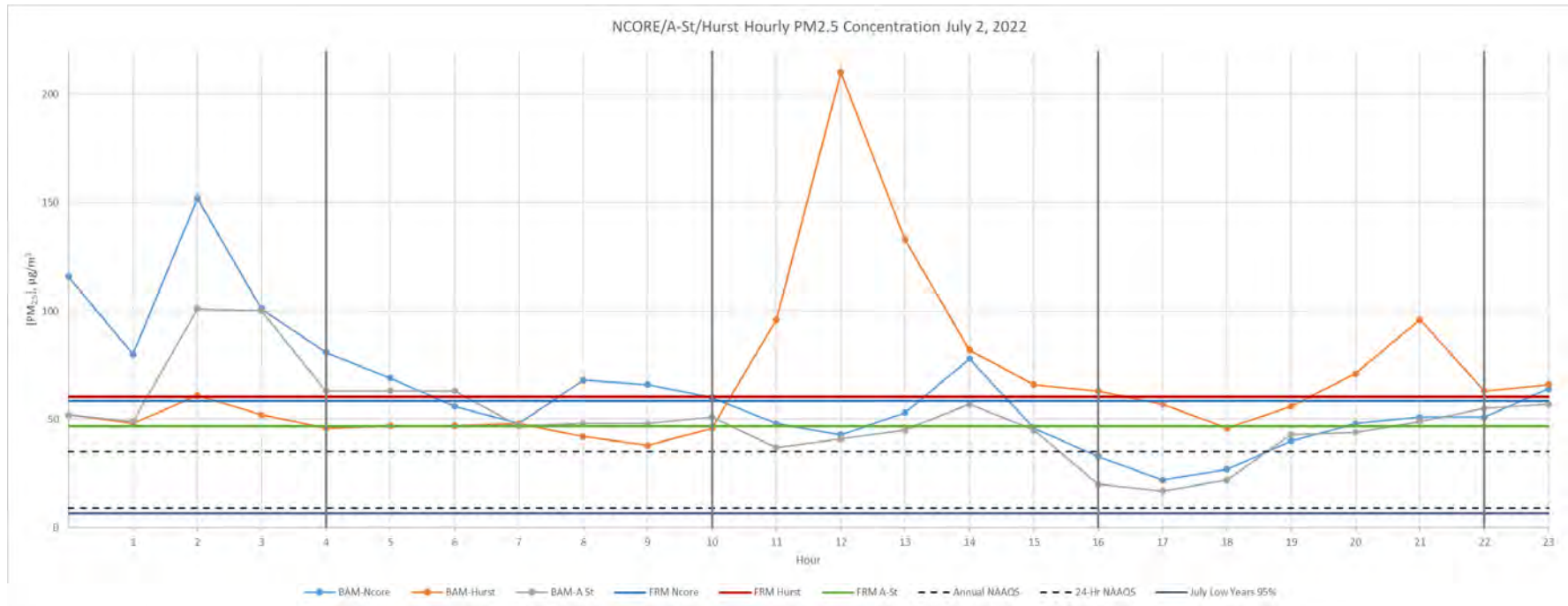


Figure 67: FNSB PM_{2.5} concentrations for July 2, 2022

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on July 2, 2022. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations spiked in the early morning hours, with the BAM-NCore and BAM-A-Street sites reaching approximately 150 µg/m³ and 100 µg/m³, respectively.

Midday Levels: The PM_{2.5} concentrations lower slightly during the midday hours, with lows around 50 µg/m³ at all sites with the exception of the Hurst Road site, which experienced a sharp spike at 12:00 PM to just above 200 µg/m³.

Afternoon to Evening: There was a steady PM_{2.5} concentrations in the late afternoon and evening. The concentrations at the BAM-NCore and BAM-A-Street sites spiked to around 60 µg/m³, with Bam-Hurst Road site climbing to approximately 100 µg/m³ at 10:00 PM.

Overall Trend: The PM_{2.5} concentrations on July 2, 2022, fluctuated throughout the day, with a gradual decrease in particulate matter at all sites for a few hours in the late afternoon. PM_{2.5} concentrations exceeded both the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) and the annual NAAQS limit (represented by the dashed black line at 9 µg/m³).

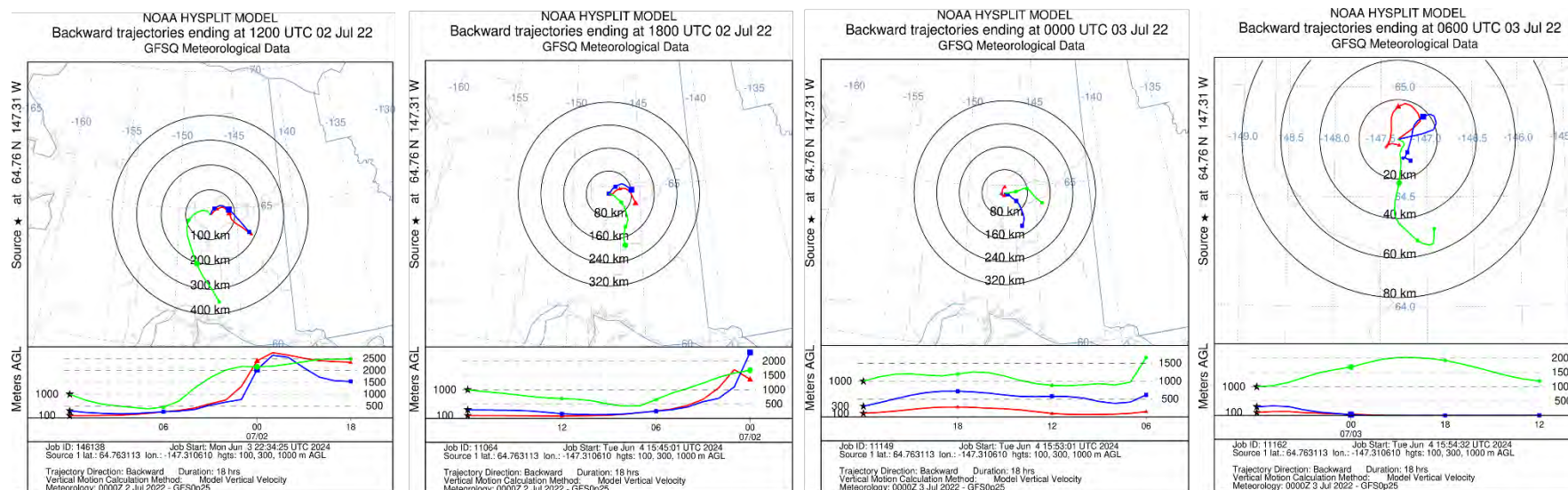


Figure 68: NOAA HYSPLIT model backward trajectories for July 2, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for July 2 to July 3, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, July 2, 2022):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate parcels originated to the east through south, converging towards the target location.
- **Image 2 (18:00 UTC, July 2, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight movement from the east at the 100m and 300m levels, with the 1000m parcel originating from the south.
- **Image 3 (00:00 UTC, July 3, 2022):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the north with the 100m, the 300m and 1000m trajectories all coming from the east-southeast.
- **Image 4 (06:00 UTC, July 3, 2022):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels at 100m, 300m, and 1000m originating from the south even though the parcels seem to circle the target location.

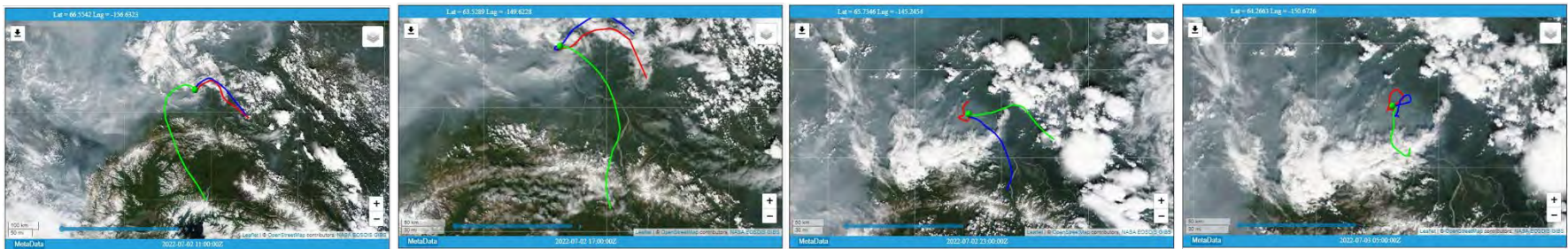


Figure 69: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for July 2 to July 3, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 2 (18:00 UTC, July 2, 2022): The air parcels' pathways continue to show movement from the east through southeast, over visible fires. **Smoke Transport:** The MODIS imagery reveals smoke plumes surrounding FNSB, indicating ongoing smoke transport into the area.

Table 31. Hourly surface observations for Fairbanks International Airport, July 2, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/02/2022 00:53 AKDT	6	20	**	7 (Smoke)	6	71	53
PAFA	07/02/2022 01:53 AKDT	0	0	**	7 (Smoke)	4	68	54
PAFA	07/02/2022 02:53 AKDT	0	0	**	7 (Smoke)	3	66	56
PAFA	07/02/2022 03:53 AKDT	5	40	**	7 (Smoke)	3	63	53
PAFA	07/02/2022 04:53 AKDT	0	0	**	7 (Smoke)	3	63	56
PAFA	07/02/2022 05:53 AKDT	3	100	**	7 (Smoke)	3	64	56
PAFA	07/02/2022 06:53 AKDT	5	250	**	7 (Smoke)	3	64	56
PAFA	07/02/2022 07:53 AKDT	5	340	**	7 (Smoke)	3	66	53
PAFA	07/02/2022 08:53 AKDT	0	0	**	7 (Smoke)	2	67	54
PAFA	07/02/2022 09:53 AKDT	3	50	**	7 (Smoke)	2	68	56
PAFA	07/02/2022 10:53 AKDT	0	0	**	7 (Smoke)	2	70	56
PAFA	07/02/2022 11:53 AKDT	0	0	**	7 (Smoke)	2	72	54
PAFA	07/02/2022 12:53 AKDT	6	150	**	7 (Smoke)	2	74	56
PAFA	07/02/2022 13:53 AKDT	5	**	**	7 (Smoke)	3	78	56
PAFA	07/02/2022 14:53 AKDT	3	30	**	7 (Smoke)	3	79	56
PAFA	07/02/2022 15:53 AKDT	6	30	**	7 (Smoke)	3	80	58
PAFA	07/02/2022 16:53 AKDT	5	50	**	7 (Smoke)	4	82	53
PAFA	07/02/2022 17:53 AKDT	0	0	**	7 (Smoke)	6	83	53
PAFA	07/02/2022 18:53 AKDT	0	0	**	7 (Smoke)	8	84	52
PAFA	07/02/2022 19:53 AKDT	5	90	**	7 (Smoke)	9	82	53
PAFA	07/02/2022 20:53 AKDT	0	0	**	7 (Smoke)	5	83	54
PAFA	07/02/2022 21:53 AKDT	5	340	**	7 (Smoke)	5	78	54
PAFA	07/02/2022 22:53 AKDT	0	0	**	7 (Smoke)	3	74	57
PAFA	07/02/2022 23:53 AKDT	0	0	**	7 (Smoke)	3	70	57

Surface observations: The surface observations from July 2, 2022, show hours of reduced visibility throughout the day. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - July 3, 2022

AICC Fire Report Summary:

- **New Fires:** 6 new fires reported.
- **Total Fires Statewide:** 170 fires burning.
- **Acres Burned:** 2,176,595 acres, with a 24-hour increase of 236,610 acres.

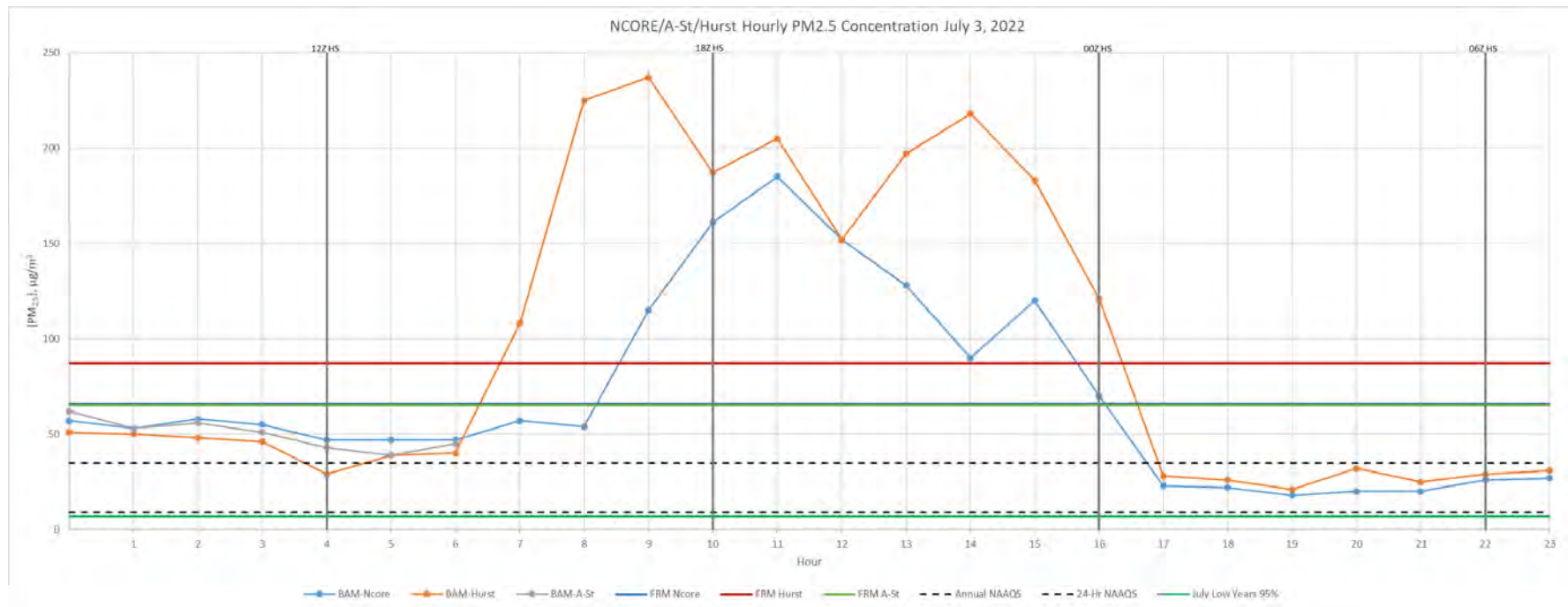


Figure 70: FNSB PM_{2.5} concentrations for July 3, 2022

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on July 3, 2022. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations saw spikes in the morning hours, all sites that were reporting reached values over 100 µg/m³.

Midday Levels: The PM_{2.5} concentrations increased during the midday hours, with highs around 240 µg/m³ for Hurst Road and 190 µg/m³ for NCore. A-Street stopped reporting after 6:00 AM.

Afternoon to Evening: There is a decrease in PM_{2.5} concentrations in the late afternoon and evening. The concentrations at the NCore and Hurst Road sites dipped to around 25 µg/m³.

Overall Trend: The PM_{2.5} concentrations on July 3, 2022, remain steady up to midmorning, then show a significant increase in particulate matter at all reporting sites. At 6:00 AM, NCore and Hurst Road began to spike and did not subside until late afternoon. The overall trend indicates that air quality was improving in the afternoon, with PM_{2.5} concentrations still exceeding both the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) and the annual NAAQS limit (represented by the dashed black line at 9 µg/m³).

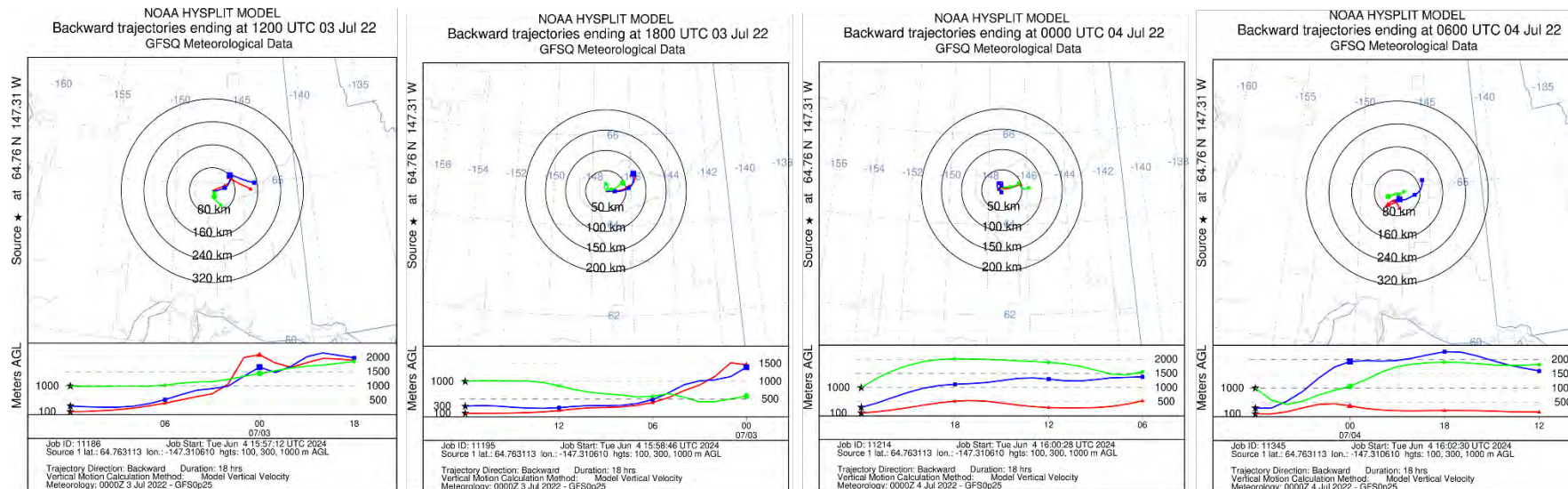


Figure 71: NOAA HYSPLIT model backward trajectories for July 3, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for July 3 to July 4, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, July 3, 2022):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate parcels originated to the east through south, converging towards the target location.
- **Image 2 (18:00 UTC, July 3, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight movement from the east at the 100m, 300m, and 1000m levels.
- **Image 3 (00:00 UTC, July 4, 2022):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the east with the 100m, the 300m and 1000m trajectories all coming from the east-southeast.
- **Image 4 (06:00 UTC, July 4, 2022):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels at 100m, 300m, and 1000m originating from the areas surrounding the immediate FNSB area.

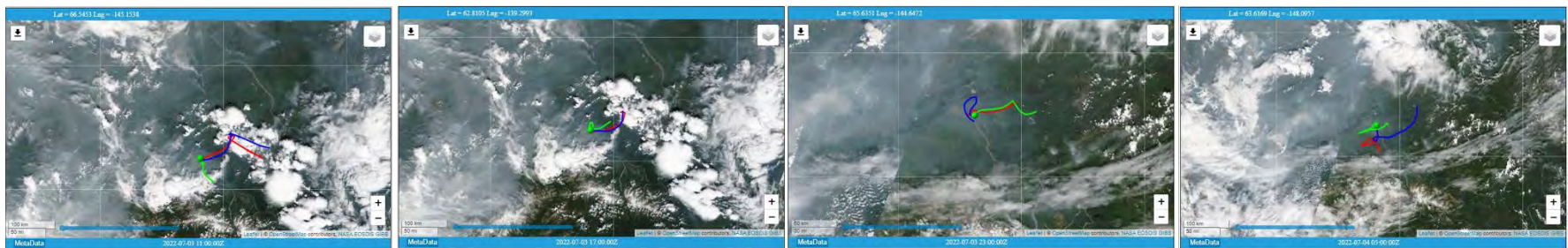


Figure 72: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for July 3 to July 4, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 2 (18:00 UTC, July 3, 2022): The air parcels' pathways continue to show movement from the east, through visible smoke plumes. **Smoke Transport:** The MODIS imagery reveals smoke plumes surrounding FNSB, indicating ongoing smoke transport into the area.

Table 32. Hourly surface observations for Fairbanks International Airport, July 3, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/03/2022 00:53 AKDT	5	60	**	7 (Smoke)	3	67	55
PAFA	07/03/2022 01:53 AKDT	5	50	**	7 (Smoke)	3	66	54
PAFA	07/03/2022 02:53 AKDT	6	20	**	7 (Smoke)	4	65	54
PAFA	07/03/2022 03:53 AKDT	0	0	**	7 (Smoke)	4	66	54
PAFA	07/03/2022 04:53 AKDT	0	0	**	7 (Smoke)	4	62	55
PAFA	07/03/2022 05:53 AKDT	0	0	**	7 (Smoke)	5	63	54
PAFA	07/03/2022 06:53 AKDT	5	40	**	7 (Smoke)	4	64	56
PAFA	07/03/2022 07:53 AKDT	8	60	**	7 (Smoke)	5	65	54
PAFA	07/03/2022 08:53 AKDT	5	50	**	7 (Smoke)	3	68	55
PAFA	07/03/2022 09:53 AKDT	5	140	**	7 (Smoke)	3	70	56
PAFA	07/03/2022 10:53 AKDT	5	**	**	7 (Smoke)	3	72	57
PAFA	07/03/2022 11:53 AKDT	3	120	**	7 (Smoke)	2	74	57
PAFA	07/03/2022 12:53 AKDT	6	90	**	7 (Smoke)	2	76	60
PAFA	07/03/2022 13:53 AKDT	0	0	**	7 (Smoke)	2	78	60
PAFA	07/03/2022 14:53 AKDT	6	230	**	7 (Smoke)	3	80	58
PAFA	07/03/2022 15:53 AKDT	6	230	**	7 (Smoke)	1	81	58
PAFA	07/03/2022 16:53 AKDT	5	190	**	7 (Smoke)	1	82	58
PAFA	07/03/2022 17:53 AKDT	17	30	**	7 (Smoke)	3	81	49
PAFA	07/03/2022 18:53 AKDT	13	30	**	7 (Smoke)	9	75	51
PAFA	07/03/2022 19:53 AKDT	13	360	**	**	10	72	53
PAFA	07/03/2022 20:53 AKDT	9	360	**	**	10	70	53
PAFA	07/03/2022 21:53 AKDT	6	40	**	7 (Smoke)	9	68	54
PAFA	07/03/2022 22:53 AKDT	3	290	**	7 (Smoke)	8	68	53
PAFA	07/03/2022 23:53 AKDT	3	40	**	7 (Smoke)	8	67	55

Surface observations: The surface observations from July 3, 2022, show hours of reduced visibility throughout the day. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - July 4, 2022

AICC Fire Report Summary:

- **New Fires:** 20 new fires reported.
- **Total Fires Statewide:** 188 fires burning.
- **Acres Burned:** 2,292,905 acres, with a 24-hour increase of 116,310 acres.

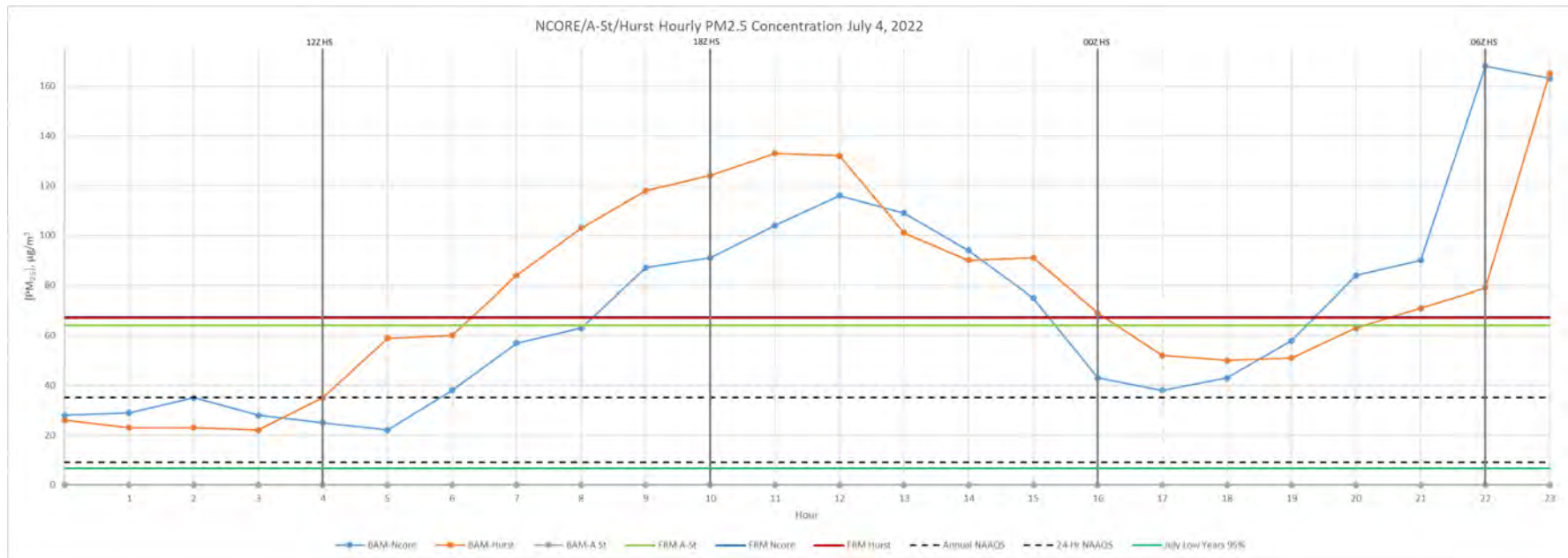


Figure 73: FNSB PM_{2.5} concentrations for July 4, 2022

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on July 4, 2022. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations are relatively low in the early morning hours, with all sites reporting values below 40 µg/m³. There is a slight increase at the BAM-Hurst Road site around 4:00 AM, reaching approximately 60 µg/m³.

Midday Levels: The PM_{2.5} concentrations show a significant rise during the midday hours, with levels increasing steadily at all sites. The concentrations at the BAM-Hurst Road site peak around 11:00 AM, reaching approximately 130 µg/m³, while the BAM-NCore site peaks around 12:00 PM, reaching approximately 140 µg/m³.

Afternoon to Evening: There is a notable decrease in PM_{2.5} concentrations in the late afternoon and early evening. The levels at the BAM-Hurst Road and BAM-NCore sites drop significantly after 4:00 PM, with concentrations falling below 80 µg/m³ by 7:00 PM. However, there is another rise in concentrations towards the late evening, with BAM-NCore and BAM-Hurst Road peaking again around 10:00 PM, reaching approximately 160 µg/m³ and 140 µg/m³, respectively.

Overall Trend: The PM_{2.5} concentrations on July 4, 2022, show a notable increase during the midday hours, followed by a decrease in the late afternoon and another rise in the late evening. The overall trend indicates that air quality deteriorated significantly during the midday and late evening hours, with PM_{2.5} concentrations exceeding both the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) and the annual NAAQS limit (represented by the dashed black line at 9 µg/m³). The midday and late evening peaks suggest potential influences from local sources or regional transport, impacting air quality throughout the day.

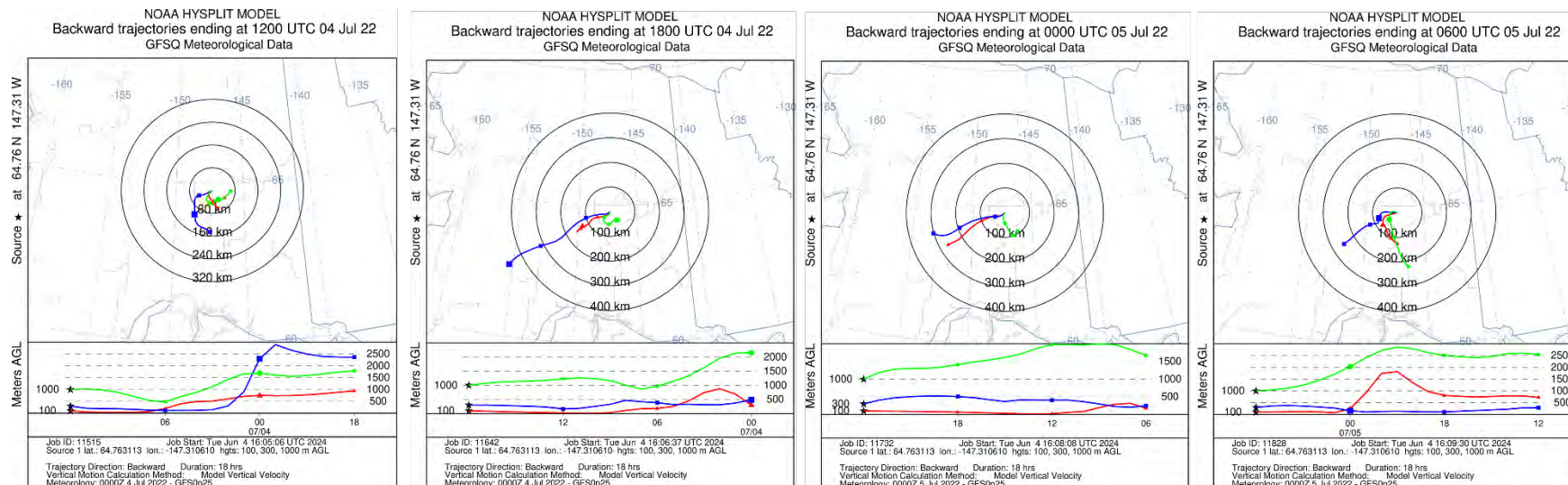


Figure 74: NOAA HYSPLIT model backward trajectories for July 4, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for July 4 to July 5, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, July 4, 2022):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the southwest and west, converging towards the target location.
- **Image 2 (18:00 UTC, July 4, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the southwest and west at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from these directions.
- **Image 3 (00:00 UTC, July 5, 2022):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the southwest, with the 100m, 300m trajectories coming from the west and the 1000m trajectory coming from the south.
- **Image 4 (06:00 UTC, July 5, 2022):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels coming from the south through southwest, with consistent pathways across all altitudes.



Figure 75: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for July 4 to July 5, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 2 (18:00 UTC, July 4, 2022): The air parcels' pathways continue to show significant movement from the southwest and west. The 100m, 300m, and 1000m trajectories indicate this direction of transport. **Smoke Transport:** The MODIS imagery reveals smoke plumes in the direction of the trajectories, indicating ongoing smoke transport from the southwest and west.

Table 33. Hourly surface observations for Fairbanks International Airport, July 4, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/04/2022 00:53 AKDT	0	0	**		10	64	54
PAFA	07/04/2022 01:53 AKDT	3	300	**		10	63	55
PAFA	07/04/2022 02:53 AKDT	6	110	**	7 (Smoke)	8	61	52
PAFA	07/04/2022 03:53 AKDT	0	0	**	7 (Smoke)	8	61	53
PAFA	07/04/2022 04:53 AKDT	5	160	**	7 (Smoke)	8	61	54
PAFA	07/04/2022 05:53 AKDT	0	0	**	7 (Smoke)	6	61	55
PAFA	07/04/2022 06:53 AKDT	5	360	**	7 (Smoke)	4	62	54
PAFA	07/04/2022 07:53 AKDT	6	40	**	7 (Smoke)	4	63	55
PAFA	07/04/2022 08:53 AKDT	3	**	**	7 (Smoke)	4	65	55
PAFA	07/04/2022 09:53 AKDT	3	150	**	7 (Smoke)	3	66	56
PAFA	07/04/2022 10:53 AKDT	0	0	**	7 (Smoke)	3	68	56
PAFA	07/04/2022 11:53 AKDT	0	0	**	7 (Smoke)	4	72	57
PAFA	07/04/2022 12:53 AKDT	0	0	**	7 (Smoke)	3	74	57
PAFA	07/04/2022 13:53 AKDT	0	0	**	7 (Smoke)	2	77	57
PAFA	07/04/2022 14:53 AKDT	0	0	**	7 (Smoke)	3	79	57
PAFA	07/04/2022 15:53 AKDT	3	150	**	7 (Smoke)	4	79	55
PAFA	07/04/2022 16:53 AKDT	5	**	**	7 (Smoke)	5	81	53
PAFA	07/04/2022 17:53 AKDT	6	200	**	7 (Smoke)	6	82	52
PAFA	07/04/2022 18:53 AKDT	7	200	**	7 (Smoke)	5	82	54
PAFA	07/04/2022 19:53 AKDT	6	240	**	7 (Smoke)	5	80	55
PAFA	07/04/2022 20:53 AKDT	6	250	**	7 (Smoke)	3	79	57
PAFA	07/04/2022 21:53 AKDT	5	240	**	7 (Smoke)	3	77	56
PAFA	07/04/2022 22:53 AKDT	15	260	21	7 (Smoke)	3	75	55
PAFA	07/04/2022 23:53 AKDT	12	300	22	7 (Smoke)	1	73	56

Surface observations: The surface observations from July 4, 2022, show hours of reduced visibility throughout the day. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - July 5, 2022

AICC Fire Report Summary:

- **New Fires:** 13 new fires reported.
- **Total Fires Statewide:** 221 fires burning.
- **Acres Burned:** 2,361,710 acres, with a 24-hour increase of 68,805 acres.

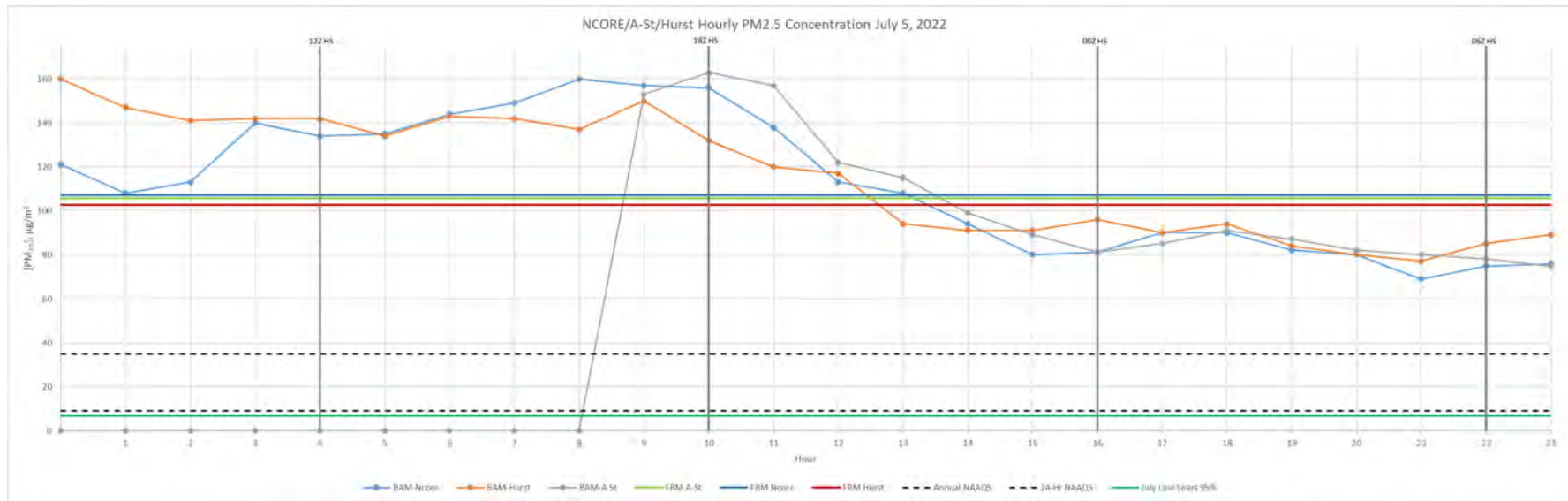


Figure 76: FNSB PM_{2.5} concentrations for July 5, 2022

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on July 5, 2022. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations are relatively high in the early morning hours, with the BAM-Hurst Road site reporting values around 160 µg/m³.

Midday Levels: The PM_{2.5} concentrations show a significant decrease during the midday hours, with levels dropping to around 140 µg/m³ at the NCore and A-Street sites. The Hurst Road site maintains lower levels, generally staying around 120 µg/m³.

Afternoon to Evening: The PM_{2.5} concentrations remain relatively stable during the afternoon and early evening, with levels fluctuating around 08 µg/m³ to 100 µg/m³. There is a slight decrease observed around 6:00 PM.

Overall Trend: The PM_{2.5} concentrations on July 5, 2022, show significantly elevated concentrations throughout the day. The overall trend indicates that air quality did not improve and the levels remained above both the annual NAAQS limit (represented by the dashed black line at 9 µg/m³) and the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) throughout the day.

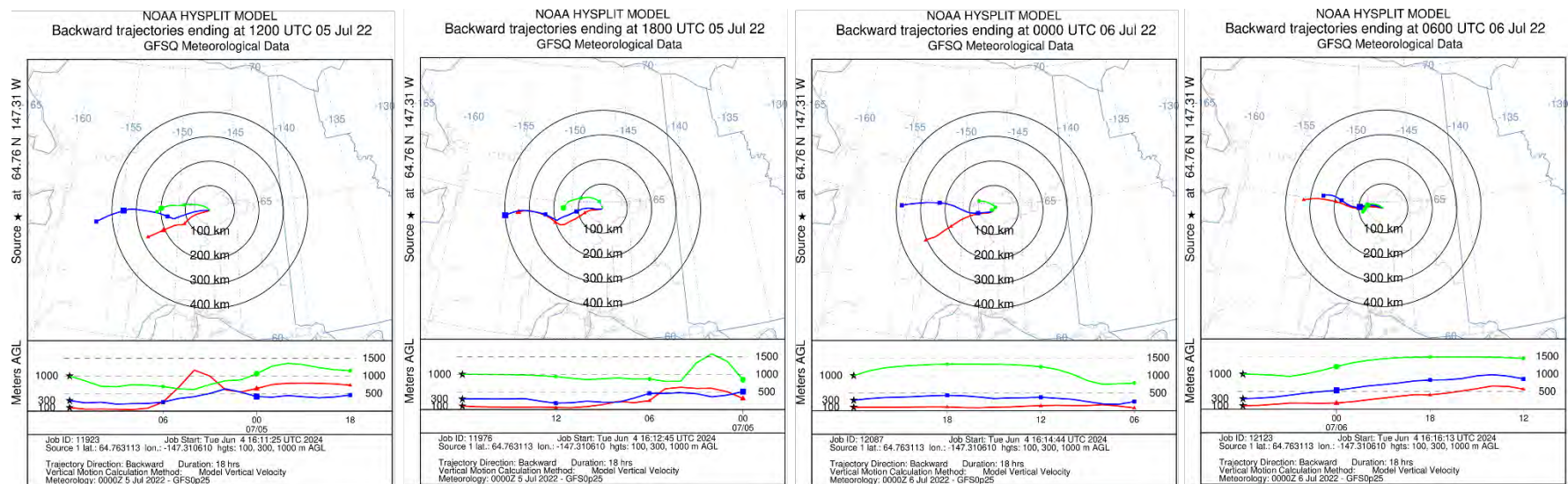


Figure 77: NOAA HYSPLIT model backward trajectories for July 5, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for July 5 to July 6, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, July 5, 2022):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the southwest and west, converging towards the target location.
- **Image 2 (18:00 UTC, July 5, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the west at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from these directions.
- **Image 3 (00:00 UTC, July 6, 2022):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the southwest, with the 100m, 300m trajectories coming from the west and the 1000m trajectory coming from the northwest.
- **Image 4 (06:00 UTC, July 6, 2022):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels coming from the west, with consistent pathways across all altitudes.

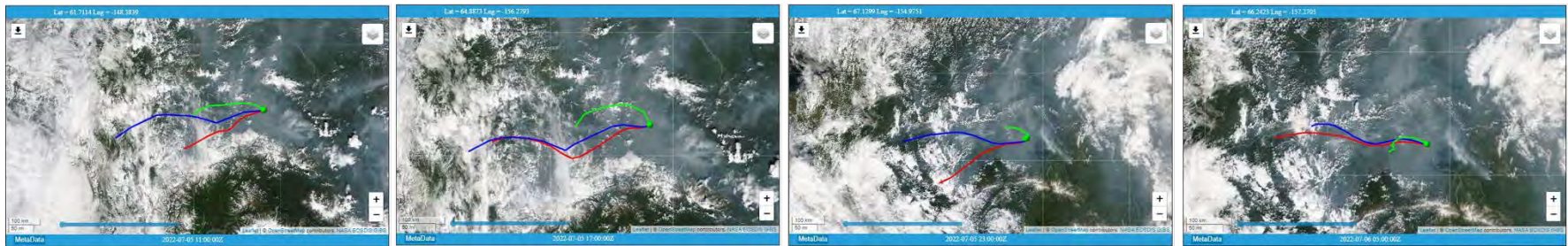


Figure 78: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for July 5 to July 6, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 2 (18:00 UTC, July 5, 2022): The air parcels' pathways again indicate movement from the west. The 100m, 300m, and 1000m trajectories converge towards the target location from the west. **Smoke Transport:** MODIS imagery aligns with these trajectories, indicating smoke from western fires moving towards Fairbanks.

Table 34. Hourly surface observations for Fairbanks International Airport, July 5, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/05/2022 00:53 AKDT	6	150	**	7 (Smoke)	2	69	56
PAFA	07/05/2022 01:53 AKDT	7	**	20	7 (Smoke)	2	66	56
PAFA	07/05/2022 02:53 AKDT	7	200	**	7 (Smoke)	3	63	57
PAFA	07/05/2022 03:53 AKDT	3	170	**	7 (Smoke)	1	61	58
PAFA	07/05/2022 04:53 AKDT	3	210	**	7 (Smoke)	1	61	57
PAFA	07/05/2022 05:53 AKDT	0	0	**	7 (Smoke)	1	61	58
PAFA	07/05/2022 06:53 AKDT	0	0	**	7 (Smoke)	1	62	58
PAFA	07/05/2022 07:53 AKDT	0	0	**	7 (Smoke)	1	63	58
PAFA	07/05/2022 08:53 AKDT	5	180	**	7 (Smoke)	1	65	59
PAFA	07/05/2022 09:53 AKDT	3	260	**	7 (Smoke)	1	66	59
PAFA	07/05/2022 10:53 AKDT	0	0	**	7 (Smoke)	1	69	59
PAFA	07/05/2022 11:53 AKDT	5	**	**	7 (Smoke)	2	70	59
PAFA	07/05/2022 12:53 AKDT	5	190	**	7 (Smoke)	2	72	58
PAFA	07/05/2022 13:53 AKDT	3	**	**	7 (Smoke)	2	74	59
PAFA	07/05/2022 14:53 AKDT	5	**	**	7 (Smoke)	3	76	58
PAFA	07/05/2022 15:53 AKDT	6	180	**	7 (Smoke)	3	78	58
PAFA	07/05/2022 16:53 AKDT	6	200	**	7 (Smoke)	3	77	57
PAFA	07/05/2022 17:53 AKDT	5	200	**	7 (Smoke)	3	76	58
PAFA	07/05/2022 18:53 AKDT	7	190	**	7 (Smoke)	3	76	58
PAFA	07/05/2022 19:53 AKDT	6	180	**	7 (Smoke)	3	75	59
PAFA	07/05/2022 20:53 AKDT	5	**	**	7 (Smoke)	3	75	59
PAFA	07/05/2022 21:53 AKDT	6	160	**	7 (Smoke)	3	73	59
PAFA	07/05/2022 22:53 AKDT	0	0	**	7 (Smoke)	3	69	58
PAFA	07/05/2022 23:53 AKDT	0	0	**	7 (Smoke)	3	65	57

Surface observations: The surface observations from July 5, 2022, show hours of reduced visibility throughout the day. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - July 6, 2022

AICC Fire Report Summary:

- **New Fires:** 13 new fires reported.
- **Total Fires Statewide:** 221 fires burning.
- **Acres Burned:** 2,361,710 acres, with a 24-hour increase of 68,805 acres.

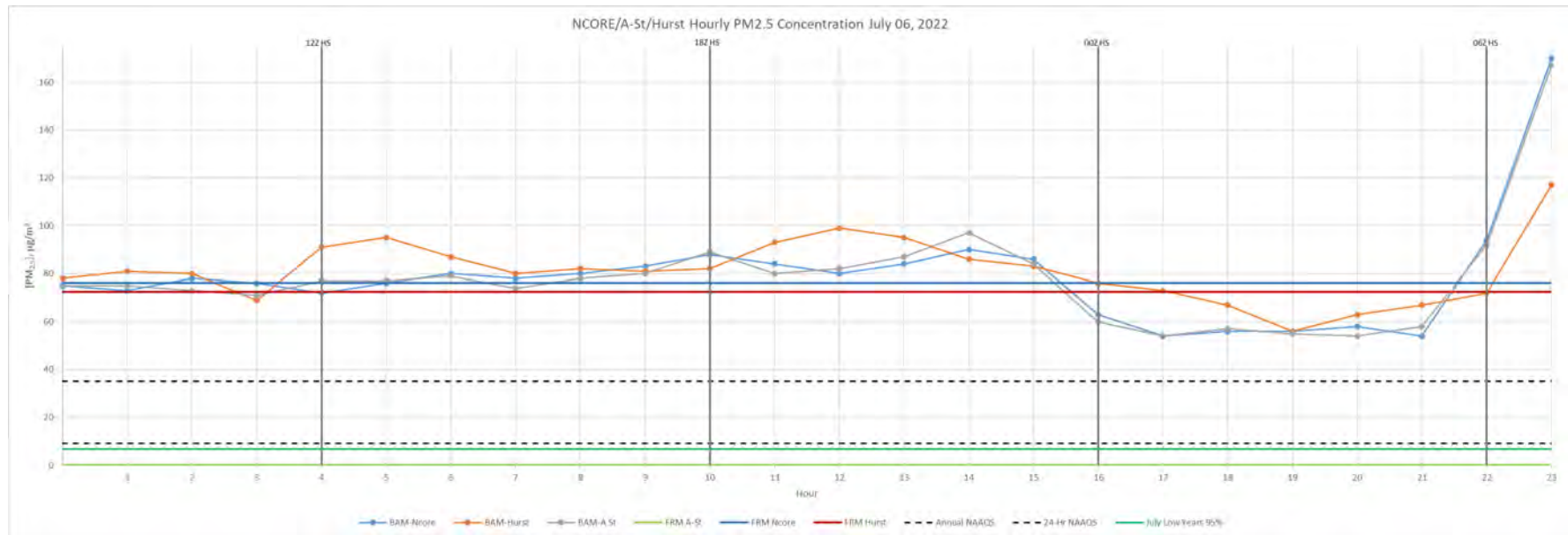


Figure 79: FNSB PM_{2.5} concentrations for July 6, 2022

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on July 6, 2022. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations are relatively high in the early morning hours, with all sites reporting values around 80 µg/m³. These levels remain steady until about 4:00 AM.

Midday Levels: The PM_{2.5} concentrations show some variability during the midday hours, with levels fluctuating around 80 µg/m³ to 100 µg/m³.

Afternoon to Evening: The PM_{2.5} concentrations show a gradual decline during the afternoon and early evening, with levels dropping to around 60 µg/m³. However, there is a significant spike observed at 11:00 PM, with concentrations peaking at approximately 160 µg/m³ at the NCore and A-Street site with the Hurst Road site spiking to 120 µg/m³.

Overall Trend: The PM_{2.5} concentrations on July 6, 2022, show a relatively steady pattern in the early morning and midday hours, followed by a decline in the afternoon. The significant spike in the late evening indicates a deterioration in air quality, with PM_{2.5} concentrations exceeding both the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) and the annual NAAQS limit (represented by the dashed black line at 9 µg/m³). The evening spike suggests potential influences from smoke transport or other sources of particulate matter.

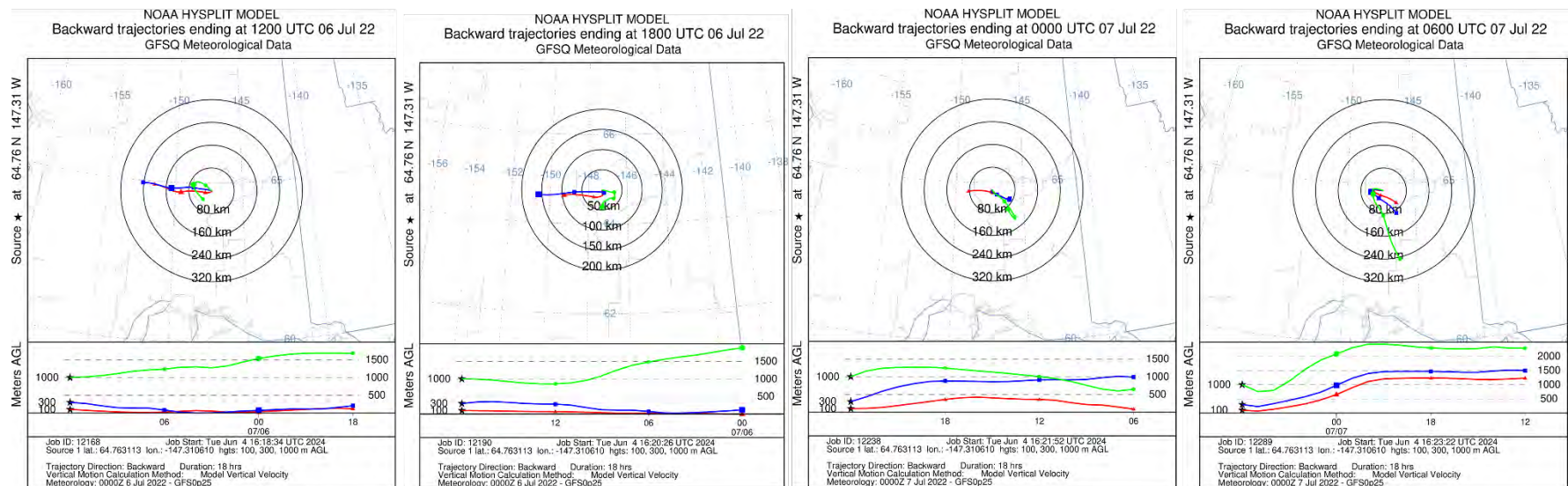


Figure 80: NOAA HYSPLIT model backward trajectories for July 6, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for July 6 to July 7, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, July 6, 2022):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the west and northwest, converging towards the target location.
- **Image 2 (18:00 UTC, July 6, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the west at the 100m and 300m trajectories. The 1000m trajectory originated from east through south.
- **Image 3 (00:00 UTC, July 7, 2022):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to areas surrounding FNSB, with the 100m trajectory coming from the west and the 300m and 1000m trajectories coming from the east.
- **Image 4 (06:00 UTC, July 7, 2022):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels at 100m, 300m, and 1000m all originating from the southeast, converging towards the target location.

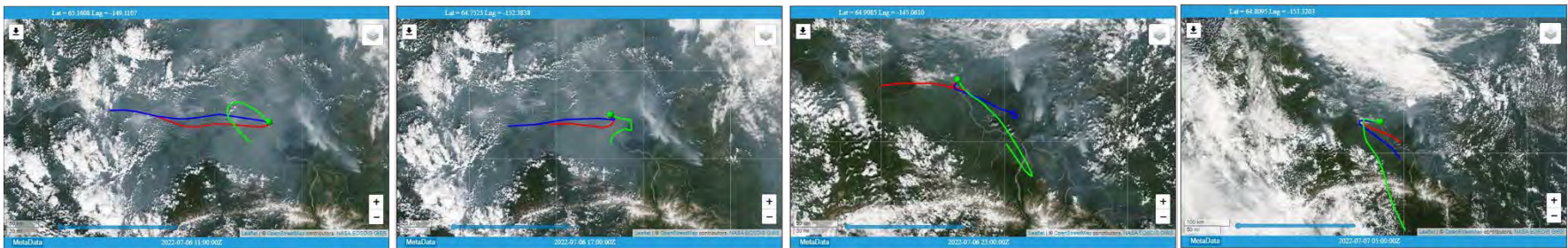


Figure 81: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for July 6 to July 7, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 2 (18:00 UTC, July 6, 2022): The 100m and 300m air parcels' pathways again indicate movement from the west. The 1000m trajectory converges towards the target location from the east through southeast. **Smoke Transport:** MODIS imagery aligns with these trajectories, indicating smoke from all locations surrounding Fairbanks.

Table 35. Hourly surface observations for Fairbanks International Airport, July 6, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/06/2022 00:53 AKDT	0	0	**	7 (Smoke)	3	65	58
PAFA	07/06/2022 01:53 AKDT	3	50	**	7 (Smoke)	3	63	57
PAFA	07/06/2022 02:53 AKDT	0	0	**	7 (Smoke)	3	60	57
PAFA	07/06/2022 03:53 AKDT	0	0	**	7 (Smoke)	3	61	56
PAFA	07/06/2022 04:53 AKDT	3	50	**	7 (Smoke)	3	59	56
PAFA	07/06/2022 05:53 AKDT	6	50	**	7 (Smoke)	3	59	54
PAFA	07/06/2022 06:53 AKDT	3	60	**	7 (Smoke)	3	61	56
PAFA	07/06/2022 07:53 AKDT	5	80	**	7 (Smoke)	3	63	57
PAFA	07/06/2022 08:53 AKDT	0	0	**	7 (Smoke)	3	65	56
PAFA	07/06/2022 09:53 AKDT	6	90	**	7 (Smoke)	3	67	57
PAFA	07/06/2022 10:53 AKDT	3	**	**	7 (Smoke)	2	70	58
PAFA	07/06/2022 11:53 AKDT	3	110	**	7 (Smoke)	3	73	58
PAFA	07/06/2022 12:53 AKDT	3	**	**	7 (Smoke)	3	76	59
PAFA	07/06/2022 13:53 AKDT	5	140	**	7 (Smoke)	3	77	58
PAFA	07/06/2022 14:53 AKDT	5	140	**	7 (Smoke)	3	79	58
PAFA	07/06/2022 15:53 AKDT	3	360	**	7 (Smoke)	3	82	57
PAFA	07/06/2022 16:53 AKDT	6	10	**	7 (Smoke)	3	84	57
PAFA	07/06/2022 17:53 AKDT	0	0	**	7 (Smoke)	3	83	52
PAFA	07/06/2022 18:53 AKDT	0	0	**	7 (Smoke)	4	84	56
PAFA	07/06/2022 19:53 AKDT	5	250	**	7 (Smoke)	4	83	56
PAFA	07/06/2022 20:53 AKDT	6	240	**	7 (Smoke)	4	80	57
PAFA	07/06/2022 21:53 AKDT	6	250	**	7 (Smoke)	4	77	60
PAFA	07/06/2022 22:53 AKDT	10	280	**	7 (Smoke)	4	75	57
PAFA	07/06/2022 23:53 AKDT	12	260	18	7 (Smoke)	2	72	54

Surface observations: The surface observations from July 6, 2022, show hours of reduced visibility throughout the day. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - July 7, 2022

AICC Fire Report Summary:

- **New Fires:** 11 new fires reported.
- **Total Fires Statewide:** 232 fires burning.
- **Acres Burned:** 2,387,203 acres, with a 24-hour increase of 25,493 acres.

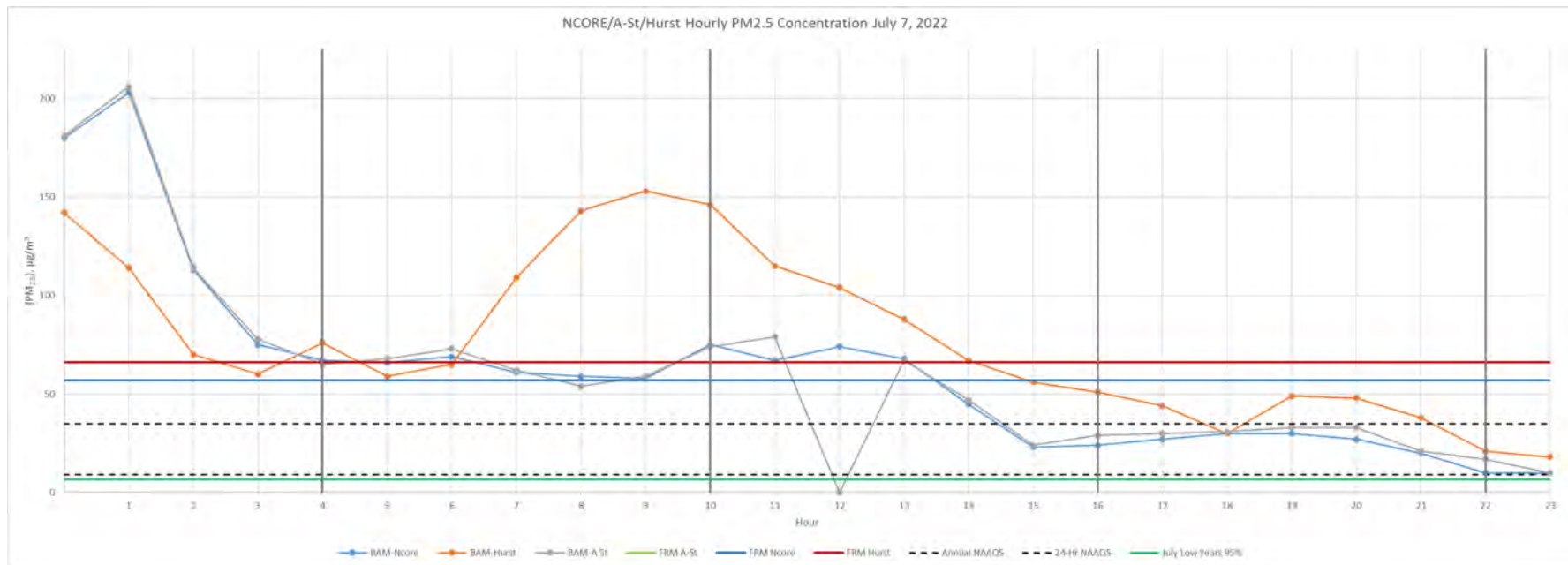


Figure 82: FNSB PM_{2.5} concentrations for July 7, 2022

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on July 7, 2022. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations are relatively high in the early morning hours, with the BAM-NCore and BAM-A-Street sites reporting values around 200 µg/m³. These levels begin to decrease as the morning progresses.

Midday Levels: The PM_{2.5} concentrations show a significant decrease during the midday hours, with levels dropping to just above 50 µg/m³, with the exception of the BAM-Hurst Road site, which maintains a higher midday peak of approximately 150 µg/m³.

Afternoon to Evening: The PM_{2.5} concentrations remain relatively stable during the afternoon and early evening, fluctuating around 50 µg/m³ to 100 µg/m³. There is a notable decrease observed in the late afternoon, with levels dropping below 50 µg/m³ by 7:00 PM.

Overall Trend: The PM_{2.5} concentrations on July 7, 2022, show a notable peak in the early morning, followed by a steady decline throughout the day. The overall trend indicates that air quality improved during the midday and afternoon hours, but the levels remained above the annual NAAQS limit (represented by the dashed black line at 9 µg/m³) throughout the day. The early morning spike suggests potential influences from smoke transport, which decreased as the day progressed.

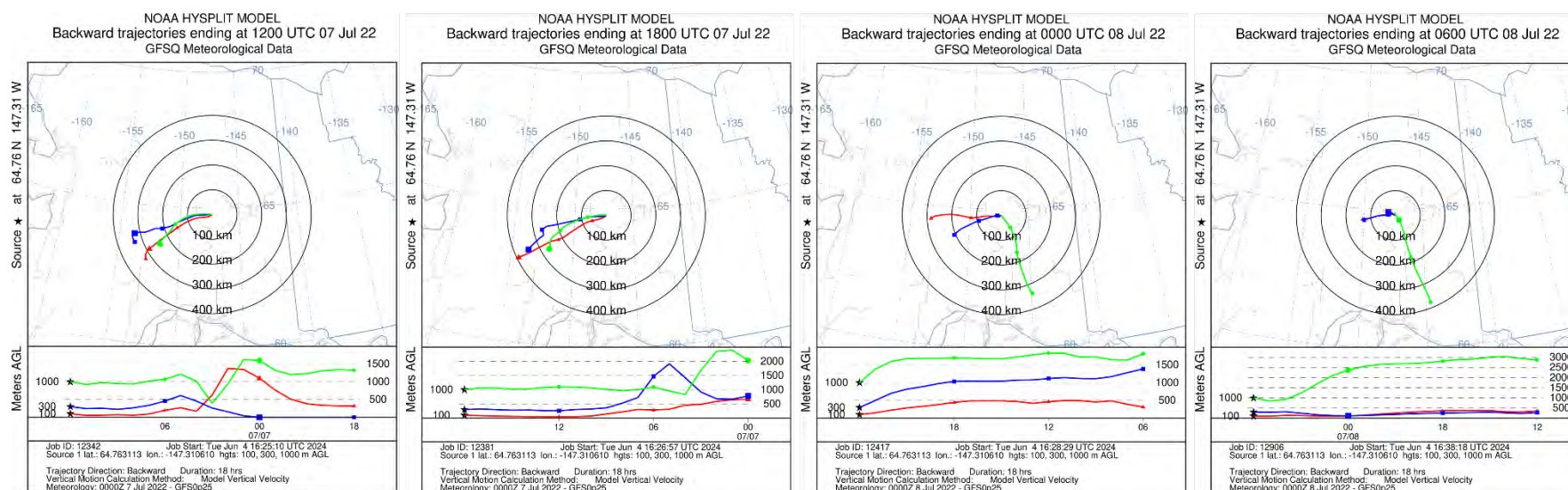


Figure 83: NOAA HYSPLIT model backward trajectories for July 7, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for July 7 to July 8, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, July 7, 2022):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the southwest, converging towards the target location.
- **Image 2 (18:00 UTC, July 7, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the west at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from the west.
- **Image 3 (00:00 UTC, July 8, 2022):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the south through west, with the 100m and 300m trajectories coming from the west and the 1000m trajectory coming from the south.
- **Image 4 (06:00 UTC, July 8, 2022):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels at 100m and 300m trajectories continuing from the west and the 1000m trajectory originating from the southeast, converging towards the target location.

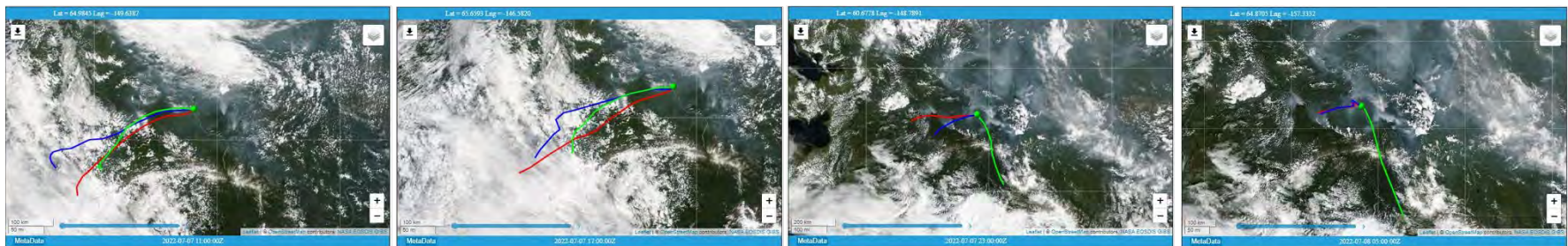


Figure 84: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for July 7 to July 8, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 2 (18:00 UTC, July 7, 2022): The 100m, 300m and 1000m air parcels' pathways again indicate movement from the southwest. Fires and smoke plumes are visible surrounding FNSB. **Smoke Transport:** MODIS imagery aligns with these trajectories, indicating smoke from all locations surrounding FNSB.

Table 36. Hourly surface observations for Fairbanks International Airport, July 7, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/07/2022 00:53 AKDT	10	250	**	7 (Smoke)	1	69	55
PAFA	07/07/2022 01:53 AKDT	9	270	**	7 (Smoke)	1	68	53
PAFA	07/07/2022 02:53 AKDT	7	200	**	7 (Smoke)	1	65	54
PAFA	07/07/2022 03:53 AKDT	5	210	**	7 (Smoke)	2	63	55
PAFA	07/07/2022 04:53 AKDT	6	200	**	7 (Smoke)	2	61	55
PAFA	07/07/2022 05:53 AKDT	3	190	**	7 (Smoke)	2	60	55
PAFA	07/07/2022 06:53 AKDT	0	0	**	7 (Smoke)	3	60	55
PAFA	07/07/2022 07:53 AKDT	0	0	**	7 (Smoke)	3	62	55
PAFA	07/07/2022 08:53 AKDT	6	70	**	7 (Smoke)	3	63	55
PAFA	07/07/2022 09:53 AKDT	6	90	**	7 (Smoke)	3	63	55
PAFA	07/07/2022 10:53 AKDT	5	100	**	7 (Smoke)	3	65	55
PAFA	07/07/2022 11:53 AKDT	3	**	**	7 (Smoke)	3	69	56
PAFA	07/07/2022 12:53 AKDT	0	0	**	7 (Smoke)	3	71	54
PAFA	07/07/2022 13:53 AKDT	3	**	**	7 (Smoke)	3	73	54
PAFA	07/07/2022 14:53 AKDT	0	0	**	7 (Smoke)	4	76	54
PAFA	07/07/2022 15:53 AKDT	0	0	**	7 (Smoke)	5	78	53
PAFA	07/07/2022 16:53 AKDT	5	200	**	7 (Smoke)	6	79	51
PAFA	07/07/2022 17:53 AKDT	5	170	**	7 (Smoke)	6	79	49
PAFA	07/07/2022 18:53 AKDT	5	150	**	7 (Smoke)	9	79	49
PAFA	07/07/2022 19:53 AKDT	3	130	**	7 (Smoke)	9	79	50
PAFA	07/07/2022 20:53 AKDT	5	250	**	7 (Smoke)	6	78	52
PAFA	07/07/2022 21:53 AKDT	5	230	**	7 (Smoke)	6	74	54
PAFA	07/07/2022 22:53 AKDT	8	270	**		10	73	50
PAFA	07/07/2022 23:53 AKDT	5	290	**		10	70	46

Surface observations: The surface observations from July 7, 2022, show hours of reduced visibility throughout the day. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - July 8, 2022

AICC Fire Report Summary:

- **New Fires:** 13 new fires reported.
- **Total Fires Statewide:** 241 fires burning.
- **Acres Burned:** 2,466,437 acres, with a 24-hour increase of 79,234 acres.

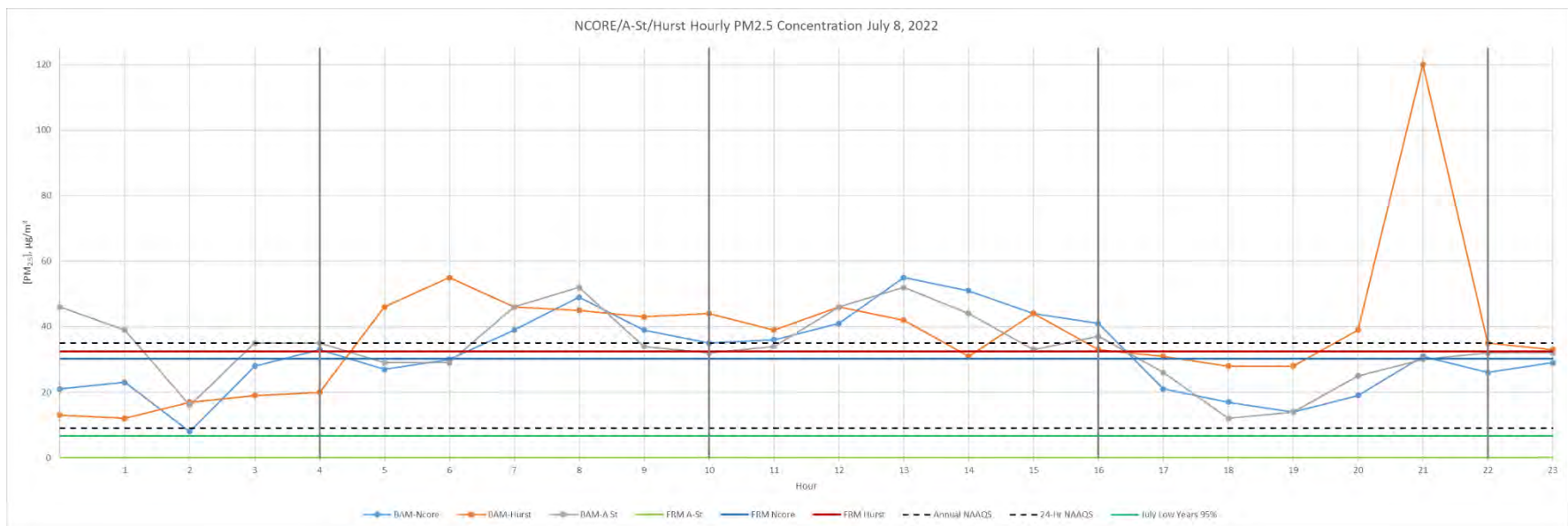


Figure 85: FNSB PM_{2.5} concentrations for July 8, 2022

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on July 8, 2022. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations are relatively low in the early morning hours, with all sites reporting values around 20 µg/m³ to 40 µg/m³. There is a slight dip around 3:00 AM.

Midday Levels: The PM_{2.5} concentrations show continuing variability during the midday hours, with levels fluctuating around 20 µg/m³ to 40 µg/m³.

Afternoon to Evening: The PM_{2.5} concentrations show a significant peak at 9:00 PM at the Hurst Road site, reaching approximately 120 µg/m³, while other sites remain stable around 20 µg/m³ to 40 µg/m³.

Overall Trend: The PM_{2.5} concentrations on July 8, 2022, show stable and relatively low levels throughout the day, except for a significant spike in the evening at the Hurst Road site. The overall trend indicates that air quality remained relatively good during the day but deteriorated sharply in the evening, with PM_{2.5} concentrations exceeding both the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) and the annual NAAQS limit (represented by the dashed black line at 9 µg/m³) during the spike.

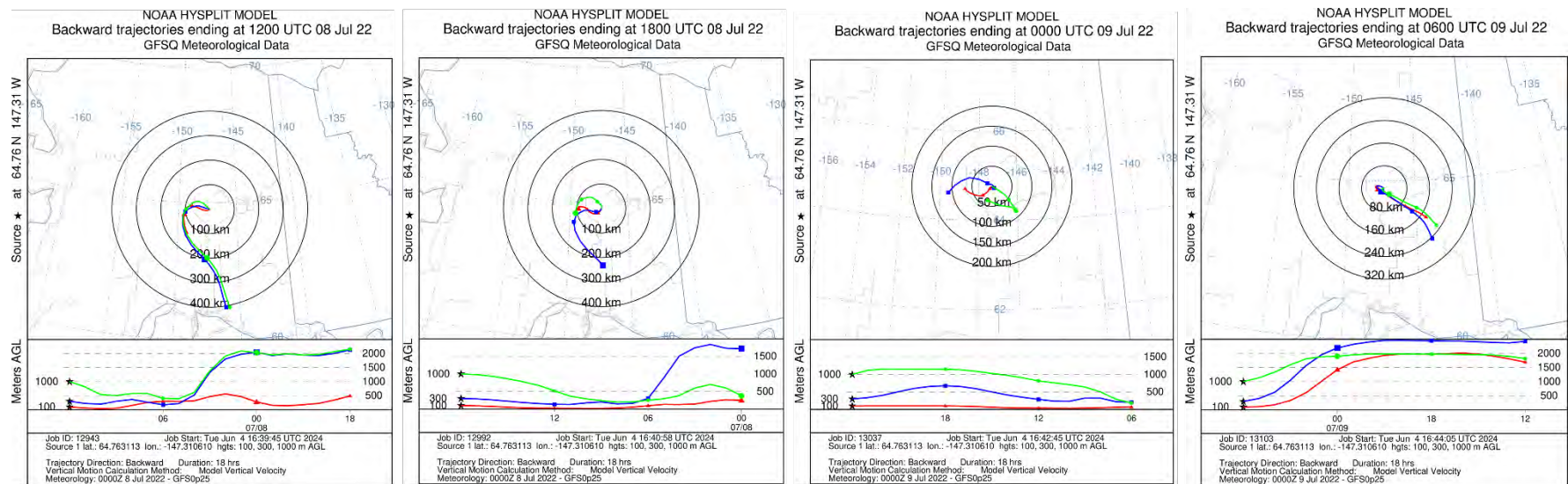


Figure 86: NOAA HYSPLIT model backward trajectories for July 8, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for July 8 to July 9, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, July 8, 2022):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the south, converging towards the target location.
- **Image 2 (18:00 UTC, July 8, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the south through west at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from a westerly component.
- **Image 3 (00:00 UTC, July 9, 2022):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the east through west, with the 100m and 300m trajectories coming from the west and the 1000m trajectory coming from the east.
- **Image 4 (06:00 UTC, July 9, 2022):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels at 100m, 300m and 1000m trajectories continuing from the southeast, converging towards the target location.

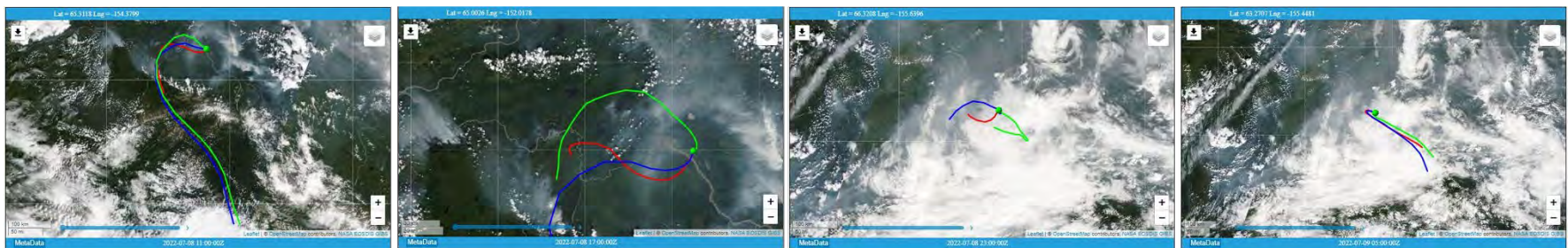


Figure 87: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for July 8 to July 9, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 2 (18:00 UTC, July 8, 2022): The 100m, 300m and 1000m air parcels' pathways again indicate movement from the west. Fires and smoke plumes are visible surrounding FNSB. **Smoke Transport:** MODIS imagery aligns with these trajectories, indicating smoke from all locations surrounding FNSB.

Table 37. Hourly surface observations for Fairbanks International Airport, July 8, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/08/2022 00:53 AKDT	3	220	**		10	67	48
PAFA	07/08/2022 01:53 AKDT	0	0	**		10	63	48
PAFA	07/08/2022 02:53 AKDT	5	240	**		10	61	51
PAFA	07/08/2022 03:53 AKDT	0	0	**		10	58	50
PAFA	07/08/2022 04:53 AKDT	5	80	**		10	58	48
PAFA	07/08/2022 05:53 AKDT	0	0	**		10	59	49
PAFA	07/08/2022 06:53 AKDT	6	60	**		10	60	51
PAFA	07/08/2022 07:53 AKDT	5	60	**	7 (Smoke)	7	62	51
PAFA	07/08/2022 08:53 AKDT	3	150	**	7 (Smoke)	6	64	51
PAFA	07/08/2022 09:53 AKDT	3	**	**	7 (Smoke)	5	67	51
PAFA	07/08/2022 10:53 AKDT	5	100	**	7 (Smoke)	5	70	52
PAFA	07/08/2022 11:53 AKDT	6	120	**	7 (Smoke)	5	72	52
PAFA	07/08/2022 12:53 AKDT	6	100	**	7 (Smoke)	5	73	53
PAFA	07/08/2022 13:53 AKDT	3	170	**	7 (Smoke)	5	75	55
PAFA	07/08/2022 14:53 AKDT	7	**	**	7 (Smoke)	5	78	52
PAFA	07/08/2022 15:53 AKDT	7	150	**	7 (Smoke)	4	80	51
PAFA	07/08/2022 16:53 AKDT	5	190	**	7 (Smoke)	6	82	47
PAFA	07/08/2022 17:53 AKDT	0	0	**	7 (Smoke)	6	82	43
PAFA	07/08/2022 18:53 AKDT	0	0	**	7 (Smoke)	6	83	42
PAFA	07/08/2022 19:53 AKDT	5	240	**	7 (Smoke)	9	83	49
PAFA	07/08/2022 20:53 AKDT	0	0	**	7 (Smoke)	8	81	48
PAFA	07/08/2022 21:53 AKDT	14	90	**	7 (Smoke)	9	76	49
PAFA	07/08/2022 22:53 AKDT	9	140	**	7 (Smoke)	4	74	50
PAFA	07/08/2022 23:53 AKDT	0	0	**	7 (Smoke)	9	72	50

Surface observations: The surface observations from July 8, 2022, show hours of reduced visibility throughout the day. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - July 9, 2022

AICC Fire Report Summary:

- **New Fires:** 8 new fires reported.
- **Total Fires Statewide:** 242 fires burning.
- **Acres Burned:** 2,387,203 acres, with a 24-hour increase of 89,322 acres.

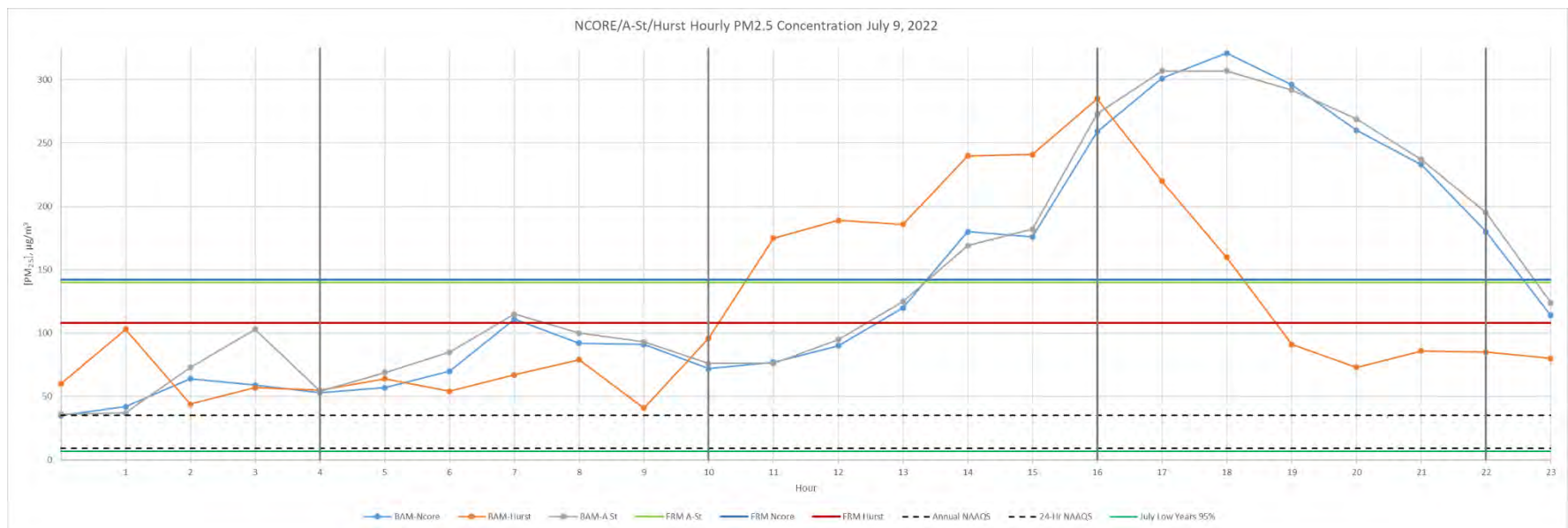


Figure 88: FNSB PM_{2.5} concentrations for July 9, 2022

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on July 9, 2022. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations are relatively low in the early morning hours compared to the rest of the day, with the NCore and Hurst Road sites reporting values around 100 µg/m³.

Midday Levels: The PM_{2.5} concentrations begin to rise during the midday hours, with levels fluctuating around 60 µg/m³ to 200 µg/m³.

Afternoon to Evening: The PM_{2.5} concentrations show a significant increase during the afternoon, peaking to just above 300 µg/m³ at the NCore and A St sites and 275 µg/m³ at the Hurst Road site around 5:00 PM. This increase is followed by a gradual decline in the evening hours.

Overall Trend: The PM_{2.5} concentrations on July 9, 2022, show a steady pattern in the early morning and midday hours, followed by a significant spike in the afternoon early evening. The late evening hours see a gradual decline in concentrations. Despite the fluctuations, the PM_{2.5} levels exceed the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) and the annual NAAQS limit (represented by the dashed black line at 9 µg/m³). This trend indicates periods of poor air quality, likely influenced by smoke transport or other sources of particulate matter.

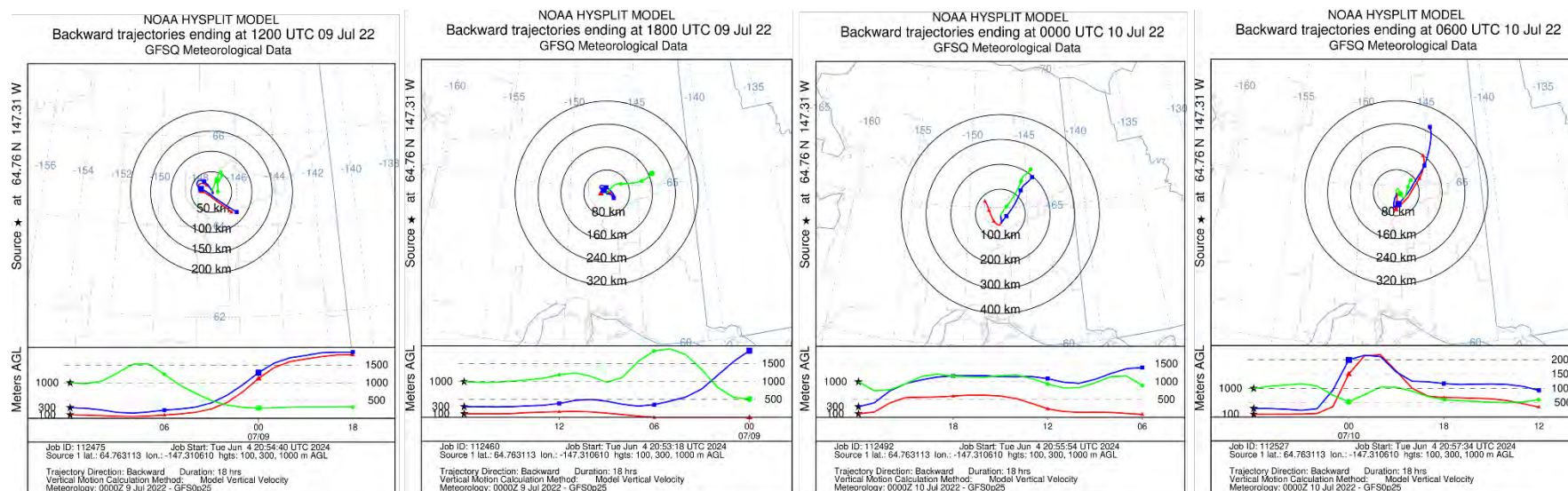


Figure 89: NOAA HYSPLIT model backward trajectories for July 9, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for July 9 to July 10, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, July 9, 2022):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the southeast, converging towards the target location.
- **Image 2 (18:00 UTC, July 9, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the east through south at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from an easterly component.
- **Image 3 (00:00 UTC, July 10, 2022):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the north, with the 100m and 300m trajectories coming from the west with the 1000m trajectory coming from the east.
- **Image 4 (06:00 UTC, July 10, 2022):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels at 100m, 300m and 1000m trajectories continuing from the northeast, converging towards the target location.

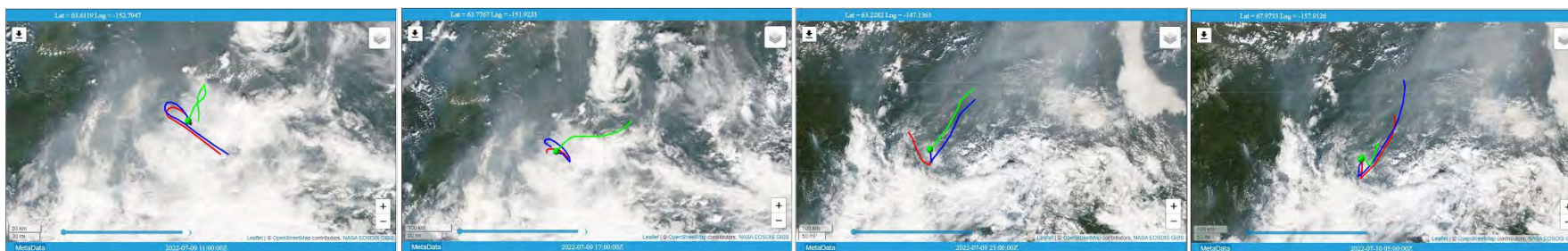


Figure 90: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for July 9 to July 10, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 2 (18:00 UTC, July 9, 2022): The 100m, 300m and 1000m air parcels' pathways again indicate movement from the east. Fires and smoke plumes are visible surrounding FNSB. **Smoke Transport:** MODIS imagery aligns with these trajectories, indicating smoke from all locations surrounding FNSB.

Table 38. Hourly surface observations for Fairbanks International Airport, July 9, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/09/2022 00:53 AKDT	7	80	**	7 (Smoke)	9	67	51
PAFA	07/09/2022 01:53 AKDT	7	30	**	7 (Smoke)	7	64	52
PAFA	07/09/2022 02:53 AKDT	0	0	**	7 (Smoke)	6	65	53
PAFA	07/09/2022 03:53 AKDT	0	0	**	7 (Smoke)	6	64	53
PAFA	07/09/2022 04:53 AKDT	0	0	**	7 (Smoke)	5	63	53
PAFA	07/09/2022 05:53 AKDT	6	50	**	7 (Smoke)	4	59	52
PAFA	07/09/2022 06:53 AKDT	0	0	**	7 (Smoke)	4	61	52
PAFA	07/09/2022 07:53 AKDT	5	70	**	7 (Smoke)	4	62	53
PAFA	07/09/2022 08:53 AKDT	3	**	**	7 (Smoke)	3	64	52
PAFA	07/09/2022 09:53 AKDT	3	120	**	7 (Smoke)	4	65	51
PAFA	07/09/2022 10:53 AKDT	5	240	**	7 (Smoke)	3	70	52
PAFA	07/09/2022 11:53 AKDT	9	120	**	7 (Smoke)	3	70	54
PAFA	07/09/2022 12:53 AKDT	5	180	**	7 (Smoke)	3	69	55
PAFA	07/09/2022 13:53 AKDT	0	0	**	7 (Smoke)	3	72	55
PAFA	07/09/2022 14:53 AKDT	0	0	**	7 (Smoke)	2	71	54
PAFA	07/09/2022 15:53 AKDT	0	0	**	7 (Smoke)	1	72	54
PAFA	07/09/2022 16:53 AKDT	5	170	**	7 (Smoke)	1	72	56
PAFA	07/09/2022 17:53 AKDT	0	0	**	7 (Smoke)	1	72	56
PAFA	07/09/2022 18:53 AKDT	3	180	**	7 (Smoke)	1	72	56
PAFA	07/09/2022 19:53 AKDT	5	120	**	7 (Smoke)	1	72	57
PAFA	07/09/2022 20:53 AKDT	6	210	**	7 (Smoke)	1	69	58
PAFA	07/09/2022 21:53 AKDT	3	140	**	7 (Smoke)	1	68	59
PAFA	07/09/2022 22:53 AKDT	0	0	**	7 (Smoke)	1	66	59
PAFA	07/09/2022 23:53 AKDT	7	80	**	7 (Smoke)	1	66	57

Surface observations: The surface observations from July 9, 2022, show hours of reduced visibility throughout the day. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - July 10, 2022

AICC Fire Report Summary:

- **New Fires:** 4 new fires reported.
- **Total Fires Statewide:** 242 fires burning.
- **Acres Burned:** 2,491,349 acres, with a 24-hour increase of 104,146 acres.

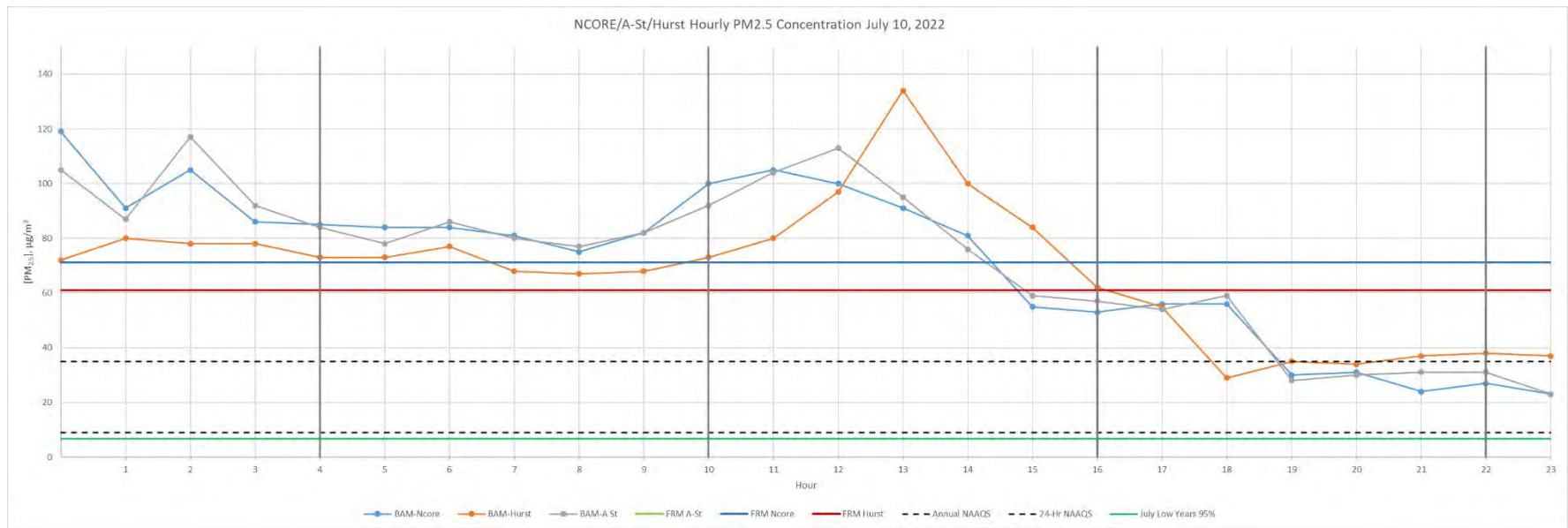


Figure 91: FNSB PM_{2.5} concentrations for July 10, 2022

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on July 10, 2022. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations are relatively low in the early morning hours, with the NCore and A-Street sites reporting values around 100 µg/m³. These levels remain steady until about 9:00 AM.

Midday Levels: The PM_{2.5} concentrations begin to rise during the midday hours, with levels fluctuating around 60 µg/m³ to 100 µg/m³ for all sites

Afternoon to Evening: The PM_{2.5} concentrations show a significant spike around 1:00 PM, peaking at approximately 100 µg/m³ to 110 µg/m³ at the BAM-A-Street and BAM-NCore sites, and just over 130 µg/m³ at the BAM-Hurst Road site. This spike is followed by a gradual decline in the afternoon and evening hours, with levels dropping to around 40 µg/m³.

Overall Trend: The PM_{2.5} concentrations on July 10, 2022, show a steady pattern in the early morning hours, followed by variability during the midday and a significant spike in the early afternoon. The overall trend indicates periods of elevated PM_{2.5} levels, with the highest concentrations exceeding the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) and the annual NAAQS limit (represented by the dashed black line at 9 µg/m³). This trend suggests potential influences from smoke transport or other sources of particulate matter affecting air quality throughout the day.

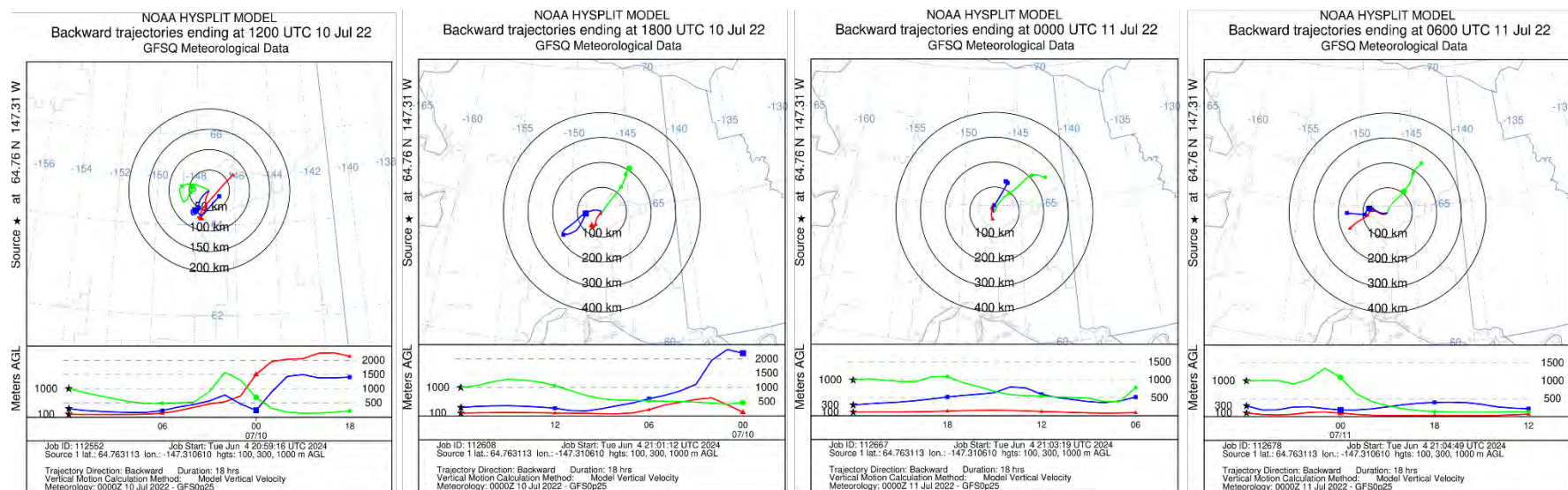


Figure 92: NOAA HYSPLIT model backward trajectories for July 10, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for July 10 to July 11, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, July 10, 2022):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from multiple directions surrounding FNSB, converging towards the target location.
- **Image 2 (18:00 UTC, July 10, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the north at the 1000m, with the 100m and 300m trajectories originating from the southwest.
- **Image 3 (00:00 UTC, July 11, 2022):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the northeast, with the 300m and 1000m trajectories coming from the northeast and the 100m trajectory coming from the south.
- **Image 4 (06:00 UTC, July 11, 2022):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels at 100m and 300m trajectories coming from the west and the 1000m trajectory coming from the northeast, converging towards the target location.

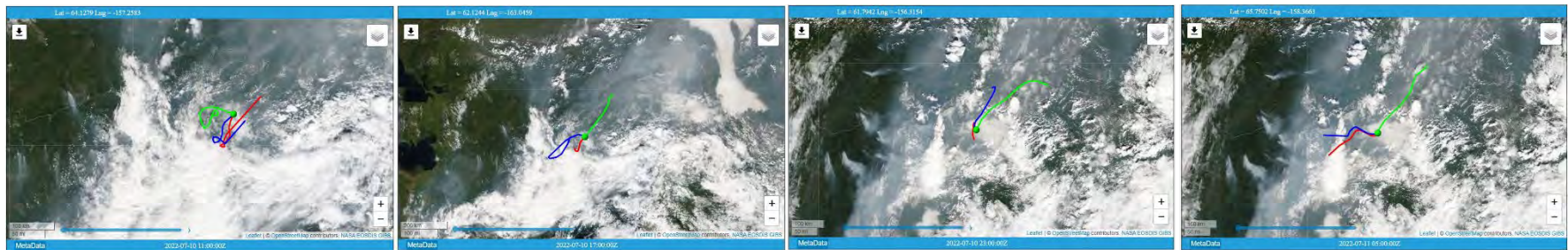


Figure 93: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for July 10 to July 11, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 2 (18:00 UTC, July 10, 2022): The 100m, 300m and 1000m air parcels' pathways again indicate movement from all regions surrounding FNSB. Fires and smoke plumes are visible in the image. **Smoke Transport:** MODIS imagery aligns with these trajectories, indicating smoke from all locations surrounding FNSB.

Table 39. Hourly surface observations for Fairbanks International Airport, July 10, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/10/2022 00:53 AKDT	0	0	**	7 (Smoke)	2	66	58
PAFA	07/10/2022 01:53 AKDT	3	120	**	7 (Smoke)	2	64	60
PAFA	07/10/2022 02:53 AKDT	0	0	**	7 (Smoke)	2	63	60
PAFA	07/10/2022 03:53 AKDT	3	130	**	7 (Smoke)	2	62	59
PAFA	07/10/2022 04:53 AKDT	0	0	**	7 (Smoke)	2	61	58
PAFA	07/10/2022 05:53 AKDT	0	0	**	7 (Smoke)	2	61	58
PAFA	07/10/2022 06:53 AKDT	7	80	**	7 (Smoke)	2	62	58
PAFA	07/10/2022 07:53 AKDT	0	0	**	7 (Smoke)	2	62	58
PAFA	07/10/2022 08:53 AKDT	3	30	**	7 (Smoke)	2	63	59
PAFA	07/10/2022 09:53 AKDT	0	0	**	7 (Smoke)	2	63	59
PAFA	07/10/2022 10:53 AKDT	5	200	**	7 (Smoke)	2	64	59
PAFA	07/10/2022 11:53 AKDT	3	**	**	7 (Smoke)	2	67	59
PAFA	07/10/2022 12:53 AKDT	0	0	**	7 (Smoke)	3	67	58
PAFA	07/10/2022 13:53 AKDT	3	**	**	7 (Smoke)	3	71	59
PAFA	07/10/2022 14:53 AKDT	5	**	**	7 (Smoke)	3	72	61
PAFA	07/10/2022 15:53 AKDT	6	230	**	7 (Smoke)	3	74	60
PAFA	07/10/2022 16:53 AKDT	6	230	**	7 (Smoke)	5	76	60
PAFA	07/10/2022 17:53 AKDT	3	220	**	7 (Smoke)	5	74	59
PAFA	07/10/2022 18:53 AKDT	7	300	**	7 (Smoke)	5	76	61
PAFA	07/10/2022 19:53 AKDT	16	160	24	7 (Smoke)	5	69	59
PAFA	07/10/2022 20:53 AKDT	0	0	**	7 (Smoke)	6	67	59
PAFA	07/10/2022 21:53 AKDT	9	260	**	7 (Smoke)	6	65	58
PAFA	07/10/2022 22:53 AKDT	6	110	**	7 (Smoke)	6	65	57
PAFA	07/10/2022 23:53 AKDT	3	170	**	7 (Smoke)	8	61	55

Surface observations: The surface observations from July 10, 2022, show hours of reduced visibility throughout the day. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - July 11, 2022

AICC Fire Report Summary:

- **New Fires:** 15 new fires reported.
- **Total Fires Statewide:** 250 fires burning.
- **Acres Burned:** 2,661,982 acres, with a 24-hour increase of 170,633 acres.

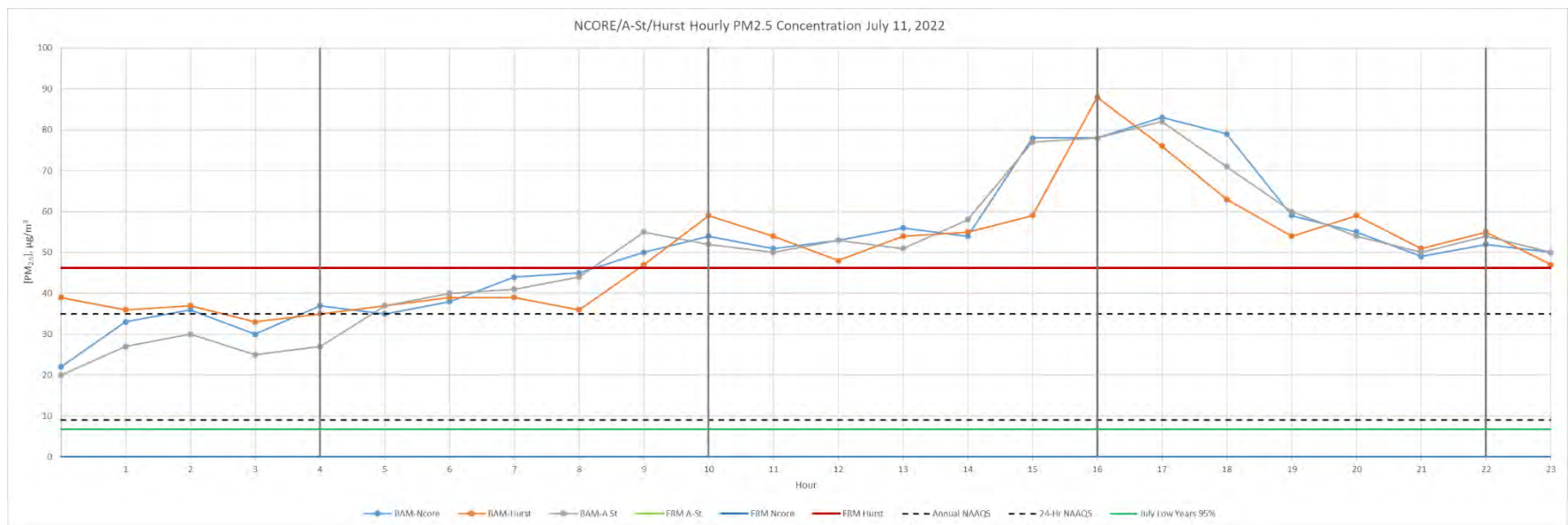


Figure 94: FNSB PM_{2.5} concentrations for July 11, 2022

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on July 11, 2022. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations start relatively low in the early morning hours, with values around 20 µg/m³ to 40 µg/m³. These levels remain steady until about 5:00 AM.

Midday Levels: The PM_{2.5} concentrations show some variability during the midday hours, with levels fluctuating around 40 µg/m³ to 50 µg/m³ at all sites.

Afternoon to Evening: The PM_{2.5} concentrations show a gradual increase during the afternoon and early evening, with levels peaking around 70 µg/m³ to 80 µg/m³ at 4:00 PM. Thereafter, the levels show a decline but remain elevated compared to the early morning.

Overall Trend: The PM_{2.5} concentrations on July 11, 2022, show a relatively steady pattern in the early morning and midday hours, followed by a significant increase in the afternoon. The levels remain above the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) and exceed the annual NAAQS limit (represented by the dashed black line at 9 µg/m³) throughout the day. This pattern indicates a persistent influence of particulate matter, potentially from smoke transport or other sources.

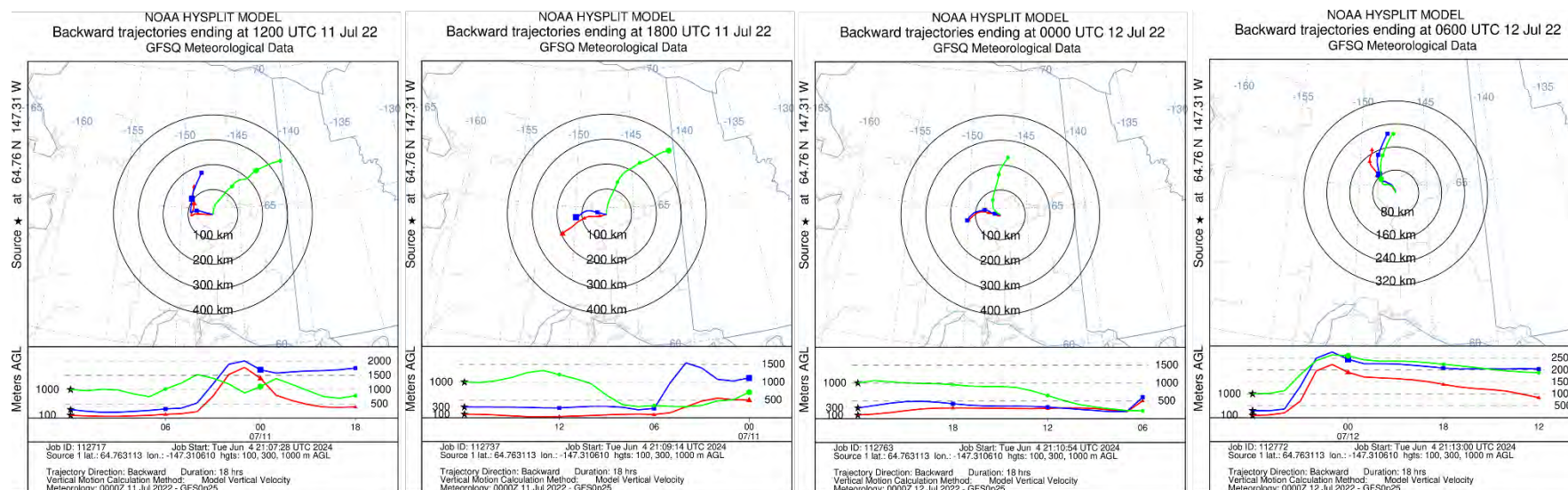


Figure 95: NOAA HYSPLIT model backward trajectories for July 11, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for July 11 to July 12, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, July 11, 2022):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the north and northwest, converging towards the target location.
- **Image 2 (18:00 UTC, July 11, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the north at the 1000m, with the 100m and 300m trajectories originating from the west-southwest.
- **Image 3 (00:00 UTC, July 12, 2022):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the northeast, with the 100m and 300m trajectories coming from the west and the 1000m trajectory coming from the north.
- **Image 4 (06:00 UTC, July 12, 2022):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels at 100m, 300m, and 1000m trajectories coming from the northwest converging towards the target location.

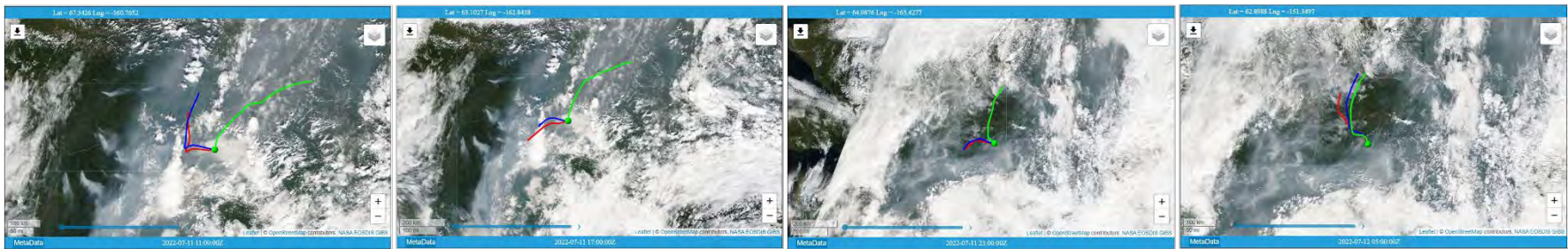


Figure 96: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for July 11 to July 12, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 2 (18:00 UTC, July 11, 2022): The 100m, 300m and 1000m air parcels' pathways again indicate movement from all regions surrounding FNSB. Fires and smoke plumes are visible in the image. **Smoke Transport:** MODIS imagery aligns with these trajectories, indicating smoke from all locations surrounding FNSB.

Table 40. Hourly surface observations for Fairbanks International Airport, July 11, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/11/2022 00:53 AKDT	0	0	**	7 (Smoke)	9	59	55
PAFA	07/11/2022 01:53 AKDT	0	0	**	7 (Smoke)	6	58	55
PAFA	07/11/2022 02:53 AKDT	0	0	**	7 (Smoke)	5	56	54
PAFA	07/11/2022 03:53 AKDT	0	0	**	7 (Smoke)	4	57	54
PAFA	07/11/2022 04:53 AKDT	5	140	**	7 (Smoke)	2	56	54
PAFA	07/11/2022 05:53 AKDT	0	0	**	7 (Smoke)	1	57	56
PAFA	07/11/2022 06:53 AKDT	5	10	**	7 (Smoke)	1	59	57
PAFA	07/11/2022 07:53 AKDT	0	0	**	7 (Smoke)	1	59	57
PAFA	07/11/2022 08:53 AKDT	0	0	**	7 (Smoke)	2	60	57
PAFA	07/11/2022 09:53 AKDT	0	0	**	7 (Smoke)	2	61	57
PAFA	07/11/2022 10:53 AKDT	0	0	**	7 (Smoke)	2	61	57
PAFA	07/11/2022 11:53 AKDT	5	190	**	7 (Smoke)	2	61	57
PAFA	07/11/2022 12:53 AKDT	0	0	**	7 (Smoke)	2	65	58
PAFA	07/11/2022 13:53 AKDT	3	30	**	7 (Smoke)	3	68	59
PAFA	07/11/2022 14:53 AKDT	3	**	**	7 (Smoke)	3	72	61
PAFA	07/11/2022 15:53 AKDT	6	80	**	7 (Smoke)	3	74	62
PAFA	07/11/2022 16:53 AKDT	10	240	**	7 (Smoke)	3	77	58
PAFA	07/11/2022 17:53 AKDT	8	240	**	7 (Smoke)	3	76	58
PAFA	07/11/2022 18:53 AKDT	8	250	**	7 (Smoke)	3	76	58
PAFA	07/11/2022 19:53 AKDT	6	230	**	7 (Smoke)	3	74	59
PAFA	07/11/2022 20:53 AKDT	5	220	**	7 (Smoke)	3	72	58
PAFA	07/11/2022 21:53 AKDT	3	**	**	7 (Smoke)	3	72	58
PAFA	07/11/2022 22:53 AKDT	7	90	**	7 (Smoke)	3	68	62
PAFA	07/11/2022 23:53 AKDT	0	0	**	7 (Smoke)	3	66	61

Surface observations: The surface observations from July 11, 2022, show hours of reduced visibility throughout the day. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - July 12, 2022

AICC Fire Report Summary:

- **New Fires:** 11 new fires reported.
- **Total Fires Statewide:** 255 fires burning.
- **Acres Burned:** 2,736,839 acres, with a 24-hour increase of 74,857 acres.

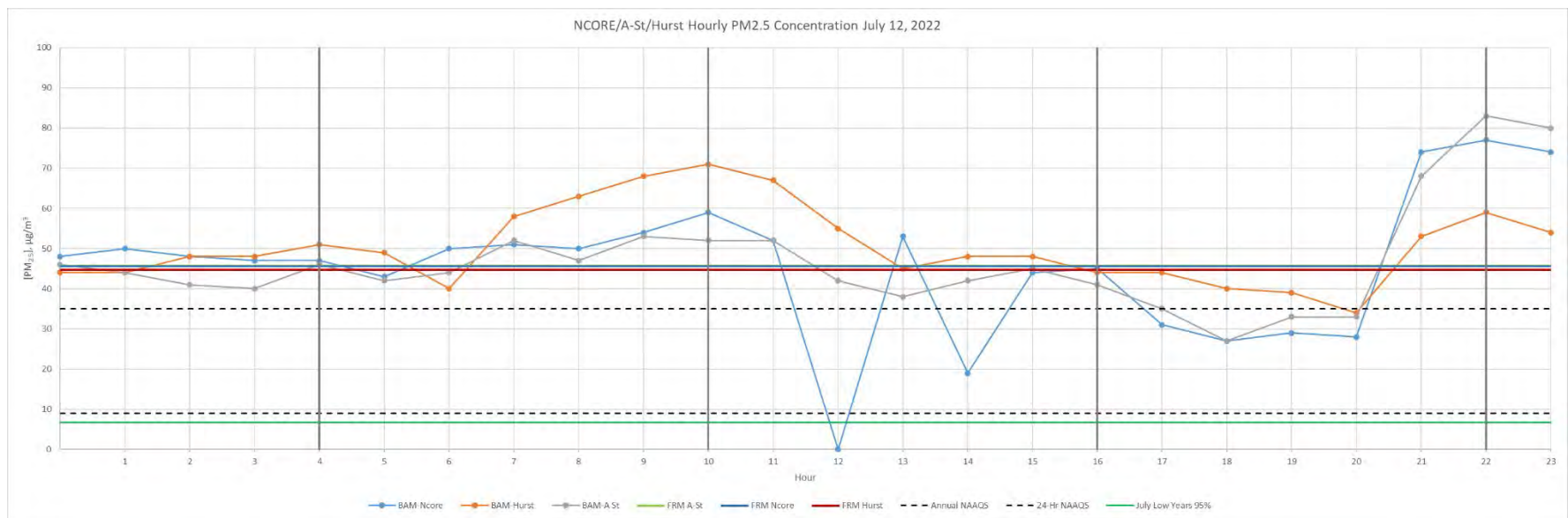


Figure 97: FNSB PM_{2.5} concentrations for July 12, 2022

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on July 12, 2022. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations are relatively steady in the early morning hours, with values around 40 to 50 µg/m³ across the monitoring sites. The levels remain stable until approximately 6:00 AM.

Midday Levels: The PM_{2.5} concentrations show slight variability during the midday hours, fluctuating around 40 to 60 µg/m³. The Hurst Road site shows higher concentrations compared to the other sites, reaching up to 70 µg/m³ around 10:00 AM.

Afternoon to Evening: The PM_{2.5} concentrations exhibit a decline during the afternoon, with levels dropping to around 40 µg/m³. However, a significant increase is observed starting at 8:00 PM, with concentrations peaking at approximately 80 µg/m³ at the A-Street site and 70 µg/m³ at the NCore site.

Overall Trend: The PM_{2.5} concentrations on July 12, 2022, remain relatively stable in the early morning and midday hours, with a notable increase in the evening. Despite the fluctuations, the PM_{2.5} levels generally exceed the annual NAAQS limit (represented by the dashed black line at 9 µg/m³) and approach or exceed the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) during certain periods of the day. This pattern indicates a consistent presence of particulate matter, likely influenced by smoke transport or other pollution sources.

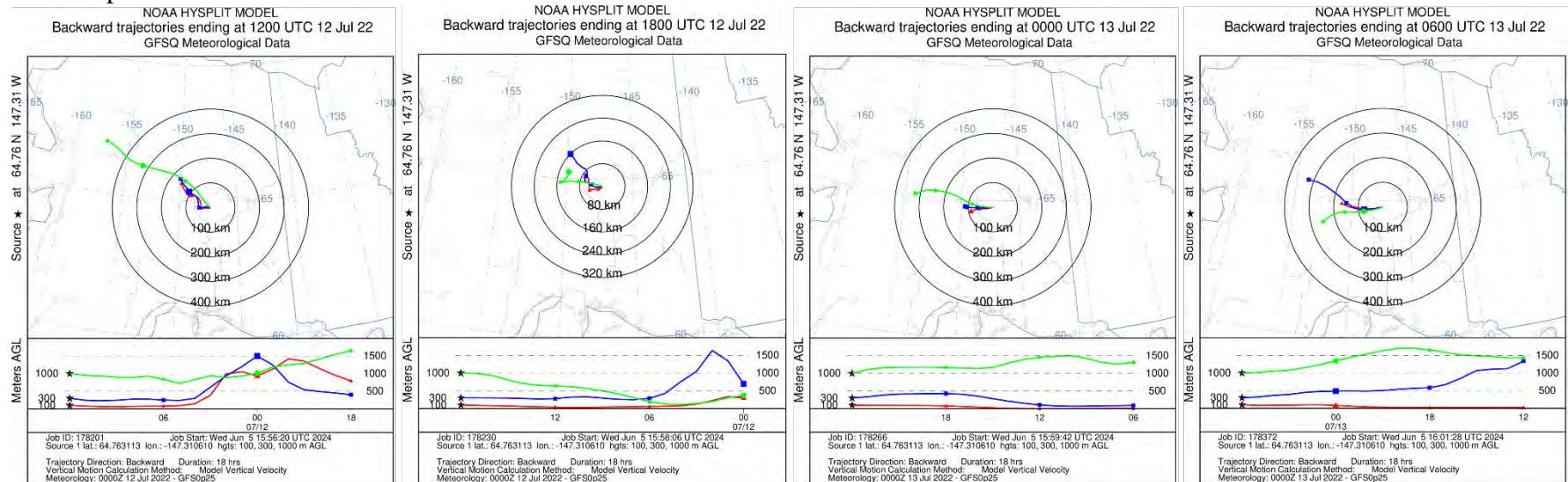


Figure 98: NOAA HYSPLIT model backward trajectories for July 12, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for July 12 to July 13, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, July 12, 2022):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the north and northwest, converging towards the target location.
- **Image 2 (18:00 UTC, July 12, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the northwest at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from a northwesterly component.
- **Image 3 (00:00 UTC, July 13, 2022):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the west, with the 100m, 300m, and 1000m trajectories all coming from the same direction.
- **Image 4 (06:00 UTC, July 13, 2022):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels at 100m, 300m, and 1000m trajectories coming from the west converging towards the target location.



Figure 99: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for July 12 to July 13, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 2 (18:00 UTC, July 12, 2022): The 100m, 300m and 1000m air parcels' pathways again indicate movement from the west. Fires and smoke plumes are visible in the image over FNSB. **Smoke Transport:** MODIS imagery aligns with these trajectories, indicating smoke from all locations surrounding FNSB.

Table 41. Hourly surface observations for Fairbanks International Airport, July 12, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/12/2022 00:53 AKDT	3	70	**	7 (Smoke)	3	64	60
PAFA	07/12/2022 01:53 AKDT	3	350	**	7 (Smoke)	3	63	60
PAFA	07/12/2022 02:53 AKDT	0	0	**	7 (Smoke)	2	63	61
PAFA	07/12/2022 03:53 AKDT	5	140	**	7 (Smoke)	2	61	59
PAFA	07/12/2022 04:53 AKDT	3	30	**	7 (Smoke)	2	61	59
PAFA	07/12/2022 05:53 AKDT	5	50	**	7 (Smoke)	2	60	58
PAFA	07/12/2022 06:53 AKDT	5	60	**	7 (Smoke)	2	61	59
PAFA	07/12/2022 07:53 AKDT	0	0	**	7 (Smoke)	2	62	59
PAFA	07/12/2022 08:53 AKDT	0	0	**	7 (Smoke)	2	63	59
PAFA	07/12/2022 09:53 AKDT	0	0	**	7 (Smoke)	2	63	59
PAFA	07/12/2022 10:53 AKDT	3	**	**	7 (Smoke)	3	65	60
PAFA	07/12/2022 11:53 AKDT	3	**	**	7 (Smoke)	4	69	59
PAFA	07/12/2022 12:53 AKDT	3	**	**	7 (Smoke)	6	71	57
PAFA	07/12/2022 13:53 AKDT	7	200	**	7 (Smoke)	7	72	54
PAFA	07/12/2022 14:53 AKDT	6	170	**	7 (Smoke)	7	74	54
PAFA	07/12/2022 15:53 AKDT	5	**	**	7 (Smoke)	7	77	55
PAFA	07/12/2022 16:53 AKDT	6	210	**	7 (Smoke)	7	78	48
PAFA	07/12/2022 17:53 AKDT	3	**	**	7 (Smoke)	7	80	47
PAFA	07/12/2022 18:53 AKDT	6	180	**	7 (Smoke)	7	79	48
PAFA	07/12/2022 19:53 AKDT	7	180	**	7 (Smoke)	7	78	49
PAFA	07/12/2022 20:53 AKDT	6	210	**	7 (Smoke)	9	76	49
PAFA	07/12/2022 21:53 AKDT	6	210	**	7 (Smoke)	6	72	51
PAFA	07/12/2022 22:53 AKDT	5	220	**	7 (Smoke)	3	70	54
PAFA	07/12/2022 23:53 AKDT	0	0	**	7 (Smoke)	4	68	53

Surface observations: The surface observations from July 12, 2022, show hours of reduced visibility throughout the day. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - July 13, 2022

AICC Fire Report Summary:

- **New Fires:** 10 new fires reported.
- **Total Fires Statewide:** 264 fires burning.
- **Acres Burned:** 2,831,766 acres, with a 24-hour increase of 94,927 acres.

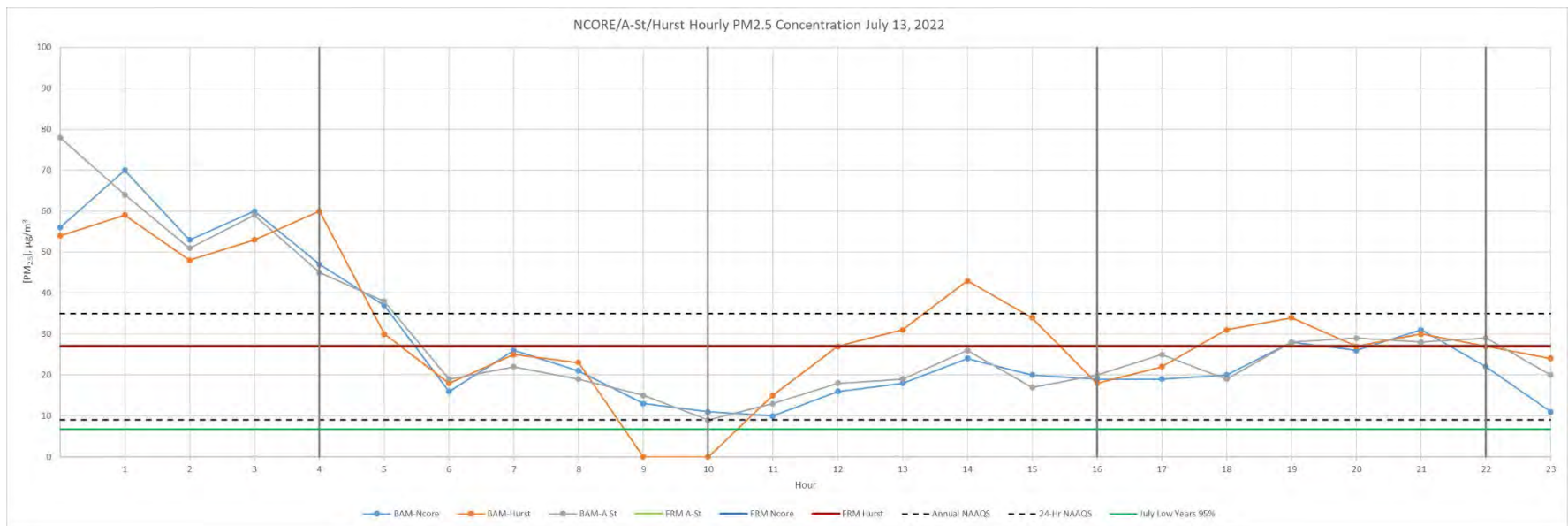


Figure 100: FNSB PM_{2.5} concentrations for July 13, 2022

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on July 13, 2022. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations start high, with values around 70 µg/m³ at the A-Street site and 60 µg/m³ at the NCore site. These levels show a gradual decline as the morning progresses.

Midday Levels: During the midday hours, the PM_{2.5} concentrations fluctuate between 30 and 50 µg/m³ across all monitoring sites. Notably, the BAM-Hurst Road site records a peak around 60 µg/m³ in the early afternoon.

Afternoon to Evening: The concentrations continue to vary, with a slight increase observed at the Hurst Road site in the late afternoon, reaching up to 50 µg/m³. By the late evening, PM_{2.5} levels drop significantly, falling below the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³).

Overall Trend: The PM_{2.5} concentrations on July 13, 2022, indicate a pattern of high levels in the early morning, fluctuating midday levels, and a notable decrease by the evening. While concentrations generally stayed below critical thresholds, occasional spikes highlight the intermittent influence of smoke and other particulate sources. The day concluded with PM_{2.5} levels well within acceptable limits, indicating improved air quality in the later hours.

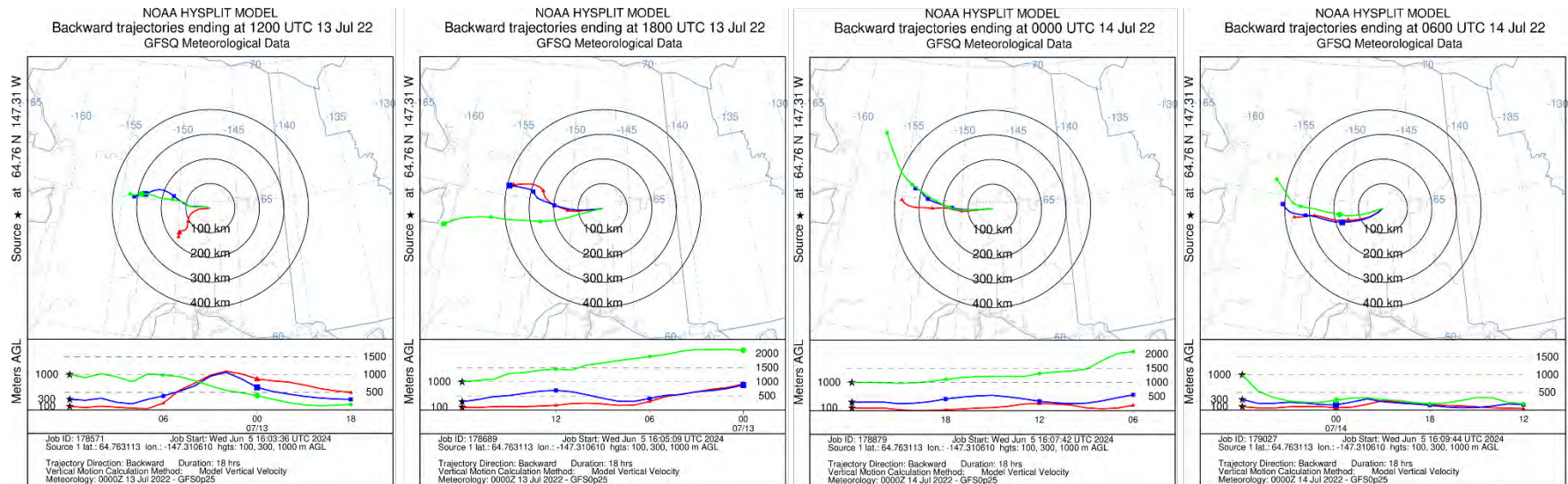


Figure 101: NOAA HYSPLIT model backward trajectories for July 13, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for July 13 to July 14, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, July 13, 2022):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the west, converging towards the target location.
- **Image 2 (18:00 UTC, July 13, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the west at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from a westerly component.
- **Image 3 (00:00 UTC, July 14, 2022):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the west, with the 100m, 300m, and 1000m trajectories all coming from these directions.
- **Image 4 (06:00 UTC, July 14, 2022):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels at 100m coming from the northwest, and the 300m and 1000m trajectories originating from the west.

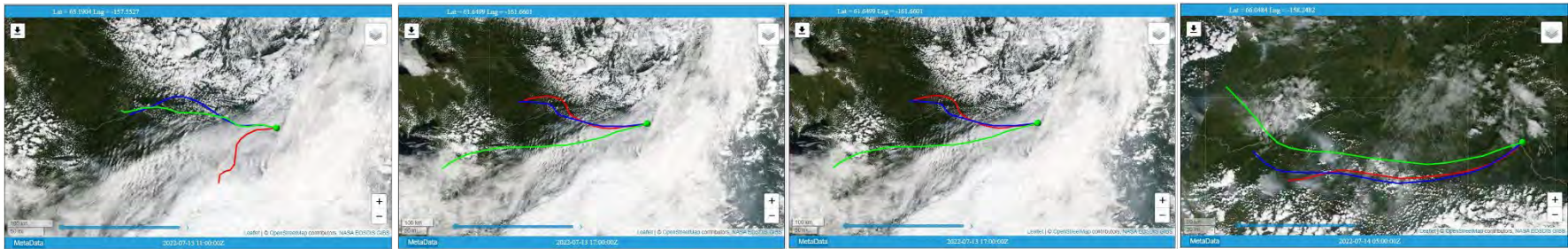


Figure 102: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for July 13 to July 14, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 2 (18:00 UTC, July 13, 2022): The 100m, 300m and 1000m air parcels' pathways again indicate movement from the west. Weak frontal system is moving through the region cleaning out the smoke. **Smoke Transport:** MODIS imagery aligns with these trajectories, indicating over target area with cleaner air to the west.

Table 42. Hourly surface observations for Fairbanks International Airport, July 13, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	07/13/2022 00:53 AKDT	0	0	**	7 (Smoke)	4	66	53
PAFA	07/13/2022 01:53 AKDT	0	0	**	7 (Smoke)	4	64	53
PAFA	07/13/2022 02:53 AKDT	5	**	**	7 (Smoke)	5	66	51
PAFA	07/13/2022 03:53 AKDT	6	280	**	7 (Smoke)	4	65	51
PAFA	07/13/2022 04:53 AKDT	7	340	**	7 (Smoke)	5	63	51
PAFA	07/13/2022 05:53 AKDT	5	210	**	7 (Smoke)	2	58	54
PAFA	07/13/2022 06:53 AKDT	6	220	**	7 (Smoke)	5	57	53
PAFA	07/13/2022 07:53 AKDT	7	280	**	7 (Smoke)	8	57	52
PAFA	07/13/2022 08:53 AKDT	8	240	**	**	10	57	51
PAFA	07/13/2022 09:53 AKDT	7	200	**	**	10	57	50
PAFA	07/13/2022 10:53 AKDT	8	240	**	**	10	57	49
PAFA	07/13/2022 11:53 AKDT	6	250	**	**	10	58	49
PAFA	07/13/2022 12:53 AKDT	8	220	**	**	10	61	48
PAFA	07/13/2022 13:53 AKDT	6	**	**	**	10	61	48
PAFA	07/13/2022 14:53 AKDT	12	240	**	**	10	63	47
PAFA	07/13/2022 15:53 AKDT	12	250	**	**	10	64	47
PAFA	07/13/2022 16:53 AKDT	10	270	**	**	10	65	46
PAFA	07/13/2022 17:53 AKDT	10	250	**	**	10	64	45
PAFA	07/13/2022 18:53 AKDT	12	250	**	**	10	64	46
PAFA	07/13/2022 19:53 AKDT	7	230	**	**	10	64	46
PAFA	07/13/2022 20:53 AKDT	5	250	**	**	10	63	47
PAFA	07/13/2022 21:53 AKDT	7	240	**	**	10	63	47
PAFA	07/13/2022 22:53 AKDT	5	250	**	**	10	61	49
PAFA	07/13/2022 23:53 AKDT	0	0	**	**	10	58	49

Surface observations: The surface observations from July 13, 2022, show morning hours of reduced visibility, improving drastically as the frontal system cleans out FNSB. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - July 15, 2022

AICC Fire Report Summary:

- **New Fires:** 3 new fires reported.
- **Total Fires Statewide:** 266 fires burning.
- **Acres Burned:** 2,920,361 acres, with a 24-hour increase of 35,725 acres.

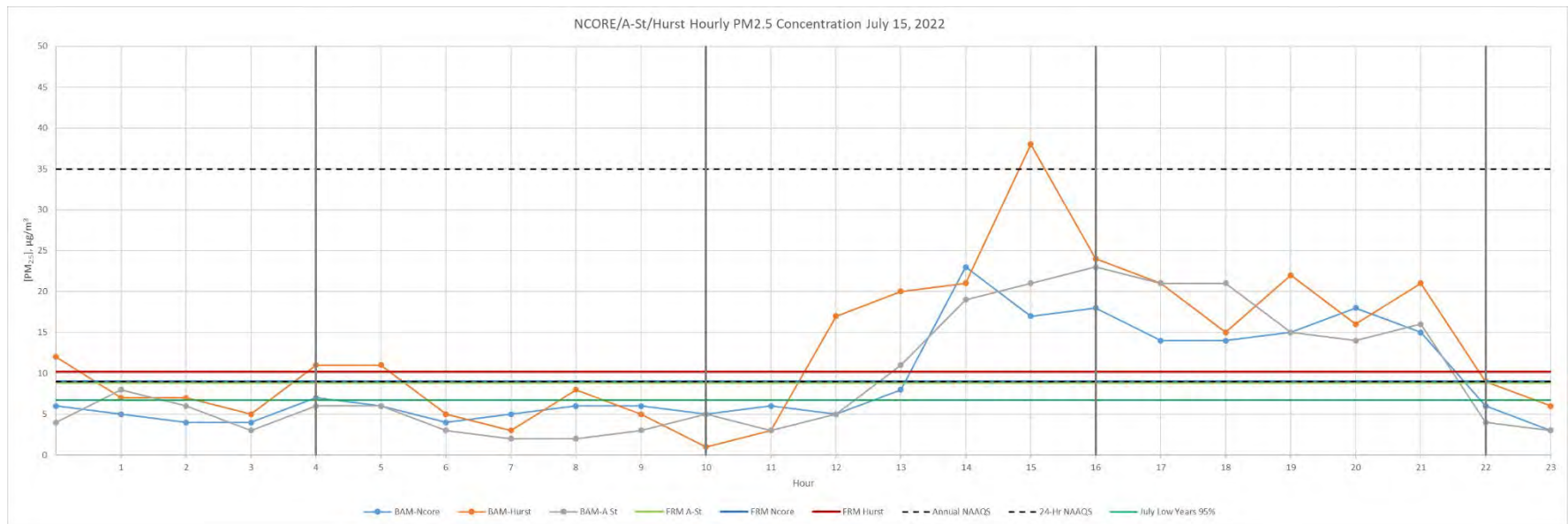


Figure 103: FNSB PM_{2.5} concentrations for July 15, 2022

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on July 15, 2022. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations are relatively low in the early morning hours, with the Hurst Road site showing values around 10 µg/m³, and the other sites reporting even lower levels.

Midday Levels: The concentrations remain low through the midday, fluctuating slightly but staying below the 24-hour NAAQS limit of 35 µg/m³.

Afternoon to Evening: There is a notable increase in the late afternoon around 15:00, where the Hurst Road site records a spike to approximately 40 µg/m³. This spike suggests a temporary deterioration in air quality, due to localized smoke influx.

Overall Trend: Throughout the day, the PM_{2.5} levels mostly remain below the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) and the annual NAAQS limit (represented by the dashed black line at 9 µg/m³). The short-term spike in the late afternoon highlights the variability in air quality that can occur due to transient smoke plumes.

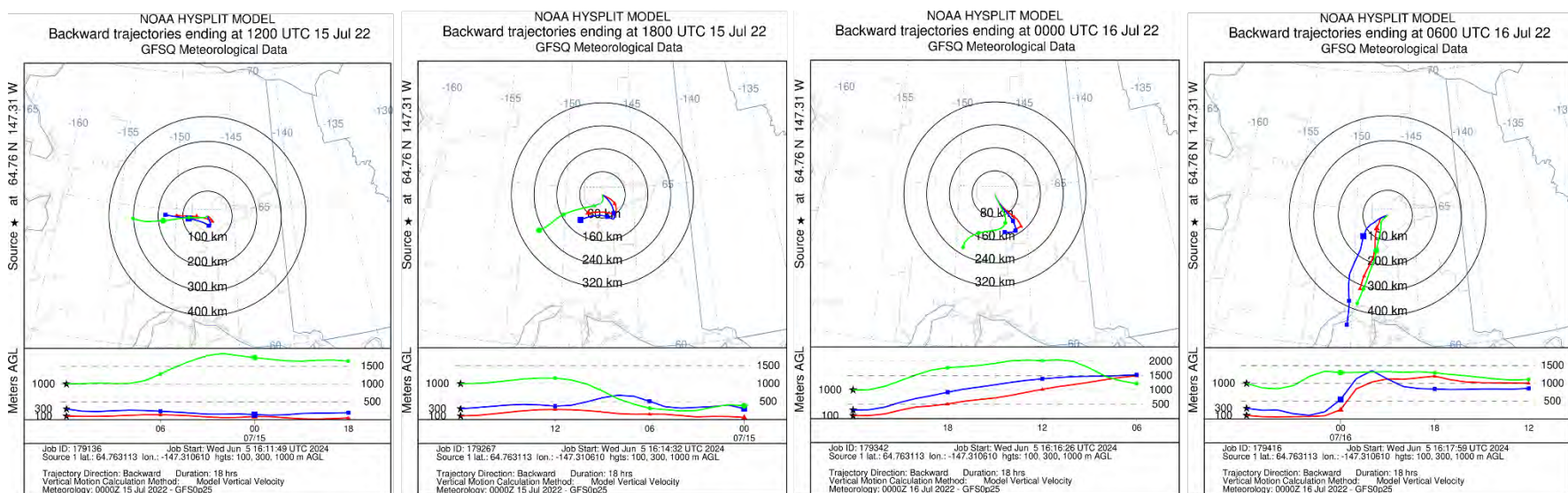


Figure 104: NOAA HYSPLIT model backward trajectories for July 15, 2022. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for July 15 to July 16, 2022. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, July 15, 2022):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the west and converged towards the target location.
- **Image 2 (18:00 UTC, July 15, 2022):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the west at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from a southwesterly component.
- **Image 3 (00:00 UTC, July 16, 2022):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the south, with the 100m, 300m, and 1000m trajectories all coming from these directions.
- **Image 4 (06:00 UTC, July 16, 2022):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show all air parcels at 100m, 300m, and 1000m coming from the south.

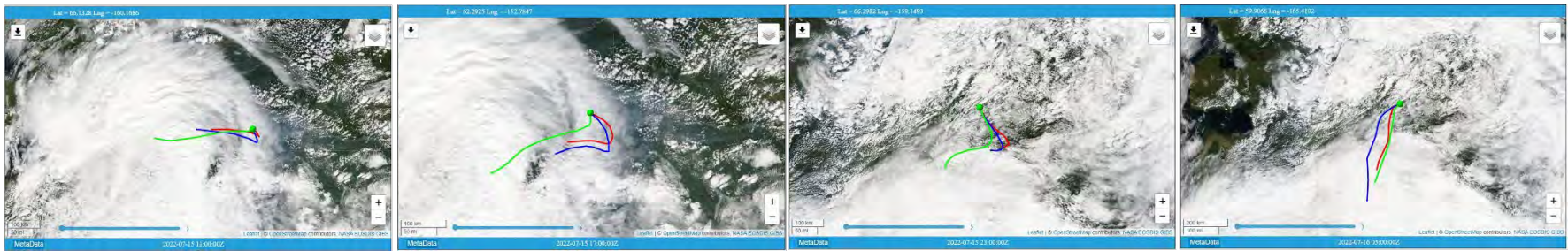


Figure 105: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for July 15 to July 16, 2022. These images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

Image 2 (18:00 UTC, July 15, 2022): The 100m, 300m, and 1000m air parcels' pathways again indicate movement from the southwest. Thin smoke plumes are visible in the Modis imagery. **Smoke Transport:** MODIS imagery aligns with these trajectories, indicating over target area with cleaner air to the west.

Table 43. Hourly surface observations for Fairbanks International Airport, July 15, 2022

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPT (F)
PAFA	07/15/2022 00:53 AKDT	0	0	**	**	10	52	42
PAFA	07/15/2022 01:53 AKDT	3	80	**	**	10	51	41
PAFA	07/15/2022 02:53 AKDT	6	50	**	**	10	51	41
PAFA	07/15/2022 03:53 AKDT	3	40	**	**	10	49	40
PAFA	07/15/2022 04:53 AKDT	5	40	**	**	10	48	40
PAFA	07/15/2022 05:53 AKDT	3	40	**	**	10	50	40
PAFA	07/15/2022 06:53 AKDT	5	70	**	**	10	51	41
PAFA	07/15/2022 07:53 AKDT	3	50	**	**	10	54	43
PAFA	07/15/2022 08:53 AKDT	5	70	**	**	10	57	43
PAFA	07/15/2022 09:53 AKDT	7	50	**	**	10	60	43
PAFA	07/15/2022 10:53 AKDT	5	100	**	**	10	63	43
PAFA	07/15/2022 11:53 AKDT	9	100	**	**	10	65	42
PAFA	07/15/2022 12:53 AKDT	9	90	**	**	10	67	43
PAFA	07/15/2022 13:53 AKDT	6	80	**	**	10	68	44
PAFA	07/15/2022 14:53 AKDT	9	90	**	**	10	71	43
PAFA	07/15/2022 15:53 AKDT	8	100	**	**	10	70	42
PAFA	07/15/2022 16:53 AKDT	3	150	**	Lgt Rain	10	66	47
PAFA	07/15/2022 17:53 AKDT	6	90	**	Lgt Rain	10	63	52
PAFA	07/15/2022 18:53 AKDT	7	100	**	Lgt Rain	10	62	52
PAFA	07/15/2022 19:53 AKDT	0	0	**	Lgt Rain	8	61	52
PAFA	07/15/2022 20:53 AKDT	5	**	**	Lgt Rain	10	60	53
PAFA	07/15/2022 21:53 AKDT	8	210	**	7 (Smoke)	5	57	53
PAFA	07/15/2022 22:53 AKDT	8	210	**	7 (Smoke)	6	56	53
PAFA	07/15/2022 23:53 AKDT	6	230	**	Lgt Rain	9	54	50

Surface observations: The surface observations from July 15, 2022, show evening hours of reduced visibility as a thin smoke plume moves through FNSB. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Summary of the 2022 Event Period

The late June/early July 2022 fire event significantly impacted air quality in the Fairbanks North Star Borough (FNSB). The persistent west-southwest wind flow through the large complex of fires in the interior of Alaska was the primary cause of smoke advection into the region throughout the summer fire season. PM_{2.5} concentrations consistently exceeded the National Ambient Air Quality Standards (NAAQS), with notable spikes observed on several days. For instance, on June 28, 2022, PM_{2.5} levels peaked around 500 µg/m³, and on July 7, concentrations reached up to 200 µg/m³.

The NOAA HYSPLIT model backward trajectories during this period consistently indicated that air parcels originated from the north and northwest, pointing to sustained smoke transport from wildfire regions. Surface observations confirmed reduced visibility down to 1-2 miles due to smoke, aligning with high PM_{2.5} readings. The smoke and PM_{2.5} levels varied due to changes in fire spread, suppression efforts, and shallow, surface-based inversions. This prolonged exposure resulted in twenty-one 24-hour PM_{2.5} exceedances, and FNSB also recorded ten days over the 9 µg/m³ Annual NAAQS standard. The sustained smoke transport underscored the significant impact of wildfires on air quality, highlighting the need for continuous monitoring and effective public health advisories during such events.

2023 Fire Season

This section establishes the clear causal relationship between the smoke from the wildland fires in the Interior of Alaska during the summer of 2023 and the PM_{2.5} concentrations in Fairbanks measured between July 25, 2023, and August 19, 2023. The following section describes the major fires impacting air quality in Fairbanks during these periods. This includes a daily description of fire locations, measured PM_{2.5} concentrations, HYSPLIT backward trajectory forecasts, meteorological observations, and other pertinent data for each day as needed to show the origin and extent of fire smoke. These products are arranged in chronological order on a day-to-day basis and shown for each day of the event. Along with these products, a narrative details the daily changes.

July's weather was notably warm across most of Alaska, with particularly dry conditions in the eastern Interior, Copper River Basin, and Panhandle. This warm trend, which encompassed nearly all of Alaska except the Lower Yukon Valley and Southcentral, was significant, especially in northern Alaska and the central and eastern Interior. The combination of high temperatures and low precipitation in these regions set the stage for more severe wildfire conditions by the end of the month.

During July, precipitation levels were below average in much of the Interior. By the morning of July 24th, the total area burned was at a record low of 1,892 acres. On that same day a notable weather shift occurred. While thunderstorms are typically most frequent in the Interior from late May to early July, the largest single day of lightning strikes for Alaska's 2023 season was recorded from 6:00 am on July 24th to 6:00 am on July 25th, with over 20,000 strikes detected across the state and in the Yukon. Due to the preceding warm and dry weather, this surge of lightning ignited numerous new wildfires.

The widespread lightning strikes over areas with dry and warm conditions led to the ignition of the largest wildfires that crews had to manage for the rest of the season. These included the Anderson Complex, Lost Horse Creek Fire, McCoy Creek Fire, and the Pogo Mine Road Fire. All these significant fires were located on state land in the southern Interior, mainly in the Middle Tanana Valley, where the driest fuels and a significant population base were found.

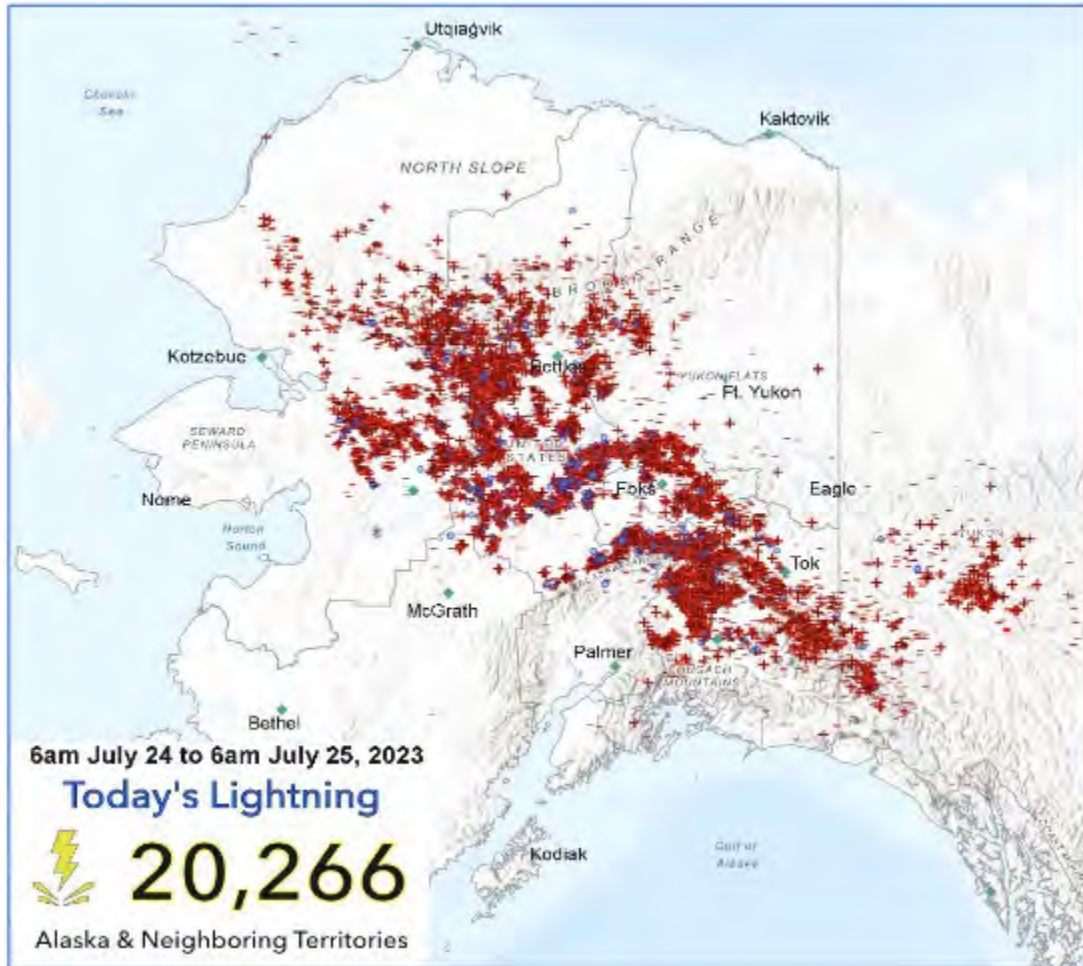


Figure 106: Lightning Map, July 24-25, 2023

Numerous Red Flag Warnings were issued by the National Weather Service in late July and early August due to continued lightning activity over flammable fuels and Chinook wind events through the Alaska Range passes. Once substantial fires had started in the southern Interior, the southerly Chinook winds through these passes became particularly significant. The Initial Spread Index (ISI), a fire weather index that illustrates the effect of wind on wildfire behavior, showed high values across the state on August 6th during a typical Chinook wind event.

Fuels and Fire Behavior Advisory

Central Interior, Eastern Interior, and Copper River Basin

Valid: August 4 – August 18, 2023

Subject: Exceptional landscape flammability and widespread ongoing large fire growth.

Discussion: The Buildup Index (BUI) is the best indicator of seasonal severity and overall flammability of fuels in Alaska. It represents deeper drying in the duff layers and greater fuel availability. Large fire growth typically occurs from mid-June to mid-July when long days and rapid drying can produce elevated BUIs. The delayed onset of season-ending rains has resulted in BUI far above average for this time of year. There are already numerous fires near core population areas. New starts continue to be discovered in these areas and are resistant to containment.

Description of Major Fires:

There was a total of 343 wildland fires in Alaska in 2023, with a total of 295,764 acres burned. Although the total acreage burned was well under the annual average in Alaska for the last 23 years, the proximity of most of the fires to FNSB caused Fairbanks and North Pole air quality monitors to see elevated $PM_{2.5}$ concentrations throughout the event.

Fire activity was triggered by lightning strikes in the first week of July. Despite their considerable distance, smoke from these fires to the southeast and southwest of FNSB enveloped the Tanana Flats, resulting in notably high $PM_{2.5}$ levels in FNSB late in the fire season. Figure 107 highlights fires within 200 km of the FNSB that contributed to the 2023 exceedances. Due to their location, shifts in wind direction consistently resulted in elevated $PM_{2.5}$ levels affecting the FNSB. Figure 108 provides a summary of the fires, over 1000 acres, within 200 km of FNSB that were burning, and the total acreage burned for each fire by the end of the summer.

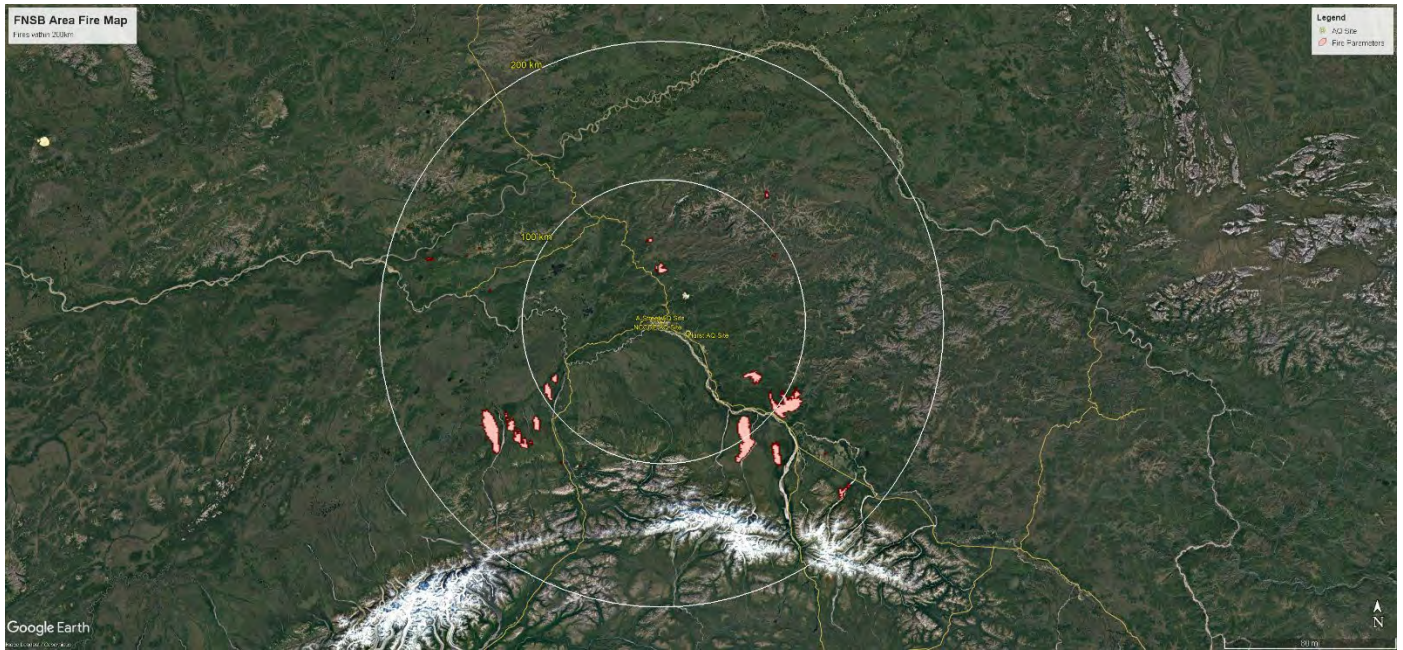


Figure 107: Wildland fires that impacted FNSB in the summer of 2023. Google Earth image, all fires within 200 km.

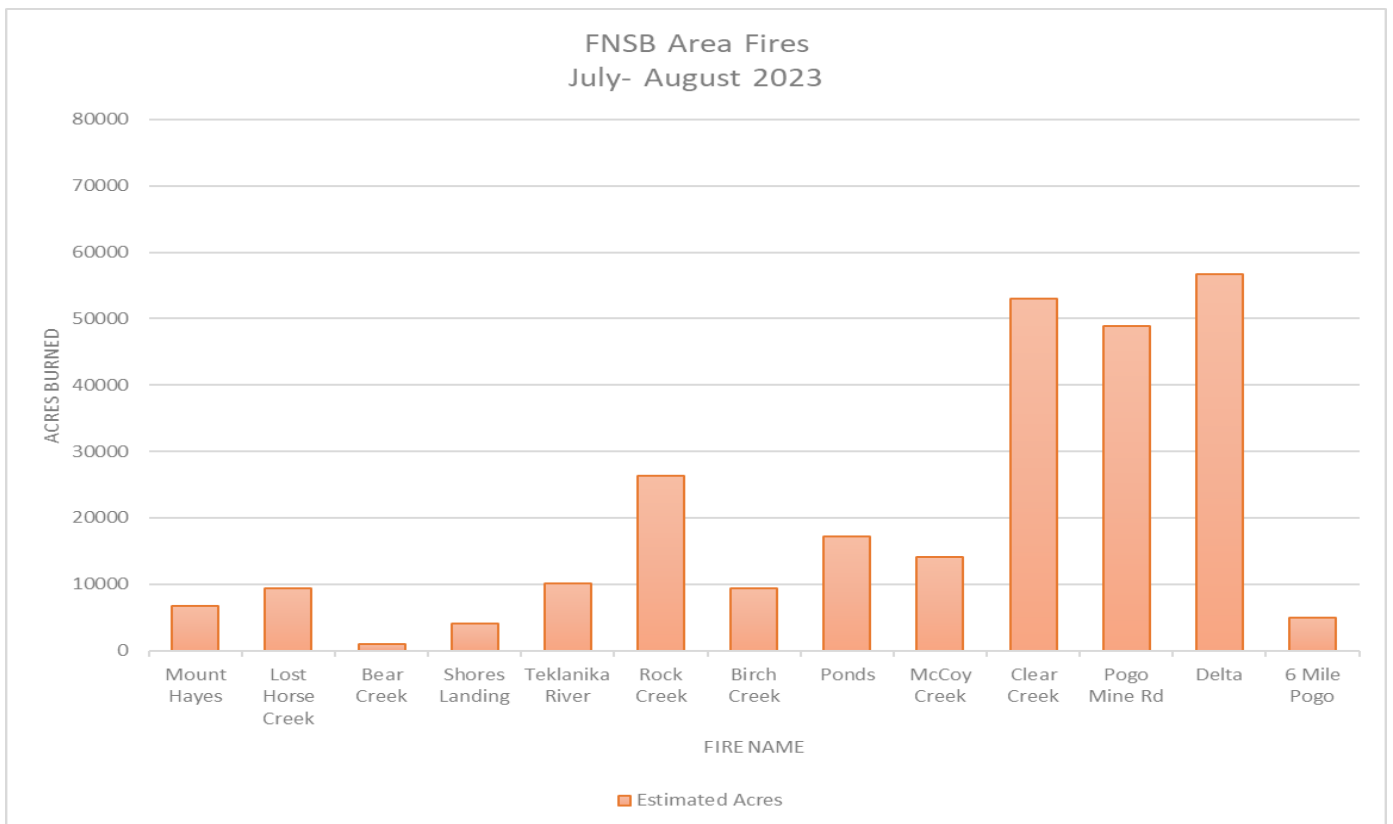


Figure 108. Fires over 1000 acres, within 200 km of FNSB.

Daily Breakdown of the Event:

The daily fluctuations in PM_{2.5} concentrations in Fairbanks from July 24 to August 19 are analyzed using terrain maps, satellite imagery, and modeling. For each day, the analysis incorporates Moderate Resolution Imaging Spectroradiometer (MODIS) satellite images, Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model forecasts presented on terrain maps and MODIS imagery, along with hourly PM_{2.5} readings. These assessments are supported by observational data, meteorological insights, and information on firefighting efforts.

PM_{2.5} concentration data primarily come from the Fairbanks NCore, A-Street and Hurst Road Federal Reference Monitors (FRM). NCore uses 24-hour averaged filters on a 1-in-1 day schedule. Secondary data are gathered from a co-located FRM operating on a 1-in-3 day schedule. Additionally, continuous PM_{2.5} measurements are obtained from a beta attenuation monitor (BAM) co-located at the same site, providing correlated hourly concentrations on days without FRM data collection. A-Street uses 24-hour averaged filters on a 1-in-1 day schedule. Lastly, Hurst Road site uses 24-hour averaged filters on a 1-in-1 day schedule. Secondary data are gathered from a co-located FRM operating on a 1-in-3 day schedule. Additionally, continuous PM_{2.5} measurements are obtained from a beta attenuation monitor (BAM) co-located at the same site, providing correlated hourly concentrations on days without FRM data collection.

All weather observation data were downloaded from the National Climate Data Center (NCDC) and were subject to their quality control (<http://www7.ncdc.noaa.gov/CDO/dataproduct>). The MODIS imagery was downloaded from either http://www.arl.noaa.gov/HYSPLIT_info.php or <https://worldview.earthdata.nasa.gov/>. The HYSPLIT model information and model runs are available online from http://www.arl.noaa.gov/HYSPLIT_info.php.

PM_{2.5} data underwent quality assurance and control by FNSB and DEC staff and meet the requirements as defined in the State Quality Assurance Plan. DEC provides oversight of FNSB data collection, processing, and quality assurance and certifies all Fairbanks data entered in AQS, EPA's national ambient air monitoring database.

All days with PM_{2.5} concentrations above 9 µg/m³ from July 24-30, August 1-2, 4, 11-12, 15 and 19, 2023 are being submitted as one exceptional event. The cause of the increased PM_{2.5} concentrations throughout the entire period was wildfire smoke. Daily PM_{2.5} concentrations varied with meteorological conditions and fire development or suppression. Wind direction and fire location were the most important components with which to predict high PM_{2.5} concentrations. The following 2023 daily data can be referenced in Appendix D, 2023 Daily Data.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - July 24, 2023

AICC Fire Report Summary:

- **New Fires:** 1 new fire reported.
- **Total Fires Statewide:** 21 fires burning.
- **Acres Burned:** 1,892 acres, with a 24-hour increase of 0 acres.

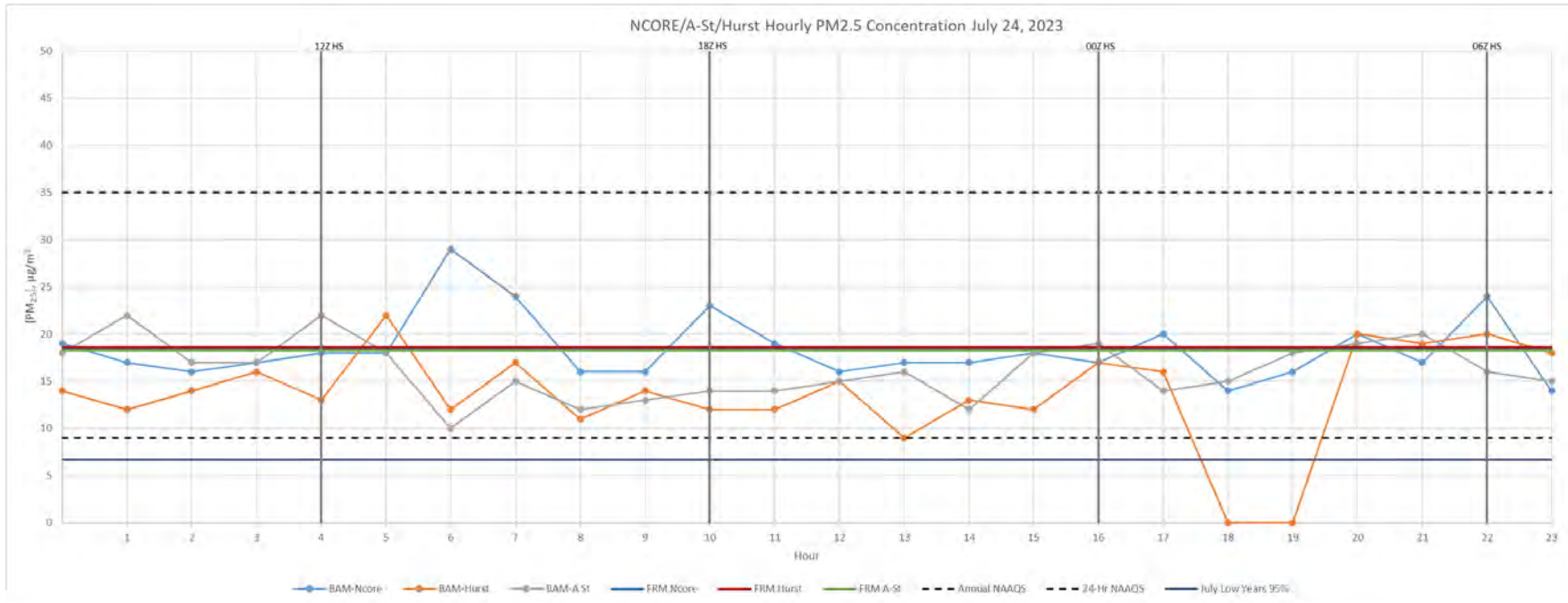


Figure 109: FNSB PM_{2.5} concentrations for July 24, 2023

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on July 24, 2023. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations are relatively low in the early morning hours, with the Hurst Road site showing the lowest values around 15 µg/m³. The A-Street site shows slightly higher levels, while the NCore site has the highest readings during this period.

Midday Levels: The concentrations remain low through the midday, fluctuating slightly but staying below the 24-hour NAAQS limit of 35 µg/m³. The NCore and Hurst Road sites show some variations but remain below the limit.

Afternoon to Evening: All sites consistently between 15 and 25 throughout the evening with the exception to the Hurst Road Site. It had a power failure and did not report for a few hours

Overall Trend: Throughout the day, the PM_{2.5} levels remain below the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) but above the annual NAAQS limit (represented by the dashed black line at 9 µg/m³). The overall trend highlights the variability in air quality, with some fluctuations but generally staying within acceptable limits.

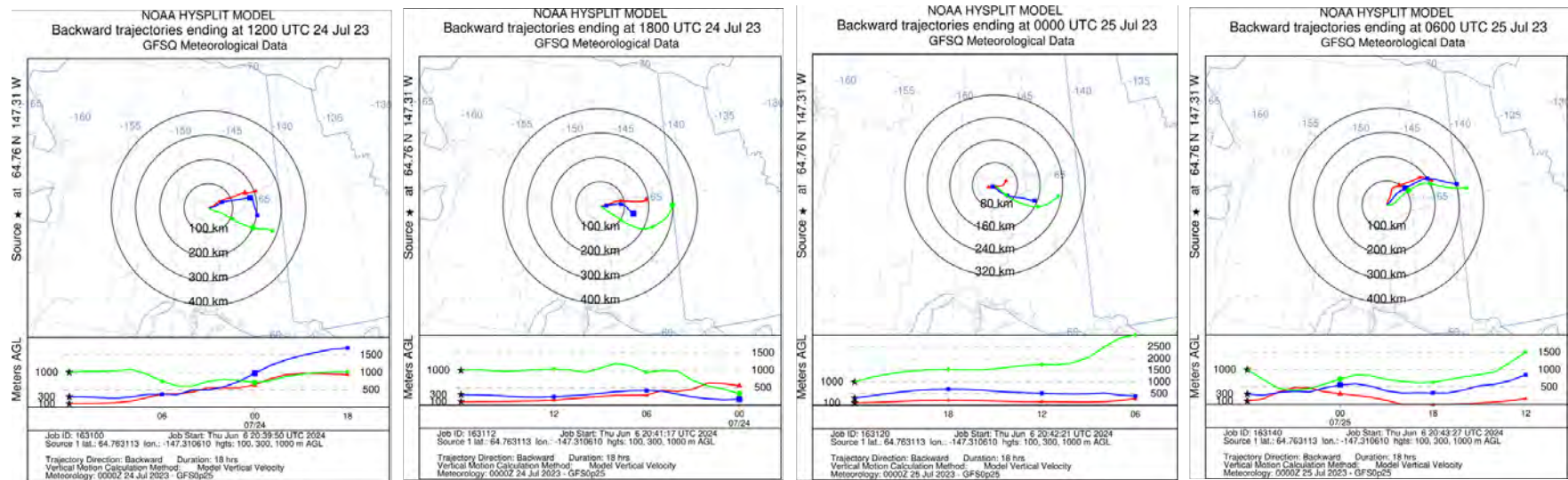


Figure 110: NOAA HYSPLIT model backward trajectories for July 24, 2023. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for July 24 and July 25, 2023. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, July 24, 2023):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the east, converging towards the target location.
- **Image 2 (18:00 UTC, July 24, 2023):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the southeast at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from an easterly component.
- **Image 3 (00:00 UTC, July 25, 2023):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the east, with the 100m, 300m, and 1000m trajectories all coming from the same direction.
- **Image 4 (06:00 UTC, July 25, 2023):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels at 100m, 300m, and 1000m coming from the northeast.

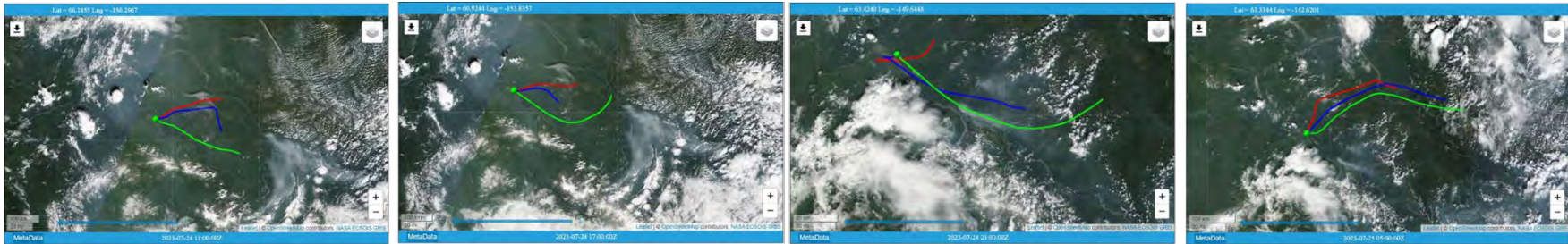


Figure 110: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for July 24 and July 25, 2023. The images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

- **Image 2 (18:00 UTC, July 24):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the southeast at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from an easterly component. **Smoke Transport:** The MODIS imagery shows smoke plumes to the northeast and to southeast, consistent with the trajectories of the air parcels, indicating potential transport of smoke towards the target location.

Table 44. Hourly surface observations for Fort Wainwright AAF, July 24, 2023

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	07/24/2023 00:55 AKDT	0	0	**	**	10	71	58
PAFB	07/24/2023 01:55 AKDT	0	0	**	**	10	67	58
PAFB	07/24/2023 02:55 AKDT	5	60	**	**	10	67	58
PAFB	07/24/2023 03:55 AKDT	0	0	**	**	9	65	58
PAFB	07/24/2023 04:55 AKDT	0	0	**	6 (Haze)	5	62	57
PAFB	07/24/2023 05:55 AKDT	3	60	**	**	9	63	58
PAFB	07/24/2023 06:55 AKDT	3	70	**	**	10	64	58
PAFB	07/24/2023 07:55 AKDT	5	80	**	**	8	68	59
PAFB	07/24/2023 08:55 AKDT	**	**	**	**	**	**	**
PAFB	07/24/2023 09:55 AKDT	0	0	**	**	10	74	60
PAFB	07/24/2023 10:55 AKDT	0	0	**	**	10	77	61
PAFB	07/24/2023 11:55 AKDT	3	210	**	**	10	80	61
PAFB	07/24/2023 12:55 AKDT	6	200	**	**	10	81	61
PAFB	07/24/2023 13:55 AKDT	5	210	**	**	10	84	60
PAFB	07/24/2023 14:55 AKDT	0	0	**	**	10	85	58
PAFB	07/24/2023 15:55 AKDT	3	240	**	**	10	87	60
PAFB	07/24/2023 16:55 AKDT	3	170	**	**	10	88	56
PAFB	07/24/2023 17:55 AKDT	9	50	**	**	8	88	57
PAFB	07/24/2023 18:55 AKDT	10	70	**	**	10	88	55
PAFB	07/24/2023 19:55 AKDT	8	90	**	**	10	85	57
PAFB	07/24/2023 20:55 AKDT	3	110	**	**	8	80	61
PAFB	07/24/2023 21:55 AKDT	3	40	**	**	9	78	60
PAFB	07/24/2023 22:55 AKDT	0	0	**	**	8	74	60
PAFB	07/24/2023 23:55 AKDT	0	0	**	**	10	70	61

Surface observations: The surface observations from July 24, 2023, show various hours during the day of slightly reduced visibility as a thin smoke plume moves through FNSB. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough - July 25, 2023

AICC Fire Report Summary:

- **New Fires:** 30 new fires reported.
- **Total Fires Statewide:** 51 fires burning.
- **Acres Burned:** 2,352 acres, with a 24-hour increase of 460 acres.

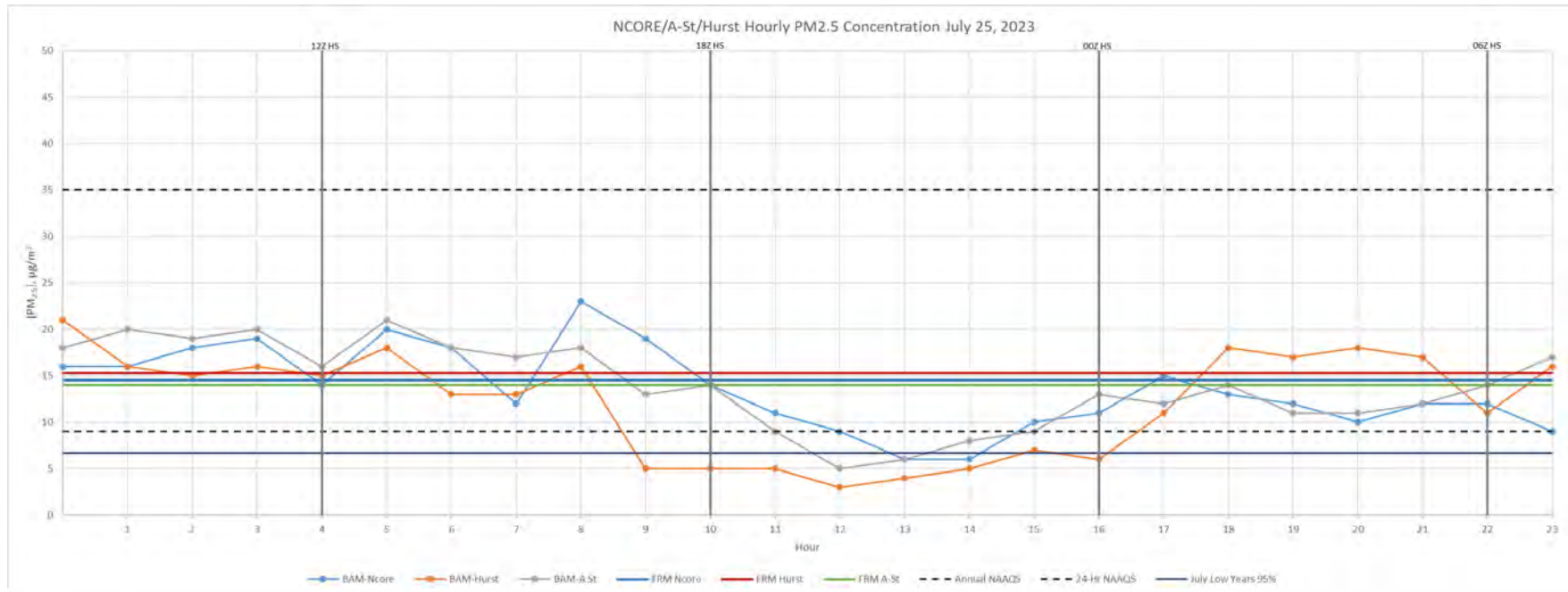


Figure 111: FNSB PM_{2.5} concentrations for July 25, 2023

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on July 25, 2023. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations start relatively moderate throughout the morning hours.

Midday Levels: PM_{2.5} The concentrations at all sites remain stable through the midday hours.

Afternoon to Evening: In the late afternoon, the PM_{2.5} levels show a slight increase, particularly around 17:00. The Hurst Road site shows a gradual increase, with concentrations reaching around 20 µg/m³ by the evening. Other sites also show a rising trend, indicating a moderate increase in PM_{2.5} levels as the day progresses, but all remain significantly below the 24-hour NAAQS limit.

Overall Trend: Throughout the day, the PM_{2.5} levels remain solidly below the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) and dip briefly below the annual NAAQS limit (represented by the dashed black line at 9 µg/m³). The trend indicates variability in air quality, with some fluctuations but generally staying within acceptable limits. The overall rising trend towards the evening highlights the influence of localized factors potentially contributing to temporary increases in particulate matter.

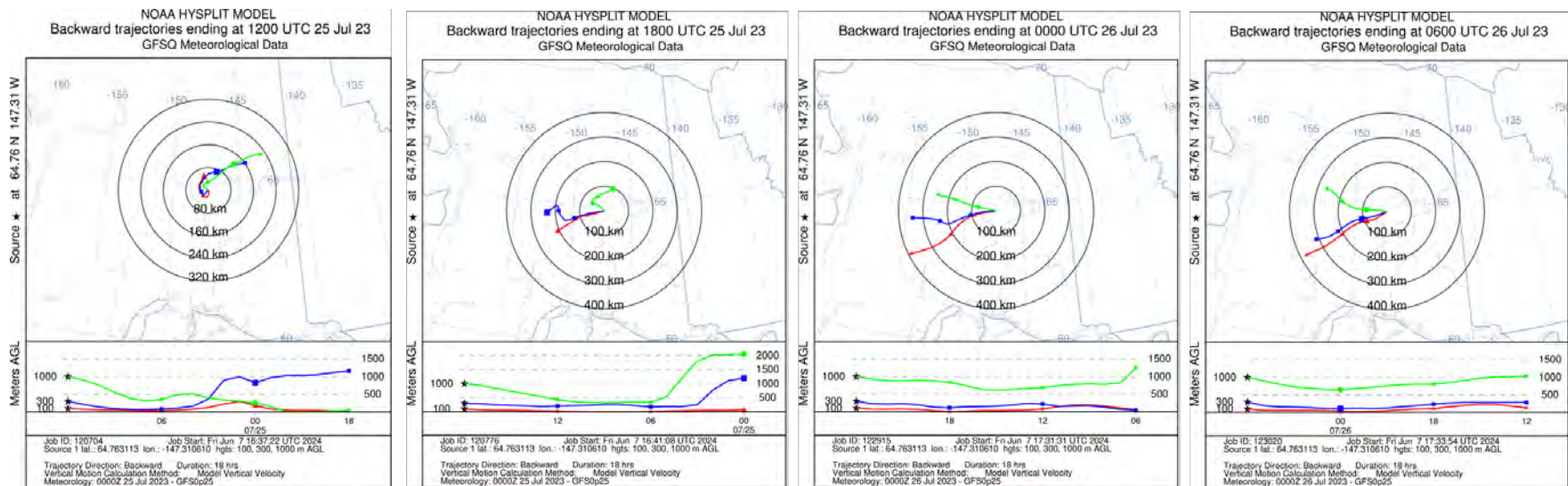


Figure 112: NOAA HYSPLIT model backward trajectories for July 25, 2023. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for July 25 and July 26, 2023. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, July 25, 2023):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the northeast, converging towards the target location.
- **Image 2 (18:00 UTC, July 25, 2023):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the west at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from a westerly component.
- **Image 3 (00:00 UTC, July 26, 2023):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the west, with the 100m, 300m, and 1000m trajectories all coming from the same direction.
- **Image 4 (06:00 UTC, July 26, 2023):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels at 100m, 300m, and 1000m coming from a westerly component.

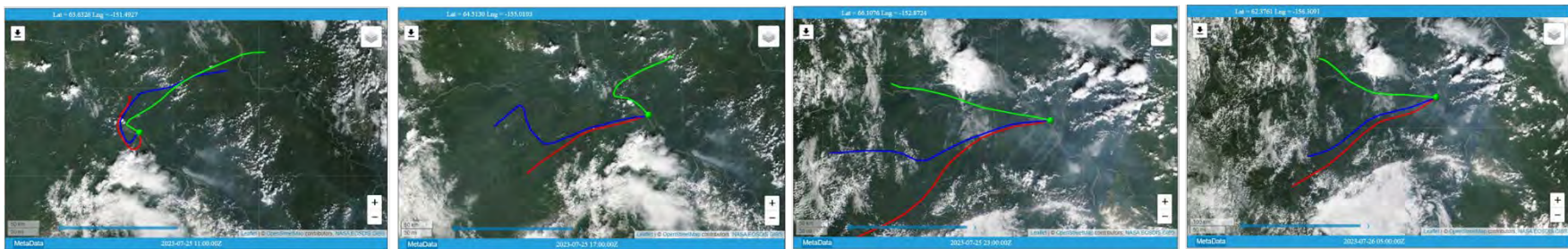


Figure 113: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for July 25 and July 26, 2023. The images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

- **Image 2 (18:00 UTC, July 25):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from a westerly component at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from that direction. **Smoke Transport:** The MODIS imagery shows thin smoke plumes in the Flats surrounding FNSB and thicker plumes to the southeast.

Table 45. Hourly surface observations for Fort Wainwright AAF, July 25, 2023

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	07/25/2023 00:55 AKDT	0	0	**	**	10	67	58
PAFB	07/25/2023 01:55 AKDT	0	0	**	**	10	66	59
PAFB	07/25/2023 02:55 AKDT	0	0	**	**	9	66	61
PAFB	07/25/2023 03:55 AKDT	3	60	**	**	10	63	59
PAFB	07/25/2023 04:55 AKDT	0	0	**	**	10	64	60
PAFB	07/25/2023 05:55 AKDT	0	0	**	**	9	62	58
PAFB	07/25/2023 06:55 AKDT	5	100	**	**	10	62	59
PAFB	07/25/2023 07:55 AKDT	0	0	**	**	10	65	60
PAFB	07/25/2023 08:55 AKDT	0	0	**	**	10	66	59
PAFB	07/25/2023 09:55 AKDT	5	170	**	**	10	69	60
PAFB	07/25/2023 10:55 AKDT	5	230	**	**	10	71	61
PAFB	07/25/2023 11:55 AKDT	0	0	**	**	10	74	62
PAFB	07/25/2023 12:55 AKDT	10	240	**	**	10	77	59
PAFB	07/25/2023 13:55 AKDT	12	230	**	**	10	79	59
PAFB	07/25/2023 14:55 AKDT	8	220	**	**	10	81	60
PAFB	07/25/2023 15:55 AKDT	8	200	**	**	10	82	60
PAFB	07/25/2023 16:55 AKDT	3	280	**	**	10	84	60
PAFB	07/25/2023 17:55 AKDT	6	340	**	**	10	85	62
PAFB	07/25/2023 18:55 AKDT	5	280	**	**	10	84	59
PAFB	07/25/2023 19:55 AKDT	6	280	**	**	10	82	61
PAFB	07/25/2023 20:55 AKDT	6	30	**	**	10	81	61
PAFB	07/25/2023 21:55 AKDT	0	0	**	**	9	78	59
PAFB	07/25/2023 22:55 AKDT	0	0	**	**	9	74	63
PAFB	07/25/2023 23:55 AKDT	0	0	**	**	10	71	63

Surface observations: The surface observations from July 25, 2023, show a few hours during the day of slightly reduced visibility as a thin smoke plume moves through FNSB. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough – July 26, 2023

AICC Fire Report Summary:

- **New Fires:** 31 new fires reported.
- **Total Fires Statewide:** 80 fires burning.
- **Acres Burned:** 8,831 acres, with a 24-hour increase of 6,479 acres.

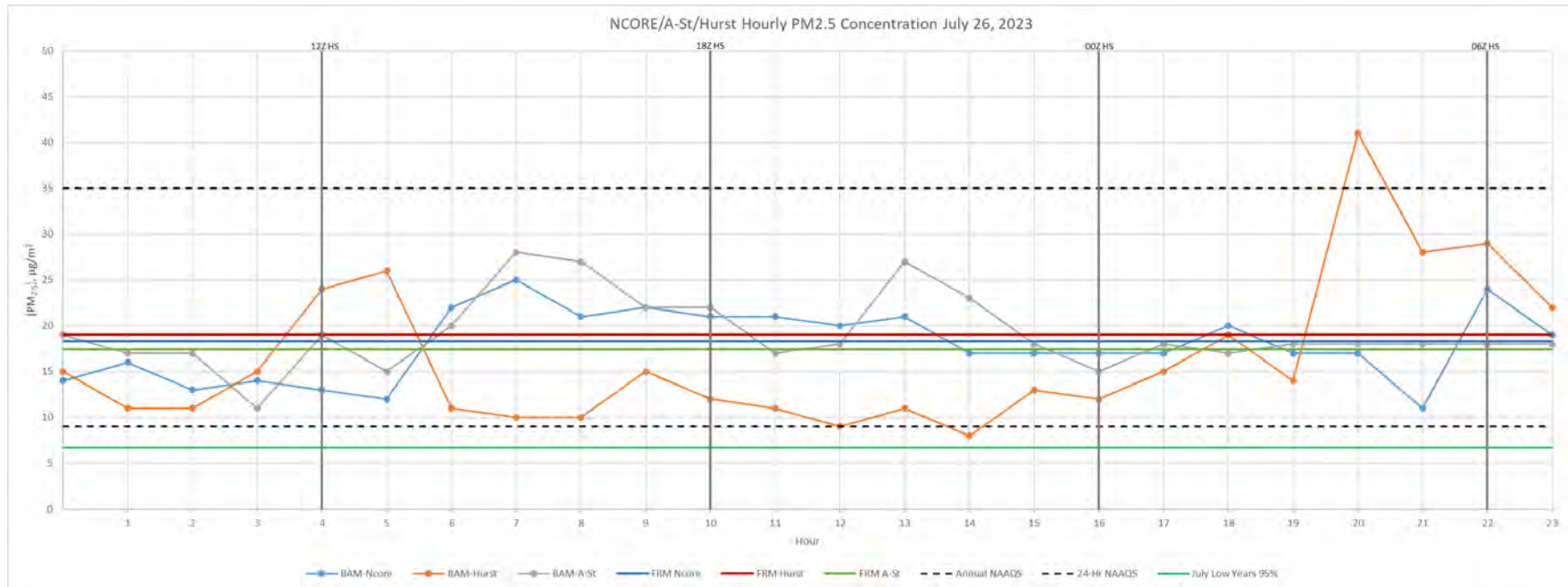


Figure 114: FNSB PM_{2.5} concentrations for July 26, 2023

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on July 26, 2023. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations start relatively low in the early morning hours, with values around 10-15 µg/m³ for all sites. The Hurst Road site shows slightly higher levels just over 25 µg/m³, while NCore and A-Street maintain similar lower levels until mid-morning.

Midday Levels: PM_{2.5}: During the midday hours, the concentrations remain stable for NCore and A-Street between 15-30 µg/m³. Hurst site remained between 15-30 µg/m³. Overall, the midday period shows stable and moderate PM_{2.5} levels across all sites.

Afternoon to Evening: In the late afternoon, the PM_{2.5} levels show significant fluctuations. The Hurst Road site experiences a noticeable spike, reaching approximately 40 µg/m³ around 20:00. NCore and A-Street sites also show some variations, with NCore peaking around 15-20 µg/m³ and A-Street reaching about 25 µg/m³ in the evening.

Overall Trend: Throughout the day, the PM_{2.5} levels show variability, with some fluctuations across all sites. The Hurst Road site shows the most significant increase in the evening, indicating a potential localized source of PM_{2.5}. PM_{2.5} mostly remained below the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) and above the annual NAAQS limit (represented by the dashed black line at 9 µg/m³). The overall trend suggests variations in air quality, with periods of increased particulate matter, particularly in the late afternoon to evening.

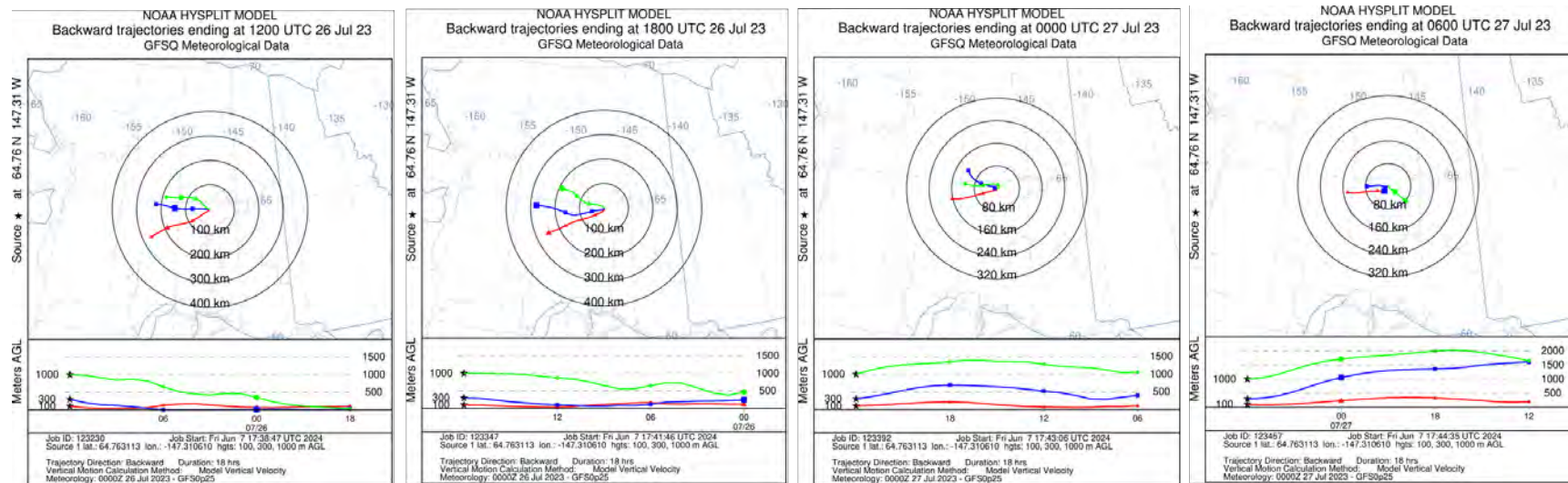


Figure 115: NOAA HYSPLIT model backward trajectories for July 26, 2023. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for July 26 and July 27, 2023. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, July 26, 2023):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the west, converging towards the target location.
- **Image 2 (18:00 UTC, July 26, 2023):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the west at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from a westerly component.
- **Image 3 (00:00 UTC, July 27, 2023):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the west, with the 100m, 300m, and 1000m trajectories all coming from the same direction.
- **Image 4 (06:00 UTC, July 27, 2023):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels at 100m and 300m trajectories coming from the west and the 1000m trajectory coming from the east.

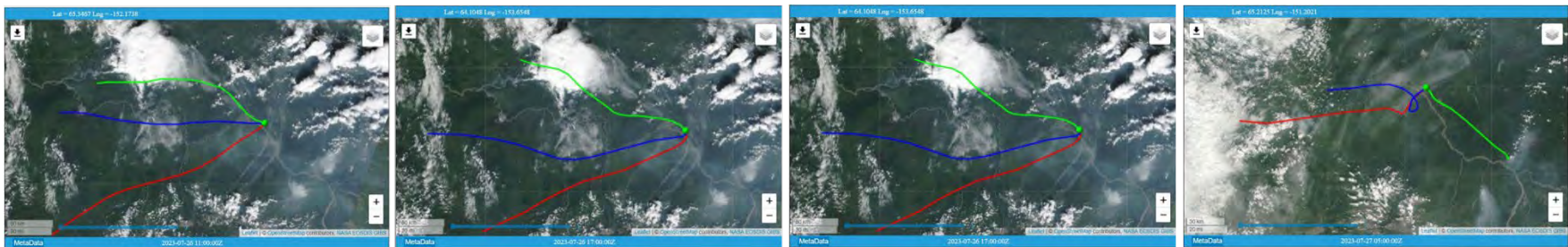


Figure 116: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for July 26 and July 27, 2023. The images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

- **Image 2 (18:00 UTC, July 26):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from a westerly component at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from that direction. **Smoke Transport:** The MODIS imagery shows thin smoke plumes in the Flats surrounding FNSB and thicker plumes to the southeast.

Table 46. Hourly surface observations for Fort Wainwright AAF, July 26, 2023

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	Dpt (F)
PAFB	07/26/2023 00:55 AKDT	0	0	**	**	10	68	63
PAFB	07/26/2023 01:55 AKDT	0	0	**	**	10	66	62
PAFB	07/26/2023 02:55 AKDT	3	70	**	**	10	65	61
PAFB	07/26/2023 03:55 AKDT	7	110	**	**	10	62	59
PAFB	07/26/2023 04:55 AKDT	0	0	**	**	9	63	61
PAFB	07/26/2023 05:55 AKDT	3	50	**	**	8	62	58
PAFB	07/26/2023 06:55 AKDT	5	90	**	**	7	64	58
PAFB	07/26/2023 07:55 AKDT	6	90	**	**	10	66	58
PAFB	07/26/2023 08:55 AKDT	0	0	**	**	9	68	60
PAFB	07/26/2023 09:55 AKDT	5	110	**	**	10	70	61
PAFB	07/26/2023 10:55 AKDT	5	120	**	7 (Smoke)	6	73	61
PAFB	07/26/2023 11:55 AKDT	0	0	**	7 (Smoke)	6	75	62
PAFB	07/26/2023 12:55 AKDT	0	0	**	7 (Smoke)	6	77	63
PAFB	07/26/2023 13:55 AKDT	3	230	**	7 (Smoke)	6	78	62
PAFB	07/26/2023 14:55 AKDT	0	0	**	7 (Smoke)	7	80	62
PAFB	07/26/2023 15:55 AKDT	5	180	**	7 (Smoke)	6	82	63
PAFB	07/26/2023 16:55 AKDT	5	180	**	7 (Smoke)	7	83	61
PAFB	07/26/2023 17:55 AKDT	0	0	**	7 (Smoke)	7	83	60
PAFB	07/26/2023 18:55 AKDT	0	0	**	7 (Smoke)	7	84	59
PAFB	07/26/2023 19:55 AKDT	0	0	**	**	10	84	58
PAFB	07/26/2023 20:55 AKDT	3	250	**	7 (Smoke)	9	82	59
PAFB	07/26/2023 21:55 AKDT	0	0	**	7 (Smoke)	9	78	64
PAFB	07/26/2023 22:55 AKDT	0	0	**	7 (Smoke)	9	74	64
PAFB	07/26/2023 23:55 AKDT	0	0	**	**	10	73	64

Surface observations: The surface observations from July 26, 2023, show hours during the day of slightly reduced visibility as a thin smoke plume moves through FNSB. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough – July 27, 2023

AICC Fire Report Summary:

- **New Fires:** 17 new fires reported.
- **Total Fires Statewide:** 97 fires burning.
- **Acres Burned:** 15,159 acres, with a 24-hour increase of 6,328 acres.

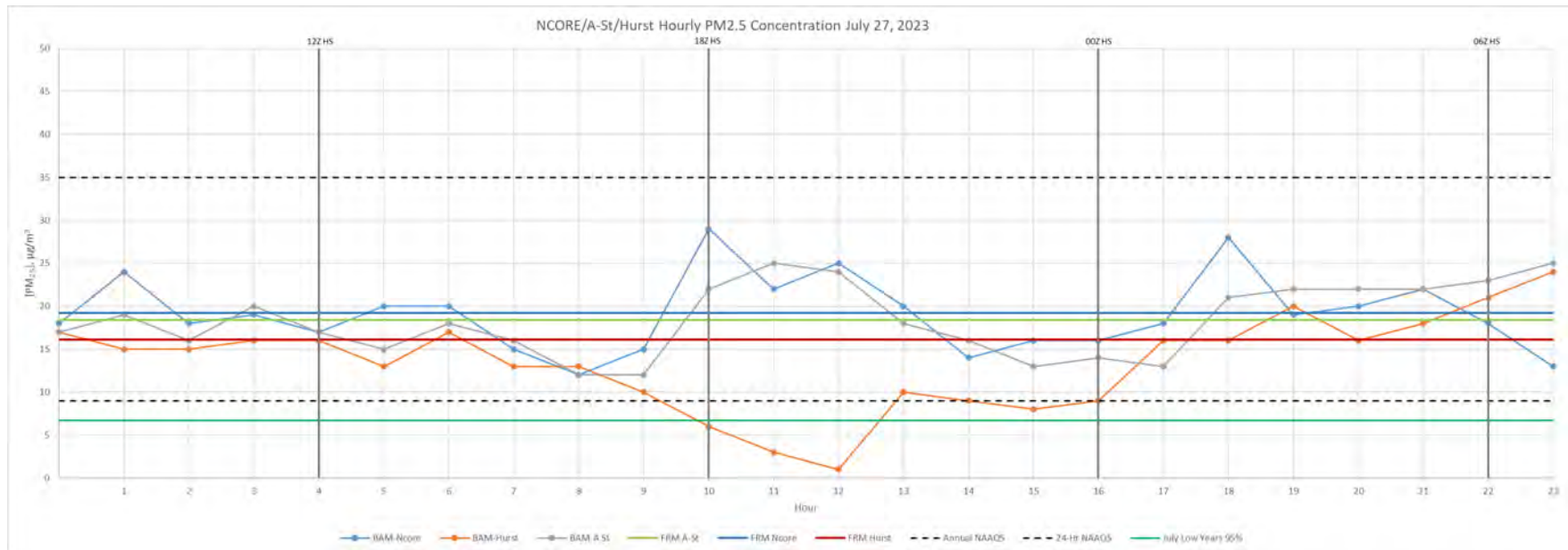


Figure 117: FNSB PM_{2.5} concentrations for July 27, 2023

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on July 27, 2023. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations start at moderate levels in the early morning hours, with NCore peaking around 25 µg/m³, while Hurst Road and A-Street show values around 15-20 µg/m³.

Midday Levels: PM_{2.5}: During the midday hours, the concentrations remain relatively stable. Hurst Road drops to levels around 10 $\mu\text{g}/\text{m}^3$, while NCore and A-Street show slight fluctuations but generally stay within the 15-25 $\mu\text{g}/\text{m}^3$ range. This period shows consistent PM_{2.5} levels across all sites.

Afternoon to Evening: In the late afternoon, the PM_{2.5} levels show noticeable variations. NCore experiences a significant spike, reaching approximately 30 $\mu\text{g}/\text{m}^3$ around 6 pm. Hurst Road and A-Street also show some fluctuations, with all sites peaking around 25 $\mu\text{g}/\text{m}^3$ at some point during the evening.

Overall Trend: Throughout the day, the PM_{2.5} levels show variability, with some fluctuations across all sites. The Hurst Road site shows the most significant movement during the day, indicating a potential localized source of PM_{2.5}. PM_{2.5} remained below the 24-hour NAAQS limit (represented by the dashed black line at 35 $\mu\text{g}/\text{m}^3$) but above the annual NAAQS limit (represented by the dashed black line at 9 $\mu\text{g}/\text{m}^3$). The overall trend suggests variations in air quality, steady concentrations of particulate matter throughout the day.

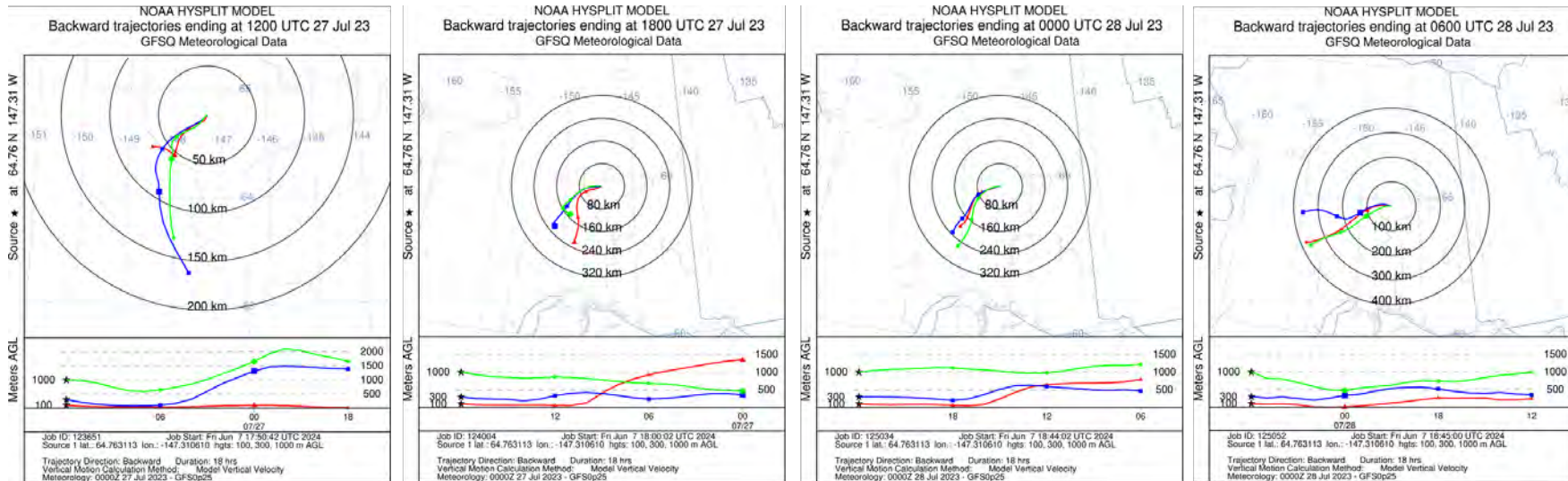


Figure 118: NOAA HYSPLIT model backward trajectories for July 27, 2023. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for July 27 and July 28, 2023. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, July 27, 2023):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the south, converging towards the target location.
- **Image 2 (18:00 UTC, July 27, 2023):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the southwest at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from a southwesterly component.
- **Image 3 (00:00 UTC, July 28, 2023):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the southwest, with the 100m, 300m, and 1000m trajectories all coming from the same direction.
- **Image 4 (06:00 UTC, July 28, 2023):** The final image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the southwest, with the 100m, 300m, and 1000m trajectories all coming from the same direction.

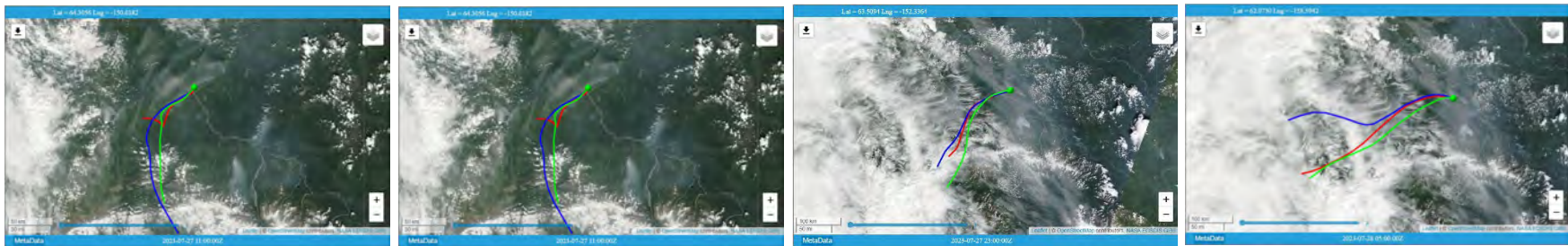


Figure 119: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for July 27 and July 28, 2023. The images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

- **Image 2 (18:00 UTC, July 27):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from a southerly component at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from that direction. **Smoke Transport:** The MODIS imagery shows thin smoke plumes in the Flats, higher elevations to the north, and thicker plumes to the southeast of FNSB.

Table 47. Hourly surface observations for Fort Wainwright AAF, July 27, 2023

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	07/27/2023 00:55 AKDT	0	0	**	**	10	69	62
PAFB	07/27/2023 01:55 AKDT	3	60	**	**	10	66	61
PAFB	07/27/2023 02:55 AKDT	5	80	**	**	10	66	61
PAFB	07/27/2023 03:55 AKDT	7	60	**	**	9	64	59
PAFB	07/27/2023 04:55 AKDT	6	70	**	**	9	64	59
PAFB	07/27/2023 05:55 AKDT	0	0	**	**	9	64	58
PAFB	07/27/2023 06:55 AKDT	3	90	**	**	8	65	60
PAFB	07/27/2023 07:55 AKDT	0	0	**	**	8	66	59
PAFB	07/27/2023 08:55 AKDT	8	300	**	**	10	72	55
PAFB	07/27/2023 09:55 AKDT	6	270	**	**	10	73	53
PAFB	07/27/2023 10:55 AKDT	7	250	**	**	10	74	55
PAFB	07/27/2023 11:55 AKDT	10	230	**	**	10	75	57
PAFB	07/27/2023 12:55 AKDT	7	190	**	**	10	77	58
PAFB	07/27/2023 13:55 AKDT	10	220	**	**	10	78	57
PAFB	07/27/2023 14:55 AKDT	10	220	**	7 (Smoke)	9	80	55
PAFB	07/27/2023 15:55 AKDT	8	240	16	7 (Smoke)	9	81	55
PAFB	07/27/2023 16:55 AKDT	10	230	**	7 (Smoke)	9	82	53
PAFB	07/27/2023 17:55 AKDT	9	280	**	7 (Smoke)	9	81	58
PAFB	07/27/2023 18:55 AKDT	8	260	**	7 (Smoke)	9	79	56
PAFB	07/27/2023 19:55 AKDT	5	280	**	**	10	79	55
PAFB	07/27/2023 20:55 AKDT	7	300	**	7 (Smoke)	9	78	55
PAFB	07/27/2023 21:55 AKDT	0	0	**	7 (Smoke)	9	76	57
PAFB	07/27/2023 22:55 AKDT	0	0	**	**	7	68	60
PAFB	07/27/2023 23:55 AKDT	0	0	**	**	8	65	60

Surface observations: The surface observations from July 27, 2023, show hours during the day of slightly reduced visibility as a thin smoke plume moves through FNSB. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough – July 28, 2023

AICC Fire Report Summary:

- **New Fires:** 22 new fires reported.
- **Total Fires Statewide:** 113 fires burning.
- **Acres Burned:** 20,413 acres, with a 24-hour increase of 5,254 acres.

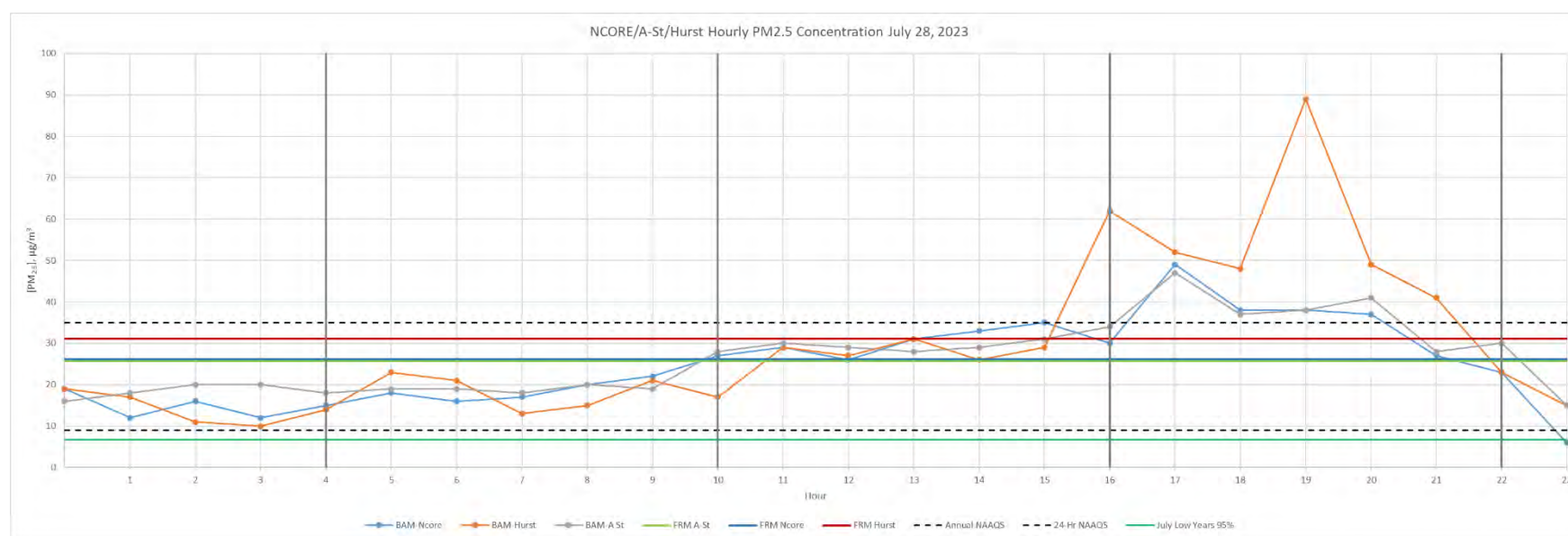


Figure 120: FNSB PM_{2.5} concentrations for July 28, 2023

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on July 28, 2023. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations start at similar levels in the early morning hours, with all sites showing values around 15-20 µg/m³. NCore, Hurst Road, and A-Street exhibit consistent readings, indicating comparable air quality across the locations during this period.

Midday Levels: PM_{2.5}: The PM_{2.5} concentrations start at similar levels in the early morning hours, with all sites showing values around 05-20 $\mu\text{g}/\text{m}^3$. NCore, Hurst Road, and A-Street exhibit consistent readings, indicating comparable air quality across the locations during this period.

Afternoon to Evening: In the late afternoon, the PM_{2.5} levels show significant variations. The Hurst Road site experiences a noticeable spike, reaching approximately 90 $\mu\text{g}/\text{m}^3$ around 19:00. NCore and A-Street also show increases, with NCore peaking around 50 $\mu\text{g}/\text{m}^3$ and A-Street reaching about 45 $\mu\text{g}/\text{m}^3$ in the evening.

Overall Trend: Throughout the day, the PM_{2.5} levels show variability, with some fluctuations across all sites. The Hurst Road site shows the most significant increase in the evening, indicating a potential localized source of PM_{2.5}. PM_{2.5} mostly remained below the 24-hour NAAQS limit (represented by the dashed black line at 35 $\mu\text{g}/\text{m}^3$) but above the annual NAAQS limit (represented by the dashed black line at 9 $\mu\text{g}/\text{m}^3$). The overall trend suggests variations in air quality, with periods of increased particulate matter, particularly in the late afternoon to evening.

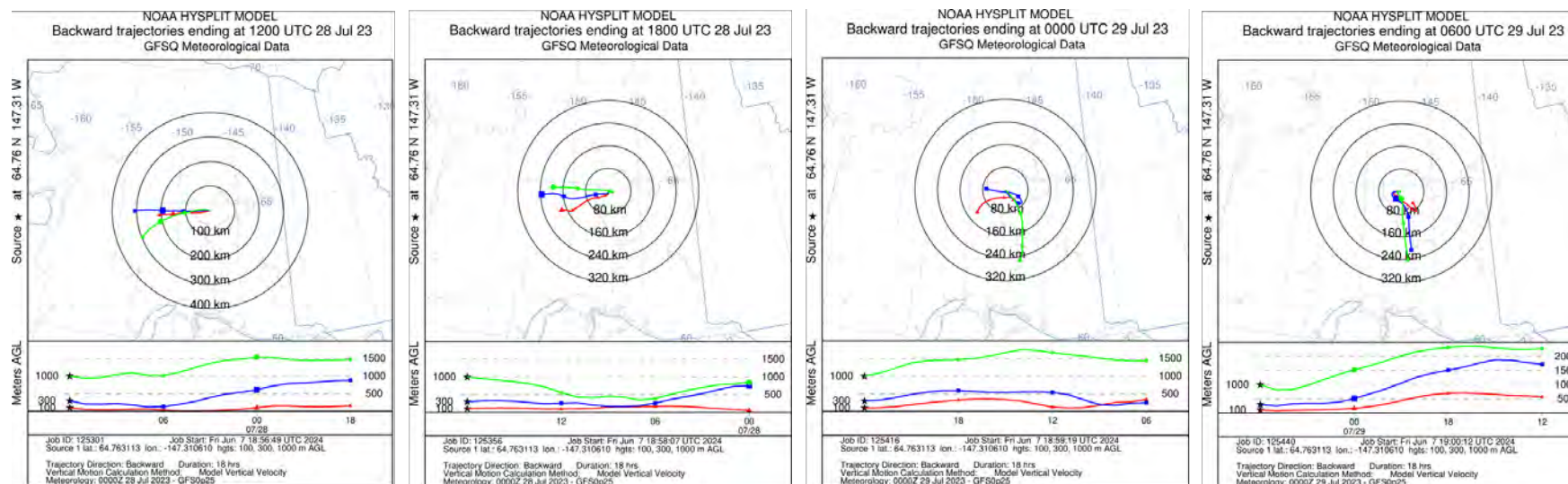


Figure 121: NOAA HYSPLIT model backward trajectories for July 28, 2023. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for July 28 and July 29, 2023. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, July 28, 2023):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the west, converging towards the target location.
- **Image 2 (18:00 UTC, July 28, 2023):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the west at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from a westerly component.
- **Image 3 (00:00 UTC, July 29, 2023):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the east through west, with the 100m and 300m making a direction change during parcel movement, from the west then from the east, and the 1000m trajectory coming from the south.
- **Image 4 (06:00 UTC, July 29, 2023):** The final image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the south, with the 100m, 300m, and 1000m trajectories all coming from the same direction.

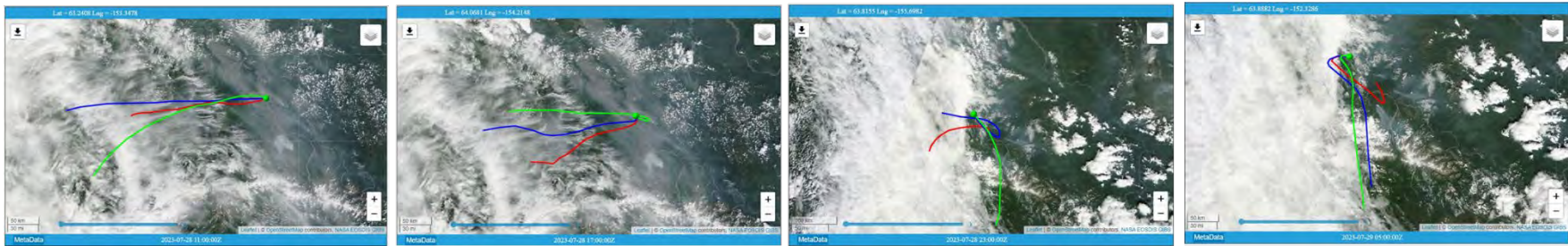


Figure 122: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for July 28 and July 29, 2023. The images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

- **Image 2 (18:00 UTC, July 28):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from a westerly component at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from that direction. **Smoke Transport:** The MODIS imagery shows thin smoke plumes in the Flats, higher elevations to the north, and thicker plumes to the southeast of FNSB.

Table 48. Hourly surface observations for Fort Wainwright AAF, July 28, 2023

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPT (F)
PAFB	07/28/2023 00:55 AKDT	5	270	**	**	10	65	60
PAFB	07/28/2023 01:55 AKDT	0	0	**	**	10	65	58
PAFB	07/28/2023 02:55 AKDT	5	110	**	**	10	63	58
PAFB	07/28/2023 03:55 AKDT	0	0	**	7(Smoke)	9	63	58
PAFB	07/28/2023 04:55 AKDT	3	80	**	**	10	60	58
PAFB	07/28/2023 05:55 AKDT	3	100	**	7(Smoke)	9	61	57
PAFB	07/28/2023 06:55 AKDT	0	0	**	**	10	60	57
PAFB	07/28/2023 07:55 AKDT	0	0	**	7(Smoke)	9	64	56
PAFB	07/28/2023 08:55 AKDT	0	0	**	7(Smoke)	9	65	58
PAFB	07/28/2023 09:55 AKDT	5	100	**	**	10	68	60
PAFB	07/28/2023 10:55 AKDT	3	90	**	7(Smoke)	9	72	60
PAFB	07/28/2023 11:55 AKDT	0	0	**	7(Smoke)	9	74	61
PAFB	07/28/2023 12:55 AKDT	0	0	**	7(Smoke)	9	76	58
PAFB	07/28/2023 13:55 AKDT	0	0	**	7(Smoke)	9	80	60
PAFB	07/28/2023 14:55 AKDT	3	210	**	7(Smoke)	9	80	56
PAFB	07/28/2023 15:55 AKDT	5	60	**	7(Smoke)	8	82	59
PAFB	07/28/2023 16:55 AKDT	3	200	**	7(Smoke)	9	82	59
PAFB	07/28/2023 17:55 AKDT	0	0	**	7(Smoke)	7	82	58
PAFB	07/28/2023 18:55 AKDT	0	0	**	7(Smoke)	8	83	57
PAFB	07/28/2023 19:55 AKDT	0	0	**	7(Smoke)	9	82	56
PAFB	07/28/2023 20:55 AKDT	0	0	**	7(Smoke)	4	81	57
PAFB	07/28/2023 21:55 AKDT	6	280	**	7(Smoke)	7	77	59
PAFB	07/28/2023 22:55 AKDT	6	300	**	7(Smoke)	8	75	59
PAFB	07/28/2023 23:55 AKDT	8	290	**	**	10	75	52

Surface observations: The surface observations from July 28, 2023, show hours during the day of slightly reduced visibility as a thin smoke plume moves through FNSB. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough – July 29, 2023

AICC Fire Report Summary:

- **New Fires:** 11 new fires reported.
- **Total Fires Statewide:** 123 fires burning.
- **Acres Burned:** 23,206 acres, with a 24-hour increase of 2,793 acres.

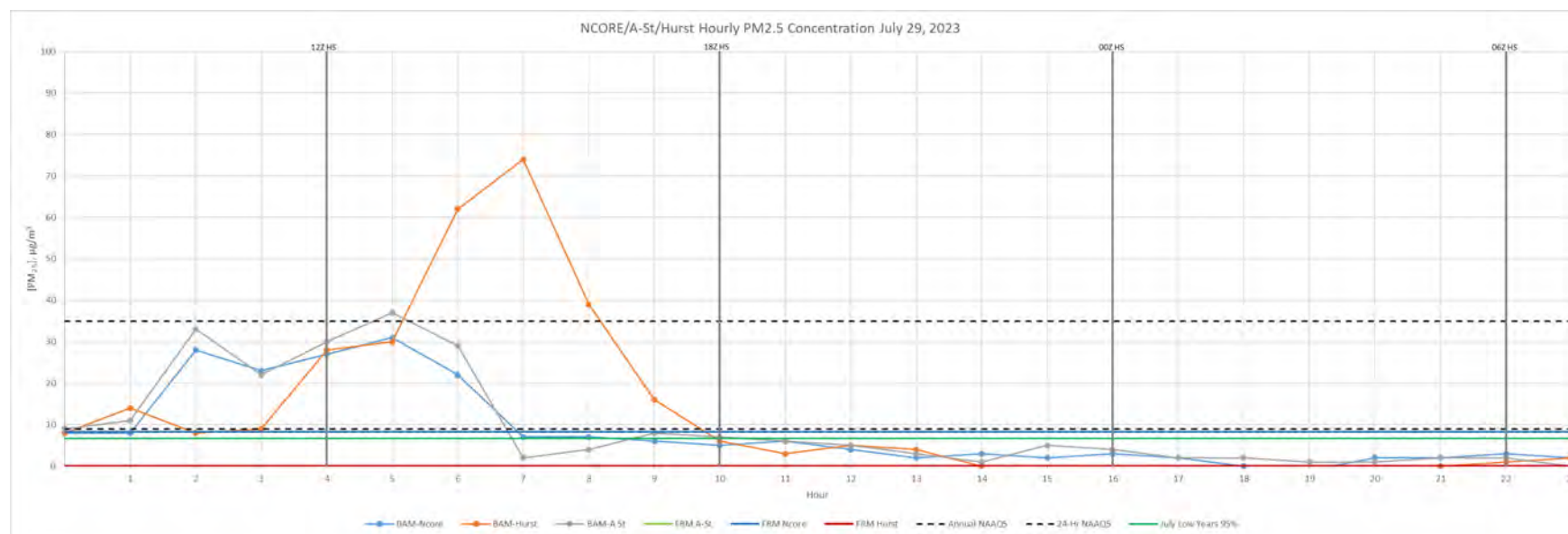


Figure 123: FNSB PM_{2.5} concentrations for July 29, 2023

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on July 29, 2023. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations start at similar levels in the early morning hours, with all sites showing values around 10-15 µg/m³. NCore, Hurst Road, and A-Street began to rise with Hurst Road site showing the greatest increase in concentrations.

Midday Levels: PM_{2.5}: During the midday hours, the concentrations show some variability. The Hurst Road site experiences a significant

spike, reaching approximately $80 \mu\text{g}/\text{m}^3$ around 7:00. NCore and A-Street also show increases, with NCore peaking around $30 \mu\text{g}/\text{m}^3$ and A-Street reaching about $35 \mu\text{g}/\text{m}^3$. The levels at Hurst Road drop sharply after the peak, returning to around $10 \mu\text{g}/\text{m}^3$ by 10:00, while NCore and A-Street stabilize at lower levels.

Afternoon to Evening: In the afternoon to evening, the $\text{PM}_{2.5}$ levels remain relatively low and stable across all sites. Hurst Road, NCore, and A-Street exhibit values below $10 \mu\text{g}/\text{m}^3$, indicating improved air quality during these hours.

Overall Trend: Throughout the day, the $\text{PM}_{2.5}$ levels show variability, with significant fluctuations in the morning, particularly at the Hurst Road site. The Hurst Road site shows the most significant increase in the early morning, indicating a potential localized source of $\text{PM}_{2.5}$. $\text{PM}_{2.5}$ mostly remained below the 24-hour NAAQS limit (represented by the dashed black line at $35 \mu\text{g}/\text{m}^3$) but above the annual NAAQS limit (represented by the dashed black line at $9 \mu\text{g}/\text{m}^3$) during the early morning hours. The overall trend suggests variations in air quality, with periods of increased particulate matter, particularly in the early morning hours.

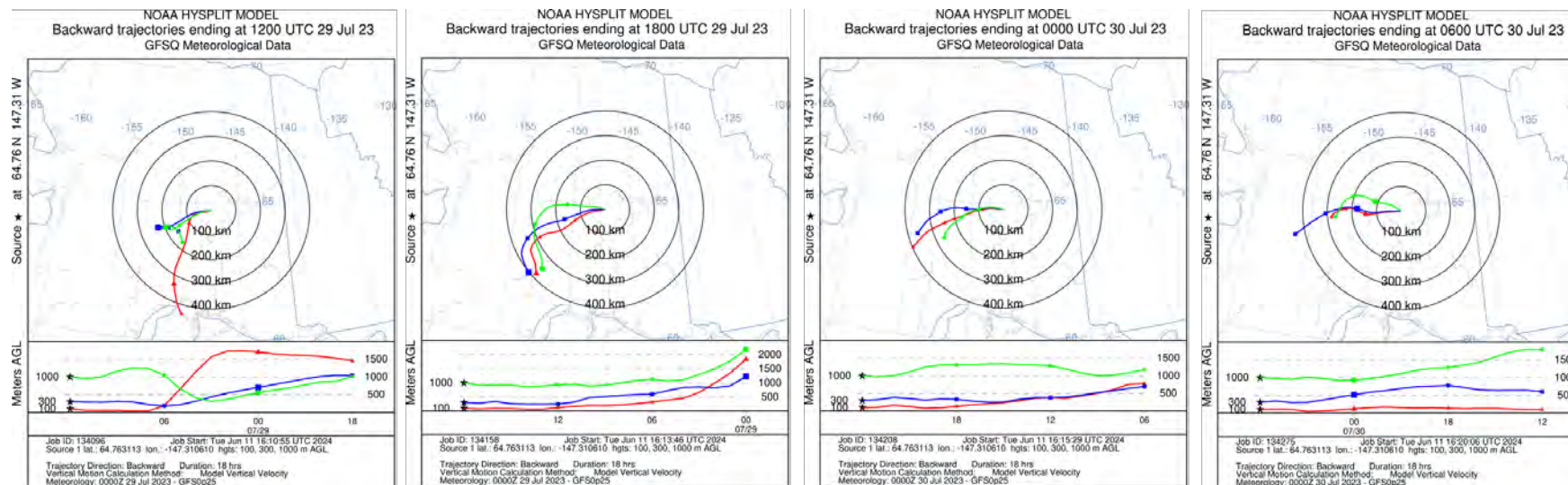


Figure 124: NOAA HYSPLIT model backward trajectories for July 29, 2023. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for July 29 and July 30, 2023. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, July 29, 2023):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the southwest, converging towards the target location.
- **Image 2 (18:00 UTC, July 29, 2023):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the southwest at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from a westerly component.
- **Image 3 (00:00 UTC, July 30, 2023):** The third image displays the backward trajectory ending in the early afternoon. The air parcels' pathways highlight significant movement from the southwest at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from a westerly component.
- **Image 4 (06:00 UTC, July 30, 2023):** The final image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the west, with the 100m, 300m, and 1000m trajectories all coming from the same direction.



Figure 125: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for July 29 and July 30, 2023. The images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

- **Image 2 (18:00 UTC, July 29):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from a westerly component at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from that direction. **Smoke Transport:** The MODIS imagery shows thin smoke plumes over FNSB, in addition to smoke trapped below the low clouds to the west.

Table 49. Hourly surface observations for Fort Wainwright AAF, July 29, 2023

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPT (F)
PAFB	07/29/2023 00:55 AKDT	8	290	**	**	10	74	46
PAFB	07/29/2023 01:55 AKDT	5	300	**	**	10	73	46
PAFB	07/29/2023 02:55 AKDT	7	250	**	7 (Smoke)	5	72	47
PAFB	07/29/2023 03:55 AKDT	5	190	**	7 (Smoke)	9	71	49
PAFB	07/29/2023 04:55 AKDT	3	210	**	7 (Smoke)	7	66	51
PAFB	07/29/2023 05:55 AKDT	3	230	**	7 (Smoke)	5	66	54
PAFB	07/29/2023 06:55 AKDT	3	70	**	7 (Smoke)	2	64	56
PAFB	07/29/2023 07:55 AKDT	8	230	**	7 (Smoke)	8	68	57
PAFB	07/29/2023 08:55 AKDT	6	260	**	7 (Smoke)	6	66	58
PAFB	07/29/2023 09:55 AKDT	3	250	**	7 (Smoke)	4	66	57
PAFB	07/29/2023 10:55 AKDT	3	70	**	7 (Smoke)	2	63	58
PAFB	07/29/2023 11:55 AKDT	3	60	**	7 (Smoke)	6	64	58
PAFB	07/29/2023 12:55 AKDT	7	240	**	**	10	71	56
PAFB	07/29/2023 13:55 AKDT	8	250	**	**	10	72	57
PAFB	07/29/2023 14:55 AKDT	8	240	**	**	10	73	55
PAFB	07/29/2023 15:55 AKDT	12	240	**	**	9	75	55
PAFB	07/29/2023 16:55 AKDT	10	240	**	**	9	75	55
PAFB	07/29/2023 17:55 AKDT	13	260	**	**	8	75	55
PAFB	07/29/2023 18:55 AKDT	15	260	**	**	10	74	56
PAFB	07/29/2023 19:55 AKDT	13	250	**	**	7	72	56
PAFB	07/29/2023 20:55 AKDT	14	250	**	**	7	69	55
PAFB	07/29/2023 21:55 AKDT	12	250	**	**	10	67	53
PAFB	07/29/2023 22:55 AKDT	12	240	**	**	9	65	53
PAFB	07/29/2023 23:55 AKDT	8	230	**	**	9	64	54

Surface observations: The surface observations from July 29, 2023, show hours during the day of reduced visibility as a thin smoke plume moves through FNSB. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough – July 30, 2023

AICC Fire Report Summary:

- **New Fires:** 6 new fires reported.
- **Total Fires Statewide:** 126 fires burning.
- **Acres Burned:** 26,932 acres, with a 24-hour increase of 3,726 acres.

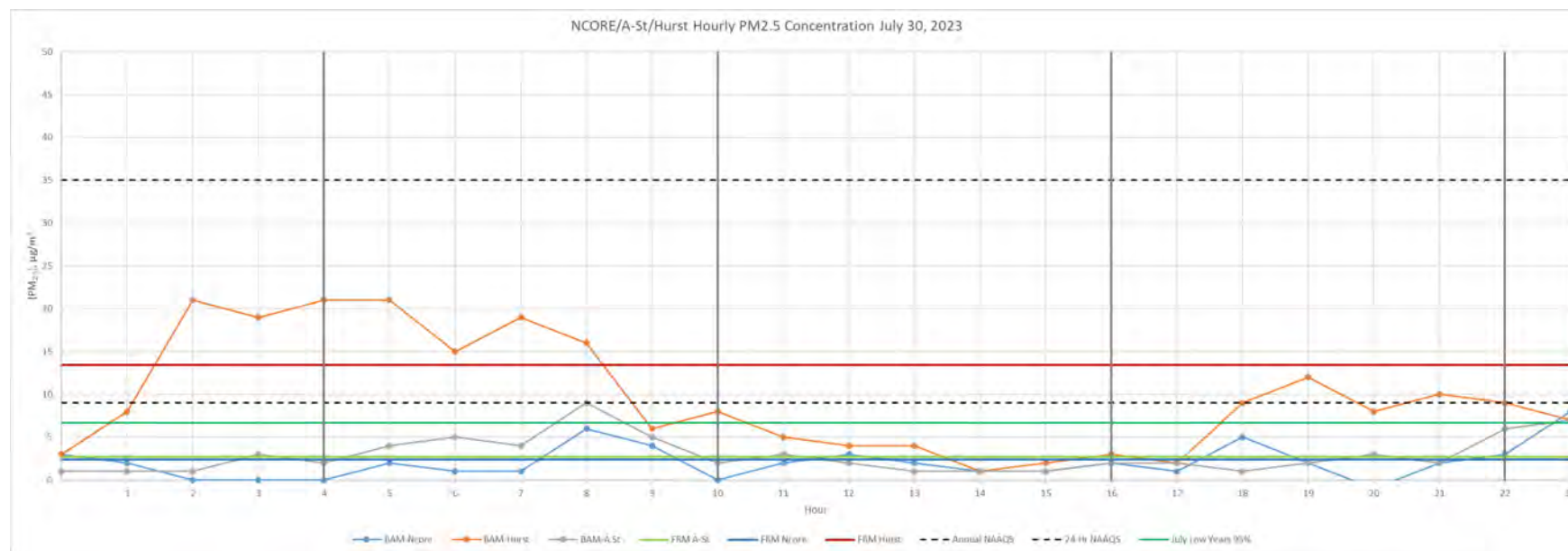


Figure 126: FNSB PM_{2.5} concentrations for July 30, 2023

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on July 30, 2023. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations in the early morning show that the Hurst Road site is significantly higher than the other sites. Hurst Road peaks around 20 µg/m³ at 2:00, while NCore and A-Street remain lower, with values below 5 µg/m³. This indicates that the Hurst Road site experienced higher levels of particulate matter during the early morning hours compared to NCore and A-Street.

Midday Levels: PM_{2.5}: During the midday hours, the concentrations show some variability. The Hurst Road site shows a decrease after the early morning peak, dropping below 15 $\mu\text{g}/\text{m}^3$ by 9:00 and then fluctuating around 10-15 $\mu\text{g}/\text{m}^3$. NCore and A-Street continue to exhibit lower and more stable levels, generally around 5-10 $\mu\text{g}/\text{m}^3$. This period shows consistent and relatively lower PM_{2.5} levels at NCore and A-Street, while Hurst Road maintains moderate levels.

Afternoon to Evening: In the afternoon to evening, the PM_{2.5} levels remain relatively low and stable across all sites. NCore, and A-Street exhibit values mostly below 5 $\mu\text{g}/\text{m}^3$ while Hurst Road site hovered at 10 $\mu\text{g}/\text{m}^3$.

Overall Trend: Throughout the day, the PM_{2.5} levels show variability, with some fluctuations across all sites. The Hurst Road site shows the most significant increase in the early morning hours, indicating a potential localized source of PM_{2.5}. PM_{2.5} remained significantly below the 24-hour NAAQS limit (represented by the dashed black line at 35 $\mu\text{g}/\text{m}^3$) with Hurst Road, the only site above the annual NAAQS limit (represented by the dashed black line at 9 $\mu\text{g}/\text{m}^3$). The overall trend suggests variations in air quality, with periods of increased particulate matter, particularly in the early morning hours at the Hurst Road site.

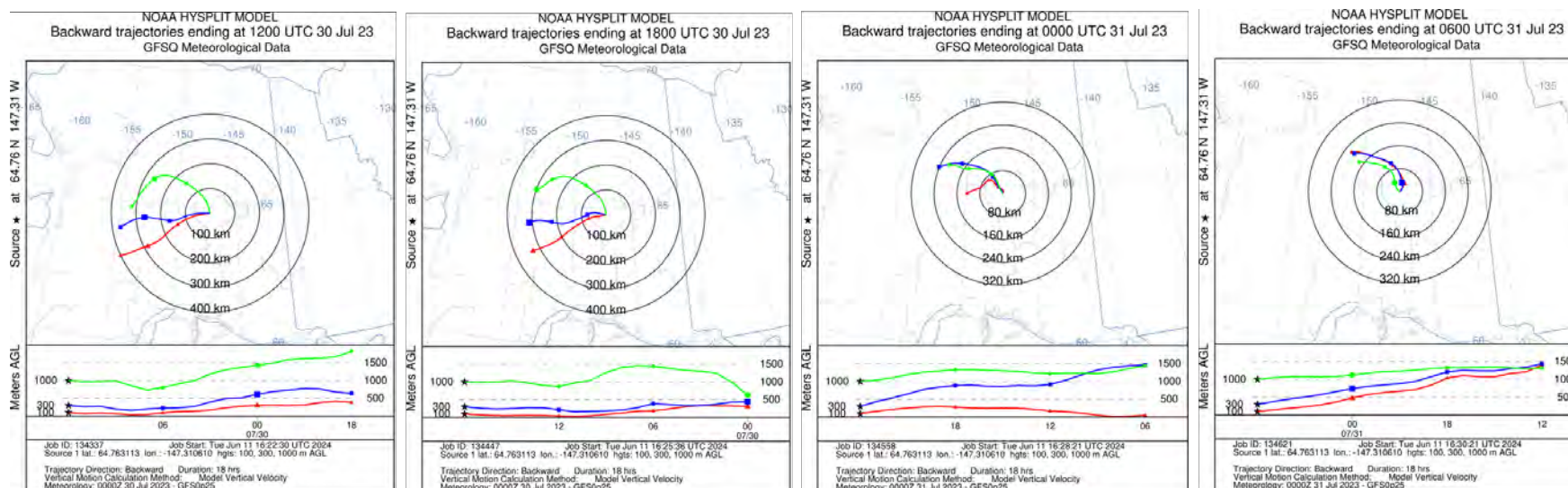


Figure 127: NOAA HYSPLIT model backward trajectories for July 30, 2023. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for July 30 and July 31, 2023. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, July 30, 2023):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from a westerly component, converging towards the target location.
- **Image 2 (18:00 UTC, July 30, 2023):** The second image captures the backward trajectory ending in the late morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from a westerly component, converging towards the target location.
- **Image 3 (00:00 UTC, July 31, 2023):** The third image displays the backward trajectory ending in the early afternoon. The air parcels' pathways highlight significant movement from the northwest at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from a westerly component.
- **Image 4 (06:00 UTC, July 31, 2023):** The final image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the northwest, with the 100m, 300m, and 1000m trajectories all coming from the same direction.

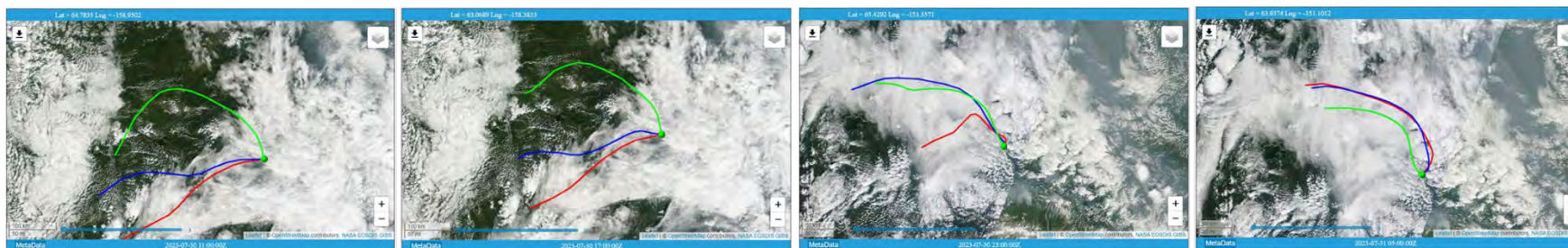


Figure 128: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for July 30 and July 31, 2023. The images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

- **Image 1 (12:00 UTC, July 30):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from a westerly component at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from that direction. **Smoke Transport:** The MODIS imagery show as cloud shield over FNSB but according to surface observations, there is also smoke trapped below the low clouds.

Table 50. Hourly surface observations for Fort Wainwright AAF, July 30, 2023

	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	07/30/2023 00:55 AKDT	9	220	**	7 (Smoke)	7	63	57
PAFB	07/30/2023 01:55 AKDT	9	230	**	**	10	62	55
PAFB	07/30/2023 02:55 AKDT	7	230	**	**	10	61	56
PAFB	07/30/2023 03:55 AKDT	7	220	**	**	10	60	55
PAFB	07/30/2023 04:55 AKDT	7	240	**	**	10	60	55
PAFB	07/30/2023 05:55 AKDT	6	220	**	**	8	60	55
PAFB	07/30/2023 06:55 AKDT	6	250	**	**	9	60	56
PAFB	07/30/2023 07:55 AKDT	3	270	**	**	10	60	55
PAFB	07/30/2023 08:55 AKDT	5	220	**	**	7	60	55
PAFB	07/30/2023 09:55 AKDT	3	220	**	**	9	61	56
PAFB	07/30/2023 10:55 AKDT	7	220	**	**	10	63	56
PAFB	07/30/2023 11:55 AKDT	6	250	**	**	10	65	56
PAFB	07/30/2023 12:55 AKDT	5	240	**	**	10	66	55
PAFB	07/30/2023 13:55 AKDT	5	240	**	**	10	68	55
PAFB	07/30/2023 14:55 AKDT	5	230	**	**	10	69	53
PAFB	07/30/2023 15:55 AKDT	3	360	**	**	10	72	54
PAFB	07/30/2023 16:55 AKDT	3	40	**	**	10	71	53
PAFB	07/30/2023 17:55 AKDT	5	220	**	**	10	71	53
PAFB	07/30/2023 18:55 AKDT	3	200	**	**	10	70	54
PAFB	07/30/2023 19:55 AKDT	3	120	**	**	10	70	57
PAFB	07/30/2023 20:55 AKDT	0	0	**	**	9	69	57
PAFB	07/30/2023 21:55 AKDT	3	100	**	**	8	67	58
PAFB	07/30/2023 22:55 AKDT	0	0	**	**	9	64	59
PAFB	07/30/2023 23:55 AKDT	3	60	**	**	10	60	58

Surface observations: The surface observations from July 30, 2023, show hours during the day of reduced visibility as a thin smoke plume moves through FNSB. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough – August 1, 2023

AICC Fire Report Summary:

- **New Fires:** 3 new fires reported.
- **Total Fires Statewide:** 131 fires burning.
- **Acres Burned:** 46,805 acres, with a 24-hour increase of 5,866 acres.

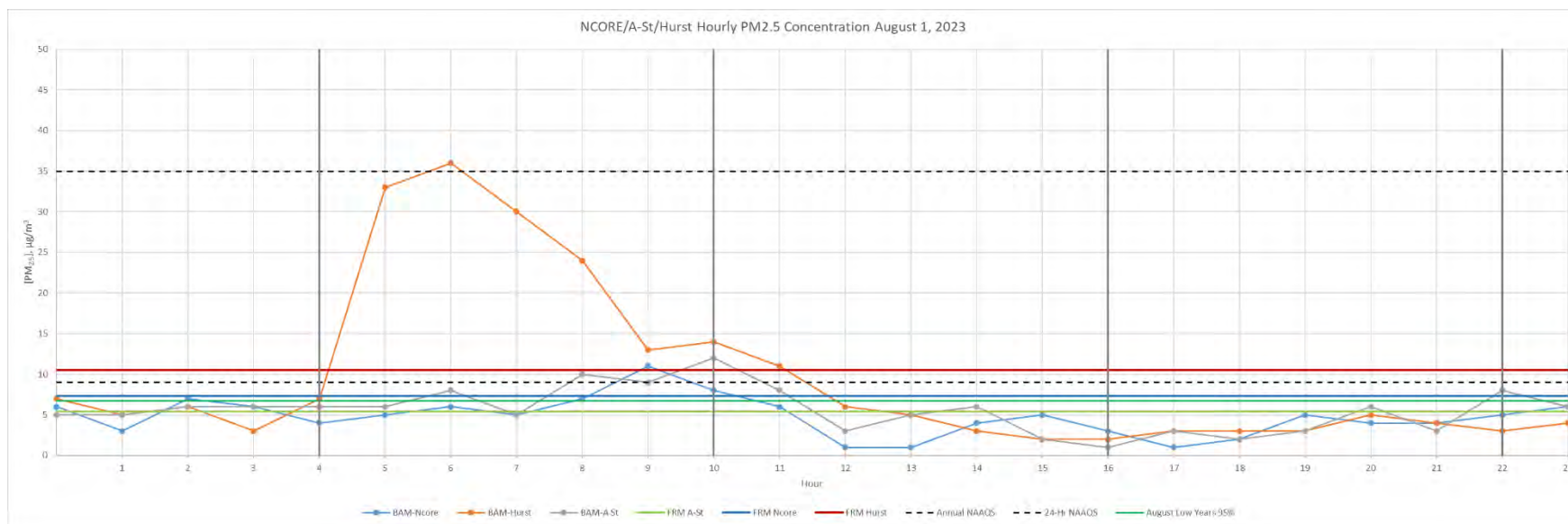


Figure 129: FNSB PM_{2.5} concentrations for August 1, 2023

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on August 1, 2023. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations in the early morning hours show that the Hurst Road site experiences a significant spike, peaking around 35 µg/m³ at 6:00. In contrast, NCore and A-Street sites exhibit much lower values, generally around 5-10 µg/m³, indicating that the Hurst Road site had elevated particulate matter levels compared to the other sites.

Midday Levels: PM_{2.5}: During the midday hours, the concentrations at Hurst Road gradually decrease from the early morning peak, stabilizing around 10-15 µg/m³. NCore and A-Street continue to show relatively stable and low PM_{2.5} levels, maintaining values

between 5-10 $\mu\text{g}/\text{m}^3$.

Afternoon to Evening: In the afternoon to evening, the $\text{PM}_{2.5}$ levels remain low and stable across all sites. Hurst Road, NCore, and A-Street exhibit values mostly below 10 $\mu\text{g}/\text{m}^3$, indicating improved air quality during these hours.

Overall Trend: Throughout the day, the $\text{PM}_{2.5}$ levels show variability, with some fluctuations across all sites. The Hurst Road site shows the most significant increase in the early morning hours, indicating a potential localized source of $\text{PM}_{2.5}$. $\text{PM}_{2.5}$ remained below the 24-hour NAAQS limit (represented by the dashed black line at 35 $\mu\text{g}/\text{m}^3$), Hurst Road was the only site above the annual NAAQS limit (represented by the dashed black line at 9 $\mu\text{g}/\text{m}^3$) for the day. The overall trend suggests variations in air quality, with periods of increased particulate matter, particularly in the early morning hours at the Hurst Road site.

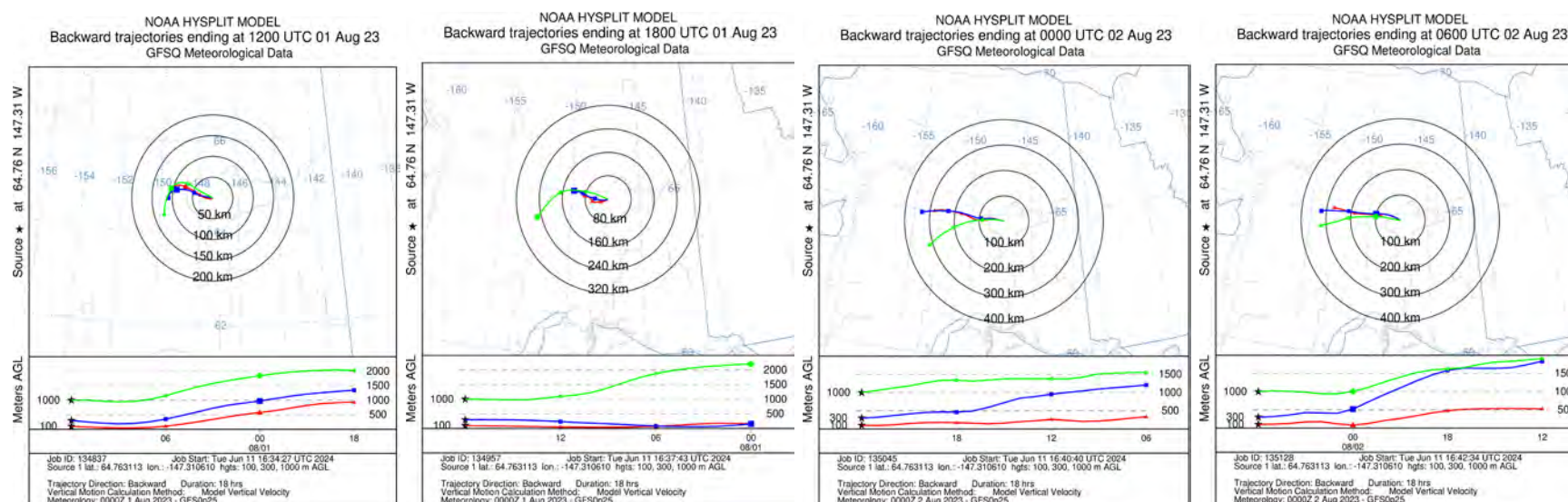


Figure 130: NOAA HYSPLIT model backward trajectories for August 1, 2023. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for August 1 and August 2, 2023. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, August 1, 2023):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from a westerly component, converging towards the target location.
- **Image 2 (18:00 UTC, August 1, 2023):** The second image captures the backward trajectory ending in the late morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from a westerly component, converging towards the target location.
- **Image 3 (00:00 UTC, August 2, 2023):** The third image displays the backward trajectory ending in the early afternoon. The air parcels' pathways highlight significant movement from the west at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from a westerly component.
- **Image 4 (06:00 UTC, August 2, 2023):** The final image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the west, with the 100m, 300m, and 1000m trajectories all coming from the same direction.



Figure 131: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for August 1 and August 2, 2023. The images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

- **Image 2 (18:00 UTC, August 1):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from a westerly component at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from that direction. **Smoke Transport:** The MODIS imagery shows the thin smoke plume to the east of FNSB.

Table 51. Hourly surface observations for Fort Wainwright AAF, August 1, 2023

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	Dpt (F)
PAFB	08/01/2023 00:55 AKDT	3	290	**	**	10	62	55
PAFB	08/01/2023 01:55 AKDT	0	0	**	**	10	59	53
PAFB	08/01/2023 02:55 AKDT	0	0	**	**	10	57	54
PAFB	08/01/2023 03:55 AKDT	0	0	**	**	9	55	53
PAFB	08/01/2023 04:55 AKDT	0	0	**	**	9	54	52
PAFB	08/01/2023 05:55 AKDT	3	90	**	**	9	53	51
PAFB	08/01/2023 06:55 AKDT	0	0	**	**	9	55	53
PAFB	08/01/2023 07:55 AKDT	5	50	**	MIST	5	54	54
PAFB	08/01/2023 08:55 AKDT	5	80	**	**	9	59	56
PAFB	08/01/2023 09:55 AKDT	0	0	**	**	9	62	56
PAFB	08/01/2023 10:55 AKDT	0	0	**	**	9	65	57
PAFB	08/01/2023 11:55 AKDT	3	260	**	**	10	69	55
PAFB	08/01/2023 12:55 AKDT	6	250	**	**	10	73	55
PAFB	08/01/2023 13:55 AKDT	8	240	**	**	10	76	52
PAFB	08/01/2023 14:55 AKDT	10	220	**	**	10	77	52
PAFB	08/01/2023 15:55 AKDT	12	230	**	**	10	77	52
PAFB	08/01/2023 16:55 AKDT	9	250	**	**	10	78	51
PAFB	08/01/2023 17:55 AKDT	7	260	**	**	10	77	50
PAFB	08/01/2023 18:55 AKDT	9	270	**	**	10	78	49
PAFB	08/01/2023 19:55 AKDT	10	260	**	**	10	77	48
PAFB	08/01/2023 20:55 AKDT	8	280	**	**	9	75	49
PAFB	08/01/2023 21:55 AKDT	7	280	**	**	9	73	48
PAFB	08/01/2023 22:55 AKDT	6	310	**	**	10	71	48
PAFB	08/01/2023 23:55 AKDT	3	140	**	**	8	60	53

Surface observations: The surface observations from August 1, 2023, show hours during the day of slightly reduced visibility as a thin smoke plume settled in the FNSB area. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough – August 2, 2023

AICC Fire Report Summary:

- **New Fires:** 5 new fires reported.
- **Total Fires Statewide:** 136 fires burning.
- **Acres Burned:** 51,122 acres, with a 24-hour increase of 4,317 acres.

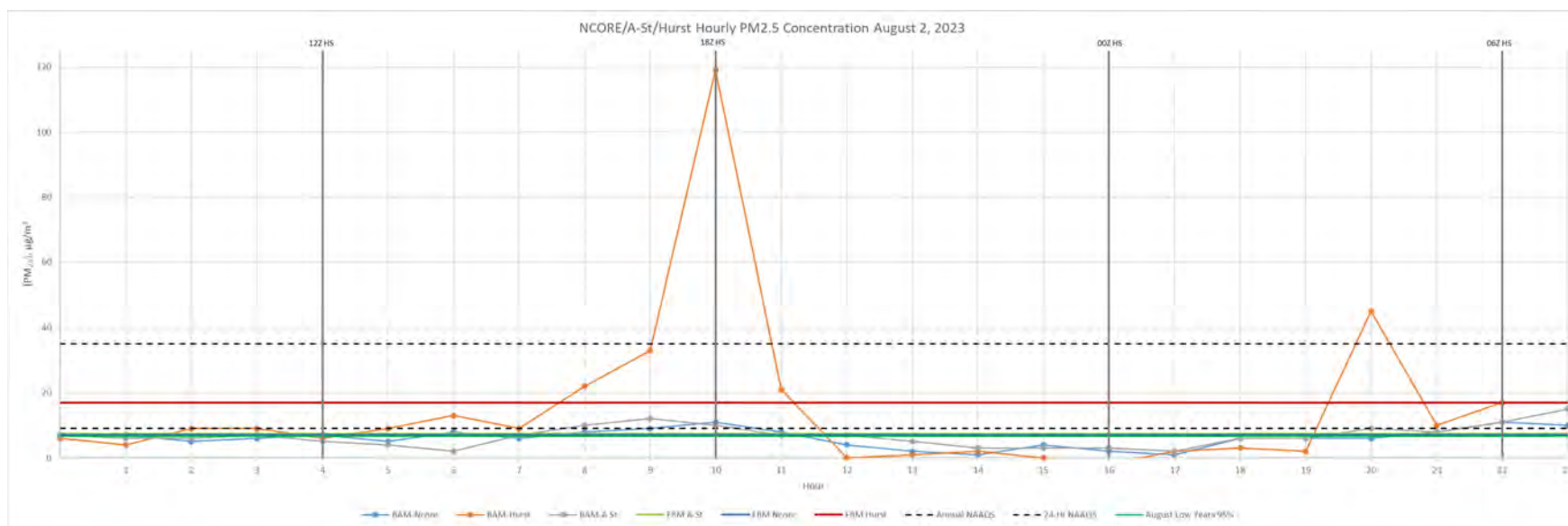


Figure 132: FNSB PM_{2.5} concentrations for August 2, 2023

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on August 2, 2023. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations in the early morning hours are relatively low across all sites, with values generally around 5-10 µg/m³. This indicates good air quality in the early morning.

Midday Levels: PM_{2.5}: During the midday hours, there is a significant spike at the Hurst Road site, reaching approximately 120 µg/m³ around 10:00. This spike is well above the levels observed at the NCore and A-Street sites, which remain stable around 5-10 µg/m³. The elevated levels at Hurst Road suggest a localized source of particulate matter affecting the air quality at that site during the midday hours.

Afternoon to Evening: In the afternoon to evening, the PM_{2.5} levels decrease significantly at the Hurst Road site following the midday spike, returning to values around 5-10 µg/m³ before another small spike at 20:00 to approximately 40 µg/m³. NCore and A-Street continue to exhibit low and stable PM_{2.5} levels throughout the afternoon and evening, maintaining values below 10 µg/m³.

Overall Trend: Throughout the day, the PM_{2.5} levels show variability, with significant fluctuations particularly at the Hurst Road site. The Hurst Road site shows the most significant increase during the midday hours, indicating a potential localized source of PM_{2.5}. PM_{2.5} mostly remained below the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) but above the annual NAAQS limit (represented by the dashed black line at 9 µg/m³). The overall trend suggests variations in air quality, with periods of increased particulate matter, particularly in the midday hours at the Hurst Road site.

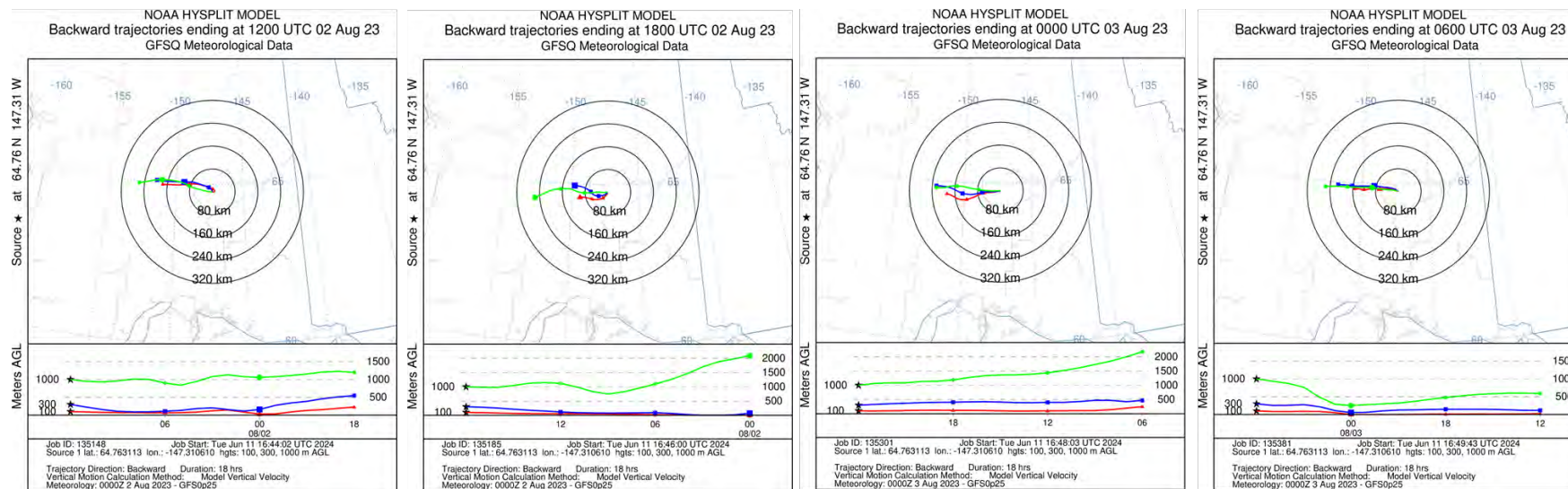


Figure 133: NOAA HYSPLIT model backward trajectories for August 2, 2023. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for August 2 and August 3, 2023. These backward

trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, August 2, 2023):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from a westerly component, converging towards the target location.
- **Image 2 (18:00 UTC, August 2, 2023):** The second image captures the backward trajectory ending in the late morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from a westerly component, converging towards the target location.
- **Image 3 (00:00 UTC, August 3, 2023):** The third image displays the backward trajectory ending in the early afternoon. The air parcels' pathways highlight significant movement from the west at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from a westerly component.
- **Image 4 (06:00 UTC, August 3, 2023):** The final image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the west, with the 100m, 300m, and 1000m trajectories all coming from the same direction.



Figure 134: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for August 2 and August 3, 2023. The images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

- **Image 2 (18:00 UTC, August 2):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from a westerly component at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from that direction. **Smoke Transport:** The MODIS imagery shows the thin smoke plume

lingering over FNSB.

Table 52. Hourly surface observations for Fort Wainwright AAF, August 2, 2023

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	08/02/2023 00:55 AKDT	0	0	**	**	10	58	51
PAFB	08/02/2023 01:55 AKDT	0	0	**	**	10	56	50
PAFB	08/02/2023 02:55 AKDT	3	60	**	**	10	55	51
PAFB	08/02/2023 03:55 AKDT	0	0	**	**	10	54	50
PAFB	08/02/2023 04:55 AKDT	5	80	**	**	9	52	48
PAFB	08/02/2023 05:55 AKDT	6	80	**	**	9	51	48
PAFB	08/02/2023 06:55 AKDT	3	70	**	**	9	54	50
PAFB	08/02/2023 07:55 AKDT	5	80	**	**	10	57	50
PAFB	08/02/2023 08:55 AKDT	**	**	**	**	**	**	**
PAFB	08/02/2023 09:55 AKDT	**	**	**	**	**	**	**
PAFB	08/02/2023 10:55 AKDT	**	**	**	**	**	**	**
PAFB	08/02/2023 11:55 AKDT	0	0	**	**	10	72	52
PAFB	08/02/2023 12:55 AKDT	5	220	**	**	10	74	48
PAFB	08/02/2023 13:55 AKDT	**	**	**	**	**	**	**
PAFB	08/02/2023 14:55 AKDT	7	210	**	**	10	77	46
PAFB	08/02/2023 15:55 AKDT	5	180	**	**	10	78	46
PAFB	08/02/2023 16:55 AKDT	14	220	**	**	10	79	42
PAFB	08/02/2023 17:55 AKDT	8	250	**	**	10	79	43
PAFB	08/02/2023 18:55 AKDT	10	230	**	**	10	80	42
PAFB	08/02/2023 19:55 AKDT	8	290	**	**	9	78	41
PAFB	08/02/2023 20:55 AKDT	6	300	**	**	9	76	42
PAFB	08/02/2023 21:55 AKDT	3	320	**	**	9	73	45
PAFB	08/02/2023 22:55 AKDT	3	70	**	**	9	64	50
PAFB	08/02/2023 23:55 AKDT	0	0	**	**	10	62	51

Surface observations: The surface observations from August 2, 2023, show hours during the day of slightly reduced visibility as thin smoke plumes moved through FNSB. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough – August 3, 2023

AICC Fire Report Summary:

- **New Fires:** 5 new fires reported.
- **Total Fires Statewide:** 140 fires burning.
- **Acres Burned:** 54,619 acres, with a 24-hour increase of 3,497 acres.

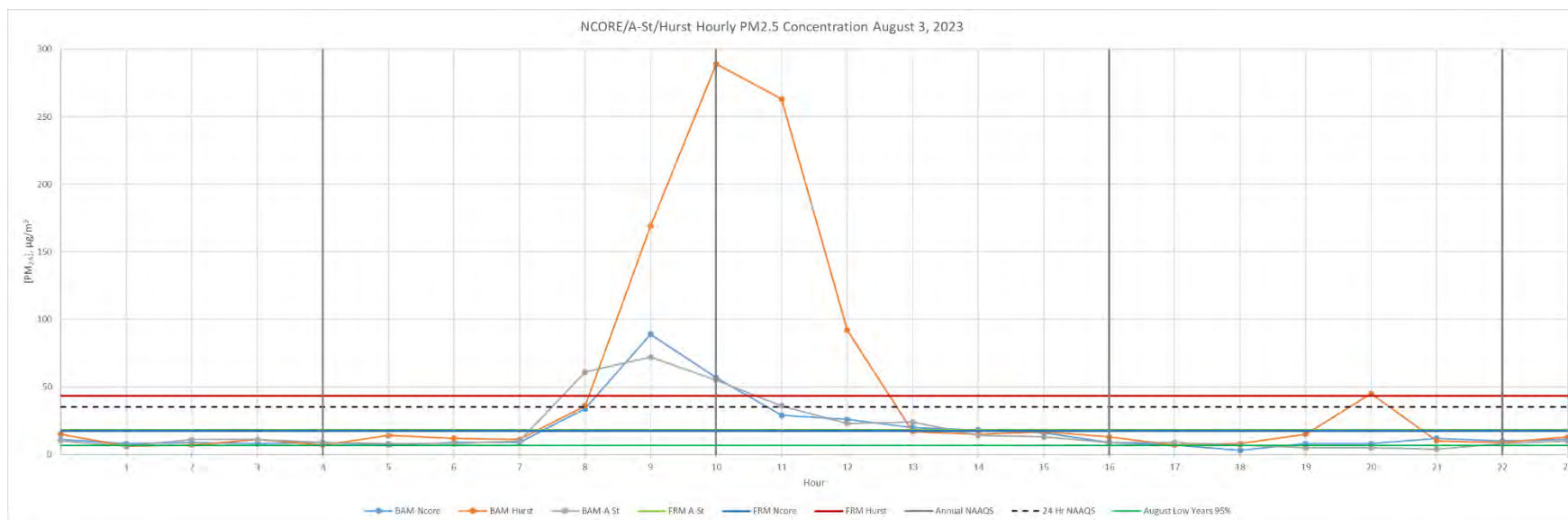


Figure 135: FNSB PM_{2.5} concentrations for August 3, 2023

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on August 3, 2023. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations in the early morning hours are relatively low across all sites, with values generally around 5 µg/m³. This indicates good air quality in the early morning.

Midday Levels: PM_{2.5}: During the midday hours, there is a significant spike at the Hurst Road site, reaching approximately 280 µg/m³ around 10:00. NCore and A-Street also experience notable spikes, with concentrations reaching approximately 75-90 µg/m³. These

spikes are well above the usual levels, indicating that all sites were affected by a substantial increase in particulate matter during the midday hours.

Afternoon to Evening: In the afternoon to evening, the PM_{2.5} levels decrease significantly at the Hurst Road site following the midday spike, returning to values around 10-15 µg/m³. NCore and A-Street also show a reduction in PM_{2.5} levels, stabilizing below 10 µg/m³ throughout the afternoon and evening.

Overall Trend: Throughout the day, the PM_{2.5} levels show variability, with significant fluctuations particularly at the Hurst Road site. The midday hours show the most notable increases, with spikes at all three sites, indicating a potential localized or regional source of PM_{2.5}. For the Hurst Road site, PM_{2.5} remained above both the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) and the annual NAAQS limit (represented by the solid black line at 9 µg/m³). The overall trend suggests variations in air quality, with periods of increased particulate matter, particularly in the midday hours across all monitored sites.

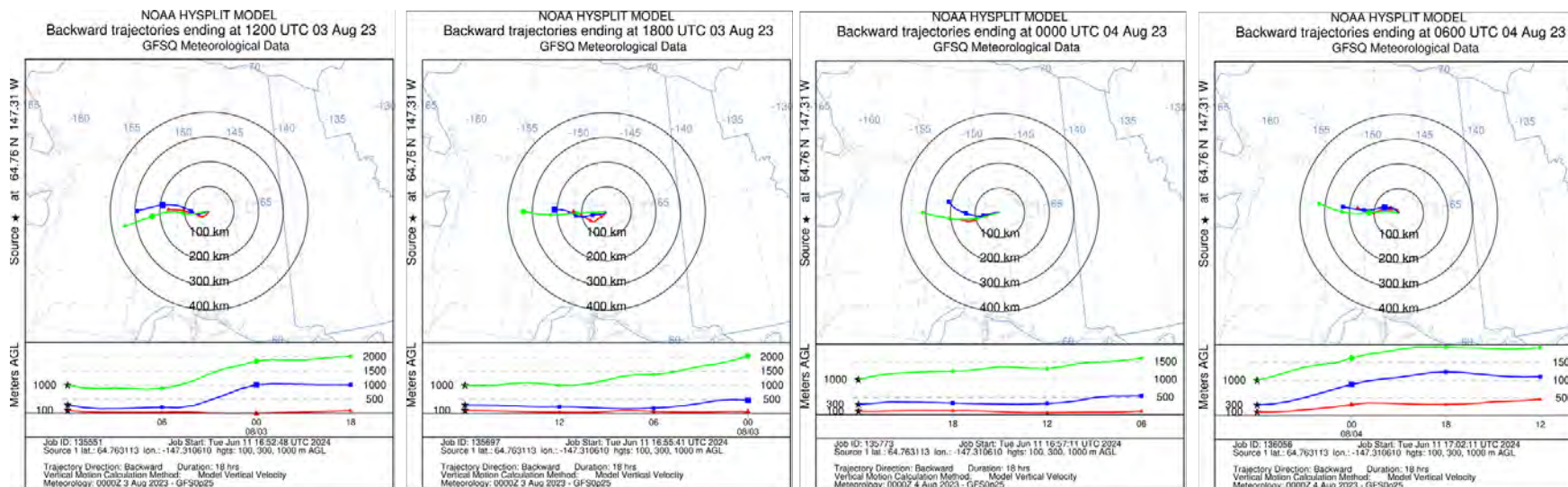


Figure 136: NOAA HYSPLIT model backward trajectories for August 3, 2023. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for August 3 and August 4, 2023. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, August 3, 2023):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from a westerly component, converging towards the target location.
- **Image 2 (18:00 UTC, August 3, 2023):** The second image captures the backward trajectory ending in the late morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from a westerly component, converging towards the target location.
- **Image 3 (00:00 UTC, August 4, 2023):** The third image displays the backward trajectory ending in the early afternoon. The air parcels' pathways highlight significant movement from the west at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from a westerly component.
- **Image 4 (06:00 UTC, August 4, 2023):** The final image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the west, with the 100m, 300m, and 1000m trajectories all coming from the same direction.

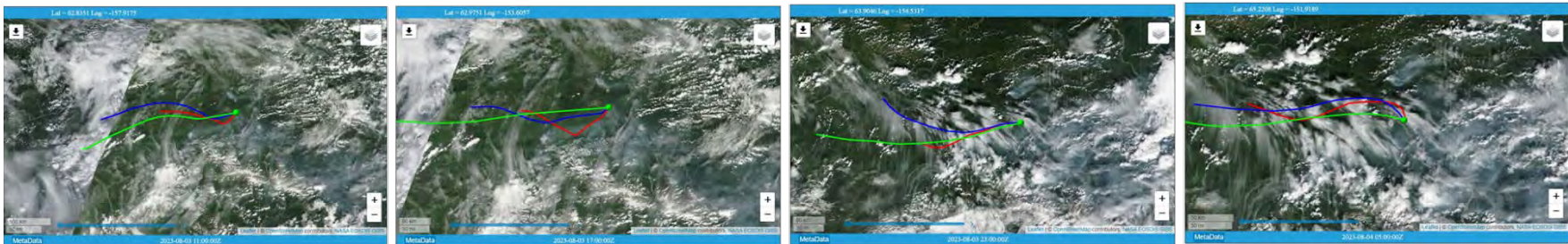


Figure 137: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for August 3 and August 4, 2023. The images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

- **Image 2 (18:00 UTC, August 3):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from a westerly component at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from that direction. **Smoke Transport:** The MODIS imagery shows the thin smoke plumes surrounding FNSB.

Table 53. Hourly surface observations for Fort Wainwright AAF, August 3, 2023

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFB	08/03/2023 00:55 AKDT	0	0	**	**	10	59	52
PAFB	08/03/2023 01:55 AKDT	6	90	**	**	10	54	49
PAFB	08/03/2023 02:55 AKDT	5	100	**	**	9	56	50
PAFB	08/03/2023 03:55 AKDT	5	80	**	**	10	53	50
PAFB	08/03/2023 04:55 AKDT	5	60	**	**	10	52	49
PAFB	08/03/2023 05:55 AKDT	5	80	**	**	10	54	49
PAFB	08/03/2023 06:55 AKDT	3	90	**	**	9	54	50
PAFB	08/03/2023 07:55 AKDT	3	70	**	**	9	56	49
PAFB	08/03/2023 08:55 AKDT	3	100	**	**	10	60	51
PAFB	08/03/2023 09:55 AKDT	3	110	**	7 (Smoke)	3	64	50
PAFB	08/03/2023 10:55 AKDT	0	0	**	7 (Smoke)	3	67	51
PAFB	08/03/2023 11:55 AKDT	0	0	**	7 (Smoke)	3	70	50
PAFB	08/03/2023 12:55 AKDT	0	0	**	7 (Smoke)	4	73	49
PAFB	08/03/2023 13:55 AKDT	3	200	**	7 (Smoke)	5	75	51
PAFB	08/03/2023 14:55 AKDT	0	0	**	7 (Smoke)	8	78	51
PAFB	08/03/2023 15:55 AKDT	6	210	**	**	10	79	49
PAFB	08/03/2023 16:55 AKDT	7	270	**	7 (Smoke)	9	80	49
PAFB	08/03/2023 17:55 AKDT	9	250	**	7 (Smoke)	9	81	46
PAFB	08/03/2023 18:55 AKDT	6	290	**	7 (Smoke)	9	80	44
PAFB	08/03/2023 19:55 AKDT	8	290	**	7 (Smoke)	9	79	44
PAFB	08/03/2023 20:55 AKDT	6	310	**	7 (Smoke)	9	77	48
PAFB	08/03/2023 21:55 AKDT	0	0	**	7 (Smoke)	8	75	48
PAFB	08/03/2023 22:55 AKDT	3	120	**	7 (Smoke)	9	66	54
PAFB	08/03/2023 23:55 AKDT	0	0	**	**	10	66	53

Surface observations: The surface observations from August 3, 2023, show hours during the day of reduced visibility as smoke plumes moved through FNSB. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough – August 4, 2023

AICC Fire Report Summary:

- **New Fires:** 8 new fires reported.
- **Total Fires Statewide:** 144 fires burning.
- **Acres Burned:** 60,873 acres, with a 24-hour increase of 6,254 acres.

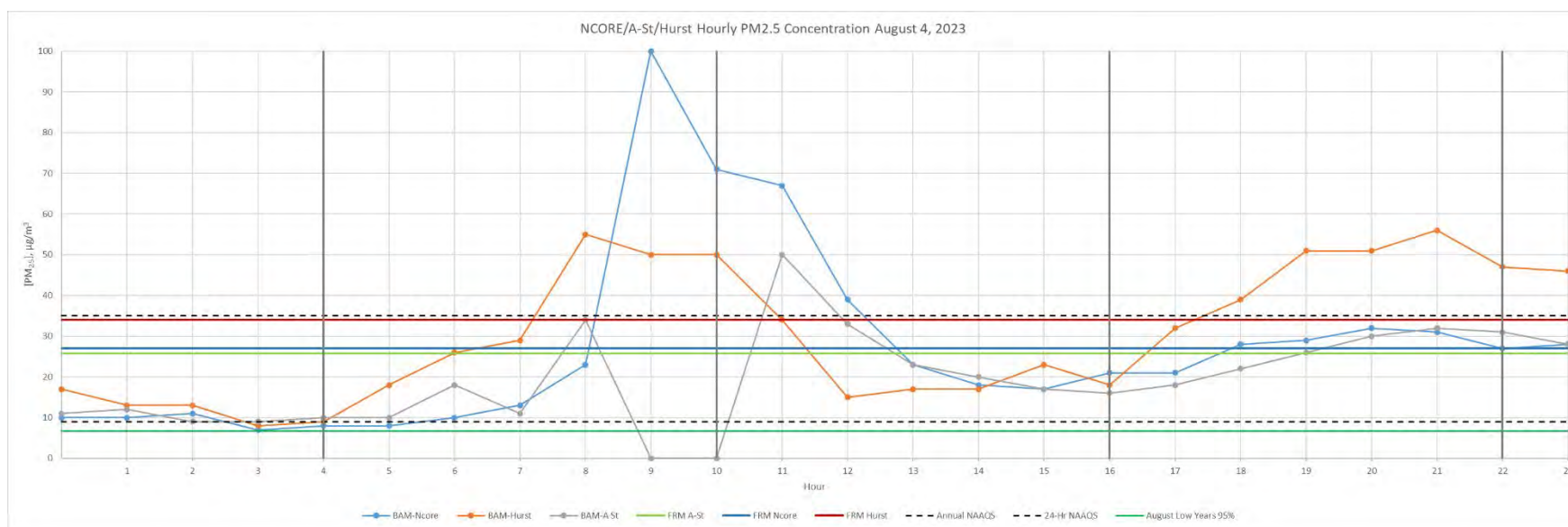


Figure 138: FNSB PM_{2.5} concentrations for August 4, 2023

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on August 4, 2023. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations in the early morning hours are relatively low across all sites, with values generally around 5-15 µg/m³. This indicates good air quality in the early morning.

Midday Levels: PM_{2.5}: During the midday hours, there are significant spikes at the NCore and A-Street sites. NCore experiences a peak around 100 $\mu\text{g}/\text{m}^3$ at 9:00, while A-Street reaches approximately 50 $\mu\text{g}/\text{m}^3$ around the same time. The Hurst Road site also shows an increase, peaking around 50 $\mu\text{g}/\text{m}^3$. These spikes indicate a substantial increase in particulate matter during the midday hours across all monitored sites, suggesting a localized or regional source affecting the area.

Afternoon to Evening: The PM_{2.5} levels decrease slightly before climbing again in the evening at all sites. Hurst Road stabilizes around 50 $\mu\text{g}/\text{m}^3$, while NCore and A-Street maintain lower levels, generally near 30 $\mu\text{g}/\text{m}^3$.

Overall Trend: Throughout the day, the PM_{2.5} levels show variability, with significant fluctuations particularly during the midday hours. The midday hours show the most notable increases, with spikes at NCore, A-Street, and Hurst Road, indicating a potential localized or regional source of PM_{2.5}. PM_{2.5} fluctuated above and below the 24-hour NAAQS limit (represented by the dashed black line at 35 $\mu\text{g}/\text{m}^3$) but above the annual NAAQS limit (represented by the dashed black line at 9 $\mu\text{g}/\text{m}^3$). The overall trend suggests variations in air quality, with periods of increased particulate matter, particularly in the midday hours across all monitored sites.

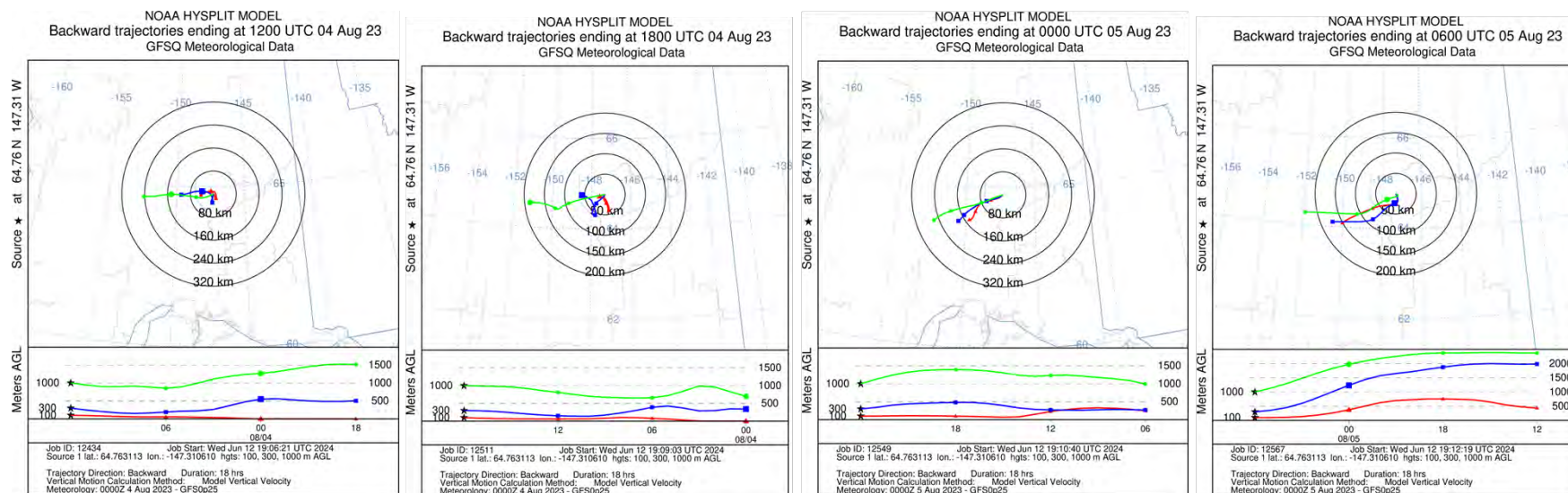


Figure 139: NOAA HYSPLIT model backward trajectories for August 4, 2023. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for August 4 and August 5, 2023. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, August 4, 2023):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from a westerly component, converging towards the target location.
- **Image 2 (18:00 UTC, August 4, 2023):** The second image captures the backward trajectory ending in the late morning. The trajectories at 100m and 300m indicate that the air parcels originated from a southerly component while the 1000m trajectory maintained a westerly component, all converging towards the target location.
- **Image 3 (00:00 UTC, August 5, 2023):** The third image displays the backward trajectory ending in the early afternoon. The air parcels' pathways highlight significant movement from the southwest at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from a westerly component.
- **Image 4 (06:00 UTC, August 5, 2023):** The final image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the southwest, with the 100m, 300m, and 1000m trajectories all coming from the same direction.

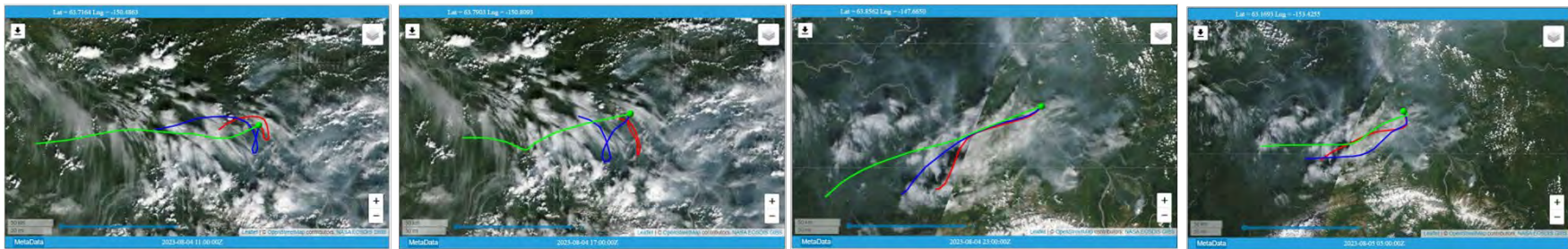


Figure 140: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for August 4 and August 5, 2023. The images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

- **Image 2 (18:00 UTC, August 4):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from southerly and westerly components at varying altitudes, with the 100m and 300m trajectories originating from the south, and the 1000m trajectory coming from the west. **Smoke Transport:** The MODIS imagery shows the thin smoke plumes from local fires surrounding FNSB.

Table 54. Hourly surface observations for Fort Wainwright AAF, August 4, 2023

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	Dpt (F)
PAFB	08/04/2023 00:55 AKDT	0	0	**	**	10	62	51
PAFB	08/04/2023 01:55 AKDT	0	0	**	**	10	60	51
PAFB	08/04/2023 02:55 AKDT	3	70	**	**	10	60	52
PAFB	08/04/2023 03:55 AKDT	0	0	**	**	10	58	51
PAFB	08/04/2023 04:55 AKDT	5	70	**	**	10	57	50
PAFB	08/04/2023 05:55 AKDT	7	90	**	7 (Smoke)	9	56	51
PAFB	08/04/2023 06:55 AKDT	3	80	**	7 (Smoke)	9	58	50
PAFB	08/04/2023 07:55 AKDT	3	30	**	7 (Smoke)	8	60	51
PAFB	08/04/2023 08:55 AKDT	6	90	**	7 (Smoke)	9	64	52
PAFB	08/04/2023 09:55 AKDT	0	0	**	7 (Smoke)	4	67	54
PAFB	08/04/2023 10:55 AKDT	0	0	**	7 (Smoke)	3	69	55
PAFB	08/04/2023 11:55 AKDT	0	0	**	7 (Smoke)	4	72	55
PAFB	08/04/2023 12:55 AKDT	0	0	**	7 (Smoke)	4	73	56
PAFB	08/04/2023 13:55 AKDT	3	160	**	7 (Smoke)	6	76	55
PAFB	08/04/2023 14:55 AKDT	0	0	**	7 (Smoke)	9	78	53
PAFB	08/04/2023 15:55 AKDT	0	0	**	7 (Smoke)	9	79	52
PAFB	08/04/2023 16:55 AKDT	7	160	**	7 (Smoke)	9	79	52
PAFB	08/04/2023 17:55 AKDT	7	240	**	7 (Smoke)	9	80	51
PAFB	08/04/2023 18:55 AKDT	5	210	**	7 (Smoke)	9	79	54
PAFB	08/04/2023 19:55 AKDT	5	210	**	7 (Smoke)	8	79	53
PAFB	08/04/2023 20:55 AKDT	0	0	**	7 (Smoke)	7	78	52
PAFB	08/04/2023 21:55 AKDT	0	0	**	7 (Smoke)	6	73	57
PAFB	08/04/2023 22:55 AKDT	0	0	**	7 (Smoke)	6	67	58
PAFB	08/04/2023 23:55 AKDT	3	70	**	7 (Smoke)	7	64	57

Surface observations: The surface observations from August 4, 2023, show hours during the day of reduced visibility as smoke from local fires settle into FNSB. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough – August 5, 2023

AICC Fire Report Summary:

- **New Fires:** 5 new fires reported.
- **Total Fires Statewide:** 146 fires burning.
- **Acres Burned:** 69,611 acres, with a 24-hour increase of 8,738 acres.

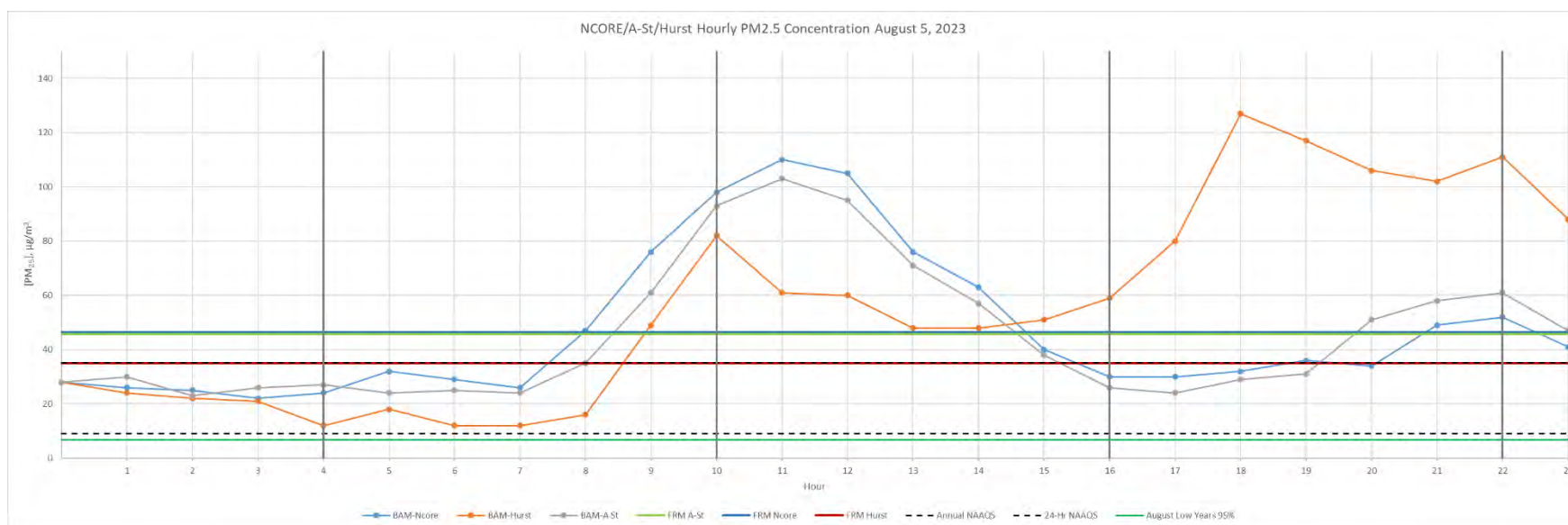


Figure 141: FNSB PM_{2.5} concentrations for August 5, 2023

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on August 5, 2023. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations in the early morning hours are relatively low across all sites, with values generally around 30 µg/m³. This indicates good air quality in the early morning.

Midday Levels: PM_{2.5}: During the midday hours, there are significant spikes at the NCore and A-Street sites. NCore experiences a peak around 110 $\mu\text{g}/\text{m}^3$ at 11:00, while A-Street reaches approximately 100 $\mu\text{g}/\text{m}^3$ around the same time. The Hurst Road site also shows an increase, peaking around 80 $\mu\text{g}/\text{m}^3$. These spikes indicate a substantial increase in particulate matter during the midday hours across all monitored sites, suggesting a localized or regional source affecting the area.

Afternoon to Evening: In the afternoon to evening, the PM_{2.5} levels decrease significantly at the NCore and A-Street sites following the midday spikes. Hurst Road climbs to around 120 $\mu\text{g}/\text{m}^3$.

Overall Trend: Throughout the day, the PM_{2.5} levels show variability, with significant fluctuations particularly during the midday hours. The midday hours show the most notable increases, with spikes at NCore, A-Street, and Hurst Road, indicating a potential localized or regional source of PM_{2.5}. PM_{2.5} levels exceeded the 24-hour NAAQS limit (represented by the dashed black line at 35 $\mu\text{g}/\text{m}^3$) during the peak periods and remained above the annual NAAQS limit (represented by the dashed black line at 9 $\mu\text{g}/\text{m}^3$). The overall trend suggests variations in air quality, with periods of increased particulate matter, particularly in the midday hours across all monitored sites.

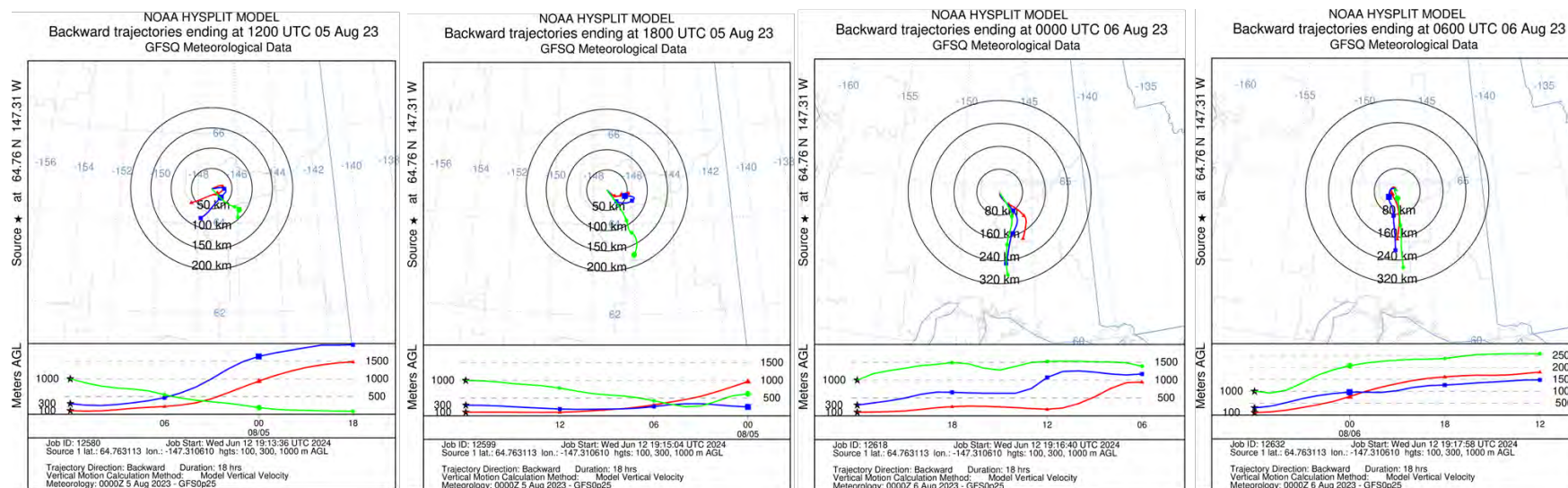


Figure 142: NOAA HYSPLIT model backward trajectories for August 5, 2023. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for August 5 and August 6, 2023. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, August 5, 2023):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the east through southwest, converging towards the target location.
- **Image 2 (18:00 UTC, August 5, 2023):** The second image captures the backward trajectory ending in the late morning. The trajectories at 100m and 300m indicate that the air parcels originated from an easterly component while the 1000m trajectory maintained a southerly component, all converging towards the target location.
- **Image 3 (00:00 UTC, August 6, 2023):** The third image displays the backward trajectory ending in the early afternoon. The air parcels' pathways highlight significant movement from the south at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from a southerly component.
- **Image 4 (06:00 UTC, August 6, 2023):** The final image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the south, with the 100m, 300m, and 1000m trajectories all coming from the same direction.

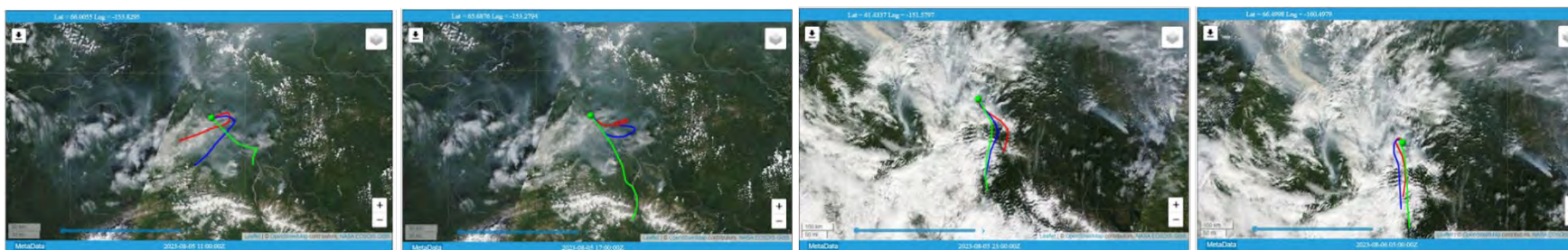


Figure 143: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for August 5 and August 6, 2023. The images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

- **Image 2 (18:00 UTC, August 5):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from easterly and southerly components at varying altitudes, with the 100m and 300m trajectories originating from the east, and the 1000m trajectory coming from the south. **Smoke Transport:** The MODIS imagery shows the thin smoke plumes from local fires surrounding FNSB.

Table 55. Hourly surface observations for Fairbanks International Airport, August 5, 2023

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPT (F)
PAFA	08/05/2023 00:53 AKDT	0	0	**	**	10	63	58
PAFA	08/05/2023 01:53 AKDT	0	0	**	**	10	61	56
PAFA	08/05/2023 02:53 AKDT	5	90	**	**	10	60	55
PAFA	08/05/2023 03:53 AKDT	0	0	**	**	10	61	54
PAFA	08/05/2023 04:53 AKDT	0	0	**	**	10	56	52
PAFA	08/05/2023 05:53 AKDT	0	0	**	**	8	55	51
PAFA	08/05/2023 06:53 AKDT	0	0	**	**	8	58	54
PAFA	08/05/2023 07:53 AKDT	3	50	**	7 (Smoke)	6	60	53
PAFA	08/05/2023 08:53 AKDT	6	30	**	7 (Smoke)	6	65	54
PAFA	08/05/2023 09:53 AKDT	3	110	**	7 (Smoke)	2	66	53
PAFA	08/05/2023 10:53 AKDT	0	0	**	7 (Smoke)	2	69	53
PAFA	08/05/2023 11:53 AKDT	0	0	**	7 (Smoke)	2	72	54
PAFA	08/05/2023 12:53 AKDT	0	0	**	7 (Smoke)	2	74	54
PAFA	08/05/2023 13:53 AKDT	6	70	**	7 (Smoke)	3	76	56
PAFA	08/05/2023 14:53 AKDT	5	120	**	7 (Smoke)	3	79	56
PAFA	08/05/2023 15:53 AKDT	0	0	**	7 (Smoke)	3	81	52
PAFA	08/05/2023 16:53 AKDT	3	**	**	7 (Smoke)	6	82	52
PAFA	08/05/2023 17:53 AKDT	0	0	**	7 (Smoke)	7	83	52
PAFA	08/05/2023 18:53 AKDT	0	0	**	7 (Smoke)	7	83	52
PAFA	08/05/2023 19:53 AKDT	0	0	**	7 (Smoke)	6	83	51
PAFA	08/05/2023 20:53 AKDT	0	0	**	7 (Smoke)	5	78	58
PAFA	08/05/2023 21:53 AKDT	0	0	**	7 (Smoke)	4	73	60
PAFA	08/05/2023 22:53 AKDT	0	0	**	7 (Smoke)	5	70	57
PAFA	08/05/2023 23:53 AKDT	0	0	**	7 (Smoke)	4	67	54

Surface observations: The surface observations from August 5, 2023, show hours during the day of reduced visibility as smoke from local fires settle into FNSB. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough – August 6, 2023

AICC Fire Report Summary:

- **New Fires:** 2 new fires reported.
- **Total Fires Statewide:** 148 fires burning.
- **Acres Burned:** 80,170 acres, with a 24-hour increase of 10,559 acres.

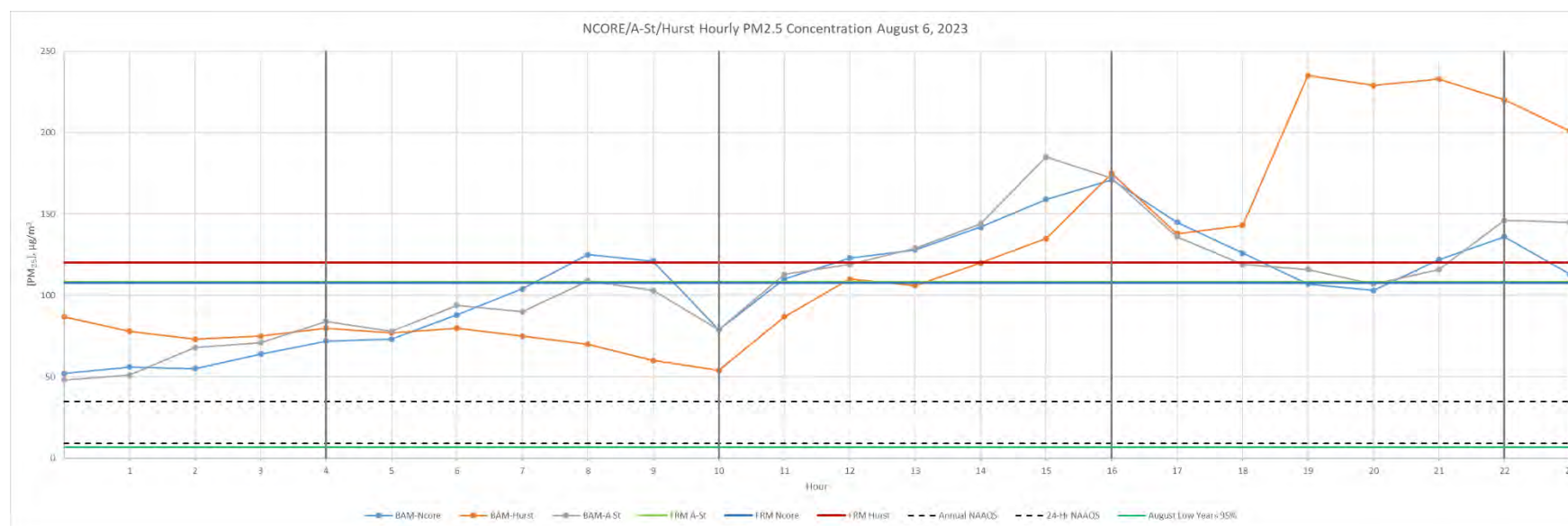


Figure 144: FNSB PM_{2.5} concentrations for August 6, 2023

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on August 6, 2023. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations in the early morning hours are relatively high across all sites, with values generally around 50-100 µg/m³. This indicates moderate to poor air quality in the early morning.

Midday Levels: PM_{2.5}: During the midday hours, there is a gradual increase in PM_{2.5} levels at all sites. NCore, A-Street, and Hurst Road all show rising concentrations, with NCore and Hurst Road peaking around 170 µg/m³ at 16:00, and A-Street peaking slightly earlier at approximately 175µg/m³. These levels indicate significant air quality issues during the midday hours, with substantial increases in particulate matter.

Afternoon to Evening: In the afternoon to evening, the PM_{2.5} levels remain elevated at all sites. NCore and A-Street stabilize around 100-150 µg/m³, while Hurst Road spikes again at 19:00 to 230 µg/m³. This period shows persistent high PM_{2.5} levels, indicating ongoing air quality concerns.

Overall Trend: Throughout the day, the PM_{2.5} levels show significant variability and substantial increases, particularly during the midday to evening hours. All three sites show notable spikes, indicating a potential localized or regional source of PM_{2.5}. PM_{2.5} levels exceeded the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) and remained above the annual NAAQS limit (represented by the dashed black line at 9 µg/m³). The overall trend suggests significant air quality impacts, with persistent periods of increased particulate matter throughout the day across all monitored sites.

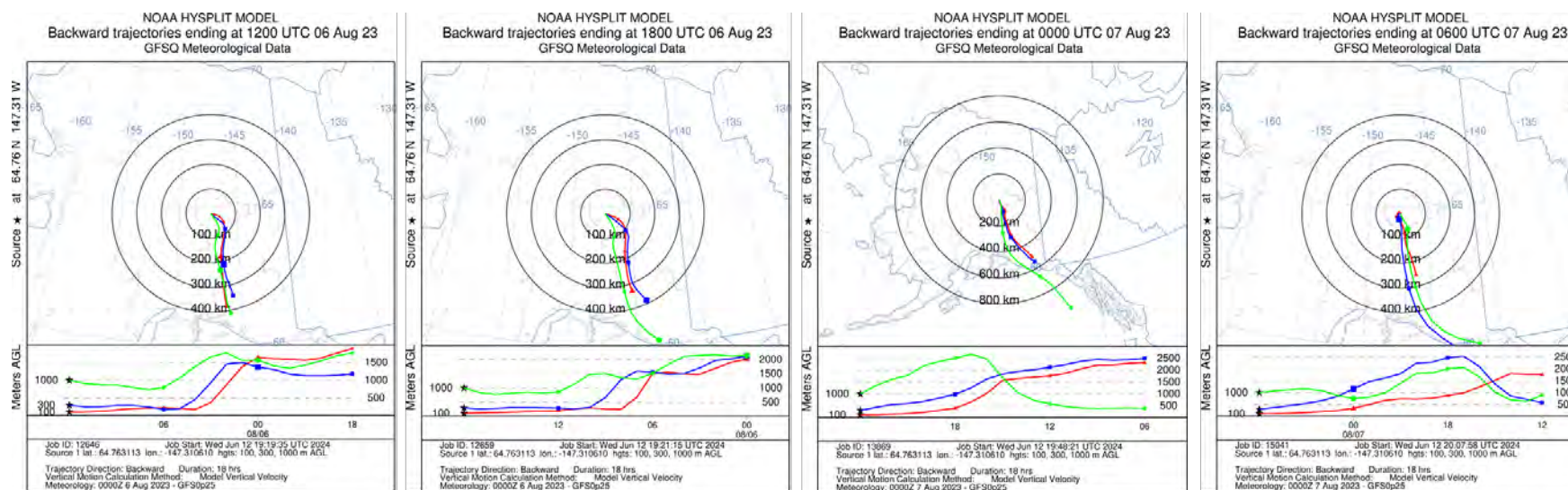


Figure 145: NOAA HYSPLIT model backward trajectories for August 6, 2023. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for August 6 and August 7, 2023. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these

trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, August 6, 2023):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from south, converging towards the target location.
- **Image 2 (18:00 UTC, August 6, 2023):** The image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels continuing from south, converging towards the target location.
- **Image 3 (00:00 UTC, August 7, 2023):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the south, with the 100m, 300m, and 1000m trajectories all coming from the same direction.
- **Image 4 (06:00 UTC, August 7, 2023):** he final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels at 100m, 300m, and 1000m coming from the south.

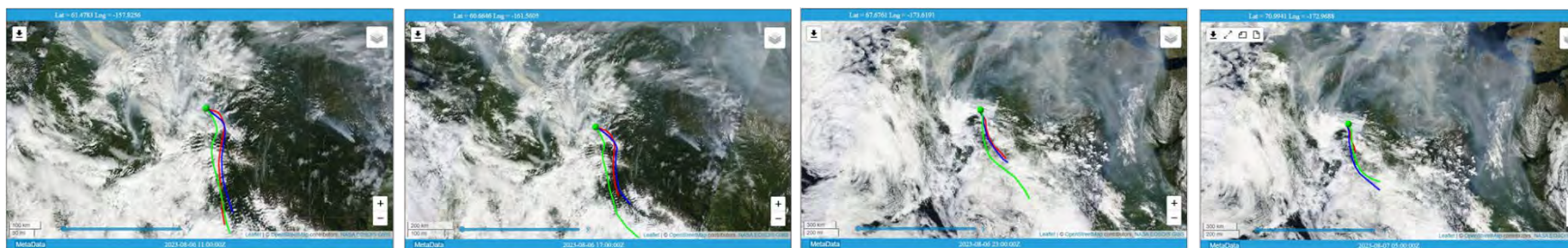


Figure 146: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for August 6 and August 7, 2023. The images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

- **Image 2 (18:00 UTC, August 6):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement at all levels from a southerly component at varying altitudes. **Smoke Transport:** The MODIS imagery shows the smoke plumes from local fires surrounding FNSB. Even though there is cleaner air upstream, the thick smoke is backing up against the higher elevations to the north of FNSB and getting trapped in the bowl.

Table 56. Hourly surface observations for Fairbanks International Airport, August 6, 2023

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	08/06/2023 00:53 AKDT	0	0	**	7 (Smoke)	4	64	57
PAFA	08/06/2023 01:53 AKDT	8	50	**	7 (Smoke)	4	63	52
PAFA	08/06/2023 02:53 AKDT	0	0	**	7 (Smoke)	5	59	52
PAFA	08/06/2023 03:53 AKDT	0	0	**	7 (Smoke)	5	61	52
PAFA	08/06/2023 04:53 AKDT	6	40	**	7 (Smoke)	5	57	52
PAFA	08/06/2023 05:53 AKDT	0	0	**	7 (Smoke)	4	58	52
PAFA	08/06/2023 06:53 AKDT	3	20	**	7 (Smoke)	3	57	52
PAFA	08/06/2023 07:53 AKDT	6	50	**	7 (Smoke)	3	58	52
PAFA	08/06/2023 08:53 AKDT	6	50	**	7 (Smoke)	2	61	52
PAFA	08/06/2023 09:53 AKDT	0	0	**	7 (Smoke)	2	66	52
PAFA	08/06/2023 10:53 AKDT	0	0	**	7 (Smoke)	2	69	51
PAFA	08/06/2023 11:53 AKDT	6	80	**	7 (Smoke)	2	72	52
PAFA	08/06/2023 12:53 AKDT	3	140	**	7 (Smoke)	2	74	50
PAFA	08/06/2023 13:53 AKDT	3	**	**	7 (Smoke)	2	76	52
PAFA	08/06/2023 14:53 AKDT	6	150	**	7 (Smoke)	2	78	51
PAFA	08/06/2023 15:53 AKDT	5	130	**	7 (Smoke)	2	78	51
PAFA	08/06/2023 16:53 AKDT	0	0	**	7 (Smoke)	2	77	51
PAFA	08/06/2023 17:53 AKDT	3	350	**	7 (Smoke)	2	79	52
PAFA	08/06/2023 18:53 AKDT	6	50	**	7 (Smoke)	2	80	51
PAFA	08/06/2023 19:53 AKDT	0	0	**	7 (Smoke)	3	77	57
PAFA	08/06/2023 20:53 AKDT	0	0	**	7 (Smoke)	3	73	57
PAFA	08/06/2023 21:53 AKDT	0	0	**	7 (Smoke)	3	69	58
PAFA	08/06/2023 22:53 AKDT	3	10	**	7 (Smoke)	3	66	55
PAFA	08/06/2023 23:53 AKDT	0	0	**	7 (Smoke)	2	66	57

Surface observations: The surface observations from August 6, 2023, show hours during the day of reduced visibility as smoke from local fires settle into FNSB. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough – August 7, 2023

AICC Fire Report Summary:

- **New Fires:** 5 new fires reported.
- **Total Fires Statewide:** 151 fires burning.
- **Acres Burned:** 114,832 acres, with a 24-hour increase of 34,662 acres.

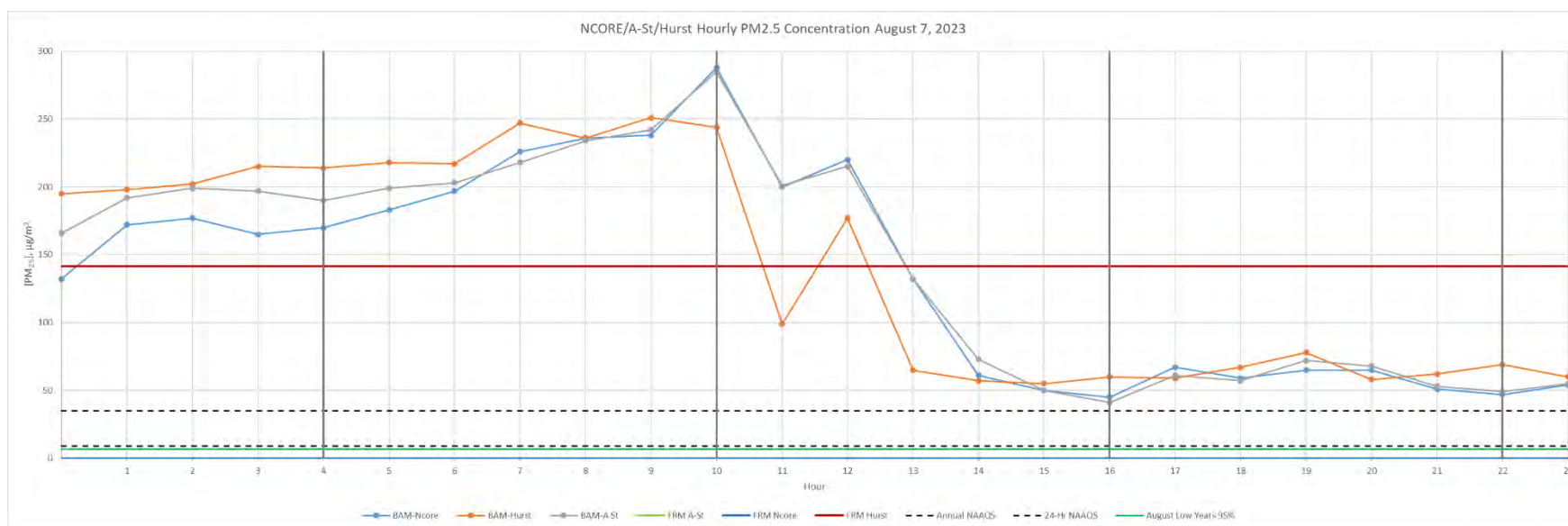


Figure 147: FNSB PM_{2.5} concentrations for August 7, 2023

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on August 7, 2023. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations in the early morning hours are relatively high across all sites, with values generally around 150-200 µg/m³. This indicates poor air quality in the early morning.

Midday Levels: PM_{2.5}: During the midday hours, the PM_{2.5} levels remain elevated at all sites, with NCore and A-Street showing a peak around 290 µg/m³ at 10:00. The Hurst Road site also shows high levels, peaking around 250 µg/m³. These levels indicate significant air quality issues during the midday hours, with substantial concentrations of particulate matter affecting the area.

Afternoon to Evening: In the afternoon to evening, the PM_{2.5} levels decrease significantly at all sites following the midday spikes. All sites stabilize around 50-60 µg/m³.

Overall Trend: Throughout the day, the PM_{2.5} levels show significant variability and substantial increases, particularly during the morning to midday hours. All three sites show notable spikes, indicating a potential localized or regional source of PM_{2.5}. PM_{2.5} levels exceeded the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) and the annual NAAQS limit (represented by the dashed black line at 9 µg/m³). The overall trend suggests significant air quality impacts, with persistent periods of increased particulate matter throughout the day across all monitored sites.

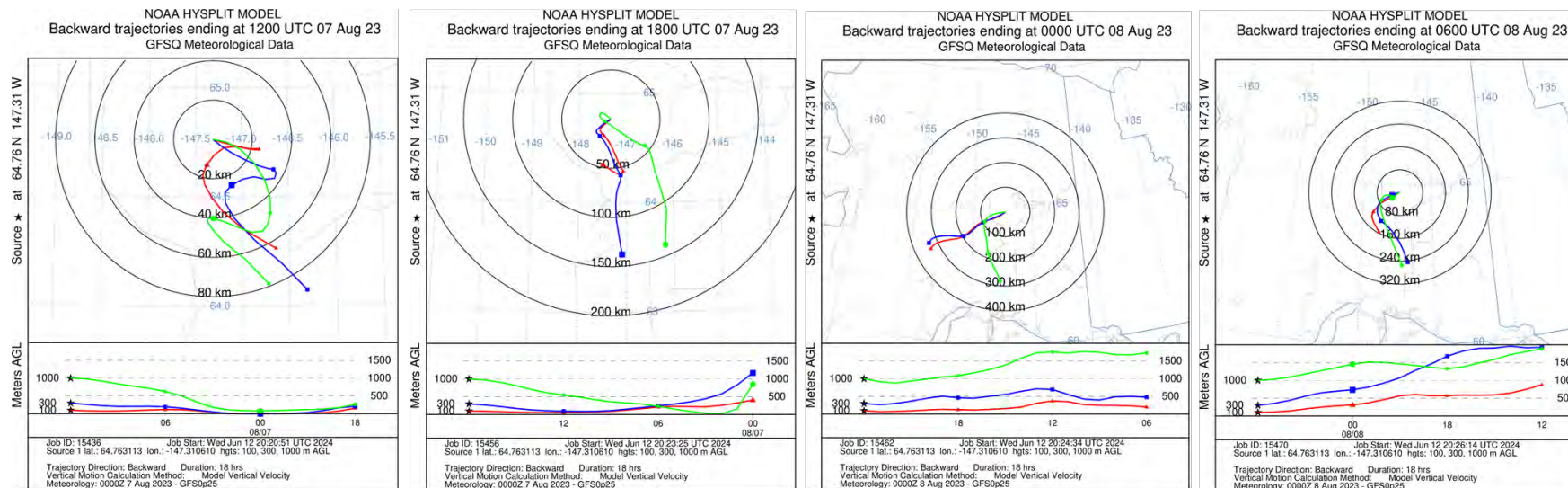


Figure 148: NOAA HYSPLIT model backward trajectories for August 7, 2023. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for August 7 and August 8, 2023. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, August 7, 2023):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from south but due to the light winds the parcels path randomly changed their direction, converging towards the target location.
- **Image 2 (18:00 UTC, August 7, 2023):** The image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels came from south, converging towards the target location.
- **Image 3 (00:00 UTC, August 8, 2023):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the southwest, with the 100m, 300m, and 1000m trajectories all coming from the same direction.
- **Image 4 (06:00 UTC, August 8, 2023):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels at 100m, 300m, and 1000m coming from the south through southwest.

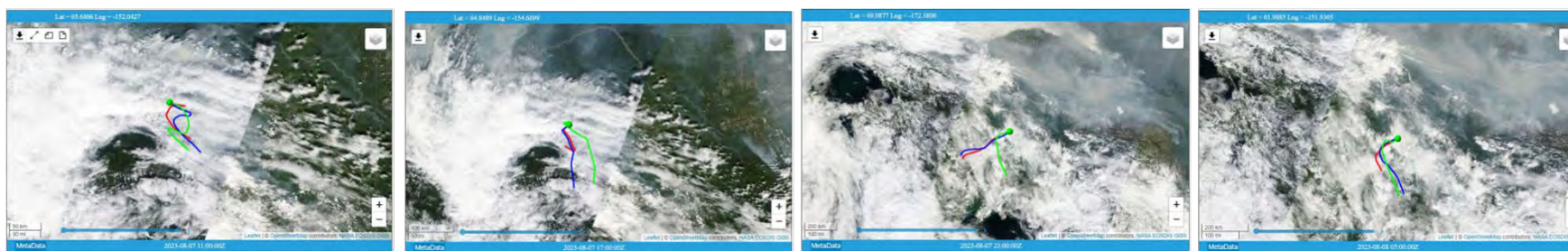


Figure 149: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for August 7 and August 8, 2023. The images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

- **Image 2 (18:00 UTC, August 7):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement at all levels from a southerly component at varying altitudes. **Smoke Transport:** The MODIS imagery shows the smoke plumes from local fires surrounding FNSB. Even though there is cleaner air upstream the thick smoke is backing up against the higher elevations to the north of FNSB and being trapped in the bowl.

Table 57. Hourly surface observations for Fairbanks International Airport, August 7, 2023

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPT (F)
PAFA	08/07/2023 00:53 AKDT	5	60	**	7 (Smoke)	2	62	53
PAFA	08/07/2023 01:53 AKDT	5	40	**	7 (Smoke)	2	62	53
PAFA	08/07/2023 02:53 AKDT	0	0	**	7 (Smoke)	2	60	53
PAFA	08/07/2023 03:53 AKDT	3	90	**	7 (Smoke)	2	59	54
PAFA	08/07/2023 04:53 AKDT	5	30	**	7 (Smoke)	2	60	51
PAFA	08/07/2023 05:53 AKDT	0	0	**	7 (Smoke)	2	60	53
PAFA	08/07/2023 06:53 AKDT	3	80	**	7 (Smoke)	2	60	53
PAFA	08/07/2023 07:53 AKDT	0	0	**	7 (Smoke)	2	61	54
PAFA	08/07/2023 08:53 AKDT	3	190	**	7 (Smoke)	1	62	55
PAFA	08/07/2023 09:53 AKDT	8	180	**	7 (Smoke)	1	62	55
PAFA	08/07/2023 10:53 AKDT	3	240	**	7 (Smoke)	1	64	55
PAFA	08/07/2023 11:53 AKDT	7	170	**	7 (Smoke)	1	64	55
PAFA	08/07/2023 12:53 AKDT	7	200	**	7 (Smoke)	1	64	55
PAFA	08/07/2023 13:53 AKDT	8	240	**	7 (Smoke)	1	65	56
PAFA	08/07/2023 14:53 AKDT	7	330	**	7 (Smoke)	2	69	55
PAFA	08/07/2023 15:53 AKDT	3	350	**	7 (Smoke)	6	71	53
PAFA	08/07/2023 16:53 AKDT	5	**	**	7 (Smoke)	5	71	53
PAFA	08/07/2023 17:53 AKDT	3	150	**	7 (Smoke)	5	71	53
PAFA	08/07/2023 18:53 AKDT	3	230	**	7 (Smoke)	5	70	56
PAFA	08/07/2023 19:53 AKDT	3	230	**	7 (Smoke)	6	68	57
PAFA	08/07/2023 20:53 AKDT	0	0	**	7 (Smoke)	6	68	57
PAFA	08/07/2023 21:53 AKDT	0	0	**	7 (Smoke)	4	64	59
PAFA	08/07/2023 22:53 AKDT	3	280	**	7 (Smoke)	4	63	58
PAFA	08/07/2023 23:53 AKDT	0	0	**	7 (Smoke)	4	63	56

Surface observations: The surface observations from August 7, 2023, show hours during the day of reduced visibility as smoke plumes move through FNSB. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough – August 8, 2023

AICC Fire Report Summary:

- **New Fires:** 2 new fires reported.
- **Total Fires Statewide:** 152 fires burning.
- **Acres Burned:** 243,918 acres, with a 24-hour increase of 129,086 acres.

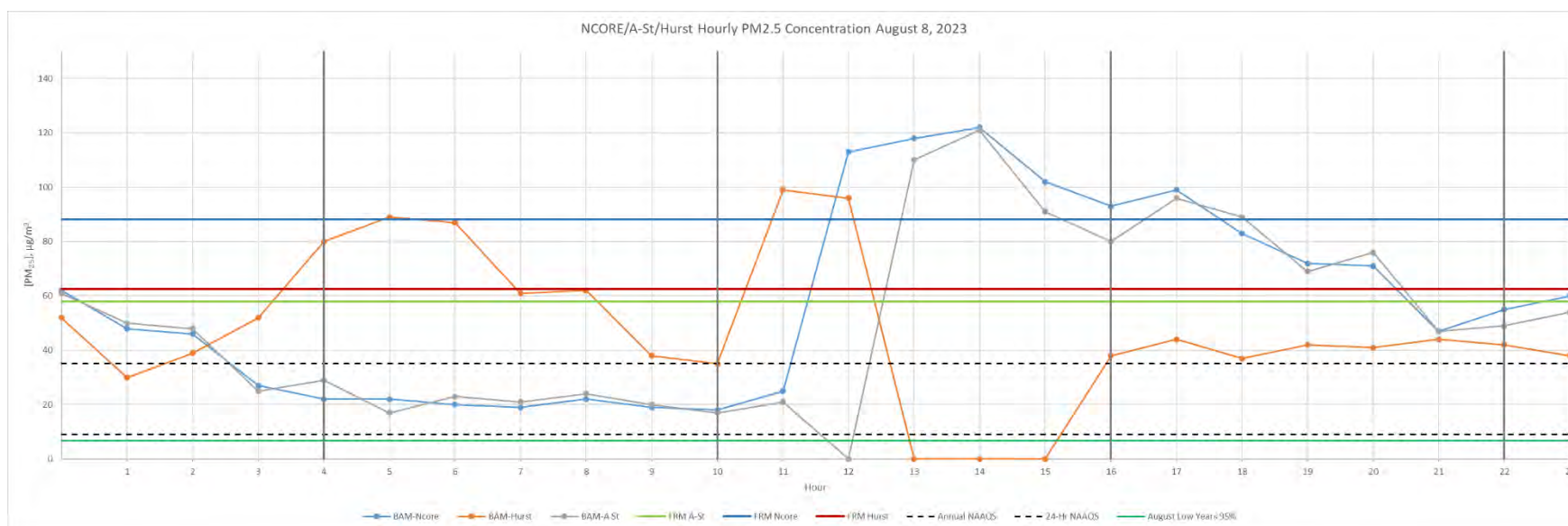


Figure 150: FNSB PM_{2.5} concentrations for August 8, 2023

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on August 8, 2023. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: The PM_{2.5} concentrations in the early morning hours are relatively high across all sites. NCore and A-Street start out at 60 µg/m³ and gradually decline to 20 µg/m³, while Hurst Road climbs to 90 µg/m³. This indicates poor air quality in the early morning.

Midday Levels: PM_{2.5}: During the midday hours, the PM_{2.5} levels show some variability. NCore and A-Street show significant increases, spiking to 120 µg/m³. Hurst Road spiked to 100 µg/m³ then dropped to 0 µg/m³ at 1:00 PM.

Afternoon to Evening: In the afternoon to evening, PM_{2.5} levels at the Ncore and A-Street sites increase further, reaching up to 120 µg/m³. The Hurst Road site dropped off line for a few hours due to maintenance, once back online it showed steady concentrations around 40 µg/m³ for the evening.

Overall Trend: Throughout the day, the PM_{2.5} levels show significant variability and fluctuations across all sites. The NCore and A-Street sites show notable spikes, indicating potential localized sources of PM_{2.5}. PM_{2.5} levels exceeded the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) during the peak periods and remained above the annual NAAQS limit (represented by the dashed black line at 9 µg/m³) outside of those spikes. The overall trend suggests significant air quality variations, with persistent periods of increased particulate matter throughout the day across all monitored sites.

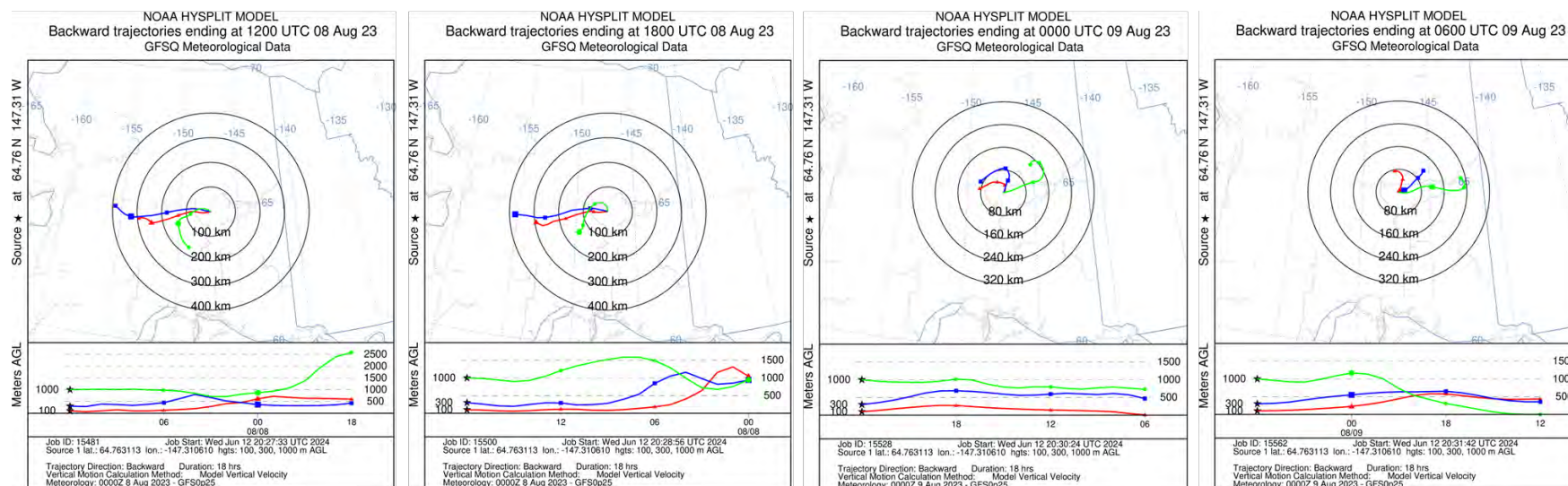


Figure 151: NOAA HYSPLIT model backward trajectories for August 8, 2023. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for August 8 and August 9, 2023. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, August 8, 2023):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the west and southwest, converging towards the target location.
- **Image 2 (18:00 UTC, August 8, 2023):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the west at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from a westerly component.
- **Image 3 (00:00 UTC, August 9, 2023):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the northwest through northeast, with the 100m, 300m, and 1000m trajectories all coming from the same direction.
- **Image 4 (06:00 UTC, August 9, 2023):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels at 100m, 300m, and 1000m coming from the north through east.

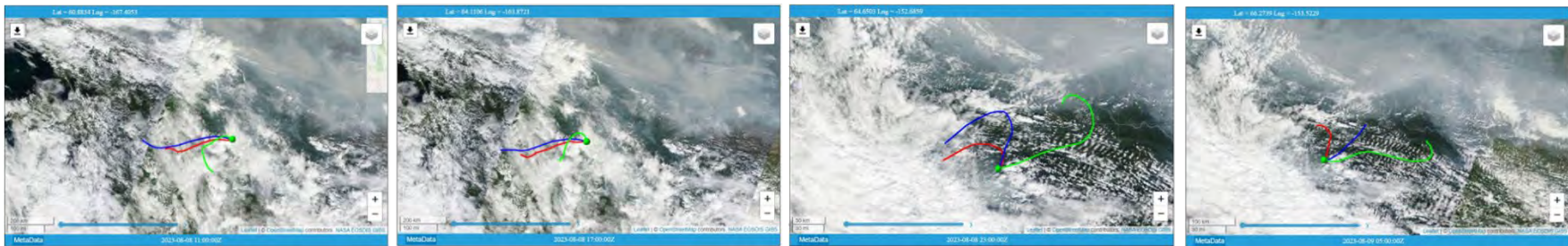


Figure 152: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for August 8 and August 9, 2023. The images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

- **Image 2 (18:00 UTC, August 8):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement at all levels from a westerly component at varying altitudes. **Smoke Transport:** The MODIS imagery shows the smoke plumes from local fires surrounding FNSB.

Table 58. Hourly surface observations for Fairbanks International Airport, August 8, 2023

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	Dpt (F)
PAFA	08/08/2023 00:53 AKDT	3	250	**	7 (Smoke)	4	61	56
PAFA	08/08/2023 01:53 AKDT	5	200	**	7 (Smoke)	4	58	56
PAFA	08/08/2023 02:53 AKDT	5	180	**	7 (Smoke)	4	57	55
PAFA	08/08/2023 03:53 AKDT	7	210	**	7 (Smoke)	4	57	53
PAFA	08/08/2023 04:53 AKDT	3	210	**	7 (Smoke)	4	56	54
PAFA	08/08/2023 05:53 AKDT	0	0	**	7 (Smoke)	5	56	54
PAFA	08/08/2023 06:53 AKDT	3	230	**	7 (Smoke)	5	56	54
PAFA	08/08/2023 07:53 AKDT	5	40	**	7 (Smoke)	5	58	56
PAFA	08/08/2023 08:53 AKDT	3	190	**	7 (Smoke)	7	61	56
PAFA	08/08/2023 09:53 AKDT	0	0	**	7 (Smoke)	10	63	56
PAFA	08/08/2023 10:53 AKDT	0	0	**	7 (Smoke)	10	64	55
PAFA	08/08/2023 11:53 AKDT	8	170	**	7 (Smoke)	10	66	55
PAFA	08/08/2023 12:53 AKDT	7	200	**	7 (Smoke)	2	63	56
PAFA	08/08/2023 13:53 AKDT	3	**	**	7 (Smoke)	2	61	57
PAFA	08/08/2023 14:53 AKDT	6	220	**	7 (Smoke)	2	63	59
PAFA	08/08/2023 15:53 AKDT	5	220	**	7 (Smoke)	2	63	59
PAFA	08/08/2023 16:53 AKDT	3	220	**	7 (Smoke)	2	65	60
PAFA	08/08/2023 17:53 AKDT	0	0	**	7 (Smoke)	3	66	57
PAFA	08/08/2023 18:53 AKDT	5	190	**	7 (Smoke)	3	66	59
PAFA	08/08/2023 19:53 AKDT	5	210	**	7 (Smoke)	3	66	59
PAFA	08/08/2023 20:53 AKDT	3	150	**	7 (Smoke)	3	65	60
PAFA	08/08/2023 21:53 AKDT	5	90	**	7 (Smoke)	4	64	59
PAFA	08/08/2023 22:53 AKDT	0	0	**	7 (Smoke)	3	62	58
PAFA	08/08/2023 23:53 AKDT	3	350	**	7 (Smoke)	2	62	58

Surface observations: The surface observations from August 8, 2023, show hours during the day of reduced visibility as smoke plumes move through FNSB. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough – August 9, 2023

AICC Fire Report Summary:

- **New Fires:** 2 new fires reported.
- **Total Fires Statewide:** 153 fires burning.
- **Acres Burned:** 253,475 acres, with a 24-hour increase of 9,551 acres.

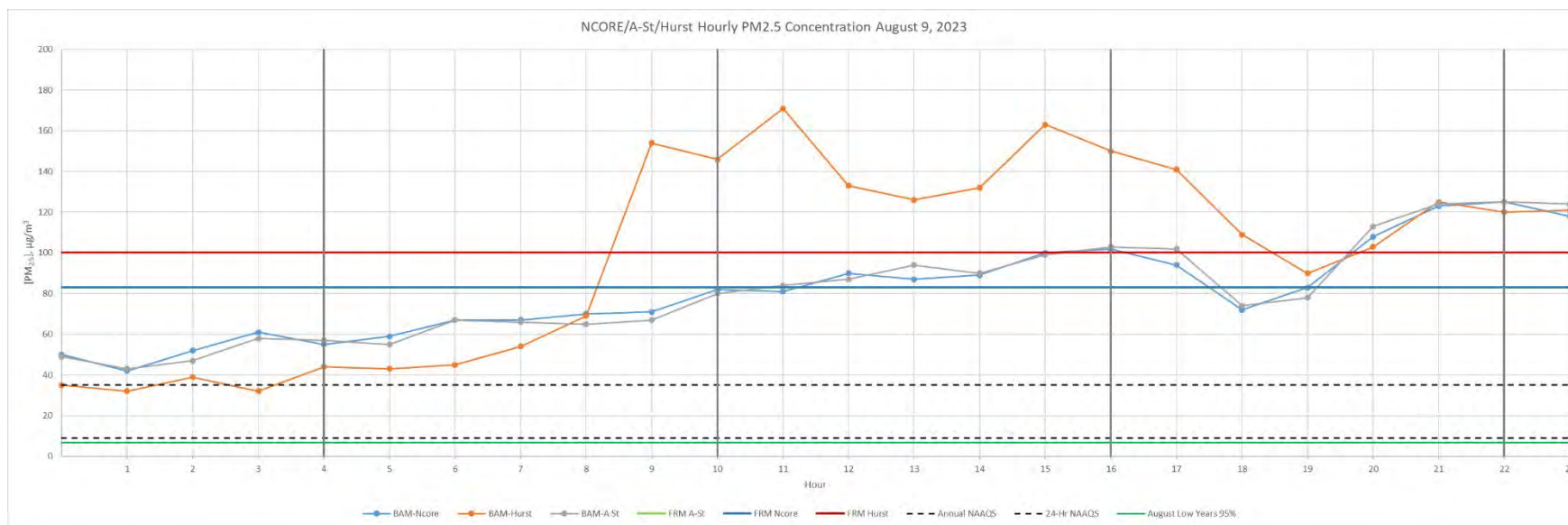


Figure 153: FNSB PM_{2.5} concentrations for August 9, 2023

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on August 9, 2023. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: During the early morning hours, PM_{2.5} levels at all sites were consistent, maintaining a range between 30-60 µg/m³. The NCore and A-Street sites consistently showed the highest concentrations in this period, reaching around 60 µg/m³.

Midday Levels: PM_{2.5}: The PM_{2.5} concentrations fluctuated through midday, with a slight increase at the NCore and A St sites, peaking at around 90 µg/m³. Hurst Road showed an increase to approximately 180 µg/m³. This period demonstrates a general trend of

increasing PM_{2.5} levels across all sites.

Afternoon to Evening: NCore and A-Street sites displayed noticeable peaks, reaching about 120 µg/m³. The Hurst Road site experienced a substantial increase early, peaking at around 160 µg/m³ then declining to 120 µg/m³. During the evening, levels remained elevated at all sites, though a slight decline was observed towards the end of the day.

Overall Trend: Throughout the day, the PM_{2.5} levels show variability and fluctuations across all sites. PM_{2.5} levels exceeded the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) and the annual NAAQS limit (represented by the dashed black line at 9 µg/m³) throughout the day. The overall trend suggests significant air quality variations, with persistent periods of increased particulate matter throughout the day across all monitored sites.

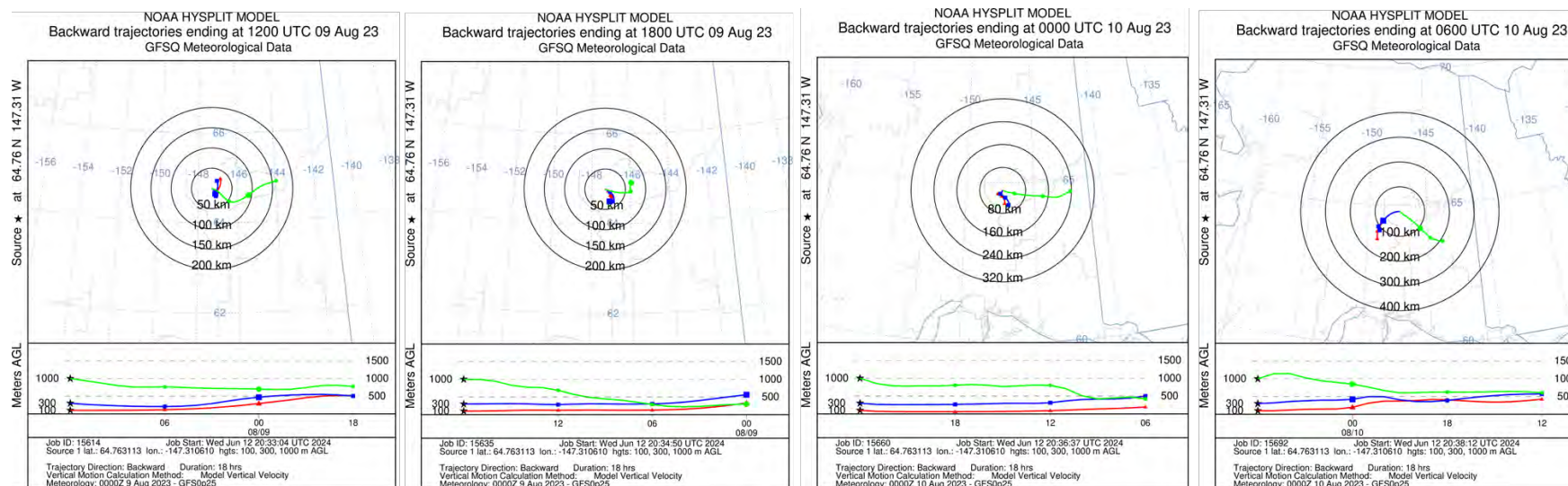


Figure 154: NOAA HYSPLIT model backward trajectories for August 9, 2023. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for August 9 and August 10, 2023. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, August 9, 2023):** This image shows the backward trajectory ending in the early morning. The trajectories at 100m, 300m, and 1000m indicate that the air parcels originated from the north through east, converging towards the target location.
- **Image 2 (18:00 UTC, August 9, 2023):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight slight movement from the east at varying altitudes, with the 100m, 300m, and 1000m trajectories all originating from a westerly component.
- **Image 3 (00:00 UTC, August 10, 2023):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the east through southeast, with the 100m, 300m, and 1000m trajectories all coming from the same direction.
- **Image 4 (06:00 UTC, August 10, 2023):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels at 100m and 300m originating from the southwest and the 1000m trajectory coming from the east.

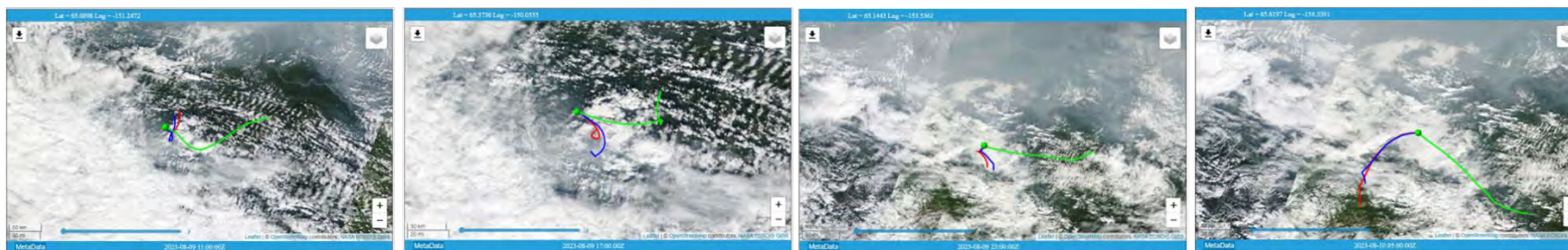


Figure 155: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for August 9 and August 10, 2023. The images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

- **Image 2 (18:00 UTC, August 9):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement at all levels from an easterly component at varying altitudes. **Smoke Transport:** The MODIS imagery shows the smoke plumes from local fires surrounding FNSB.

Table 59. Hourly surface observations for Fairbanks International Airport, August 9, 2023

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	08/09/2023 00:53 AKDT	0	0	**	7 (Smoke)	2	61	59
PAFA	08/09/2023 01:53 AKDT	0	0	**	7 (Smoke)	2	60	58
PAFA	08/09/2023 02:53 AKDT	0	0	**	7 (Smoke)	2	60	58
PAFA	08/09/2023 03:53 AKDT	0	0	**	7 (Smoke)	1	60	58
PAFA	08/09/2023 04:53 AKDT	0	0	**	7 (Smoke)	2	60	58
PAFA	08/09/2023 05:53 AKDT	5	70	**	7 (Smoke)	2	60	56
PAFA	08/09/2023 06:53 AKDT	3	120	**	7 (Smoke)	1	60	56
PAFA	08/09/2023 07:53 AKDT	**	**	**	**	**	**	**
PAFA	08/09/2023 08:53 AKDT	6	80	**	7 (Smoke)	1	61	57
PAFA	08/09/2023 09:53 AKDT	0	0	**	7 (Smoke)	2	62	57
PAFA	08/09/2023 10:53 AKDT	0	0	**	7 (Smoke)	2	63	59
PAFA	08/09/2023 11:53 AKDT	0	0	**	7 (Smoke)	2	64	59
PAFA	08/09/2023 12:53 AKDT	5	220	**	7 (Smoke)	2	67	60
PAFA	08/09/2023 13:53 AKDT	5	200	**	7 (Smoke)	2	68	59
PAFA	08/09/2023 14:53 AKDT	6	200	**	7 (Smoke)	2	69	58
PAFA	08/09/2023 15:53 AKDT	8	230	**	7 (Smoke)	3	69	60
PAFA	08/09/2023 16:53 AKDT	10	240	**	7 (Smoke)	3	70	59
PAFA	08/09/2023 17:53 AKDT	6	260	**	7 (Smoke)	3	70	59
PAFA	08/09/2023 18:53 AKDT	5	220	**	7 (Smoke)	3	69	58
PAFA	08/09/2023 19:53 AKDT	7	230	**	7 (Smoke)	3	68	57
PAFA	08/09/2023 20:53 AKDT	5	220	**	7 (Smoke)	3	66	57
PAFA	08/09/2023 21:53 AKDT	5	200	**	7 (Smoke)	2	64	57
PAFA	08/09/2023 22:53 AKDT	**	**	**	**	**	**	**
PAFA	08/09/2023 23:53 AKDT	0	0	**	7 (Smoke)	2	61	57

Surface observations: The surface observations from August 9, 2023, show hours during the day of significantly reduced visibility as smoke plumes engulfs FNSB. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough – August 10, 2023

AICC Fire Report Summary:

- **New Fires:** 0 new fires reported.
- **Total Fires Statewide:** 153 fires burning.
- **Acres Burned:** 255,567 acres, with a 24-hour increase of 2,092 acres.

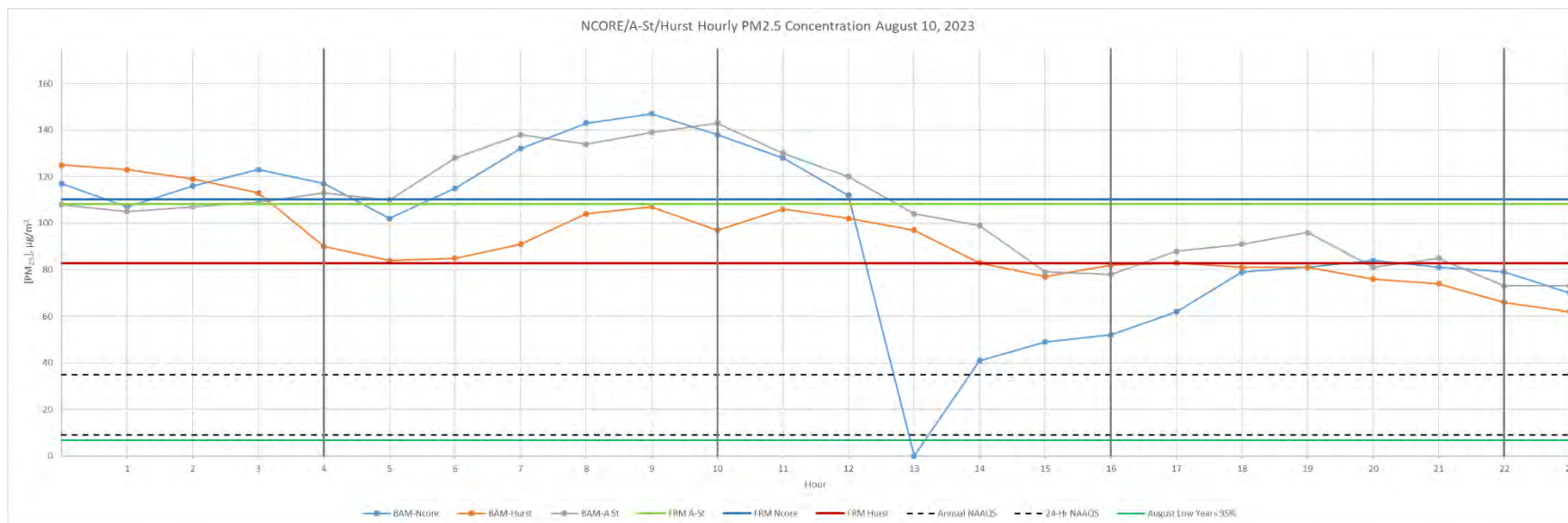


Figure 156: FNSB PM_{2.5} concentrations for August 10, 2023

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on August 10, 2023. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: During the early morning hours, PM_{2.5} levels at all sites were consistently high. The Hurst Road site showed the highest concentrations, maintaining levels around 120 µg/m³. NCore and A-Street also displayed elevated levels, with PM_{2.5} concentrations ranging from 100-120 µg/m³.

Midday Levels: PM_{2.5}: In the midday period, PM_{2.5} concentrations showed a gradual decline. The NCore site experienced a sharp drop

around midday due to maintenance, while the Hurst Road site saw a more moderate decrease, stabilizing around 90-100 $\mu\text{g}/\text{m}^3$. The A-Street site followed a similar trend, with levels gradually decreasing to around 70-80 $\mu\text{g}/\text{m}^3$.

Afternoon to Evening: During the afternoon and evening hours, PM_{2.5} levels remained relatively stable. The NCore site, which had experienced a sharp drop earlier, showed a slight increase, stabilizing around 80 $\mu\text{g}/\text{m}^3$. The Hurst Road site maintained levels around 90-100 $\mu\text{g}/\text{m}^3$, and the A-Street site fluctuated between 80-100 $\mu\text{g}/\text{m}^3$. Overall, concentrations remained elevated but showed a slight decreasing trend towards the end of the day.

Overall Trend: Throughout the day, PM_{2.5} levels showed significant variability across the different monitoring sites. The morning hours exhibited the highest concentrations, particularly at the Hurst Road site. Midday saw a notable decline, especially at the NCore site. The afternoon and evening levels stabilized but remained elevated, indicating persistent particulate matter in the air. PM_{2.5} levels exceeded the 24-hour NAAQS limit (represented by the dashed black line at 35 $\mu\text{g}/\text{m}^3$) and the annual NAAQS limit (represented by the dashed black line at 9 $\mu\text{g}/\text{m}^3$) throughout the day. The overall trend suggests significant air quality variations, with persistent periods of increased particulate matter throughout the day across all monitored sites.

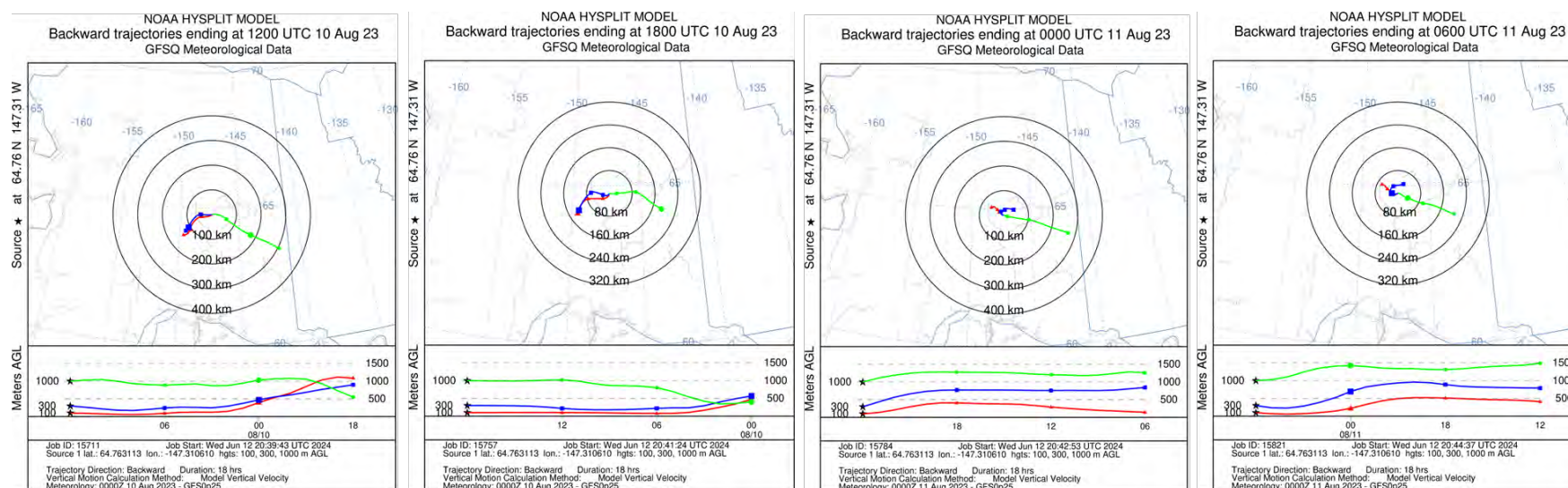


Figure 157: NOAA HYSPLIT model backward trajectories for August 10, 2023. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for August 10 and August 11, 2023. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, August 10, 2023):** The trajectories at 100m, 300m, and 1000m show that the air parcels originated from the southeast and southwest. The 1000m trajectory indicates a higher altitude origin with a more consistent direction from the southeast, whereas the lower altitude trajectories show some variability but generally point towards the southwest.
- **Image 2 (18:00 UTC, August 10, 2023):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight slight movement from the east at varying altitudes, with the 100m and 300m trajectories continuing from a southwesterly component, and the 1000m trajectory originating from the southeast.
- **Image 3 (00:00 UTC, August 11, 2023):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the southeast, with the 100m, 300m, and 1000m trajectories all coming from the same general direction. The 1000m trajectory is slightly more westerly compared to the lower altitude paths.
- **Image 4 (06:00 UTC, August 11, 2023):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show that air parcels at 100m and 300m trajectories have a northerly component and the 1000m trajectory continues from the southeast.

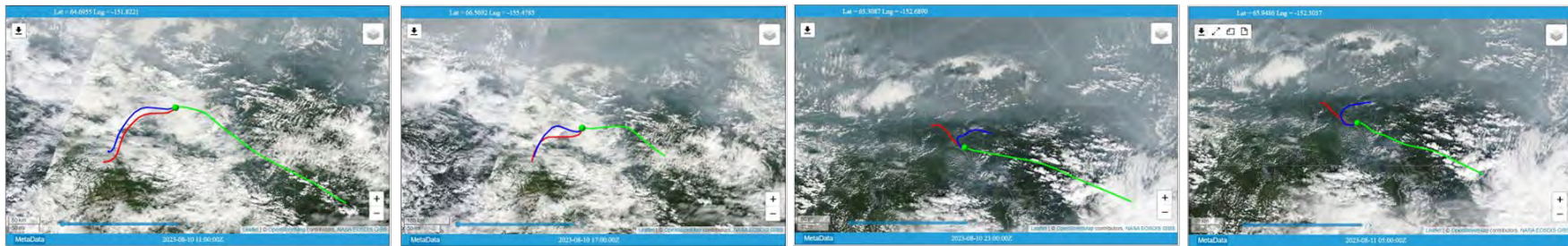


Figure 158: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for August 10 and August 11, 2023. The images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

- **Image 2 (18:00 UTC, August 10):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement from the west at 100m and 300m, and the 1000m air parcel coming from the southeast. **Smoke Transport:** The MODIS imagery shows the smoke plumes from local fires surrounding FNSB.

Table 60. Hourly surface observations for Fairbanks International Airport, August 10, 2023

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	Dpt (F)
PAFA	08/10/2023 00:53 AKDT	3	150	**	7 (Smoke)	2	59	55
PAFA	08/10/2023 01:53 AKDT	3	110	**	7 (Smoke)	2	58	56
PAFA	08/10/2023 02:53 AKDT	0	0	**	7 (Smoke)	2	57	55
PAFA	08/10/2023 03:53 AKDT	0	0	**	7 (Smoke)	2	55	53
PAFA	08/10/2023 04:53 AKDT	3	70	**	7 (Smoke)	0	57	55
PAFA	08/10/2023 05:53 AKDT	3	40	**	7 (Smoke)	0	57	55
PAFA	08/10/2023 06:53 AKDT	0	0	**	7 (Smoke)	1	58	58
PAFA	08/10/2023 07:53 AKDT	5	50	**	7 (Smoke)	1	58	58
PAFA	08/10/2023 08:53 AKDT	3	220	**	7 (Smoke)	1	58	58
PAFA	08/10/2023 09:53 AKDT	0	0	**	7 (Smoke)	0	58	58
PAFA	08/10/2023 10:53 AKDT	5	190	**	7 (Smoke)	1	59	57
PAFA	08/10/2023 11:53 AKDT	0	0	**	7 (Smoke)	1	61	57
PAFA	08/10/2023 12:53 AKDT	3	140	**	7 (Smoke)	2	63	58
PAFA	08/10/2023 13:53 AKDT	0	0	**	7 (Smoke)	2	66	57
PAFA	08/10/2023 14:53 AKDT	3	120	**	7 (Smoke)	3	67	60
PAFA	08/10/2023 15:53 AKDT	3	120	**	7 (Smoke)	4	69	56
PAFA	08/10/2023 16:53 AKDT	3	200	**	7 (Smoke)	4	70	57
PAFA	08/10/2023 17:53 AKDT	0	0	**	7 (Smoke)	4	70	57
PAFA	08/10/2023 18:53 AKDT	5	130	**	7 (Smoke)	3	68	61
PAFA	08/10/2023 19:53 AKDT	3	70	**	7 (Smoke)	2	66	61
PAFA	08/10/2023 20:53 AKDT	5	40	**	7 (Smoke)	2	65	61
PAFA	08/10/2023 21:53 AKDT	3	200	**	7 (Smoke)	2	64	60
PAFA	08/10/2023 22:53 AKDT	3	300	**	7 (Smoke)	3	63	61
PAFA	08/10/2023 23:53 AKDT	0	0	**	7 (Smoke)	2	61	59

Surface observations: The surface observations from August 10, 2023, show hours during the day of significantly reduced visibility as smoke plumes engulf FNSB. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough – August 11, 2023

AICC Fire Report Summary:

- **New Fires:** 0 new fires reported.
- **Total Fires Statewide:** 152 fires burning.
- **Acres Burned:** 270,271 acres, with a 24-hour increase of 14,704 acres.

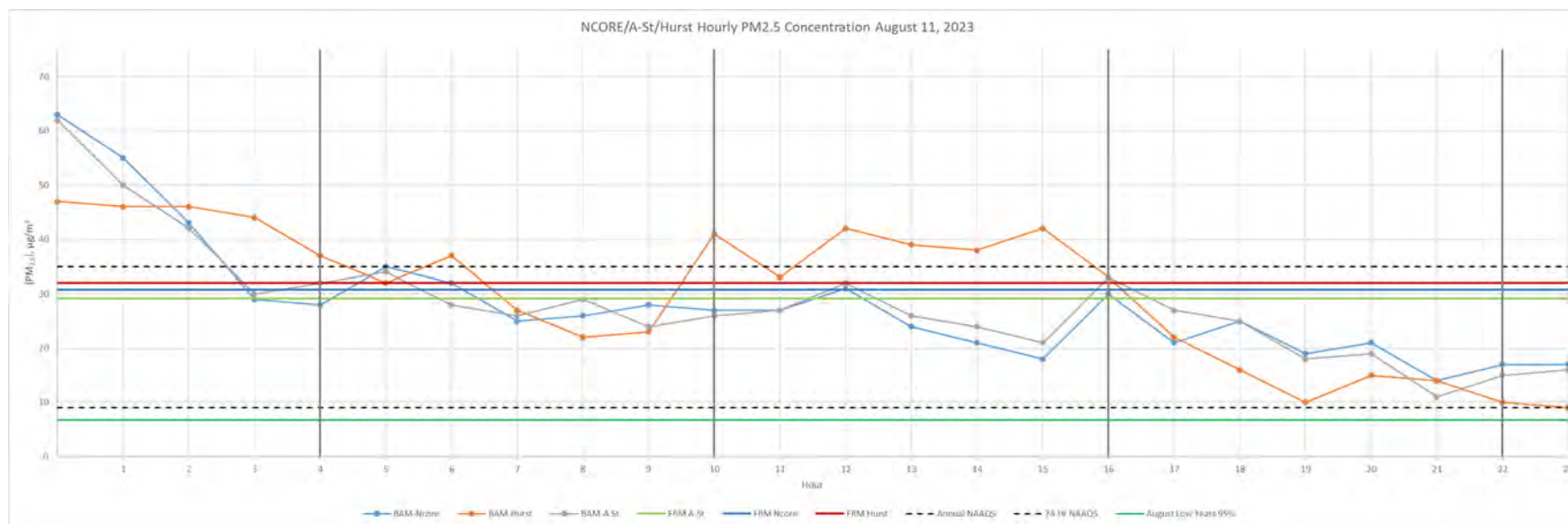


Figure 158: FNSB PM_{2.5} concentrations for August 11, 2023

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on August 11, 2023. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: During the early morning hours, PM_{2.5} levels at all sites were consistently high. The NCore and A-Street sites showed the highest concentrations, starting around 60 µg/m³ and then decreasing steadily. The Hurst Road site displayed slightly lower levels, maintaining around 45 µg/m³.

Midday Levels: PM_{2.5}: In the midday period, PM_{2.5} concentrations showed a decline. The NCore and A-Street sites experienced a

notable decrease, reaching levels between 25-30 $\mu\text{g}/\text{m}^3$. The Hurst Road site saw a slight increase, stabilizing around 40 $\mu\text{g}/\text{m}^3$. **Afternoon to Evening:** During the afternoon and evening hours, $\text{PM}_{2.5}$ levels remained relatively stable. All sites showed a slight decrease, stabilizing around 15-25 $\mu\text{g}/\text{m}^3$.

Overall Trend: Throughout the day, $\text{PM}_{2.5}$ levels showed steady decrease in concentration at all monitoring sites. The early morning hours exhibited the highest concentrations, particularly at the NCore and A-Street sites. Midday saw a notable decline, especially at the NCore site. The afternoon and evening levels stabilized but remained elevated, indicating persistent particulate matter in the air. $\text{PM}_{2.5}$ levels did not exceed the 24-hour NAAQS limit (represented by the dashed black line at 35 $\mu\text{g}/\text{m}^3$) for the day, but did stay above the annual NAAQS limit (represented by the dashed black line at 9 $\mu\text{g}/\text{m}^3$). The overall trend suggests significant air quality variations, with persistent periods of increased particulate matter throughout the day across all monitored sites.

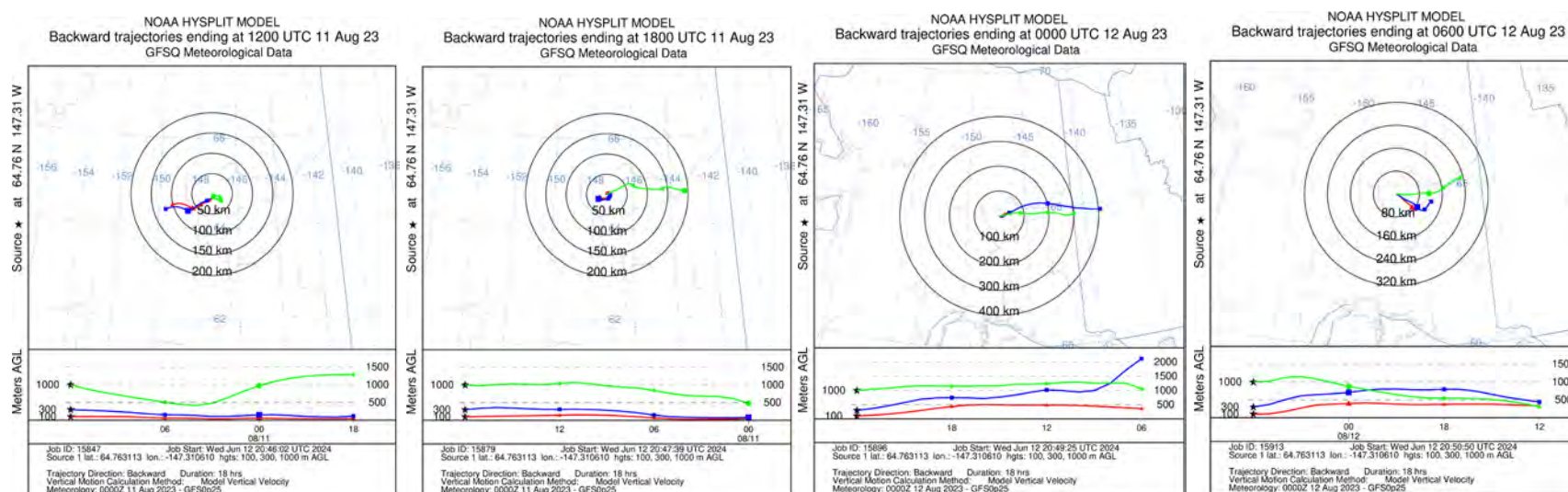


Figure 160: NOAA HYSPLIT model backward trajectories for August 11, 2023. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for August 11 and August 12, 2023. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, August 11, 2023):** The trajectories at 100m, 300m, and 1000m show that the air parcels originated from the east and southwest. The 1000m trajectory indicates a higher altitude origin with a more consistent direction from the east, whereas the lower altitude trajectories show some variability but generally point towards the southwest.
- **Image 2 (18:00 UTC, August 11, 2023):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight slight movement from the east at varying altitudes, with the 100m and 300m trajectories continuing from a southwesterly component, and the 1000m trajectory originating from the east.
- **Image 3 (00:00 UTC, August 12, 2023):** The third image displays the backward trajectory ending in the early afternoon. It shows air parcels tracing back to sources located to the east, with the 100m, 300m, and 1000m trajectories all coming from the same general direction.
- **Image 4 (06:00 UTC, August 12, 2023):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels at 100m and 300m trajectories have a southeast component, and the 1000m trajectory continues from the east.

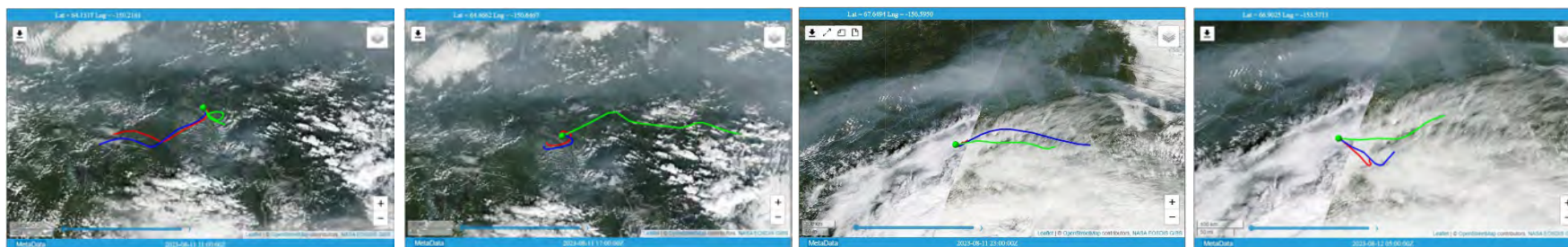


Figure 161: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for August 11 and August 12, 2023. The images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

- **Image 2 (18:00 UTC, August 11):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement at all levels from the southwest through southeast at 100m and 300m, with the 1000m coming from the east. **Smoke Transport:** The MODIS imagery shows the thin smoke plumes from local fires surrounding FNSB.

Table 61. Hourly surface observations for Fairbanks International Airport, August 11, 2023

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPT (F)
PAFA	08/11/2023 00:53 AKDT	5	20	**	7 (Smoke)	2	61	59
PAFA	08/11/2023 01:53 AKDT	5	70	**	7 (Smoke)	2	60	56
PAFA	08/11/2023 02:53 AKDT	3	250	**	7 (Smoke)	2	61	57
PAFA	08/11/2023 03:53 AKDT	0	0	**	7 (Smoke)	2	60	56
PAFA	08/11/2023 04:53 AKDT	0	0	**	7 (Smoke)	2	60	56
PAFA	08/11/2023 05:53 AKDT	7	20	**	7 (Smoke)	5	60	55
PAFA	08/11/2023 06:53 AKDT	0	0	**	7 (Smoke)	5	59	55
PAFA	08/11/2023 07:53 AKDT	3	40	**	7 (Smoke)	5	61	57
PAFA	08/11/2023 08:53 AKDT	0	0	**	7 (Smoke)	6	61	56
PAFA	08/11/2023 09:53 AKDT	0	0	**	7 (Smoke)	7	63	56
PAFA	08/11/2023 10:53 AKDT	3	120	**	7 (Smoke)	7	63	56
PAFA	08/11/2023 11:53 AKDT	3	20	**	7 (Smoke)	7	68	55
PAFA	08/11/2023 12:53 AKDT	0	0	**	7 (Smoke)	8	70	56
PAFA	08/11/2023 13:53 AKDT	3	50	**	7 (Smoke)	8	72	56
PAFA	08/11/2023 14:53 AKDT	7	130	**	7 (Smoke)	8	73	53
PAFA	08/11/2023 15:53 AKDT	0	0	**	7 (Smoke)	8	74	54
PAFA	08/11/2023 16:53 AKDT	3	130	**	7 (Smoke)	8	73	55
PAFA	08/11/2023 17:53 AKDT	6	130	**	7 (Smoke)	6	71	57
PAFA	08/11/2023 18:53 AKDT	7	110	**	7 (Smoke)	4	69	58
PAFA	08/11/2023 19:53 AKDT	10	50	**	7 (Smoke)	5	64	59
PAFA	08/11/2023 20:53 AKDT	0	0	**	7 (Smoke)	8	63	59
PAFA	08/11/2023 21:53 AKDT	5	80	**	7 (Smoke)	8	61	57
PAFA	08/11/2023 22:53 AKDT	6	50	**	7 (Smoke)	8	59	55
PAFA	08/11/2023 23:53 AKDT	0	0	**	**	10	59	57

Surface observations: The surface observations from August 11, 2023, show hours during the day of significantly reduced visibility in the morning, gradually increasing as the smoke dissipates in and around FNSB. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough – August 12, 2023

AICC Fire Report Summary:

- **New Fires:** 2 new fires reported.
- **Total Fires Statewide:** 153 fires burning.
- **Acres Burned:** 274,431 acres, with a 24-hour increase of 4,160 acres.

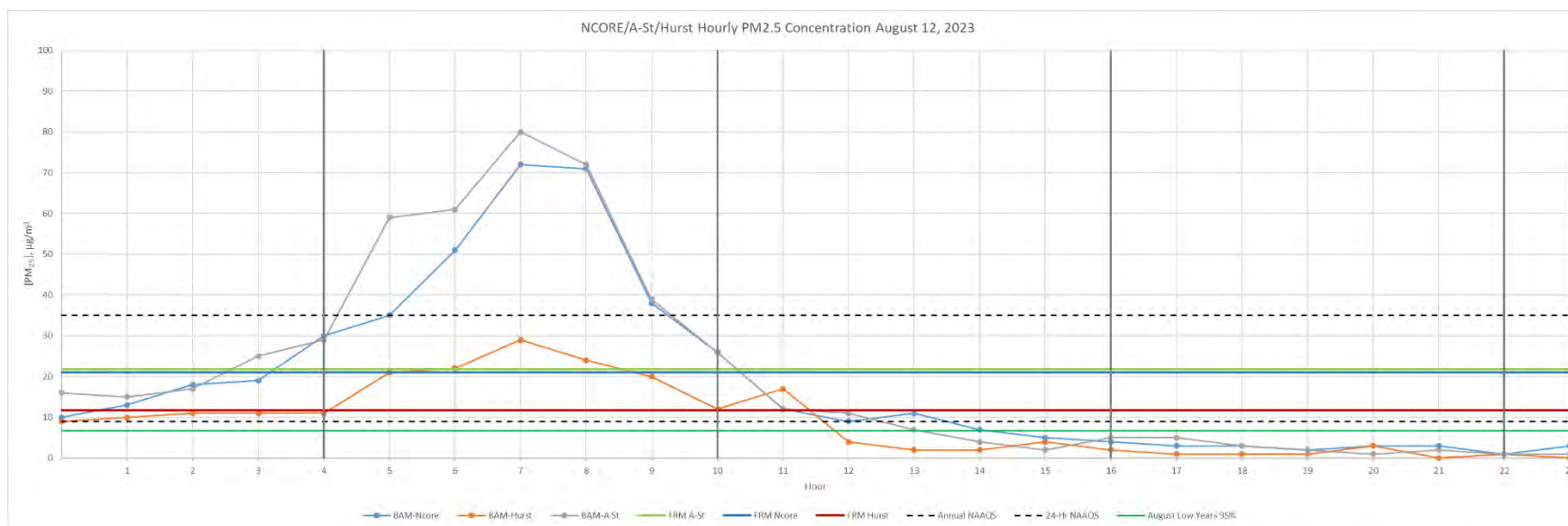


Figure 162: FNSB PM_{2.5} concentrations for August 12, 2023

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on August 12, 2023. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: During the early morning hours, PM_{2.5} levels were relatively low at all sites. The concentrations ranged from 10-20 µg/m³, with the BAM-Hurst Road site showing the lowest levels around 10 µg/m³. The BAM-NCore and BAM-A St sites had slightly higher levels, between 15-20 µg/m³.

Midday Levels: PM_{2.5}: In the midday period, PM_{2.5} concentrations increased significantly, especially at the A-Street site. The A-Street site experienced a peak around 7:00, reaching levels close to 80 µg/m³, well above the 24-hour NAAQS limit. The NCore site also saw an increase, peaking around 70 µg/m³.

Afternoon to Evening: During the afternoon and evening hours, PM_{2.5} levels declined at all sites. The A St site, which had experienced a peak earlier, showed a sharp decrease to levels around 10 µg/m³ by the late afternoon. The NCore and Hurst Road sites also saw a decrease, stabilizing around 5-10 µg/m³ in the evening.

Overall Trend: Throughout the day, PM_{2.5} levels showed significant variability across the different monitoring sites. The early morning hours exhibited low concentrations, followed by a sharp increase around midday, particularly at the BAM-A St site. The afternoon and evening levels declined significantly, indicating improved air quality later in the day. PM_{2.5} levels did not exceed the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) for the day but did stay above the annual NAAQS limit (represented by the dashed black line at 9 µg/m³) throughout the day.

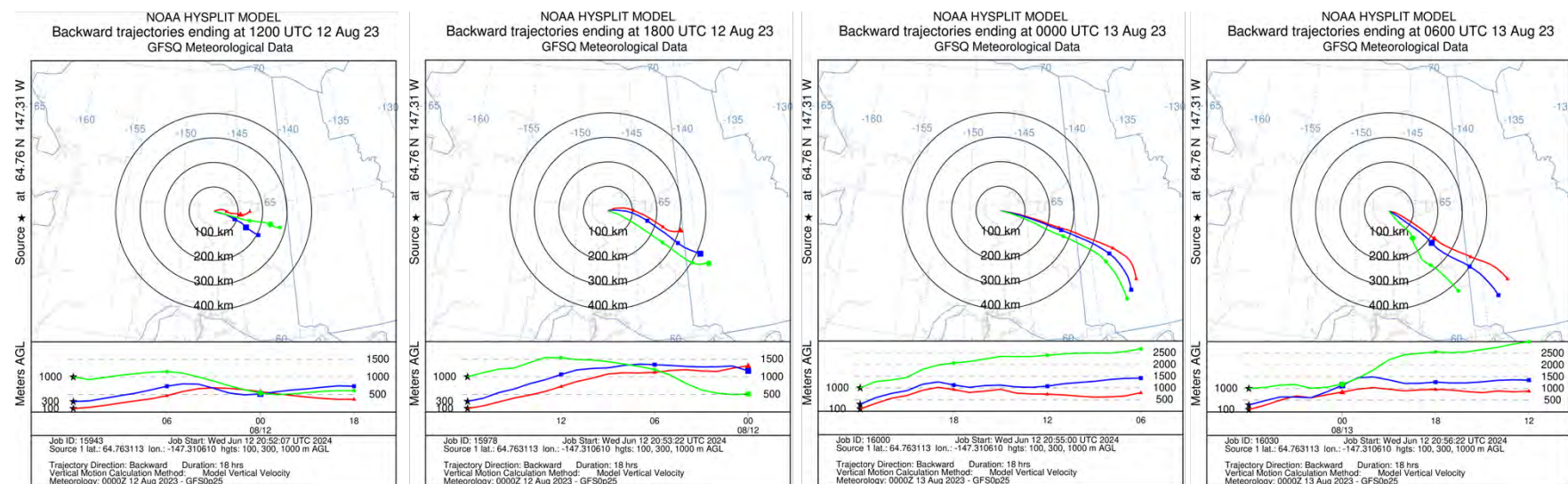


Figure 163: NOAA HYSPLIT model backward trajectories for August 12, 2023. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for August 12 and August 13, 2023. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, August 12, 2023):** The trajectories at 100m, 300m, and 1000m show that the air parcels originated from the southeast. The 1000m trajectory indicates a higher altitude origin with a more consistent direction, whereas the lower altitude trajectories show some variability but generally point towards the southeast.
- **Image 2 (18:00 UTC, August 12, 2023):** This image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight movement from the southeast at varying altitudes, with the 100m, 300m, and 1000m trajectories all showing a southeast origin.
- **Image 3 (00:00 UTC, August 13, 2023):** The third image displays the backward trajectory ending in the early afternoon. The air parcels' pathways highlight movement from the southeast at varying altitudes, with the 100m, 300m, and 1000m trajectories all showing a southeast origin.
- **Image 4 (06:00 UTC, August 13, 2023):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels at 100m, 300m, and 1000m coming from the southeast. The 1000m trajectory indicates a higher altitude origin and a slightly more westerly path compared to the 100m and 300m trajectories.

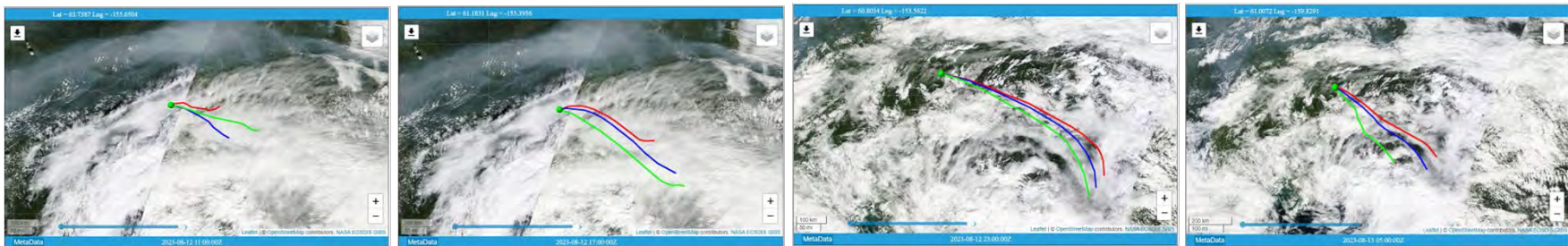


Figure 164: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for August 12 and August 13, 2023. The images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

- **Image 2 (18:00 UTC, August 12):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement at all levels from the southeast at 100m, 300m, and 1000m trajectories. **Smoke Transport:** The MODIS imagery shows the thin smoke plumes from local fires surrounding FNSB.

Table 62. Hourly surface observations for Fairbanks International Airport, August 12, 2023

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	08/12/2023 00:53 AKDT	7	20	**	7 (Smoke)	8	57	55
PAFA	08/12/2023 01:53 AKDT	3	20	**	7 (Smoke)	8	56	54
PAFA	08/12/2023 02:53 AKDT	3	10	**	7 (Smoke)	8	55	51
PAFA	08/12/2023 03:53 AKDT	3	30	**	7 (Smoke)	8	55	53
PAFA	08/12/2023 04:53 AKDT	6	40	**	7 (Smoke)	5	54	52
PAFA	08/12/2023 05:53 AKDT	3	20	**	7 (Smoke)	4	55	51
PAFA	08/12/2023 06:53 AKDT	3	30	**	7 (Smoke)	3	55	51
PAFA	08/12/2023 07:53 AKDT	5	50	**	7 (Smoke)	3	59	54
PAFA	08/12/2023 08:53 AKDT	7	50	**	7 (Smoke)	3	62	55
PAFA	08/12/2023 09:53 AKDT	10	60	**	7 (Smoke)	3	65	56
PAFA	08/12/2023 10:53 AKDT	9	70	**	7 (Smoke)	6	68	54
PAFA	08/12/2023 11:53 AKDT	8	90	**	7 (Smoke)	7	70	54
PAFA	08/12/2023 12:53 AKDT	10	90	**	**	10	70	52
PAFA	08/12/2023 13:53 AKDT	7	100	**	**	10	70	54
PAFA	08/12/2023 14:53 AKDT	7	80	**	**	10	72	54
PAFA	08/12/2023 15:53 AKDT	10	130	**	**	10	72	52
PAFA	08/12/2023 16:53 AKDT	10	130	**	**	10	71	48
PAFA	08/12/2023 17:53 AKDT	12	140	**	**	10	69	46
PAFA	08/12/2023 18:53 AKDT	13	120	**	**	10	67	47
PAFA	08/12/2023 19:53 AKDT	12	90	**	**	10	64	46
PAFA	08/12/2023 20:53 AKDT	7	80	**	**	10	63	48
PAFA	08/12/2023 21:53 AKDT	8	70	**	**	10	62	48
PAFA	08/12/2023 22:53 AKDT	7	70	**	**	10	60	47
PAFA	08/12/2023 23:53 AKDT	5	40	**	**	10	60	47

Surface observations: The surface observations from August 12, 2023, show hours during the day of reduced visibility in the morning, gradually increasing as the smoke dissipates in and around FNSB. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough – August 15, 2023

AICC Fire Report Summary:

- **New Fires:** 2 new fires reported.
- **Total Fires Statewide:** 149 fires burning.
- **Acres Burned:** 285,416 acres, with a 24-hour increase of 8,452 acres.

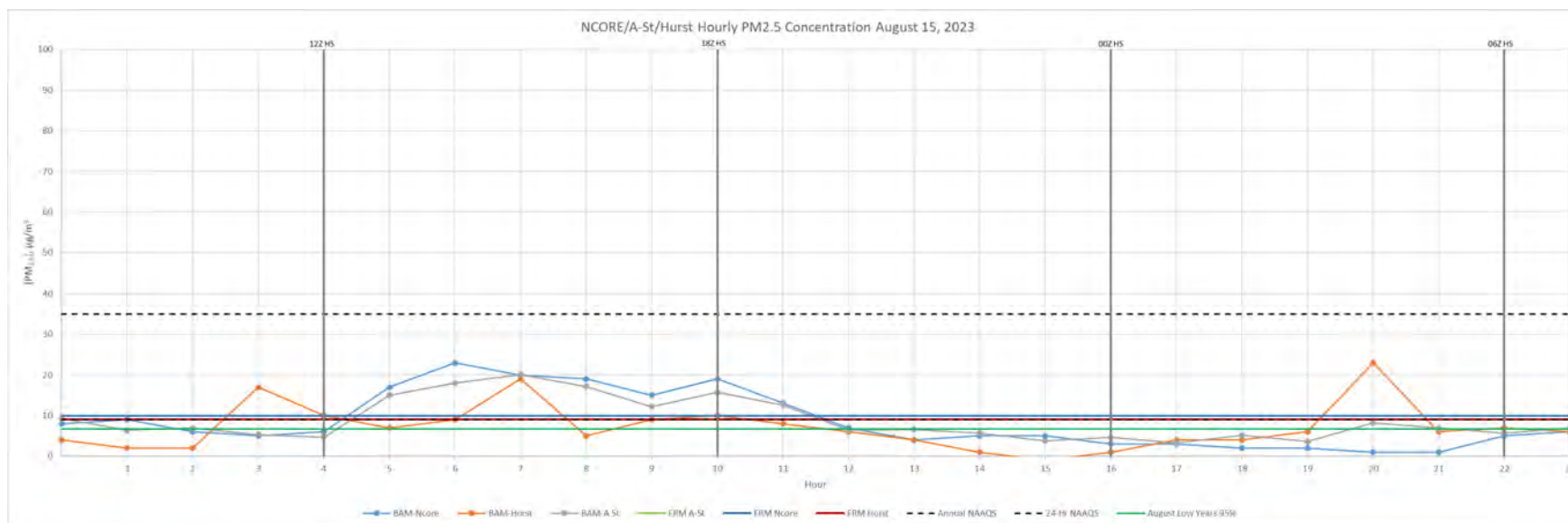


Figure 165: FNSB PM_{2.5} concentrations for August 15, 2023

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on August 15, 2023. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: During the early morning hours, PM_{2.5} levels were relatively low at all sites. The concentrations ranged from 5-20 µg/m³, with the BAM-Hurst Road site showing the lowest levels around 3 µg/m³ in the early morning. The all sites had slightly higher levels, between 15-20 µg/m³ later in the morning.

Midday Levels: PM_{2.5}: In the midday period, PM_{2.5} concentrations decreased significantly. All sites experienced a lull around midday, with levels well below the 24-hour NAAQS limit.

Afternoon to Evening: During the afternoon and evening hours, PM_{2.5} levels continued to stay below the 24-hour NAAQS limit, with the exception of a small spike at the Hurst Road site around 20:00 to just above 20 µg/m³.

Overall Trend: Throughout the day, PM_{2.5} levels showed significant variability across the different monitoring sites. The early morning hours exhibited the highest concentrations of the day, followed by a decrease around midday. PM_{2.5} levels did not exceed the 24-hour NAAQS limit (represented by the dashed black line at 35 µg/m³) but did stay above the annual NAAQS limit (represented by the dashed black line at 9 µg/m³) for nine hours during the day.

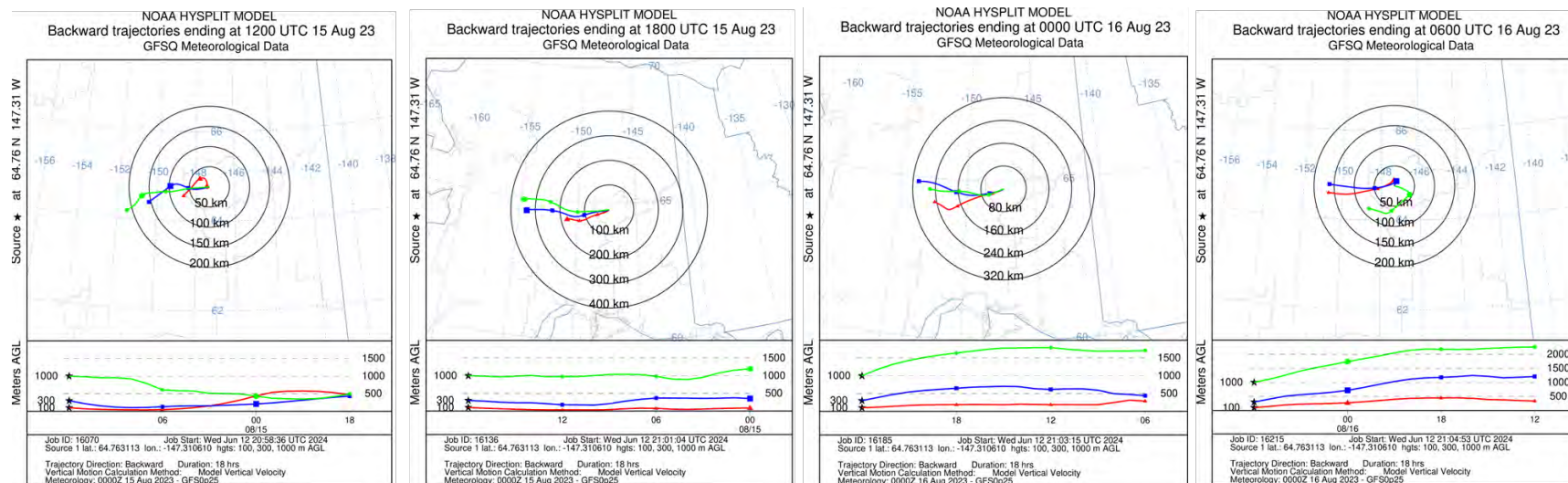


Figure 166: NOAA HYSPLIT model backward trajectories for August 15, 2023. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for August 15 and August 16, 2023. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, August 15, 2023):** The trajectories at 100m, 300m, and 1000m show that the air parcels originated from the southwest. The 1000m trajectory indicates a higher altitude origin with a more consistent direction, whereas the lower altitude trajectories show some variability but generally point towards the southwest.
- **Image 2 (18:00 UTC, August 15, 2023):** This image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight movement from the southwest at varying altitudes, with the 100m, 300m, and 1000m trajectories all showing

a westerly origin.

- **Image 3 (00:00 UTC, August 16, 2023):** The third image displays the backward trajectory ending in the late morning. The air parcels' pathways highlight movement from the southwest at varying altitudes, with the 100m, 300m, and 1000m trajectories all showing a westerly origin.
- **Image 4 (06:00 UTC, August 16, 2023):** The final image in this series illustrates the backward trajectory ending in the late evening. The trajectories show air parcels at 100m and 300m coming from the west. The 1000m trajectory indicates a higher altitude origin and a more southeast path compared to the 100m and 300m trajectories.



Figure 167: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for August 15 and August 16, 2023. The images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

- **Image 2 (18:00 UTC, August 15):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement at all levels from the west at 100m, 300m, and 1000m trajectories. **Smoke Transport:** The MODIS imagery shows the almost no smoke plumes from local fires close to FNSB. Smoke is very thin and not pictured in the imagery.

Table 63. Hourly surface observations for Fairbanks International Airport, August 15, 2023

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	DPt (F)
PAFA	08/15/2023 00:53 AKDT	0	0	**	**	10	56	50
PAFA	08/15/2023 01:53 AKDT	5	210	**	**	10	56	50
PAFA	08/15/2023 02:53 AKDT	0	0	**	**	10	56	51
PAFA	08/15/2023 03:53 AKDT	5	140	**	**	10	56	51
PAFA	08/15/2023 04:53 AKDT	3	150	**	**	10	54	50
PAFA	08/15/2023 05:53 AKDT	3	180	**	**	10	54	50
PAFA	08/15/2023 06:53 AKDT	0	0	**	7	4	53	50
PAFA	08/15/2023 07:53 AKDT	0	0	**	7	4	55	51
PAFA	08/15/2023 08:53 AKDT	5	60	**	7	6	56	51
PAFA	08/15/2023 09:53 AKDT	3	**	**	**	10	58	51
PAFA	08/15/2023 10:53 AKDT	5	120	**	**	10	60	52
PAFA	08/15/2023 11:53 AKDT	0	0	**	**	10	65	52
PAFA	08/15/2023 12:53 AKDT	6	150	**	**	10	67	51
PAFA	08/15/2023 13:53 AKDT	3	80	**	**	10	66	50
PAFA	08/15/2023 14:53 AKDT	6	320	**	**	10	69	50
PAFA	08/15/2023 15:53 AKDT	0	0	**	**	10	70	49
PAFA	08/15/2023 16:53 AKDT	0	0	**	**	10	70	47
PAFA	08/15/2023 17:53 AKDT	5	110	**	**	10	70	46
PAFA	08/15/2023 18:53 AKDT	3	160	**	**	10	70	45
PAFA	08/15/2023 19:53 AKDT	3	100	**	**	10	69	47
PAFA	08/15/2023 20:53 AKDT	0	0	**	**	10	68	55
PAFA	08/15/2023 21:53 AKDT	6	320	**	**	10	63	50
PAFA	08/15/2023 22:53 AKDT	0	0	**	**	10	59	49
PAFA	08/15/2023 23:53 AKDT	0	0	**	**	10	59	48

Surface observations: The surface observations from August 15, 2023, show hours during the day of reduced visibility in the morning, gradually increasing as the smoke dissipates in and around FNSB. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Daily Evaluation of Air Quality Impacts: Fairbanks North Star Borough – August 19, 2023

AICC Fire Report Summary:

- **New Fires:** 0 new fires reported.
- **Total Fires Statewide:** 139 fires burning.
- **Acres Burned:** 296,884 acres, with a 24-hour increase of 7,271 acres.

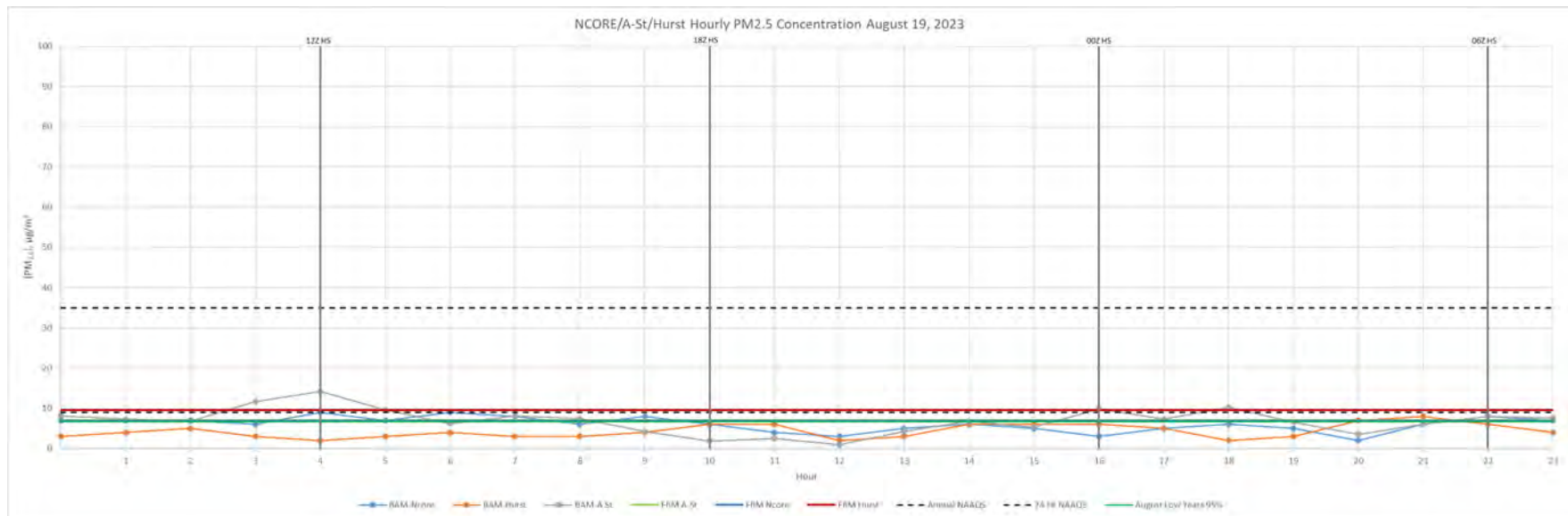


Figure 168: FNSB PM_{2.5} concentrations for August 19, 2023

The chart above illustrates the hourly PM_{2.5} concentrations measured at various monitoring sites (NCore, A-Street, and Hurst Road) on August 19, 2023. The data include readings from both BAM and FRM instruments at each site.

Early Morning Levels: During the early morning hours, PM_{2.5} levels across all sites remained low and stable, consistently under 10 µg/m³.

Midday Levels: PM_{2.5}: In the midday period, PM_{2.5} concentrations continued to remain low across all monitoring sites. There were minor fluctuations, but overall, concentrations remained well under any concerning thresholds. This indicates good air quality during

this time frame.

Afternoon to Evening: Throughout the afternoon and evening hours, PM_{2.5} levels at all sites stayed steady with slight increases but remained below 10 µg/m³. The stability of concentrations suggests minimal impact from pollution sources, maintaining a low pollution profile throughout this part of the day.

Overall Trend: Throughout the day, PM_{2.5} levels showed consistently low values across all sites, with hourly concentrations remaining well below both the annual and 24-hour NAAQS limits. The data reflects very good air quality, with no significant spikes or trends indicating pollution events. This suggests stable atmospheric conditions with minimal particulate matter impact throughout the day.

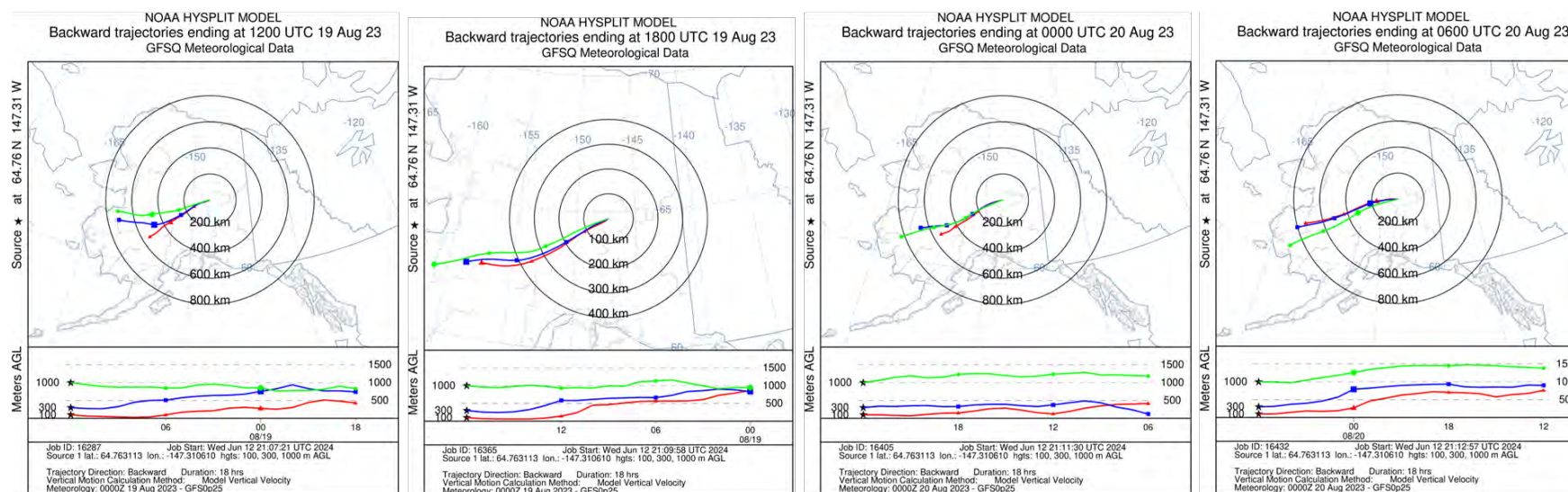


Figure 169: NOAA HYSPLIT model backward trajectories for August 19, 2023. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The above images provide NOAA HYSPLIT model backward trajectories for August 19 and August 20, 2023. These backward trajectories trace the path of air parcels backward in time, indicating the origin of air masses arriving at a specific location. The analysis of these trajectories helps identify potential sources of pollutants and smoke impacting the area.

- **Image 1 (12:00 UTC, August 19, 2023):** The trajectories at 100m, 300m, and 1000m show that the air parcels originated from the west. The 1000m trajectory indicates a higher altitude origin with a steady movement from the west, while the 100m and 300m paths also reflect a westerly direction but with slight deviations in path consistency.

- **Image 2 (18:00 UTC, August 19, 2023):** This image captures the backward trajectory ending later in the day. The air parcels' pathways maintain a southwest origin, with all three trajectories (100m, 300m, and 1000m) aligning in direction.
- **Image 3 (00:00 UTC, August 20, 2023):** The third image displays the backward trajectory ending around midnight. It shows air parcels tracing back to sources located to the southwest of the observation point. The 100m, 300m, and 1000m trajectories maintain alignment in their general southwesterly direction, with minor variations in altitude path consistency.
- **Image 4 (06:00 UTC, August 20, 2023):** The final image in this series illustrates the backward trajectory ending early in the morning. The trajectories show air parcels at 100m, 300m, and 1000m continuing their southwest origin. The 1000m trajectory remains steady with minimal deviation, while the 100m and 300m paths show slight fluctuations, consistent with lower-altitude variability.

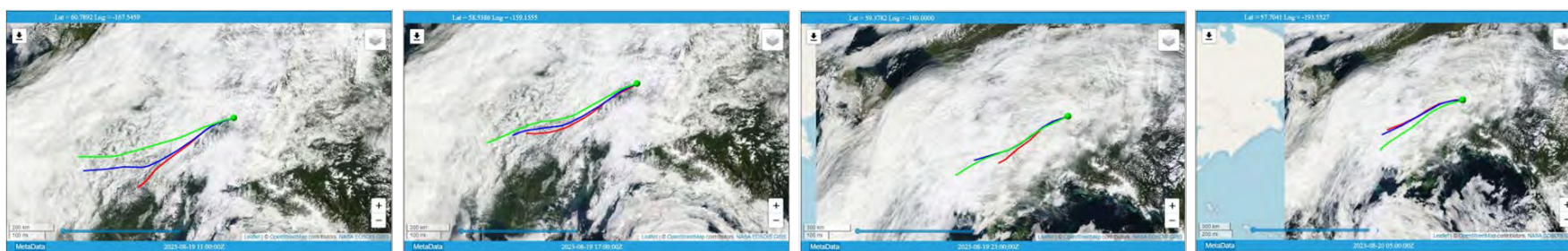


Figure 170: MODIS Imagery with HYSPLIT Overlay. Air parcel backward trajectories are shown at 100m AGL (red), 300m AGL (blue), and 1000m AGL (green).

The series of images presented above shows MODIS satellite imagery overlaid with NOAA HYSPLIT backward trajectories for August 19 and August 20, 2023. The images provide valuable insight into the transport pathways of smoke and pollutants from nearby fires, helping to understand their potential impact on air quality in the FNSB.

- **Image 2 (18:00 UTC, August 19):** The second image captures the backward trajectory ending in the late morning. The air parcels' pathways highlight significant movement at all levels from the southwest at 100m, 300m, and 1000m trajectories. **Smoke Transport:** The MODIS imagery shows a cloud shield over FNSB, this shield helps trap smoke from smoldering fires at the surface. No smoke is evident in the imagery, but reduced visibility was reported via surface observations, see Table 64 below.

Table 64. Hourly surface observations for Fort Wainwright AAF, August 19, 2023

Station	Date/Time	SPD (MPH)	DIR (From)	Gust (MPH)	WX Condition	VIS (SM)	TEMP (F)	Dpt (F)
PAFB	08/19/2023 00:55 AKDT	9	220	**	**	10	54	49
PAFB	08/19/2023 01:55 AKDT	8	200	**	**	10	54	49
PAFB	08/19/2023 02:55 AKDT	8	210	**	**	9	54	49
PAFB	08/19/2023 03:55 AKDT	6	210	**	**	9	53	49
PAFB	08/19/2023 04:55 AKDT	7	210	**	**	9	53	49
PAFB	08/19/2023 05:55 AKDT	7	210	**	**	9	53	49
PAFB	08/19/2023 06:55 AKDT	6	200	**	**	9	53	49
PAFB	08/19/2023 07:55 AKDT	8	210	**	**	8	53	49
PAFB	08/19/2023 08:55 AKDT	7	190	**	**	8	54	49
PAFB	08/19/2023 09:55 AKDT	8	220	**	**	8	55	49
PAFB	08/19/2023 10:55 AKDT	12	240	**	**	9	55	49
PAFB	08/19/2023 11:55 AKDT	15	240	**	**	9	56	48
PAFB	08/19/2023 12:55 AKDT	14	240	**	**	9	57	47
PAFB	08/19/2023 13:55 AKDT	15	240	**	**	9	58	45
PAFB	08/19/2023 14:55 AKDT	13	230	**	**	10	59	46
PAFB	08/19/2023 15:55 AKDT	14	250	**	**	9	59	46
PAFB	08/19/2023 16:55 AKDT	15	230	**	**	9	59	45
PAFB	08/19/2023 17:55 AKDT	9	300	**	**	9	58	47
PAFB	08/19/2023 18:55 AKDT	13	230	22	**	8	57	45
PAFB	08/19/2023 19:55 AKDT	9	250	**	**	9	57	46
PAFB	08/19/2023 20:55 AKDT	5	300	**	**	9	55	45
PAFB	08/19/2023 21:55 AKDT	0	0	**	**	10	55	47
PAFB	08/19/2023 22:55 AKDT	0	0	**	**	9	52	48
PAFB	08/19/2023 23:55 AKDT	0	0	**	**	7	52	48

Surface observations: The surface observations from August 19, 2023, show hours during the day of reduced visibility throughout the day. These observations align with the PM_{2.5} concentration data and HYSPLIT trajectories, indicating sustained smoke transport into the Fairbanks area.

Summary of 2023 Event Period

The late July to mid-August 2023 fire event had a substantial impact on air quality across the Fairbanks North Star Borough (FNSB). The primary factor driving smoke advection into the region was the persistent gradient wind flow from the southeast through southwest, carrying smoke from wildfires in proximity of FNSB (within 200 km). PM_{2.5} concentrations frequently exceeded the National Ambient Air Quality Standards (NAAQS) during this period, with prolonged elevated levels observed across multiple days. These spikes were directly linked to intensified wildfire activity, sparked by lightning in dry fuel areas and wind flow directly upstream from the wildfires in late July.

NOAA HYSPLIT model backward trajectories during this period confirmed that air parcels transported into FNSB originated predominantly from the southeast and southwest wildfires. Surface observations documented reduced visibility down to 1-2 miles due to heavy smoke, corroborating high PM_{2.5} concentrations recorded at FNSB monitoring stations. Notably, the influence of nighttime and early morning stagnant conditions allowed smoke to settle in the Tanana Flats area, further impacting FNSB air quality. When frontal systems periodically passed over the Interior, PM_{2.5} levels temporarily decreased, although subsequent resumption of stable conditions allowed smoke levels to rise again.

During the 2023 fire season, there were seven exceedances of the 24-hour PM_{2.5} NAAQS, with prolonged exposure to elevated PM_{2.5} resulting in fourteen days surpassing the annual 9 µg/m³ standard.

Mitigation

DEC continues to work closely with Alaska Fire Service, the AICC, and the Fire Weather Forecasters to ensure Air Quality Advisory Notifications are sent to the public as rapidly as possible. In-place procedures allow DEC to send Air Quality Advisories via Twitter and email, greatly reducing the time required to contact government agencies and the general public (see Appendix F).

DEC, the federal land management agencies, and Alaskan tribes developed an interagency plan, the Alaska Interagency Wildland Fire Management Plan (AIWFMP), to address controlling wildland fires. The AIWFMP requires an annual, pre-season land manager(s)/owner(s) review of the fire protection needs on lands under their management authority. In addition, responsibilities and actions taken to mitigate impacts of wildfire smoke are outlined in the “Alaska’s Enhanced Smoke Management Plan for Prescribed Fire, Procedures Manual June 3, 2019.” The purpose of

the Enhanced Smoke Management Plan (ESMP) is to provide a clear and equitable regulatory basis for smoke management in Alaska. The ESMP also outlines procedures for monitoring ambient air quality in the event of a wildfire.

Procedural Requirements

In accordance with the exceptional events rule 40 CFR §50.14(c)(2)(vi)(A), fifty-two data points were flagged in the state's AQS data submission for 2022 and 2023. For 2022, there were eight days over the annual NAAQS limit but below the 24-Hour NAAQS limit and twenty three days over the 24-Hour NAAQS limit. For 2023, there were fourteen days over the annual NAAQS limit but below the 24-Hour NAAQS limit and seven days over the 24-Hour NAAQS limit. DEC requests that EPA exclude these flagged data points when determining compliance with the 24-Hour NAAQS for the NCore, A-Street and Hurst Road. sites.

Conclusions

This document describes the wildfires in Alaska in the summer of 2022 and 2023 by location and acreage burned. The cause of the major fires was lightning ignition of very dry fuels caused by drought conditions. Large fires do not occur unless meteorological and fuel conditions are favorable, which occurs frequently during summer months in Interior Alaska.

The smoke from these fires impacted the FNSB and resulted in numerous days of increased smoke and PM_{2.5} concentrations. The smoke impacted; natural event data should not be used in the determination of compliance with the NAAQS for FNSB. Without the wildfires, the PM_{2.5} concentrations at the FNSB NCore, A-Street, and Hurst Road sites would have been much lower. Smoke impacts not only lead to exceedances of the 24-hour standard, but also clearly contribute to daily concentration above the annual standard. Data from low fire years provide an estimate of background summertime PM_{2.5} concentrations with mean and media concentrations of 3.2 to 4.7 and 2.8 to 3.6 µg/m³, respectively, depending on the monitoring site.

These wildfires will reoccur and are not controllable. State of Alaska ESMP and Air Quality Advisory procedures adequately cover actions to be taken when these events occur.

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Abbreviations

AFS	Alaska Fire Service
AICC	Alaska Interagency Coordination Center
AIWFMP	Alaska Interagency Wildland Fire Management Plan
AQI	Air Quality Index
AQS	Air Quality System
BAM	Beta Attenuation Monitor
BUI	Buildup Index
DEC	Department of Environmental Conservation
EEWR	Exceptional Event(s)? Waiver Request
ESMP	Alaska Enhanced Smoke Management Plan
FEM	Federal Equivalent Method
FNSB	Fairbanks North Star Borough
FRM	Federal Reference Method
HYSPLIT	HYbrid Single-Particle Lagrangian Integrated Trajectory
ISI	Initial Spread Index
MODIS	Moderate Resolution Imaging Spectroradiometer satellite imagery
NAAQS	National Ambient Air Quality Standard
NCDC	National Climate Data Center
NCEP	National Centers for Environmental Prediction
NCore	National Core Multi-Pollutant Monitoring Stations
NOAA	National Oceanic and Atmospheric Administration
PM	Particulate Matter
SOA	State Office Building
UTC	Coordinated Universal Time
WD	Wind Direction
WS	Wind Speed