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**GROUND-BASED SAMPLING FOR TOXINS  
SEPTEMBER MONTHLY REPORT**

**September 1 – September 30, 2023**

**Operational Summaries,  
Data Summaries and Plots**

Prepared for

**DEREK PRICE  
AIR TOXICS AND OZONE PRECURSOR SECTION  
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A decorative graphic at the bottom left of the page consisting of three stylized mountain peaks in shades of green and blue.

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## 1.0 INTRODUCTION

The Colorado Department of Public Health & Environment Air Pollution Control Division (APCD) is conducting twelve (12) months of community monitoring as a result of the Air Toxics Act (Colorado HB21-1189). The bill created a new program at APCD to regulate toxics air contaminants at four (4) covered facilities located in Commerce City, Henderson, and Pueblo. As a part of this program, APCD is establishing a community monitoring program that prioritizes disproportionately impacted communities to better protect public health. The objectives of the monitoring program consist of monitoring for benzene, hydrogen sulfide (H<sub>2</sub>S), and hydrogen cyanide (HCN), with supporting meteorological measurements, to help characterize impacts on the surrounding disproportionately impacted communities.

The facilities covered by HB21-1189 are the Suncor Refinery (Commerce City), the Phillips 66 Pipeline Terminal (Commerce City), the Sinclair Pipeline Terminal (Henderson), and Goodrich Carbon Products (Pueblo). These facilities have been divided into three (3) sampling regions. Air Resource Specialists, Inc. (ARS) is the contractor responsible for this monitoring effort, which will consist of thirty (30) days of sampling of each compound at each sampling region per quarter.

This monthly data submittal report describes all work performed by Air Resource Specialists, Inc. (ARS) for the project site for the monitoring period September 1 through September 30, 2023.

Any questions regarding the content of this report or the accompanying digital data files should be addressed to:

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## 2.0 OPERATIONAL SUMMARIES

Operational activities for this project consist of site installations, routine sampling per an established schedule, quarterly maintenance visits, and emergency visits.

Significant events that occurred during the September 1 through September 30, 2023, timeframe include the following:

- Quarterly maintenance was conducted on the meteorological sensors at all sites on 09/20/2023.
- The HCN sample for the A1 site on 09/29/2023 and the duplicate HCN sample for the C1 site on 09/15/2023 were reported as samples above the detection limit by margins smaller than the expected uncertainty of the measurements. These samples are likely non-detects.

Significant deviations from the established sampling schedule include:

- The sampling event for benzene for the 09/13/2023 to 09/27/2023 sampling period occurred 09/15/2023 to 09/27/2023. See below.

Sampling issues or corrective actions taken include:

- A sampling recovery error occurred on the B1 site for benzene sorbent tubes on 09/13/2023, resulting in the loss of benzene data from 08/30/2023 to 09/13/2023. The recovered sorbent tube was accidentally redeployed on 09/13/2023 at the C1 site. The new sorbent tube was replaced at the C1 site on 09/15/2023 to correct the issue.
- The HCN sample for the A1 site on 09/13/2023 was invalidated due to an issue with the sampling pump. A make-up sample for the A1 site occurred on 09/20/2023.

### 3.0 AIR TOXICS SAMPLING STATISTICS

Statistics for samples collected during the September 1 to September 30, 2023, monitoring period are displayed in the table below. The table compares samples collected for each monitoring region against the requirements of the project. The statement of work requires 30 sampling days per quarter. Benzene and H<sub>2</sub>S sampling frequency is twice the requirement in the statement of work. Collection statistics are slightly skewed since this report encompasses more than a month of data. Duplicate samples and field blanks are required to be collected at a 10% rate over the course of each quarter.

Table 3-1

14-day Benzene Sample Collection  
September 1 to September 30, 2023

Sampling Region	Site	Monthly		Quarterly	
		Collected	Required	Collected	Required
A	A1	2	1	6	3
B	B1	1	1	5	3
C	C1	2	1	6	3

Table 3-2

Benzene Duplicate Sample and Field Blank Collection  
September 1 to September 30, 2023

Duplicate		Field Blank	
Collected	%	Collected	%
0	0%	0	0%

Table 3-3

14-day H<sub>2</sub>S Sample Collection  
September 1 to September 30, 2023

Sampling Region	Site	Monthly		Quarterly	
		Collected	Required	Collected	Required
A	A1	2	1	6	3
B	B1	2	1	6	3
C	C1	2	1	4	3

Table 3-4  
H<sub>2</sub>S Duplicate Sample and Field Blank Collection  
September 1 to September 30, 2023

<b>Duplicate</b>		<b>Field Blank</b>	
<b>Collected</b>	<b>%</b>	<b>Collected</b>	<b>%</b>
0	0%	0	0%

Table 3-5  
HCN Sample Collection  
September 1 to September 30, 2023

<b>Sampling Region</b>	<b>Site</b>	<b>Monthly</b>		<b>Quarterly</b>	
		<b>Collected</b>	<b>Required</b>	<b>Collected</b>	<b>Required</b>
A	A1	12	10	32	30
B	B1	12	10	32	30
C	C1	12	10	32	30

Table 3-6  
HCN Duplicate Sample and Field Blank Collection  
September 1 to September 30, 2023

<b>Duplicate</b>		<b>Field Blank</b>	
<b>Collected</b>	<b>%</b>	<b>Collected</b>	<b>%</b>
2	8%	2	8%

#### 4.0 AIR TOXIC DATA SUMMARIES

The tables below summarize the air toxics data collected during the period of September 1 to September 30, 2023.

Table 4-1  
14-Day Benzene Data  
September 1 to September 30, 2023

SITE	Sampling Start Day	Sampling End Day	Days	Concentration (ppb)	MDL (ppb)	Notes
A1	8/30/2023	9/13/2023	14	0.231	0.0579	
A1	09/13/2023	09/27/2023	14	0.222	0.0593	
B1	8/30/2023	9/13/2023	14			Sampling Error
B1	09/13/2023	09/27/2023	14	0.249	0.0595	
C1	08/30/2023	09/13/2023	14	0.156	0.0579	
C1	09/15/2023	09/27/2023	14	0.120	0.0691	
		Maximum		0.249		
		Minimum		0.120		
		Average		0.196		

Table 4-2  
14-Day H<sub>2</sub>S Data  
September 1 to September 30, 2023

SITE	Sampling Start Day	Sampling End Day	Days	Concentration (ppb)	LOD (ppb)	Notes
A1	8/30/2023	9/13/2023	14	0.348	0.04	
A1	9/13/2023	9/27/2023	14	0.352	0.04	
B1	8/30/2023	9/13/2023	14	0.335	0.04	
B1	9/13/2023	9/27/2023	14	0.743	0.04	
C1	8/30/2023	9/13/2023	14	0.100	0.04	
C1	9/13/2023	9/27/2023	14	0.0987	0.04	
		Maximum		0.743		
		Minimum		0.099		
		Average		0.329		



Table 4-3  
HCN Data  
September 1 to September 30, 2023

<b>SITE</b>	<b>Sampling Date</b>	<b>Duration (min)</b>	<b>Concentration (ppb)</b>	<b>MDL (ppb)</b>	<b>Notes</b>
A1	09/01/2023 06:53	439	ND	0.9	
A1	09/05/2023 06:54	452	ND	0.9	
A1	09/07/2023 06:27	442	ND	0.9	
A1	09/08/2023 06:10	433	ND	0.9	
A1	09/11/2023 06:46	446	ND	0.9	
A1	09/15/2023 10:18	477	ND	0.8	
A1	09/19/2023 08:32	469	ND	0.8	
A1	09/20/2023 11:39	445	ND	0.8	
A1	09/21/2023 07:58	462	ND	0.9	
A1	09/25/2023 08:13	487	ND	0.8	
A1	09/27/2023 06:34	480	ND	0.8	
A1	09/29/2023 06:08	449	0.95	0.9	
B1	9/1/2023 6:36	476	ND	0.8	
B1	9/5/2023 6:27	502	ND	0.8	
B1	9/7/2023 6:04	487	ND	0.8	
B1	9/8/2023 5:47	477	ND	0.8	
B1	9/11/2023 6:20	495	ND	0.8	
B1	9/13/2023 10:50	469	ND	0.8	
B1	9/15/2023 9:56	523	ND	0.7	
B1	9/19/2023 7:56	534	ND	0.7	
B1	9/21/2023 7:25	517	ND	0.8	
B1	9/25/2023 7:40	545	ND	0.7	
B1	9/25/2023 7:44	546	ND	0.8	Duplicate
B1	9/25/2023 7:40		ND	0.7	Blank
B1	9/27/2023 5:58	541	ND	0.7	
B1	9/29/2023 5:04	494	ND	0.8	
C1	9/1/2023 8:56	180	ND	2.1	
C1	9/5/2023 9:19	180	ND	2.2	
C1	9/7/2023 8:41	180	ND	2.2	
C1	9/8/2023 8:14	180	ND	2.2	
C1	9/11/2023 9:08	180	ND	2.1	
C1	9/13/2023 13:35	178	ND	2.1	
C1	9/15/2023 12:50	180	ND	2.1	

Table 4-3 (continued)

C1	9/15/2023 12:50	180	2.1	2.1	Duplicate
C1	9/15/2023 12:50		ND	2.1	Blank
C1	9/19/2023 11:00	184	ND	2.1	
C1	9/21/2023 10:32	181	ND	2.2	
C1	9/25/2023 10:53	190	ND	2.3	
C1	9/27/2023 9:19	183	ND	2.2	
C1	9/29/2023 8:21	190	ND	2.1	

## **4.1 METEOROLOGICAL DATA COLLECTION STATISTICS AND SUMMARIES**

The tables and graphs below summarize the meteorological data collected during the period of September 1 to September 30, 2023.

### **4.1.1 Site A1**

- Data Collection Statistics for A1 - Hourly Data
- Wind Rose for A1
- Stackplots - Hourly Data

### **4.1.2 Site B1**

- Data Collection Statistics for B1 - Hourly Data
- Wind Rose for B1
- Stackplots - Hourly Data

### **4.1.3 Site C1**

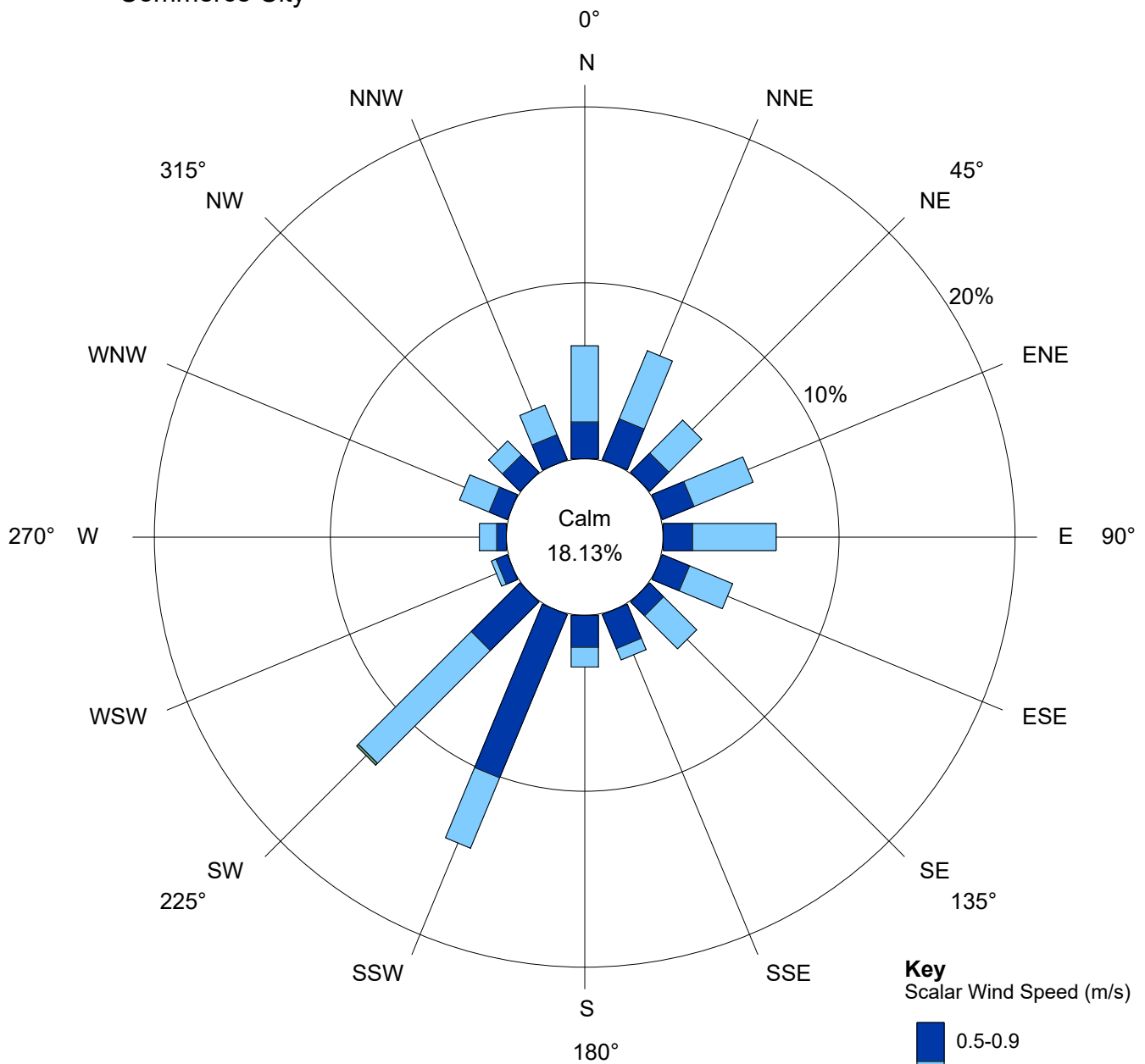
- Data Collection Statistics for C1 - Hourly Data
- Wind Rose for C1
- Stackplots - Hourly Data

Table 4-4

Data Collection Statistics							
Colorado Air Toxics - A1 Commerce City							
09/01/2023 - 09/30/2023							
Parameter	Interval	Par Code	No. Possible	No. Collected	% Collected	No. Valid	% Valid
Relative Humidity	hourly	RH	720	720	100.0	720	100.0
Standard Deviation for Wind Direction	hourly	SDWD	720	717	99.6	717	99.6
Solar Radiation	hourly	SOL	720	720	100.0	720	100.0
Scalar Wind Direction	hourly	SWD	720	717	99.6	717	99.6
Scalar Wind Speed	hourly	SWS	720	717	99.6	717	99.6
Ambient Temperature	hourly	TMP	720	717	99.6	717	99.6
Vector Wind Direction	hourly	VWD	720	717	99.6	717	99.6
Vector Wind Speed	hourly	VWS	720	717	99.6	717	99.6

Note: The percent valid is calculated against the number possible.

Automatic zeros and spans are performed daily on most ambient gas analyzers and ambient data can only be reported if the duration of these events is less than 25% of the hour. As a result, the maximum percent valid is generally less than 100%.



99.6% Collected 99.6% Valid  
 720 Possible /717 Collected /717 Valid  
 Collection Statistics Include:  
 Scalar Wind Speed, Wind Speed and Wind Direction  
 (SWS-1; SWS-1; SWD-1)  
 (includes WS and WD) (Calm<0.5m/s)

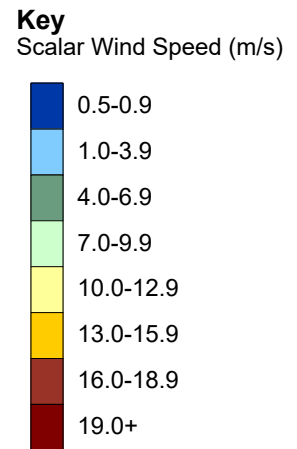


Figure 4-2  
 Colorado Air Toxics - A1 (Commerce City) - Hourly Meteorological Data  
 September 2023



Figure 4-3  
 Colorado Air Toxics - A1 (Commerce City) - Hourly Meteorological Data  
 September 2023



Figure 4-4  
 Colorado Air Toxics - A1 (Commerce City) - Hourly Meteorological Data  
 September 2023

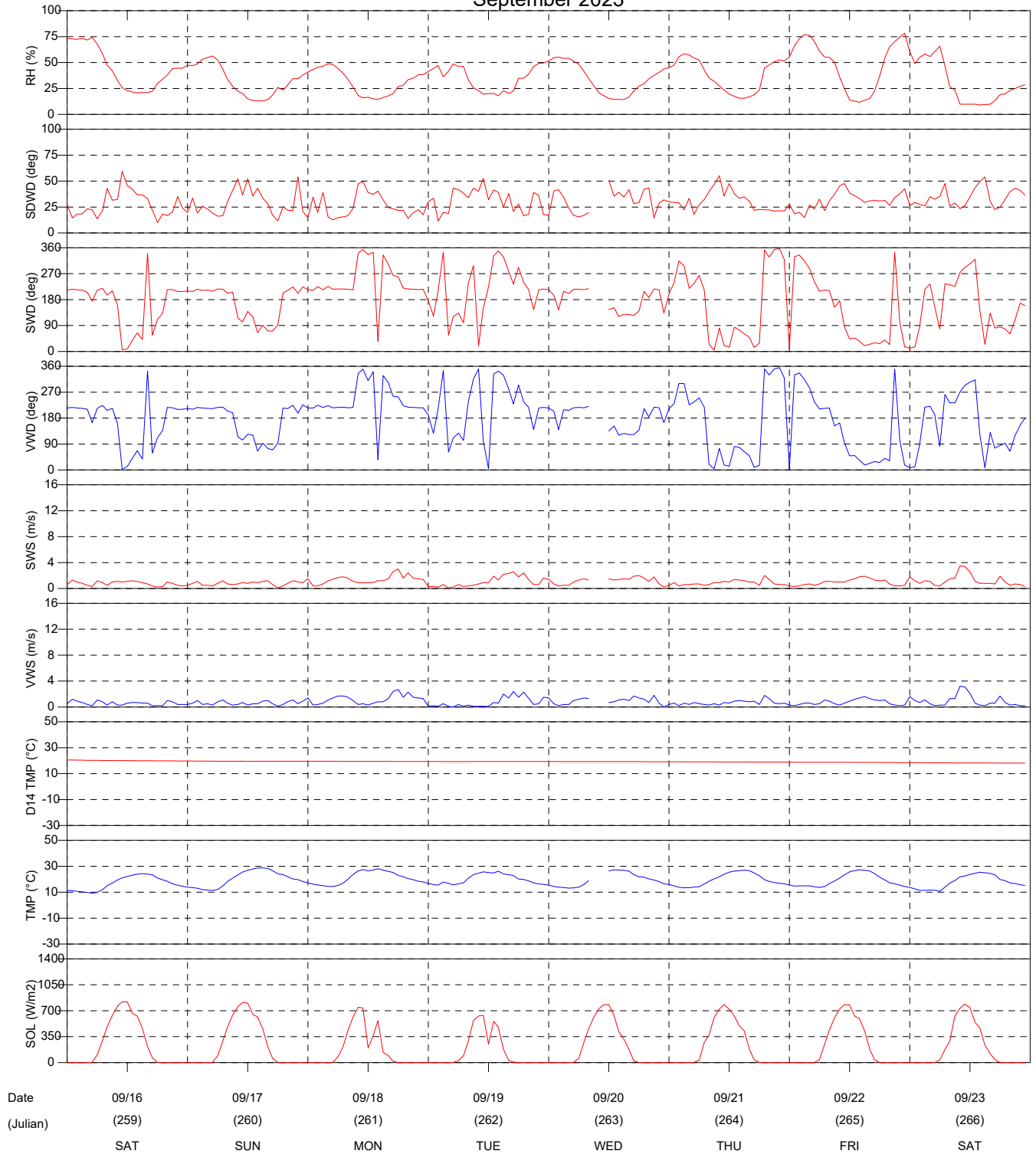




Figure 4-5  
 Colorado Air Toxics - A1 (Commerce City) - Hourly Meteorological Data  
 September 2023



Table 4-5

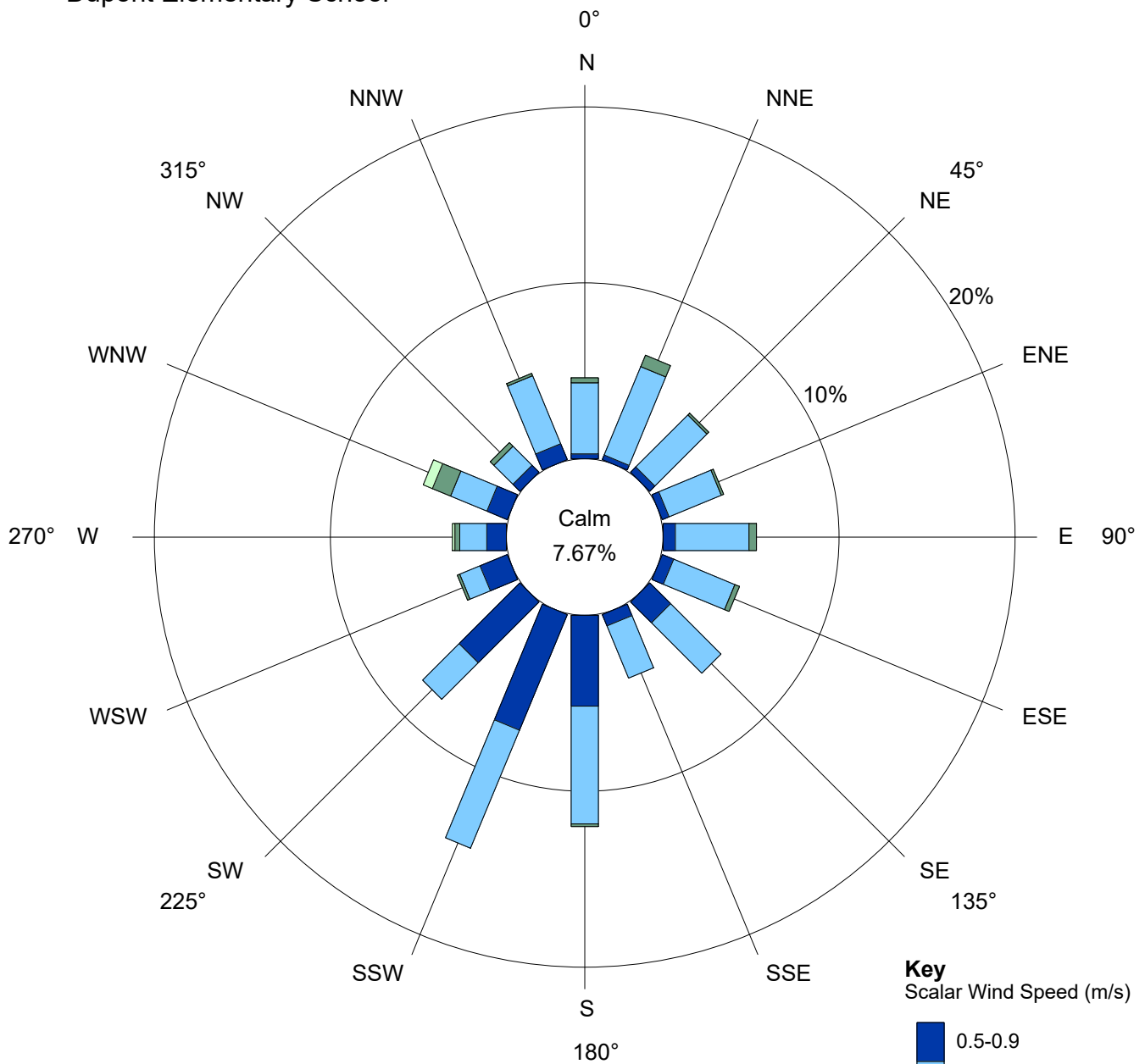
Data Collection Statistics							
Colorado Air Toxics - B1 Dupont Elementary School							
09/01/2023 - 09/30/2023							
Parameter	Interval	Par Code	No. Possible	No. Collected	% Collected	No. Valid	% Valid
Relative Humidity	hourly	RH	720	720	100.0	720	100.0
Standard Deviation for Wind Direction	hourly	SDWD	720	717	99.6	717	99.6
Solar Radiation	hourly	SOL	720	720	100.0	720	100.0
Scalar Wind Direction	hourly	SWD	720	717	99.6	717	99.6
Scalar Wind Speed	hourly	SWS	720	717	99.6	717	99.6
Ambient Temperature	hourly	TMP	720	717	99.6	717	99.6
Vector Wind Direction	hourly	VWD	720	717	99.6	717	99.6
Vector Wind Speed	hourly	VWS	720	717	99.6	717	99.6

Note: The percent valid is calculated against the number possible.

Automatic zeros and spans are performed daily on most ambient gas analyzers and ambient data can only be reported if the duration of these events is less than 25% of the hour. As a result, the maximum percent valid is generally less than 100%.

Figure 4-6  
Wind Rose

09/01/2023 - 09/30/2023



99.6% Collected 99.6% Valid  
720 Possible /717 Collected /717 Valid  
Collection Statistics Include:  
Scalar Wind Speed, Wind Speed and Wind Direction  
(SWS-1; SWS-1; SWD-1)  
(includes WS and WD) (Calm<0.5m/s)

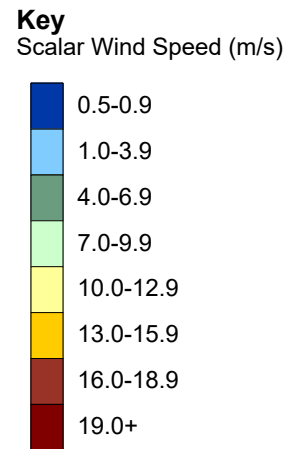


Figure 4-7  
 Colorado Air Toxics - B1 (DuPont Elementary School) - Hourly Meteorological Data  
 September 2023



Figure 4-8  
 Colorado Air Toxics - B1 (DuPont Elementary School) - Hourly Meteorological Data  
 September 2023



Figure 4-9  
 Colorado Air Toxics - B1 (DuPont Elementary School) - Hourly Meteorological Data  
 September 2023



Figure 4-10  
 Colorado Air Toxics - B1 (DuPont Elementary School) - Hourly Meteorological Data  
 September 2023

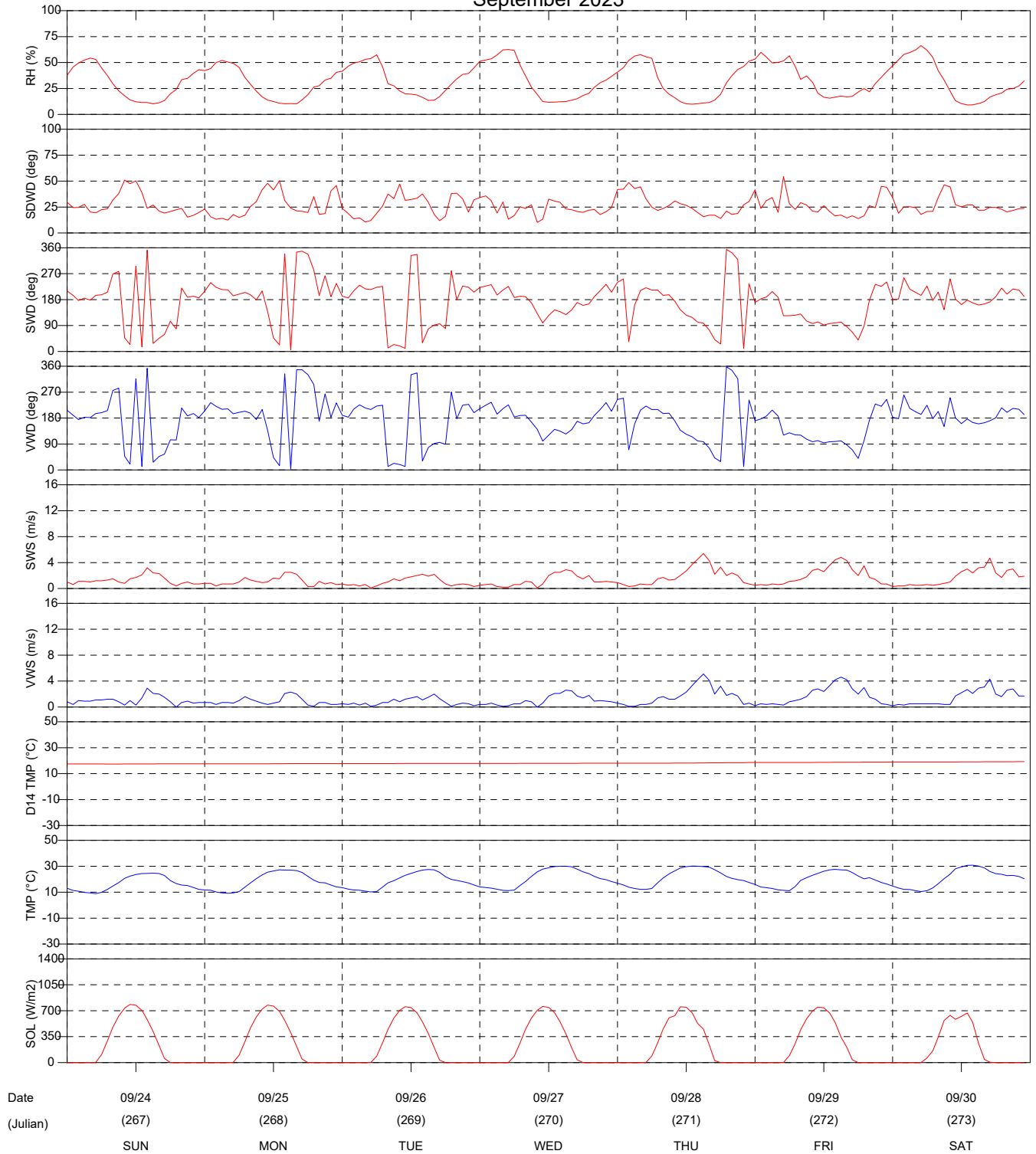


Table 4-6

Data Collection Statistics							
Colorado Air Toxics - C1 Pueblo							
09/01/2023 - 09/30/2023							
Parameter	Interval	Par Code	No. Possible	No. Collected	% Collected	No. Valid	% Valid
Relative Humidity	hourly	RH	720	720	100.0	720	100.0
Standard Deviation for Wind Direction	hourly	SDWD	720	718	99.7	718	99.7
Solar Radiation	hourly	SOL	720	720	100.0	720	100.0
Scalar Wind Direction	hourly	SWD	720	718	99.7	718	99.7
Scalar Wind Speed	hourly	SWS	720	718	99.7	718	99.7
Ambient Temperature	hourly	TMP	720	718	99.7	718	99.7
Vector Wind Direction	hourly	VWD	720	718	99.7	718	99.7
Vector Wind Speed	hourly	VWS	720	718	99.7	718	99.7

Note: The percent valid is calculated against the number possible.

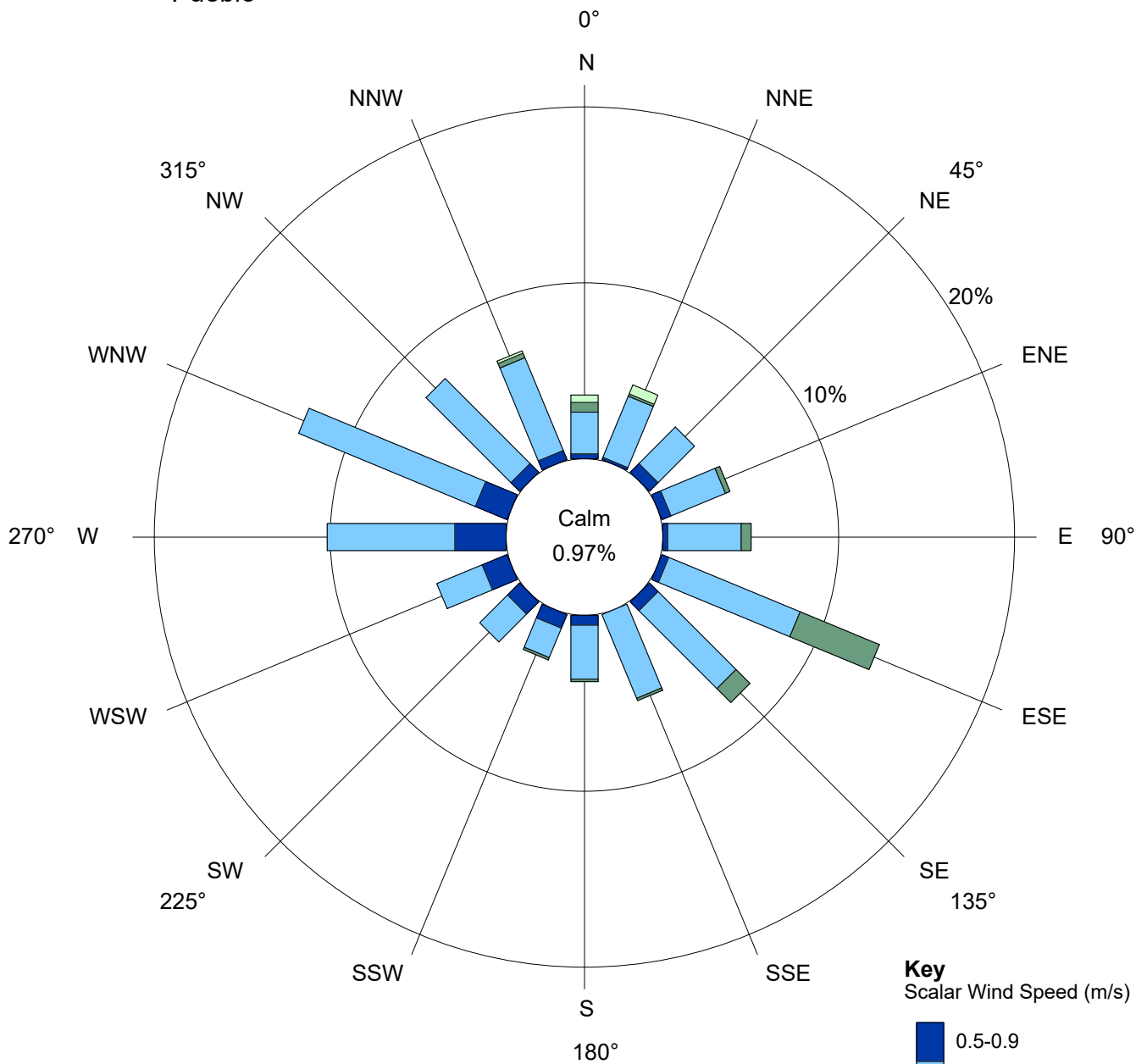
Automatic zeros and spans are performed daily on most ambient gas analyzers and ambient data can only be reported if the duration of these events is less than 25% of the hour. As a result, the maximum percent valid is generally less than 100%.



Colorado Air Toxics - C1  
 Pueblo

Figure 4-11  
 Wind Rose

09/01/2023 - 09/30/2023



99.7% Collected 99.7% Valid  
 720 Possible /718 Collected /718 Valid  
 Collection Statistics Include:  
 Scalar Wind Speed, Wind Speed and Wind Direction  
 (SWS-1; SWS-1; SWD-1)  
 (includes WS and WD) (Calm<0.5m/s)

Figure 4-12  
 Colorado Air Toxics - C1 (Pueblo) - Hourly Met Data  
 September 2023

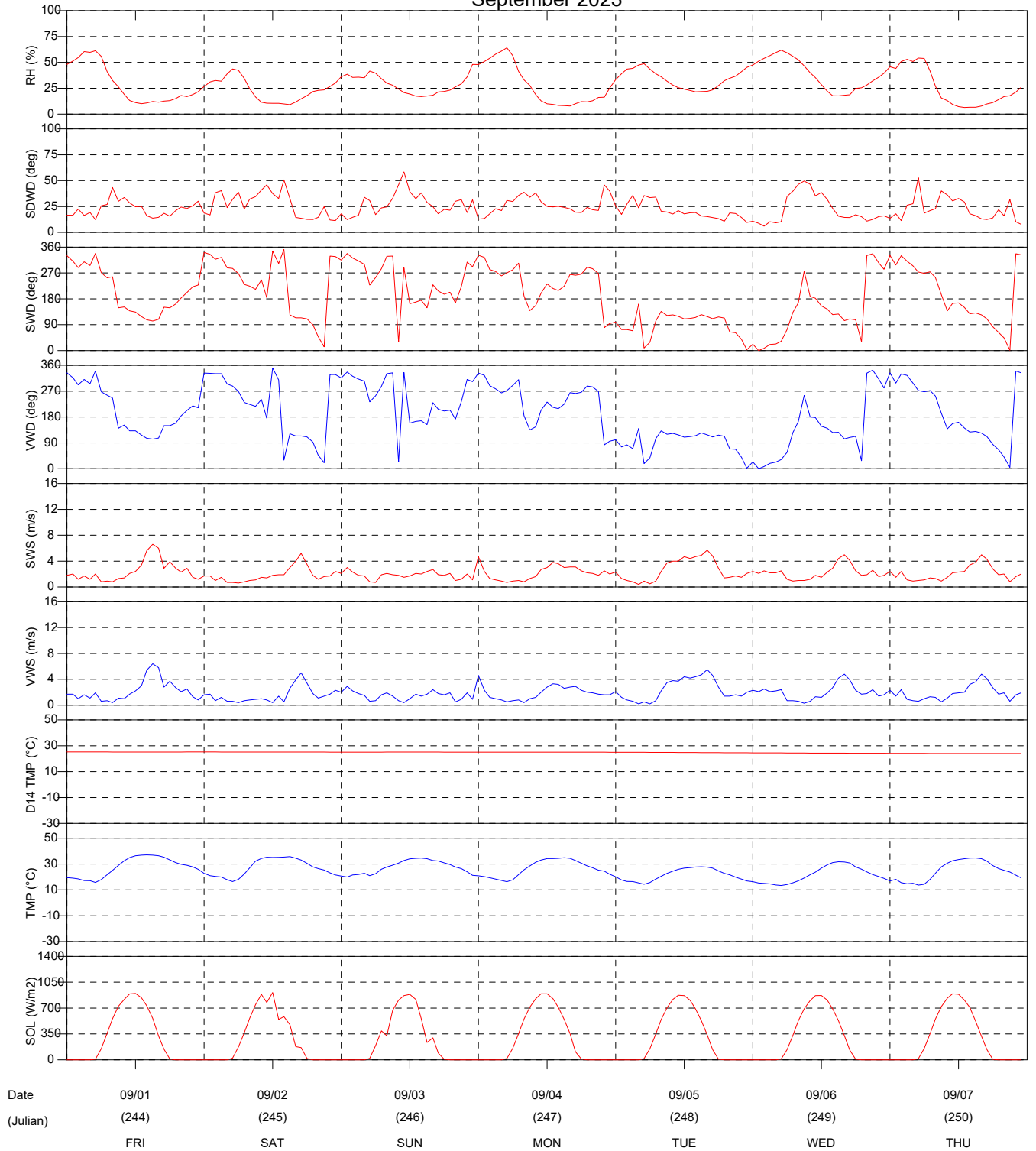


Figure 4-13  
 Colorado Air Toxics - C1 (Pueblo) - Hourly Met Data  
 September 2023



Figure 4-14  
 Colorado Air Toxics - C1 (Pueblo) - Hourly Met Data  
 September 2023



Figure 4-15  
 Colorado Air Toxics - C1 (Pueblo) - Hourly Met Data  
 September 2023

