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

July 1 – July 31, 2023

**Operational Summaries,
Data Summaries and Plots**

Prepared for

**DEREK PRICE
AIR TOXICS AND OZONE PRECURSOR SECTION
COLORADO DEPARTMENT OF PUBLIC HEALTH & ENVIRONMENT
4300 CHERRY CREEK DRIVE SOUTH
DENVER, CO 80246**

Prepared by



1901 Sharp Point Drive, Suite F
Fort Collins, CO 80525
970-484-7941
www.air-resource.com

August 28, 2023

A decorative graphic in the bottom left corner consisting of three stylized mountain peaks in shades of green and blue.

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
1.0 INTRODUCTION	1-1
2.0 OPERATIONAL SUMMARIES	2-1
3.0 AIR TOXICS SAMPLING STATISTICS	3-1
4.0 AIR TOXIC DATA SUMMARIES	4-1
4.1 Meteorological Data Collection Statistics and Summaries	4-5
4.1.1 Site A1	4-5
4.1.2 Site B1	4-5
4.1.3 Site C1	4-5

LIST OF FIGURES

<u>Figure</u>	<u>Page</u>
4-1 A1, Commerce City - Wind Rose – 07/01/2023 – 07/31/2023	4-7
4-2 A1, Commerce City - Hourly Meteorological Data 07/01/2023 – 07/07/2023	4-8
4-3 A1, Commerce City - Hourly Meteorological Data 07/08/2023 – 07/15/2023	4-9
4-4 A1, Commerce City - Hourly Meteorological Data 07/16/2023 – 07/23/2023	4-10
4-5 A1, Commerce City - Hourly Meteorological Data 07/24/2023 – 07/31/2023	4-11
4-6 B1, Dupont Elementary School - Wind Rose – 07/01/2023 – 07/31/2023	4-13
4-7 B1, Dupont Elementary School - Hourly Meteorological Data 07/01/2023 – 07/07/2023	4-14
4-8 B1, Dupont Elementary School - Hourly Meteorological Data 07/08/2023 – 07/15/2023	4-15
4-9 B1, Dupont Elementary School - Hourly Meteorological Data 07/16/2023 – 07/23/2023	4-16
4-10 B1, Dupont Elementary School - Hourly Meteorological Data 07/24/2023 – 07/31/2023	4-17
4-11 C1, Pueblo - Wind Rose – 07/01/2023 – 07/31/2023	4-19
4-12 C1, Pueblo - Hourly Meteorological Data 07/01/2023 – 07/07/2023	4-20
4-13 C1, Pueblo - Hourly Meteorological Data 07/08/2023 – 07/15/2023	4-21
4-14 C1, Pueblo - Hourly Meteorological Data 07/16/2023 – 07/23/2023	4-22
4-15 C1, Pueblo - Hourly Meteorological Data 07/24/2023 – 07/30/2023	4-23

LIST OF TABLES

<u>Table</u>		<u>Page</u>
3-1	14-day Benzene Sample Collection – 07/01/2023 – 07/31/2023	3-1
3-2	Benzene Duplicate Sample and Field Blank Collection – 07/01/2023 – 07/31/2023	3-1
3-3	14-day H2S Sample Collection – 07/01/2023 – 07/31/2023	3-1
3-4	H2S Duplicate Sample and Field Blank Collection - 07/01/2023 – 07/31/2023	3-2
3-5	HCN Sample Collection - 07/01/2023 – 07/31/2023	3-2
3-6	HCN Duplicate Sample and Field Blank Collection – 07/01/2023 – 07/31/2023	3-2
4-1	14-Day Benzene Data - 07/01/2023 – 07/31/2023	4-1
4-2	14-Day H2S Data - 07/01/2023 – 07/31/2023	4-2
4-3	HCN Data - 07/01/2023 – 07/31/2023	4-3
4-4	Data Collection Statistics - A1, Commerce – 07/01/2023 – 07/31/2023	4-6
4-5	Data Collection Statistics - B1, Henderson - 07/01/2023 – 07/31/2023	4-12
4-6	Data Collection Statistics - C1, Pueblo - 07/01/2023 – 07/31/2023	4-18

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 (H₂S), 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 July 1 through July 31, 2023.

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

Christian Kirk, Project Manager
ckirk@air-resource.com
Air Resource Specialists, Inc.
1901 Sharp Point Drive, Suite F
Fort Collins, Colorado 80525
Telephone: 970-484-7941

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 July 1 through July 31, 2023, timeframe include the following:

- The analysis of H₂S samples transitioned from Ormantine to Ethalpy (RAD170). RAD170 samples and duplicates were collocated with Ormantine samples during the month of July.

Significant deviations from the established sampling schedule include:

- The contract laboratory, Ormantine, failed to ship sorbent tubes on schedule. H₂S sampling at all locations for the sampling period of 07/19/2023 to 08/02/2023 was missed.
- A duplicate H₂S sample (RAD170) in Sampling Region C (Pueblo) was lost as it fell out of its sample holder during the sampling period.

Sampling issues or corrective actions taken include:

- None.

3.0 AIR TOXICS SAMPLING STATISTICS

Statistics for samples collected during the July 1 to July 31, 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 H₂S 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
July 1 to July 31, 2023

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

Table 3-2
Benzene Duplicate Sample and Field Blank Collection
July 1 to July 31, 2023

Duplicate		Field Blank	
Collected	%	Collected	%
1	17%	1	17%

Table 3-3
14-day H₂S Sample Collection
July 1 to July 31, 2023

Sampling Region	Site	Monthly		Quarterly	
		Collected	Required	Collected	Required
A (Ormantine)	A1	1	1	1	3
(RAD170)	A1	2	1	2	3
B	B1	1	1	1	3
	B1	2	1	2	3
C	C1	1	1	1	3
	C1	2	1	2	3

Table 3-4
H₂S Duplicate Sample and Field Blank Collection
July 1 to July 31, 2023

	Duplicate		Field Blank	
	Collected	%	Collected	%
Ormantine	1	17%	1	17%
RAD170	5	83%	6	100%

Table 3-5
HCN Sample Collection
July 1 to July 31, 2023

Sampling Region	Site	Monthly		Quarterly	
		Collected	Required	Collected	Required
A	A1	10	10	10	30
B	B1	10	10	10	30
C	C1	10	10	10	30

Table 3-6
HCN Duplicate Sample and Field Blank Collection
July 1 to July 31, 2023

Duplicate		Field Blank	
Collected	%	Collected	%
4	13%	4	13%

4.0 AIR TOXIC DATA SUMMARIES

The tables below summarize the air toxics data collected during the period of July 1 to July 31, 2023.

Table 4-1
14-Day Benzene Data
July 1 to July 31, 2023

SITE	Sampling Start Day	Sampling End Day	Days	Concentration (ppb)	MDL (ppb)	Notes
A1	7/5/2023	7/19/2023	14	0.175	0.0582	
A1	7/5/2023	7/19/2023	14	0.192	0.0582	Duplicate
A1	7/5/2023	7/19/2023	14	ND	0.0582	Field Blank
A1	7/19/2023	8/2/2023	14	0.198	0.0581	
B1	7/5/2023	7/19/2023	14	0.246	0.0583	
B1	7/19/2023	8/2/2023	14	0.226	0.0581	
C1	7/5/2023	7/19/2023	14	0.0822	0.0582	
C1	7/19/2023	8/2/2023	14	0.103	0.0581	
		Maximum		0.246		
		Minimum		0.082		
		Average		0.175		

Table 4-2
 14-Day H₂S Data
 July 1 to July 31, 2023

SITE	Sampling Start Day	Sampling End Day	Days	Concentration (ppb)	LOD (ppb)	Notes
A1	7/5/2023	7/19/2023	14	ND	0.14	
A1	7/5/2023	7/19/2023	14	0.438	0.04	
A1	7/5/2023	7/19/2023	14	0.469	0.04	Duplicate
A1	7/5/2023	7/19/2023	14	ND	0.04	Blank
A1	7/19/2023	8/2/2023	14	0.508	0.04	
A1	7/19/2023	8/2/2023	14	0.466	0.04	Duplicate
A1	7/19/2023	8/2/2023	14	ND	0.04	Blank
B1	7/5/2023	7/19/2023	14	ND	0.14	
B1	7/5/2023	7/19/2023	14	ND	0.14	Duplicate
B1	7/5/2023	7/19/2023	14	ND	0.14	Blank
B1	7/5/2023	7/19/2023	14	0.597	0.04	
B1	7/5/2023	7/19/2023	14	0.604	0.04	Duplicate
B1	7/5/2023	7/19/2023	14	ND	0.04	Blank
B1	7/19/2023	8/2/2023	14	0.713	0.04	
B1	7/19/2023	8/2/2023	14	0.633	0.04	Duplicate
B1	7/19/2023	8/2/2023	14	ND	0.04	Blank
C1	7/5/2023	7/19/2023	14	ND	0.14	
C1	7/5/2023	7/19/2023	14	0.224	0.04	
C1	7/5/2023	7/19/2023	14	0.243	0.04	Duplicate
C1	7/5/2023	7/19/2023	14	ND	0.04	Blank
C1	7/19/2023	8/2/2023	14	0.151	0.04	
C1	7/19/2023	8/2/2023	14	ND	0.04	Blank
		Maximum		0.713		
		Minimum		0.151		
	=RAD170	Average		0.459		

Table 4-3
HCN Data
July 1 to July 31, 2023

SITE	Sampling Date	Duration (min)	Concentration (ppb)	MDL (ppb)	Notes
A1	7/5/2023 9:10	474	ND	0.8	
A1	7/7/2023 7:47	445	ND	0.9	
A1	7/11/2023 8:59	489	ND	0.8	
A1	7/13/2023 7:16	500	ND	0.8	
A1	7/19/2023 7:21	512	ND	0.7	
A1	7/20/2023 6:46	461	ND	0.8	
A1	7/21/2023 6:30	486	ND	0.8	
A1	7/21/2023 6:30	486	ND	0.8	Duplicate
A1	7/21/2023 6:30		ND	0.8	Blank
A1	7/25/2023 9:47	520	ND	0.7	
A1	7/27/2023 8:27	459	ND	0.9	
A1	7/31/2023 6:18	434	ND	0.9	
B1	07/05/2023 08:18	557	ND	0.7	
B1	07/05/2023 08:18	558	ND	0.7	Duplicate
B1	07/05/2023 08:18		ND	0.7	Blank
B1	07/07/2023 07:19	493	ND	0.8	
B1	07/11/2023 08:13	512	ND	0.8	
B1	07/13/2023 06:49	504	ND	0.8	
B1	07/19/2023 06:28	544	ND	0.7	
B1	07/20/2023 06:20	508	ND	0.8	
B1	07/21/2023 06:00	541	ND	0.7	
B1	07/25/2023 10:13	503	ND	0.8	
B1	07/27/2023 08:05	499	ND	0.8	
B1	07/31/2023 05:55	479	ND	0.8	
C1	7/5/2023 11:49	180	ND	2.2	
C1	7/7/2023 9:56	181	ND	2.1	
C1	7/11/2023 11:10	181	ND	2.1	
C1	7/13/2023 9:43	180	ND	2.1	
C1	7/13/2023 9:43	180	ND	2.1	
C1	7/13/2023 9:43		ND	2.1	
C1	7/19/2023 9:57	180	ND	2.1	
C1	7/20/2023 8:59	180	ND	2.2	
C1	7/21/2023 8:38	180	ND	2.2	

Table 4-3 (continued)

C1	7/25/2023 12:54	181	ND	2.2	
C1	7/25/2023 12:56	179	ND	2.2	Duplicate
C1	7/25/2023 12:54		ND	2.2	Blank
C1	7/27/2023 10:39	181	ND	2.2	
C1	7/31/2023 8:31	180	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 July 1 to July 31, 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

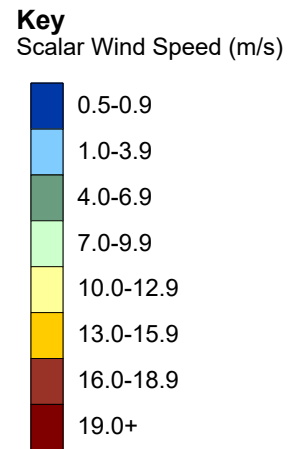
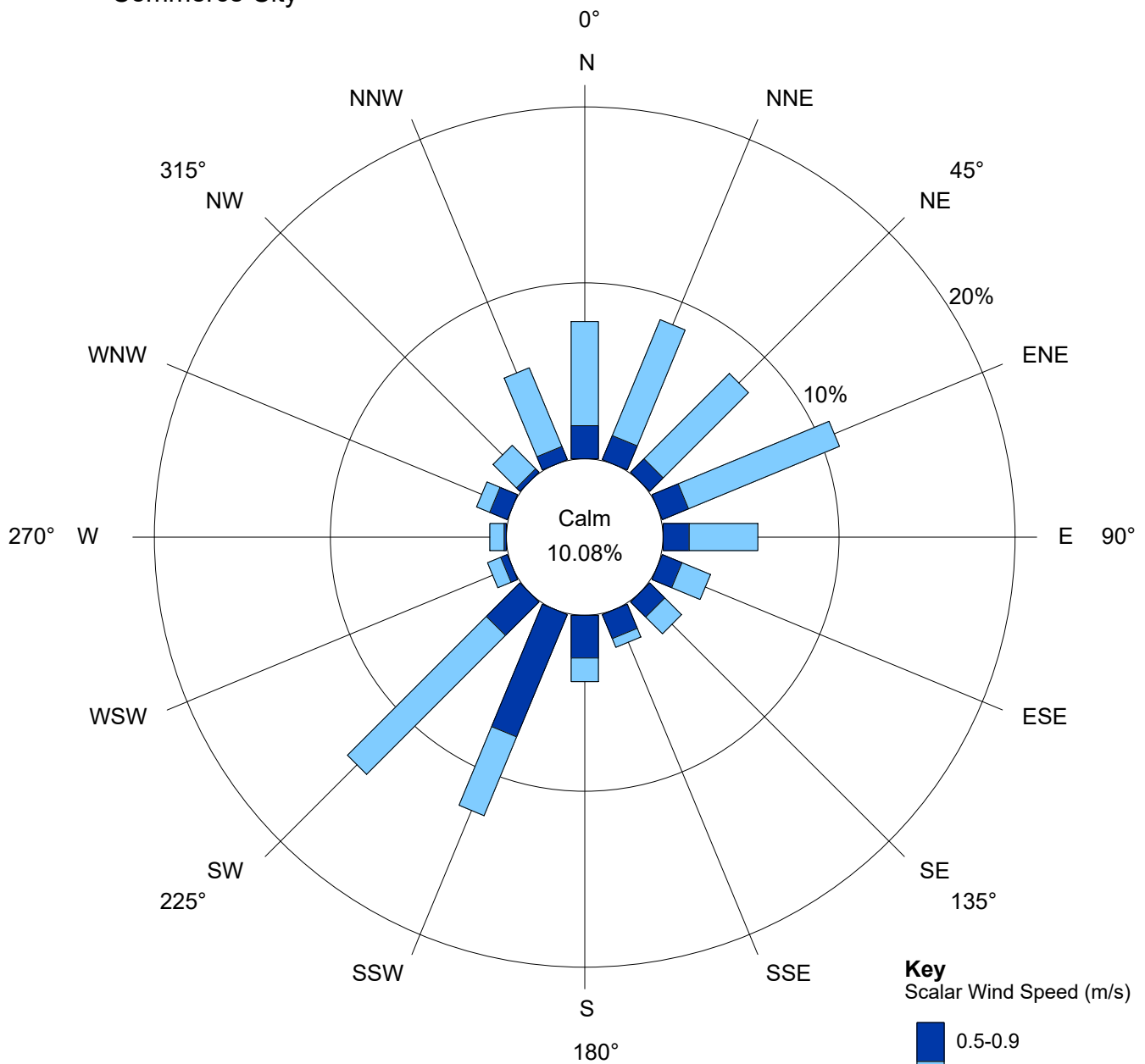
- Data Collection Statistics for C1 - Hourly Data
- Wind Rose for C1
- Stackplots - Hourly Data

Table 4-4

Data Collection Statistics							
Colorado Air Toxics - A1 Commerce City							
07/01/2023 - 07/31/2023							
Parameter	Interval	Par Code	No. Possible	No. Collected	% Collected	No. Valid	% Valid
Relative Humidity	hourly	RH	744	744	100.0	744	100.0
Standard Deviation for Wind Direction	hourly	SDWD	744	744	100.0	744	100.0
Solar Radiation	hourly	SOL	744	744	100.0	744	100.0
Scalar Wind Direction	hourly	SWD	744	744	100.0	744	100.0
Scalar Wind Speed	hourly	SWS	744	744	100.0	744	100.0
Ambient Temperature	hourly	TMP	744	744	100.0	744	100.0
Vector Wind Direction	hourly	VWD	744	744	100.0	744	100.0
Vector Wind Speed	hourly	VWS	744	744	100.0	744	100.0

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%.



100.0% Collected 100.0% Valid
 744 Possible /744 Collected /744 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
 July 2023

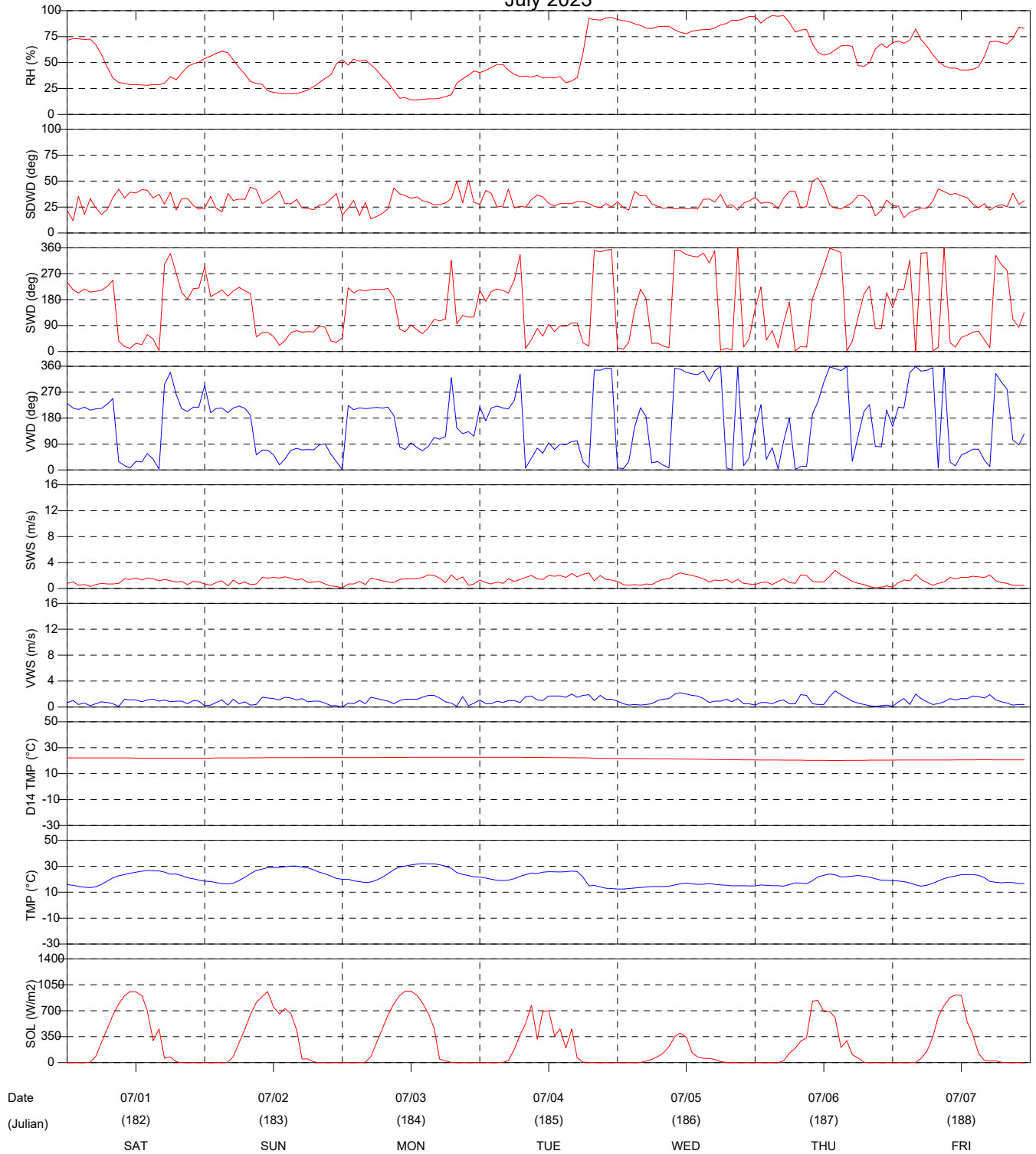


Figure 4-3
 Colorado Air Toxics - A1 (Commerce City) - Hourly Meteorological Data
 July 2023

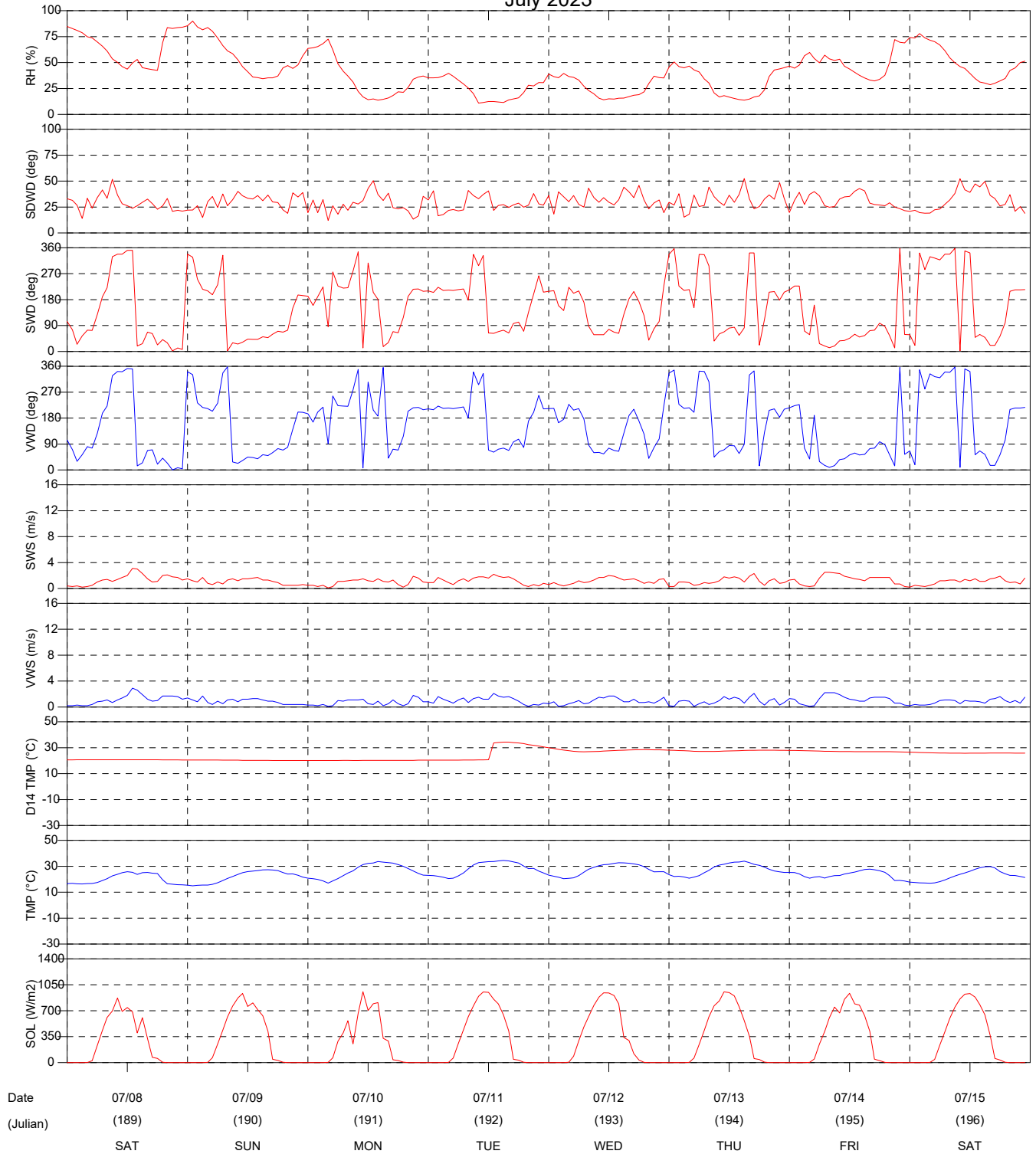


Figure 4-4
 Colorado Air Toxics - A1 (Commerce City) - Hourly Meteorological Data
 July 2023



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



Table 4-5

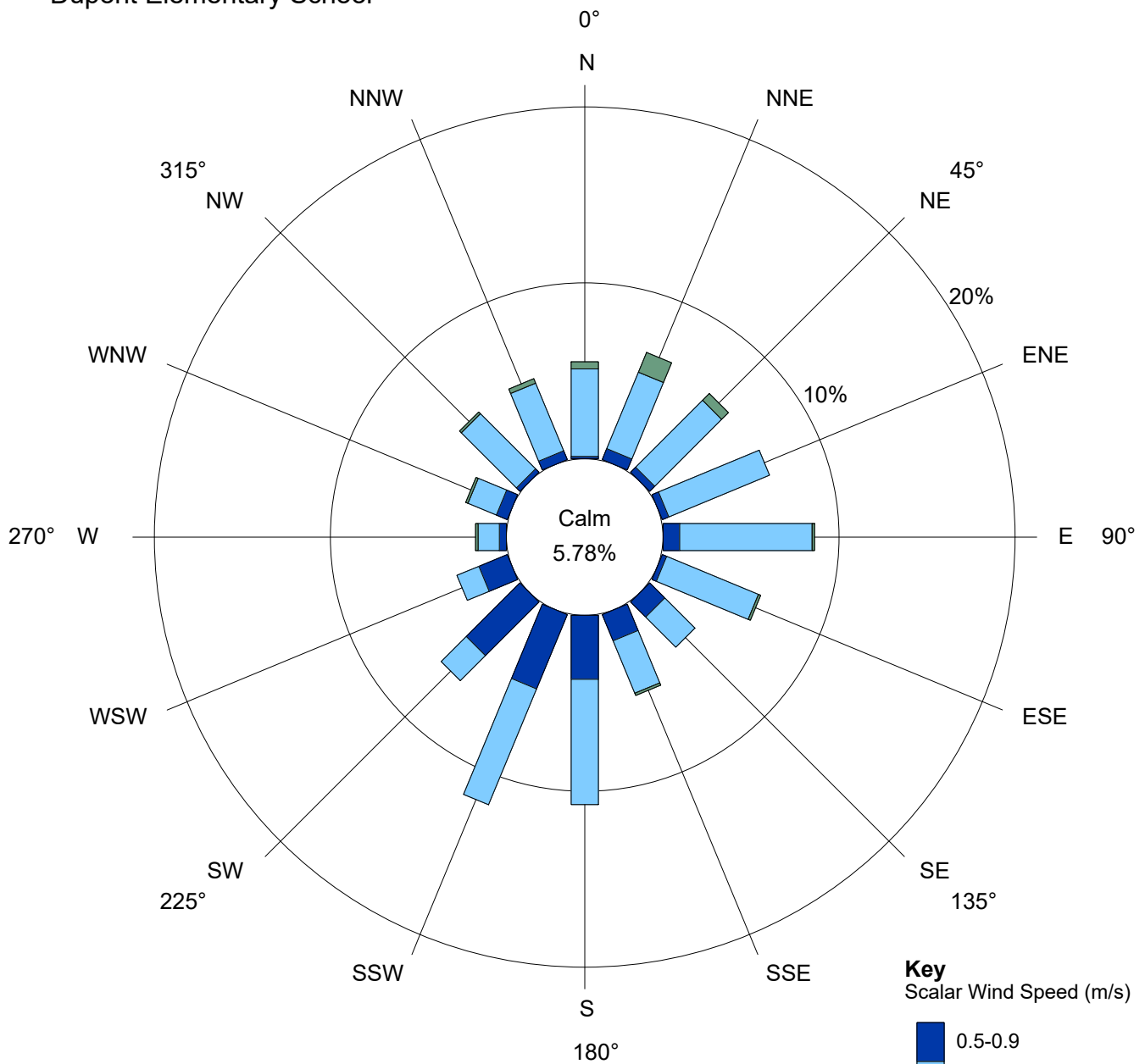
Data Collection Statistics							
Colorado Air Toxics - B1							
07/01/2023 - 07/31/2023							
Parameter	Interval	Par Code	No. Possible	No. Collected	% Collected	No. Valid	% Valid
Relative Humidity	hourly	RH	744	744	100.0	744	100.0
Standard Deviation for Wind Direction	hourly	SDWD	744	744	100.0	744	100.0
Solar Radiation	hourly	SOL	744	744	100.0	744	100.0
Scalar Wind Direction	hourly	SWD	744	744	100.0	744	100.0
Scalar Wind Speed	hourly	SWS	744	744	100.0	744	100.0
Ambient Temperature	hourly	TMP	744	744	100.0	744	100.0
Vector Wind Direction	hourly	VWD	744	744	100.0	744	100.0
Vector Wind Speed	hourly	VWS	744	744	100.0	744	100.0

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

07/01/2023 - 07/31/2023



100.0% Collected 100.0% Valid
744 Possible /744 Collected /744 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)

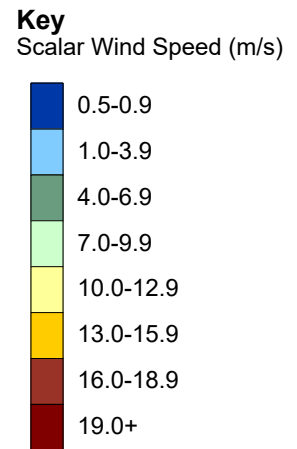


Figure 4-7
 Colorado Air Toxics - B1 (DuPont Elementary School) - Hourly Meteorological Data
 July 2023



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

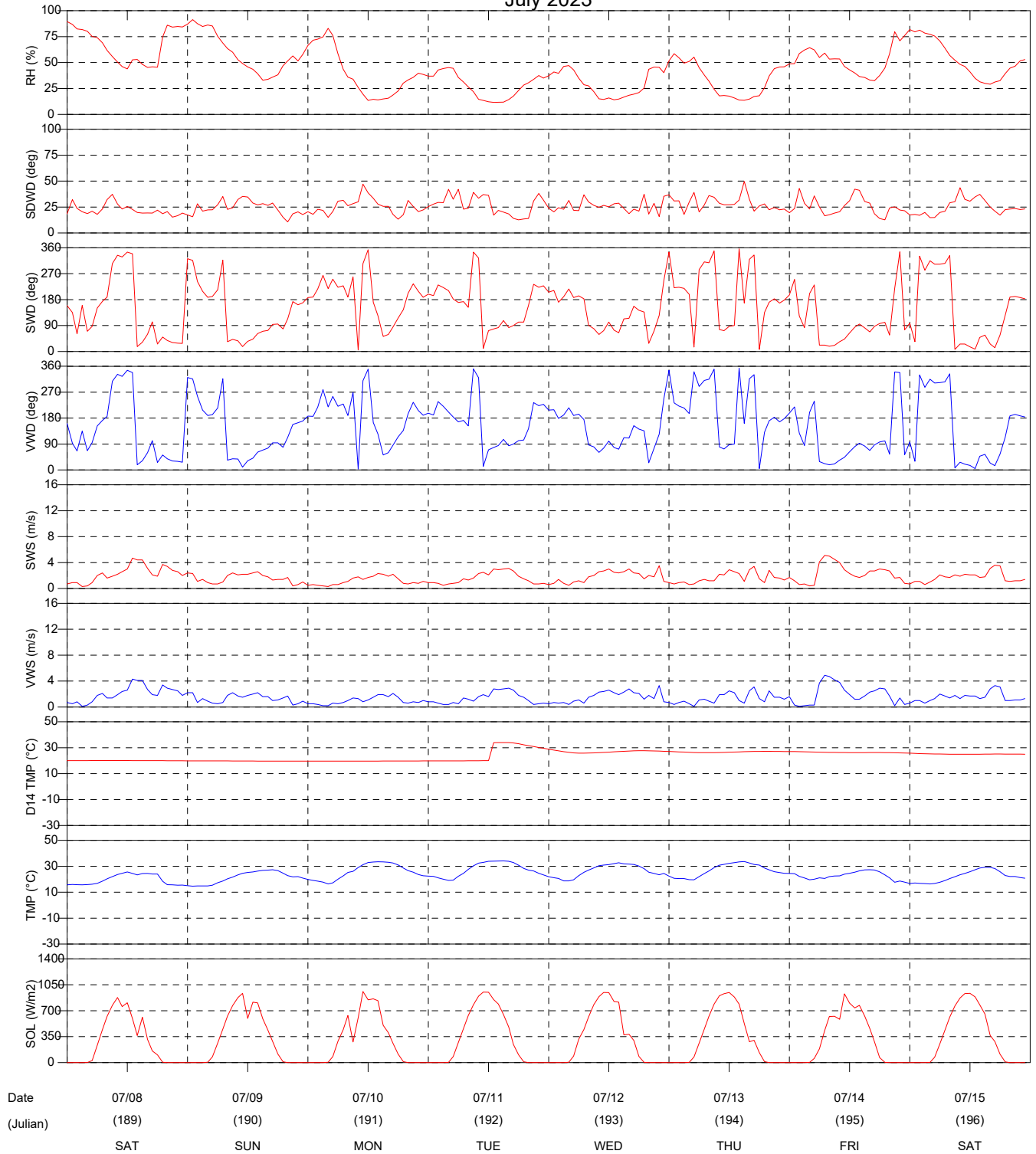


Figure 4-9
 Colorado Air Toxics - B1 (DuPont Elementary School) - Hourly Meteorological Data
 July 2023

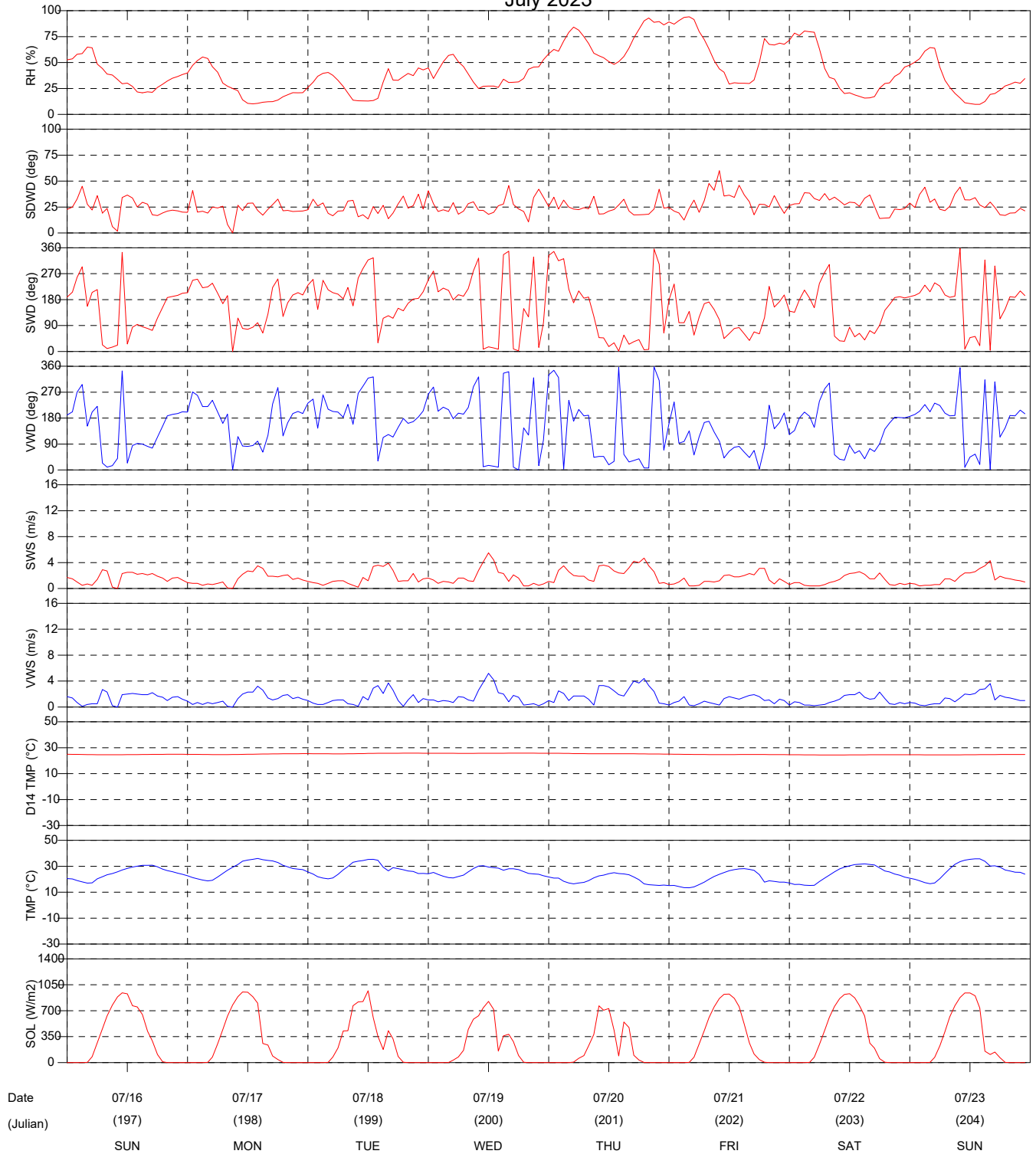


Figure 4-10
 Colorado Air Toxics - B1 (DuPont Elementary School) - Hourly Meteorological Data
 July 2023

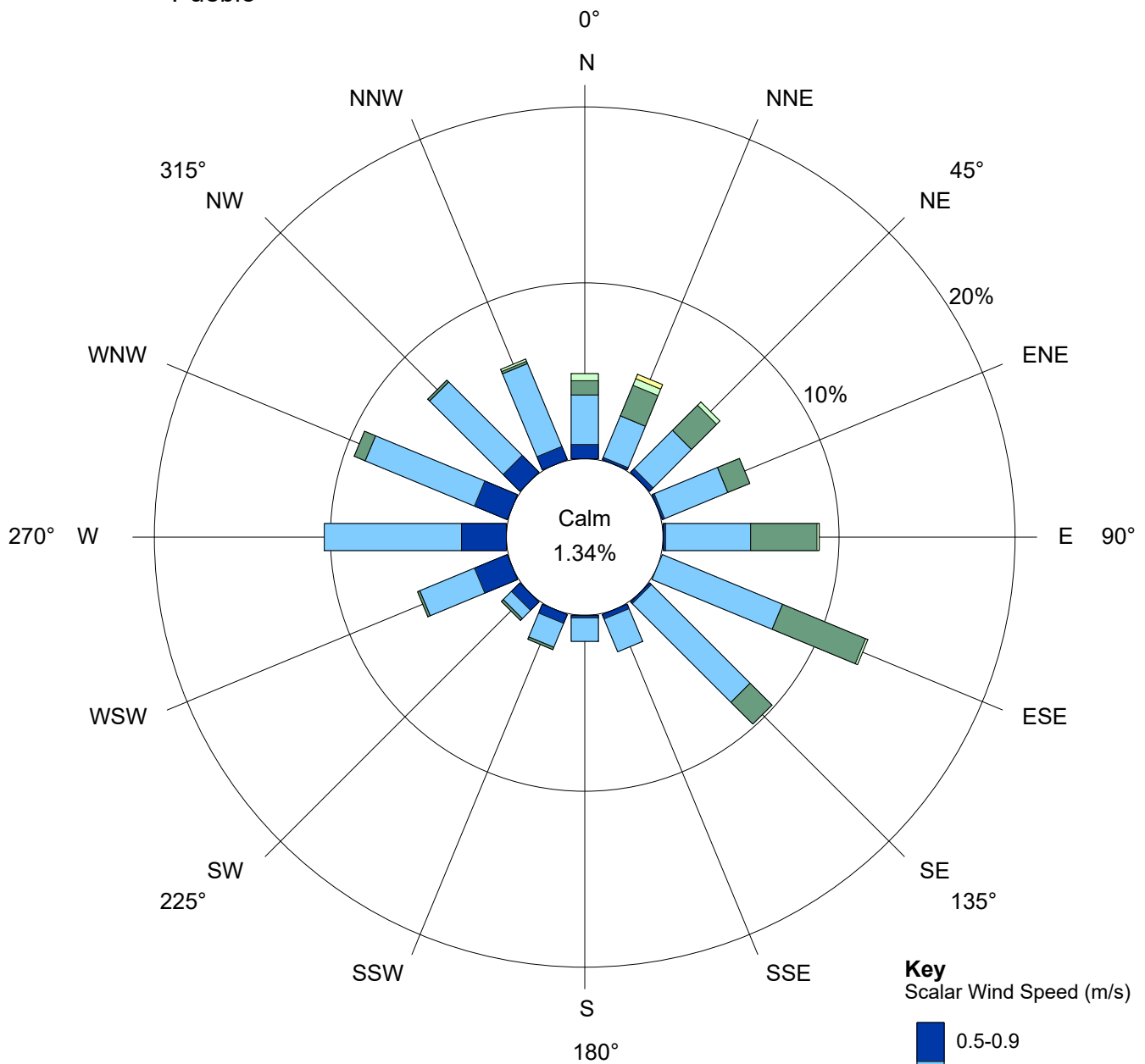


Table 4-6

Data Collection Statistics							
Colorado Air Toxics - C1 Pueblo							
07/01/2023 - 07/31/2023							
Parameter	Interval	Par Code	No. Possible	No. Collected	% Collected	No. Valid	% Valid
Relative Humidity	hourly	RH	744	744	100.0	744	100.0
Standard Deviation for Wind Direction	hourly	SDWD	744	744	100.0	744	100.0
Solar Radiation	hourly	SOL	744	743	99.9	743	99.9
Scalar Wind Direction	hourly	SWD	744	744	100.0	744	100.0
Scalar Wind Speed	hourly	SWS	744	744	100.0	744	100.0
Ambient Temperature	hourly	TMP	744	744	100.0	744	100.0
Vector Wind Direction	hourly	VWD	744	744	100.0	744	100.0
Vector Wind Speed	hourly	VWS	744	744	100.0	744	100.0

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%.



100.0% Collected 100.0% Valid
 744 Possible /744 Collected /744 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)

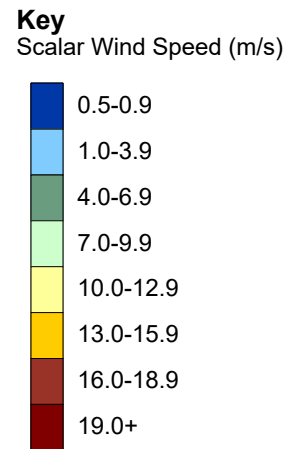


Figure 4-12
 Colorado Air Toxics - C1 (Pueblo) - Hourly Met Data
 July 2023



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

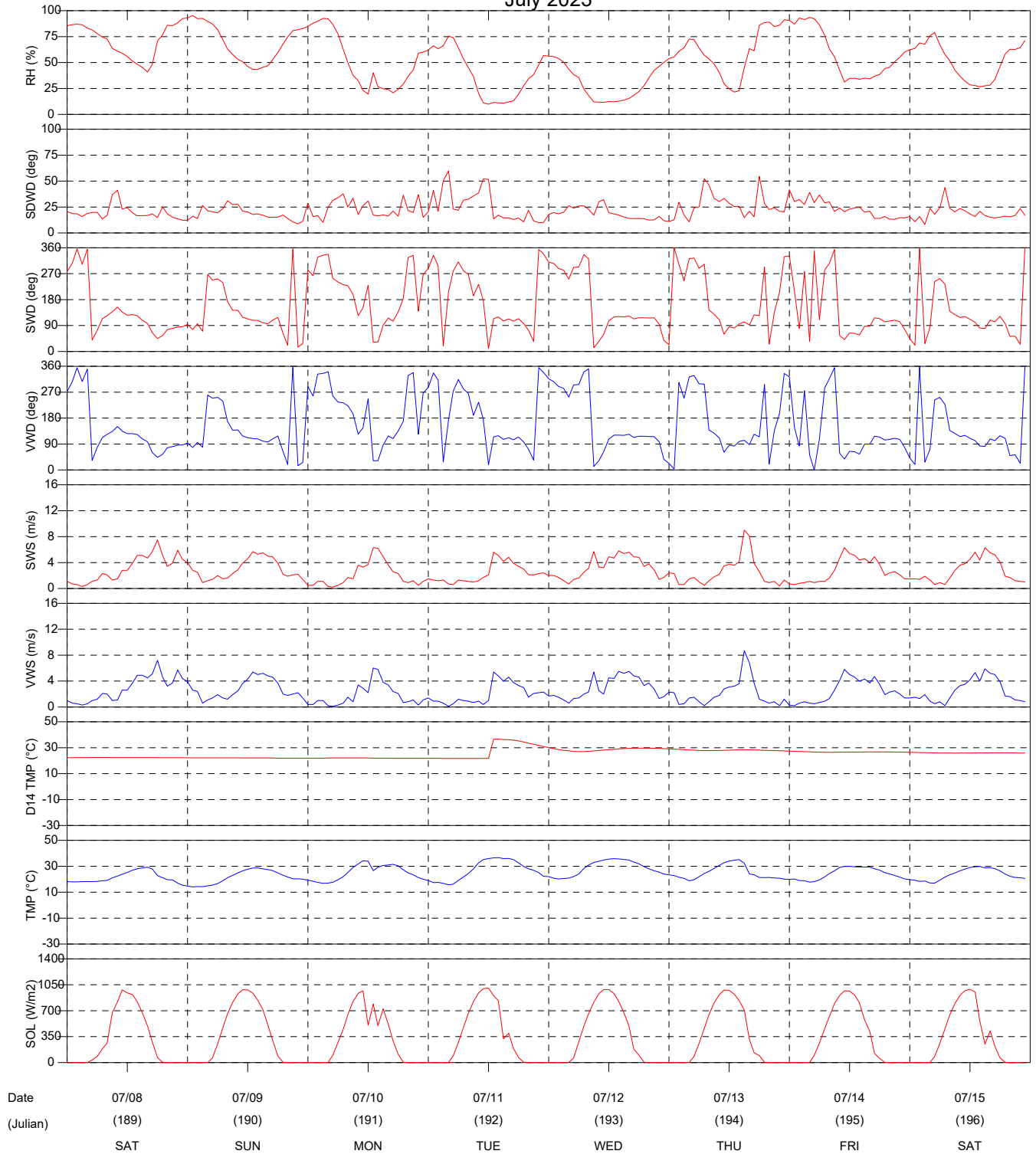


Figure 4-14
 Colorado Air Toxics - C1 (Pueblo) - Hourly Met Data
 July 2023



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

