GROUND-BASED SAMPLING FOR TOXINS
MAY MONTHLY REPORT

May 1 – May 31, 2023

**Operational Summaries,
Data Summaries and Plots**

Prepared for

**DEREK PRICE
AIR TOXICS AND OZONE PRECURSOR SECTION
COLORADO DEPARTMENT OF PUBLIC HEALTH & ENVIRONMENT**
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June 28, 2023

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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 contaminates 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_2S), 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 May 1 through May 31, 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 May 1 through May 31, 2023, timeframe include the following:

- None.

Significant deviations from the established sampling schedule include:

- The contract laboratory, Ormantine, failed to ship sorbent tubes on schedule. H_2S sampling at all locations for the sampling period of 4/26/2023 to 5/10/2023 was missed.

Sampling issues or corrective actions taken include:

- An HCN sample at B1 was invalidated. A make-up sample was collected during the month.

3.0   AIR TOXICS SAMPLING STATISTICS

Statistics for samples collected during the May 1 to May 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

May 1 to May 31, 2023

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

Table 3-2

Benzene Duplicate Sample and Field Blank Collection

May 1 to May 31, 2023

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

Table 3-3

14-day H_2S Sample Collection

May 1 to May 31, 2023

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

Table 3-4

H$_2$S Duplicate Sample and Field Blank Collection
May 1 to May 31, 2023

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

Table 3-5

HCN Sample Collection
May 1 to May 31, 2023

		Monthly		Quarterly	
Sampling Region	Site	Collected	Required	Collected	Required
A	A1	10	10	20	30
B	B1	10	10	20	30
C	C1	10	10	20	30

Table 3-6

HCN Duplicate Sample and Field Blank Collection
May 1 to May 31, 2023

Duplicate		Field Blank	
Collected	%	Collected	%
5	17%	4	13%

4.0   AIR TOXIC DATA SUMMARIES

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

Table 4-1

14-Day Benzene Data
May 1 to May 31, 2023

SITE	Sampling Start Day	Sampling End Day	Days	Concentration (ppb)	MDL (ppb)	Notes
A1	4/26/2023	5/10/2023	14	0.159	0.0588	
A1	5/10/2023	5/24/2023	14	0.287	0.0588	
B1	4/26/2023	5/10/2023	14	0.220	0.0589	
B1	5/10/2023	5/24/2023	14	0.320	0.0589	
C1	4/26/2023	5/10/2023	14	0.0871	0.0587	
C1	5/10/2023	5/24/2023	14	0.141	0.0588	
		Maximum		0.320		
		Minimum		0.0871		
		Average		0.202		

Table 4-2

14-Day H_2S Data
May 1 to May 31, 2023

SITE	Sampling Start Day	Sampling End Day	Days	Concentration (ppb)	LOD (ppb)	Notes
A1	5/10/2023	5/24/2023	14	ND	0.14	
B1	5/10/2023	5/24/2023	14	ND	0.14	
C1	5/10/2023	5/24/2023	14	ND	0.14	
		Maximum		ND		
		Minimum		ND		
		Average		ND		

Table 4-3

HCN Data
May 1 to May 31, 2023

SITE	Sampling Date	Duration (min)	Concentration (ppb)	MDL (ppb)	Notes
A1	05/02/2023 08:49	498	ND	0.7	
A1	05/04/2023 09:47	519	ND	0.7	
A1	05/08/2023 08:06	440	ND	0.9	
A1	05/08/2023 08:06	439	ND	0.9	Duplicate
A1	05/08/2023 08:06		ND	0.9	Blank
A1	05/10/2023 08:17	449	ND	0.8	
A1	05/12/2023 08:06	455	ND	0.8	
A1	05/16/2023 08:31	459	ND	0.8	
A1	05/18/2023 07:40	461	ND	0.9	
A1	05/22/2023 08:10	444	ND	0.9	
A1	05/24/2023 08:13	463	ND	0.8	
A1	05/30/2023 08:28	459	ND	0.8	
B1	05/02/2023 09:09	457	Invalid	0.8	
B1	05/04/2023 10:06	481	ND	0.8	
B1	05/08/2023 07:41	486	ND	0.8	
B1	05/10/2023 07:40	503	ND	0.7	
B1	05/12/2023 07:47	496	ND	0.8	
B1	05/16/2023 07:58	512	ND	0.8	
B1	05/16/2023 07:59	511	ND	0.7	Duplicate
B1	05/16/2023 07:58		ND	0.8	Blank
B1	05/17/2023 12:05	180	ND	2.1	
B1	05/17/2023 12:06	180	ND	2.1	Duplicate
B1	05/18/2023 07:20	508	ND	0.8	
B1	05/22/2023 07:46	486	ND	0.8	
B1	05/24/2023 07:41	512	ND	0.7	
B1	05/30/2023 08:03	507	ND	0.8	

Table 4-3 (continued)

C1	5/2/2023 11:28	183	ND	2.1	
C1	5/4/2023 12:30	181	ND	2.1	
C1	5/8/2023 10:20	183	ND	2.2	
C1	5/10/2023 10:30	180	ND	2.1	
C1	5/16/2023 10:20	180	ND	2.2	
C1	5/16/2023 10:46	180	ND	2.2	
C1	5/18/2023 9:47	180	ND	2.1	
C1	5/22/2023 10:30	180	ND	2.1	
C1	5/22/2023 10:30	180	ND	2.1	Duplicate
C1	5/22/2023 10:30		ND	2.1	Blank
C1	5/24/2023 10:30	182	ND	2.1	
C1	5/24/2023 10:30	185	ND	2.1	Duplicate
C1	5/24/2023 10:30		ND	2.1	Blank
C1	5/30/2023 10:38	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 May 1 to May 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

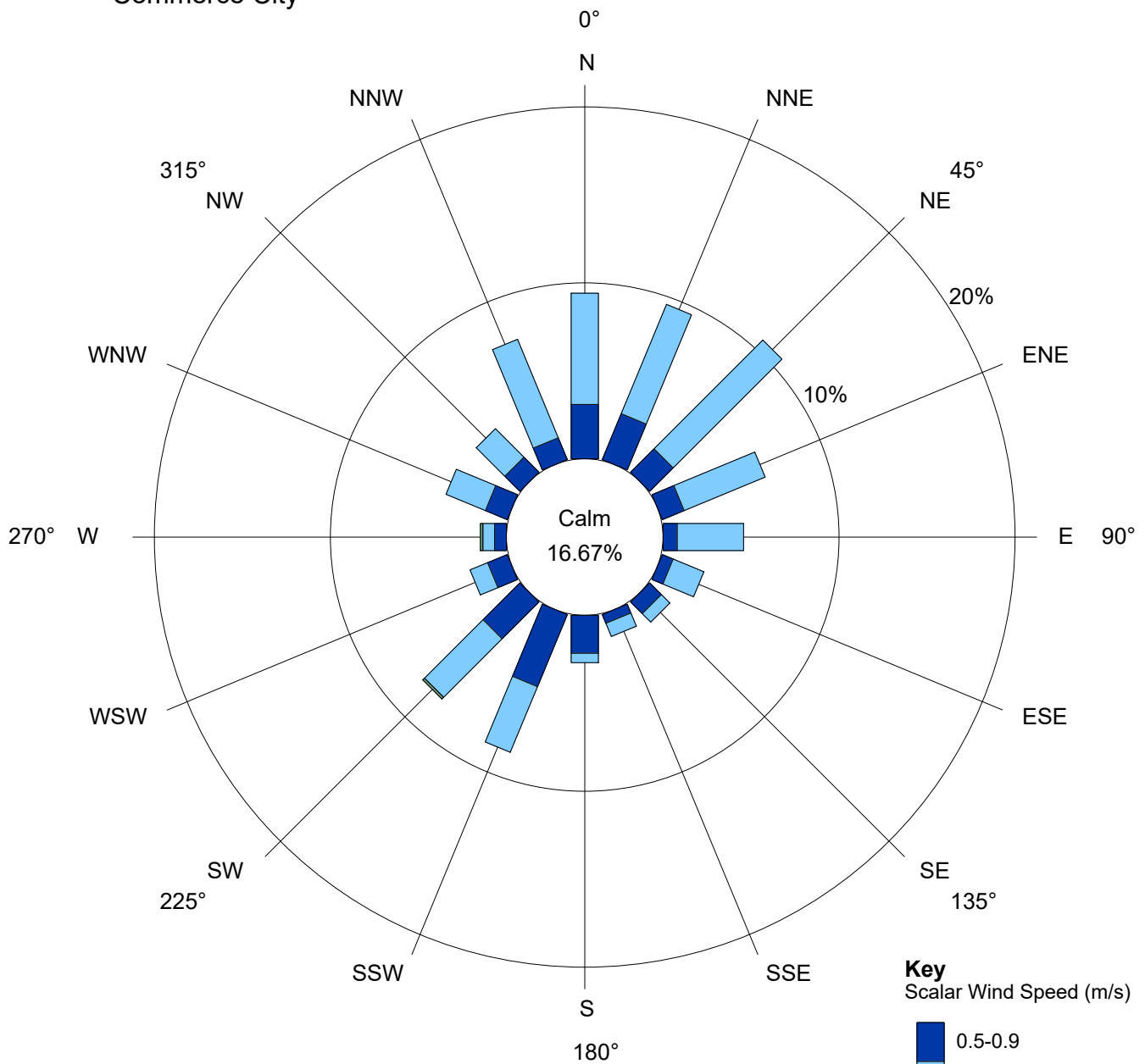- Wind Rose for B1

- 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

05/01/2023 - 05/31/2023

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 4-1
Wind Rose

Colorado Air Toxics - A1
Commerce City

05/01/2023 - 05/31/2023

100.0% Collected 100.0% Valid
744 Possible /744 Collected /744 Valid
Collection Statistics Include:
Wind Speed and Wind Direction
(Calm<0.5m/s)

Key
Scalar Wind Speed (m/s)

0.5-0.9
1.0-3.9
4.0-6.9
7.0-9.9
10.0-12.9
13.0-15.9
16.0-18.9
19.0+

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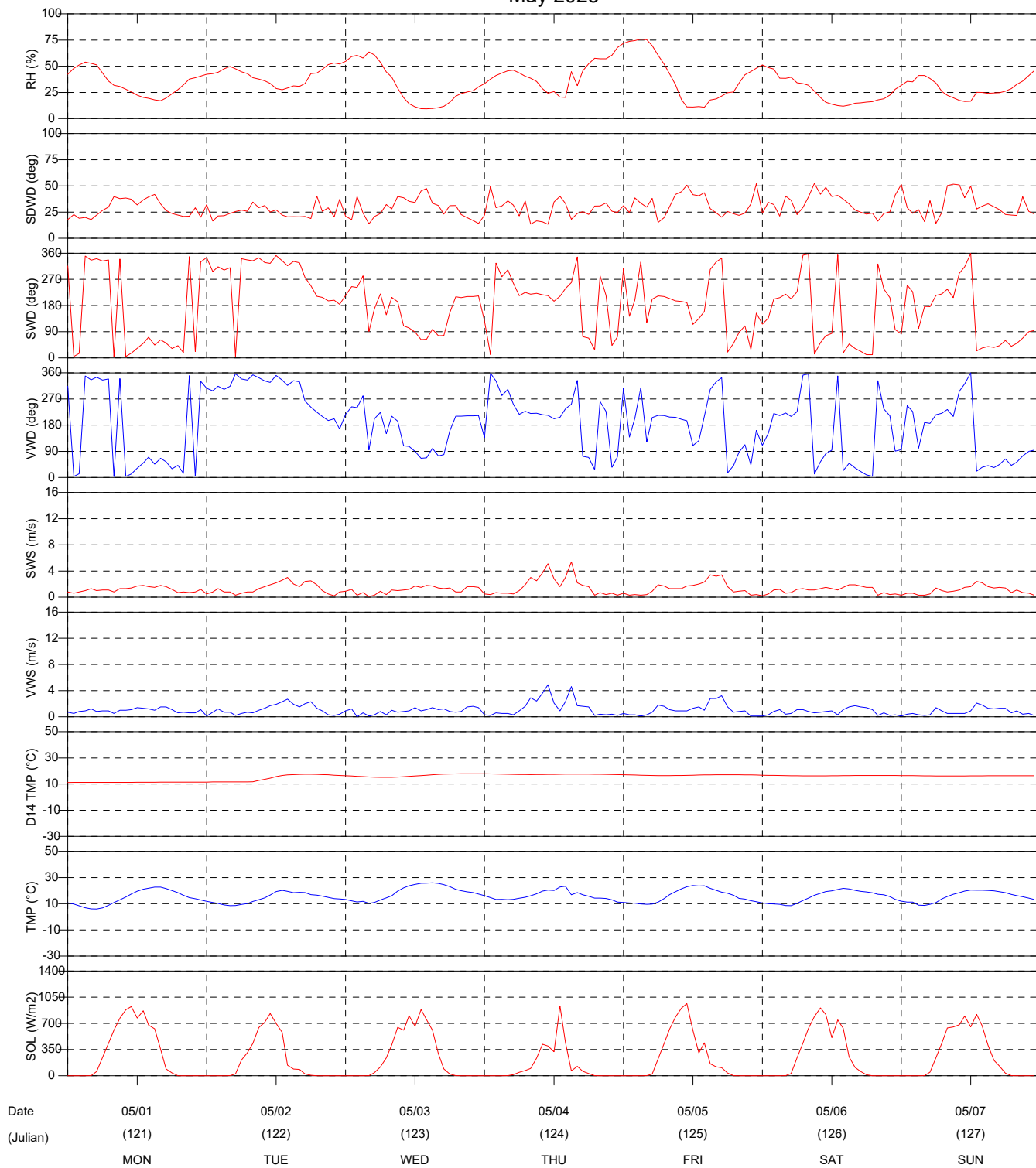May 2023

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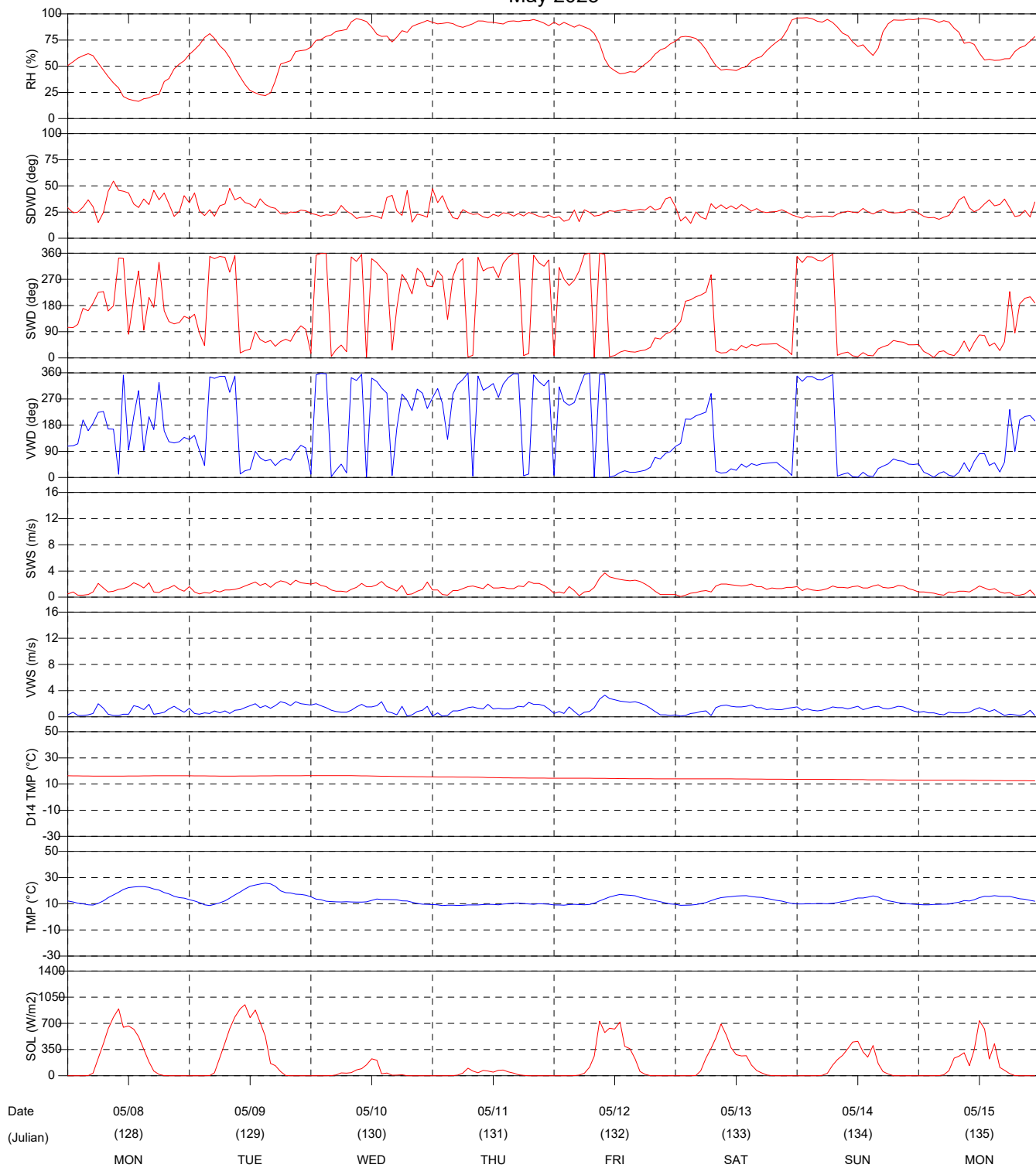May 2023

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

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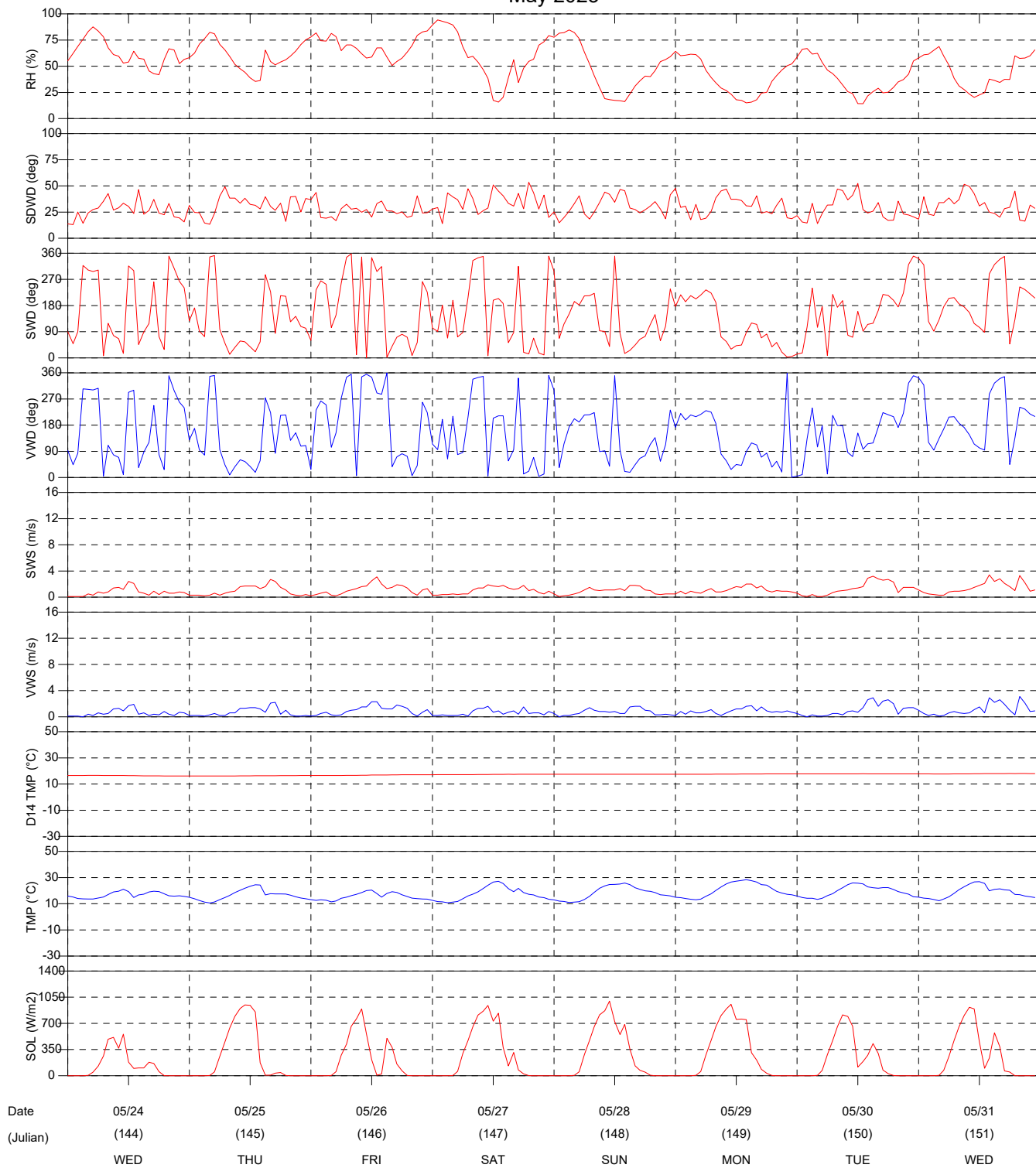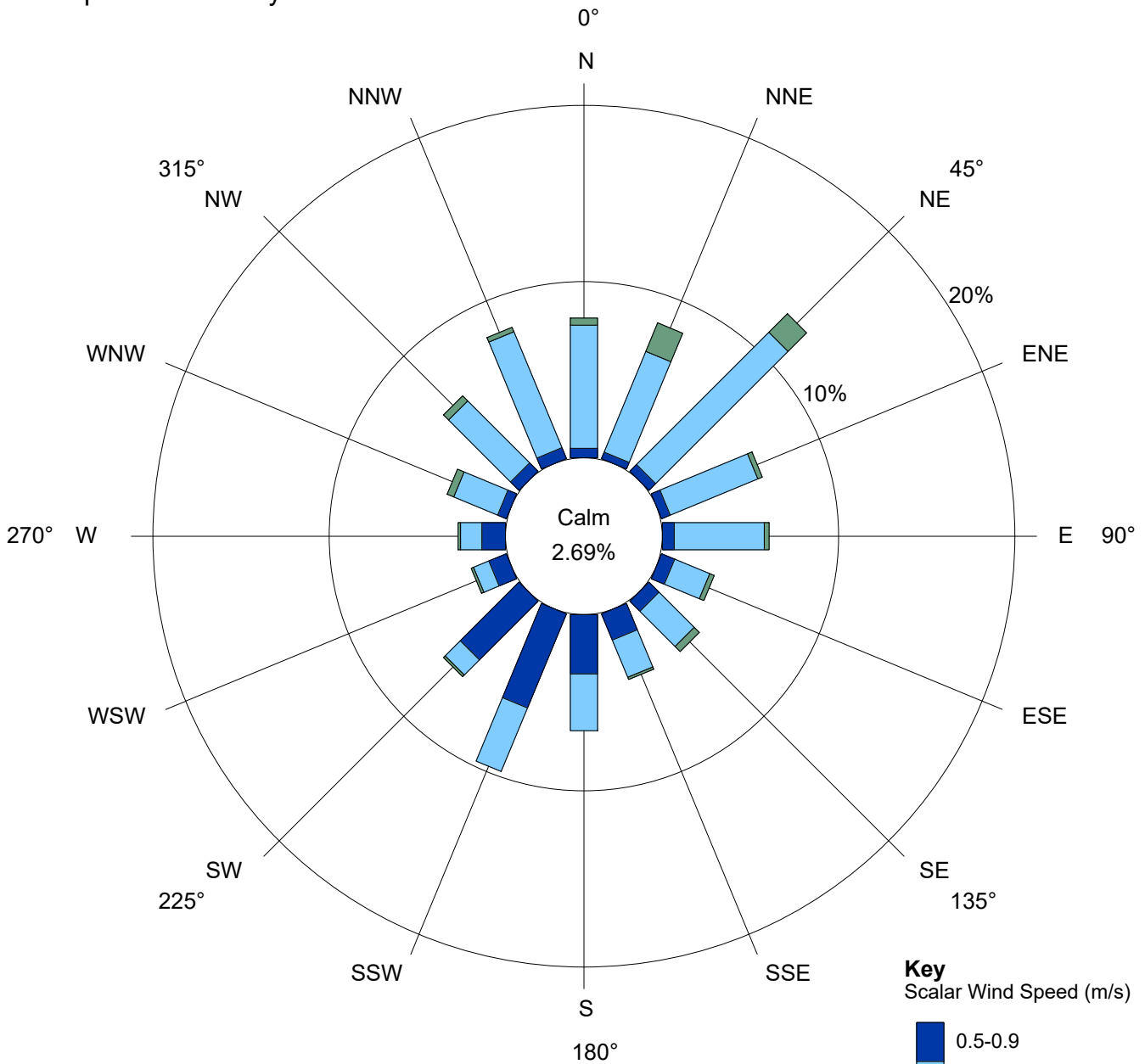May 2023

Table 4-5

Data Collection Statistics

Colorado Air Toxics - B1 Dupont Elementary School

05/01/2023 - 05/31/2023

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

Colorado Air Toxics - B1　　Wind Rose　　05/01/2023 - 05/31/2023
Dupont Elementary School

100.0% Collected　100.0% Valid
744 Possible /744 Collected /744 Valid
Collection Statistics Include:
Wind Speed and Wind Direction
(Calm<0.5m/s)

Key
Scalar Wind Speed (m/s)

■	0.5-0.9
■	1.0-3.9
■	4.0-6.9
■	7.0-9.9
■	10.0-12.9
■	13.0-15.9
■	16.0-18.9
■	19.0+

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

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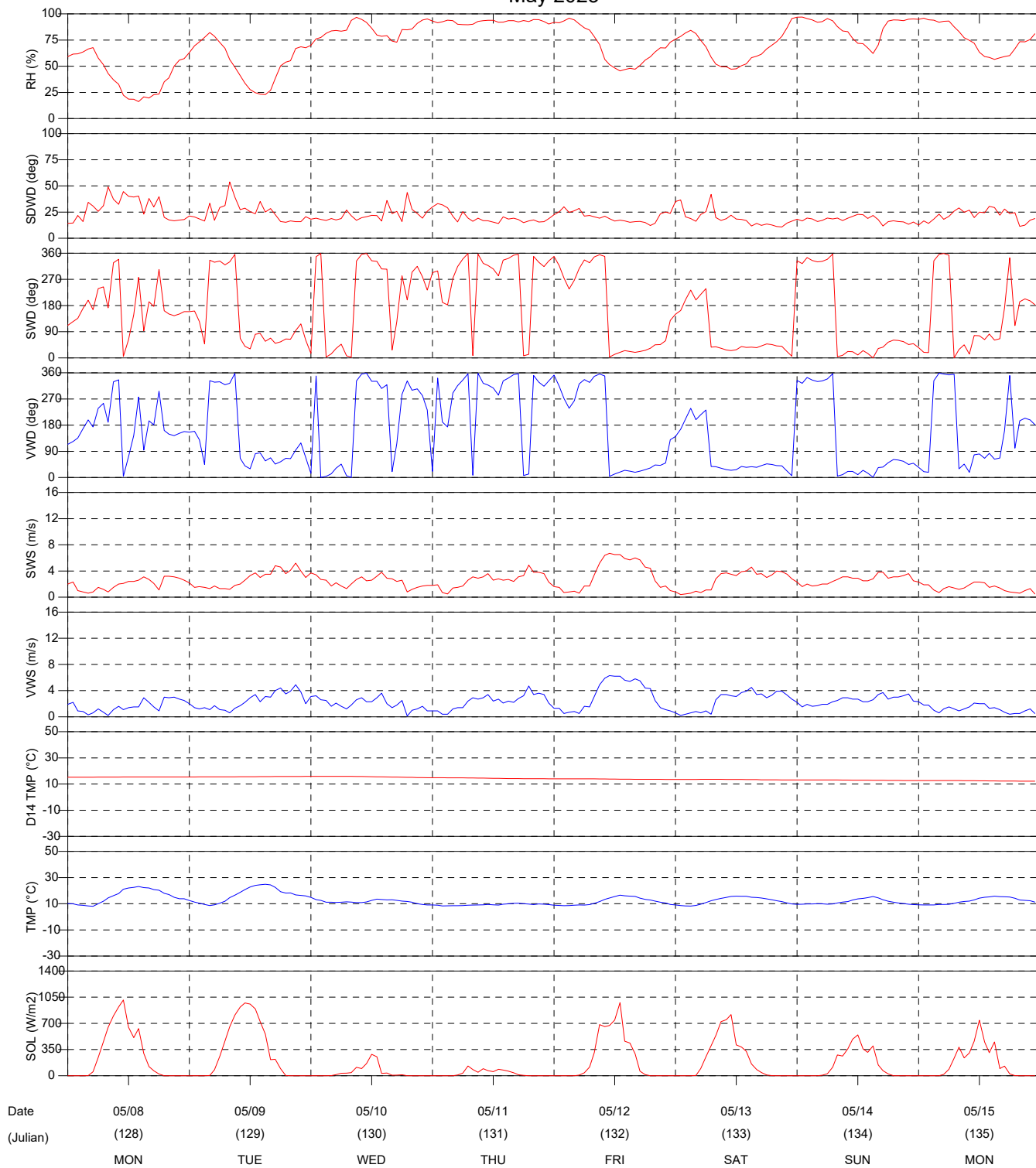May 2023

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

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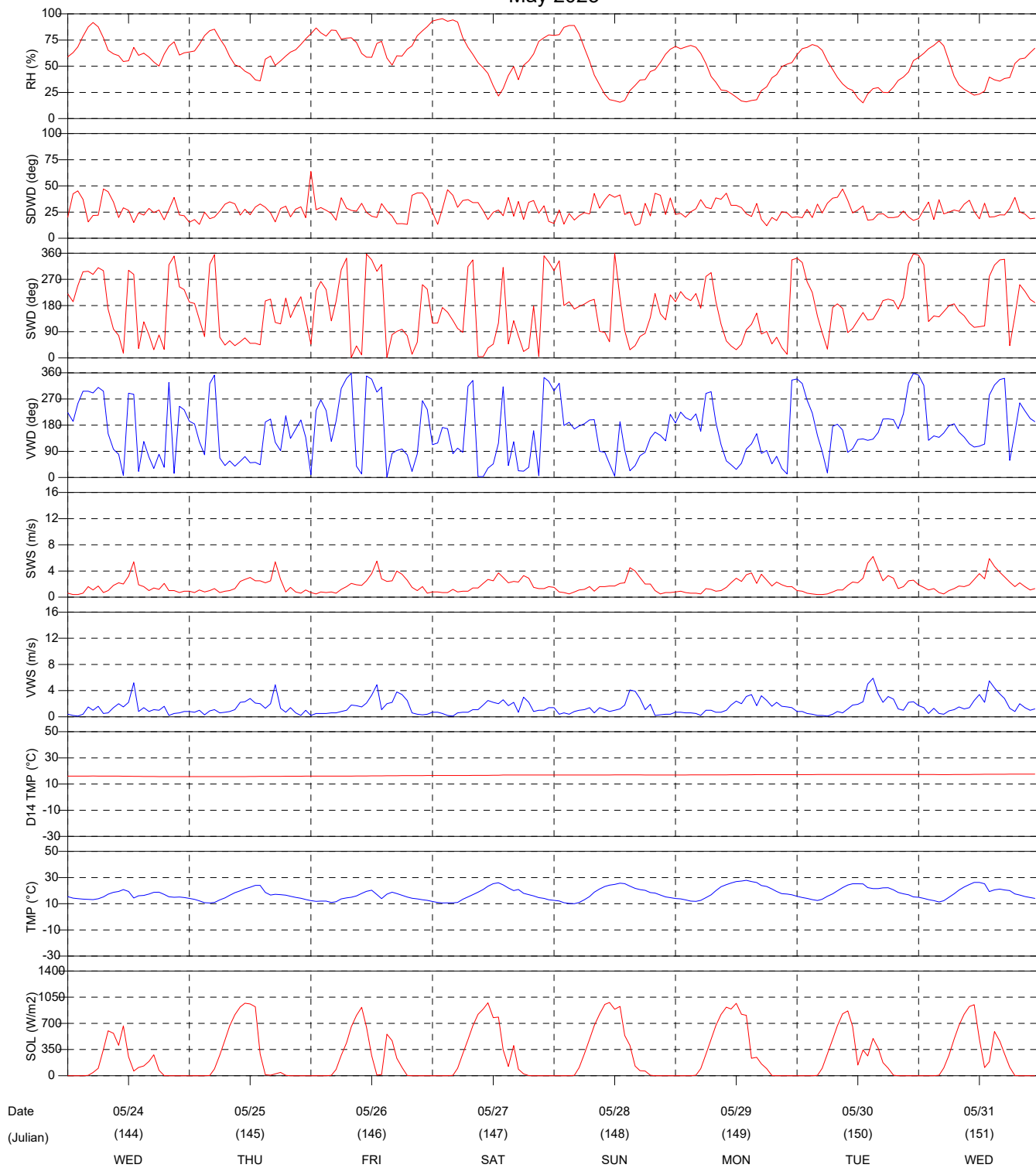May 2023

Table 4-6

Data Collection Statistics							
Colorado Air Toxics - C1 Pueblo 05/01/2023 - 05/31/2023							
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

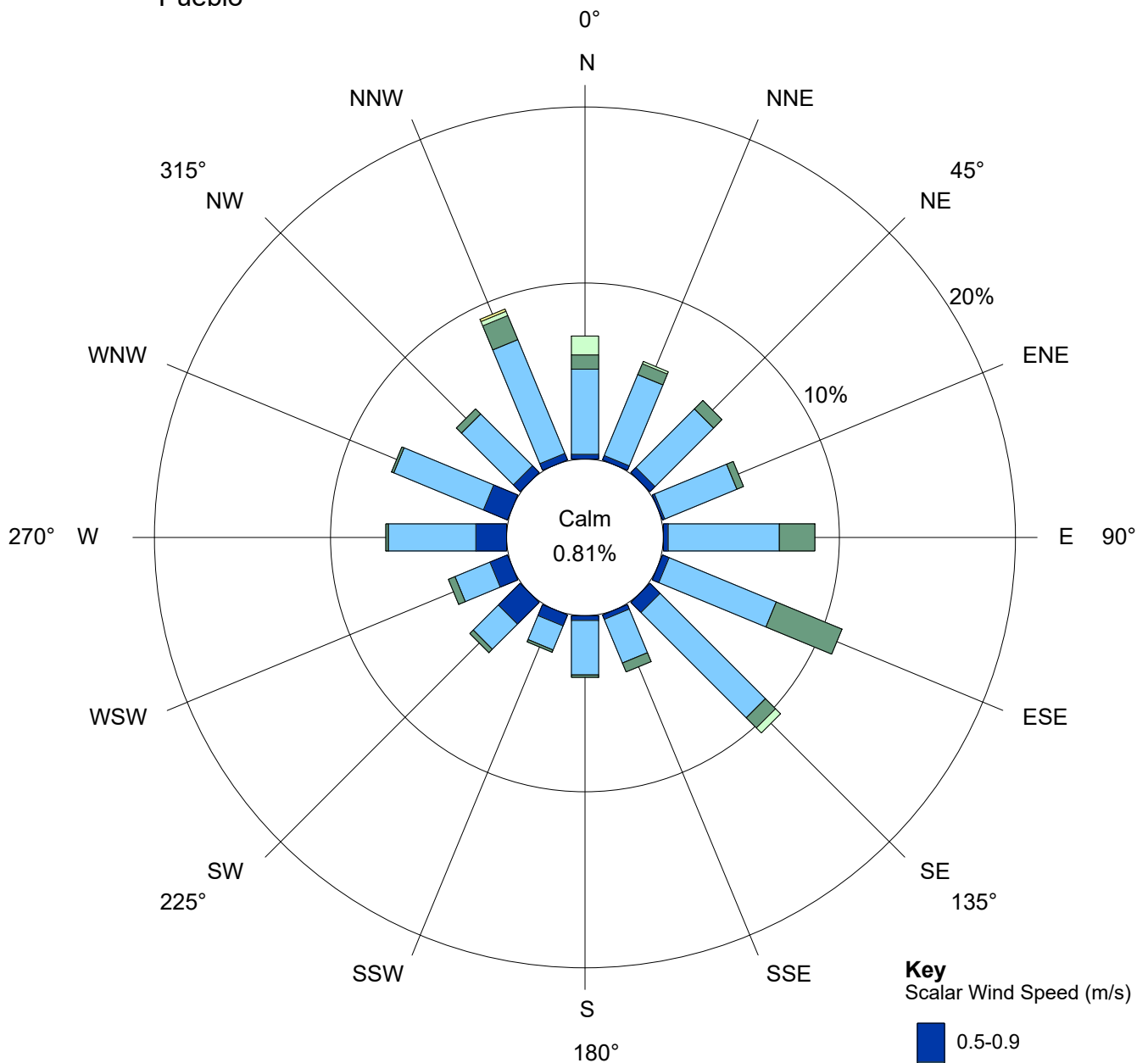Note: The percent valid is calculated against the number possible.

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%.
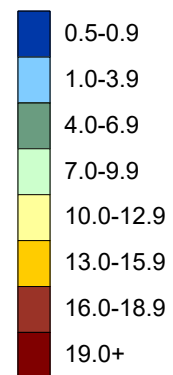
Figure 4-11

**Colorado Air Toxics - C1
Pueblo**

Wind Rose

05/01/2023 - 05/31/2023

100.0% Collected 100.0% Valid

744 Possible /744 Collected /744 Valid

Collection Statistics Include:

Wind Speed and Wind Direction

(Calm<0.5m/s)

Key
Scalar Wind Speed (m/s)

■	0.5-0.9
■	1.0-3.9
■	4.0-6.9
■	7.0-9.9
■	10.0-12.9
■	13.0-15.9
■	16.0-18.9
■	19.0+

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

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

Date	05/08	05/09	05/10	05/11	05/12	05/13	05/14	05/15
(Julian)	(128)	(129)	(130)	(131)	(132)	(133)	(134)	(135)
	MON	TUE	WED	THU	FRI	SAT	SUN	MON

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

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