



Peace Airshed Zone Association

Ambient Air Monitoring Network Summary

**Ambient Air Quality Monitoring Program
Monthly Report
July 2019**

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August 31st, 2019

Alberta Environment and Parks

11th Floor, Oxbridge Place
9820-106 Street
Edmonton Alberta T5K 2J6

RE: Peace Airshed Zone Association (PAZA) – July 2019 Ambient Air Quality Monitoring Report

Enclosed is the PAZA Ambient Air Quality Monitoring Network Report for the month of July 2019.

The representative of the Person Responsible for this monitoring program is:

Mandeep Dhaliwal, B.Sc., P.Chem.

Program Manager

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This report was prepared by Andersen Science Consulting and reviewed by Mandeep Dhaliwal.

PAZA has retained the services of WSP Canada Inc. to conduct continuous ambient monitoring and Andersen Science Consulting to provide data validation and reporting on its behalf.

This report is submitted by PAZA on behalf of the industrial member companies to satisfy the requirements of the following facility Operating Approvals:

Company	Facility	LSD	EPEA Approval Number
Advantage Oil & Gas Ltd.	Glacier	05-02-076-13-W6	262479-00-00
Alberta Power (2000) Ltd. (an ATCO company)	Sturgeon	SW-06-069-21-W5	10283-02-02
ATCO Power Canada	Poplar Hill	11-19-073-08-W6	67774-01-01
ATCO Power Canada	Valleyview	SW-06-069-21-W5	147709-01-01
AltaGas Ltd.	Pouce Coupe	03-03-081-13-W6	247673-00-00
	Ante Creek	02-26-068-25-W5	266694-00-00
	Gordondale	16-31-78-11-W6M	287474-00-00
Apache Canada Ltd.	House Mountain	01-08-070-10-W5	10137-02-02
Birchcliff Energy Ltd.	Pouce Coupe	03-22-078-12-W6	252529-00-00

Company	Facility	LSD	EPEA Approval Number
Canadian Natural Resources Limited	Bonanza	11-25-081-11-W6	00000029-01-00
	Progress/Gordondale	01-01-077-10-W6	00010036-02-00
	Gold Creek	13-26-067-05-W6	00010446-02-00
	Teepee Creek	SE-2-074-04-W6	00001635-02-00
	Sturgeon/Valleyview	02-02-069-22-W5	1633-02-00
Canfor Forest Products	Grande Prairie	SW-23-071-06-W6	152645-01-00
Conocophillips Canada Energy Partnership	Wembley	06-19-073-08-W6	00000212-01-00
Devon Canada	NW Belloy (Dunvegan)	16-36-079-03-W6	00009810-02-00
	Eaglesham (South)	02-14-077-25-W5	00047669-01-00
	North Normanville	03-36-079-23-W5	00047455-01-00
	West Culp	05-34-078-25-W6	00136284-00-00
	Cecil	08-15-084-08-W6	00010032-02-00
Encana Corporation	Sexsmith	04-08-075-07-W6	00010002-01-00
Enerplus Resources	Pouce Coupe	SW-06-069-21-W5	1464-02-03
Exshaw Oil Corporation	Spirit River	03-10-077-07-W6	344521-00-00
Grande Prairie Generation Inc.	Northern Prairie Power Project	04-19-073-08-W6	00238762-00-00
Inception Exploration Ltd.	Gold Creek	03-26-069-05-W6	00335317-00-02
Long Run Exploration	Eaglesham	01-25-076-01-W6	00241532-00-00
	Kakut	14-12-075-03-W6	00248469-00-00
	Donnelly	06-01-077-21-W5	00000087-02-00
	Puskwaskau	03-26-074-01-W6	00017524-01-00
Longview Oil Corp.	Sunset House	06-22-070-20-W5	138884-01-00
Penn West Petroleum Ltd.	Tangent	13-29-080-23-W5	00001746-02-00

Company	Facility	LSD	EPEA Approval Number
	Pouce Coupe	16-07-078-11-W6	00000614-01-00
Petrus Resources	Rycroft	08-25-077-06-W6	11351-02-00
	Spirit River	08-34-077-06-W6	11096-02-00
Spectra Energy Midstream Corporation	Fourth Creek	16-11-082-09-W6	00000263-01-00
	Gordondale	11-26-079-09-W6	00011495-01-01
	Pouce Coupe/Bonanza	3-23-080-13-W6	00070203-01-01
Suncor Energy Inc.	Progress	07-22-078-09-W6	00011428-02-00
TAQA North Ltd.	Valhalla	13-21-076-09-W6	00017620-01-00
Veresen Energy	Hythe Brainard	11-18-074-12-W6	00010910-02-00
Weyerhaeuser Canada	Grande Prairie Pulp and Wood Plant	01-14-070-05-W6	00000113-02-00

Included in this report is a summary of the monthly passive monitoring and continuous monitoring programs and detailed hourly average reports. Operational summaries can be found on the “Continuous Ambient Network Equipment and Results Summary” pages of the report.

Continuous Monitoring: **Seven (7) Stations including Henry Pirker (Grande Prairie), Evergreen Park, Smoky Heights, Beaverlodge, Valleyview, Donnelly and Wembley-Portable.**

Calibration and Data Submission

Hourly data for July 2019 were submitted to Alberta’s Ambient Air Data Warehouse for all stations. This report and calibration reports were emailed to Air.Reporting@gov.ab.ca

During the month of July, the following events were noted:

Concentrations in excess of the Clean Air (Maximum Levels) Regulation:

There were no exceedances of the AAAQO to report in July.

Operational times less than 90 percent:

The Wembley TRS failed the as-found on the July 5 calibration; data back to the June 27 calibration was discarded as it could not be verified, with an uptime in July of 85.6%. **Ref #358298**

Air Incidents

None were reported to PAZA

Deviations from Authorized Monitoring Methods

Trees nearby to Valleyview air monitoring station exceed the height allowed under section 2.3 of the siting criteria in Chapter 3 of the AMD. This variance was authorized in writing by the director on February 4, 2019.

Passive Monitoring - 32 Stations throughout the PAZA zone:

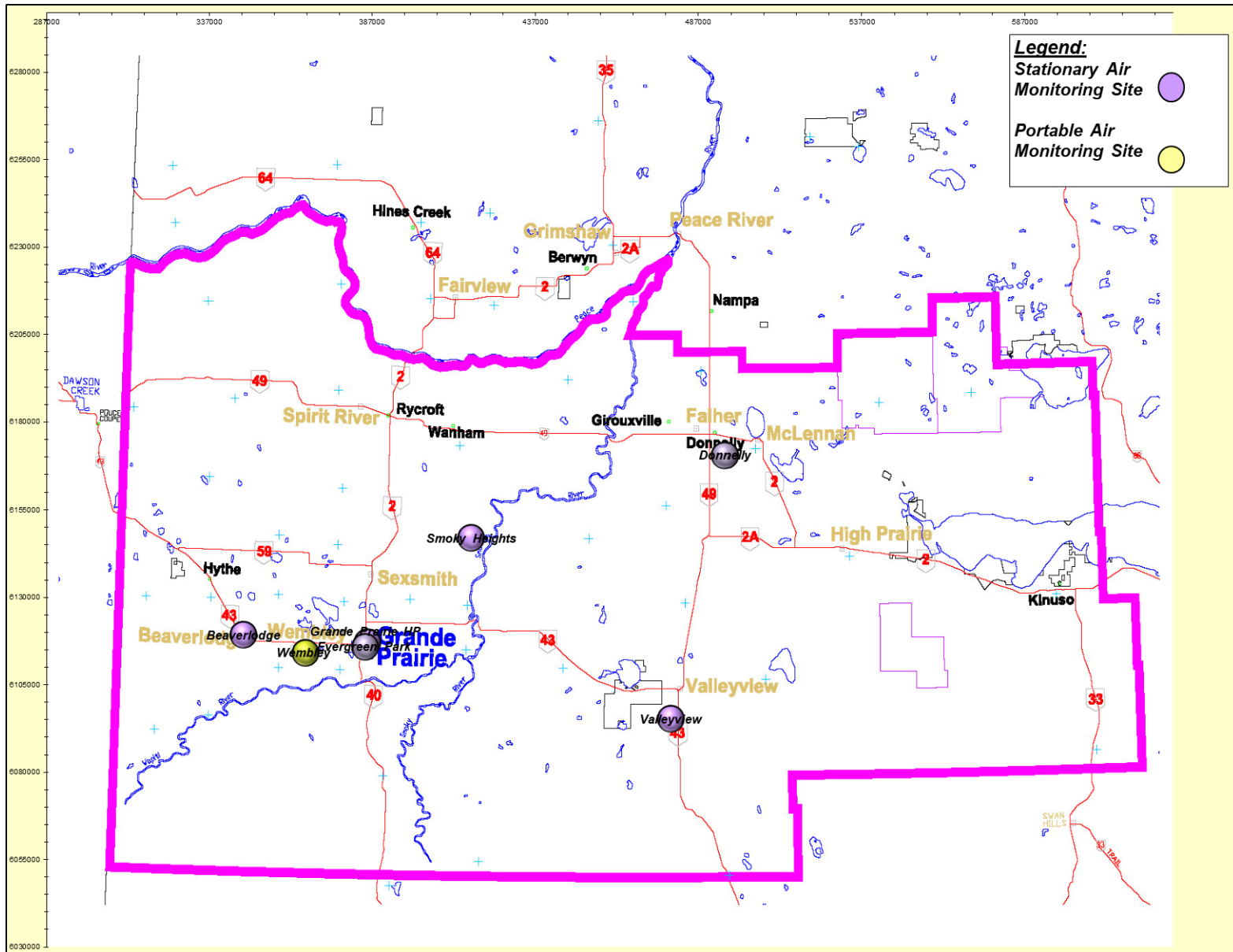
There were eight duplicate sites sampled in the month of July: Webber Creek, Eaglesham, Jean Cote (SO₂), Kinuso (O₃), Hythe, Wanham, McLennan (NO₂), and Girouxville 4 (H₂S). The passive sample analyses were performed by MAXXAM Analytics Inc. There were no exceedances of the AAAQOs for all monitored parameters at any of the passive monitoring stations during this month.

I certify that I have reviewed and verified this report and that the information is complete, accurate and representative of the monitoring results, reporting timeframe and the specified analysis, summarization and reporting requirements.

X 

Mandeep Dhaliwal, B.Sc., P.Chem.
Program Manager

Location of PAZA Continuous Monitoring Stations



Continuous Ambient Network Equipment and Results Summary

Beaverlodge Air Monitoring Station

Jul-2019Peace Airshed Zone Association									Maximum Recorded Values						
									1-hr			24-hr / 8-hr			
Parameter (units)	Objectives			Station	Monthly Average	Min	Exceedence			Conc	Day	Conc	Day	Operational Time (%)	Calibration Date
	1-hr	24-hr	30-day				1-hr	24-hr	30-day						
SO ₂ (ppb)	172	48	8	Beaverlodge	0.2	0.0	0	0	0	6.8	Jul-23 12:00	0.7	Jul-23	100.0	Jul-09
NO (ppb)					0.3	0.0	-	-	-	8.8	Jul-29 09:00	0.7	Jul-10	100.0	Jul-09
NO ₂ (ppb)	159	106			2.2	0.2	0	0	-	8.9	Jul-31 06:00	4.0	Jul-10	100.0	Jul-09
NO _x (ppb)					2.5	0.3	-	-	-	11.4	Jul-31 06:00	4.7	Jul-10	100.0	Jul-09
O ₃ (ppb)	76				23.3	2.3	0	-	-	46.5	Jul-22 18:00	33.1	Jul-22	100.0	Jul-09
O ₃ (ppb) - 8-hr							-	-	-			43.4	Jul-22		-
PM _{2.5} (µg/m3)	80	29			6.0	0.6	0	0	-	33.5	Jul-19 13:00	11.7	Jul-19	98.7	Jul-13
RH (%)					74.7	37.3	-	-	-	100.0	Jul-08 02:00	95.7	Jul-24	100.0	-
Temp (°C)					15.1	5.5	-	-	-	26.0	Jul-22 16:00	19.9	Jul-22	100.0	-
WSPD v (km/hr)					3.8	0.4	-	-	-	31.6	Jul-12 14:00	18.7	Jul-25	100.0	01/06/2017
WDIR					WNW		-	-	-	-	-	-	-	100.0	01/06/2017

Parameter	Analyzer		Notes
	Make	Model	
SO ₂	TECO	43I	
NO/NO ₂ /NO _x	TECO	42I	
O ₃	TECO	49I	
PM _{2.5}	SHARP	5030	Analyzer returned invalid readings July 13
ET/RH			
WS/WD	MetOne	50.5	

Evergreen Park Air Monitoring Station

Jul-2019 Peace Airshed Zone Association										Maximum Recorded Values					
Parameter (units)	Objectives			Station	Monthly Average	Min	Exceedence			1-hr		24-hr / 8-hr		Operational Time (%)	Calibration Date
	1-hr	24-hr	30-day				1-hr	24-hr	30-day	Conc	Day	Conc	Day		
SO ₂ (ppb)	172	48	8	Evergreen Park	0.4	0.0	0	0	0	13.3	Jul-16 10:00	1.7	Jul-25	99.6	Jul-29
TRS (ppb)					0.4	0.1	-	-	-	1.2	Jul-03 11:00	0.5	Jul-28	99.6	Jul-29
PM _{2.5} (µg/m3)	80	29			4.8	0.0	0	0	-	32.3	Jul-27 14:00	10.3	Jul-30	99.6	Jul-29
RH (%)					72.4	30.8	-	-	-	98.6	Jul-11 07:00	91.8	Jul-10	100.0	-
Temp (°C)					16.0	6.3	-	-	-	27.4	Jul-22 17:00	20.7	Jul-22	100.0	-
WSPD v (km/hr)					5.7	0.1	-	-	-	33.5	Jul-25 11:00	20.0	Jul-25	99.6	-
WDIR					WSW		-	-	-	-	-	-	-	99.6	-

Parameter	Analyzer		Notes
	Make	Model	
SO ₂	TECO	43I	Power outage July 25
TRS	TECO	43I	
PM _{2.5}	SHARP	5030	
ET/RH			
WS/WD	Gil	MetPak	

Henry Pirker Air Monitoring Station

Jul-2019Peace Airshed Zone Association									Maximum Recorded Values							
									1-hr			24-hr / 8-hr				
Parameter (units)	Objectives			Station	Monthly Average	Min	Exceedence			Conc	Day		Conc	Day	Operational Time (%)	Calibration Date
	1-hr	24-hr	30-day				1-hr	24-hr	30-day							
SO ₂ (ppb)	172	48	8	Henry Pirker	0.4	0.0	0	0	0	16.9	Jul-17 09:00	1.9	Jul-17	100.0	Jul-12	
H ₂ S (ppb)					0.1	0.0	0	0	-	1.1	Jul-07 03:00	0.4	Jul-04	100.0	Jul-15	
NO (ppb)					0.6	0.0	-	-	-	12.5	Jul-22 08:00	2.1	Jul-22	100.0	Jul-12	
NO ₂ (ppb)	159	106			3.7	0.7	0	0	-	15.9	Jul-30 07:00	6.0	Jul-17	100.0	Jul-12	
NO _x (ppb)					4.5	0.9	-	-	-	25.8	Jul-22 08:00	8.0	Jul-17	100.0	Jul-12	
O ₃ (ppb)	76				23.2	1.6	0	-	-	49.0	Jul-20 18:00	32.3	Jul-01	100.0	Jul-12	
O ₃ (ppb) - 8-hr							-	-	-			46.9	Jul-22		-	
CO (ppm)	13				0.15	0.1	0	0	-	0.5	Jul-22 08:00	0.2	Jul-22	100.0	Jul-15	
CO (ppm) - 8-hr	5						0					0.3	Jul-19		-	
THC (ppm)					2.1	2.0	-	-	-	3.4	Jul-17 00:00	2.4	Jul-17	100.0	Jul-03	
CH ₄ (ppm)					2.1	2.0	-	-	-	3.4	Jul-17 00:00	2.4	Jul-17	100.0	Jul-03	
NMHC (ppm)					0.0	0.0	-	-	-	0.1	Jul-31 04:00	0.0	Jul-15	100.0	Jul-03	
PM _{2.5} (µg/m3)	80	29			4.3	0.0	0	0	-	43.0	Jul-08 19:00	9.5	Jul-08	100.0	Jul-12	
RH (%)					66.7	34.0	-	-	-	90.1	Jul-11 06:00	84.6	Jul-24	96.8	-	
SR (W/m ²)					193.6	0.0	-	-	-	814.4	Jul-05 13:00	287.7	Jul-12	96.8	-	
Temp (°C)					16.6	7.3	-	-	-	27.7	Jul-22 17:00	21.6	Jul-22	96.8	-	
WSPD v (km/hr)					4.0	0.2	-	-	-	26.5	Jul-25 11:00	15.0	Jul-25	100.0	01/07/2017	
WDIR					W		-	-	-	-	-	-	-	100.0	01/07/2017	

Parameter	Analyzer		Notes
	Make	Model	
SO ₂	TECO	43I	
H ₂ S	TECO	450I	
NO/NO ₂ /NO _x	TECO	42I	
O ₃	TECO	49I	
CO	TECO	48I-TLE/48C-TLE	
THC/CH ₄ /NMHC	TECO	55I	
PM _{2.5}	SHARP	5030	
ET/RH			Sensor returned irregular readings July 15-16
SR			Sensor returned irregular readings July 15-16
WS/WD	MetOne	50.5	

Smoky Heights Air Monitoring Station

Jul-2019 Peace Airshed Zone Association										Maximum Recorded Values					
Parameter (units)	Objectives			Station	Monthly Average	Min	Exceedence			1-hr		24-hr / 8-hr		Operational Time (%)	Calibration Date
	1-hr	24-hr	30-day				1-hr	24-hr	30-day	Conc	Day	Conc	Day		
SO ₂ (ppb)	172	48	8	Smoky Heights	0.2	0.0	0	0	0	5.5	Jul-11 21:00	0.8	Jul-11	99.5	Jul-17
TRS (ppb)					0.5	0.2	-	-	-	0.8	Jul-18 00:00	0.6	Jul-26	99.5	Jul-17
PM _{2.5} (µg/m3)	80	29			7.0	0.0	0	0	-	60.2	Jul-19 11:00	18.1	Jul-19	99.5	Jul-17
Temp (°C)					15.6	4.5	-	-	-	27.4	Jul-22 16:00	21.3	Jul-22	99.5	-
WSPD v (km/hr)					6.1	0.6	-	-	-	38.9	Jul-25 12:00	24.5	Jul-25	99.5	04/06/2019
WDIR					W		-	-	-	-	-	-	-	99.5	04/06/2019

Parameter	Analyzer		Notes
	Make	Model	Power outage July 26
SO ₂	TECO	43I	
TRS	TECO	43I	
PM _{2.5}	SHARP	5030	
ET			
WS/WD	MetOne	50.5	

Valleyview Air Monitoring Station

Jul-2019 Peace Airshed Zone Association										Maximum Recorded Values					
Parameter (units)	Objectives			Station	Monthly Average	Min	Exceedence			1-hr		24-hr / 8-hr		Operational Time (%)	Calibration Date
	1-hr	24-hr	30-day				1-hr	24-hr	30-day	Conc	Day	Conc	Day		
SO ₂ (ppb)	172	48	8	Valleyview	0.6	0.0	0	0	0	15.5	Jul-02 01:00	1.9	Jul-24	100.0	Jul-16
H ₂ S (ppb)	10	3			0.1	0.0	0	0	-	0.6	Jul-24 03:00	0.2	Jul-31	100.0	Jul-16
RH (%)					78.3	33.1	-	-	-	100.0	Jul-03 00:00	93.8	Jul-24	100.0	-
Temp (°C)					18.1	8.6	-	-	-	30.1	Jul-22 19:00	22.6	Jul-22	100.0	-
WSPD v (km/hr)					2.2	0.0	-	-	-	18.9	Jul-25 12:00	12.0	Jul-25	100.0	-
WDIR					WNW		-	-	-	-	-	-	-	100.0	-

Parameter	Analyzer		Notes
	Make	Model	
SO ₂	TECO	43I	
H ₂ S	TECO	450I	
ET/RH			
WS/WD	Gil	MetPak	

Donnelly Air Monitoring Station

Jul-2019 Peace Airshed Zone Association										Maximum Recorded Values					
Parameter (units)	Objectives			Station	Monthly Average	Min	Exceedence			1-hr		24-hr / 8-hr		Operational Time (%)	Calibration Date
	1-hr	24-hr	30-day				1-hr	24-hr	30-day	Conc	Day	Conc	Day		
SO ₂ (ppb)	172	48	8	Donnelly	0.1	0.0	0	0	0	0.9	Jul-17 12:00	0.2	Jul-17	100.0	Jul-18
H ₂ S (ppb)	10	3			0.2	0.0	0	0	-	1.8	Jul-24 04:00	0.4	Jul-24	100.0	Jul-18
Temp (°C)					15.8	2.8	-	-	-	27.3	Jul-22 17:00	21.2	Jul-22	100.0	-
WSPD v (km/hr)					4.0	0.2	-	-	-	30.4	Jul-25 06:00	21.0	Jul-25	100.0	26/06/2019
WDIR					SW		-	-	-	-	-	-	-	100.0	26/06/2019

Parameter	Analyzer		Notes
	Make	Model	
SO ₂	TECO	43I	
H ₂ S	TECO	450I	
ET/RH			
WS/WD	RMYoung	5103	

Wembley-Portable Air Monitoring Station

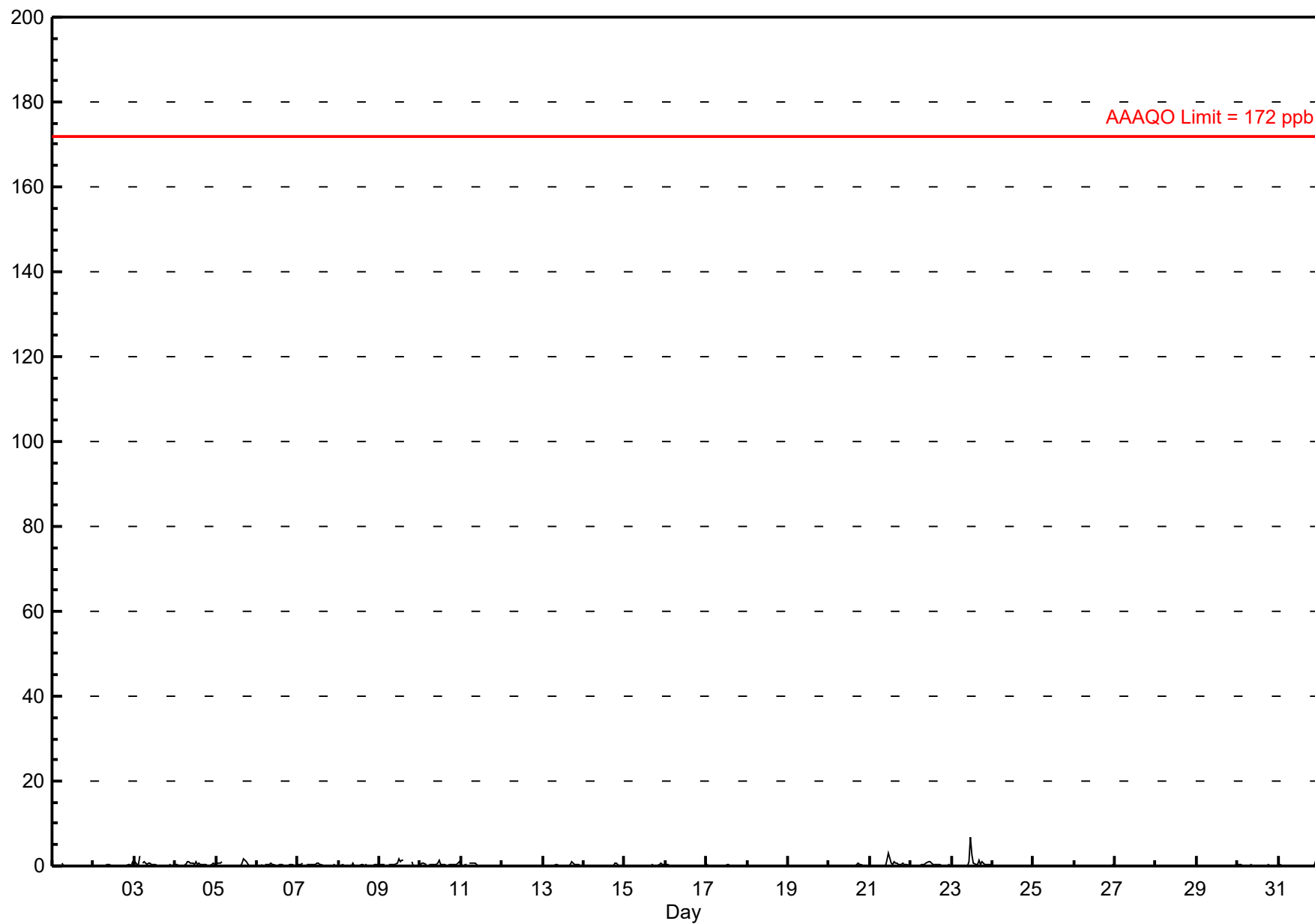
Jul-2019 Peace Airshed Zone Association										Maximum Recorded Values				Operational Time (%)	Calibration Date	
Parameter (units)	Objectives			Station	Monthly Average	Min	Exceedence			Conc	1-hr		24-hr / 8-hr			
	1-hr	24-hr	30-day				1-hr	24-hr	30-day		Day	Conc	Day			
SO ₂ (ppb)	172	48	8	Wembley-Portable	0.3	0.0	0	0	0	28.1	Jul-10 15:00	1.8	Jul-10	98.0	Jul-24	
TRS (ppb)					0.1	0.0	-	-	-	0.3	Jul-11 06:00	0.1	Jul-27	85.6	Jul-05	
NO (ppb)					0.2	0.0	-	-	-	5.1	Jul-17 20:00	0.5	Jul-17	98.1	Jul-08	
NO ₂ (ppb)	159	106			1.4	0.1	0	0	-	6.4	Jul-14 03:00	2.3	Jul-06	98.1	Jul-08	
NO _x (ppb)					1.5	0.0	-	-	-	6.9	Jul-17 20:00	2.5	Jul-06	98.1	Jul-08	
O ₃ (ppb)	76				23.4	5.3	0	-	-	52.8	Jul-22 15:00	34.3	Jul-01	98.0	Jul-08	
O ₃ (ppb) - 8-hr							-	-	-			46.7	Jul-22		-	
THC (ppm)					1.9	1.8	-	-	-	2.2	Jul-31 03:00	2.0	Jul-07	98.1	Jul-05	
CH ₄ (ppm)					1.9	1.8	-	-	-	2.2	Jul-11 07:00	2.0	Jul-07	98.1	Jul-05	
NMHC (ppm)					0.0	0.0	-	-	-	0.2	Jul-31 03:00	0.0	Jul-31	98.1	Jul-05	
PM _{2.5} (µg/m3)	80	29			3.1	0.0	0	0	-	24.5	Jul-08 21:00	8.0	Jul-30	98.3	Jun-10	
Temp (°C)					15.6	6.9	-	-	-	26.8	Jul-22 16:00	20.1	Jul-22	98.3	-	
WSPD v (km/hr)					4.0	0.2	-	-	-	24.7	Jul-02 14:00	13.0	Jul-25	98.3	19/12/2017	
WDIR					W		-	-	-	-	-	-	-	98.3	19/12/2017	

Parameter	Analyzer		Notes
	Make	Model	
			Logger failed to capture data July 4
SO ₂	TECO	43I	July 8 calibration performed without filter change; recalibrated July 24 to verify. Manual span check July 30
TRS	TECO	43I	Site visit July 5 as span was approaching 10% limit; as found failed. Maintenance performed and install calibration
			performed. Data discarded back to June 27 calibration. Manual span check July 30
NO/NO ₂ /NO _x	TECO	42I	Manual span check July 30
O ₃	TECO	49I	Manual span check July 30
THC/CH ₄ /NMHC	TECO	55I	Manual span check July 30
PM _{2.5}	TEOM		Filter change July 8, flows not checked due to weather
ET/RH			
WS/WD	MetOne	50.5	

Hourly Averages

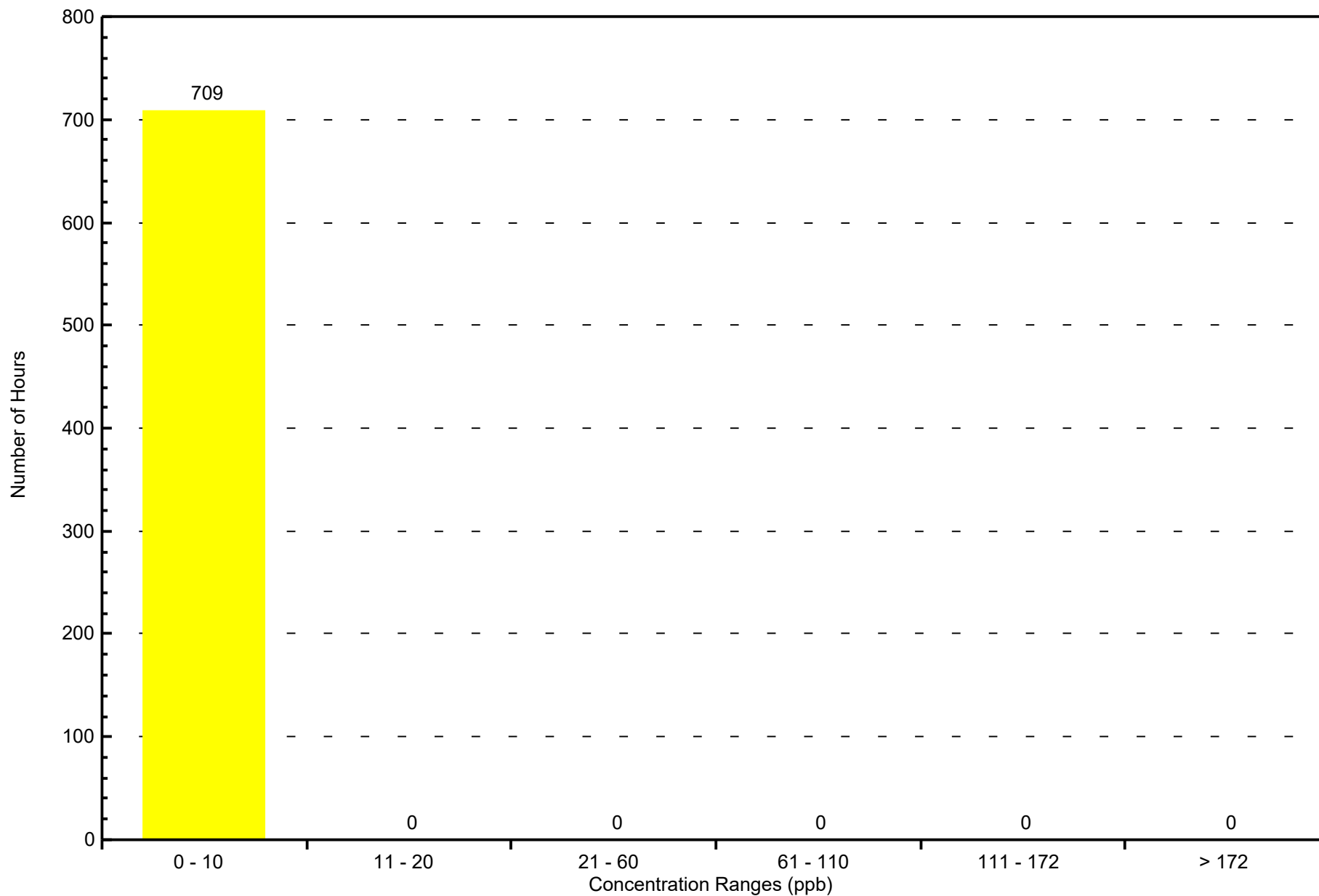
Sulphur Dioxide (SO₂) - ppb

Beaverlodge - July 2019



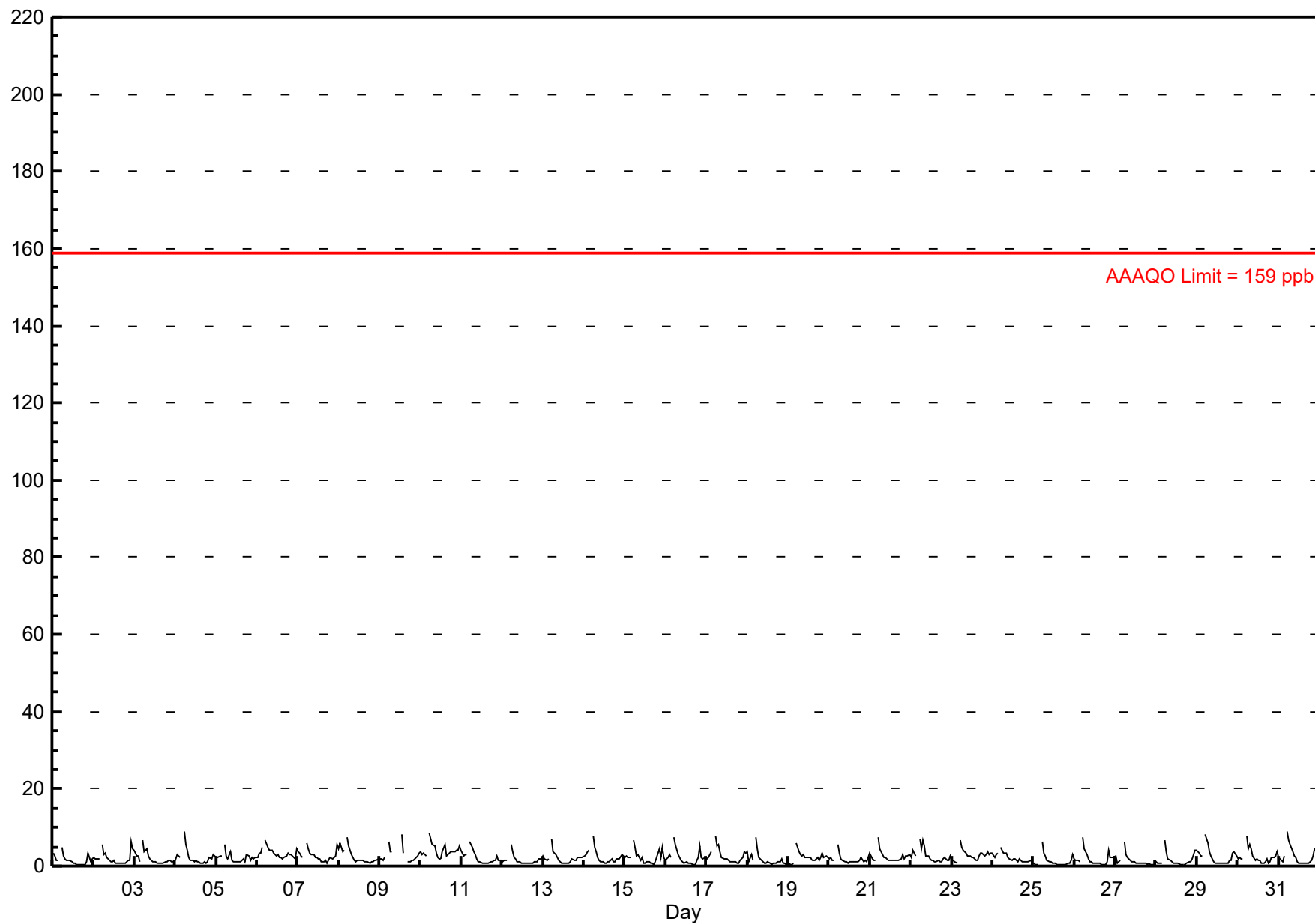
Histogram of Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Beaverlodge - July 2019



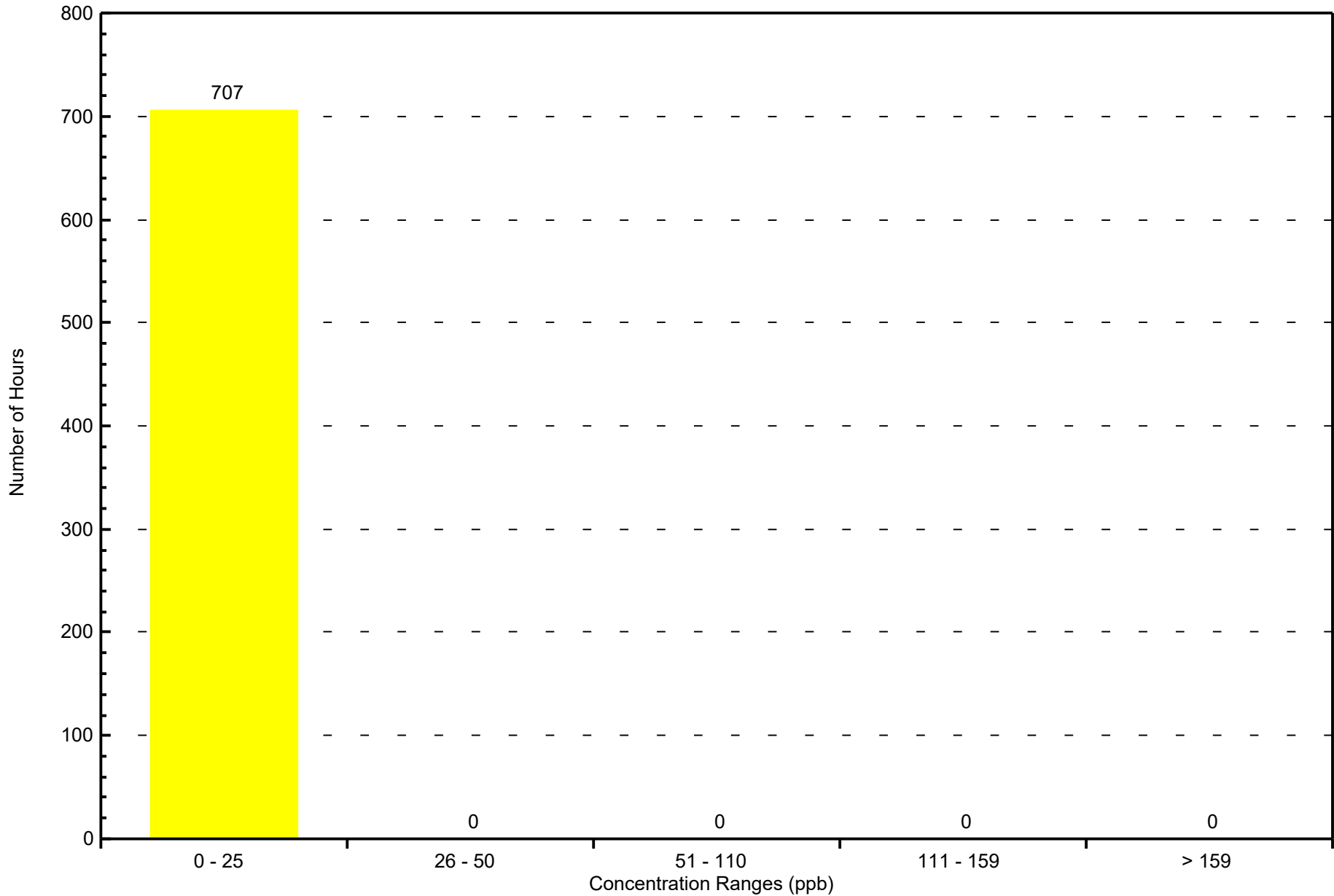
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Beaverlodge - July 2019



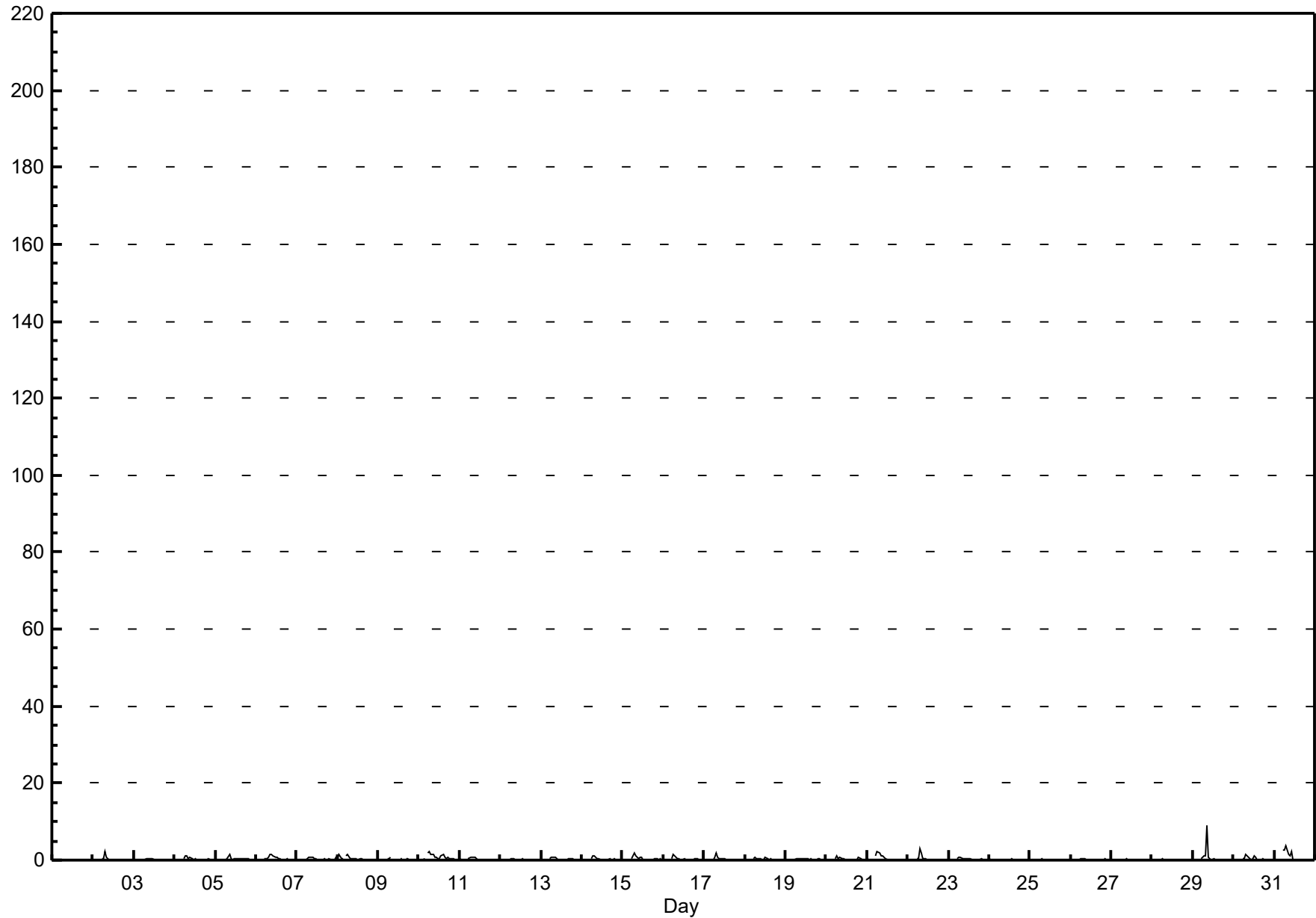
Histogram of Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Beaverlodge - July 2019



Hourly Averages

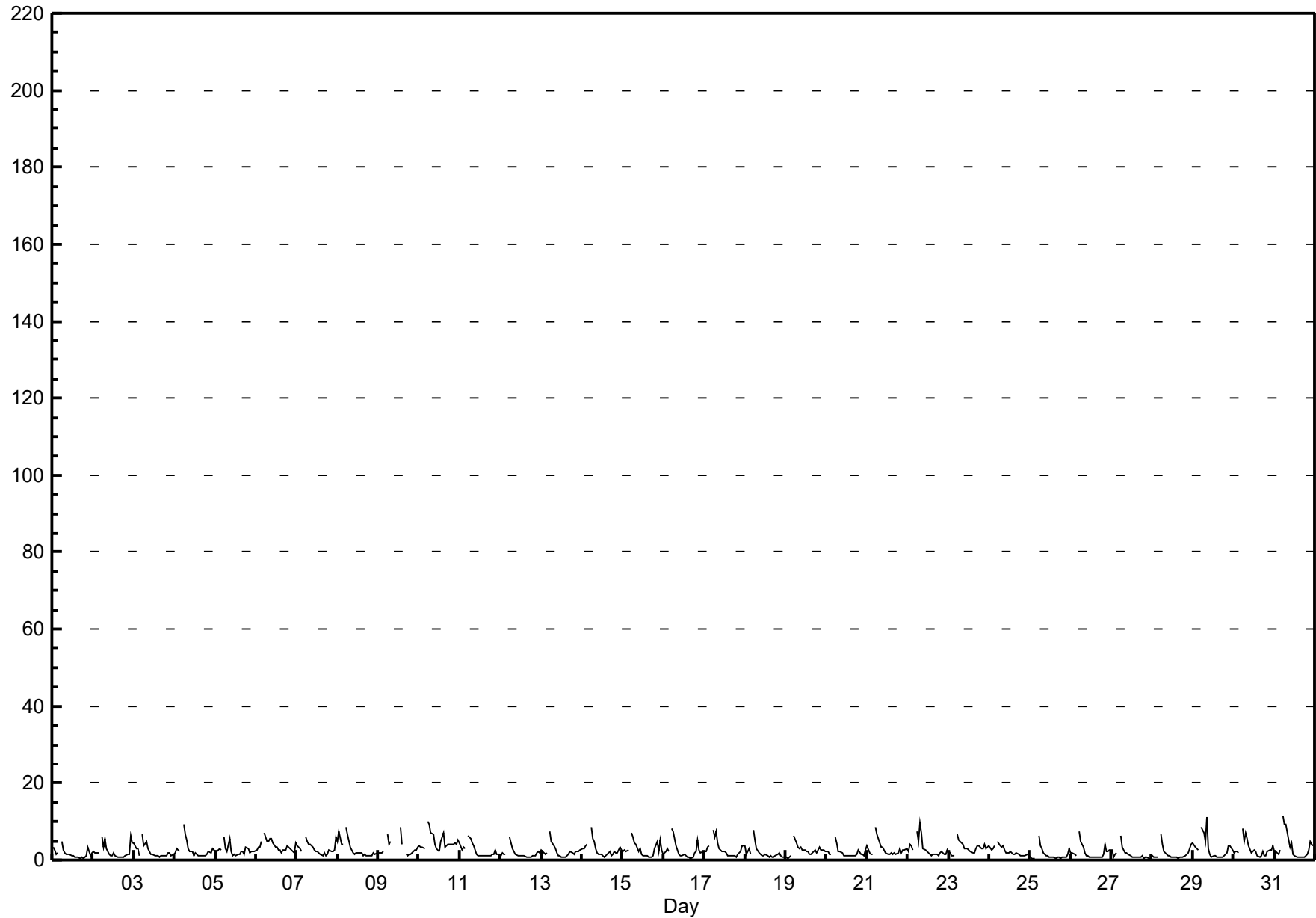
Nitrogen Oxide (NO) - ppb
Beaverlodge - July 2019



Hourly Averages

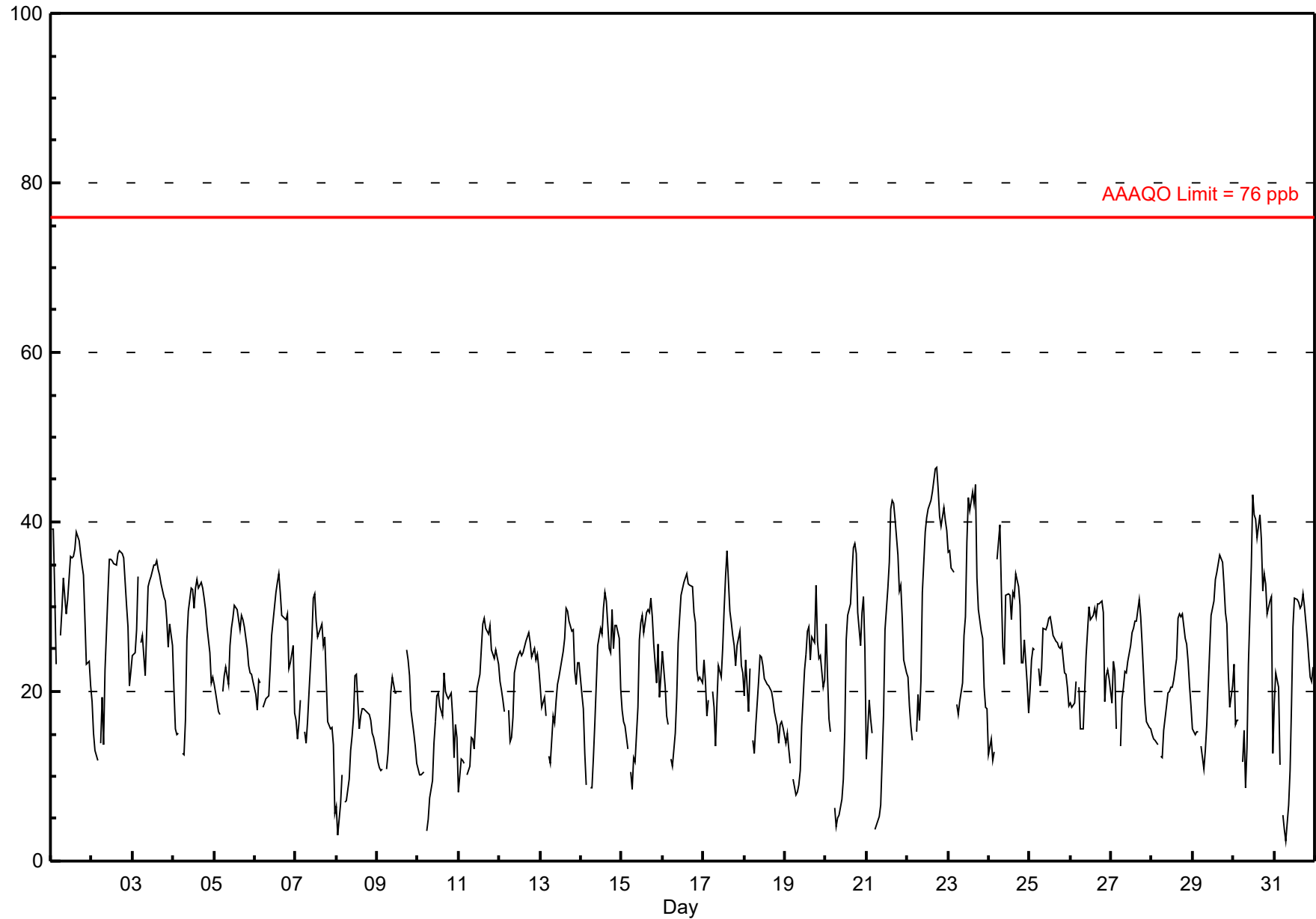
Oxides of Nitrogen (NO_x) - ppb

Beaverlodge - July 2019



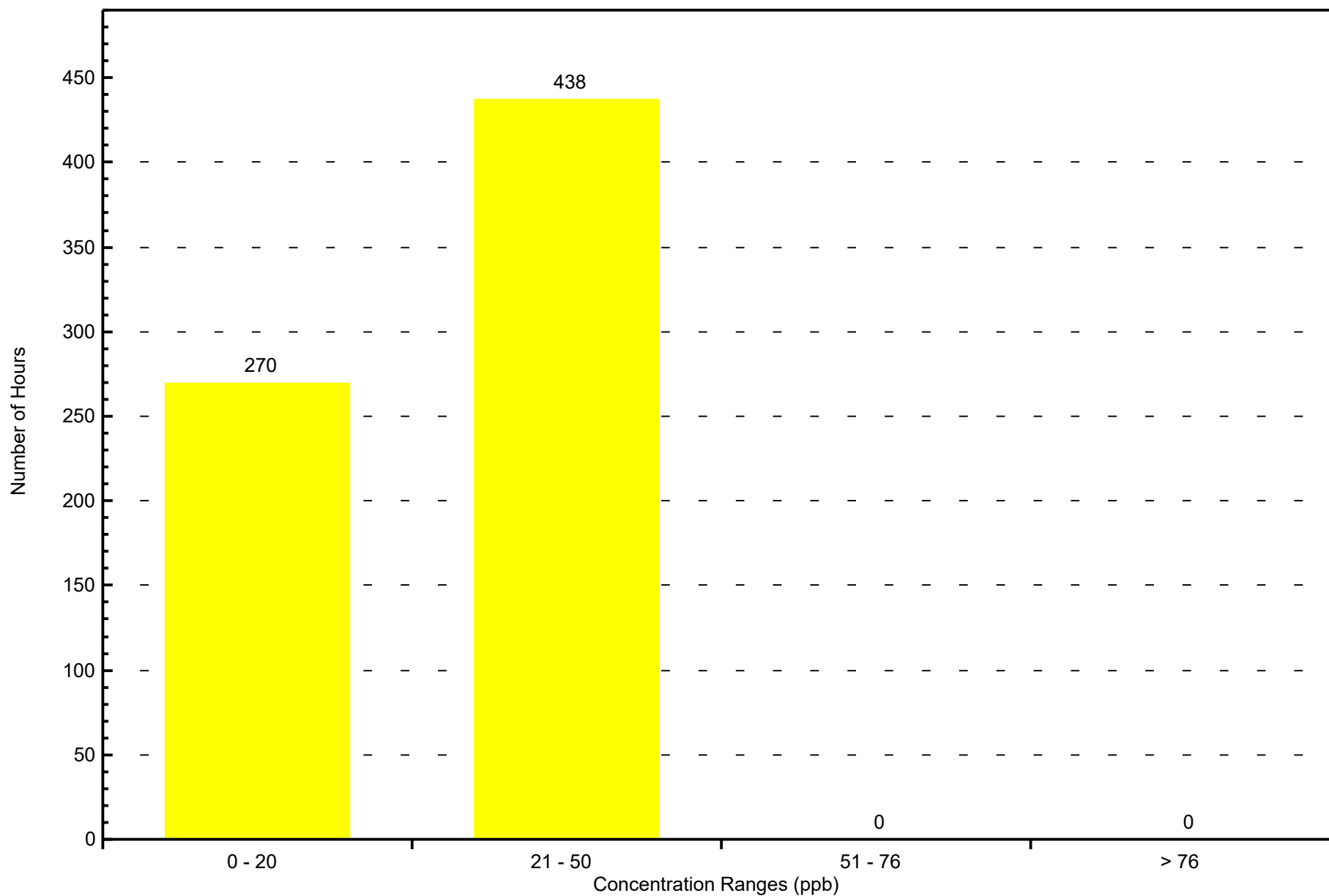
Hourly Averages

Ozone (O₃) - ppb
Beaverlodge - July 2019



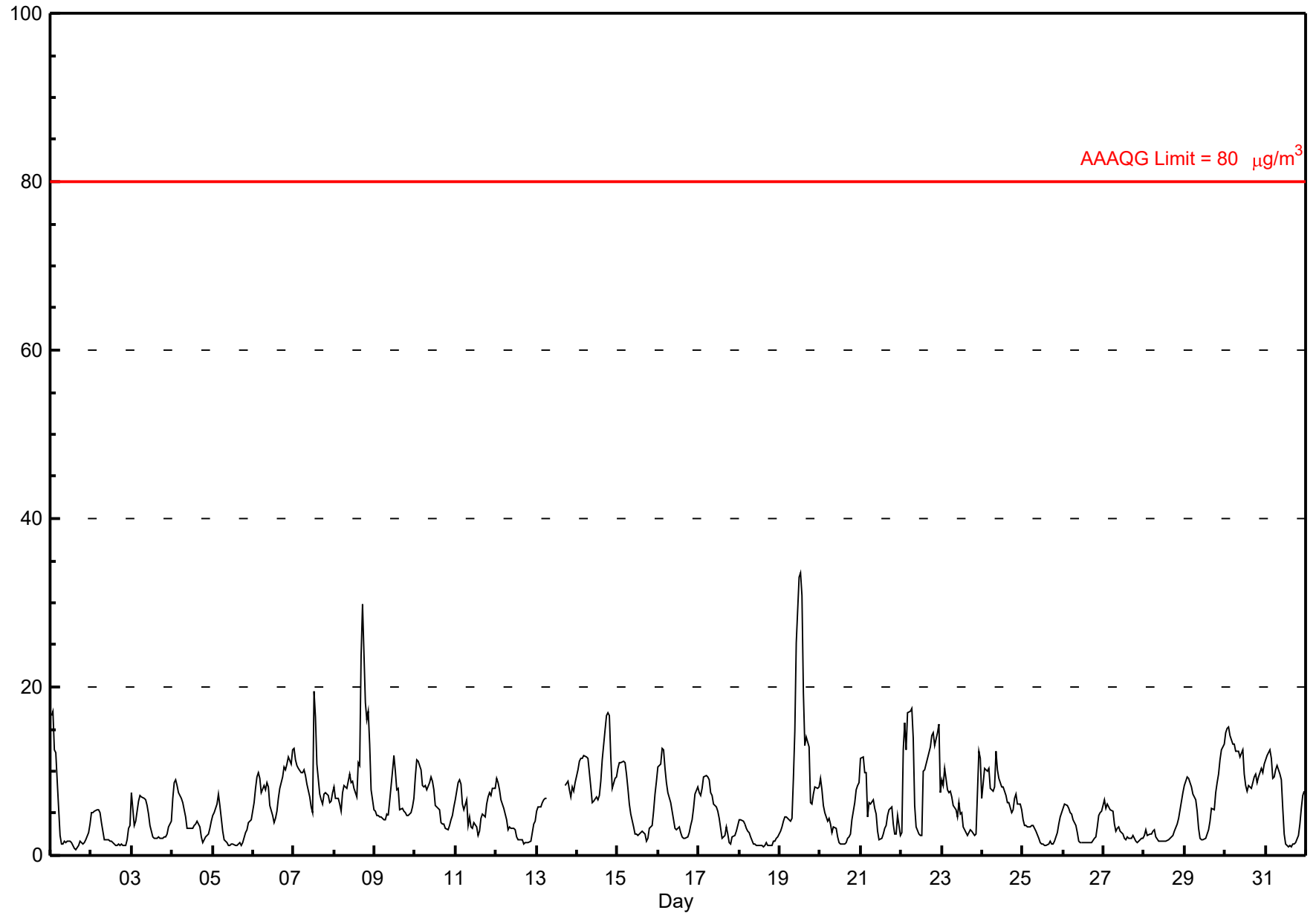
Histogram of Hourly Averages

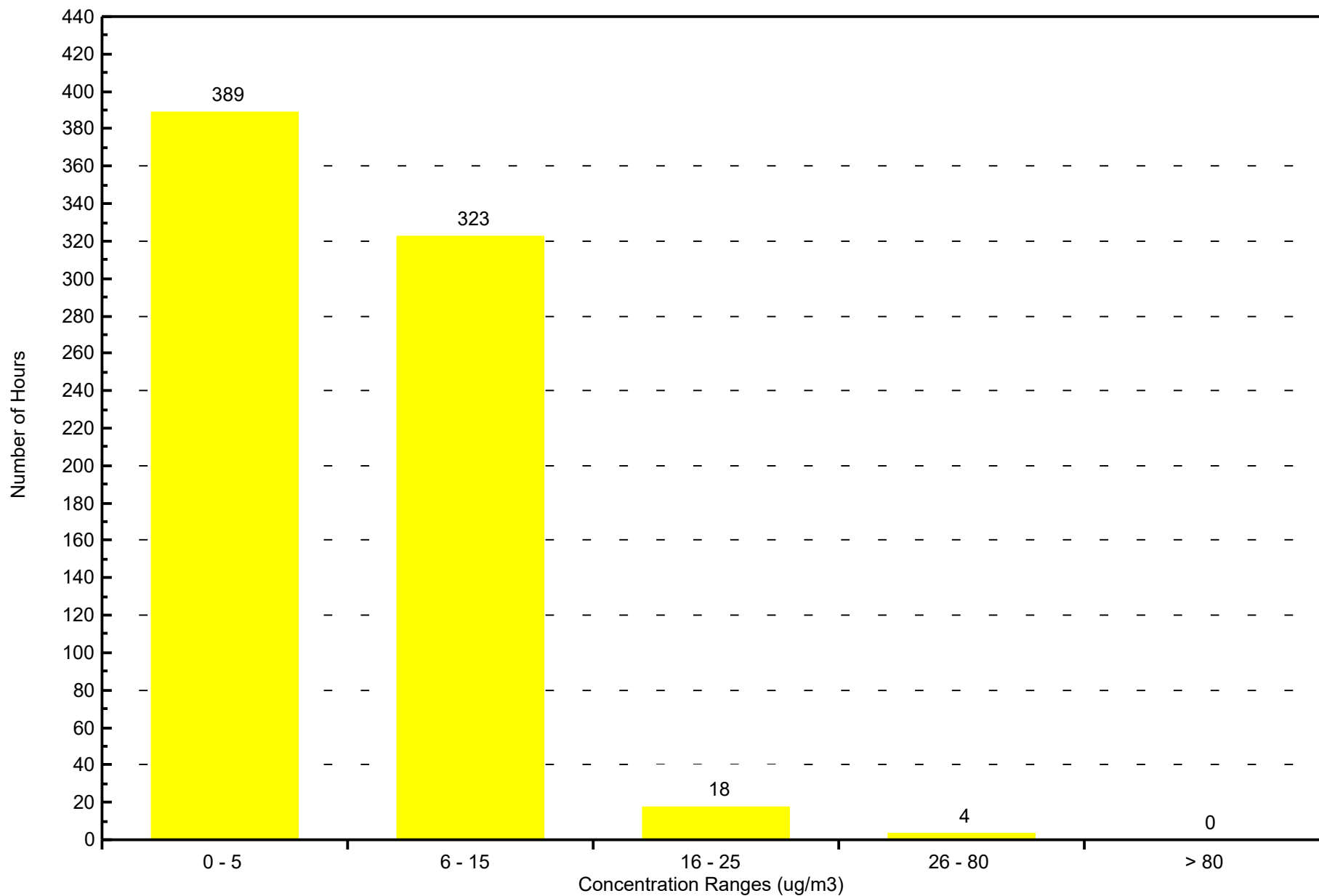
Ozone (O₃) - ppb
Beaverlodge - July 2019



Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Beaverlodge - July 2019

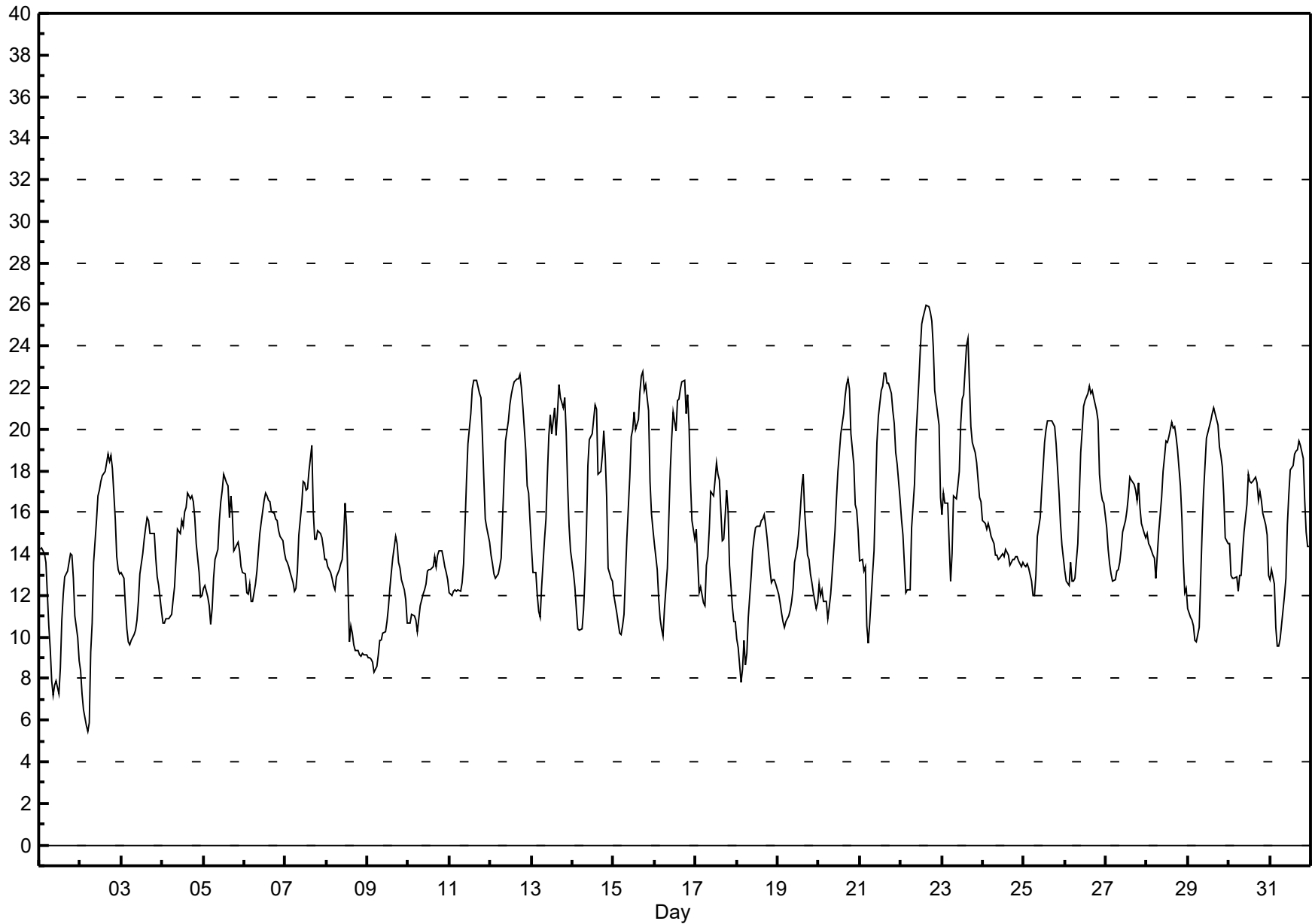




Hourly Averages

External Temperature (ET) - °C

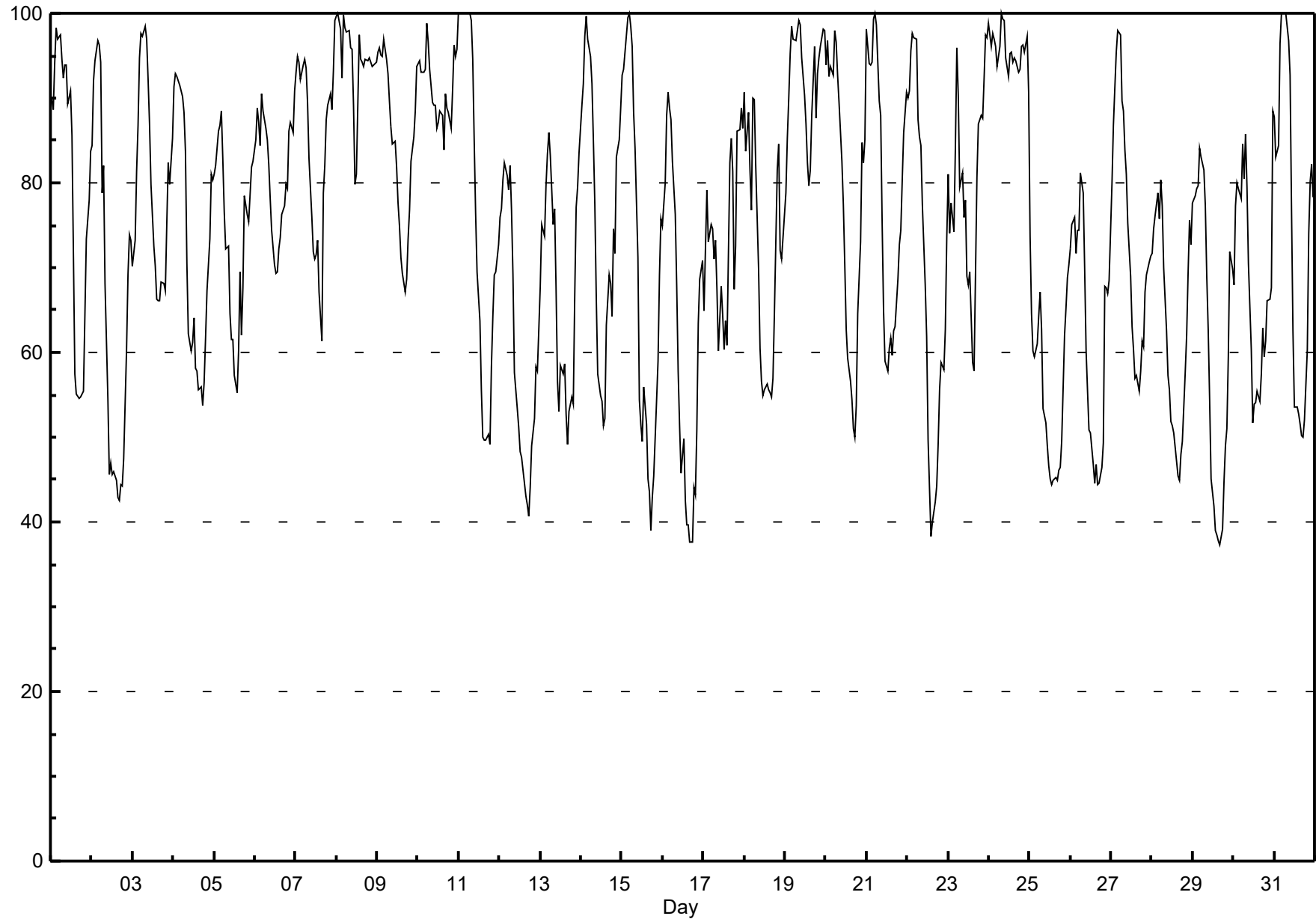
Beaverlodge - July 2019



Hourly Averages

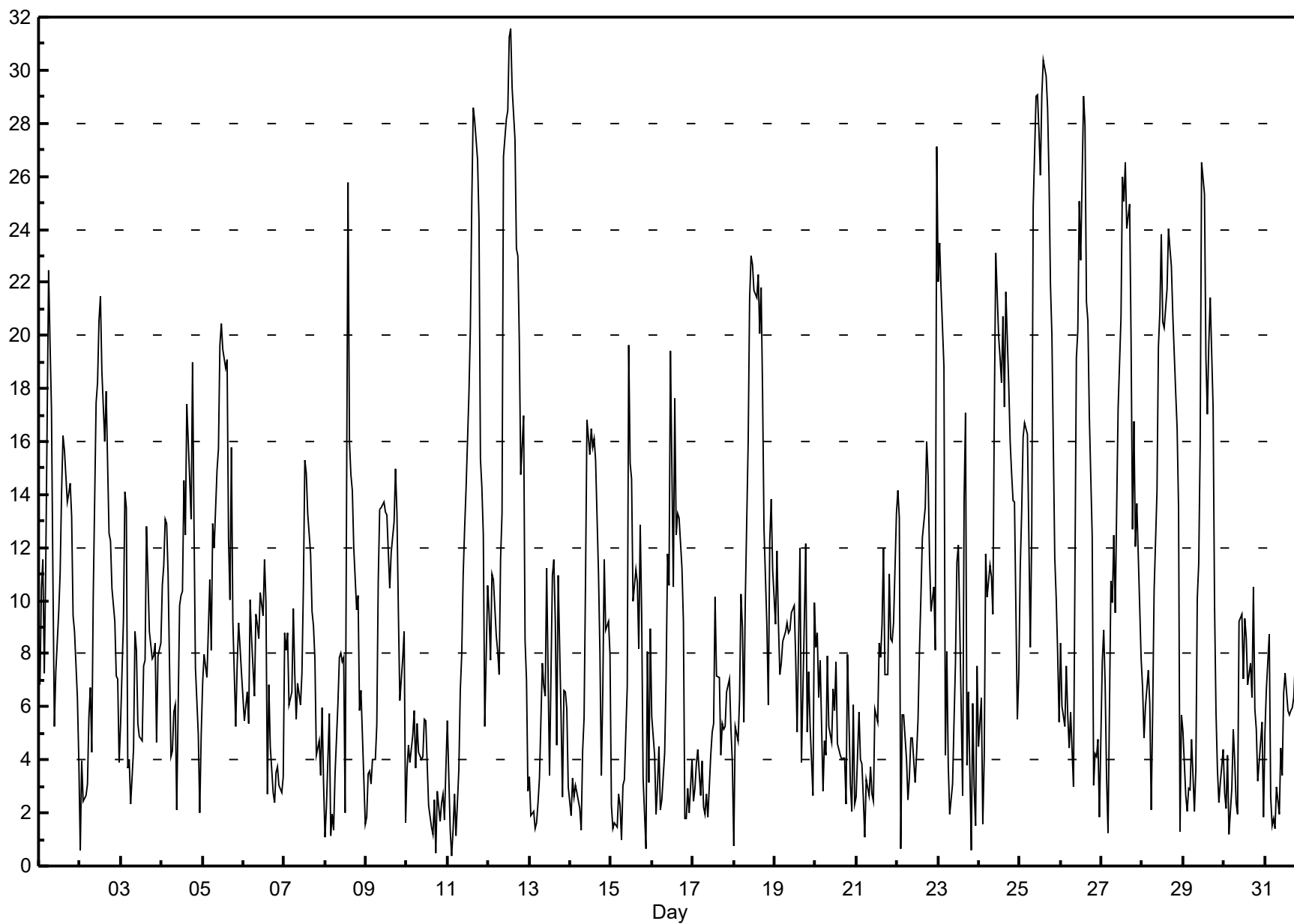
Relative Humidity (RH) - %

Beaverlodge - July 2019



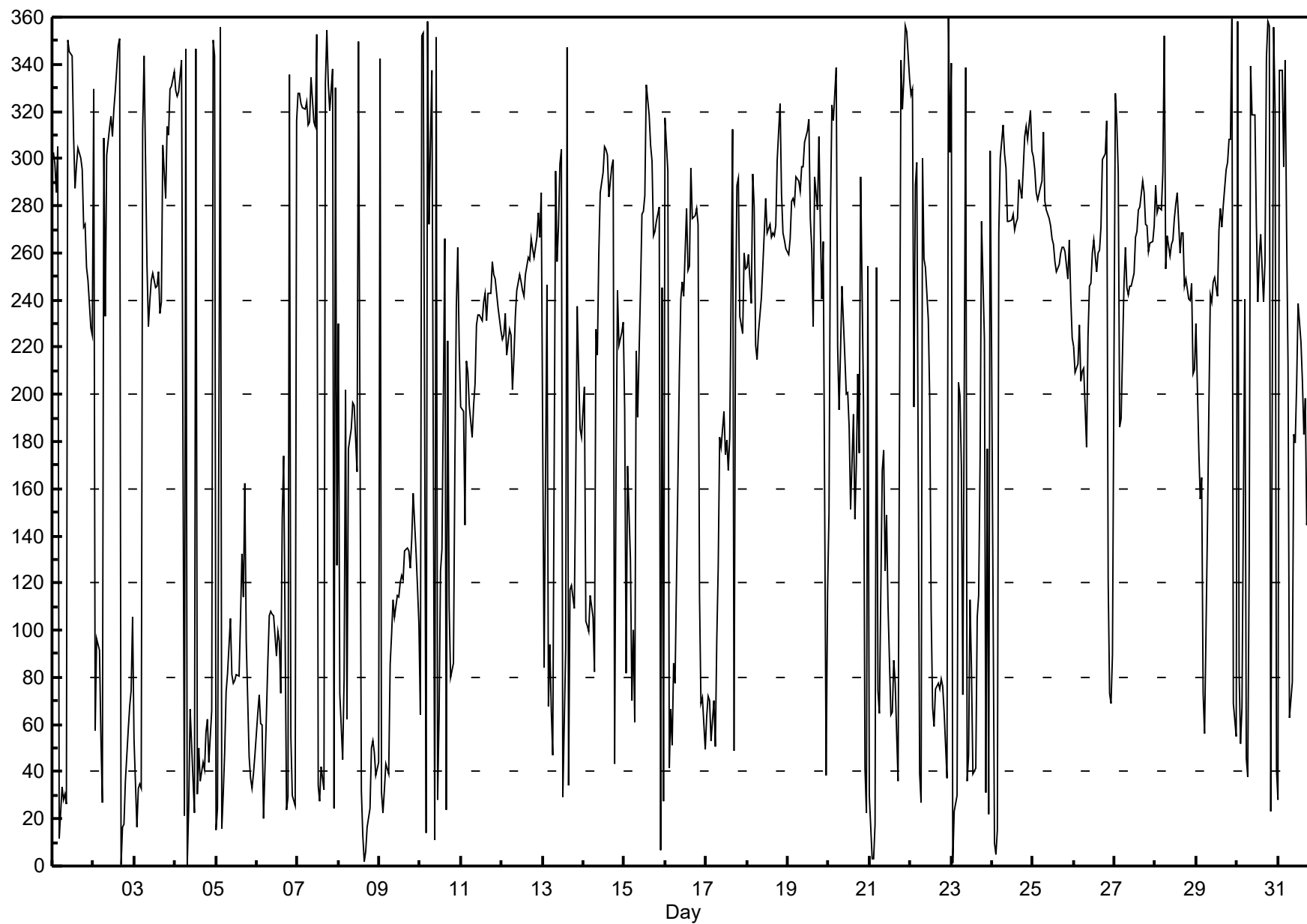
Hourly Averages

Wind Speed (WS) - km/h
Beaverlodge - July 2019



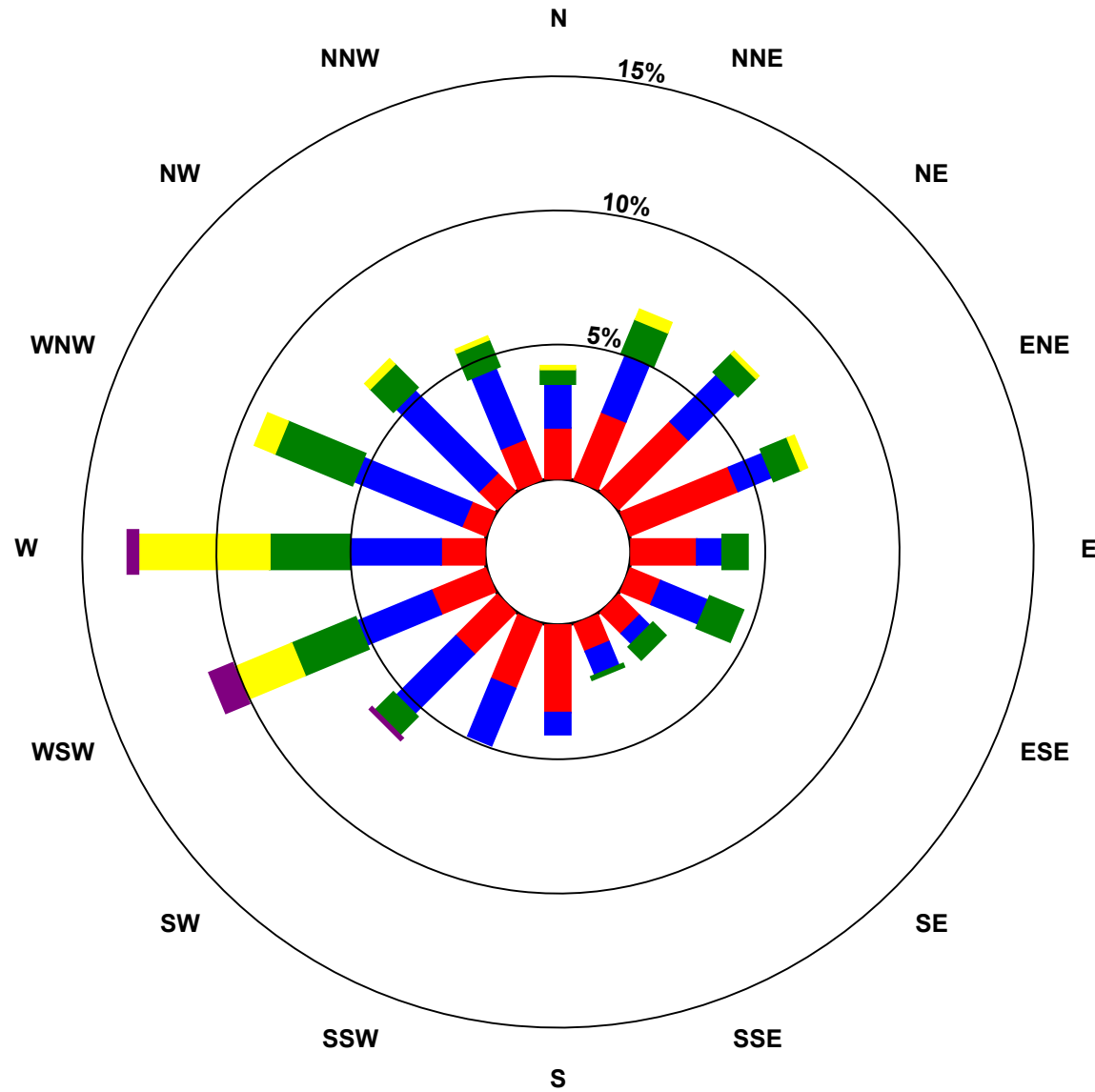
Hourly Averages

Wind Direction (WD) - deg
Beaverlodge - July 2019



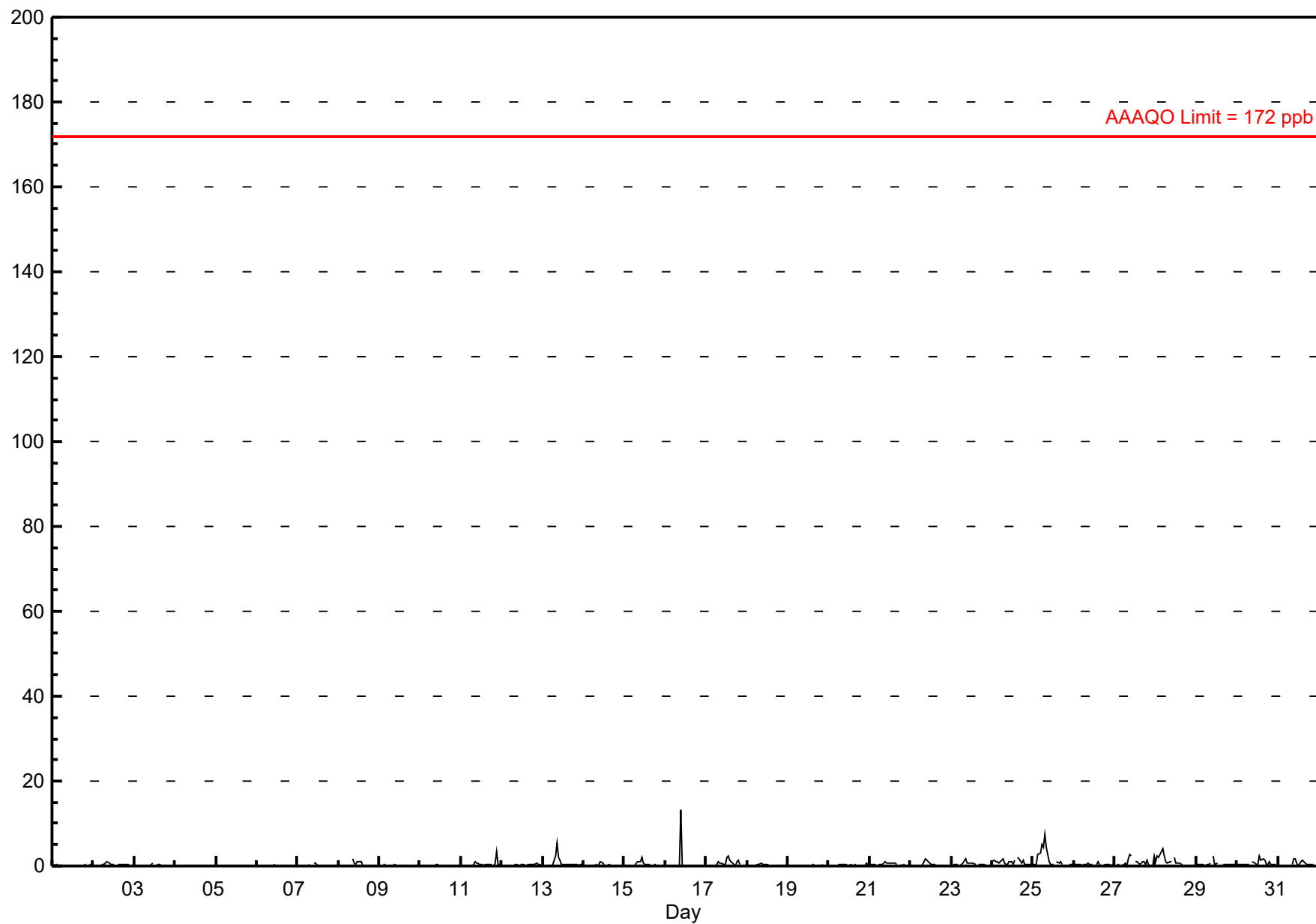
Wind Rose

Wind Speed (WS) (km/h)
Beaverlodge - July 2019



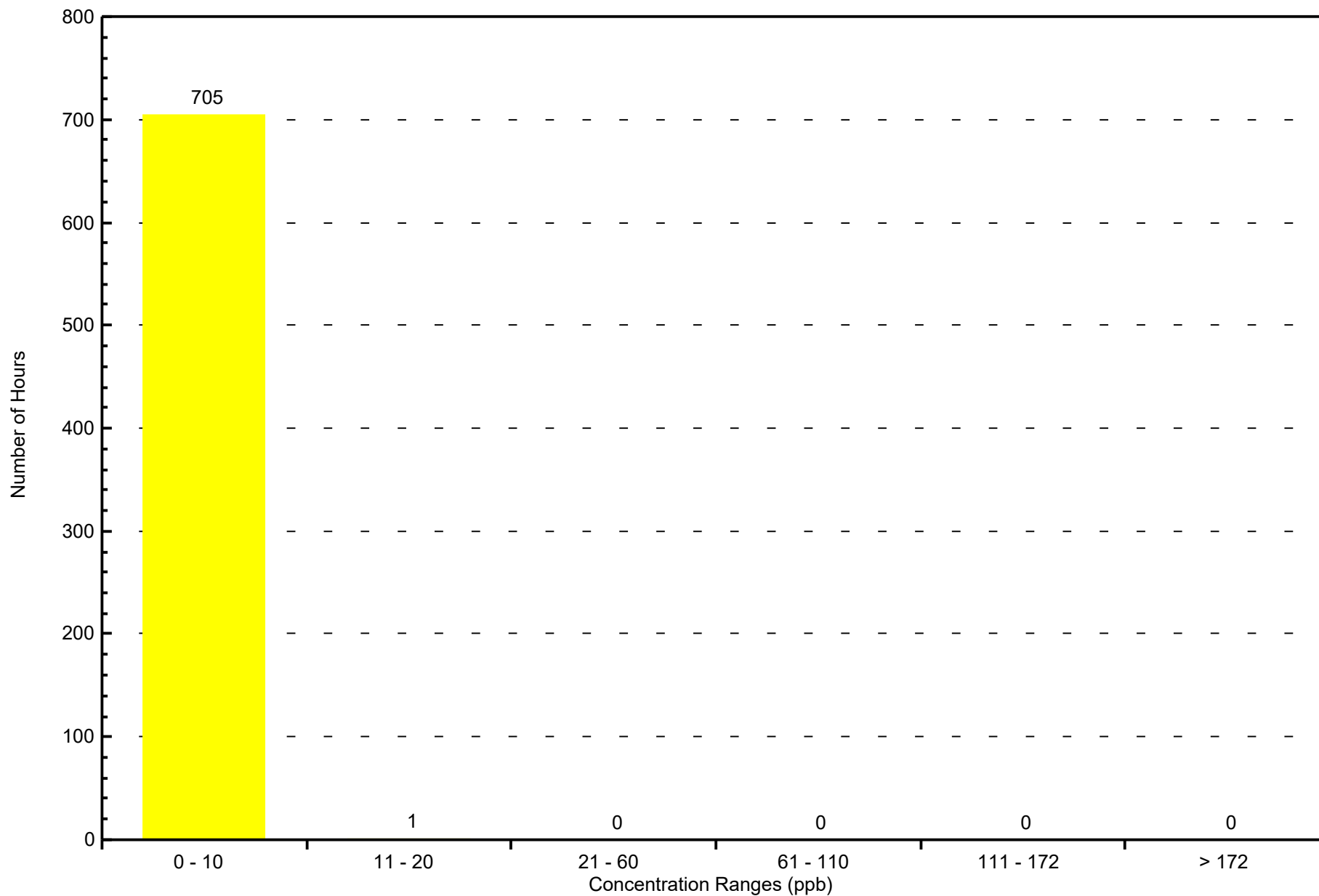
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Evergreen Park - July 2019



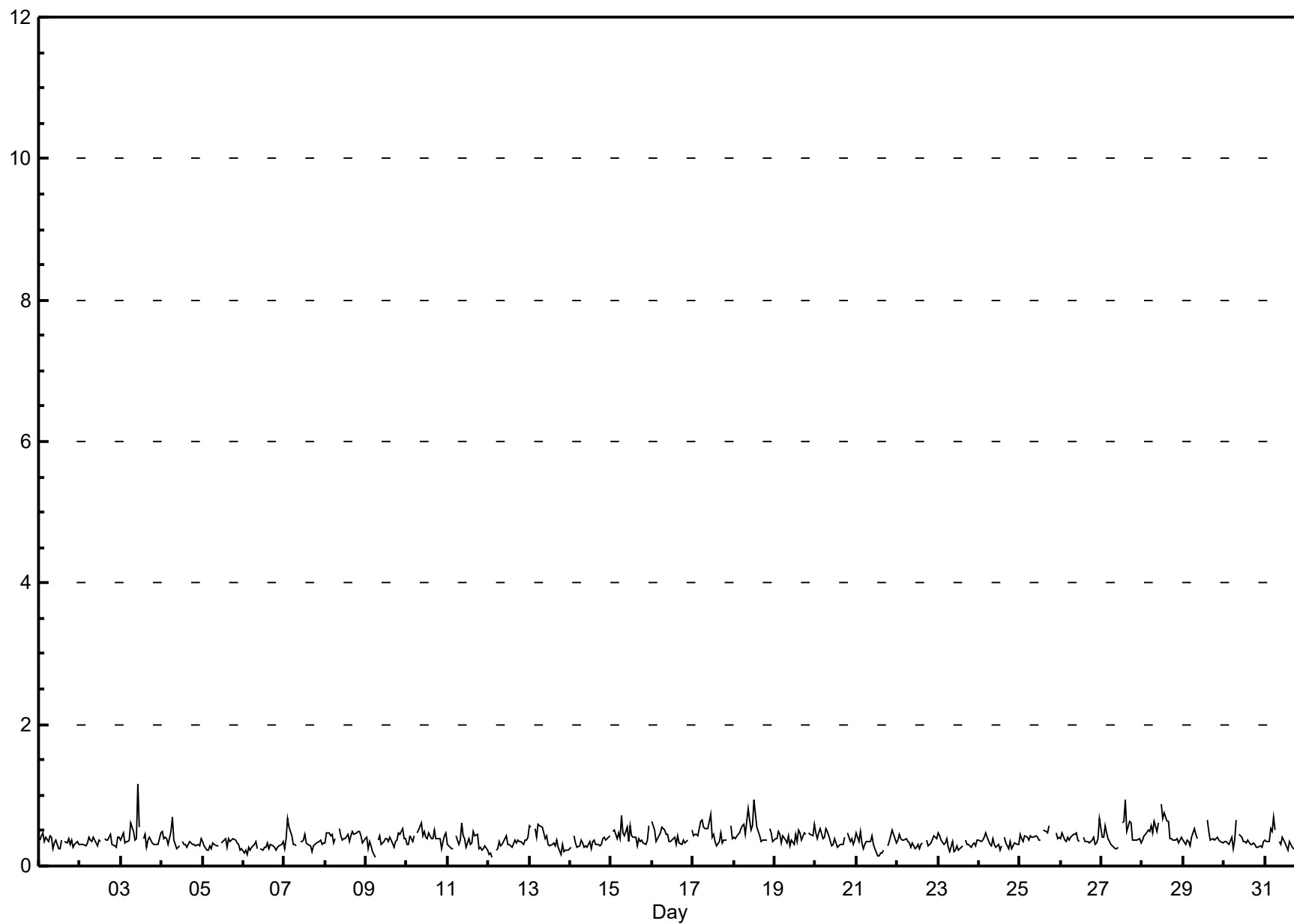
Histogram of Hourly Averages

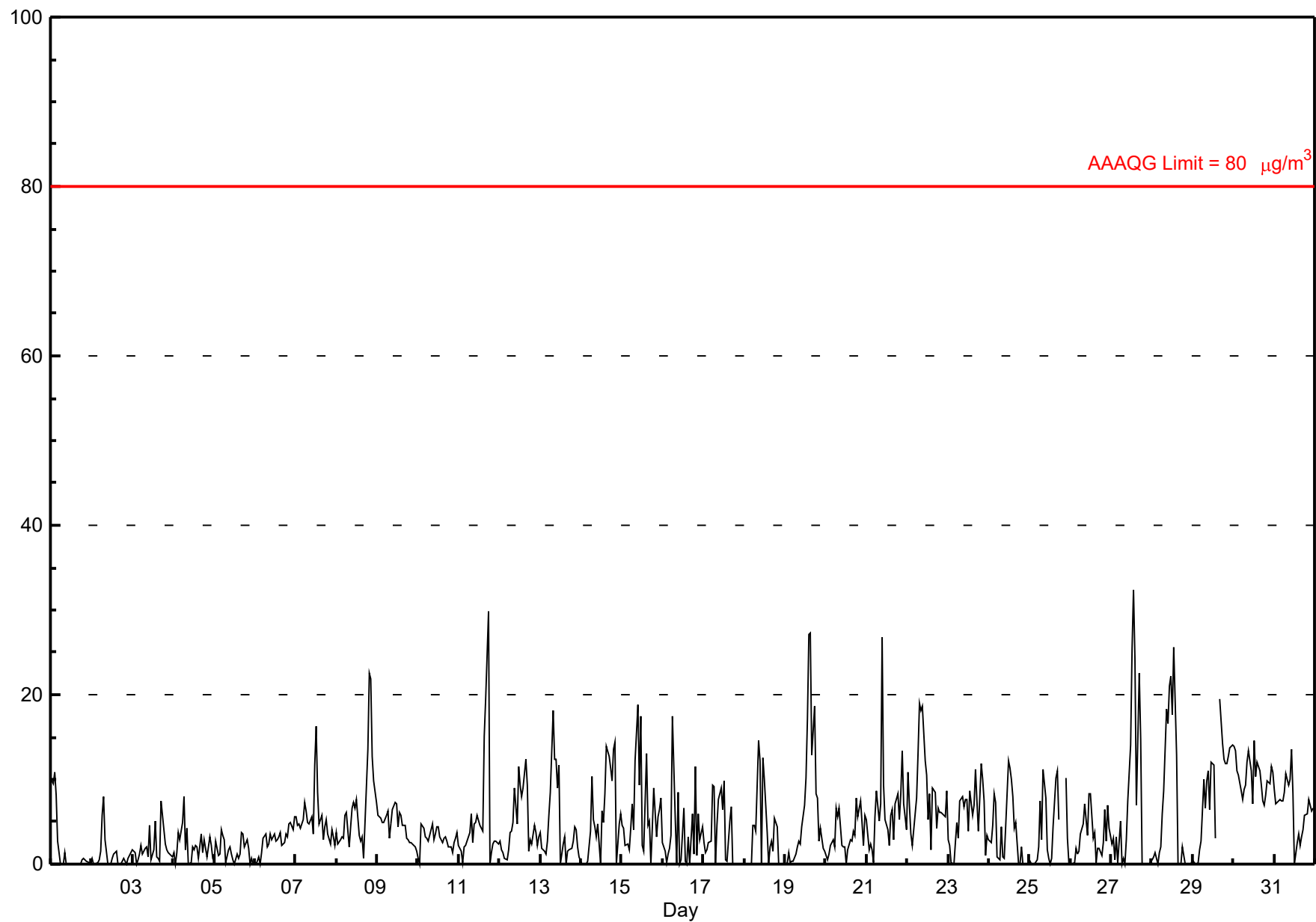
Sulphur Dioxide (SO₂) - ppb
Evergreen Park - July 2019

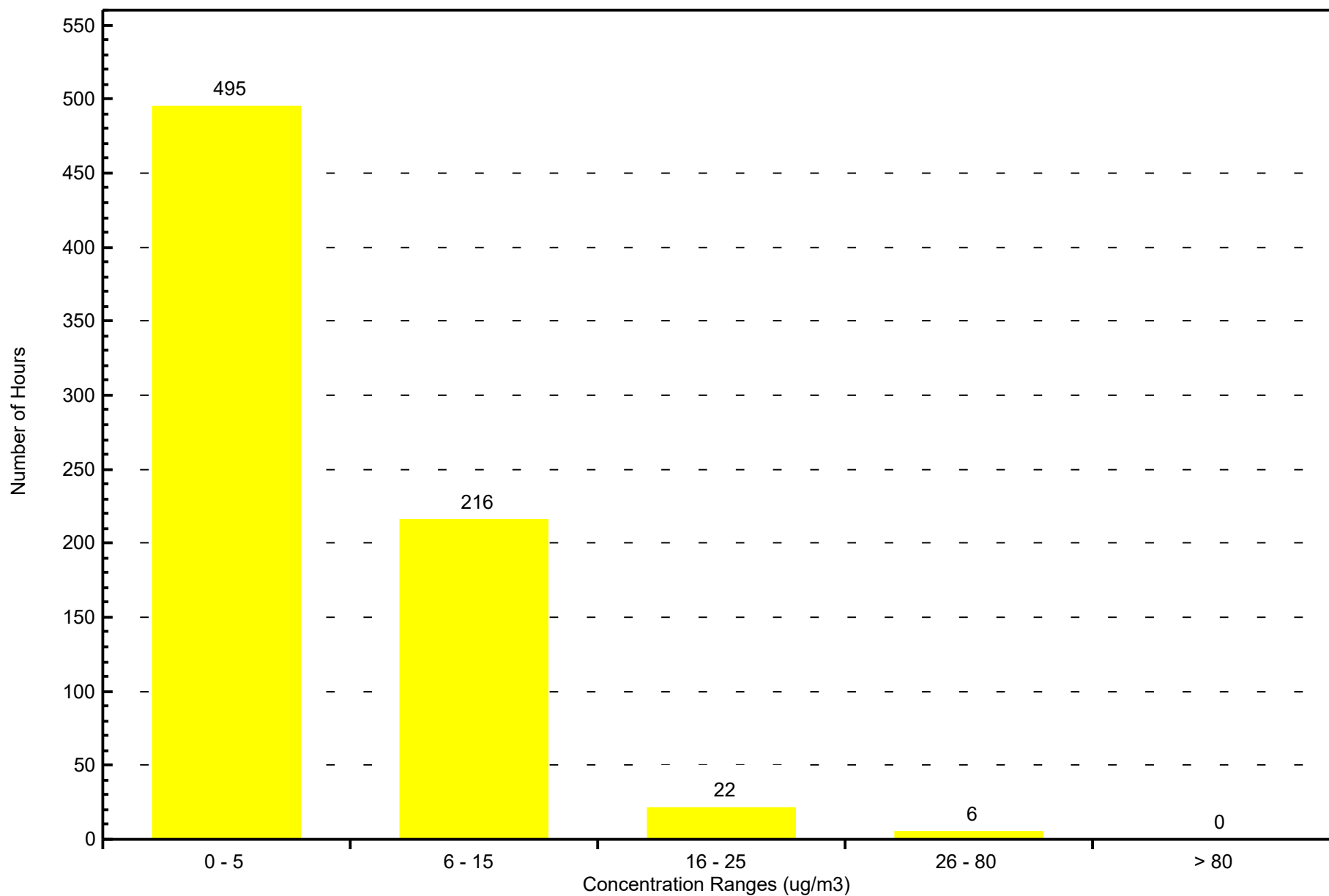


Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Evergreen Park - July 2019



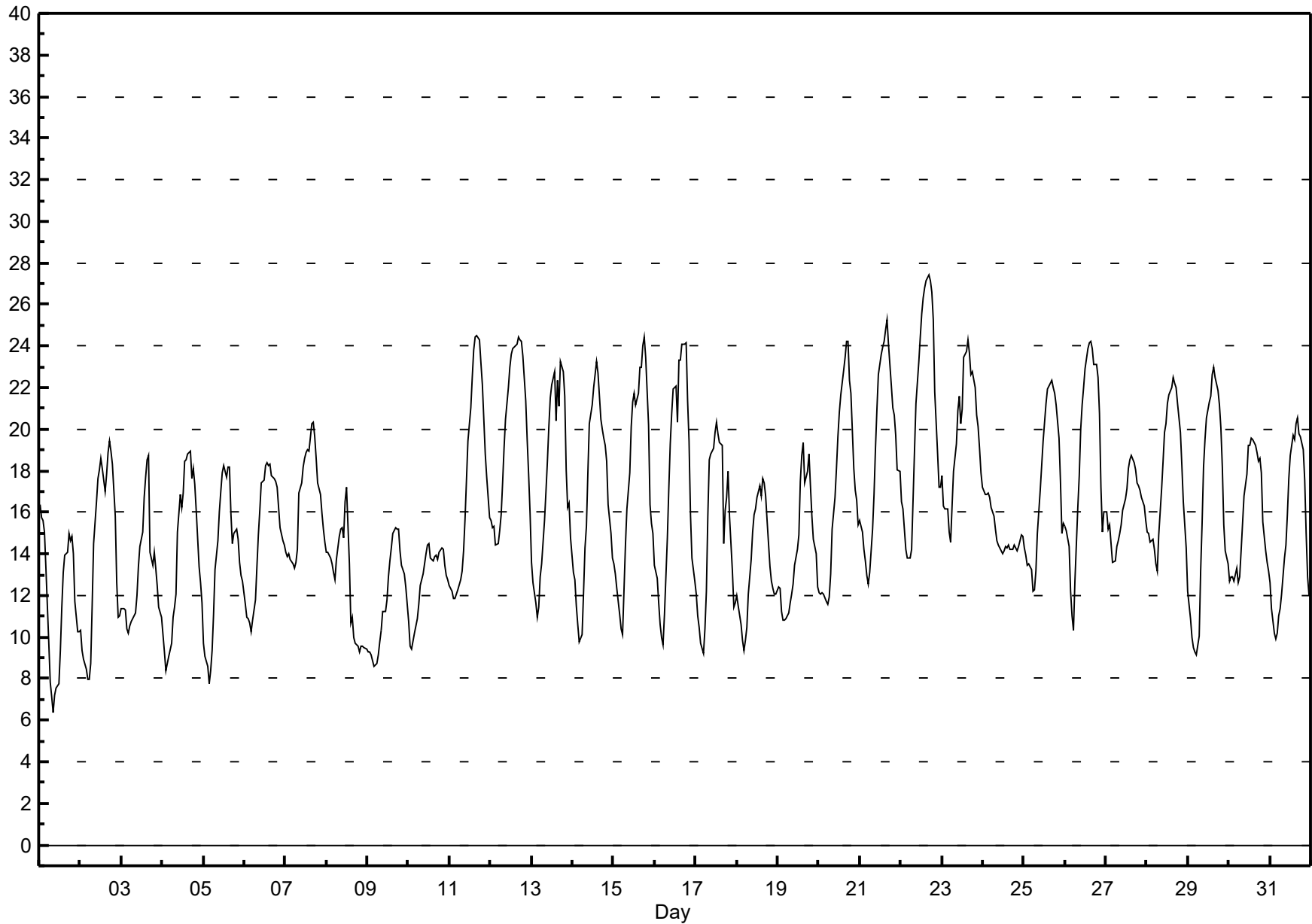




Hourly Averages

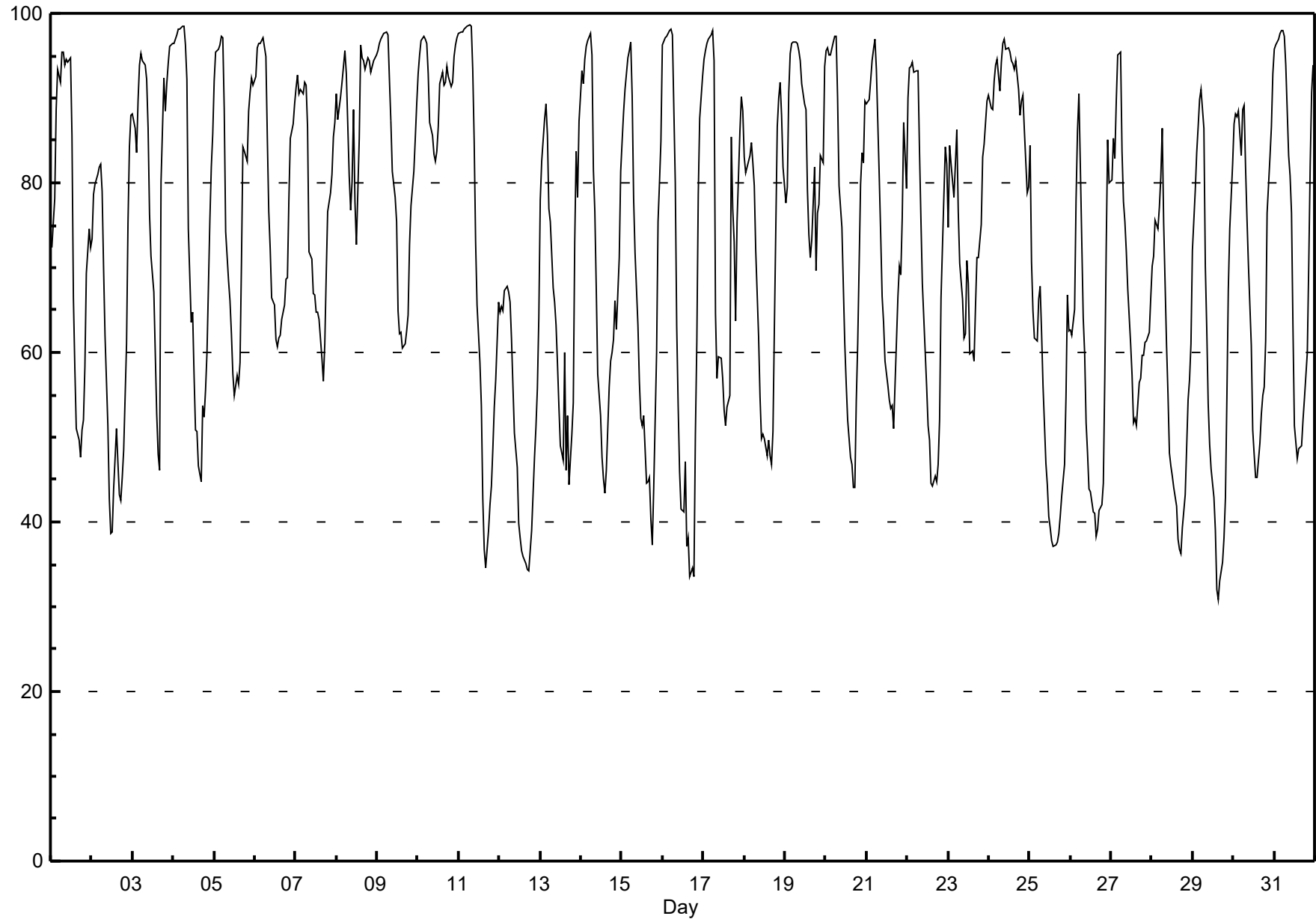
External Temperature (ET) - °C

Evergreen Park - July 2019



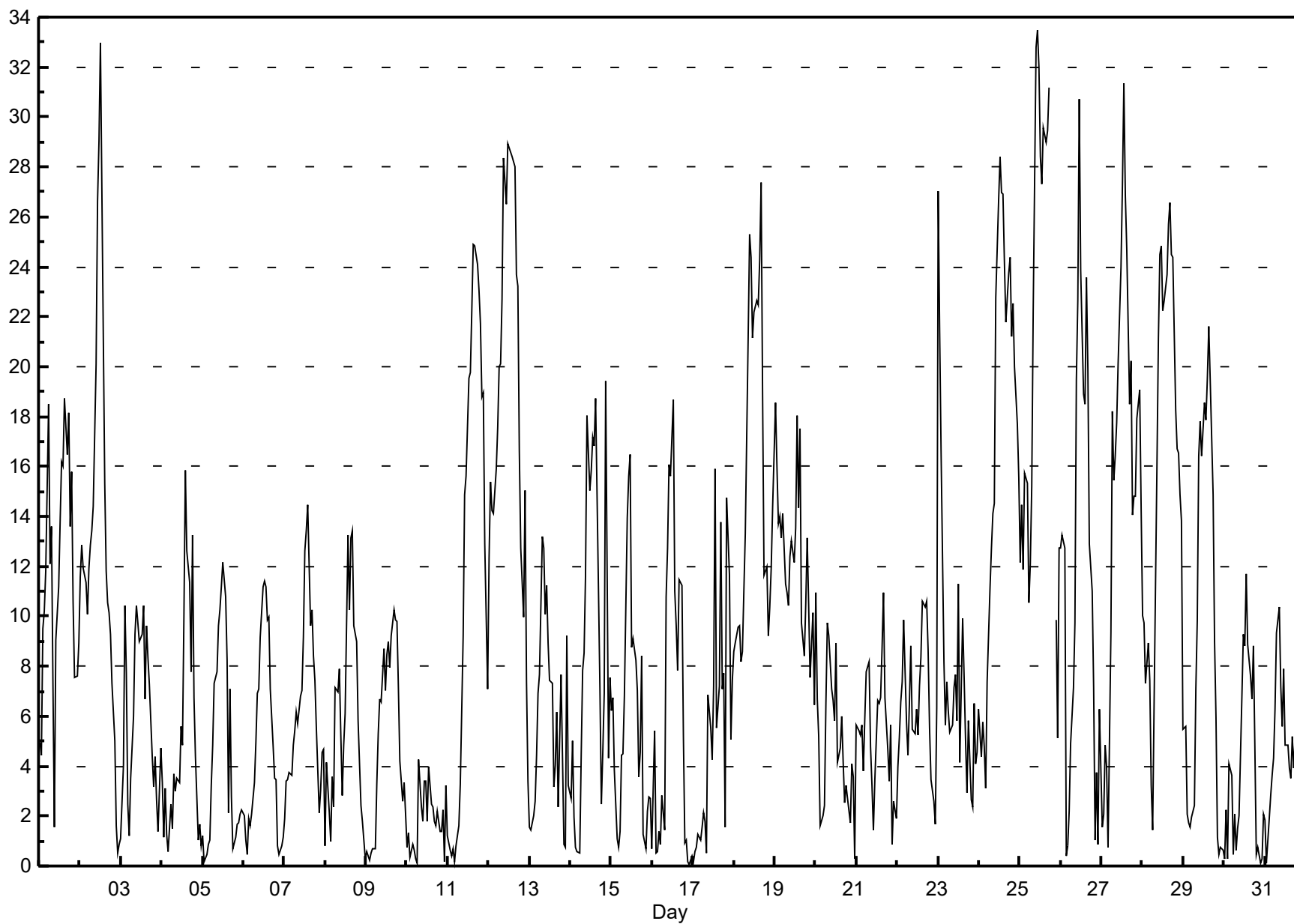
Hourly Averages

Relative Humidity (RH) - %
Evergreen Park - July 2019



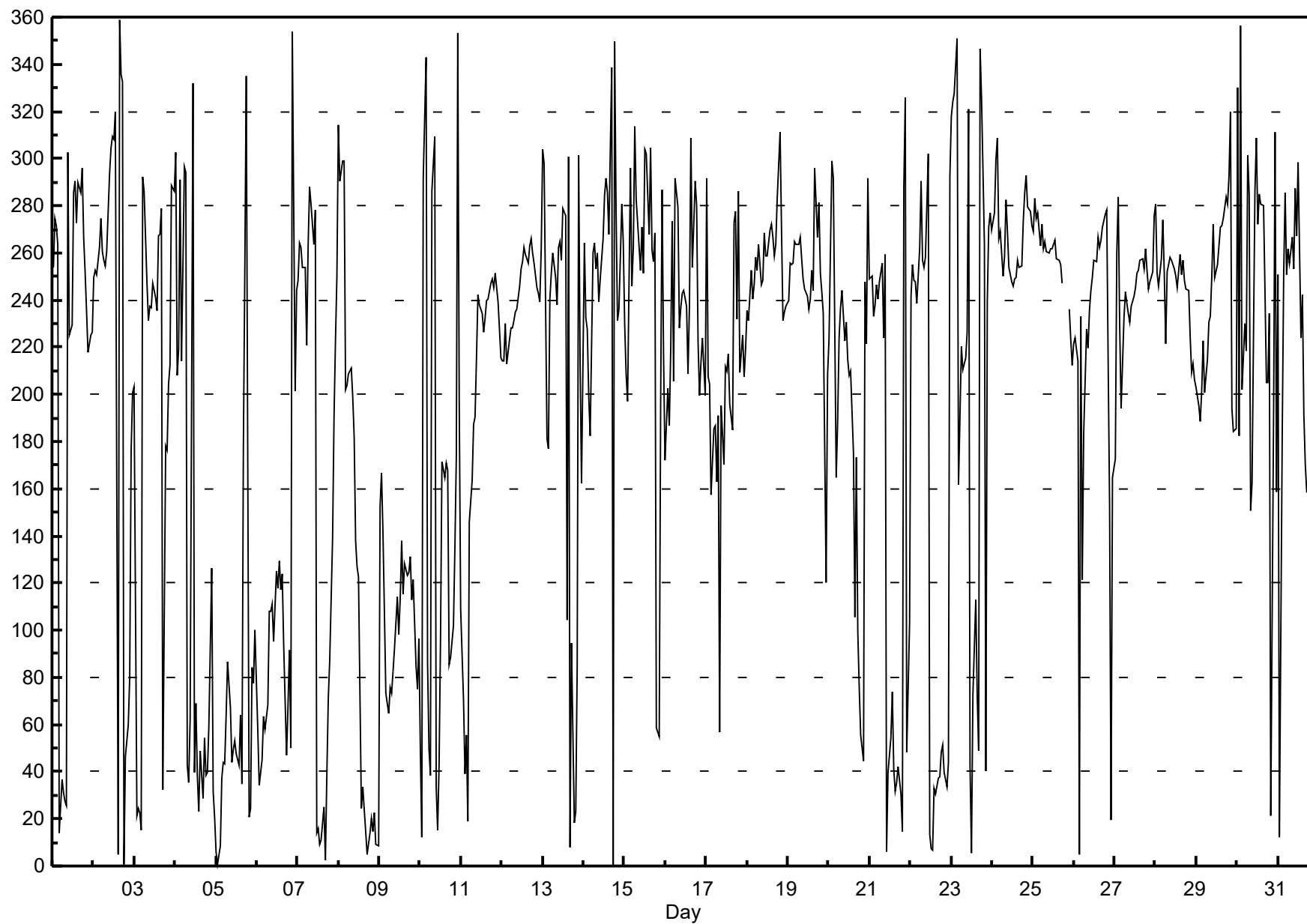
Hourly Averages

Wind Speed (WS) - km/h
Evergreen Park - July 2019



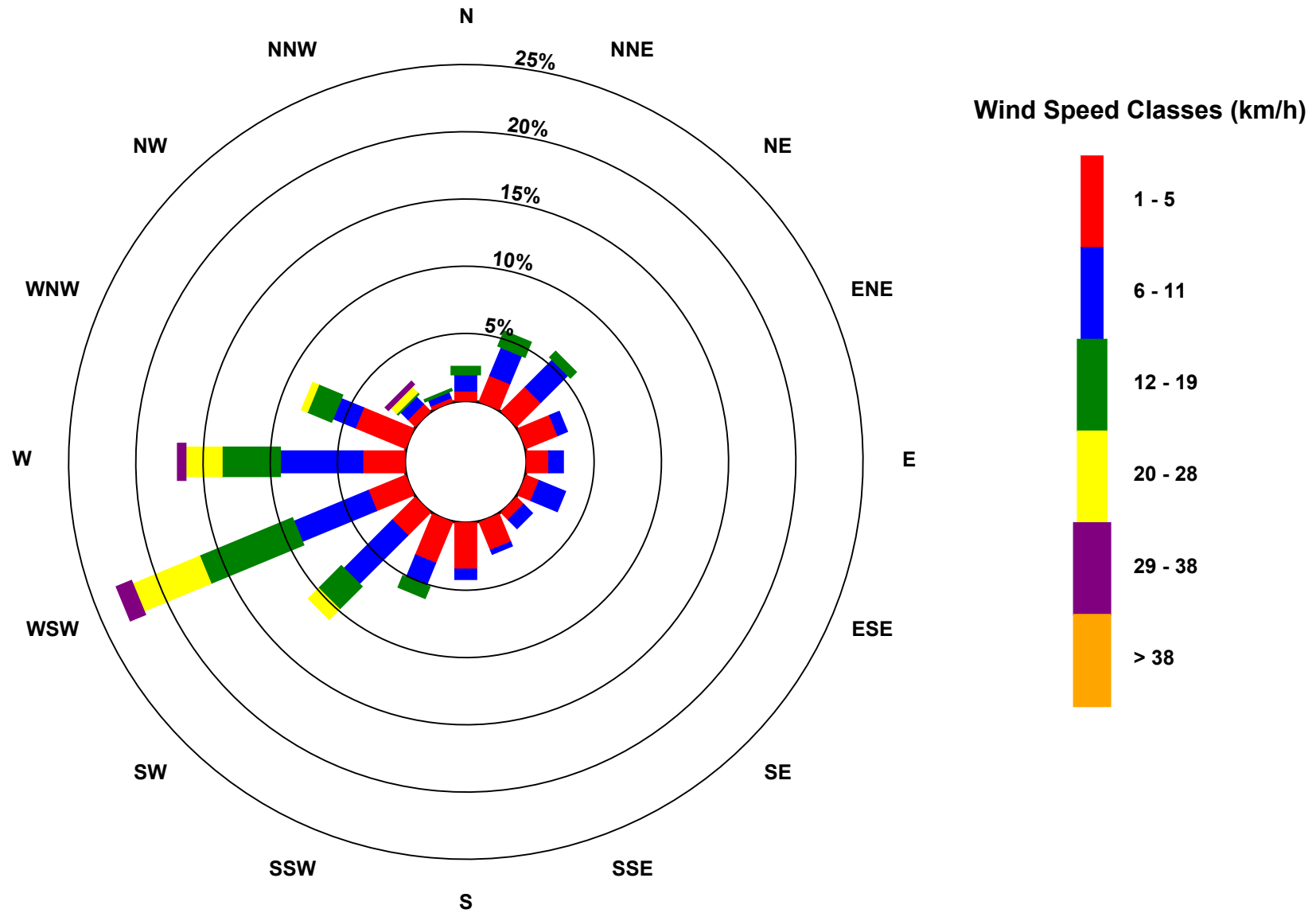
Hourly Averages

Wind Direction (WD) - deg
Evergreen Park - July 2019



Wind Rose

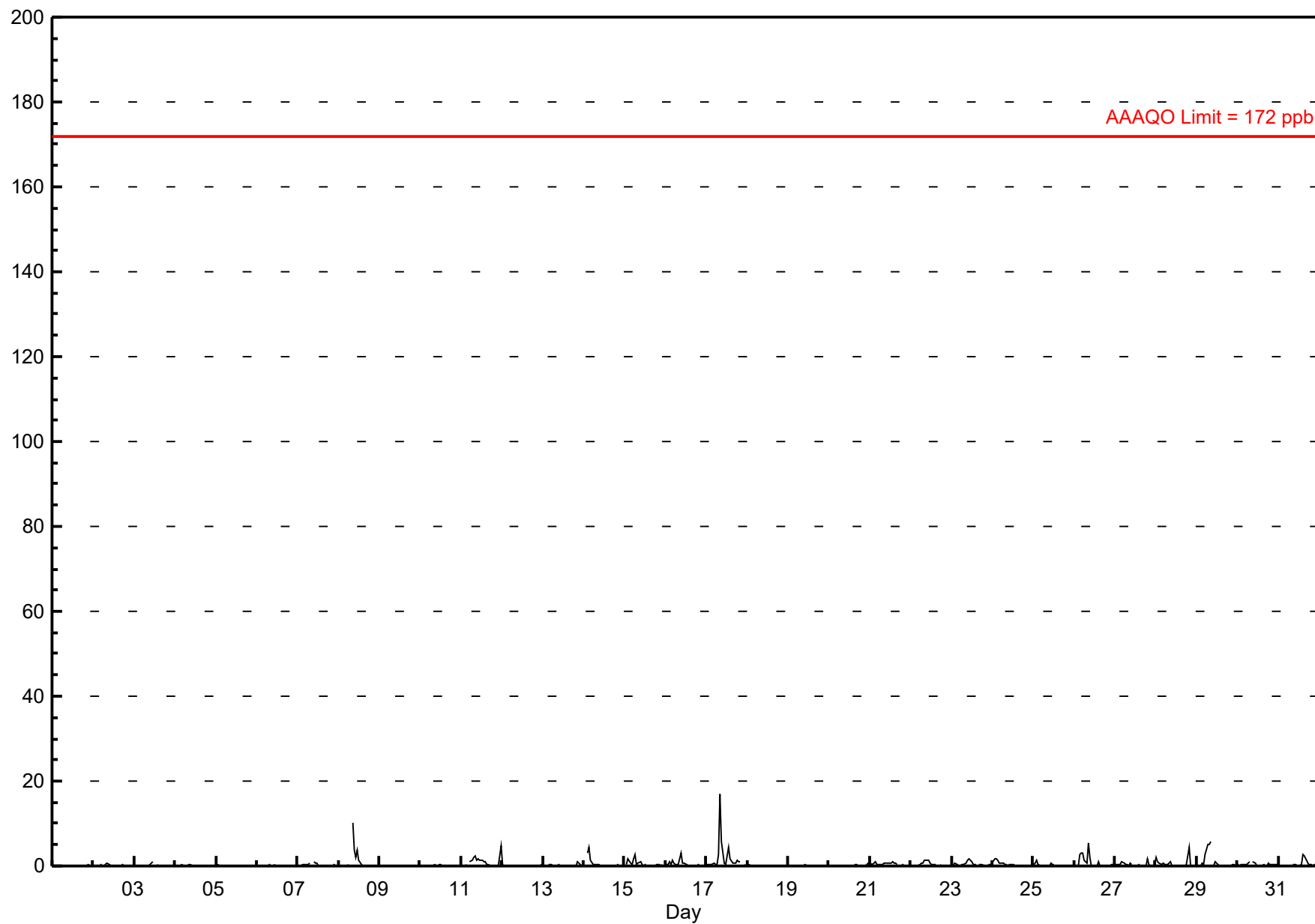
Wind Speed (WS) (km/h)
Evergreen Park - July 2019



Hourly Averages

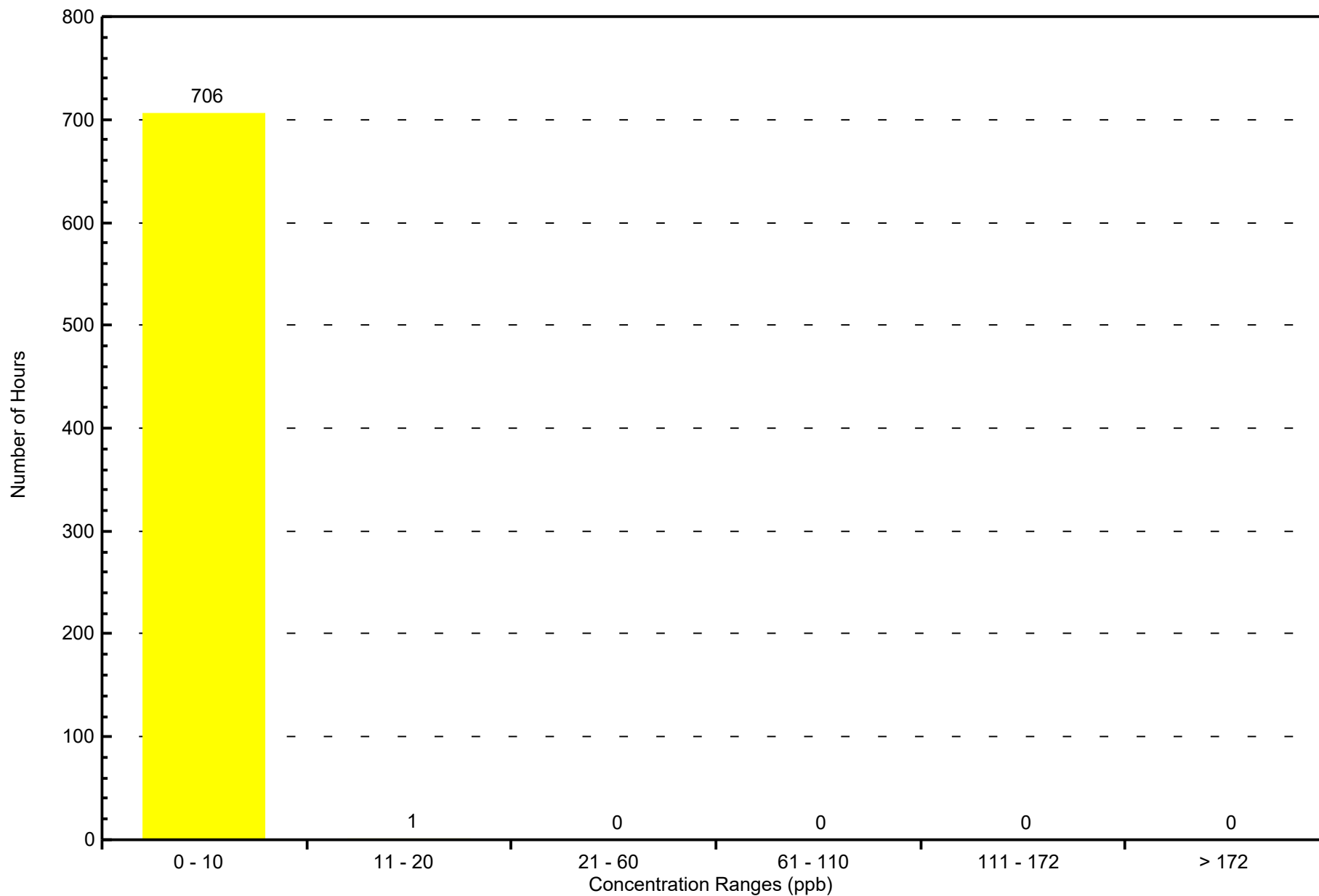
Sulphur Dioxide (SO₂) - ppb

Henry Pirker - July 2019



Histogram of Hourly Averages

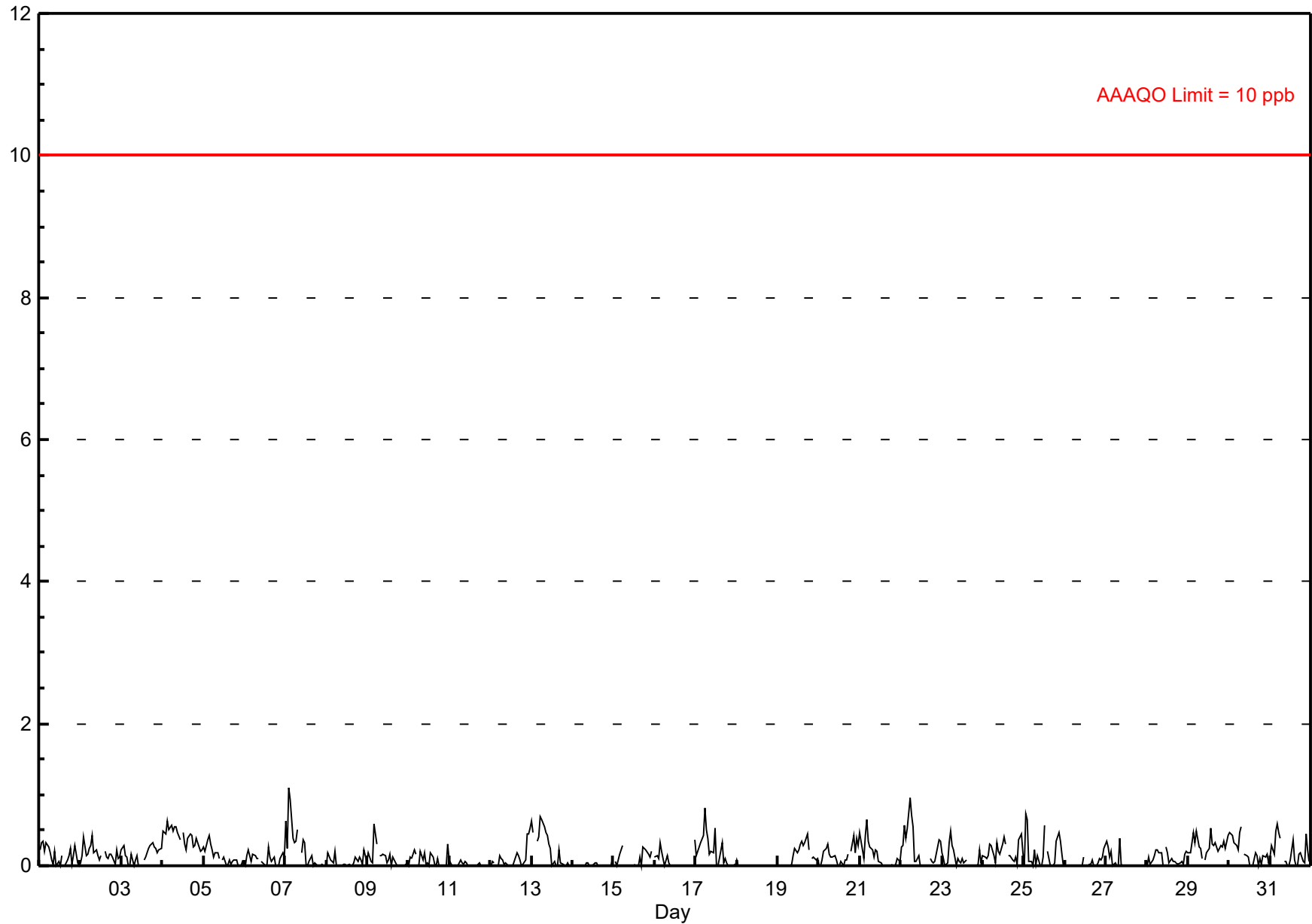
Sulphur Dioxide (SO₂) - ppb
Henry Pirker - July 2019



Hourly Averages

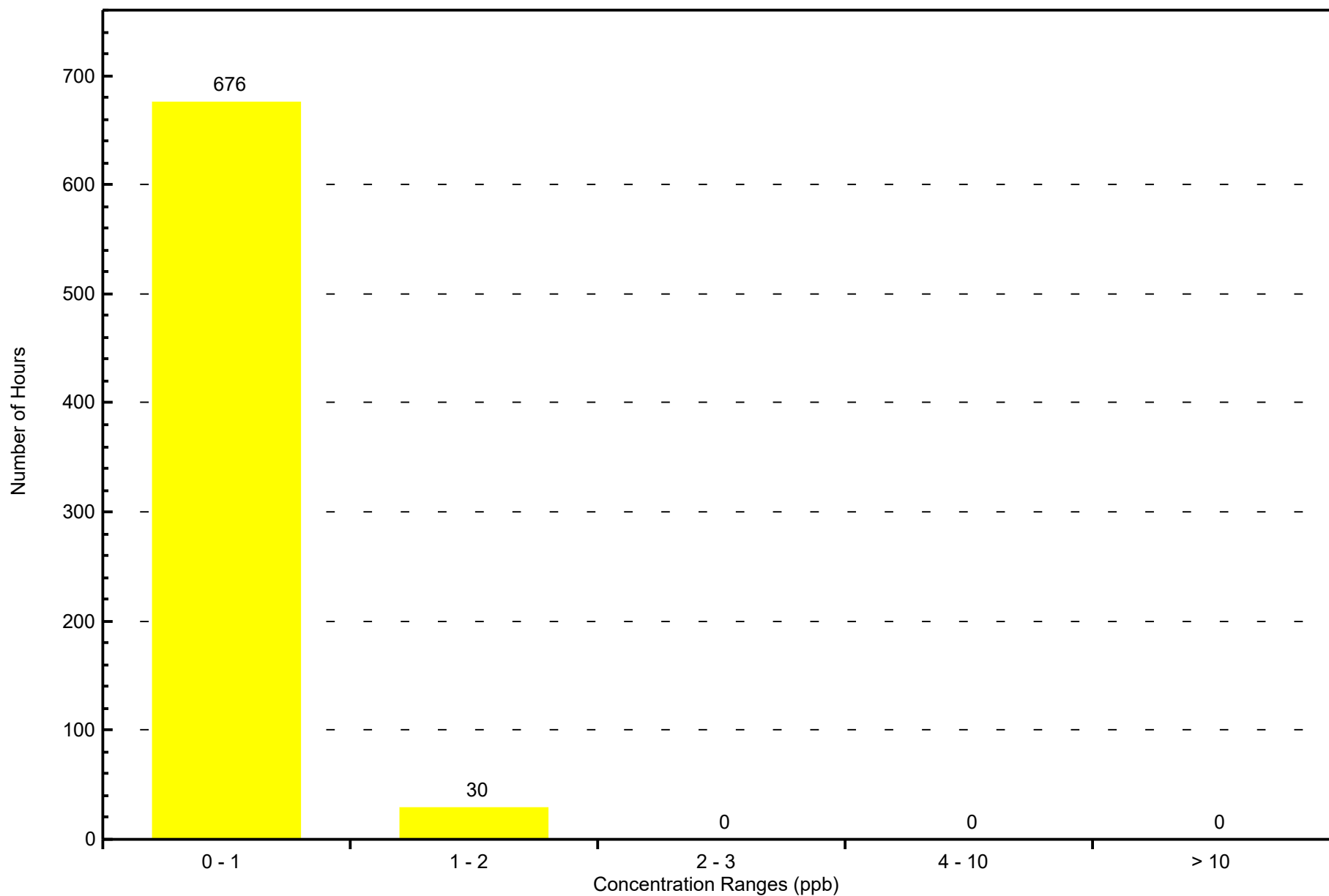
Hydrogen Sulphide (H₂S) - ppb

Henry Pirker - July 2019



Histogram of Hourly Averages

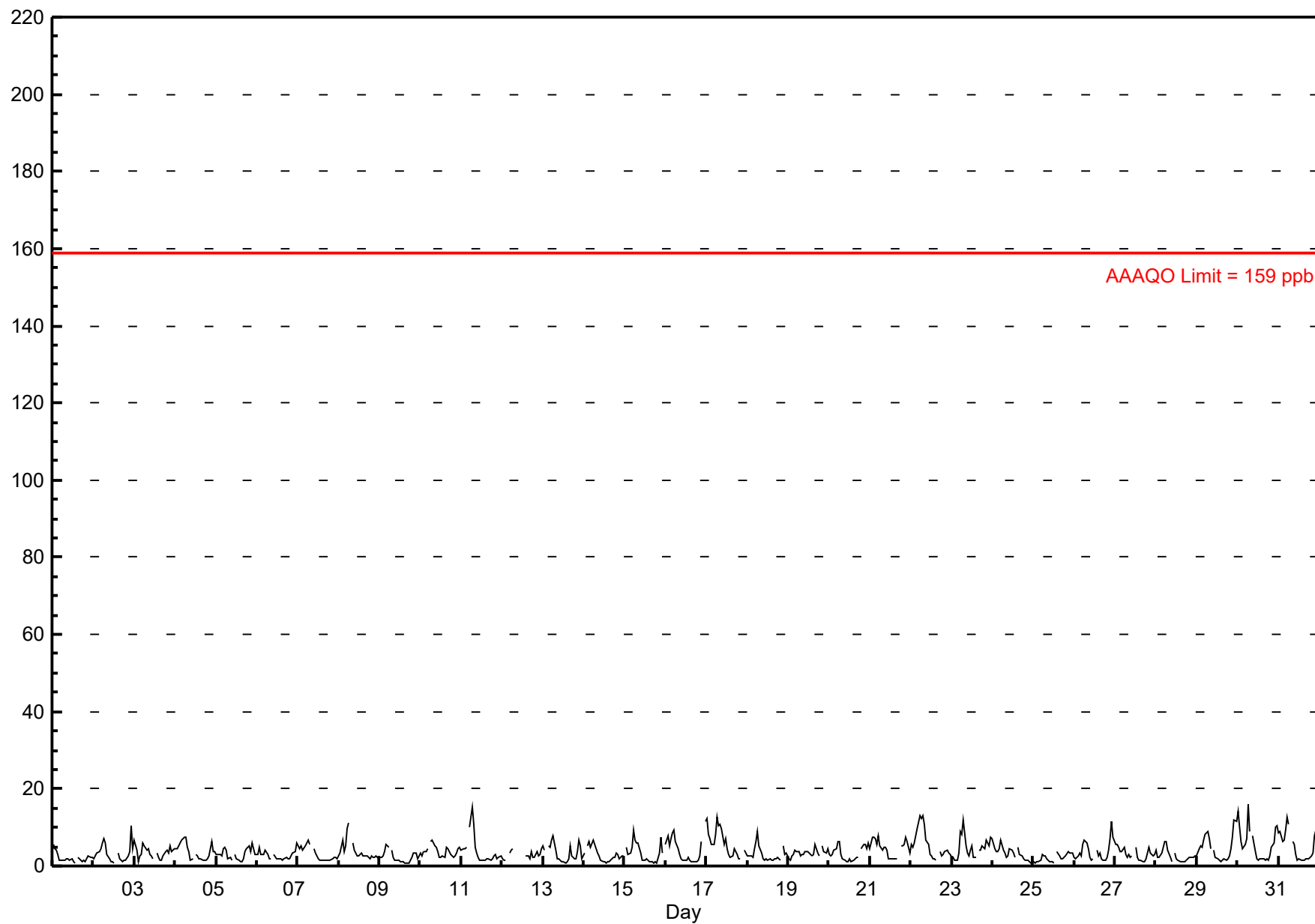
Hydrogen Sulphide (H₂S) - ppb
Henry Pirker - July 2019



Hourly Averages

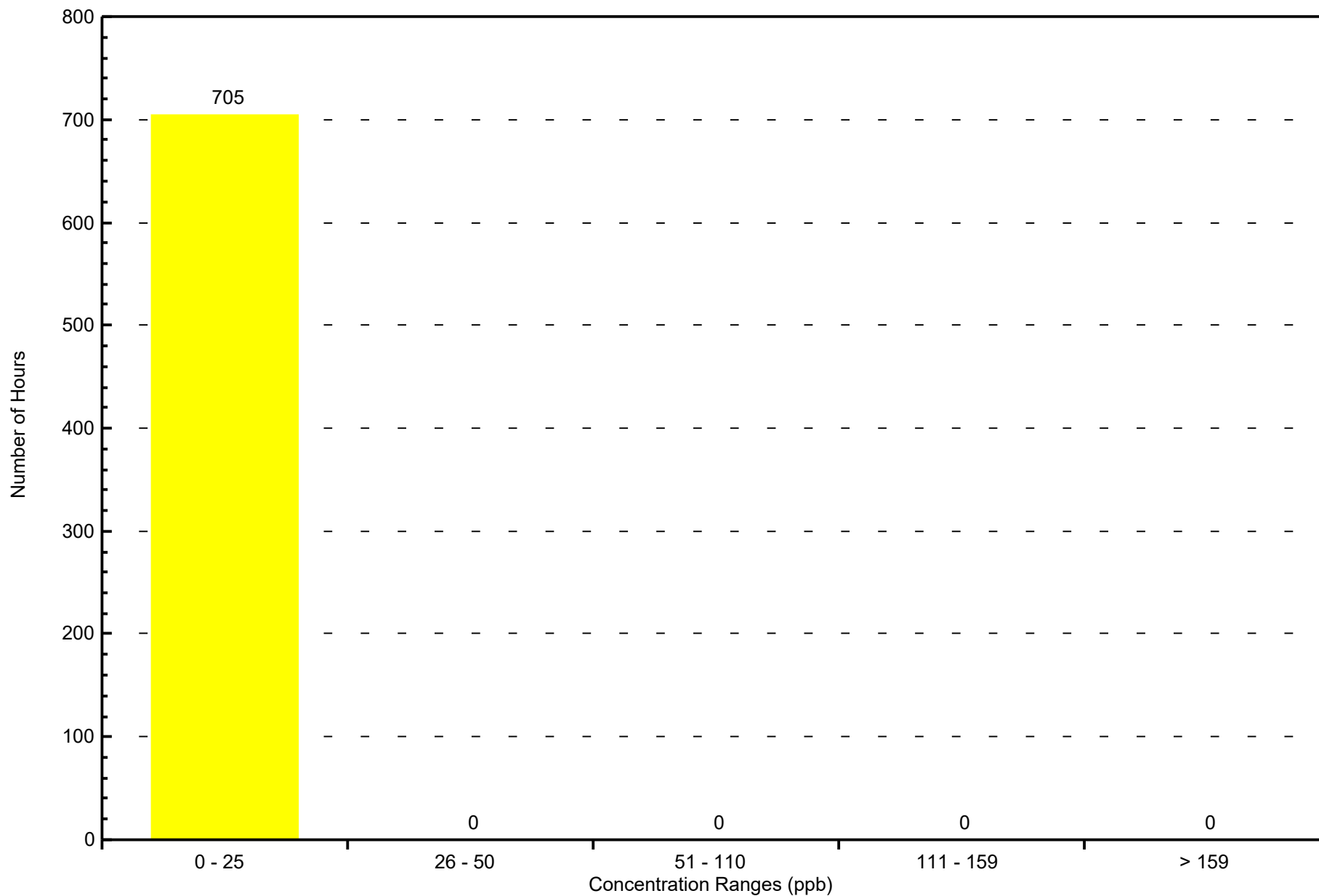
Nitrogen Dioxide (NO₂) - ppb

Henry Pirker - July 2019



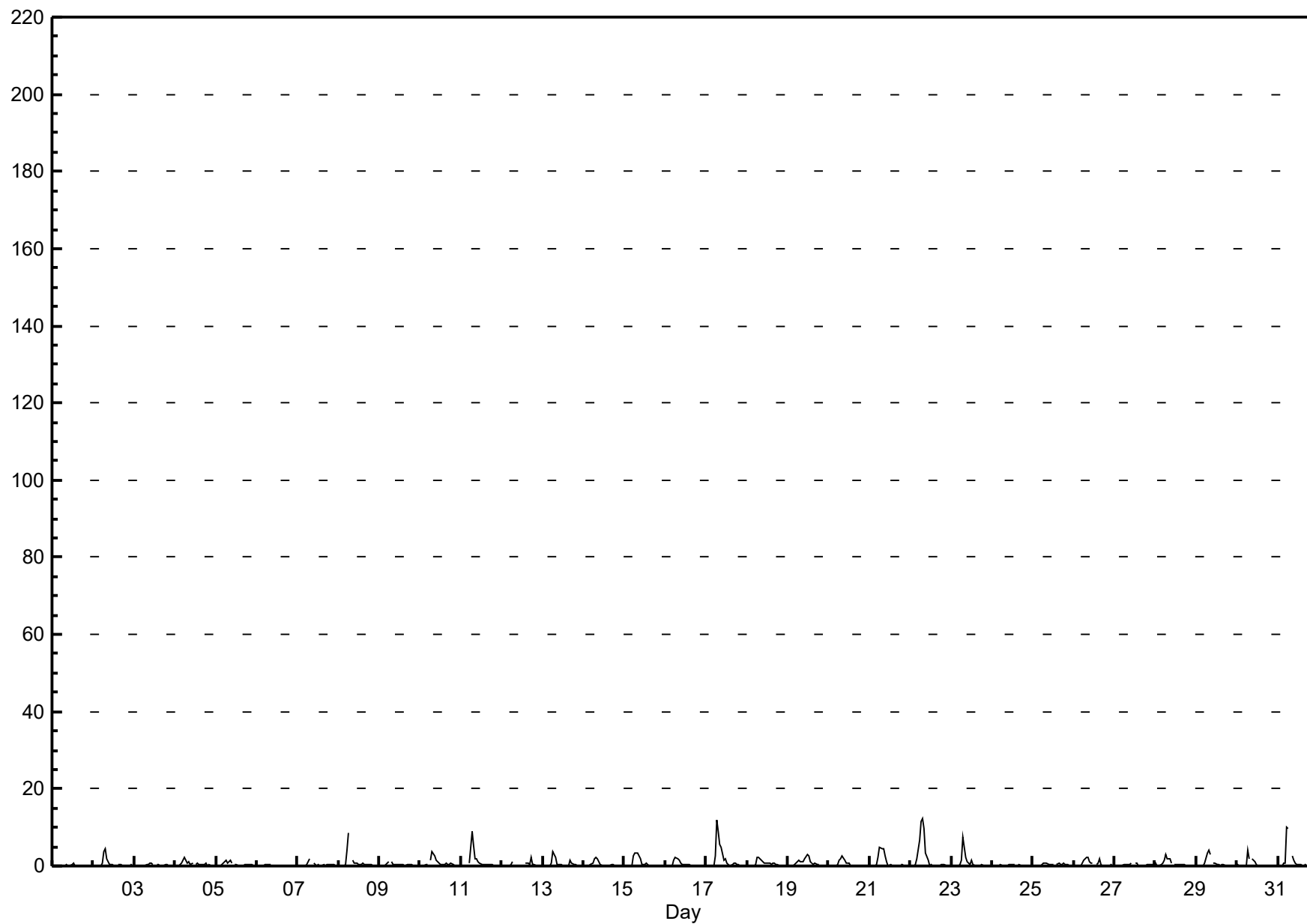
Histogram of Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Henry Pirker - July 2019



Hourly Averages

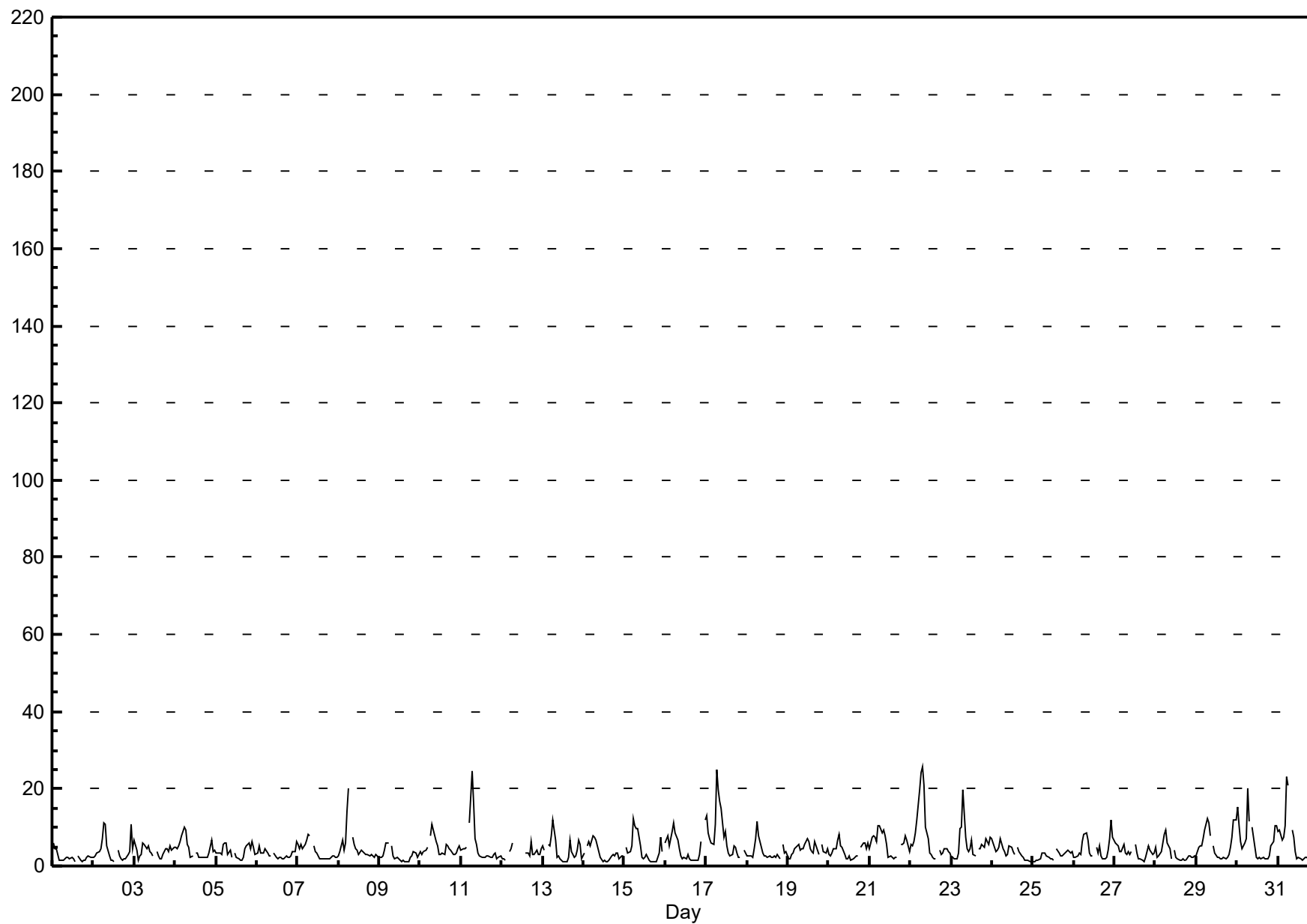
Nitrogen Oxide (NO) - ppb
Henry Pirker - July 2019



Hourly Averages

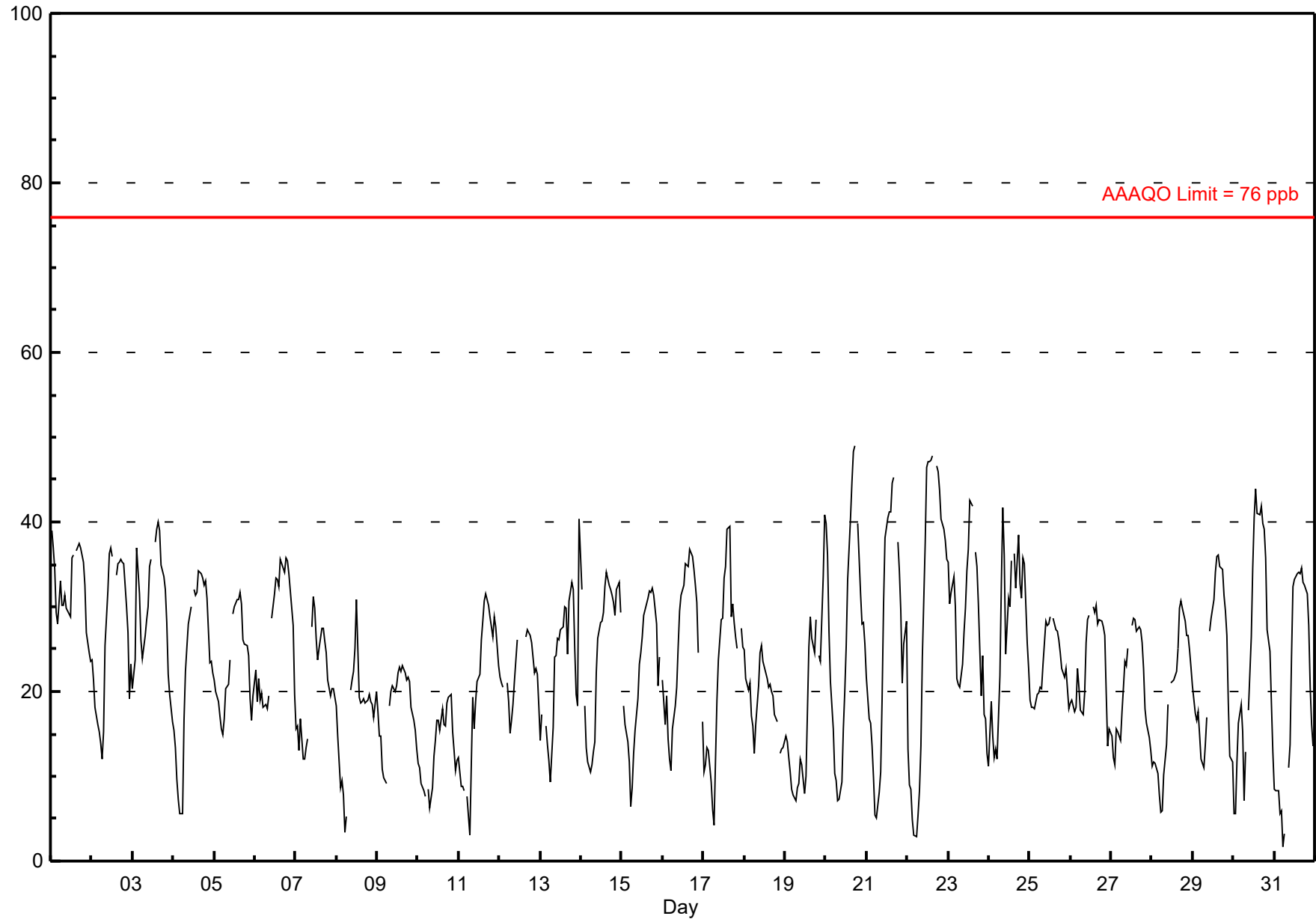
Oxides of Nitrogen (NO_x) - ppb

Henry Pirker - July 2019



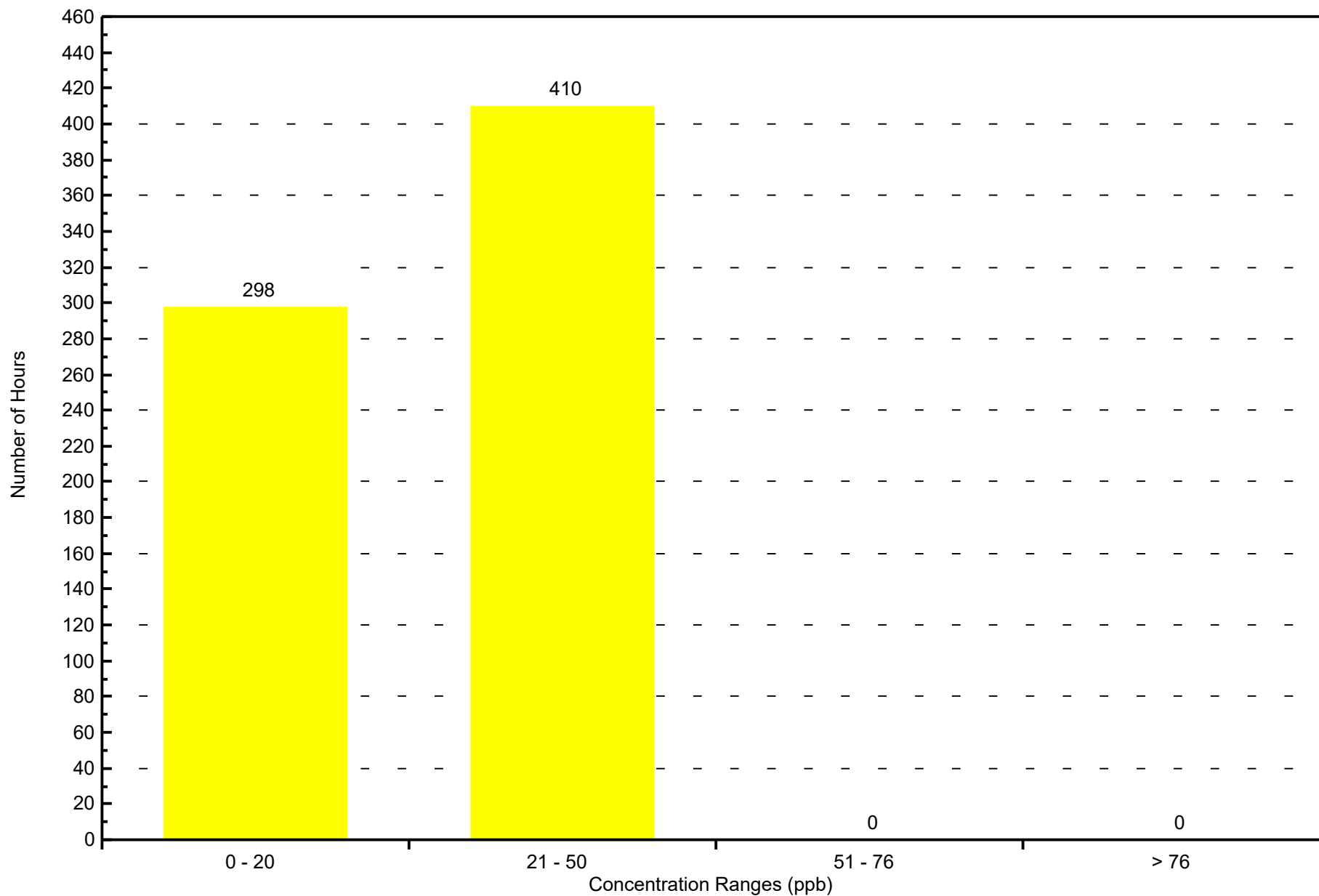
Hourly Averages

Ozone (O₃) - ppb
Henry Pirker - July 2019



Histogram of Hourly Averages

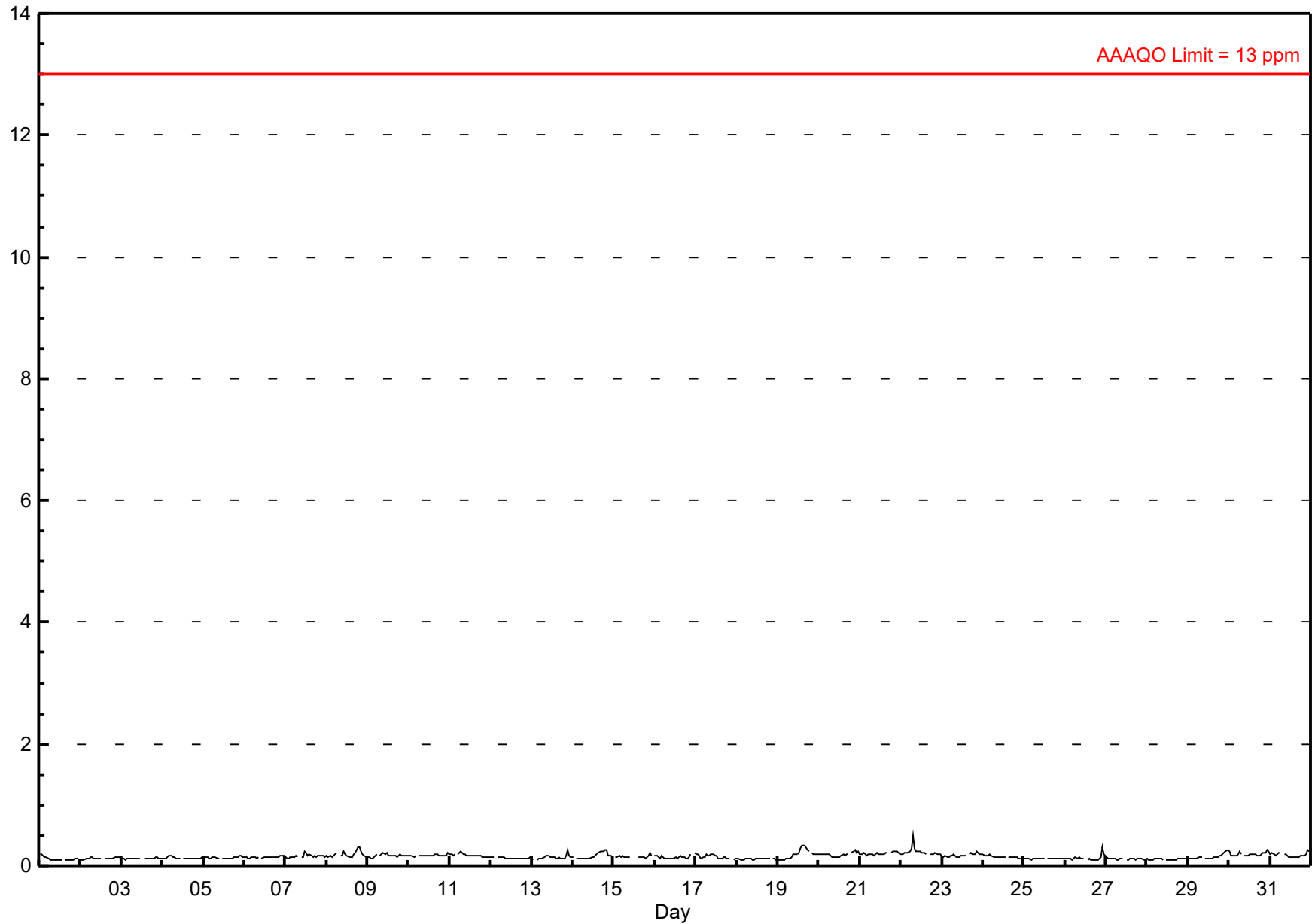
Ozone (O₃) - ppb
Henry Pirker - July 2019



Hourly Averages

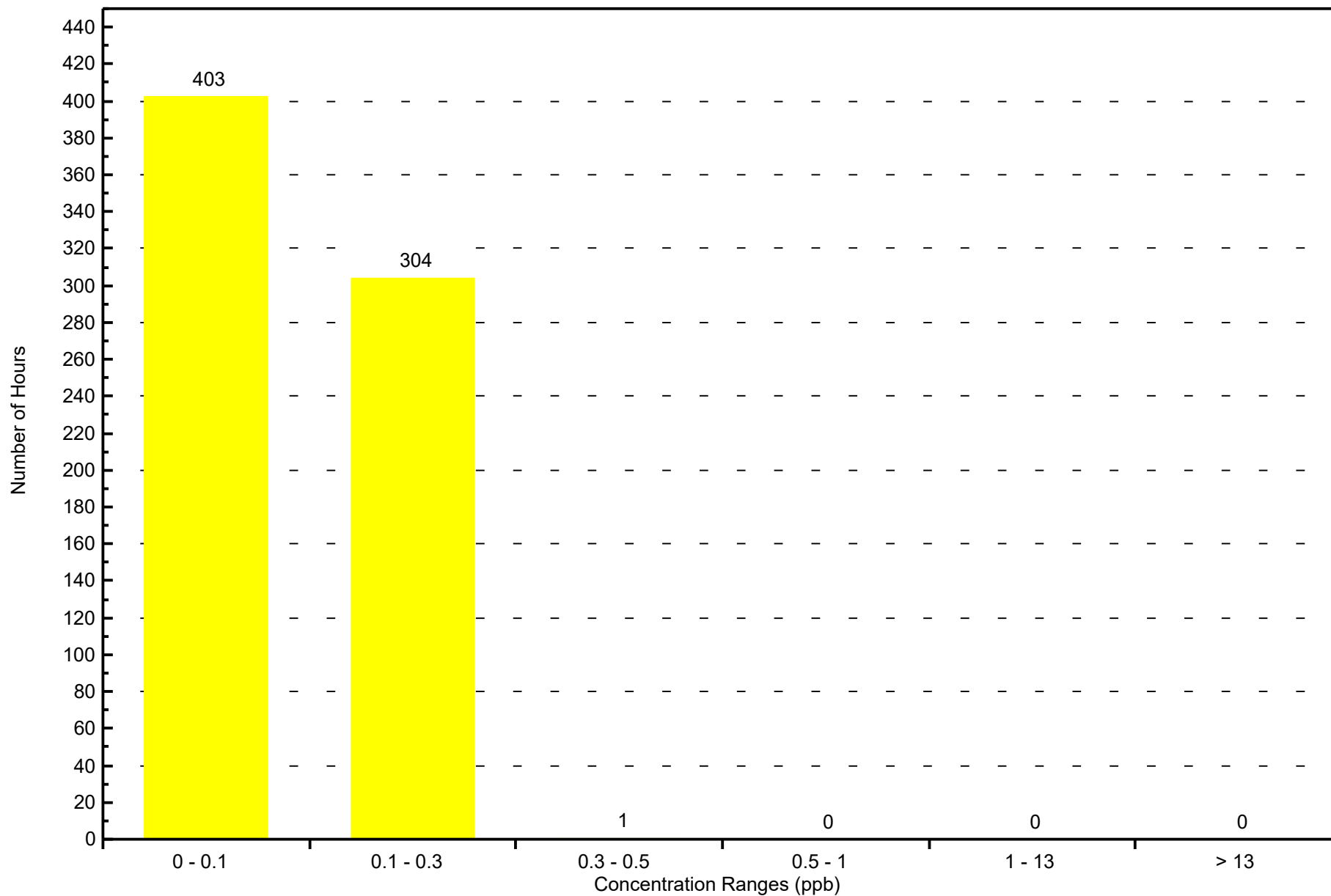
Carbon Monoxide (CO) - ppm

Henry Pirker - July 2019



Histogram of Hourly Averages

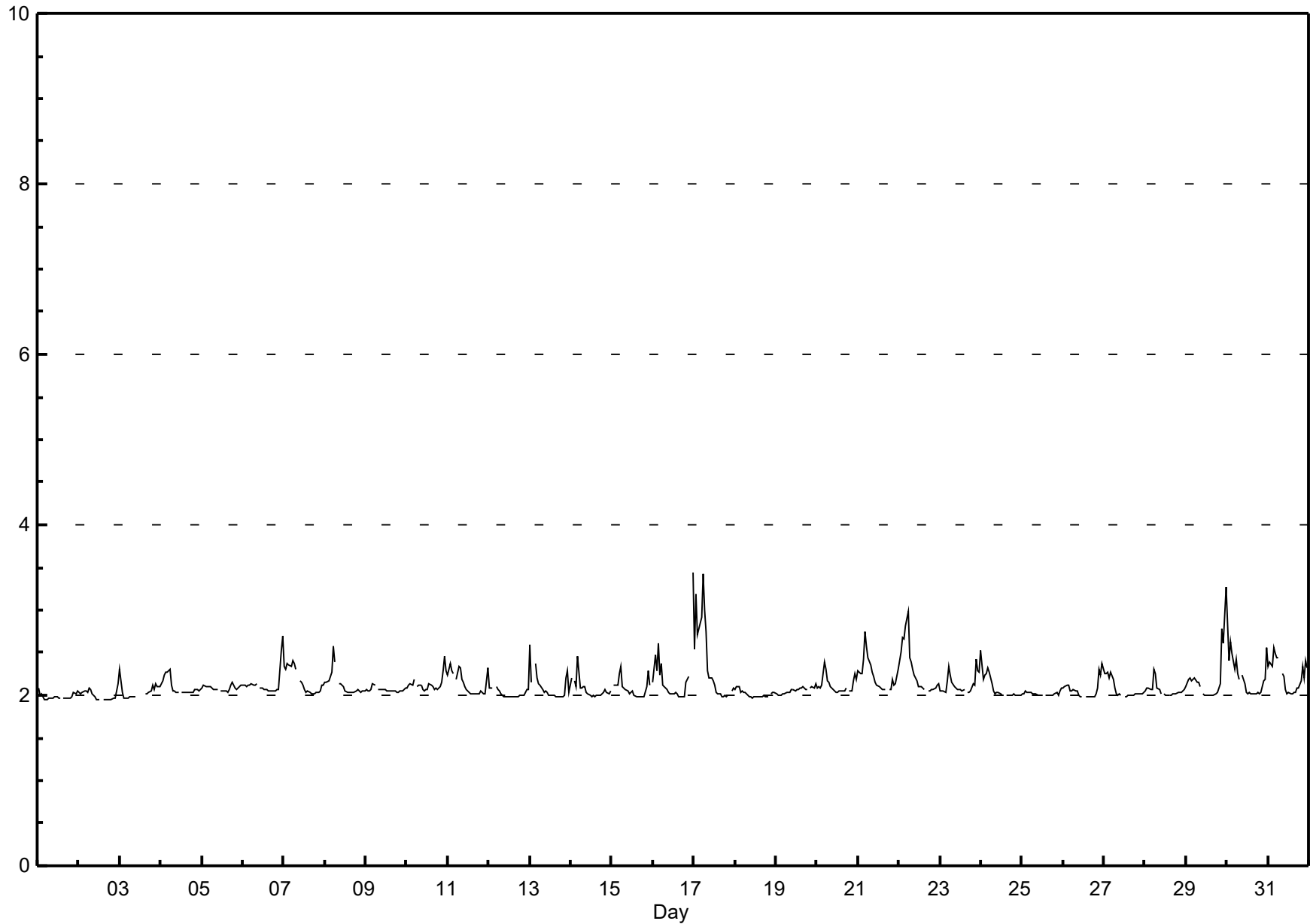
Carbon Monoxide (CO) - ppm
Henry Pirker - July 2019



Hourly Averages

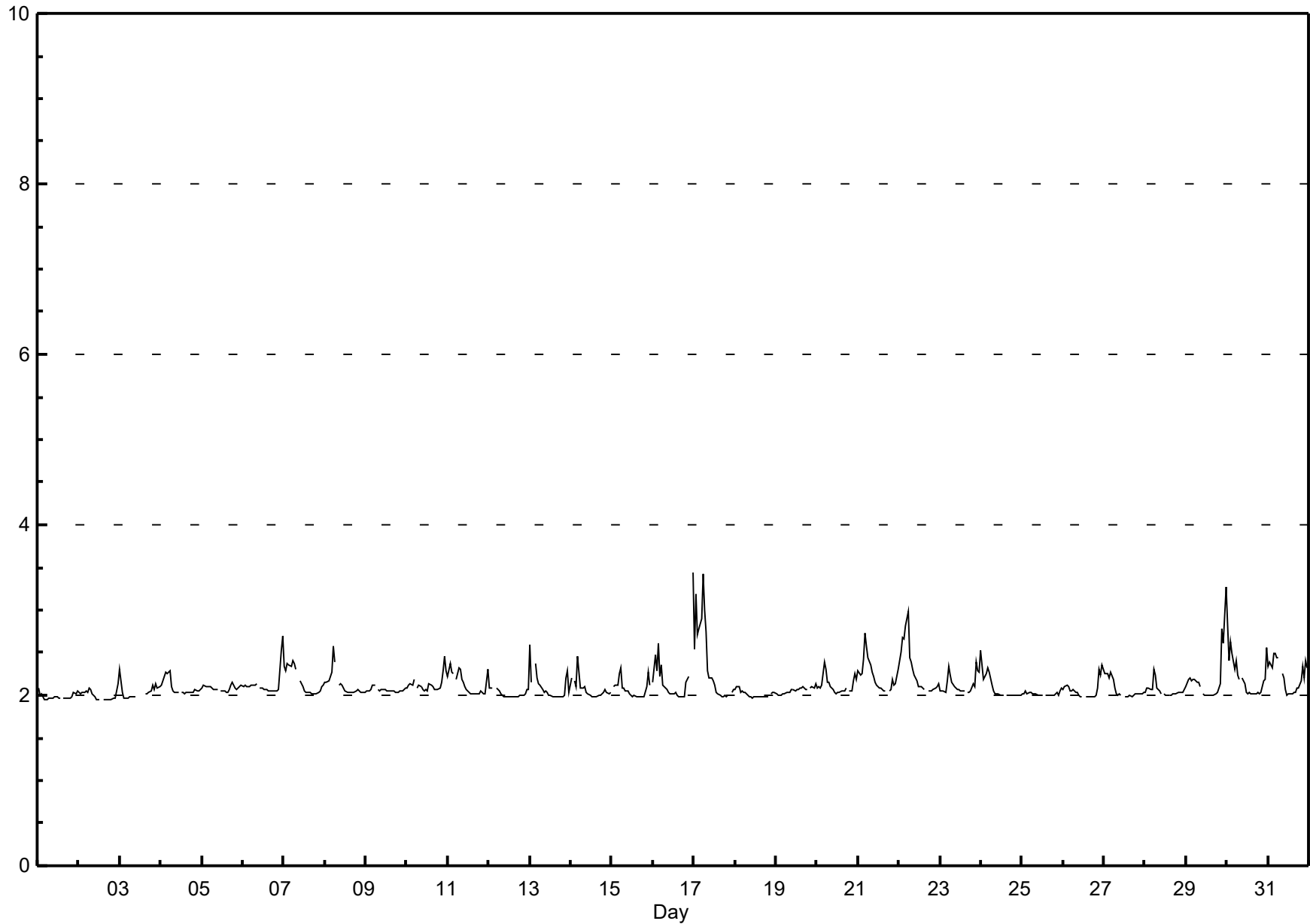
Total Hydrocarbons (THC) - ppm

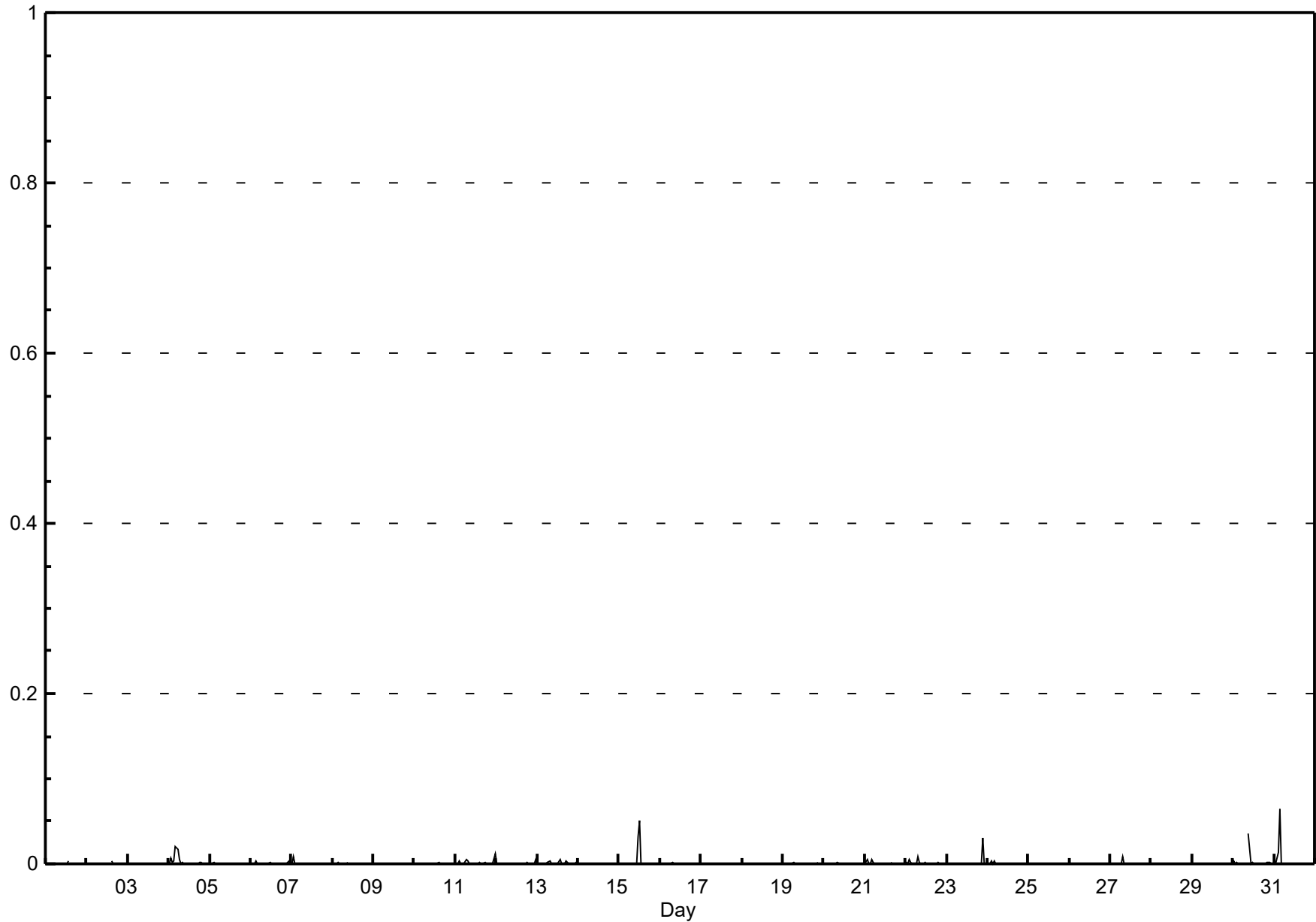
Henry Pirker - July 2019

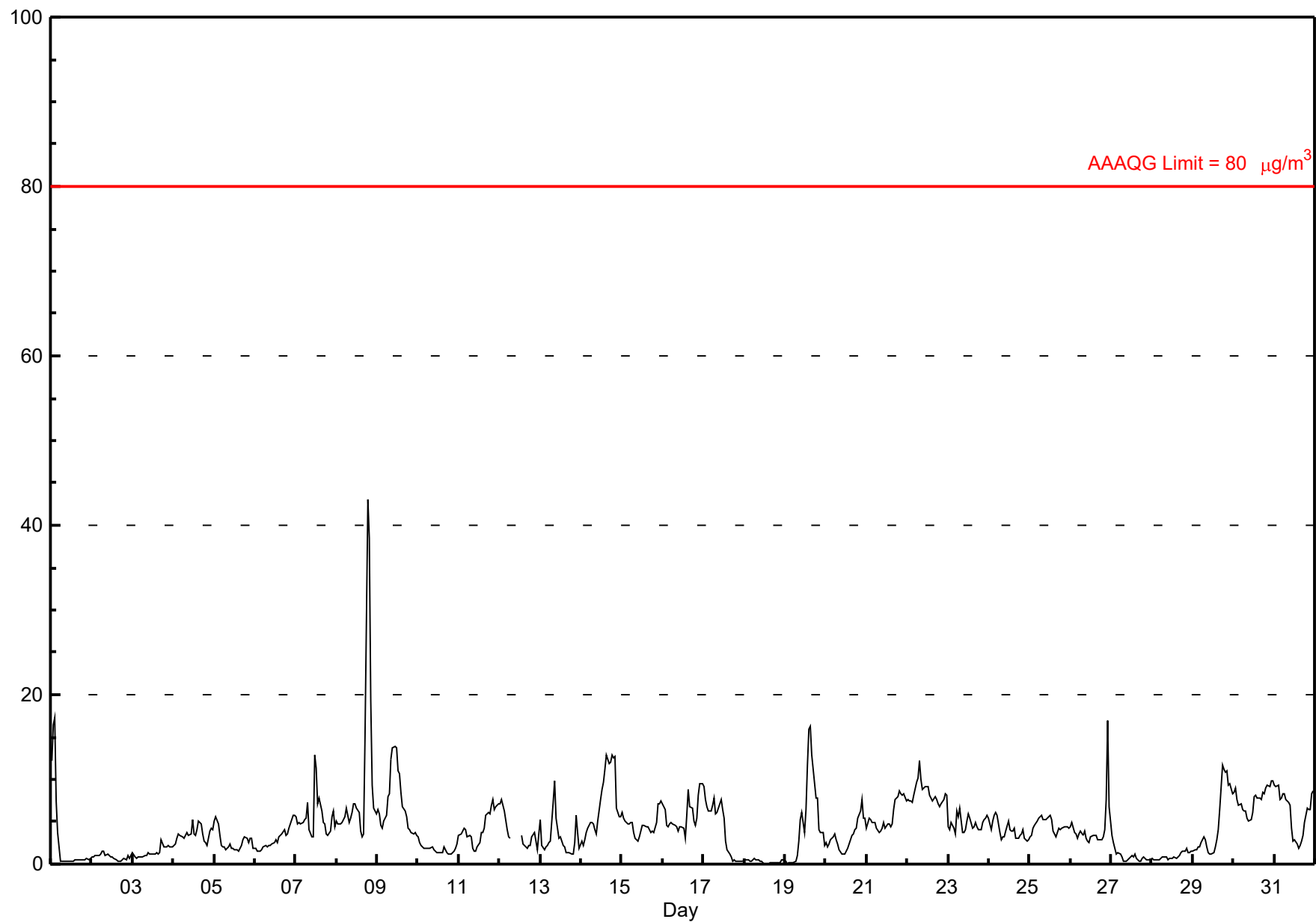


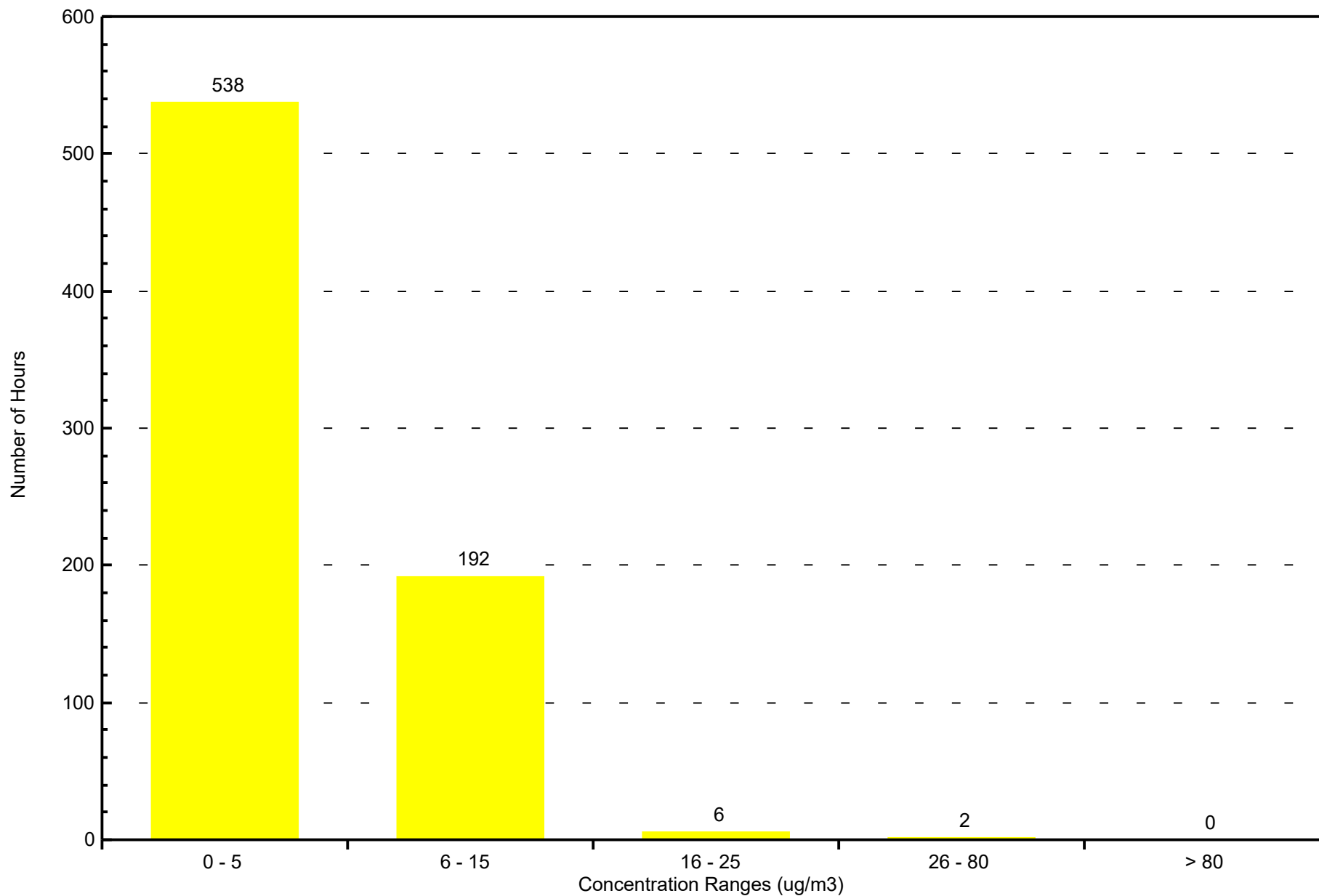
Hourly Averages

Methane (CH₄) - ppm
Henry Pirker - July 2019





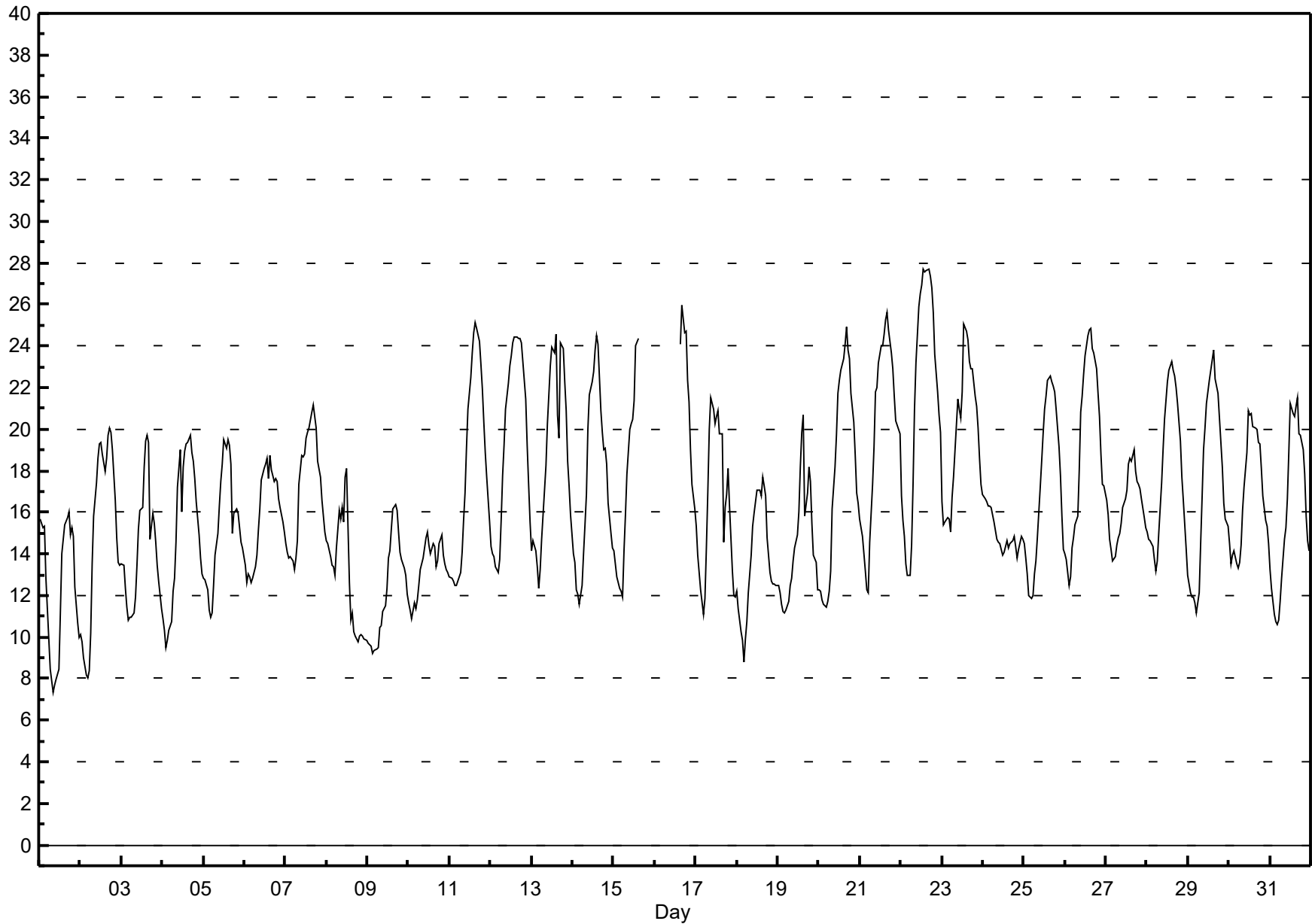




Hourly Averages

External Temperature (ET) - °C

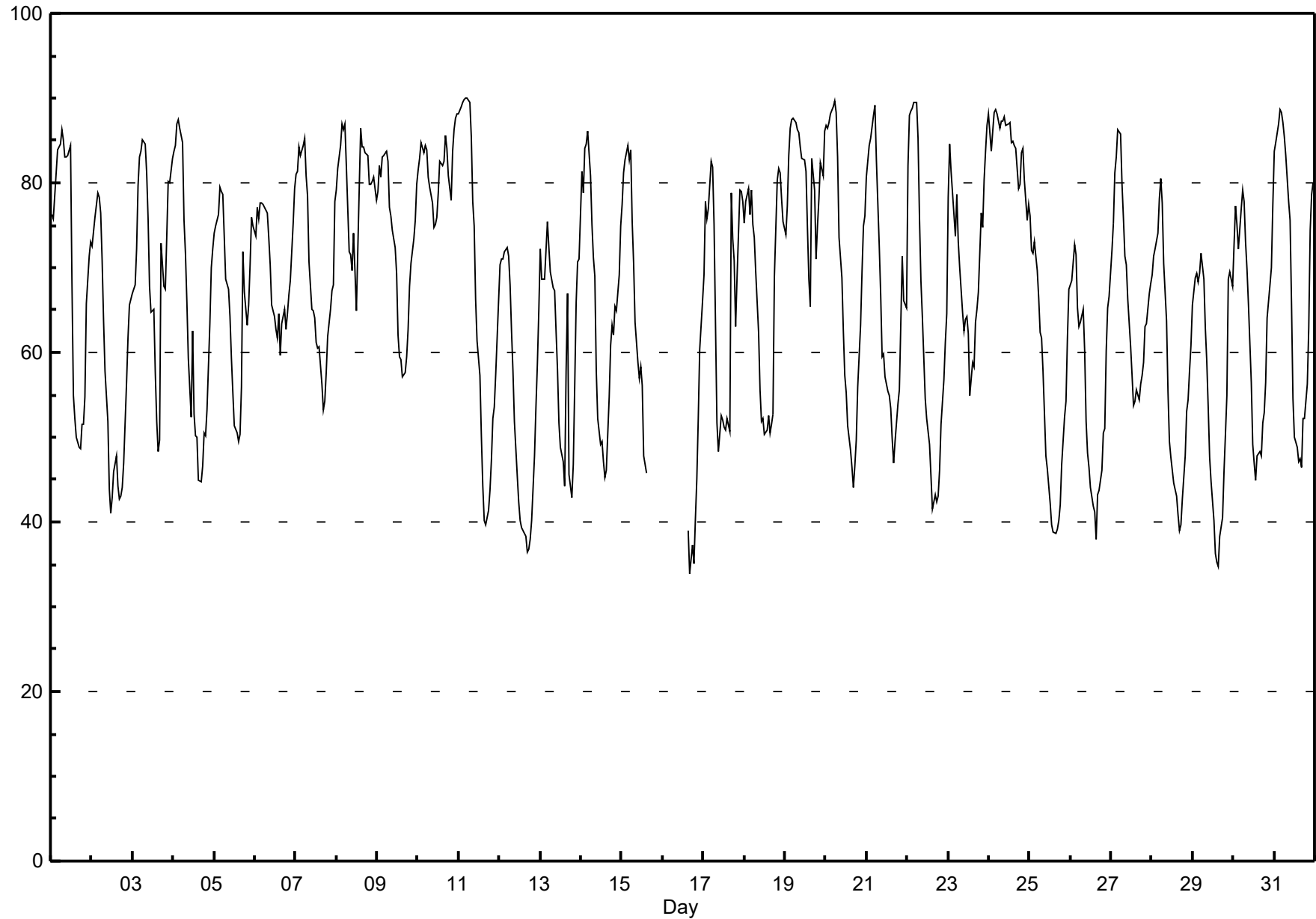
Henry Pirker - July 2019



Hourly Averages

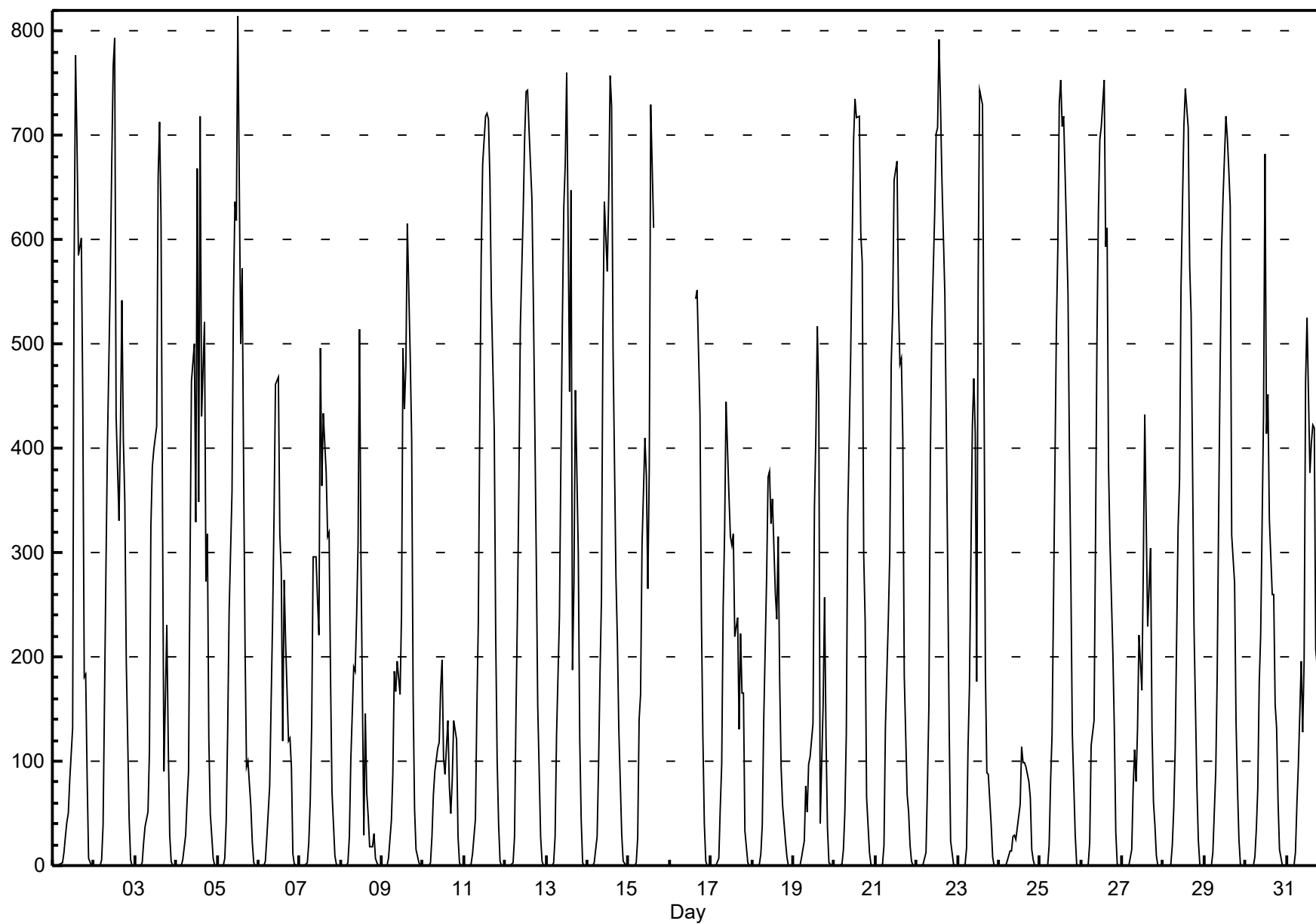
Relative Humidity (RH) - %

Henry Pirker - July 2019



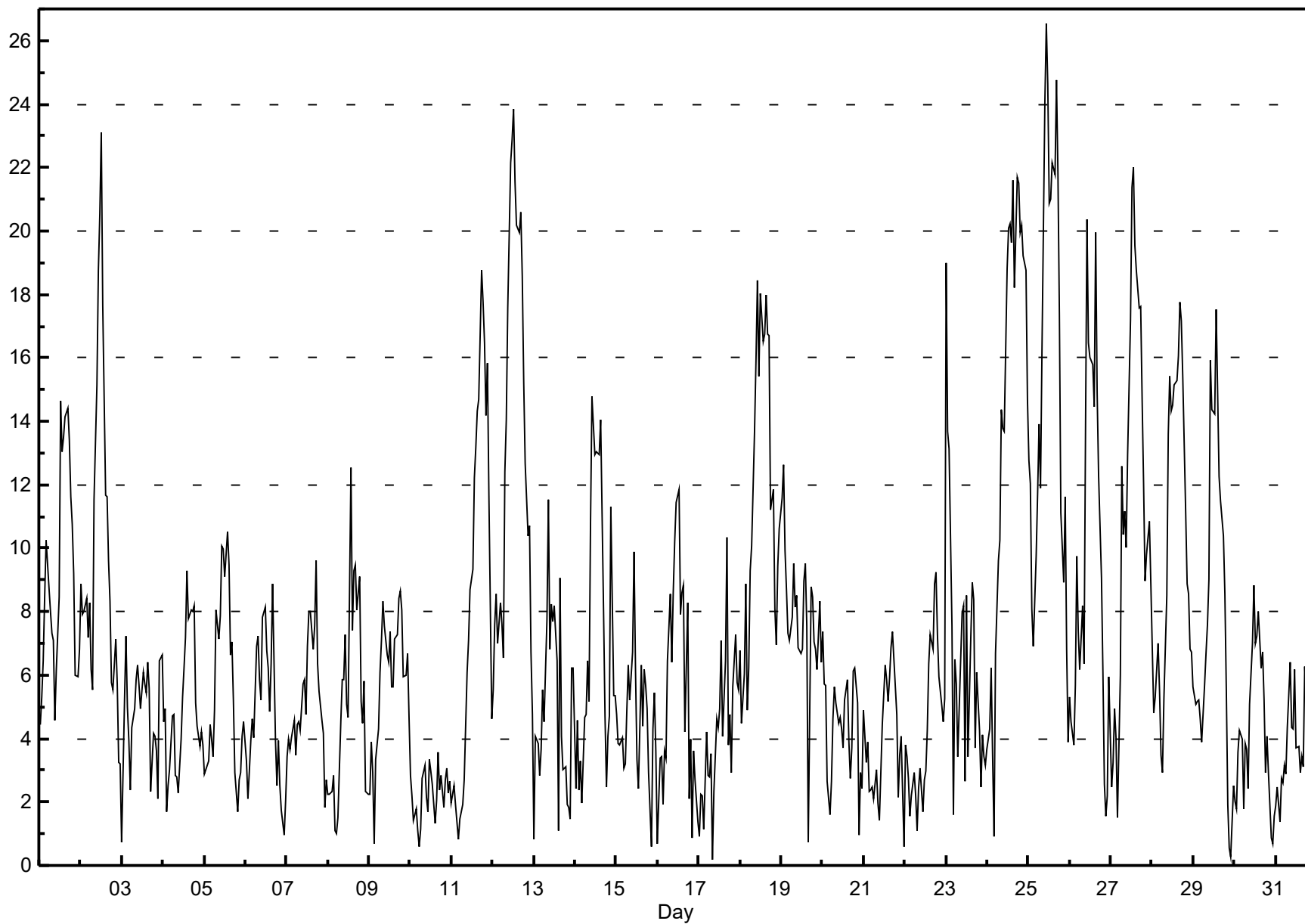
Hourly Averages

Solar Radiation (SR) - W/m²
Henry Pirker - July 2019



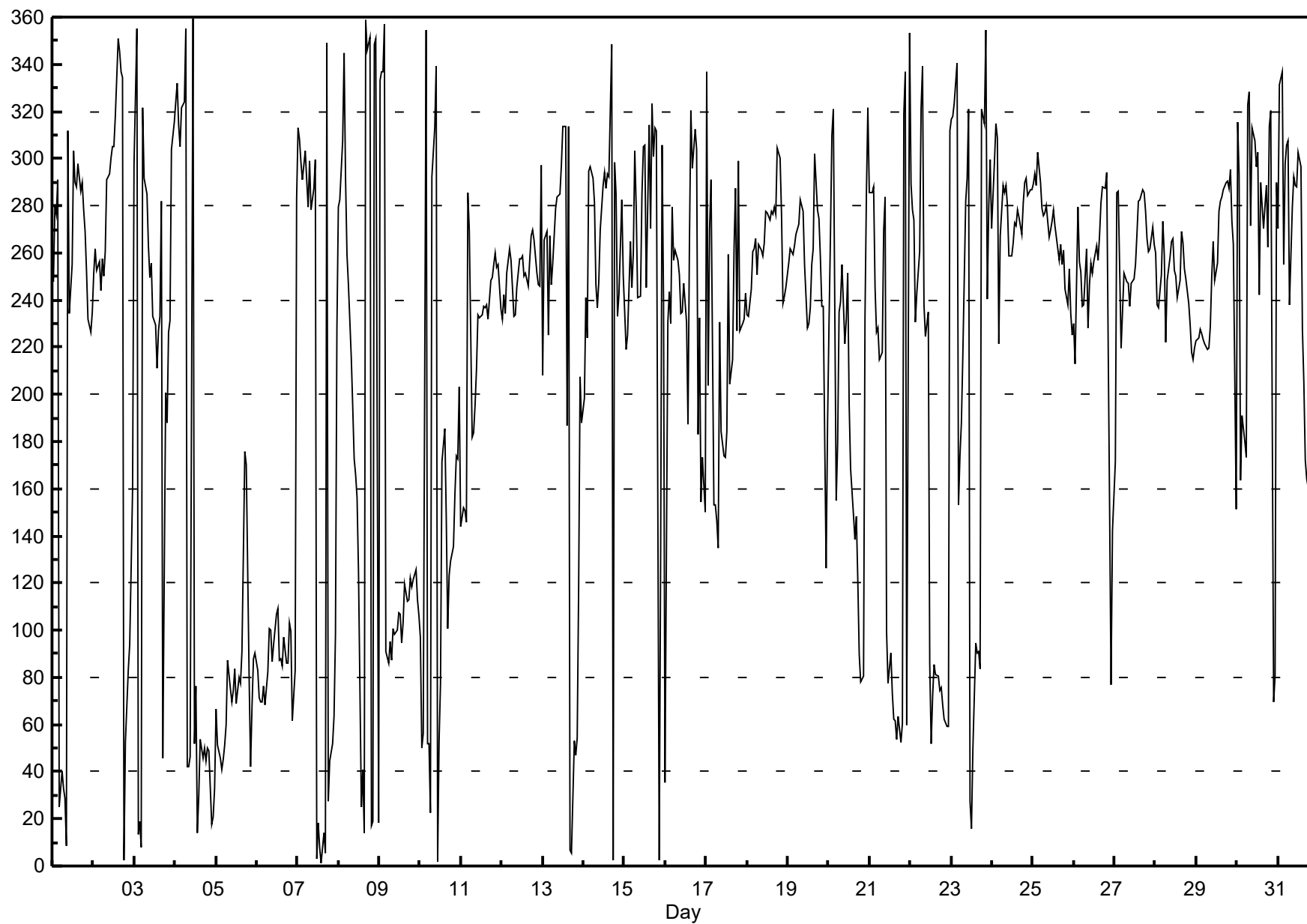
Hourly Averages

Wind Speed (WS) - km/h
Henry Pirker - July 2019



Hourly Averages

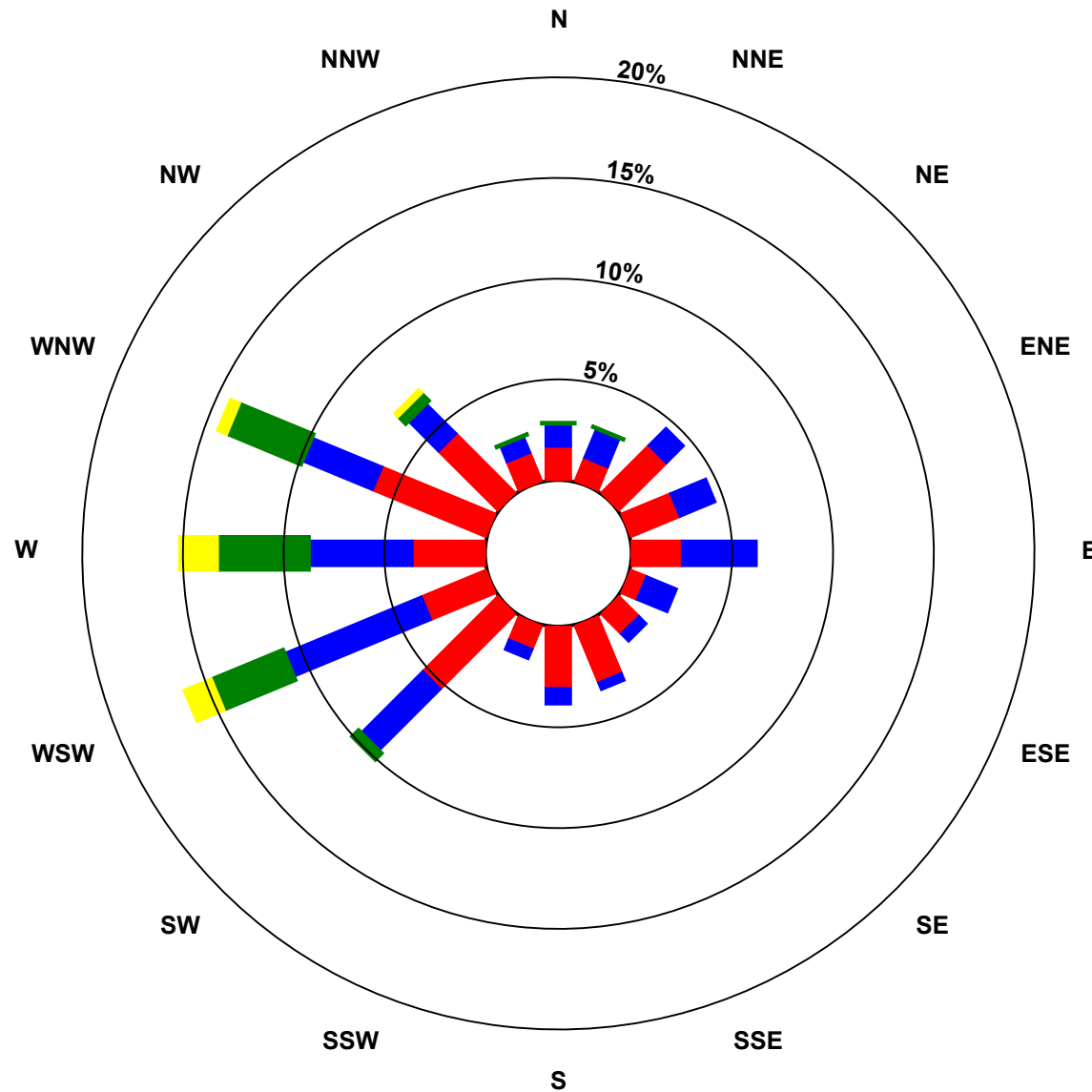
Wind Direction (WD) - deg
Henry Pirker - July 2019



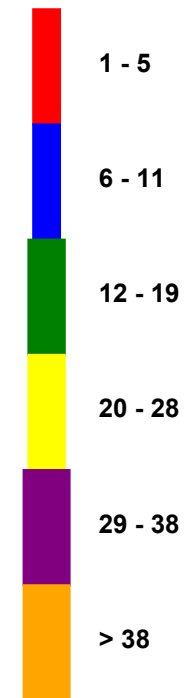
Wind Rose

Wind Speed (WS) (km/h)

Henry Pirker - July 2019

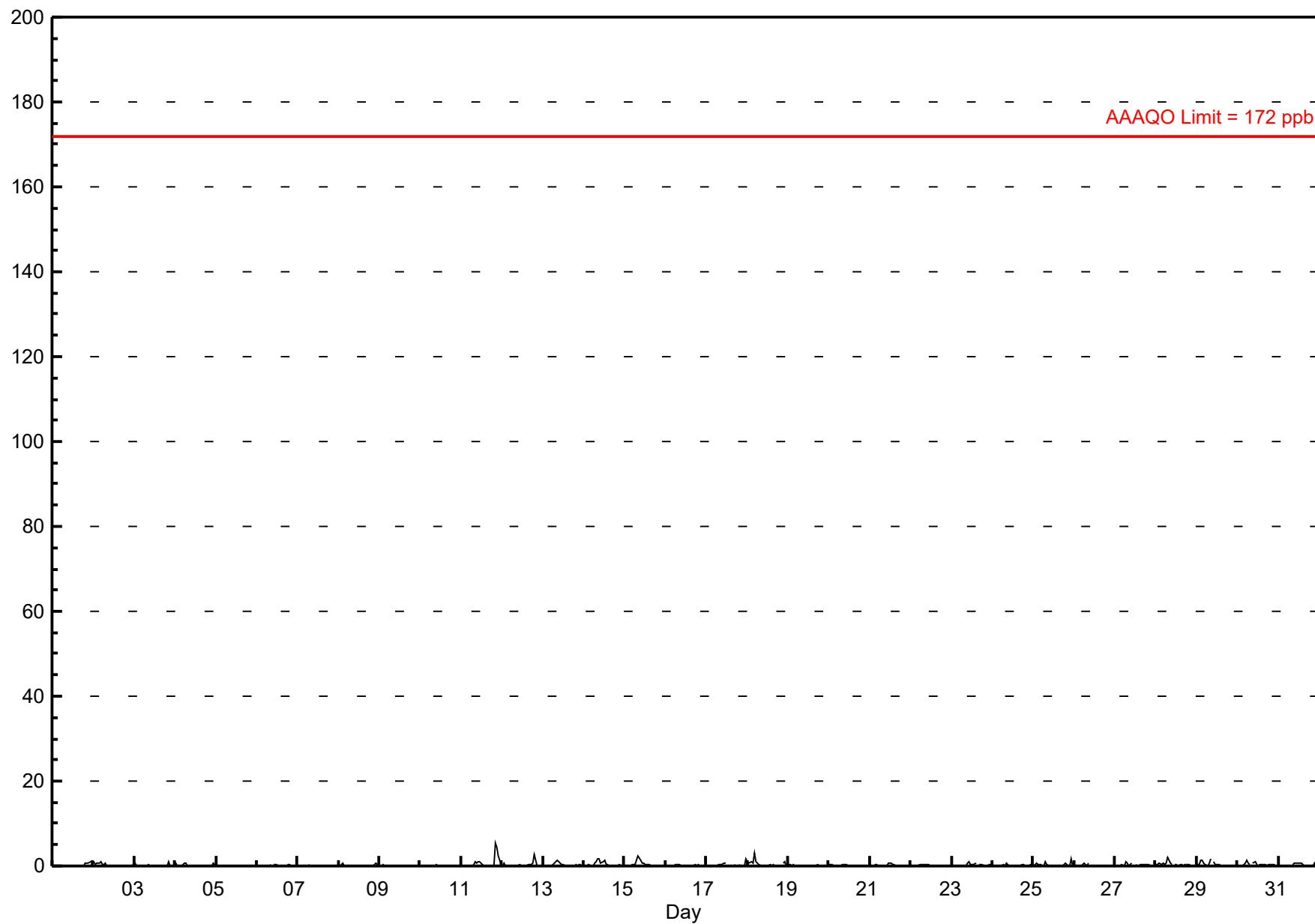


Wind Speed Classes (km/h)



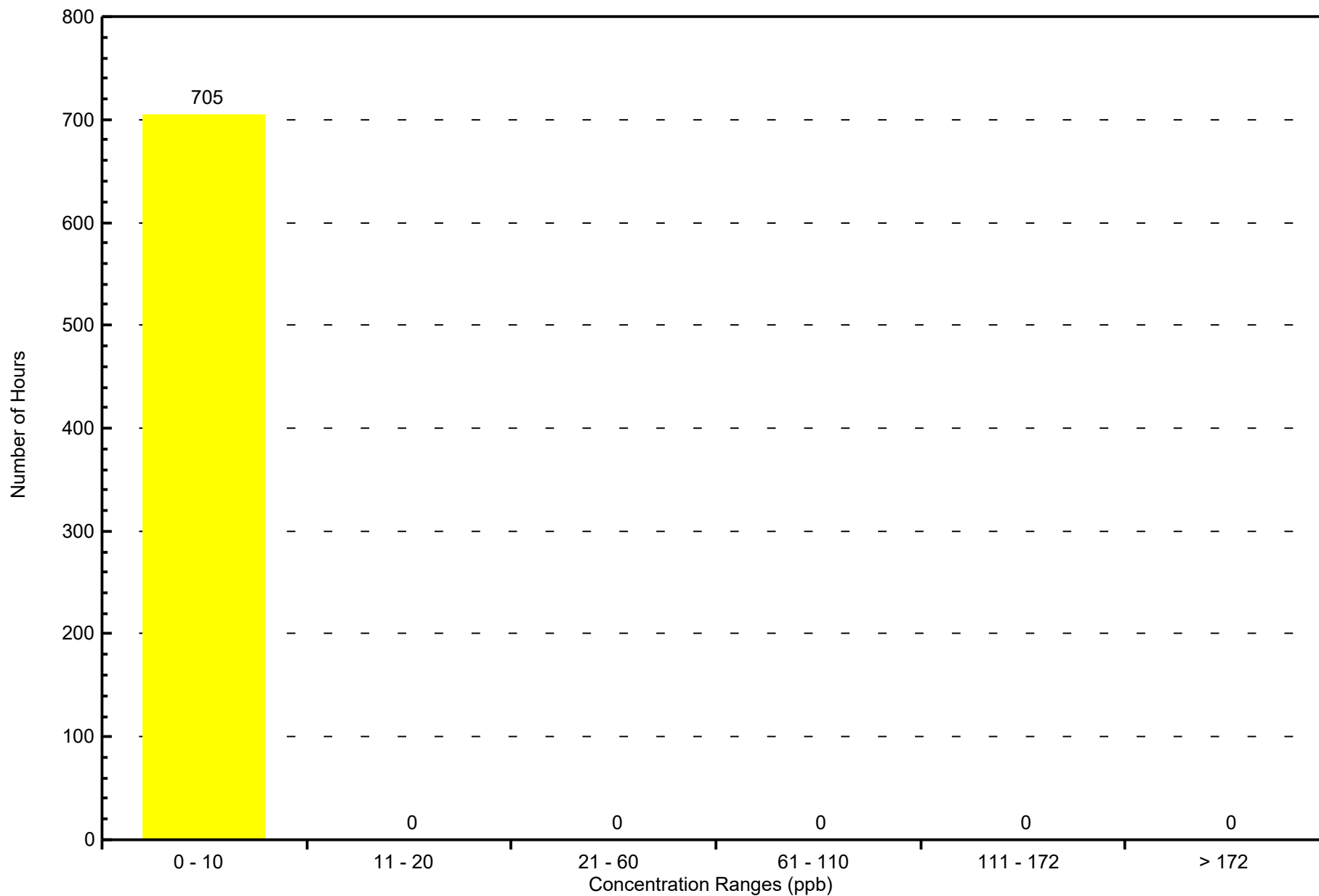
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Smoky Heights - July 2019



Histogram of Hourly Averages

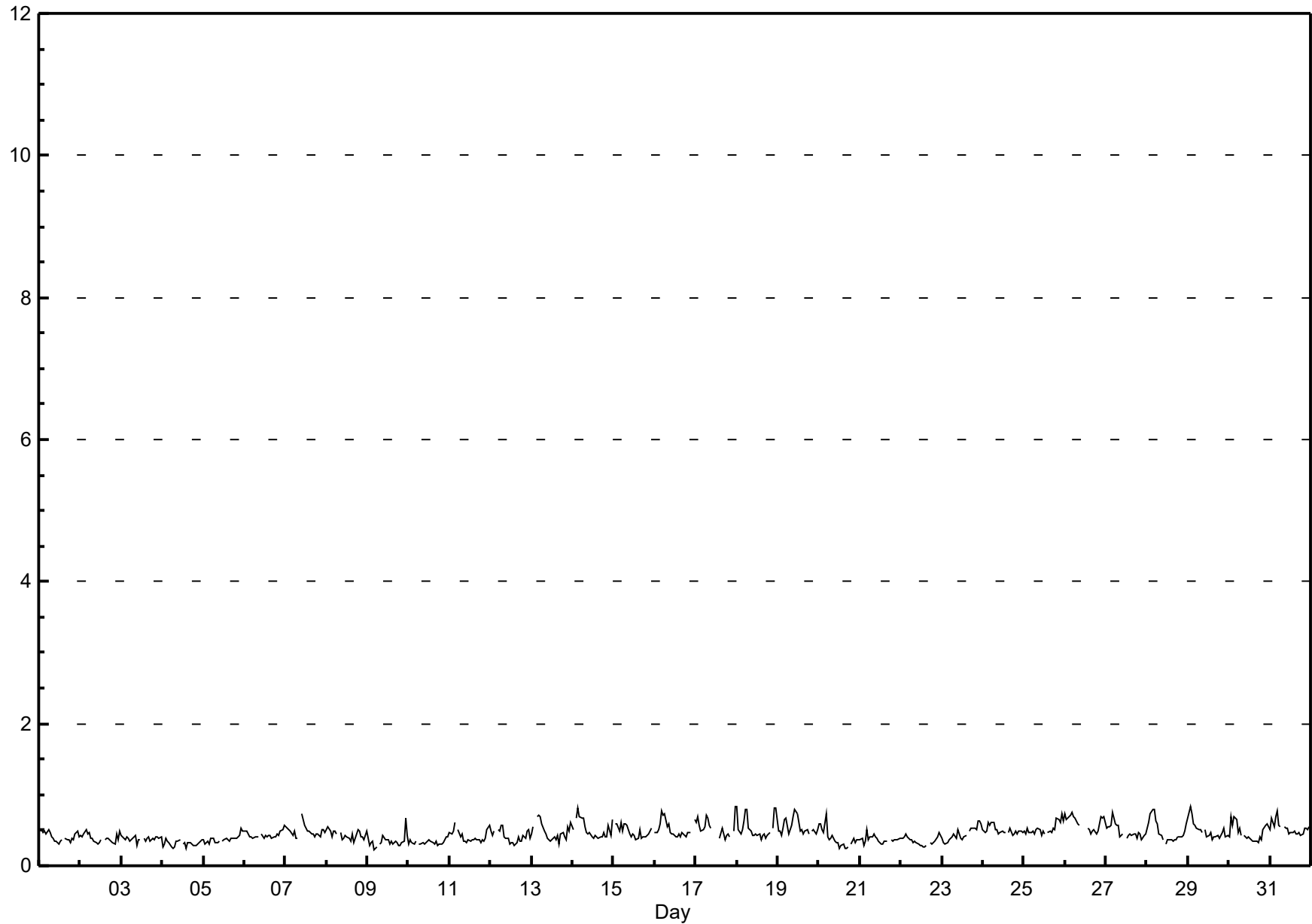
Sulphur Dioxide (SO₂) - ppb
Smoky Heights - July 2019



Hourly Averages

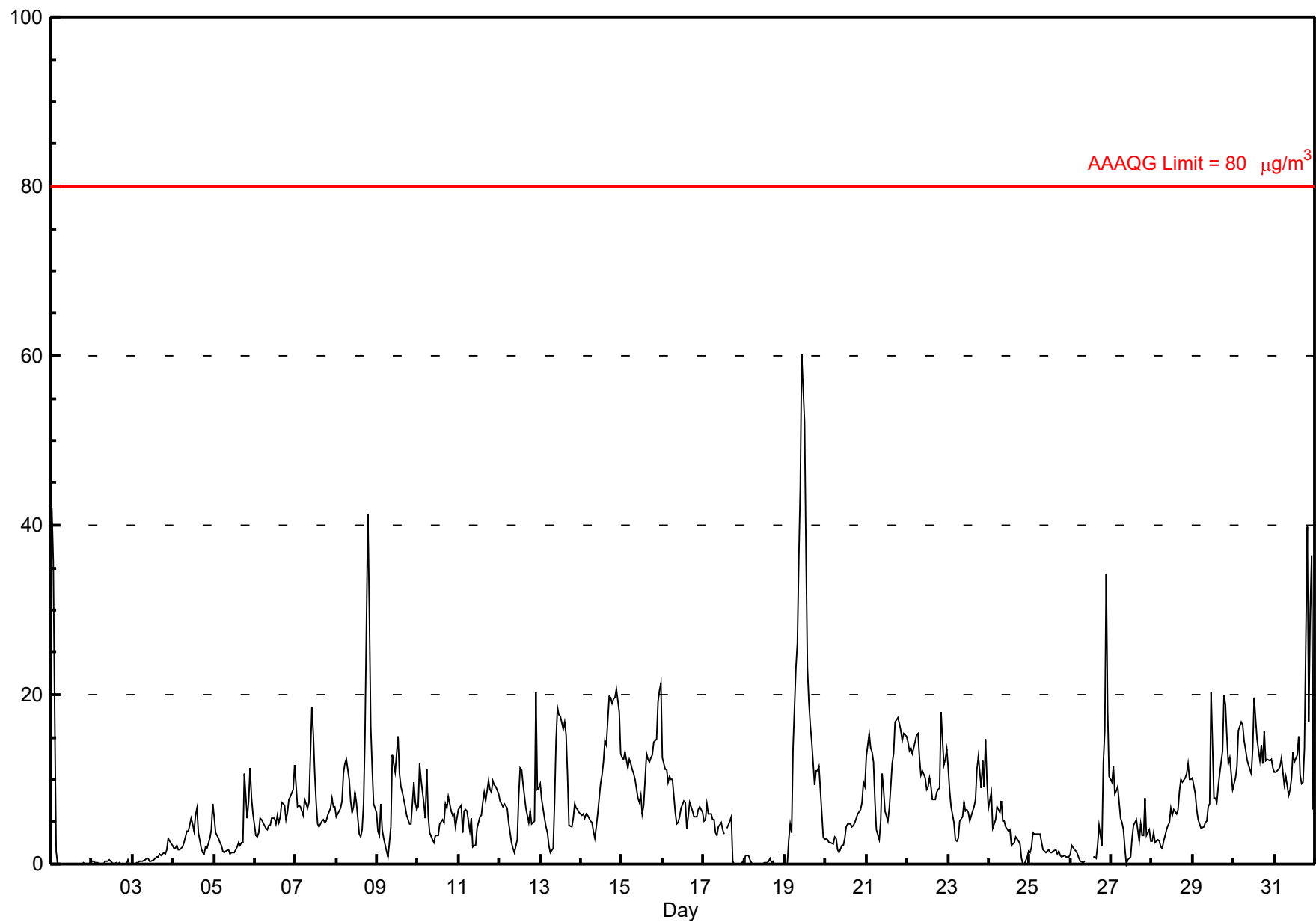
Total Reduced Sulphur (TRS) - ppb

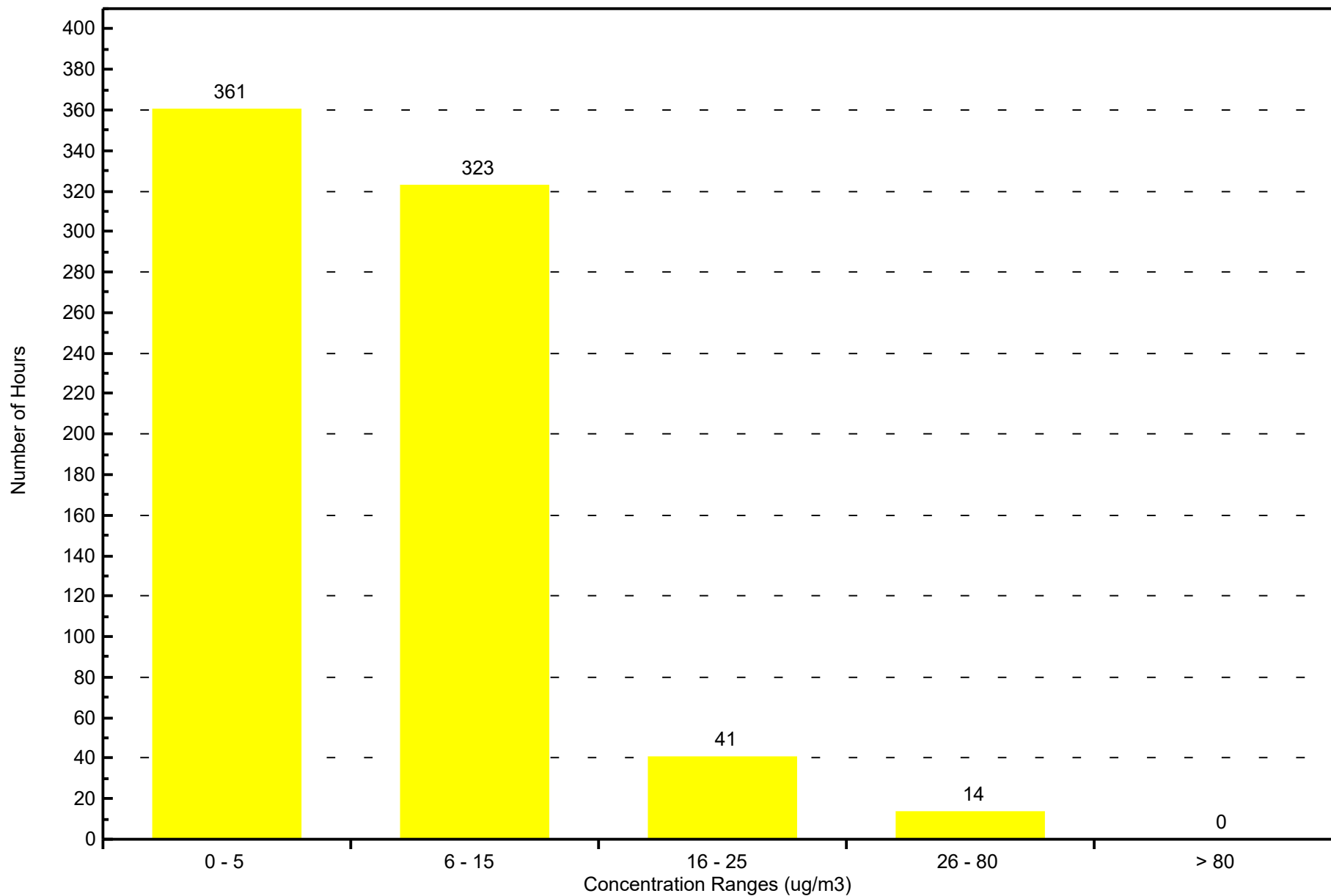
Smoky Heights - July 2019



Hourly Averages

Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Smoky Heights - July 2019

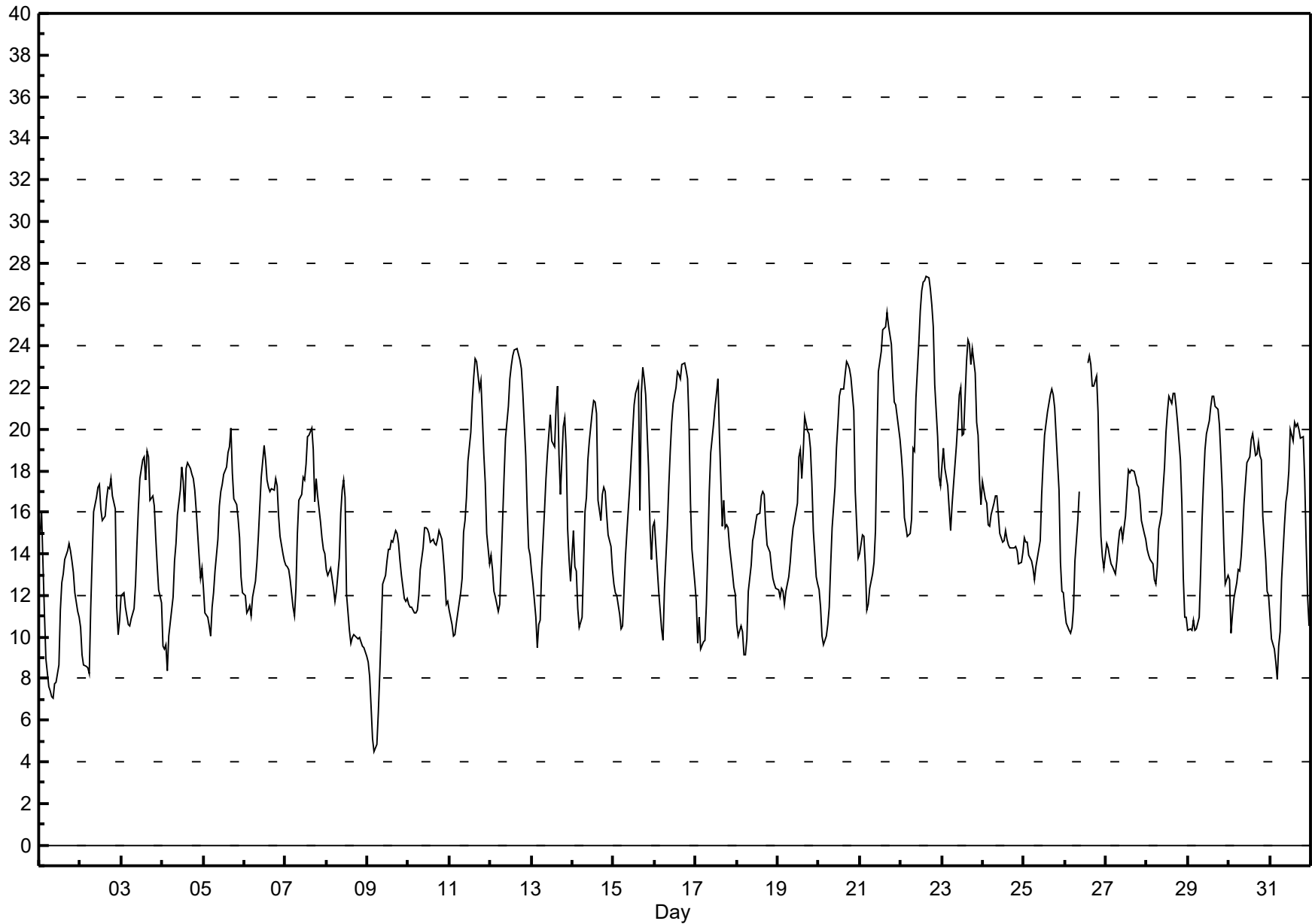




Hourly Averages

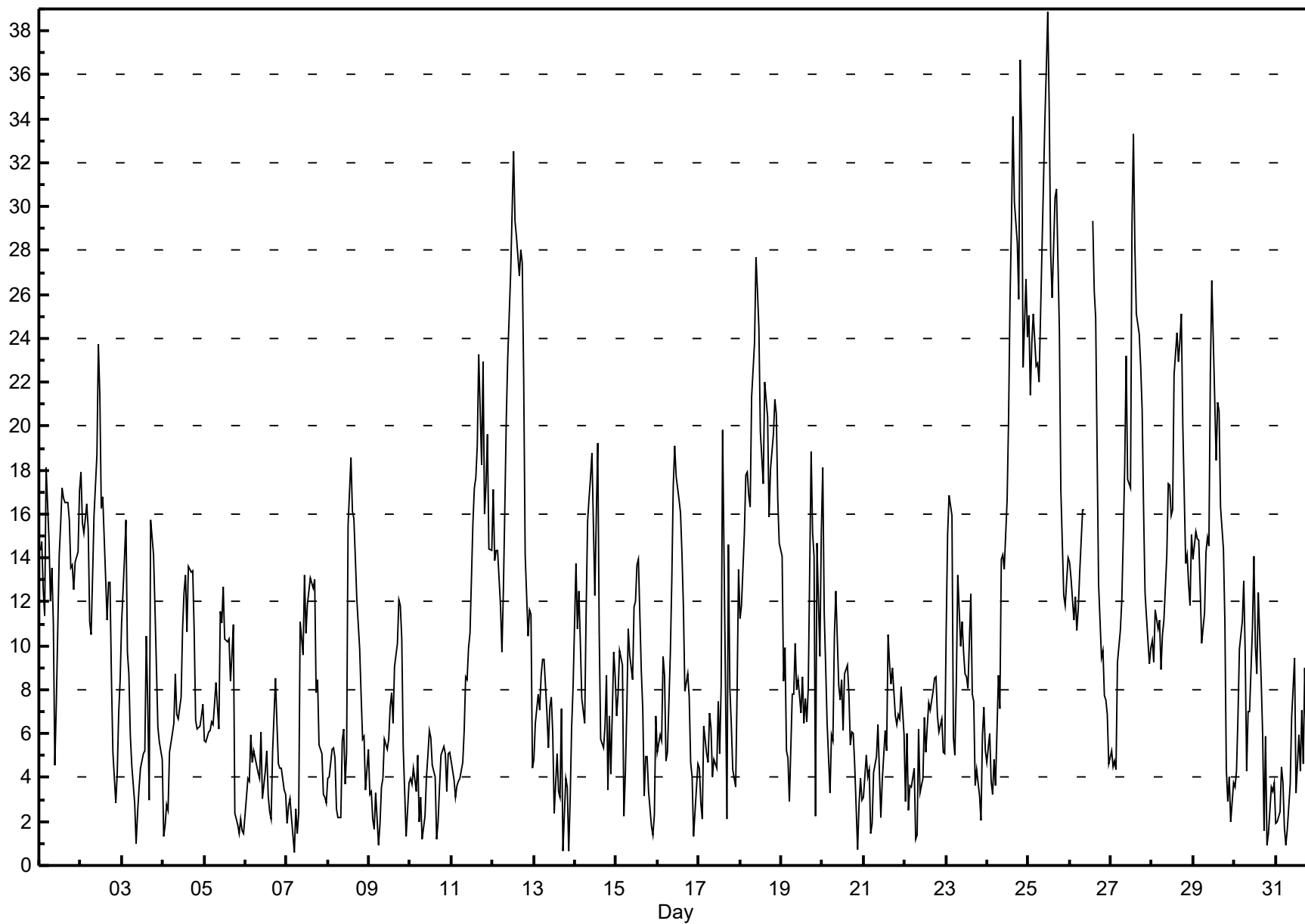
External Temperature (ET) - °C

Smoky Heights - July 2019



Hourly Averages

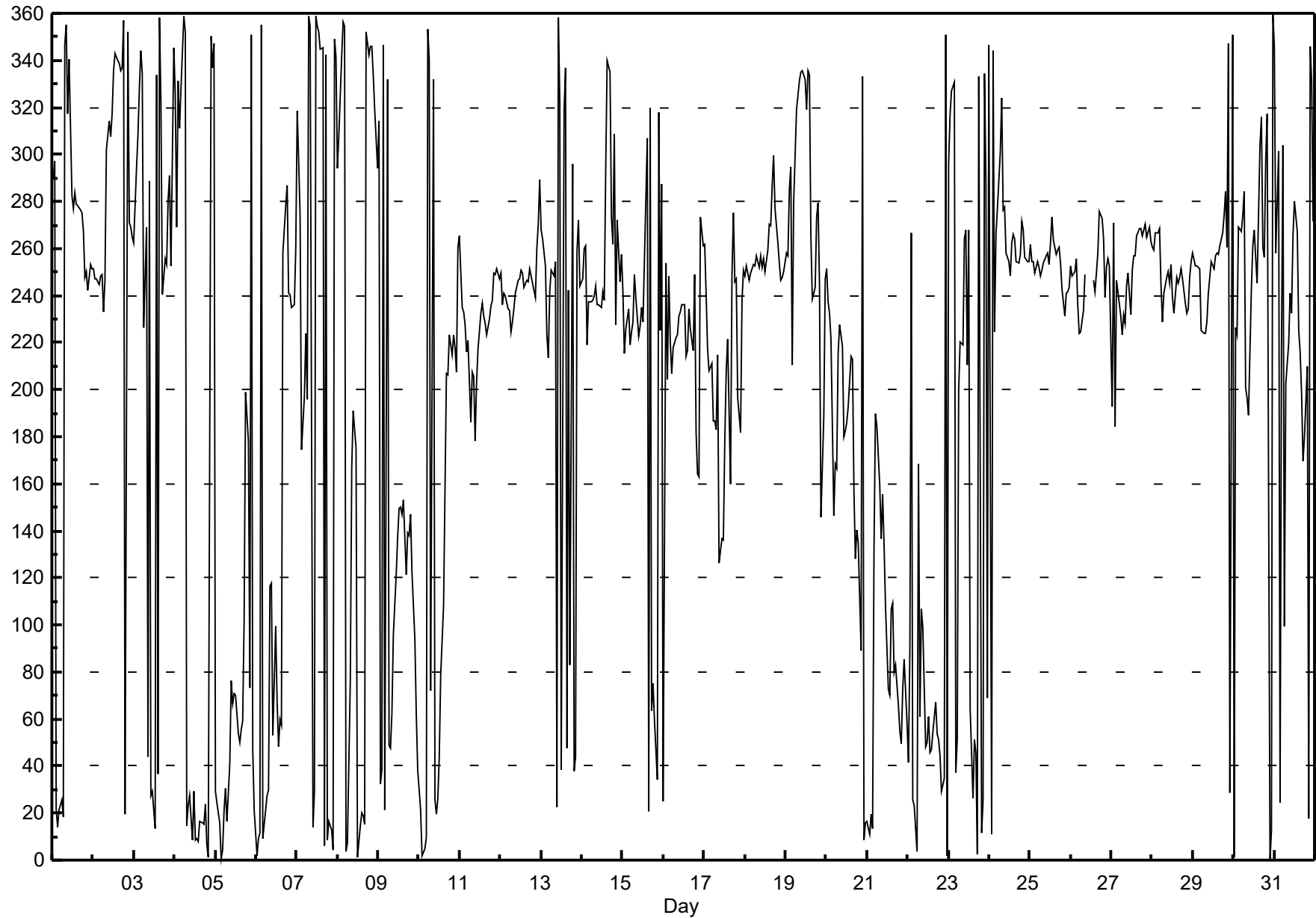
Wind Speed (WS) - km/h
Smoky Heights - July 2019



Hourly Averages

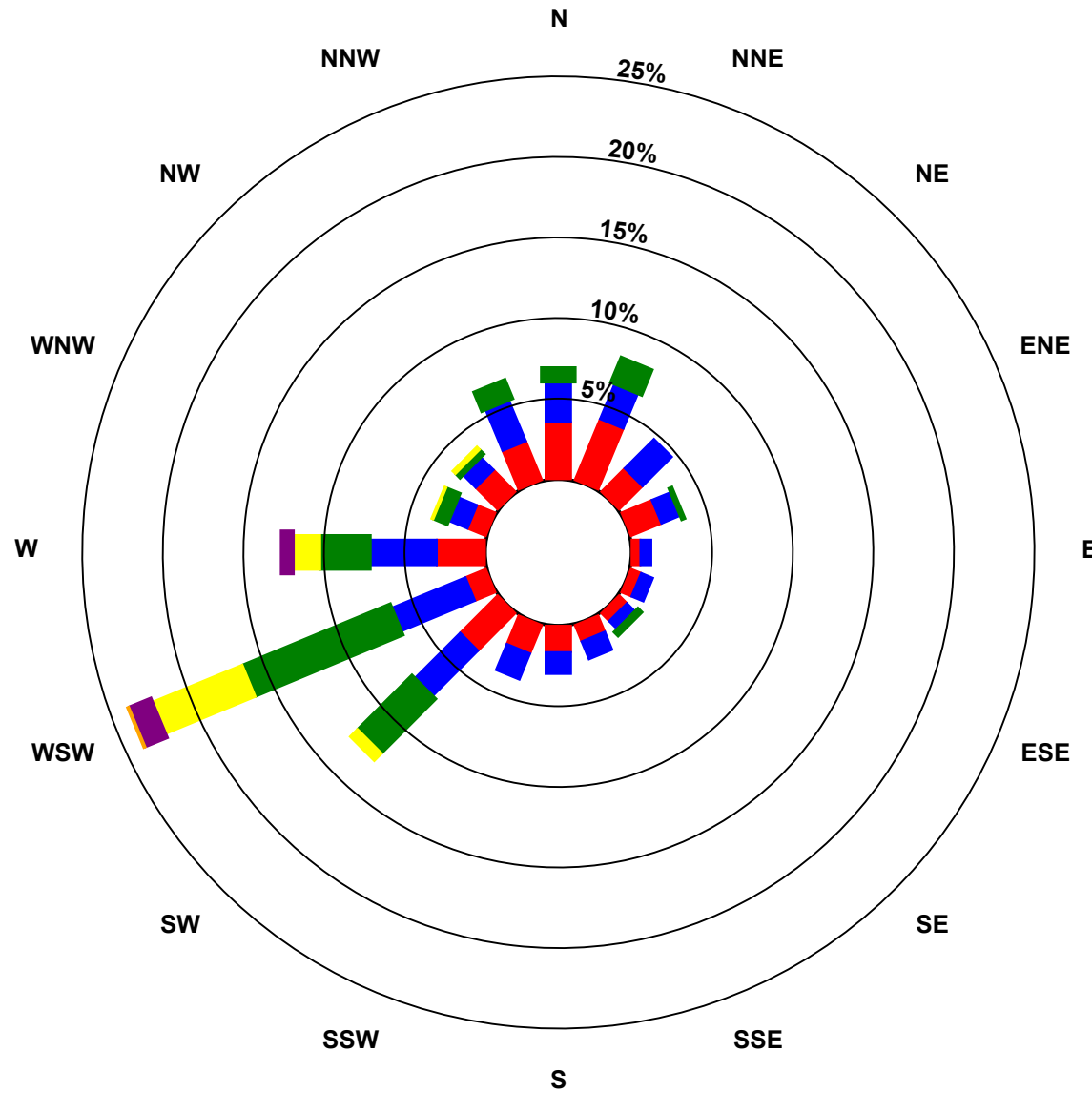
Wind Direction (WD) - deg

Smoky Heights - July 2019

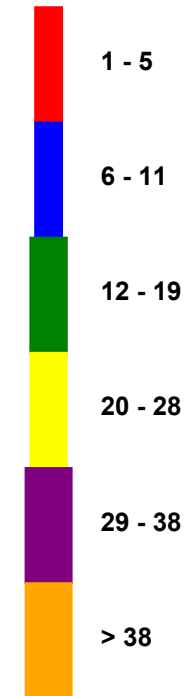


Wind Rose

Wind Speed (WS) (km/h)
Smoky Heights - July 2019

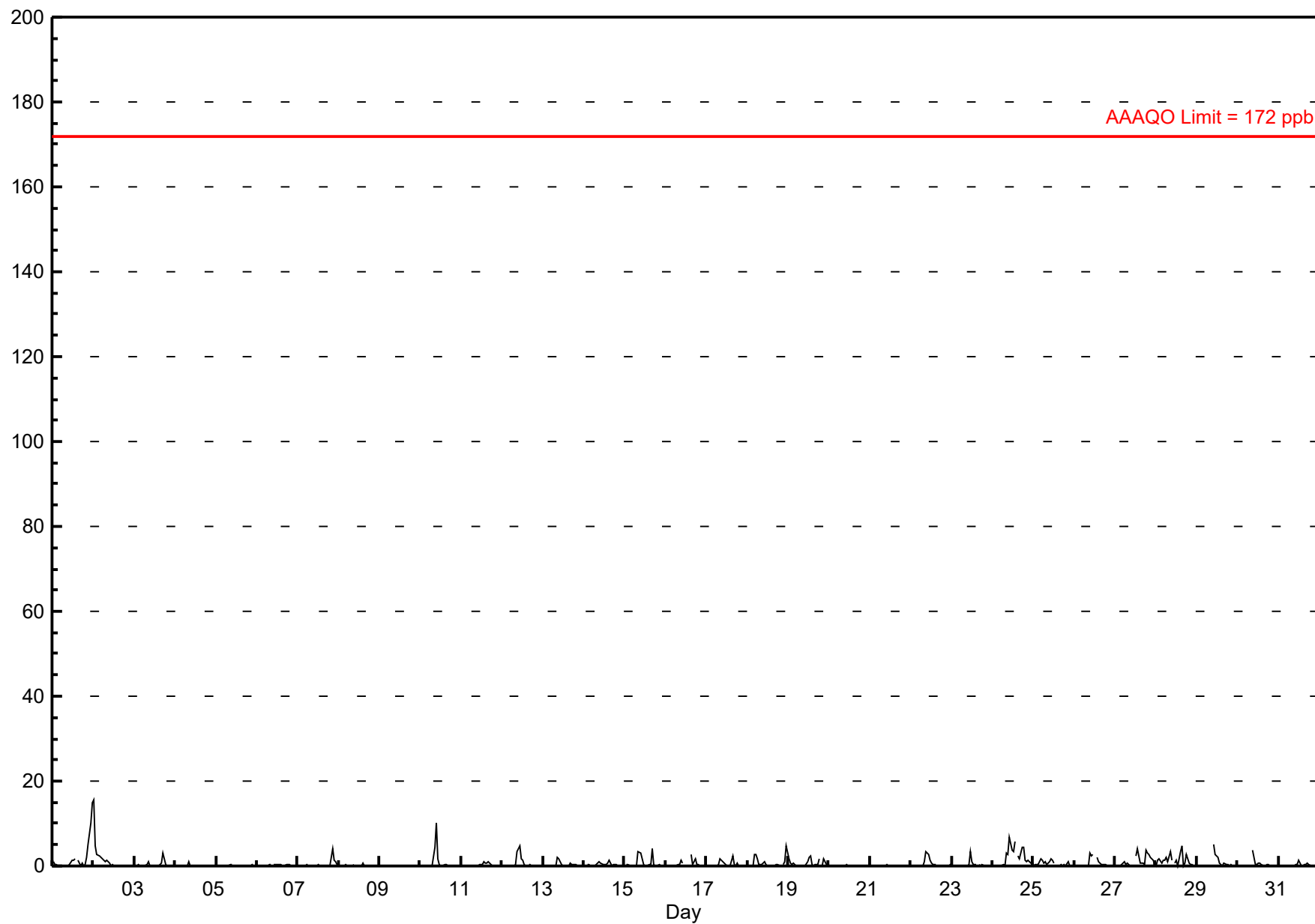


Wind Speed Classes (km/h)



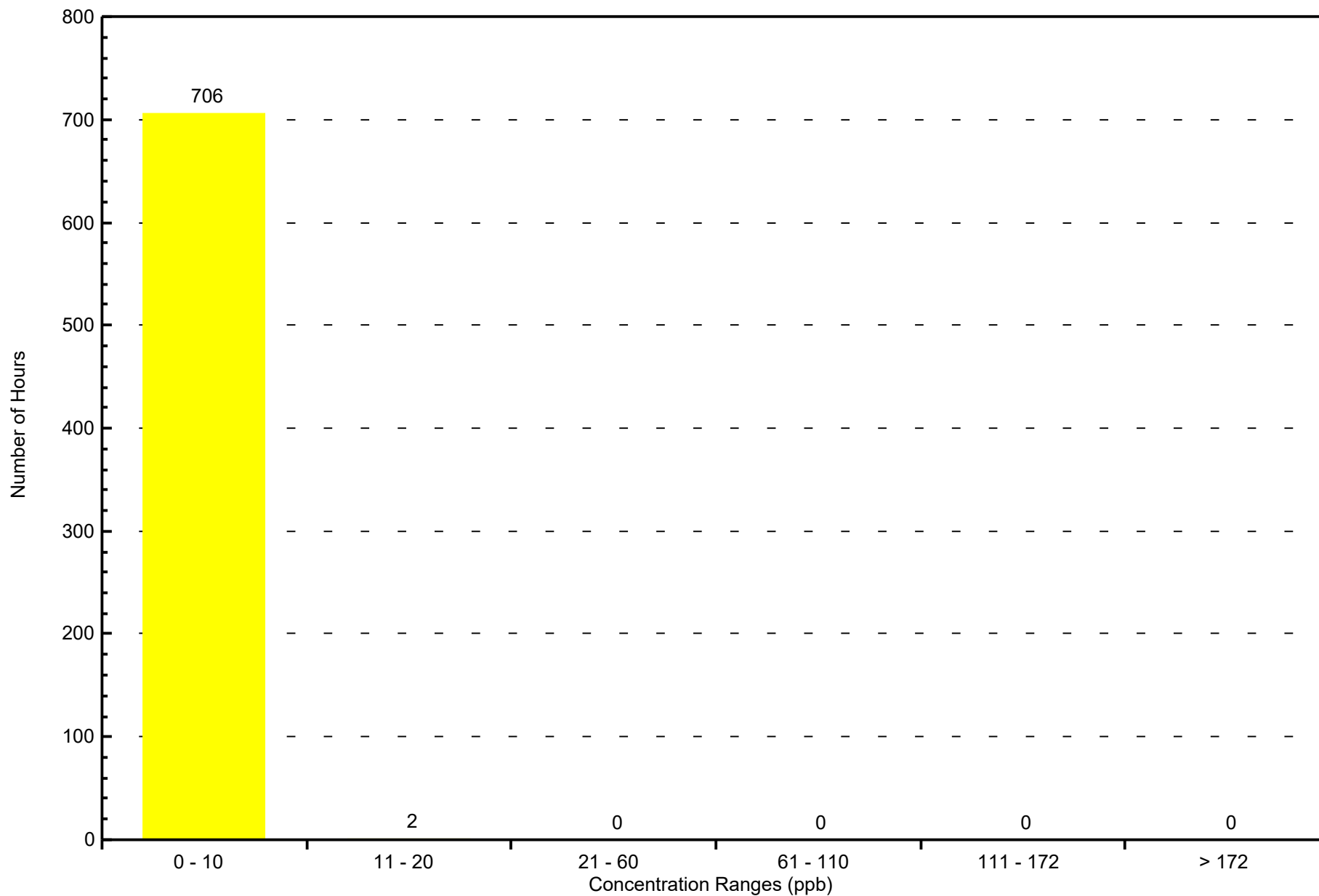
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Valleyview - July 2019



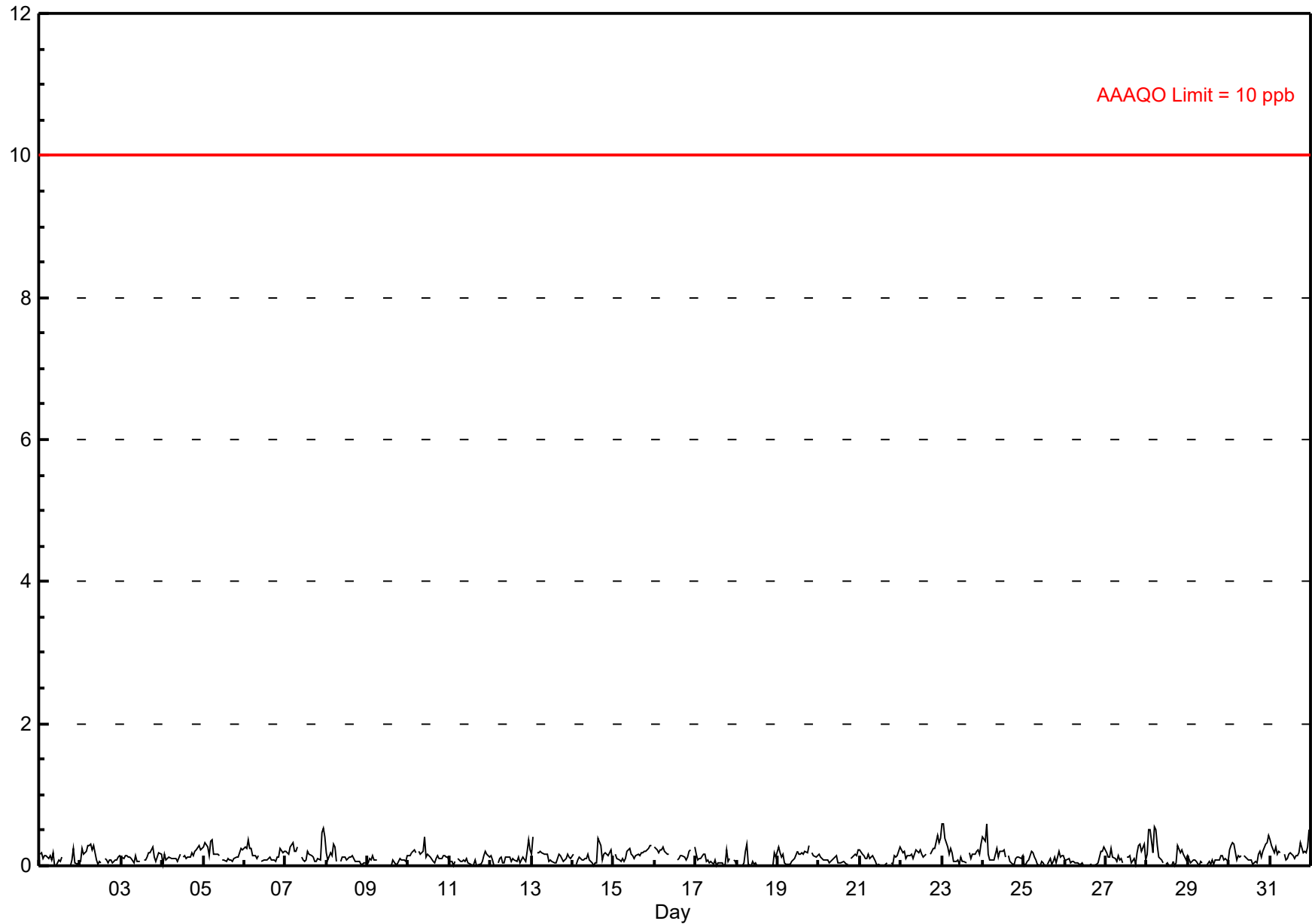
Histogram of Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Valleyview - July 2019



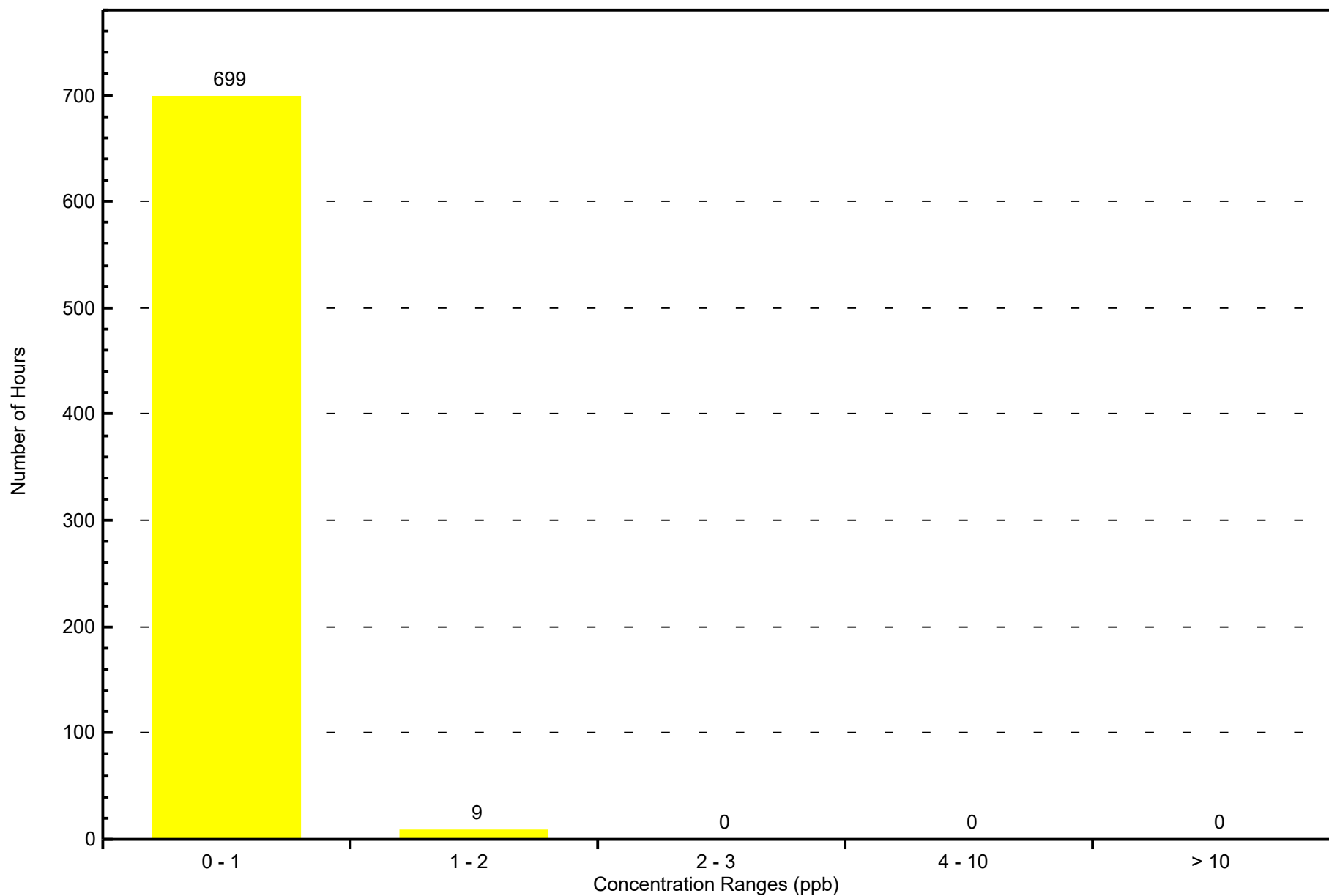
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Valleyview - July 2019



Histogram of Hourly Averages

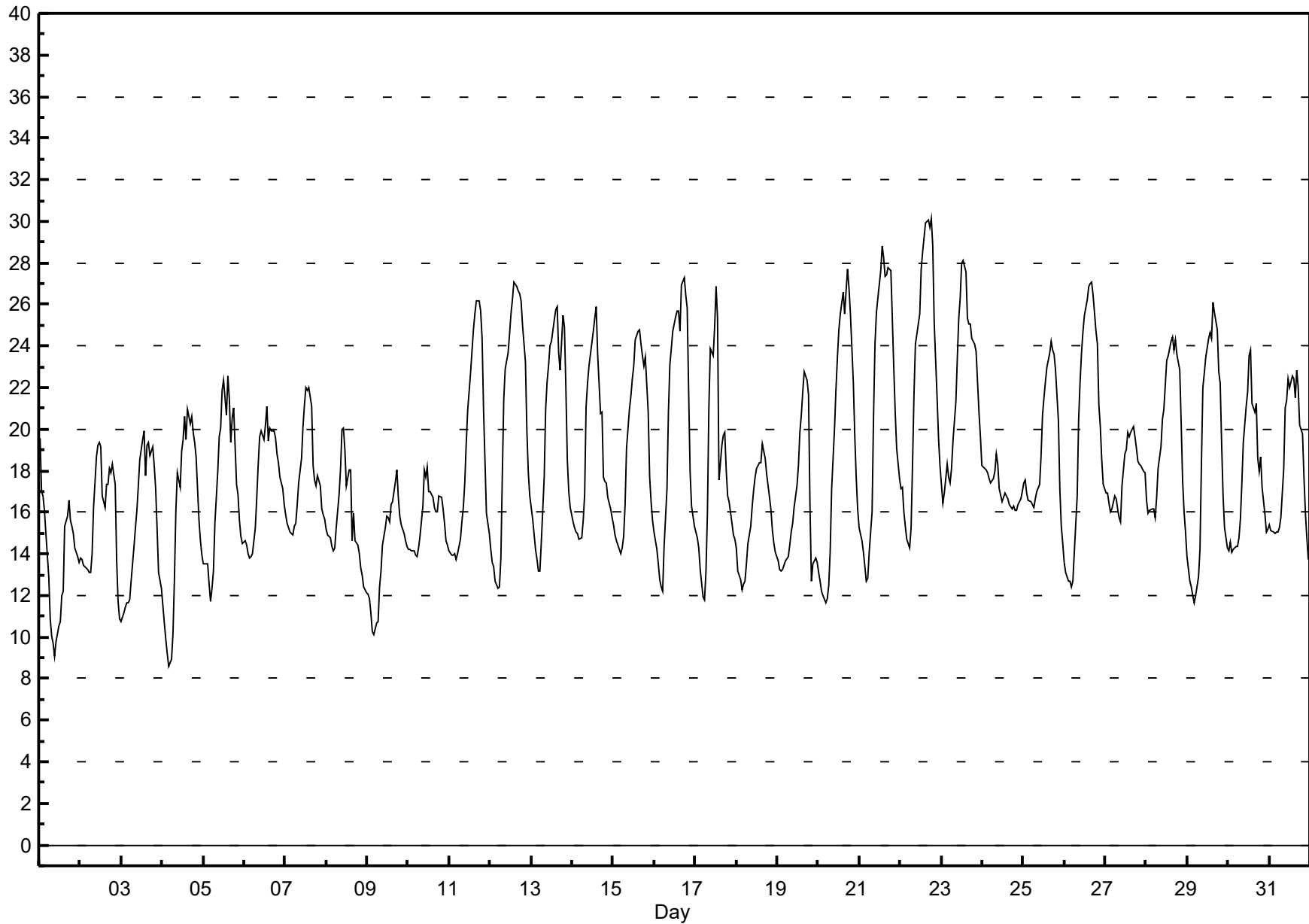
Hydrogen Sulphide (H₂S) - ppb
Valleyview - July 2019



Hourly Averages

External Temperature (ET) - °C

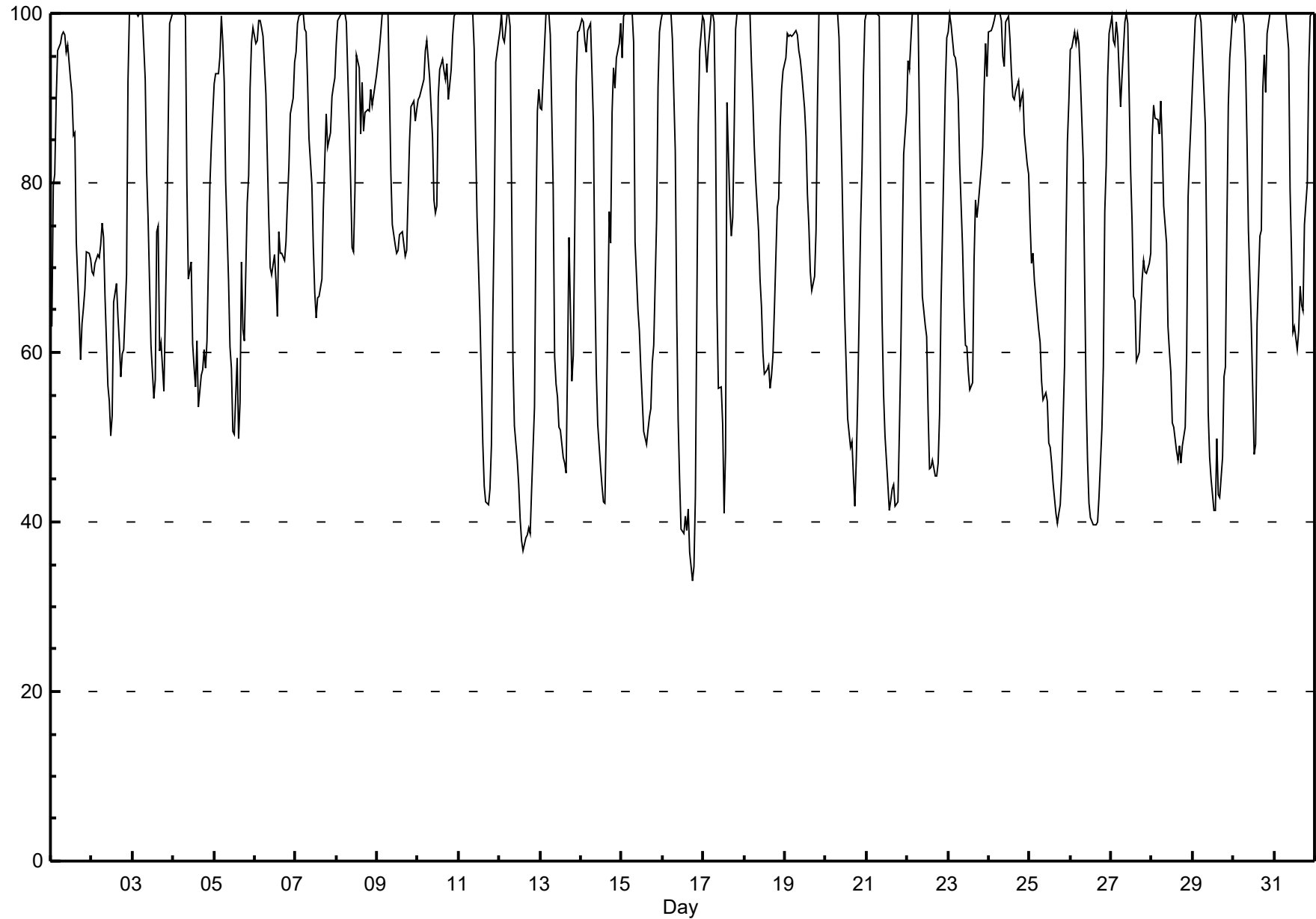
Valleyview - July 2019



Hourly Averages

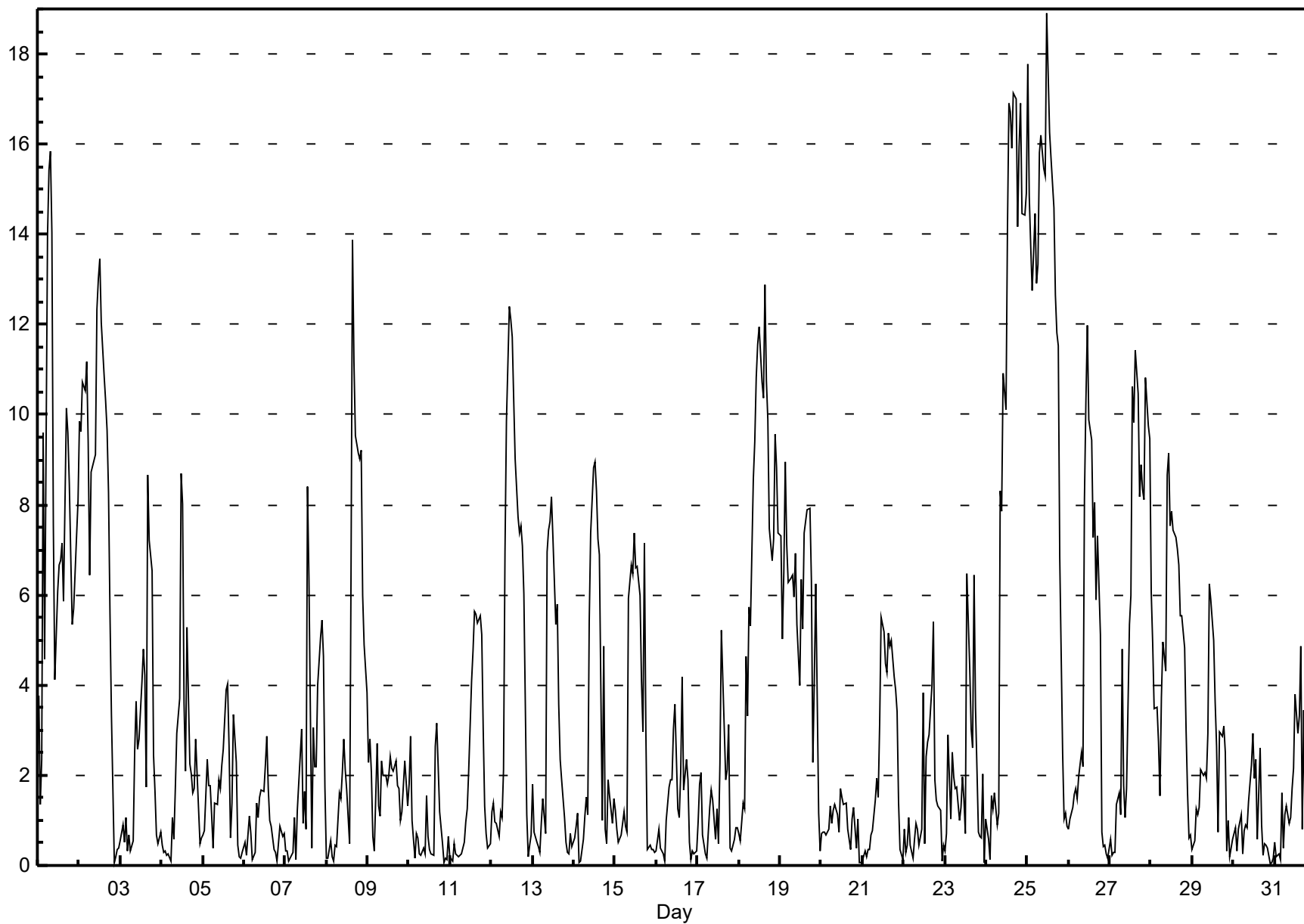
Relative Humidity (RH) - %

Valleyview - July 2019



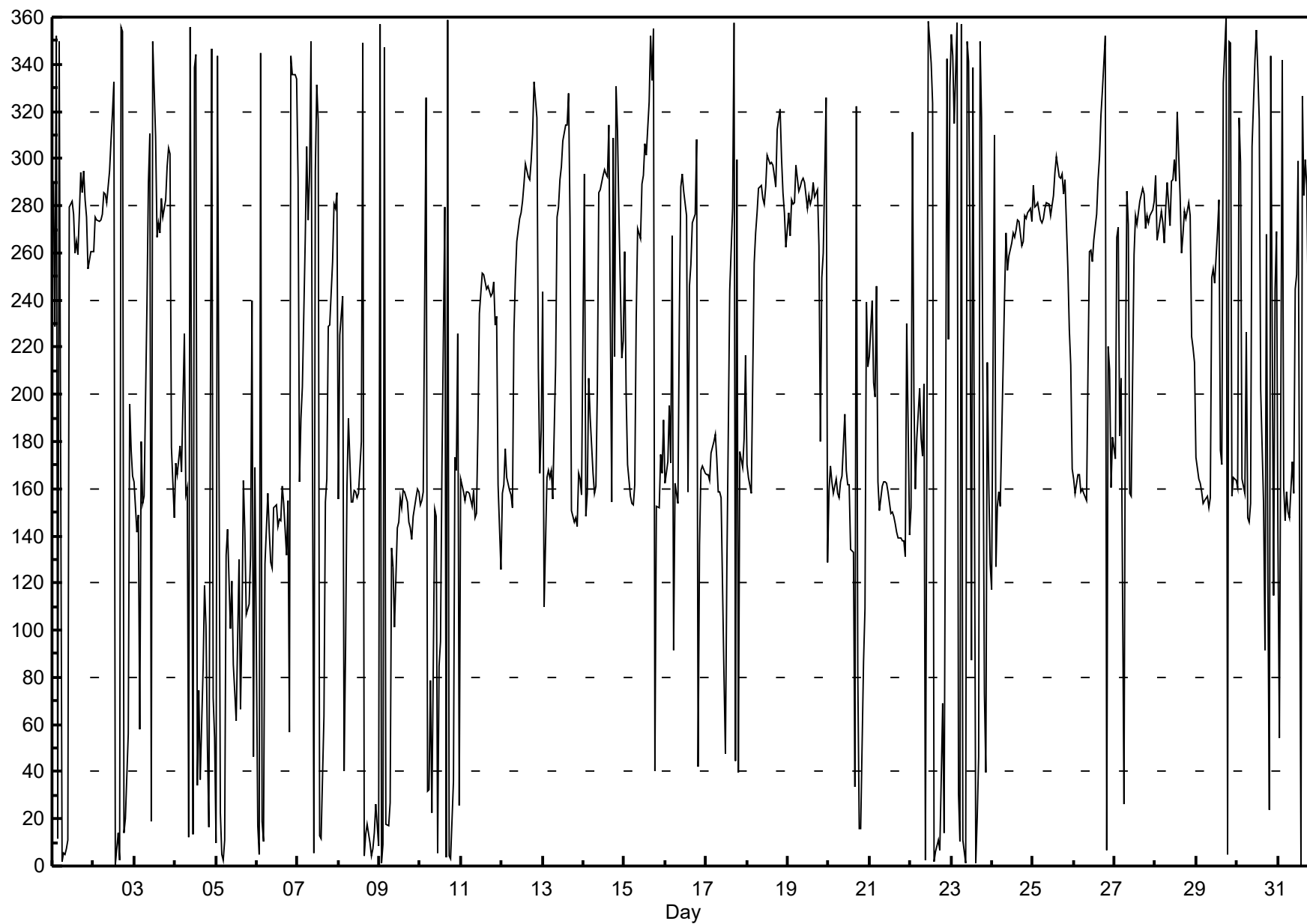
Hourly Averages

Wind Speed (WS) - km/h
Valleyview - July 2019



Hourly Averages

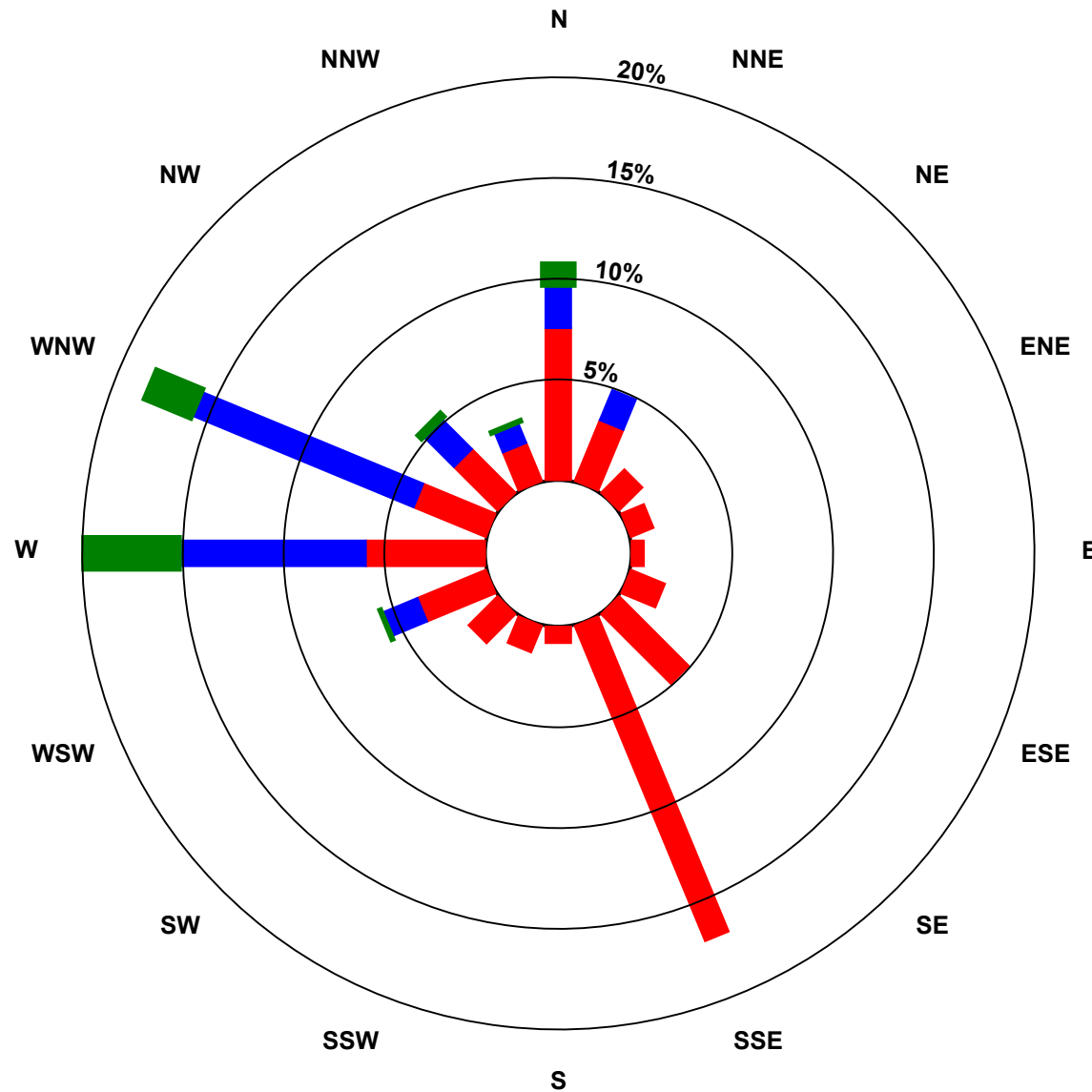
Wind Direction (WD) - deg
Valleyview - July 2019



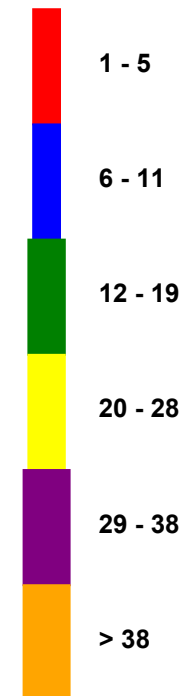
Wind Rose

Wind Speed (WS) (km/h)

Valleyview - July 2019



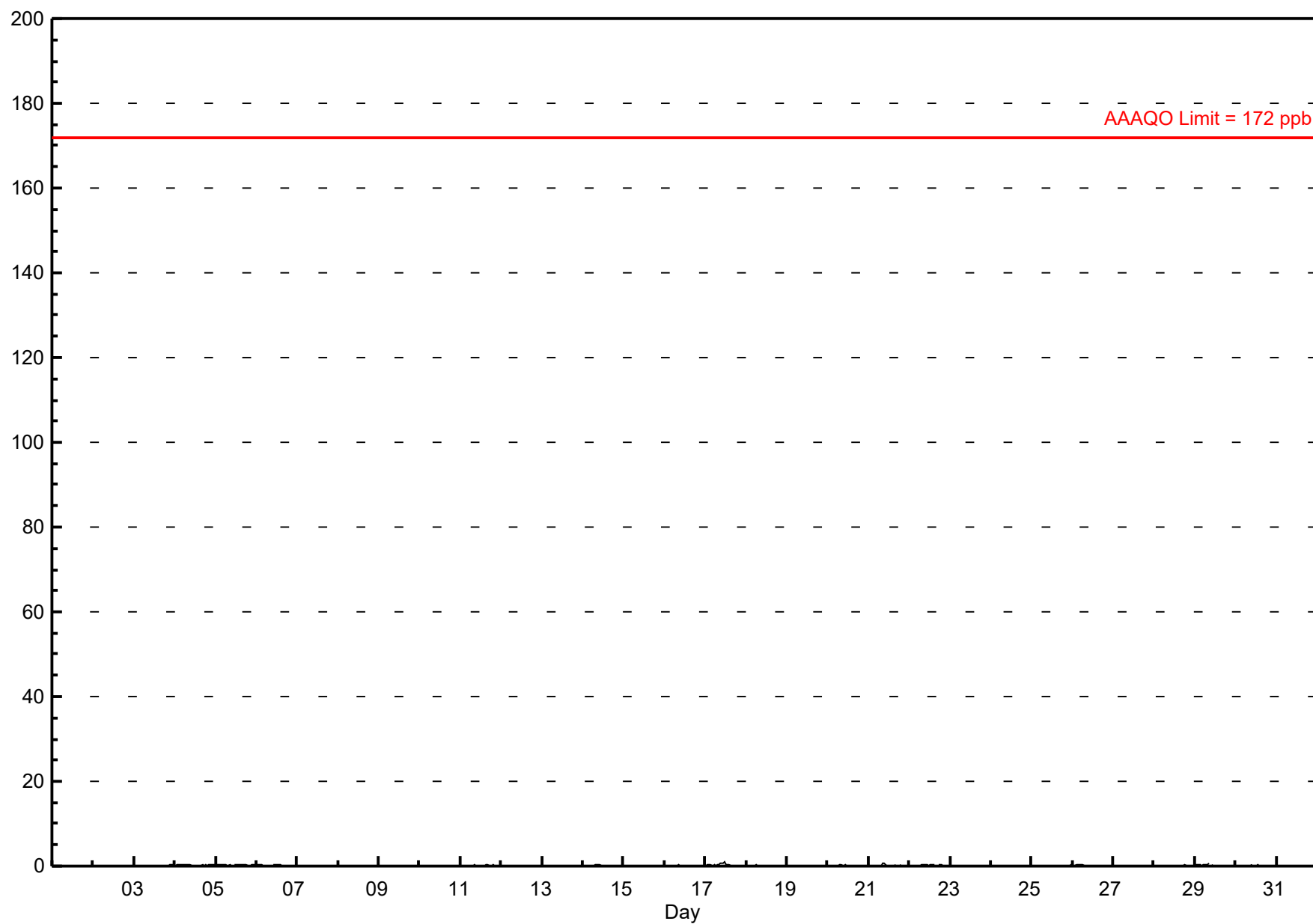
Wind Speed Classes (km/h)



Hourly Averages

Sulphur Dioxide (SO₂) - ppb

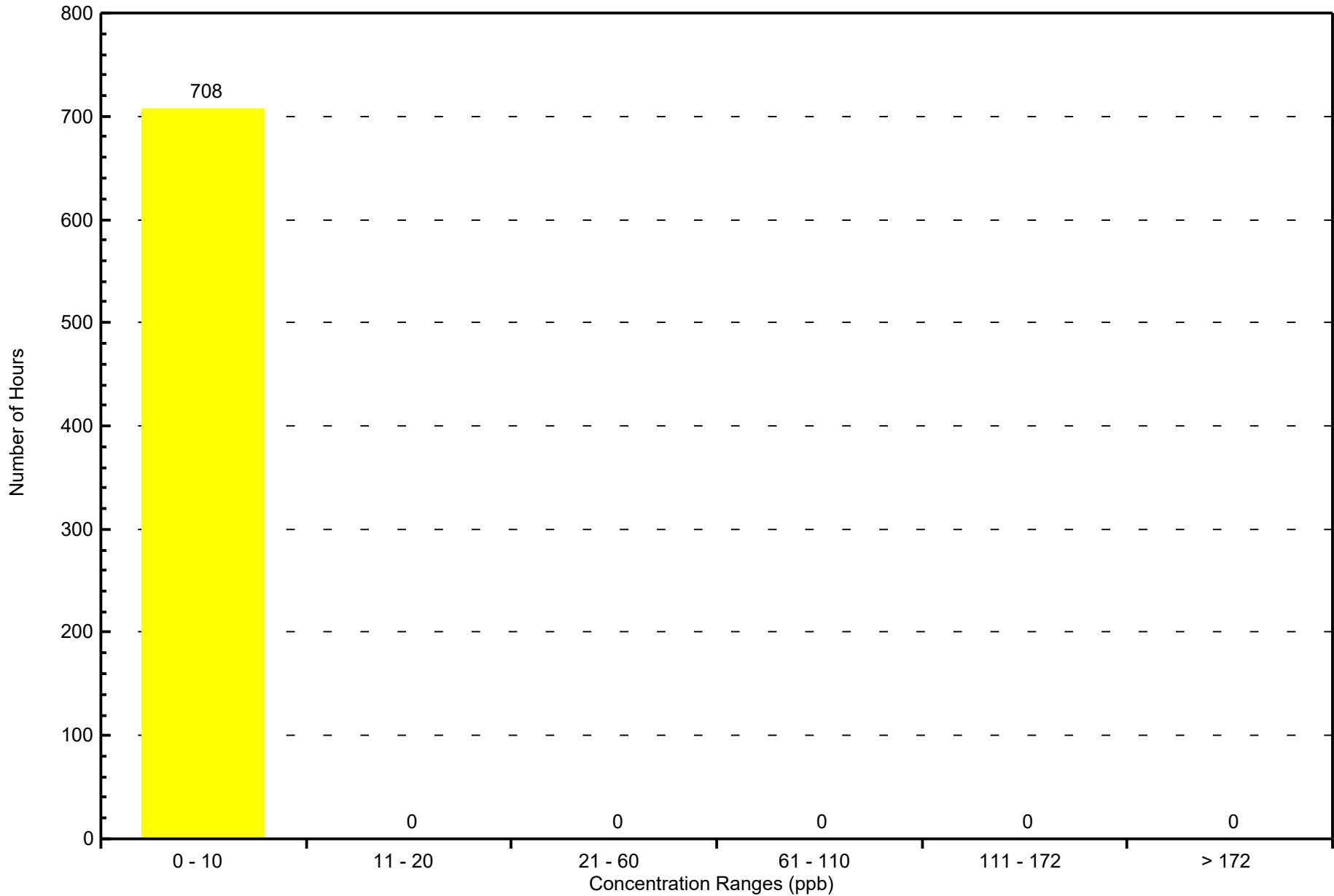
Donnelly - July 2019



Histogram of Hourly Averages

Sulphur Dioxide (SO₂) - ppb

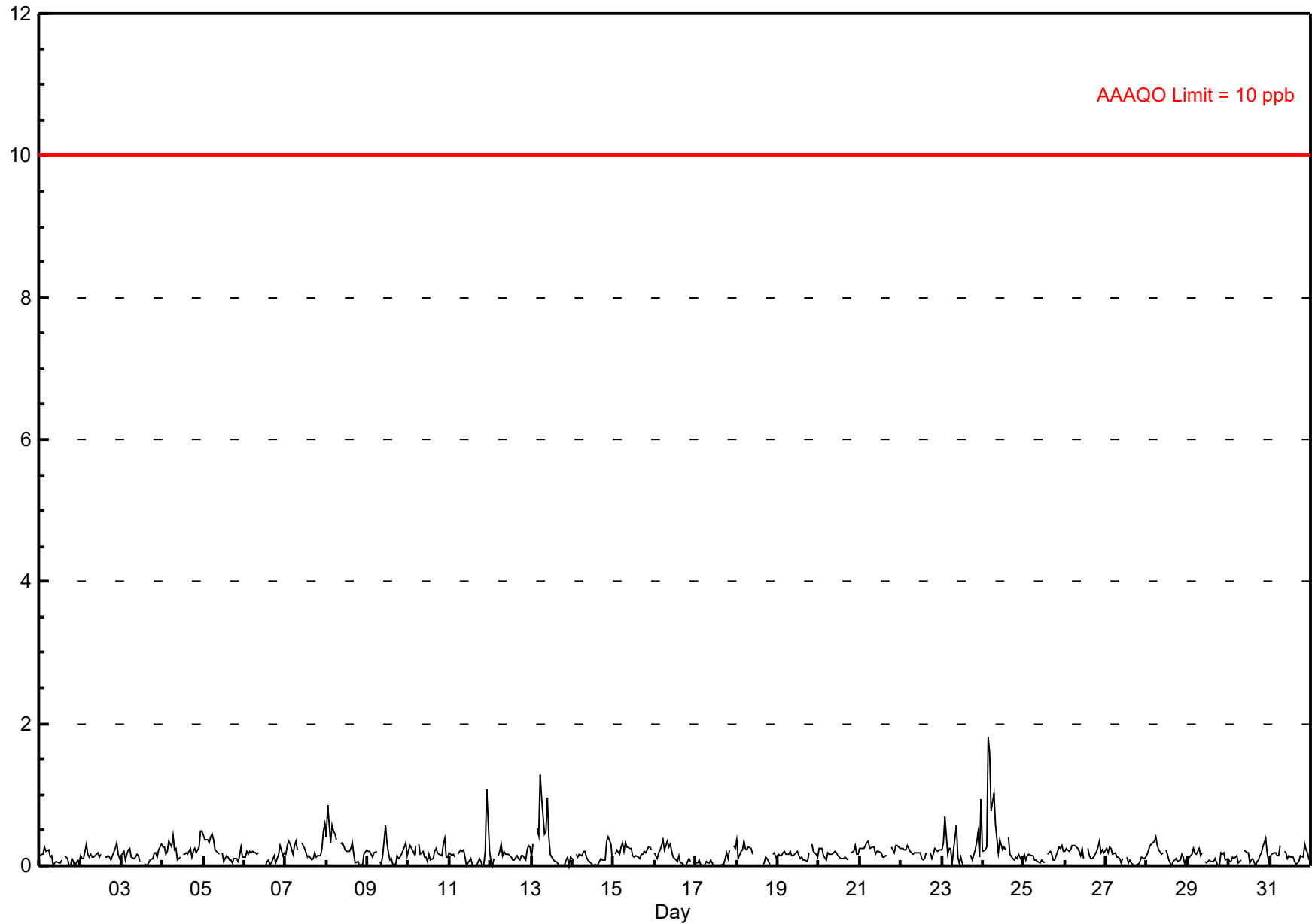
Donnelly - July 2019



Hourly Averages

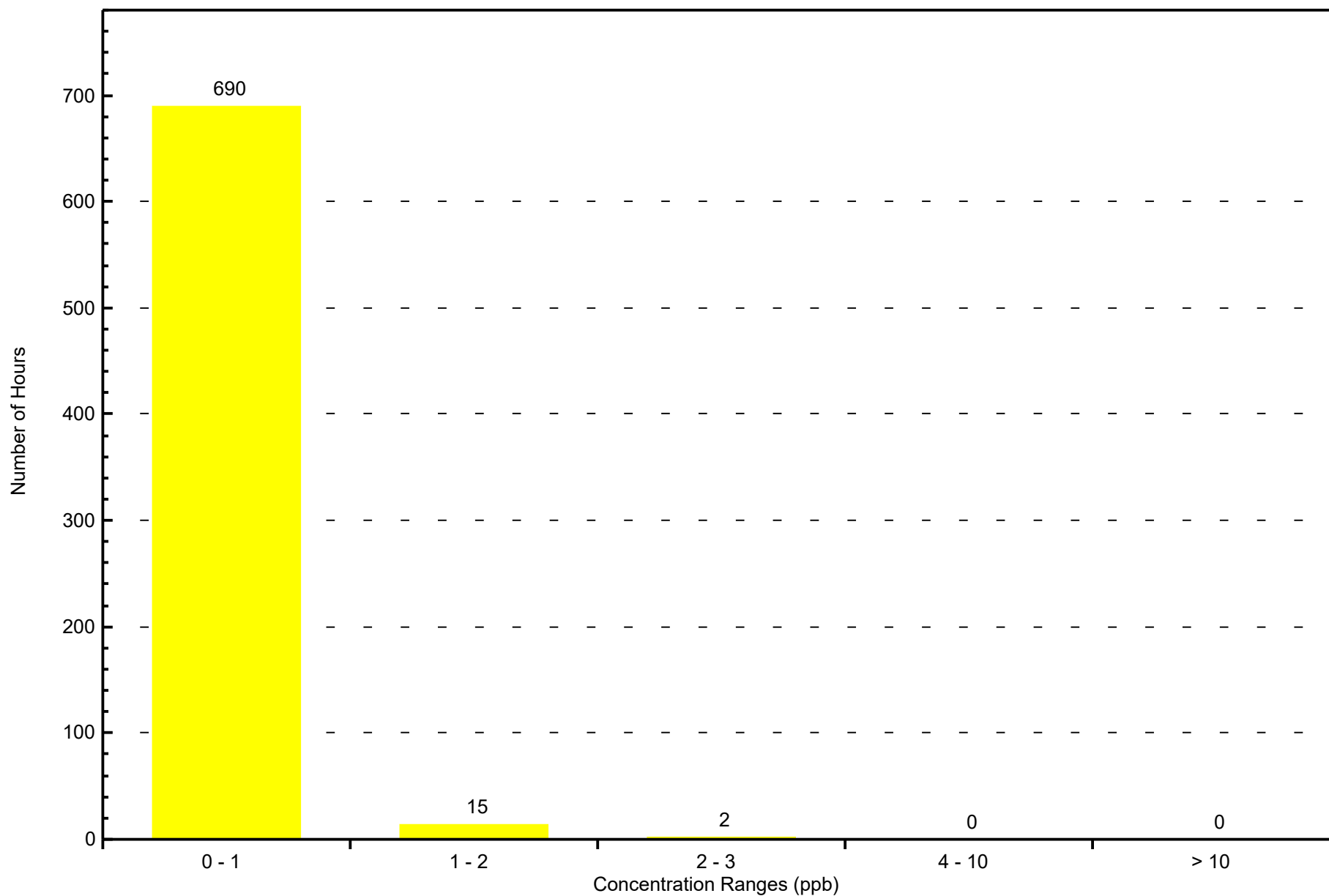
Hydrogen Sulphide (H₂S) - ppb

Donnelly - July 2019



Histogram of Hourly Averages

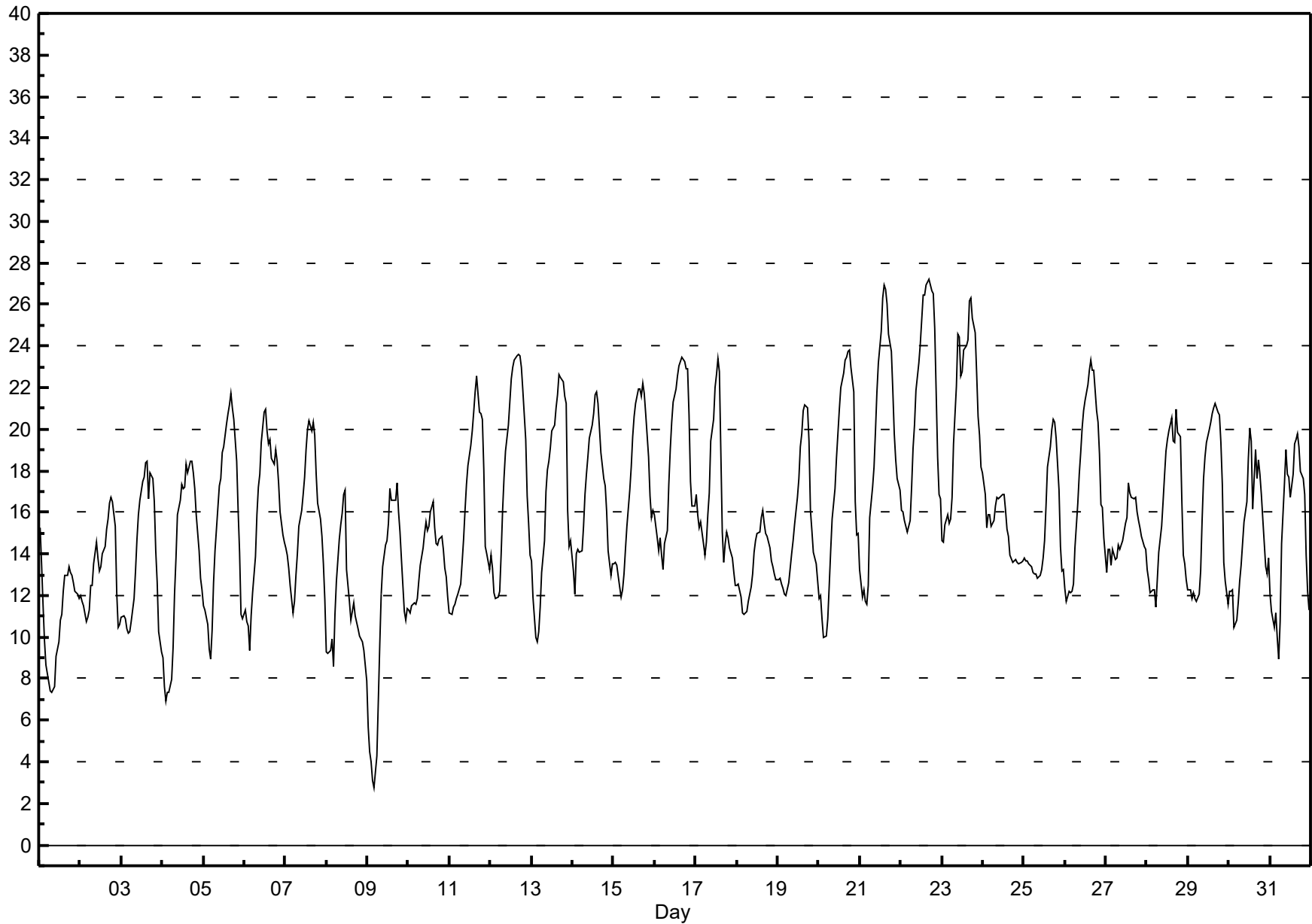
Hydrogen Sulphide (H₂S) - ppb
Donnelly - July 2019



Hourly Averages

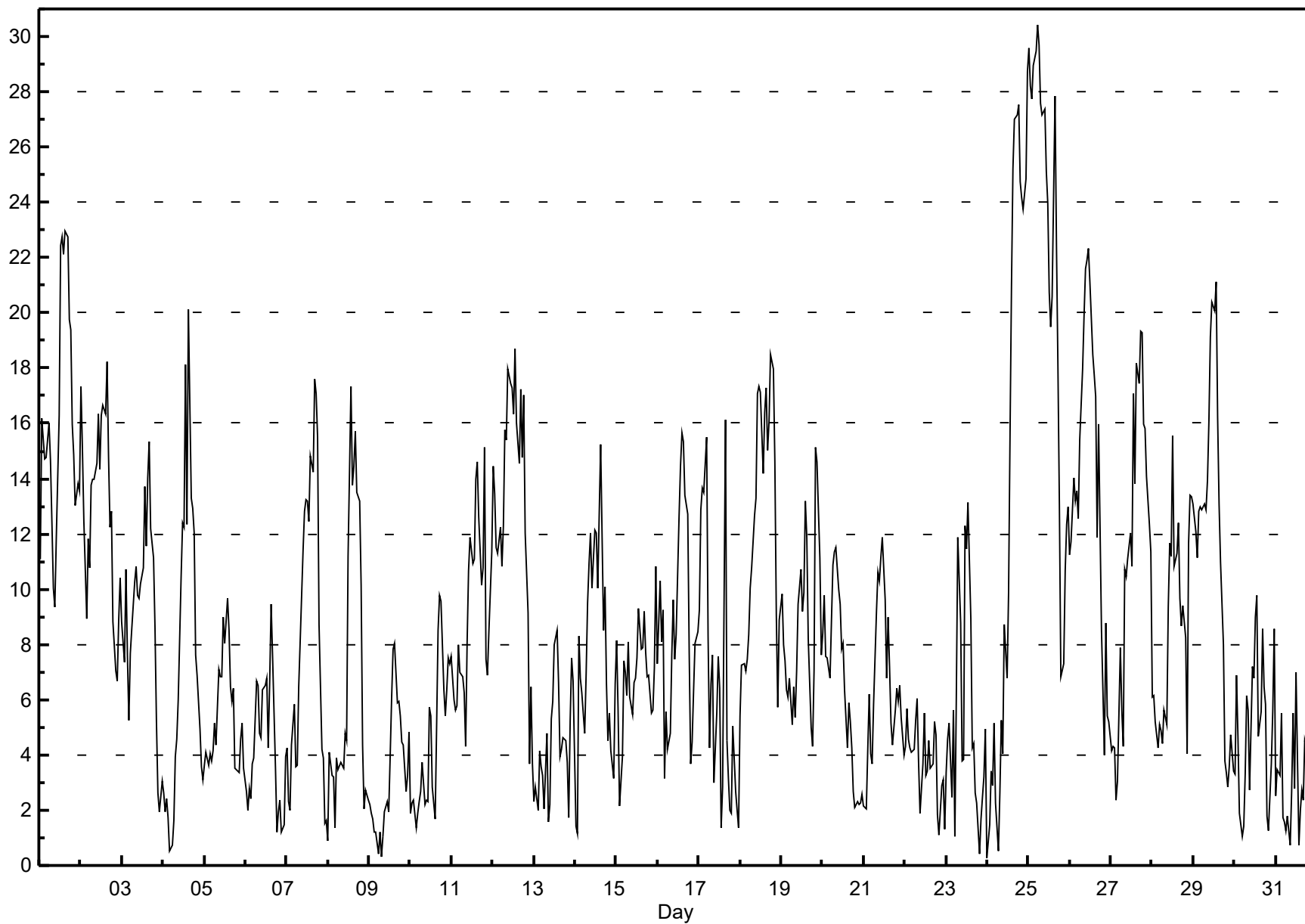
External Temperature (ET) - °C

Donnelly - July 2019



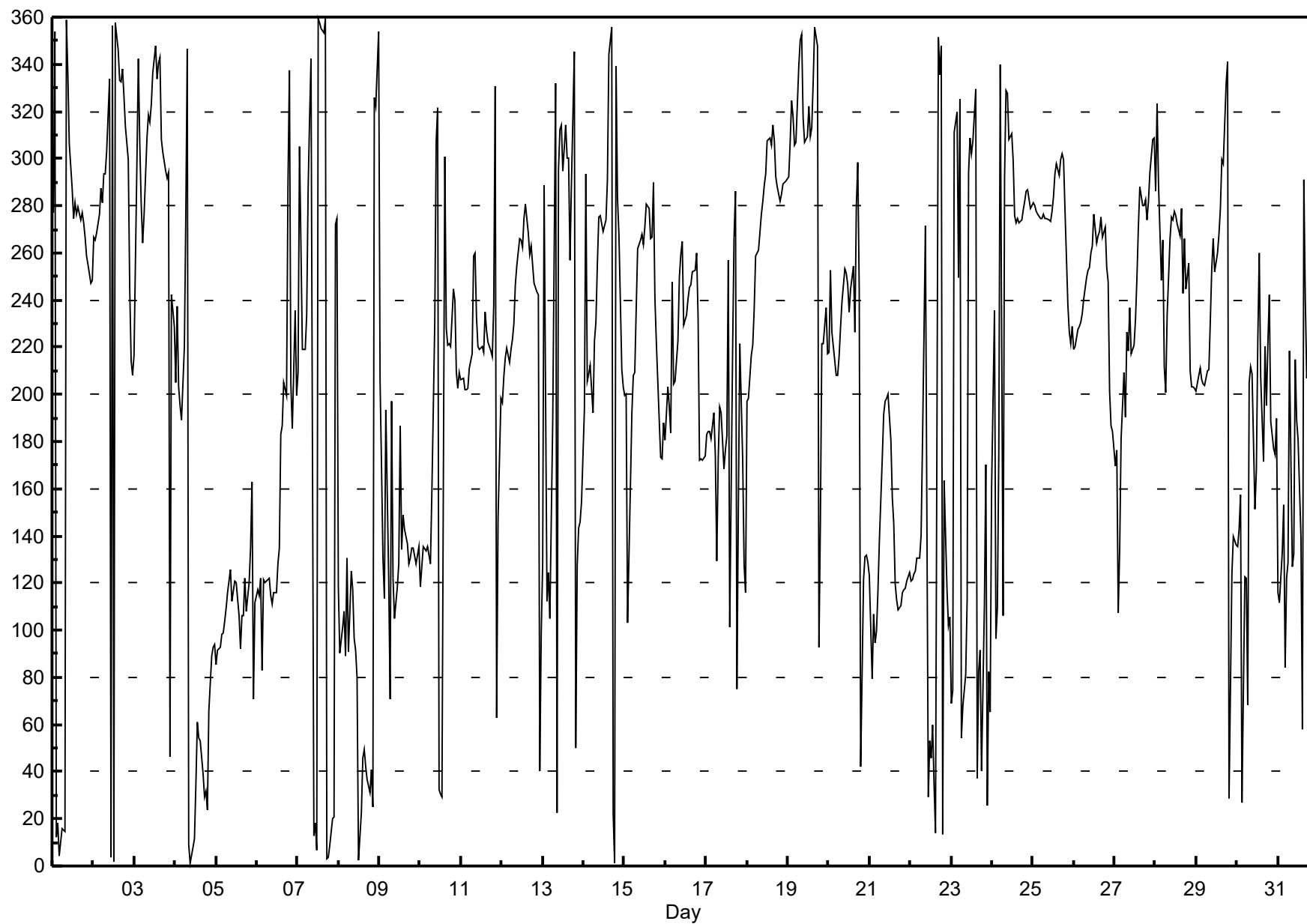
Hourly Averages

Wind Speed (WS) - km/h
Donnelly - July 2019



Hourly Averages

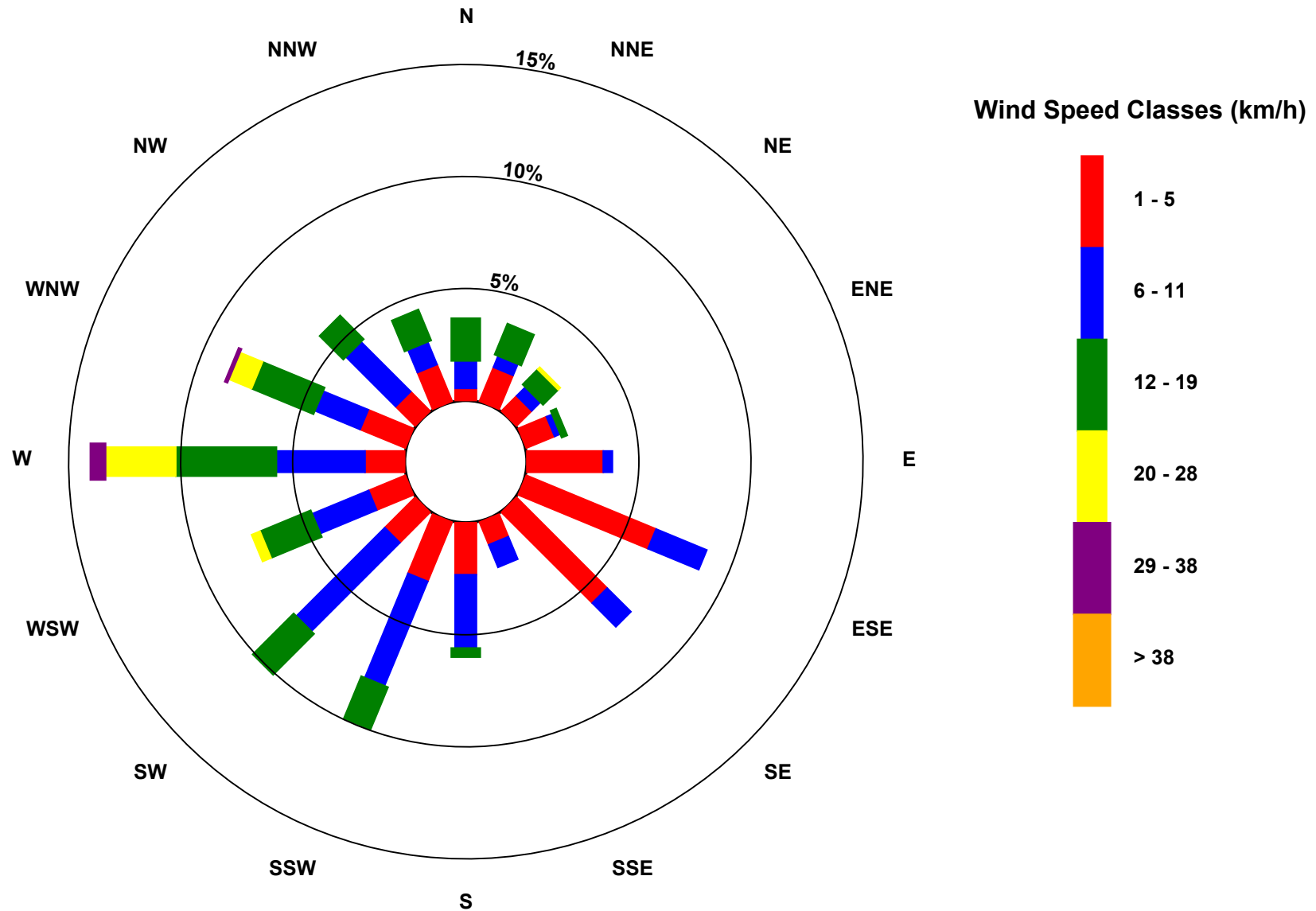
Wind Direction (WD) - deg
Donnelly - July 2019



Wind Rose

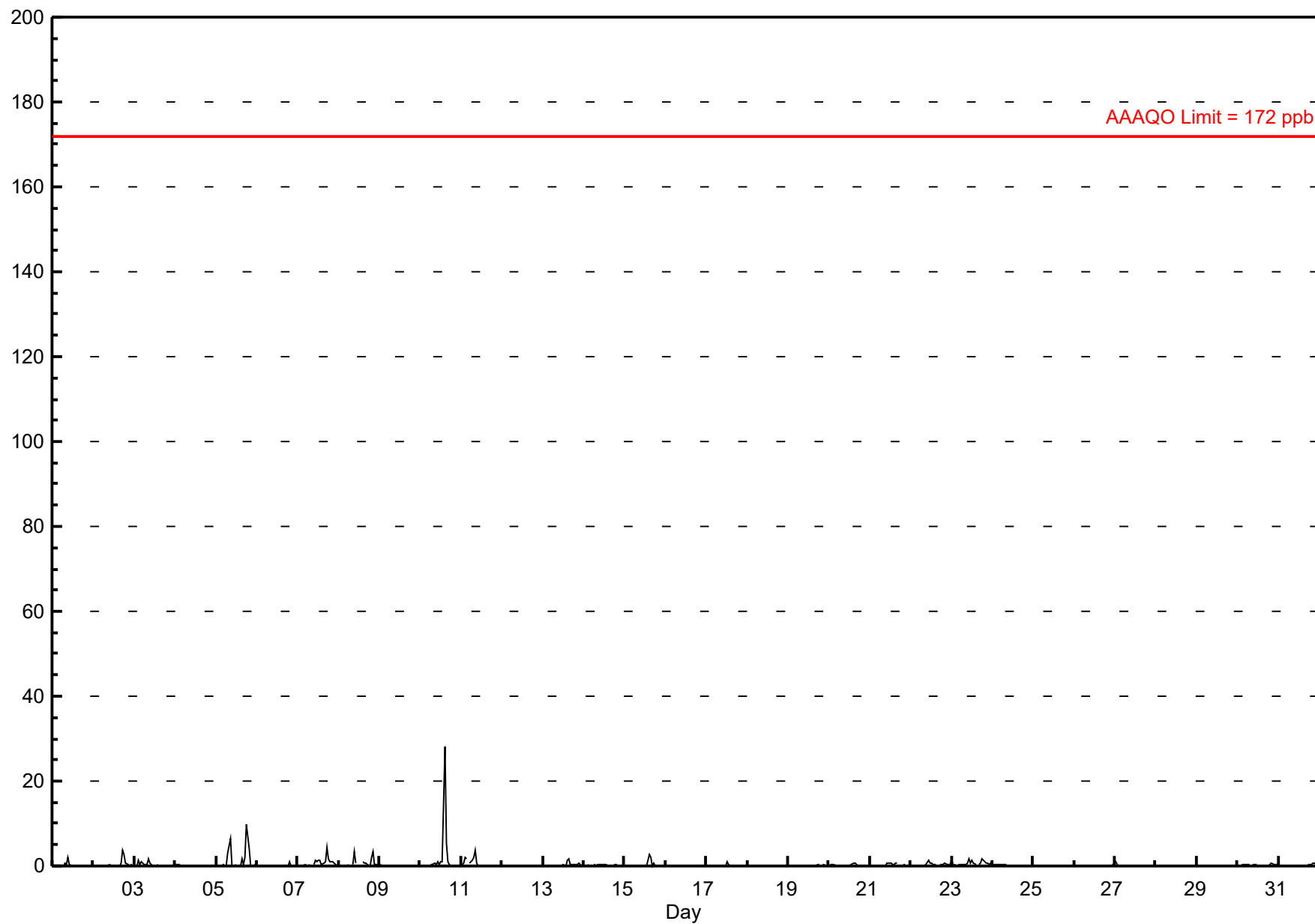
Wind Speed (WS) (km/h)

Donnelly - July 2019



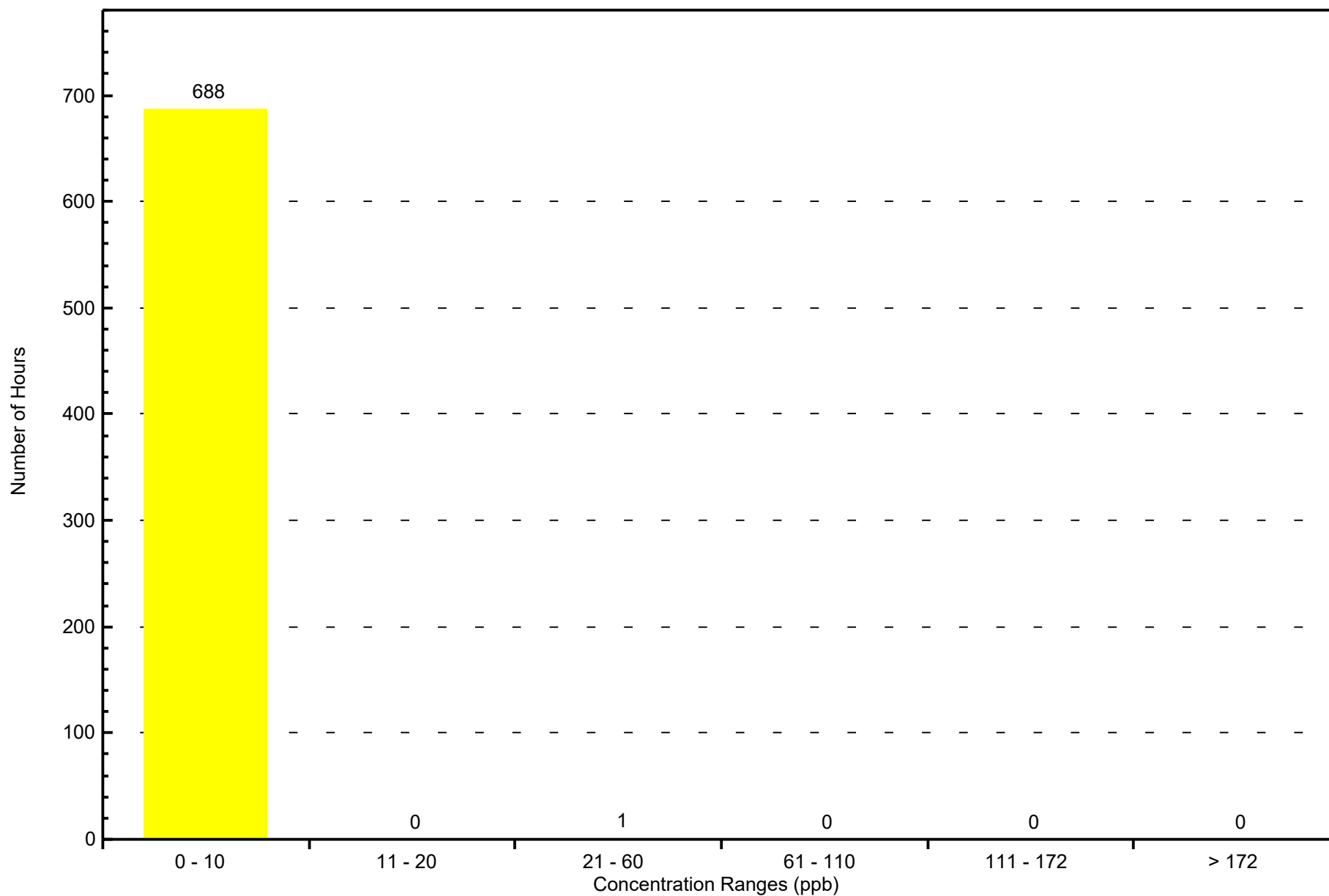
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Wembley - July 2019



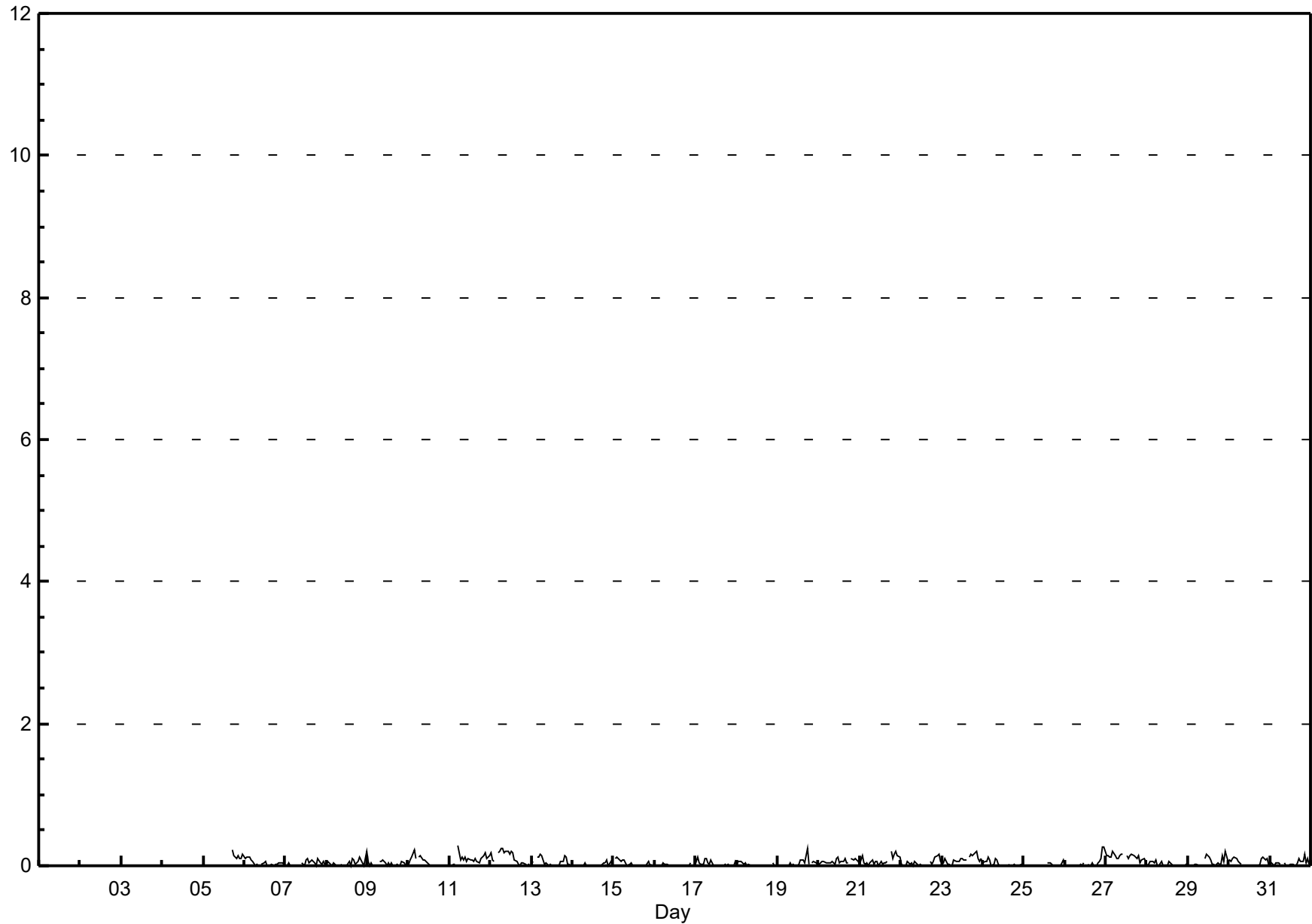
Histogram of Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Wembley - July 2019



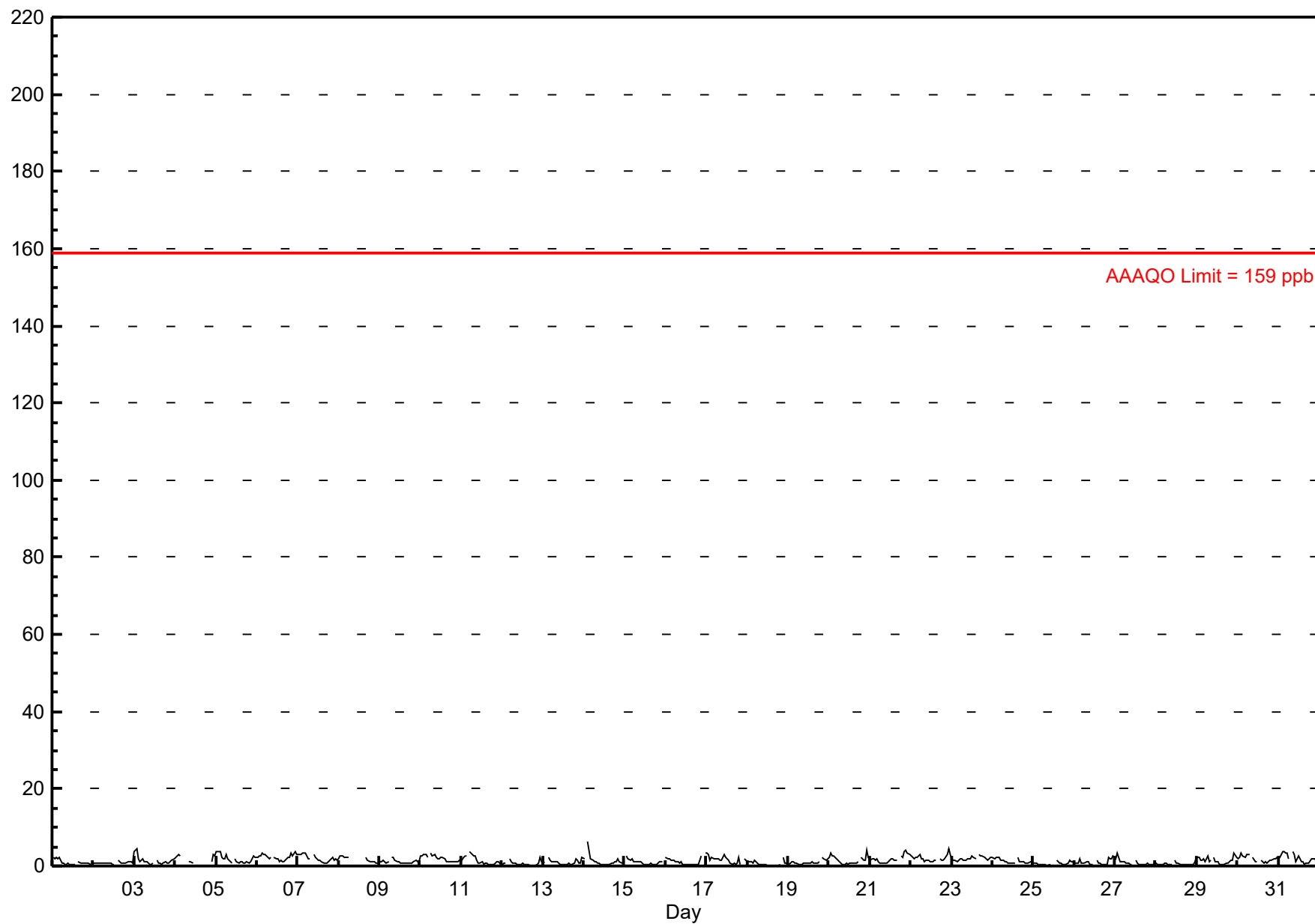
Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Wembley - July 2019



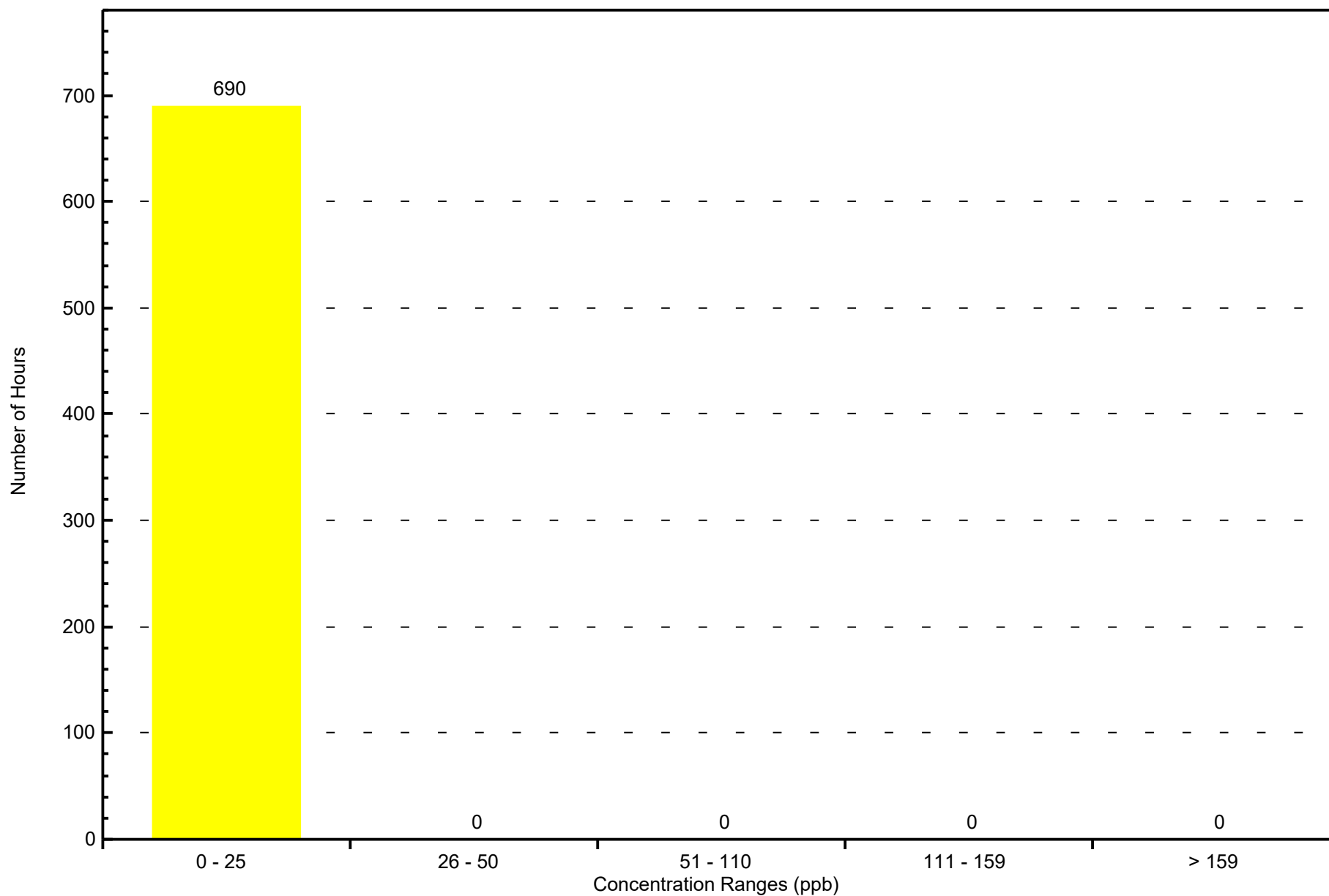
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Wembley - July 2019



Histogram of Hourly Averages

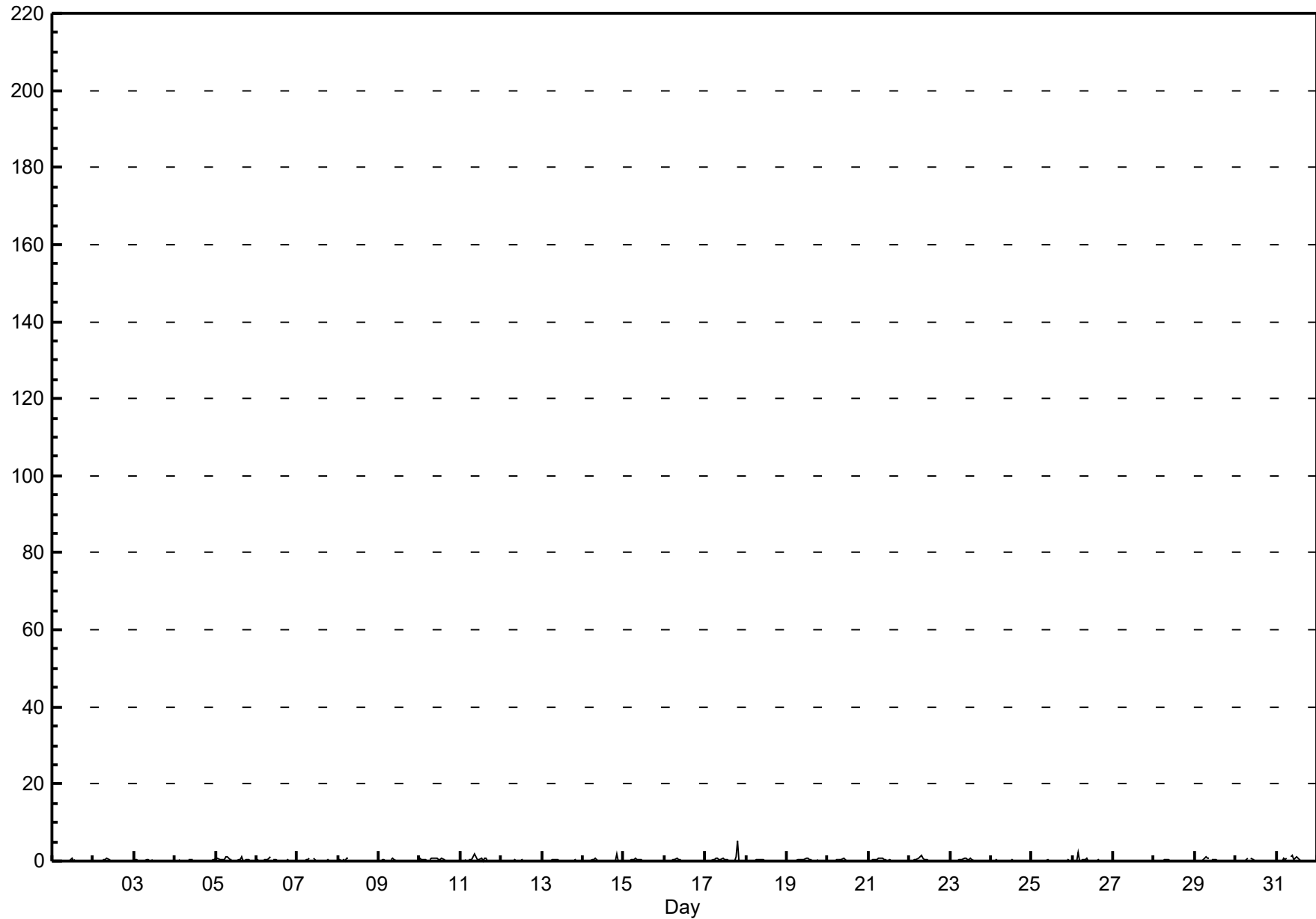
Nitrogen Dioxide (NO₂) - ppb
Wembley - July 2019



Hourly Averages

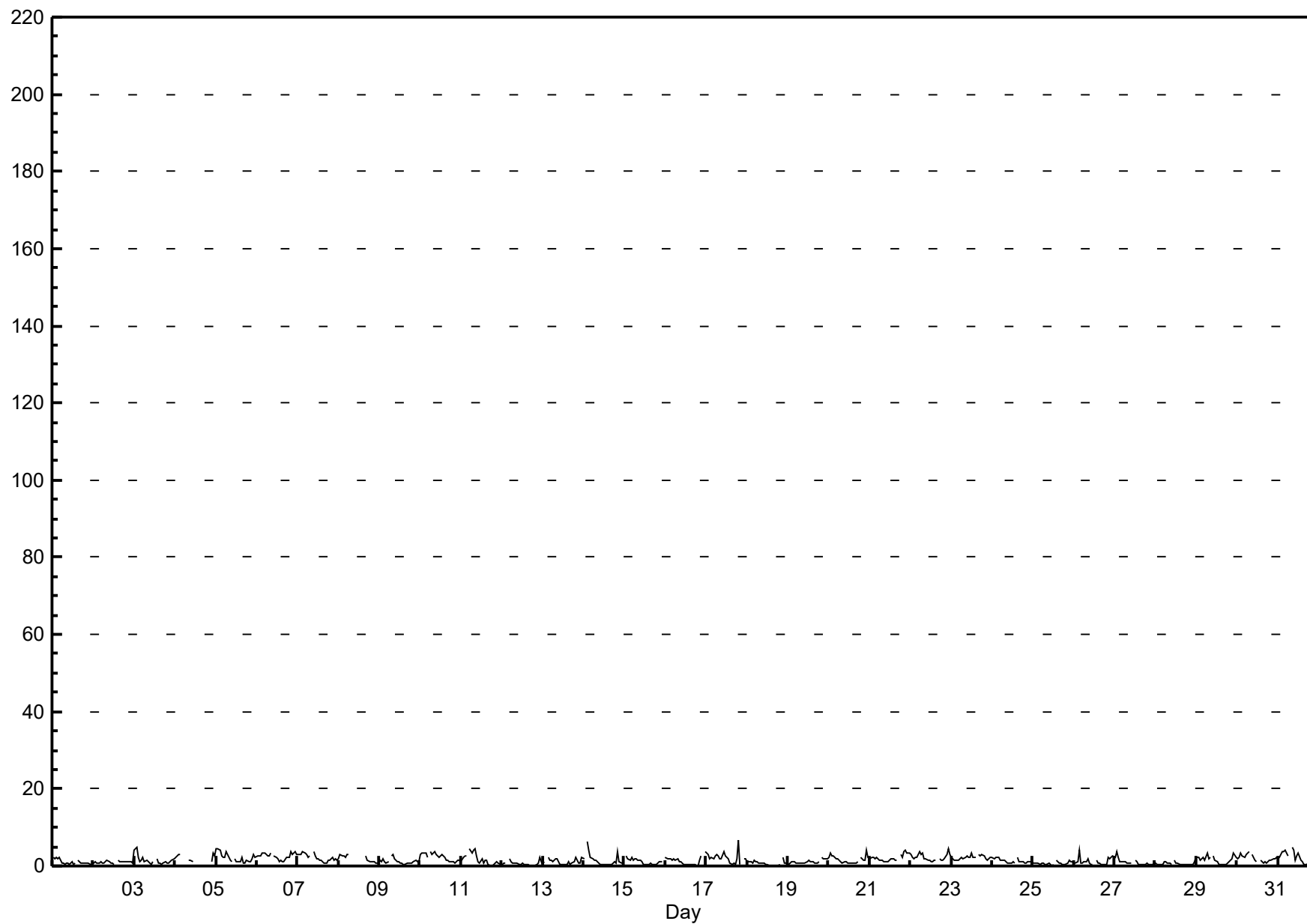
Nitrogen Oxide (NO) - ppb

Wembley - July 2019



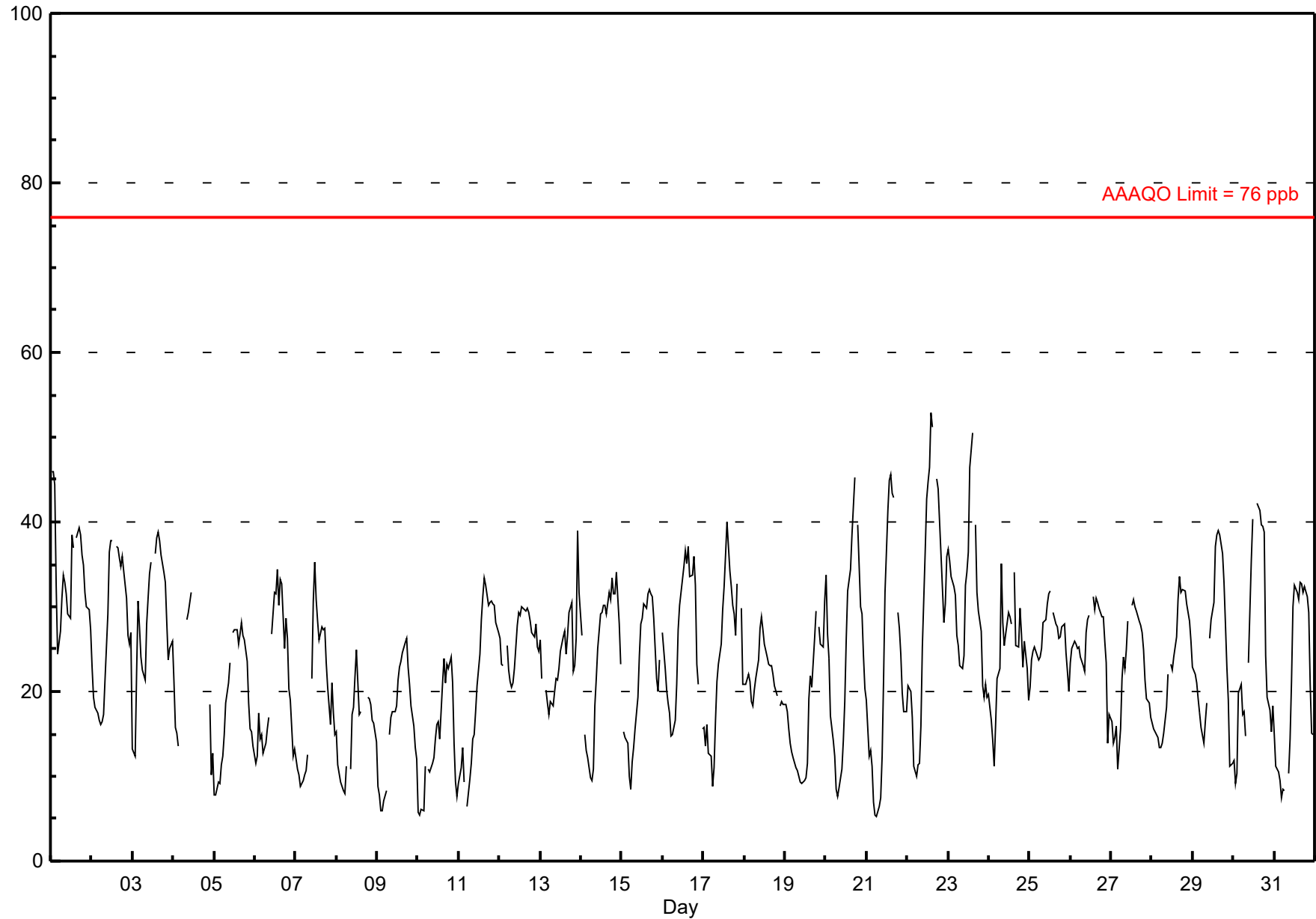
Hourly Averages

Oxides of Nitrogen (NO_x) - ppb
Wembley - July 2019



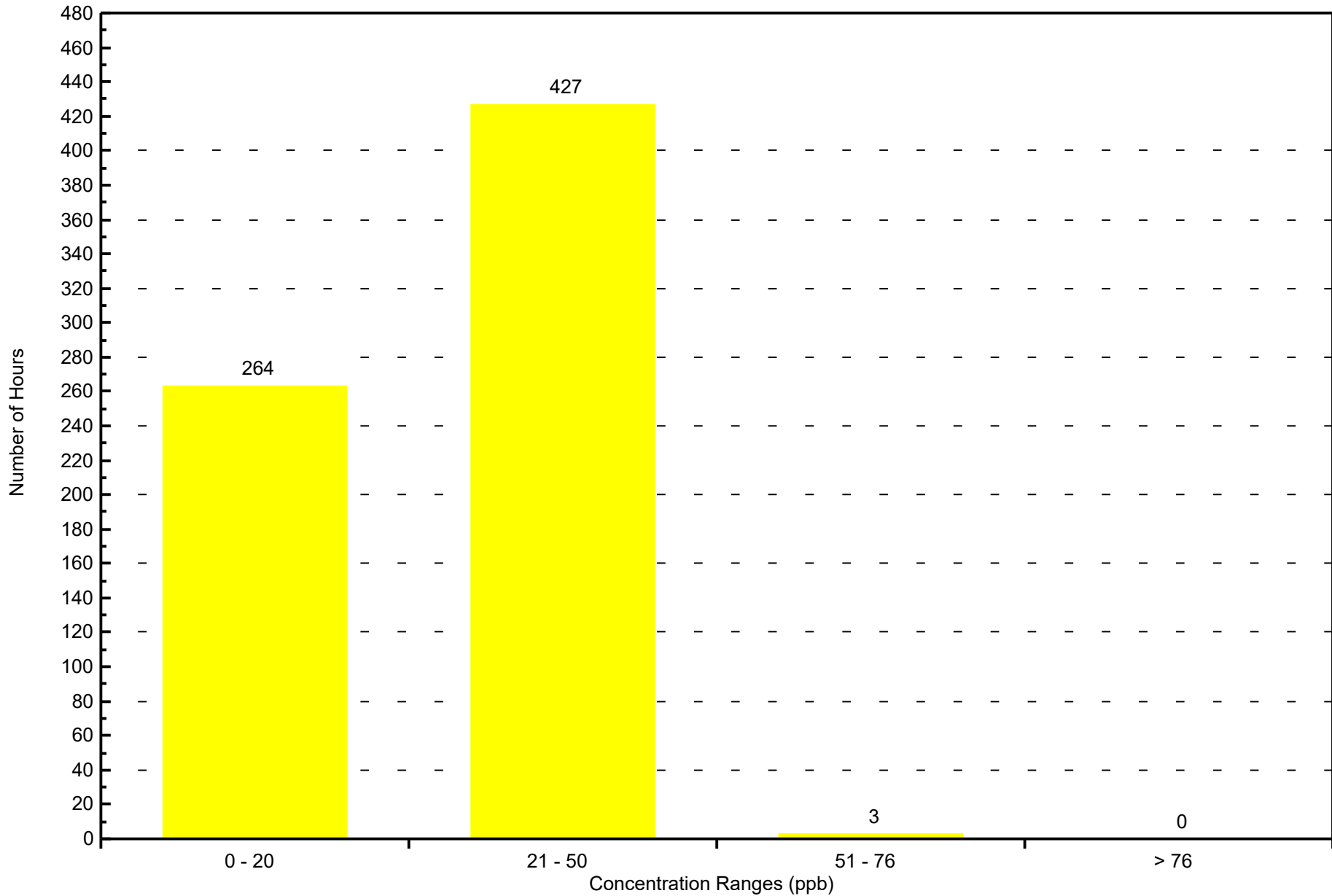
Hourly Averages

Ozone (O₃) - ppb
Wembley - July 2019



Histogram of Hourly Averages

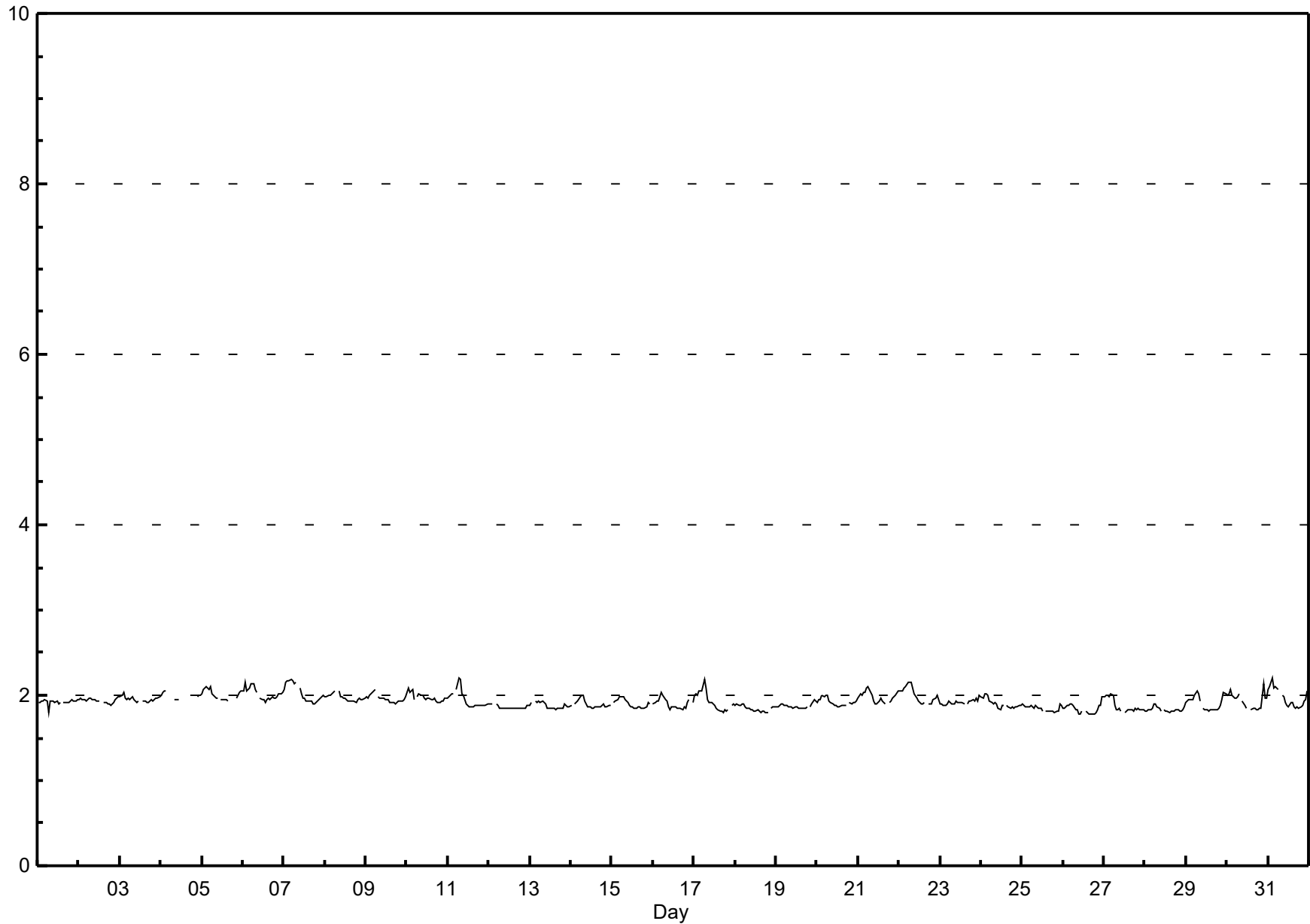
Ozone (O₃) - ppb
Wembley - July 2019



Hourly Averages

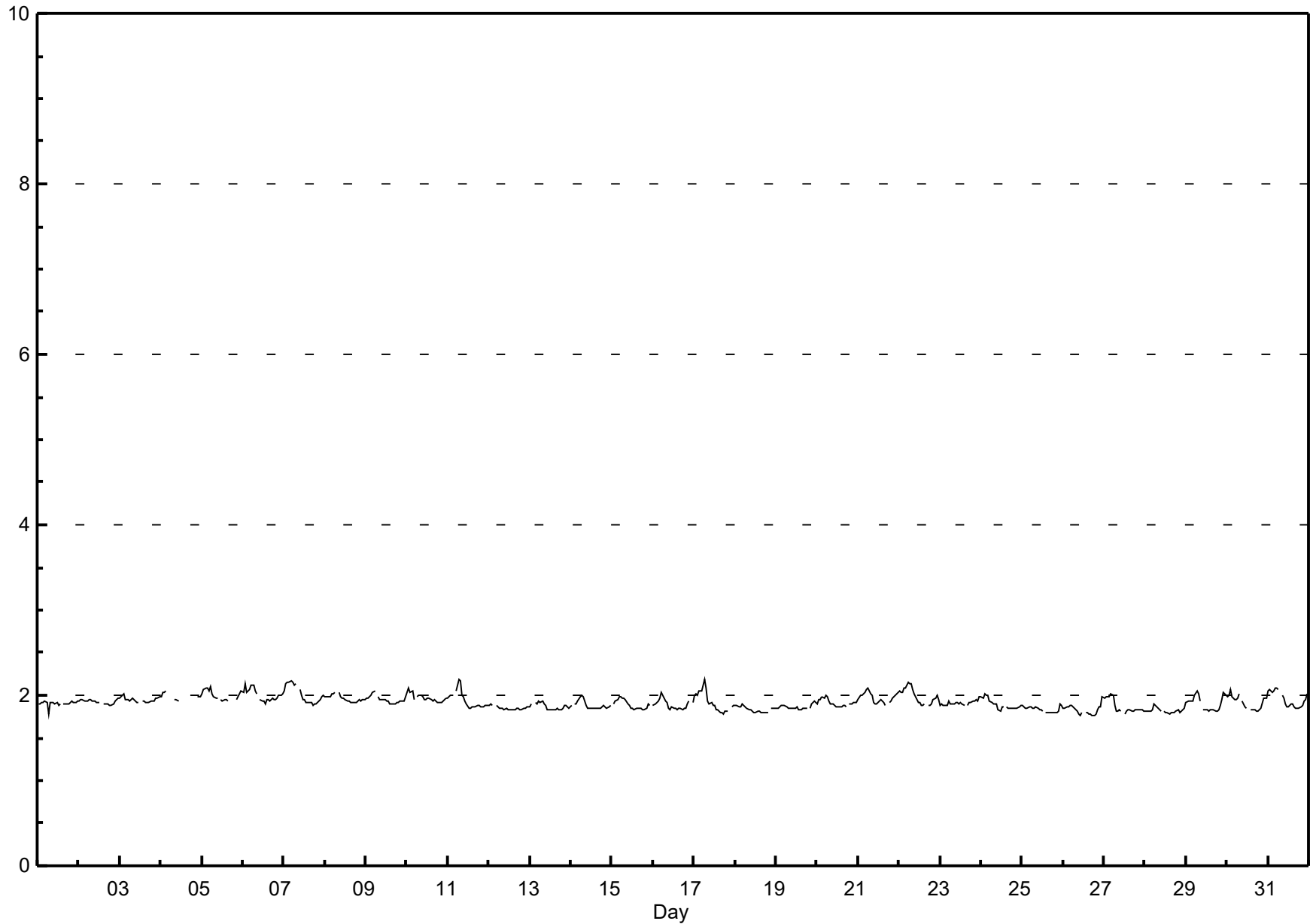
Total Hydrocarbons (THC) - ppm

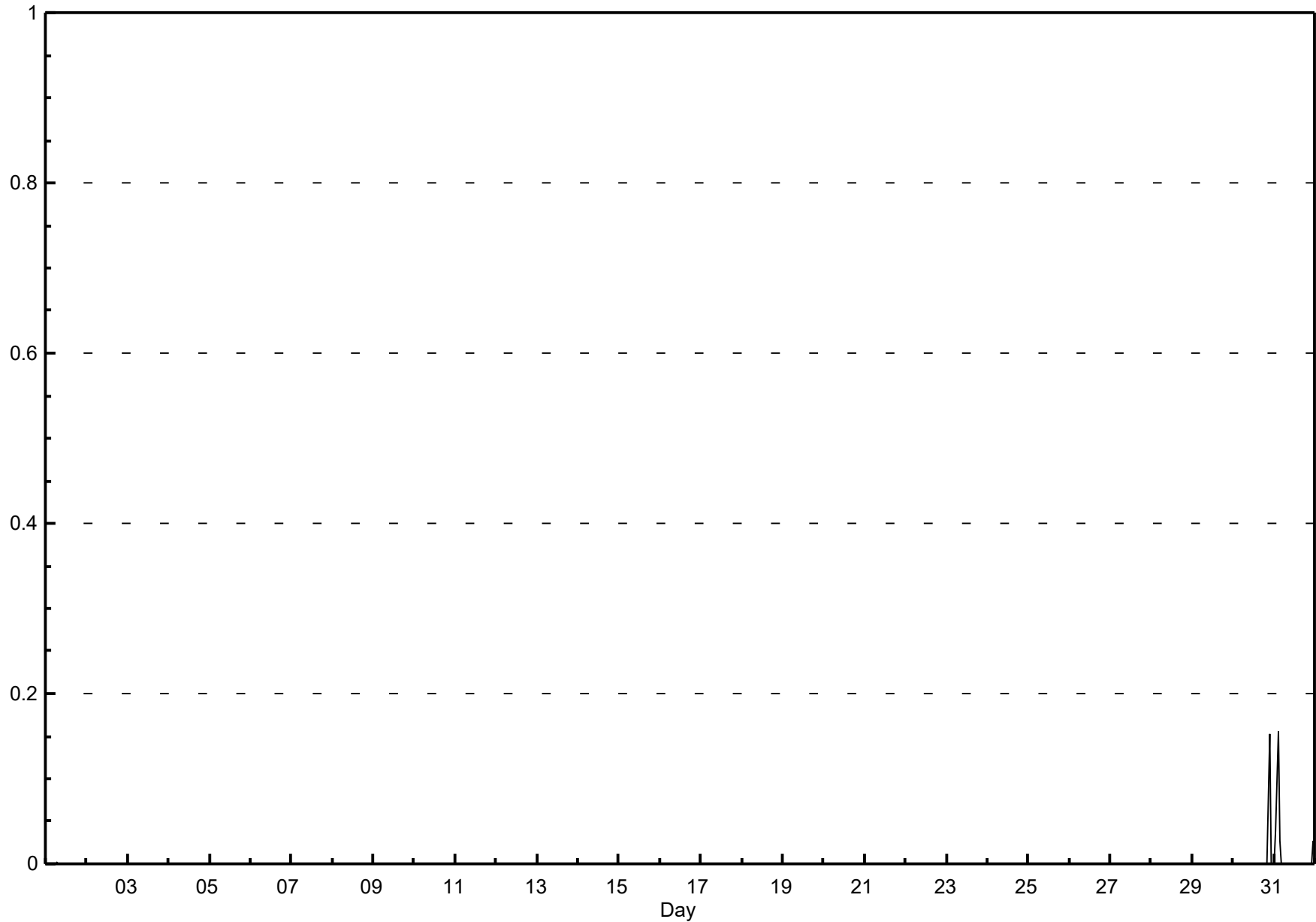
Wembley - July 2019



Hourly Averages

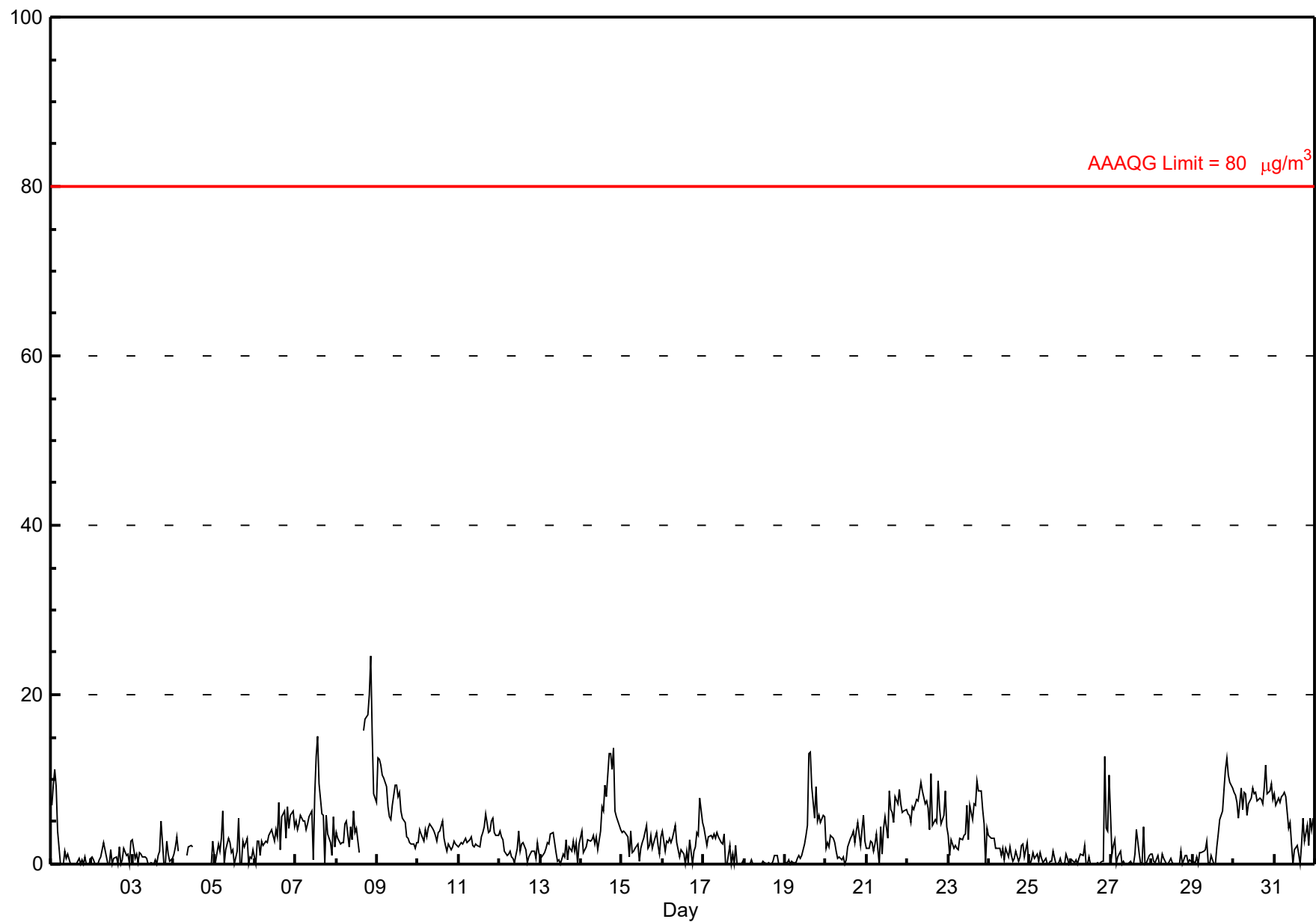
Methane (CH₄) - ppm
Wembley - July 2019





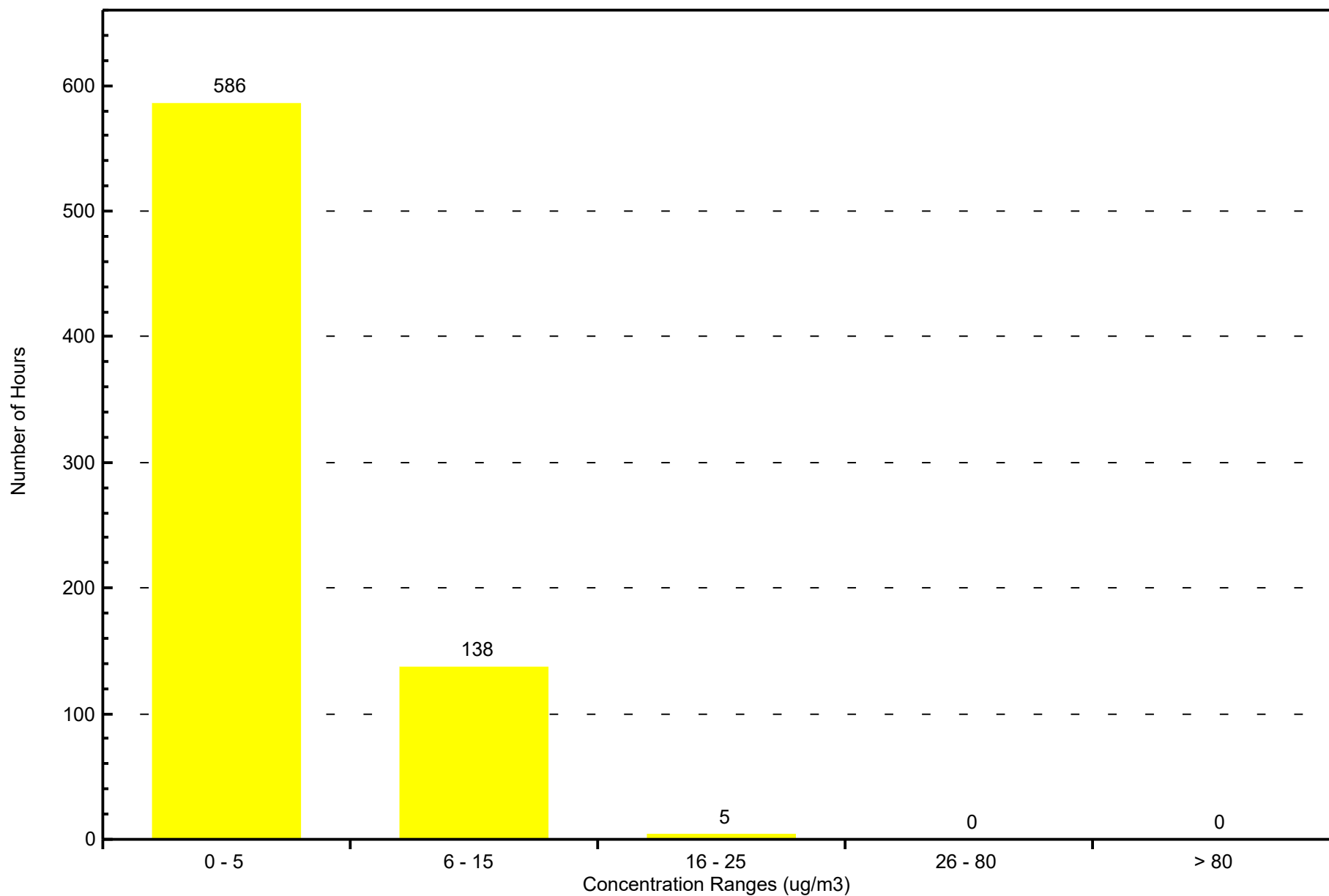
Hourly Averages

PM_{2.5} (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wembley - July 2019



Histogram of Hourly Averages

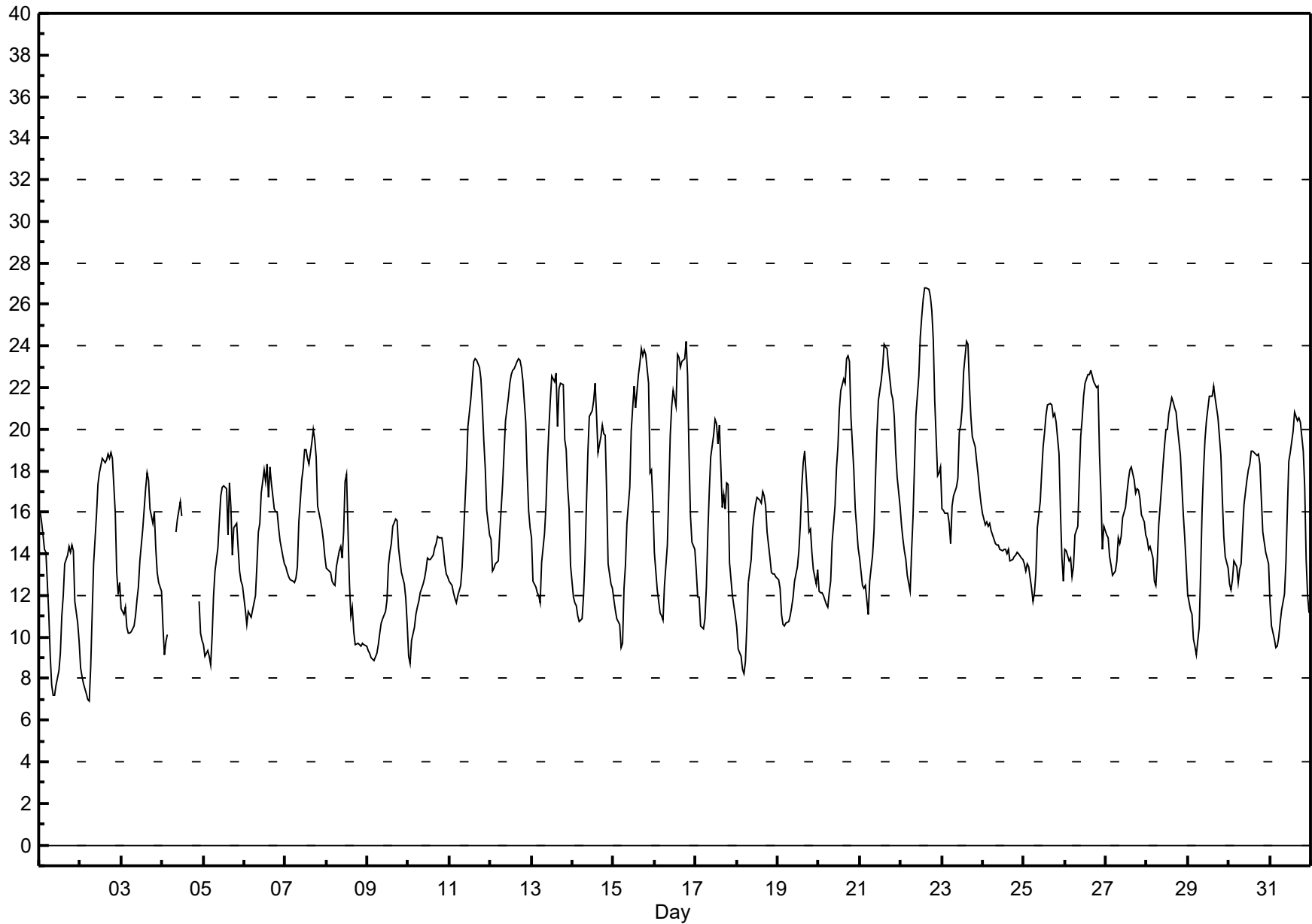
PM_{2.5} (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wembley - July 2019



Hourly Averages

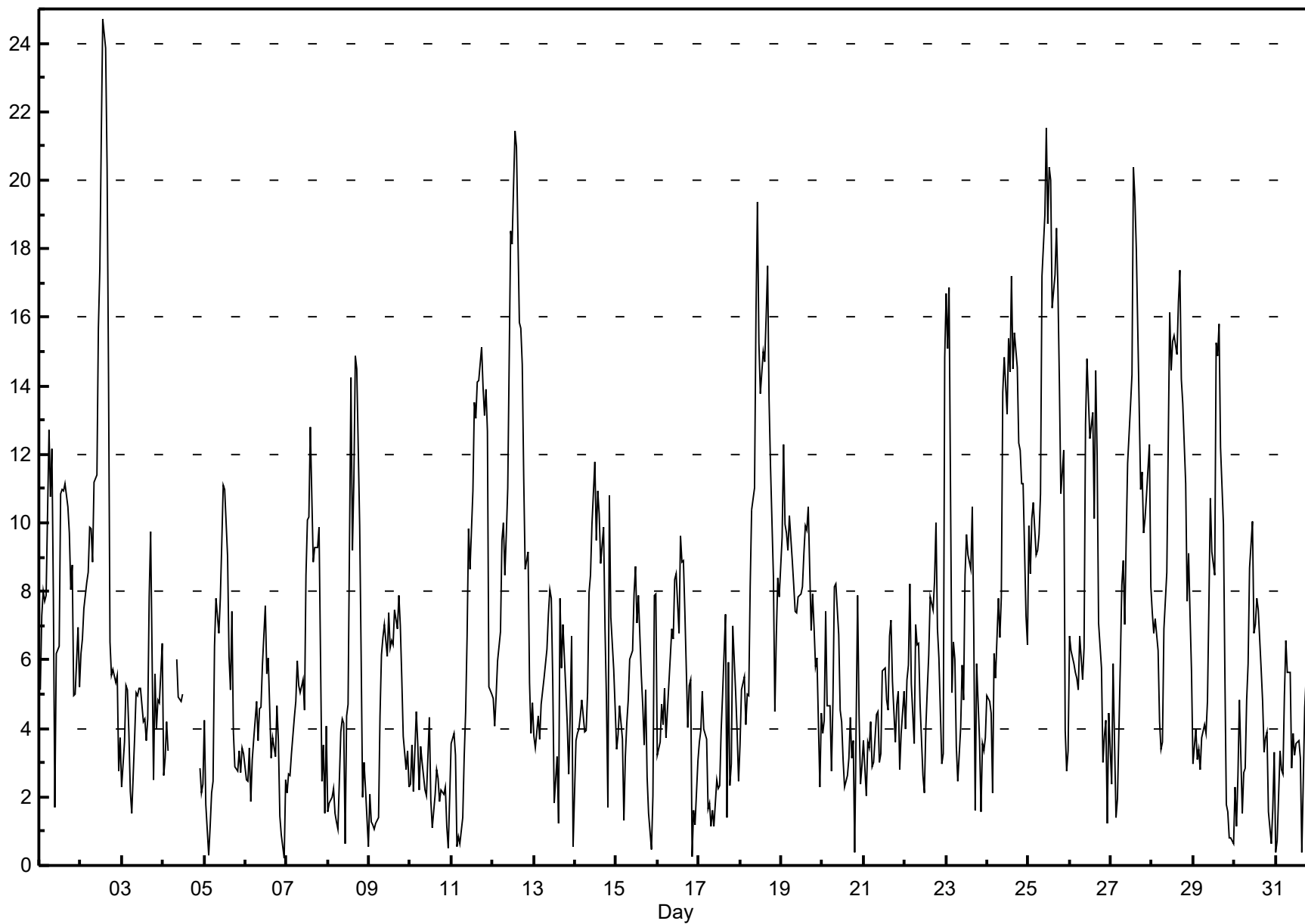
External Temperature (ET) - °C

Wembley - July 2019



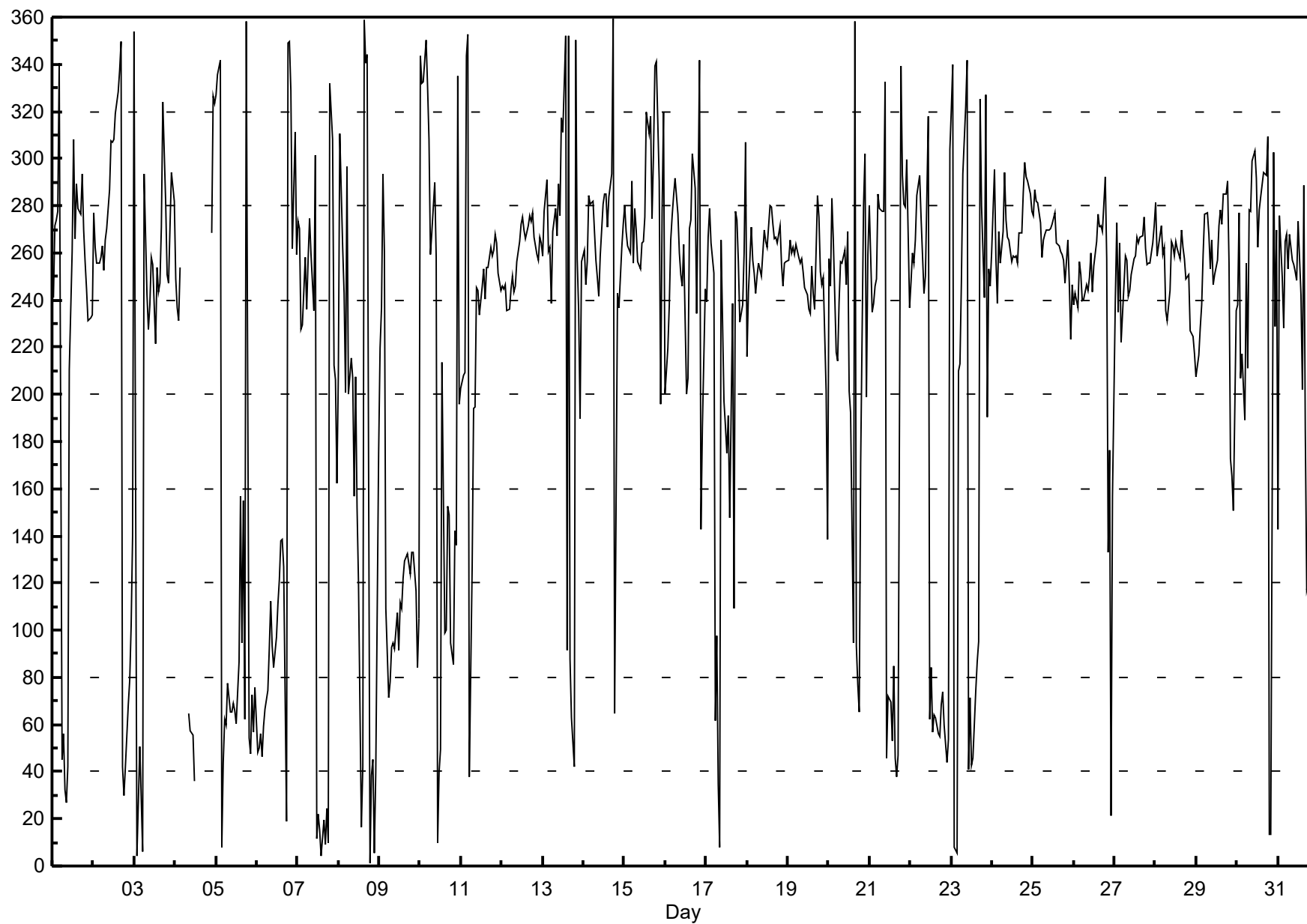
Hourly Averages

Wind Speed (WS) - km/h
Wembley - July 2019



Hourly Averages

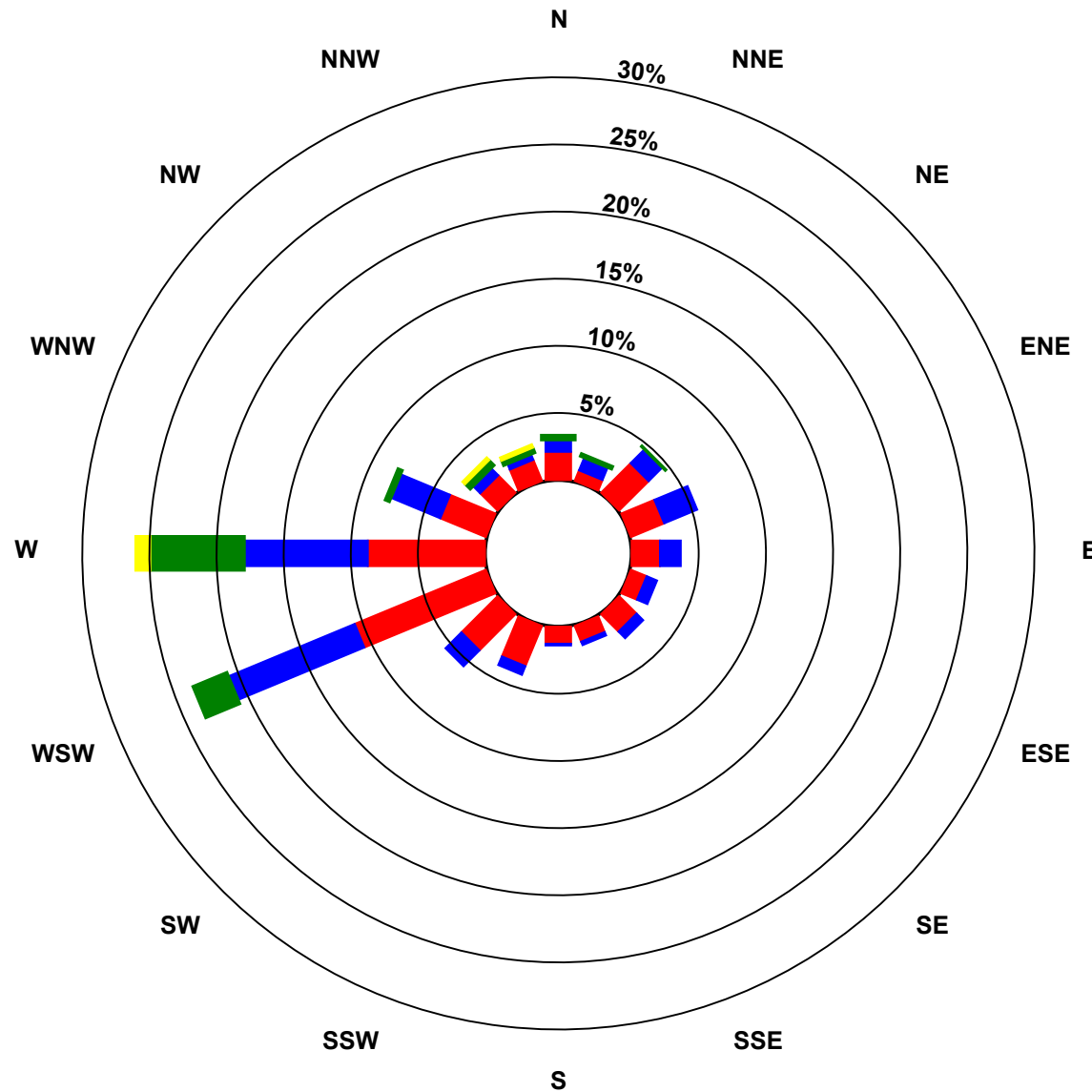
Wind Direction (WD) - deg
Wembley - July 2019



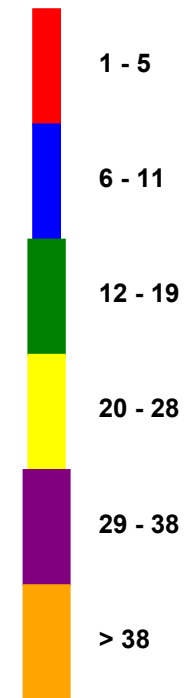
Wind Rose

Wind Speed (WS) (km/h)

Wembley - July 2019



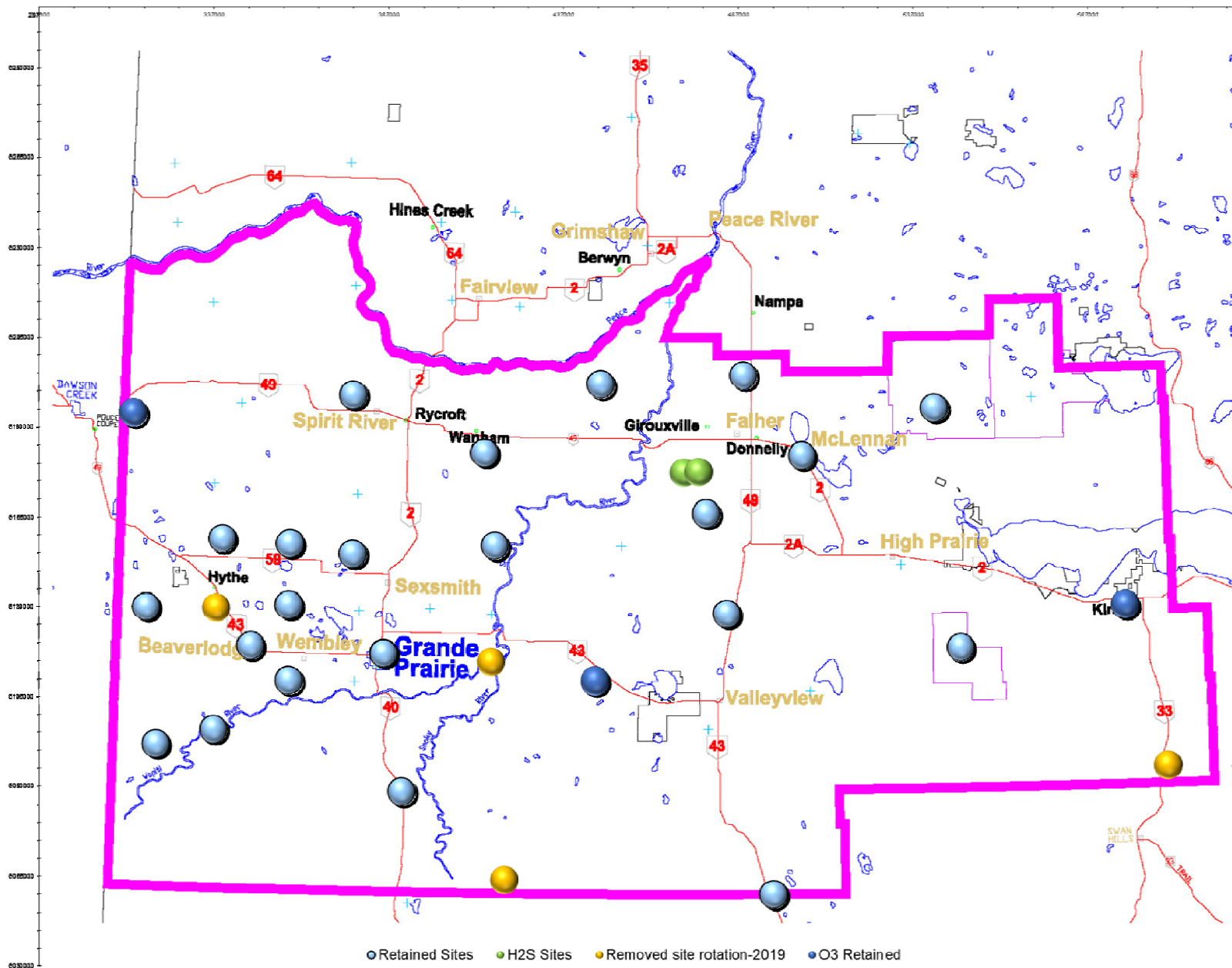
Wind Speed Classes (km/h)



PAZA

Monthly Passive Data Summary

Location of PAZA Passive Monitoring Stations



Peace Airshed Zone Association - PAZA Passive Stations
July 2019

Station Number	Station Name	SO2 ppb	O3 ppb	NO2 ppb	H2S ppb	Site Legal
Duplicates						
11a	Webber Creek	0.2				
11b	Webber Creek	0.2				
12a	Hythe			0.5		
12b	Hythe			0.5		
19a	Wanham			0.5		
19b	Wanham			0.6		
21a	Eaglesham	0.2				
21b	Eaglesham	0.2				
35a	Jean Cote	0.2				
35b	Jean Cote	0.2				
40a	McLennan			1.3		
40b	McLennan			1.2		
47a	Kinuso		26.1			
47b	Kinuso		24.2			
63a	Girouxville 3				0.2	
63b	Girouxville 3				0.2	
2	Bay Tree	0.1	28.5	0.1		13-16-078-13 W6M
5	Boone Creek	0.1		0.1		16-36-074-11 W6M
7	Steeprock Creek	0.1		0.1		09-35-072-13 W6M
9	Spirit River	0.2		0.2		08-12-079-07 W6M
11	Webber Creek	0.2		0.2		09-36-074-09 W6M
12	Hythe	0.2		0.5		14-36-072-11 W6M
14	Sylvester	0.1		0.3		08-06-069-12 W6M
16	Beaverlodge	0.2		0.8		15-36-071-10 W6M
17	Poplar	0.3		0.7		13-06-073-08 W6M
18	Saddle Hills	0.3		0.4		04-25-074-07 W6M
19	Wanham	0.3		0.5		16-22-077-03 W6M
21	Eaglesham	0.2		0.6		16-21-079-25 W5M
24	Wembley	0.1		1.1		12-31-070-08 W6M
25	Pinto Creek	0.1		0.3		04-24-069-11 W6M
27	Grande Prairie I	0.6		1.8		08-15-071-06 W6M
29	Smoky Heights	0.4		0.4		04-06-075-02 W6M
32	Gold Creek	0.8		1.0		06-33-067-05 W6M
33	Wapiti	0.3		0.7		02-25-071-03 W6M
35	Jean Cote	0.2		1.1		12-35-079-21 W5M
36	Guy	0.2		0.9	0.1	03-04-076-22 W5M
37	Crooked Creek	0.2	26.0	0.4		16-01-071-26 W5M
38	Karr Creek	0.1		0.6		10-16-065-02 W6M
39	Clouston Creek	0.1		0.3		12-01-073-22 W5M
40	McLennan	0.2		1.2		03-29-077-19 W5M
44	Peavine	0.1		0.1		03-05-079-15 W5M
46	Little Smoky	0.1		0.7		12-01-065-21 W5M
47	Kinuso	0.1	25.2	0.3		12-10-073-10 W5M
48	Deer Mountain 2	0.1		0.3		*
49	Grande Prairie HP	0.4		1.6		17-26-071-06 W6M
50	East Prairie	0.1		0.2		13-02-072-15 W5M
63	Girouxville 3				0.2	14-02-077-23 W5M
64	Girouxville 4				N/S	4-08-077-22 W5M

*BDL = Below Detection Level

*N/S - No sample

Passive Summary for July 2019

Stats	Sulphur Dioxide SO ₂	Ozone O ₃	Nitrogen Dioxide NO ₂	Hydrogen Sulphide H ₂ S
	ppb	ppb	ppb	ppb

Passive Summary for July 2019 (PAZA Zone)				
Mean	0.2	26.5	0.6	0.2
Standard Deviation	0.2	1.7	0.4	0.1
Minimum	0.1	25.2	0.1	0.1
Minimum At	Deer Mountain 2	Kinuso (#47)	Bay Tree (#2)	Guy (#36)
Maximum	0.8	28.5	1.8	0.2
Maximum At	Gold Creek (#32)	Bay Tree (#2)	Grande Prairie I (#27)	Girouxville 3 (#63)

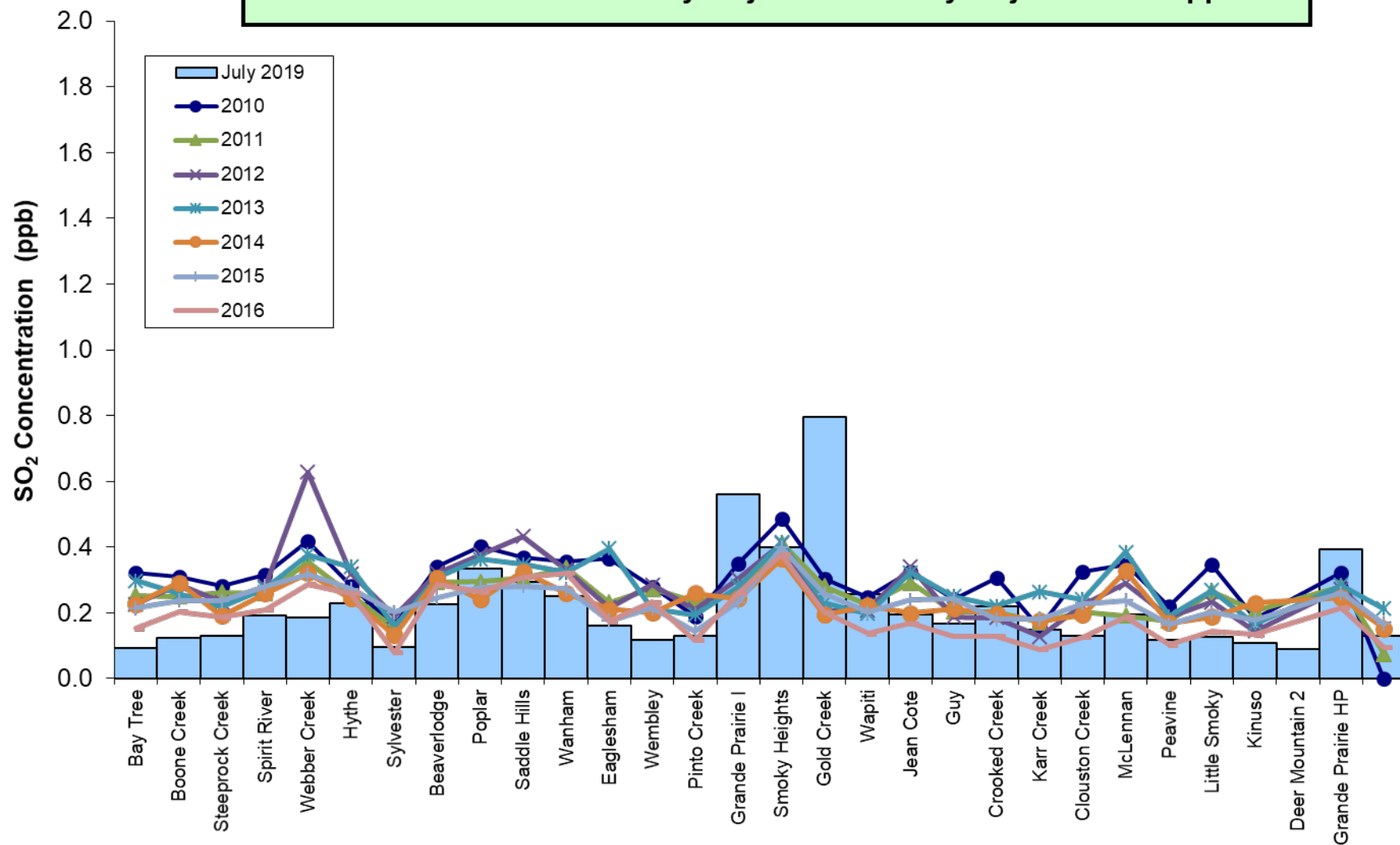
Comparison between Continuous and Passive monitoring at Beaverlodge (passive #16 Beaverlodge)

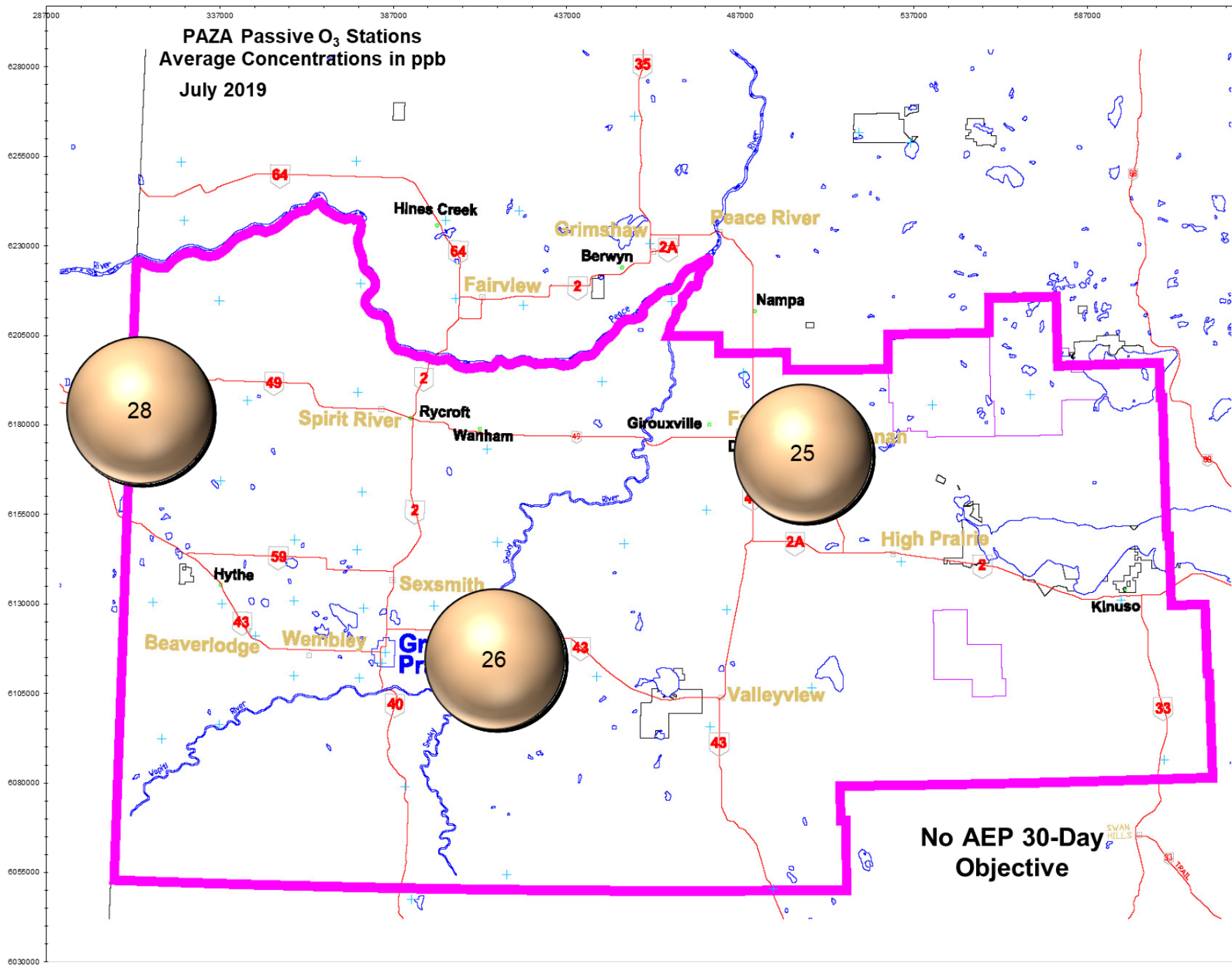
	SO ₂	NO ₂
PAZA Beaverlodge station	0.2	2.2
PAZA Beaverlodge passive	0.1	0.3

Comparison between Continuous and Passive monitoring at Henry Pirker (passive #49 Grande Prairie HP)

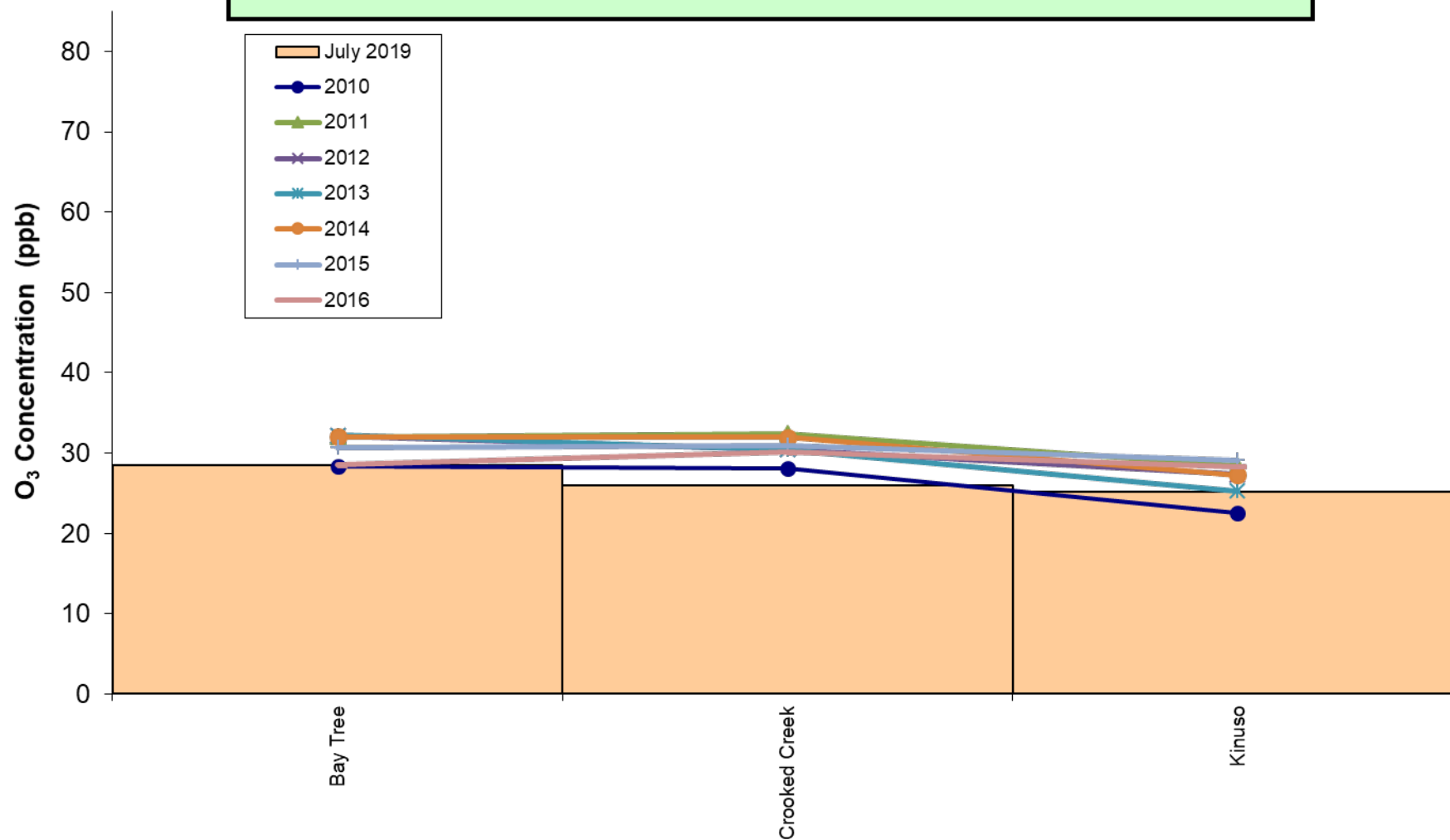
	SO ₂	NO ₂
PAZA Henry Pirker station	0.4	3.7
PAZA Grande Prairie passive	0.1	0.3

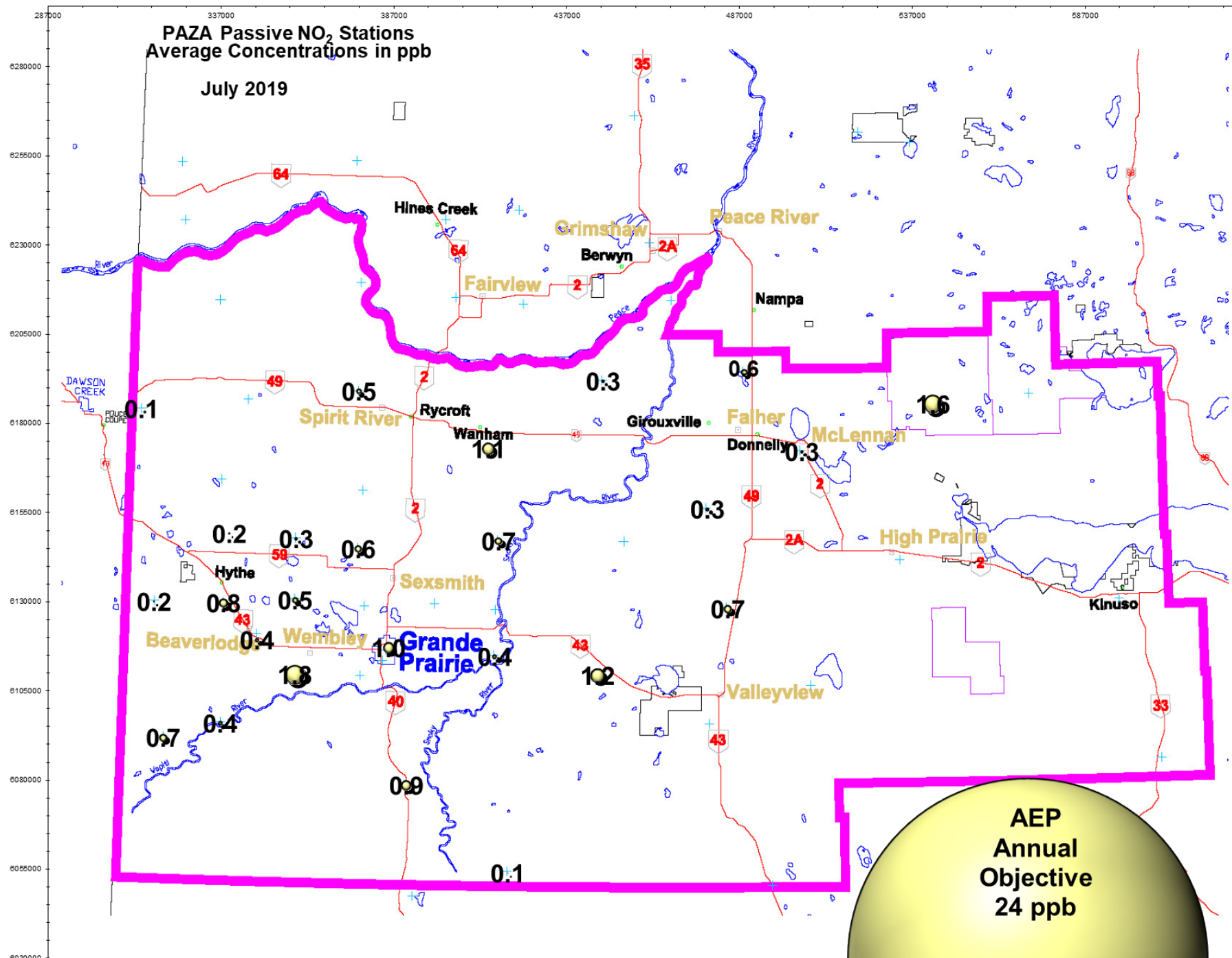
Alberta Ambient Air Quality Objective - 30-day Objective is 11 ppb



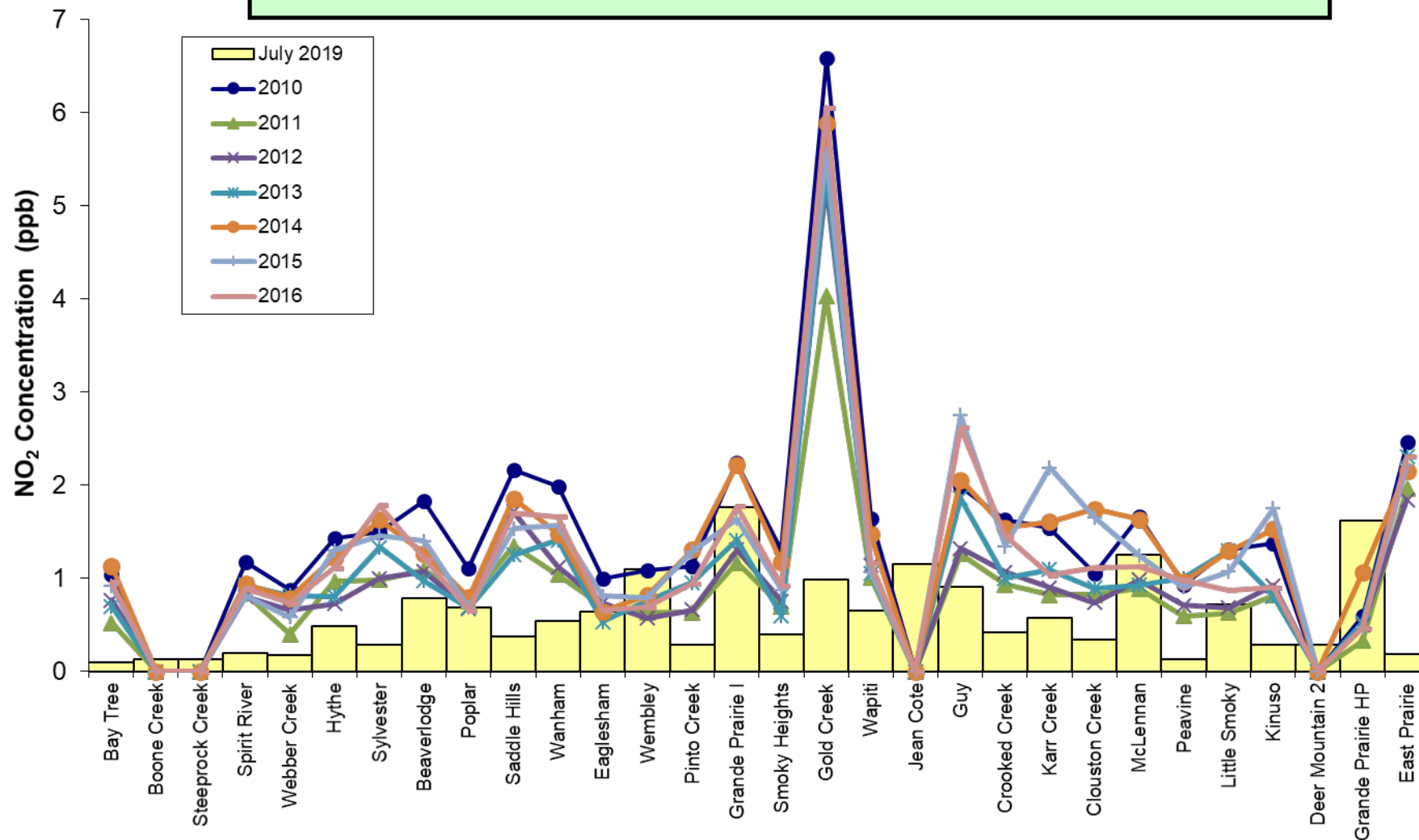


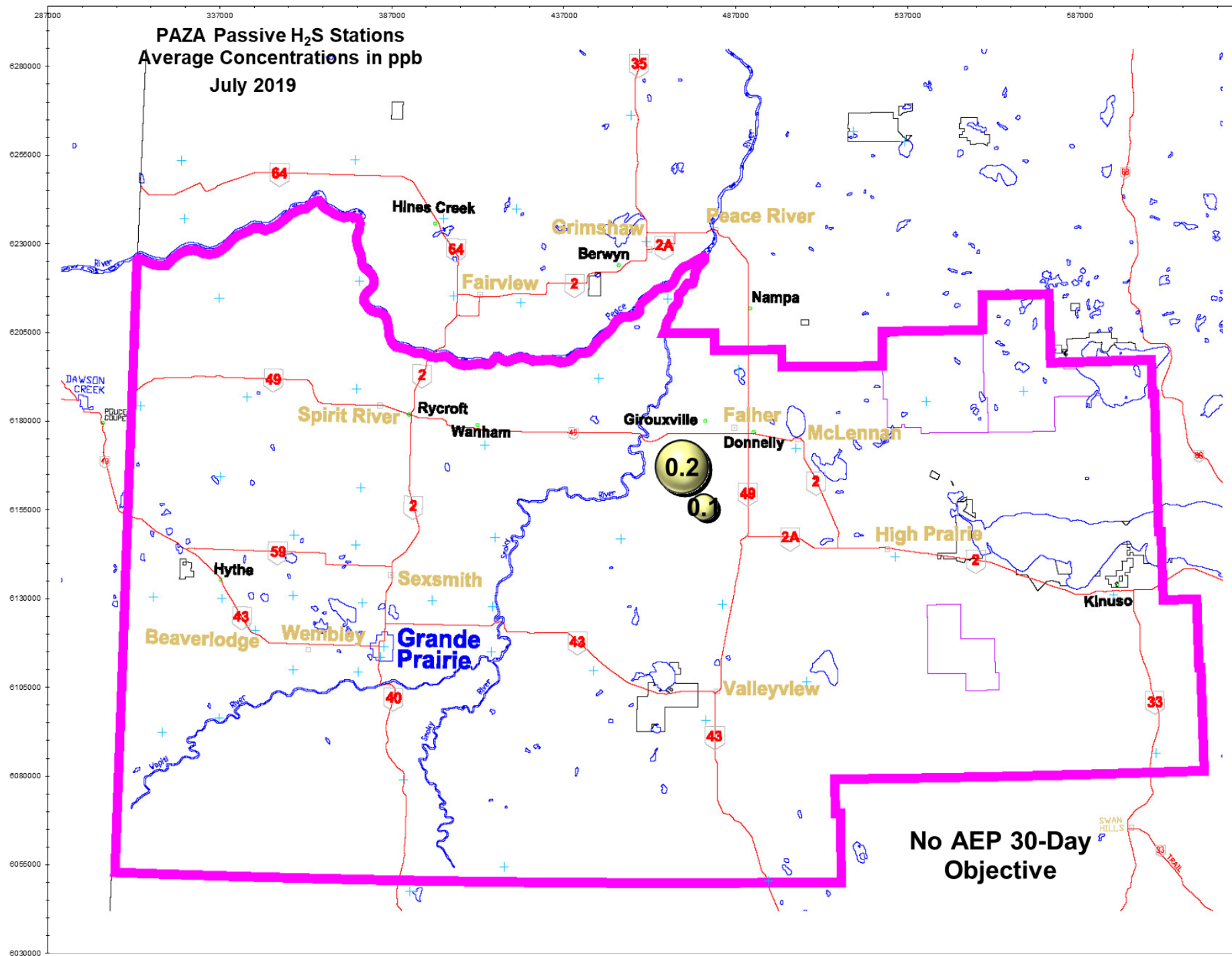
Alberta Ambient Air Quality Objective - No Annual O₃ Objective





Alberta Ambient Air Quality Objective - Annual NO₂ Objective is 24 ppb





**End of Report
PAZA
July 2019
Ambient Air Monitoring Report**