



Peace Airshed Zone Association

Ambient Air Monitoring Network Summary

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

Table of Contents	2
Cover Letter	3
Listing of Facilities	3
Calibration and Data Submission	5
Concentrations in excess of the Clean Air (Maximum Levels) Regulation	5
Operational times less than 90 percent	6
Certification	6
Continuous Network Equipment and Results Summary	
Beverlodge	8
Evergreen Park	9
Henry Pirker	10
Smoky Heights	11
Valleyview	11
Donnely	12
Portable-Wembley	13
Charts of Recorded Data	
Beverlodge	14
Evergreen Park	29
Henry Pirker	39
Smoky Heights	62
Valleyview	71
Donnely	80
Portable-Wembley	88
Passive Monitoring Data	106
End of Report	117

November 30th, 2019

Alberta Environment and Parks

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

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

Enclosed is the PAZA Ambient Air Quality Monitoring Network Report for the month of October 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

This report, hourly data and calibration reports for October 2019 were submitted to the ERC data system.

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

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

Operational times less than 90 percent:

The THC analyzer at Henry Pirker was offline from September 29 through October 4th due to malfunction. **Ref #360731**

The wind instrument at the Wembley station failed to report valid data October 17-29 and October 30-31 due to equipment malfunction. **Ref #361561**

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:

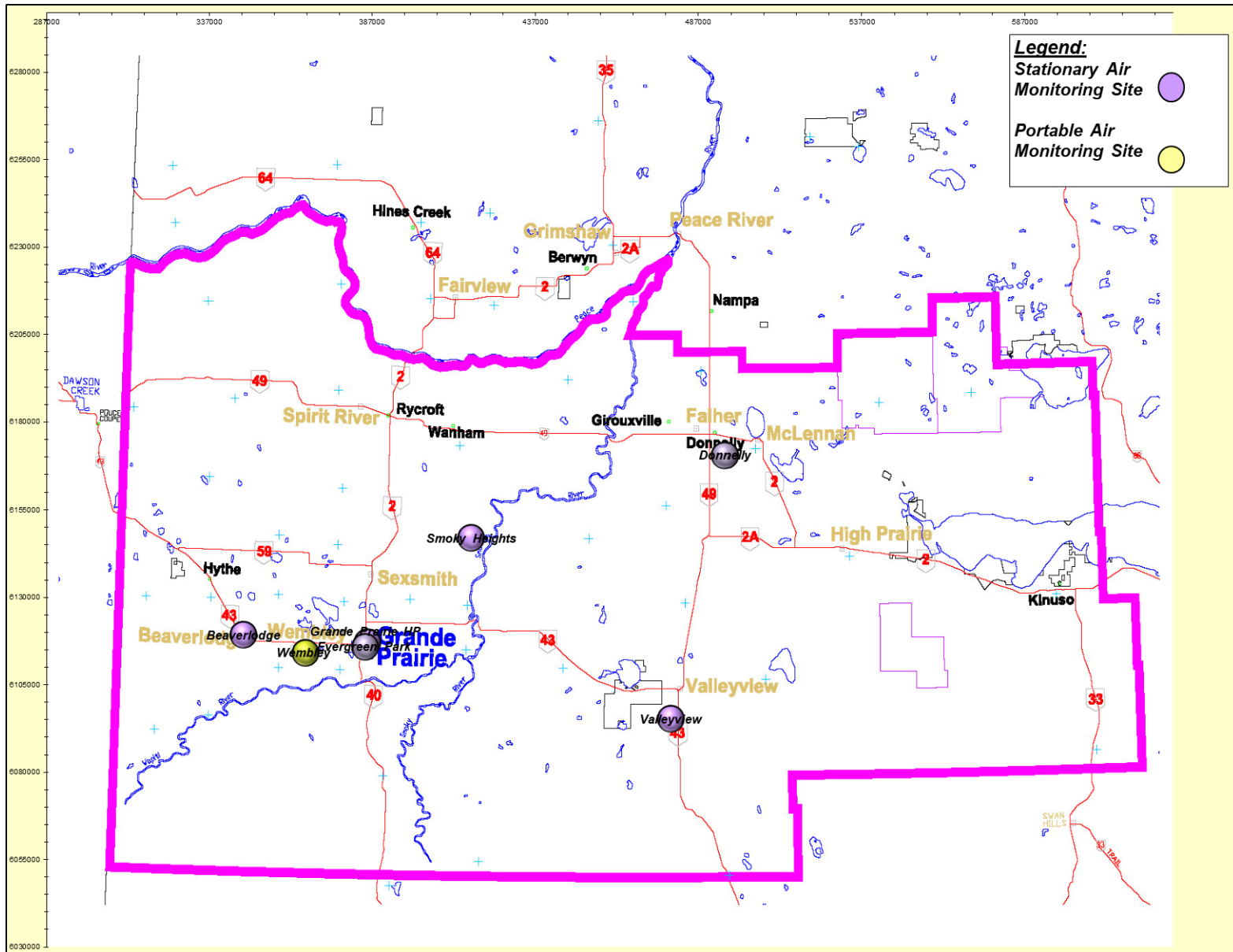
There were eight duplicate sites sampled in the month of October: Spirit River, Jean Cote, Karr Creek (SO₂), Crooked Creek (O₃), Saddle Hills, Wembley, Clouston Creek (NO₂), and Girouxville 4 (H₂S). The passive sample analyses were performed by MAXXAM Analytics Inc. There were no exceedances of the AAAQOs 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

Oct-2019 Peace 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	0.3	0.0	0	0	0	5.7	Oct-28 12:00	0.9	Oct-15	100.0	Oct-02
NO (ppb)					0.8	0.0	-	-	-	25.5	Oct-16 12:00	8.1	Oct-16	99.5	Oct-01
NO ₂ (ppb)	159	106			3.3	0.2	0	0	-	20.0	Oct-16 20:00	10.4	Oct-16	99.5	Oct-01
NO _x (ppb)					4.1	0.2	-	-	-	37.2	Oct-03 09:00	18.6	Oct-16	99.5	Oct-01
O ₃ (ppb)	76				21.9	0.2	0	-	-	39.8	Oct-24 16:00	33.1	Oct-06	99.9	Oct-02
O ₃ (ppb) - 8-hr							-	-	-			35.6	Oct-24		-
PM _{2.5} (µg/m3)	80	29			3.7	0.0	0	0	-	39.5	Oct-31 22:00	10.3	Oct-03	99.1	Oct-02
RH (%)					74.9	31.1	-	-	-	100.0	Oct-13 23:00	96.8	Oct-15	100.0	-
Temp (°C)					2.4	-13.3	-	-	-	17.3	Oct-02 16:00	9.8	Oct-02	100.0	-
WSPD v (km/hr)					5.4	0.2	-	-	-	49.8	Oct-05 16:00	29.3	Oct-05	100.0	13/08/2019
WDIR					W		-	-	-	-	-	-	-	100.0	13/08/2019

Parameter	Analyzer		Notes
	Make	Model	
SO ₂	TECO	43I	
NO/NO ₂ /NO _x	TECO	42I	Manifold cleaning Oct 2. Equipment check Oct 19.
O ₃	TECO	49I	Manifold cleaning Oct 2.
PM _{2.5}	SHARP	5030	Logging offline during Oct 1 calibration.
ET/RH			
WS/WD	MetOne	50.5	

Evergreen Park Air Monitoring Station

Oct-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	0.5	0.0	0	0	0	16.3	Oct-05 02:00	2.0	Oct-13	100.0	Oct-30
TRS (ppb)					0.4	0.1	-	-	-	1.9	Oct-17 07:00	0.8	Oct-17	100.0	Oct-19
PM _{2.5} (µg/m3)	80	29			3.4	0.0	0	0	-	35.7	Oct-05 08:00	8.7	Oct-03	100.0	Sep-17
RH (%)					74.9	26.4	-	-	-	99.0	Oct-17 10:00	96.7	Oct-16	100.0	-
Temp (°C)					2.5	-15.8	-	-	-	18.4	Oct-02 15:00	10.2	Oct-03	100.0	-
WSPD v (km/hr)					3.0	0.0	-	-	-	18.9	Oct-05 19:00	14.8	Oct-05	100.0	18/09/2019
WDIR					WSW		-	-	-	-	-	-	-	100.0	18/09/2019

Parameter	Analyzer		Notes
	Make	Model	
SO ₂	TECO	43I	
TRS	TECO	43C/43I	Analyzer spans failed Oct 16-19 due to stabilization after perm tube replacement in September
PM _{2.5}	SHARP	5030	
ET/RH			
WS/WD	Gil/RMYoung	MetPak/RMY86004	

Henry Pirker Air Monitoring Station

Oct-2019 Peace 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	0.8	0.0	0	0	0	24.5	Oct-04 21:00	5.3	Oct-04	100.0	Oct-07
H ₂ S (ppb)					0.2	0.0	0	0	-	1.3	Oct-16 11:00	0.5	Oct-16	100.0	Oct-09
NO (ppb)					5.1	0.0	-	-	-	94.0	Oct-16 11:00	31.0	Oct-16	100.0	Oct-07
NO ₂ (ppb)	159	106			8.7	1.1	0	0	-	35.3	Oct-30 08:00	18.1	Oct-11	100.0	Oct-07
NO _x (ppb)					14.0	1.3	-	-	-	116.5	Oct-16 12:00	44.8	Oct-16	100.0	Oct-07
O ₃ (ppb)	76				16.8	0.2	0	-	-	36.3	Oct-12 14:00	31.5	Oct-06	100.0	Oct-08
O ₃ (ppb) - 8-hr							-	-	-			34.8	Oct-06		-
CO (ppm)	13				0.19	0.0	0	0	-	1.0	Oct-02 08:00	0.4	Oct-16	100.0	Oct-08
CO (ppm) - 8-hr	5						0					0.7	Oct-18		-
THC (ppm)					1.9	1.6	-	-	-	3.0	Oct-18 02:00	2.2	Oct-20	79.7	Oct-29
CH ₄ (ppm)					1.9	1.6	-	-	-	2.8	Oct-18 04:00	2.2	Oct-20	79.7	Oct-29
NMHC (ppm)					0.0	0.0	-	-	-	0.4	Oct-18 00:00	0.0	Oct-18	79.7	Oct-29
PM _{2.5} (µg/m3)	80	29			4.6	0.2	0	0	-	43.3	Oct-11 10:00	13.6	Oct-11	100.0	Oct-03
RH (%)					68.3	29.9	-	-	-	89.5	Oct-17 09:00	85.6	Oct-16	100.0	-
SR (W/m ²)					51.1	0.0	-	-	-	418.9	Oct-02 13:00	114.9	Oct-02	100.0	-
Temp (°C)					2.9	-14.5	-	-	-	18.9	Oct-02 15:00	10.3	Oct-03	100.0	-
WSPD v (km/hr)					4.8	0.0	-	-	-	31.3	Oct-06 11:00	20.6	Oct-05	100.0	12/08/2019
WDIR					W		-	-	-	-	-	-	-	100.0	12/08/2019

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	
THC/CH ₄ /NMHC	TECO	55I	Analyzer returned irregular readings Sep 28-29. Troubleshooting and repair work continued to October 4.
			Pump seized Oct 14, repaired and further repairs performed Oct 15-17. Recalibrated Oct 29 after spans stabilized
PM _{2.5}	SHARP	5030	
ET/RH			
SR			
WS/WD	MetOne	50.5	

Smoky Heights Air Monitoring Station

Oct-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	0.4	0.0	0	0	0	7.2	Oct-04 11:00	1.1	Oct-30	99.1	Oct-09
TRS (ppb)					0.2	0.0	-	-	-	1.4	Oct-18 01:00	0.5	Oct-17	99.1	Oct-09
PM _{2.5} (µg/m3)	80	29			4.3	0.2	0	0	-	72.1	Oct-27 03:00	10.2	Oct-27	99.1	Oct-09
Temp (°C)					2.1	-18.0	-	-	-	17.4	Oct-02 16:00	9.2	Oct-02	99.1	-
WSPD v (km/hr)					8.8	0.3	-	-	-	57.4	Oct-06 13:00	26.3	Oct-06	100.0	04/06/2019
WDIR					WSW		-	-	-	-	-	-	-	100.0	04/06/2019

Parameter	Analyzer		Notes
	Make	Model	Power outage Oct 6.
SO ₂	TECO	43I	
TRS	TECO	43I	
PM _{2.5}	SHARP	5030	
ET			
WS/WD	MetOne	50.5	

Valleyview Air Monitoring Station

Oct-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	0.7	0.0	0	0	0	74.3	Oct-31 07:00	8.8	Oct-31	100.0	Oct-21
H ₂ S (ppb)	10	3			0.1	0.0	0	0	-	0.9	Oct-31 07:00	0.3	Oct-31	100.0	Oct-18
RH (%)					78.2	30.9	-	-	-	100.0	Oct-03 05:00	96.8	Oct-25	100.0	-
Temp (°C)					5.7	-9.4	-	-	-	19.6	Oct-02 15:00	12.1	Oct-05	100.0	-
WSPD v (km/hr)					1.9	0.0	-	-	-	14.8	Oct-28 01:00	9.5	Oct-05	100.0	23/09/2019
WDIR					W		-	-	-	-	-	-	-	100.0	23/09/2019

Parameter	Analyzer		Notes
	Make	Model	
SO ₂	TECO	43I	Analyzer maintenance Oct 18, recalibrated Oct 21
H ₂ S	TECO	450I	
ET/RH			
WS/WD	RMYoung	RMY86004	

Donnelly Air Monitoring Station

Oct-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	0.2	0.0	0	0	0	2.4	Oct-18 14:00	0.4	Oct-03	100.0	Oct-23
H ₂ S (ppb)	10	3			0.0	0.0	0	0	-	0.4	Oct-17 08:00	0.2	Oct-23	99.6	Oct-23
Temp (°C)					3.0	-11.8	-	-	-	18.4	Oct-03 17:00	9.9	Oct-02	100.0	-
WSPD v (km/hr)					6.1	1.5	-	-	-	39.6	Oct-06 15:00	22.6	Oct-06	100.0	26/06/2019
WDIR					WSW		-	-	-	-	-	-	-	100.0	26/06/2019

Parameter	Analyzer		Notes
	Make	Model	
SO ₂	TECO	43I	Zero air system failed during calibration Oct 22. Calibrations aborted and restarted Oct 23 after equipment replacement
H ₂ S	TECO	450I/43C	
ET/RH			
WS/WD	RMYoung	5103	

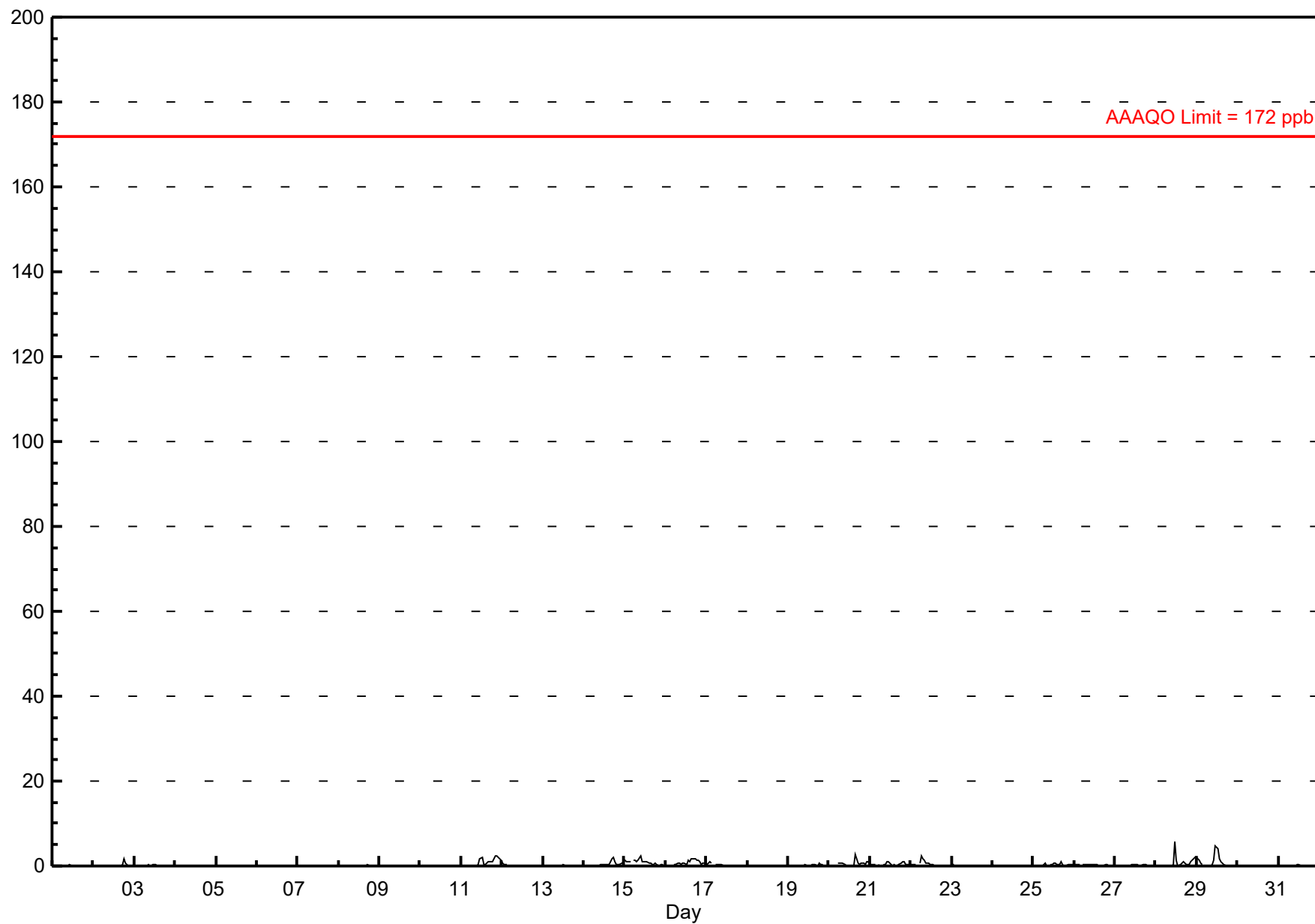
Wembley-Portable Air Monitoring Station

Oct-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	Wembley-Portable	0.7	0.0	0	0	0	51.4	Oct-31 05:00	3.4	Oct-13	97.6	Oct-11
TRS (ppb)					0.1	0.0	-	-	-	1.3	Oct-11 19:00	0.5	Oct-16	97.6	Oct-10
NO (ppb)					0.7	0.0	-	-	-	19.0	Oct-16 16:00	6.5	Oct-16	97.6	Oct-11
NO ₂ (ppb)	159	106			2.4	0.2	0	0	-	19.5	Oct-21 05:00	6.6	Oct-16	97.6	Oct-11
NO _x (ppb)					3.0	0.2	-	-	-	37.6	Oct-21 05:00	13.2	Oct-16	97.6	Oct-11
O ₃ (ppb)	76				21.8	1.2	0	-	-	41.8	Oct-24 16:00	32.5	Oct-24	97.6	Oct-11
O ₃ (ppb) - 8-hr							-	-	-			38.5	Oct-07		-
THC (ppm)					2.0	1.8	-	-	-	2.4	Oct-12 01:00	2.2	Oct-16	95.6	Oct-19
CH ₄ (ppm)					2.0	1.8	-	-	-	2.4	Oct-12 01:00	2.2	Oct-16	95.6	Oct-19
NMHC (ppm)					0.0	0.0	-	-	-	0.0	Oct-20 11:00	0.0	Oct-20	95.6	Oct-19
PM _{2.5} (µg/m3)	80	29			2.1	0.0	0	0	-	13.9	Nov-01 00:00	5.6	Oct-03	97.6	Oct-10
Temp (°C)					2.4	-15.2	-	-	-	18.5	Oct-02 16:00	9.5	Oct-03	97.6	-
WSPD v (km/hr)					7.1	0.2	-	-	-	28.4	Oct-05 18:00	19.9	Oct-05	60.0	07/08/2019
WDIR					SSW		-	-	-	-	-	-	-	60.0	07/08/2019

Parameter	Analyzer		Notes
	Make	Model	
SO ₂	TECO	43I	Logger intermittently failed to capture data Oct 5-7
TRS	TECO	43I	
NO/NO ₂ /NO _x	TECO	42I	
O ₃	TECO	49I	
THC/CH ₄ /NMHC	TECO	55I	Analyzer flamed out Oct 11, reset. Calibration attempted Oct 16, aborted due to leak in zero air system. Calibrated Oct 19
PM _{2.5}	TEOM		
ET/RH			
WS/WD	MetOne	50.5	Wind system failed to return valid data Oct 17-28 and 30-31.

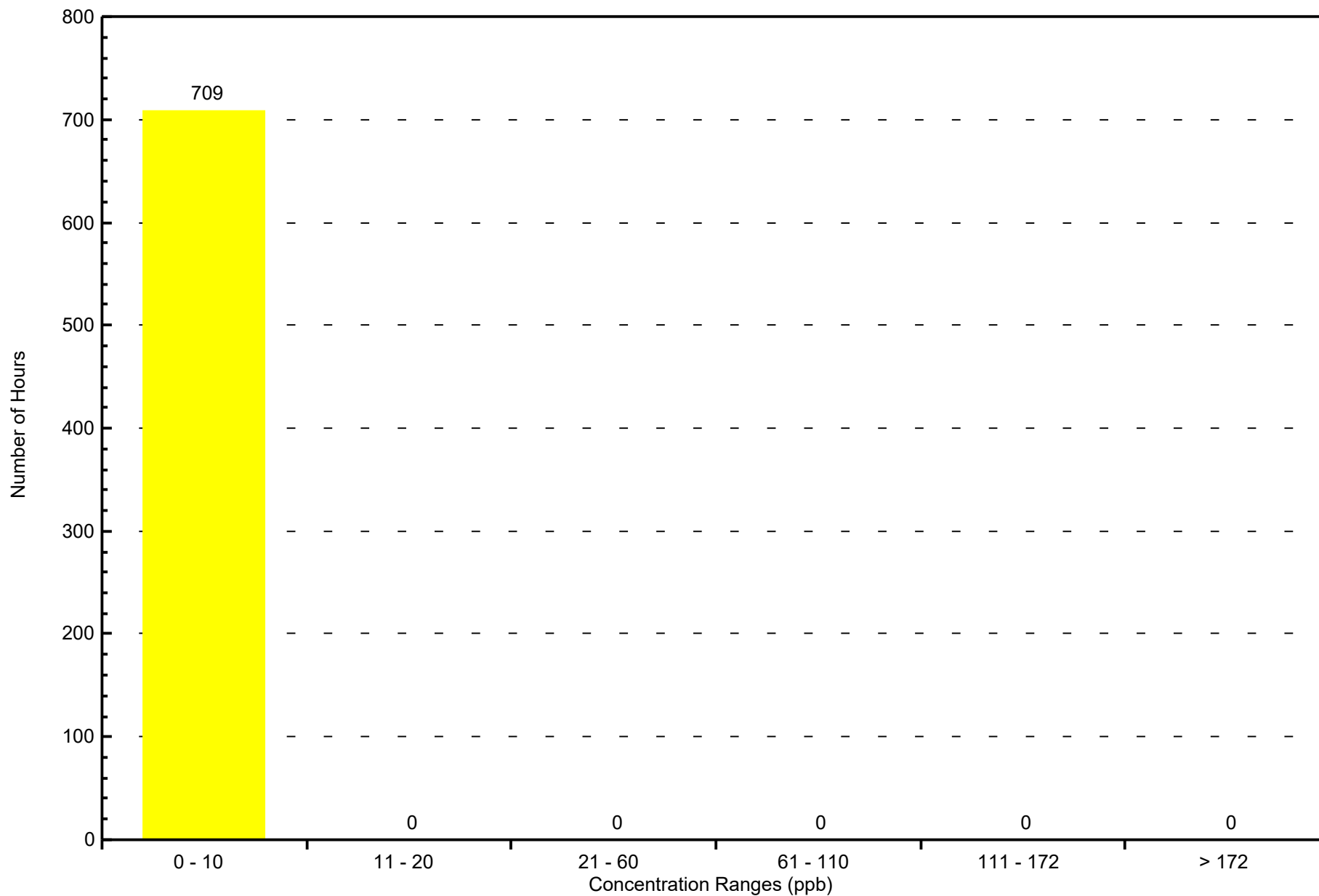
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Beaverlodge - October 2019



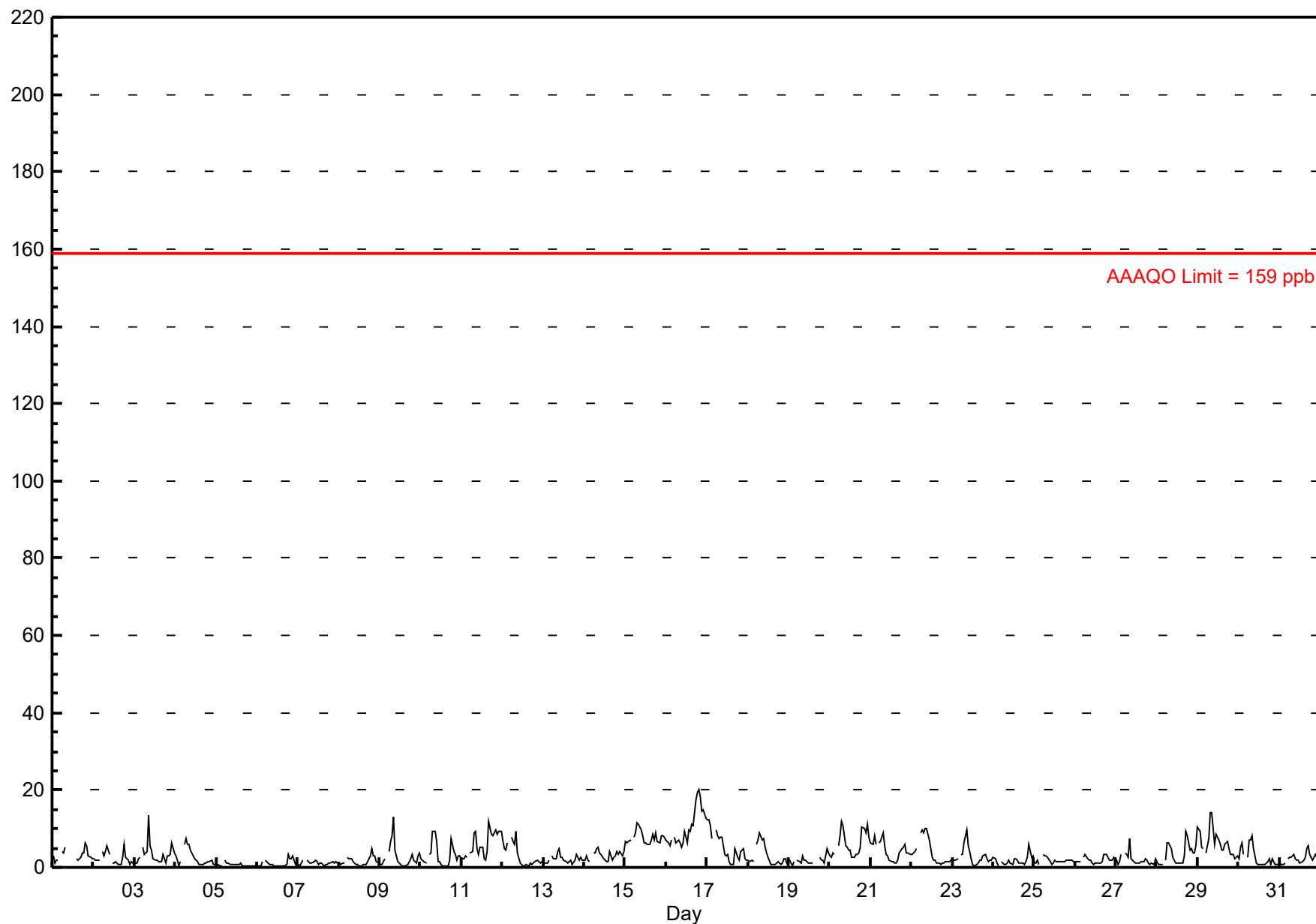
Histogram of Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Beaverlodge - October 2019



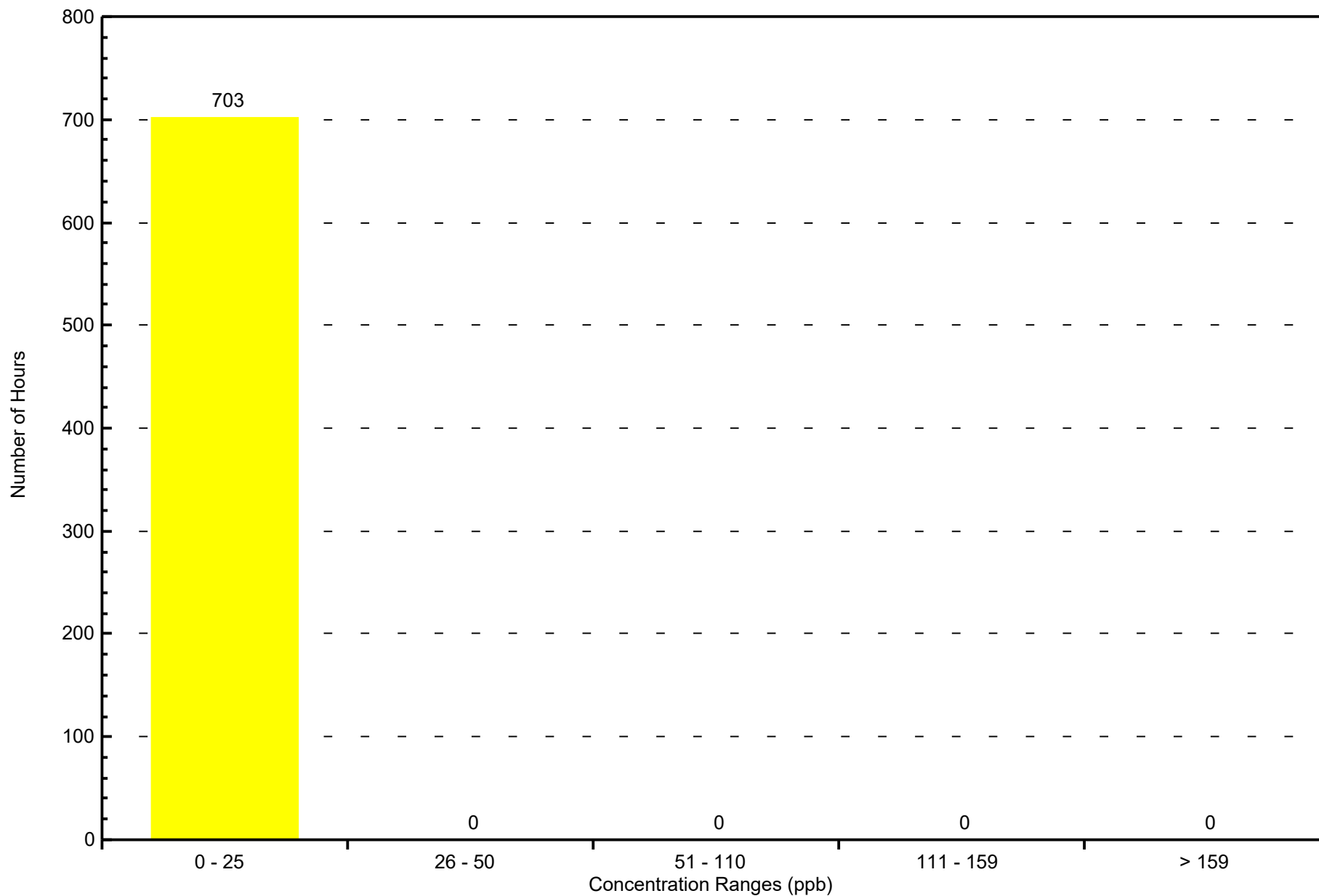
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Beaverlodge - October 2019



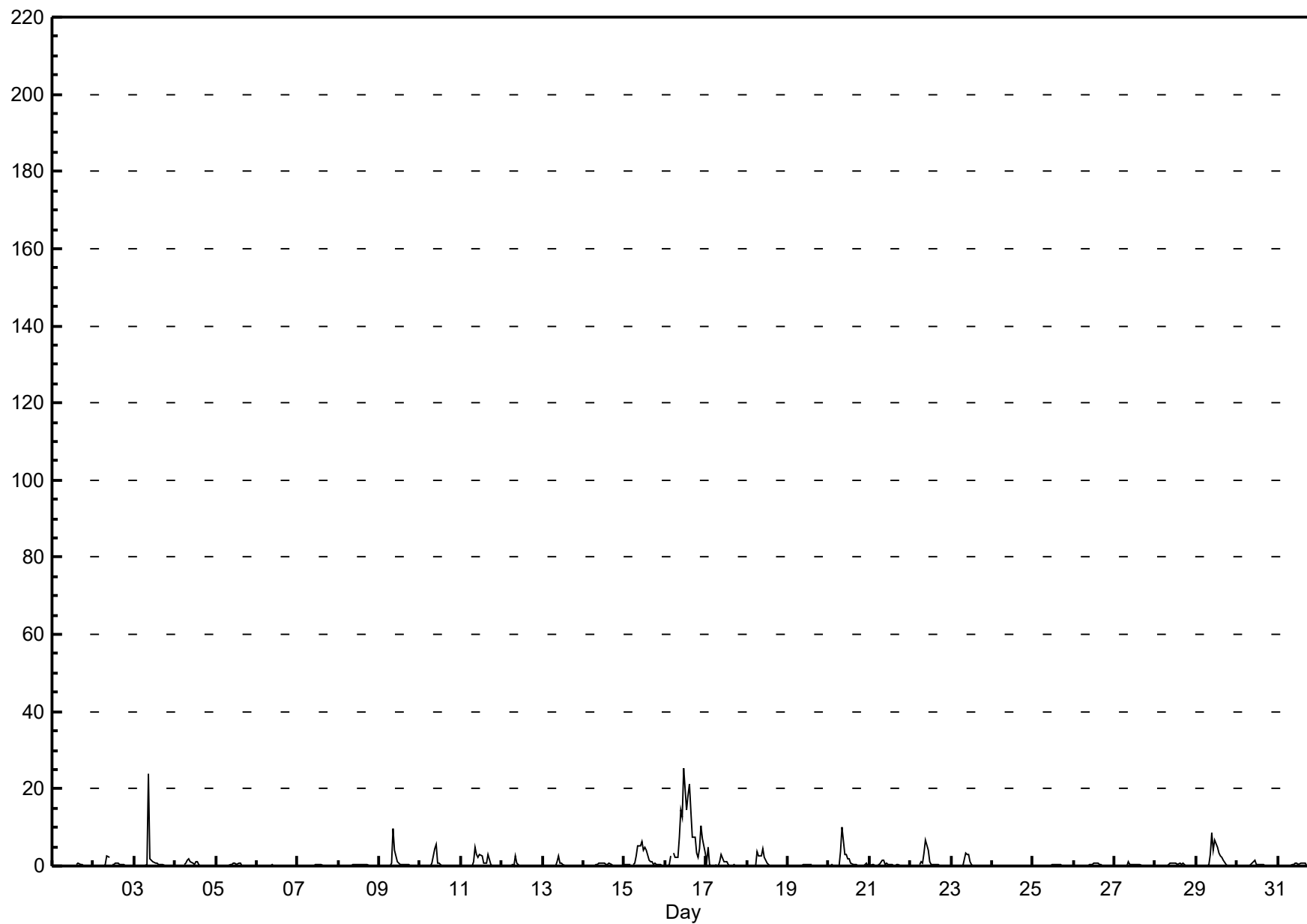
Histogram of Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Beaverlodge - October 2019



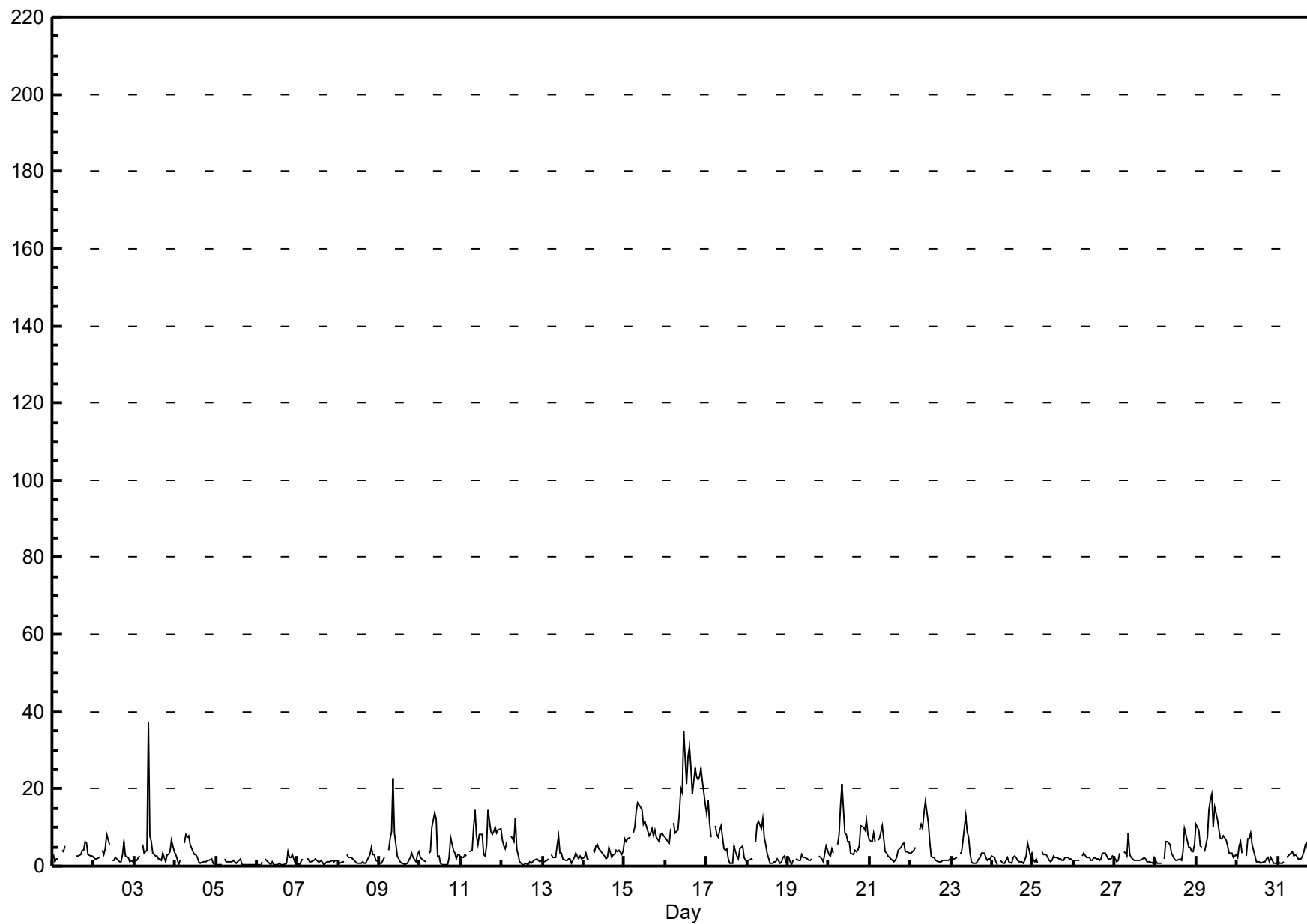
Hourly Averages

Nitrogen Oxide (NO) - ppb
Beaverlodge - October 2019



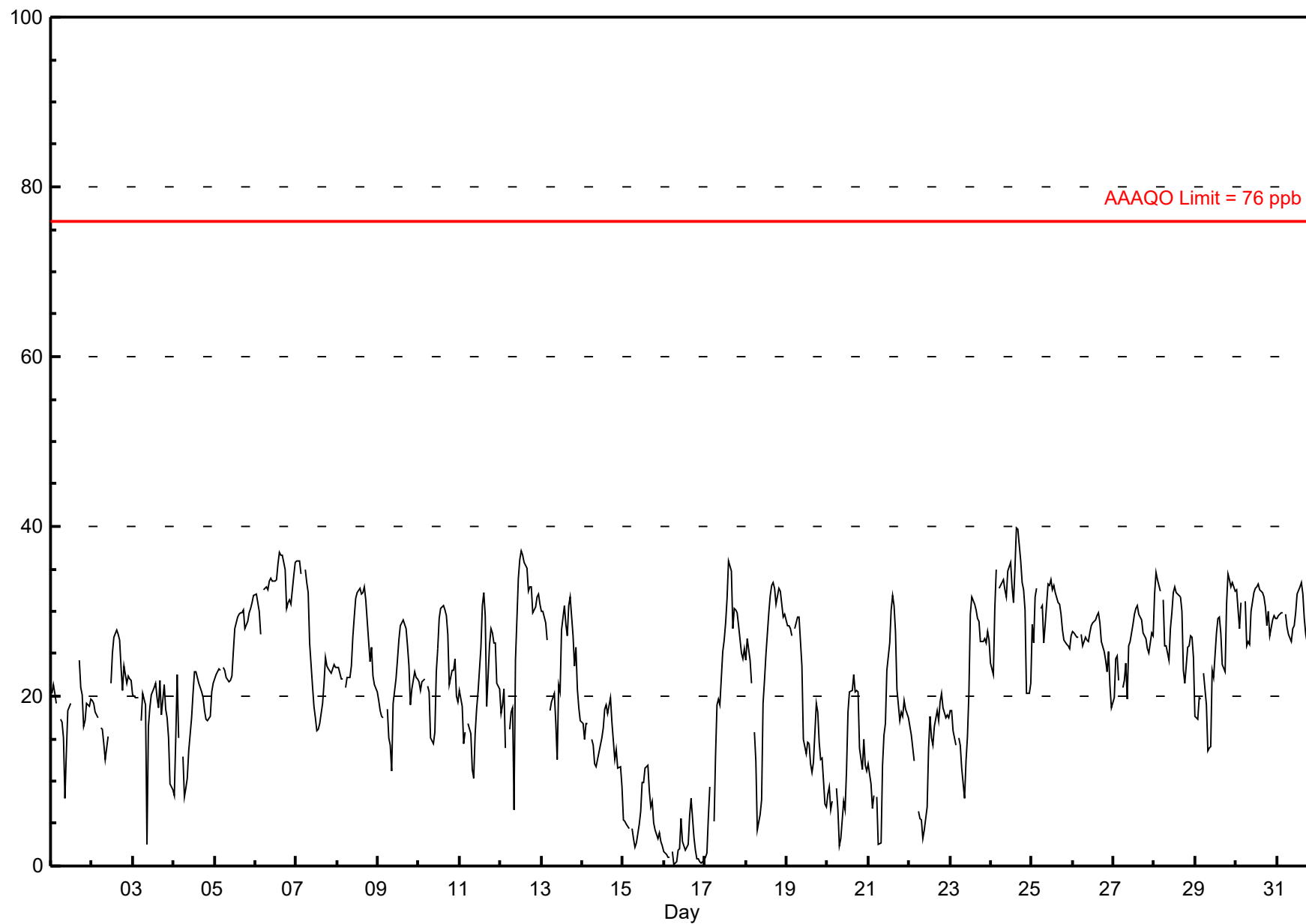
Hourly Averages

Oxides of Nitrogen (NO_x) - ppb
Beaverlodge - October 2019



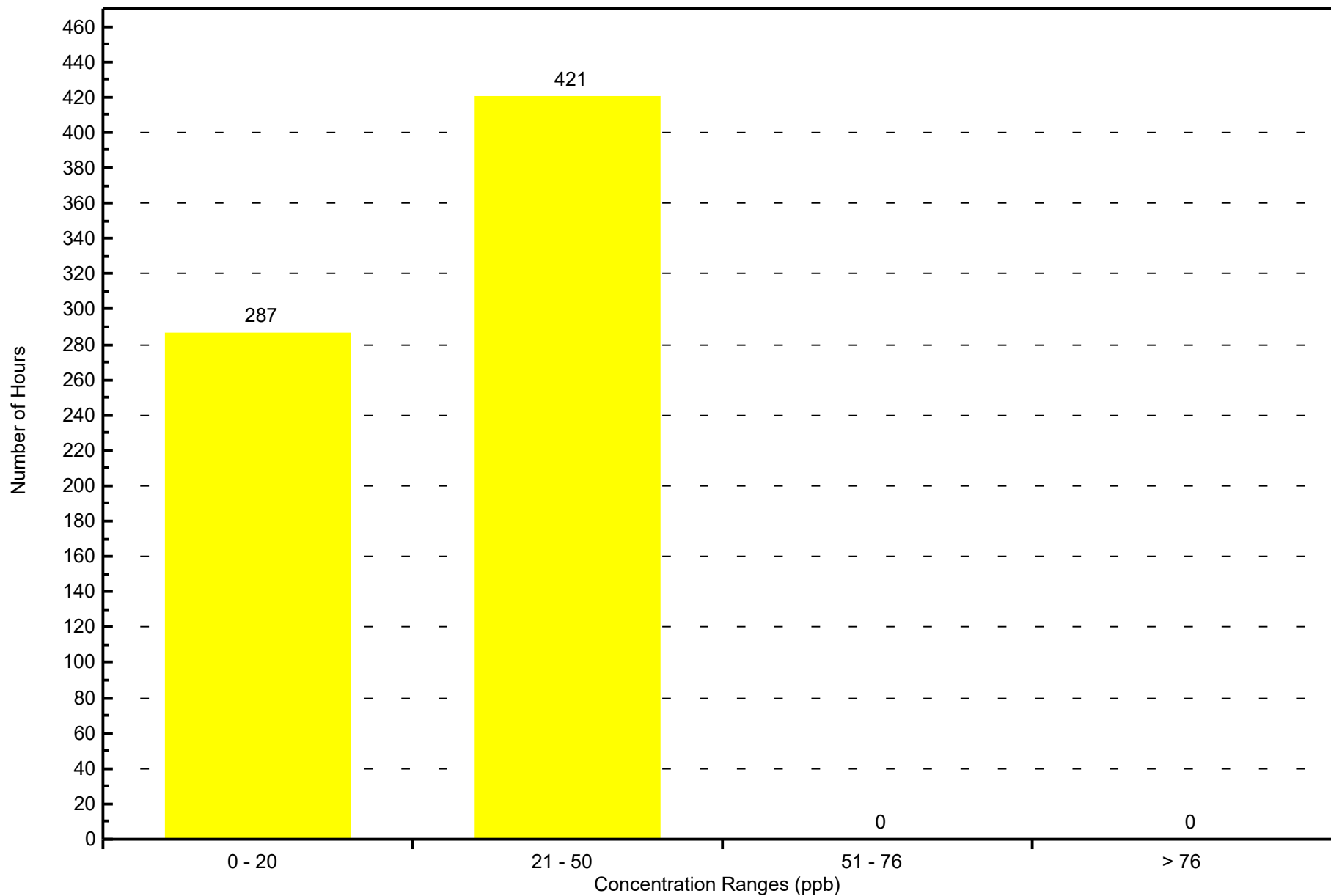
Hourly Averages

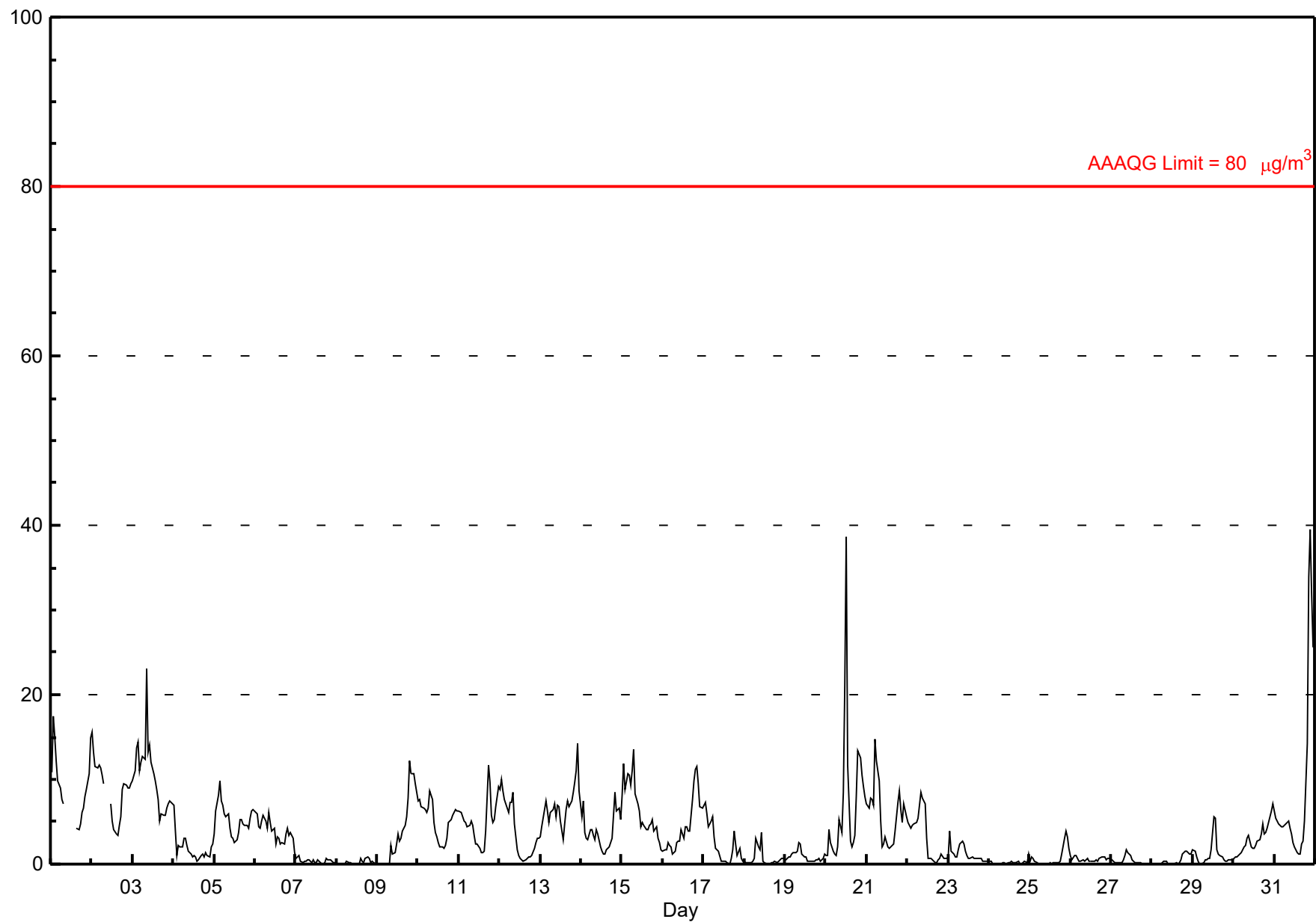
Ozone (O₃) - ppb
Beaverlodge - October 2019

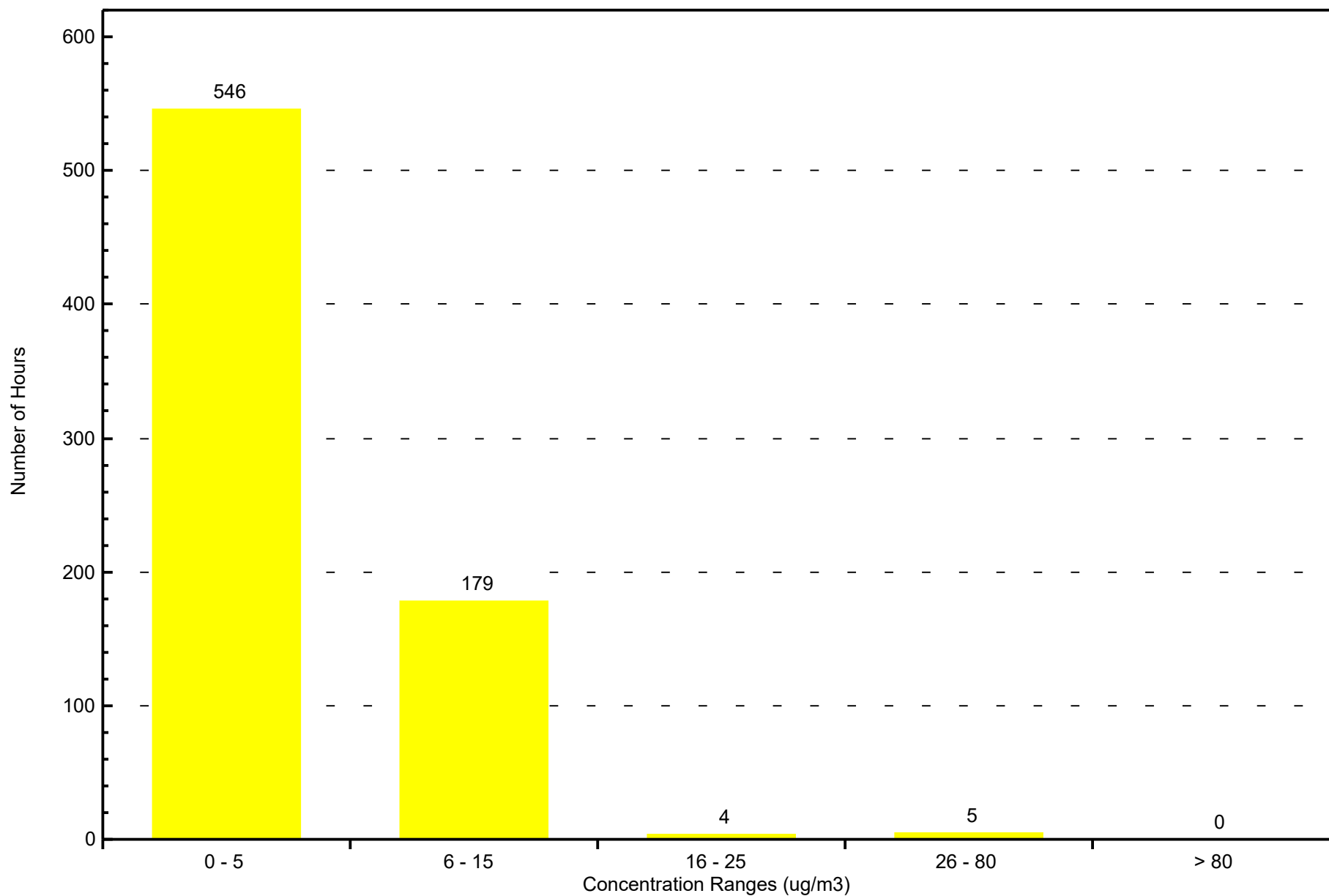


Histogram of Hourly Averages

Ozone (O₃) - ppb
Beaverlodge - October 2019



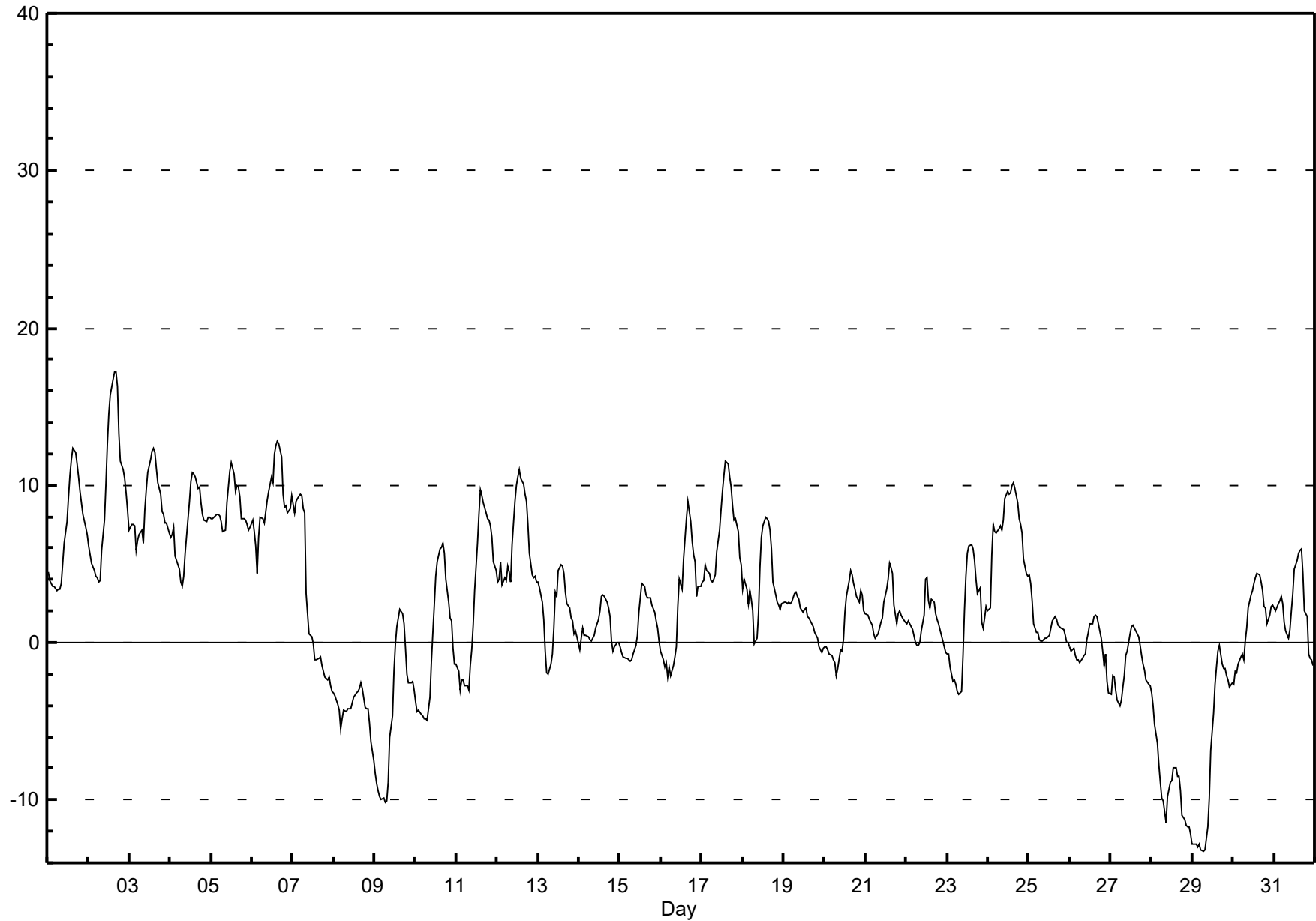




Hourly Averages

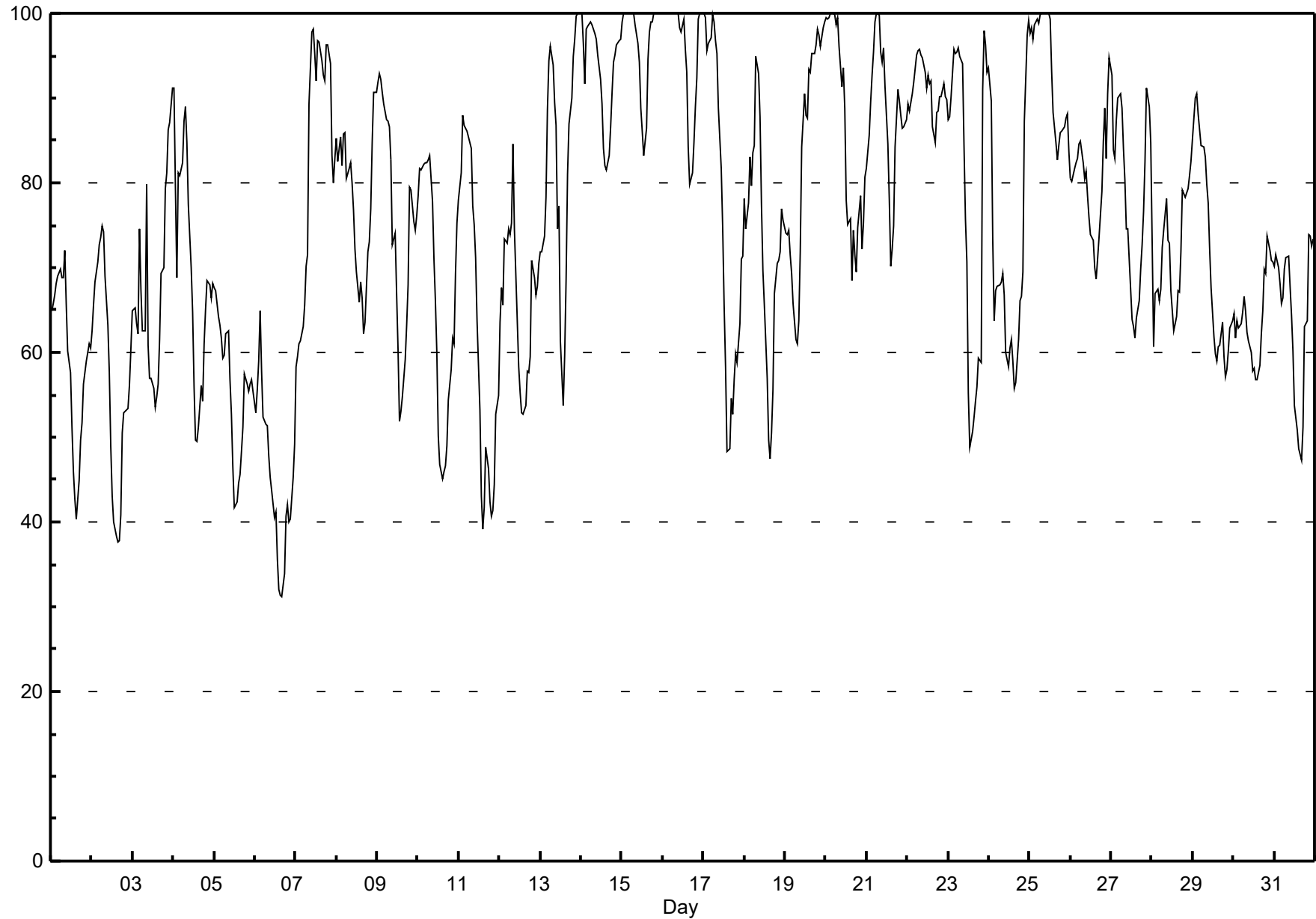
External Temperature (ET) - °C

Beaverlodge - October 2019



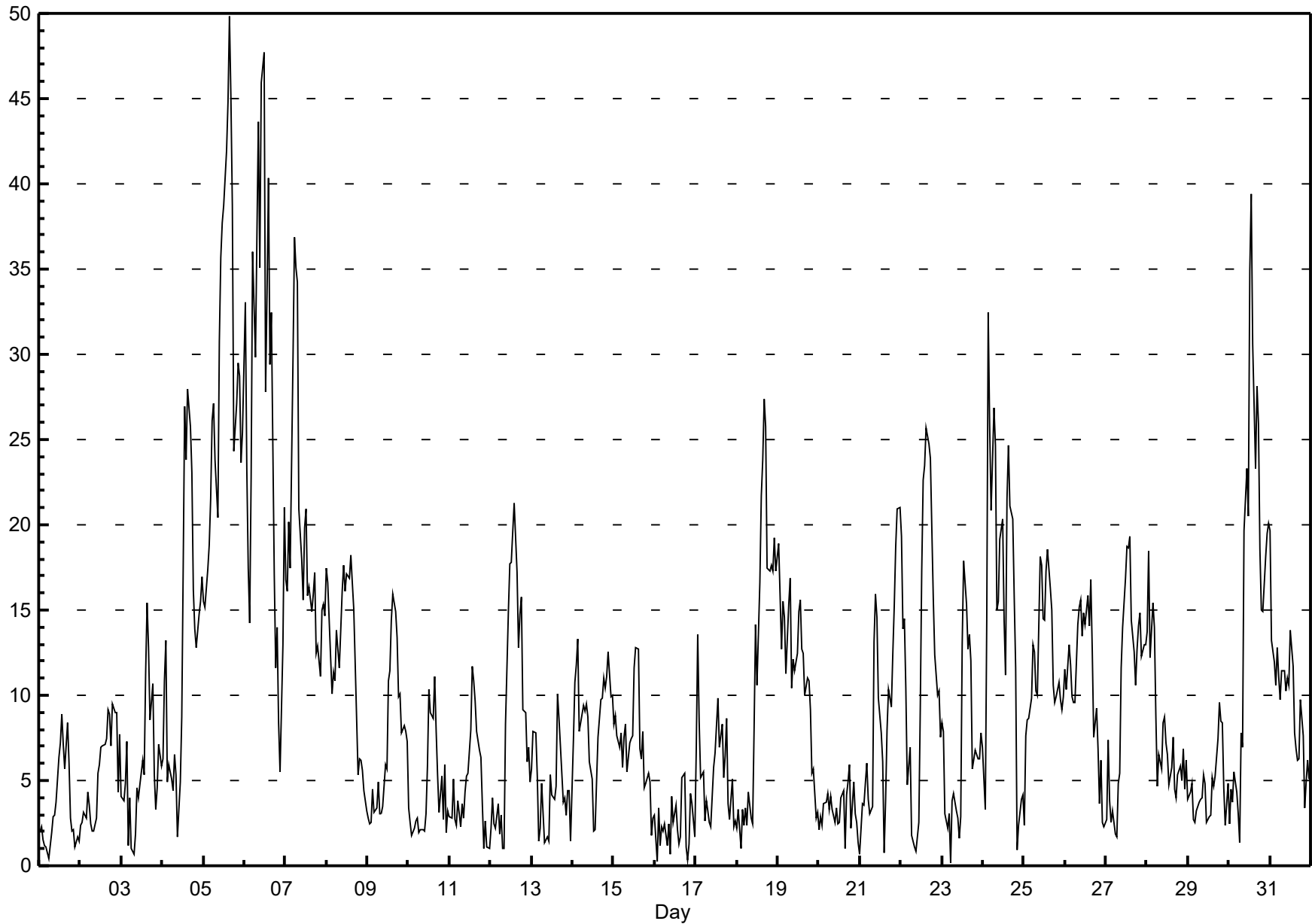
Hourly Averages

Relative Humidity (RH) - %
Beaverlodge - October 2019



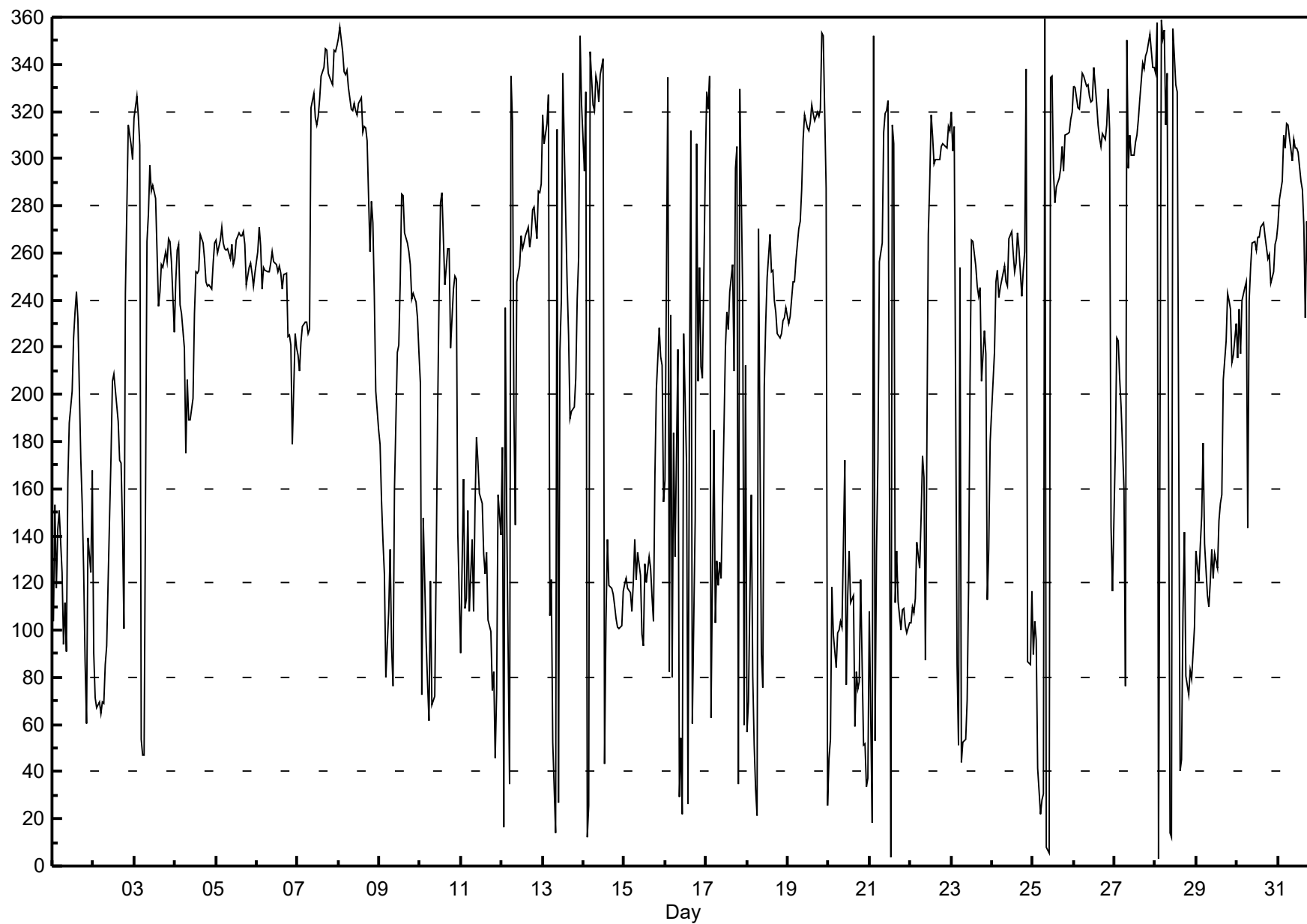
Hourly Averages

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



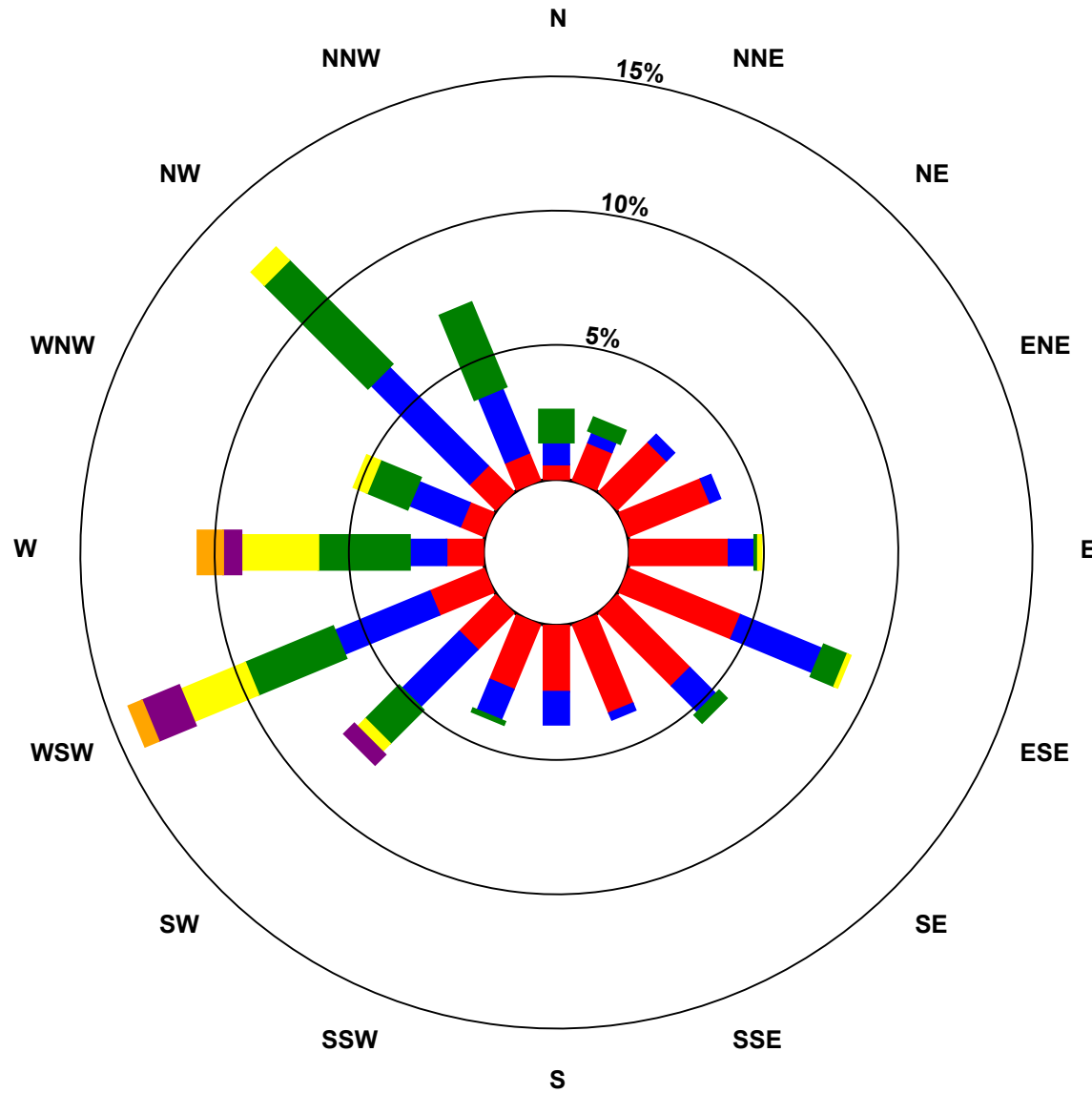
Hourly Averages

Wind Direction (WD) - deg
Beaverlodge - October 2019

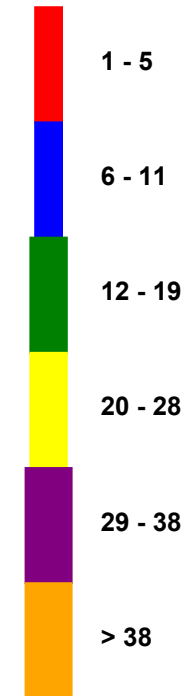


Wind Rose

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

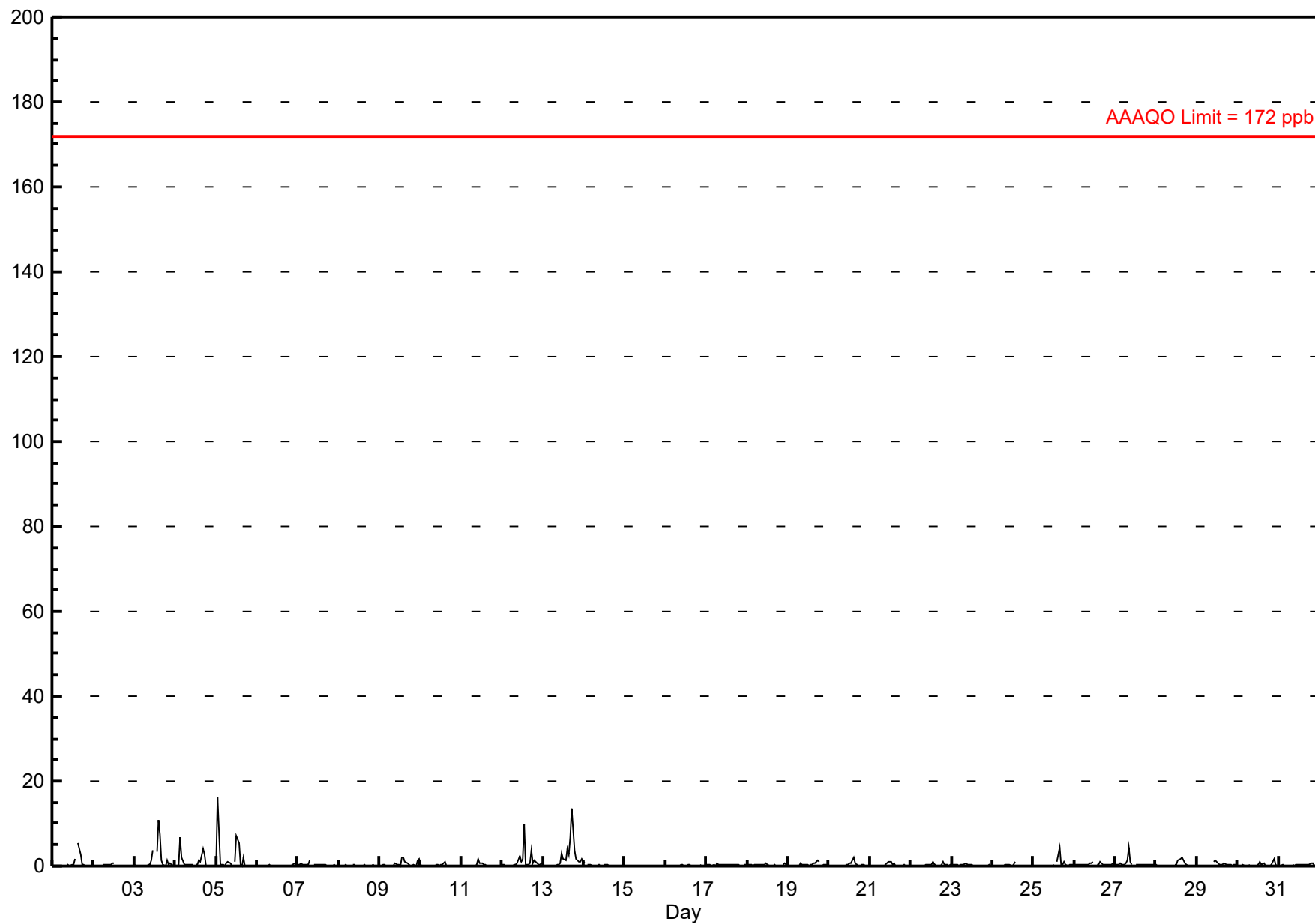


Wind Speed Classes (km/h)



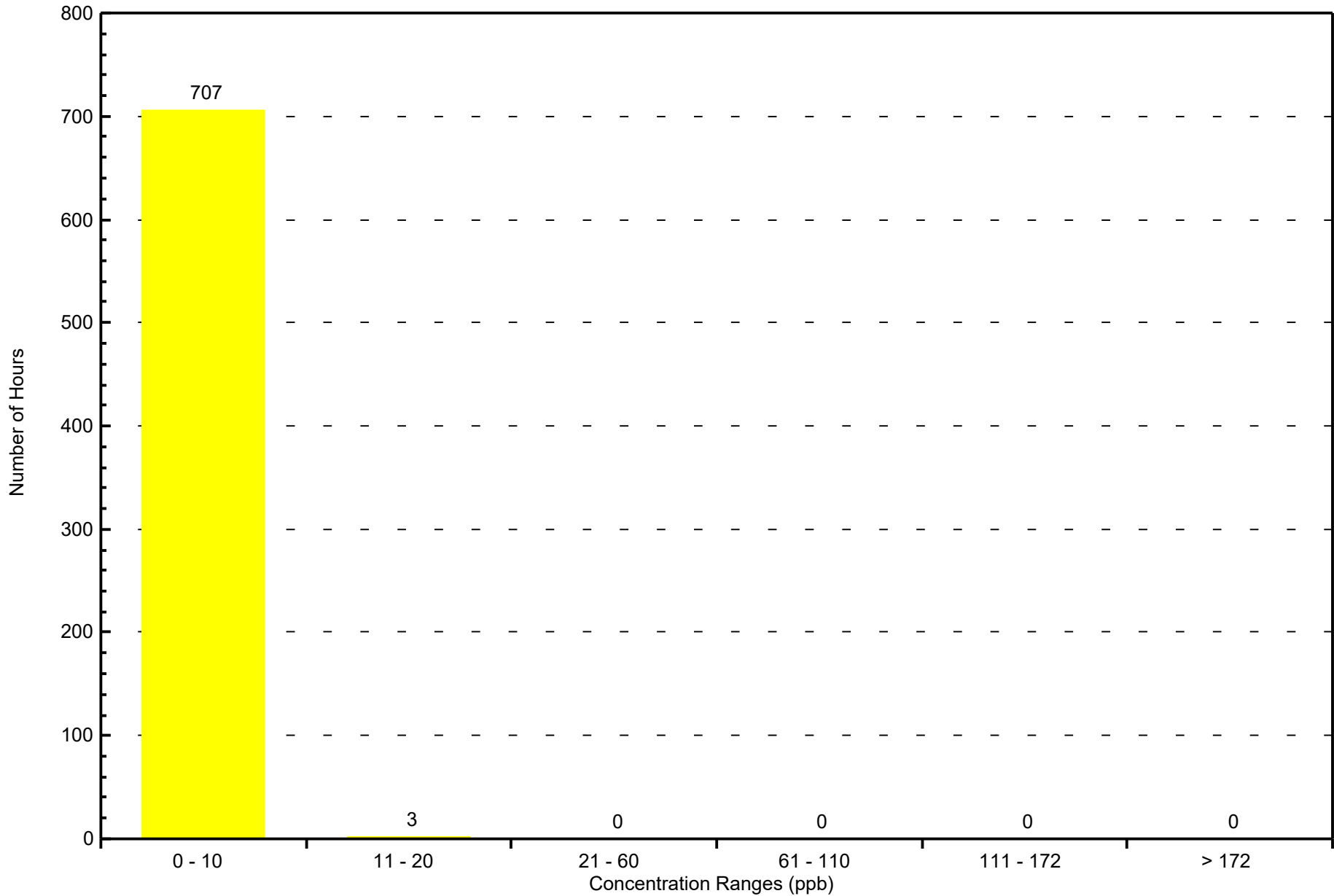
Hourly Averages

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



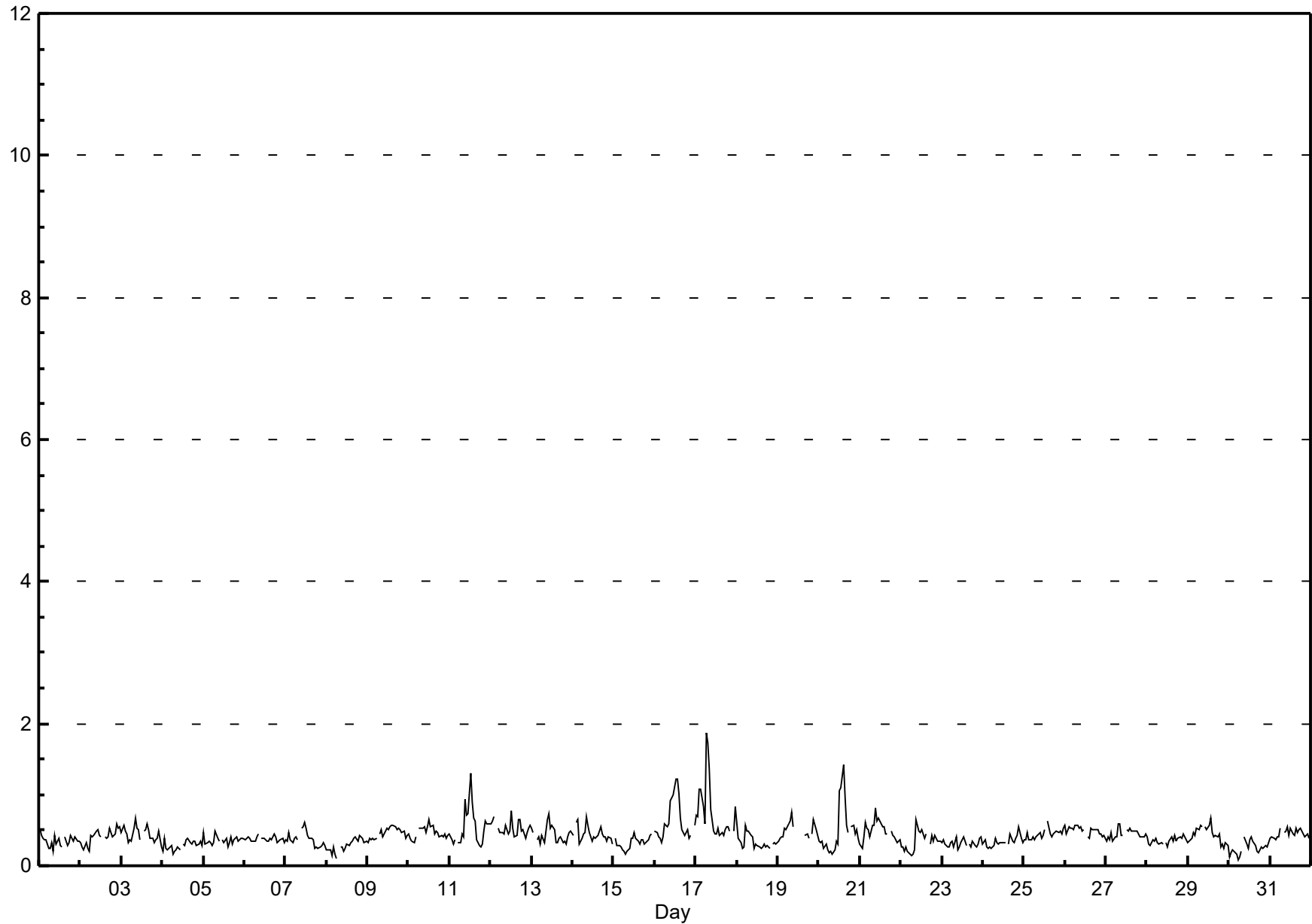
Histogram of Hourly Averages

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



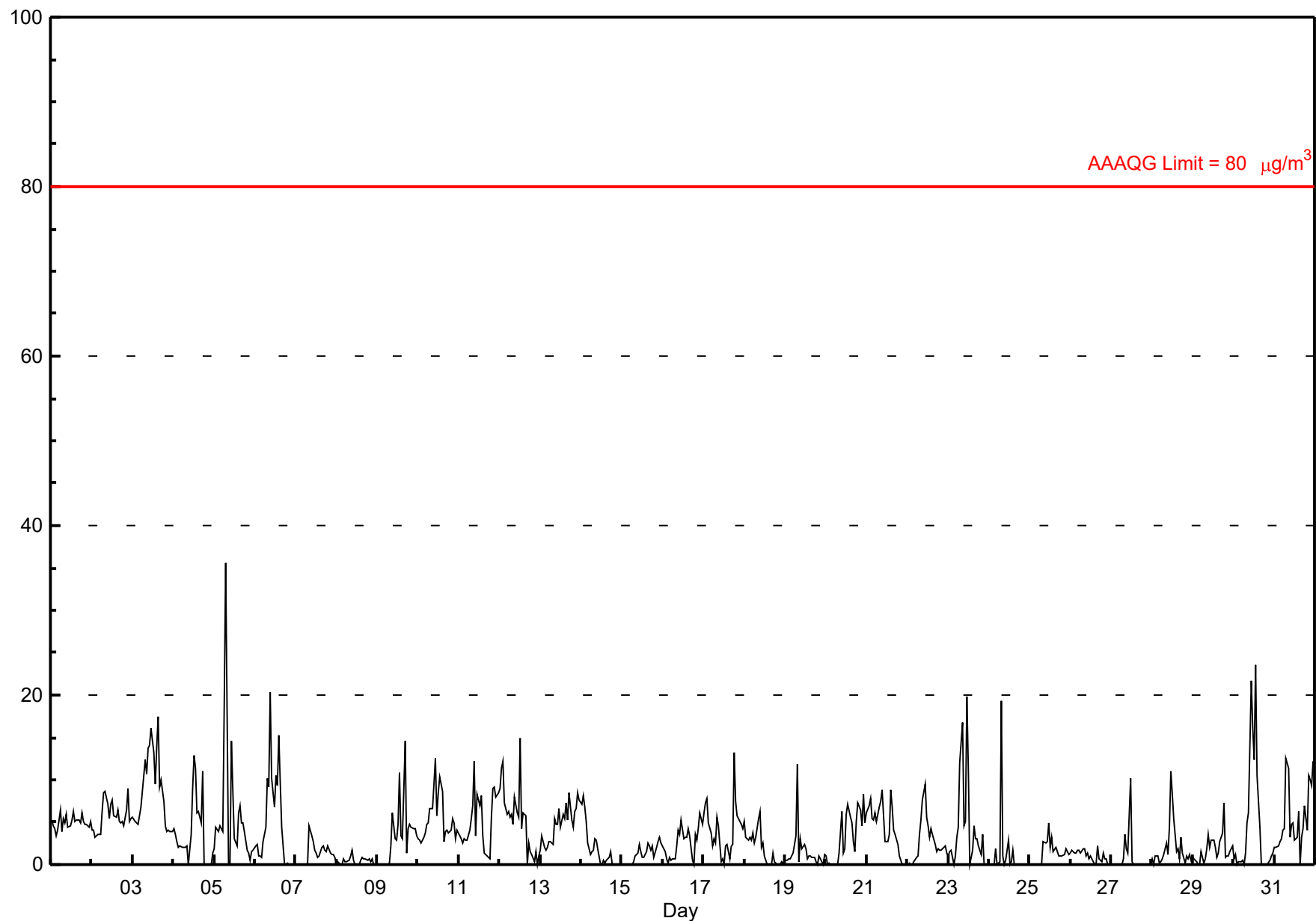
Hourly Averages

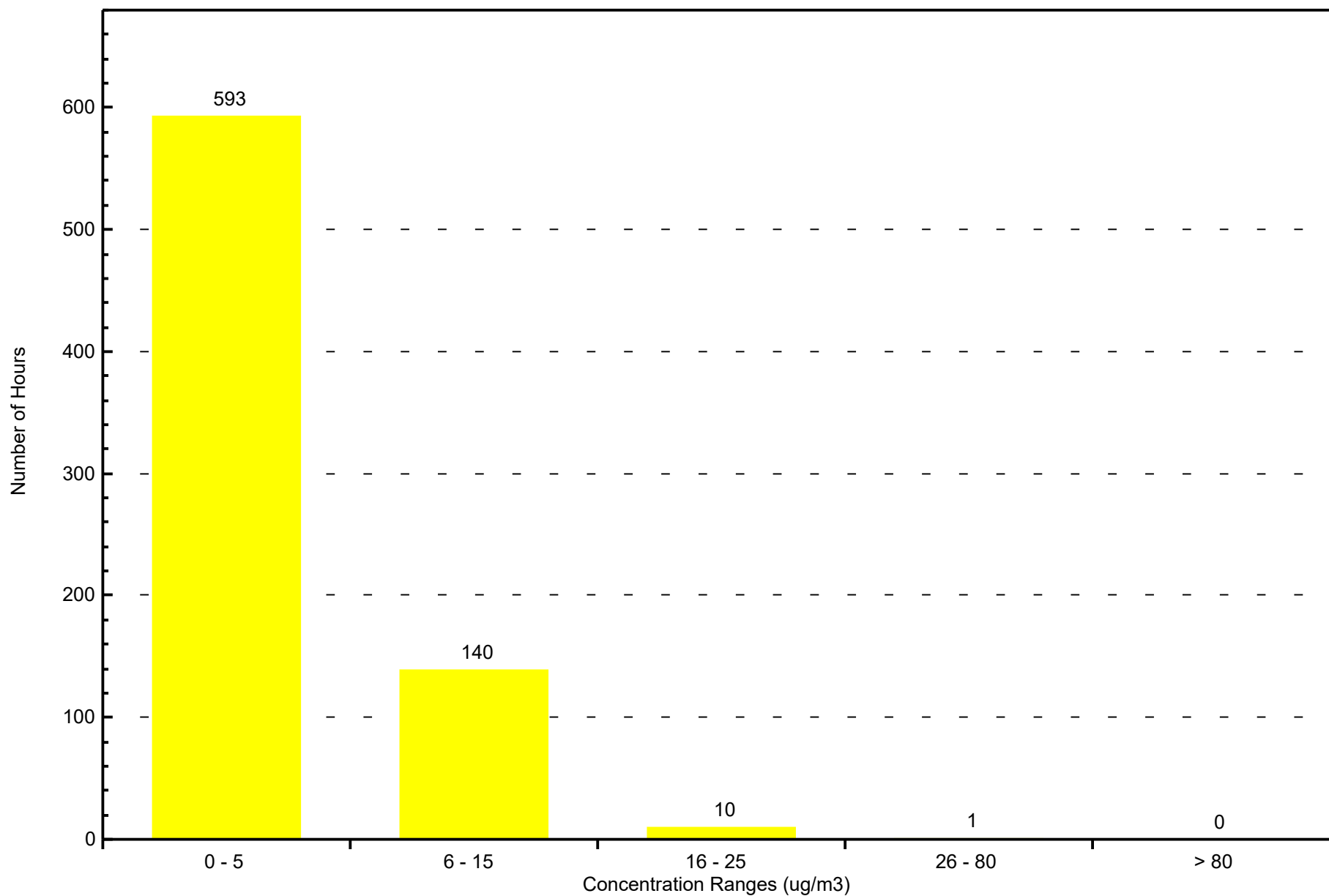
Total Reduced Sulphur (TRS) - ppb
Evergreen Park - October 2019



Hourly Averages

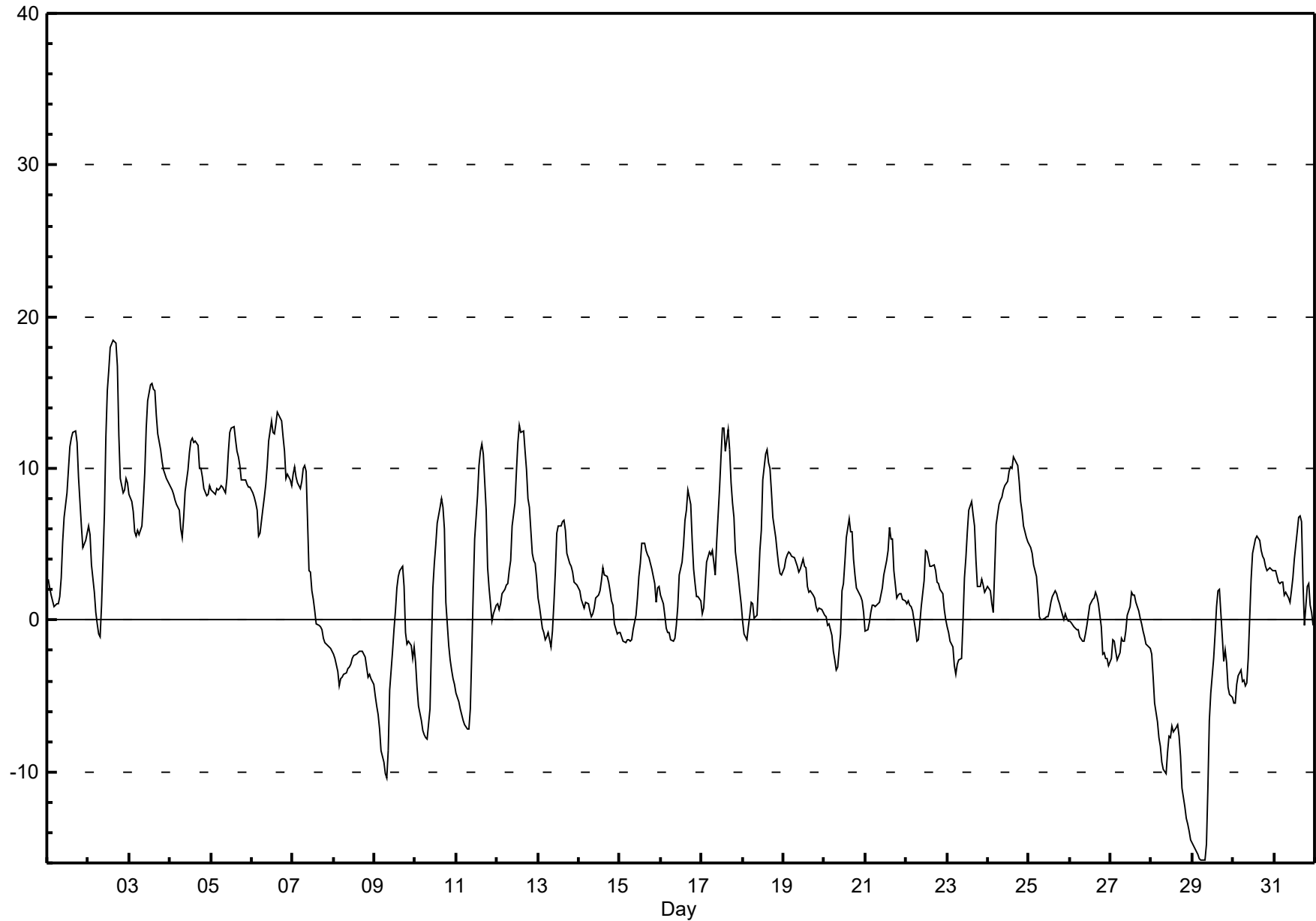
Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Evergreen Park - October 2019





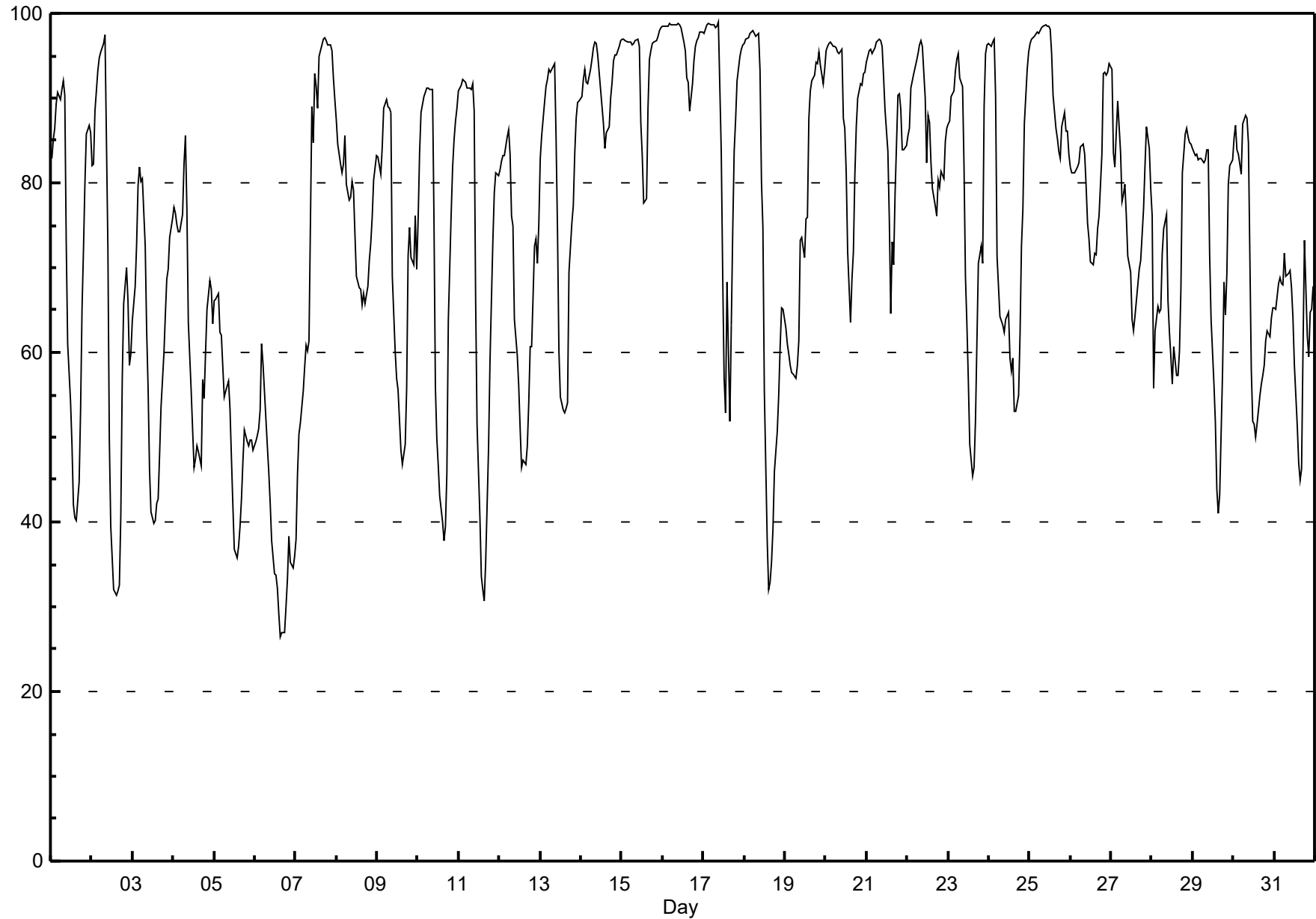
Hourly Averages

External Temperature (ET) - °C
Evergreen Park - October 2019



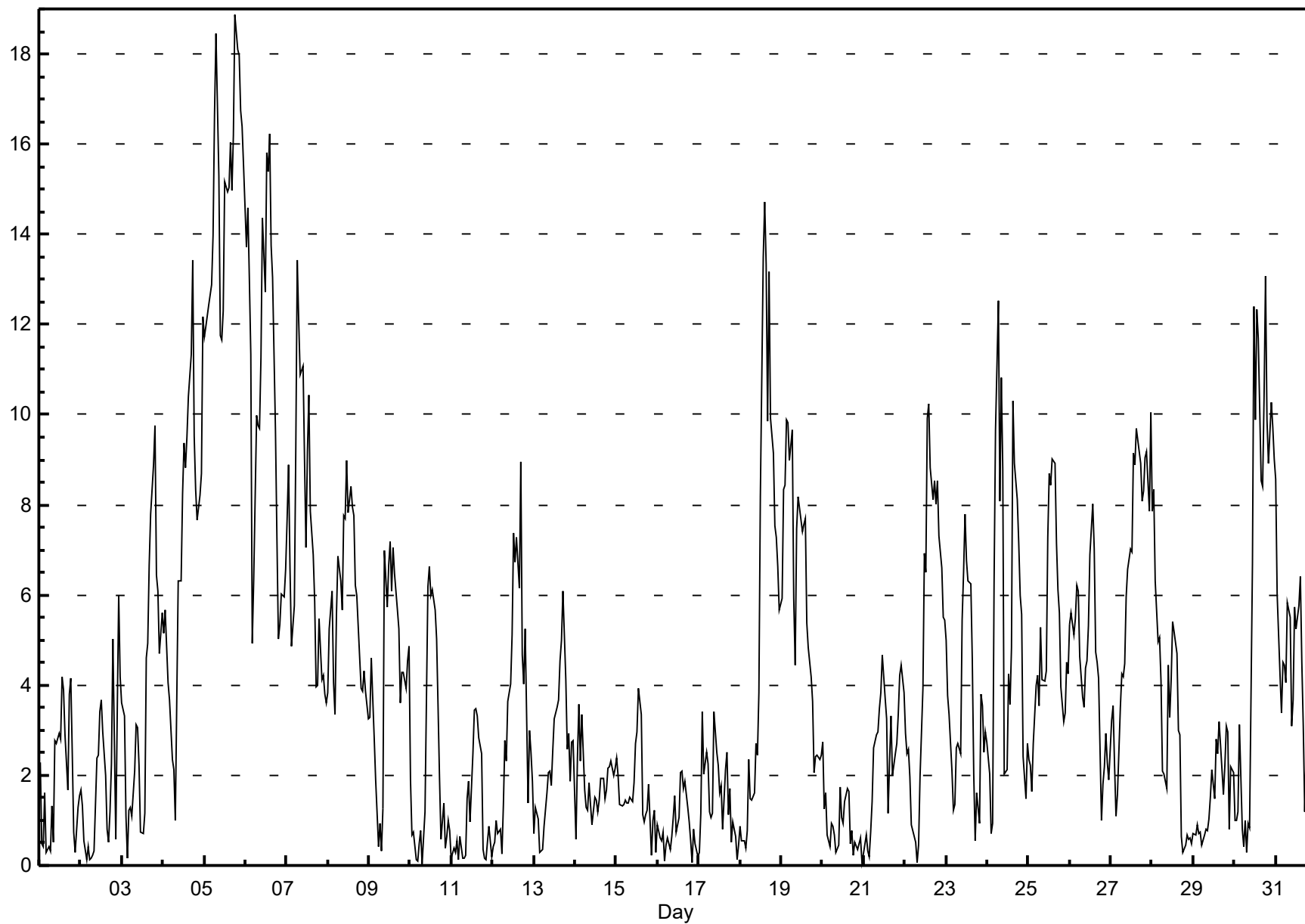
Hourly Averages

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



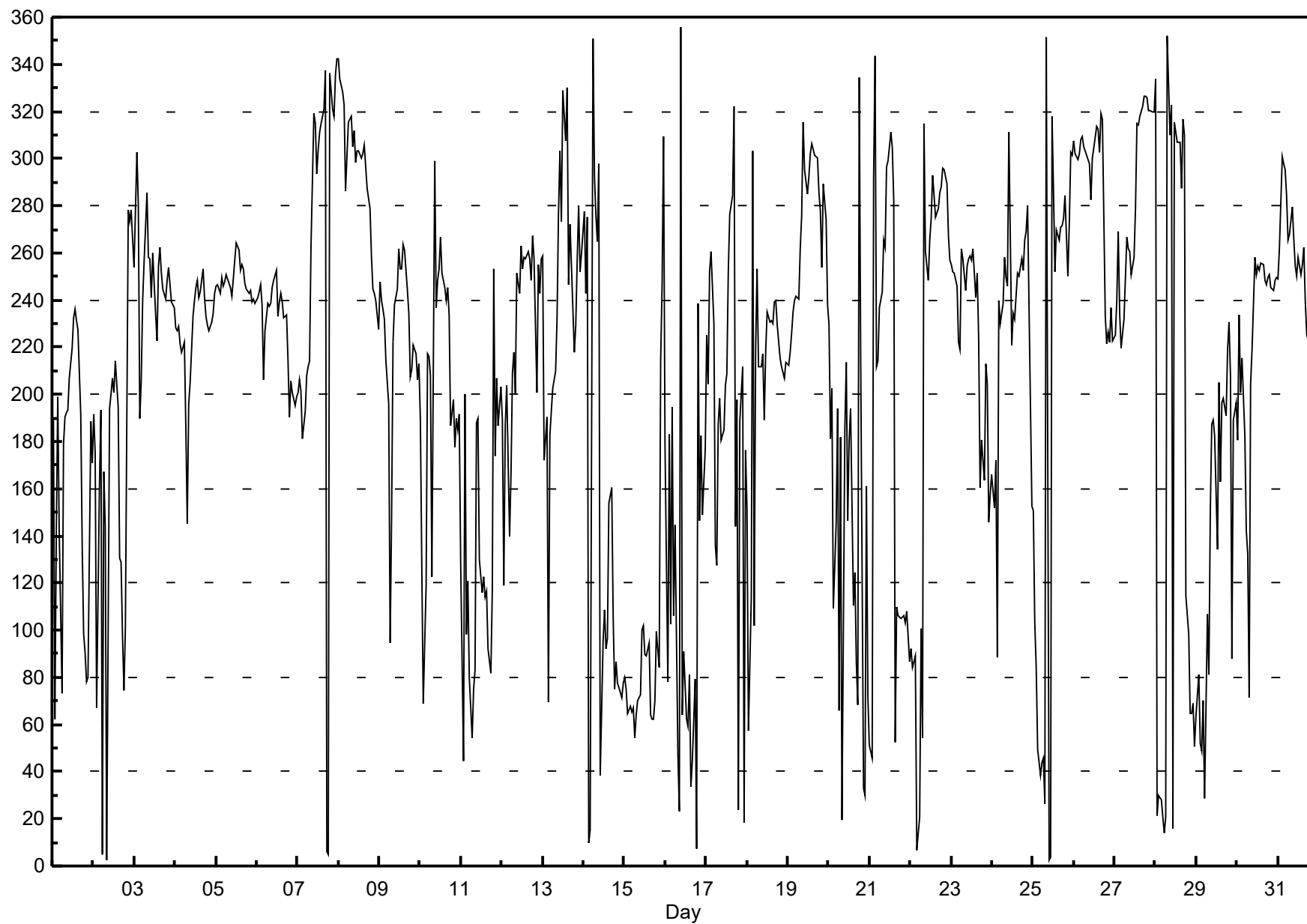
Hourly Averages

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



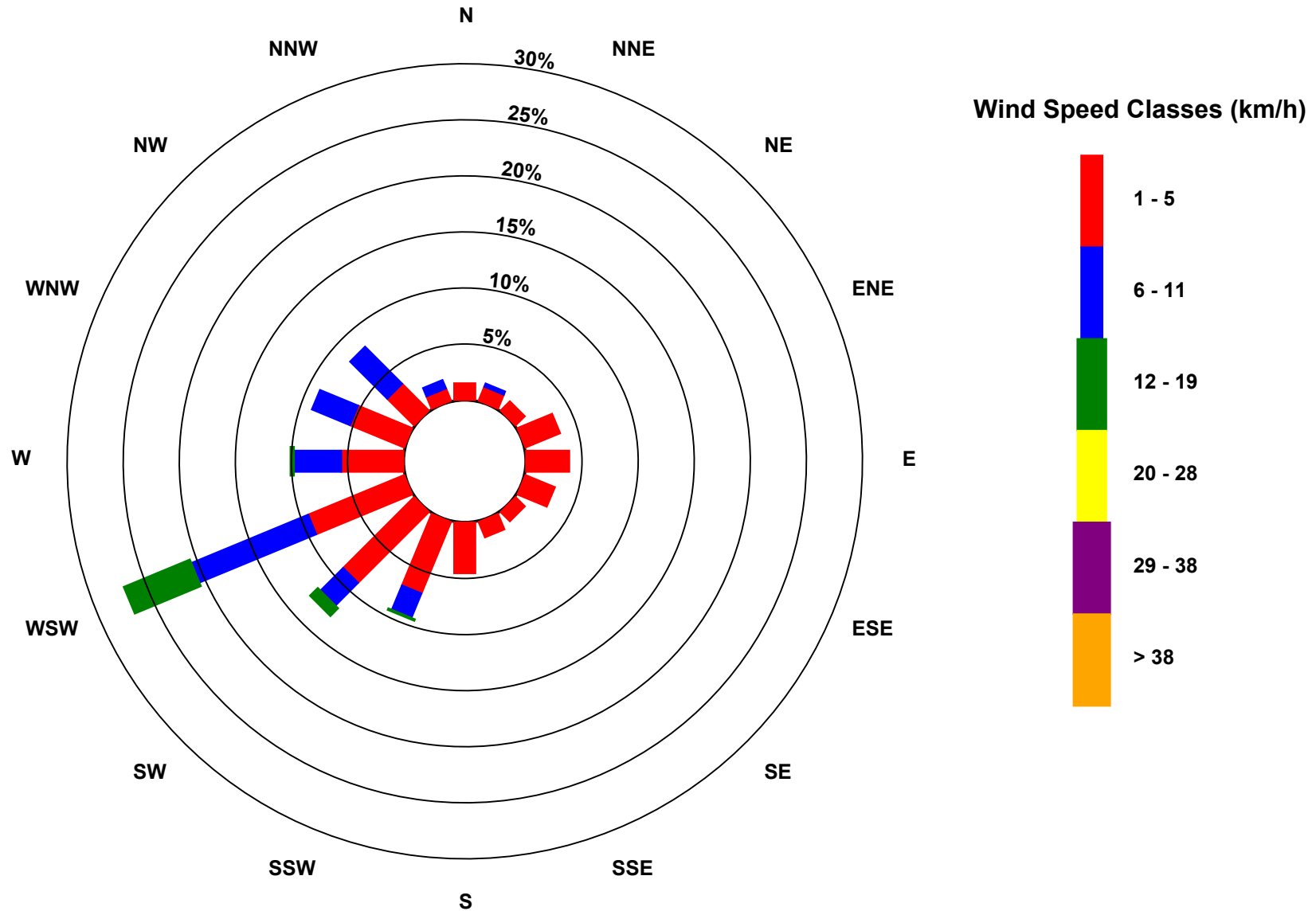
Hourly Averages

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



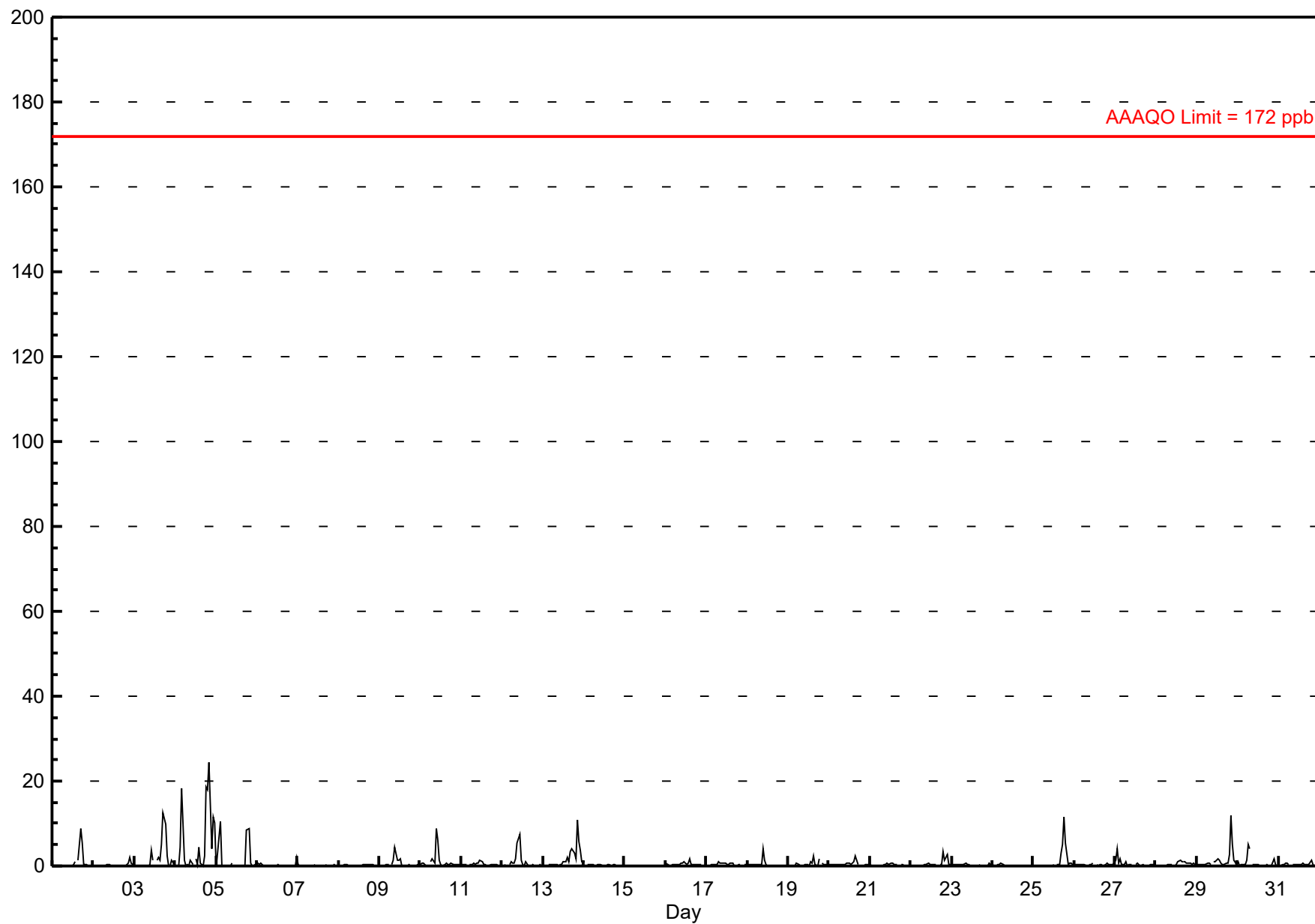
Wind Rose

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



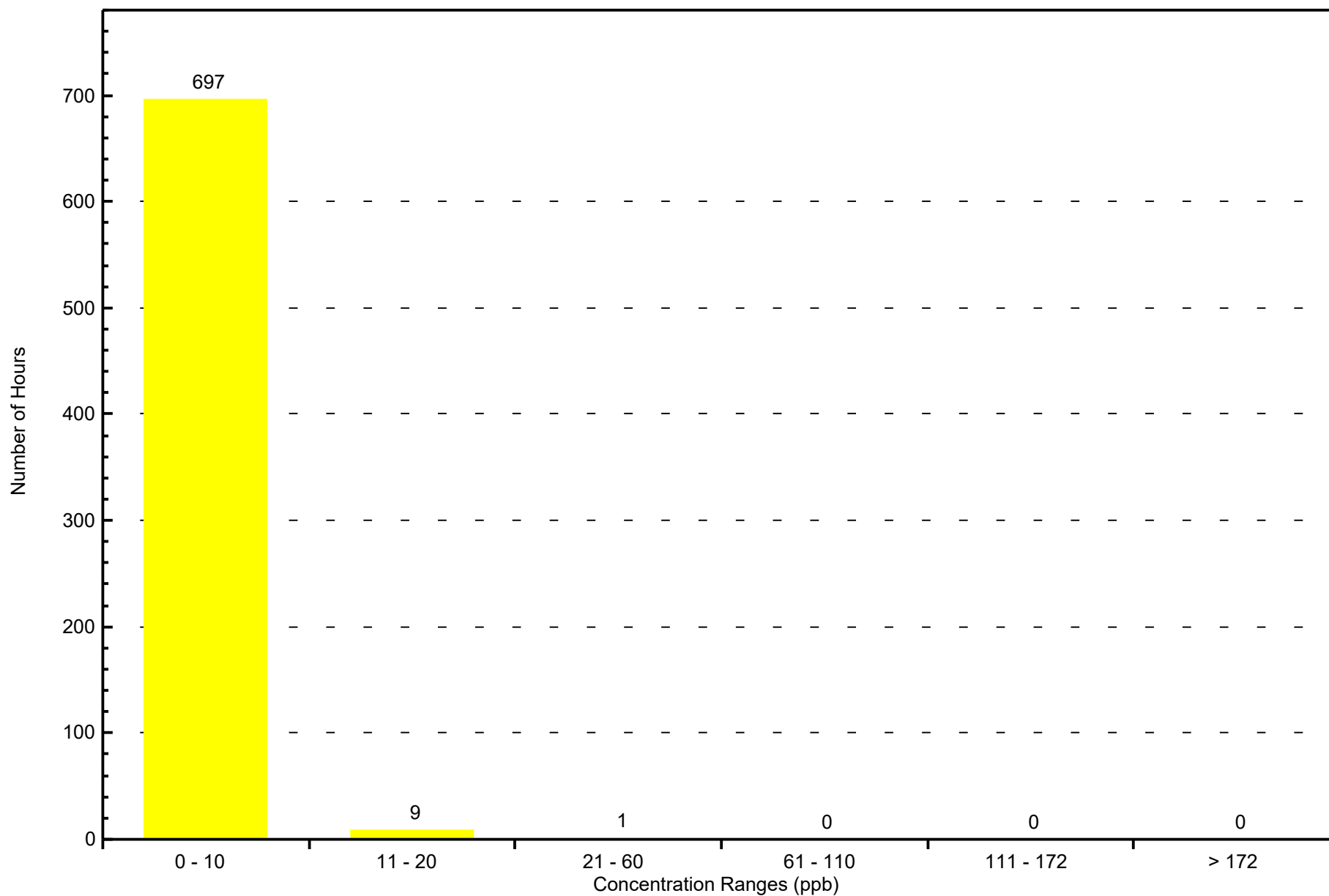
Hourly Averages

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



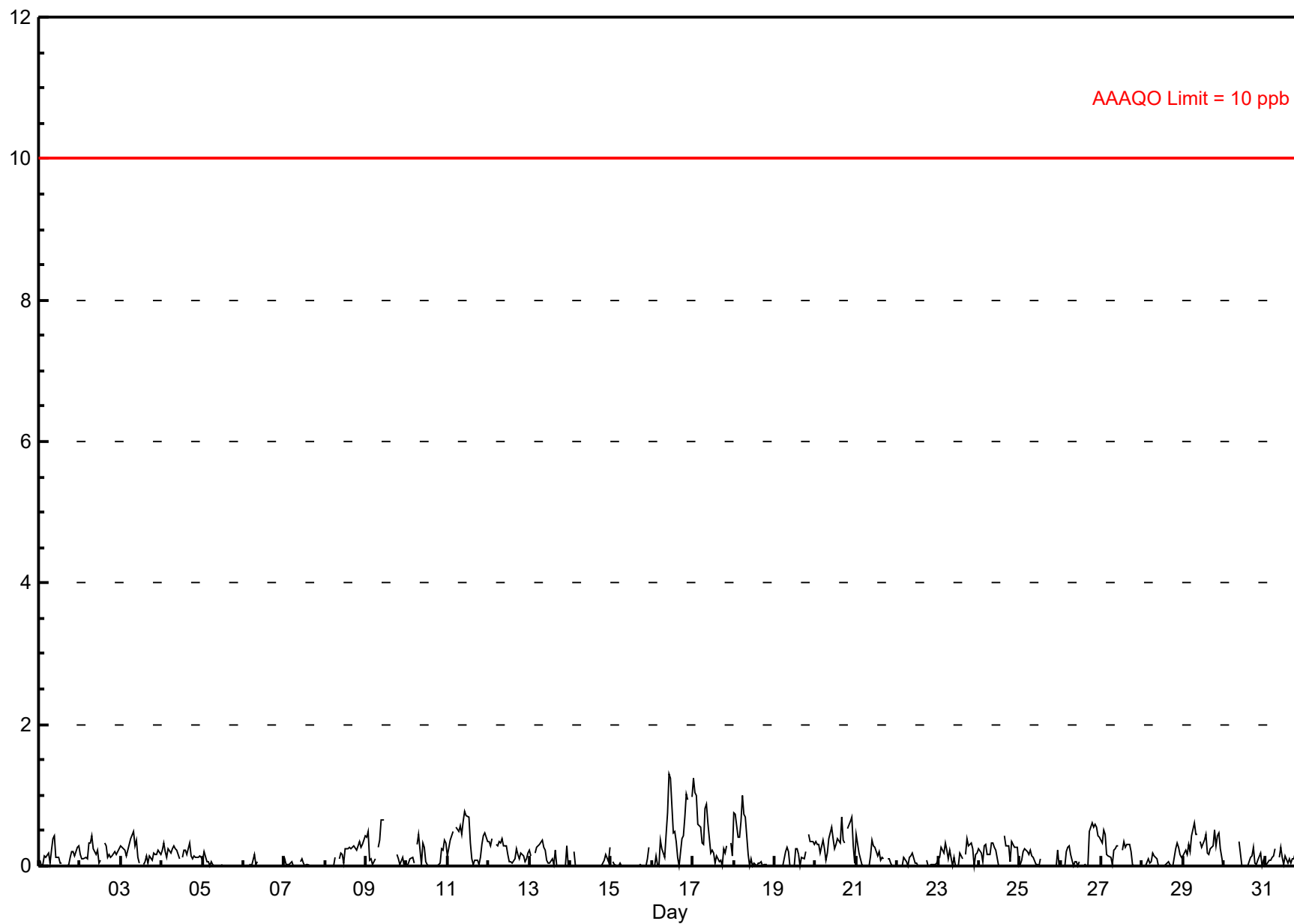
Histogram of Hourly Averages

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



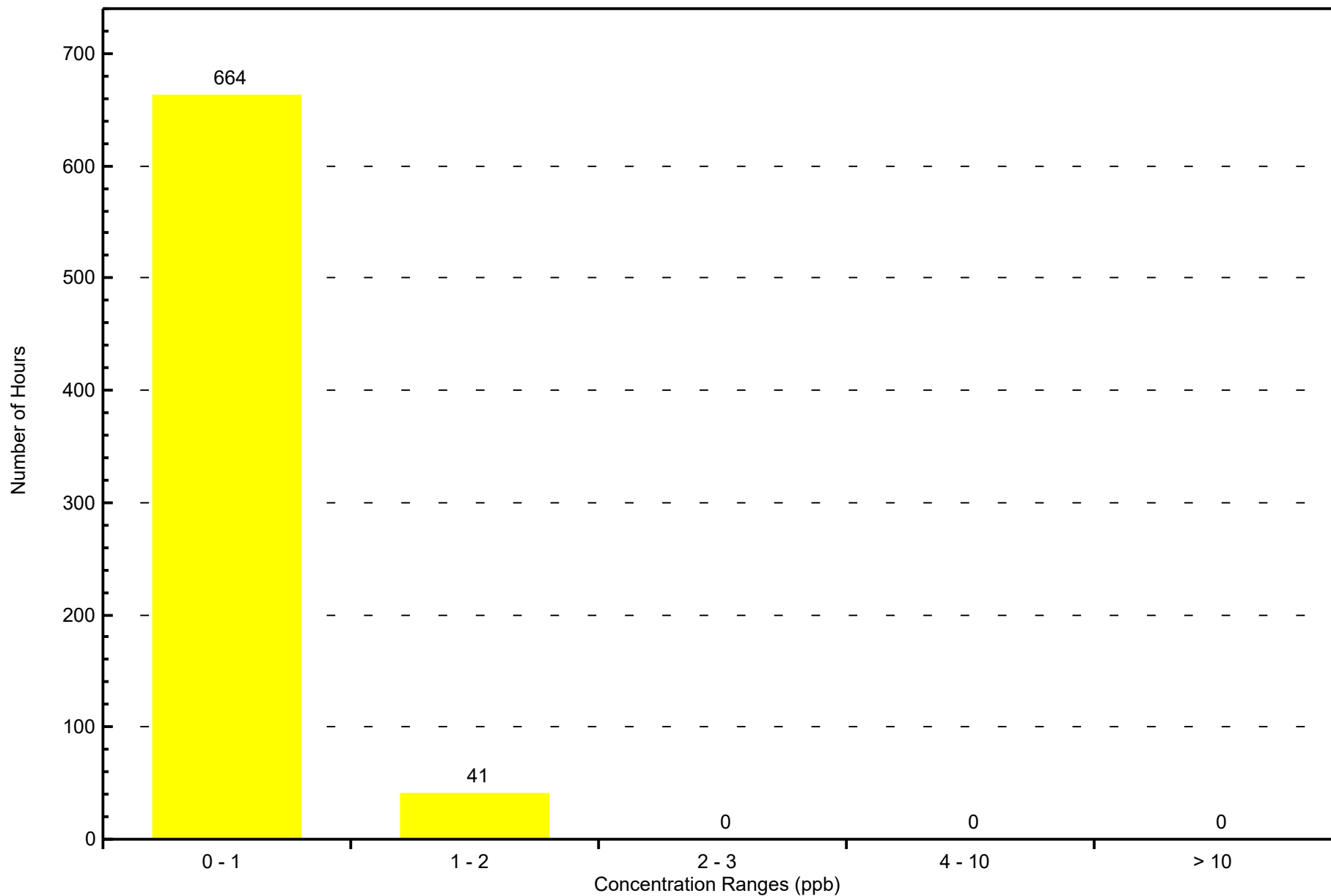
Hourly Averages

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



Histogram of Hourly Averages

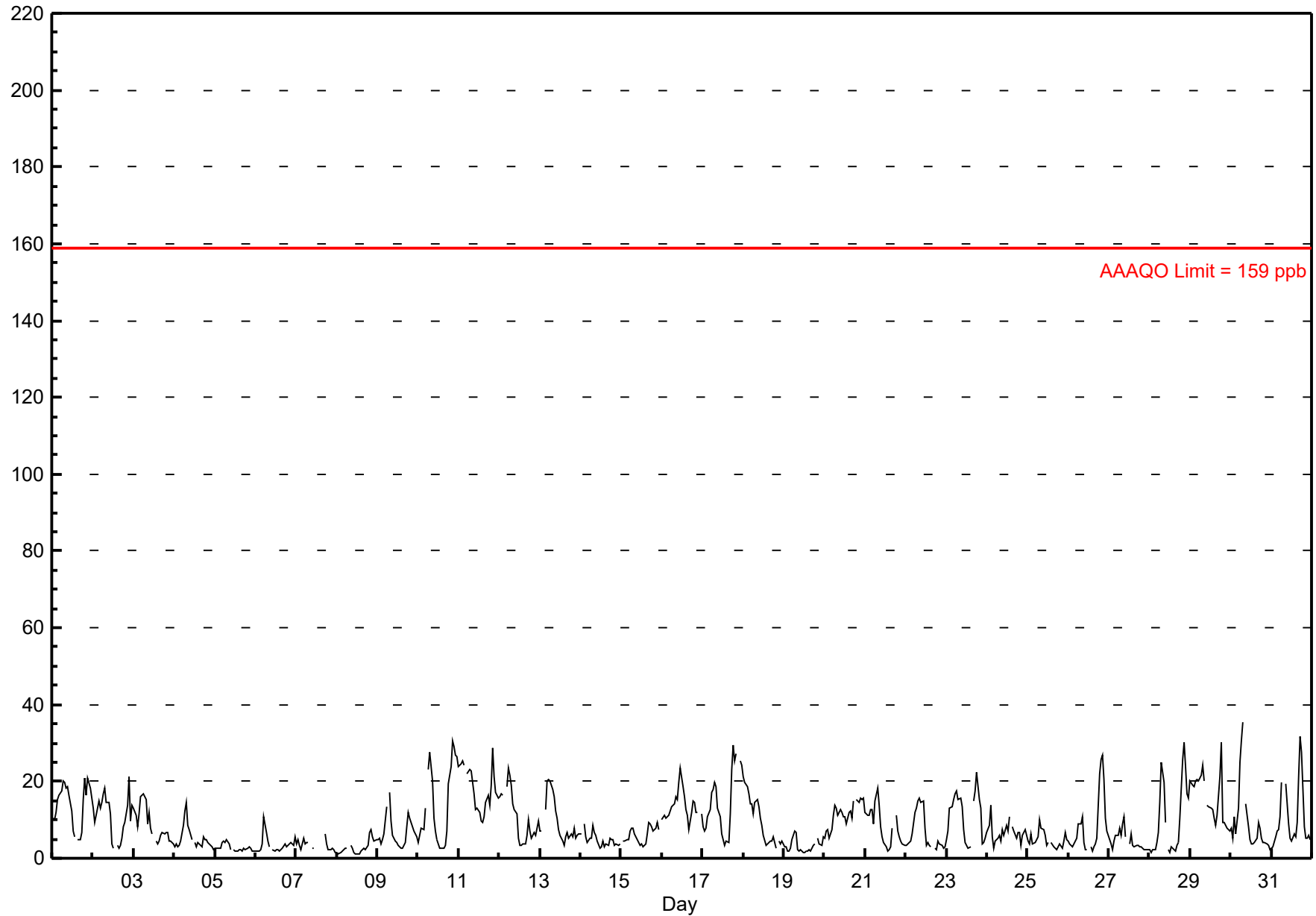
Hydrogen Sulphide (H₂S) - ppb
Henry Pirker - October 2019



Hourly Averages

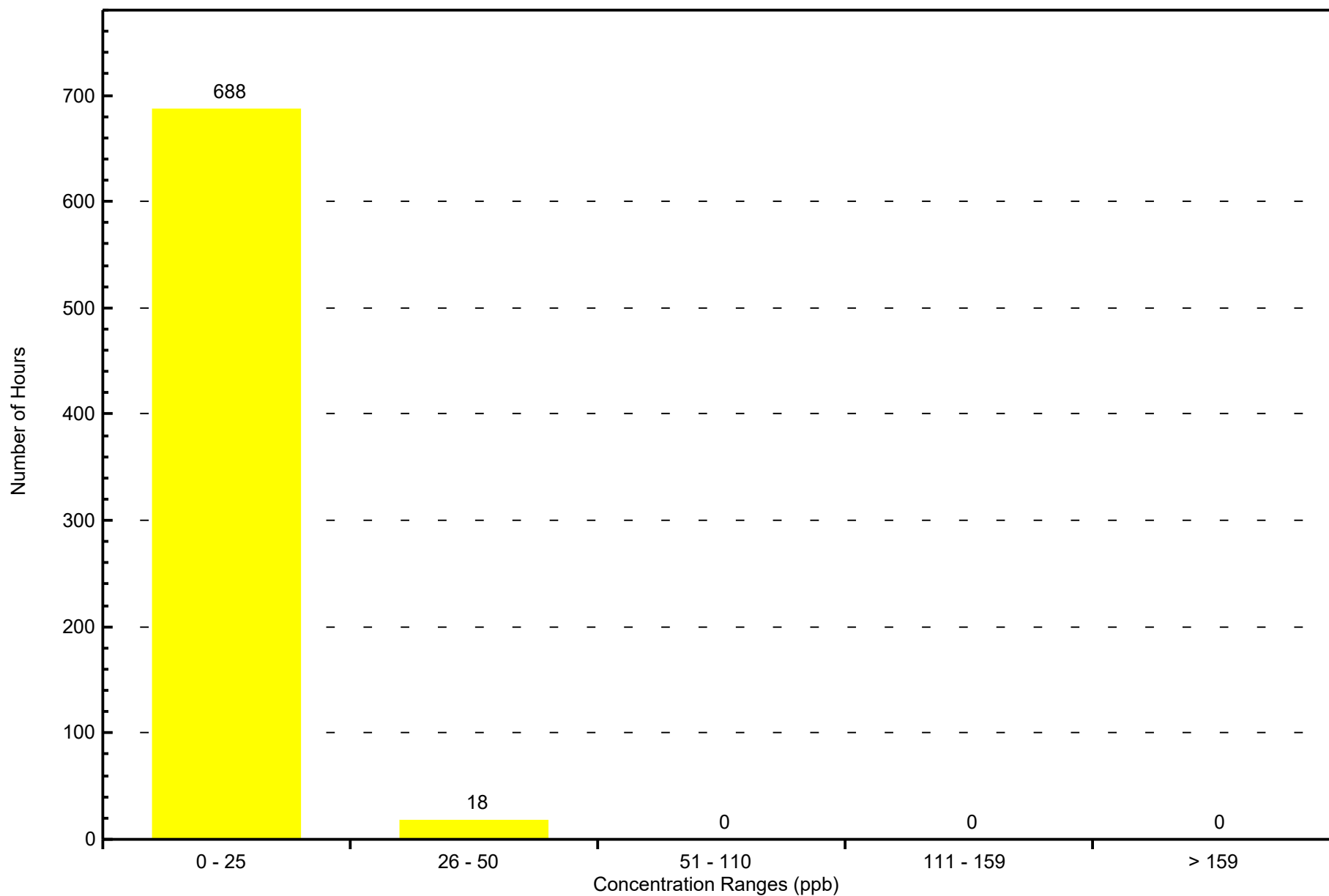
Nitrogen Dioxide (NO₂) - ppb

Henry Pirker - October 2019



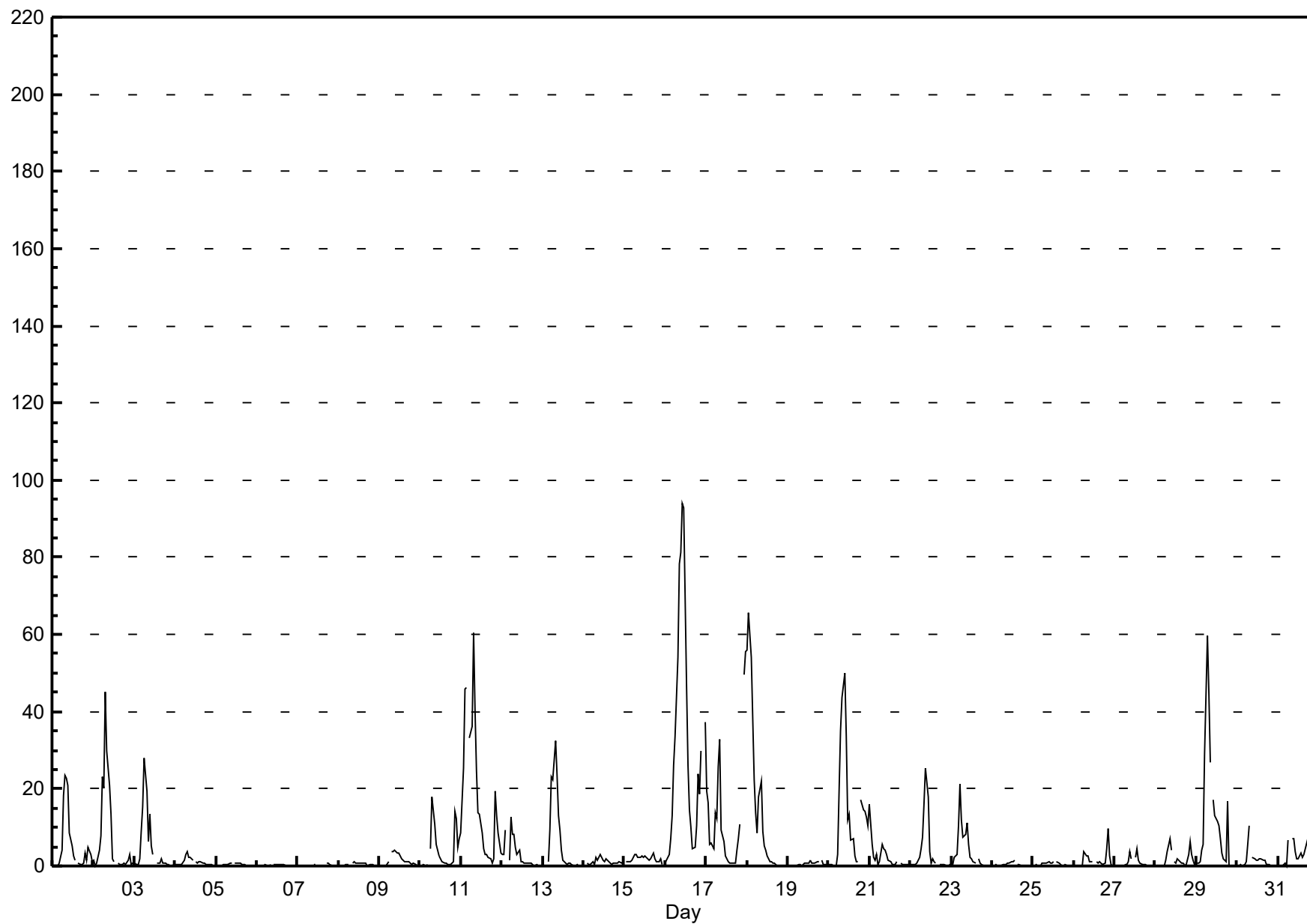
Histogram of Hourly Averages

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



Hourly Averages

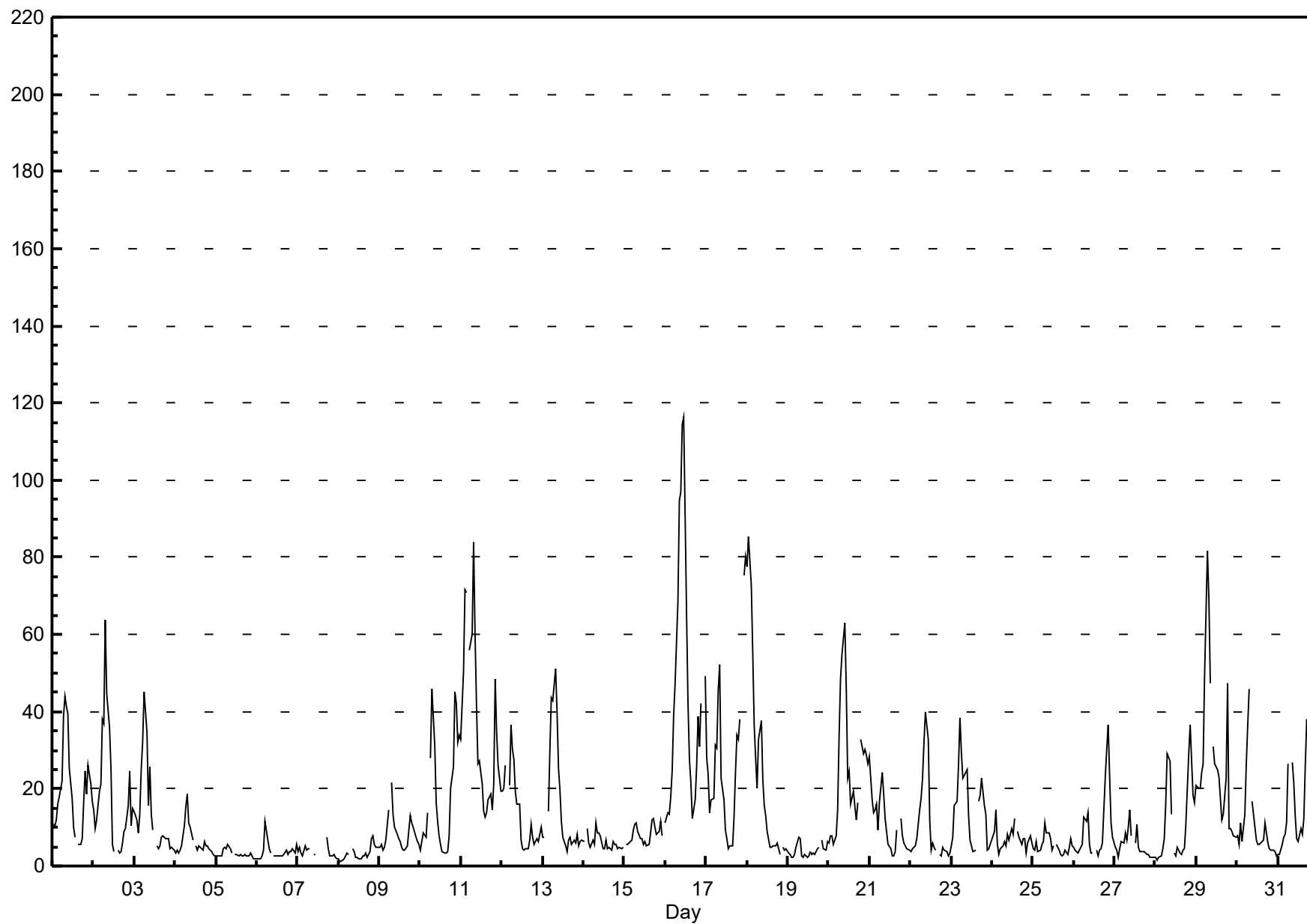
Nitrogen Oxide (NO) - ppb
Henry Pirker - October 2019



Hourly Averages

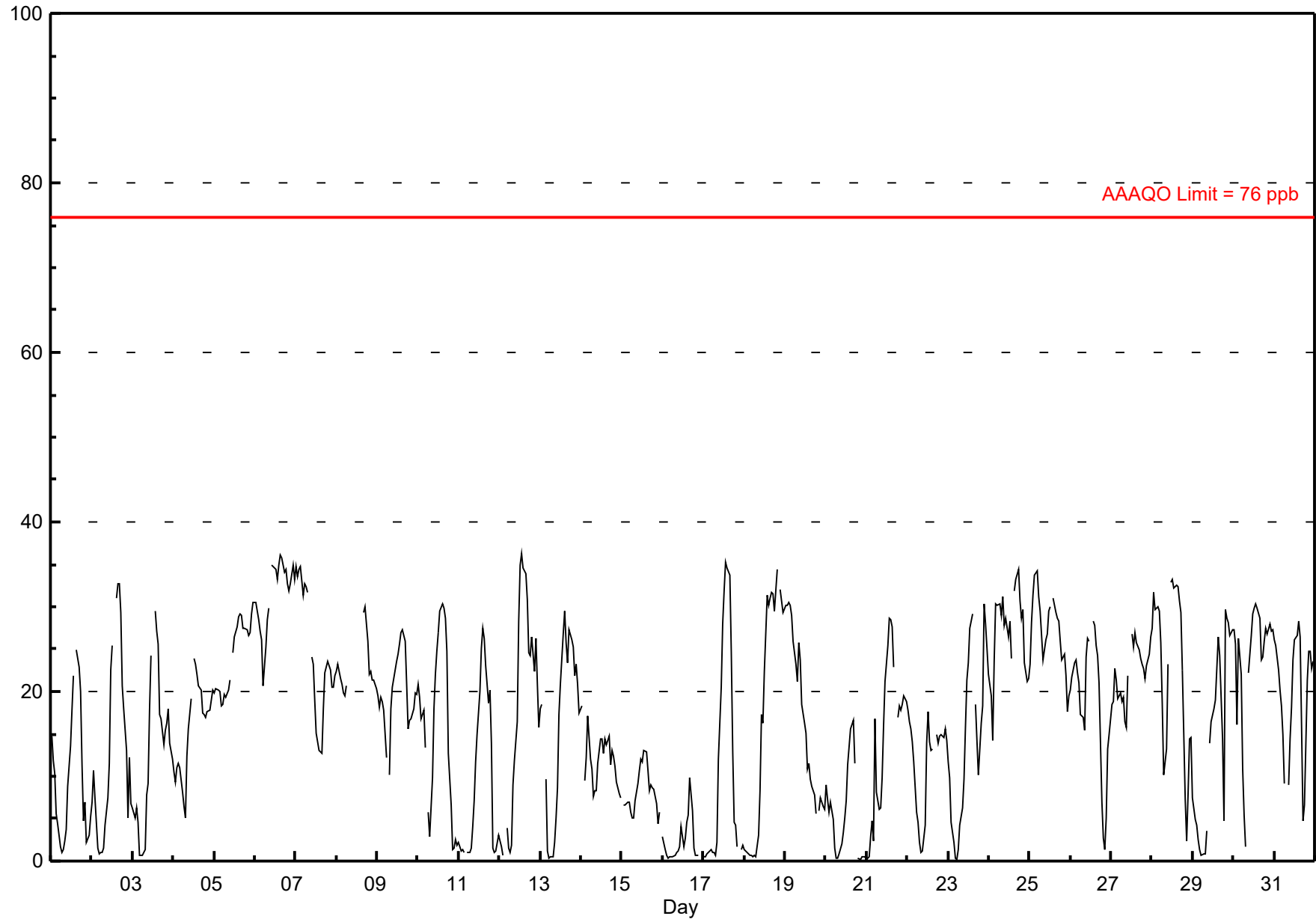
Oxides of Nitrogen (NO_x) - ppb

Henry Pirker - October 2019



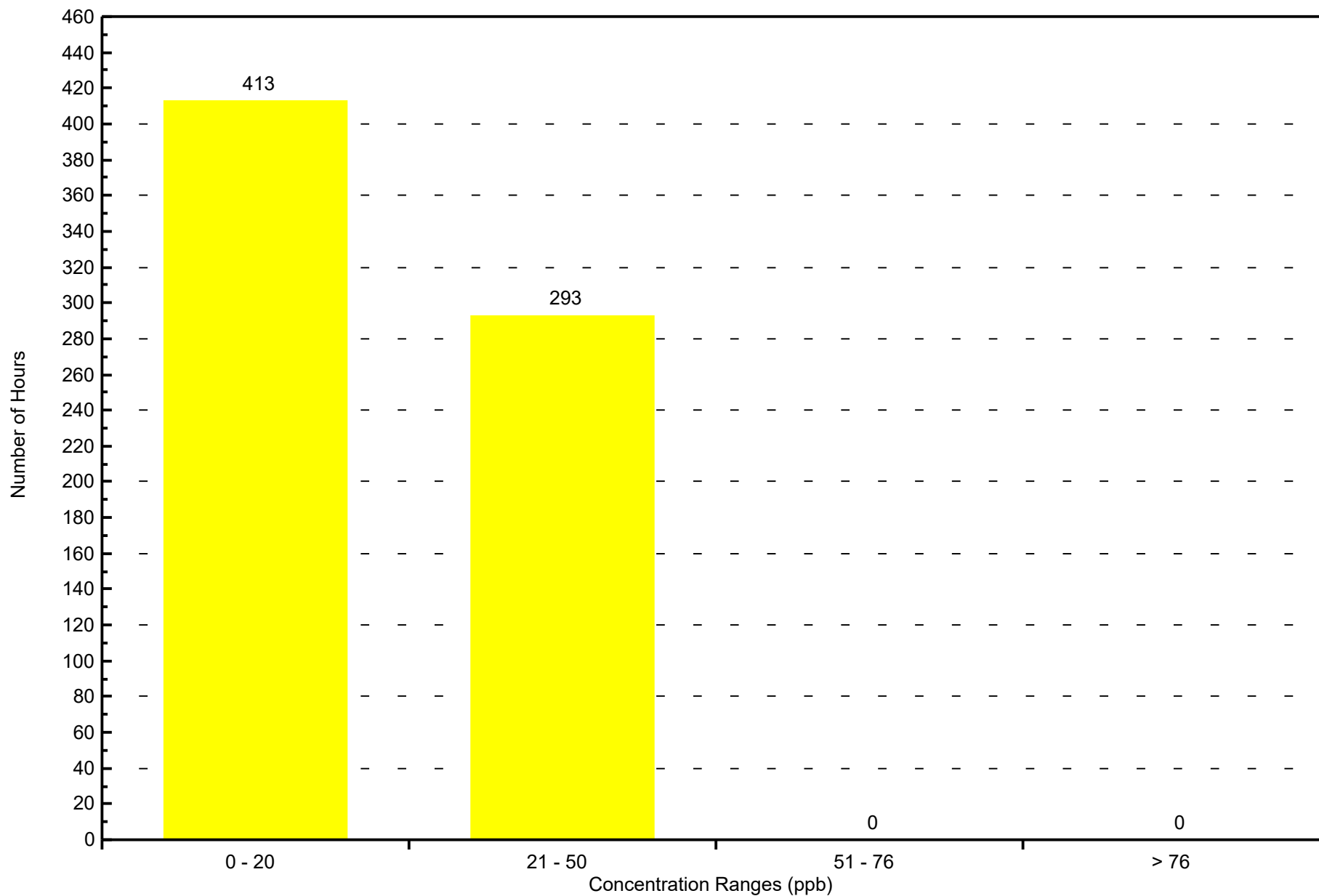
Hourly Averages

Ozone (O₃) - ppb
Henry Pirker - October 2019



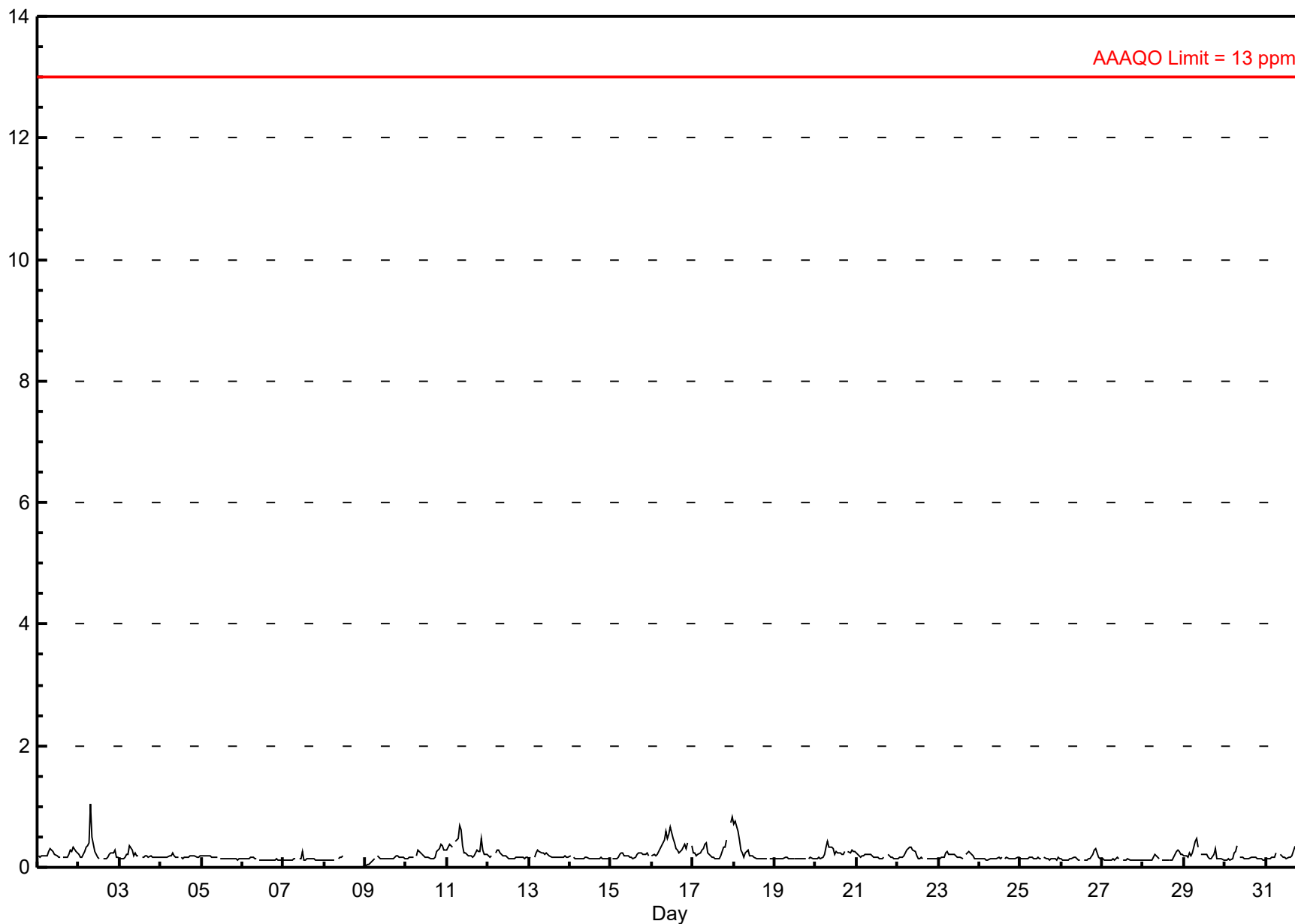
Histogram of Hourly Averages

Ozone (O₃) - ppb
Henry Pirker - October 2019



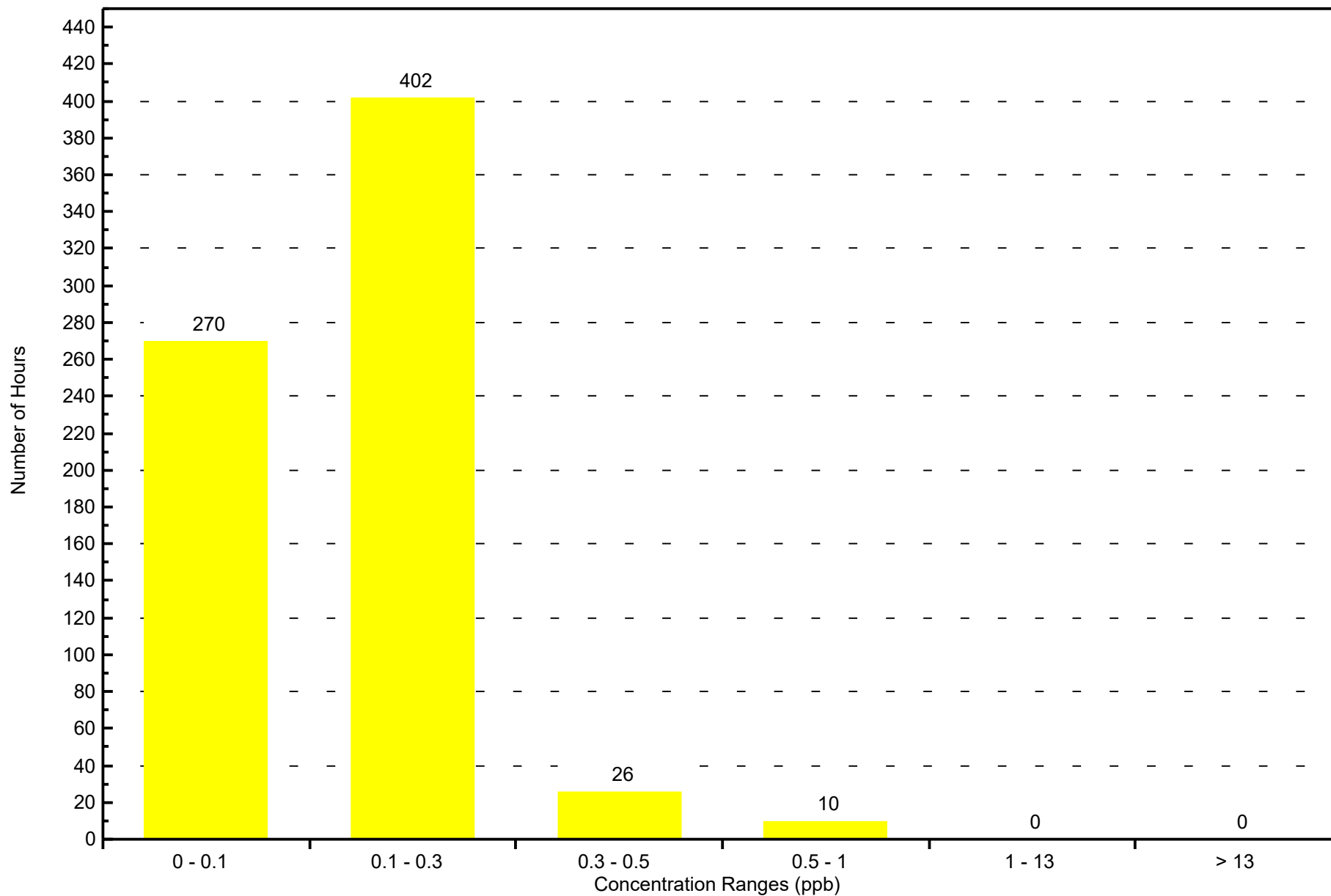
Hourly Averages

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



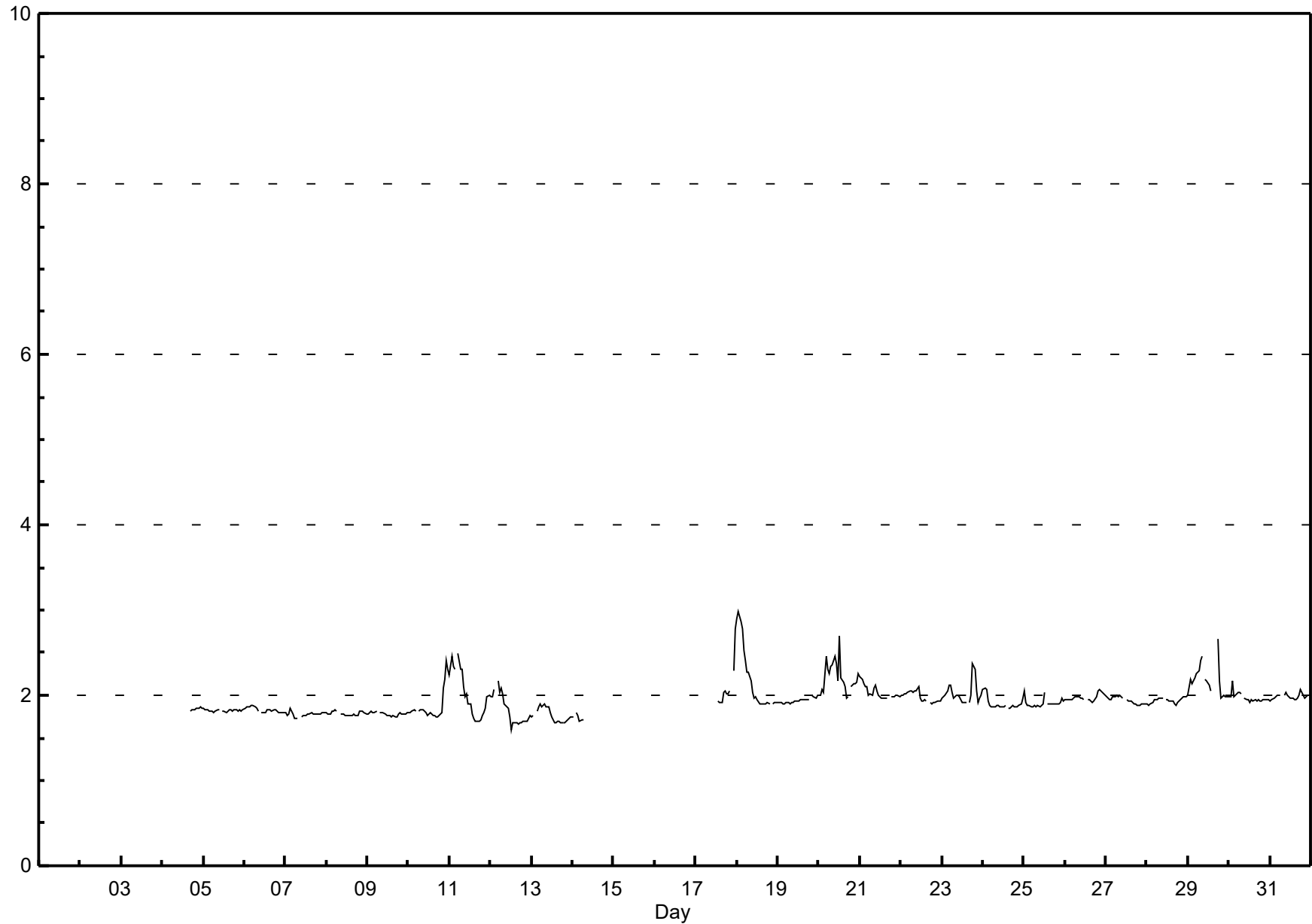
Histogram of Hourly Averages

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



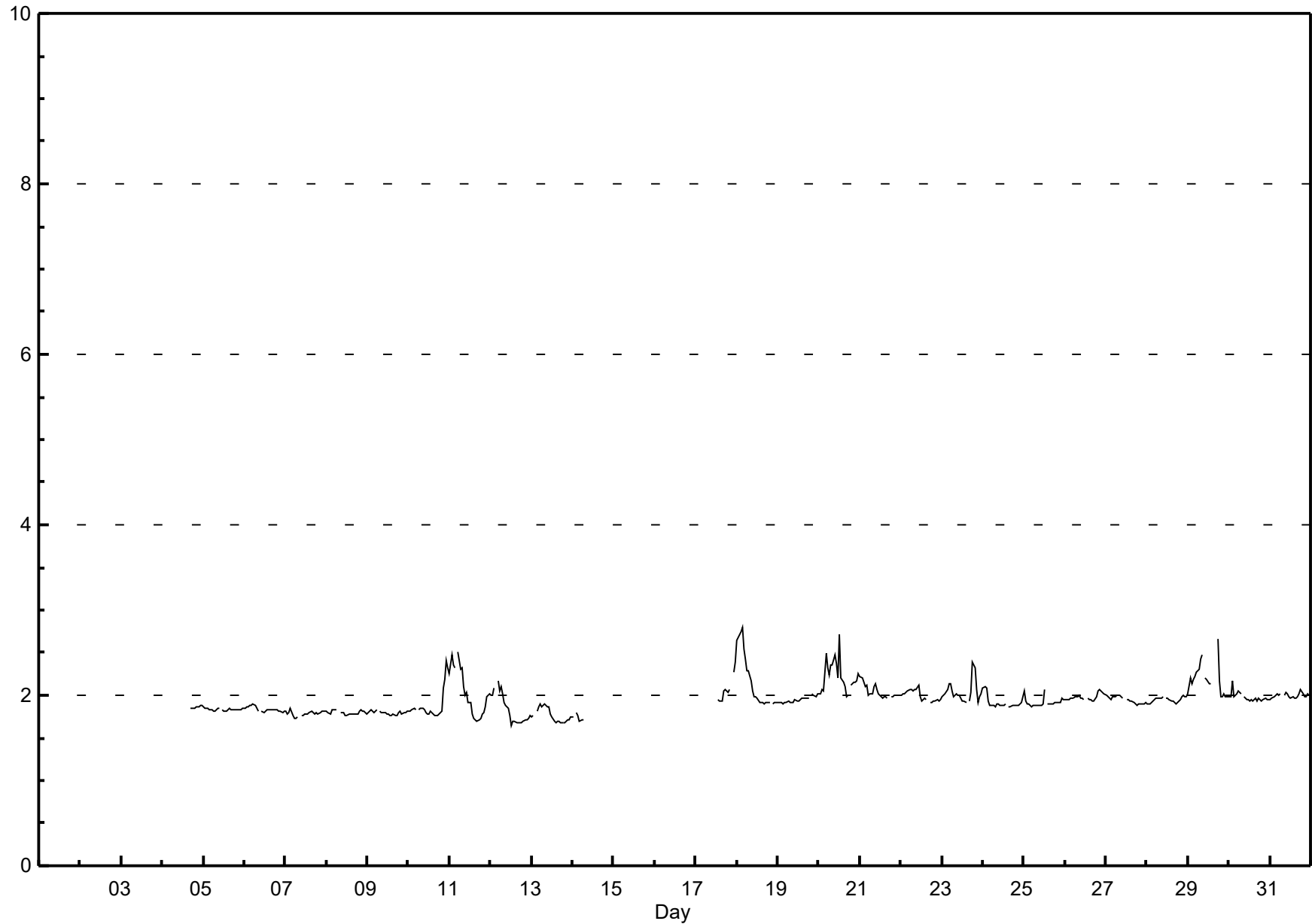
Hourly Averages

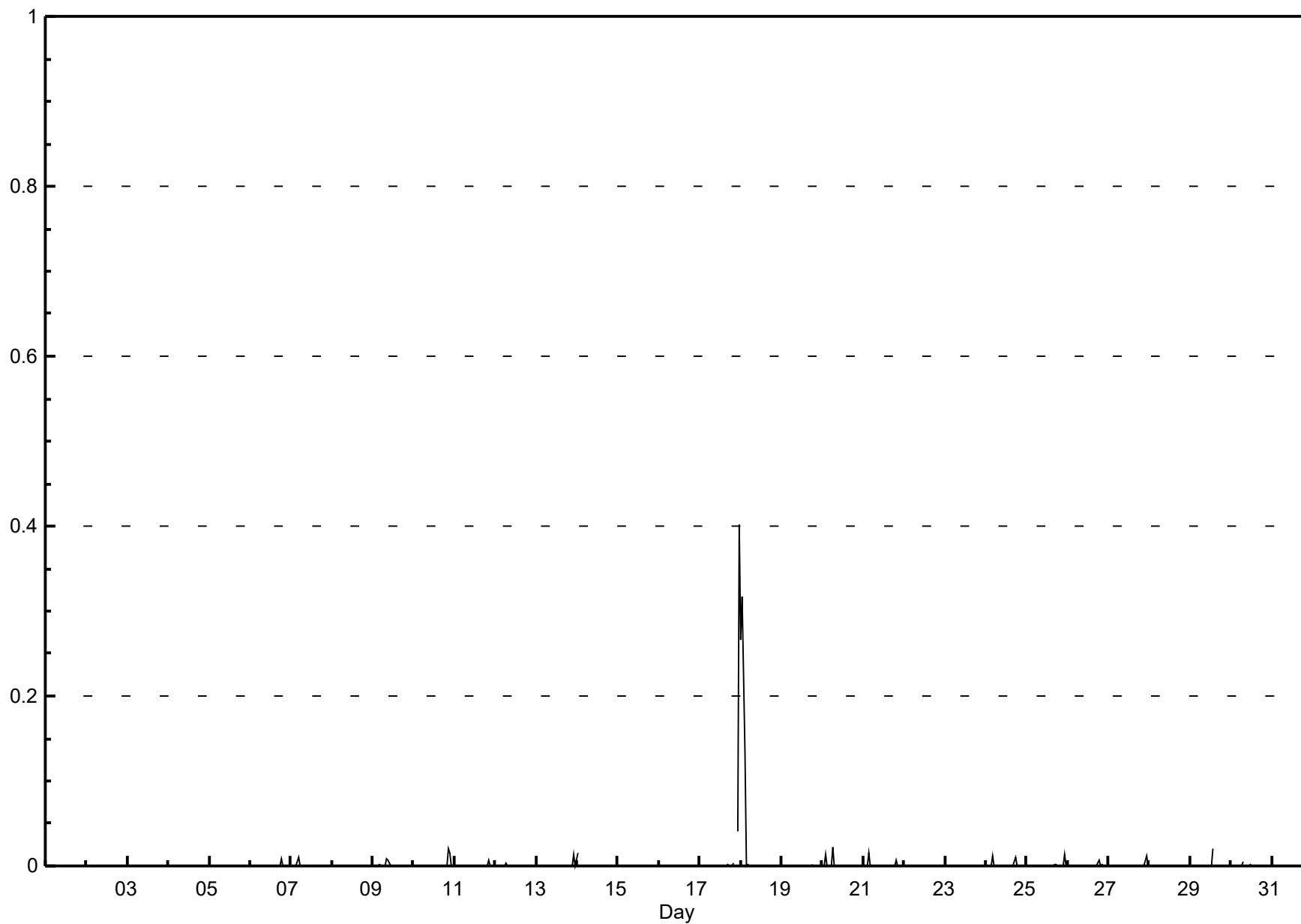
Total Hydrocarbons (THC) - ppm
Henry Pirker - October 2019

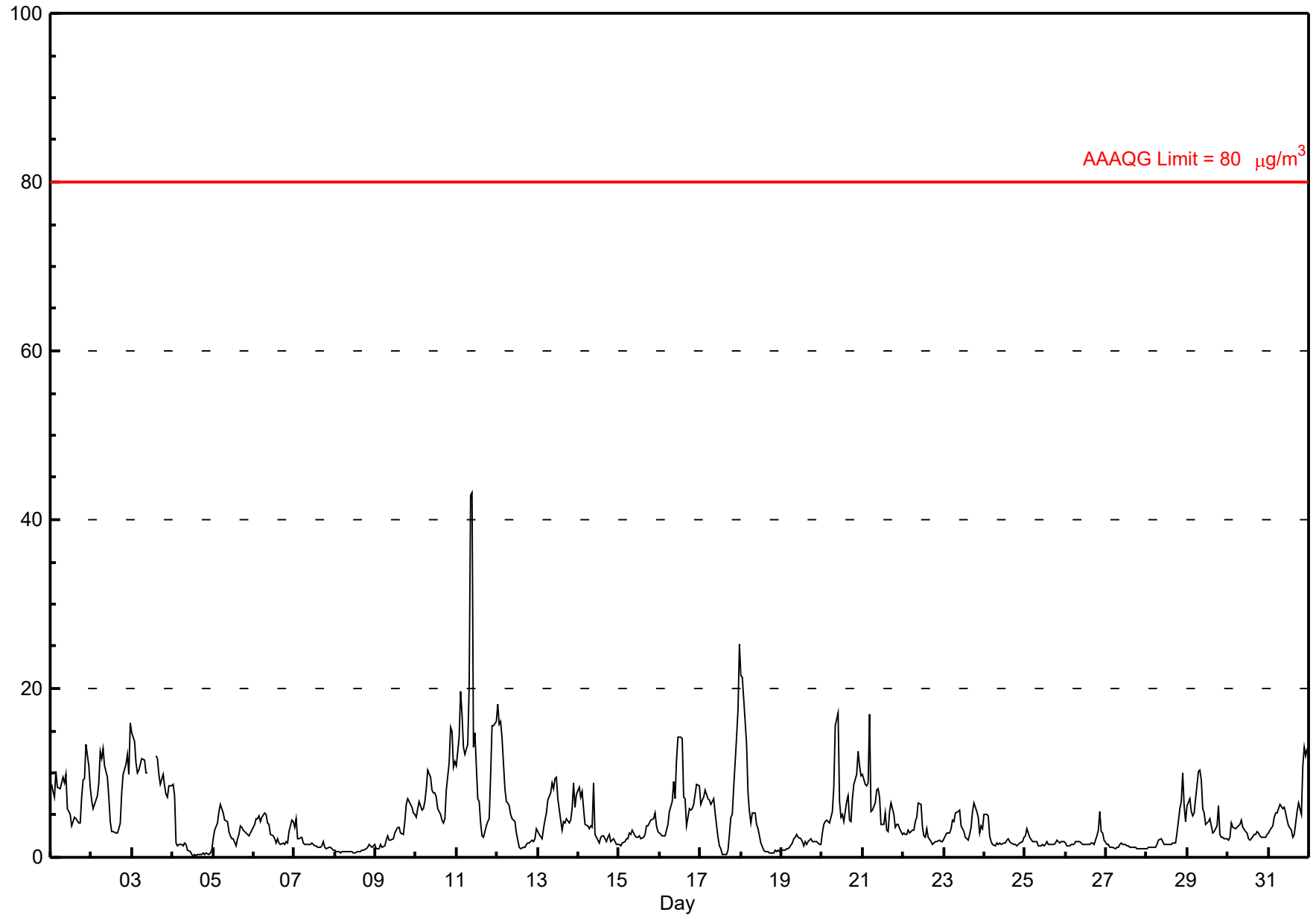


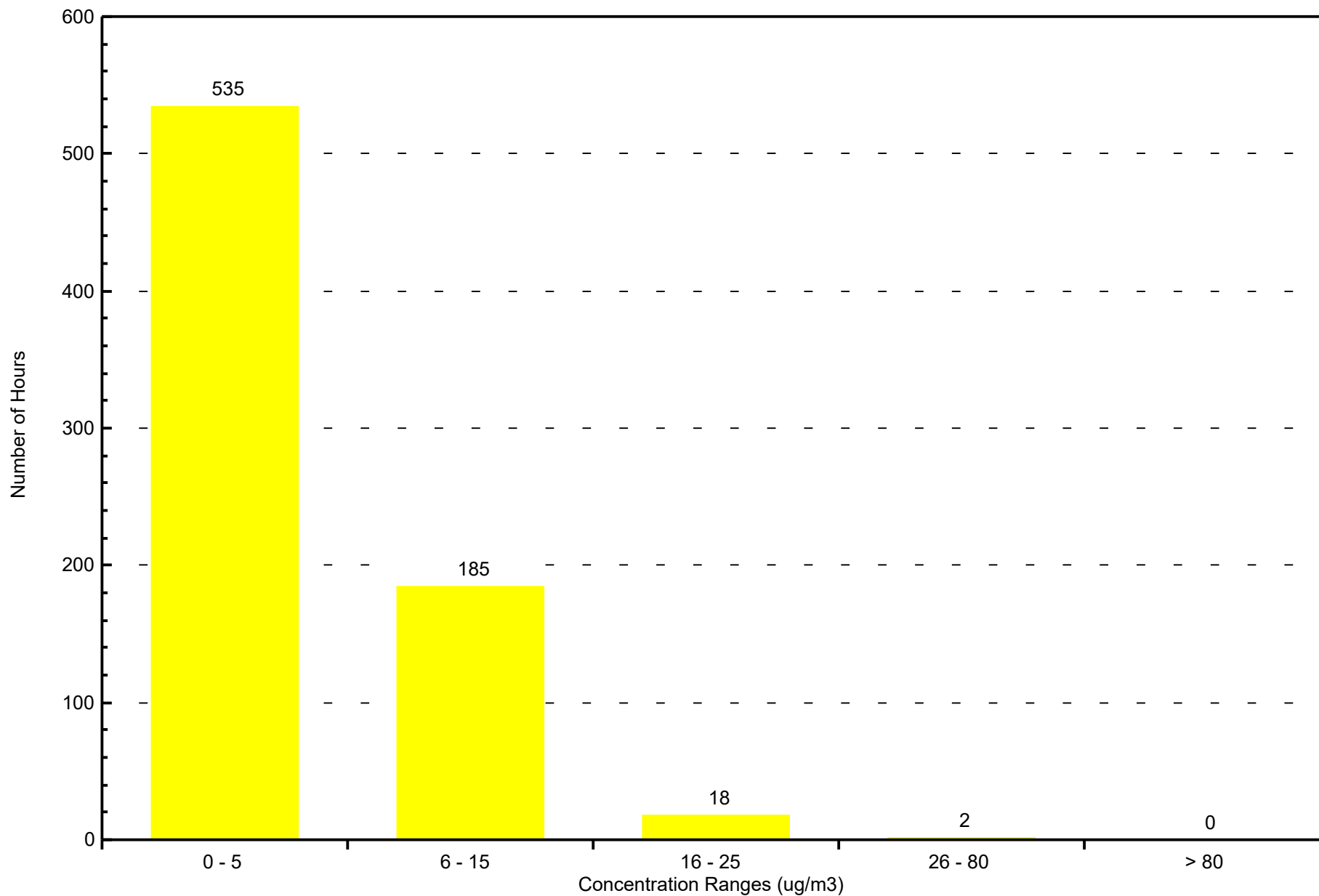
Hourly Averages

Methane (CH₄) - ppm
Henry Pirker - October 2019





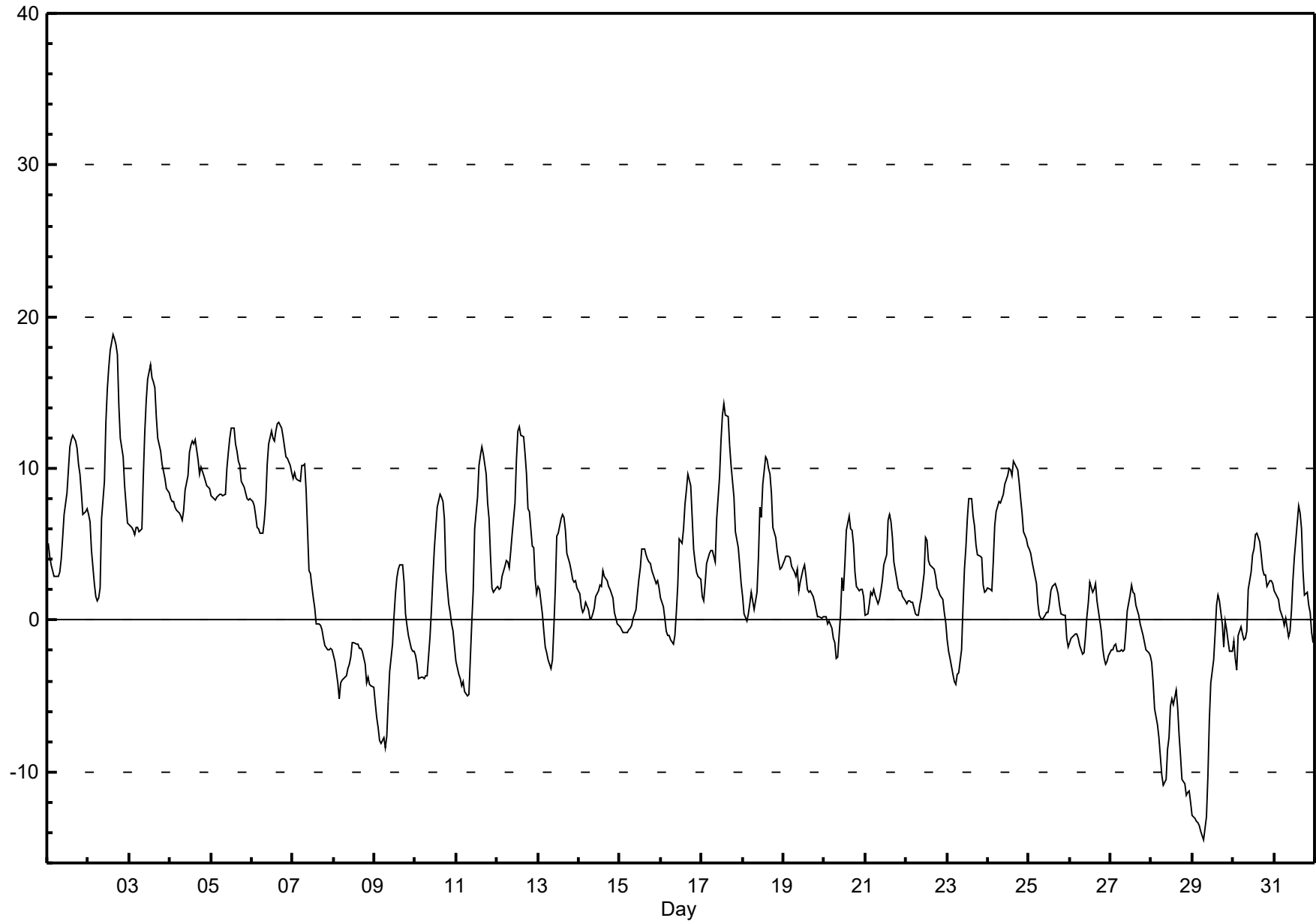




Hourly Averages

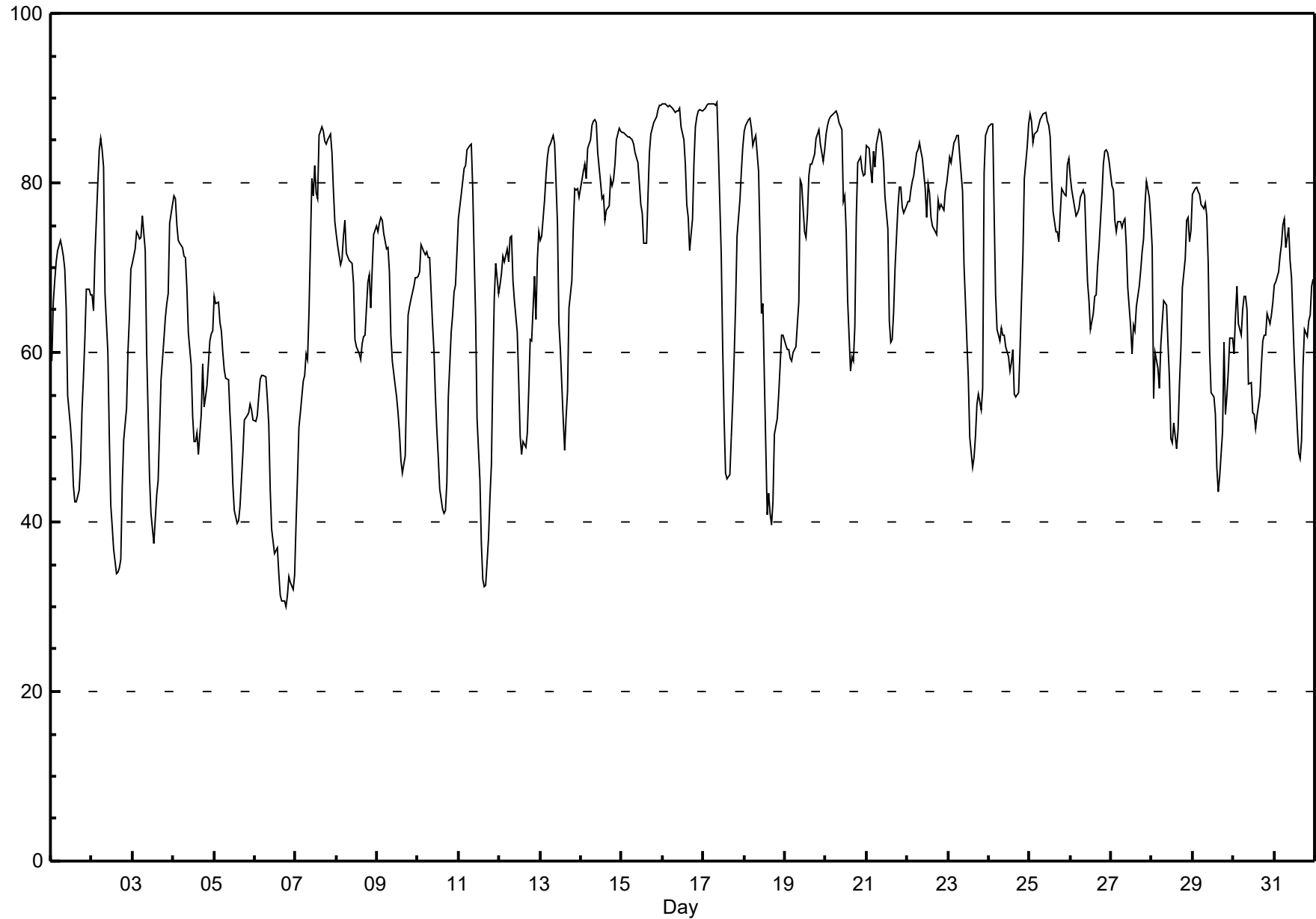
External Temperature (ET) - °C

Henry Pirker - October 2019



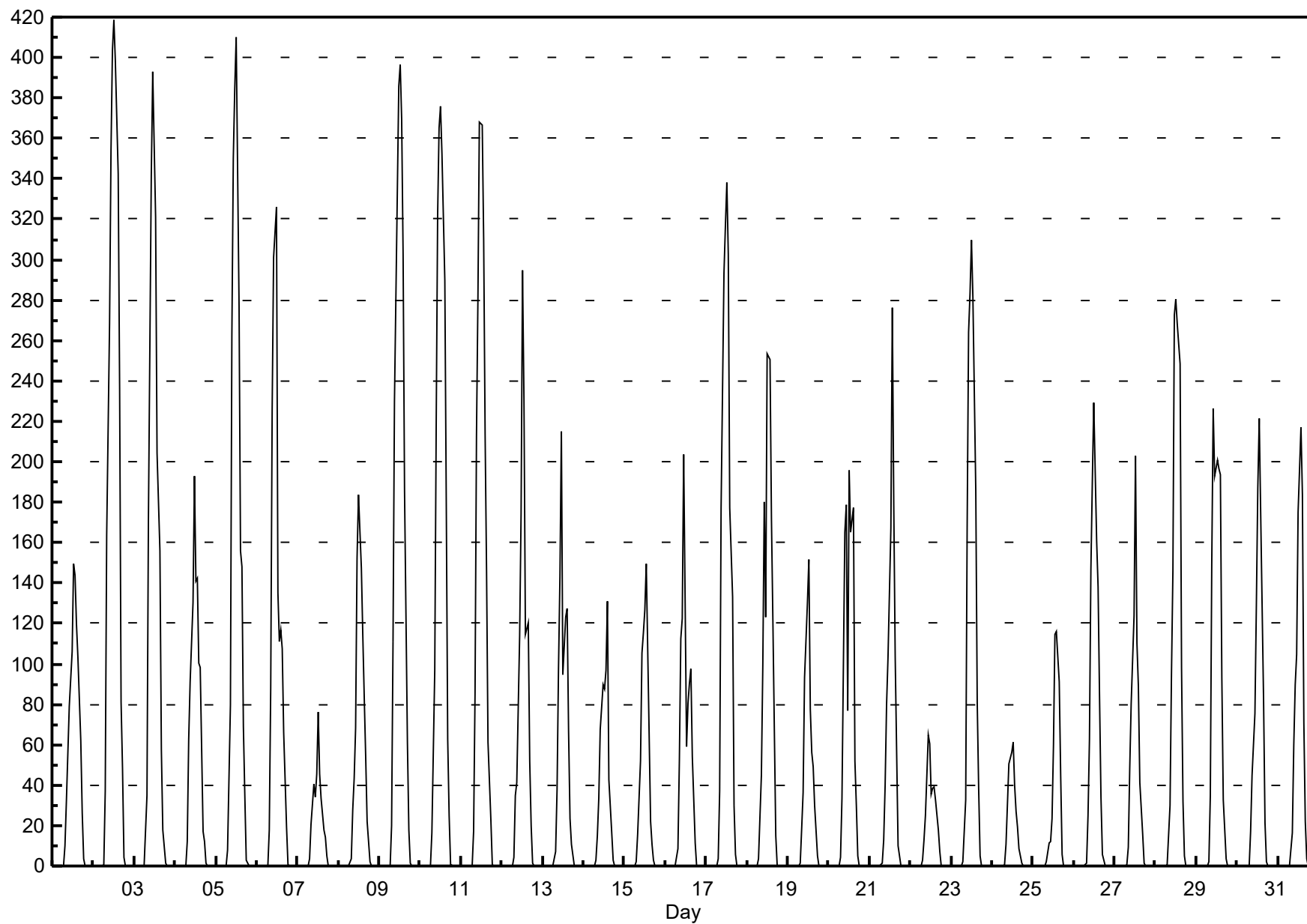
Hourly Averages

Relative Humidity (RH) - %
Henry Pirker - October 2019



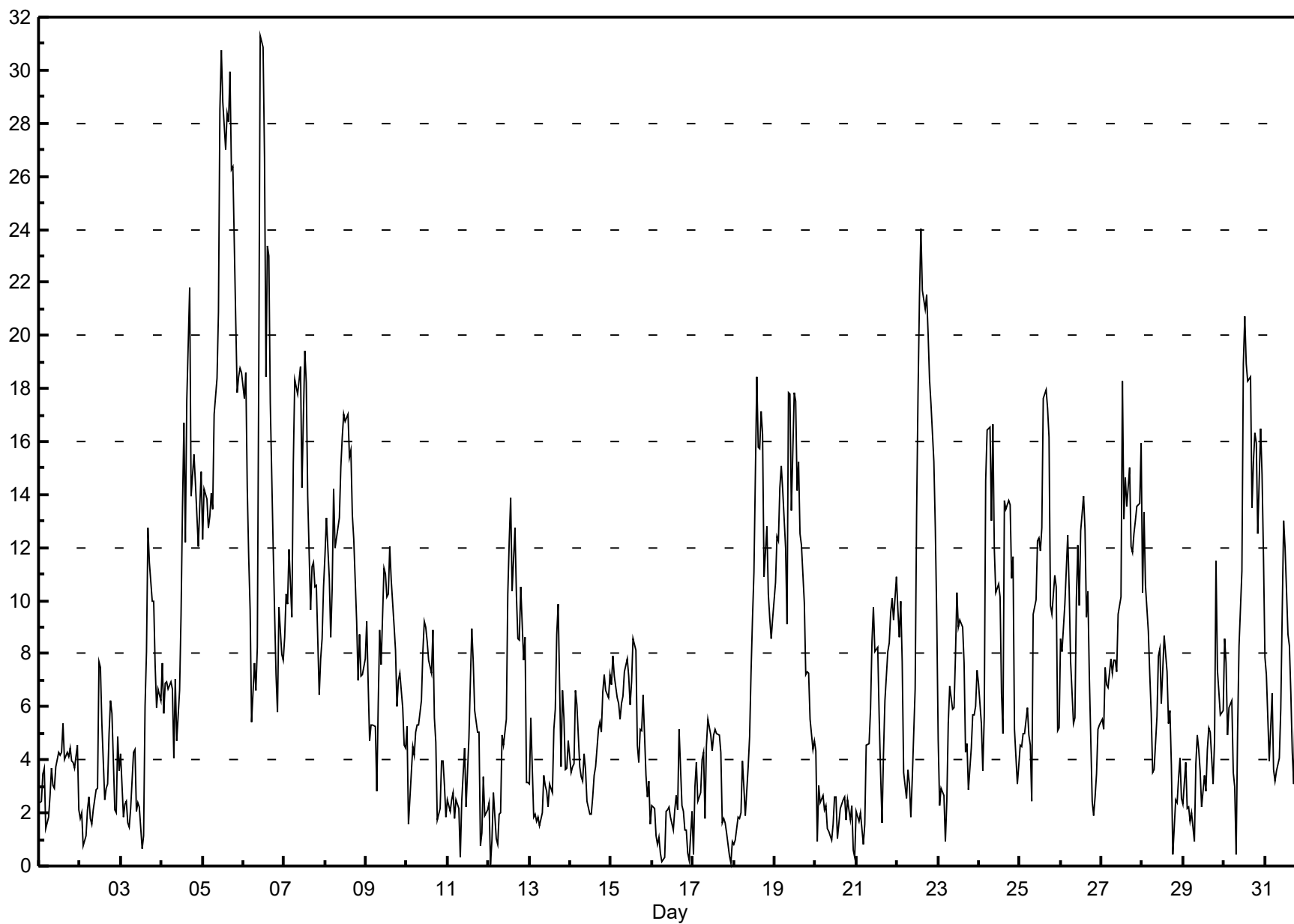
Hourly Averages

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



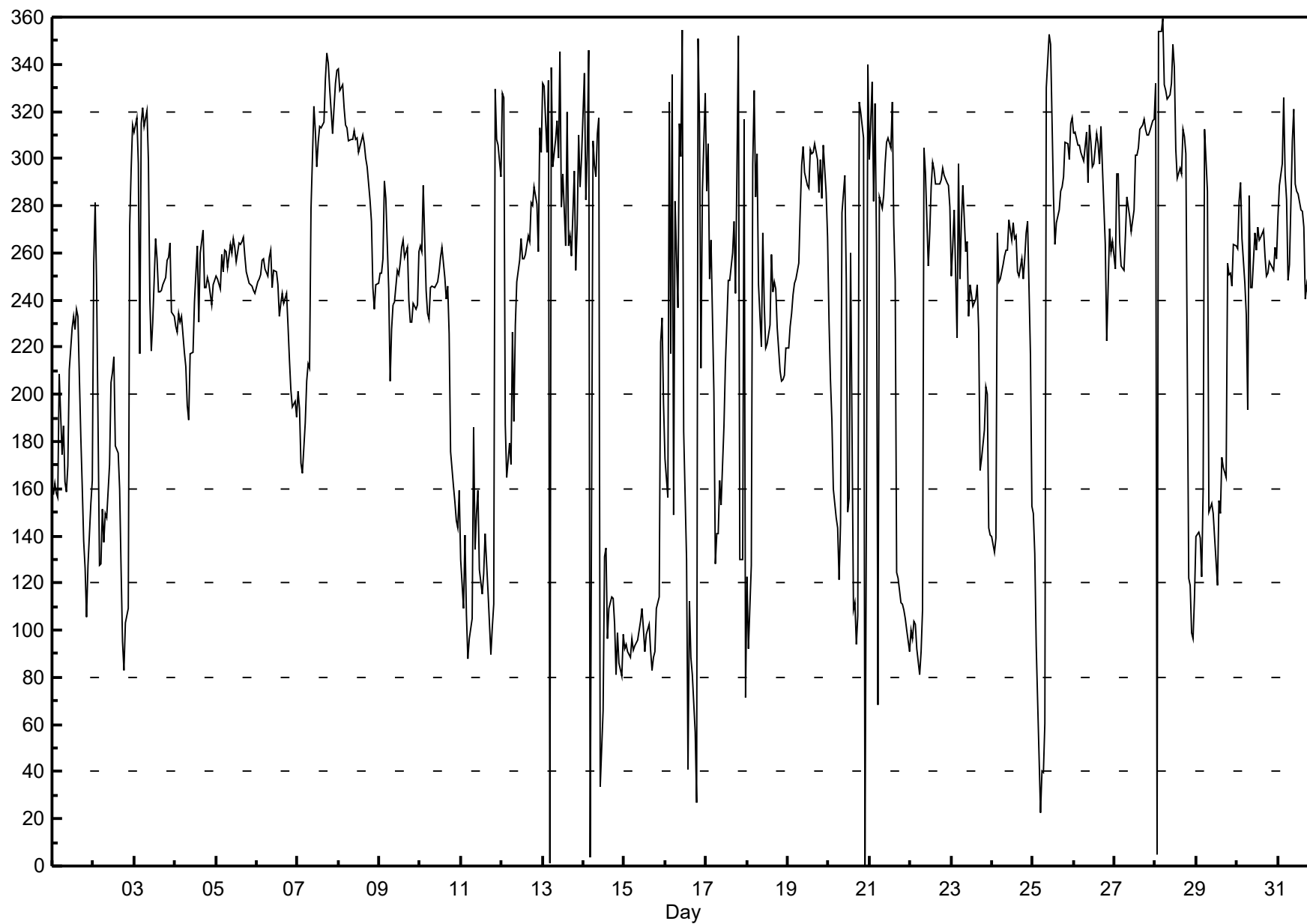
Hourly Averages

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



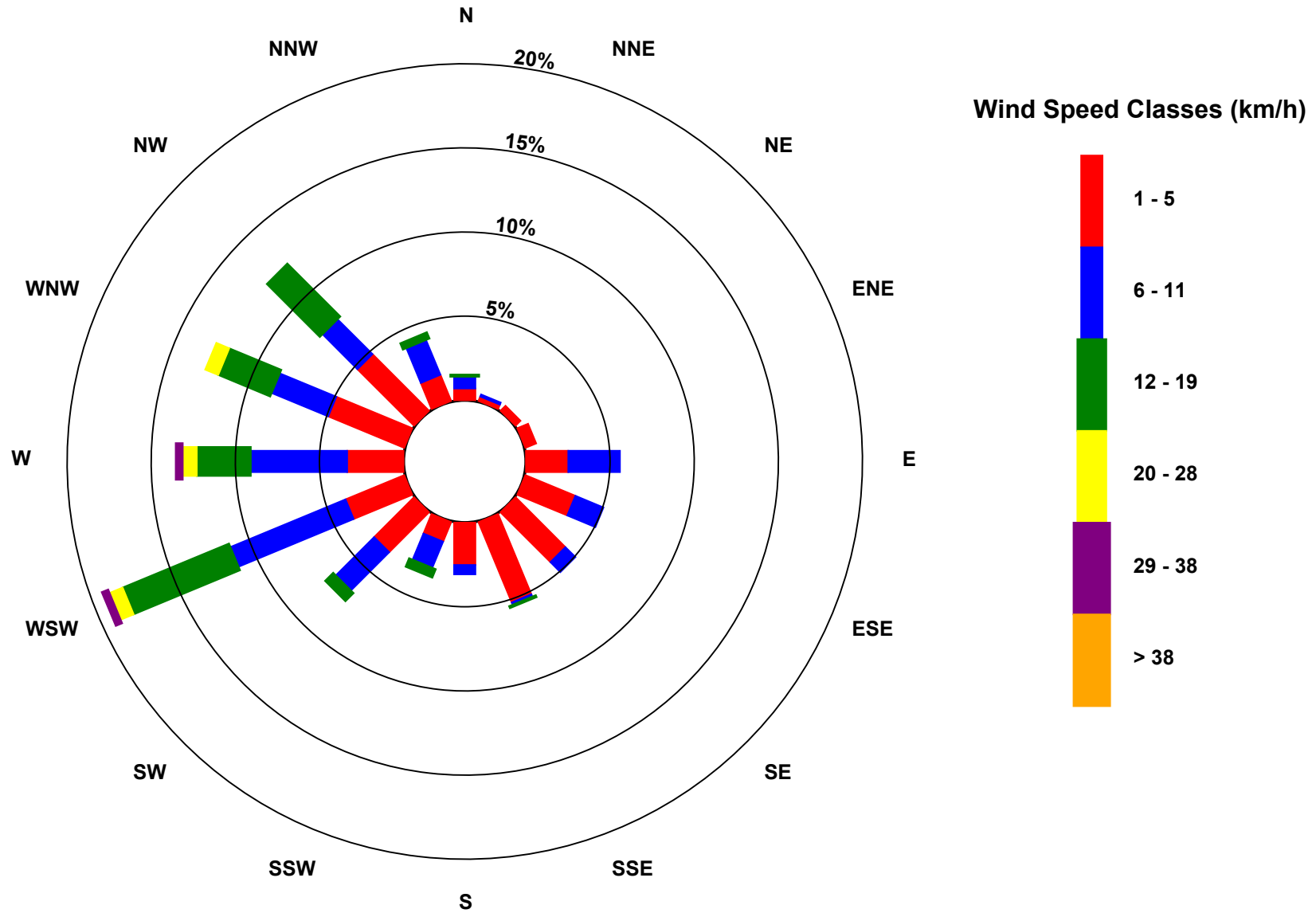
Hourly Averages

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



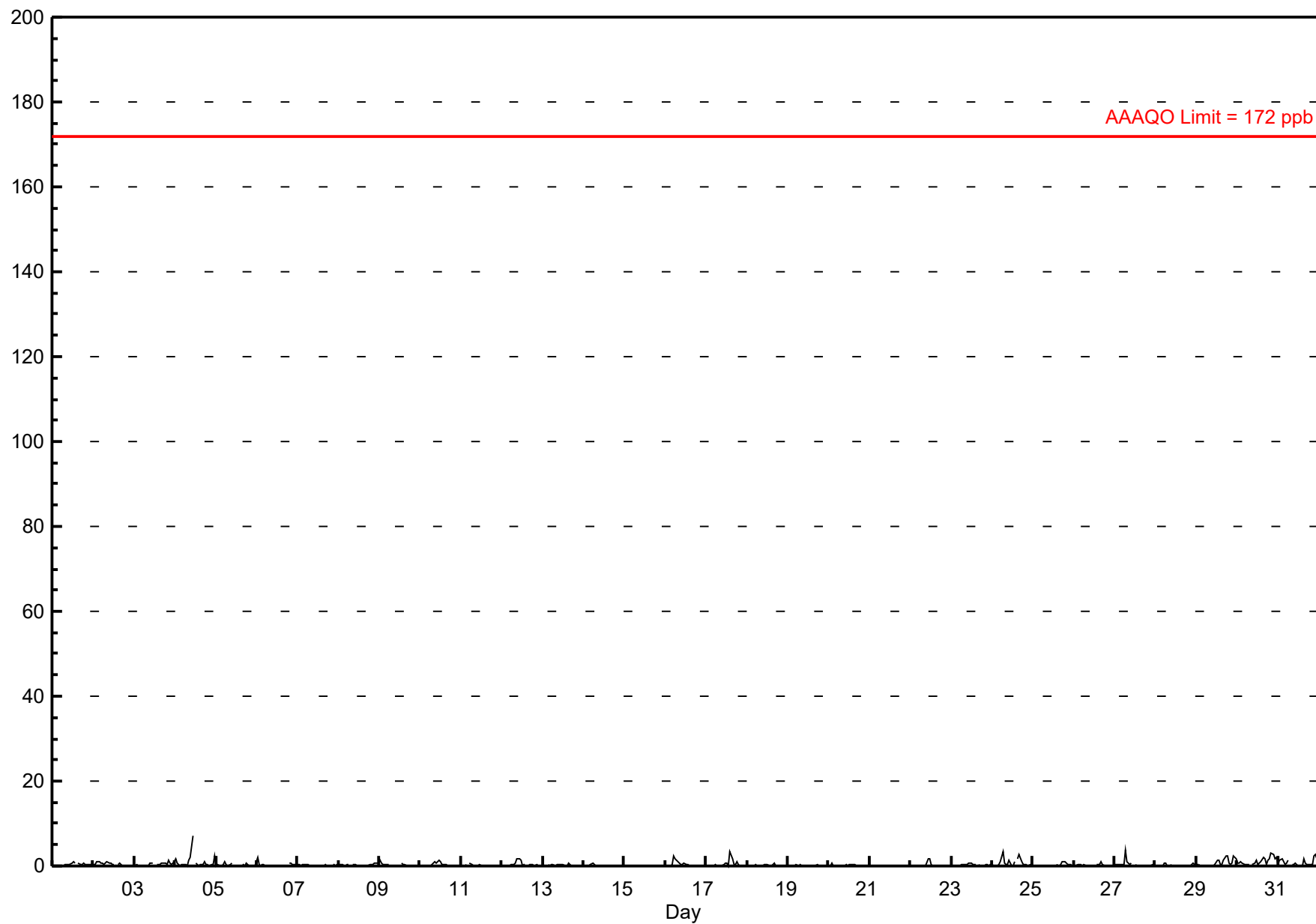
Wind Rose

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



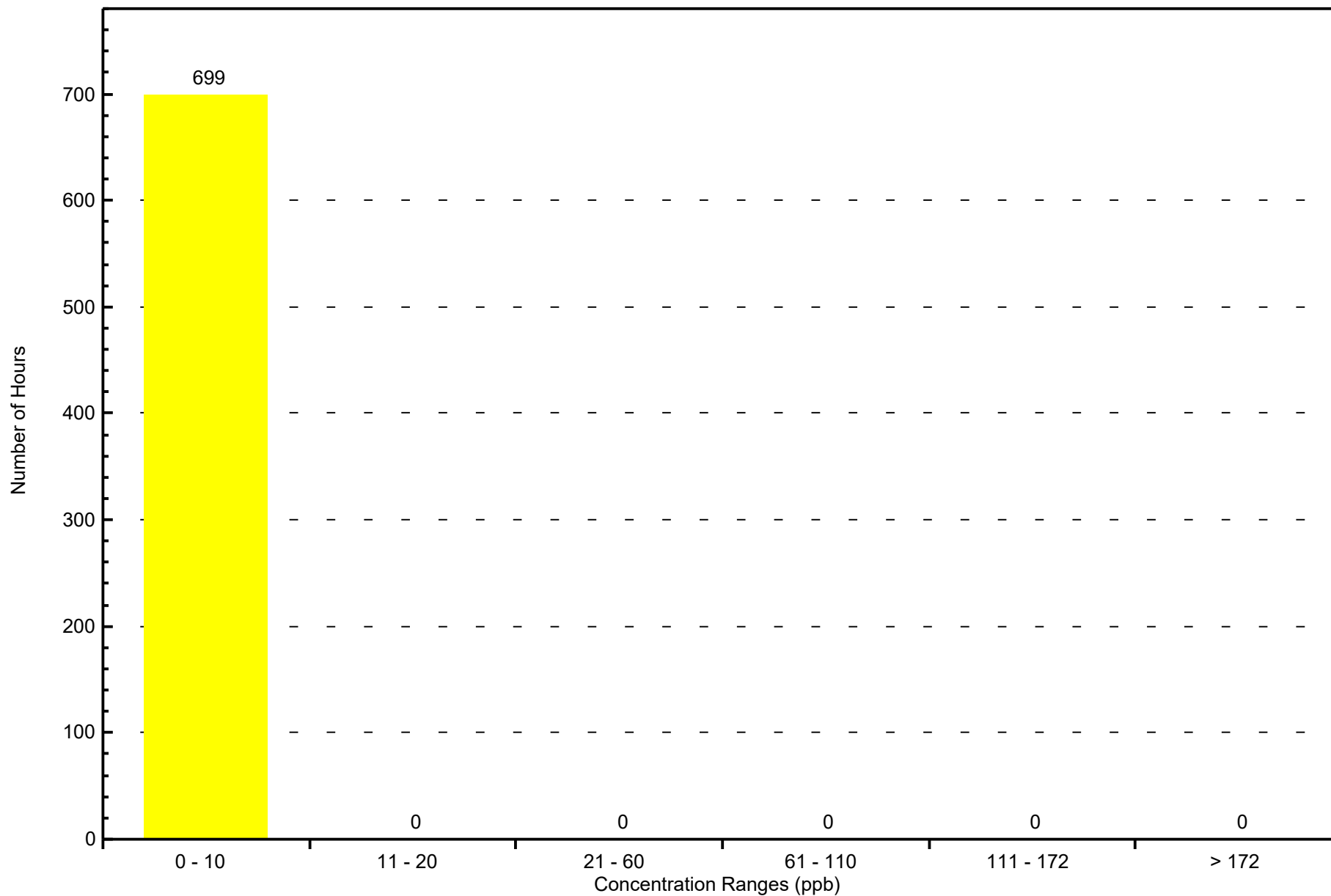
Hourly Averages

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



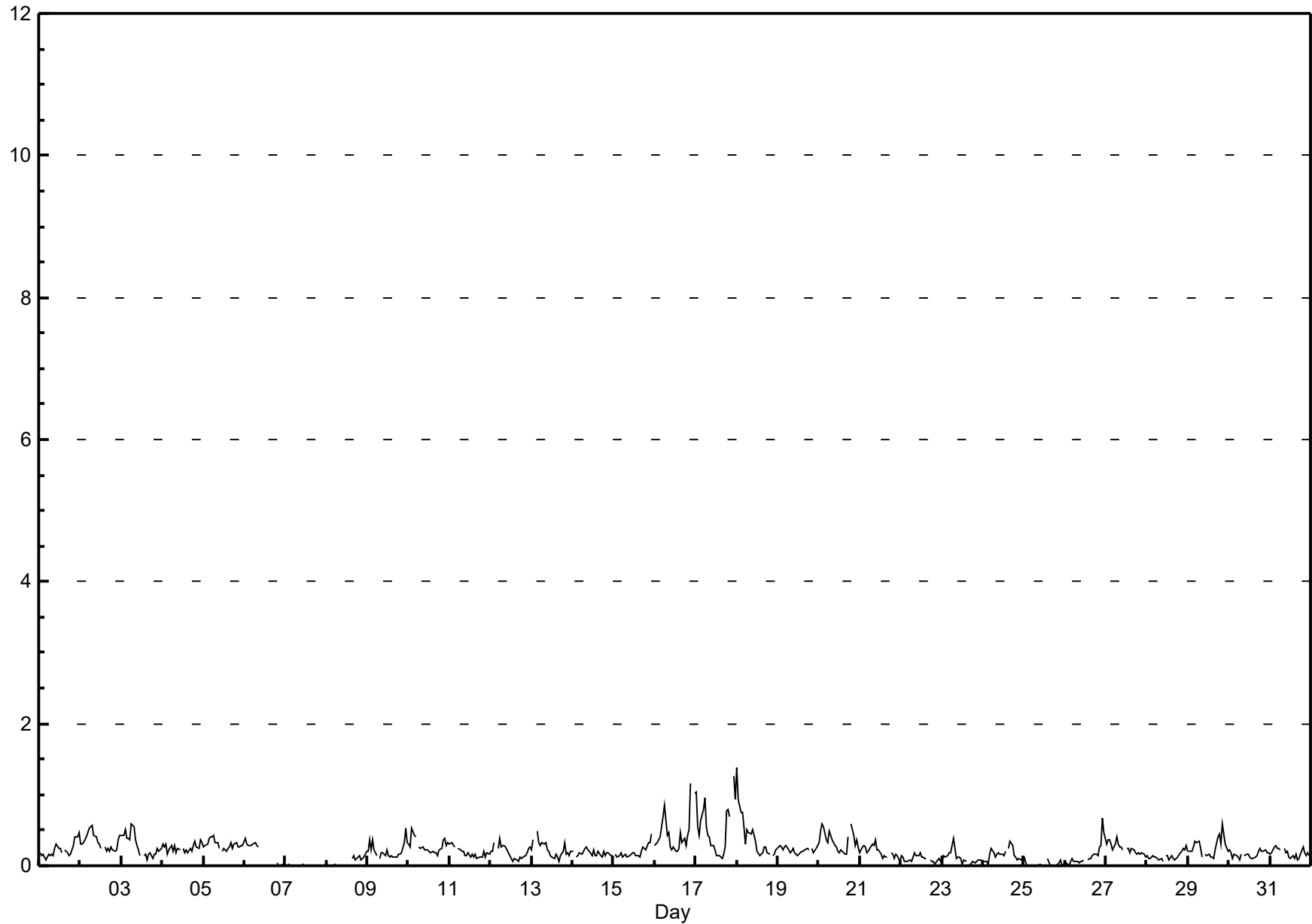
Histogram of Hourly Averages

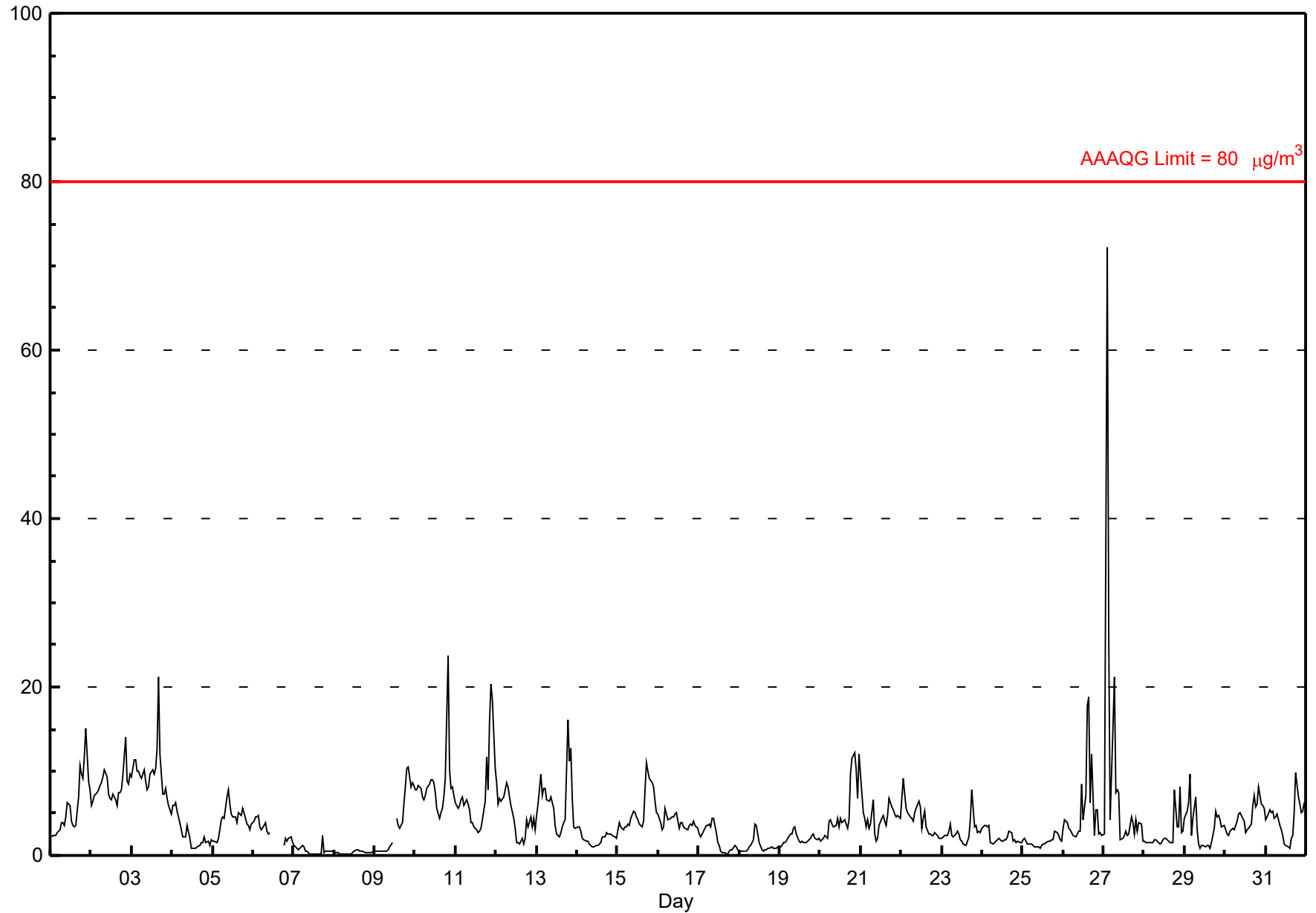
Sulphur Dioxide (SO₂) - ppb
Smoky Heights - October 2019

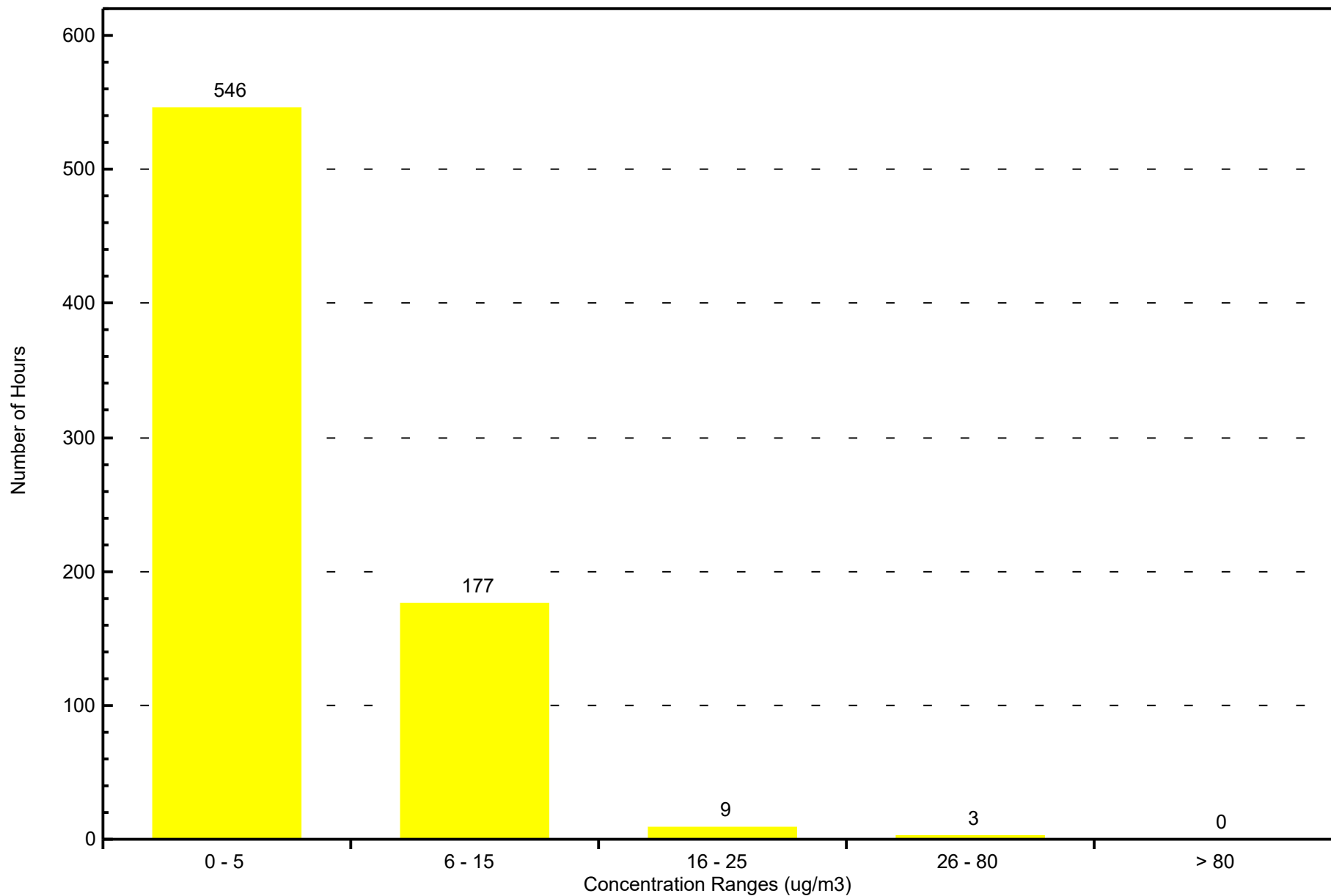


Hourly Averages

Total Reduced Sulphur (TRS) - ppb
Smoky Heights - October 2019

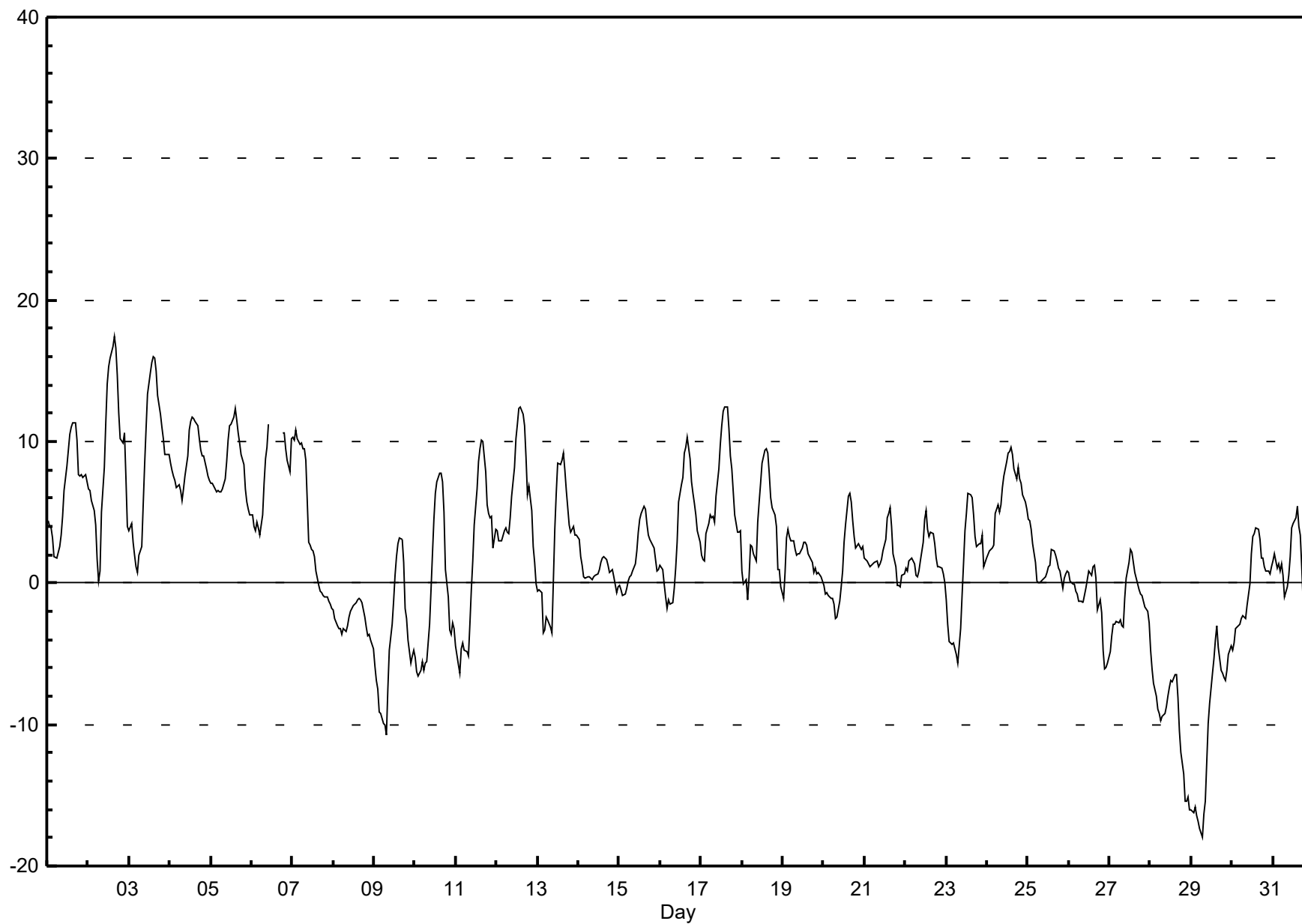






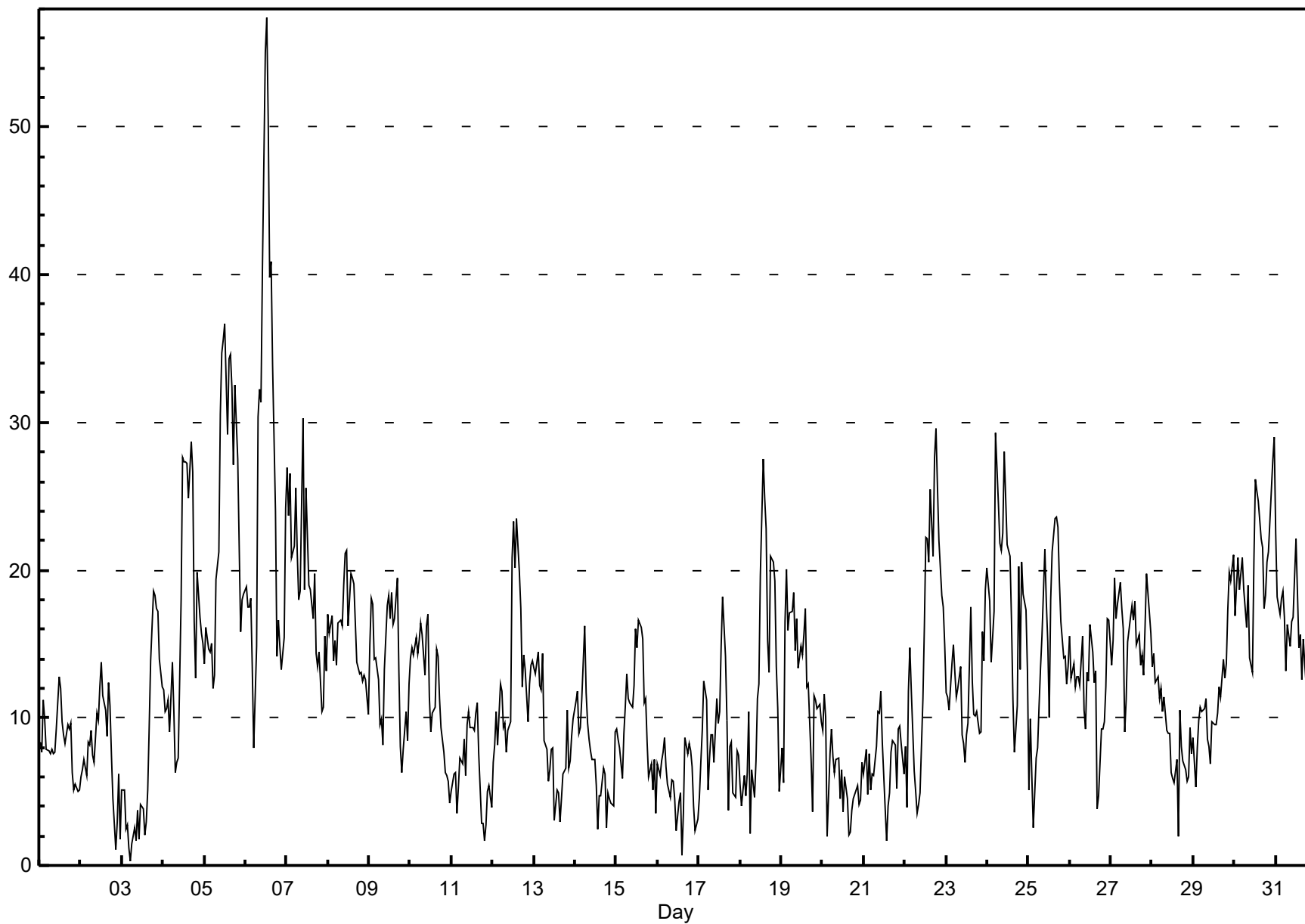
Hourly Averages

External Temperature (ET) - °C
Smoky Heights - October 2019



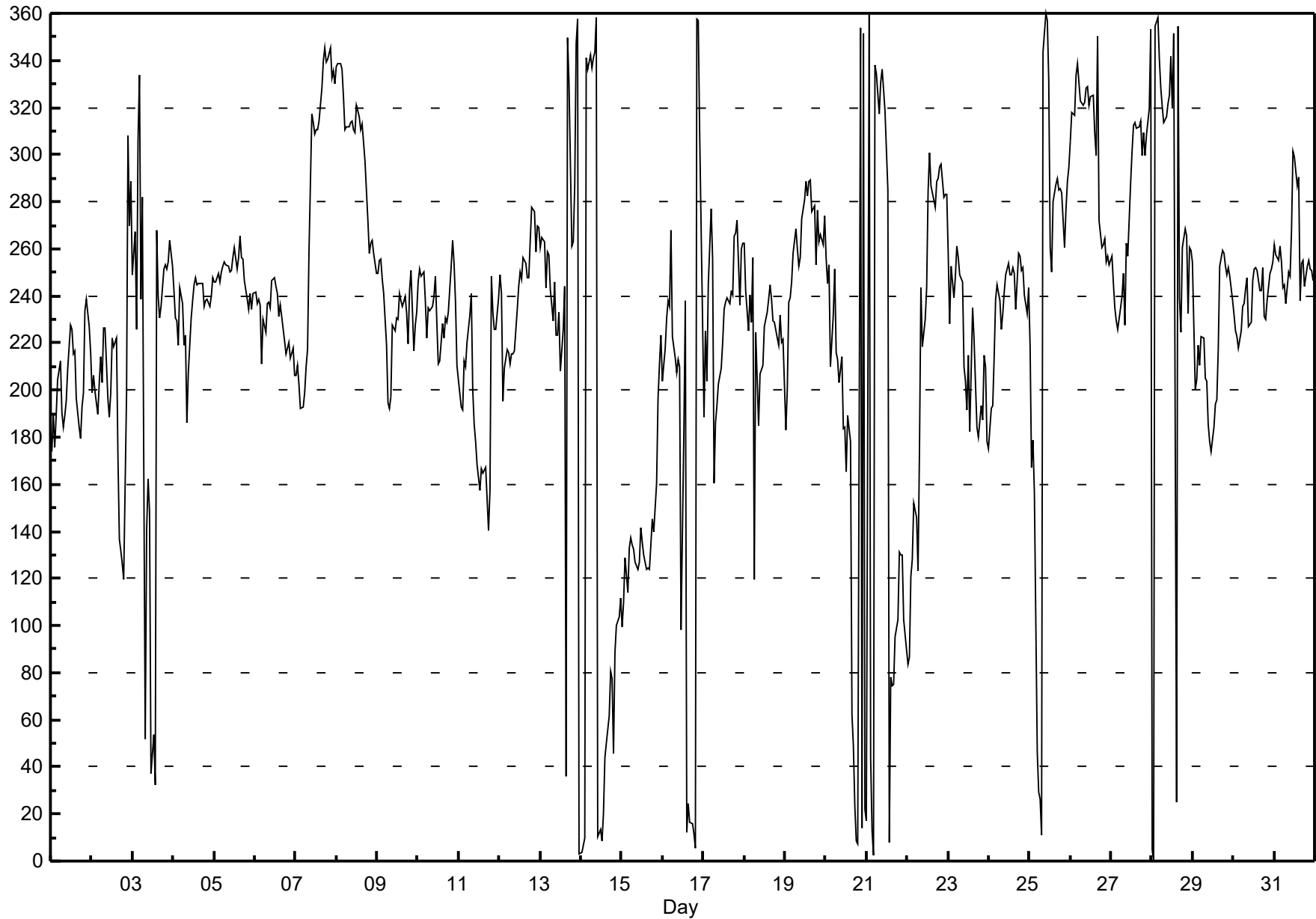
Hourly Averages

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



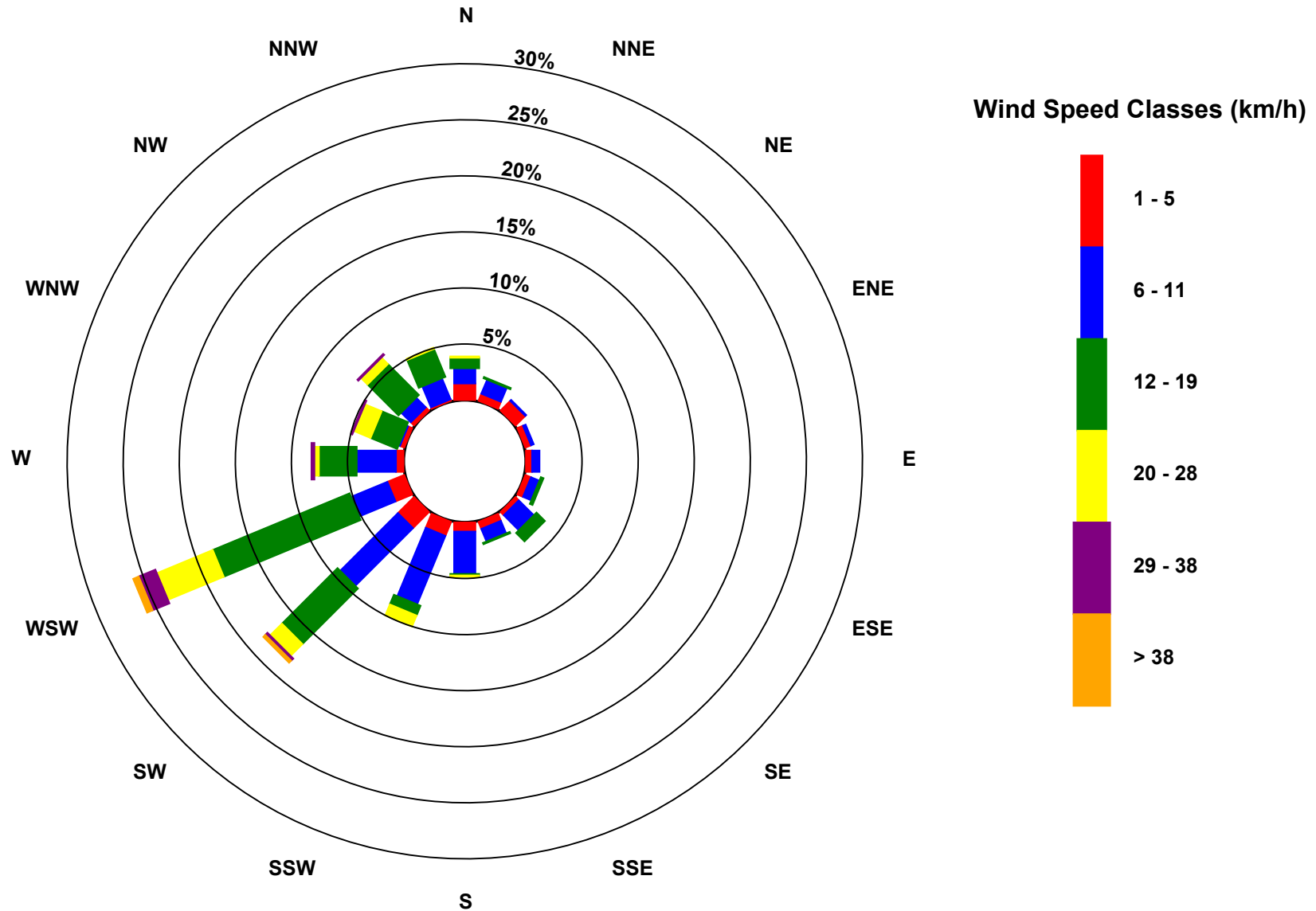
Hourly Averages

Wind Direction (WD) - deg
Smoky Heights - October 2019



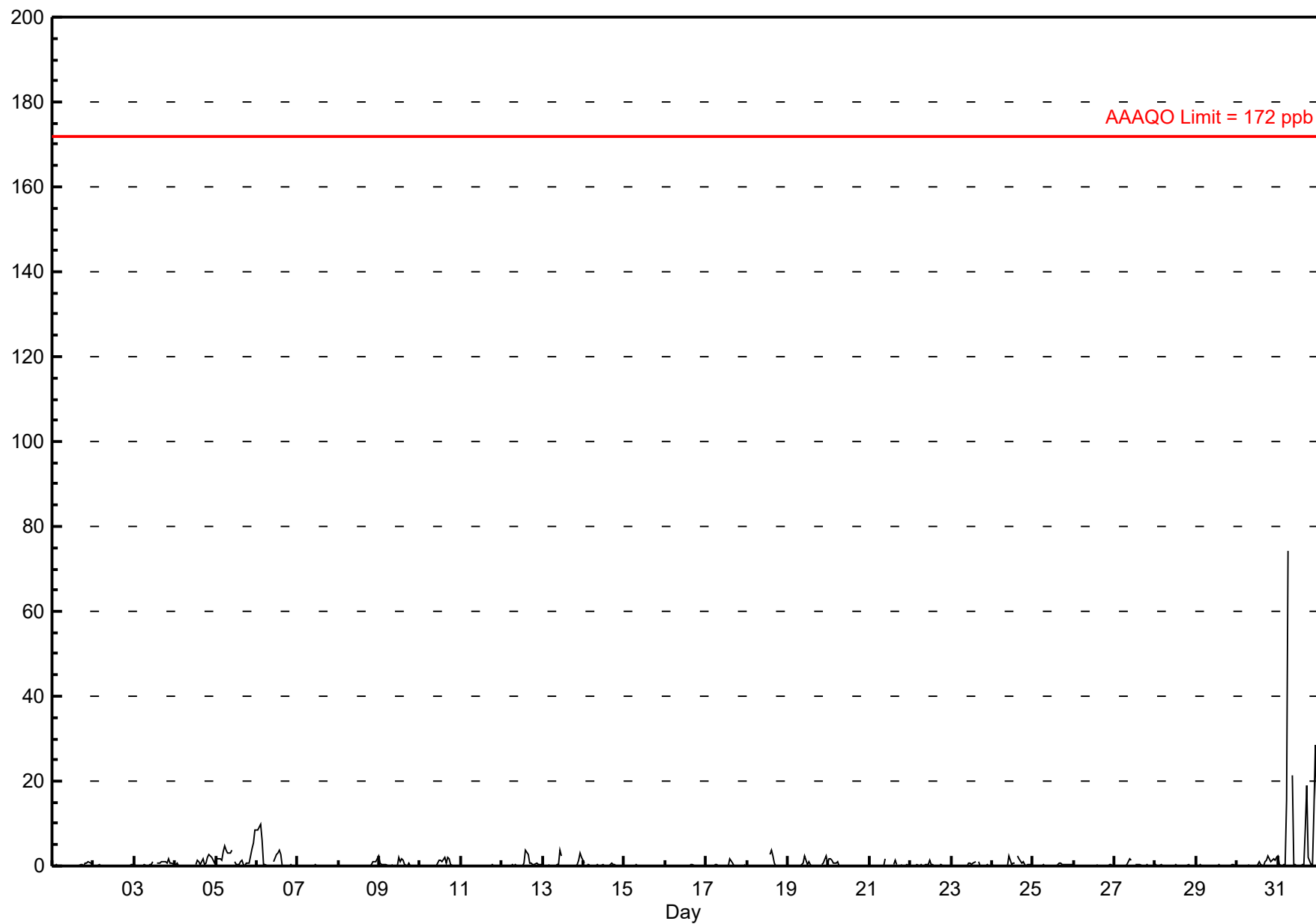
Wind Rose

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



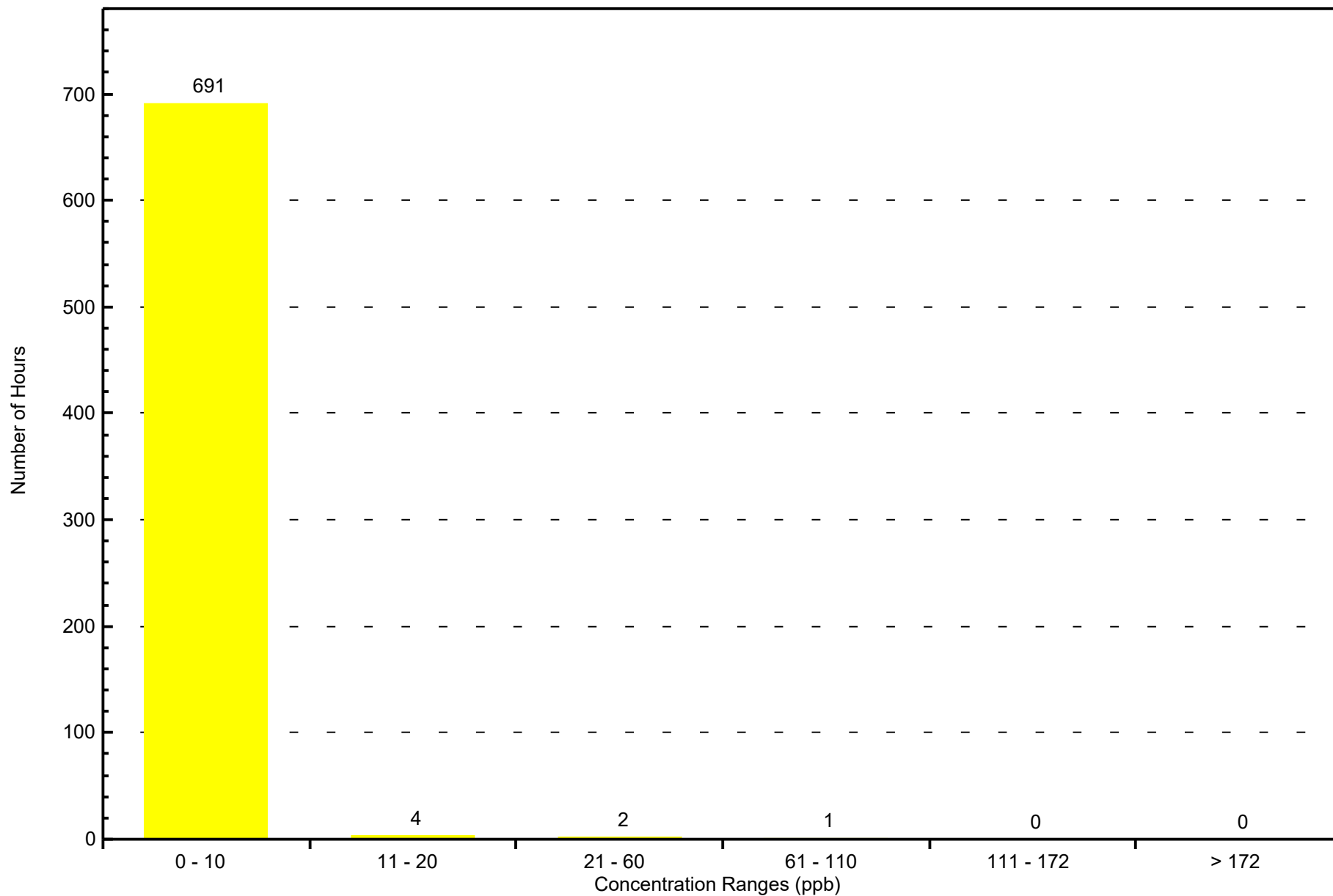
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Valleyview - October 2019



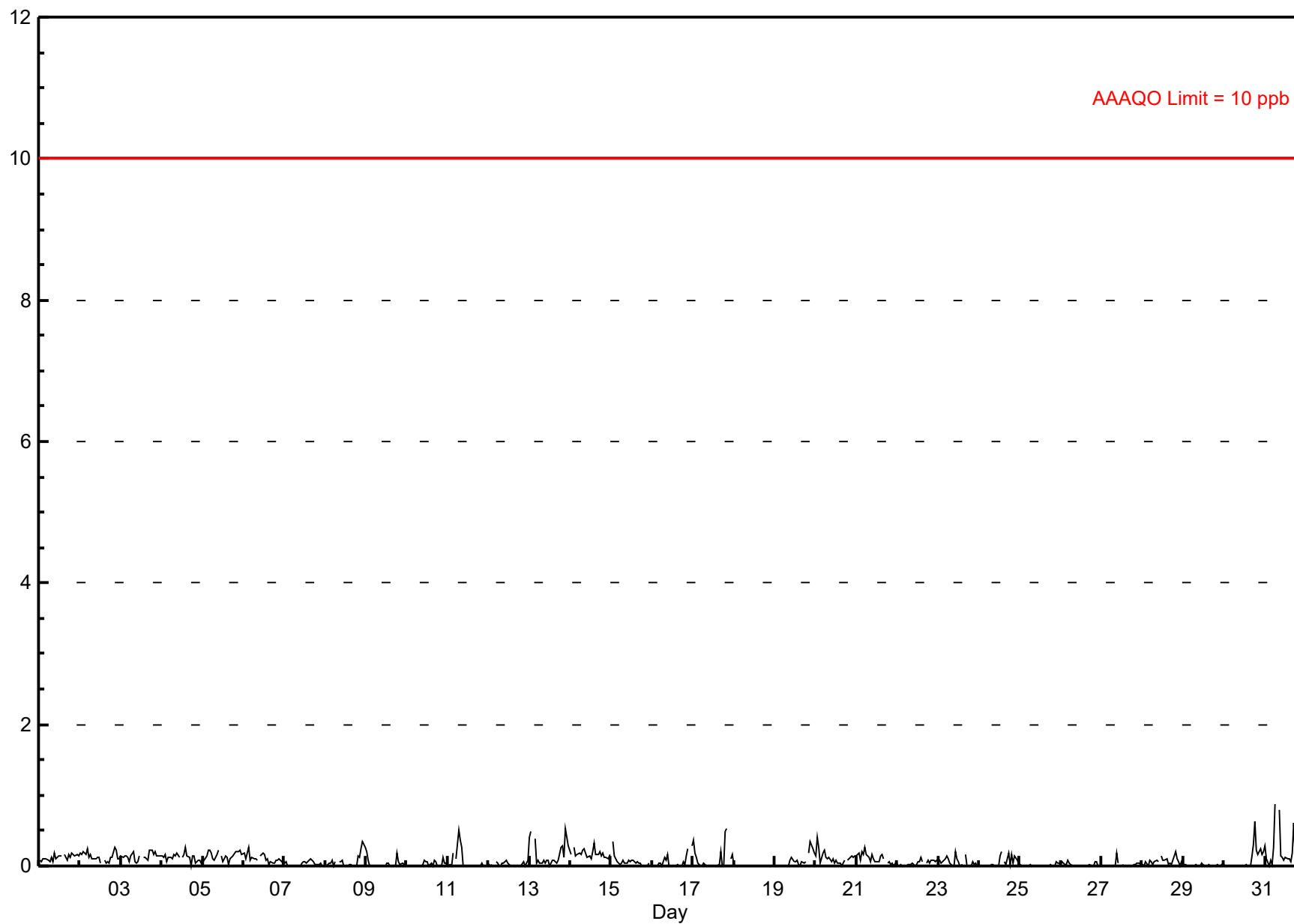
Histogram of Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Valleyview - October 2019



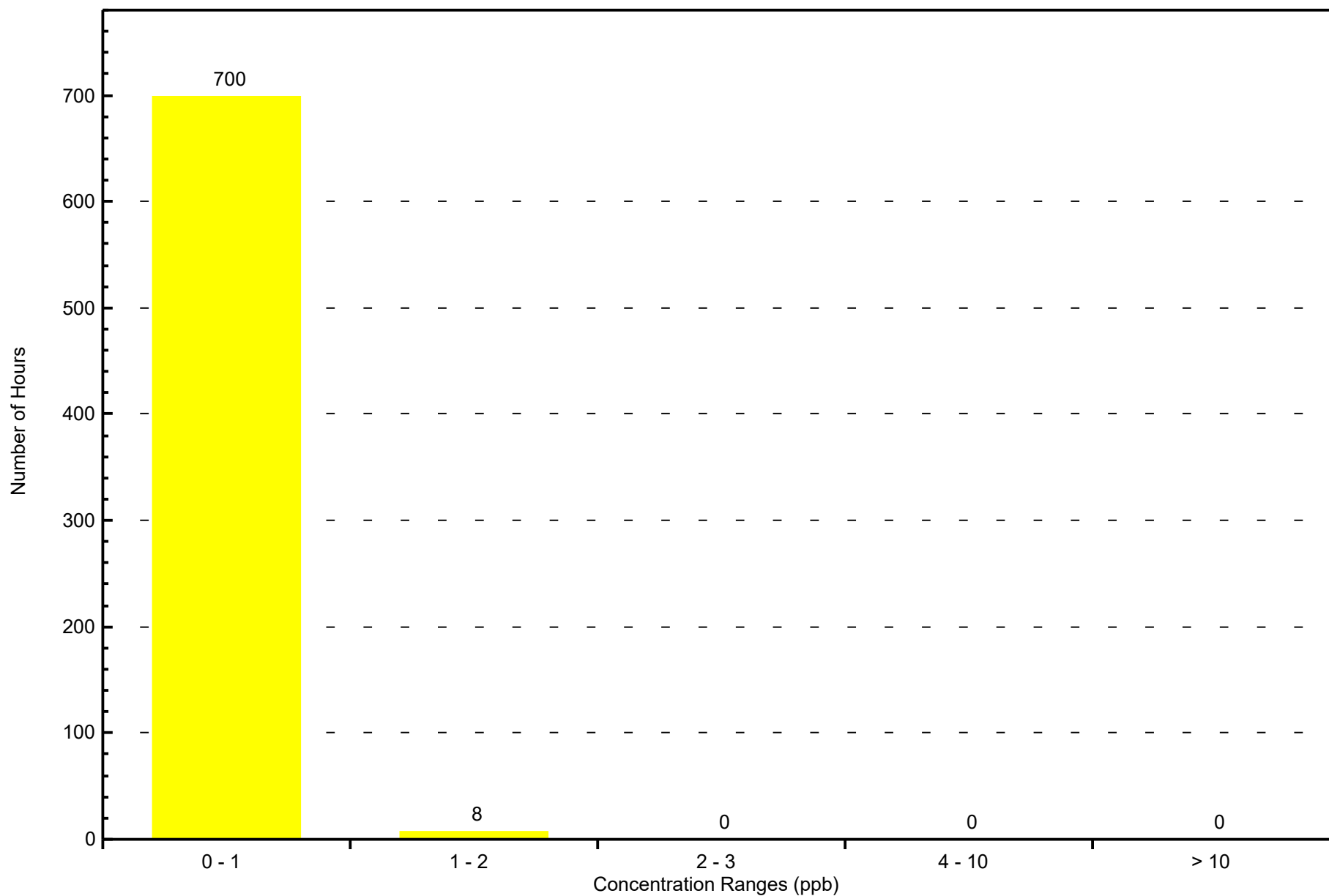
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Valleyview - October 2019



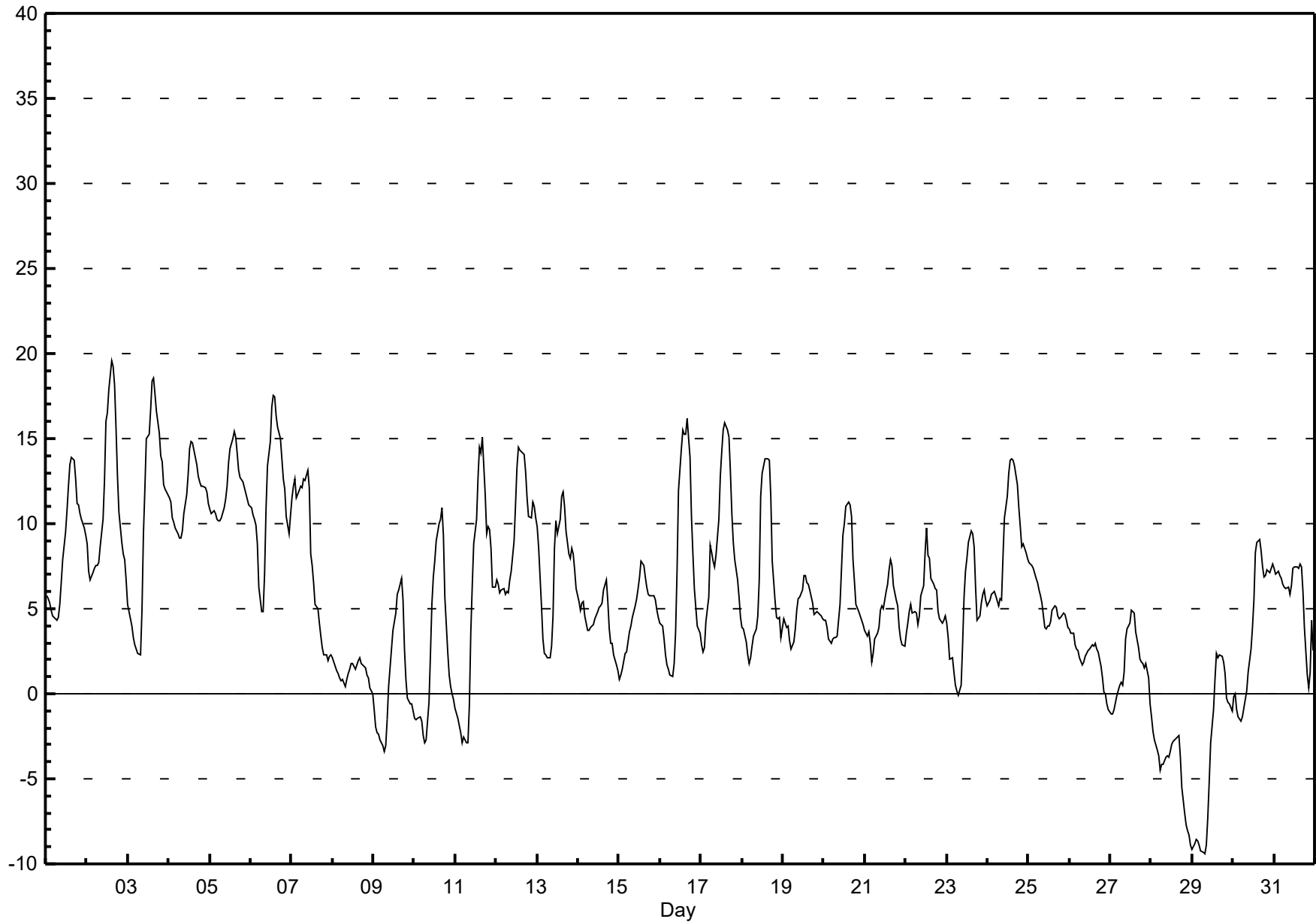
Histogram of Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Valleyview - October 2019



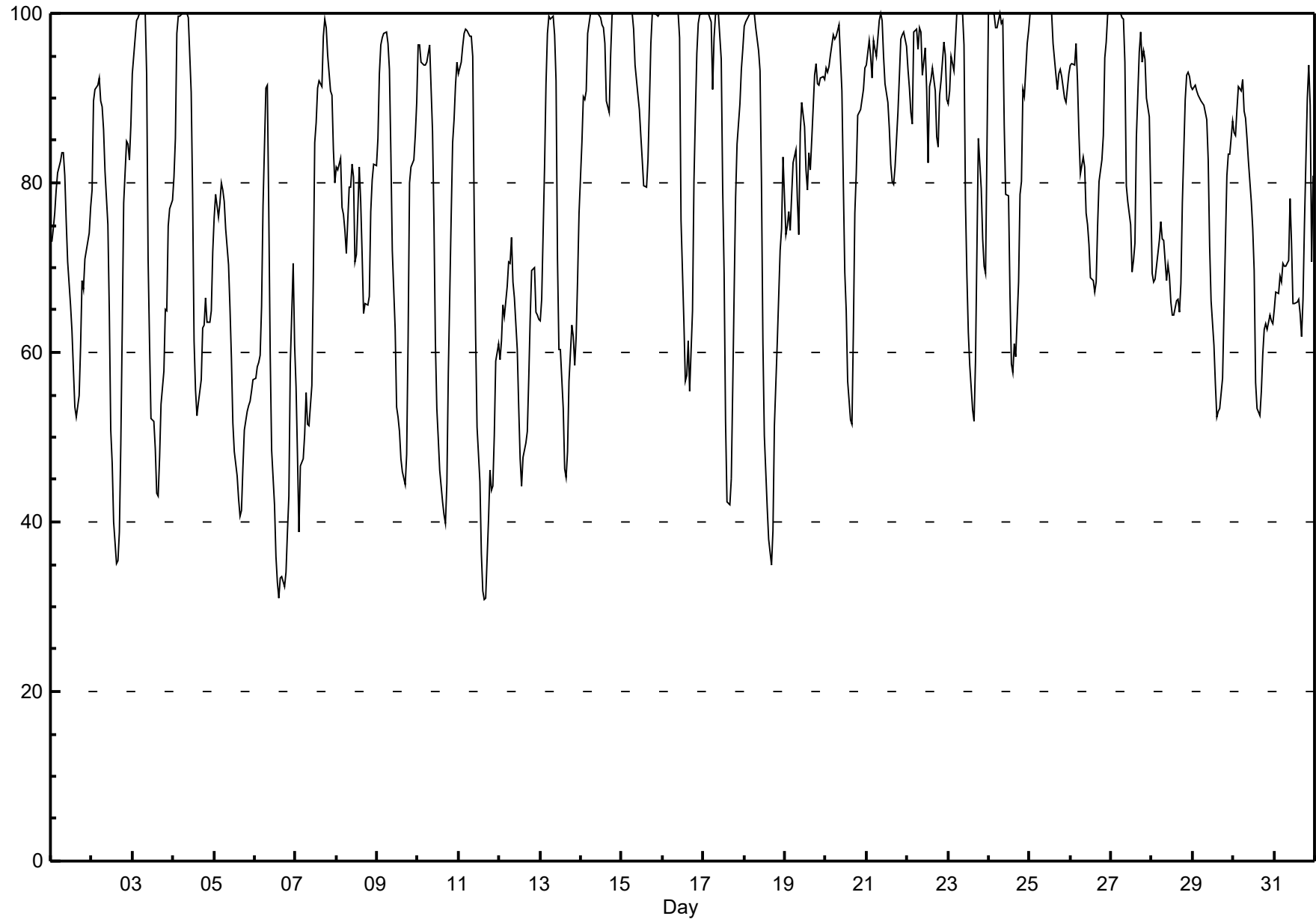
Hourly Averages

External Temperature (ET) - °C
Valleyview - October 2019



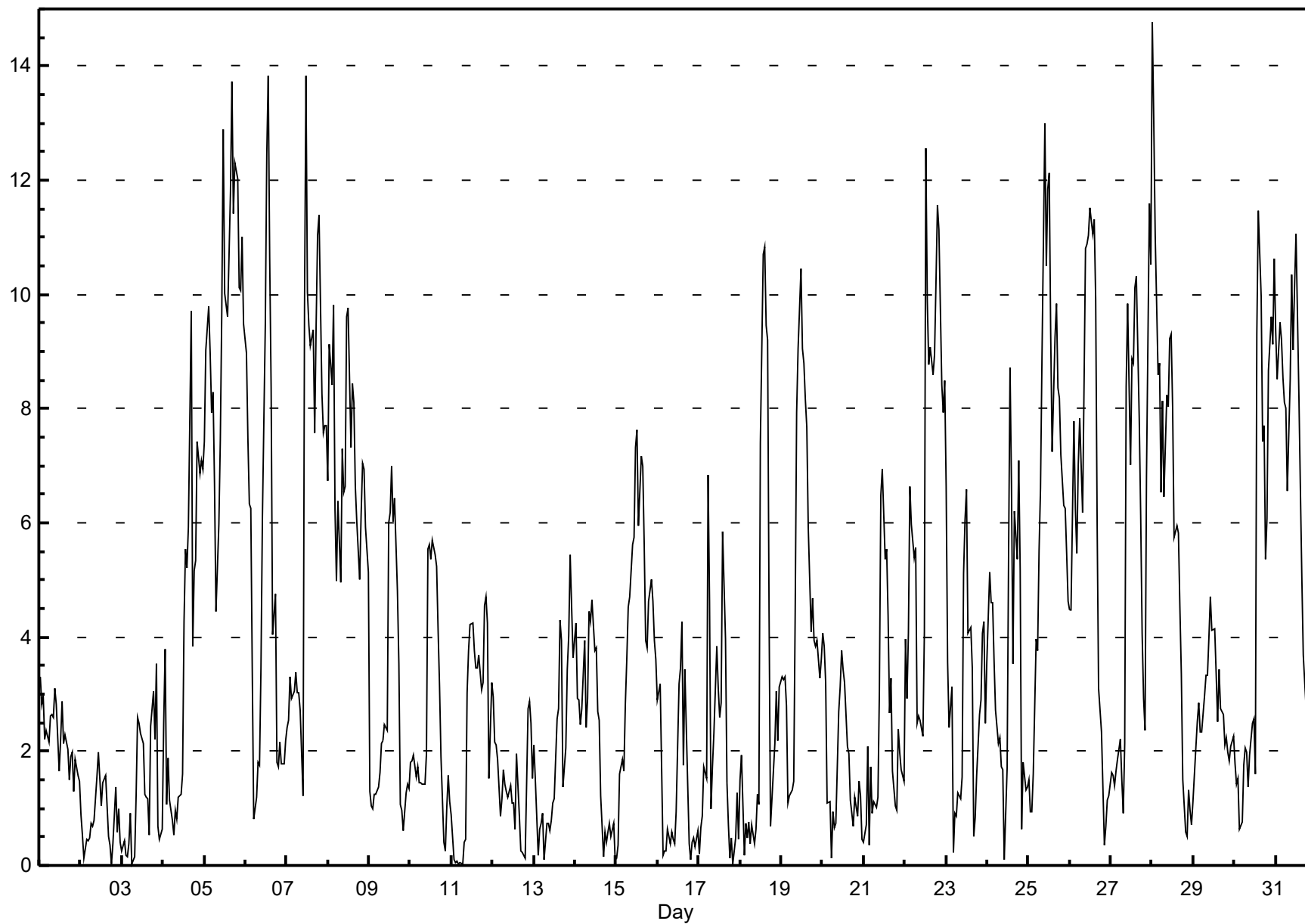
Hourly Averages

Relative Humidity (RH) - %
Valleyview - October 2019



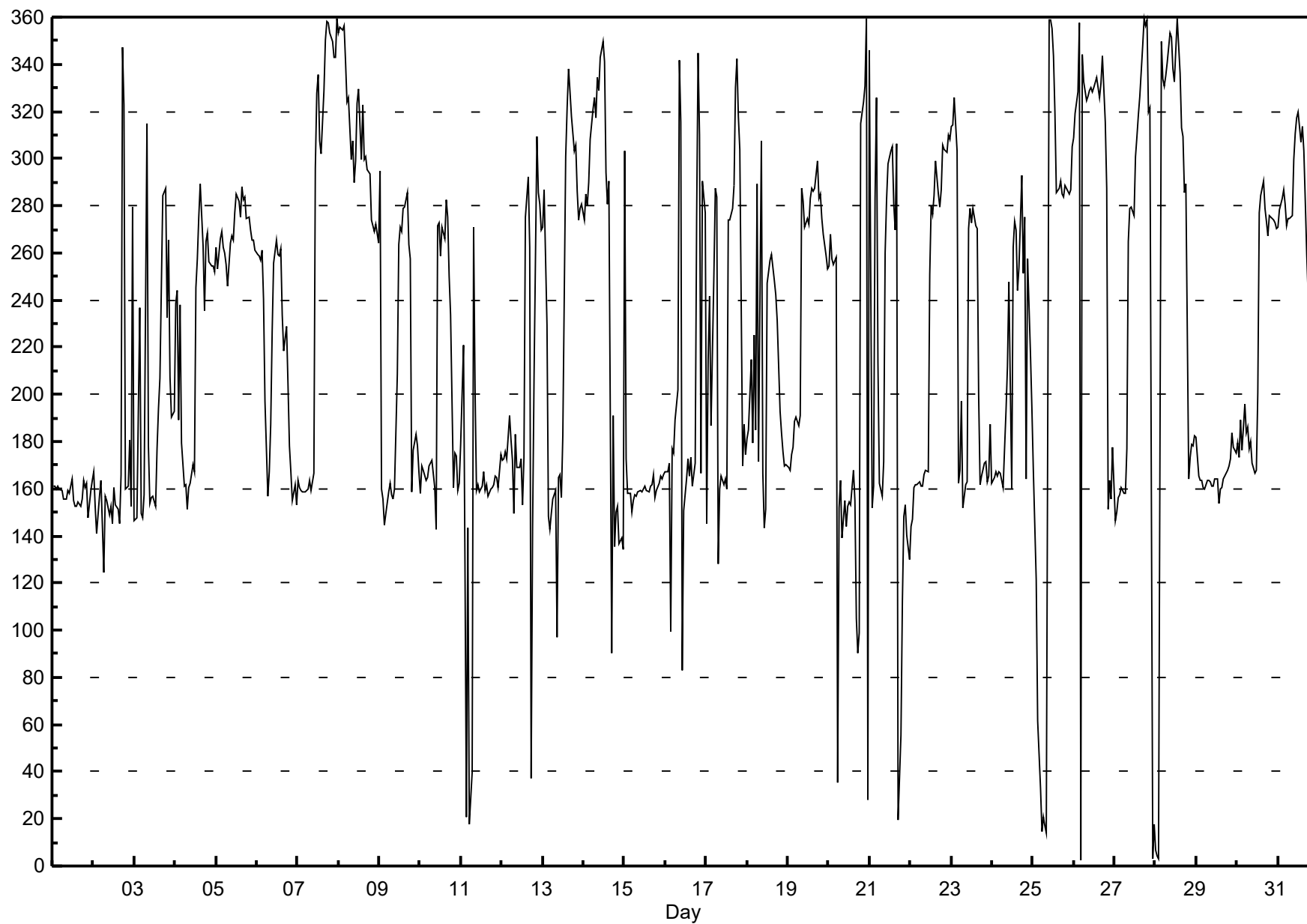
Hourly Averages

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



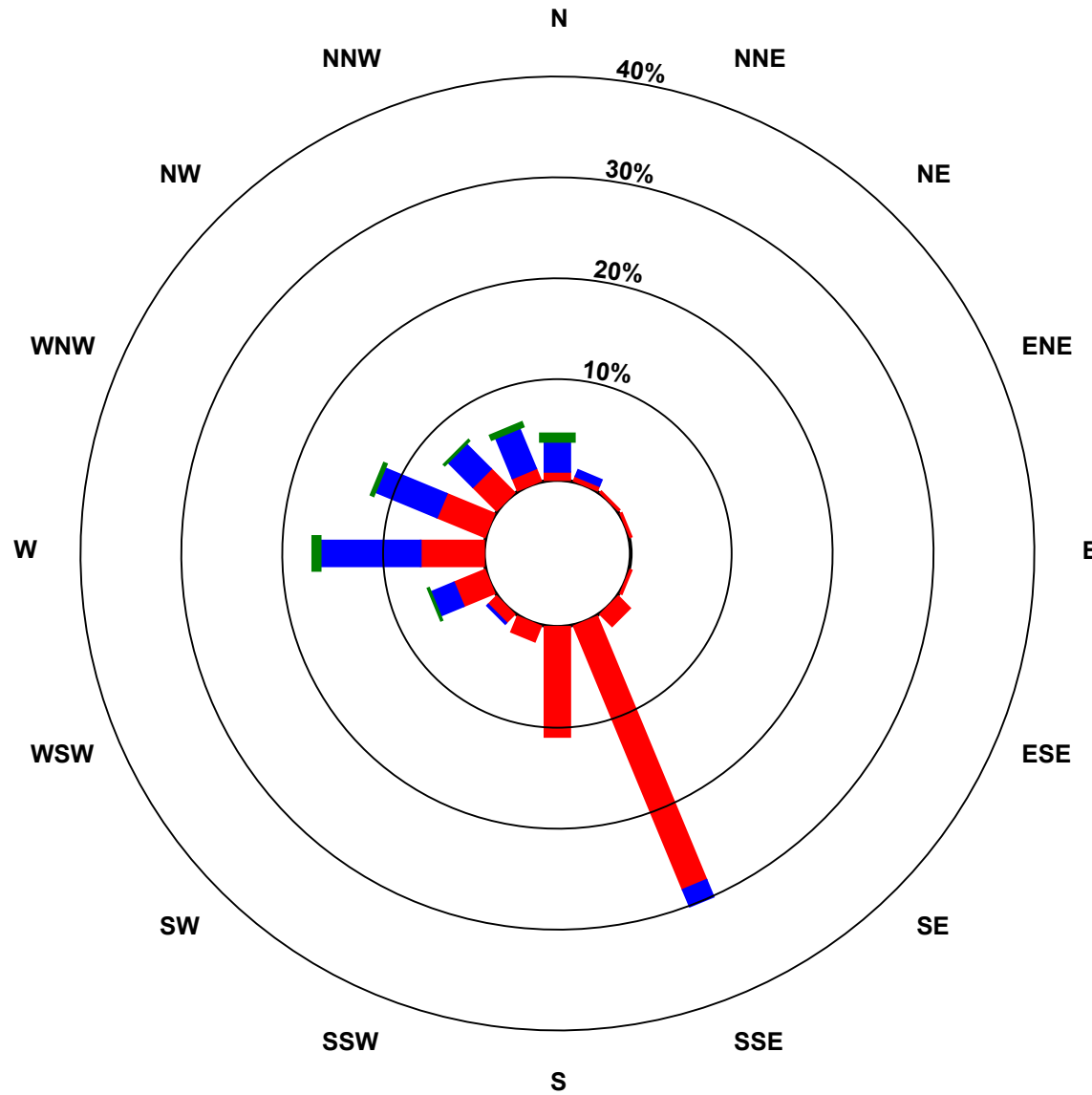
Hourly Averages

Wind Direction (WD) - deg
Valleyview - October 2019

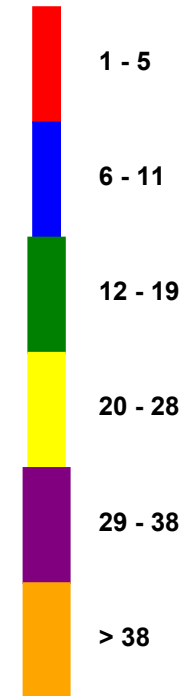


Wind Rose

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



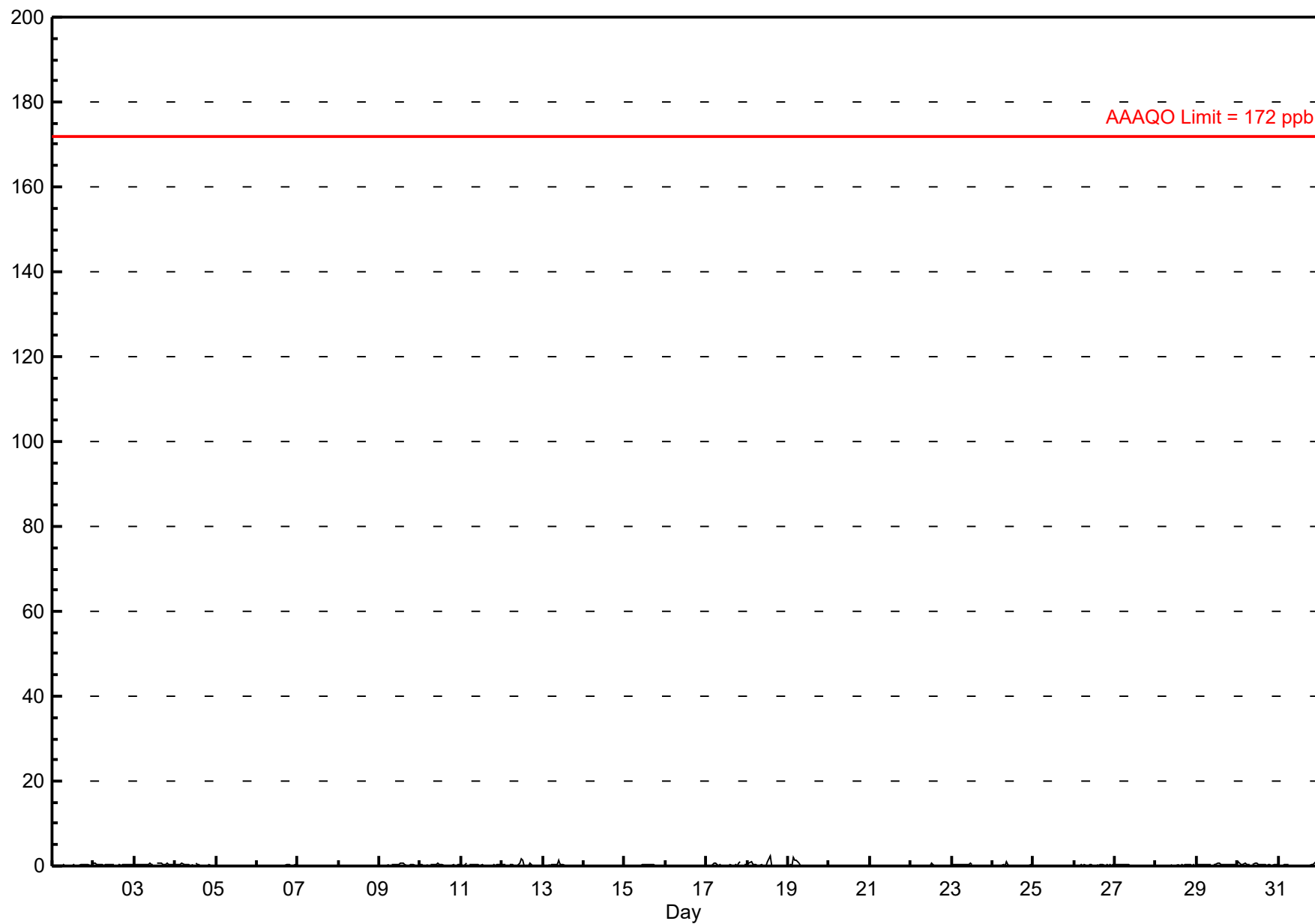
Wind Speed Classes (km/h)



Hourly Averages

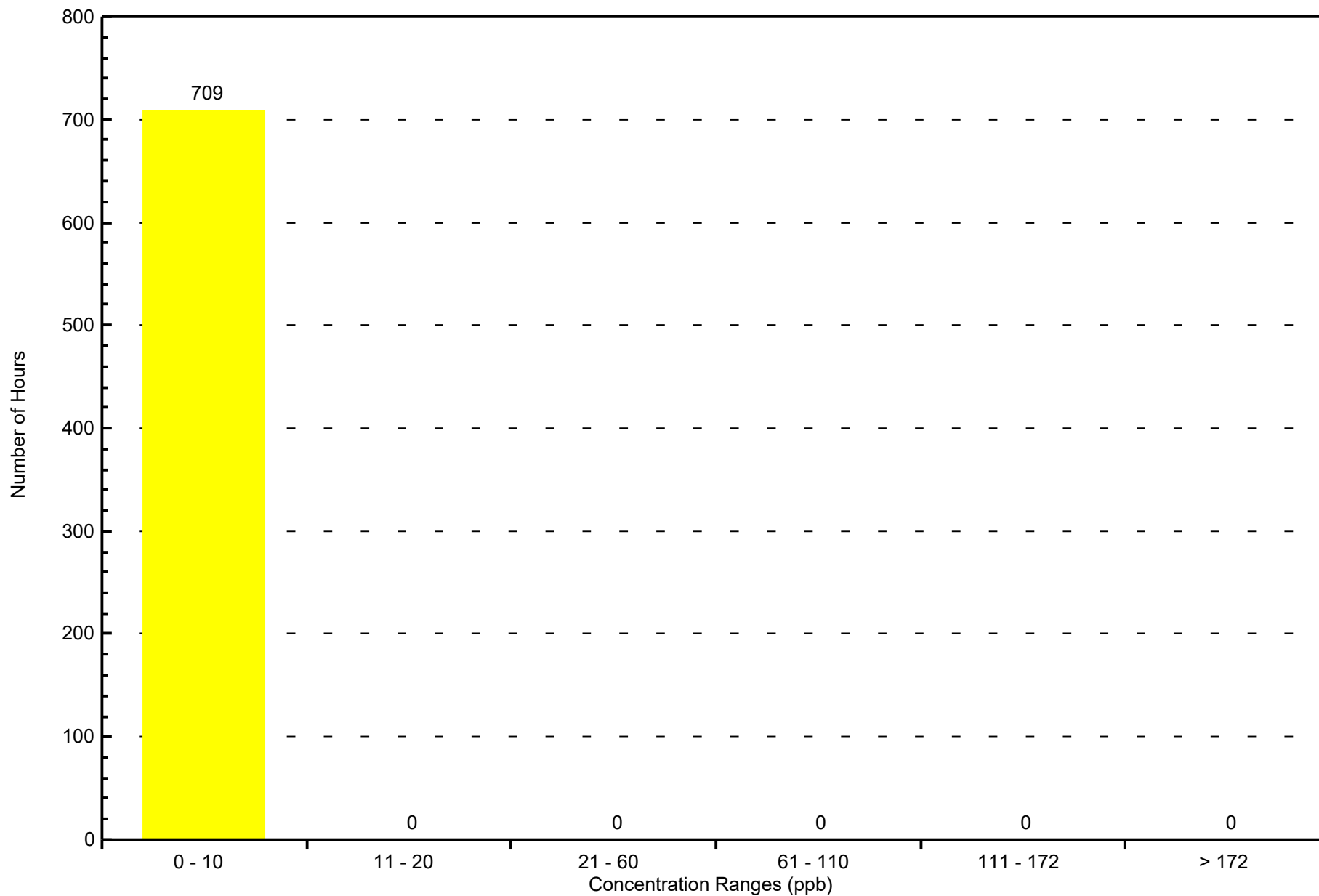
Sulphur Dioxide (SO₂) - ppb

Donnelly - October 2019



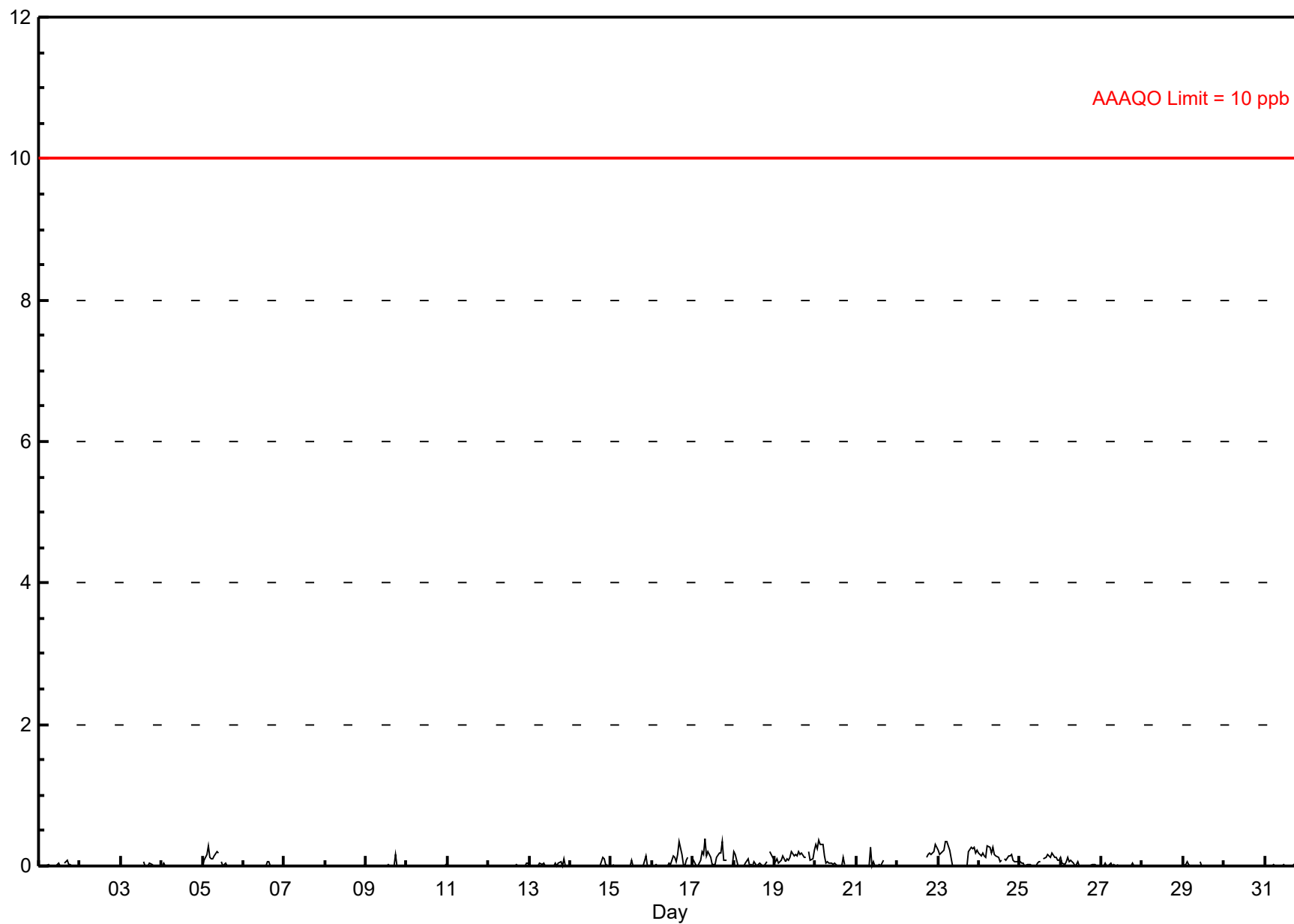
Histogram of Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Donnelly - October 2019



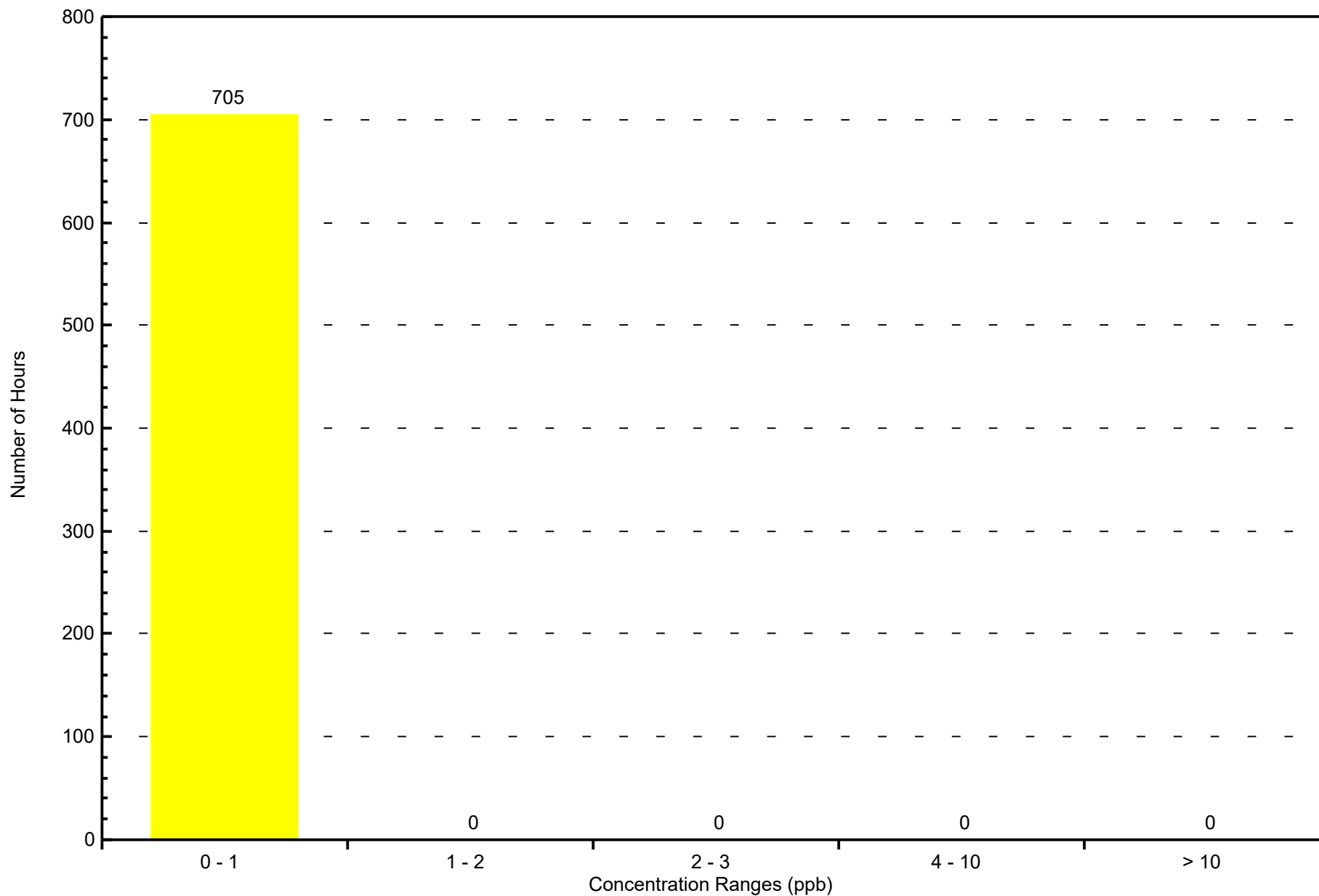
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Donnelly - October 2019



Histogram of Hourly Averages

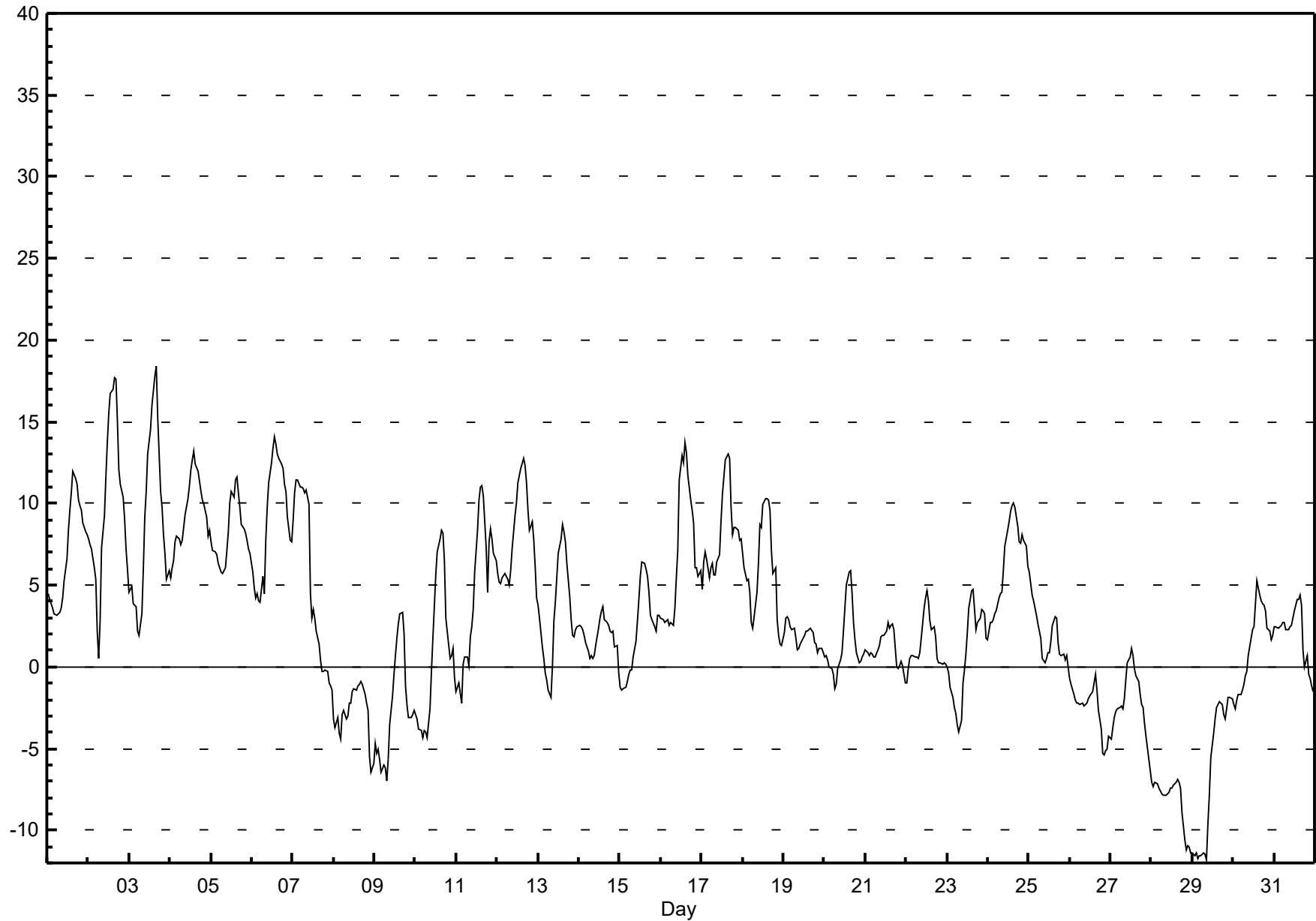
Hydrogen Sulphide (H₂S) - ppb
Donnelly - October 2019



Hourly Averages

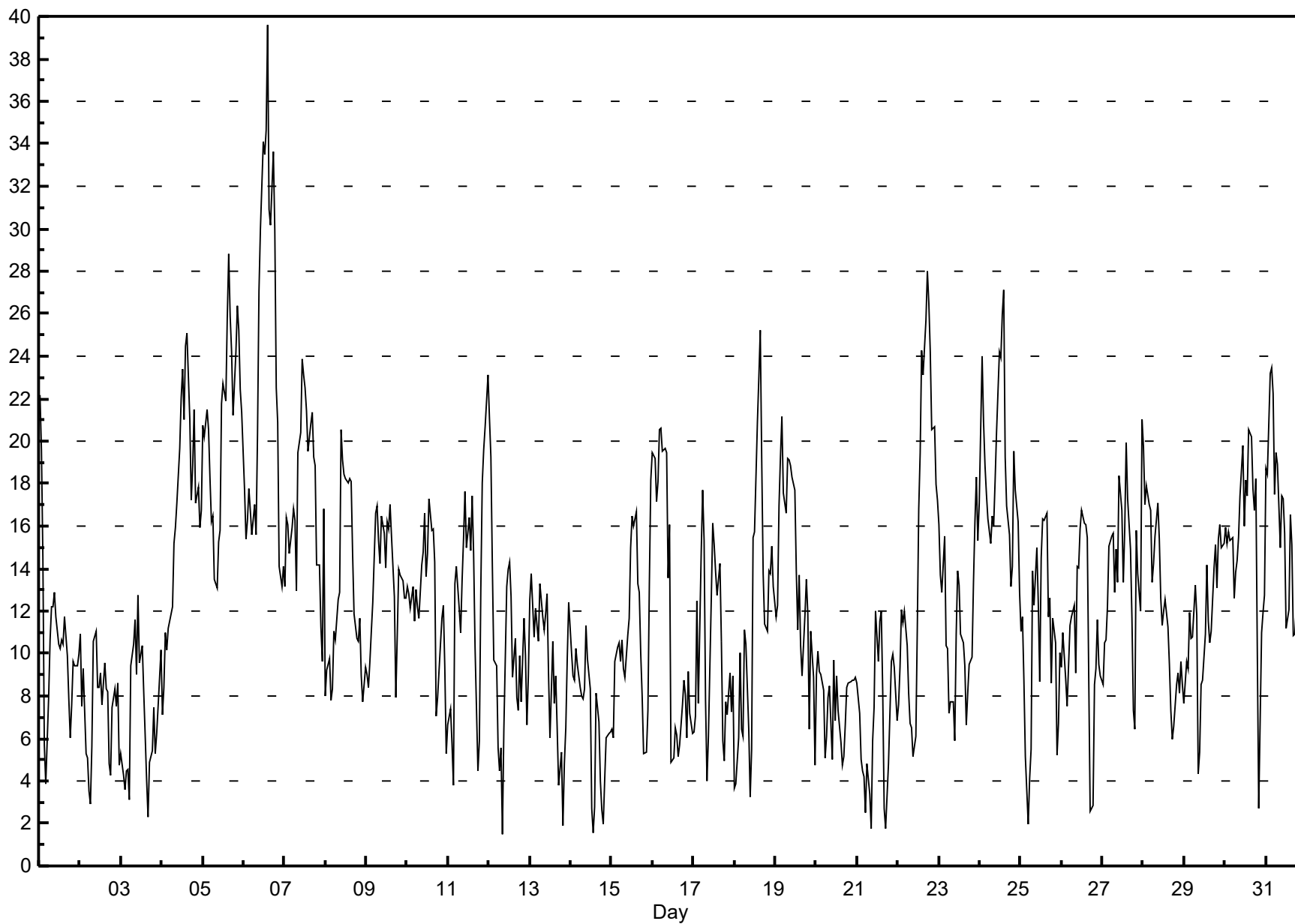
External Temperature (ET) - °C

Donnelly - October 2019



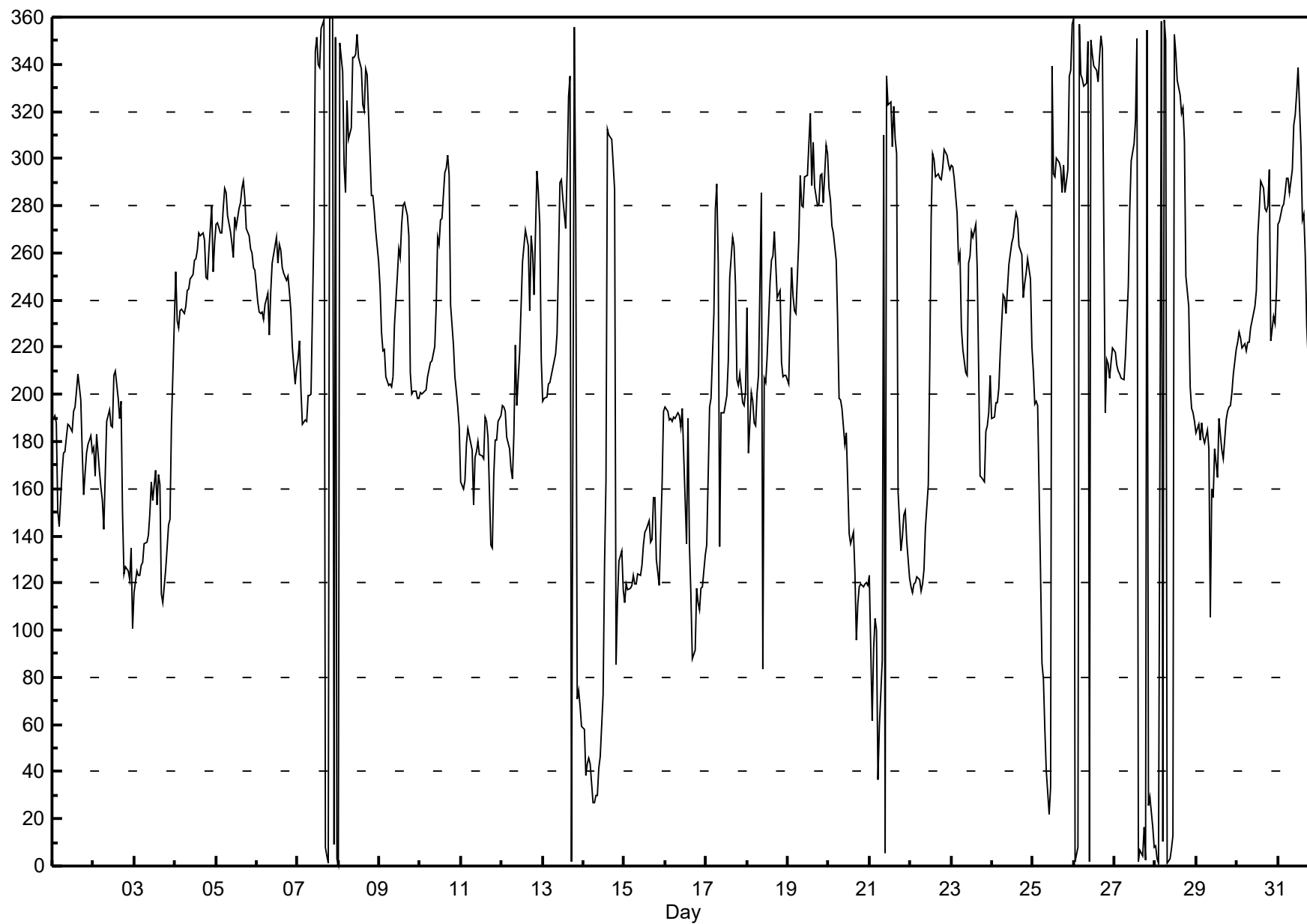
Hourly Averages

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



Hourly Averages

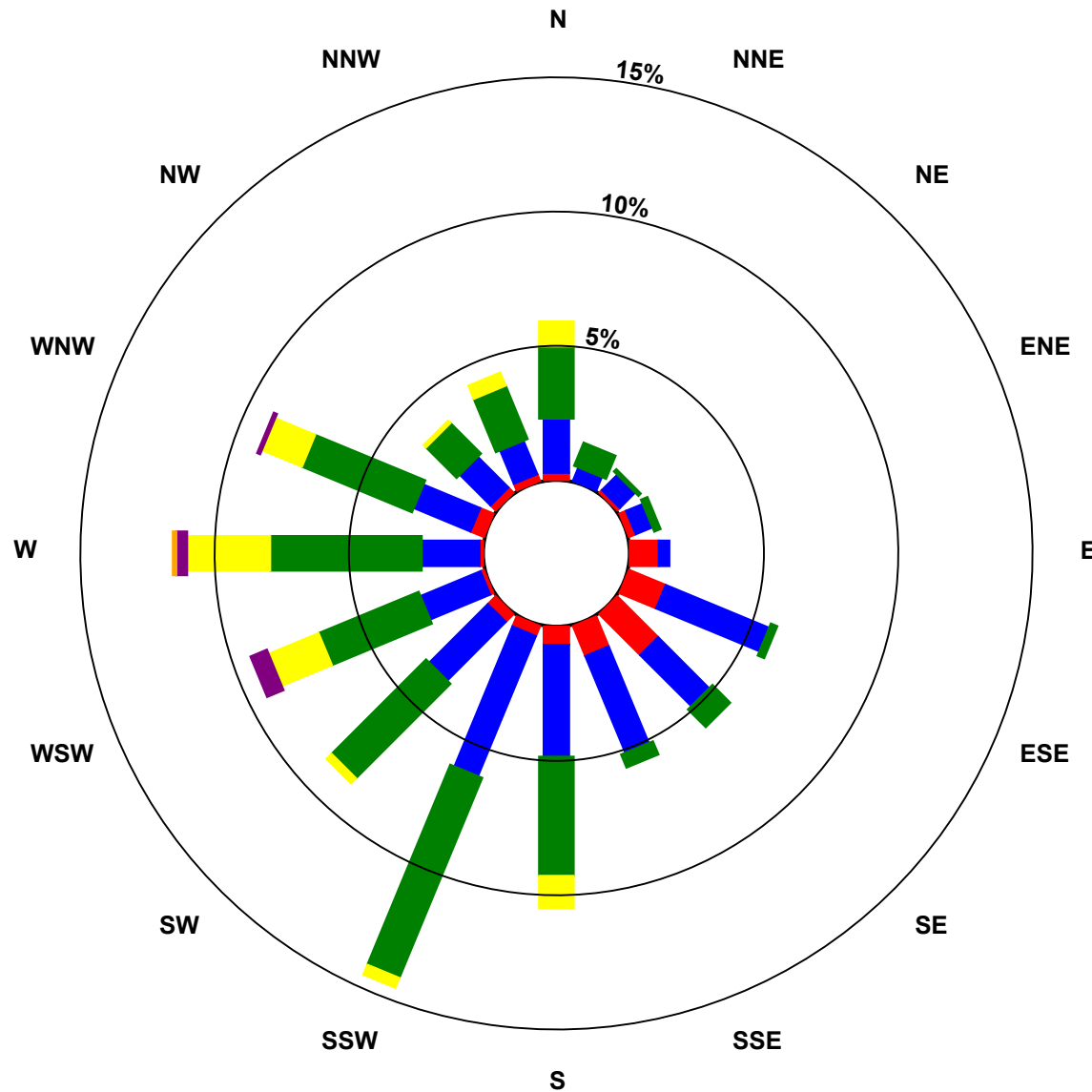
Wind Direction (WD) - deg
Donnelly - October 2019



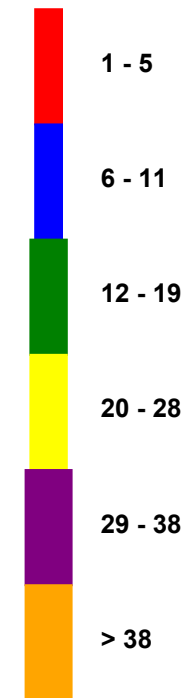
Wind Rose

Wind Speed (WS) (km/h)

Donnelly - October 2019

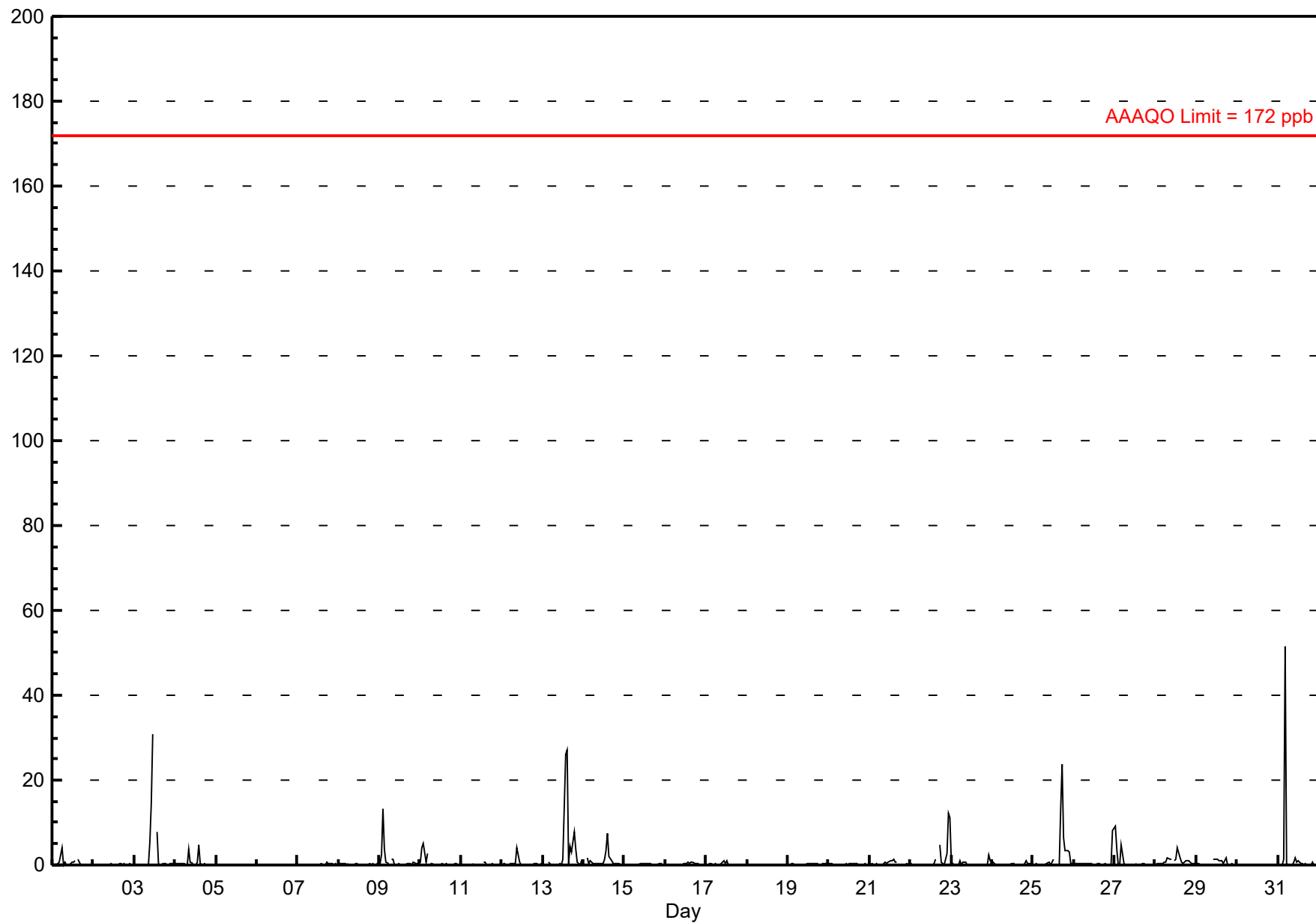


Wind Speed Classes (km/h)



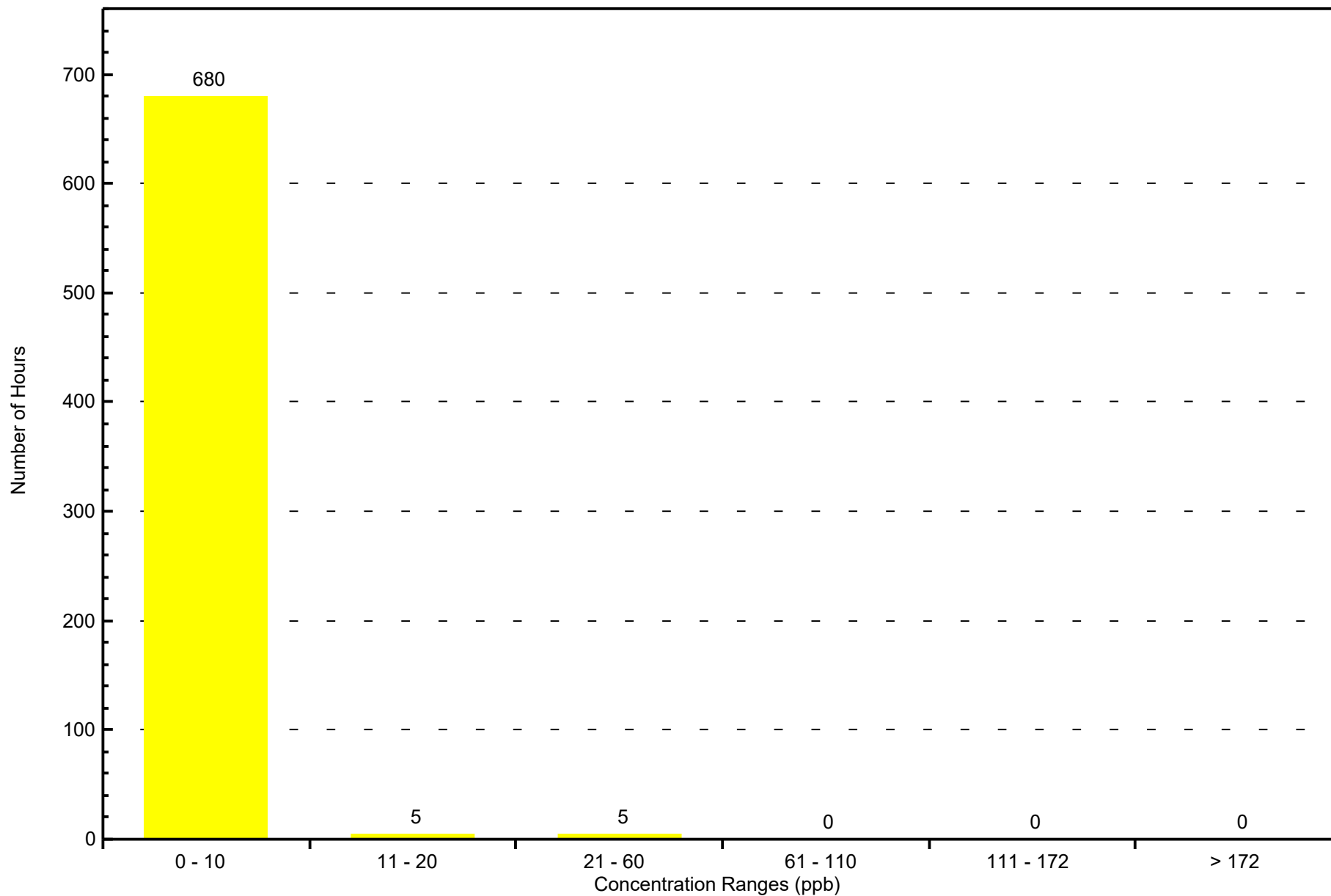
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Wembley - October 2019



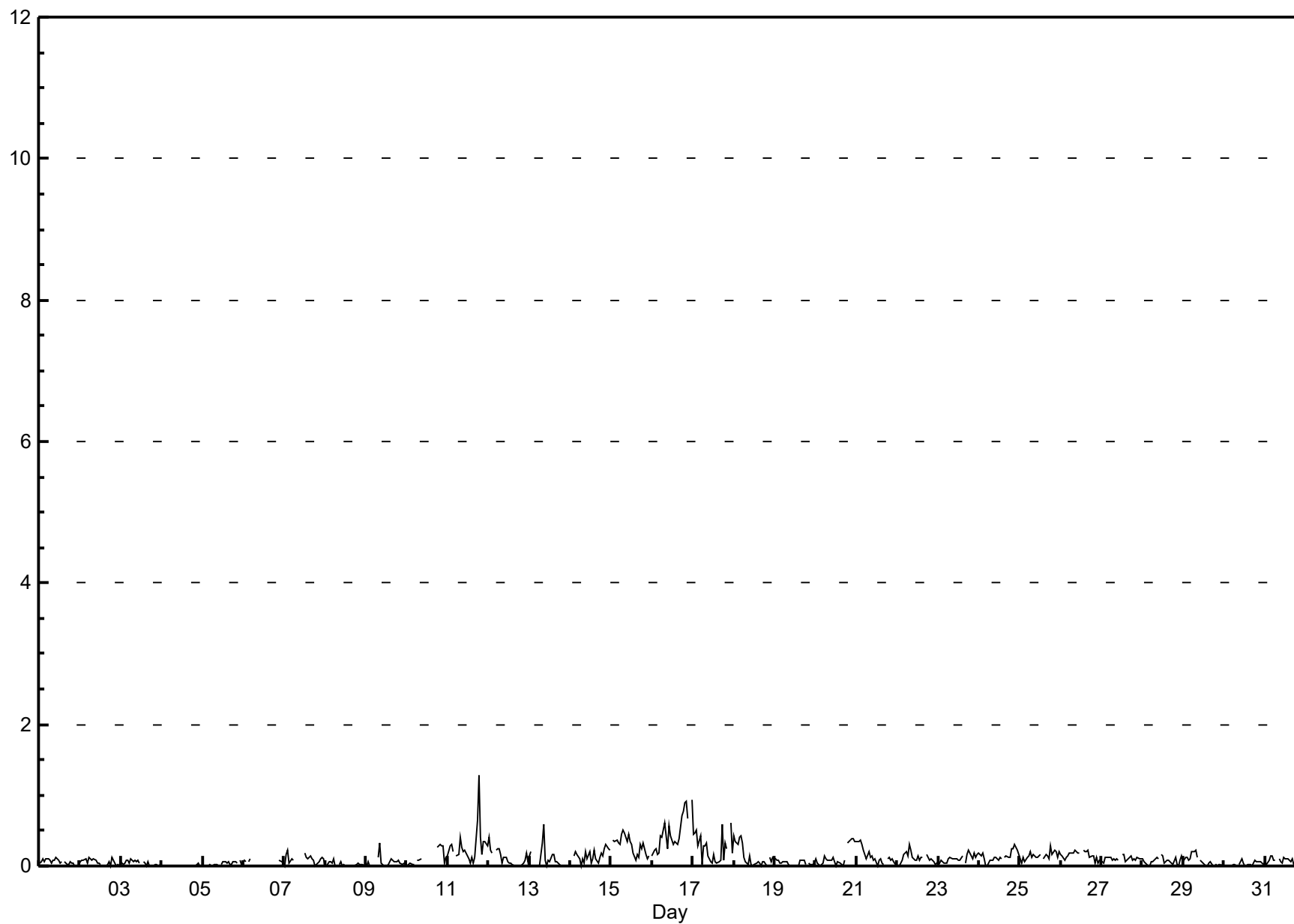
Histogram of Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Wembley - October 2019



Hourly Averages

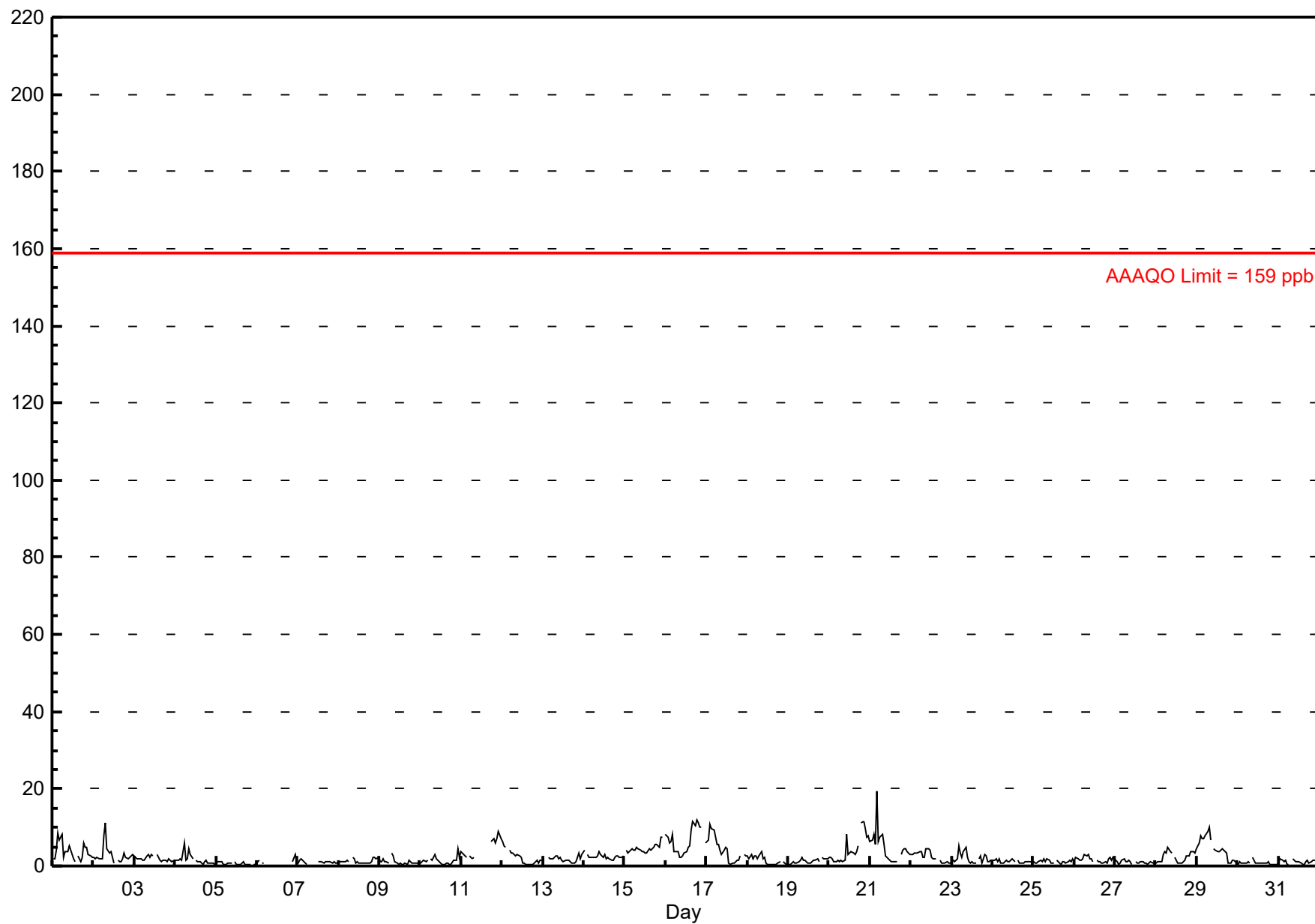
Total Reduced Sulphur (TRS) - ppb
Wembley - October 2019



Hourly Averages

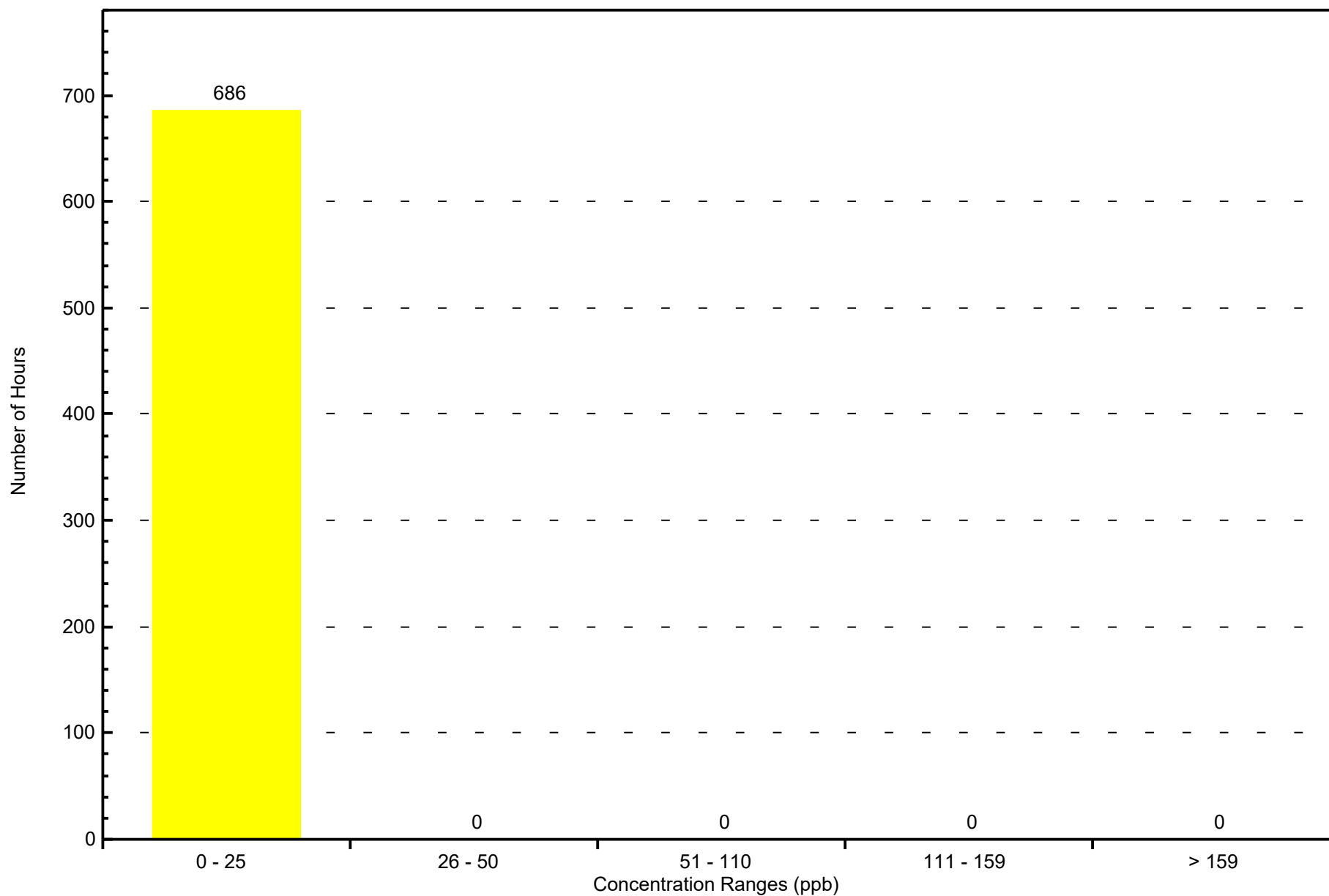
Nitrogen Dioxide (NO₂) - ppb

Wembley - October 2019



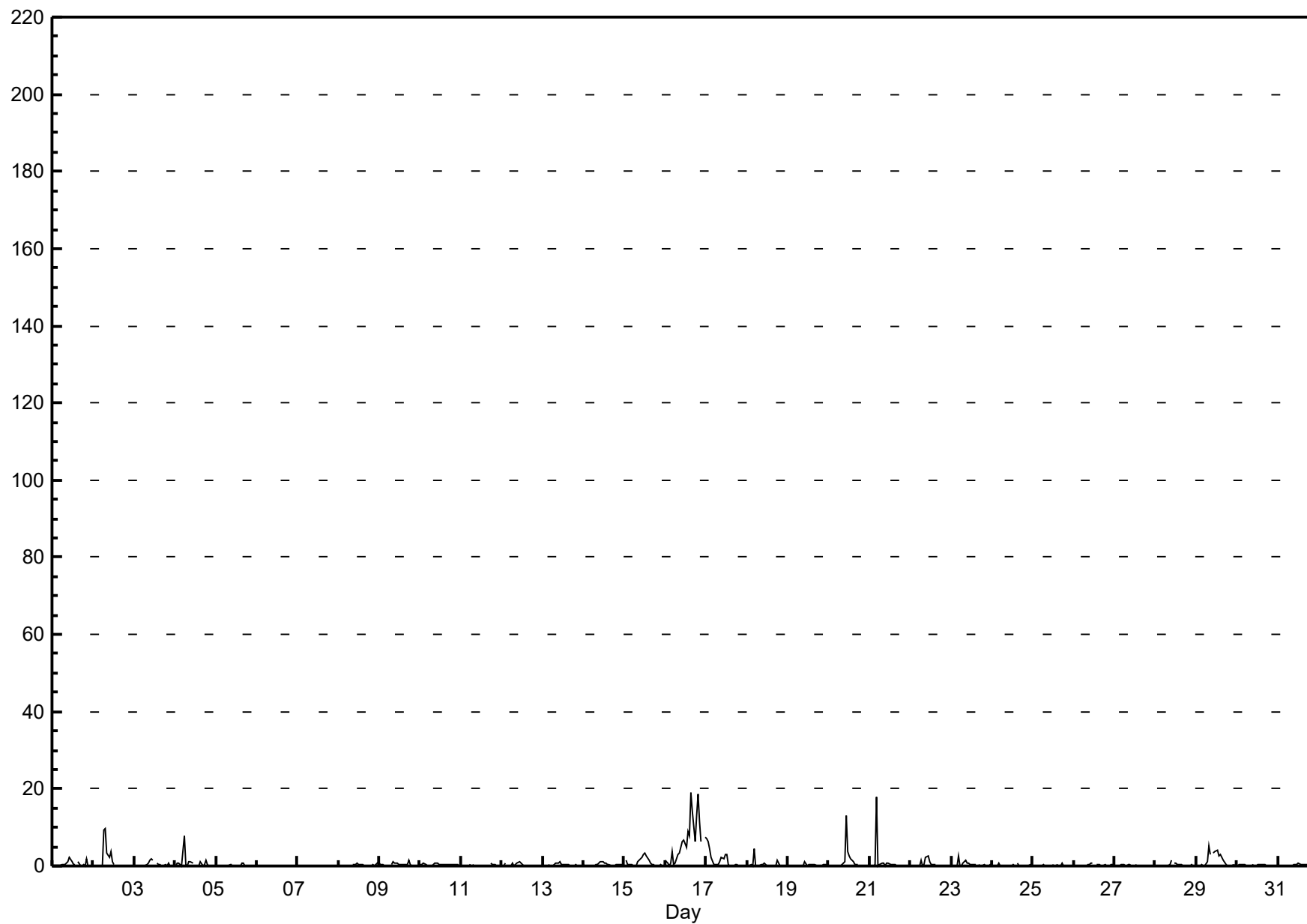
Histogram of Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Wembley - October 2019



Hourly Averages

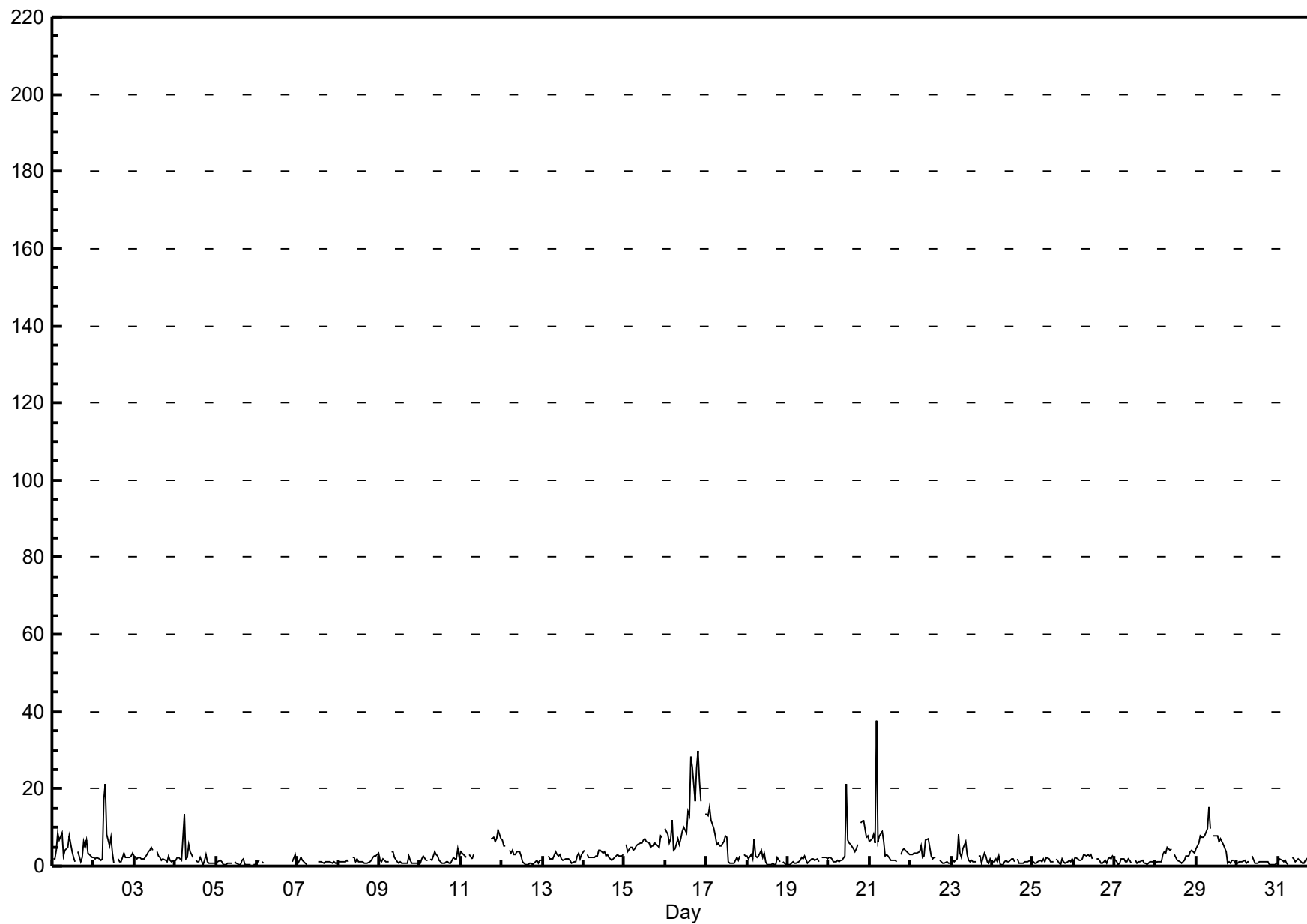
Nitrogen Oxide (NO) - ppb
Wembley - October 2019



Hourly Averages

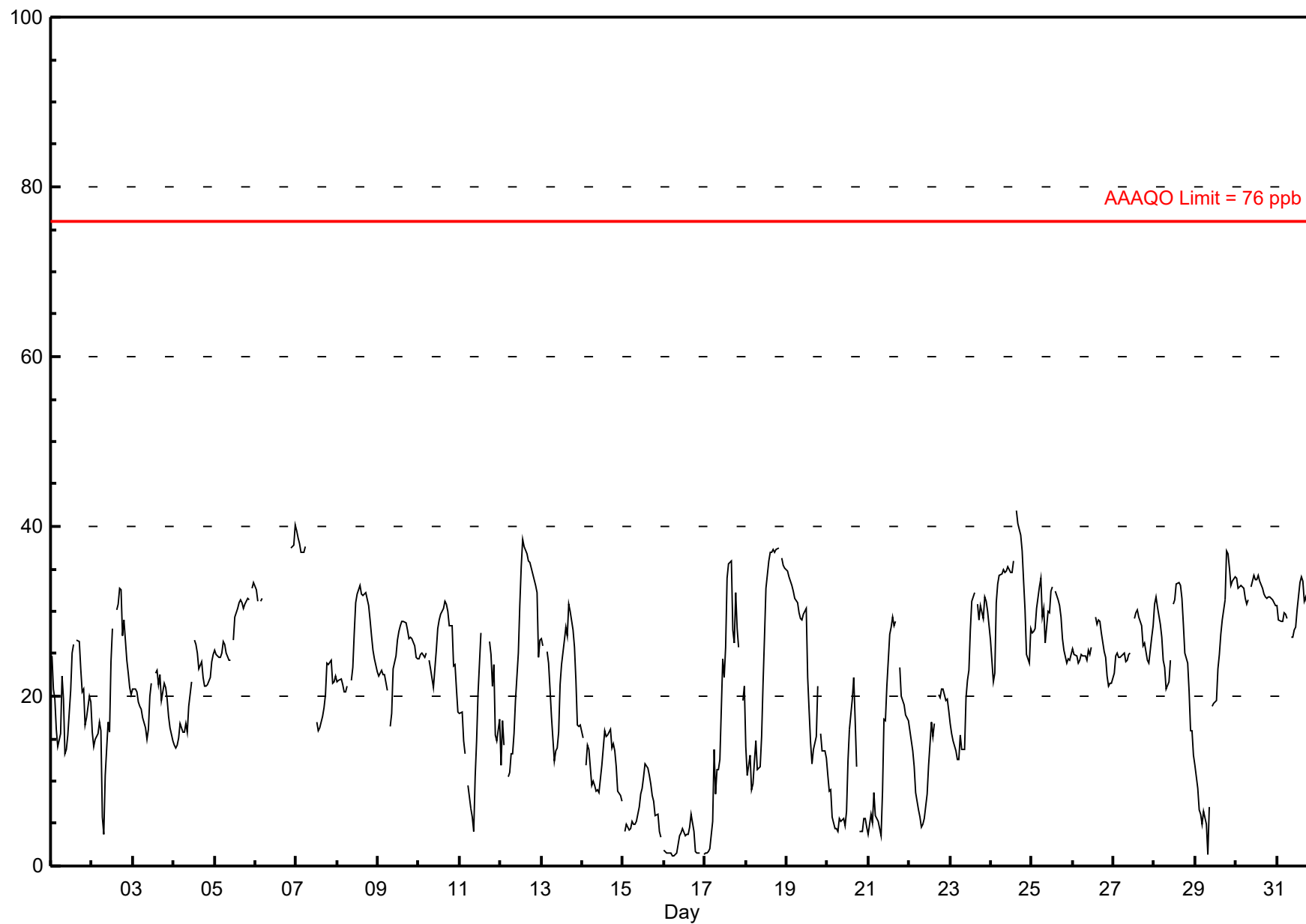
Oxides of Nitrogen (NO_x) - ppb

Wembley - October 2019



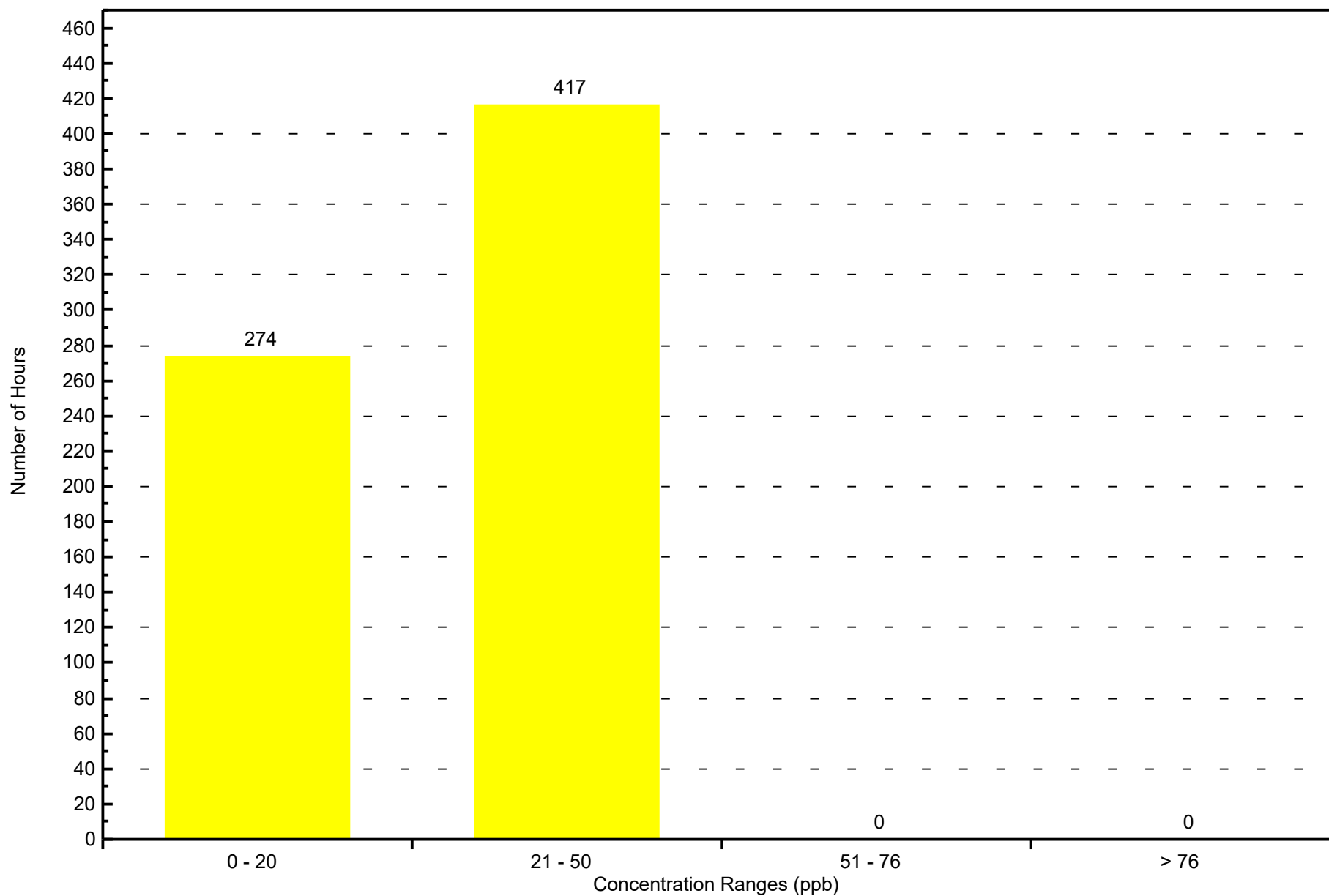
Hourly Averages

Ozone (O₃) - ppb
Wembley - October 2019



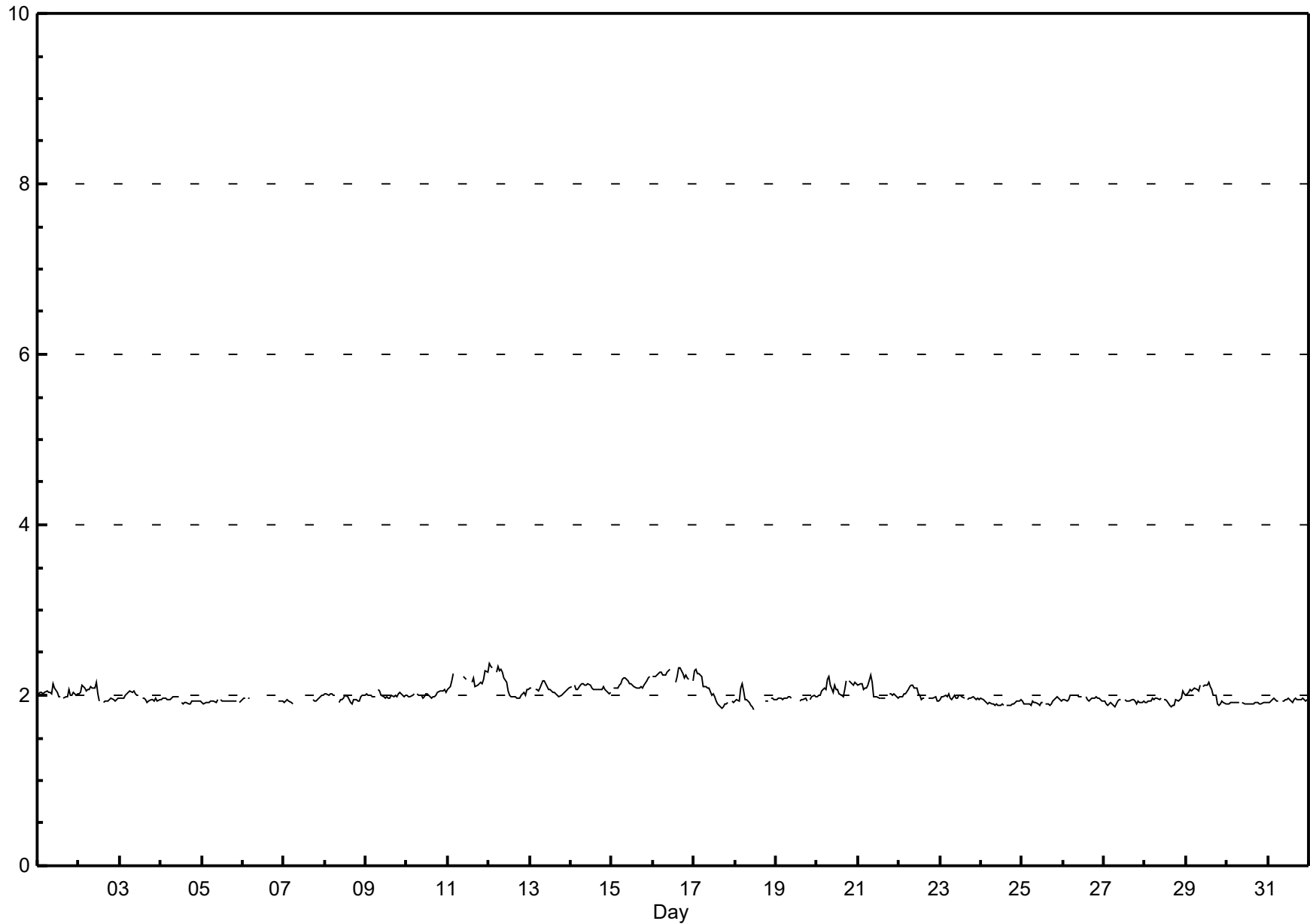
Histogram of Hourly Averages

Ozone (O₃) - ppb
Wembley - October 2019



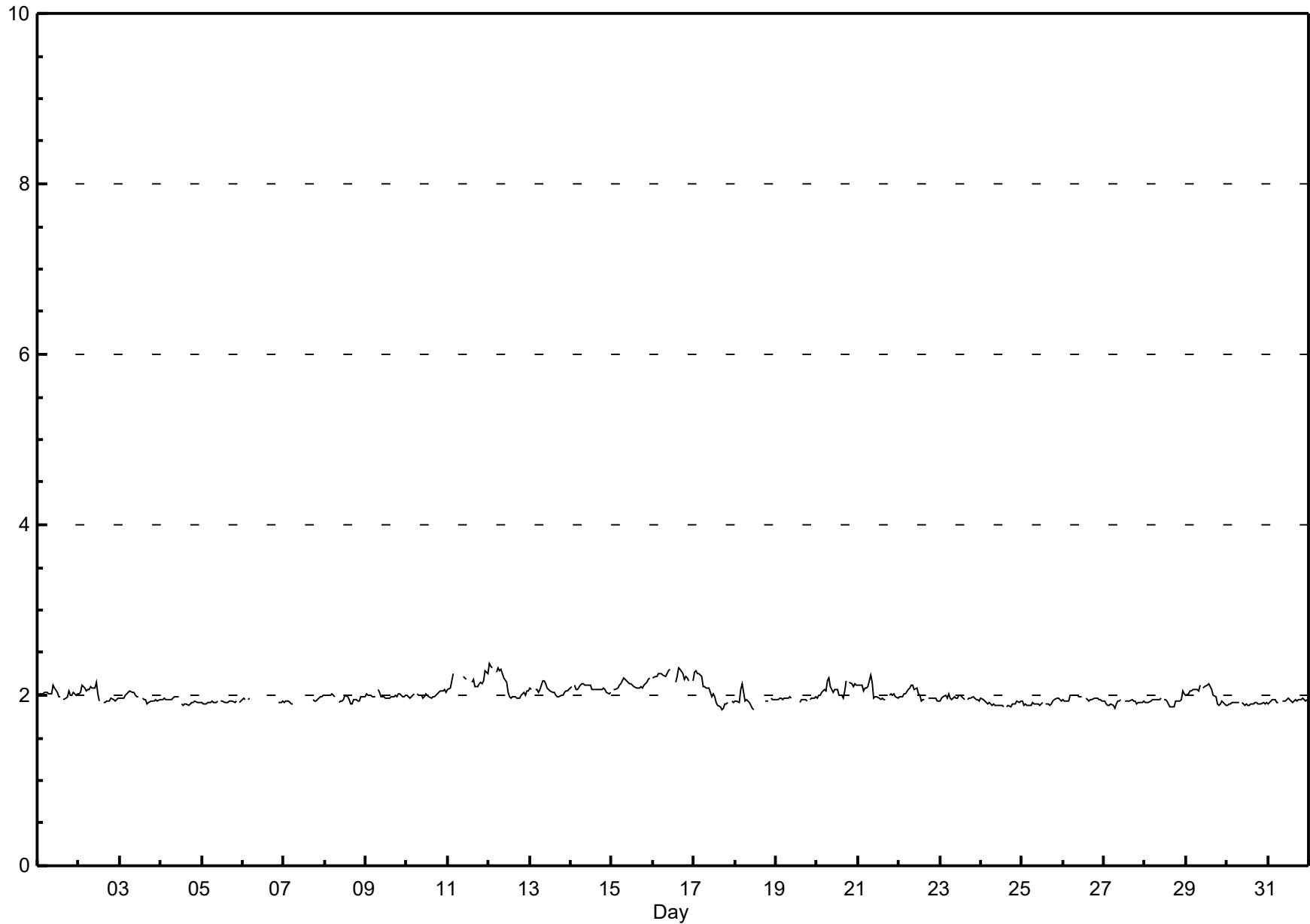
Hourly Averages

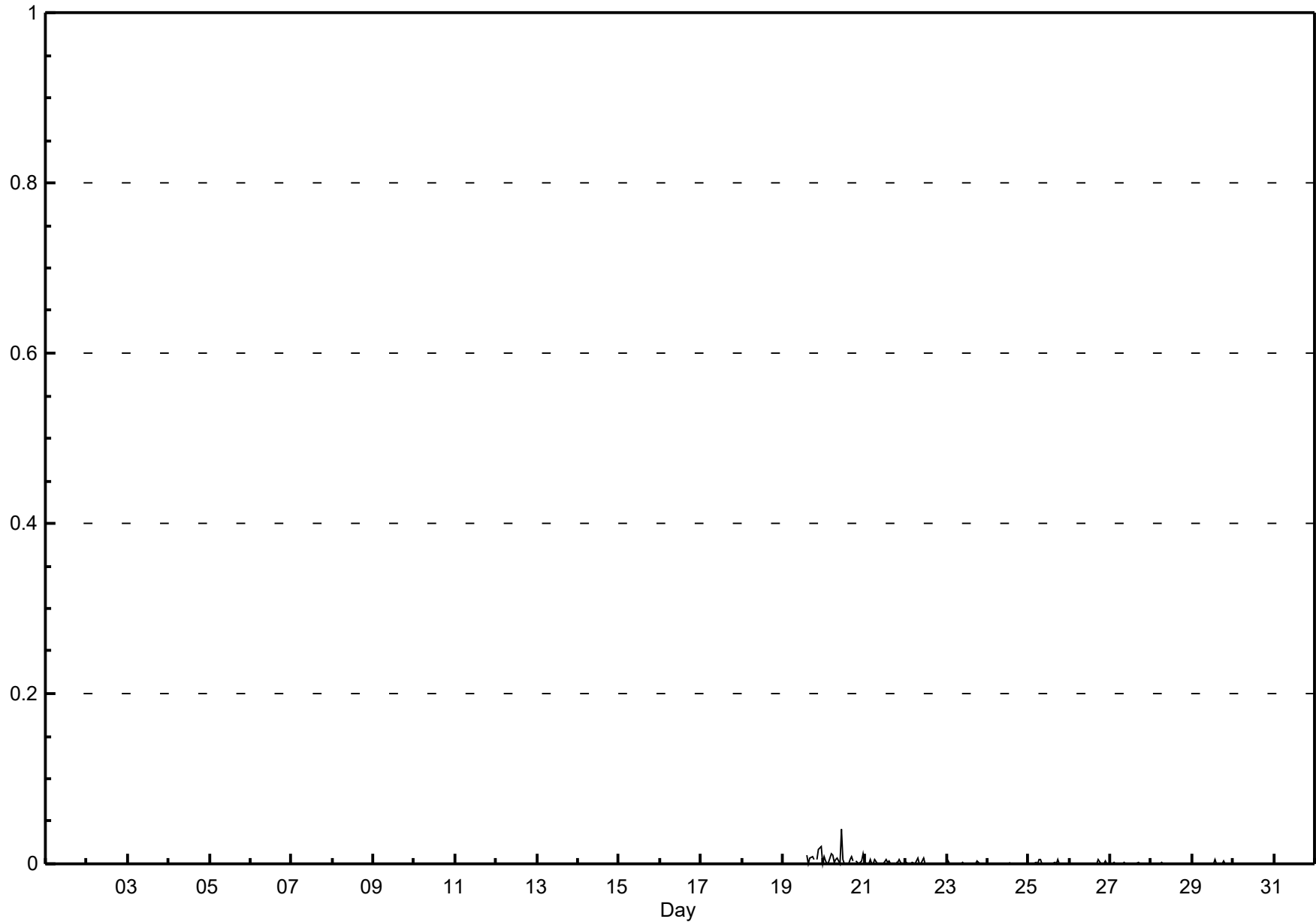
Total Hydrocarbons (THC) - ppm
Wembley - October 2019



Hourly Averages

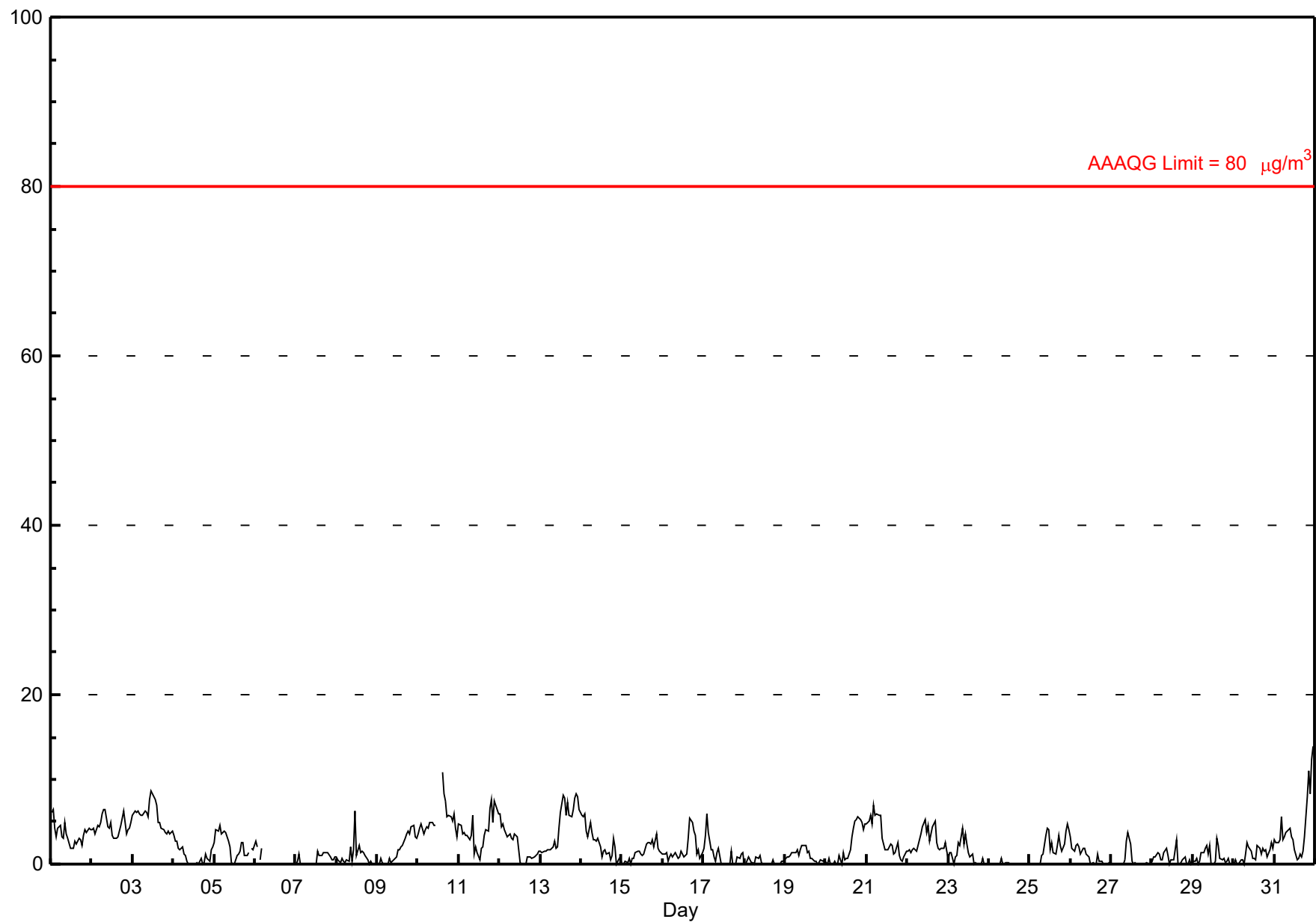
Methane (CH₄) - ppm
Wembley - October 2019





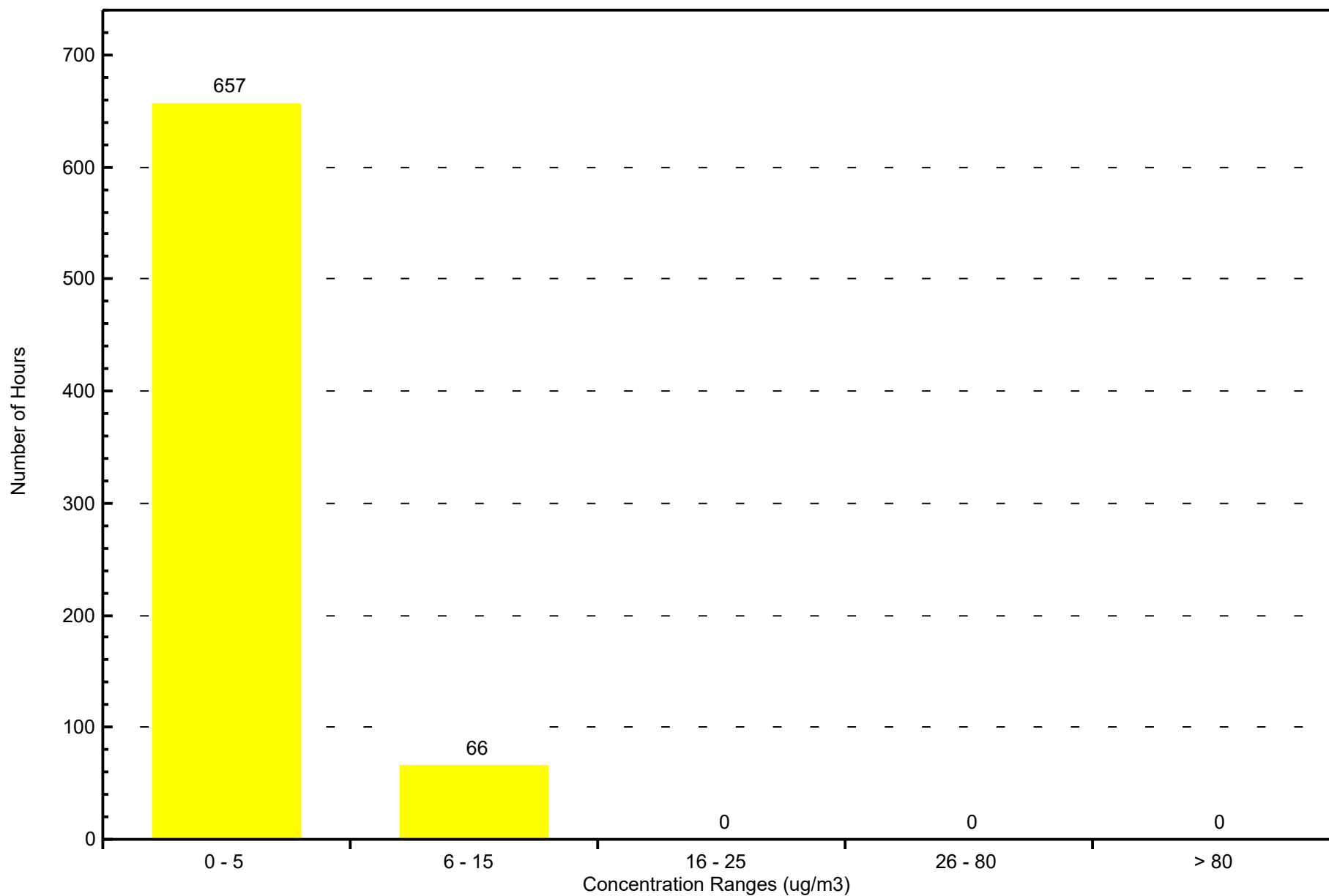
Hourly Averages

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



Histogram of Hourly Averages

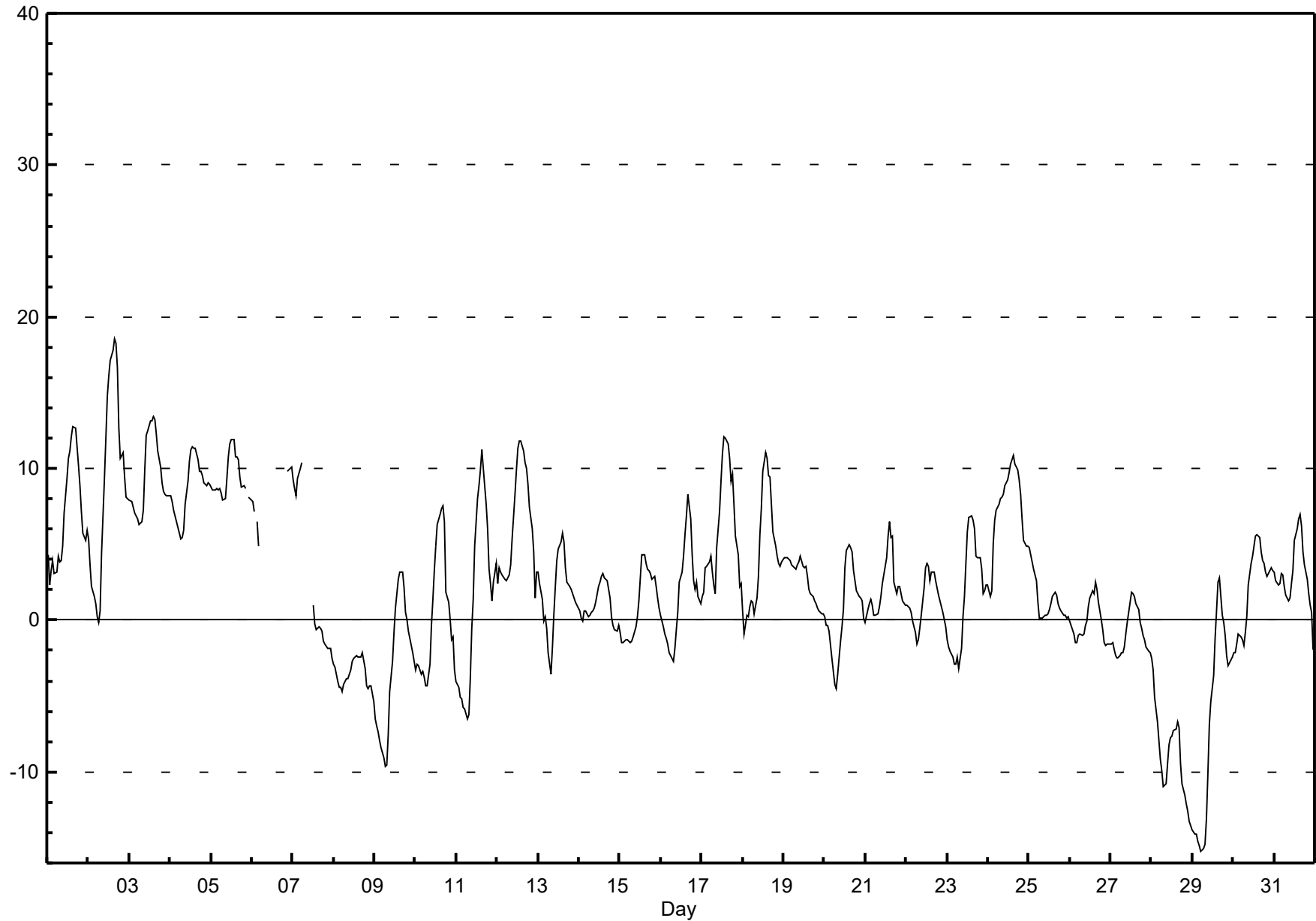
PM_{2.5} (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wembley - October 2019



Hourly Averages

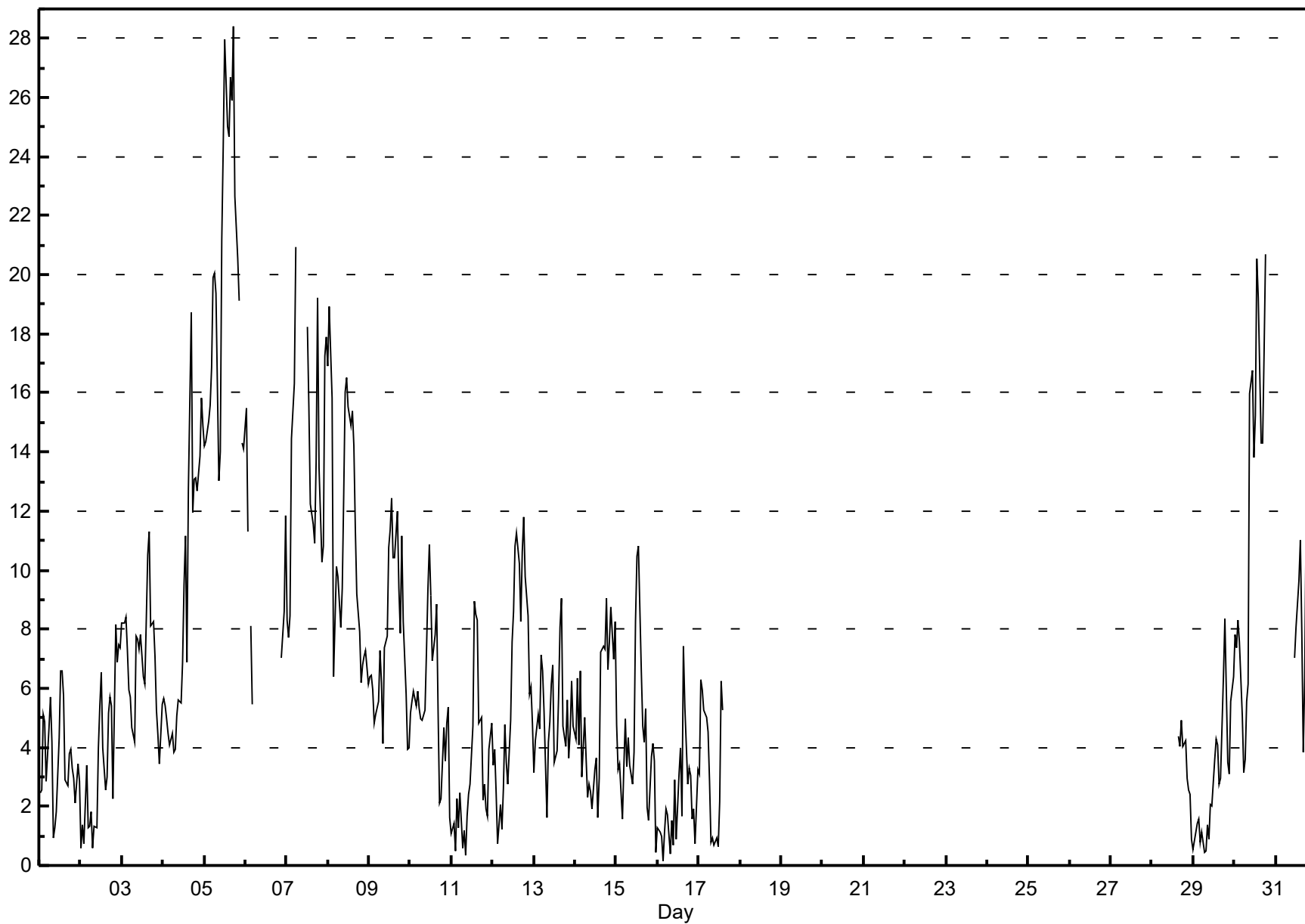
External Temperature (ET) - °C

Wembley - October 2019



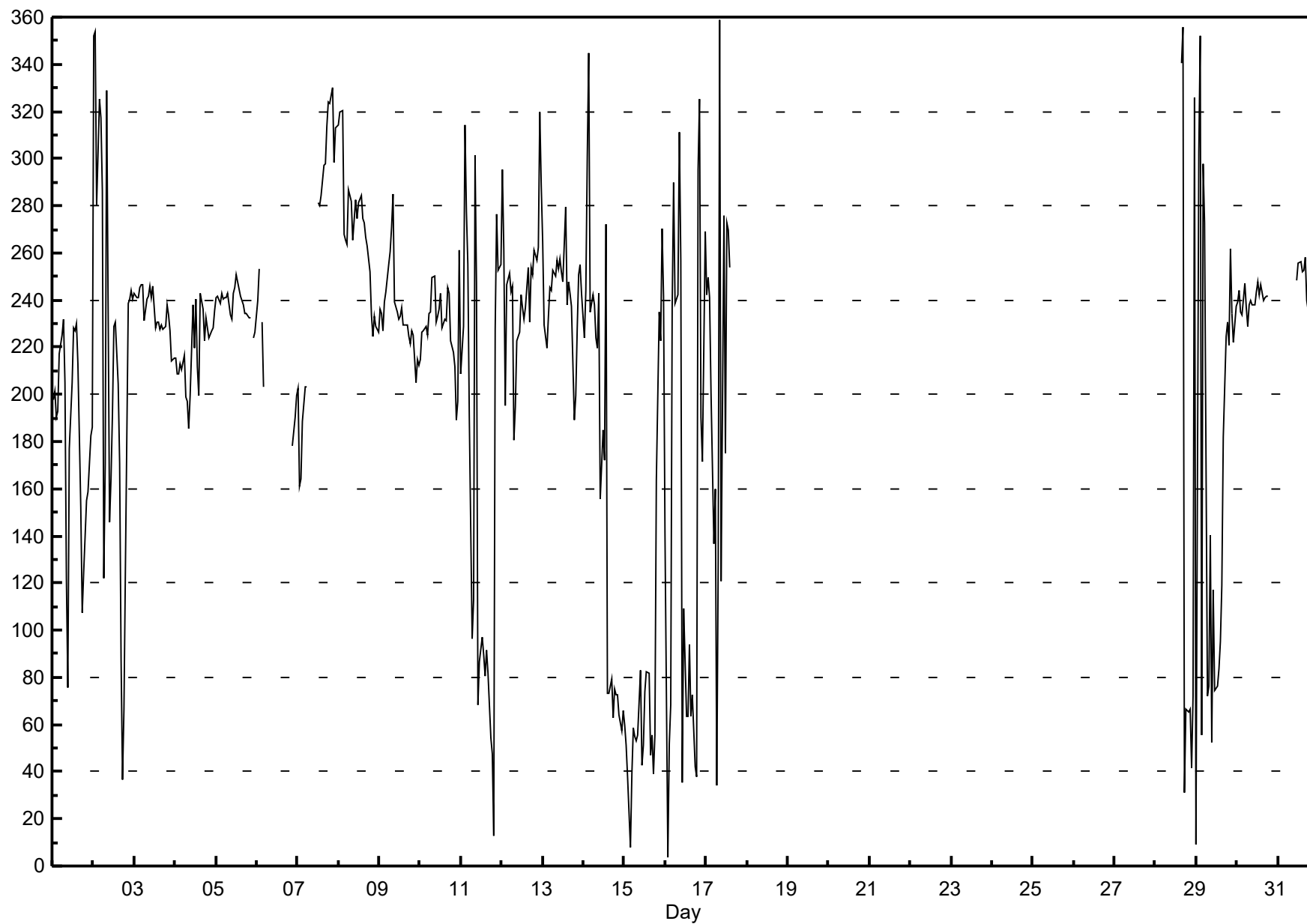
Hourly Averages

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



Hourly Averages

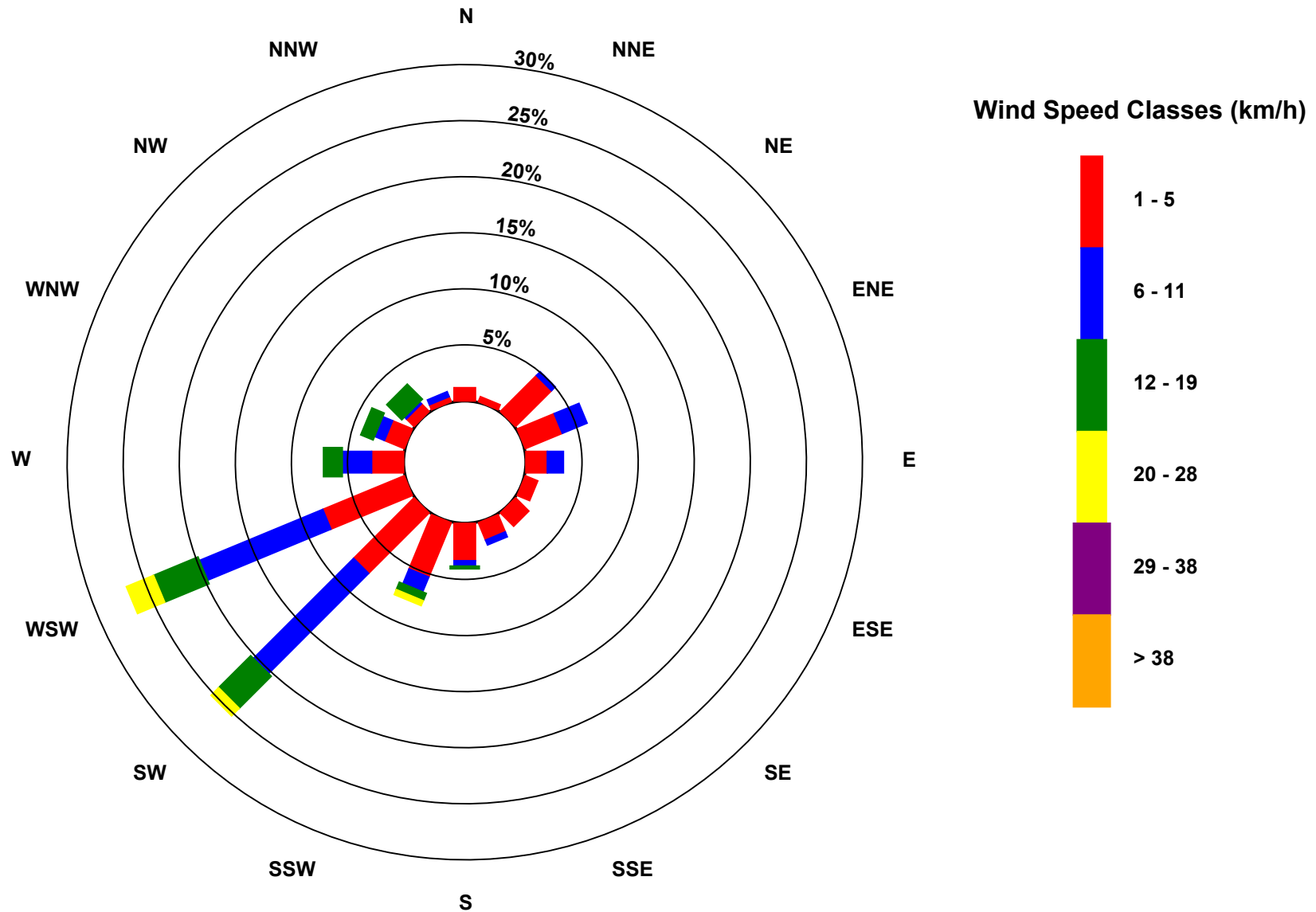
Wind Direction (WD) - deg
Wembley - October 2019



Wind Rose

Wind Speed (WS) (km/h)

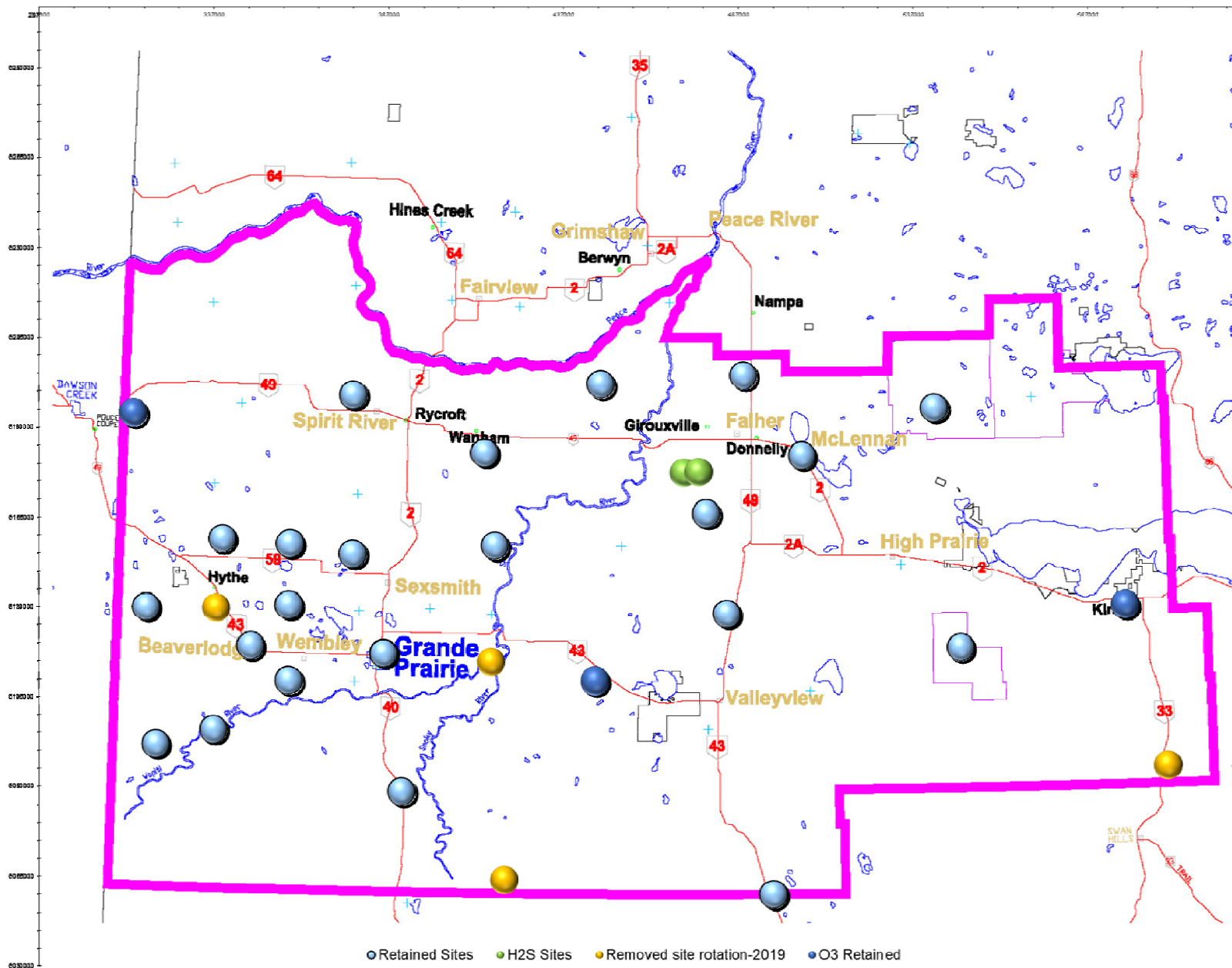
Wembley - October 2019



PAZA

Monthly Passive Data Summary

Location of PAZA Passive Monitoring Stations



**Peace Airshed Zone Association - PAZA Passive Stations
October 2019**

Station Number	Station Name	SO2 ppb	O3 ppb	NO2 ppb	H2S ppb	Site Legal
Duplicates						
9a	Spirit River	0.4				
9b	Spirit River	BDL				
18a	Saddle Hills			0.8		
18b	Saddle Hills			0.7		
24a	Wembley			1.9		
24b	Wembley			1.6		
35a	Jean Cote	0.2				
35b	Jean Cote	0.2				
37a	Crooked Creek		24.0			
37b	Crooked Creek		26.7			
38a	Karr Creek	0.1				
38b	Karr Creek	0.1				
39a	Clouston Creek			0.8		
39b	Clouston Creek			0.7		
64a	Girouxville 4				0.3	
64b	Girouxville 4				0.3	
2	Bay Tree	0.1	33.1	0.6		13-16-078-13 W6M
5	Boone Creek	0.2		0.2		16-36-074-11 W6M
7	Steeprock Creek	0.1		0.1		09-35-072-13 W6M
9	Spirit River	0.4		1.0		08-12-079-07 W6M
11	Webber Creek	0.2		0.2		09-36-074-09 W6M
12	Hythe	0.2		0.2		14-36-072-11 W6M
14	Sylvester	0.1		0.1		08-06-069-12 W6M
16	Beaverlodge	0.4		1.6		15-36-071-10 W6M
17	Poplar	0.3		1.6		13-06-073-08 W6M
18	Saddle Hills	0.4		0.8		04-25-074-07 W6M
19	Wanham	0.3		0.7		16-22-077-03 W6M
21	Eaglesham	0.1		0.6		16-21-079-25 W5M
24	Wembley	1.1		1.7		12-31-070-08 W6M
25	Pinto Creek	0.1		0.6		04-24-069-11 W6M
27	Grande Prairie I	0.8		4.3		08-15-071-06 W6M
29	Smoky Heights	0.5		0.5		04-06-075-02 W6M
32	Gold Creek	0.3		2.8		06-33-067-05 W6M
33	Wapiti	0.3		1.4		02-25-071-03 W6M
35	Jean Cote	0.2		0.7		12-35-079-21 W5M
36	Guy	0.1		0.7	0.1	03-04-076-22 W5M
37	Crooked Creek	0.2	25.4	1.1		16-01-071-26 W5M
38	Karr Creek	0.1		1.5		10-16-065-02 W6M
39	Clouston Creek	0.2		0.8		12-01-073-22 W5M
40	McLennan	0.2		1.1		03-29-077-19 W5M
44	Peavine	0.1		0.4		03-05-079-15 W5M
46	Little Smoky	0.1		3.0		12-01-065-21 W5M
47	Kinuso	0.1	26.7	0.6		12-10-073-10 W5M
48	Deer Mountain 2	0.1		0.8		*
49	Grande Prairie HP	0.6		6.4		17-26-071-06 W6M
50	East Prairie	0.1		0.4		13-02-072-15 W5M
63	Girouxville 3				0.2	14-02-077-23 W5M
64	Girouxville 4				0.3	4-08-077-22 W5M

*BDL = Below Detection Level

*N/S - No sample

Passive Summary for October 2019

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

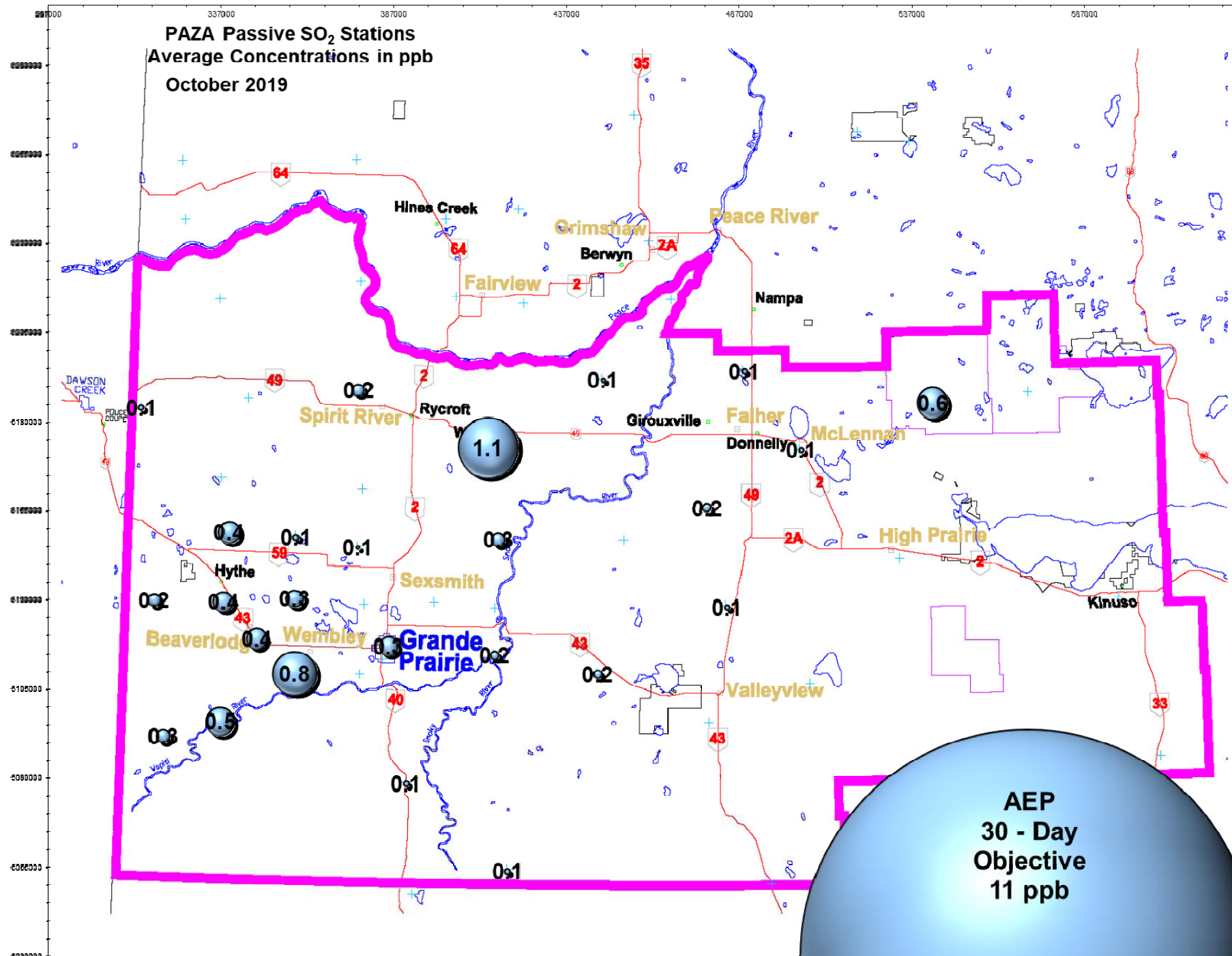
Passive Summary for October 2019 (PAZA Zone)				
Mean	0.3	28.4	1.2	0.2
Standard Deviation	0.2	4.1	1.3	0.1
Minimum	0.1	25.4	0.1	0.1
Minimum At	Deer Mountain 2	Crooked Creek (#37)	Steepprock Creek (#7)	Guy (#36)
Maximum	1.1	33.1	6.4	0.2
Maximum At	Wembley (#24)	Bay Tree (#2)	Grande Prairie HP	Girouxville 3 (#63)

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

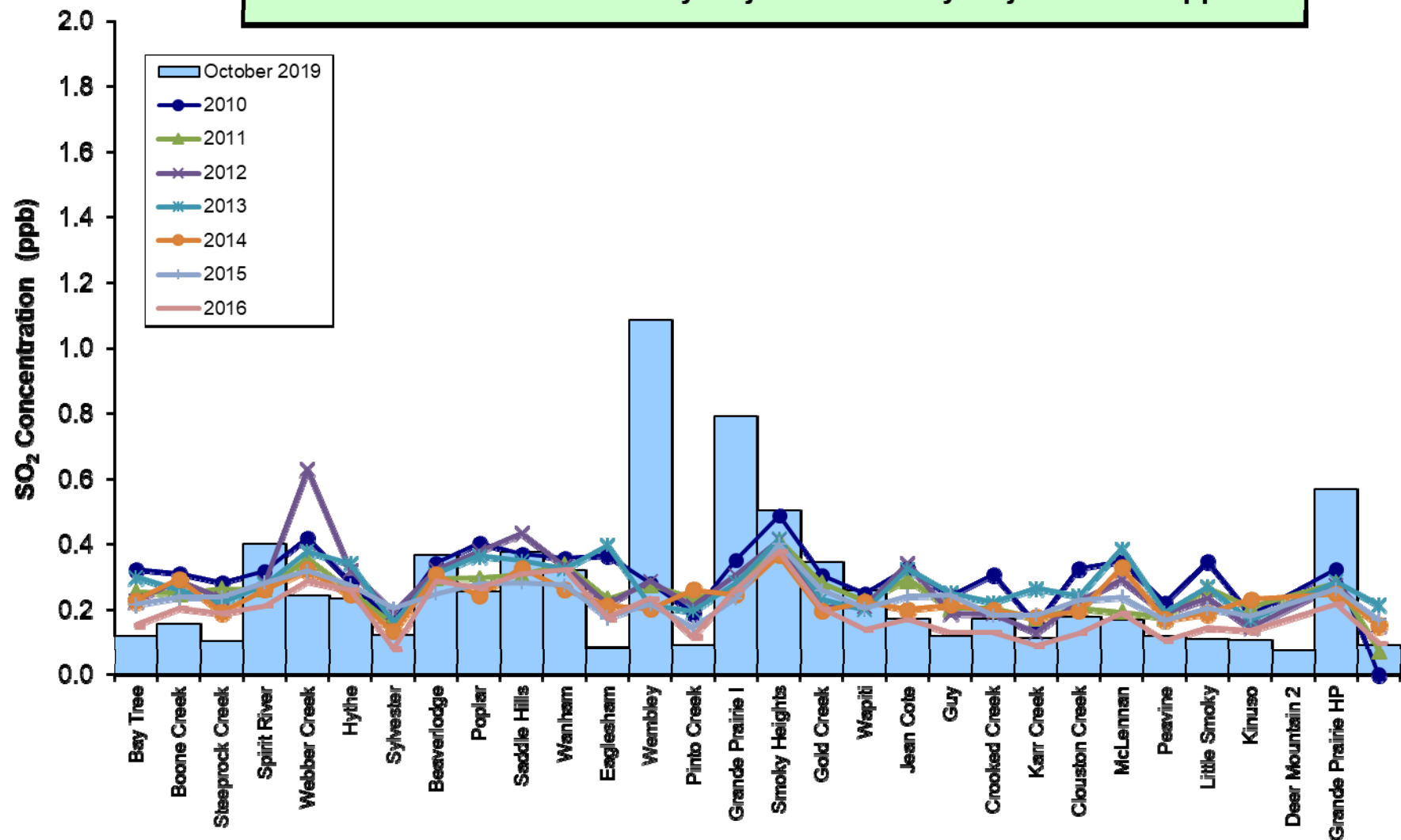
	SO ₂	NO ₂
PAZA Beaverlodge station	0.3	3.3
PAZA Beaverlodge passive	0.1	0.1

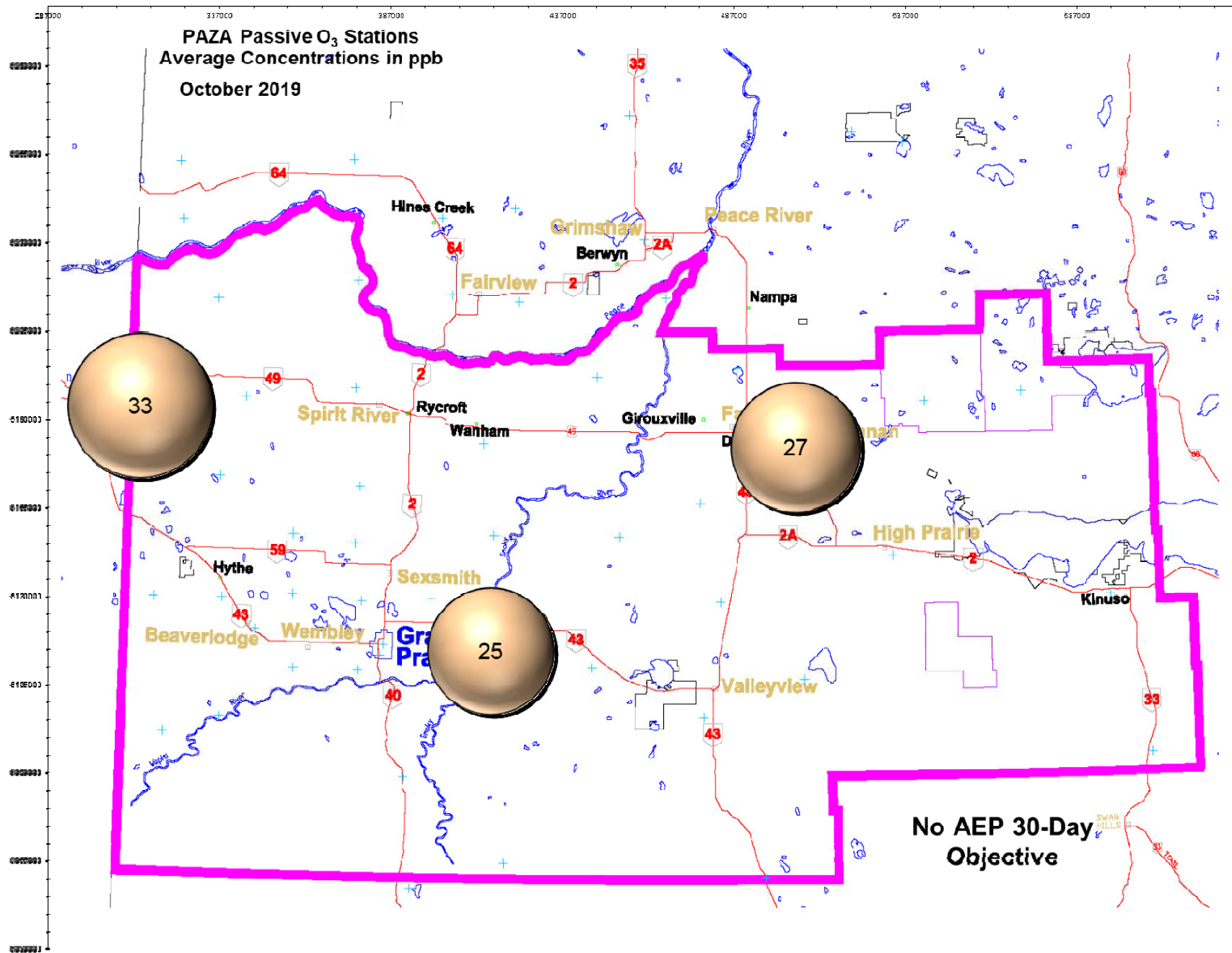
Comparison between Continuous and Passive monitoring at Henry Pirker (passive #49 Grande Prairie HP)

	SO ₂	NO ₂
PAZA Henry Pirker station	0.8	8.7
PAZA Grande Prairie passive	0.1	0.6

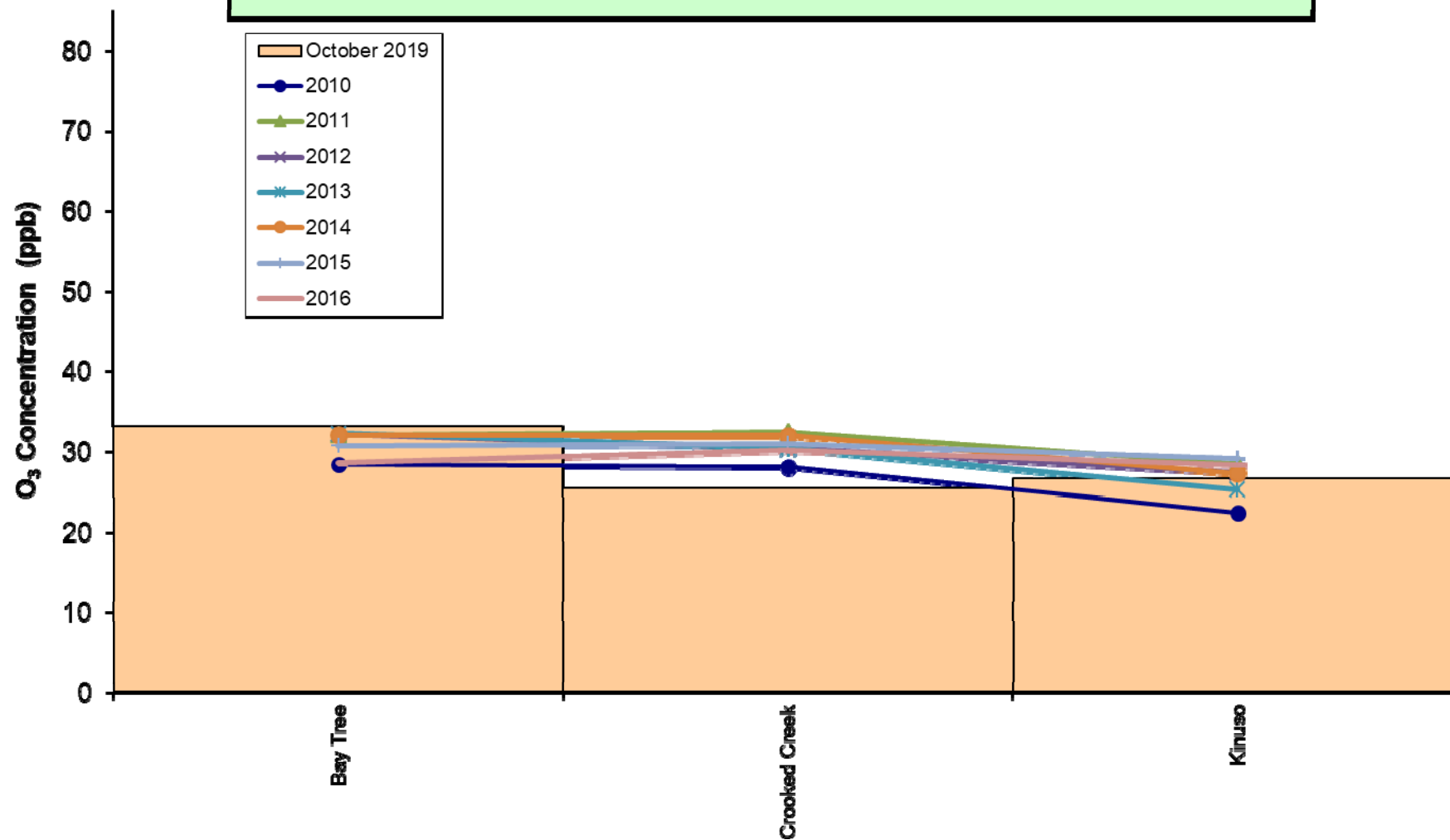


Alberta Ambient Air Quality Objective - 30-day Objective is 11 ppb

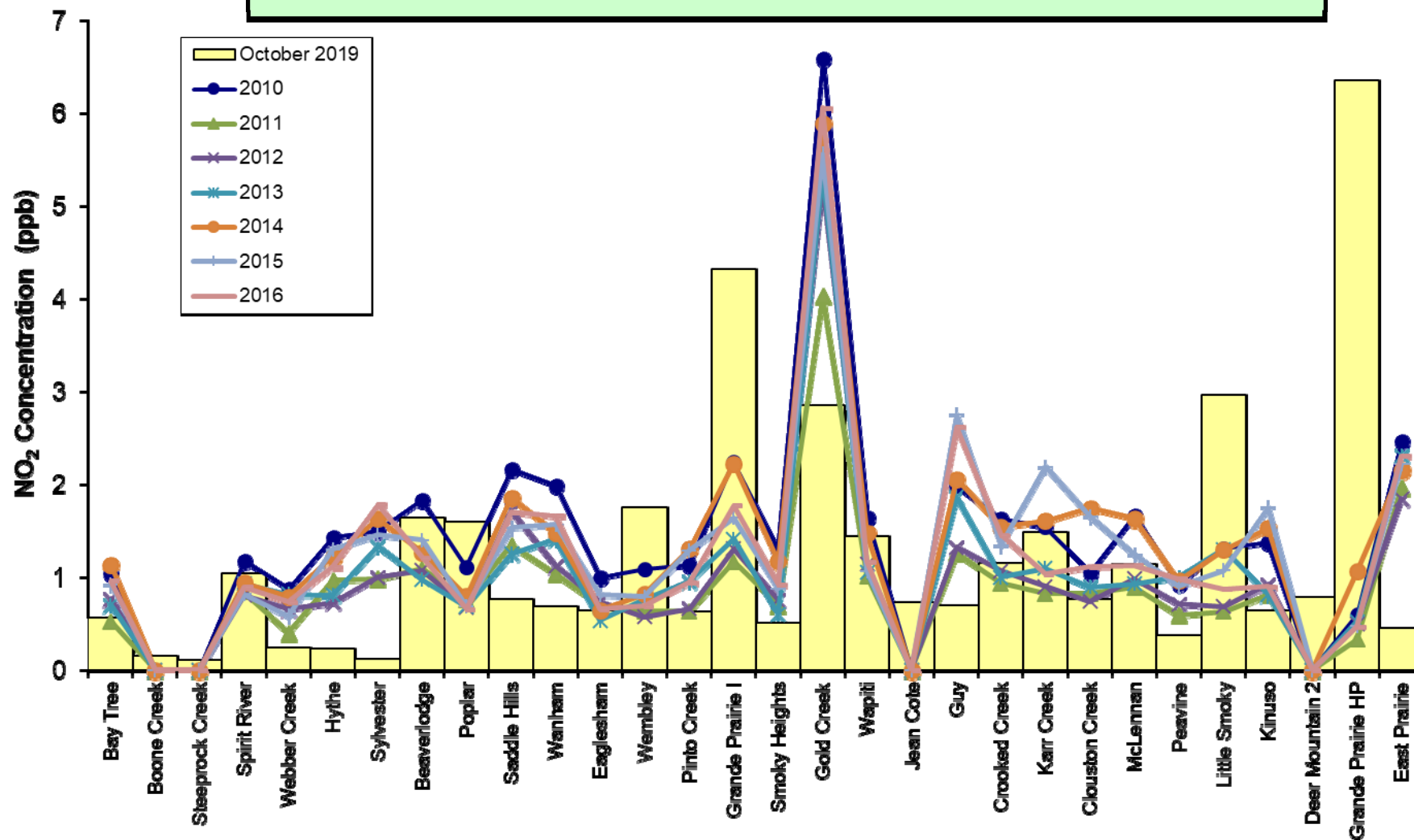


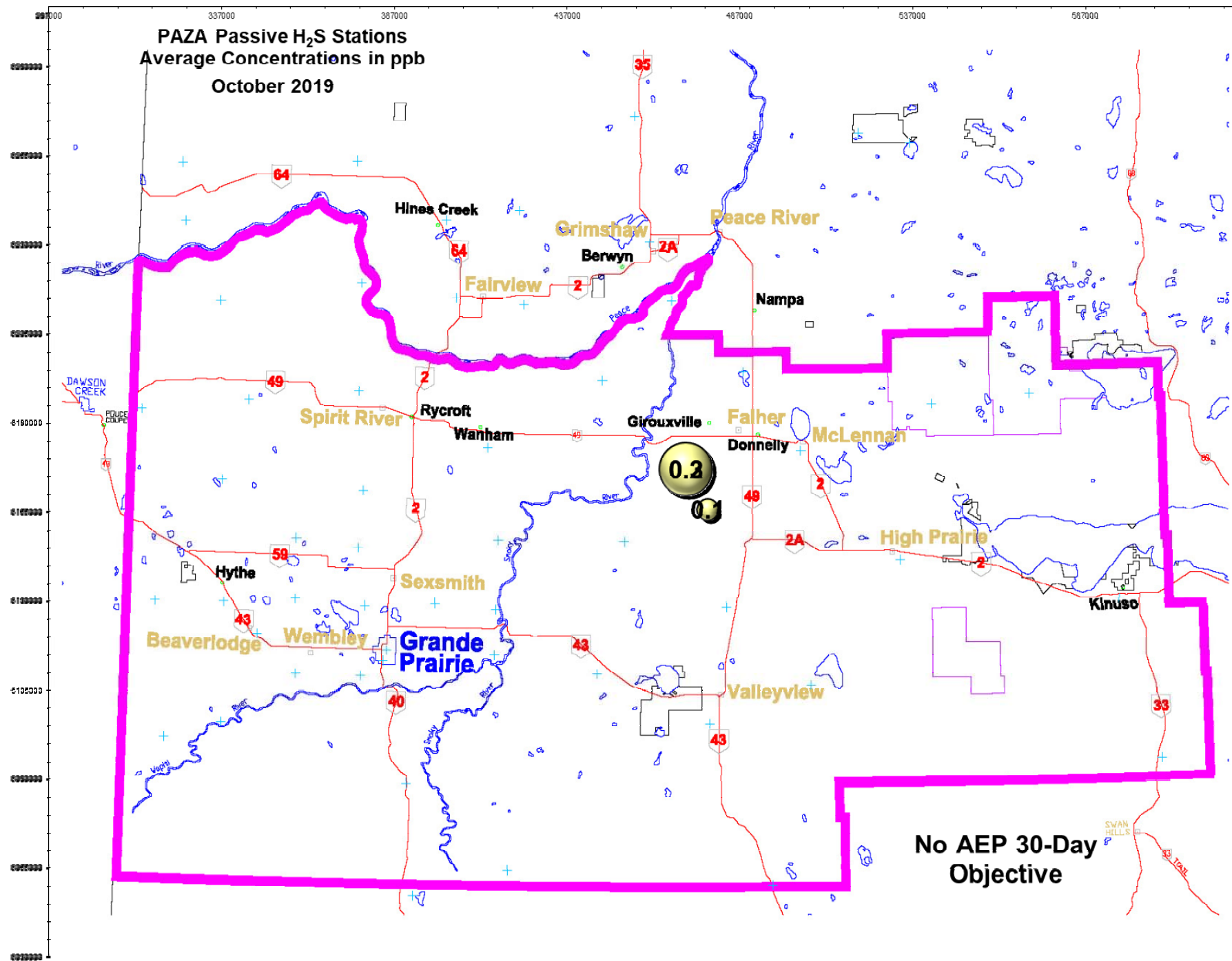


Alberta Ambient Air Quality Objective - No Annual O₃ Objective



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





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