



Peace Airshed Zone Association

Ambient Air Monitoring Network Summary

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

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December 31st, 2019

Alberta Environment and Parks

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

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

Enclosed is the PAZA Ambient Air Quality Monitoring Network Report for the month of November 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 November 2019 were submitted to the ETS data system.

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

There was 1 1-hour and 2 24-hour exceedances of the AAAQO for PM_{2.5} (80/29 µg/m³) in November.

Station Name	Date	Start Time	End Time	PM _{2.5} Concentration	Reference Number
		(MST)	(MST)	(µg/m ³)	
Beaverlodge	30-Nov-19	12:00	13:00	88.8	361582

Station Name	Date	24 hour PM _{2.5} Concentration	Reference Number
		(µg/m ³)	
Beaverlodge	29-Nov-19	30.5	362235
Beaverlodge	30-Nov-19	44.7	361582

Operational times less than 90 percent:

There were no operational times less than 90 percent in November.

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:

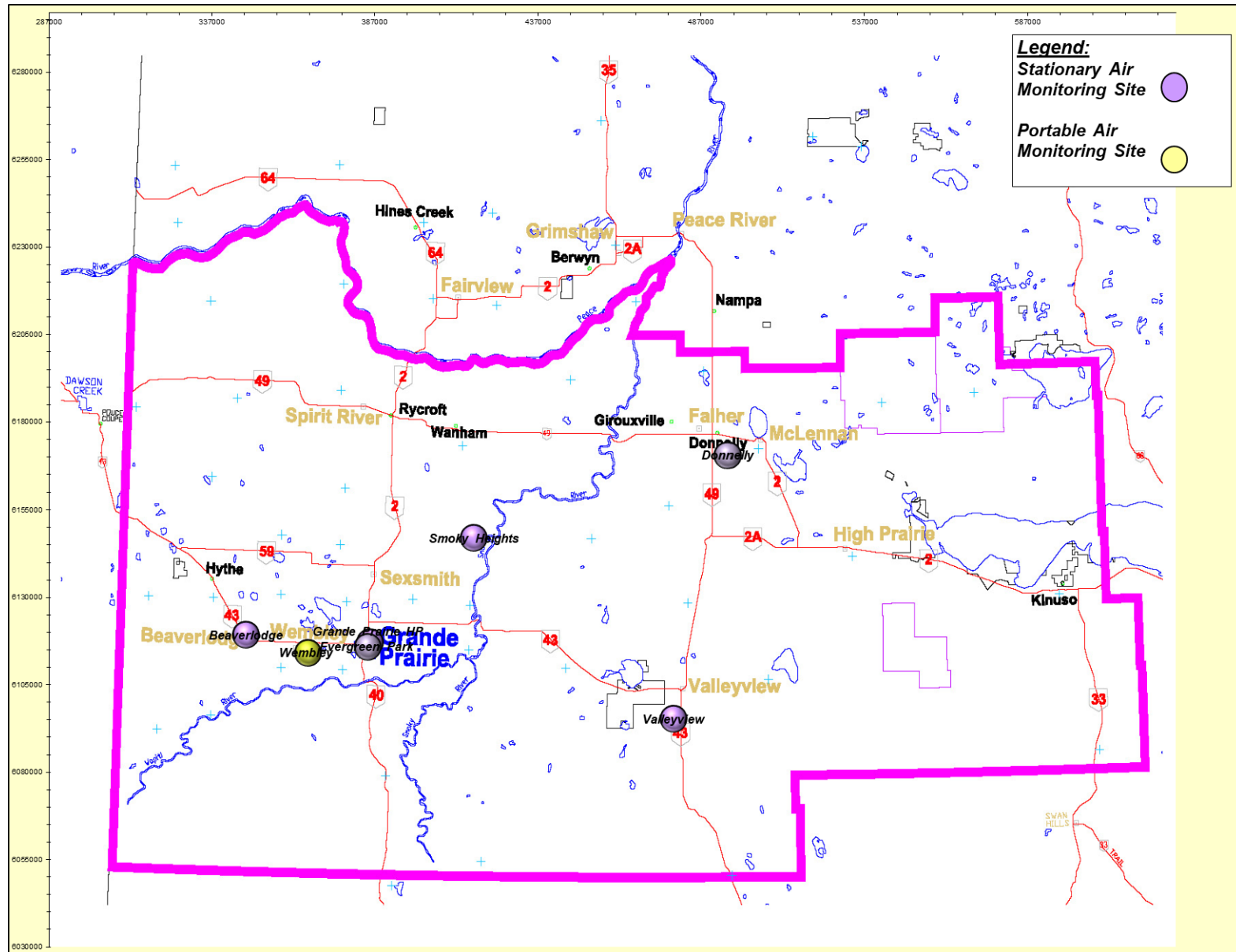
There were eight duplicate sites sampled in the month of November: Poplar, Saddle Hills, Guy (SO₂), Bay Tree (O₃), Spirit River, Webber Creek, Jean Cote (NO₂), and Girouxville 3 (H₂S). The passive sample analyses were performed by MAXXAM Analytics Inc. There were no exceedances of the AAAQOs for all 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

Nov-2019 Peace Airshed Zone Association										Maximum Recorded Values					
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	Day	Conc	Day
SO ₂ (ppb)	172	48	8	Beaverlodge	1.0	0.0	0	0	0	43.6	Nov-30 22:00	5.4	Nov-30	100.0	Nov-13
NO (ppb)					1.6	0.0	-	-	-	67.2	Nov-29 12:00	14.1	Nov-29	100.0	Nov-13
NO ₂ (ppb)	159	106			6.4	0.3	0	0	-	32.6	Nov-30 19:00	23.5	Nov-29	100.0	Nov-13
NO _x (ppb)					8.1	0.3	-	-	-	90.9	Nov-29 12:00	37.9	Nov-29	100.0	Nov-13
O ₃ (ppb)	76				24.5	0.8	0	-	-	41.2	Nov-11 13:00	37.0	Nov-22	100.0	Nov-14
O ₃ (ppb) - 8-hr							-	-	-			40.0	Nov-11		-
PM _{2.5} (µg/m3)	80	29			5.9	0.0	1	2	-	88.8	Nov-30 12:00	44.7	Nov-30	100.0	Nov-14
RH (%)					79.8	45.0	-	-	-	100.0	Nov-01 15:00	99.4	Nov-12	100.0	-
Temp (°C)					-3.4	-21.5	-	-	-	9.9	Nov-17 13:00	6.7	Nov-17	100.0	-
WSPD v (km/hr)					3.7	0.2	-	-	-	50.6	Nov-23 03:00	24.6	Nov-22	100.0	13/08/2019
WDIR					WNW		-	-	-	-	-	-	-	100.0	13/08/2019

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	
ET/RH			
WS/WD	MetOne	50.5	

Evergreen Park Air Monitoring Station

Nov-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	0.3	0.0	0	0	0	14.1	Nov-15 23:00	1.4	Nov-15	100.0	Nov-07
TRS (ppb)					0.6	0.2	-	-	-	2.1	Nov-29 20:00	1.3	Nov-29	100.0	Nov-07
PM _{2.5} (µg/m3)	80	29			4.3	0.0	0	0	-	30.0	Nov-30 15:00	14.5	Nov-30	99.6	Nov-07
RH (%)					81.8	45.7	-	-	-	98.6	Nov-08 10:00	95.2	Nov-03	100.0	-
Temp (°C)					-4.7	-24.2	-	-	-	11.7	Nov-17 14:00	5.8	Nov-17	100.0	-
WSPD v (km/hr)					1.3	0.1	-	-	-	19.0	Nov-17 23:00	8.5	Nov-22	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	
PM _{2.5}	SHARP	5030	Analyzer returned negative readings Nov 28
ET/RH			
WS/WD	Gil/RMYoung	MetPak/RMY86004	

Henry Pirker Air Monitoring Station

Nov-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	0.5	0.0	0	0	0	42.1	Nov-24 19:00	4.0	Nov-24	99.9	Nov-12
H ₂ S (ppb)					0.3	0.0	0	0	-	1.7	Nov-12 02:00	0.8	Nov-29	100.0	Nov-26
NO (ppb)					12.1	0.0	-	-	-	106.4	Nov-13 12:00	51.0	Nov-29	99.9	Nov-12
NO ₂ (ppb)	159	106			15.1	1.3	0	0	-	44.8	Nov-21 19:00	29.2	Nov-11	99.9	Nov-12
NO _x (ppb)					27.5	1.5	-	-	-	140.9	Nov-13 13:00	75.5	Nov-29	99.9	Nov-12
O ₃ (ppb)	76				15.7	0.1	0	-	-	40.1	Nov-22 22:00	32.8	Nov-23	99.9	Nov-12
O ₃ (ppb) - 8-hr							-	-	-			39.0	Nov-18		-
CO (ppm)	13				0.26	0.1	0	0	-	1.0	Nov-07 17:00	0.5	Nov-07	99.9	Nov-08
CO (ppm) - 8-hr	5						0					0.7	Nov-07		-
THC (ppm)					2.1	1.8	-	-	-	3.3	Nov-30 23:00	3.0	Nov-30	96.9	Nov-20
CH ₄ (ppm)					2.1	1.8	-	-	-	3.1	Nov-21 09:00	2.8	Nov-30	96.9	Nov-20
NMHC (ppm)					0.0	0.0	-	-	-	0.6	Nov-02 20:00	0.3	Nov-30	96.9	Nov-20
PM _{2.5} (µg/m3)	80	29			6.3	1.0	0	0	-	28.8	Nov-29 01:00	15.5	Nov-29	100.0	Nov-29
RH (%)					73.2	46.4	-	-	-	89.2	Nov-08 02:00	85.2	Nov-08	100.0	-
SR (W/m ²)					24.1	0.0	-	-	-	274.2	Nov-06 13:00	52.3	Nov-06	100.0	-
Temp (°C)					-4.5	-25.8	-	-	-	12.4	Nov-17 13:00	6.5	Nov-17	100.0	-
WSPD v (km/hr)					2.4	0.2	-	-	-	27.5	Nov-17 23:00	12.3	Nov-23	98.9	12/08/2019
WDIR					WNW		-	-	-	-	-	-	-	98.9	12/08/2019

Parameter	Analyzer		Notes
	Make	Model	
SO ₂	TECO	43I	Analyzer returned irregular values during Nov 26 station visit
H ₂ S	TECO	450I	
NO/NO ₂ /NO _x	TECO	42I	Analyzer returned irregular values during Nov 26 station visit
O ₃	TECO	49I	Analyzer returned irregular values during Nov 26 station visit
CO	TECO	48I-TLE	Analyzer returned irregular values during Nov 26 station visit
THC/CH ₄ /NMHC	TECO	55C/55I	Analyzer did not capture valid ambient readings Nov 12. 55C removed from service Nov 19, 55I installed, allowed to stabilize and calibrated Nov 20. Analyzer returned irregular values during Nov 26 station visit
PM _{2.5}	SHARP	5030	
ET/RH			
SR			
WS/WD	MetOne	50.5	Wind system returned invalid readings Nov 29 and 30 due to icing conditions

Smoky Heights Air Monitoring Station

Nov-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	8.2	Nov-18 10:00	1.5	Nov-30	99.7	Nov-18
TRS (ppb)					0.2	0.0	-	-	-	1.2	Nov-19 05:00	0.5	Nov-19	100.0	Nov-18
PM _{2.5} (µg/m3)	80	29			5.2	0.0	0	0	-	69.6	Nov-30 18:00	26.5	Nov-30	99.6	Nov-21
Temp (°C)					-5.4	-24.3	-	-	-	8.0	Nov-17 14:00	5.0	Nov-17	100.0	-
WSPD v (km/hr)					6.0	0.8	-	-	-	38.5	Nov-17 21:00	26.7	Nov-22	100.0	04/06/2019
WDIR					WSW		-	-	-	-	-	-	-	100.0	04/06/2019

Parameter	Analyzer		Notes
	Make	Model	
SO ₂	TECO	43I	Analyzer check Nov 21
TRS	TECO	43I	
PM _{2.5}	SHARP	5030	Manifold cleaned during Nov 18 visit
ET			
WS/WD	MetOne	50.5	

Valleyview Air Monitoring Station

Nov-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	0.2	0.0	0	0	0	5.0	Nov-18 06:00	1.5	Nov-18	100.0	Nov-01
H ₂ S (ppb)	10	3			0.1	0.0	0	0	-	0.9	Nov-28 09:00	0.2	Nov-30	100.0	Nov-01
RH (%)					87.7	52.1	-	-	-	100.0	Nov-01 17:00	99.8	Nov-12	100.0	-
Temp (°C)					-0.3	-18.5	-	-	-	14.5	Nov-17 15:00	9.2	Nov-17	100.0	-
WSPD v (km/hr)					0.8	0.0	-	-	-	14.7	Nov-17 23:00	8.0	Nov-09	100.0	23/09/2019
WDIR					W		-	-	-	-	-	-	-	100.0	23/09/2019

Parameter	Analyzer		Notes
	Make	Model	
SO ₂	TECO	43I	
H ₂ S	TECO	450I	
ET/RH			
WS/WD	RMYoung	RMY86004	

Donnelly Air Monitoring Station

Nov-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	1.5	Nov-06 12:00	0.4	Nov-06	100.0	Nov-20
H ₂ S (ppb)	10	3			0.0	0.0	0	0	-	1.0	Nov-28 00:00	0.1	Nov-30	100.0	Nov-20
Temp (°C)					-4.2	-23.2	-	-	-	9.3	Nov-17 15:00	6.2	Nov-17	100.0	-
WSPD v (km/hr)					10.7	0.5	-	-	-	43.0	Nov-23 03:00	24.6	Nov-22	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	

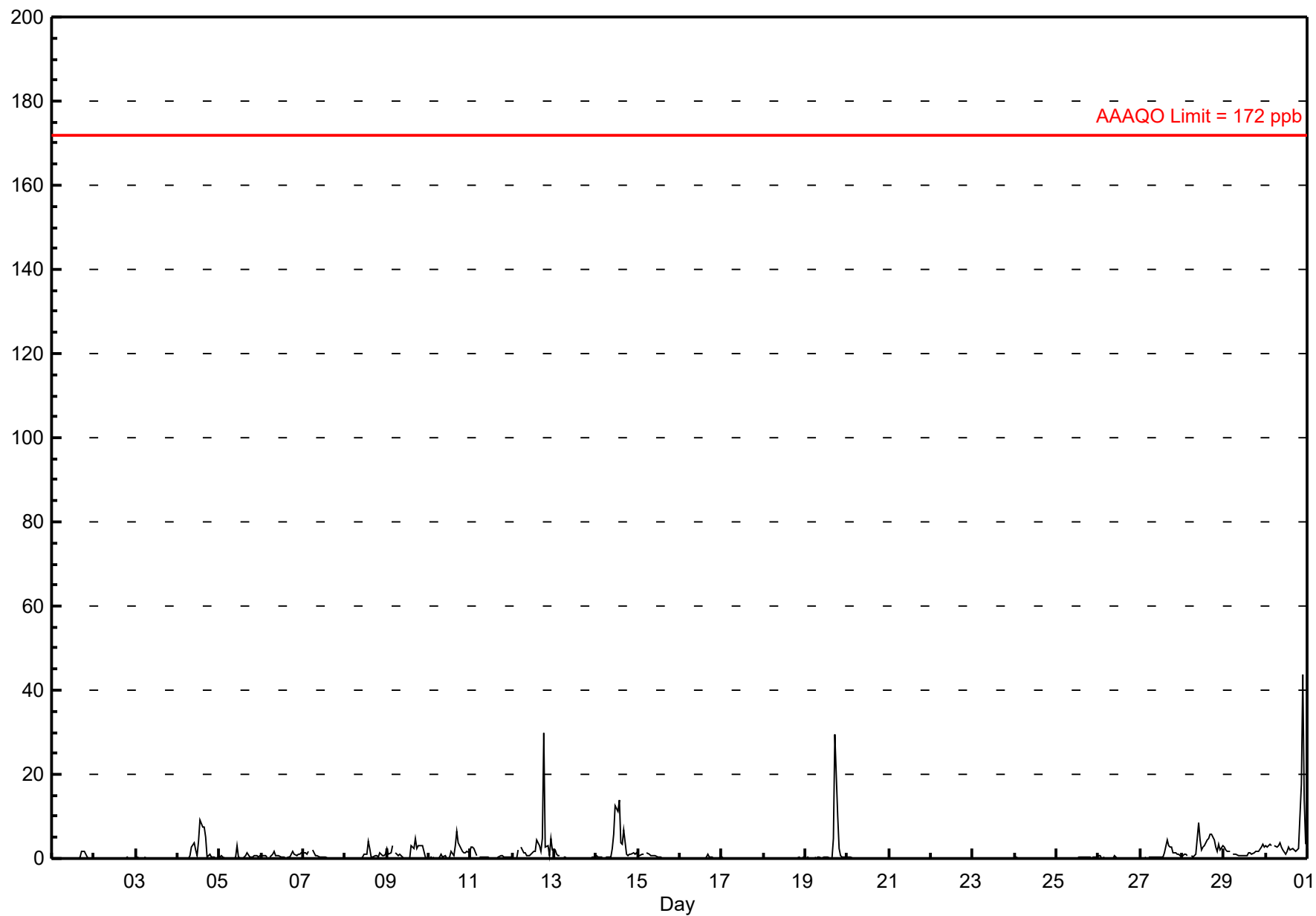
Wembley-Portable Air Monitoring Station

Nov-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	Wembley-Portable	0.4	0.0	0	0	0	51.0	Nov-19 19:00	3.9	Nov-19	100.0	Nov-06	
TRS (ppb)					0.2	0.0	-	-	-	0.7	Nov-06 18:00	0.4	Nov-29	100.0	Nov-05	
NO (ppb)					1.8	0.0	-	-	-	47.3	Nov-29 20:00	15.8	Nov-29	100.0	Nov-06	
NO ₂ (ppb)	159	106			5.4	0.3	0	0	-	30.2	Nov-30 22:00	17.8	Nov-30	100.0	Nov-06	
NO _x (ppb)					7.2	0.3	-	-	-	75.0	Nov-29 20:00	33.6	Nov-30	100.0	Nov-06	
O ₃ (ppb)	76				22.5	0.0	0	-	-	41.8	Nov-17 16:00	37.1	Nov-22	98.1	Nov-06	
O ₃ (ppb) - 8-hr							-	-	-			39.5	Nov-23		-	
THC (ppm)					2.1	1.9	-	-	-	2.8	Nov-30 10:00	2.7	Nov-30	99.9	Nov-25	
CH ₄ (ppm)					2.1	1.9	-	-	-	2.8	Nov-30 10:00	2.6	Nov-30	99.9	Nov-25	
NMHC (ppm)					0.0	0.0	-	-	-	0.0	Nov-28 22:00	0.0	Nov-30	99.9	Nov-25	
PM _{2.5} (µg/m3)	80	29			3.8	0.0	0	0	-	46.7	Nov-30 16:00	25.2	Nov-30	99.3	Nov-06	
Temp (°C)					-4.1	-25.5	-	-	-	11.4	Nov-17 13:00	7.7	Nov-17	99.6	-	
WSPD v (km/hr)					7.4	0.1	-	-	-	35.3	Nov-18 00:00	17.3	Nov-17	99.9	07/08/2019	
WDIR					WNW		-	-	-	-	-	-	-	99.9	07/08/2019	

Parameter	Analyzer		Notes
	Make	Model	
SO ₂	TECO	43I	
TRS	TECO	43I	
NO/NO ₂ /NO _x	TECO	42I	
O ₃	TECO	49I	ZS sequence failed correctly complete Nov 7, requiring analyzer reset
THC/CH ₄ /NMHC	TECO	55I	Hydrogen cylinder swapped Nov 25, analyzer recalibrated. Manual span check Nov 26
PM _{2.5}	TEOM		Analyzer check Nov 26. Invalid readings returned Nov 23, 26, 28
ET/RH			Sensor returned invalid readings Nov 5. Offline during wind tower extension work Nov 6
WS/WD	MetOne	50.5	Wind tower extension added Nov 6

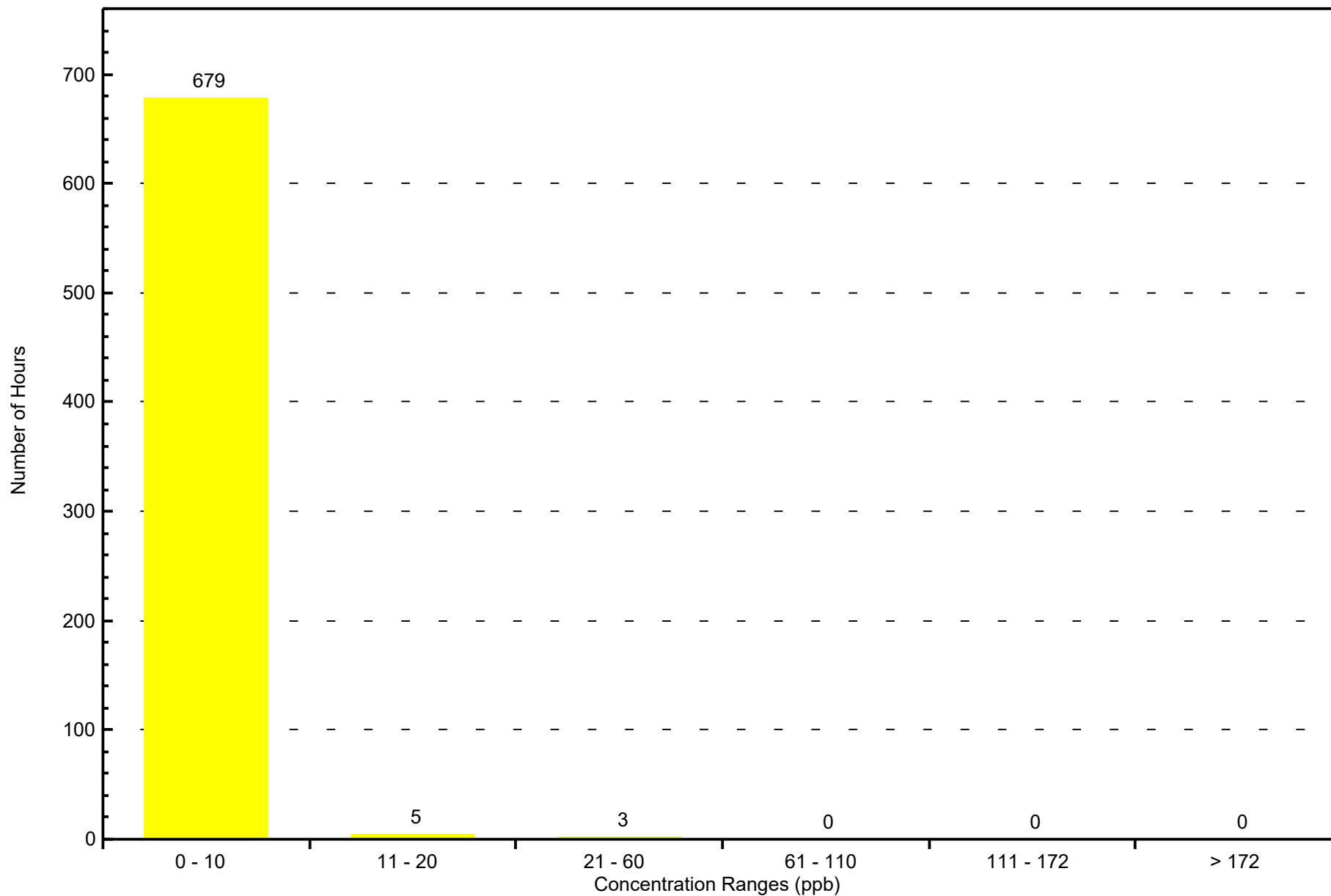
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Beaverlodge - November 2019



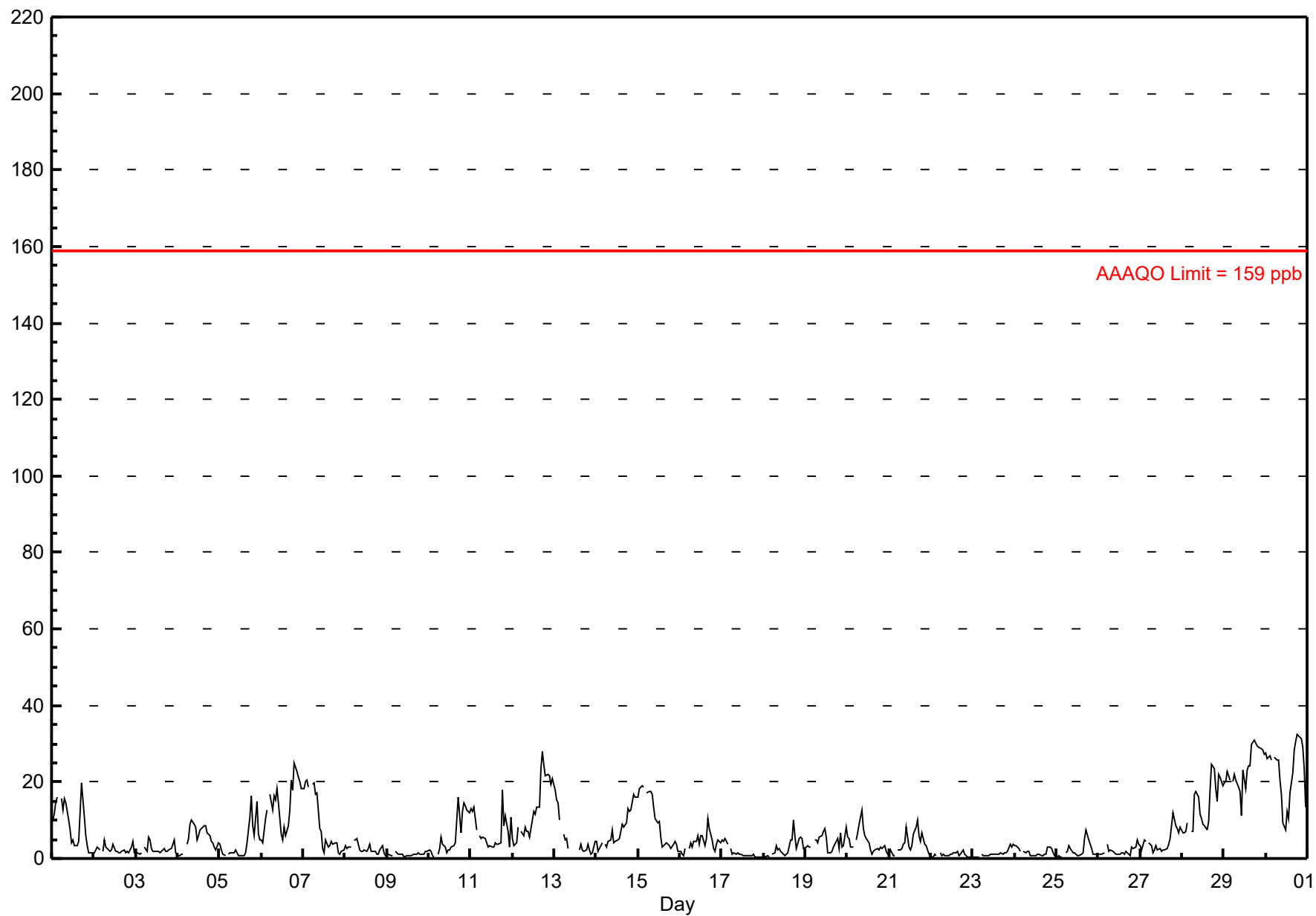
Histogram of Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Beaverlodge - November 2019



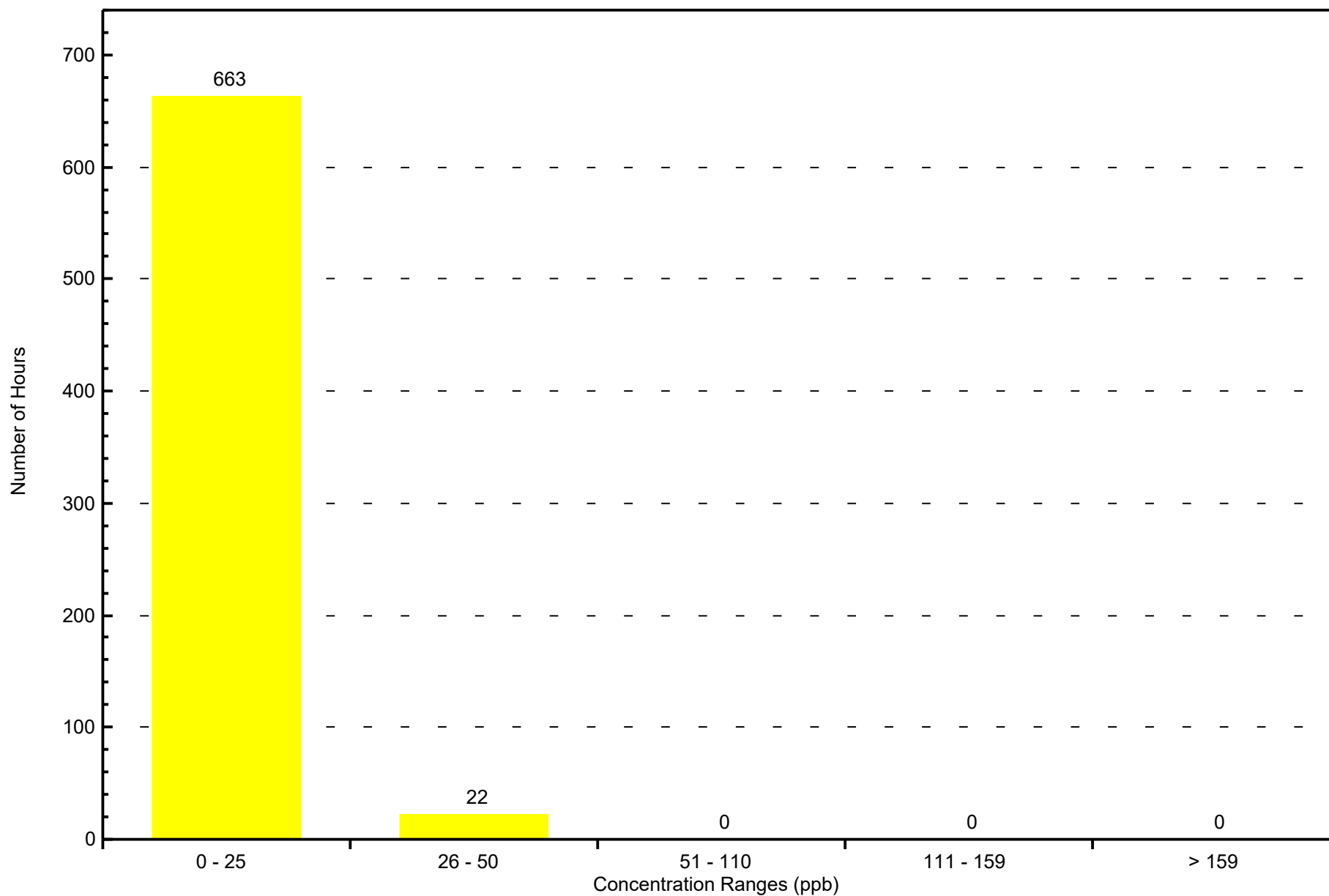
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Beaverlodge - November 2019



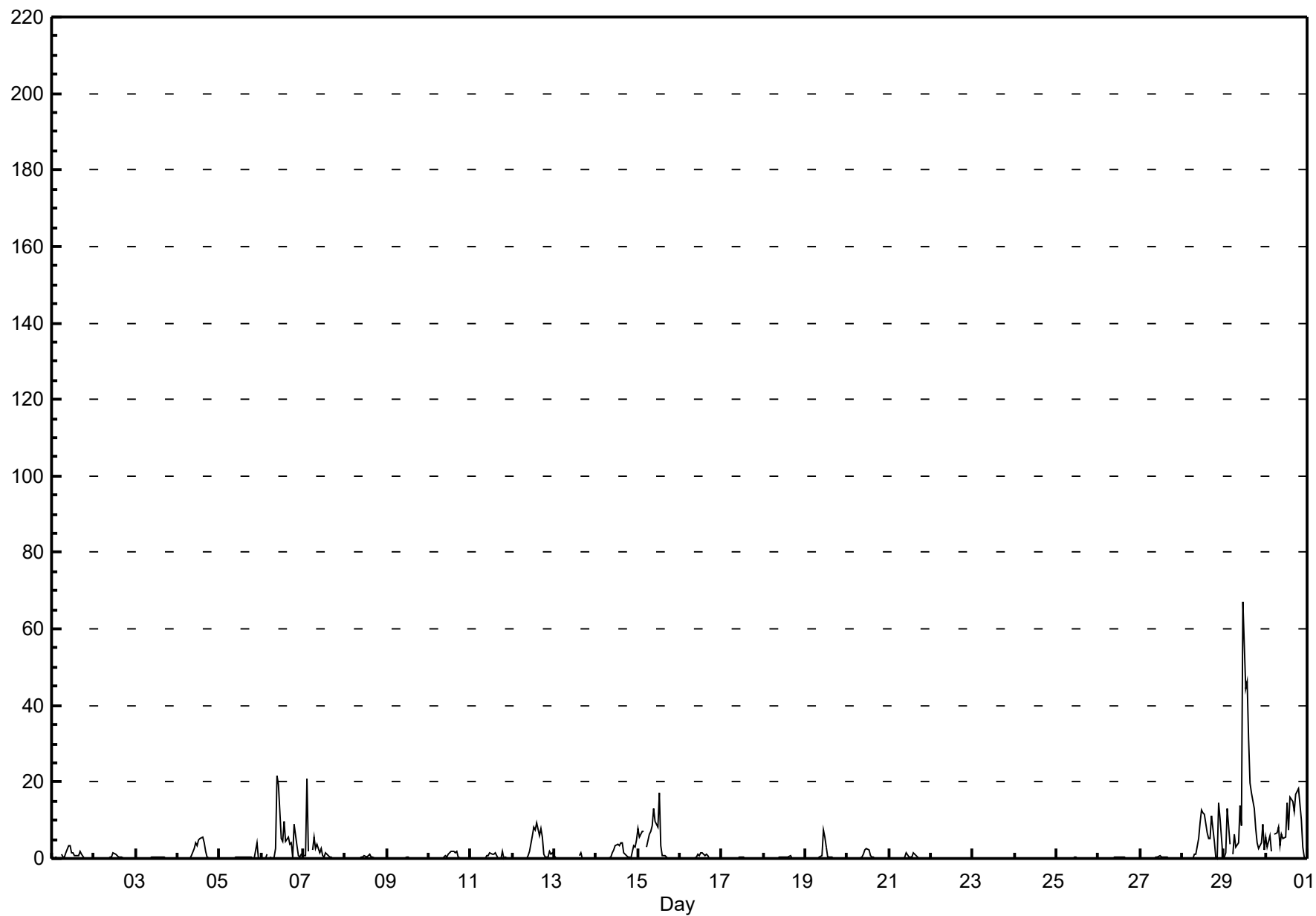
Histogram of Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Beaverlodge - November 2019



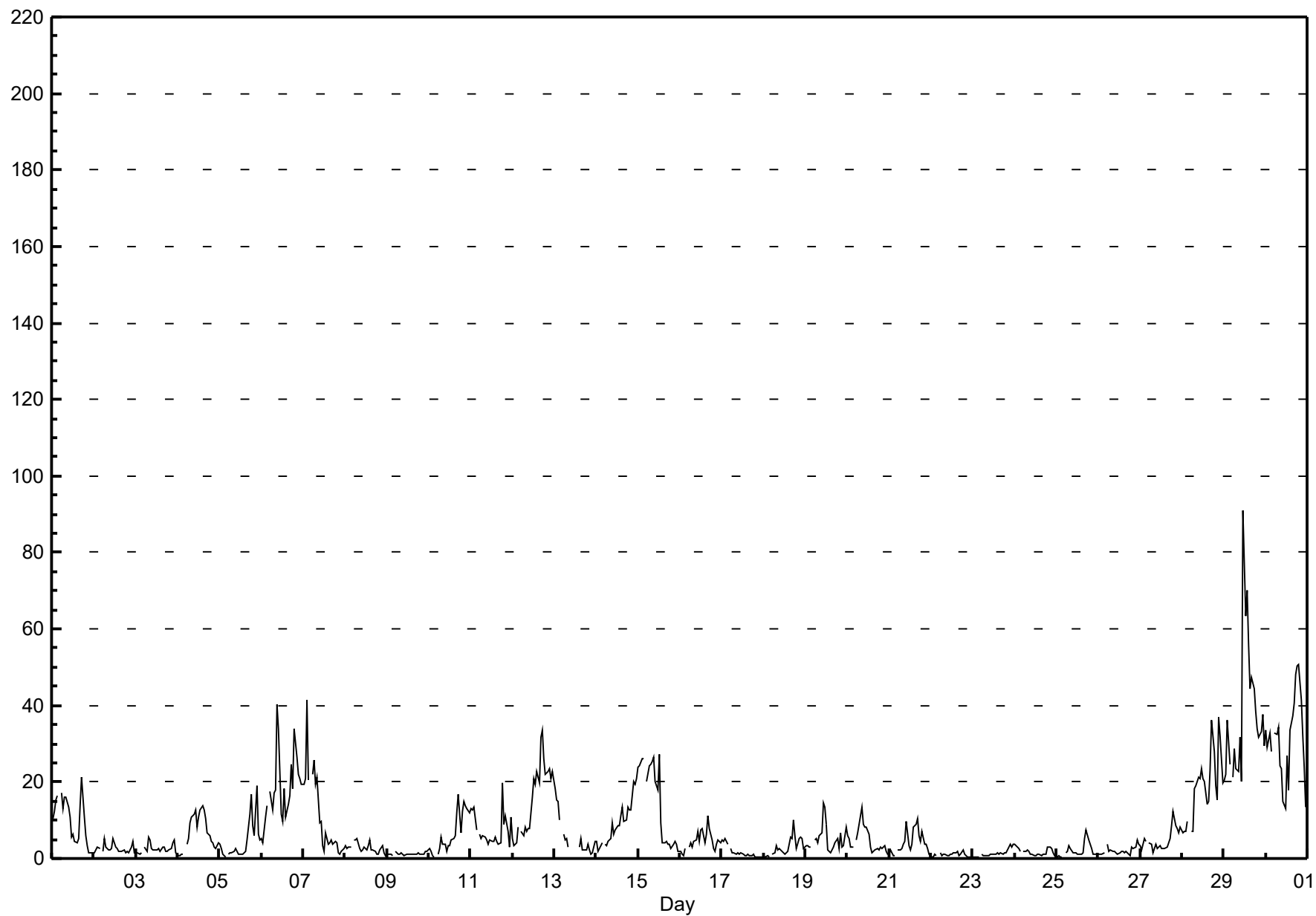
Hourly Averages

Nitrogen Oxide (NO) - ppb
Beaverlodge - November 2019



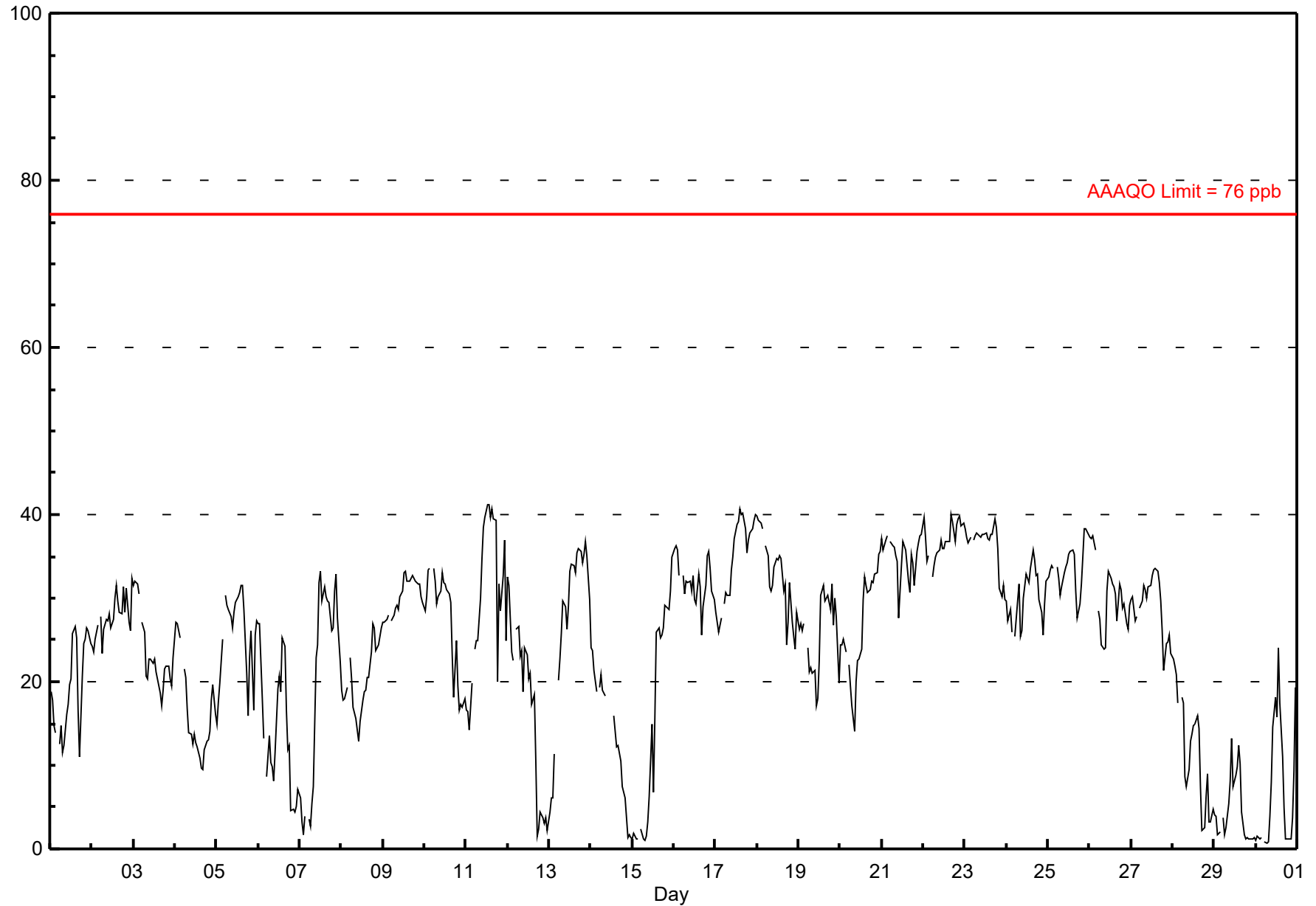
Hourly Averages

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



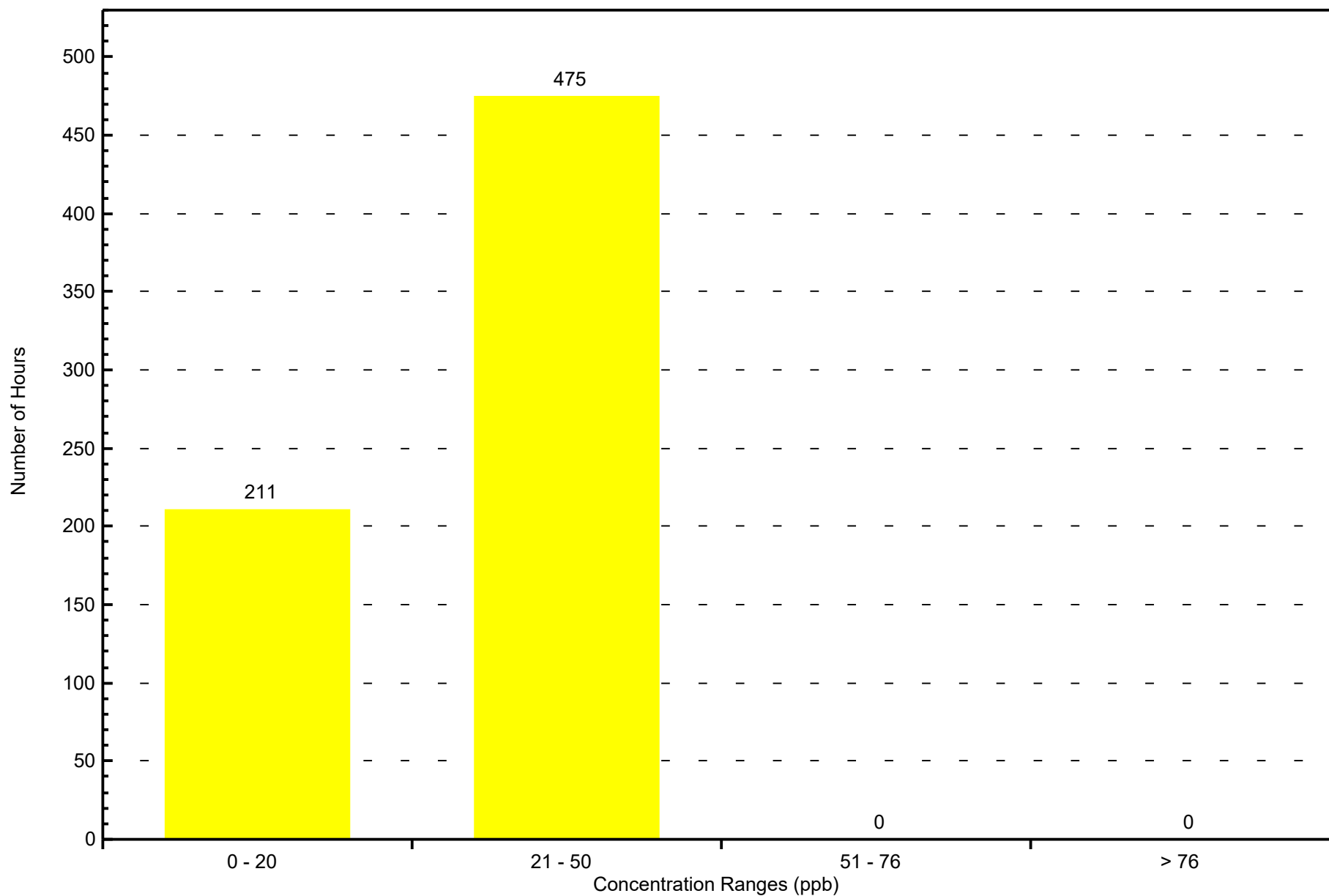
Hourly Averages

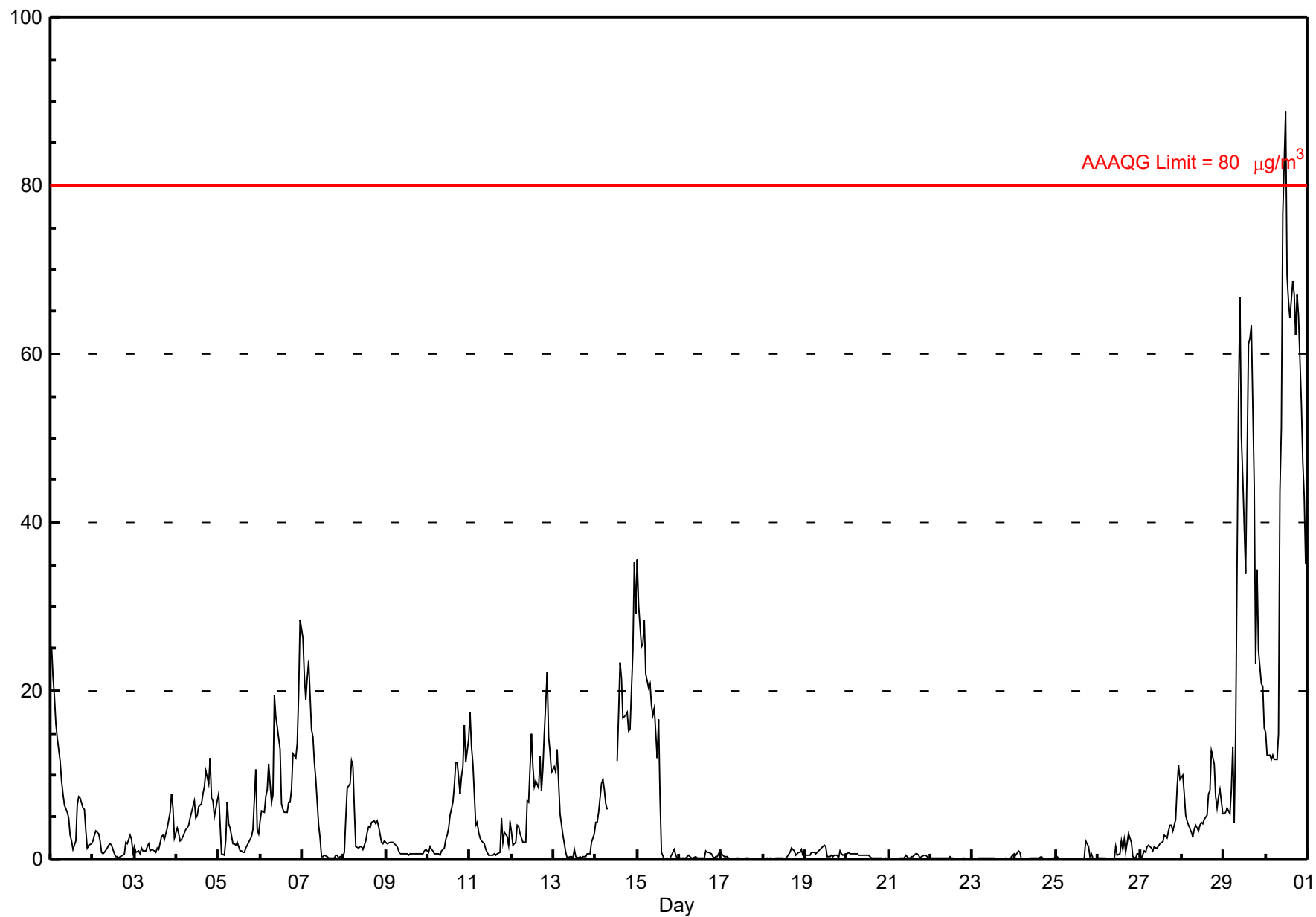
Ozone (O₃) - ppb
Beaverlodge - November 2019

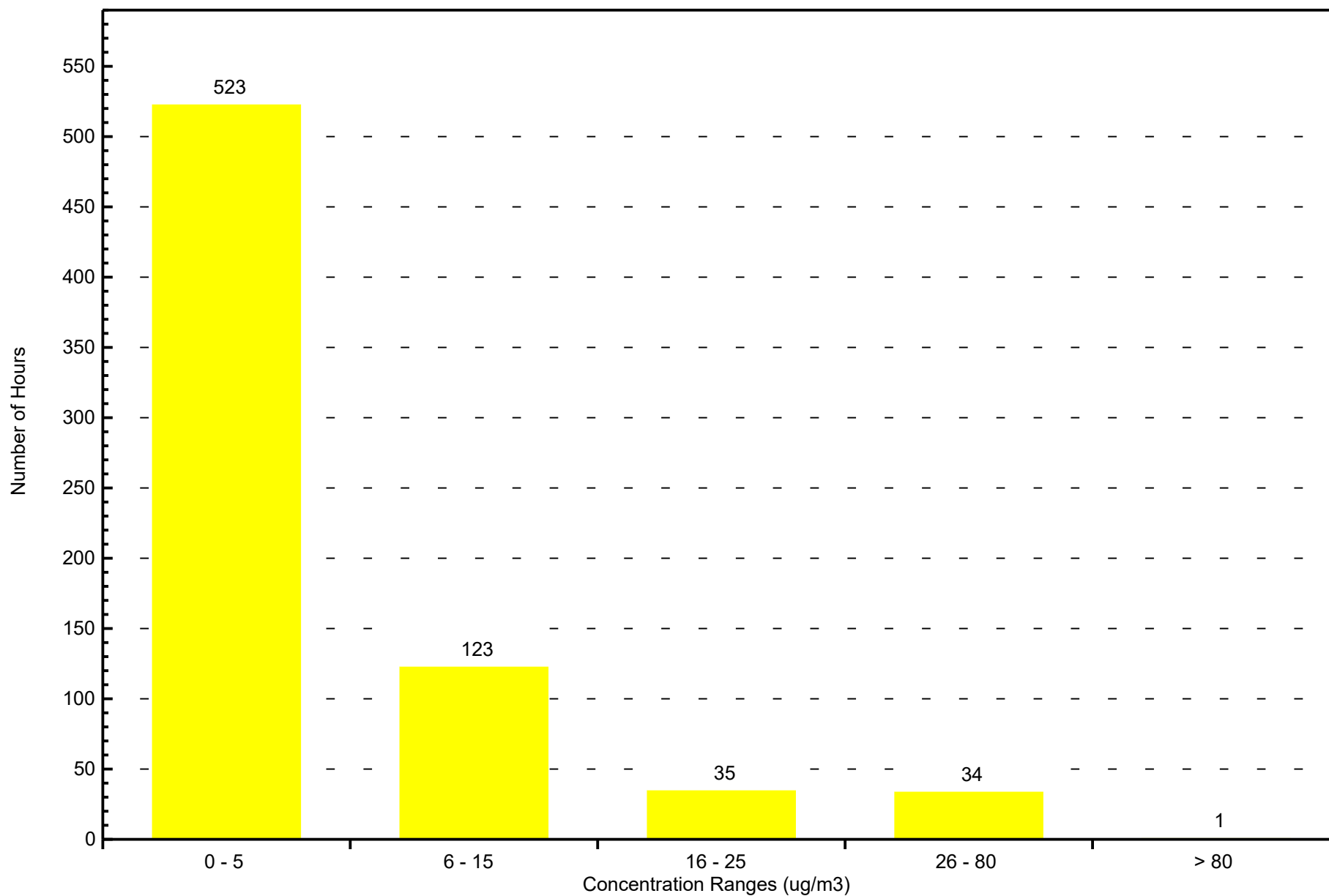


Histogram of Hourly Averages

Ozone (O₃) - ppb
Beaverlodge - November 2019

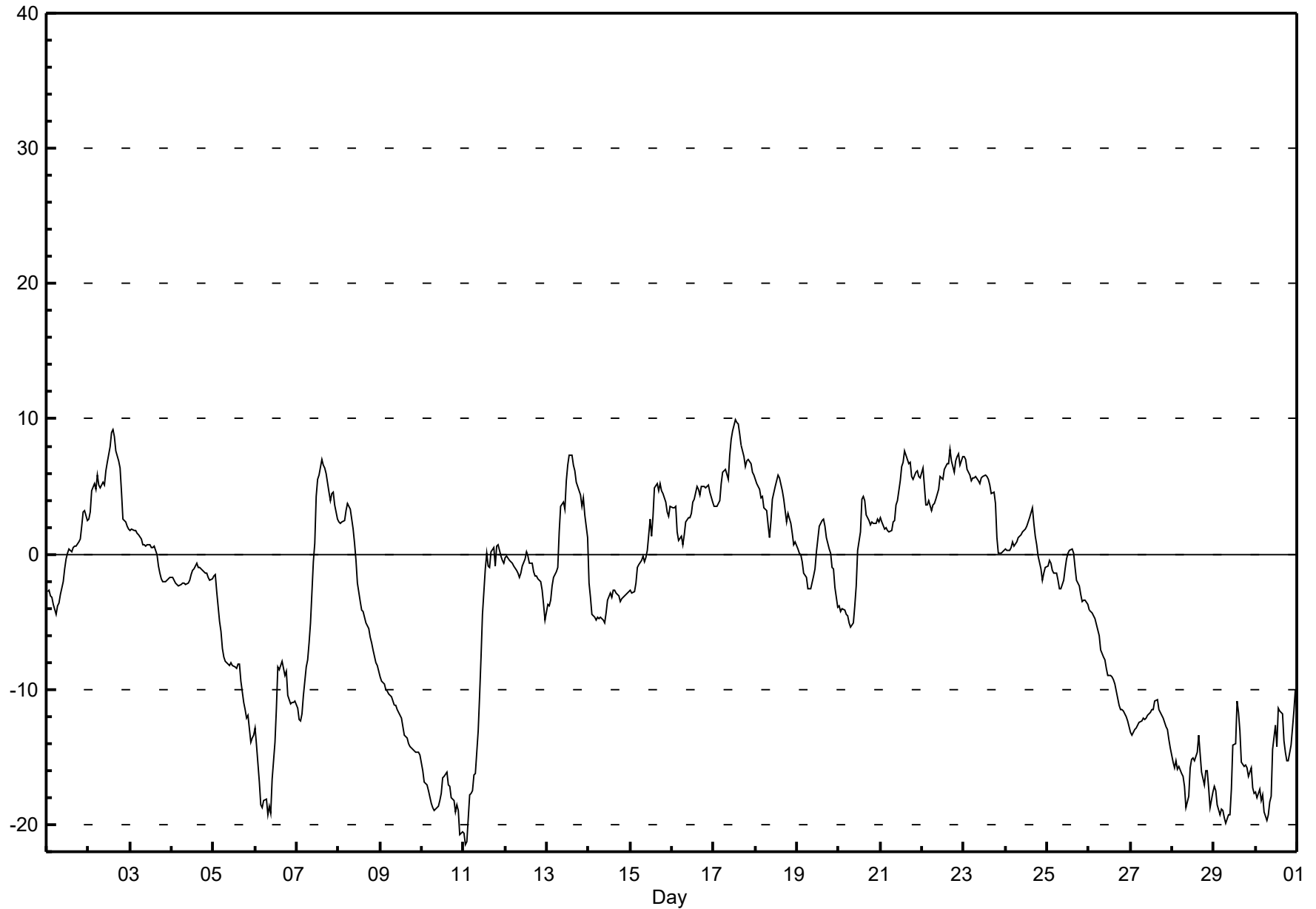






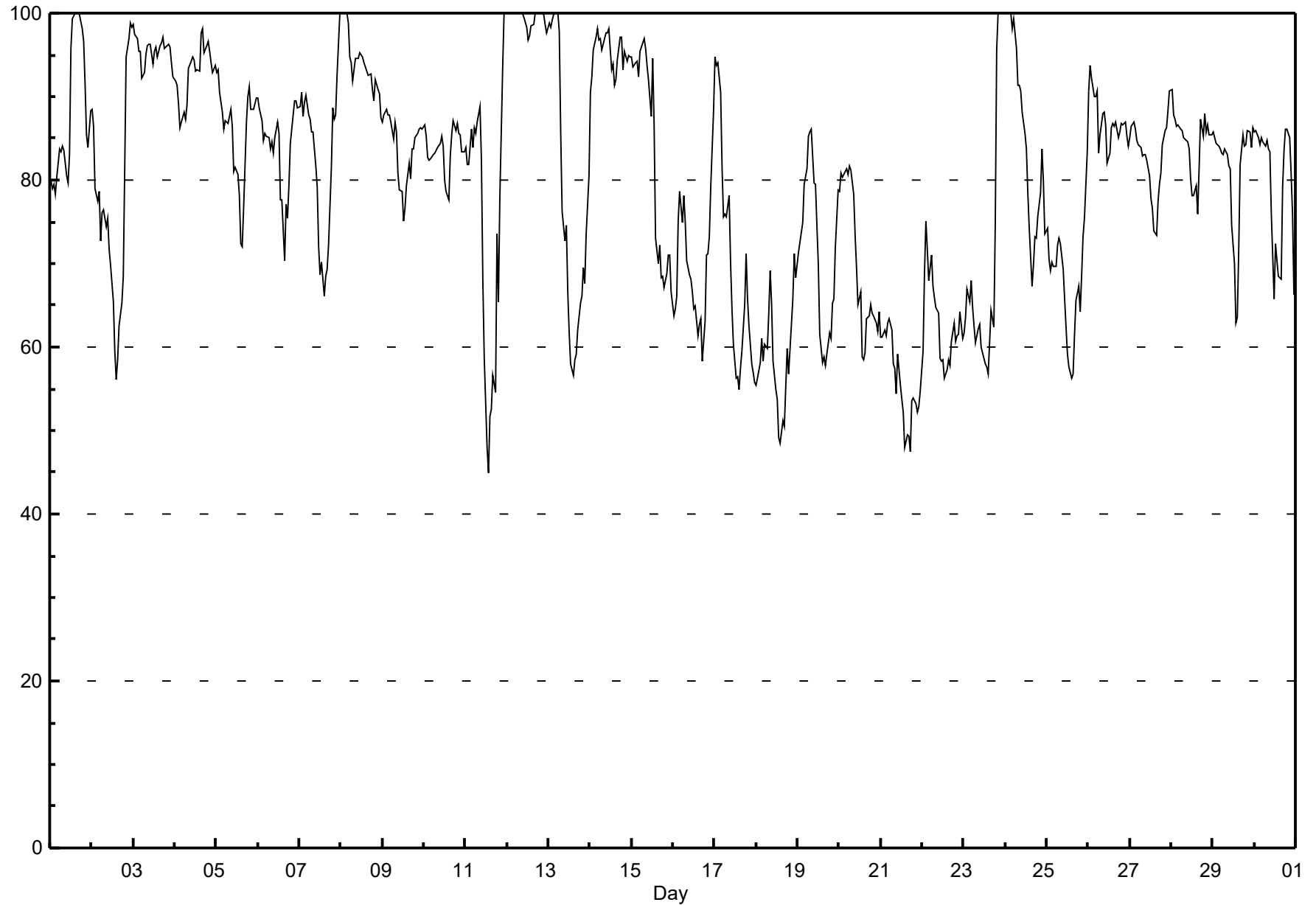
Hourly Averages

External Temperature (ET) - °C
Beaverlodge - November 2019



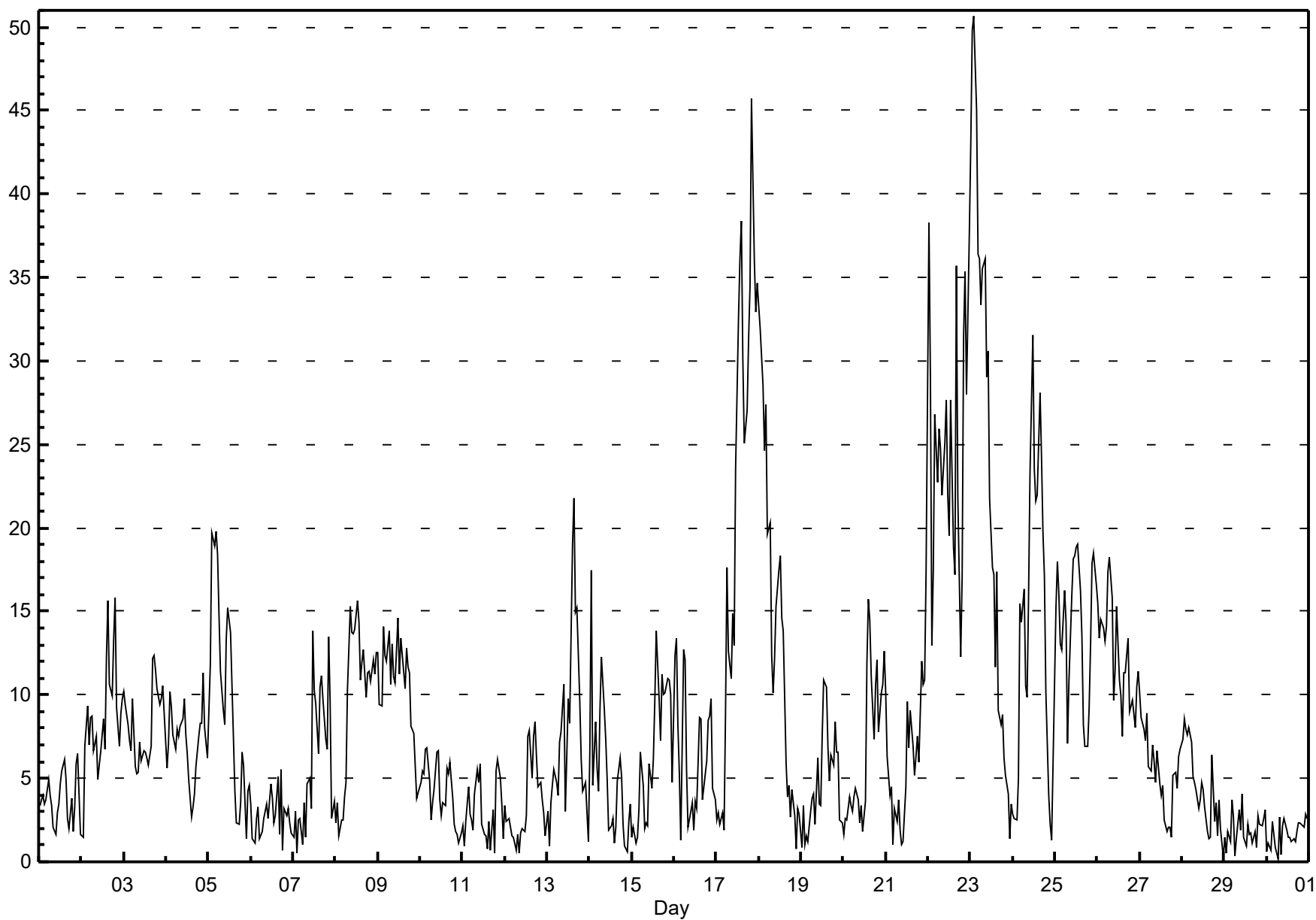
Hourly Averages

Relative Humidity (RH) - %
Beaverlodge - November 2019



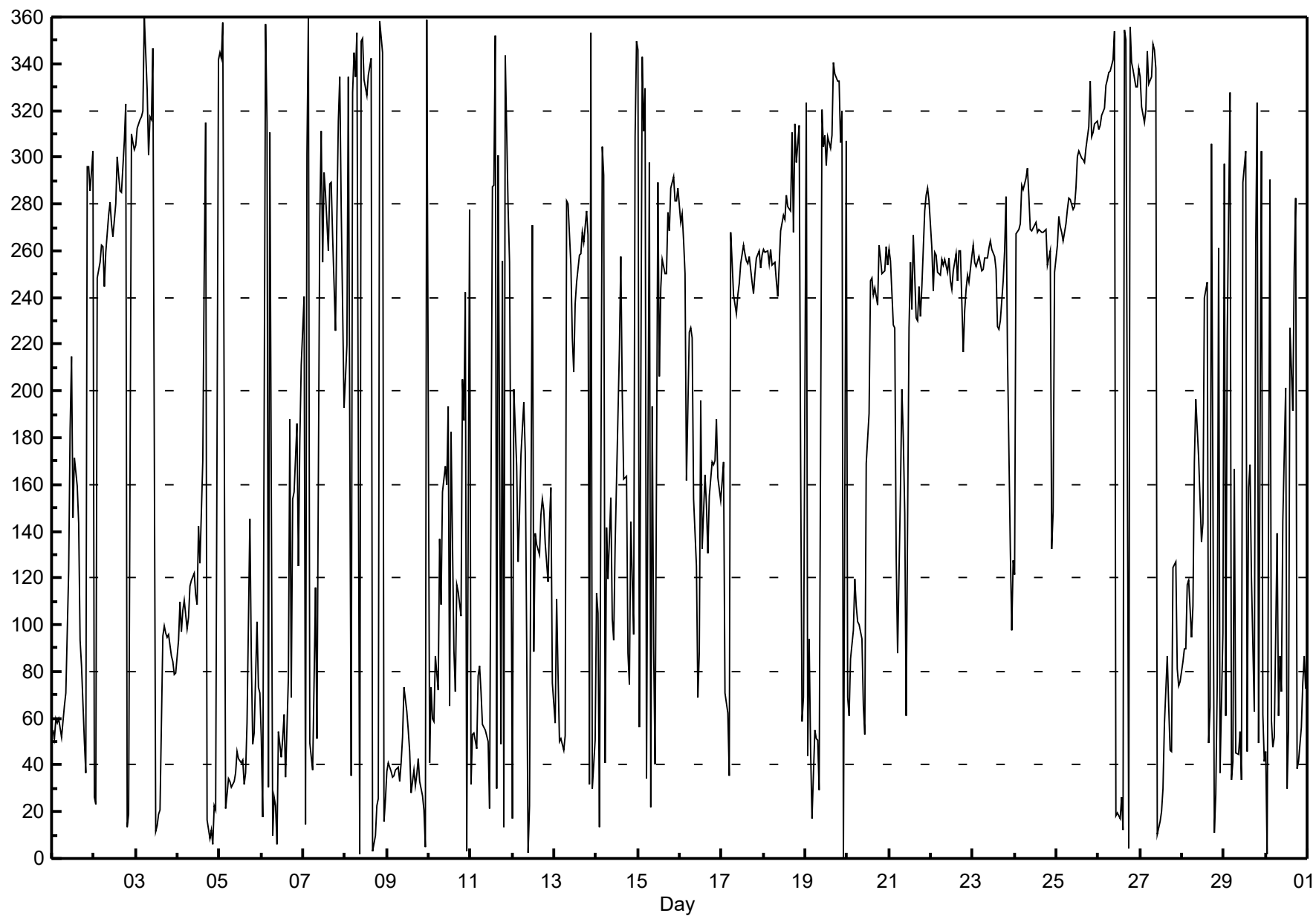
Hourly Averages

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



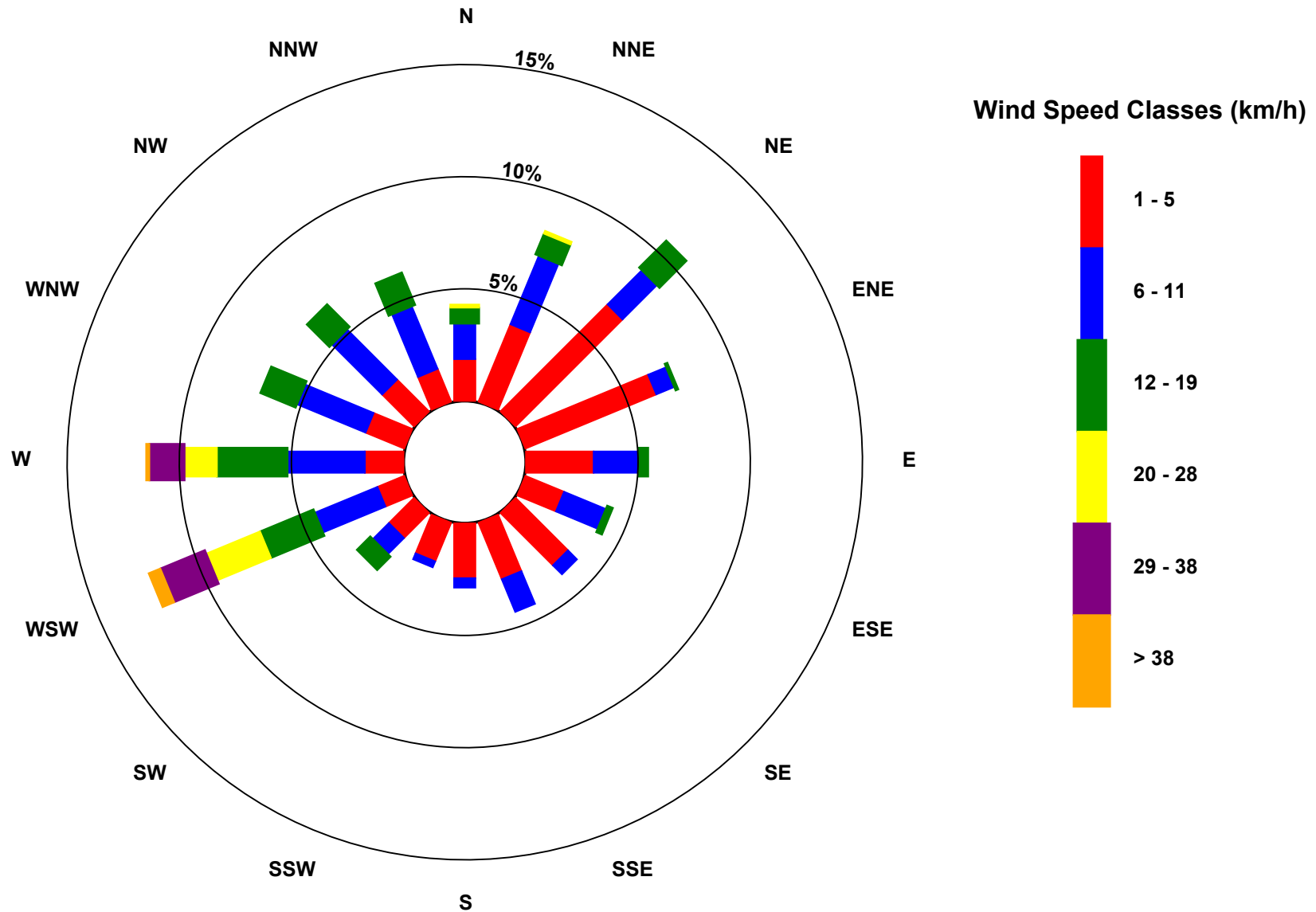
Hourly Averages

Wind Direction (WD) - deg
Beaverlodge - November 2019



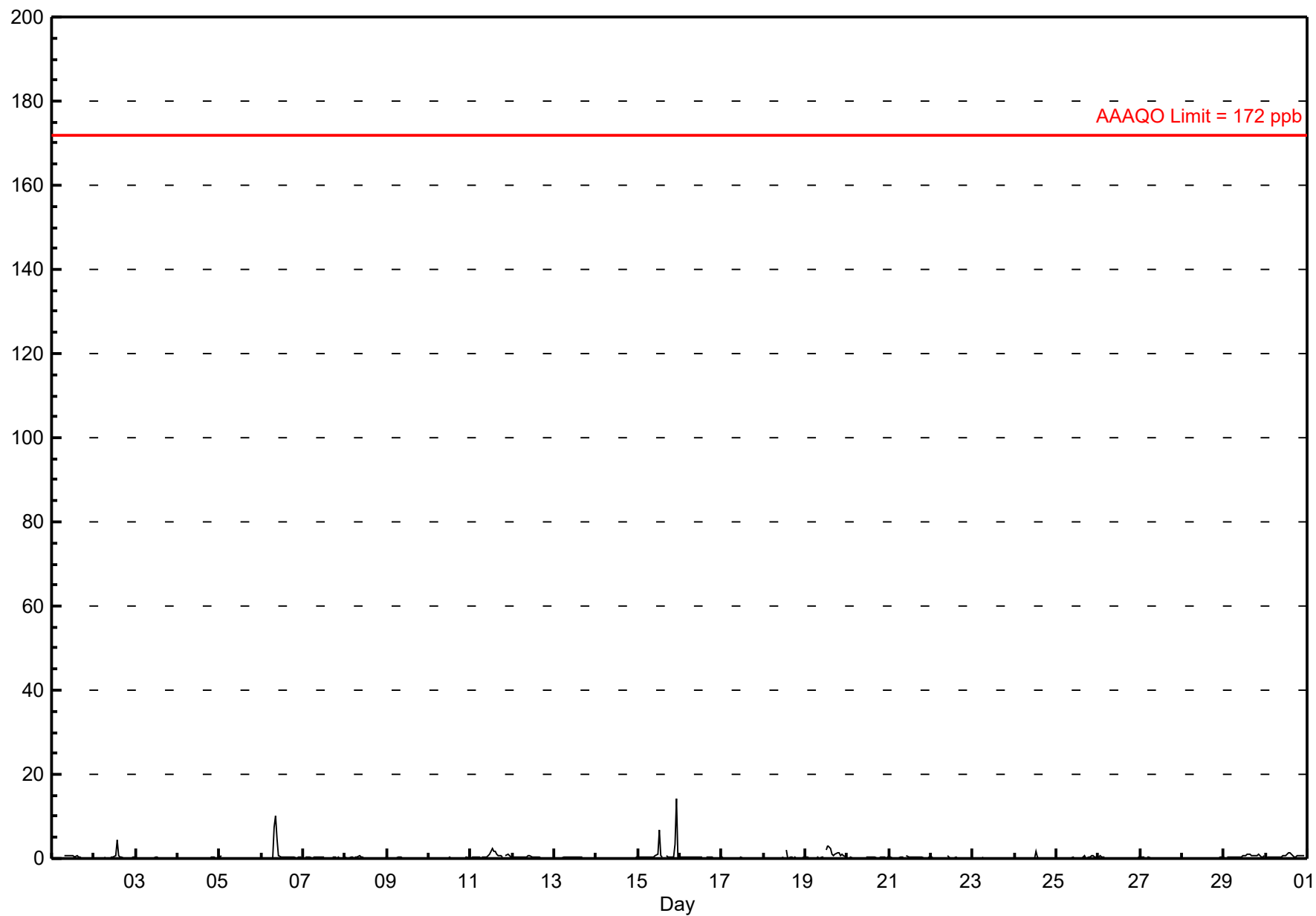
Wind Rose

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



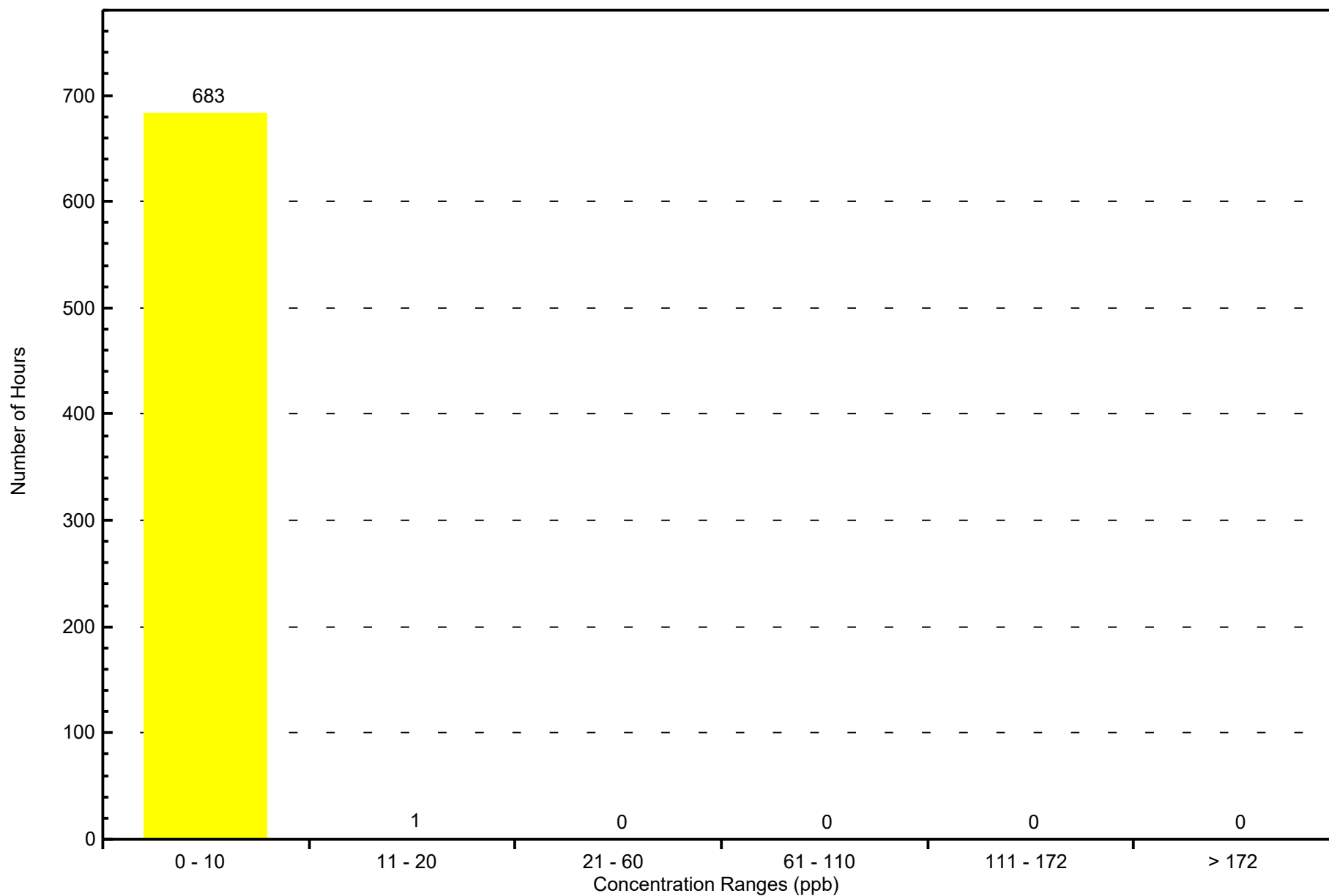
Hourly Averages

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



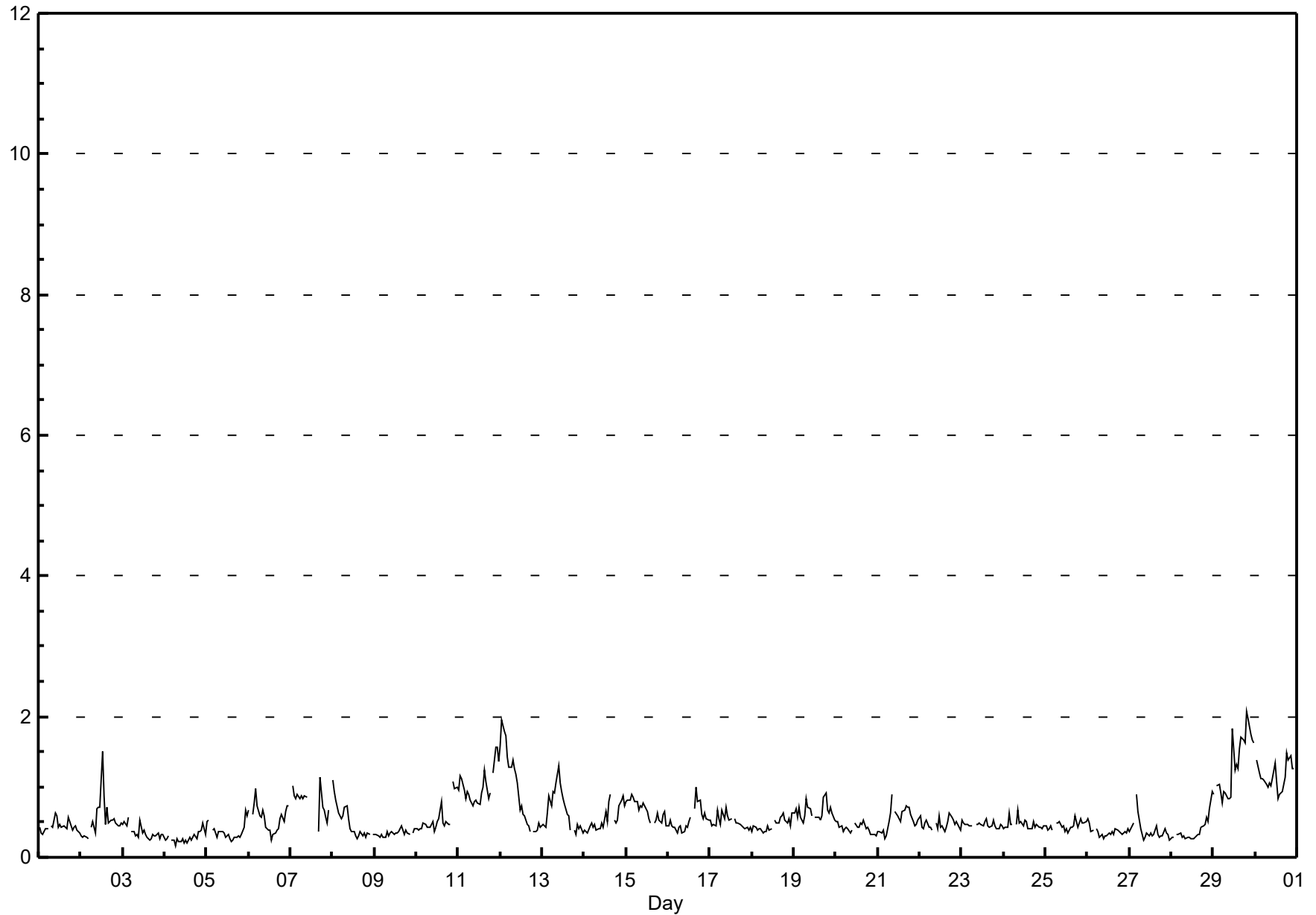
Histogram of Hourly Averages

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



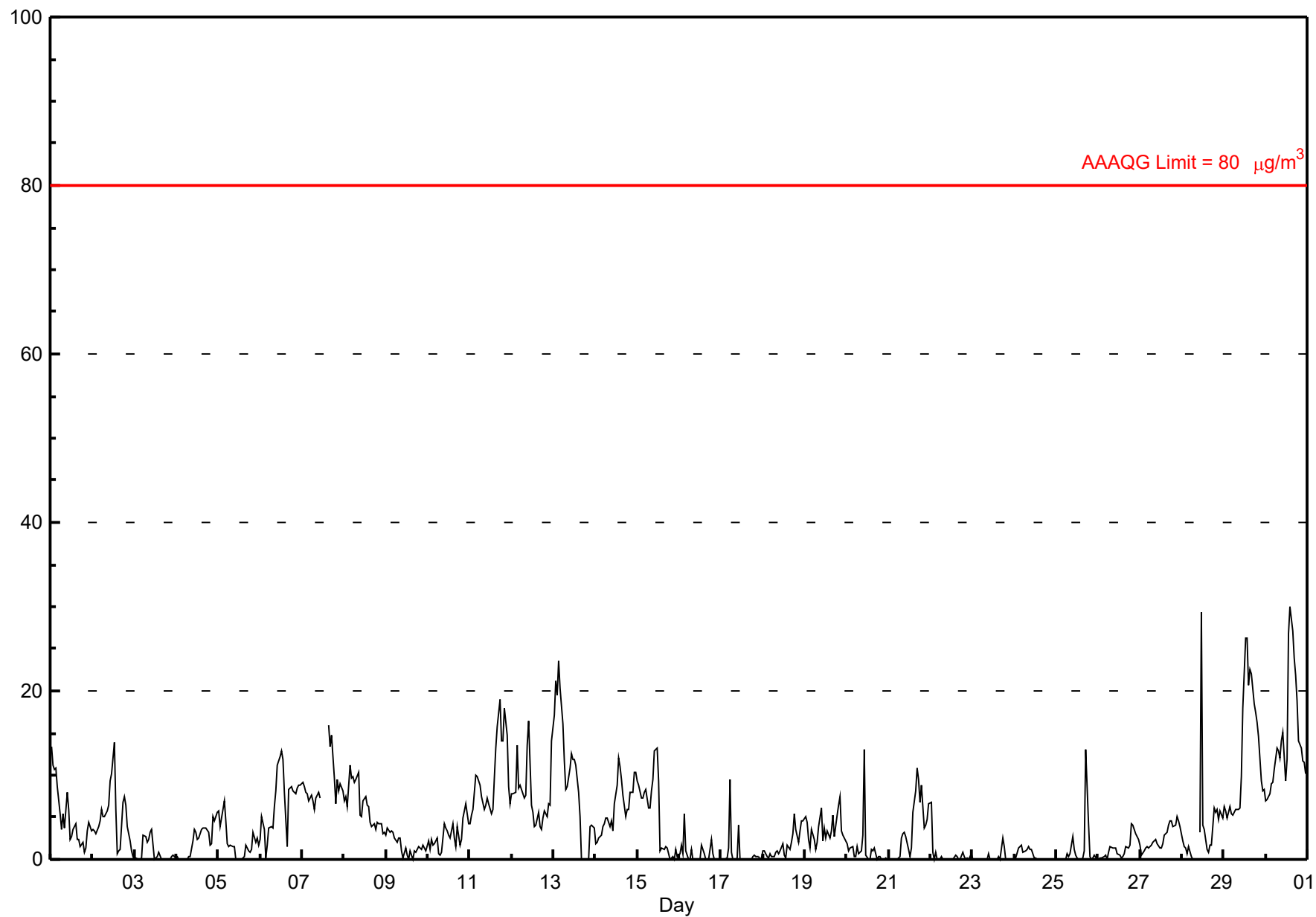
Hourly Averages

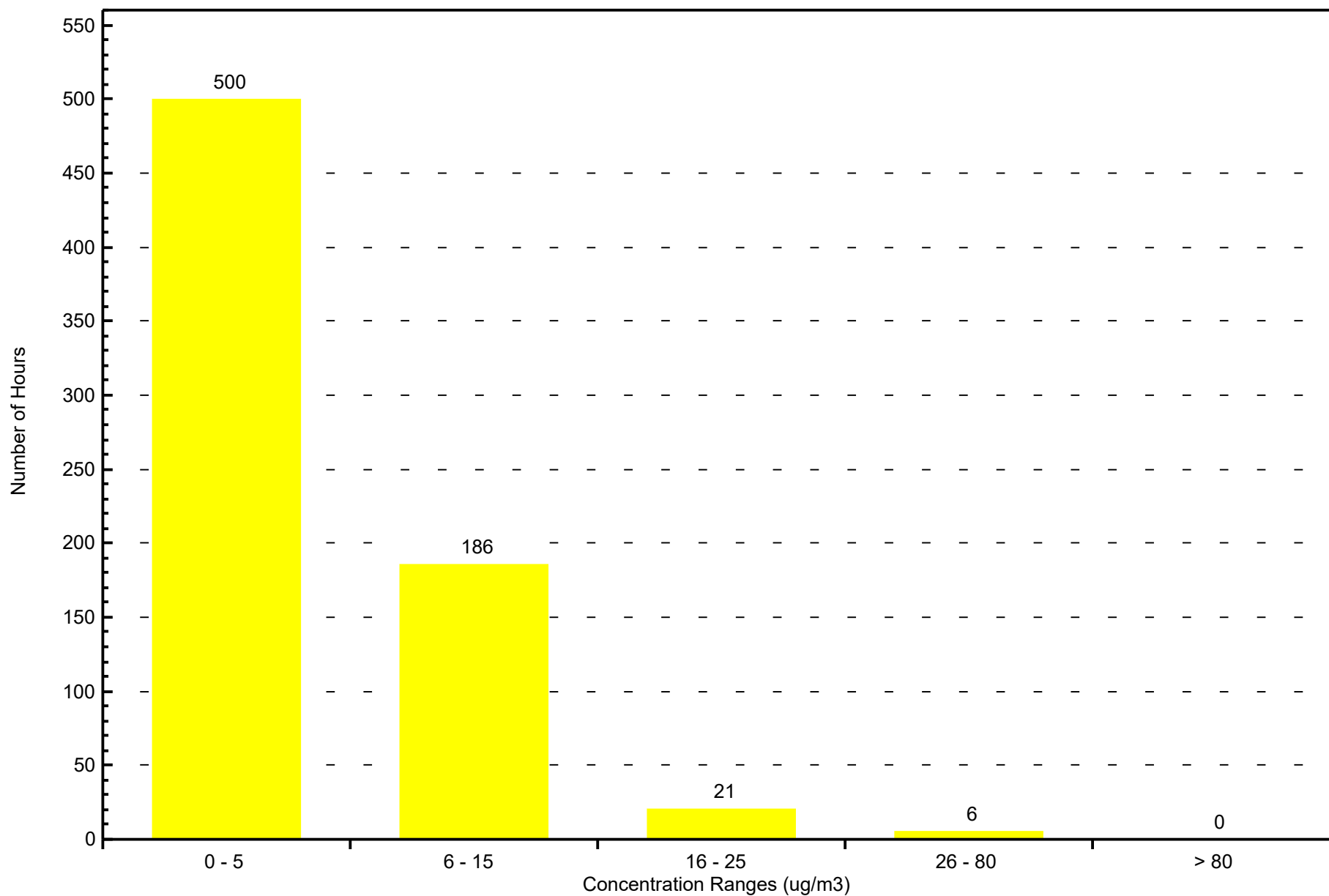
Total Reduced Sulphur (TRS) - ppb
Evergreen Park - November 2019



Hourly Averages

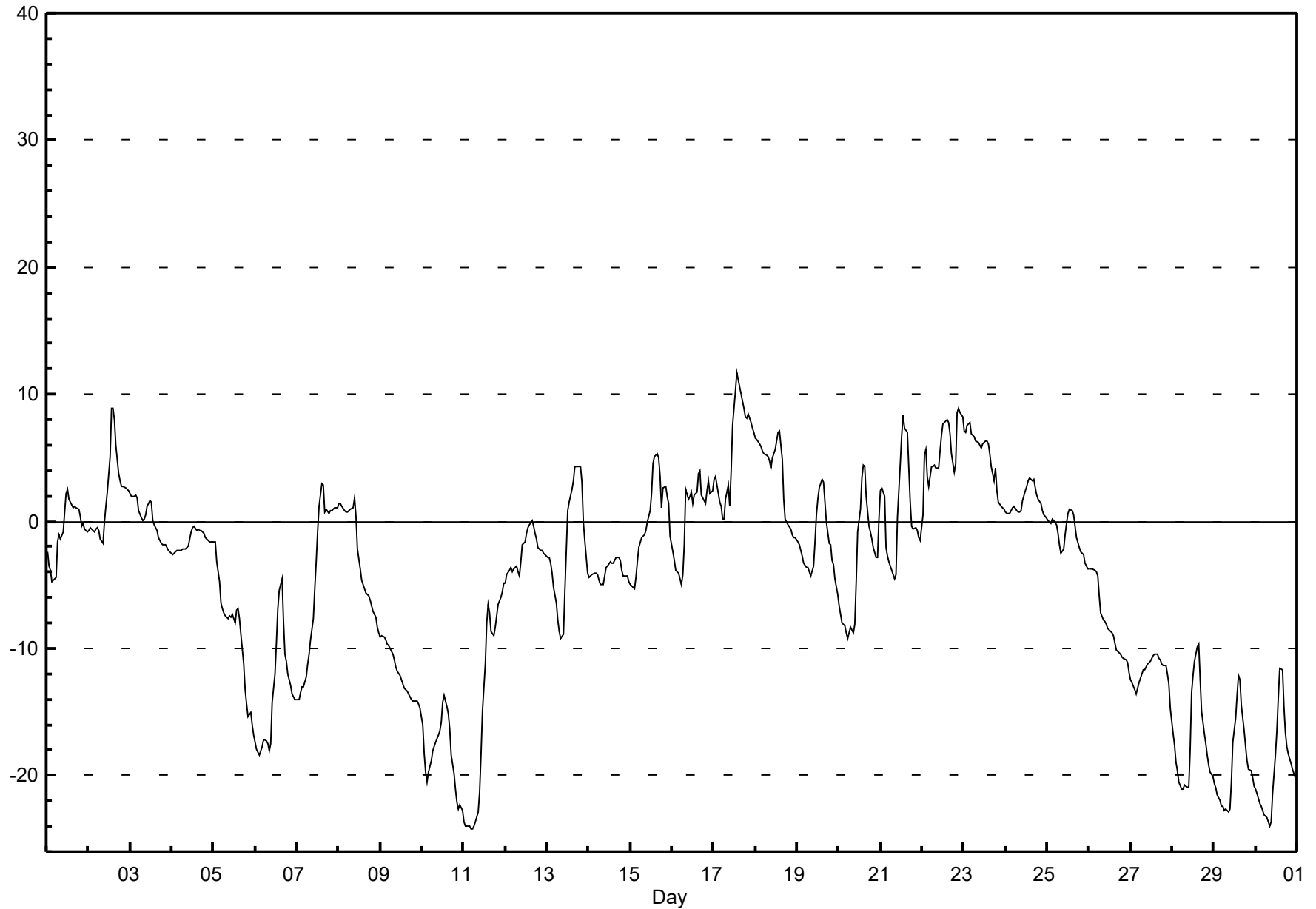
Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Evergreen Park - November 2019





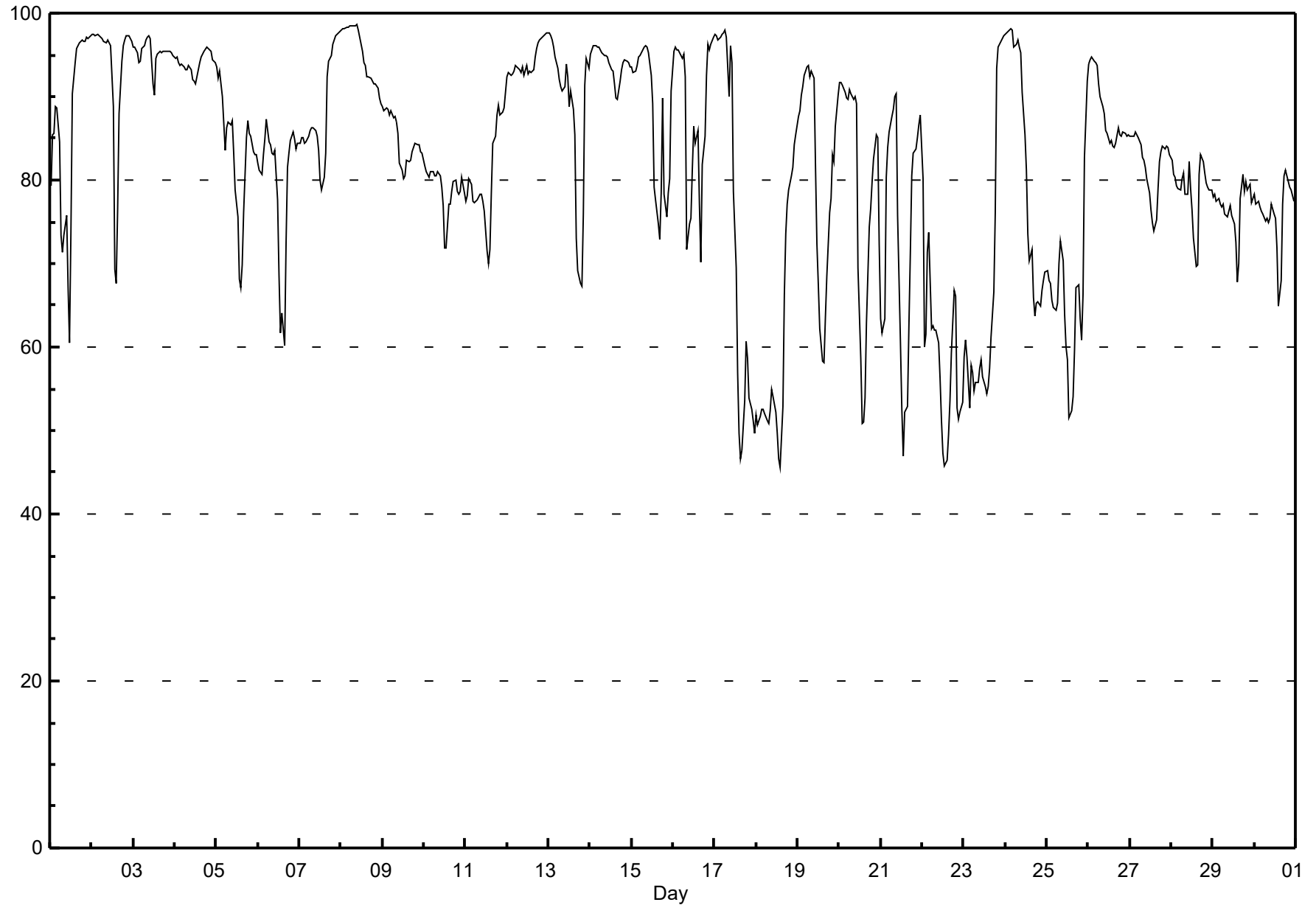
Hourly Averages

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



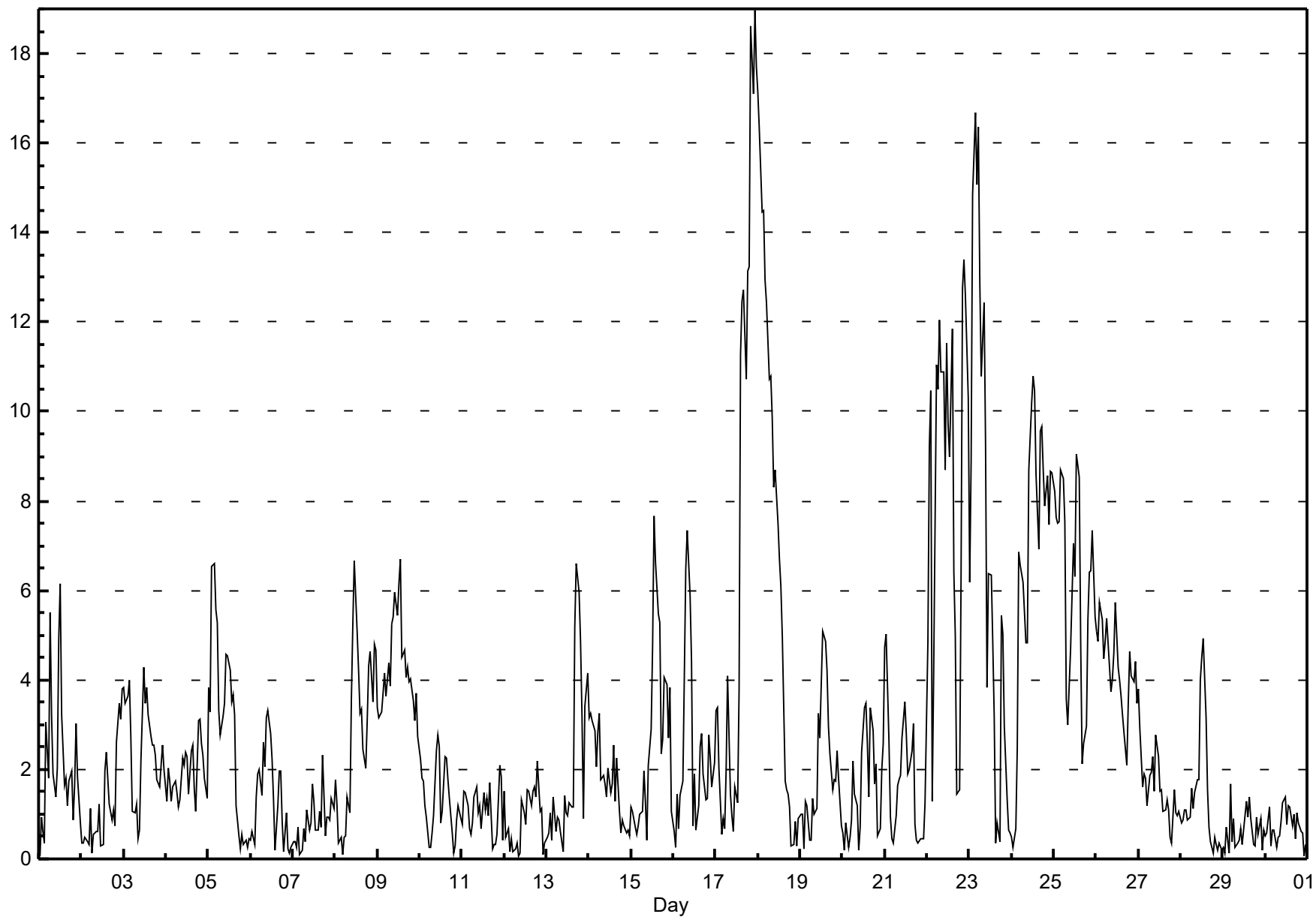
Hourly Averages

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



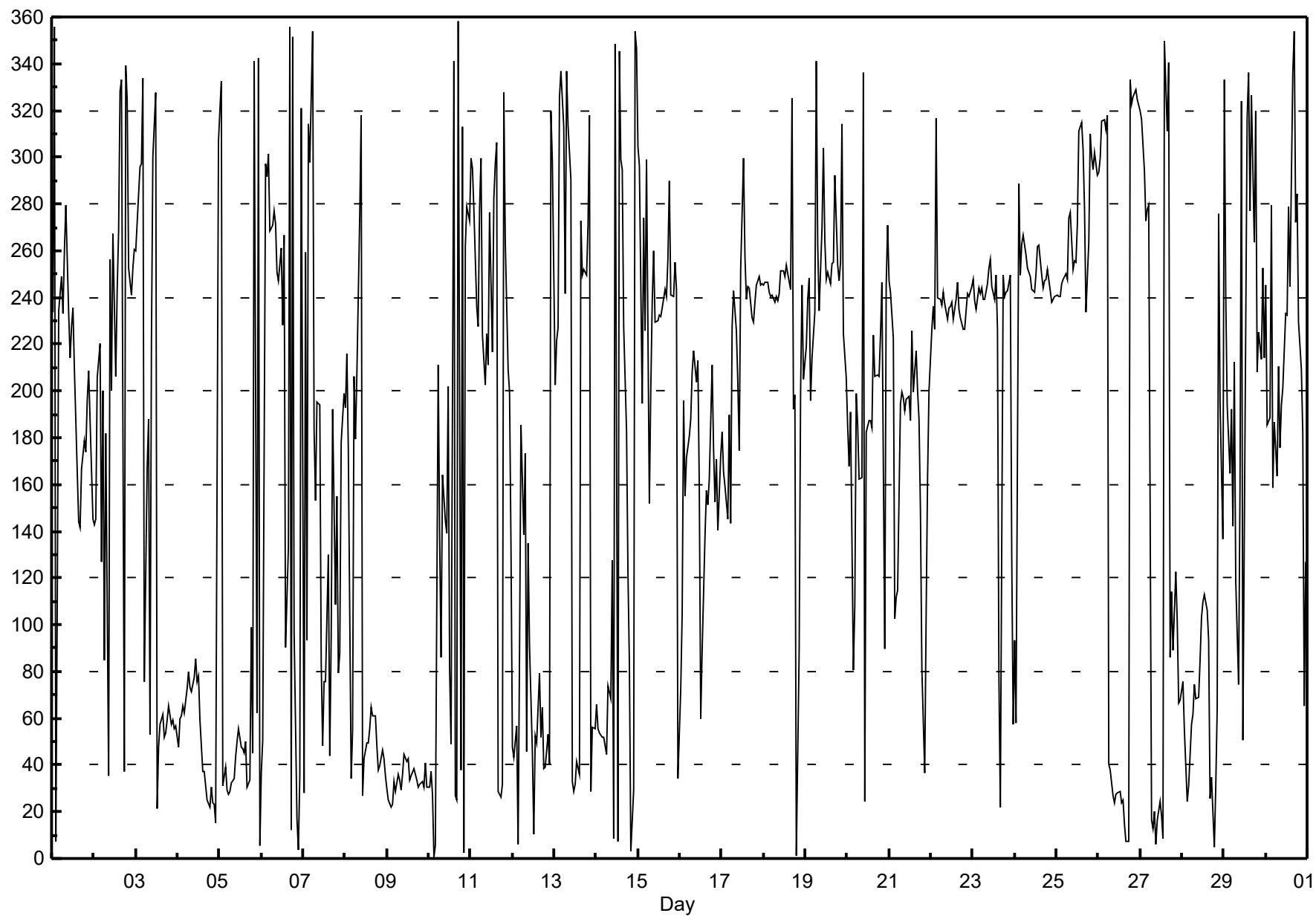
Hourly Averages

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



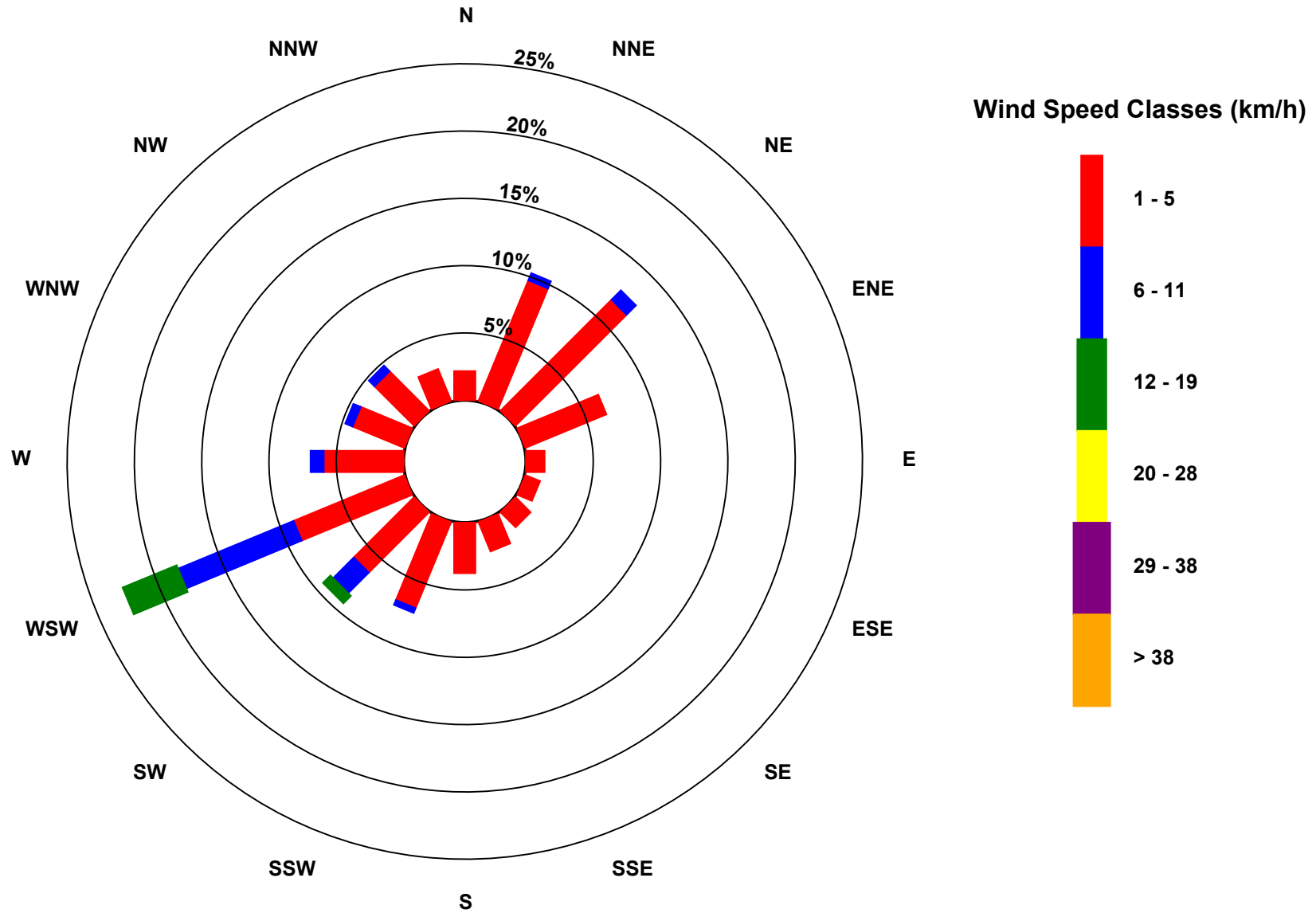
Hourly Averages

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



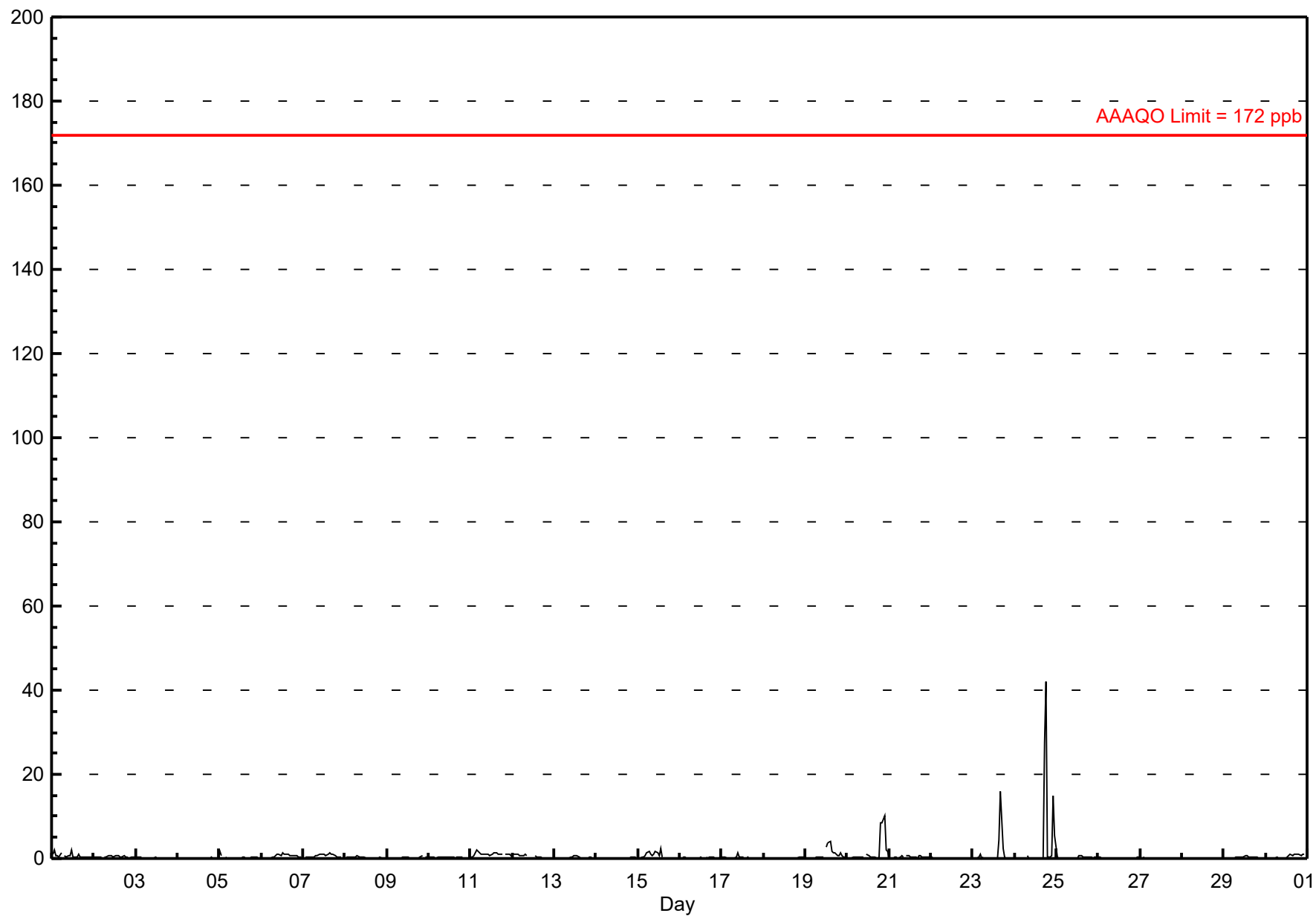
Wind Rose

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



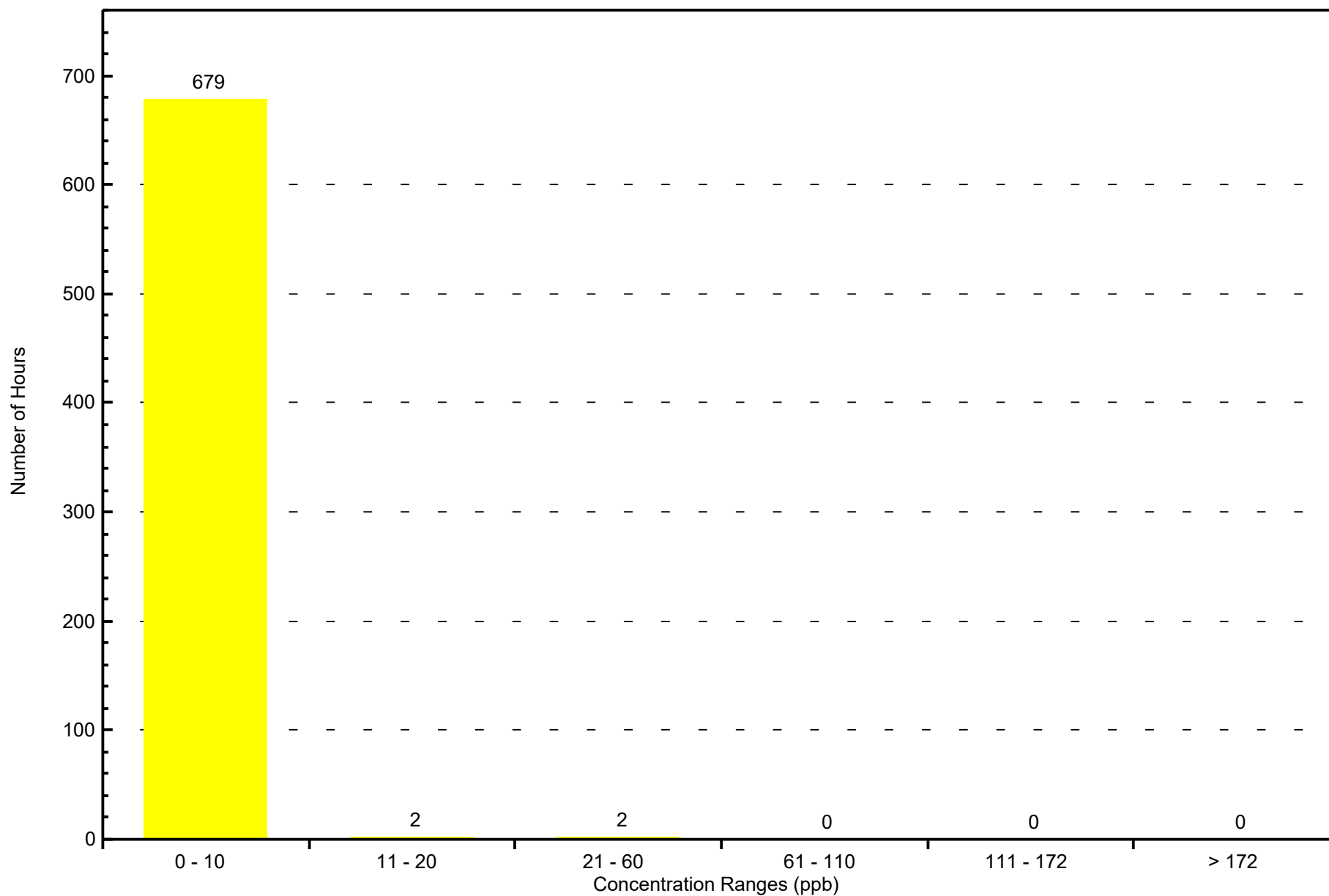
Hourly Averages

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



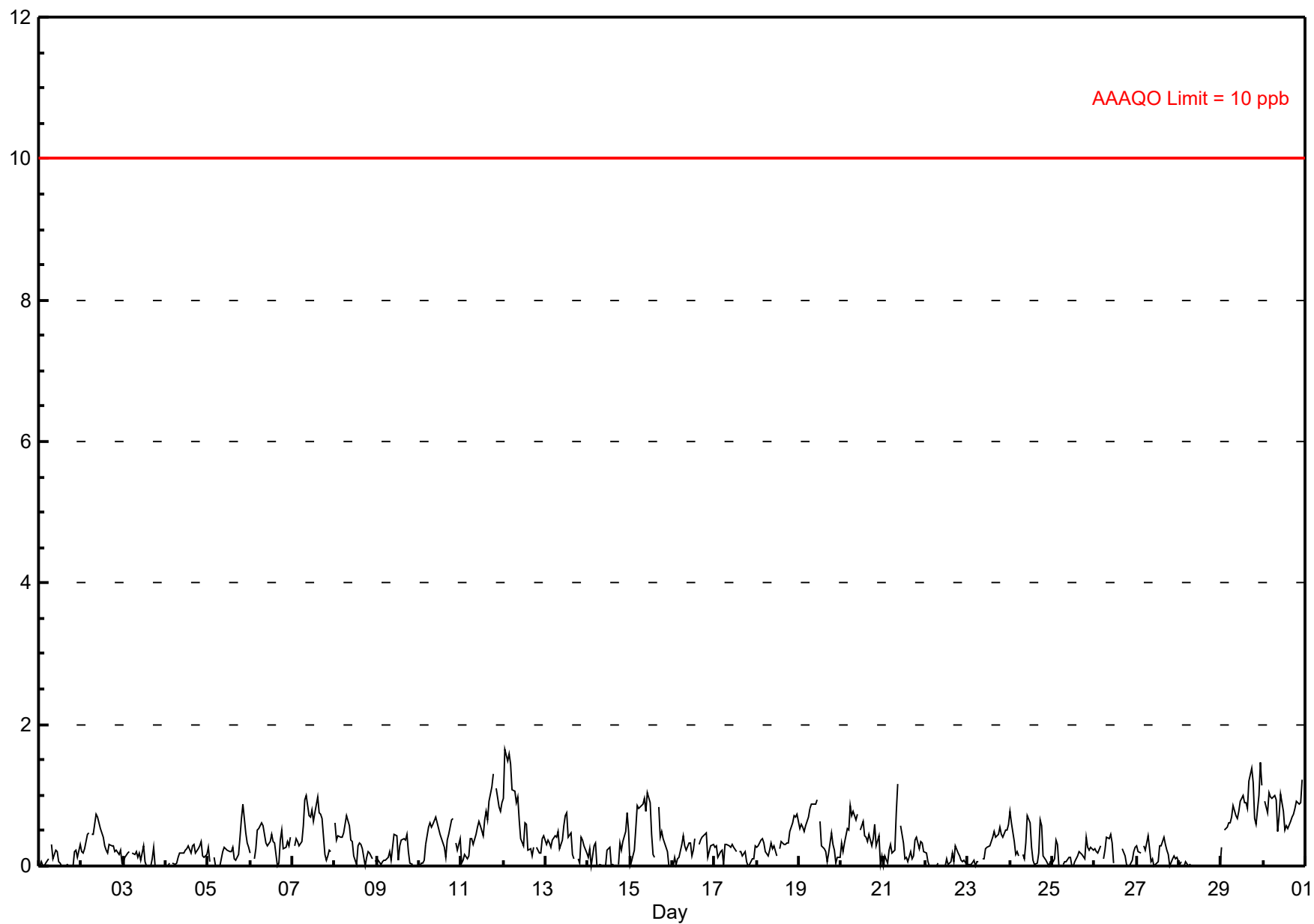
Histogram of Hourly Averages

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



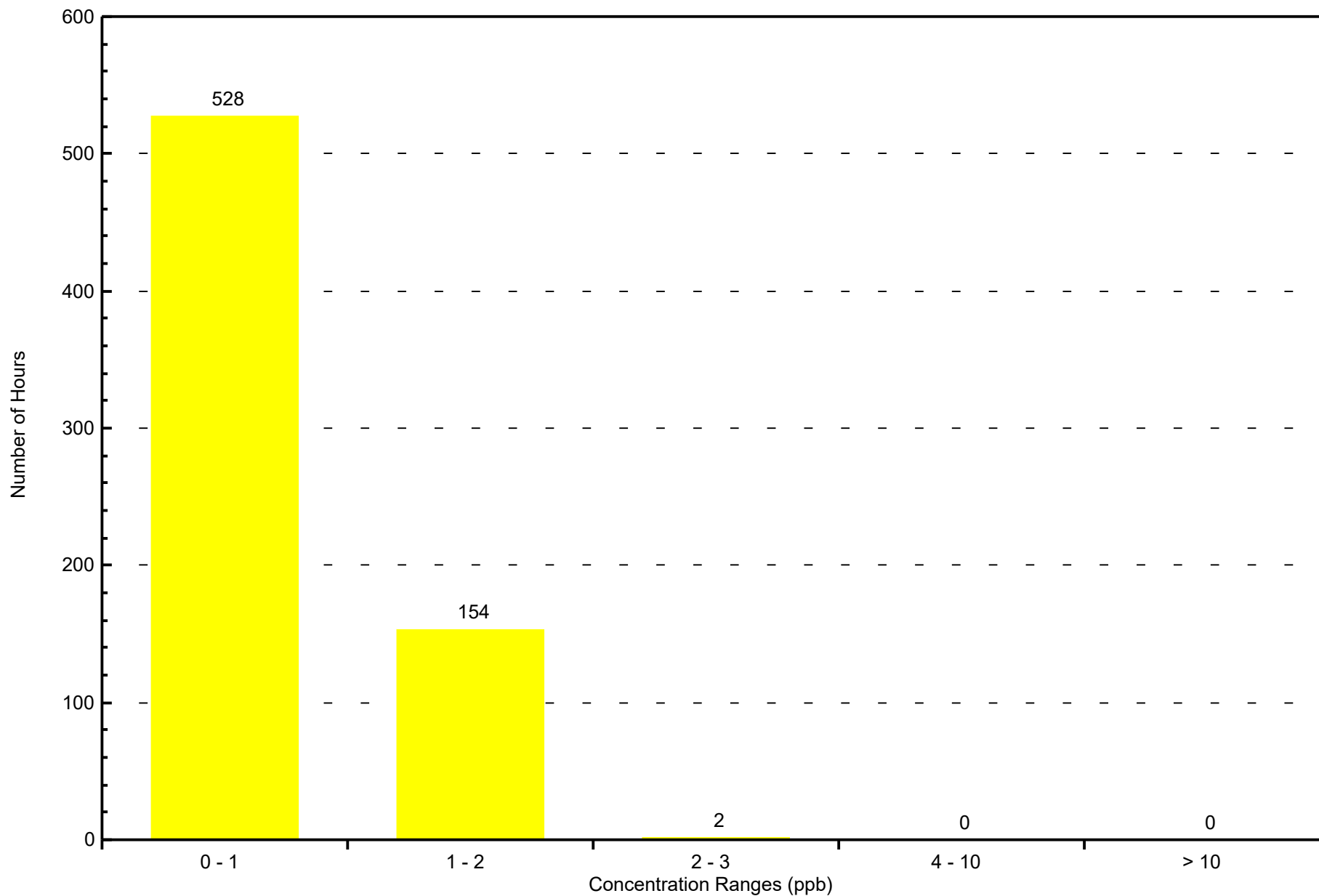
Hourly Averages

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



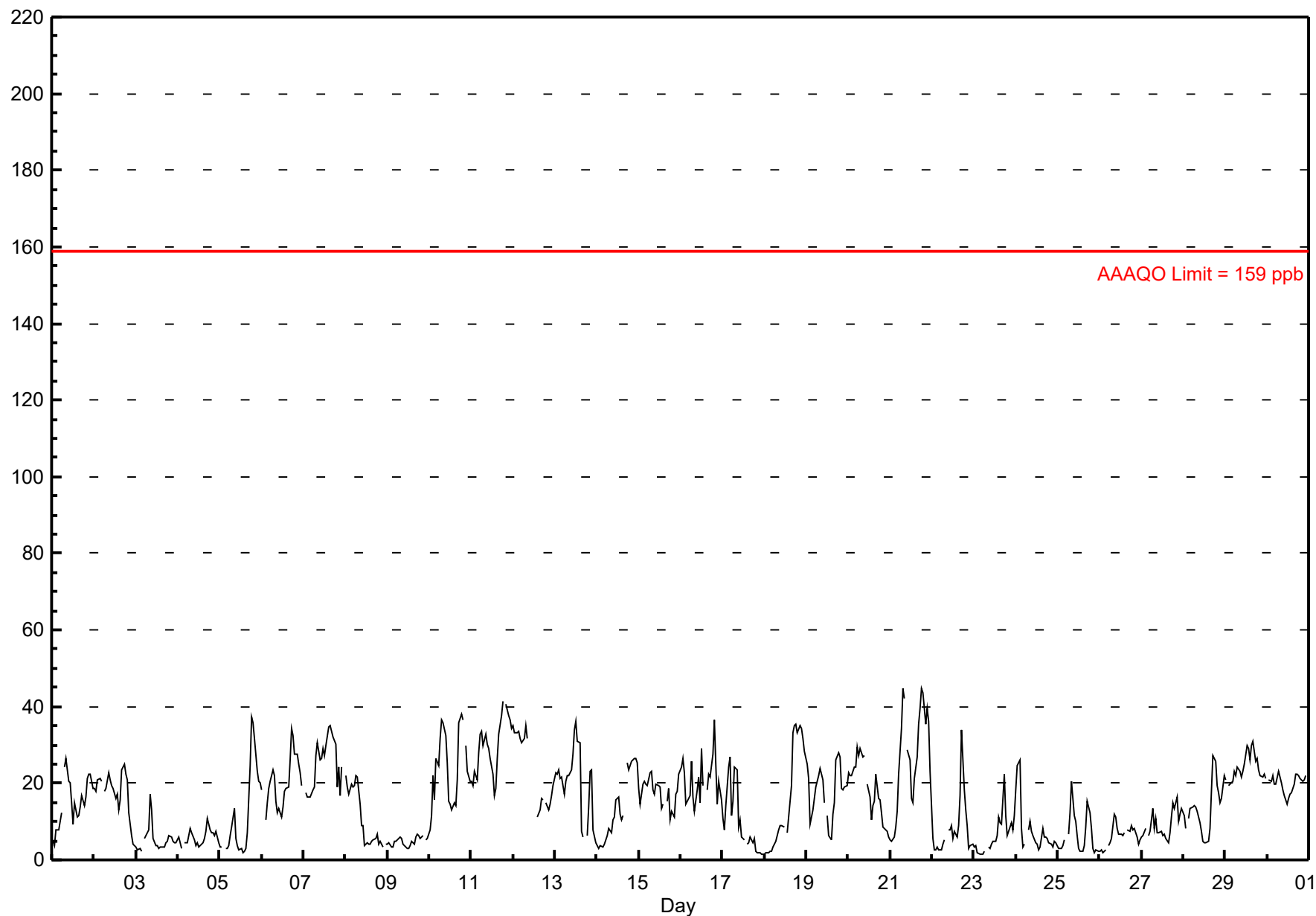
Histogram of Hourly Averages

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



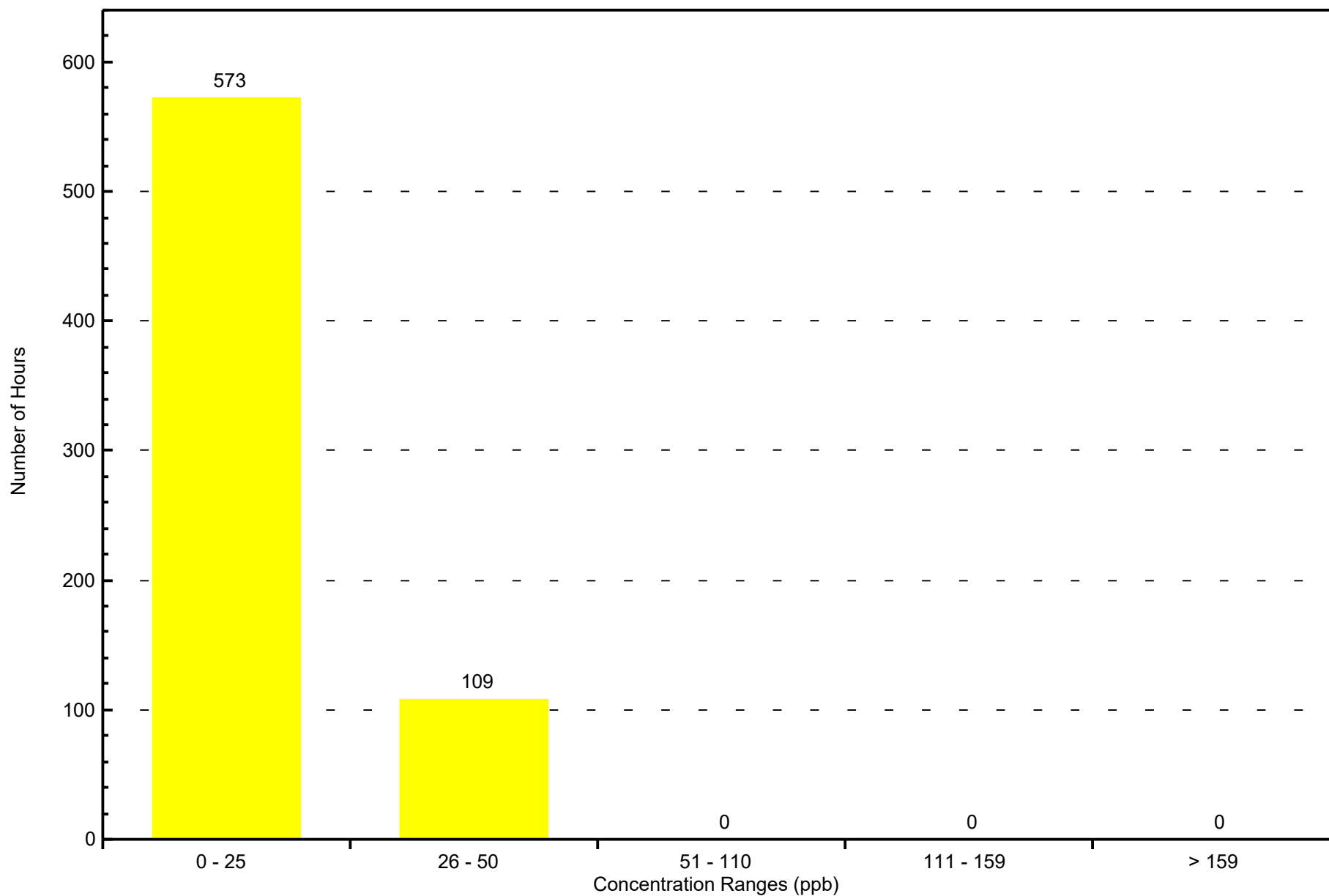
Hourly Averages

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



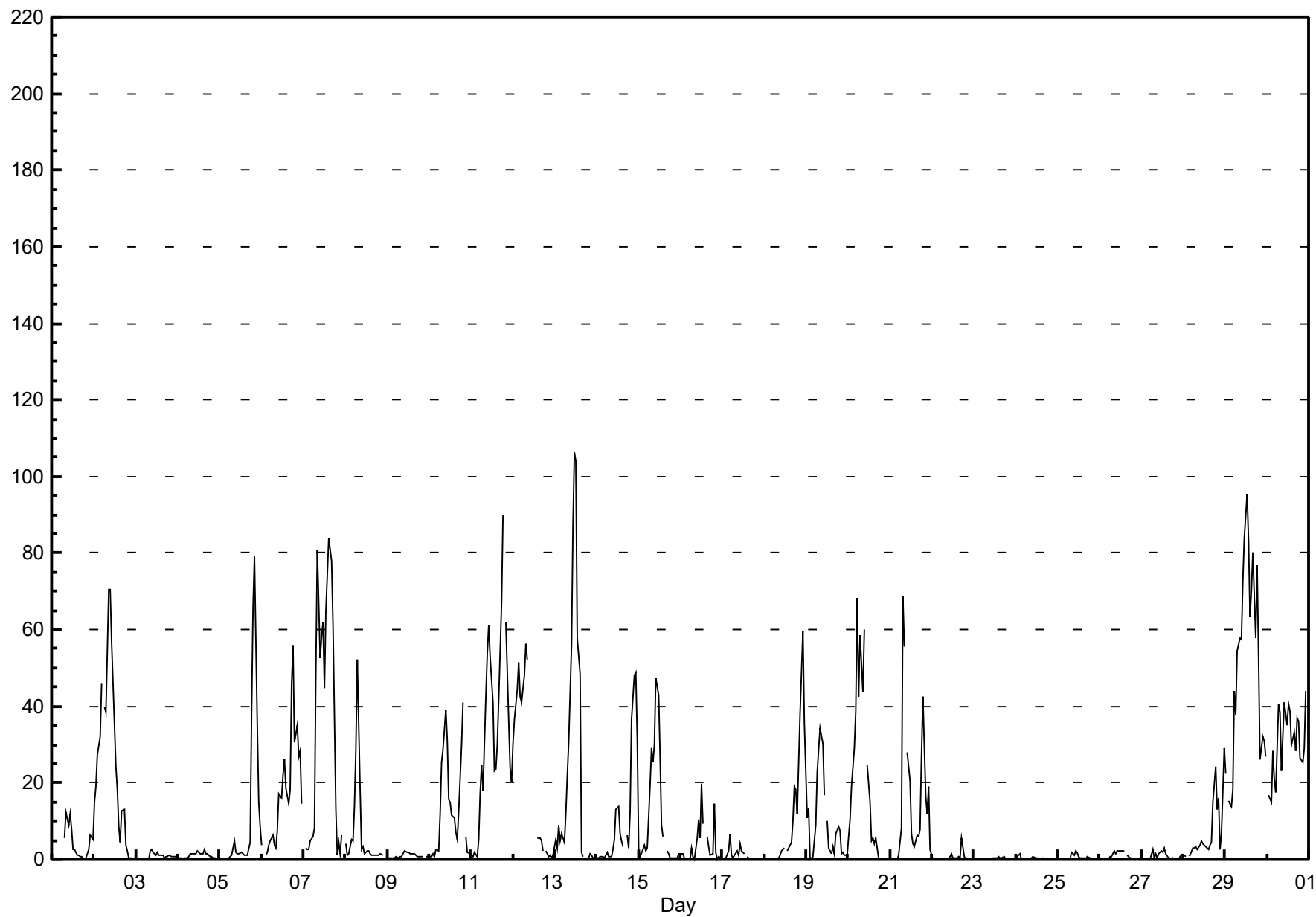
Histogram of Hourly Averages

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



Hourly Averages

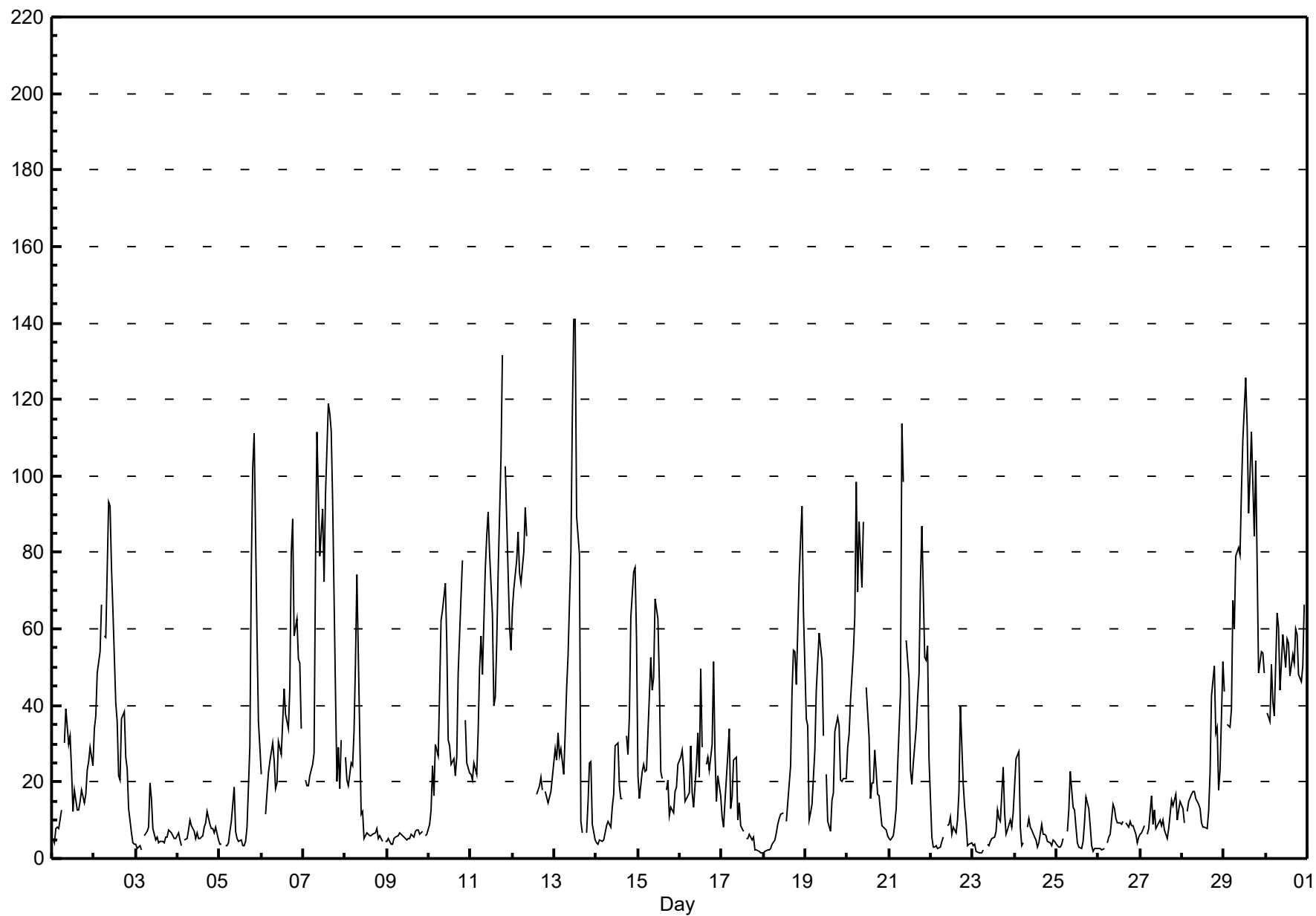
Nitrogen Oxide (NO) - ppb
Henry Pirker - November 2019



Hourly Averages

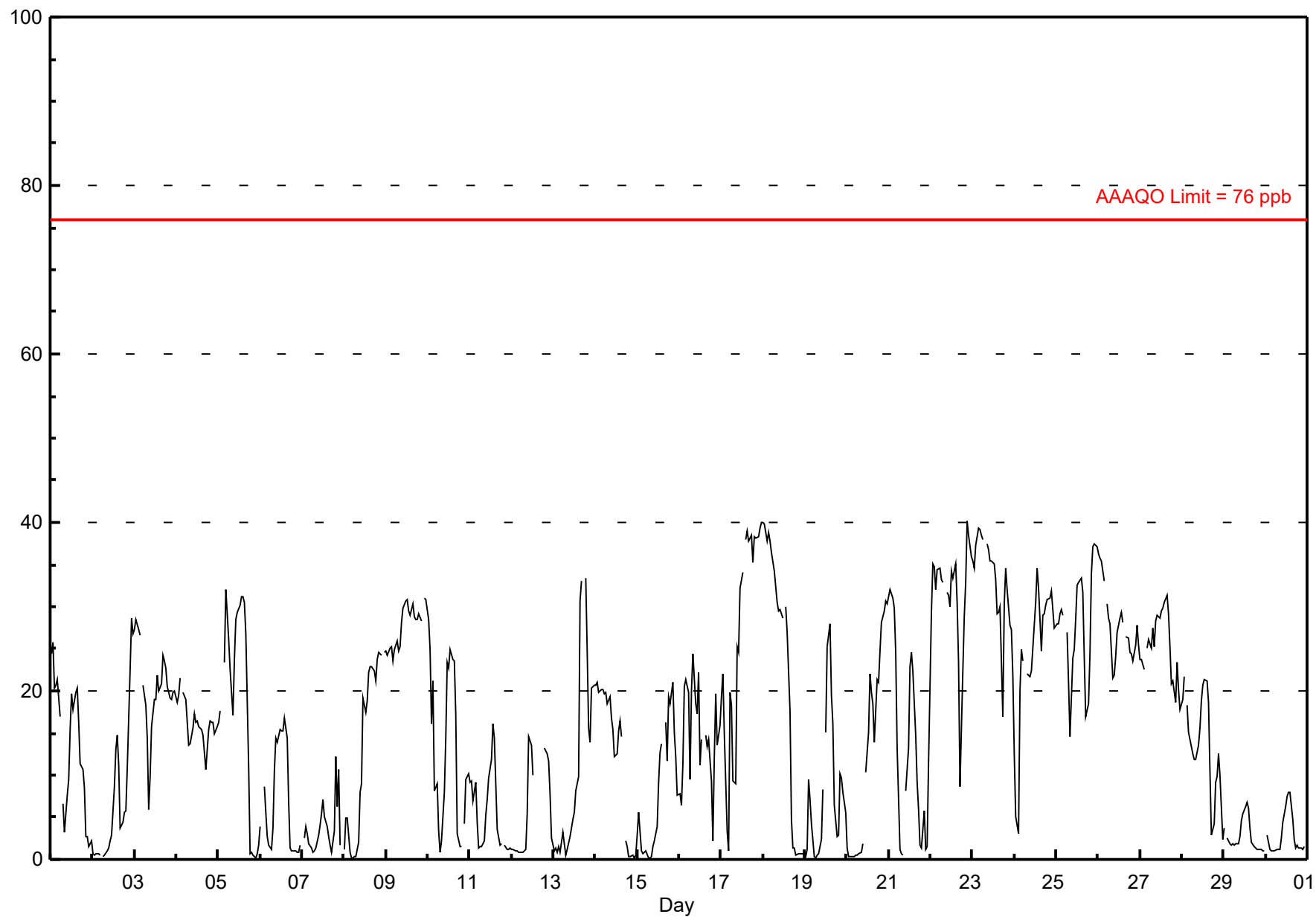
Oxides of Nitrogen (NO_x) - ppb

Henry Pirker - November 2019



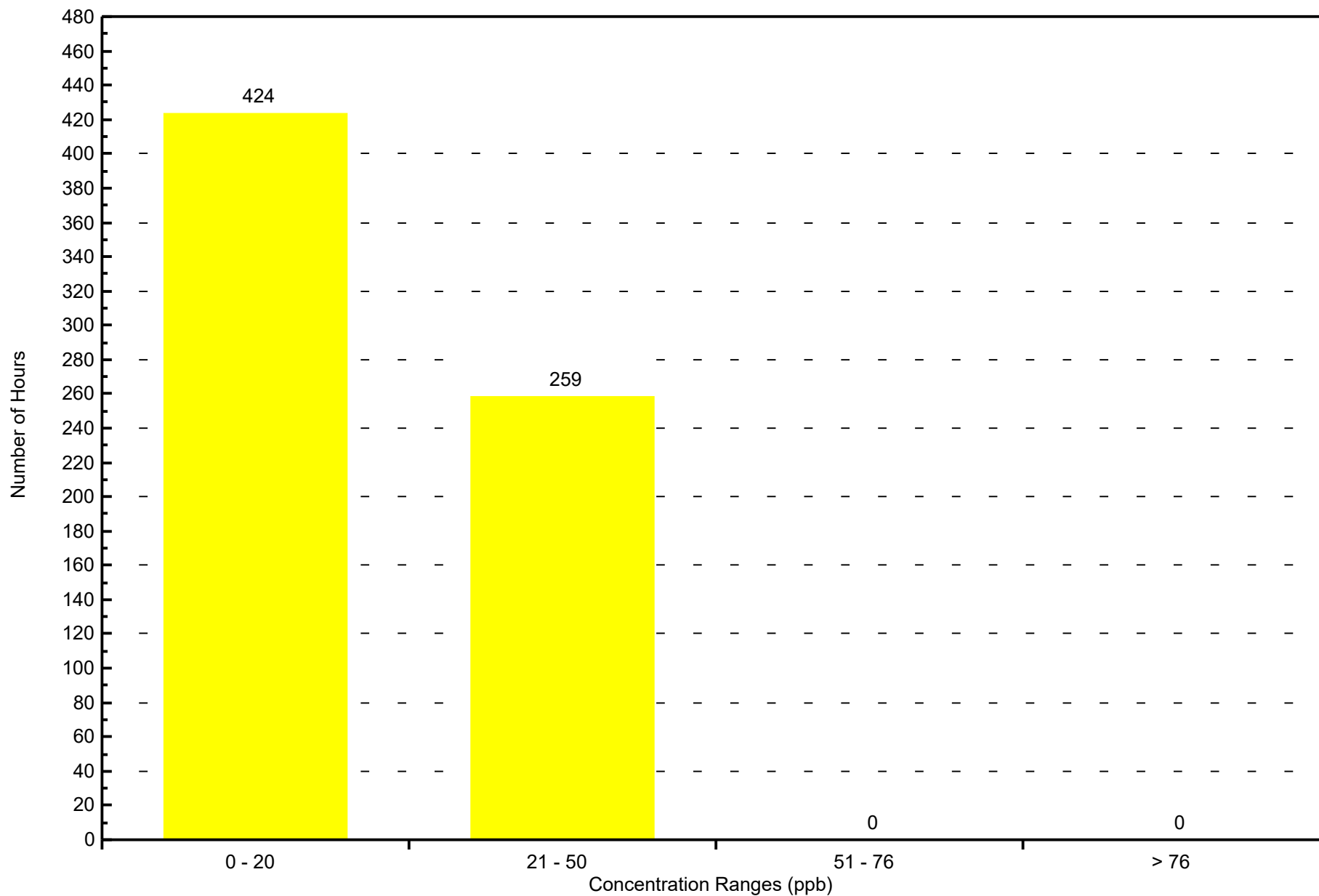
Hourly Averages

Ozone (O₃) - ppb
Henry Pirker - November 2019



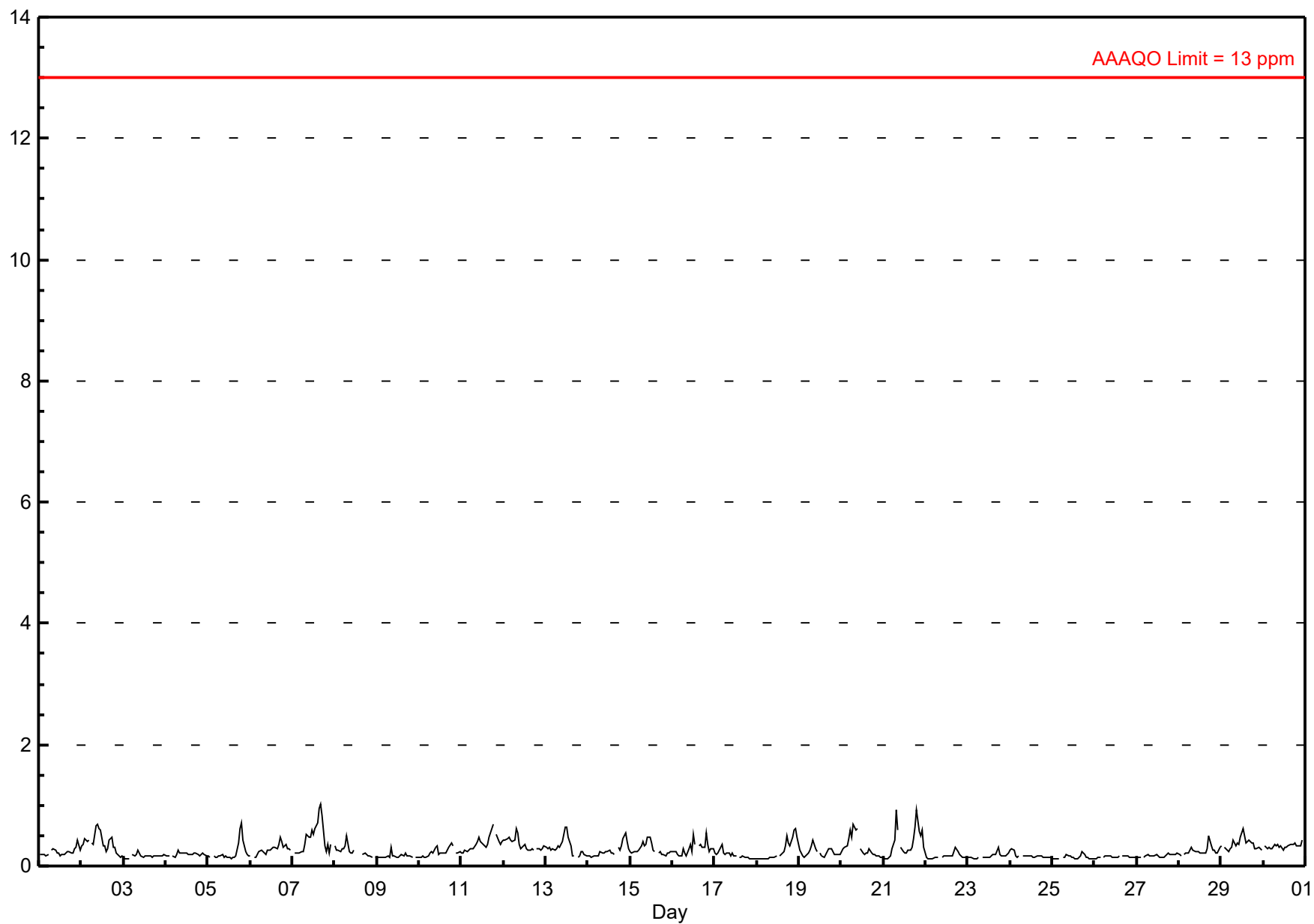
Histogram of Hourly Averages

Ozone (O₃) - ppb
Henry Pirker - November 2019



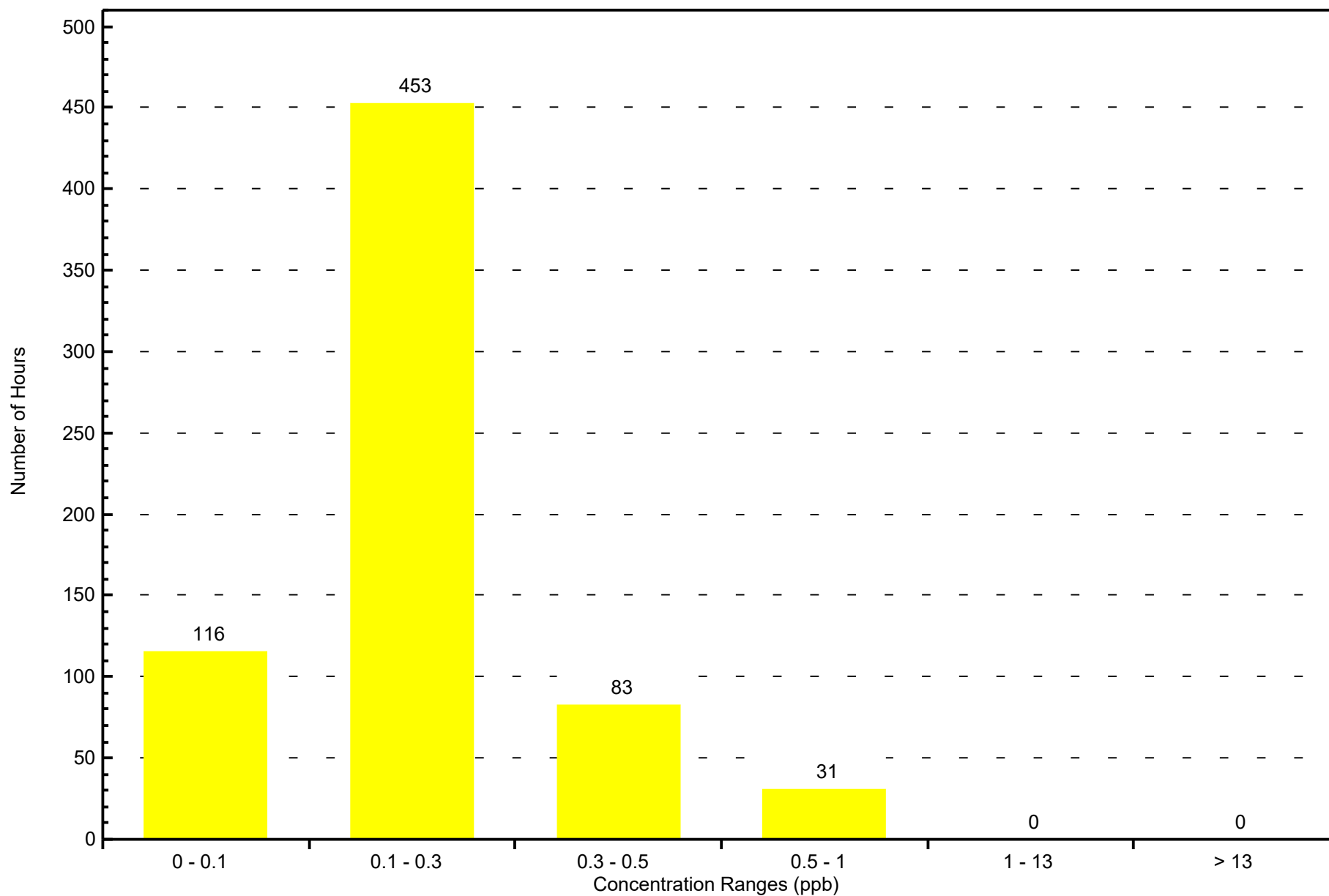
Hourly Averages

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



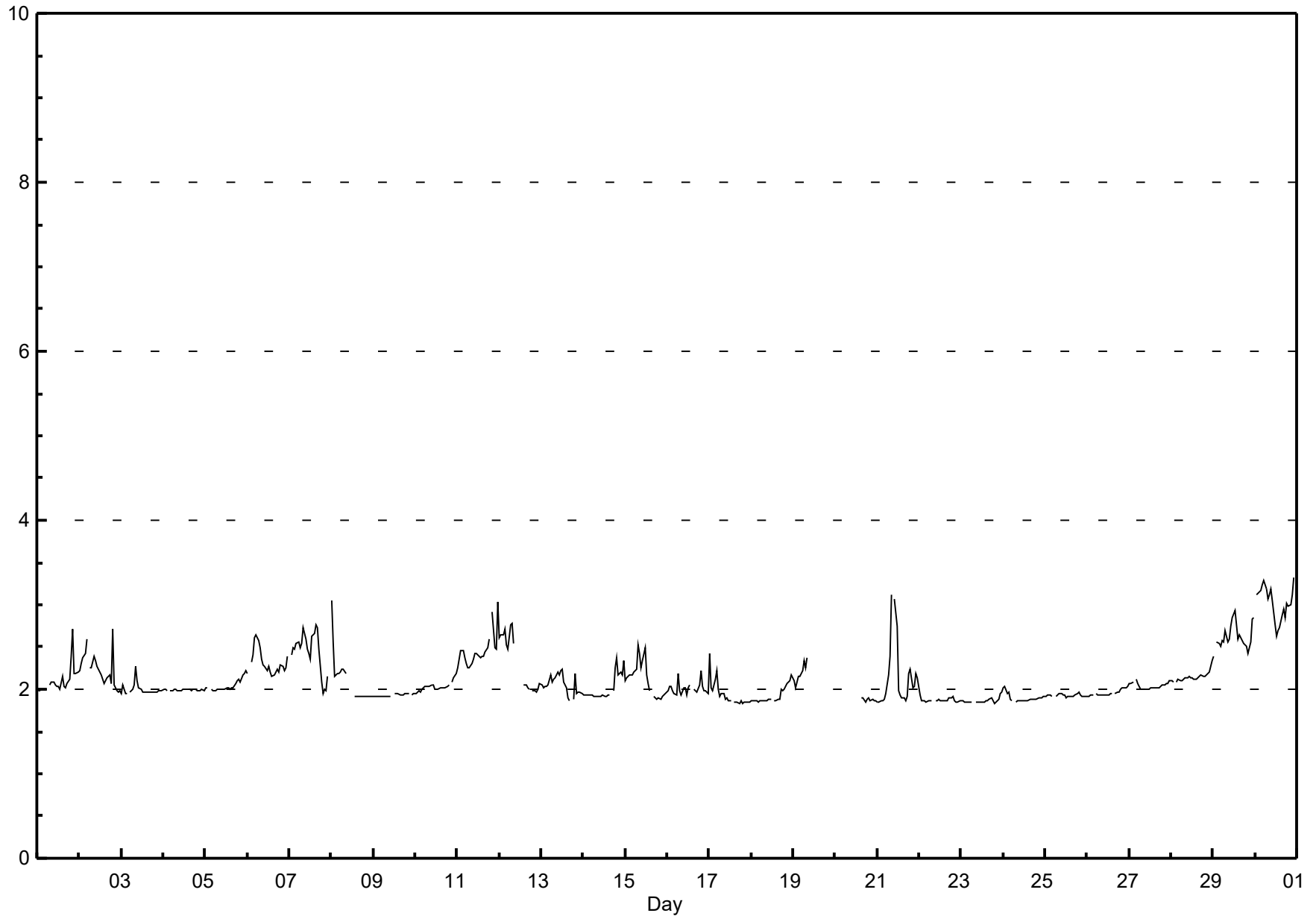
Histogram of Hourly Averages

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



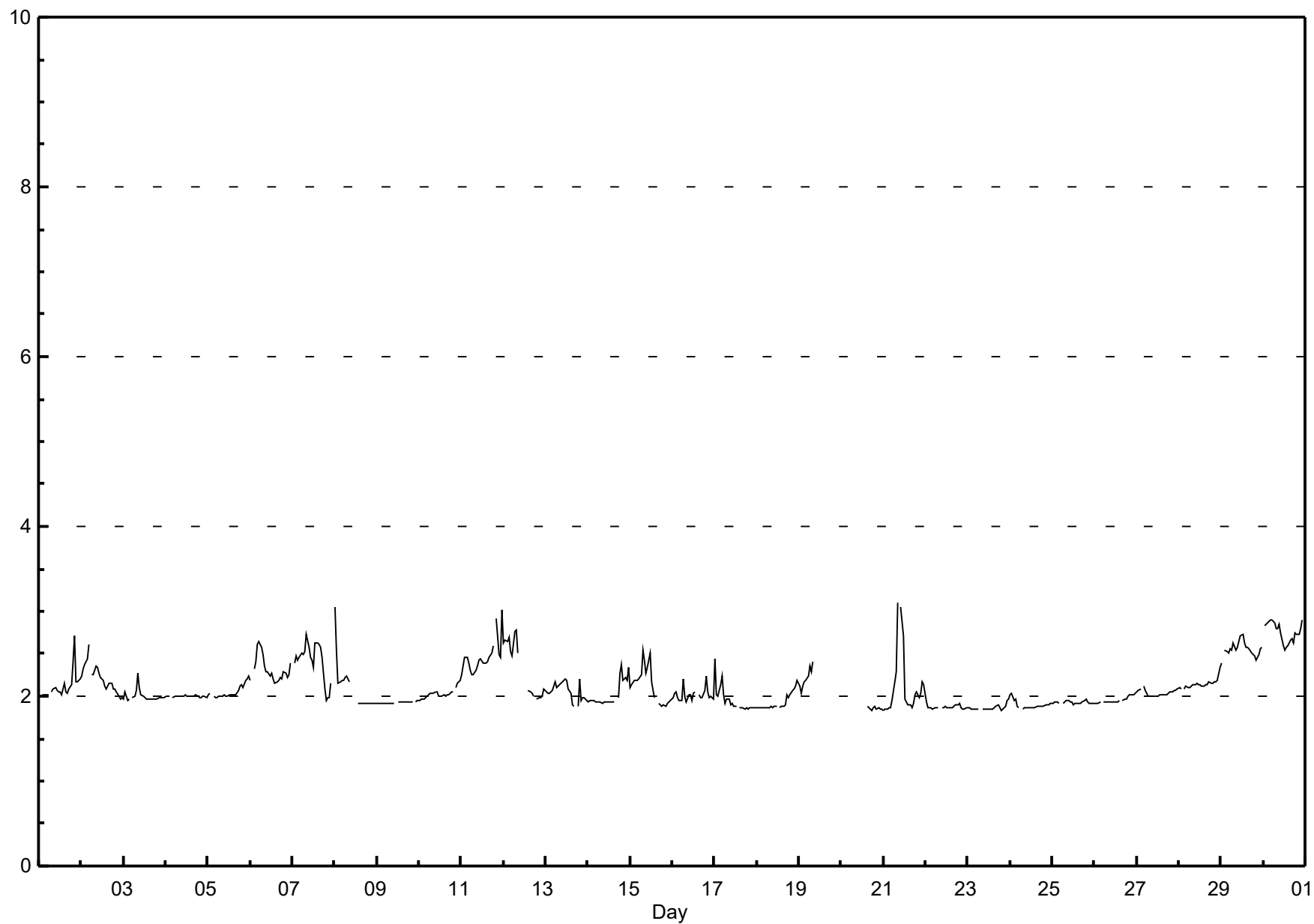
Hourly Averages

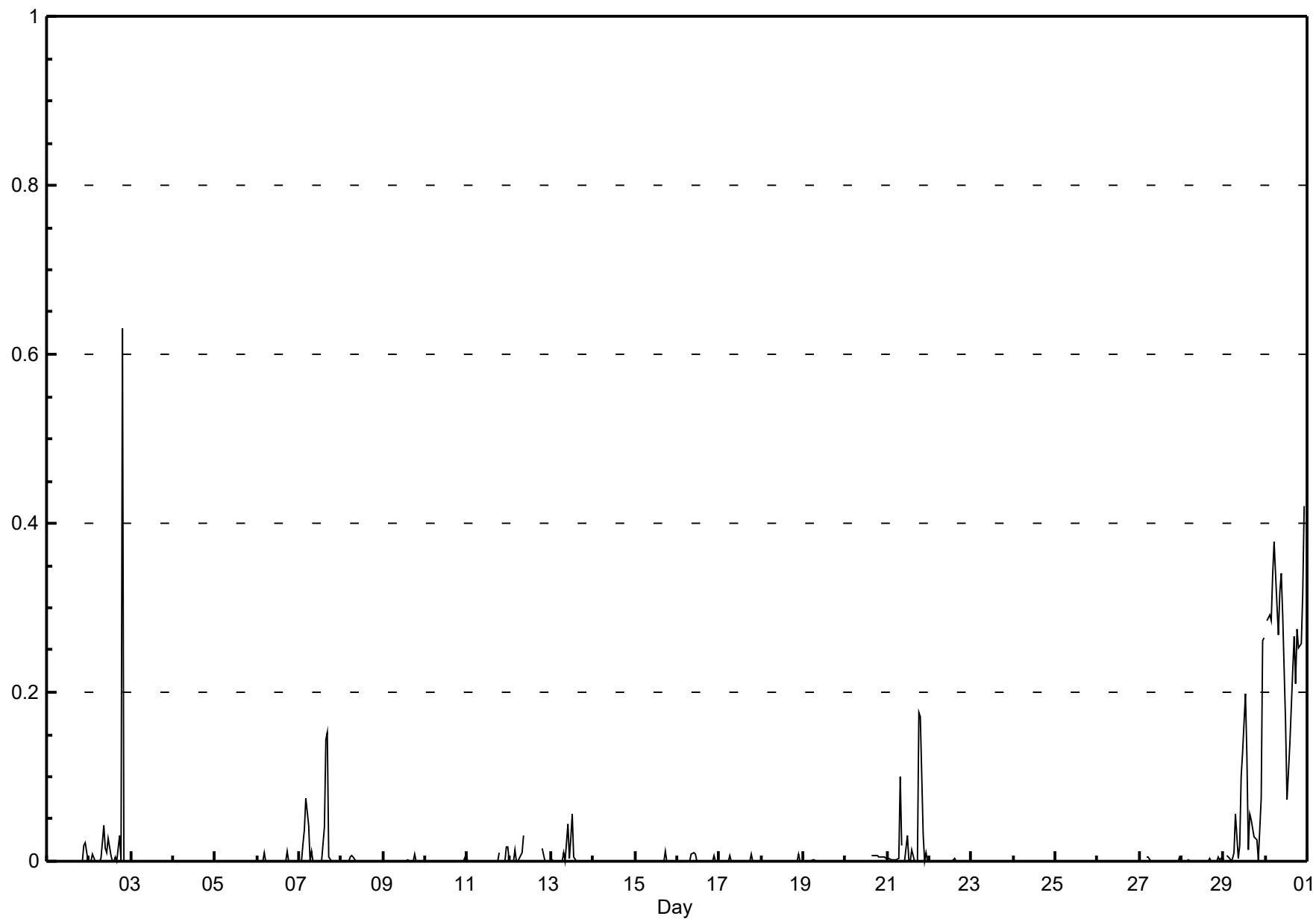
Total Hydrocarbons (THC) - ppm
Henry Pirker - November 2019

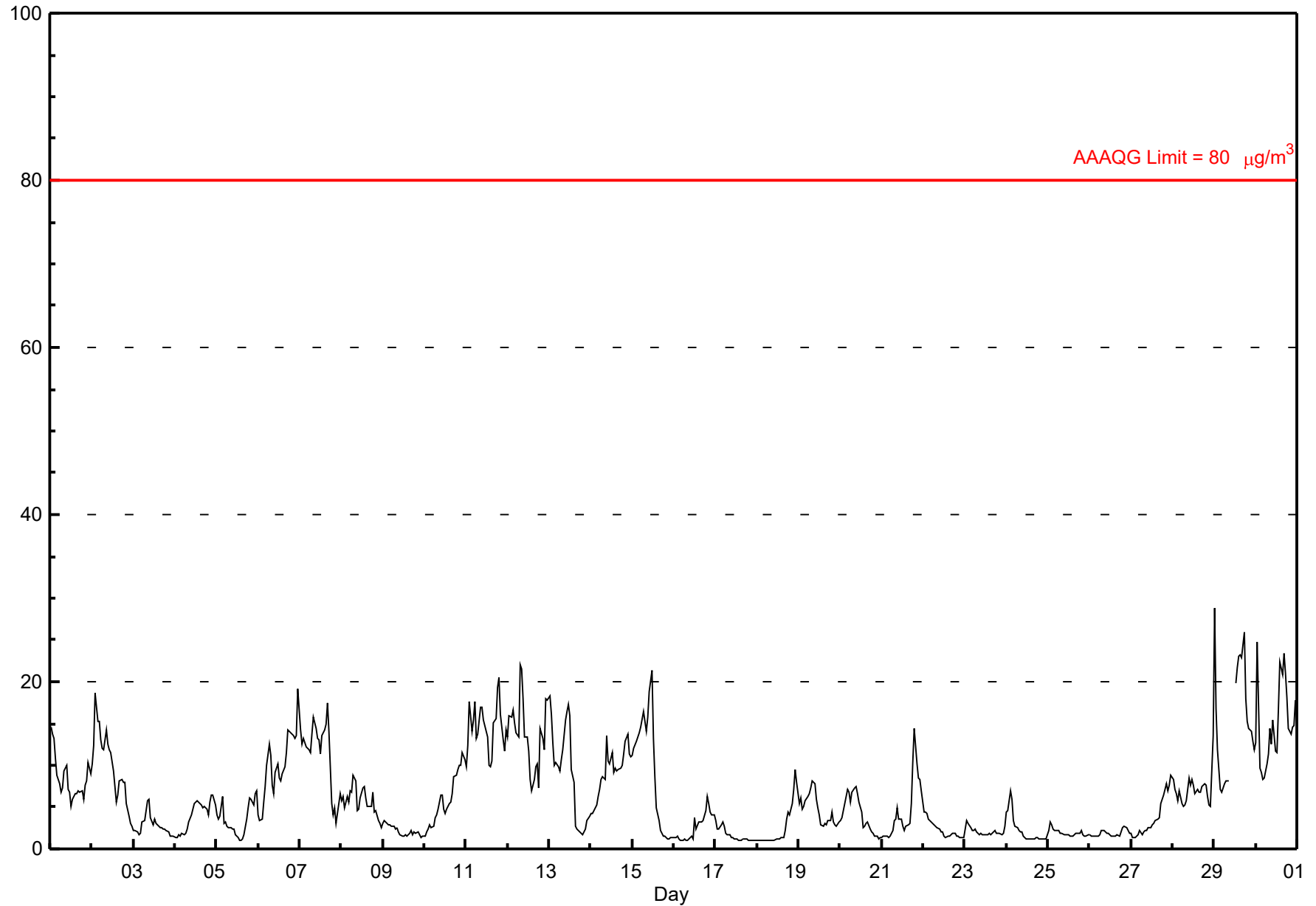


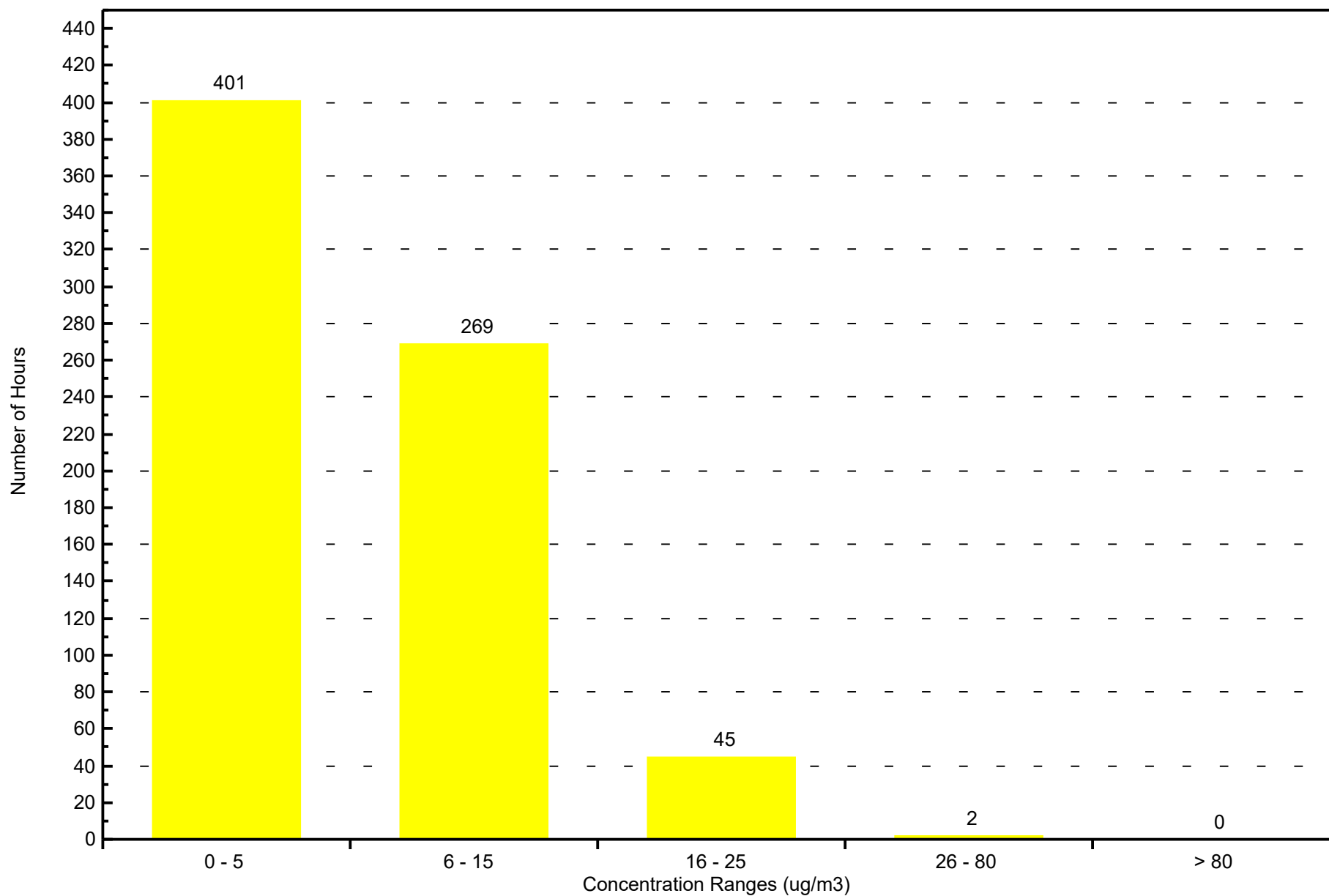
Hourly Averages

Methane (CH₄) - ppm
Henry Pirker - November 2019





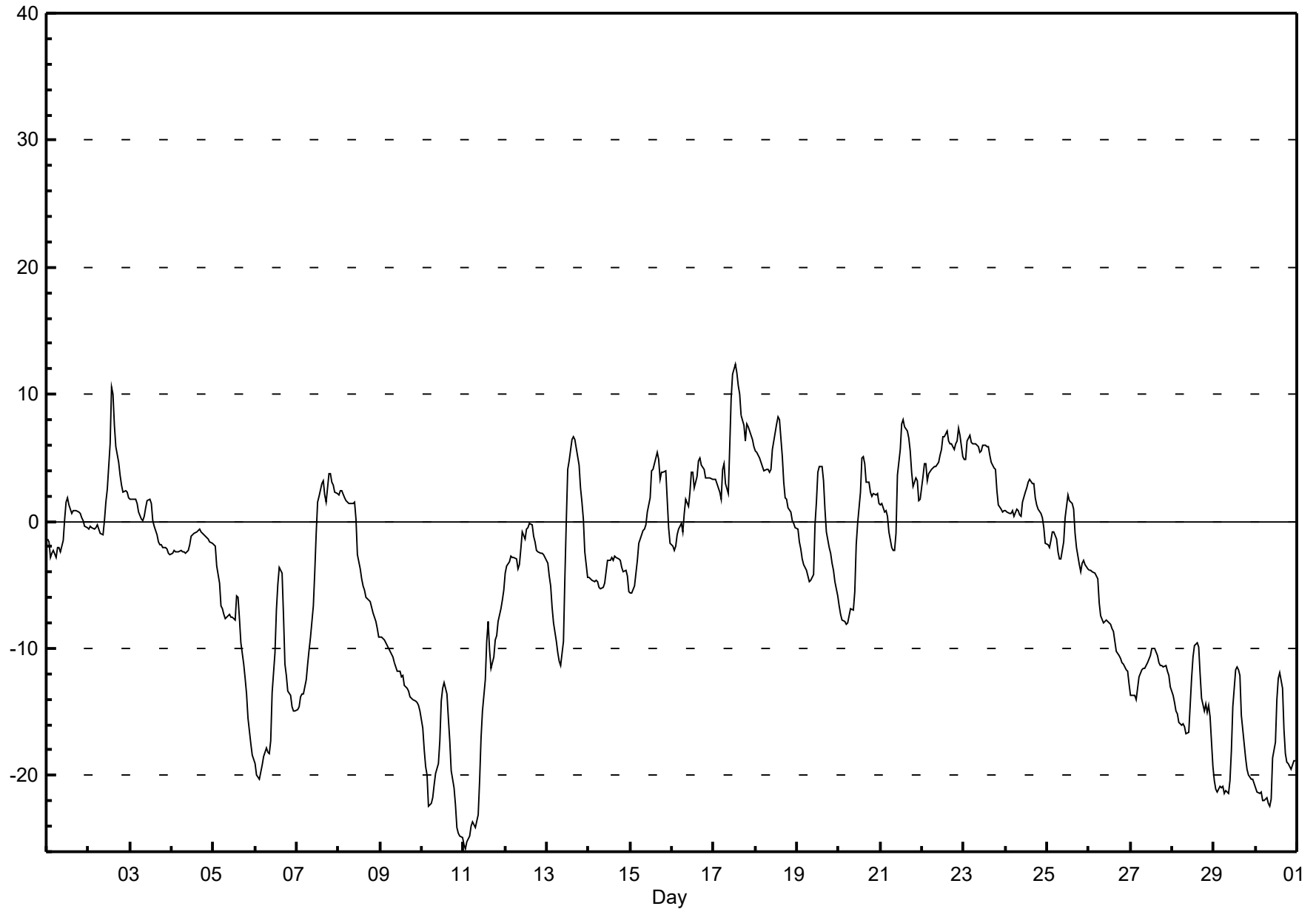




Hourly Averages

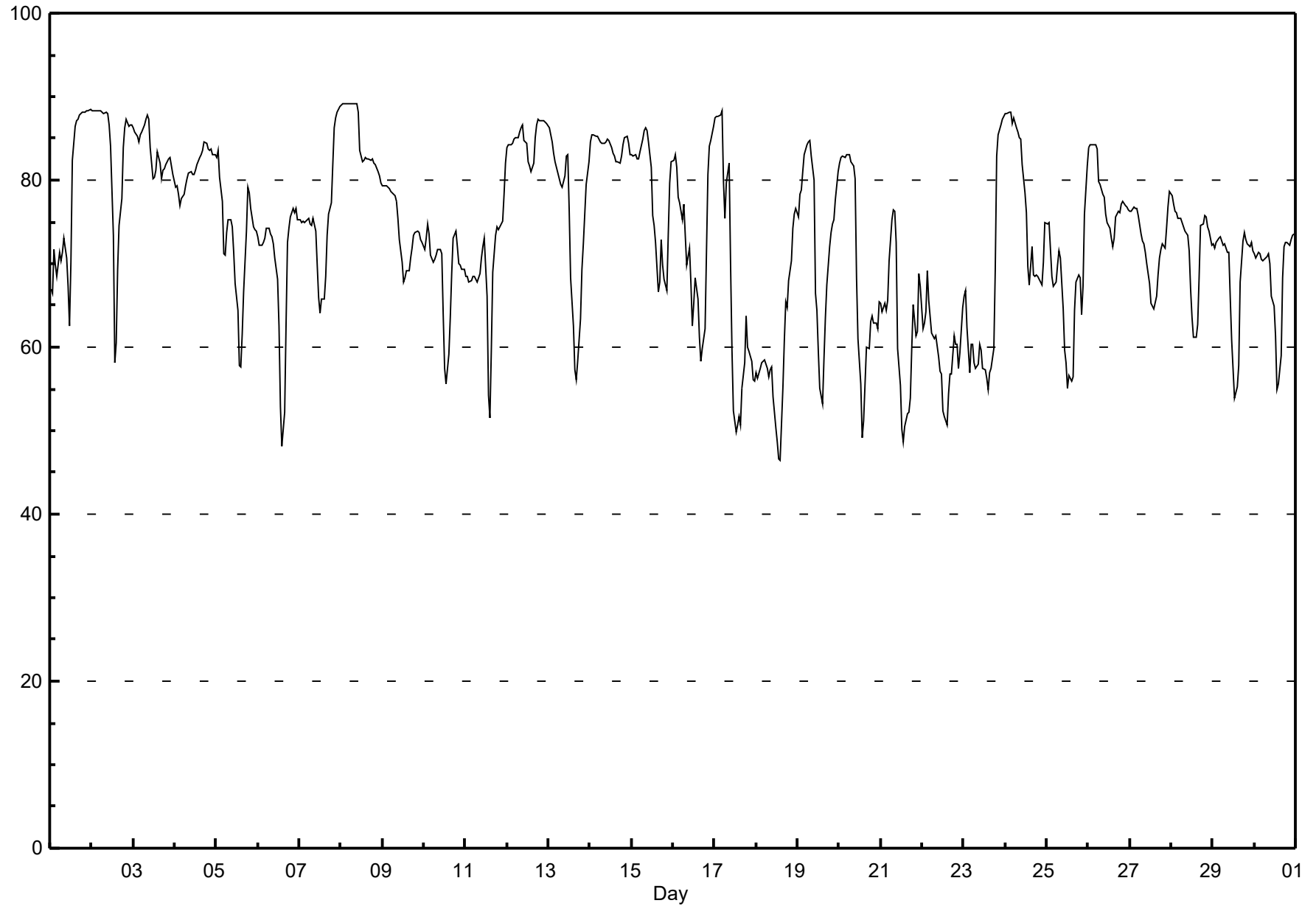
External Temperature (ET) - °C

Henry Pirker - November 2019



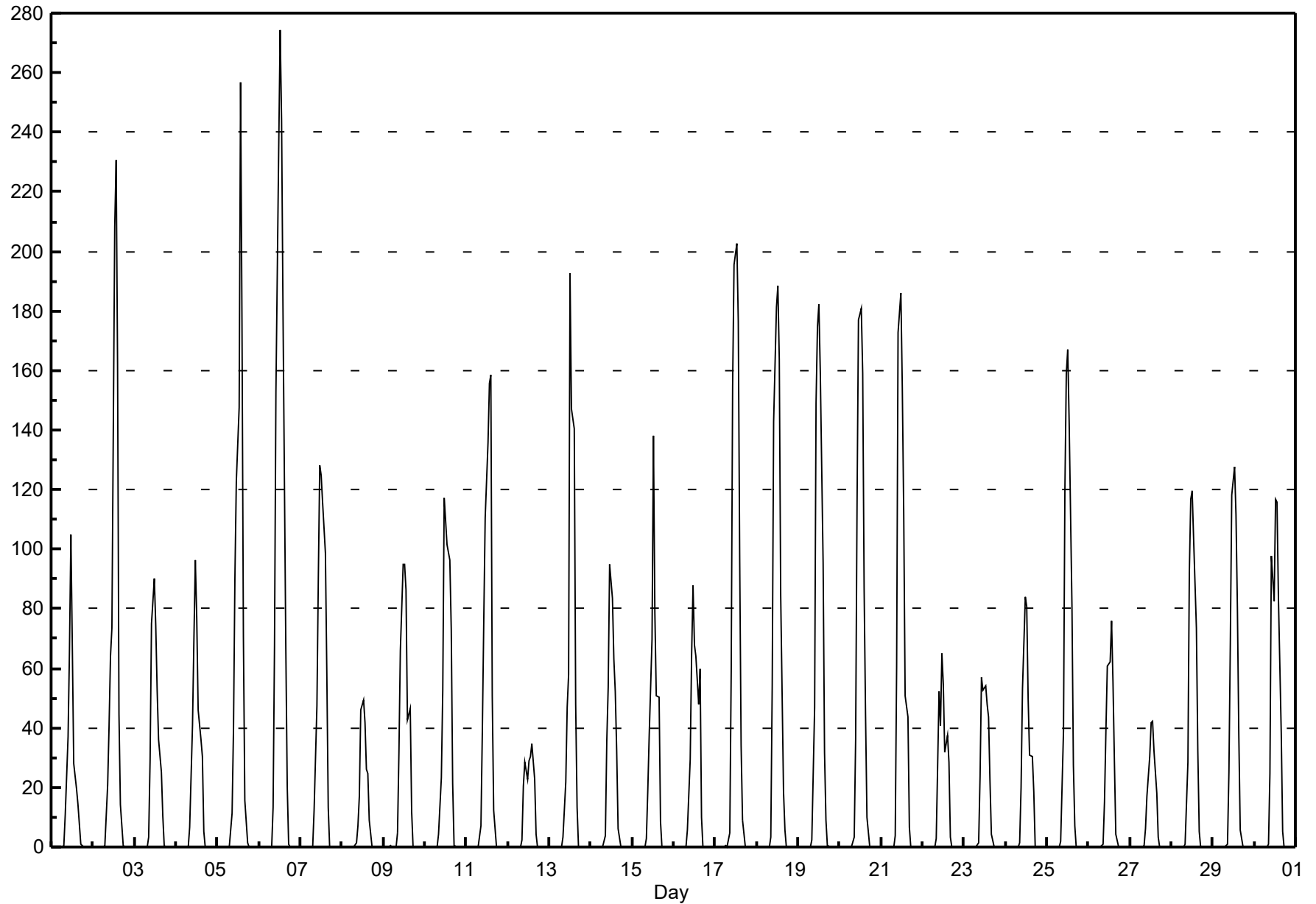
Hourly Averages

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



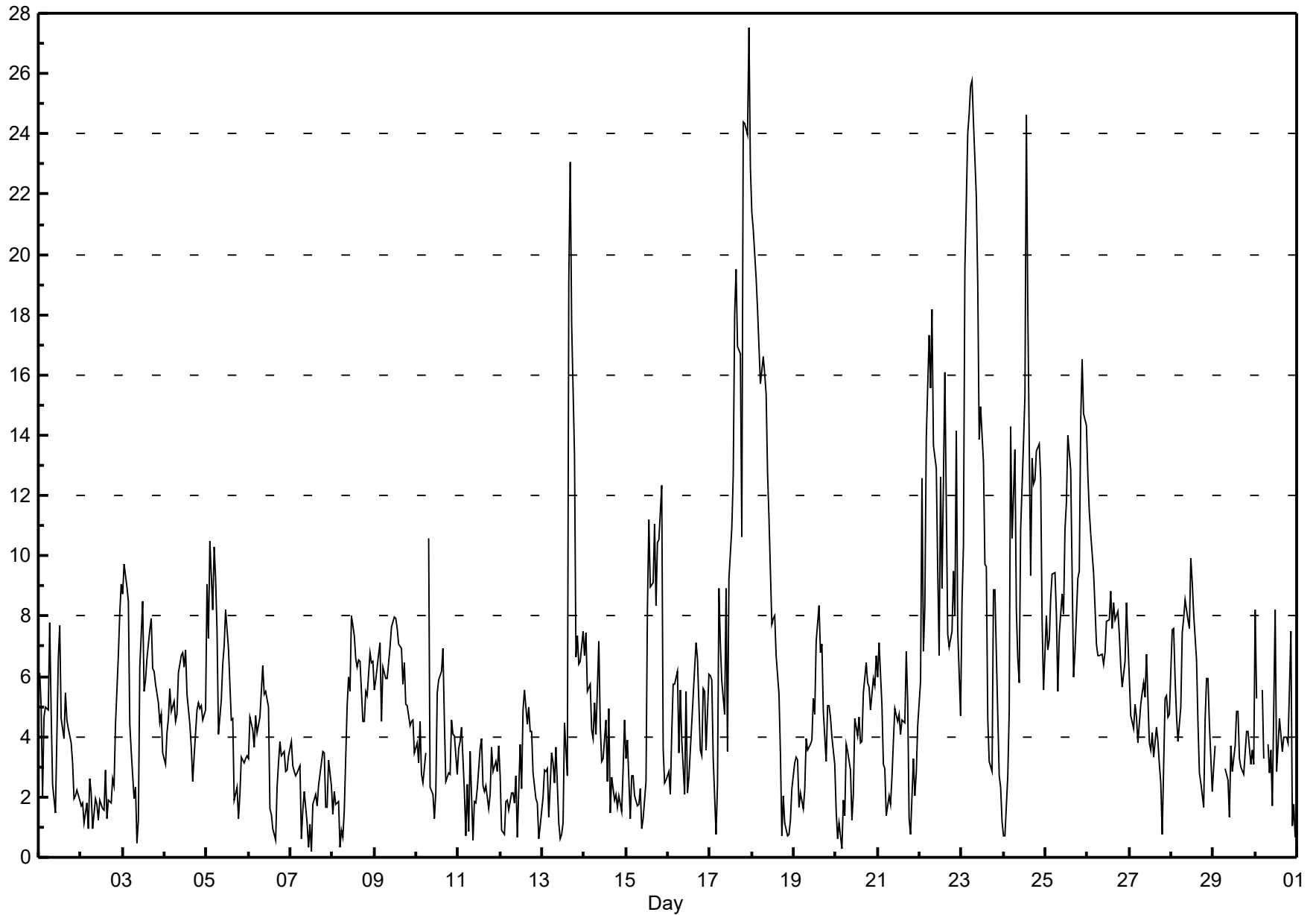
Hourly Averages

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



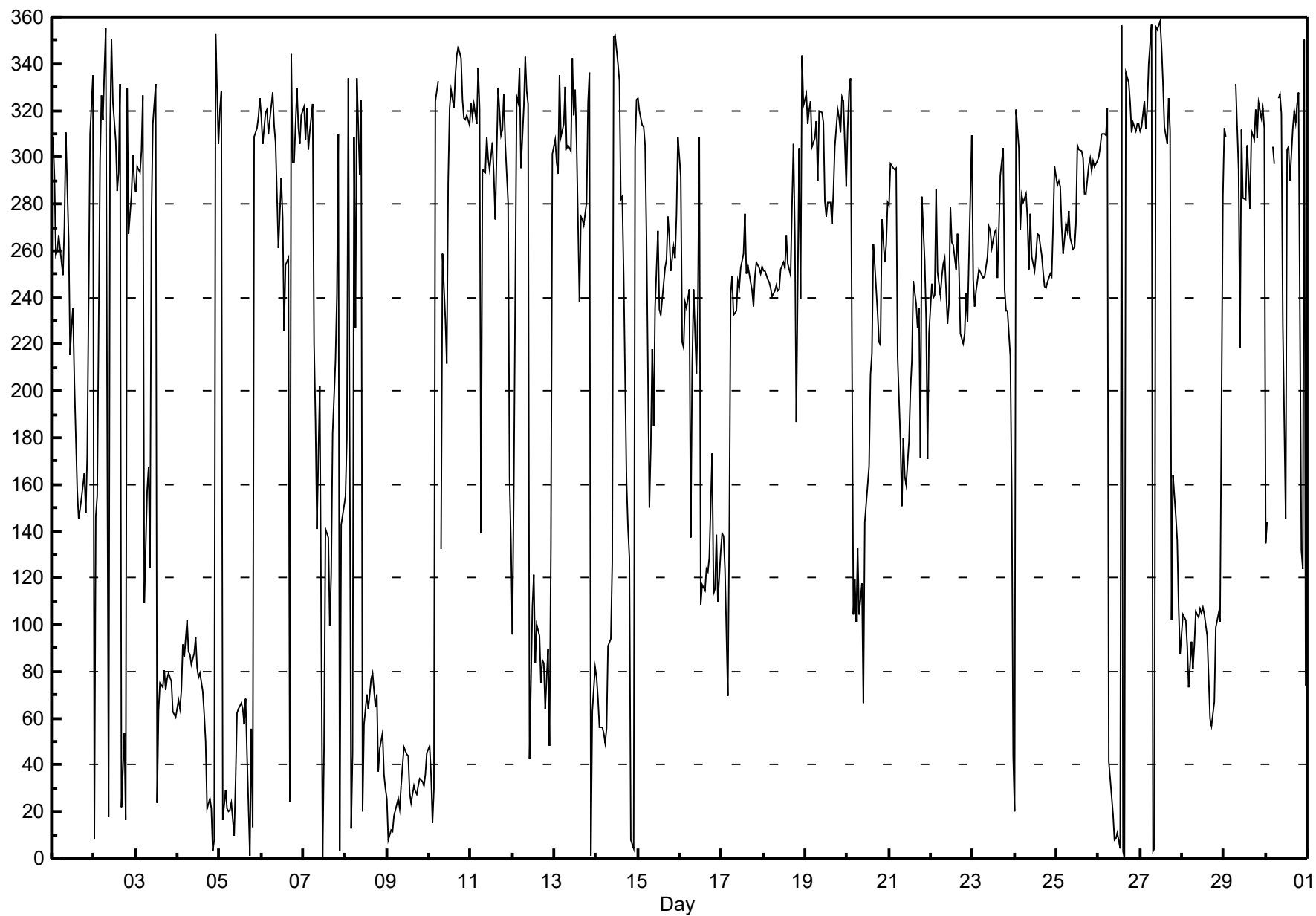
Hourly Averages

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



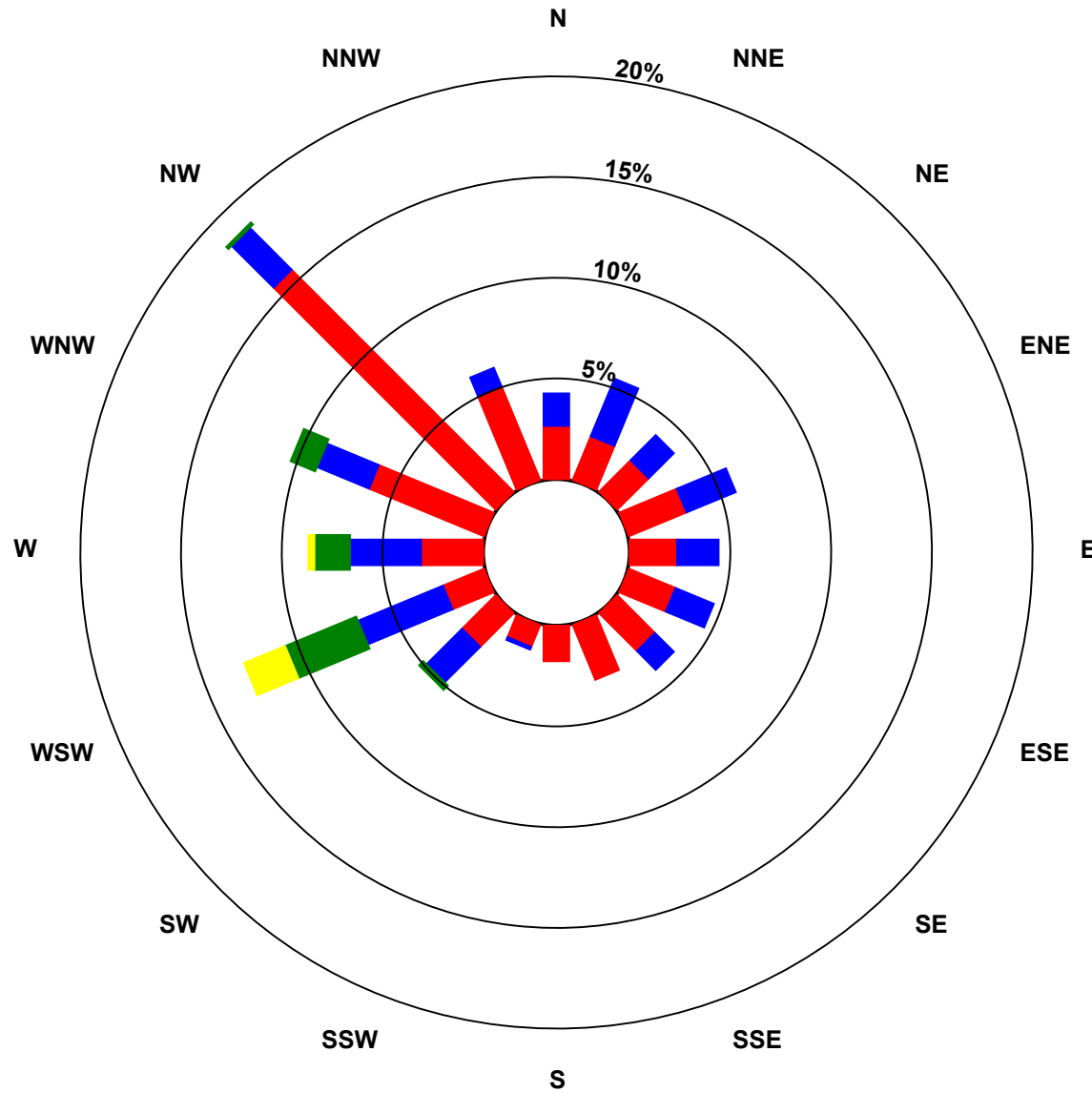
Hourly Averages

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

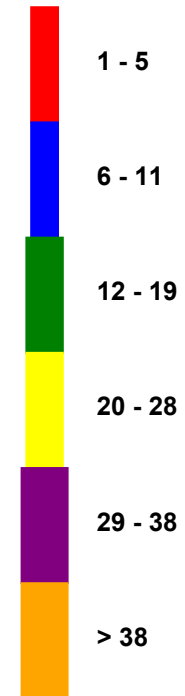


Wind Rose

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

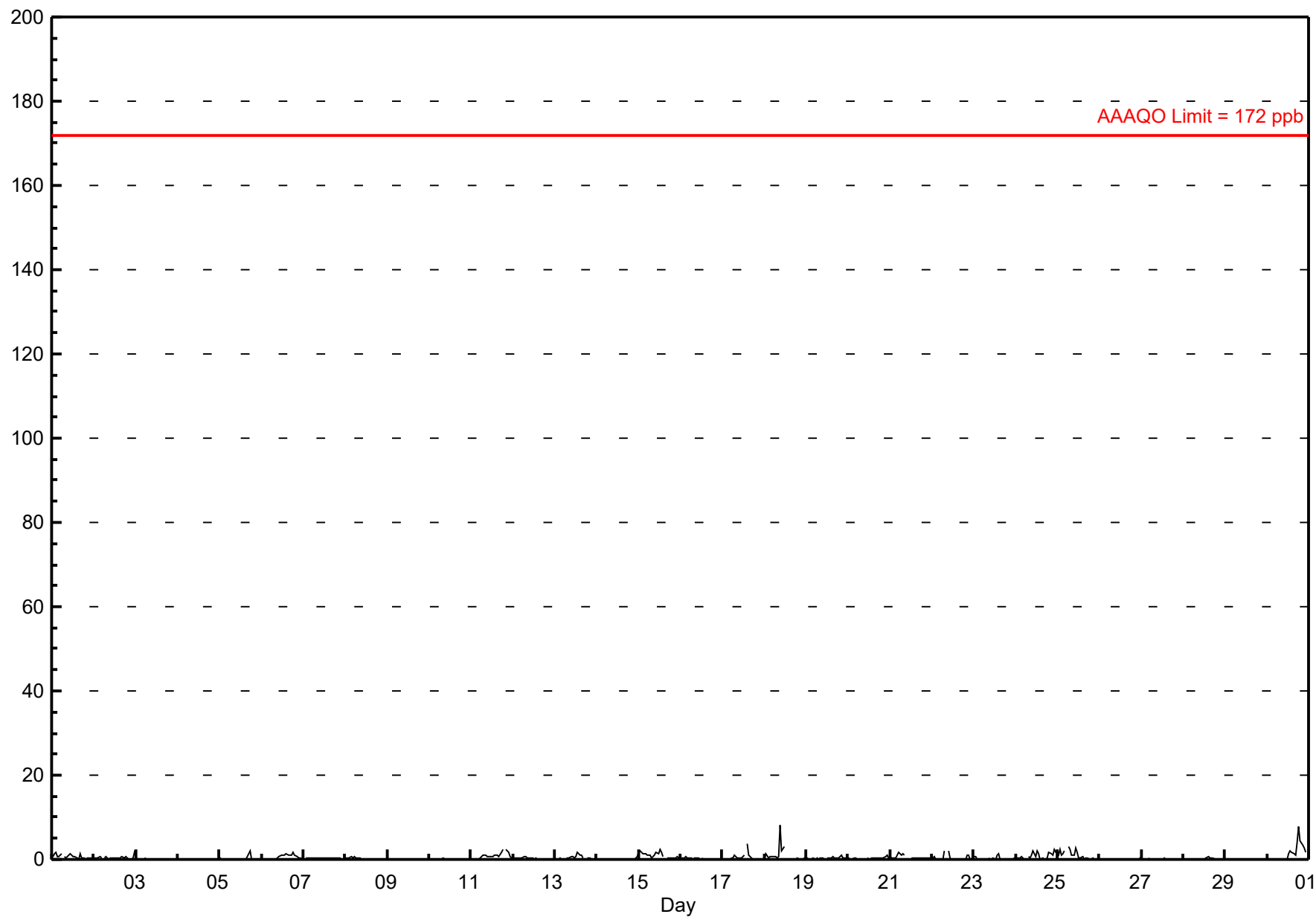


Wind Speed Classes (km/h)



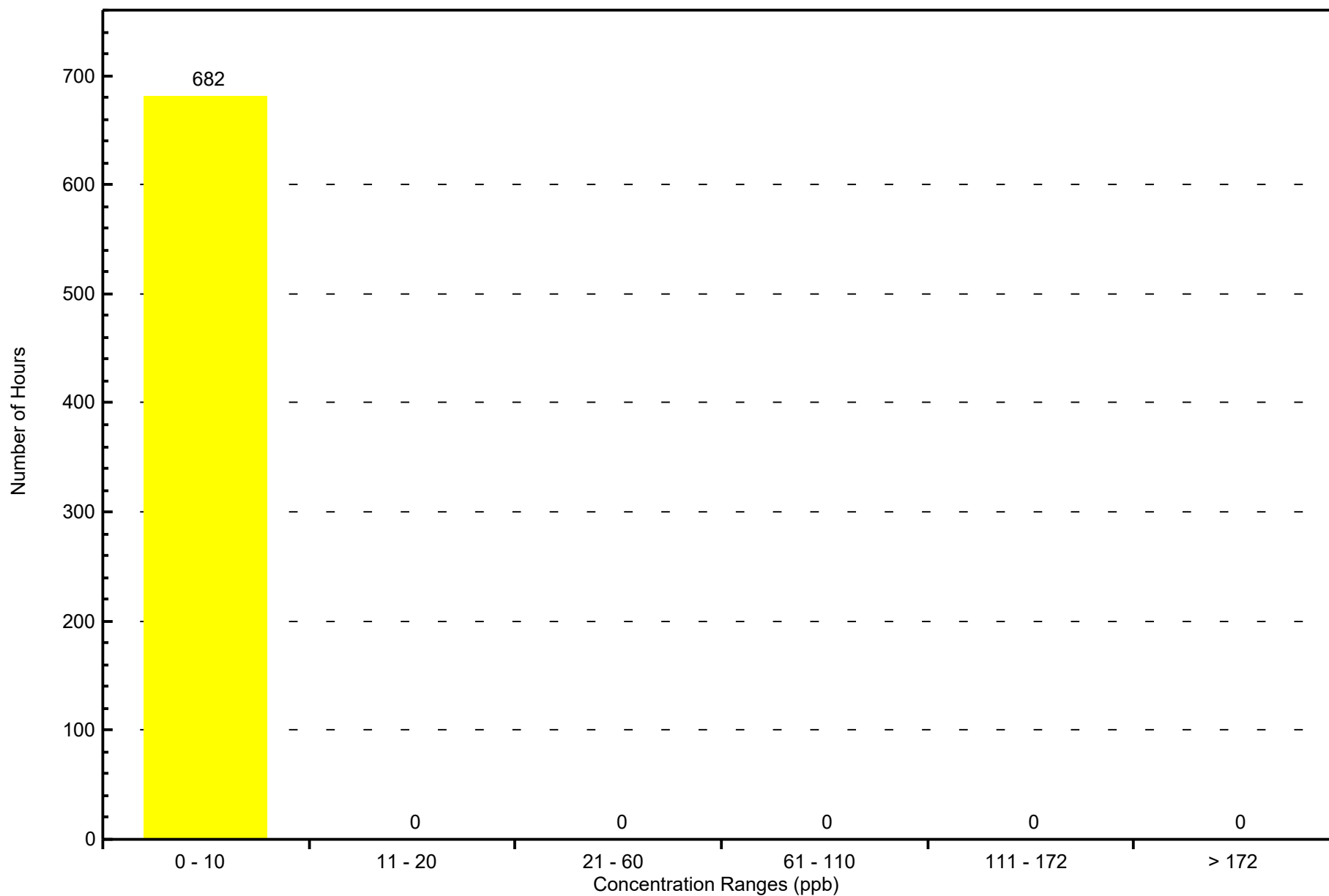
Hourly Averages

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



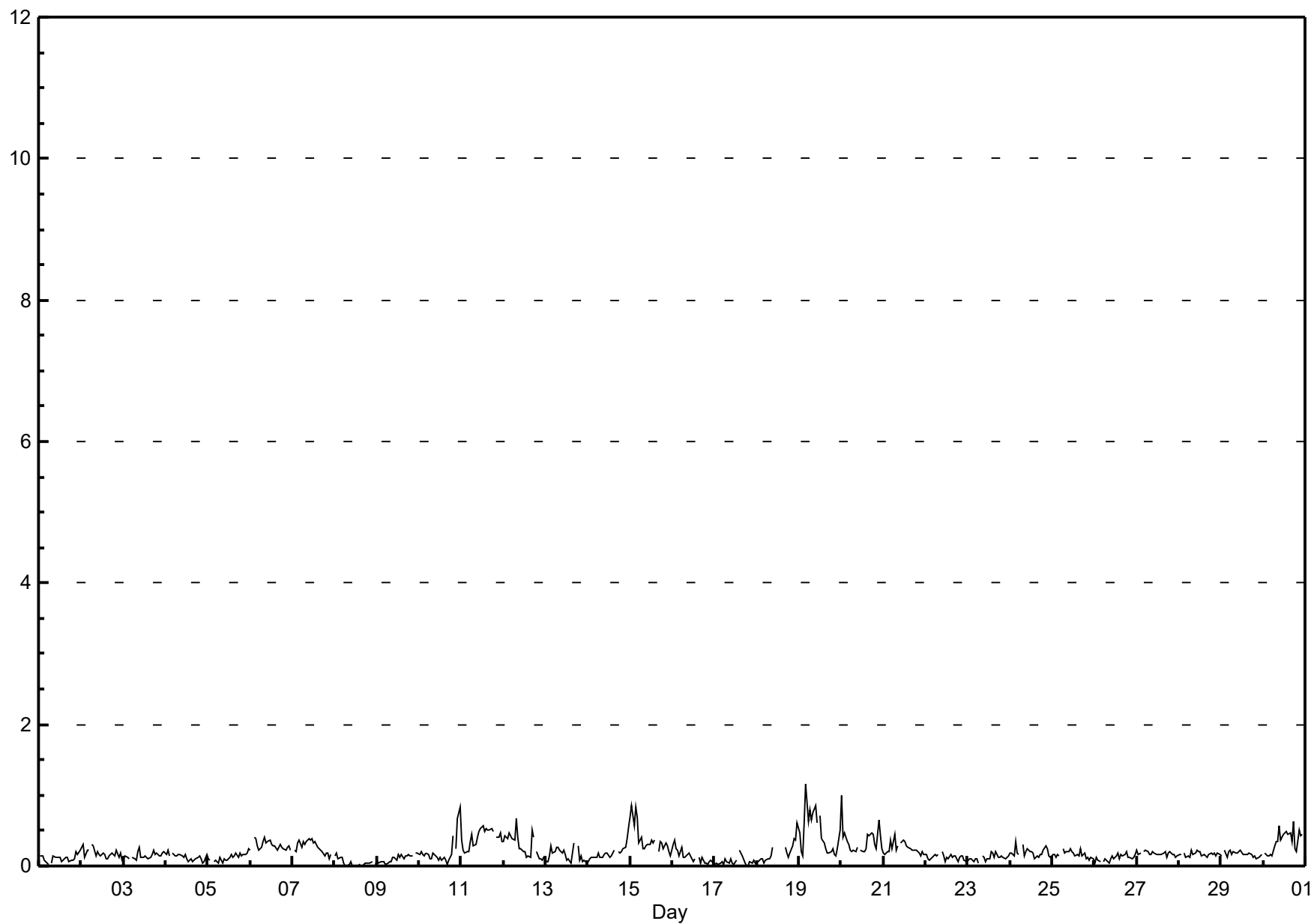
Histogram of Hourly Averages

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



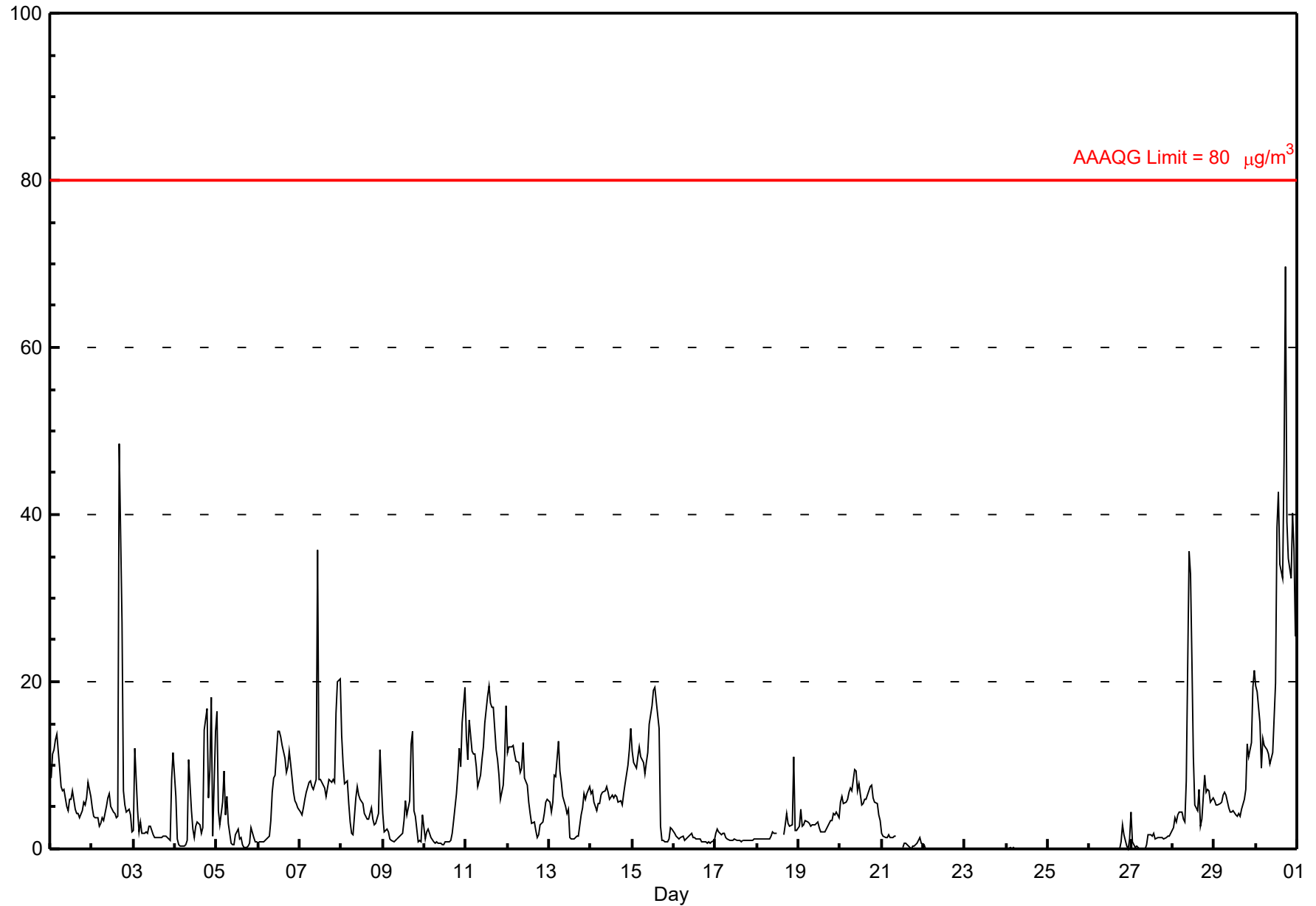
Hourly Averages

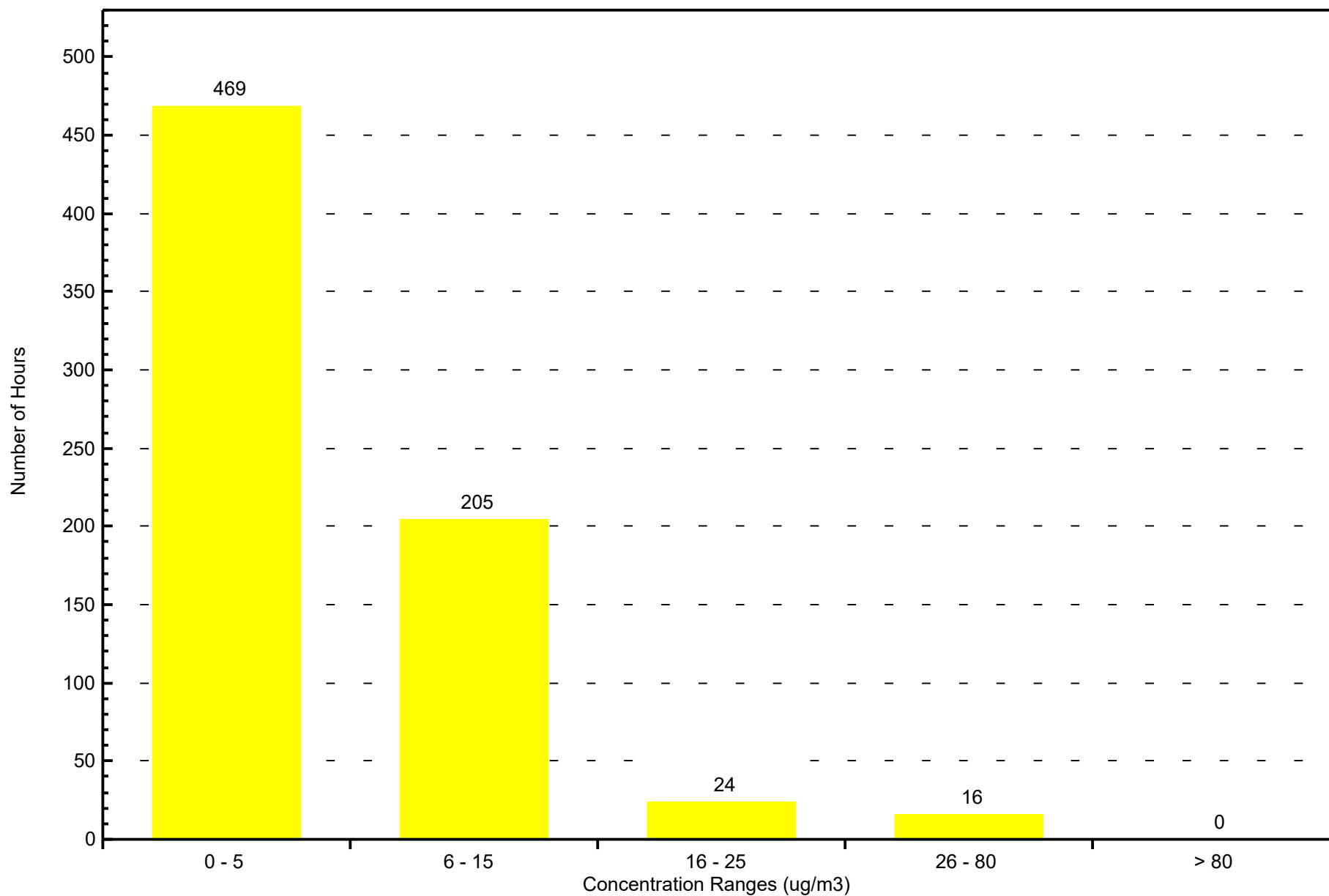
Total Reduced Sulphur (TRS) - ppb
Smoky Heights - November 2019



Hourly Averages

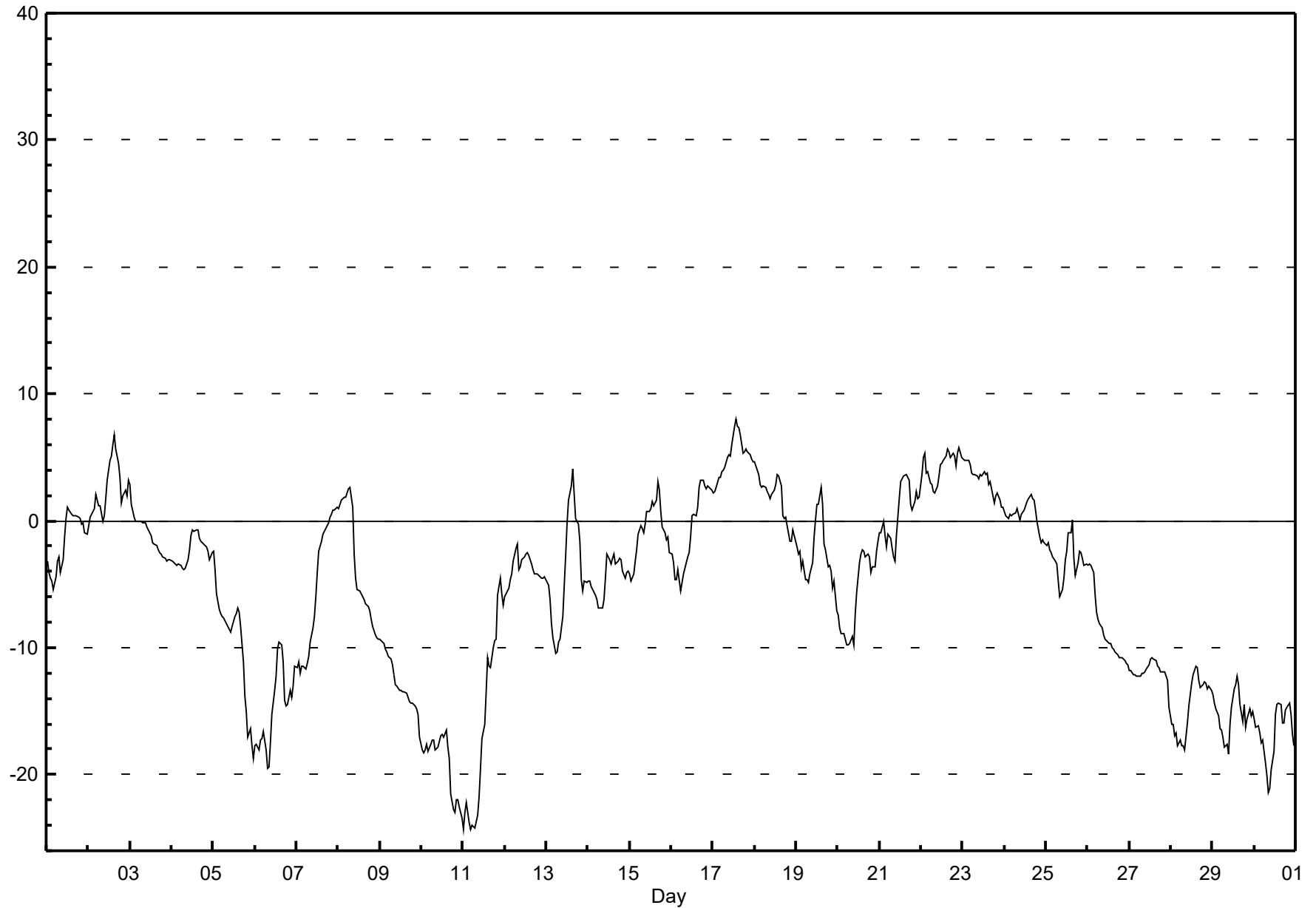
Particulate Matter 2.5 (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Smoky Heights - November 2019





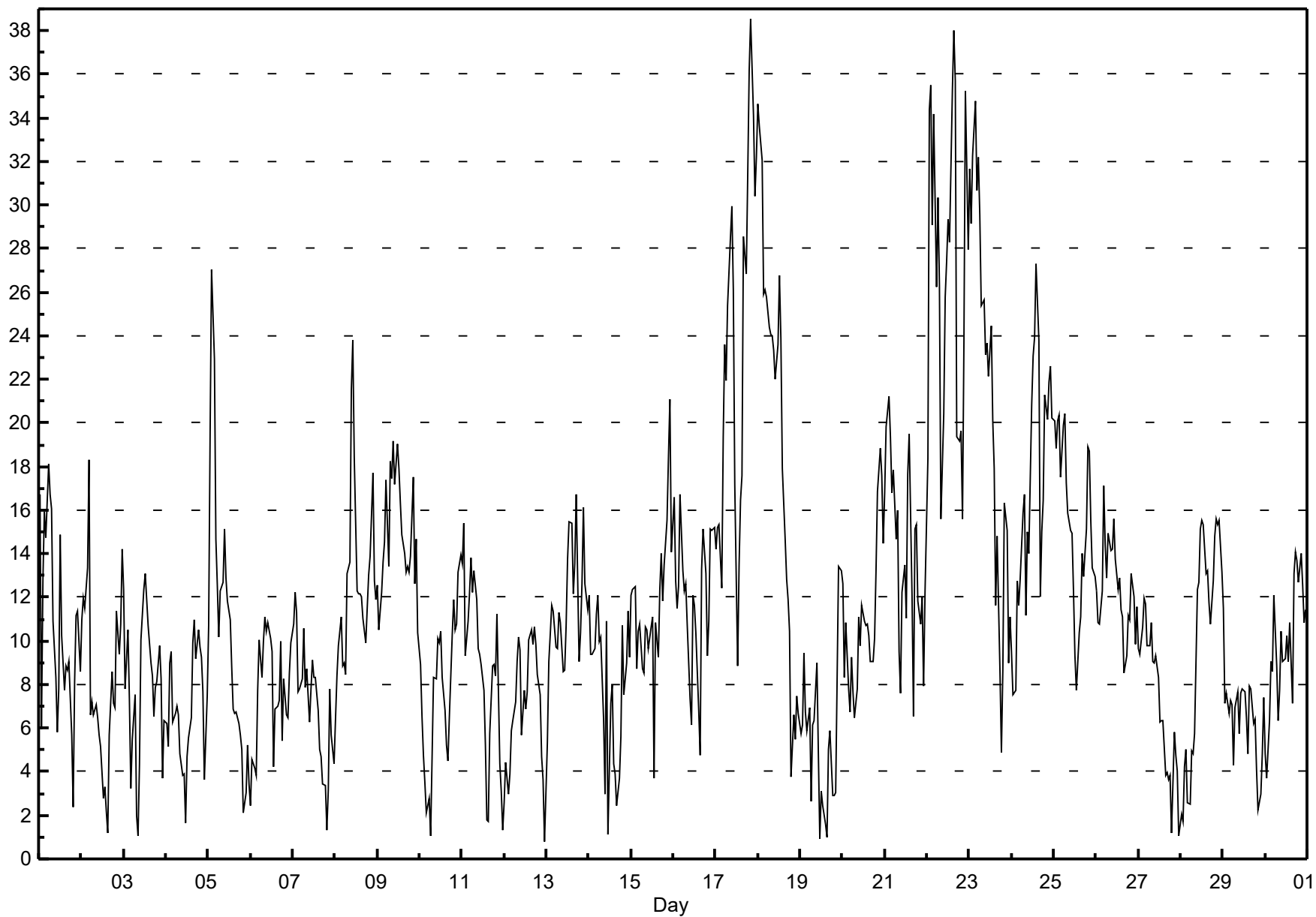
Hourly Averages

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



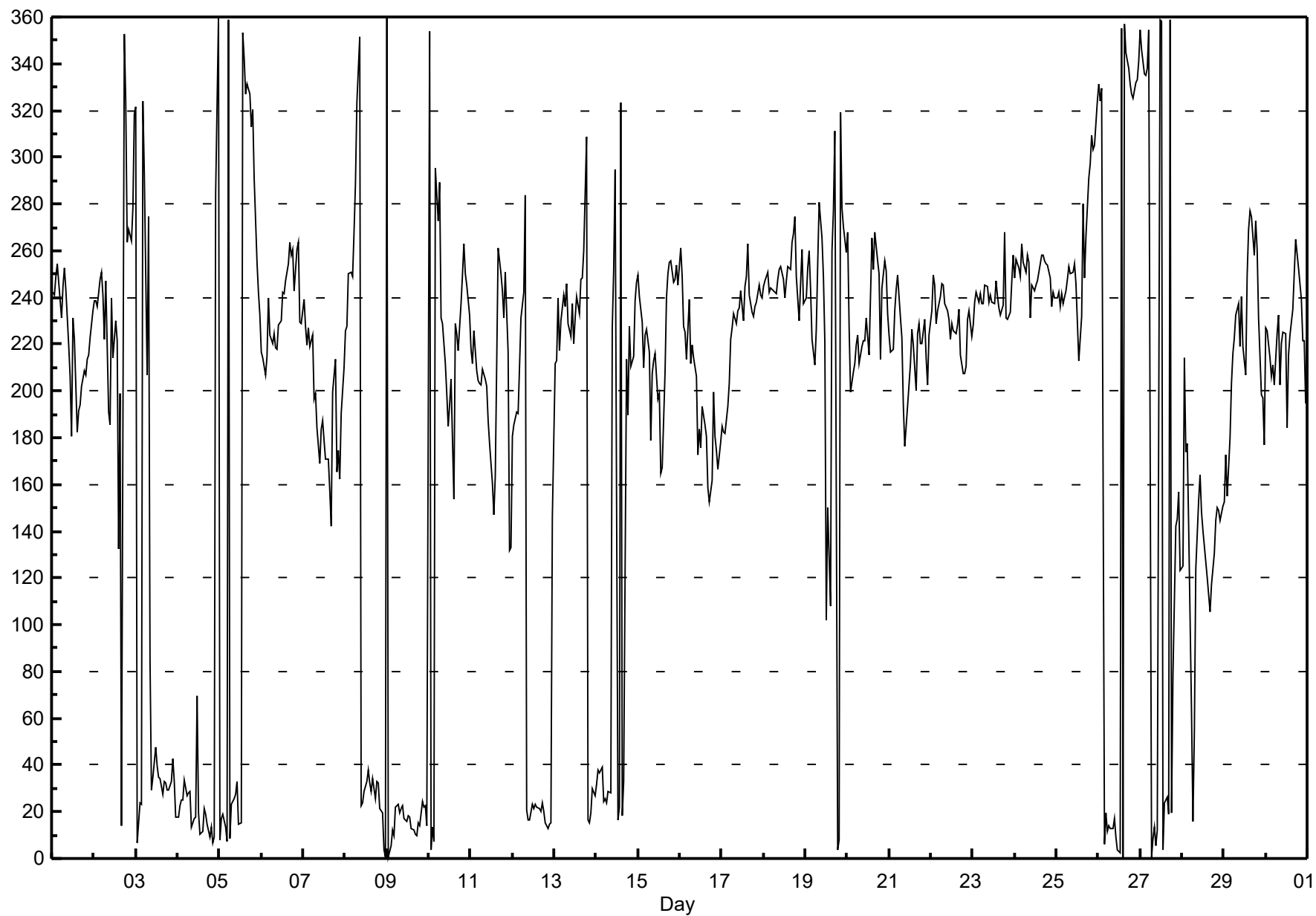
Hourly Averages

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



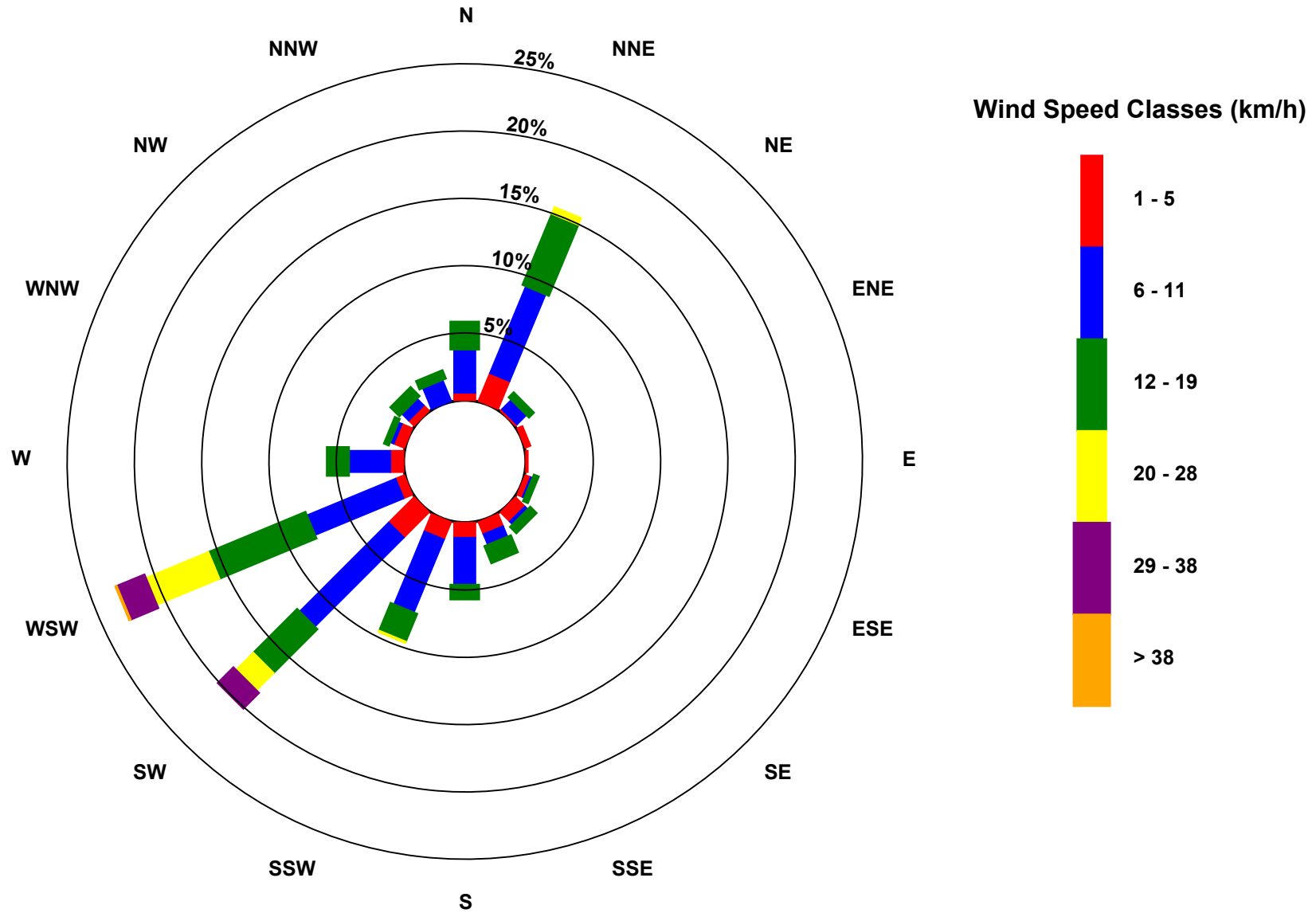
Hourly Averages

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



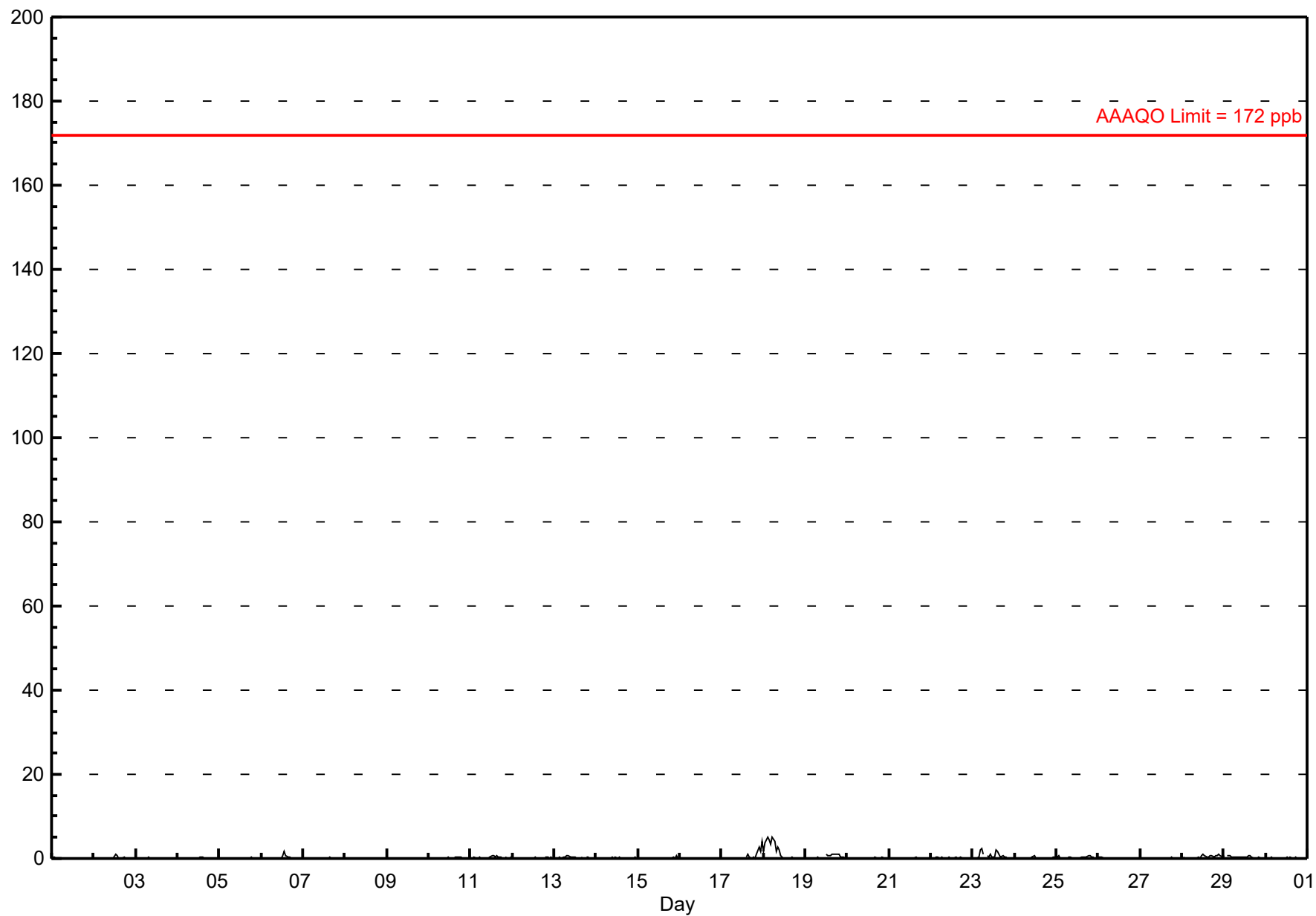
Wind Rose

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



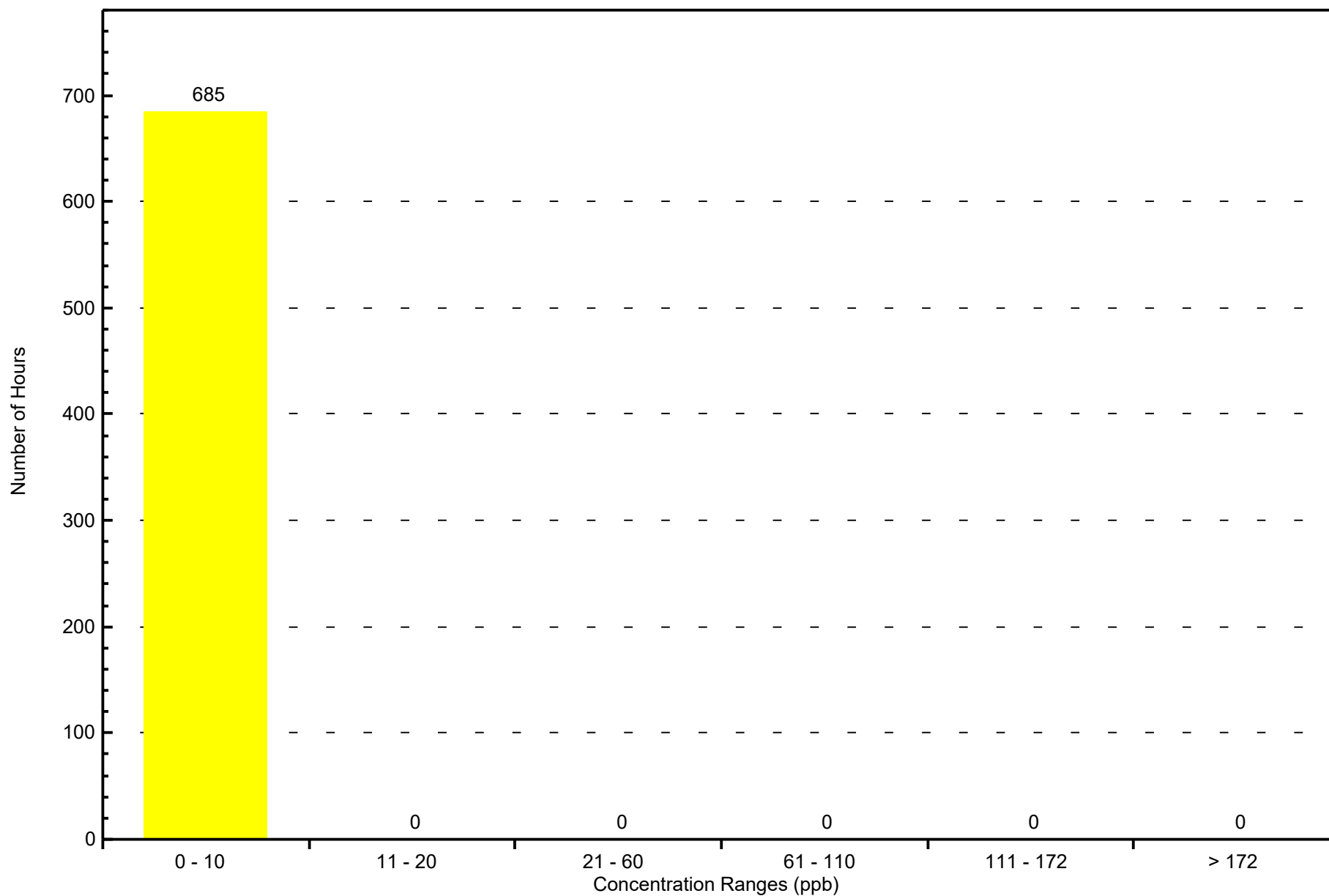
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Valleyview - November 2019



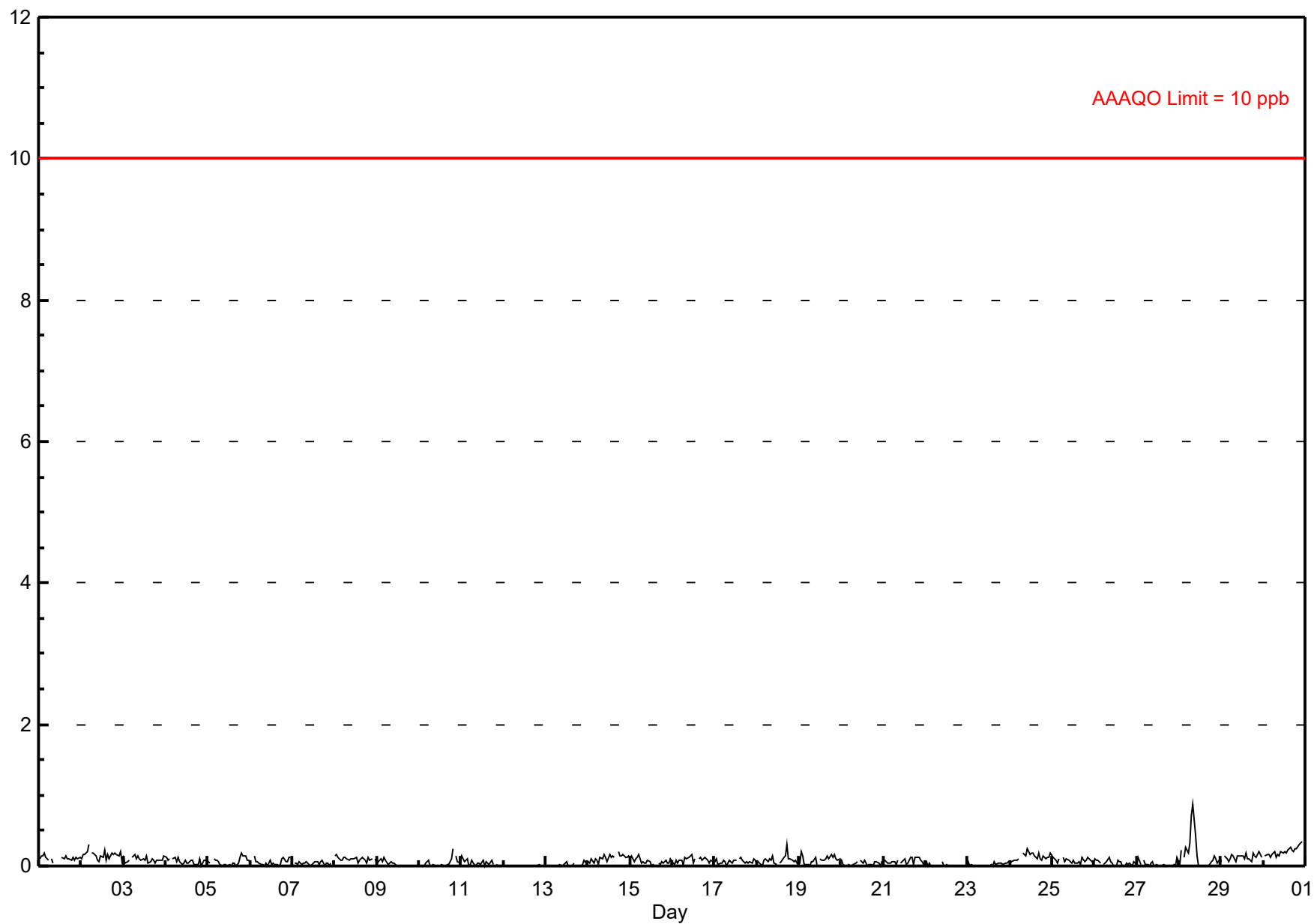
Histogram of Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Valleyview - November 2019



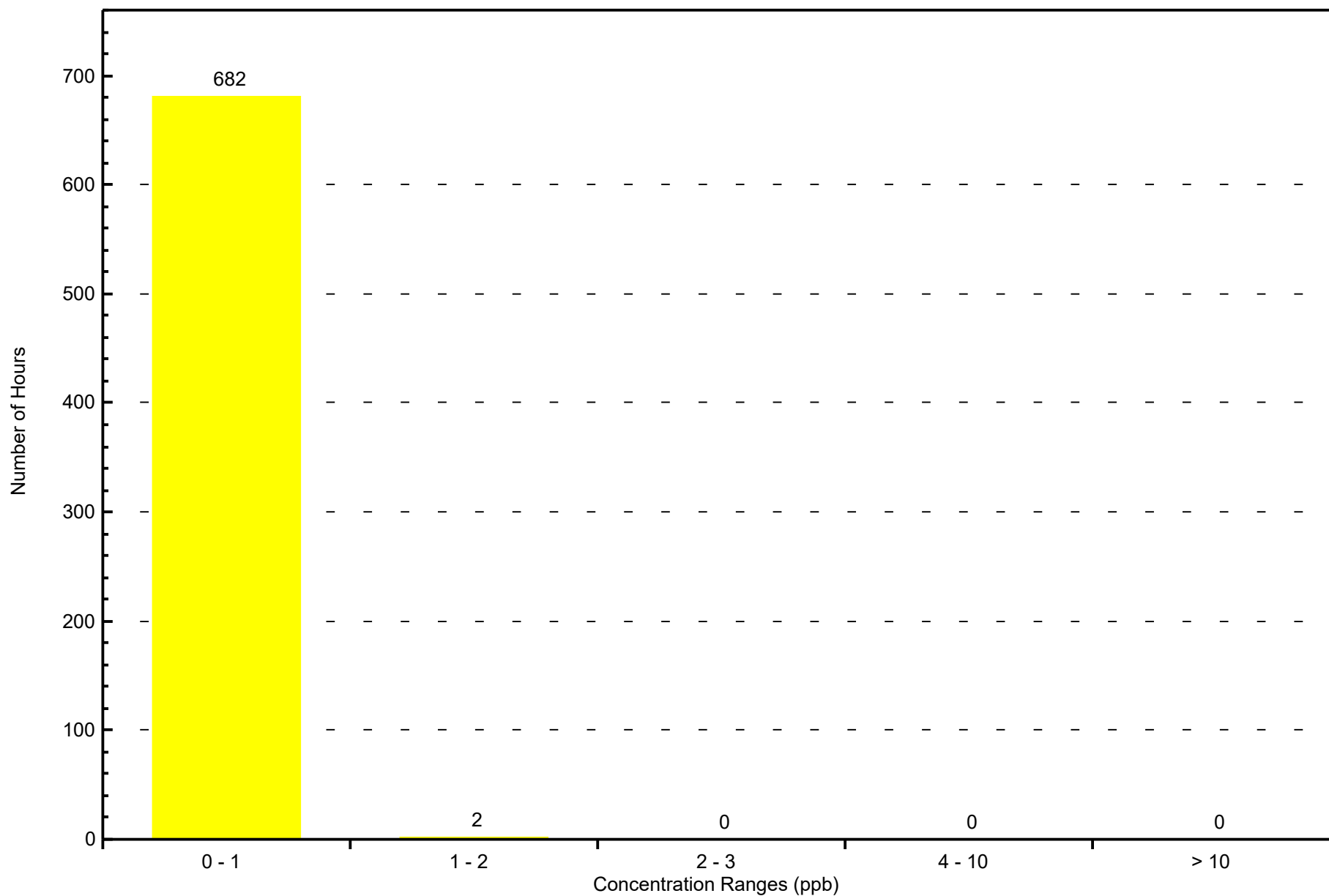
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Valleyview - November 2019



Histogram of Hourly Averages

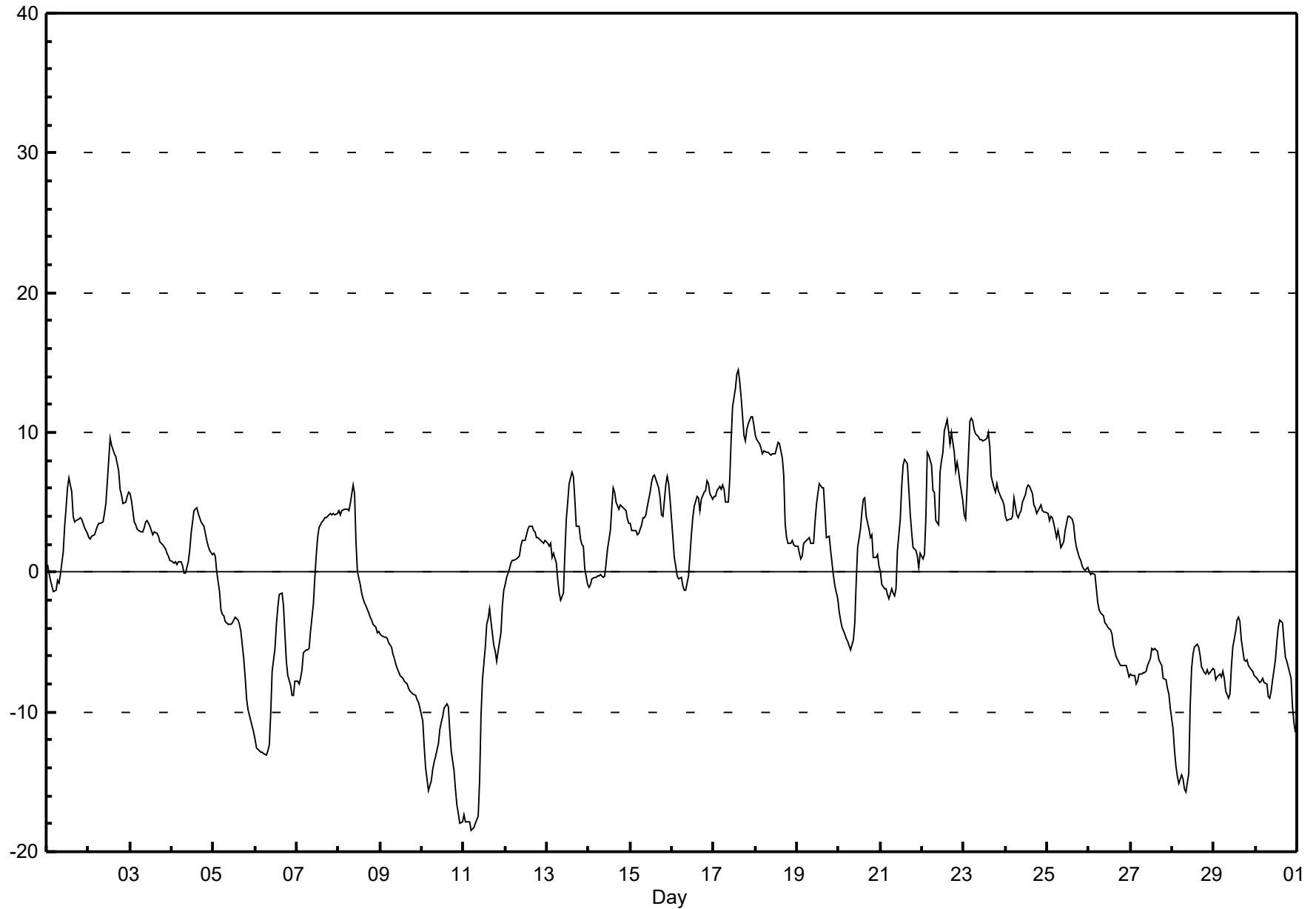
Hydrogen Sulphide (H₂S) - ppb
Valleyview - November 2019



Hourly Averages

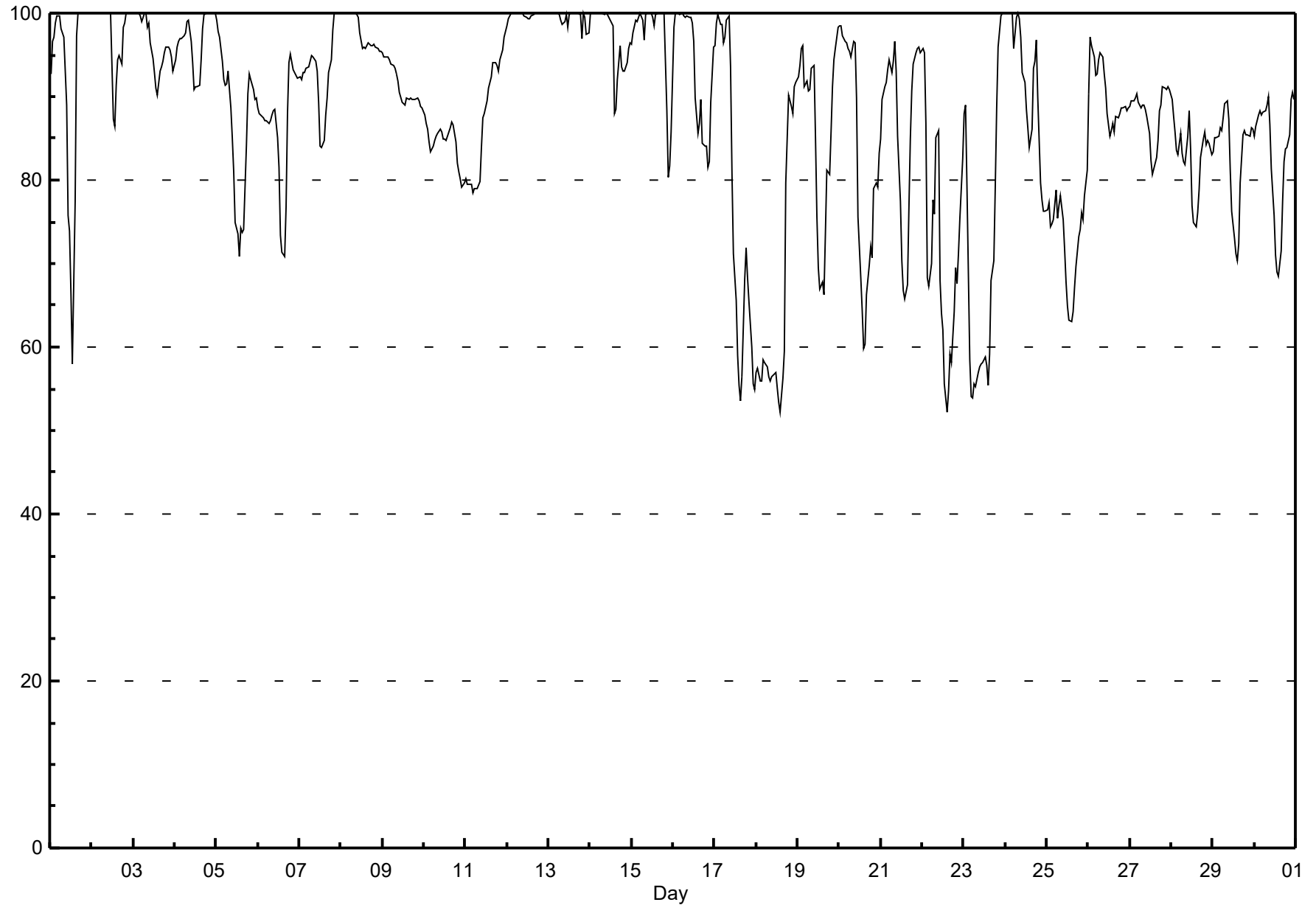
External Temperature (ET) - °C

Valleyview - November 2019



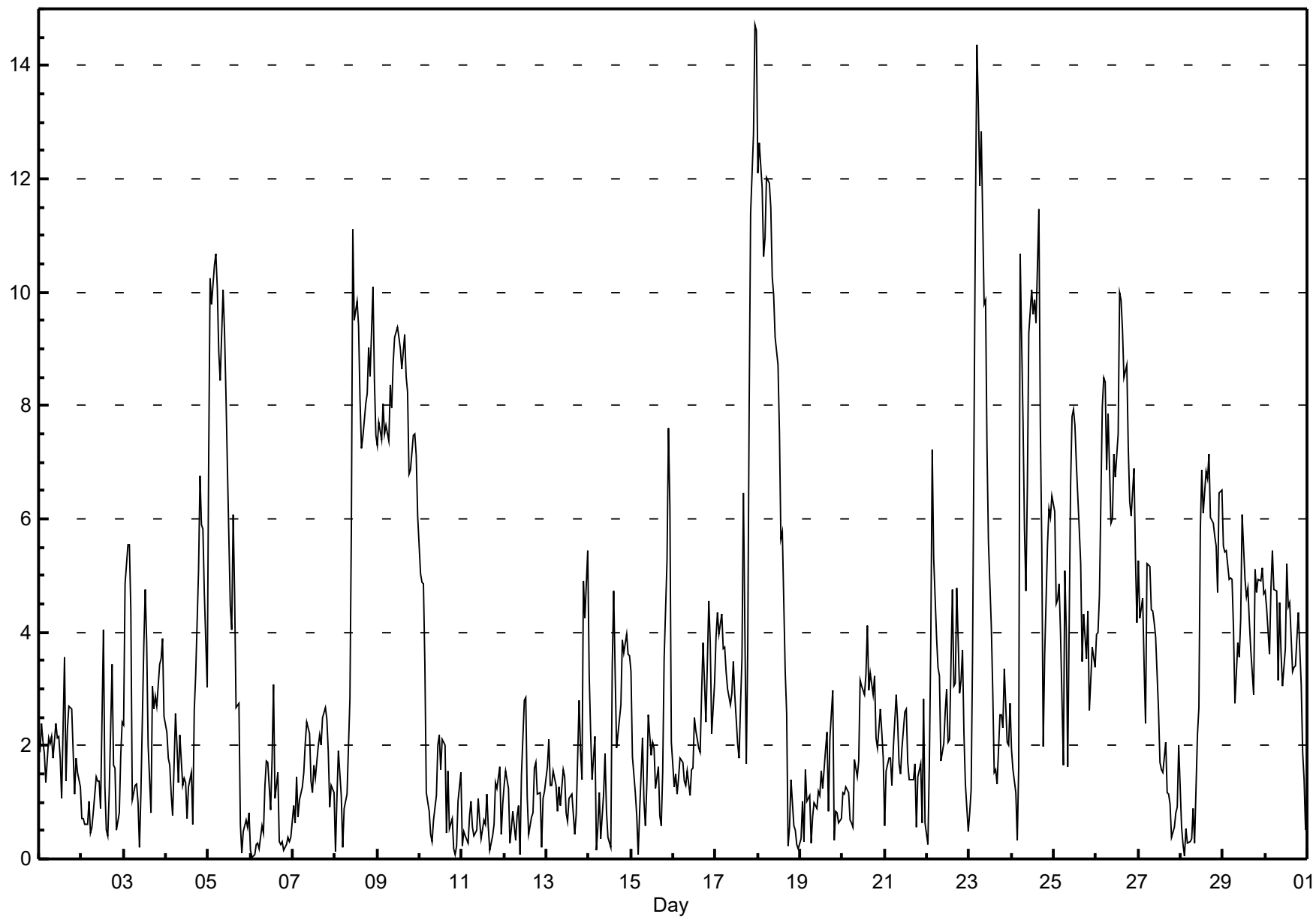
Hourly Averages

Relative Humidity (RH) - %
Valleyview - November 2019



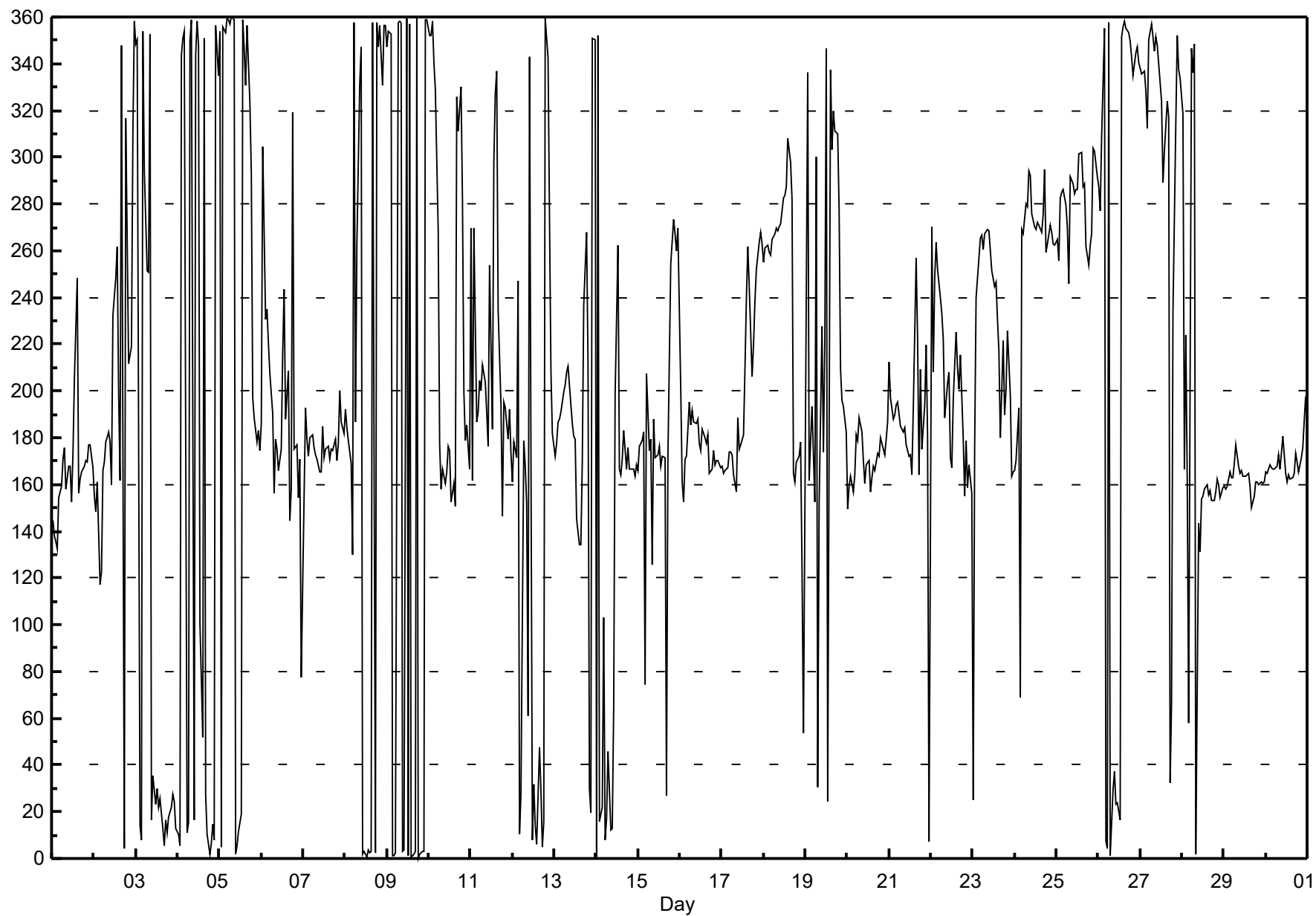
Hourly Averages

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



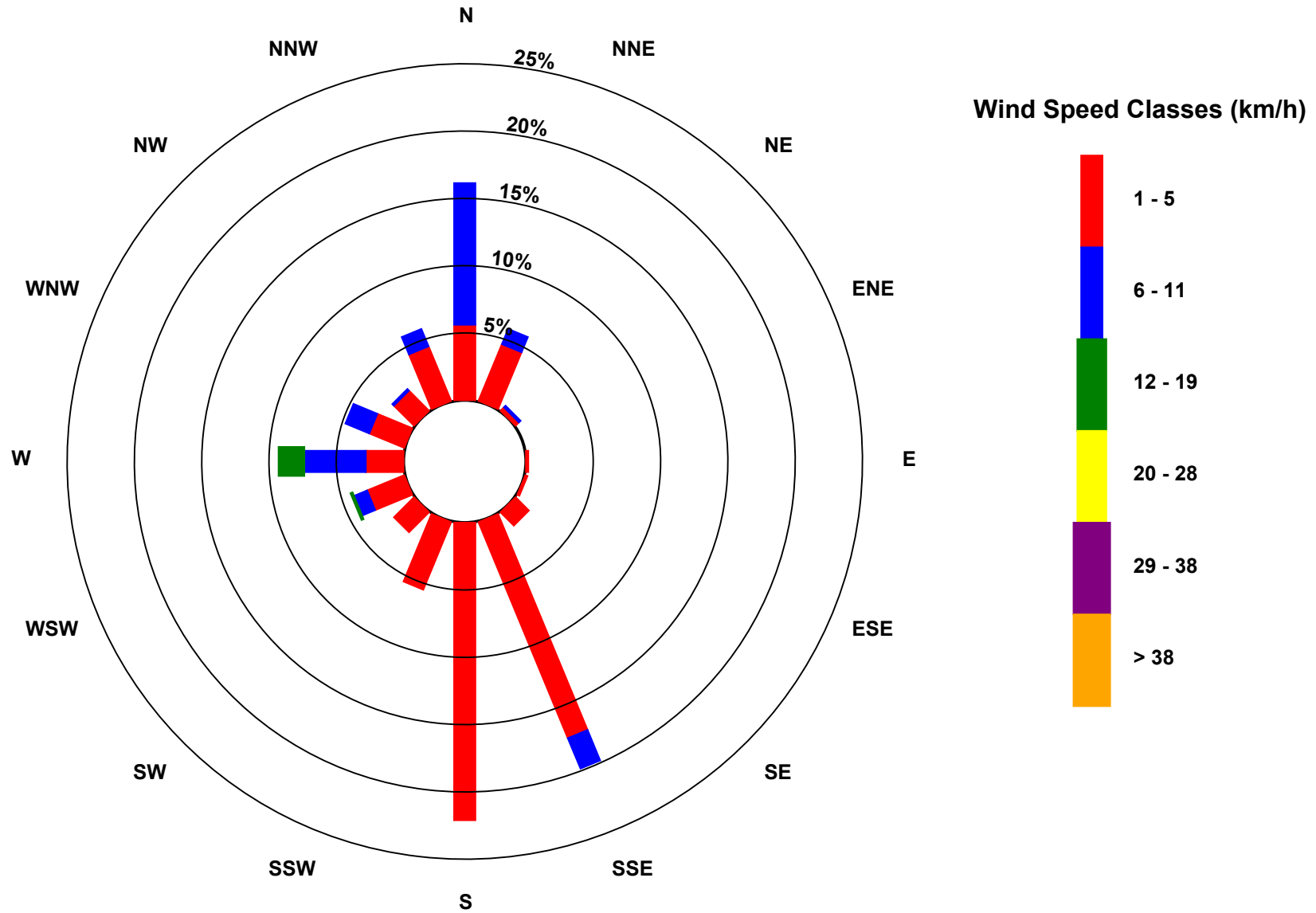
Hourly Averages

Wind Direction (WD) - deg
Valleyview - November 2019



Wind Rose

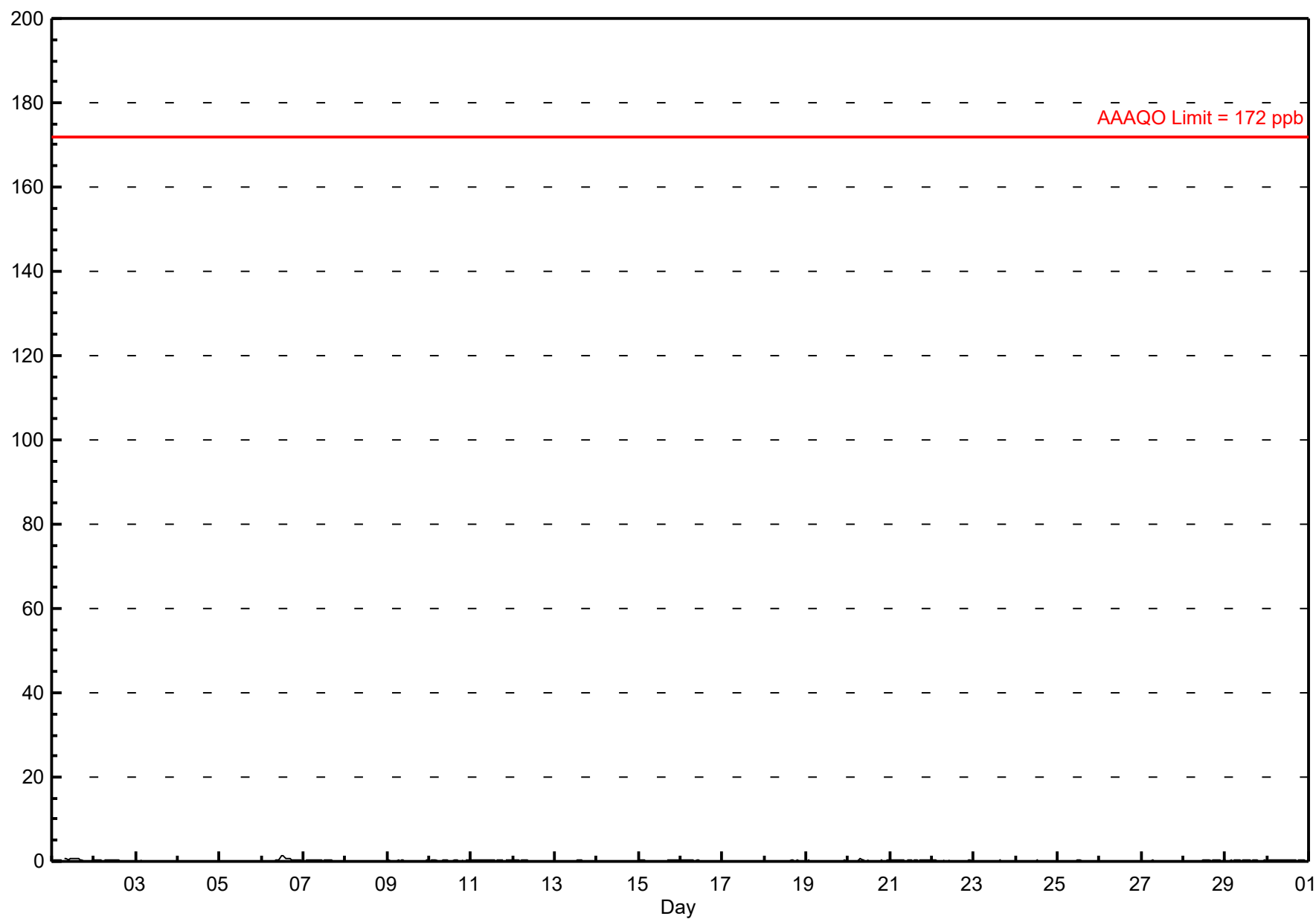
Wind Speed (WS) (km/h)
Valleyview - November 2019



Hourly Averages

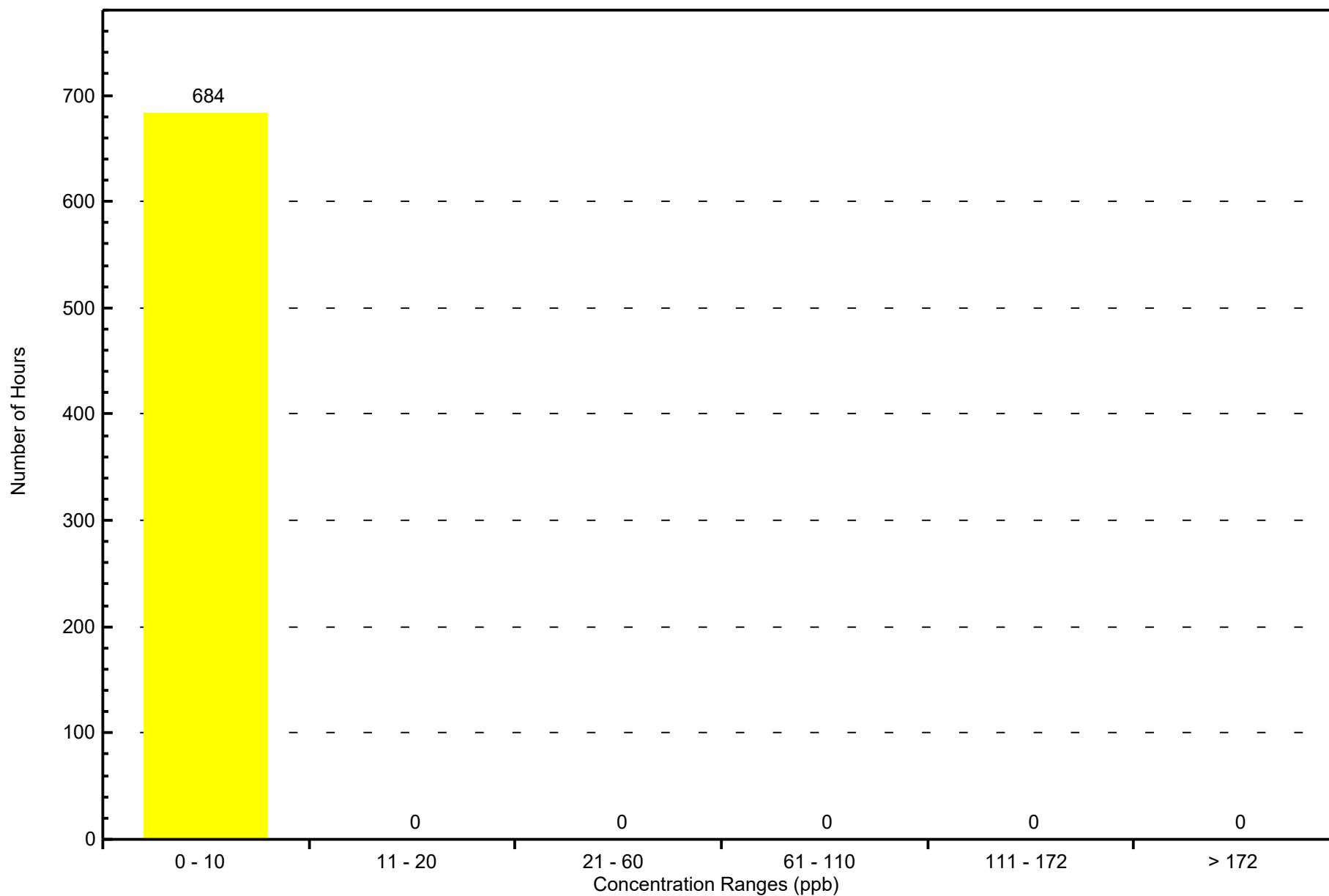
Sulphur Dioxide (SO₂) - ppb

Donnelly - November 2019



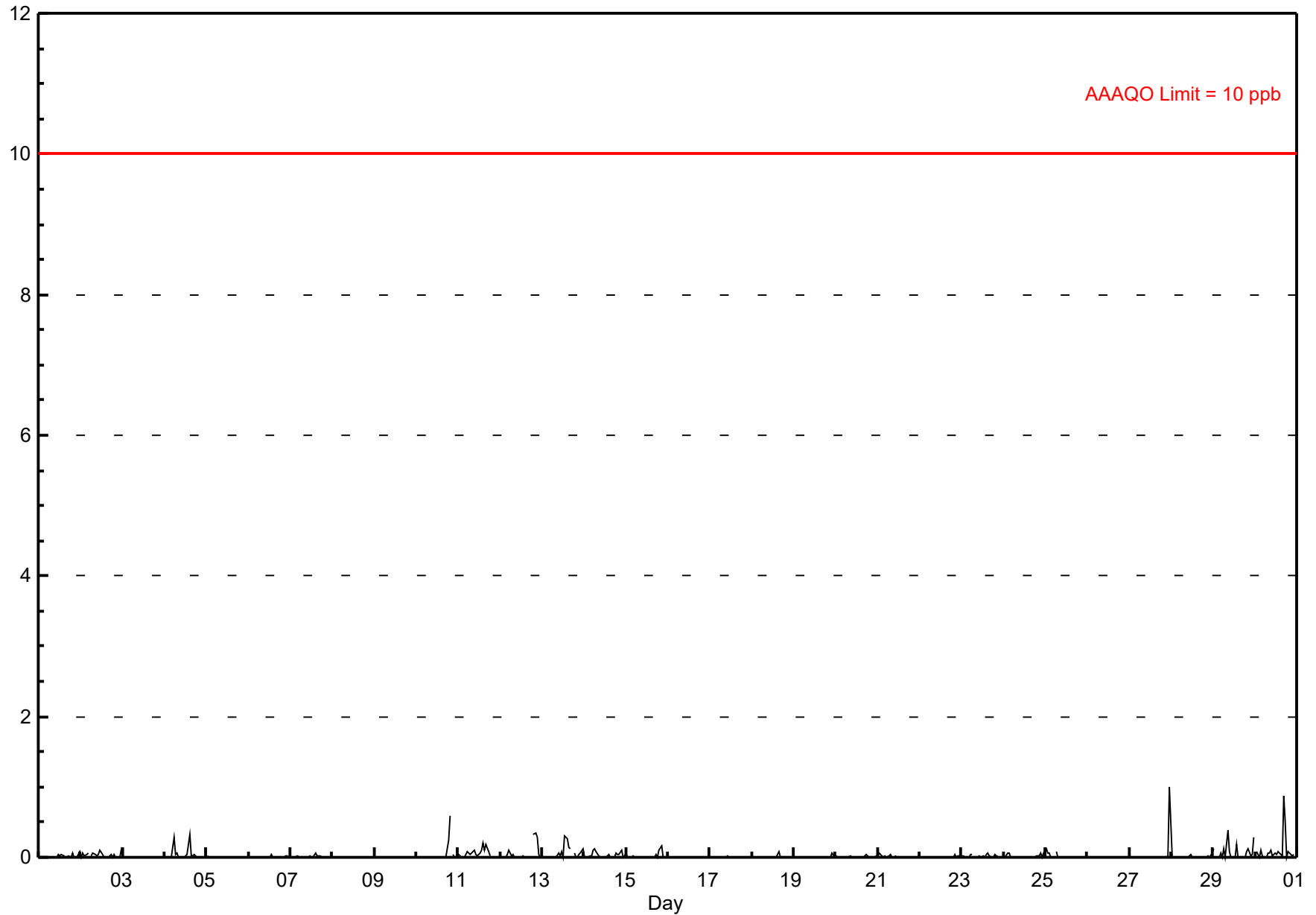
Histogram of Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Donnelly - November 2019



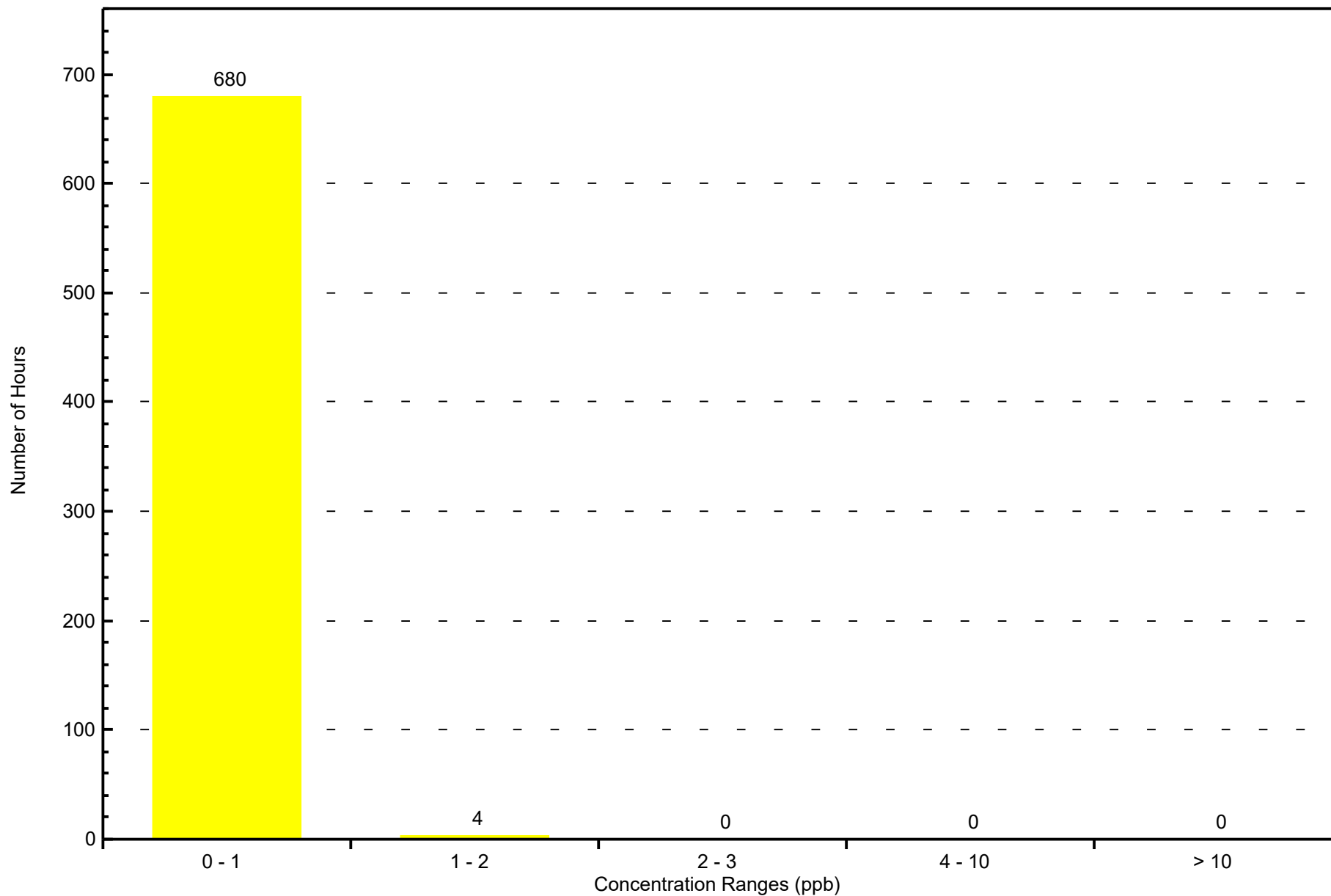
Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Donnelly - November 2019



Histogram of Hourly Averages

Hydrogen Sulphide (H₂S) - ppb
Donnelly - November 2019



Hourly Averages

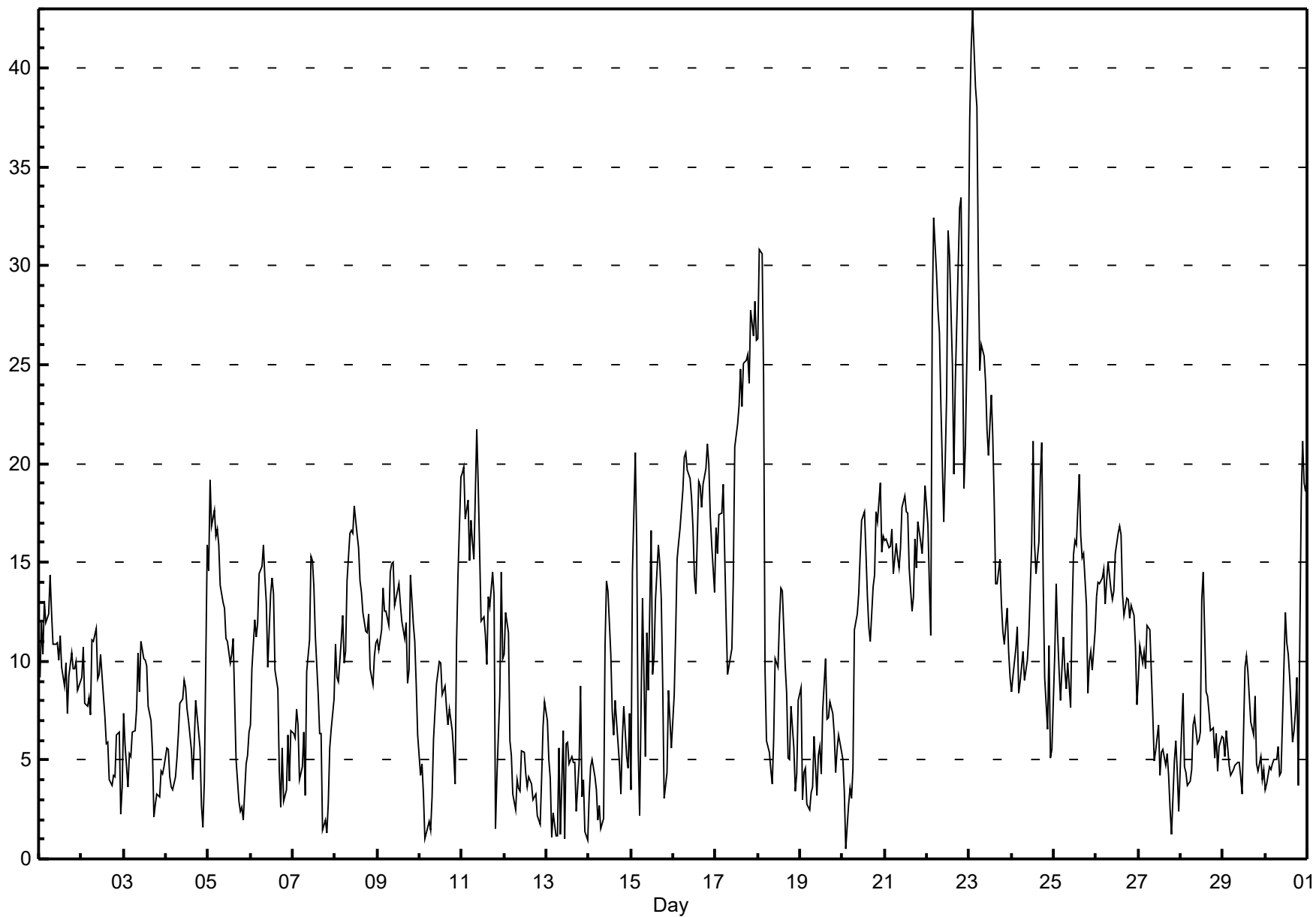
External Temperature (ET) - °C

Donnelly - November 2019



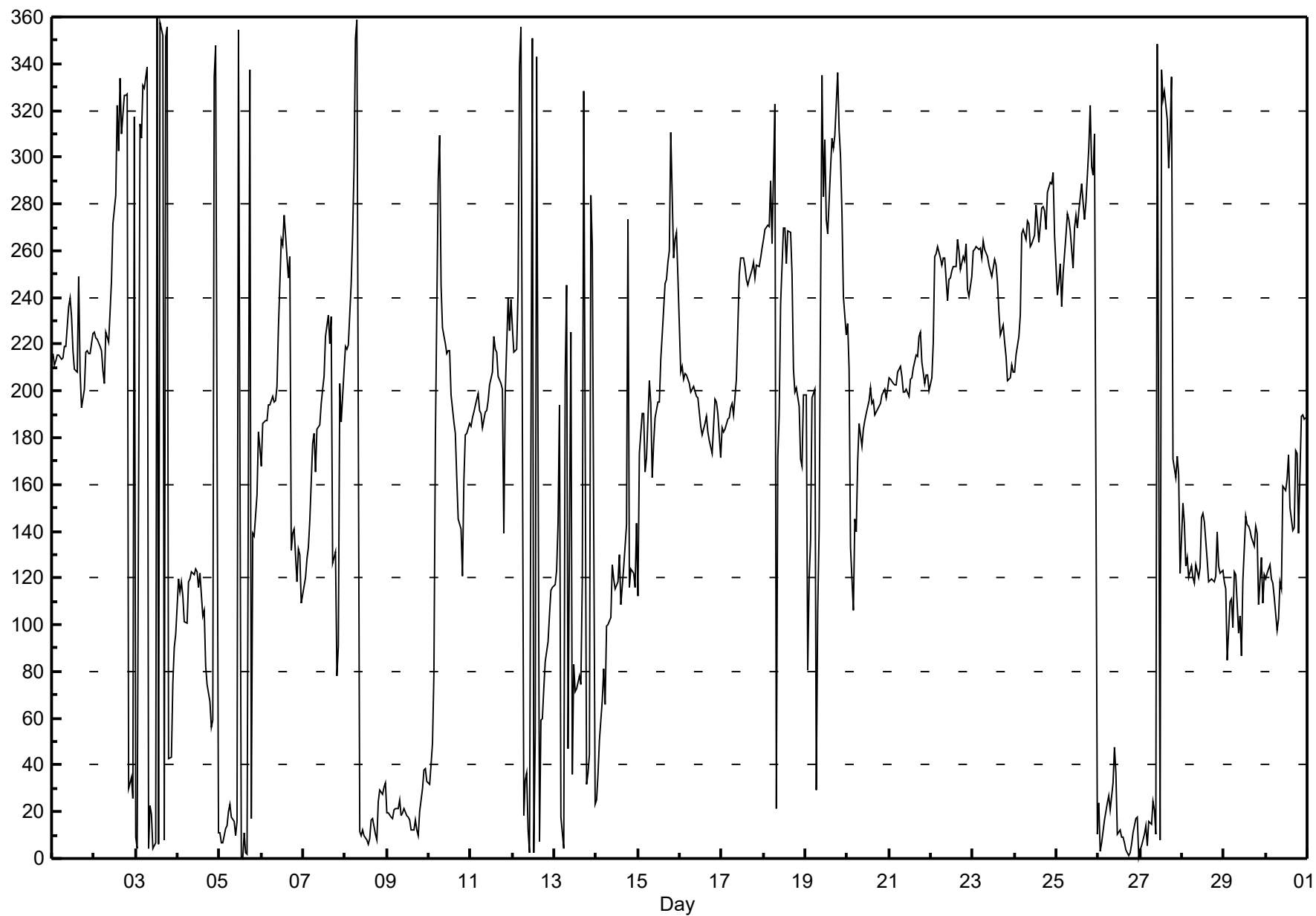
Hourly Averages

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



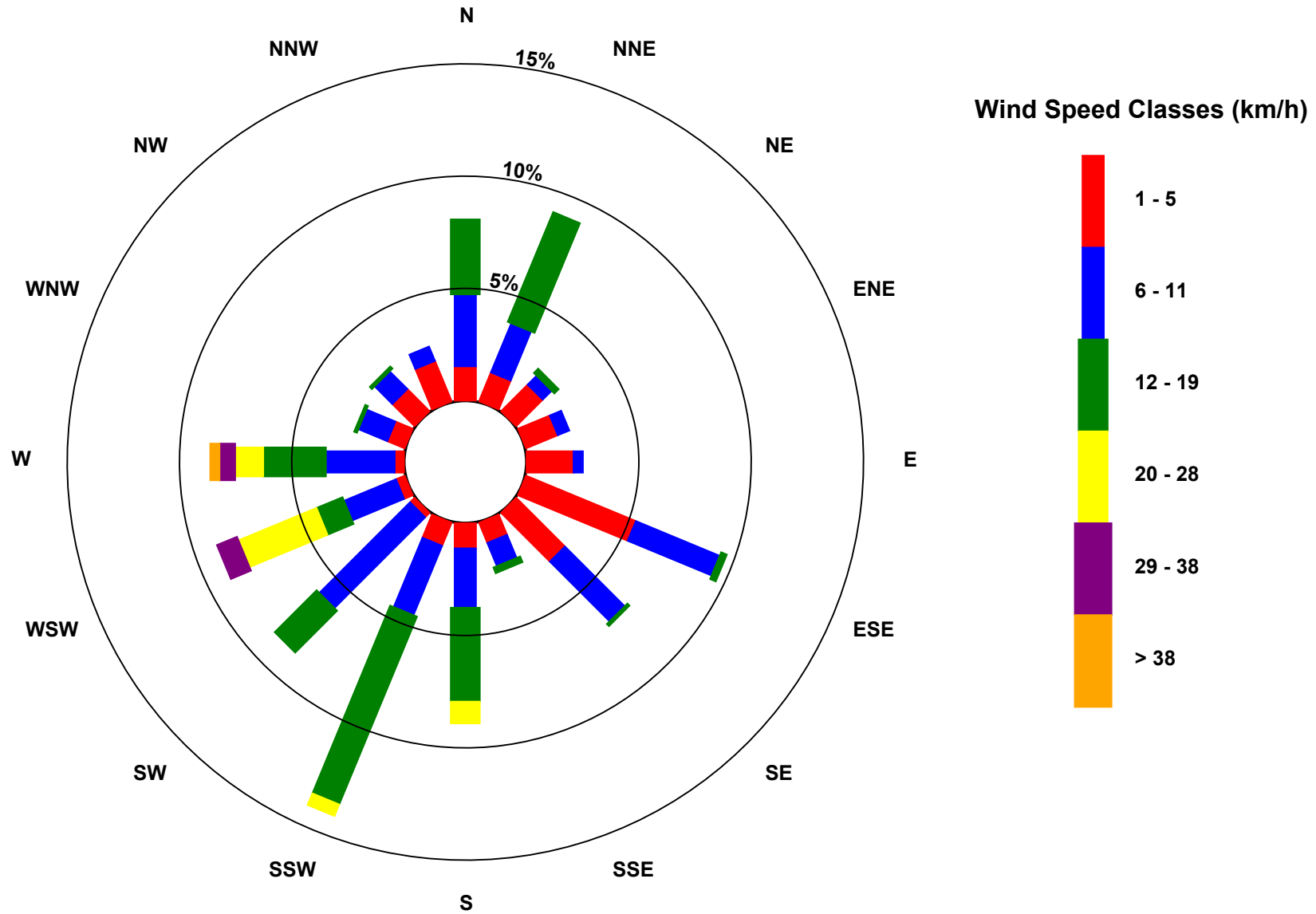
Hourly Averages

Wind Direction (WD) - deg
Donnelly - November 2019



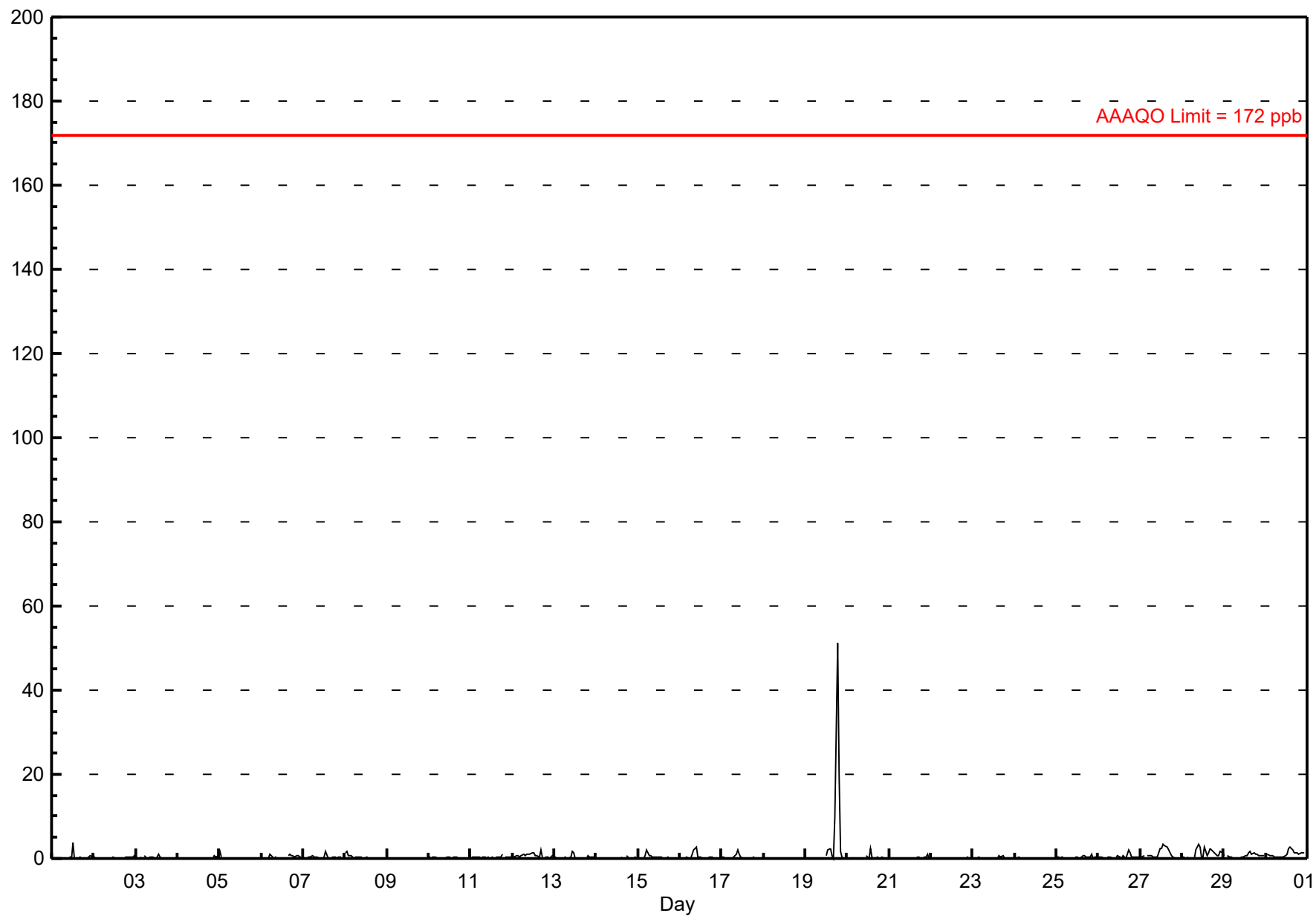
Wind Rose

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



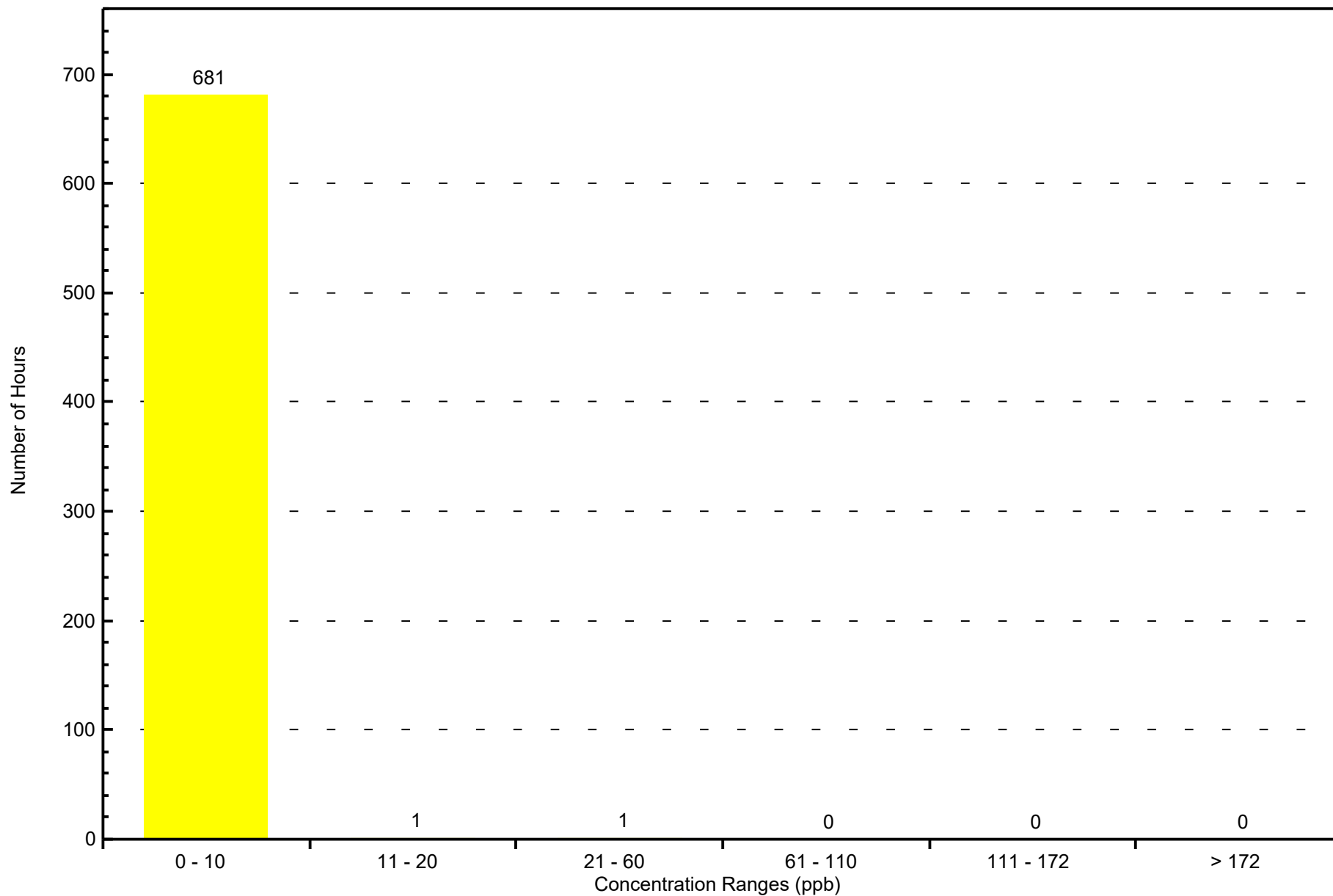
Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Wembley - November 2019



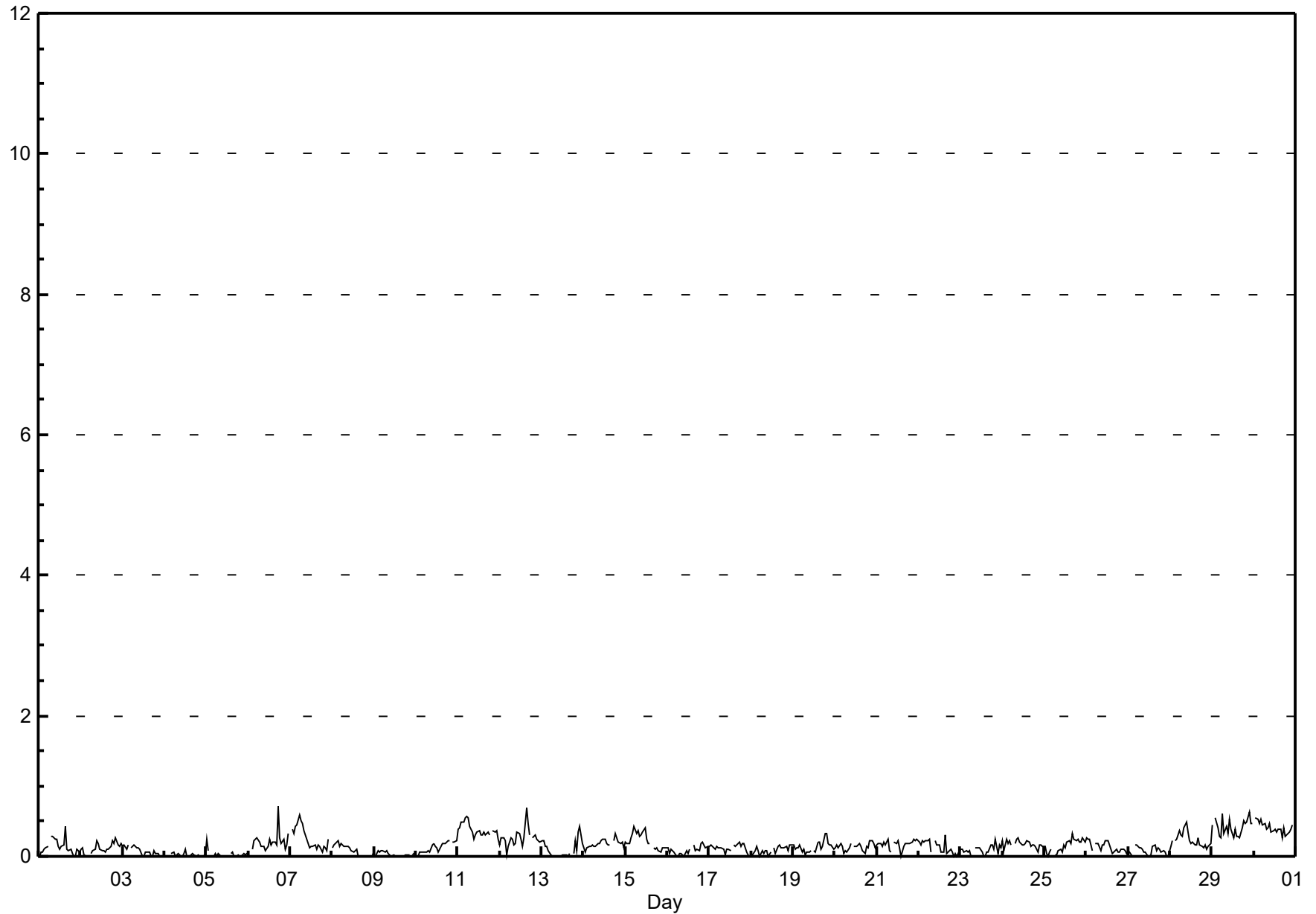
Histogram of Hourly Averages

Sulphur Dioxide (SO₂) - ppb
Wembley - November 2019



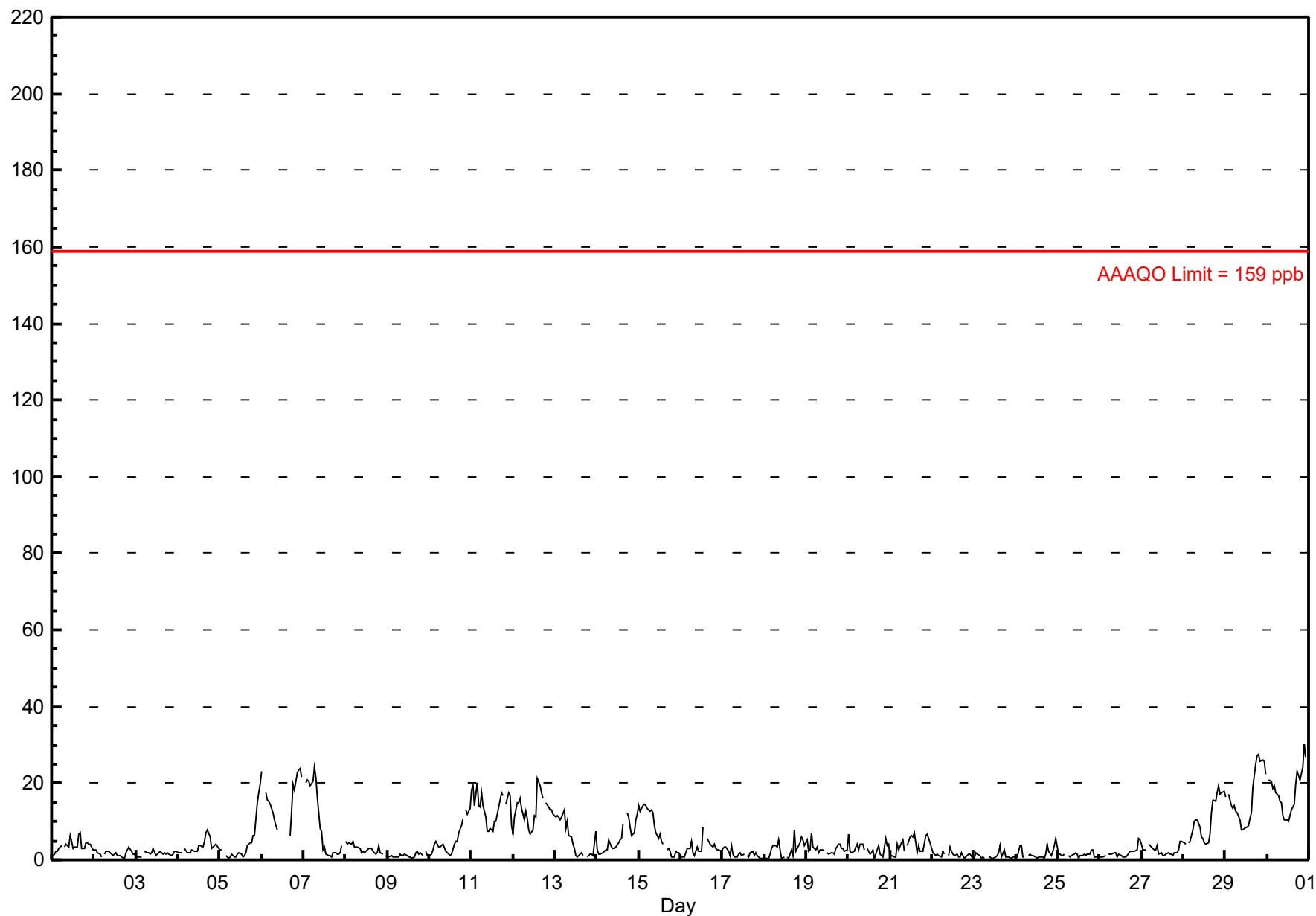
Hourly Averages

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



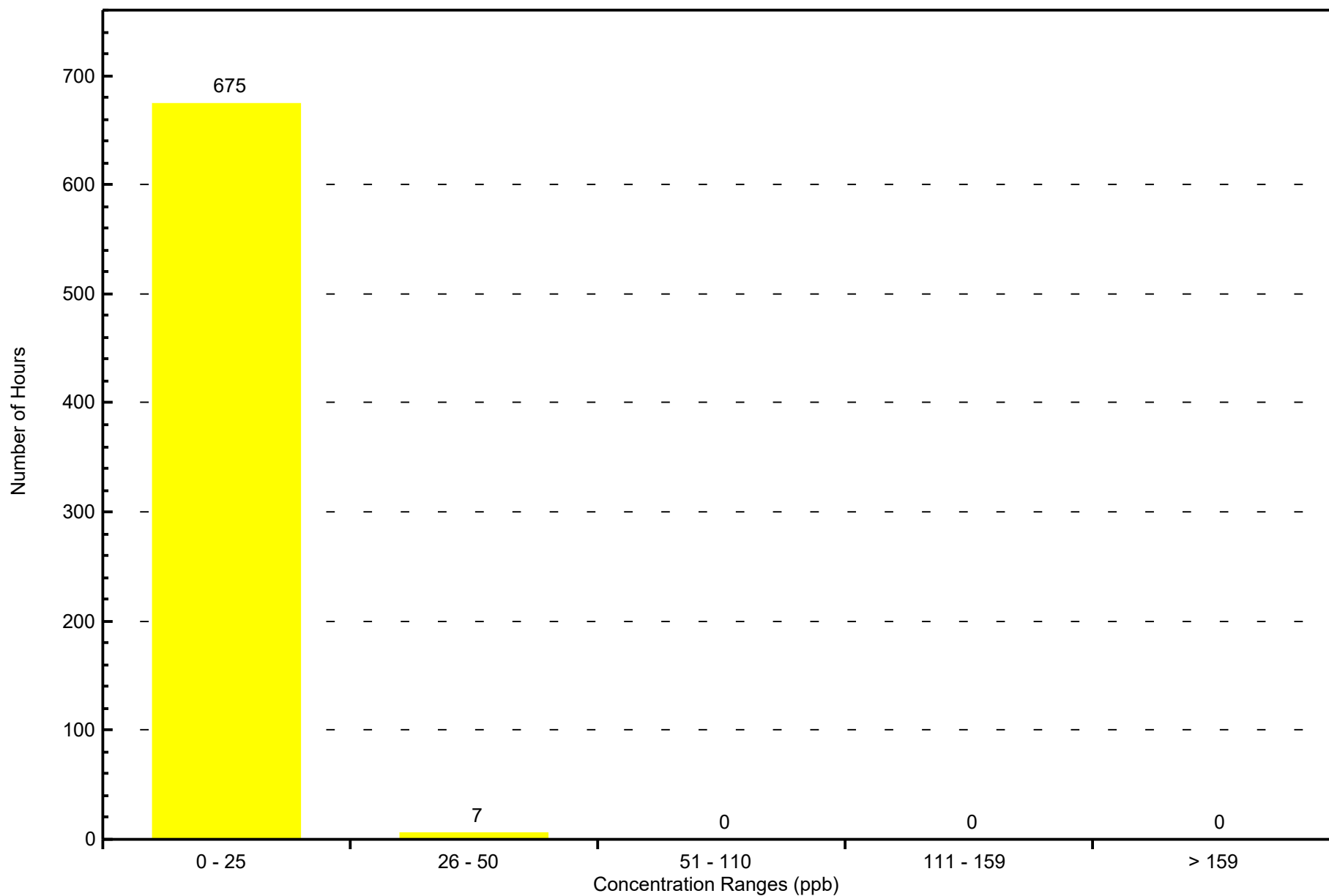
Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Wembley - November 2019



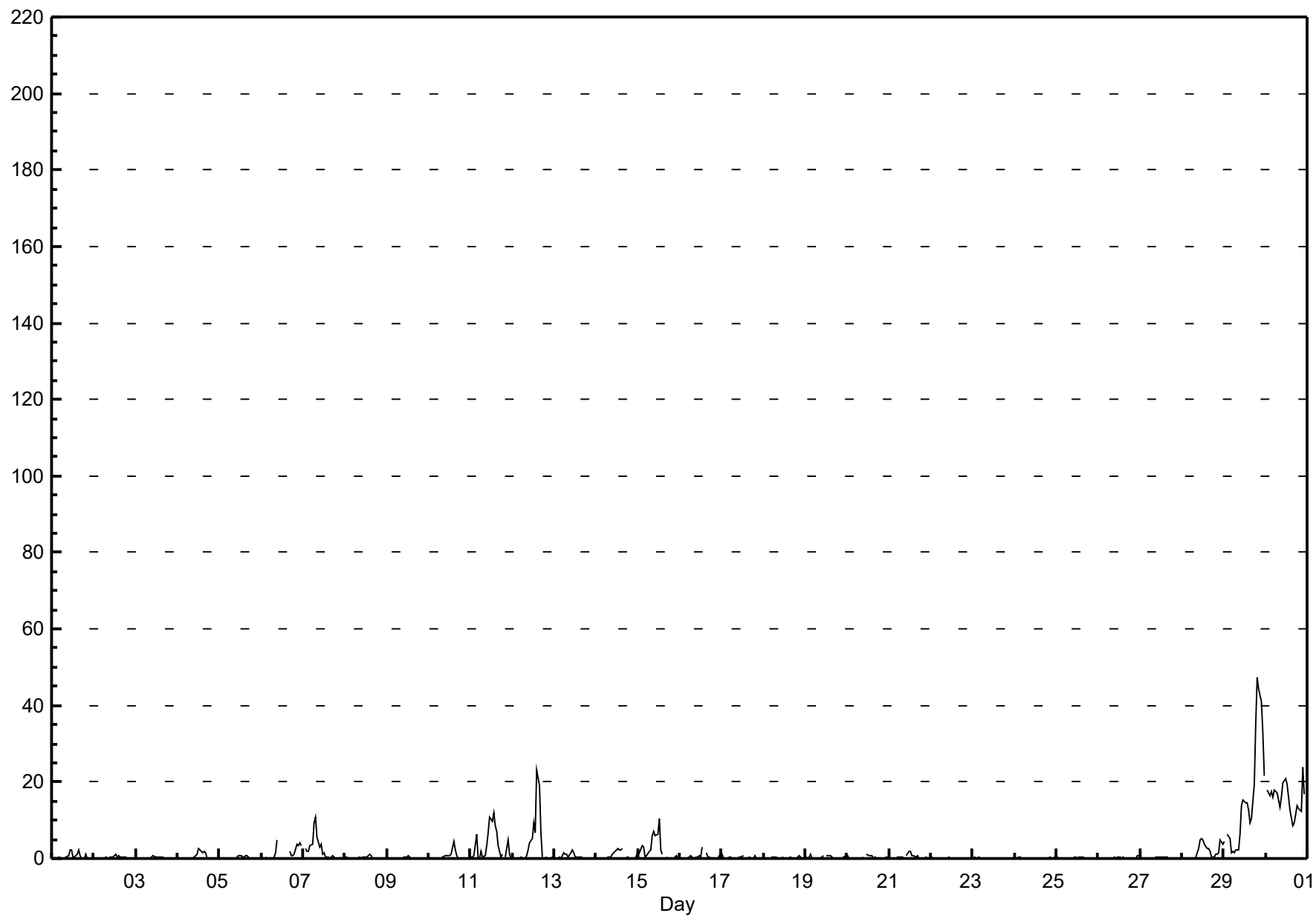
Histogram of Hourly Averages

Nitrogen Dioxide (NO₂) - ppb
Wembley - November 2019



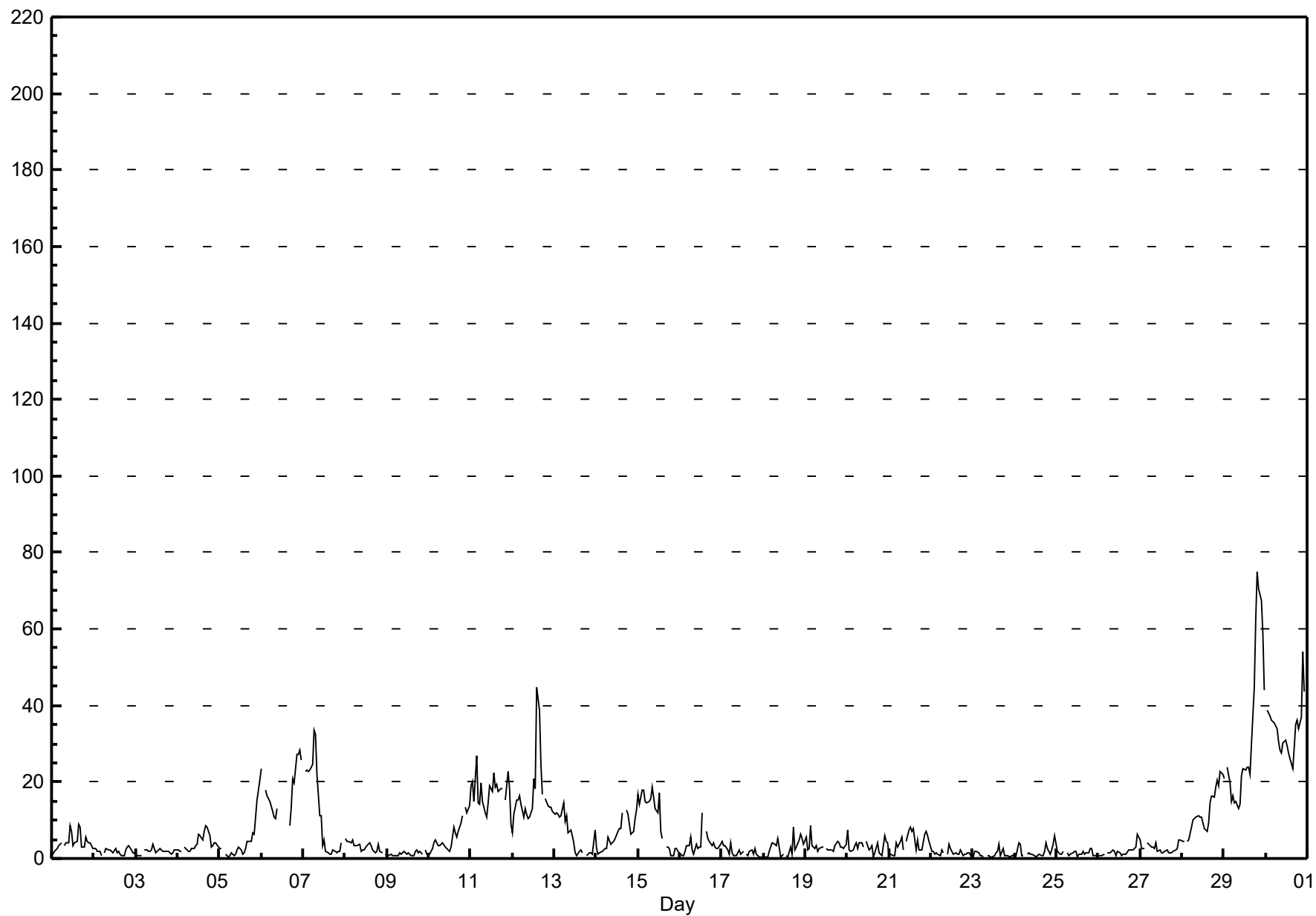
Hourly Averages

Nitrogen Oxide (NO) - ppb
Wembley - November 2019



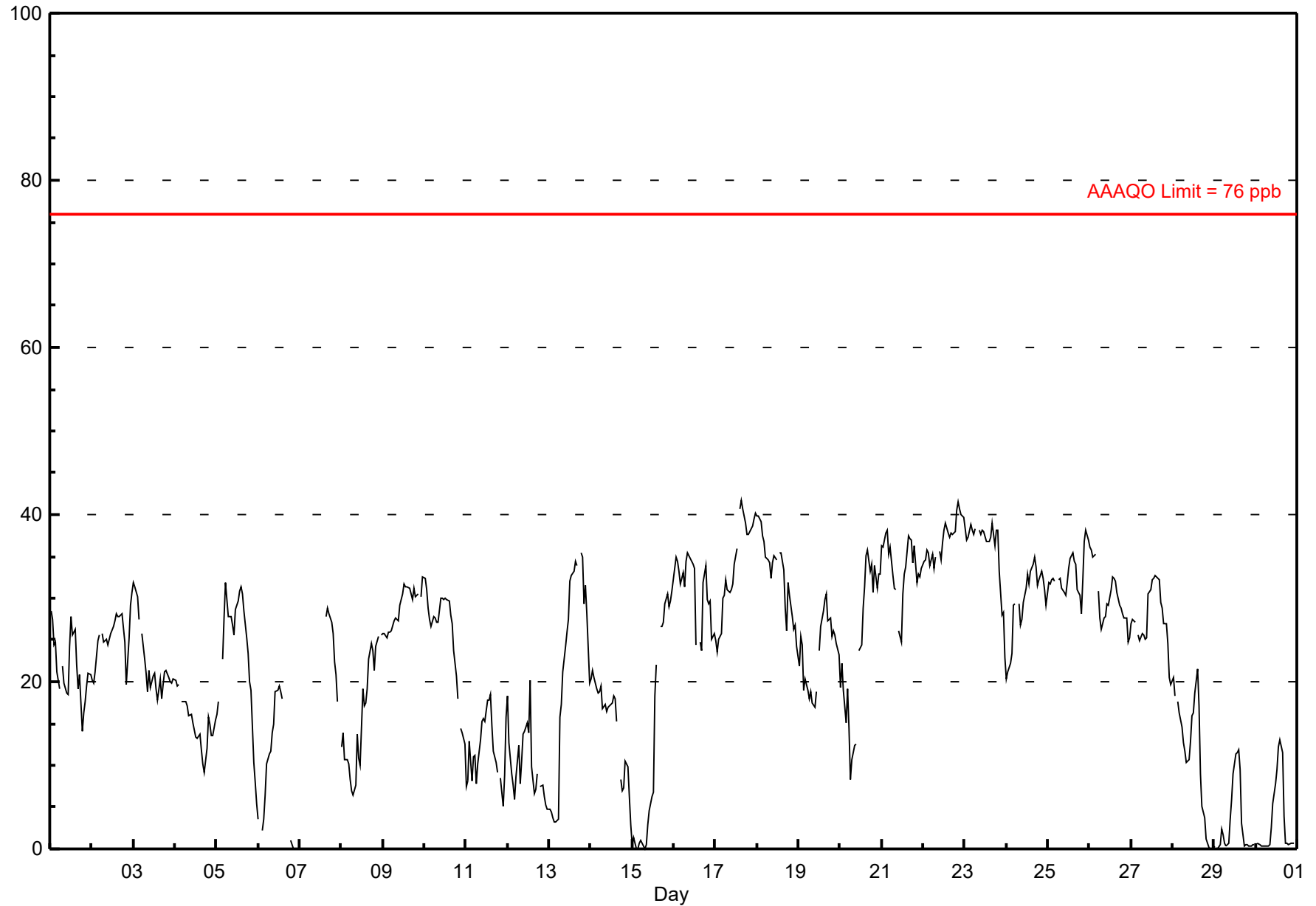
Hourly Averages

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



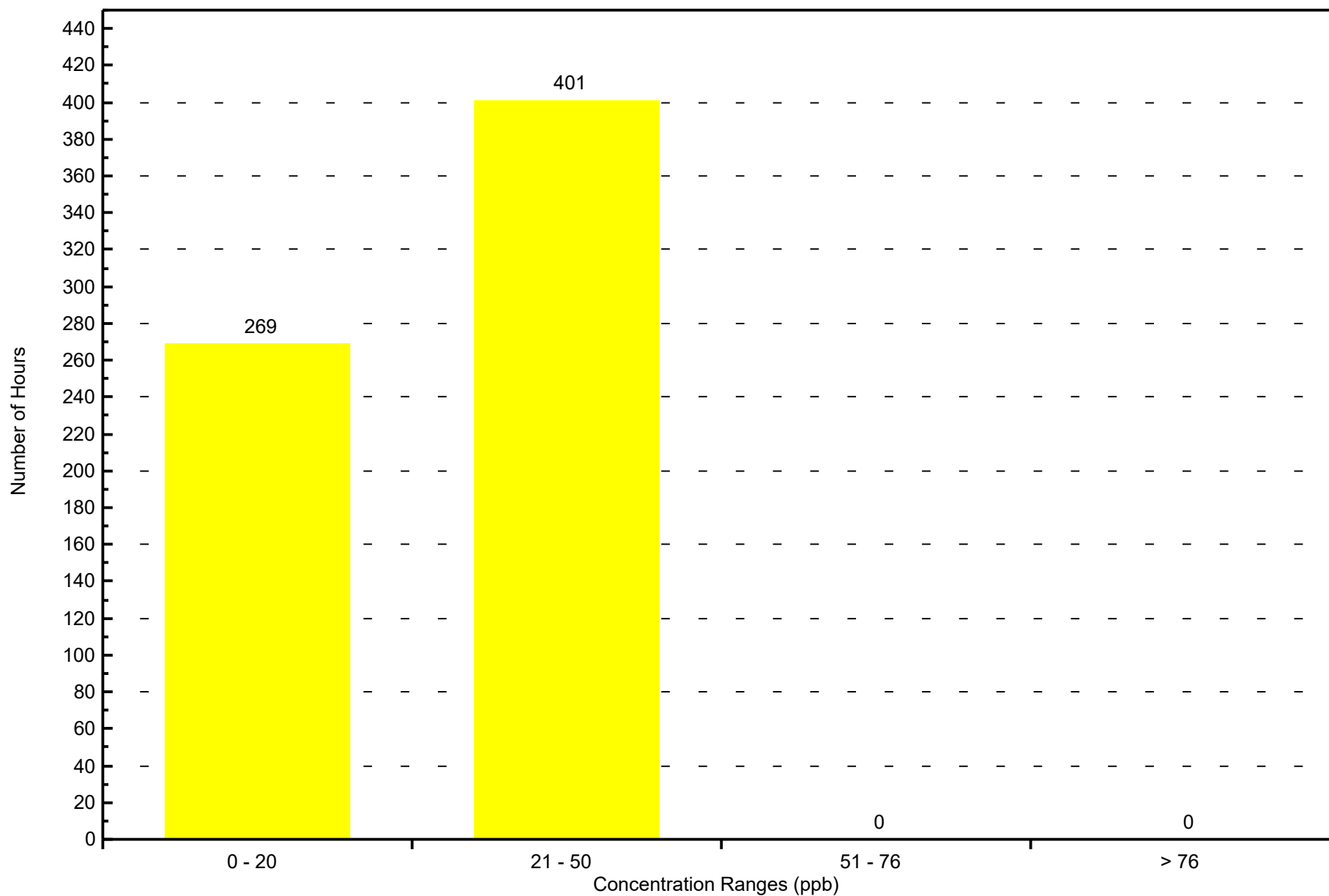
Hourly Averages

Ozone (O₃) - ppb
Wembley - November 2019



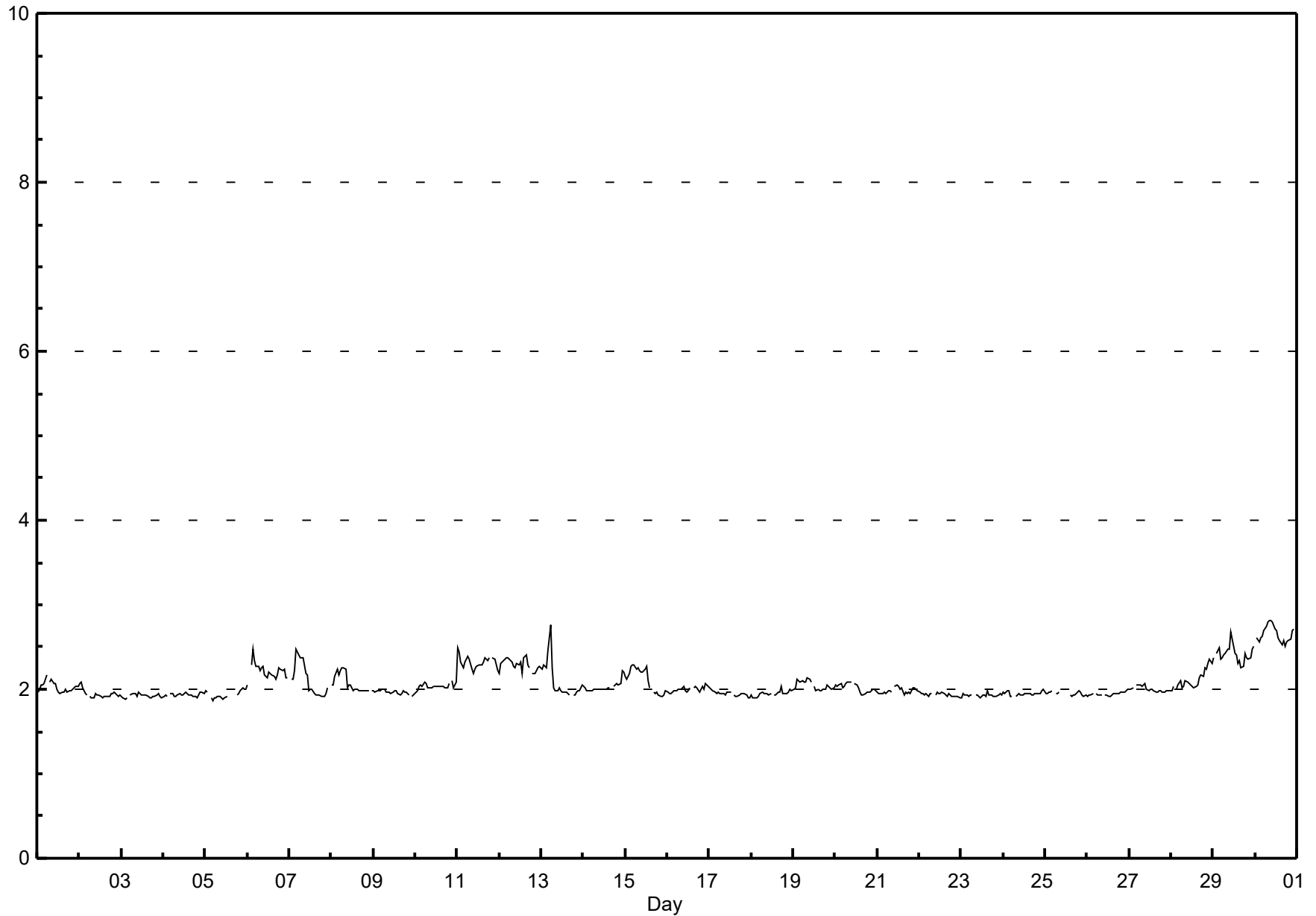
Histogram of Hourly Averages

Ozone (O₃) - ppb
Wembley - November 2019



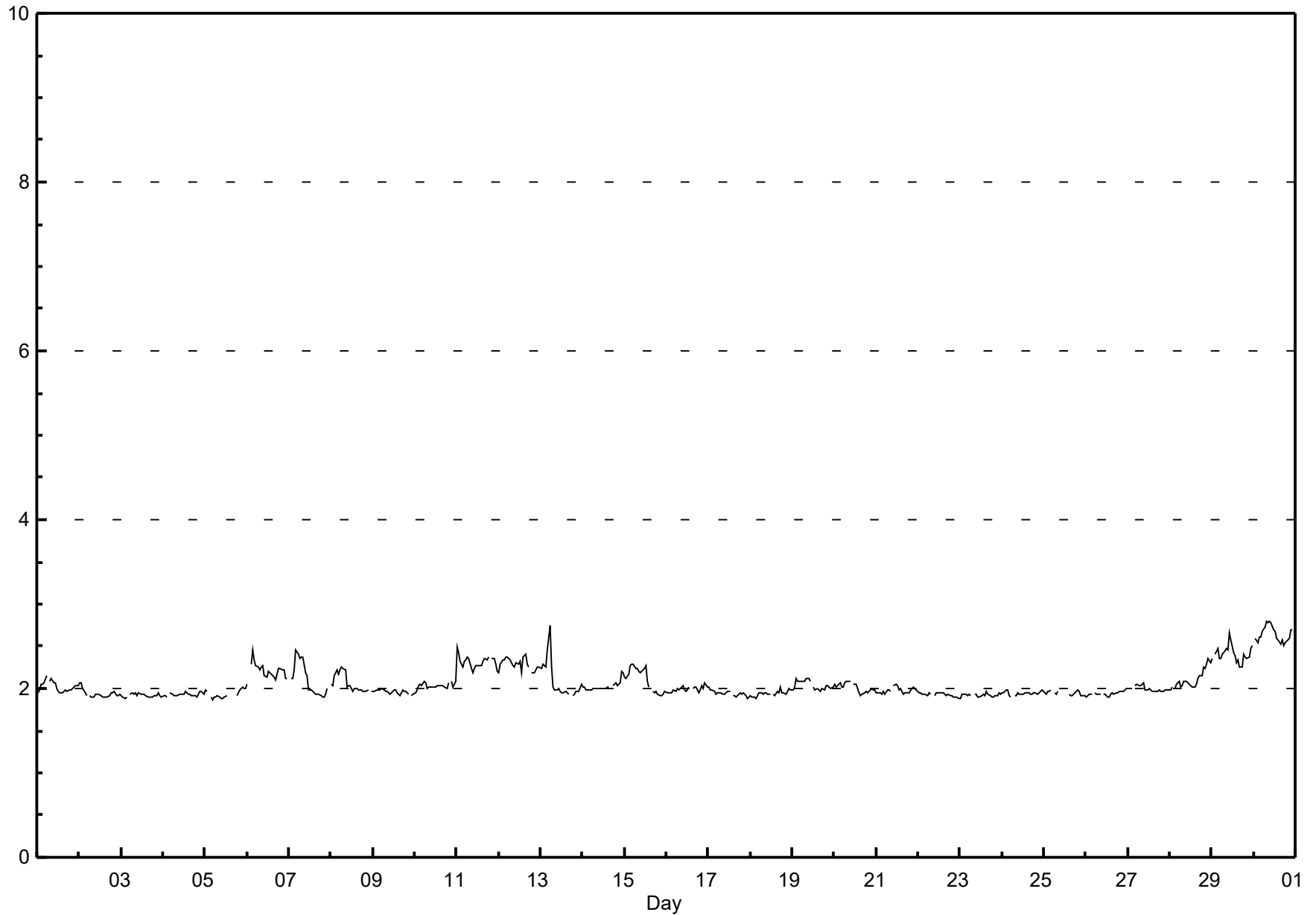
Hourly Averages

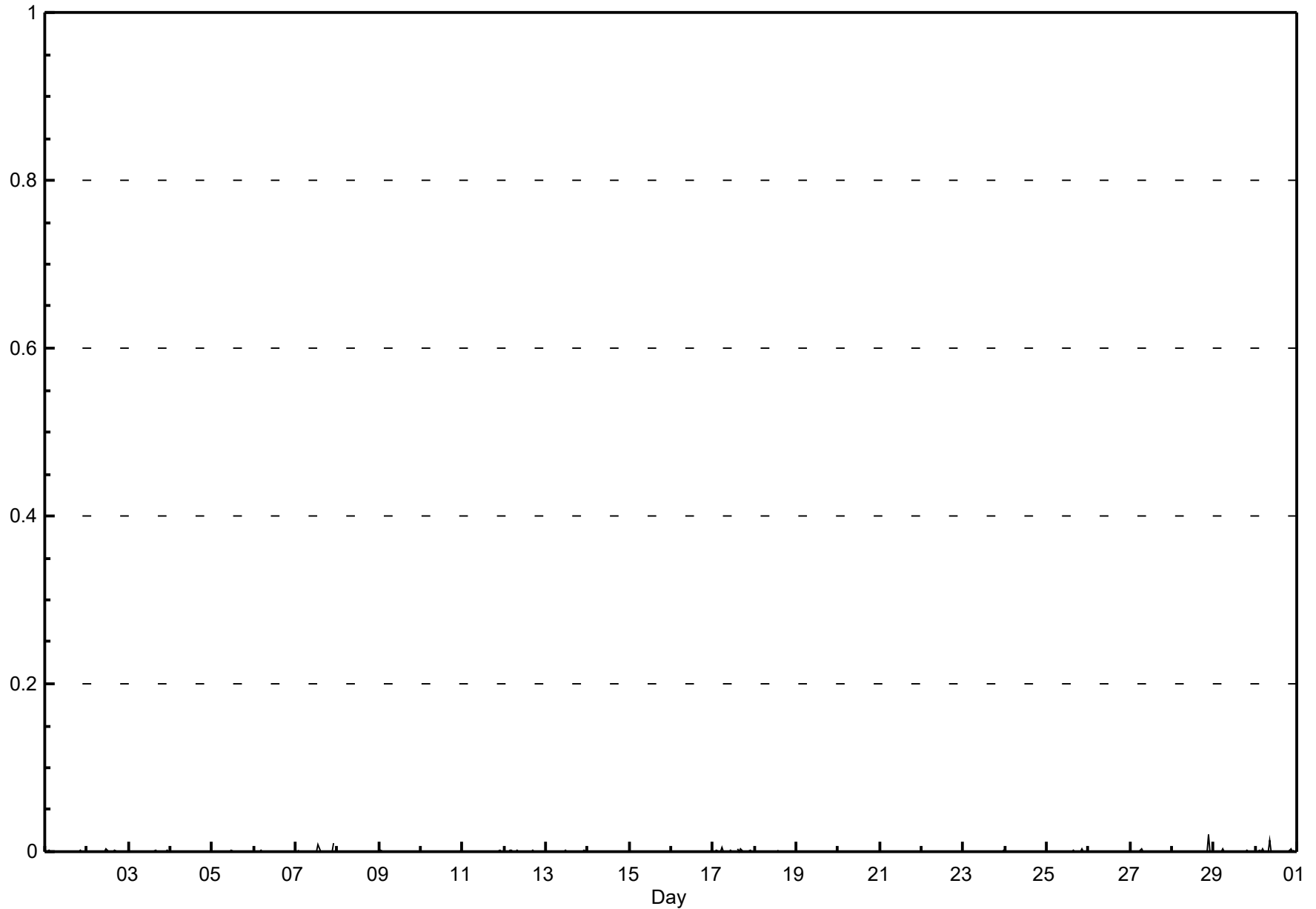
Total Hydrocarbons (THC) - ppm
Wembley - November 2019



Hourly Averages

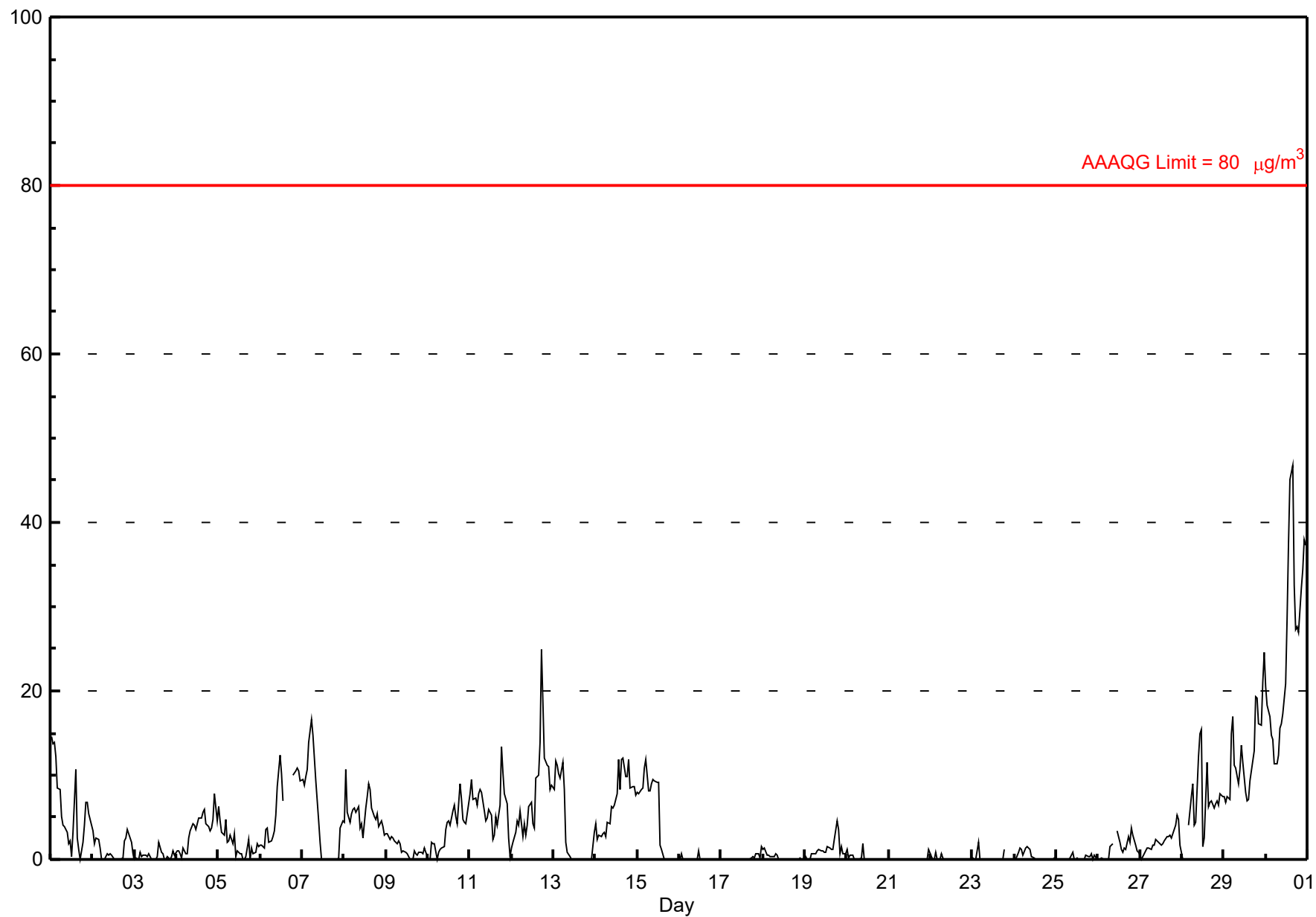
Methane (CH₄) - ppm
Wembley - November 2019





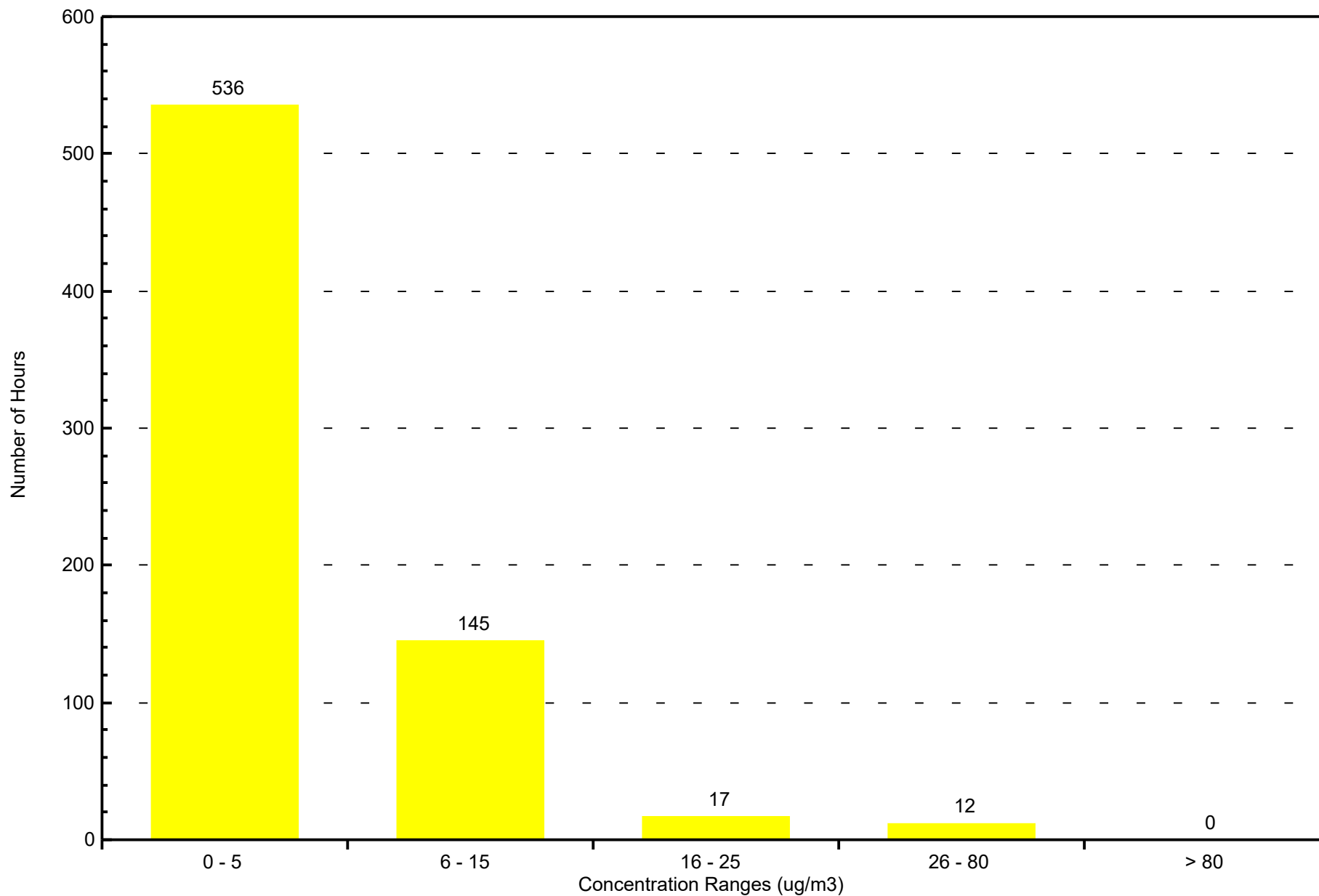
Hourly Averages

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



Histogram of Hourly Averages

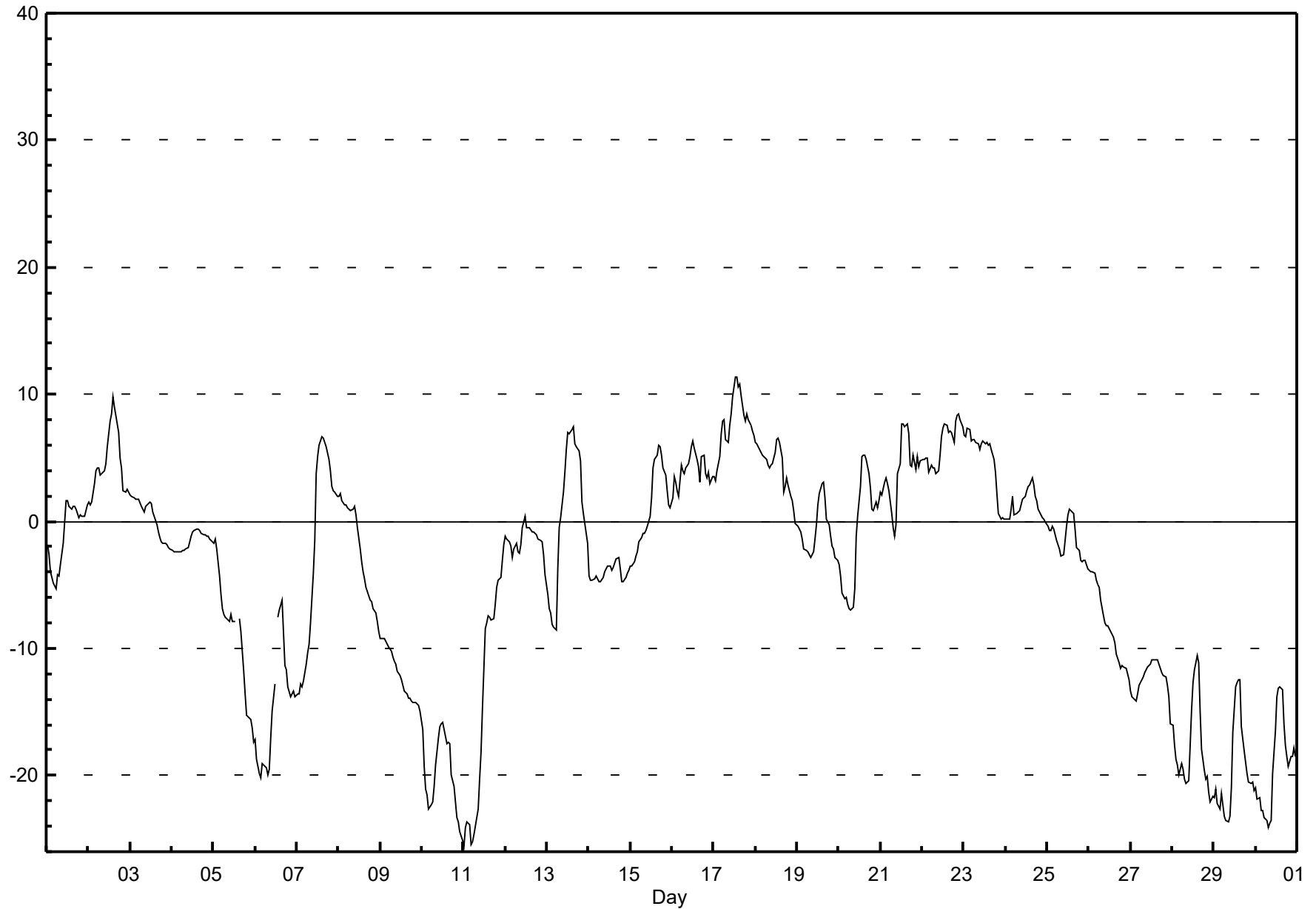
PM_{2.5} (PM_{2.5}) - $\mu\text{g}/\text{m}^3$
Wembley - November 2019



Hourly Averages

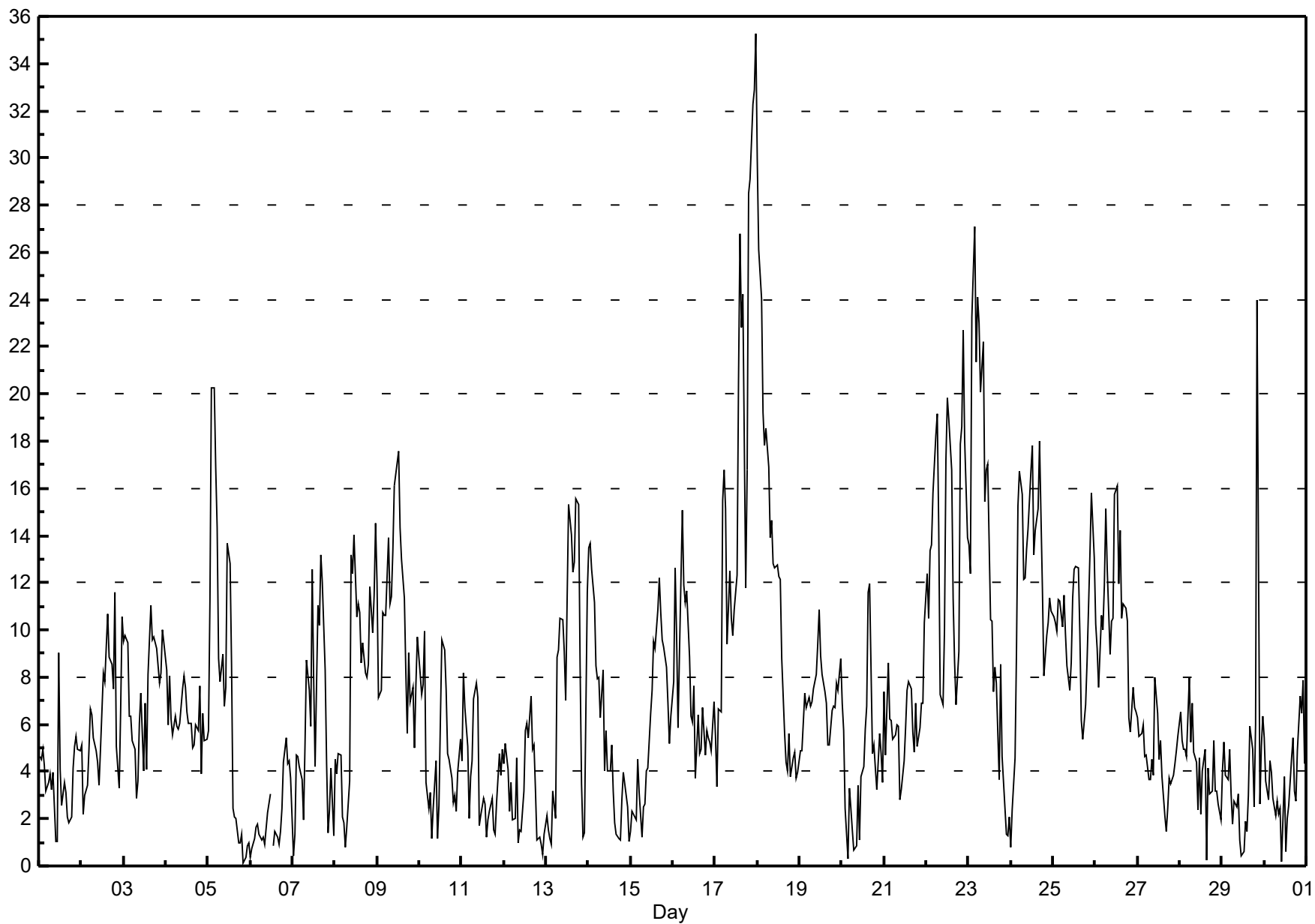
External Temperature (ET) - °C

Wembley - November 2019



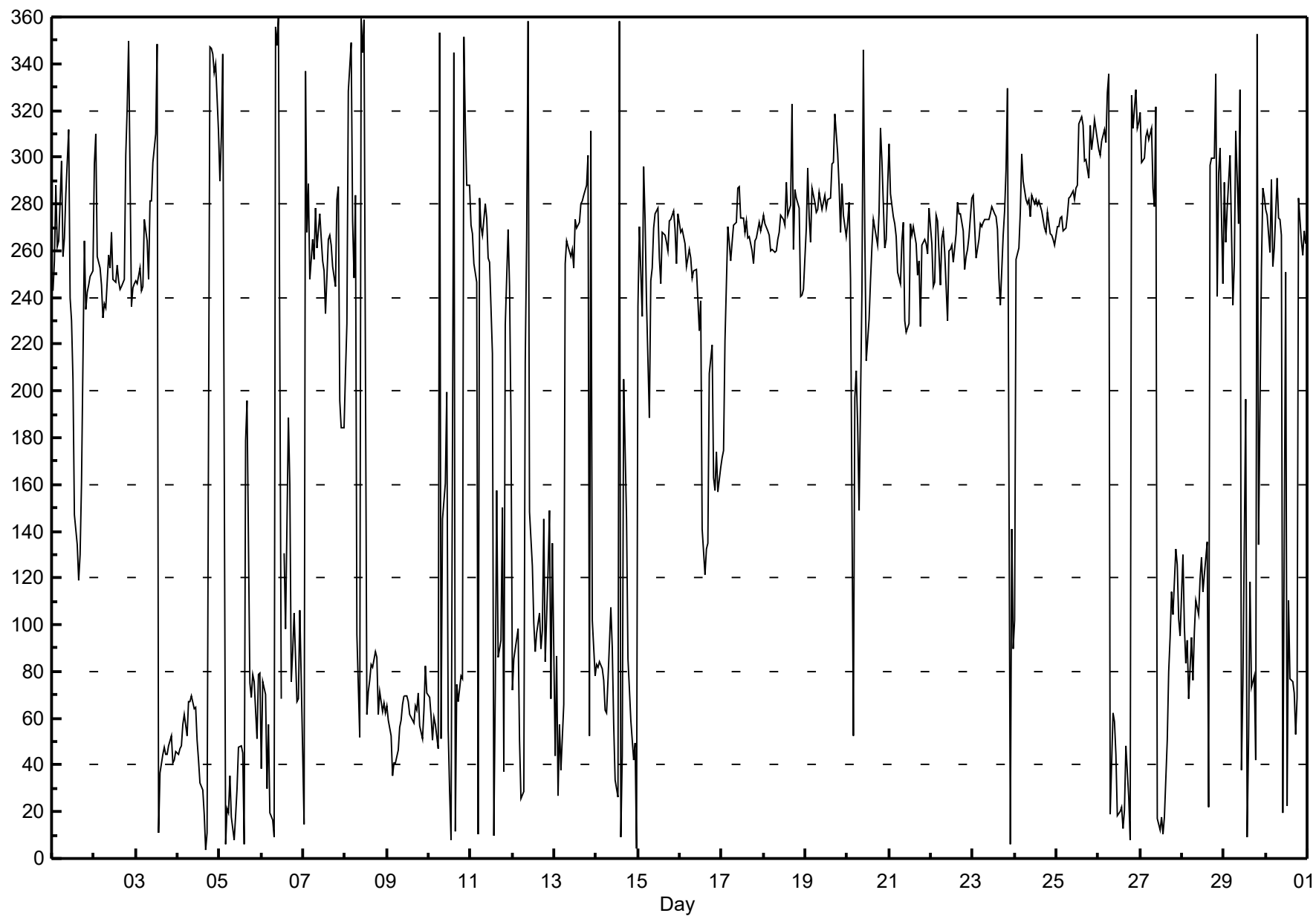
Hourly Averages

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



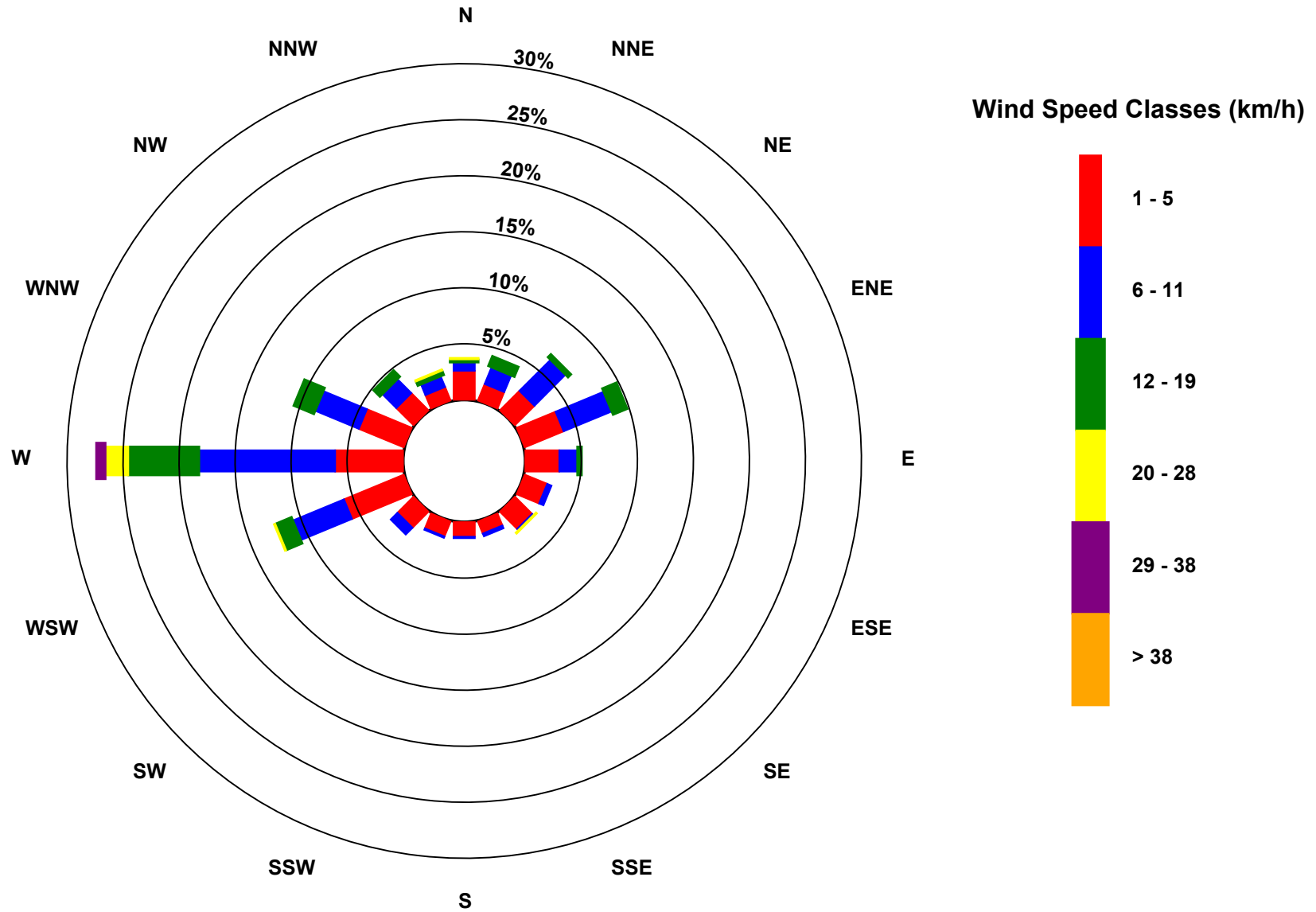
Hourly Averages

Wind Direction (WD) - deg
Wembley - November 2019



Wind Rose

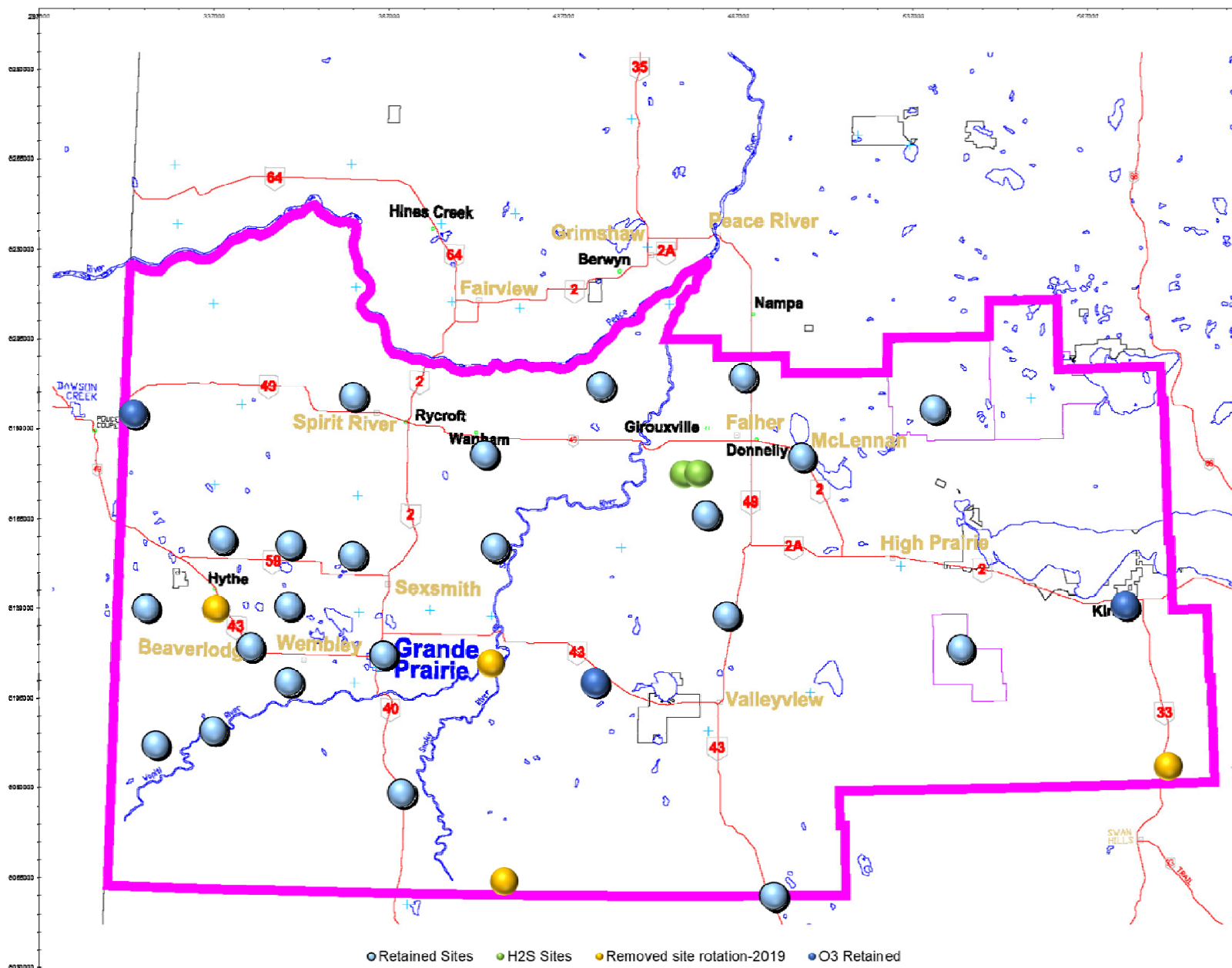
Wind Speed (WS) (km/h)
Wembley - November 2019



PAZA

Monthly Passive Data Summary

Location of PAZA Passive Monitoring Stations



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

Station Number	Station Name	SO2 ppb	O3 ppb	NO2 ppb	H2S ppb	Site Legal
Duplicates						
2a	Bay Tree		35.0			
2b	Bay Tree		36.7			
9a	Spirit River			1.7		
9b	Spirit River			1.4		
11a	Webber Creek			4.3		
11b	Webber Creek			4.3		
17a	Poplar	0.5				
17b	Poplar	0.7				
18a	Saddle Hills	0.3				
18b	Saddle Hills	0.3				
35a	Jean Cote			1.0		
35b	Jean Cote			1.4		
36a	Guy	0.2				
36b	Guy	0.2				
63a	Girouxville 3				0.3	
63b	Girouxville 3				0.3	
2	Bay Tree	0.3	35.8	1.3		13-16-078-13 W6M
5	Boone Creek	0.3		0.3		16-36-074-11 W6M
7	Steeprock Creek	0.4		0.4		09-35-072-13 W6M
9	Spirit River	0.3		1.5		08-12-079-07 W6M
11	Webber Creek	0.3		4.3		09-36-074-09 W6M
12	Hythe	0.3		0.3		14-36-072-11 W6M
14	Sylvester	0.1		0.1		08-06-069-12 W6M
16	Beaverlodge	1.0		4.2		15-36-071-10 W6M
17	Poplar	0.6		3.2		13-06-073-08 W6M
18	Saddle Hills	0.3		1.2		04-25-074-07 W6M
19	Wanham	0.6		1.9		16-22-077-03 W6M
21	Eaglesham	0.1		0.9		16-21-079-25 W5M
24	Wembley	0.5		3.5		12-31-070-08 W6M
25	Pinto Creek	0.2		1.0		04-24-069-11 W6M
27	Grande Prairie I	0.5		12.5		08-15-071-06 W6M
29	Smoky Heights	0.5		0.5		04-06-075-02 W6M
32	Gold Creek	0.3		4.9		06-33-067-05 W6M
33	Wapiti	0.2		3.0		02-25-071-03 W6M
35	Jean Cote	0.2		1.2		12-35-079-21 W5M
36	Guy	0.2		0.9	0.1	03-04-076-22 W5M
37	Crooked Creek	0.2	31.4	2.4		16-01-071-26 W5M
38	Karr Creek	0.1		2.2		10-16-065-02 W6M
39	Clouston Creek	0.3		1.3		12-01-073-22 W5M
40	McLennan	0.2		1.3		03-29-077-19 W5M
44	Peavine	0.1		0.9		03-05-079-15 W5M
46	Little Smoky	0.3		4.0		12-01-065-21 W5M
47	Kinuso	0.2	33.9	1.0		12-10-073-10 W5M
48	Deer Mountain 2	0.2		0.9		*
49	Grande Prairie HP	0.4		9.9		17-26-071-06 W6M
50	East Prairie	0.1		0.5		13-02-072-15 W5M
63	Girouxville 3				0.3	14-02-077-23 W5M
64	Girouxville 4				BDL	4-08-077-22 W5M

*BDL = Below Detection Level

*N/S - No sample

Passive Summary for November 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 November 2019 (PAZA Zone)				
Mean	0.3	33.7	2.4	0.2
Standard Deviation	0.2	2.2	2.8	0.2
Minimum	0.1	31.4	0.1	0.1
Minimum At	Peavine (#44)	Crooked Creek (#37)	Sylvester (#14)	Guy (#36)
Maximum	1.0	35.8	12.5	0.3
Maximum At	Beaverlodge (#16)	Bay Tree (#2)	Grande Prairie I (#27)	Girouxville 3 (#63)

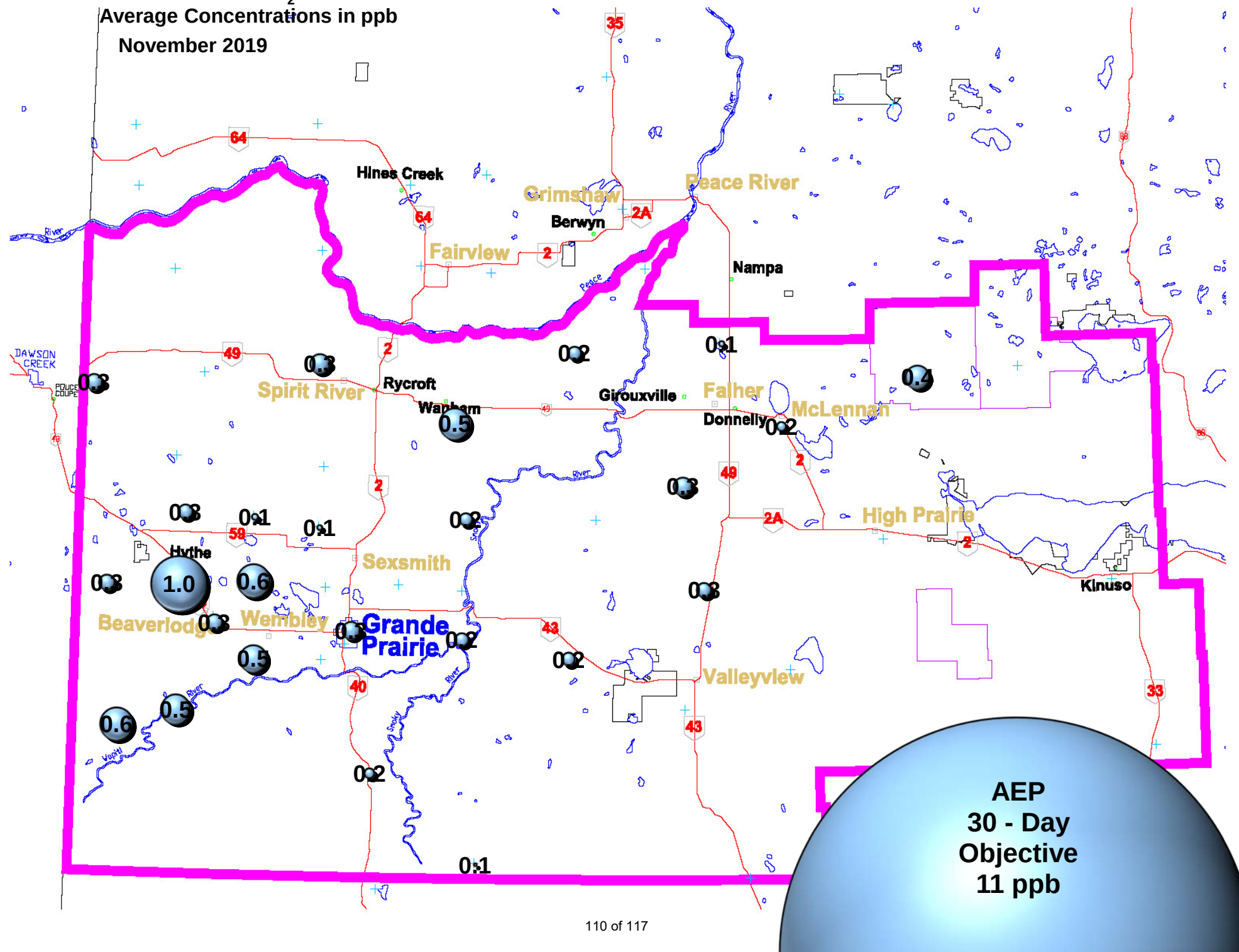
Comparison between Continuous and Passive monitoring at Beaverlodge (passive #16 Beaverlodge)

	SO ₂	NO ₂
PAZA Beaverlodge station	1.0	6.4
PAZA Beaverlodge passive	0.1	0.1

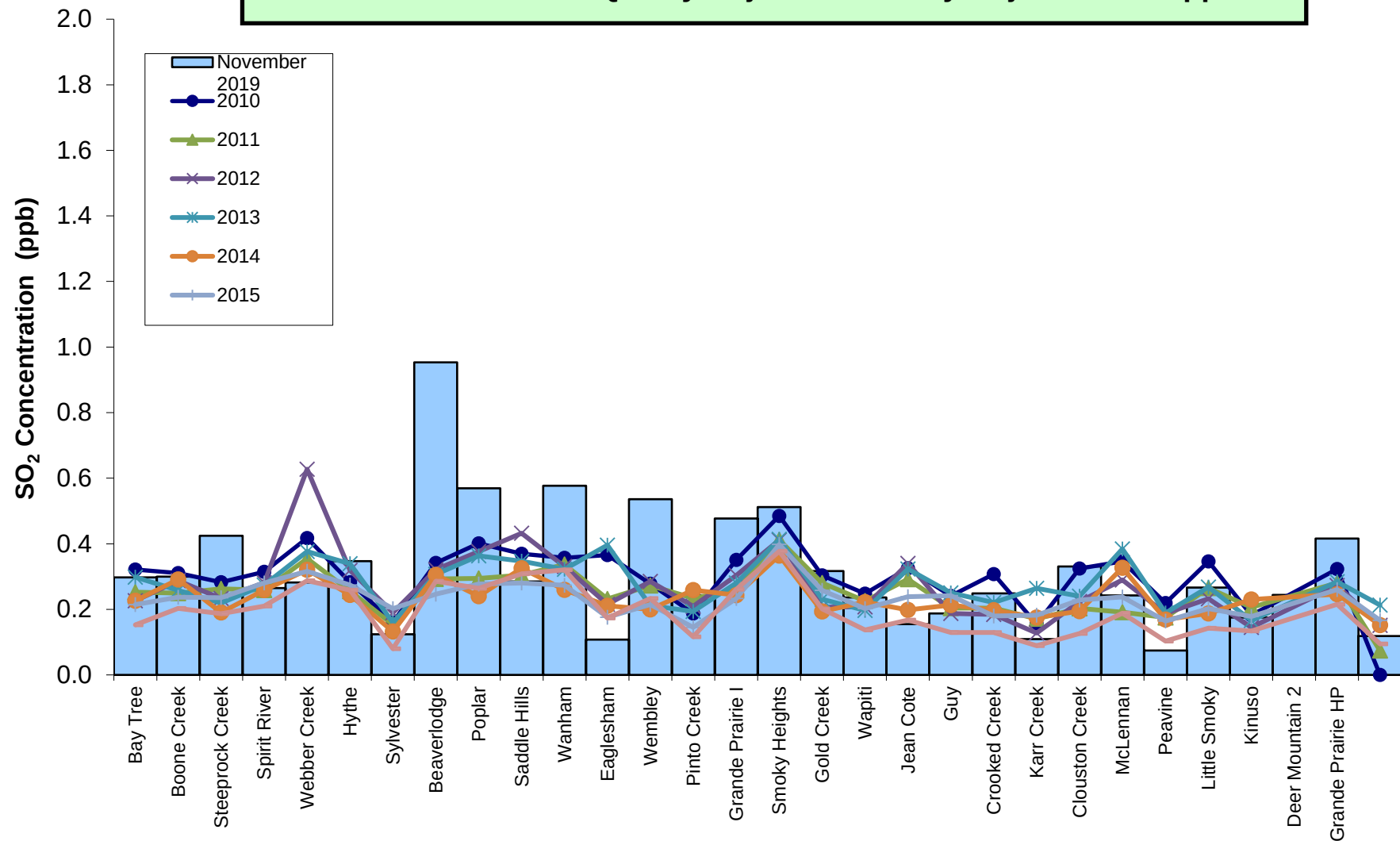
Comparison between Continuous and Passive monitoring at Henry Pirker (passive #49 Grande Prairie HP)

	SO ₂	NO ₂
PAZA Henry Pirker station	0.5	15.1
PAZA Grande Prairie passive	0.2	1.0

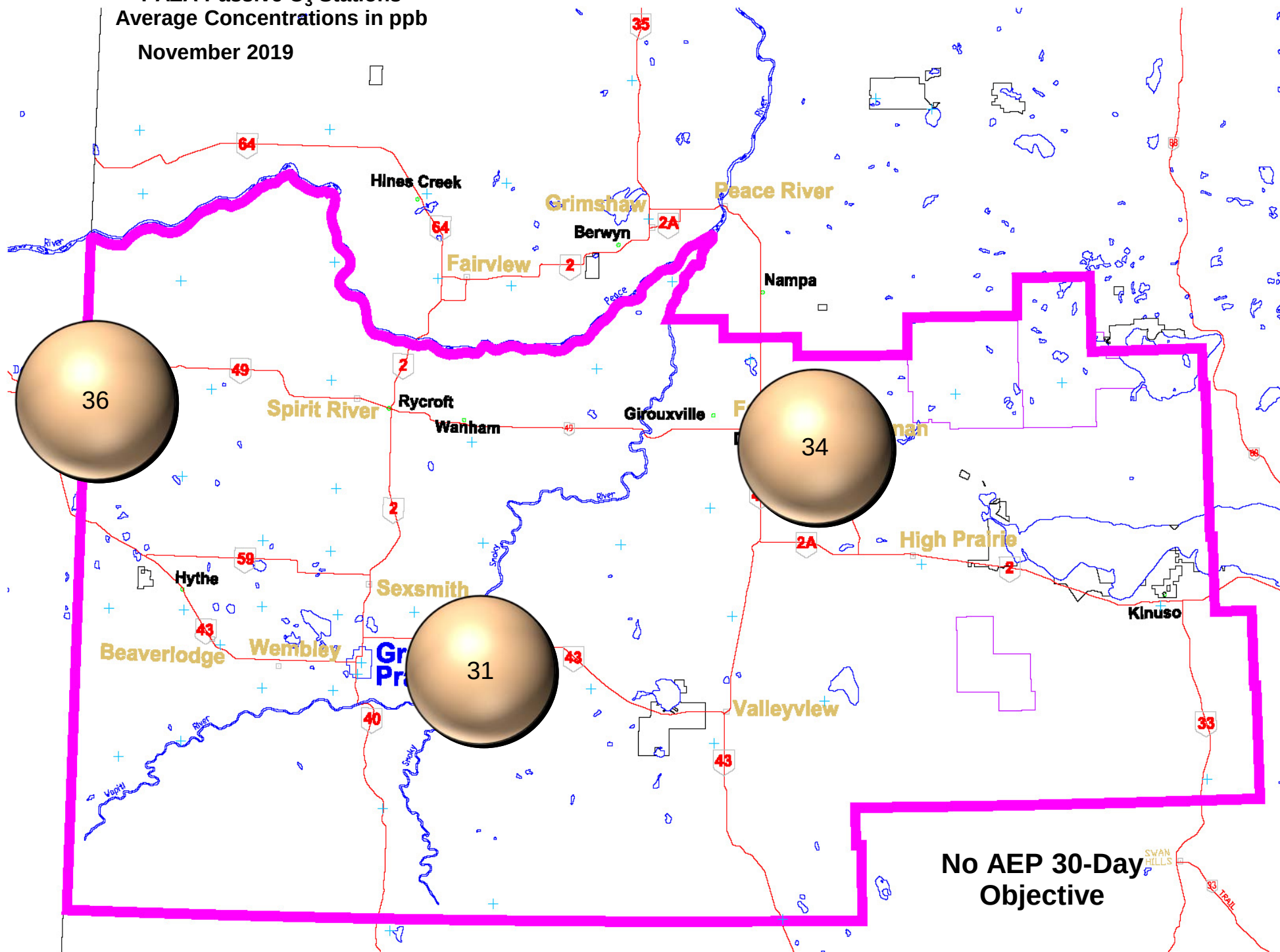
PAZA Passive SO₂ Stations
Average Concentrations in ppb
November 2019



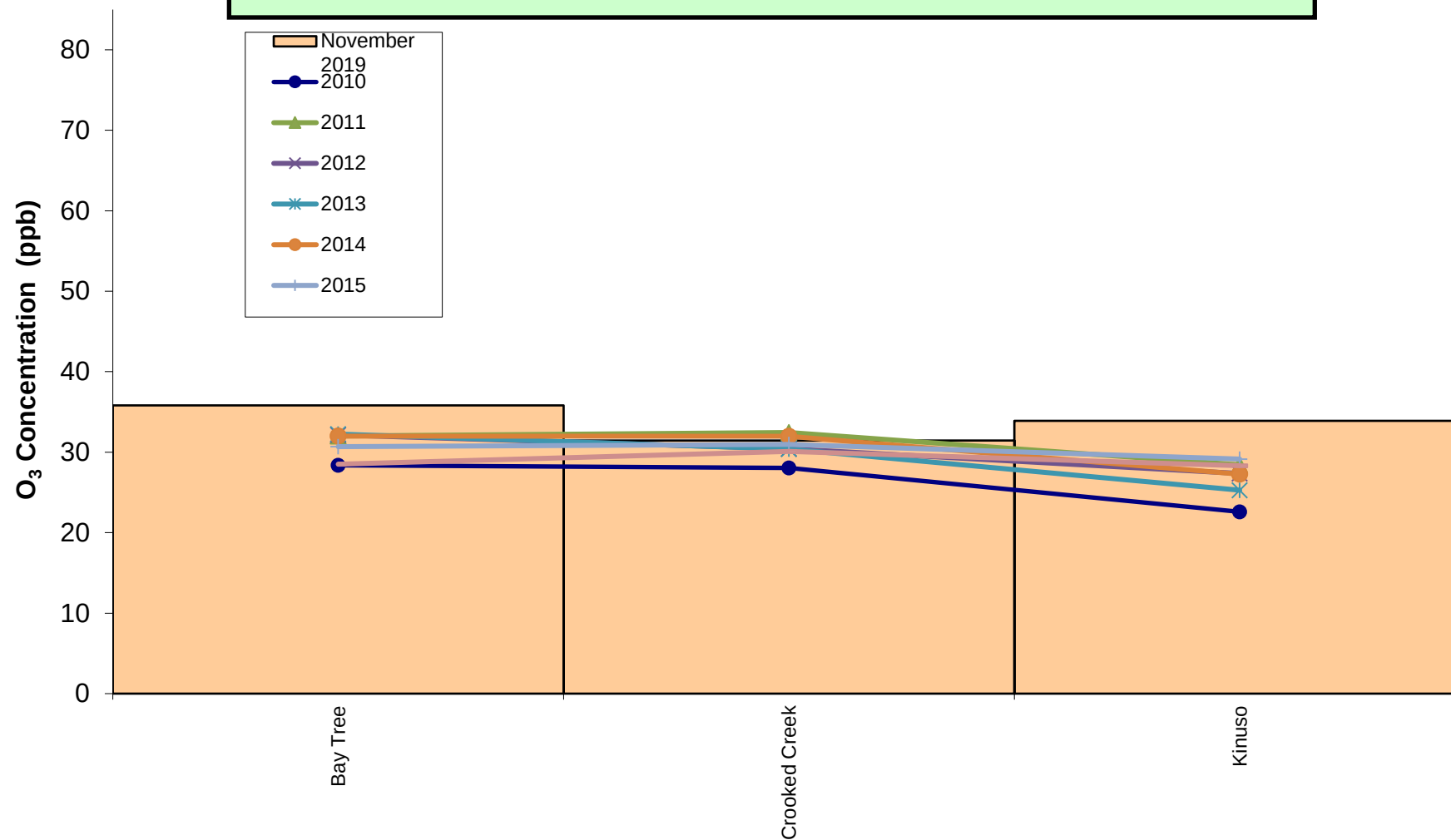
Alberta Ambient Air Quality Objective - 30-day Objective is 11 ppb



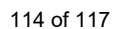
PAZA Passive O₃ Stations
Average Concentrations in ppb
November 2019



Alberta Ambient Air Quality Objective - No Annual O₃ Objective

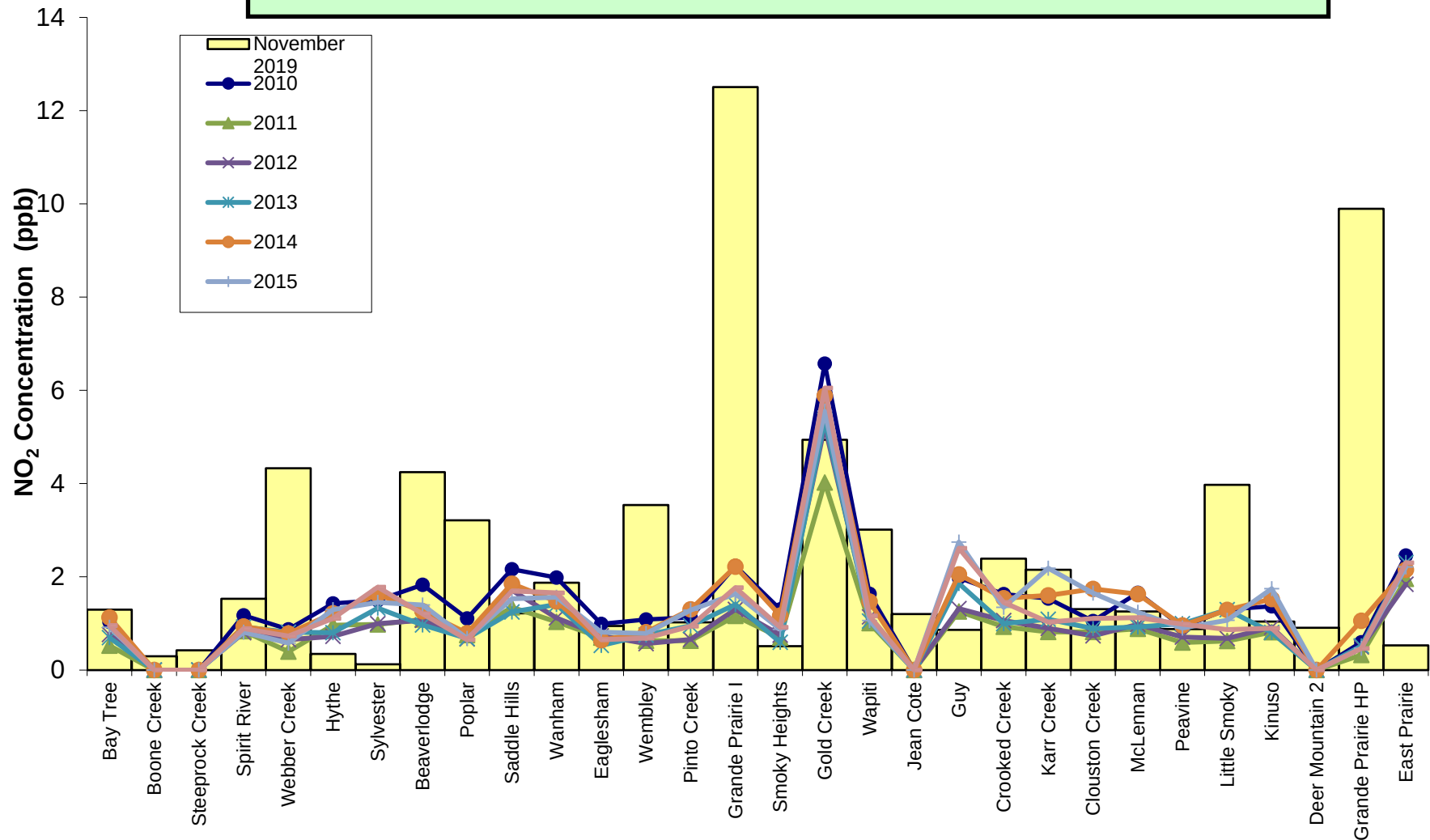


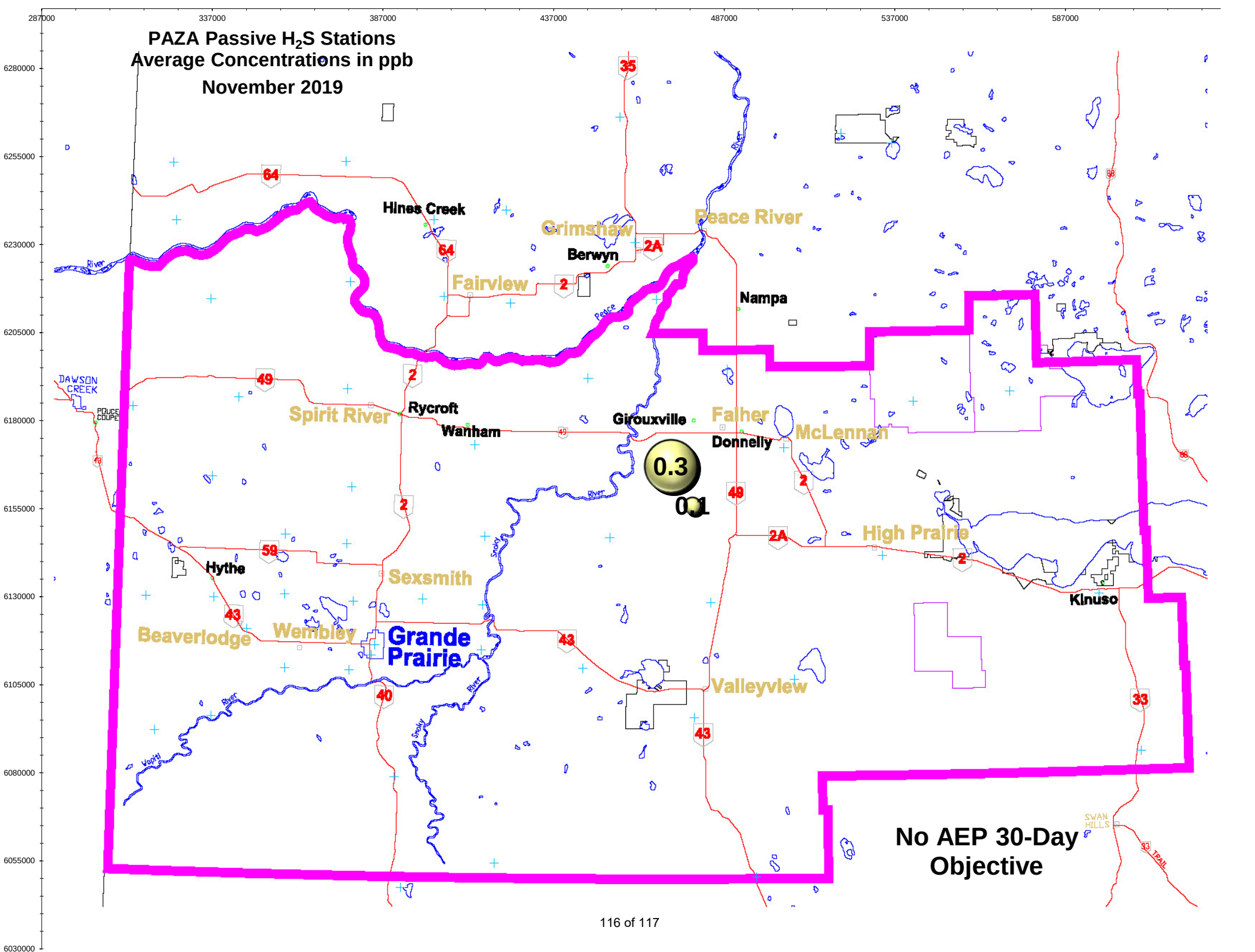
November 2019



AEP
Annual
Objective
24 ppb

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





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