



Peace Airshed Zone Association

Ambient Air Monitoring Network Summary

Ambient Air Quality Monitoring Program

Monthly Report

December 2020

January 31, 2021

Alberta Environment and Parks

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

Subject: **Peace Airshed Zone Association (PAZA)**
December 2020 Ambient Air Quality Monitoring Report

Please find enclosed the PAZA Ambient Air Quality Monitoring Network Report for the month of December 2020.

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

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This report was prepared by Matrix Solutions Inc. and reviewed by Mandeep Dhaliwal.

PAZA has retained the services of WSP Canada Inc. to conduct continuous ambient monitoring and Matrix Solutions Inc. to provide data validation and reporting.

This report is submitted by PAZA on behalf of the industrial member companies to satisfy the requirements of the facility Operating Approvals listed in Table A

The monthly summary report includes the operational summaries and hourly continuous monitoring and monthly passive results

Continuous Monitoring:

Seven (7) Stations including Henry Pirker (Grande Prairie), Evergreen Park, Smoky Heights, Beaverlodge, Valleyview, Donnelly and Wembley-Portable. Detailed Summaries are included in the report

Calibration and Data Submission:

Monthly report, hourly data and calibration reports for December 2020 were submitted to the ETS data system.

Table A. PAZA members with Facility Operating Approvals

Company	Facility	LSD	EPEA Approval No.
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	02-26-068-25-W5	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
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
	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
NorthRiver Midstream Inc.	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

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

There were no exceedances of the AAAQO in December 2020

Operational times less than 90 percent:

There were no operational times less than 90% in December 2020

Air Incidents

None were reported to PAZA

Deviations from Authorized Monitoring Methods

None to report.

Passive Monitoring

- 33 Stations throughout the PAZA zone, the passive sample analyses were performed by Bureau Veritas Laboratories
- There were eight duplicate sites sampled in the month of December with RPD ranging from 0 to 19% (SO₂), 11% (O₃), 17% to 200% (NO₂), 0% (H₂S);
 - sulphur dioxide duplicates at Wanham, Grande Prairie I, Clouston Creek stations
 - ozone duplicate at Kinuso station
 - nitrogen dioxide duplicates at Eaglesham, Wembley, Jean Cote stations
 - hydrogen sulphide duplicate at Girouxville 3 station
- There were no field notes of potential issues.
- 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.

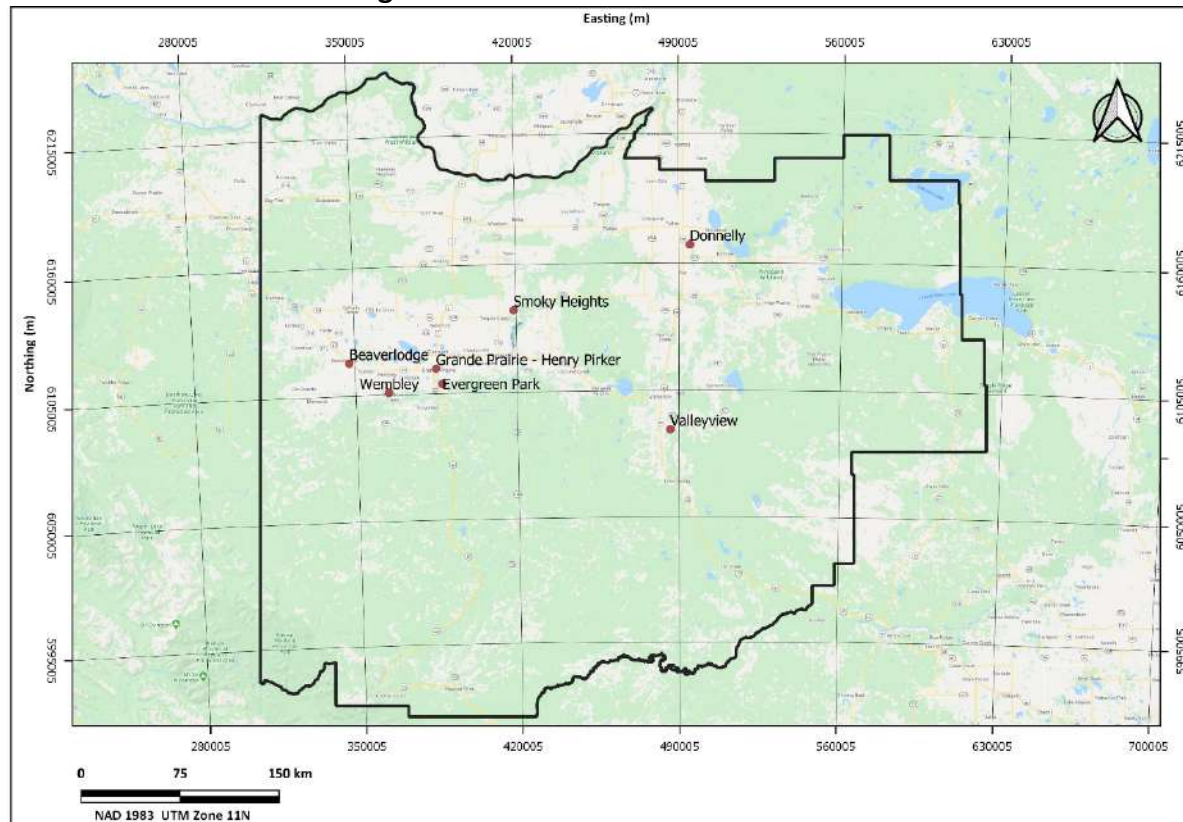


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Program Manager

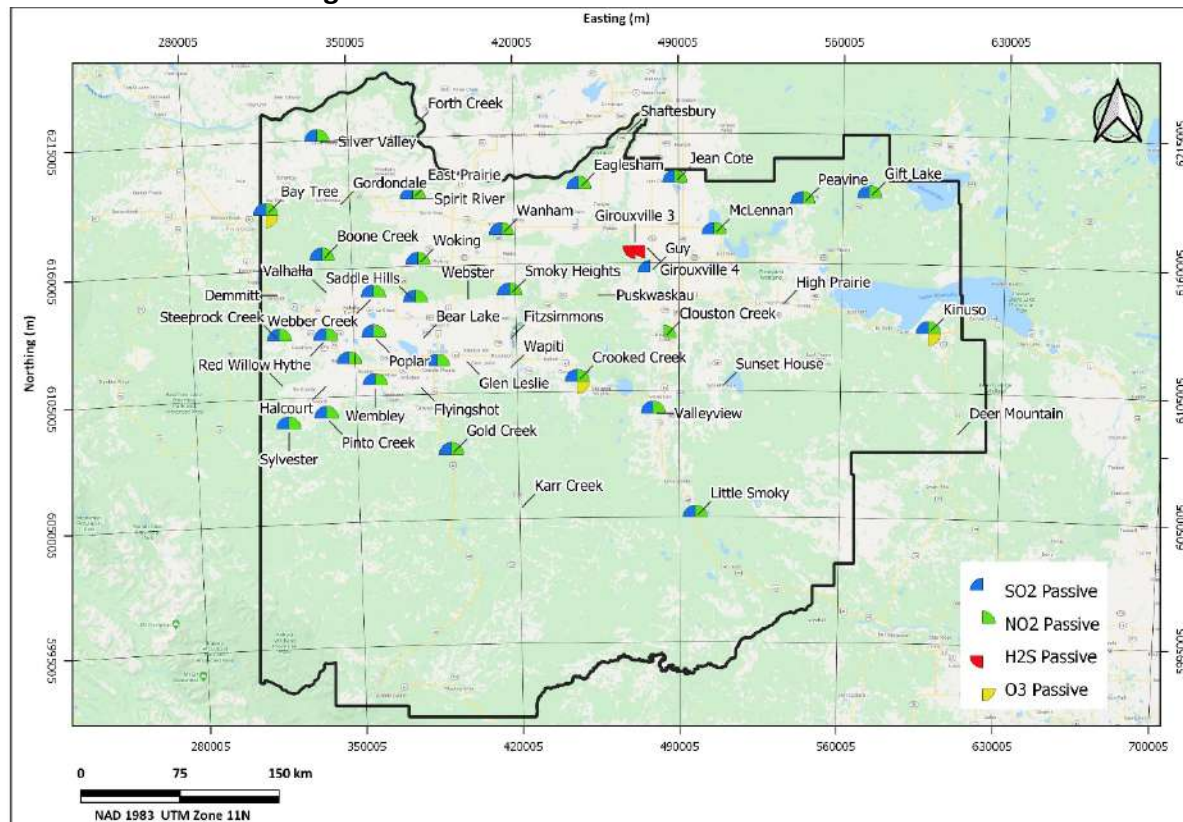
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PAZA Continuous Monitoring Station Locations



PAZA Passive Monitoring Station Locations



1 December Monthly Station Summaries

The following summaries are for the equipment and data results from the continuous ambient monitoring network

1.1 Beaverlodge Air Monitoring Station

PAZA - December 2020 Beaverlodge Station Report

Parameter	December			Valid	Operational	Max	1-hour		24-hour			Exceedance				Calibration Date
	Average	Minimum					Objective	Max Day and Time	Max	Objective	Max Day	1hr	8hr	24hr	30d	
NO (ppb)	0.7	0.0	94.9%	99.9%	17.1	-	-	Dec-22 13:00	2.5	-	Dec-22	-	-	-	-	Dec 01, 2020
NO ₂ (ppb)	5.7	0.3	94.9%	99.9%	28.0	159	-	Dec-30 22:00	12.6	-	Dec-31	0	-	-	-	Dec 01, 2020
NO _x (ppb)	6.4	0.3	94.9%	99.9%	33.6	-	-	Dec-22 13:00	14.9	-	Dec-15	-	-	-	-	Dec 01, 2020
O ₃ (ppb)	26.5	0.4	95.3%	99.9%	44.0	76	-	Dec-23 22:00	40.4	-	Dec-24	0	-	-	-	Dec 01, 2020
PM _{2.5} (µg/m³)	4.2	0.0	97.6%	98.1%	59.1	80	-	Dec-17 02:00	14.4	29	Dec-31	0	-	0	-	Dec 04, 2020
SO ₂ (ppb)	0.4	0.0	95.3%	100.0%	5.3	172	-	Dec-14 20:00	1.4	48	Dec-14	0	-	0	0	Dec 02, 2020
Temp (°C)	-4.7	-21.2	99.9%	99.9%	8.5	Note: Valid hours must be greater than 75% Operational hours must be greater than 90%										
RH (%)	71.9	31.9	100.0%	100.0%	100.0											
WS (km/hr)	8.9	0.1	100.0%	100.0%	48.7											
WD (deg)	267	0.5	100.0%	100.0%	360.0											
										Average Wind Direction		267	W			

Update Summary:

Parameter	Make	Model	Equipment summary
NO/NO ₂ /NO _x	Thermo	42i	No Operational issues noted during the month; one hour removed Dec 2 due to manifold cleaning
O ₃	Thermo	49i	No Operational issues noted during the month; one hour removed Dec 2 due to manifold cleaning
PM _{2.5}	Sharp	5030	Analyzer failed Dec 4, nine hours removed, three hours of maintenance followed by second calibration Dec 4
SO ₂	Thermo	43i-TLE	No Operational issues noted during the month
Met Equip	MetOne	50.5	No Operational issues noted during the month; one hour temperature removed Dec 4 due to excessive temp shift

1.2 Evergreen Park Air Monitoring Station

PAZA - December 2020 Evergreen Park Station Report

Parameter	December			Valid	Operational	Max	1-hour		24-hour			Exceedance				Calibration Date
	Average	Minimum					Objective	Max Day and Time	Max	Objective	Max Day	1hr	8hr	24hr	30d	
PM _{2.5} (µg/m³)	3.5	0.0	97.2%	97.9%	24.8	80	-	Dec-14 19:00	8.5	29	Dec-03	0	-	0	-	Dec-14-2020
SO ₂ (ppb)	0.2	0.0	93.7%	98.5%	10.1	172	-	Dec-17 16:00	1.2	48	Dec-17	0	-	0	0	Dec-14-2020
TRS (ppb)	0.6	0.0	93.7%	98.5%	2.9	-	-	Dec-23 09:00	1.1	-	Dec-30	-	-	-	-	Dec-14-2020
Temp (°C)	-6.9	-24.5	98.5%	98.5%	9.0	Note: Valid hours must be greater than 75% Operational hours must be greater than 90%										
RH (%)	75.5	38.6	98.5%	98.5%	97.1											
WS (km/hr)	2.9	0.0	98.5%	98.5%	15.5											
WD (deg)	248	0.2	98.5%	98.5%	358.2											
										Average Wind Direction		248	WSW			

Update Summary:

Parameter	Make	Model	Equipment summary
PM _{2.5}	Thermo	TEOM AB	No Operational issues; Data acquisition failure Dec 3, 4, 14, 21, 24 (7 hrs); Power failure Dec 30 (5 hrs)
SO ₂	TECO	43i	No Operational issues; Data acquisition failure Dec 3, 4, 21, 24 (6 hrs); Power failure Dec 30 (5 hrs)
TRS	TECO	43C	No Operational issues; Data acquisition failure Dec 3, 4, 21, 24 (6 hrs); Power failure Dec 30 (5 hrs)
Met Equip	Gil/RMYoung	MetPak/RMY86004	No Operational issues; Data acquisition failure Dec 3, 4, 21, 24 (6 hrs); Power failure Dec 30 (5 hrs)

1.3 Grande Prairie - Henry Pirker Air Monitoring Station

PAZA - December 2020 Henry Pirker Station Report

Parameter	December			Operational	Max	1-hour		8-hour / 24-hour		Max Day	Exceedance				Calibration Date
	Average	Minimum	Valid			Objective	Max Day and Time	Max	Objective		1hr	8hr	24hr	30d	
NO (ppb)	10.4	0.0	95.0%	99.9%	157.5	-	Dec-03 19:00	73.0	-	Dec-03	-	-	-	-	Dec 04, 2020
NO ₂ (ppb)	16.1	1.1	95.0%	99.9%	56.9	159	Dec-03 15:00	38.8	-	Dec-03	0	-	-	-	Dec 04, 2020
NO _x (ppb)	26.8	1.6	95.0%	99.9%	205.4	-	Dec-03 19:00	112.3	-	Dec-03	-	-	-	-	Dec 04, 2020
O ₃ (ppb)	16.6	0.4	95.3%	100.0%	43.6	76	Dec-24 00:00	33.2	-	Dec-20	0	-	-	-	Dec 04, 2020
PM _{2.5} (µg/m ³)	6.4	0.0	99.7%	100.0%	40.5	80	Dec-03 01:00	21.4	29	Dec-03	0	-	0	-	Dec 09, 2020
SO ₂ (ppb)	0.3	0.0	95.3%	99.9%	10.2	172	Dec-11 20:00	2.0	48	Dec-11	0	-	0	0	Dec 04, 2020
H ₂ S (ppb)	0.3	0.0	95.0%	99.9%	1.5	10	Dec-11 11:00	0.8	3	Dec-03	0	-	0	-	Dec 09, 2020
CH ₄ (ppm)	2.3	2.0	95.0%	99.9%	3.7	-	Dec-03 19:00	3.0	-	Dec-03	-	-	-	-	Dec 08, 2020
THC (ppm)	2.3	2.0	95.0%	99.9%	4.6	-	Dec-03 19:00	3.2	-	Dec-03	-	-	-	-	Dec 08, 2020
NMHC (ppm)	0.0	0.0	95.0%	99.9%	1.4	-	Dec-02 06:00	0.2	-	Dec-03	-	-	-	-	Dec 08, 2020
CO (ppm)	0.3	0.0	95.2%	99.9%	1.8	13	Dec-03 19:00	0.8	5	Dec-03	0	0	-	-	Dec 08, 2020
Average Minimum Valid Operational Maximum															
Temp (°C)	-6.2	-21.4	100.0%	100.0%	8.9	Note: Valid hours must be greater than 75% Operational hours must be greater than 90%									
RH (%)	68.3	39.5	100.0%	100.0%	87.2										
SR (W/m ²)	15.2	0.0	100.0%	100.0%	160.4										
WS (km/hr)	5.4	0.1	100.0%	100.0%	25.5										
WD (deg)	267	0.5	100.0%	100.0%	359.6	Average Wind Direction 267 W									

Update Summary:

Parameter	Make	Model	Equipment summary
NO/NO ₂ /NO _x	Thermo	42i	No Operational issues noted; Dec 4, one hour removed for manifold cleaning
O ₃	TECO	49i	No Operational issues noted during the month
PM _{2.5}	Sharp	5030	No Operational issues noted during the month
SO ₂	TEI	43i-TLE	No Operational issues noted; Dec 4, one hour removed for manifold cleaning
H ₂ S	TEI	450i	No Operational issues noted; Dec 4, one hour removed for manifold cleaning
THC/CH ₄ /NMHC	TEI	55i	No Operational issues noted; Dec 4, one hour removed for manifold cleaning
CO	TEI	48i-TLE	No Operational issues noted; Dec 4, one hour removed for manifold cleaning
Met Equip	MetOne	50.5	No Operational issues noted during the month

1.4 Smoky Heights Air Monitoring Station

PAZA - December 2020 Smoky Heights Station Report

AAR - December 2020 Smoky Heights Station Report															
Parameter	December			Operational	1-hour			24-hour			Exceedance				Calibration Date
	Average	Minimum	Valid		Max	Objective	Max Day and Time	Max	Objective	Max Day	1hr	8hr	24hr	30d	
PM _{2.5} (µg/m³)	4.2	0.0	99.6%	100.0%	34.3	80	Dec-03 13:00	20.6	29	Dec-03	0	-	0	-	Dec 16, 2020
SO ₂ (ppb)	0.4	0.0	95.3%	100.0%	13.9	172	Dec-11 22:00	1.6	48	Dec-11	0	-	0	0	Dec 16, 2020
TRS (ppb)	0.2	0.0	95.3%	100.0%	1.1	-	Dec-31 01:00	0.4	-	Dec-03	-	-	-	-	Dec 16, 2020
	Average	Minimum	Valid	Operational	Maximum										
Temp (°C)	-7.1	-22.5	100.0%	100.0%	7.2	Note: Valid hours must be greater than 75% Operational hours must be greater than 90%									
WS (km/hr)	11.9	0.3	100.0%	100.0%	47.8										
WD (deg)	253	0.2	100.0%	100.0%	359.8										
Average Wind Direction									253	WNW					

Update Summary:

Parameter	Make	Model	Equipment summary
PM _{2.5}	Sharp	5030	No Operational issues noted during the month
SO ₂	TECO	43i	No Operational issues noted during the month
TRS	TEI	43i APSAA	No Operational issues noted during the month
Met Equip	MetOne	50.5	No Operational issues noted during the month

1.5 Valleyview Air Monitoring Station

PAZA - December 2020 Valleyview Station Report

AZA - December 2020 Valleyview Station Report																
Parameter	December			Operational	Max	1-hour			24-hour			Exceedance				Calibration
	Average	Minimum	Valid			Objective	Max Day and Time	Max	Objective	Max Day	1hr	8hr	24hr	30d	Date	
SO ₂ (ppb)	0.1	0.0	95.3%	100.0%	1.2	172	Dec-27 14:00	0.3	48	Dec-27	0	-	0	0	Dec 10, 2020	
H ₂ S (ppb)	0.1	0.0	95.2%	100.0%	0.7	10	Dec-25 11:00	0.2	3	Dec-25	0	-	0	-	Dec 10, 2020	
	Average	Minimum	Valid	Operational	Maximum	Note: Valid hours must be greater than 75% Operational hours must be greater than 90% Average Wind Direction235NW										
Temp (°C)	-6.6	-26.4	100.0%	100.0%	9.8											
RH (%)	79.7	42.0	100.0%	100.0%	100.2											
WS (km/hr)	3.5	0.1	100.0%	100.0%	17.8											
WD (deg)	235	0.1	100.0%	100.0%	360.0											

Update Summary:

Parameter	Make	Model	Equipment summary
SO ₂	TEI	43I-APSCB	No Operational issues noted during the month
H ₂ S	TEI	450I-APHAA	No Operational issues noted during the month
Met Equip	RMYoung	RMY86004	No Operational issues noted during the month

1.6 Donnelly Air Monitoring Station

PAZA - December 2020 Donnelly Station Report

AQA - December 2020 Dornier Station Report															
December					1-hour			24-hour			Exceedance				Calibration
Parameter	Average	Minimum	Valid	Operational	Max	Objective	Max Day and Time	Max	Objective	Max Day	1hr	8hr	24hr	30d	Date
SO ₂ (ppb)	0.2	0.0	95.0%	99.6%	0.9	172	Dec-22 21:00	0.4	48	Dec-28	0	-	0	0	Dec 15, 2020
H ₂ S (ppb)	0.1	0.0	94.9%	99.6%	3.9	10	Dec-26 00:00	0.5	3	Dec-25	0	-	0	-	Dec 15, 2020
Average		Minimum	Valid	Operational	Maximum	Note: Valid hours must be greater than 75% Operational hours must be greater than 90% Average Wind Direction223SW									
Temp (°C)	-6.4	-25.7	99.6%	99.6%	9.6										
WS (km/hr)	10.8	0.0	99.6%	99.6%	48.7										
WD (deg)	223	1.4	99.6%	99.6%	360.0										

Update Summary:

Parameter	Make	Model	Equipment summary
SO ₂	Teco	43I	No Operational issues noted during the month; data acquisition failure on Dec 13 and 31 resulted in 3 hrs removed
H ₂ S	Thermo	45C	No Operational issues noted during the month; data acquisition failure on Dec 13 and 31 resulted in 3 hrs removed
Met Equip	RMYoung	5103	No Operational issues noted during the month; data acquisition failure on Dec 13 and 31 resulted in 3 hrs removed

1.7 Wembley Air Monitoring Station

PAZA - December 2020 Wembley Station Report

AAR - December 2020 Wembley Station Report															
December					1-hour			24-hour			Exceedance				Calibration
Parameter	Average	Minimum	Valid	Operational	Max	Objective	Max Day and Time	Max	Objective	Max Day	1hr	8hr	24hr	30d	Date
NO (ppb)	0.5	0.0	93.6%	98.5%	15.2	-	Dec-15 19:00	1.9	-	Dec-15	-	-	-	-	Dec 03, 2020
NO ₂ (ppb)	5.0	0.3	93.6%	98.5%	32.5	159	Dec-02 18:00	12.1	-	Dec-31	0	-	-	-	Dec 03, 2020
NO _x (ppb)	5.6	0.3	93.6%	98.5%	38.3	-	Dec-02 18:00	14.2	-	Dec-15	-	-	-	-	Dec 03, 2020
O ₃ (ppb)	26.0	0.2	94.6%	99.3%	45.7	76	Dec-24 01:00	41.4	-	Dec-24	0	-	-	-	Dec 03, 2020
PM _{2.5} (µg/m³)	2.4	0.0	98.3%	98.4%	20.9	80	Dec-31 21:00	7.5	29	Dec-31	0	-	0	-	Dec 07, 2020
SO ₂ (ppb)	0.3	0.0	94.5%	99.2%	6.0	172	Dec-10 17:00	1.0	48	Dec-14	0	-	0	0	Dec 03, 2020
TRS (ppb)	0.3	0.1	94.5%	99.2%	1.7	-	Dec-31 16:00	0.9	-	Dec-31	-	-	-	-	Dec 07, 2020
CH ₄ (ppm)	2.1	1.9	91.1%	95.7%	2.8	-	Dec-30 19:00	2.3	-	Dec-31	-	-	-	-	Dec 07, 2020
THC (ppm)	2.1	1.9	91.1%	95.7%	2.8	-	Dec-30 19:00	2.4	-	Dec-31	-	-	-	-	Dec 07, 2020
NMHC (ppm)	0.0	0.0	91.1%	95.7%	0.1	-	Dec-03 17:00	0.0	-	Dec-03	-	-	-	-	Dec 07, 2020
	Average	Minimum	Valid	Operational	Maximum	Note: Valid hours must be greater than 75% Operational hours must be greater than 90% Average Wind Direction290WNW									
Temp (°C)	-5.7	-23.2	99.3%	99.3%	8.8										
WS (km/hr)	6.8	0.1	99.3%	99.3%	27.5										
WD (deg)	290	0.9	99.3%	99.3%	357.8										

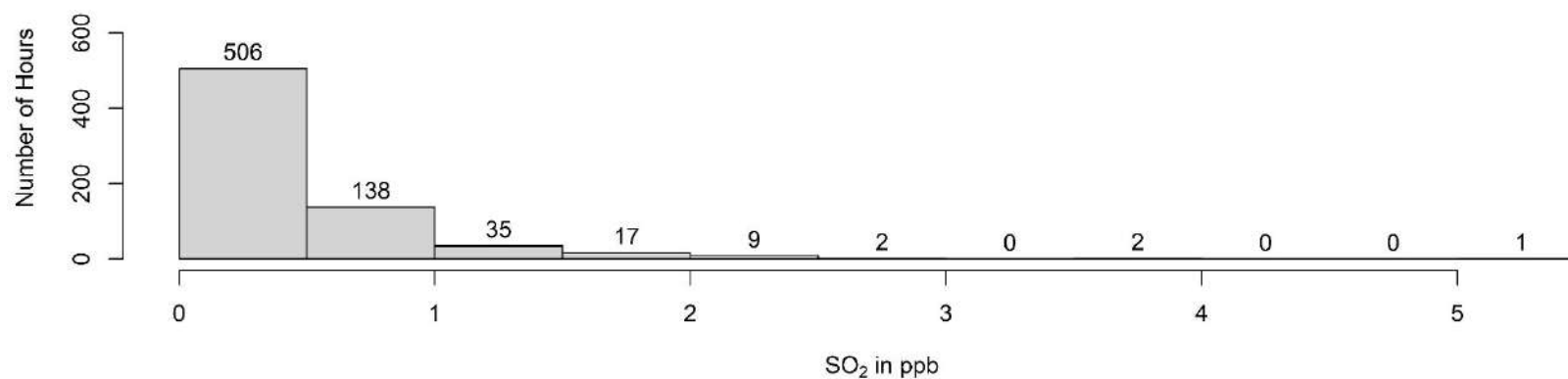
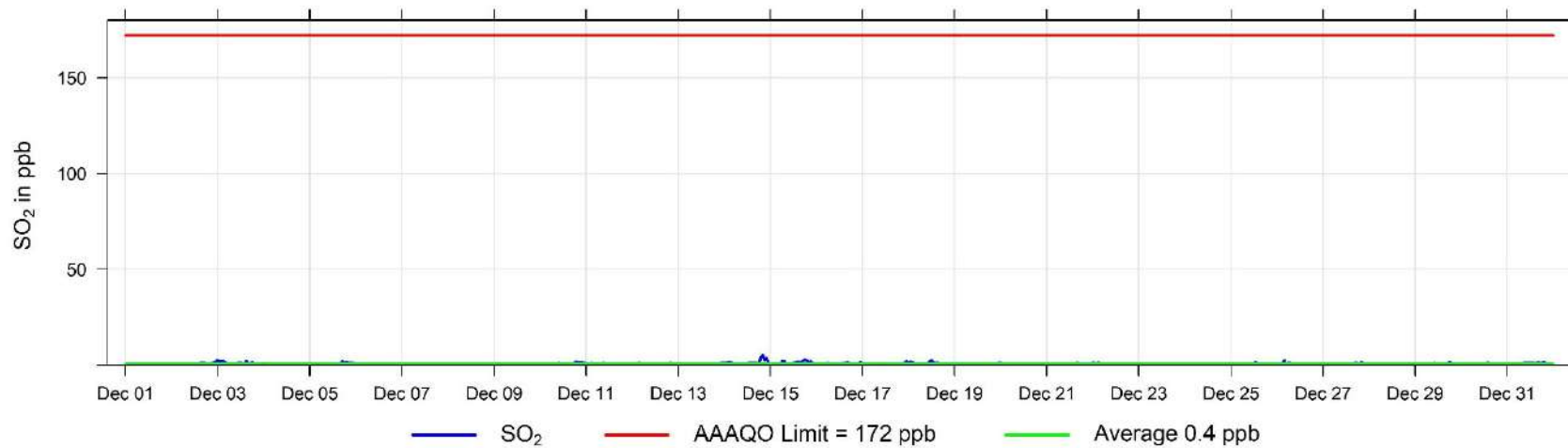
Update Summary:

Parameter	Make	Model	Equipment summary
NO/NO ₂ /NO _x	TEI	42I	Power failure Dec 15 (5hrs); second calibration Dec 16 (noted as 6hrs maintenance) following a high span
O ₃	TEI	49I	No Operational issues noted; Power failure Dec 15 (5hrs)
PM _{2.5}	Thermo	TEOM AB	No Operational issues noted; excessive spike Dec 7 (1hr); Power failure Dec 15 (5hrs)
SO ₂	TEI	43I	No Operational issues noted; Manifold cleaning Dec 3 (1hr); Power failure Dec 15 (5hrs)
TRS	TEI	43I	No Operational issues noted; Manifold cleaning Dec 3 (1hr); Power failure Dec 15 (5hrs)
THC/CH ₄ /NMHC	TEI	55I-A3PHAA	Manifold cleaning Dec 3 (1hr); Power failure Dec 15 (5hrs); analyzer flamed out on Dec 25 and was restarted on Dec 26 (26 hrs lost data); replaced hydrogen cylinder
Met Equip	MetOne	50.5	No Operational issues noted during the month; Power failure Dec 15 (5hrs)

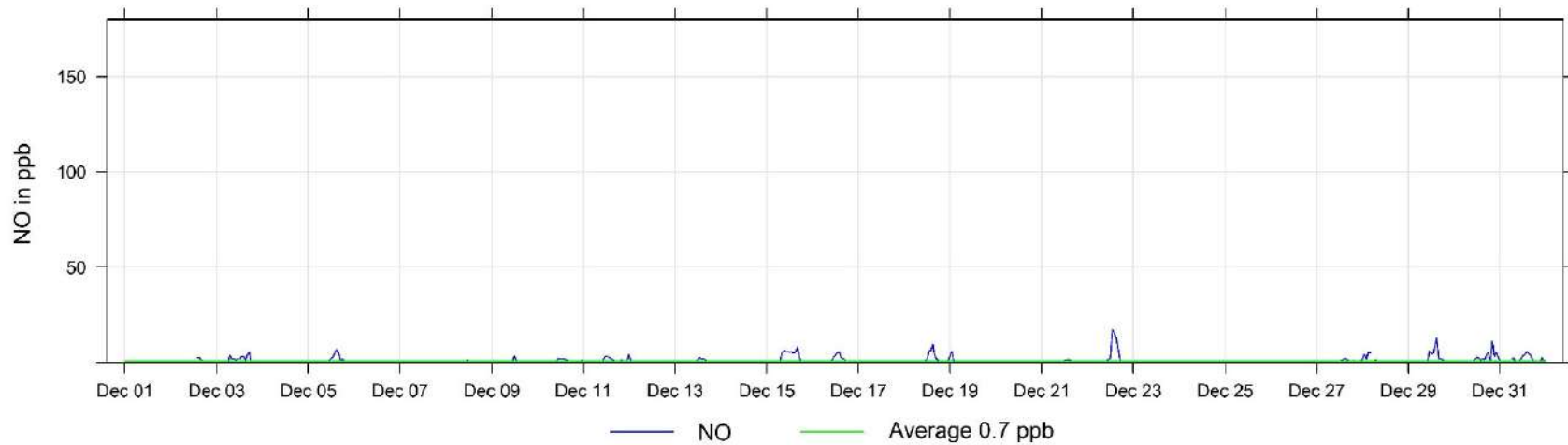
2 Beaverlodge Charts

The following pages include the charts and histograms for Beaverlodge Station

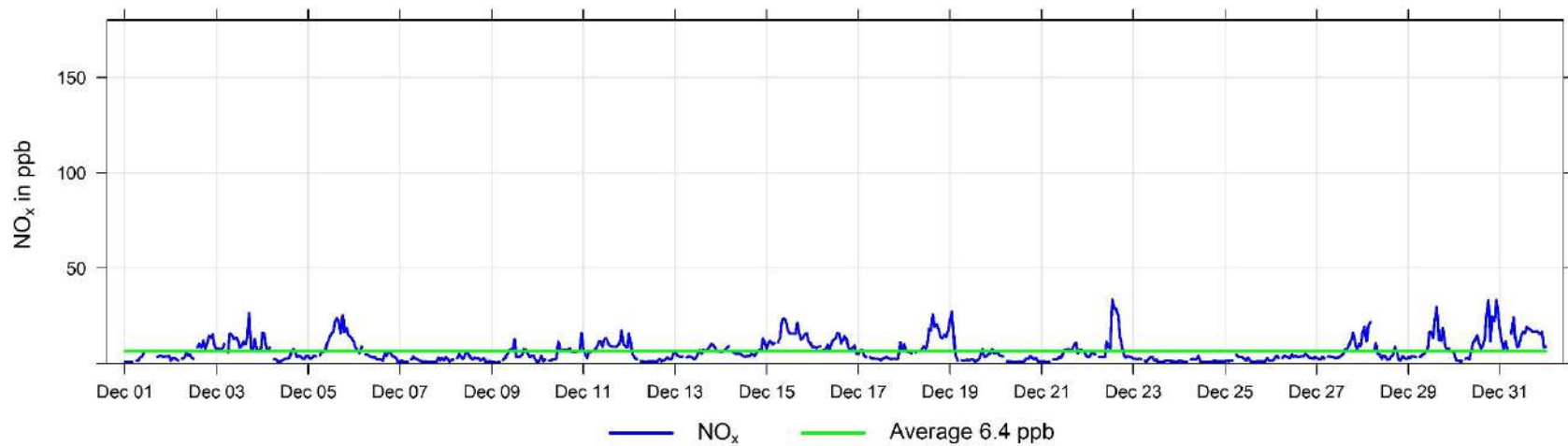
December Hourly Concentration Readings of SO₂ (in ppb) at Beaverlodge



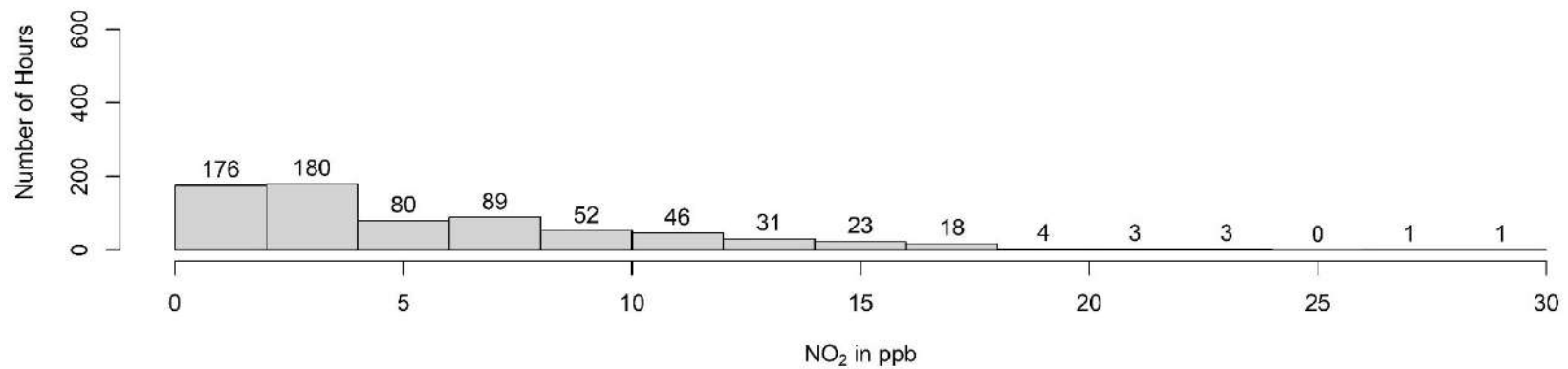
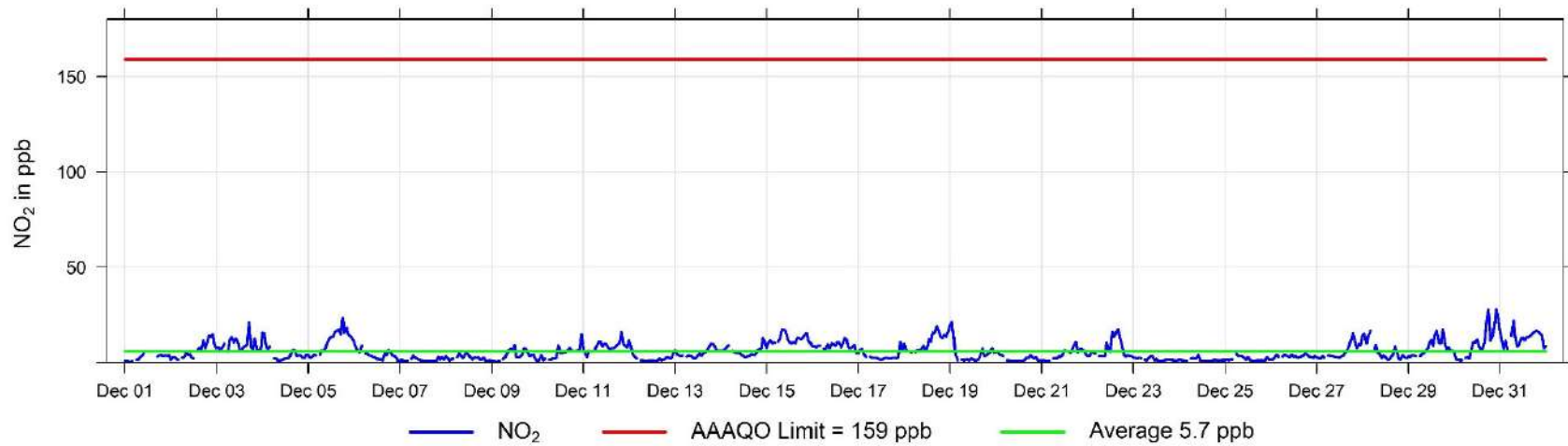
December Hourly Concentration Readings of NO (in ppb) at Beaverlodge



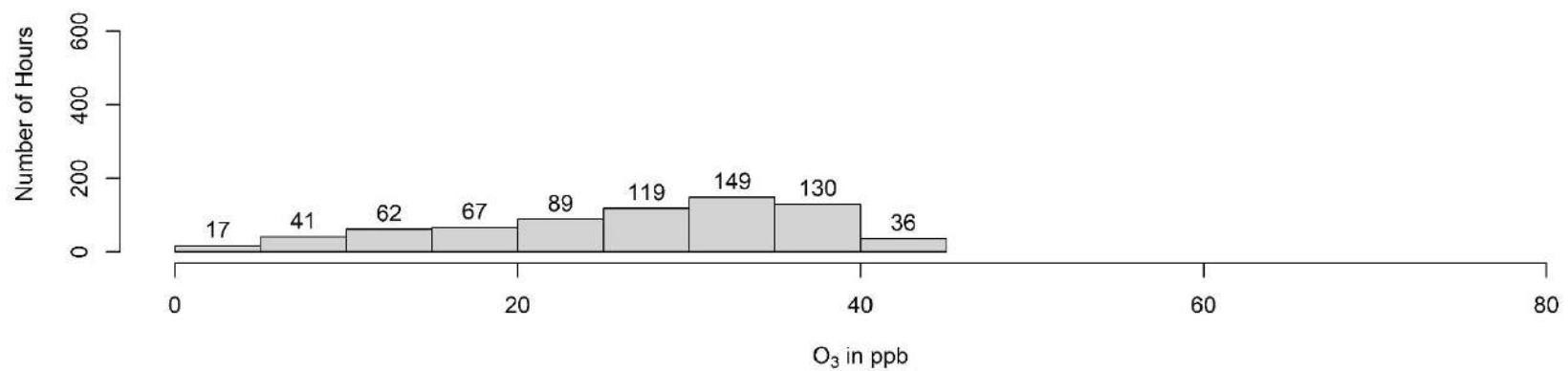
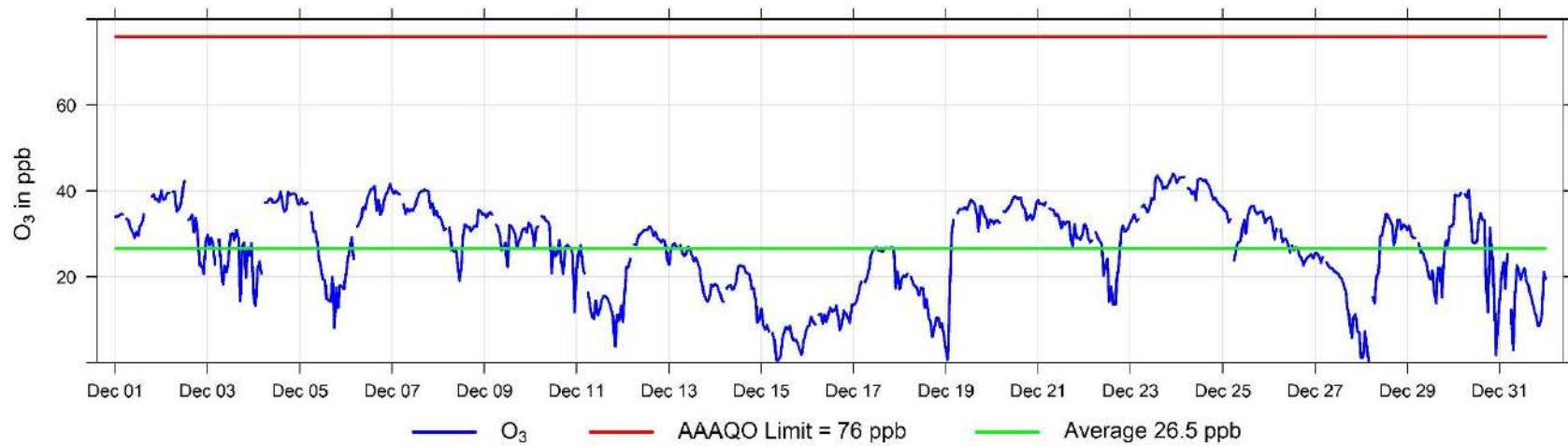
December Hourly Concentration Readings of NO_x (in ppb) at Beaverlodge



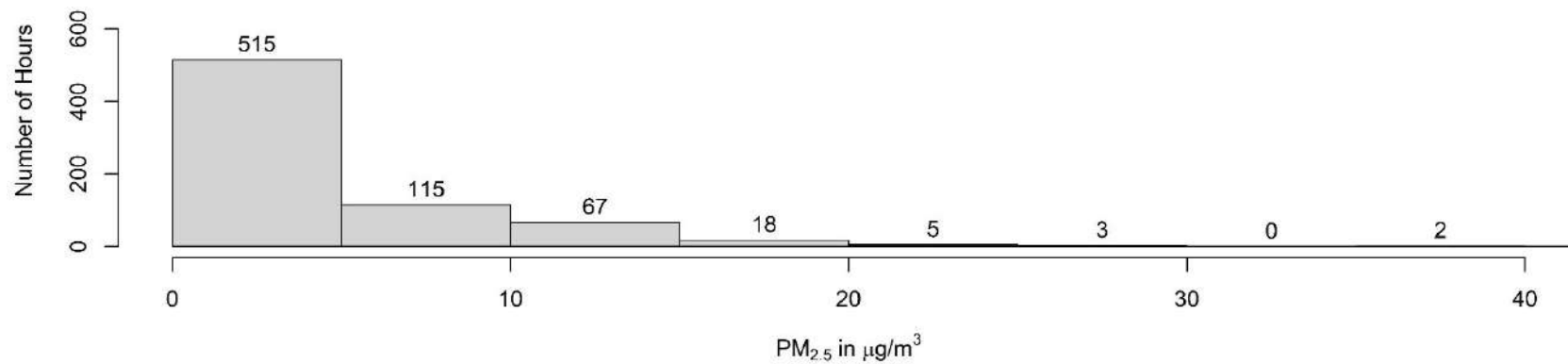
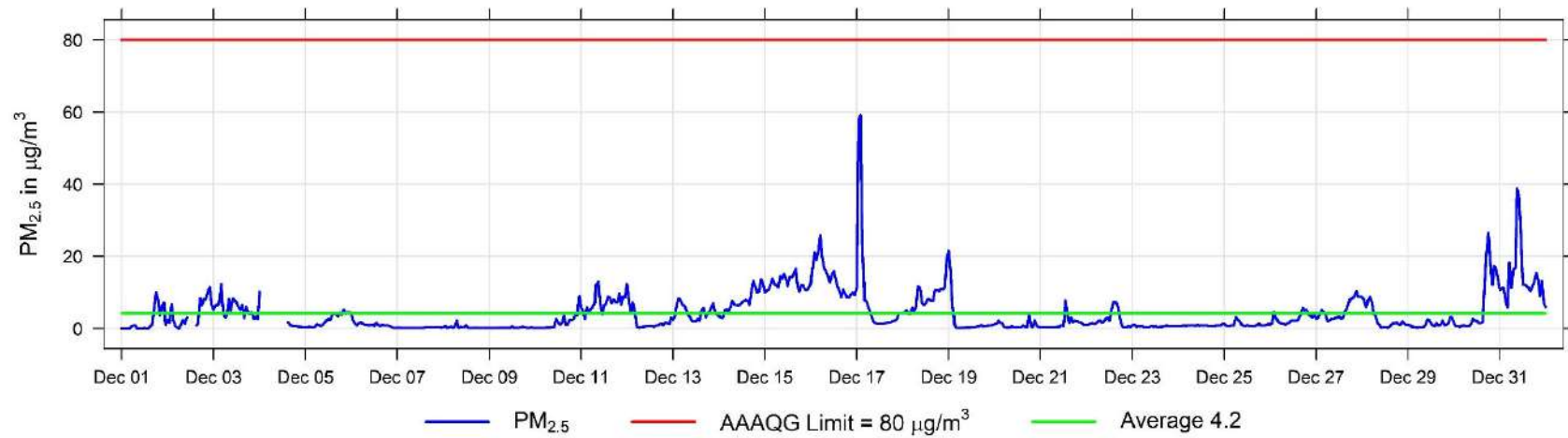
December Hourly Concentration Readings of NO₂ (in ppb) at Beaverlodge



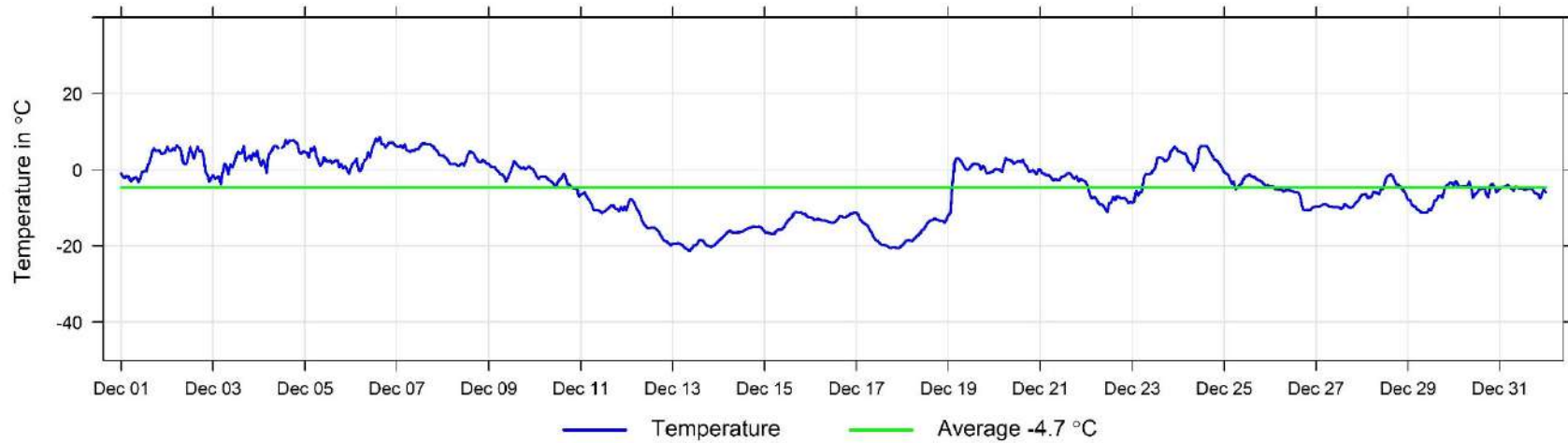
December Hourly Concentration Readings of O₃ (in ppb) at Beaverlodge



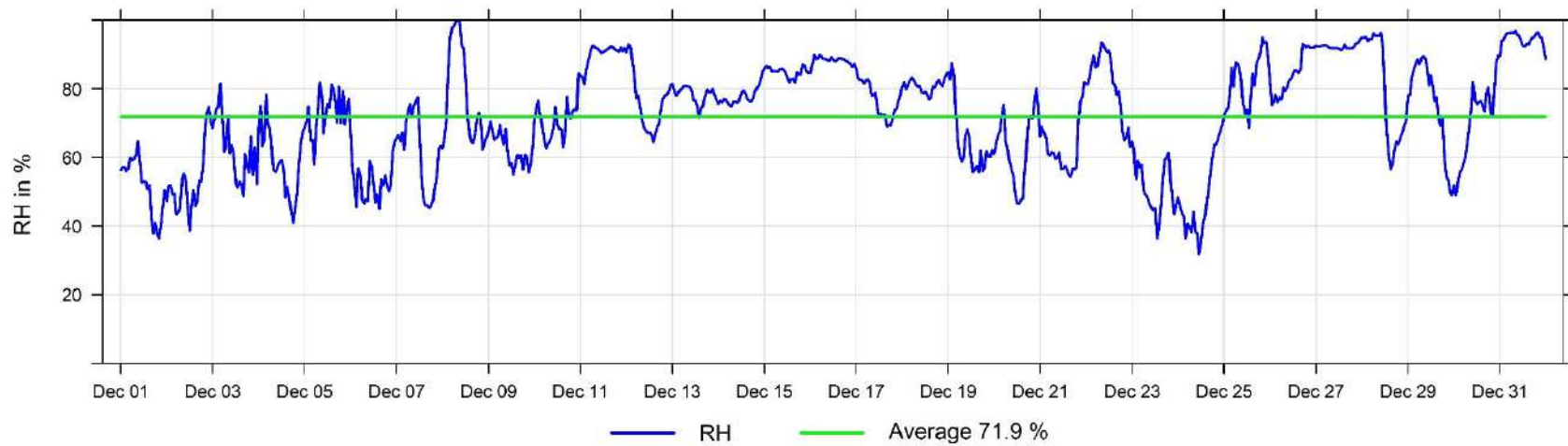
December Hourly Concentration Readings of PM_{2.5} in $\mu\text{g}/\text{m}^3$ at Beaverlodge



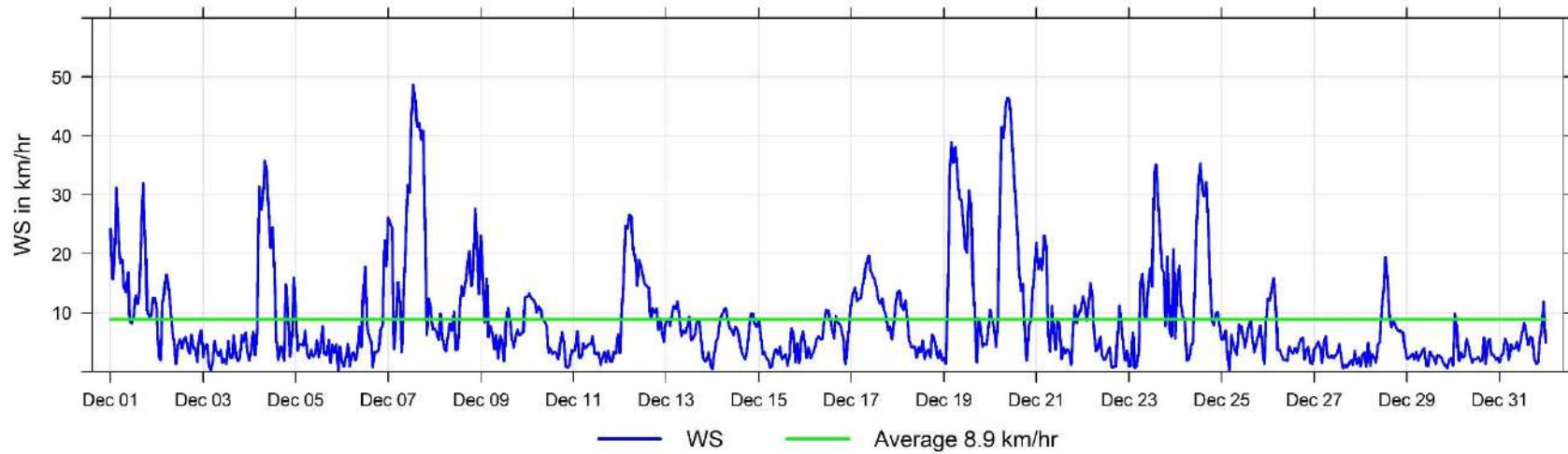
December Hourly Temperature Readings (in °C) at Beaverlodge



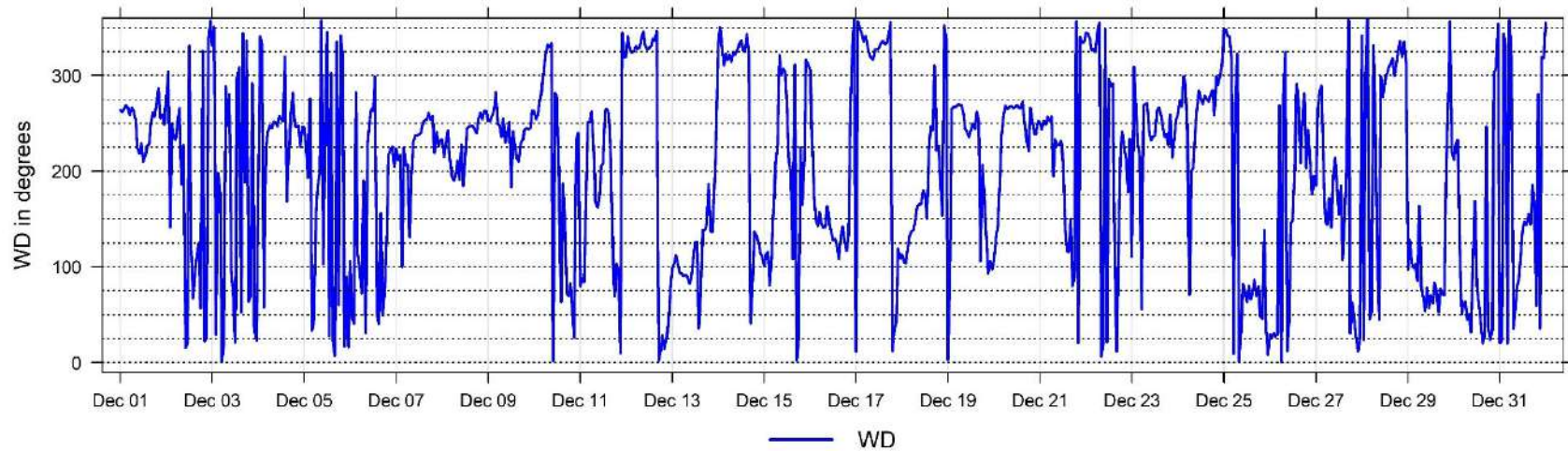
December Hourly Readings of Relative Humidity (in %) at Beaverlodge



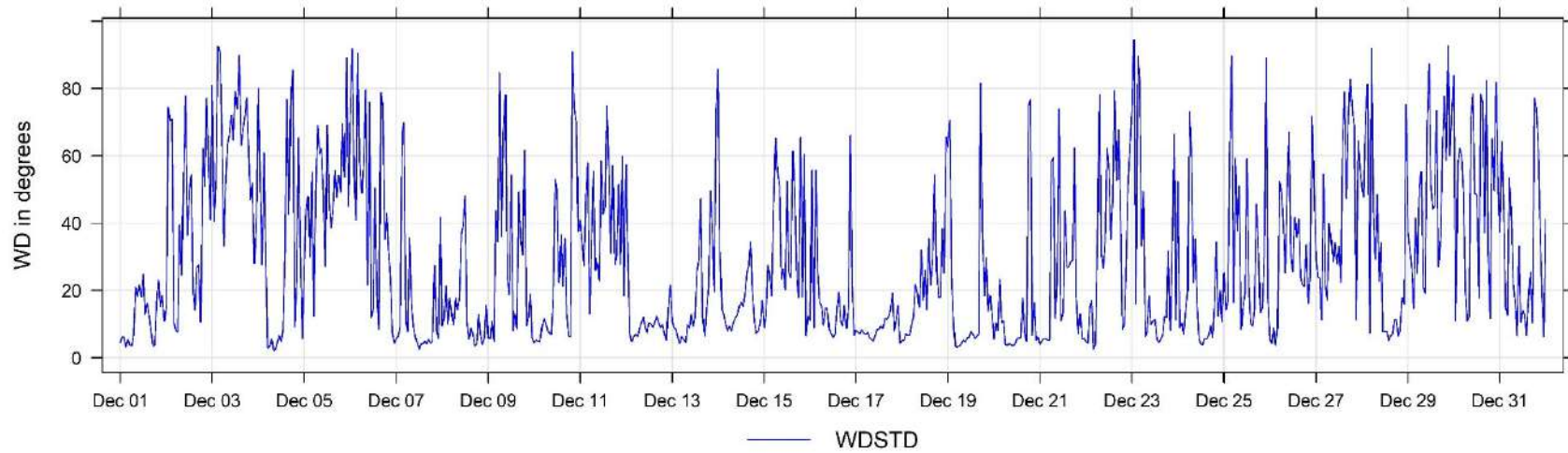
December Hourly Readings of Wind Speed (in km/hr) at Beaverlodge

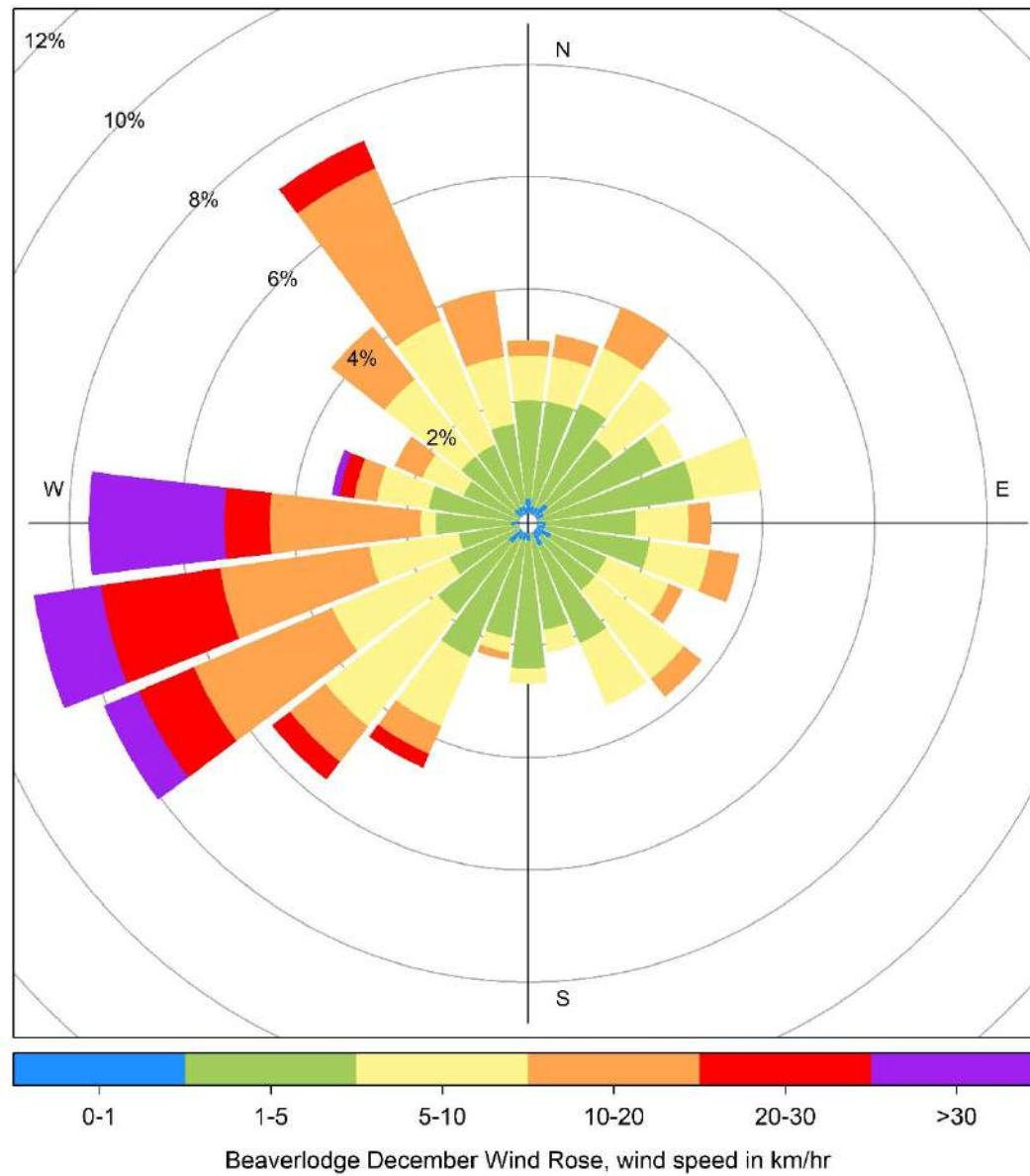


December Hourly Readings of Wind Direction (in degrees) at Beaverlodge



December Hourly Readings of Wind Direction Standard Deviation (in degrees) at Beaverlodge

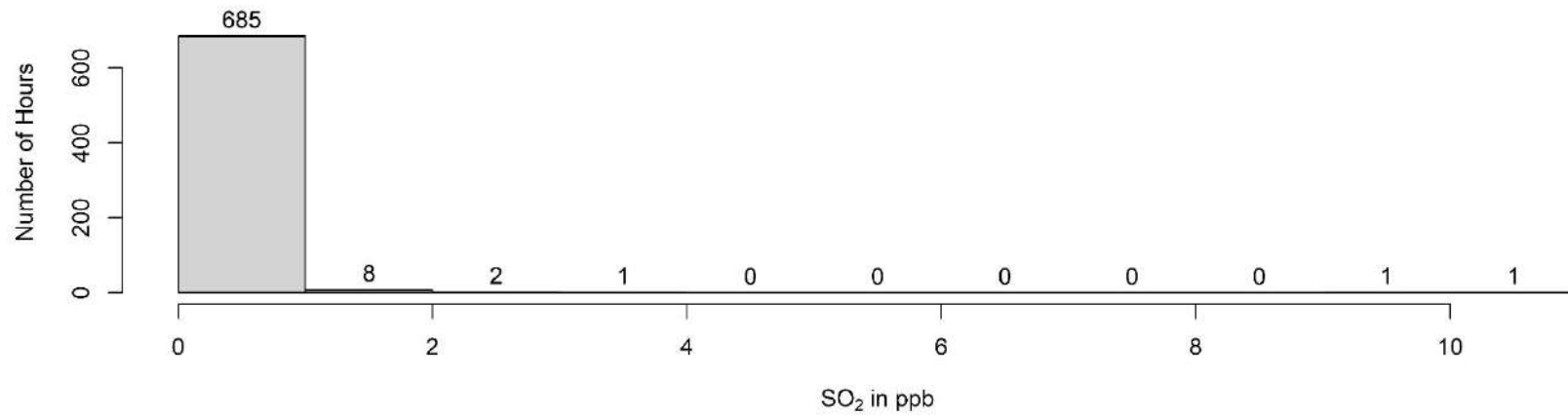
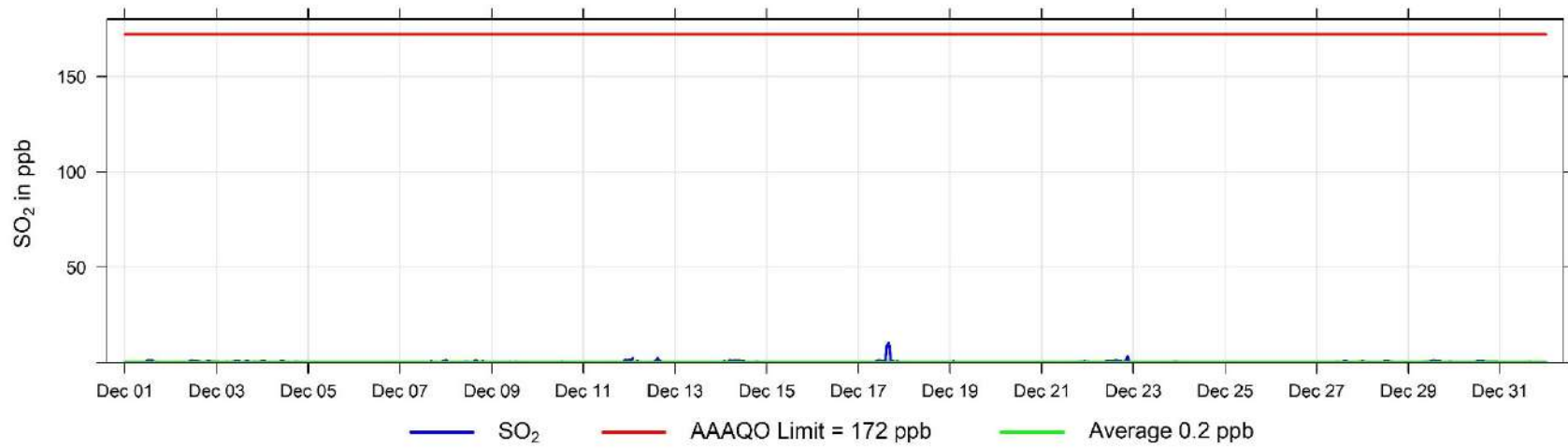




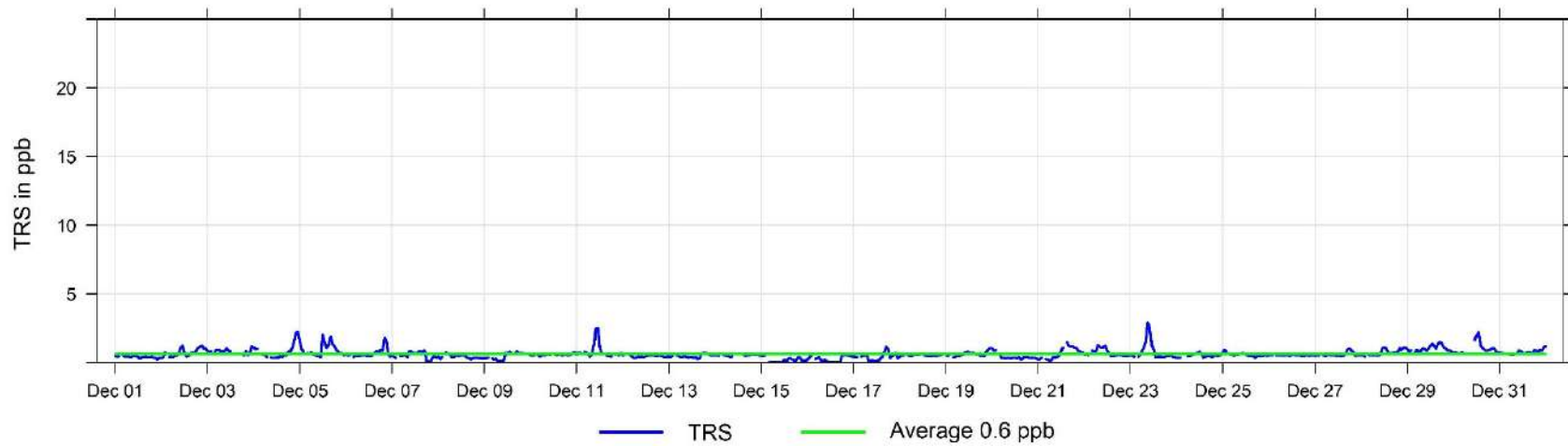
3 Evergreen Park Charts

The following pages include the charts and histograms for Evergreen Park Station

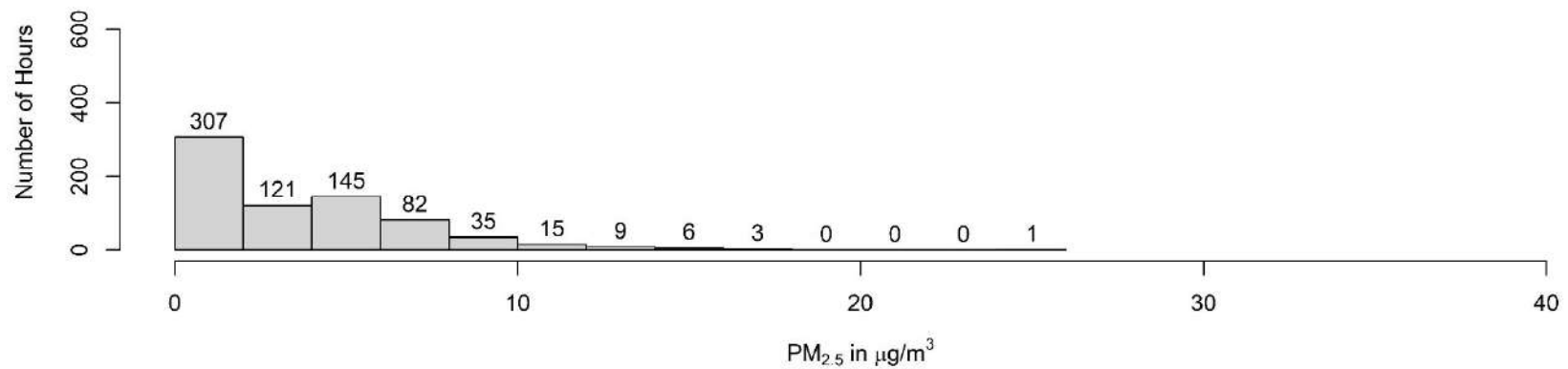
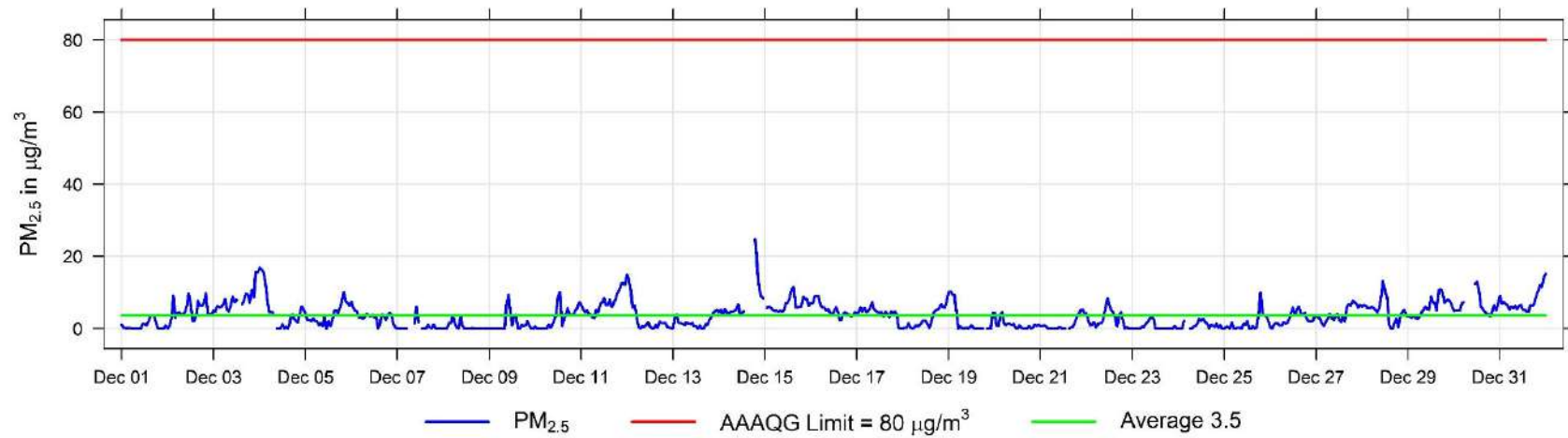
December Hourly Concentration Readings of SO₂ (in ppb) at Evergreen Park



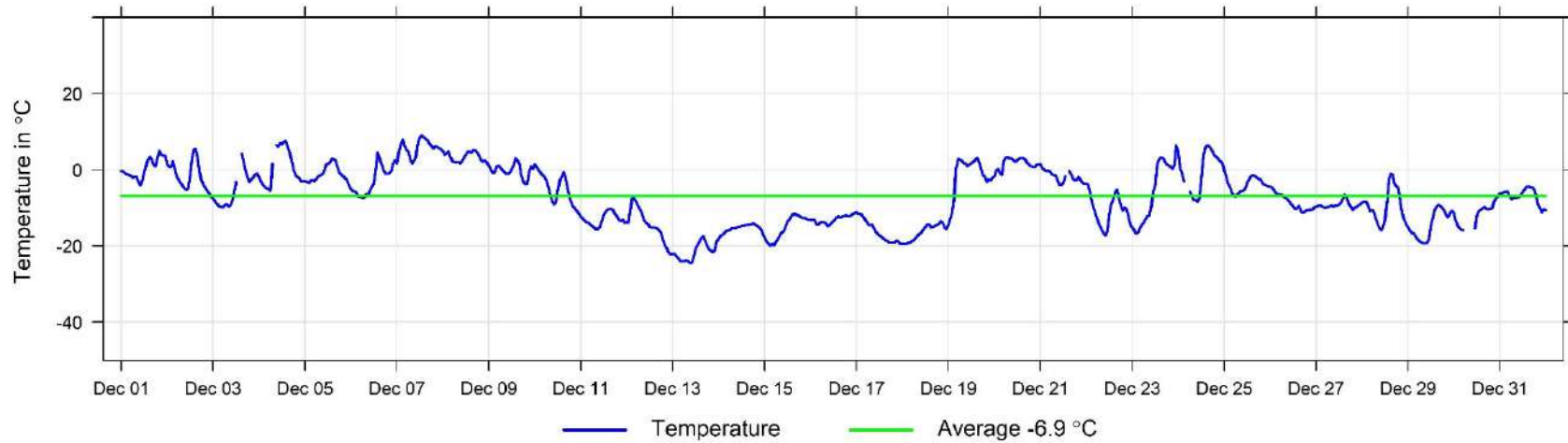
December Hourly Concentration Readings of TRS (in ppb) at Evergreen Park



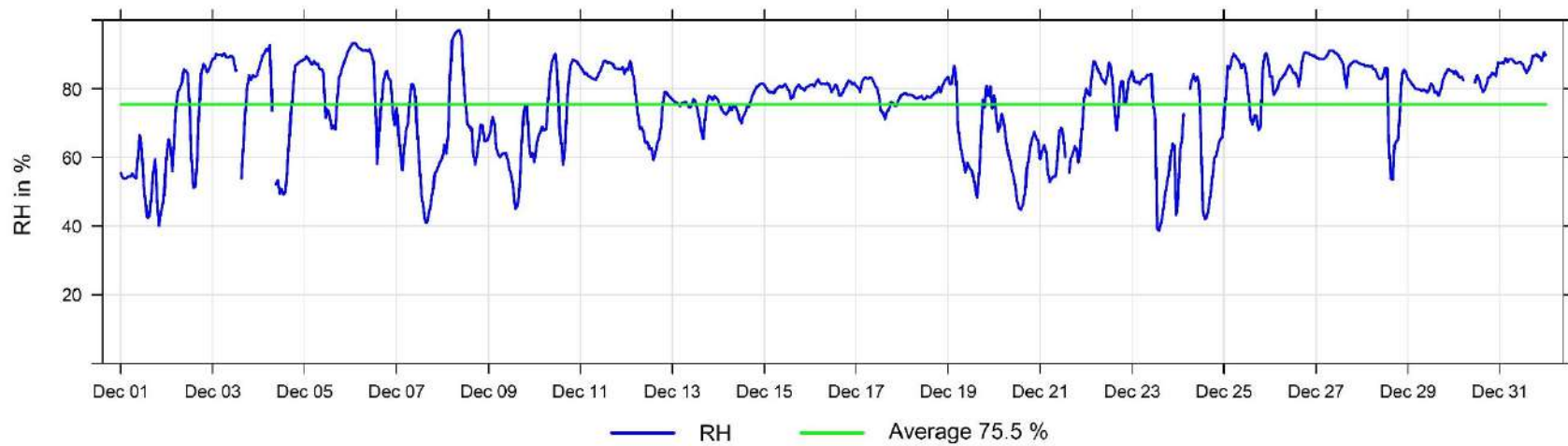
December Hourly Concentration Readings of PM_{2.5} in $\mu\text{g}/\text{m}^3$ at Evergreen Park



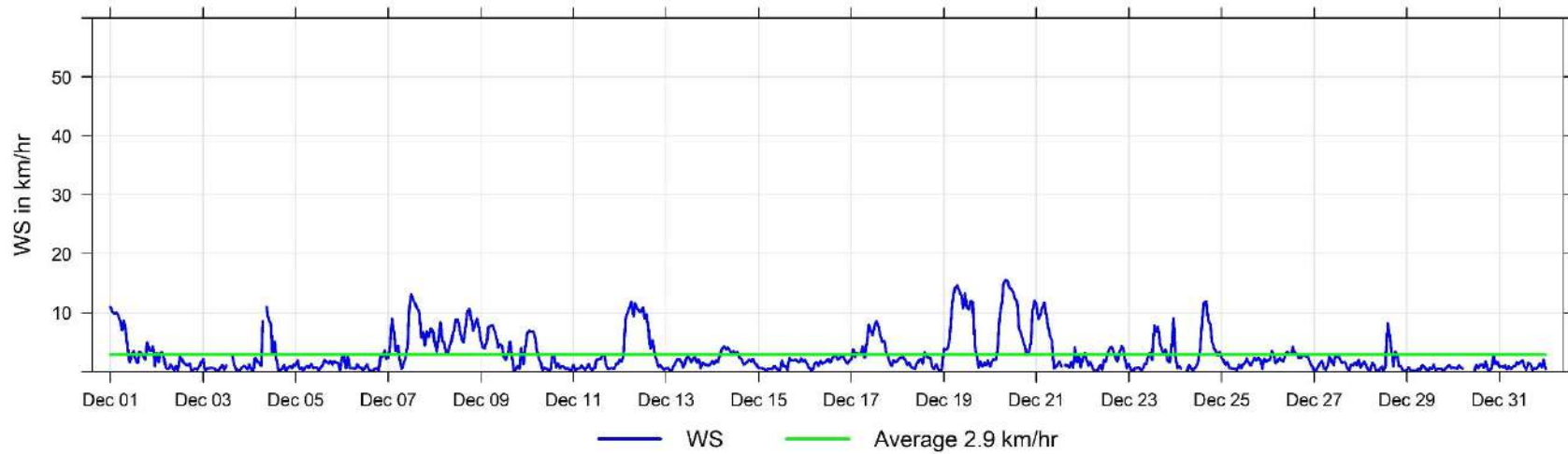
December Hourly Temperature Readings (in °C) at Evergreen Park



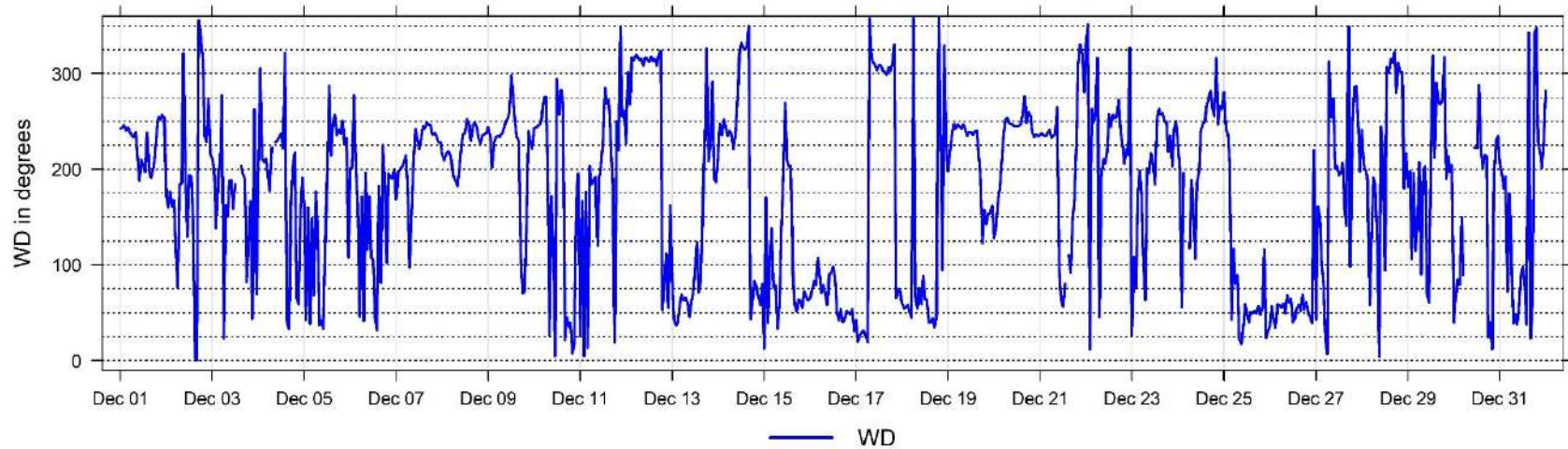
December Hourly Readings of Relative Humidity (in %) at Evergreen Park



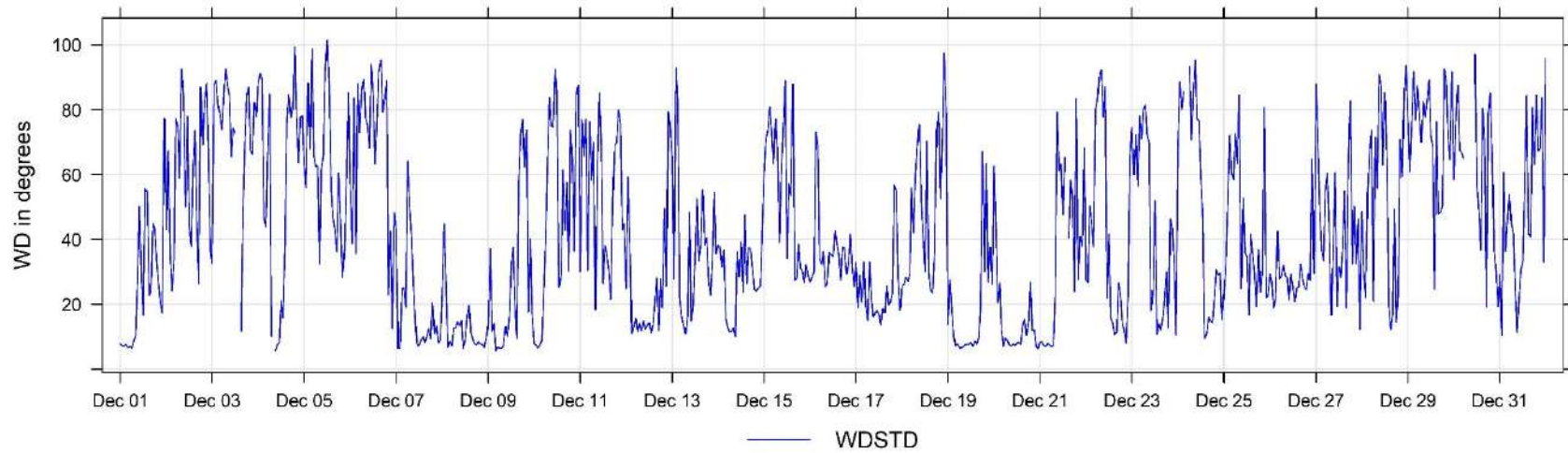
December Hourly Readings of Wind Speed (in km/hr) at Evergreen Park



December Hourly Readings of Wind Direction (in degrees) at Evergreen Park



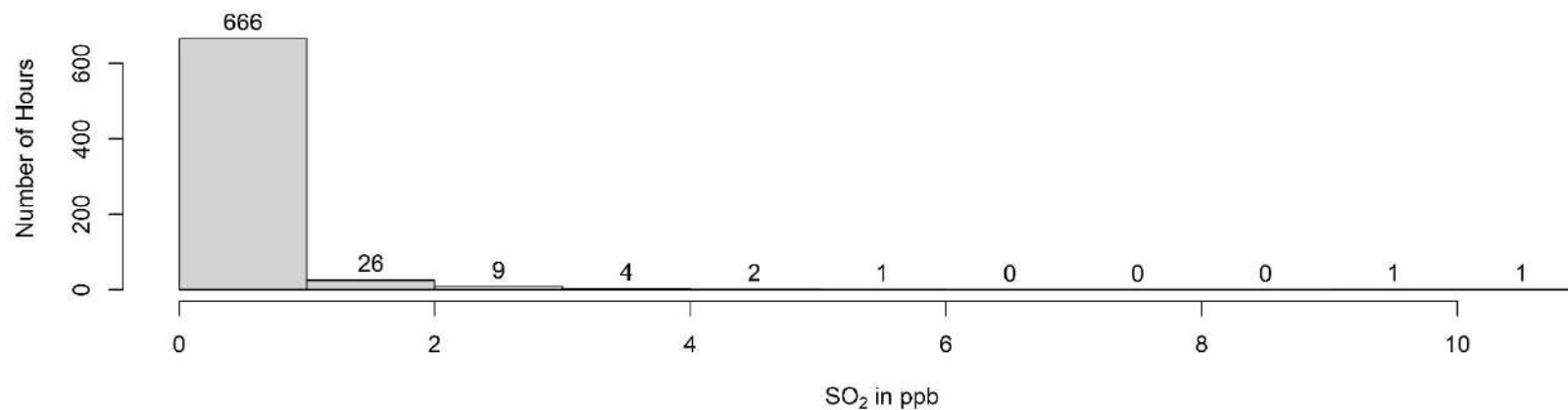
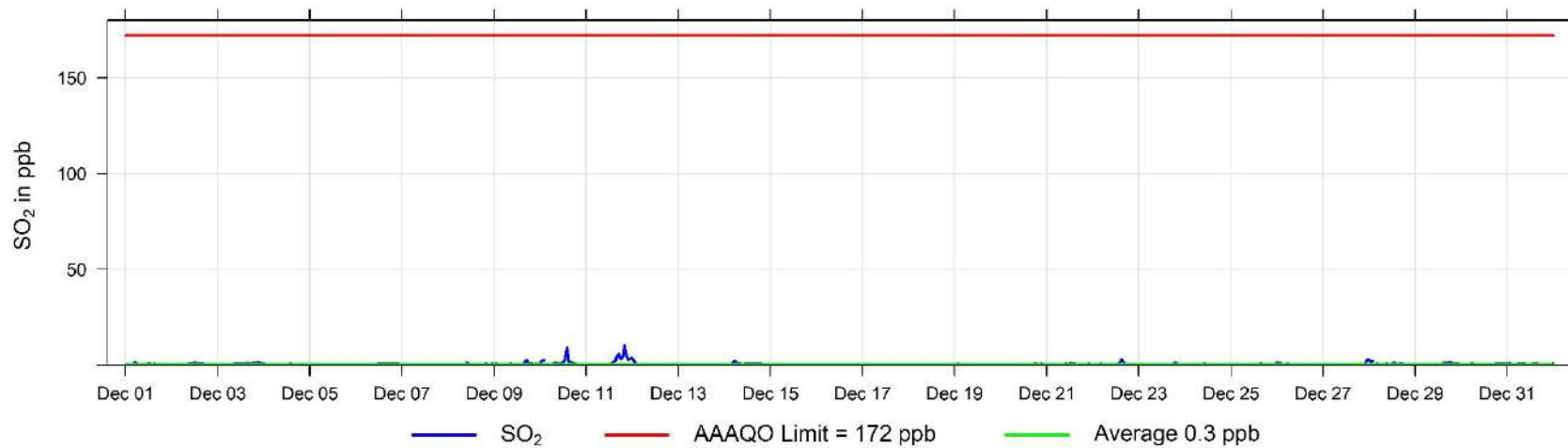
December Hourly Readings of Wind Direction Standard Deviation (in degrees) at Evergreen Park



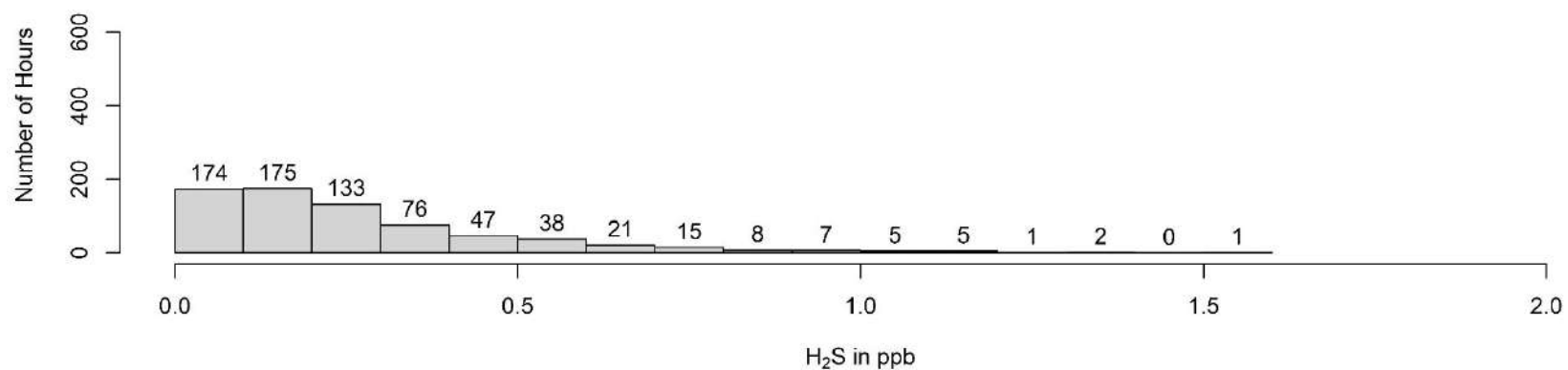
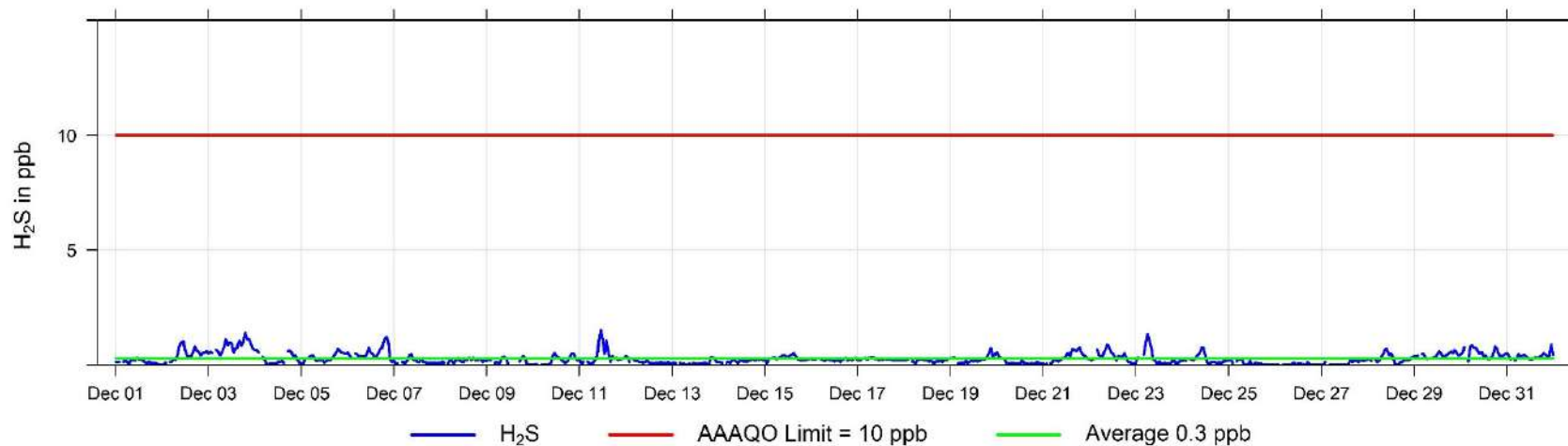
4 Grande Prairie - Henry Pirker Charts

The following pages include the charts and histograms for Henry Pirker Station in Grande Prairie

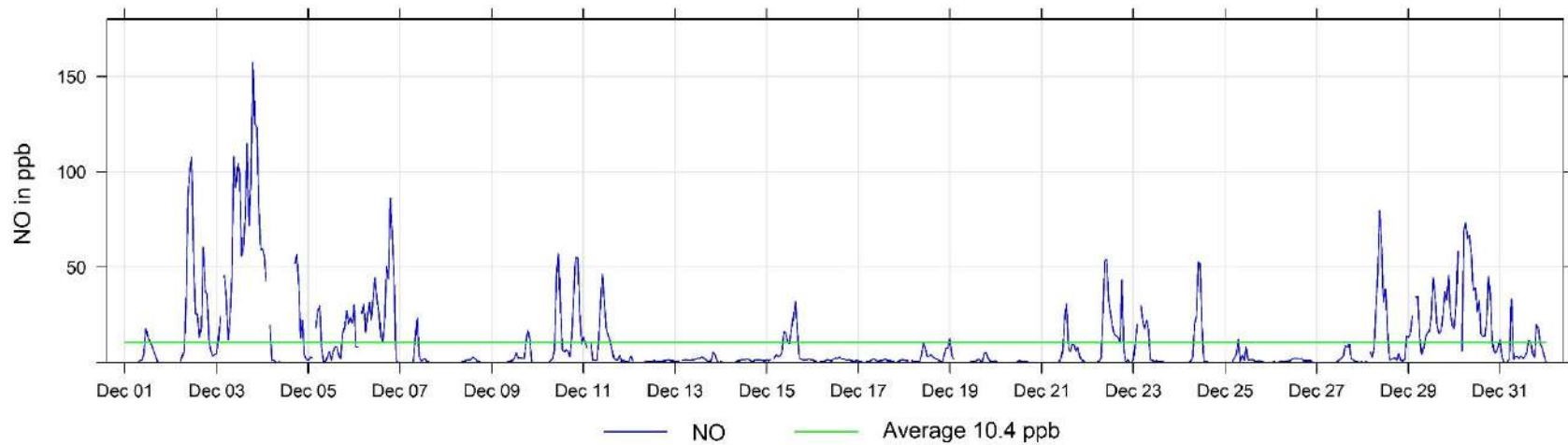
December Hourly Concentration Readings of SO₂ (in ppb) at Henry Pirker



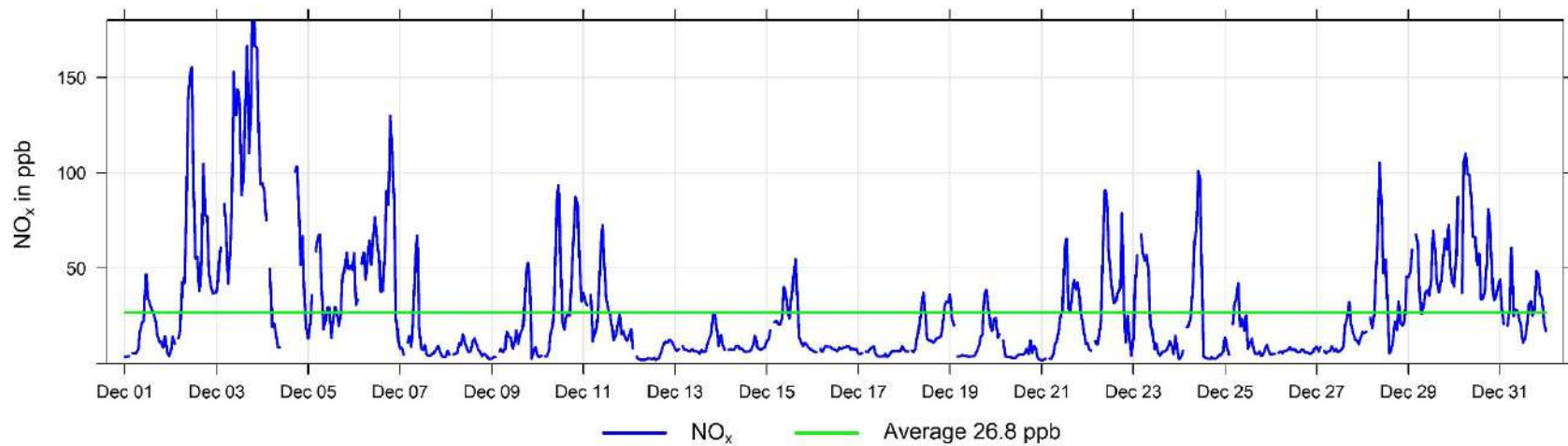
December Hourly Concentration Readings of H₂S (in ppb) at Henry Pirker



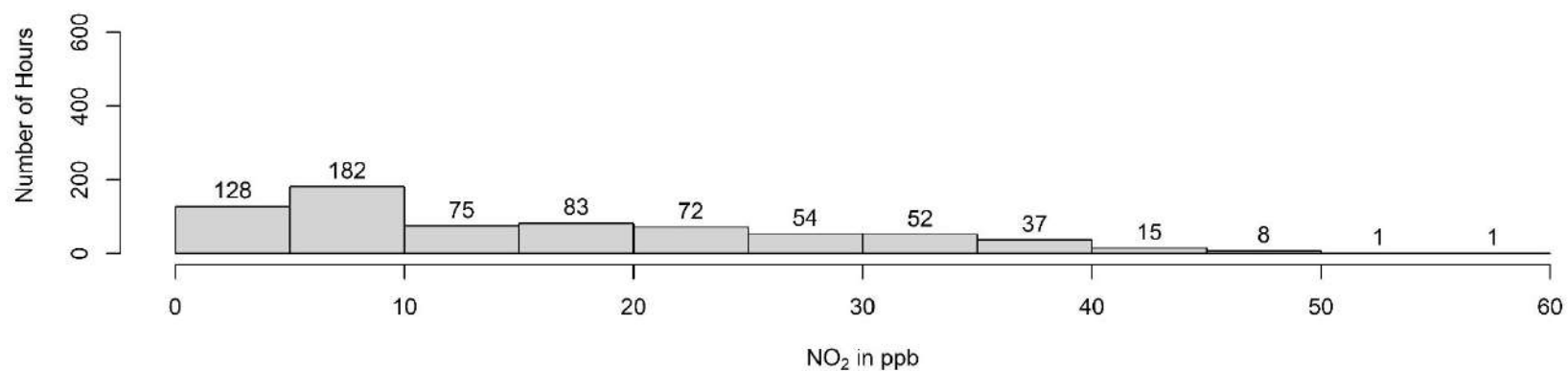
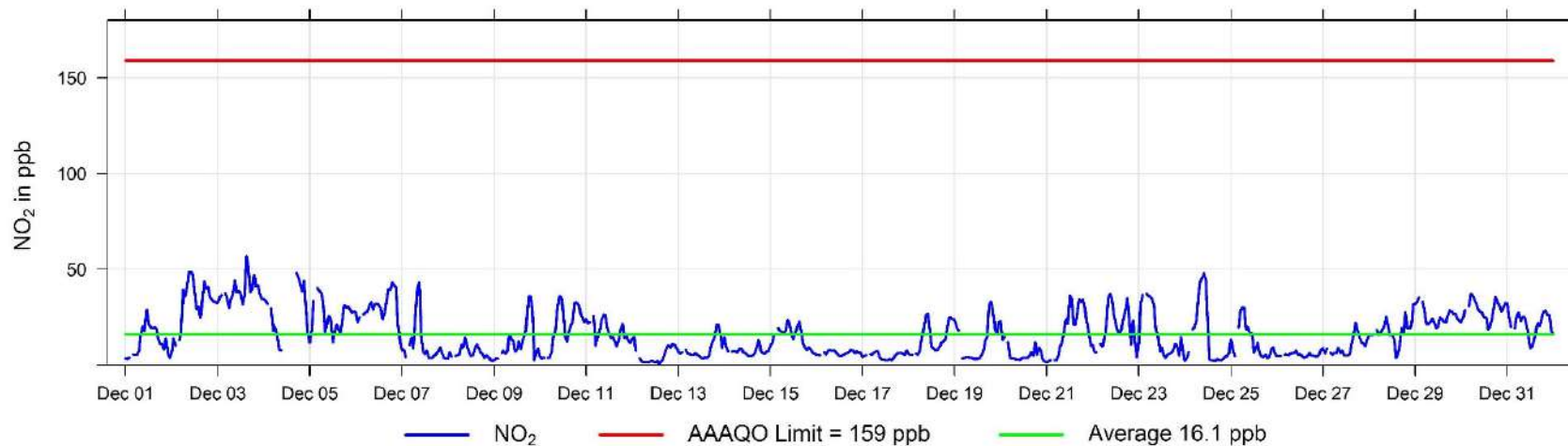
December Hourly Concentration Readings of NO (in ppb) at Henry Pirker



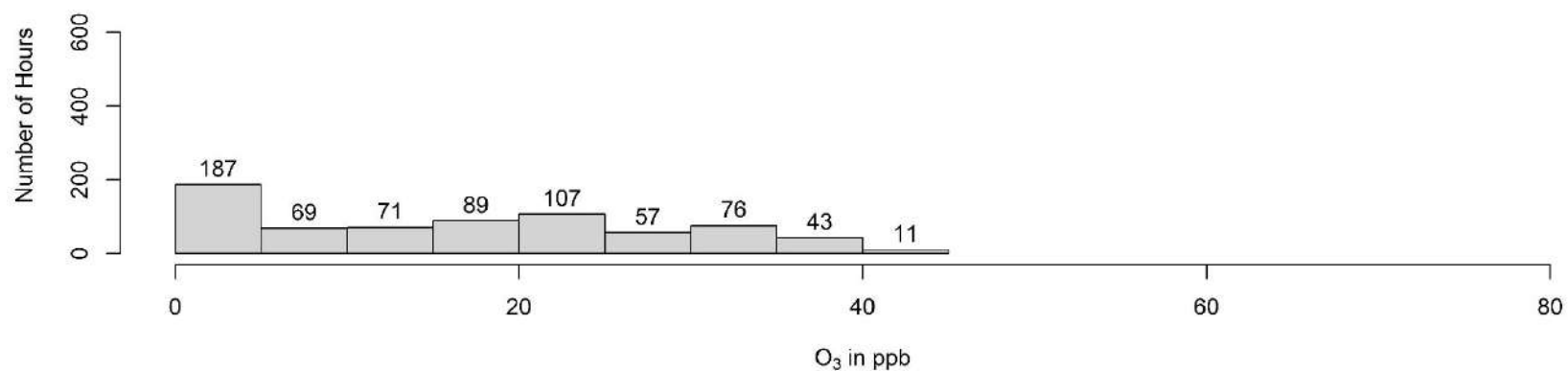
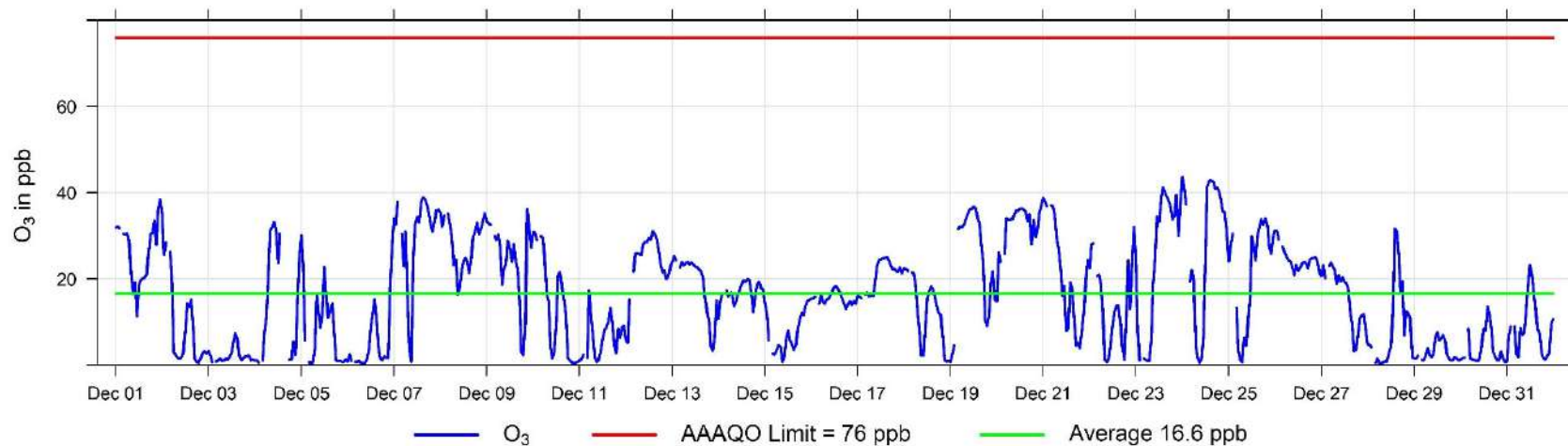
December Hourly Concentration Readings of NO_x (in ppb) at Henry Pirker



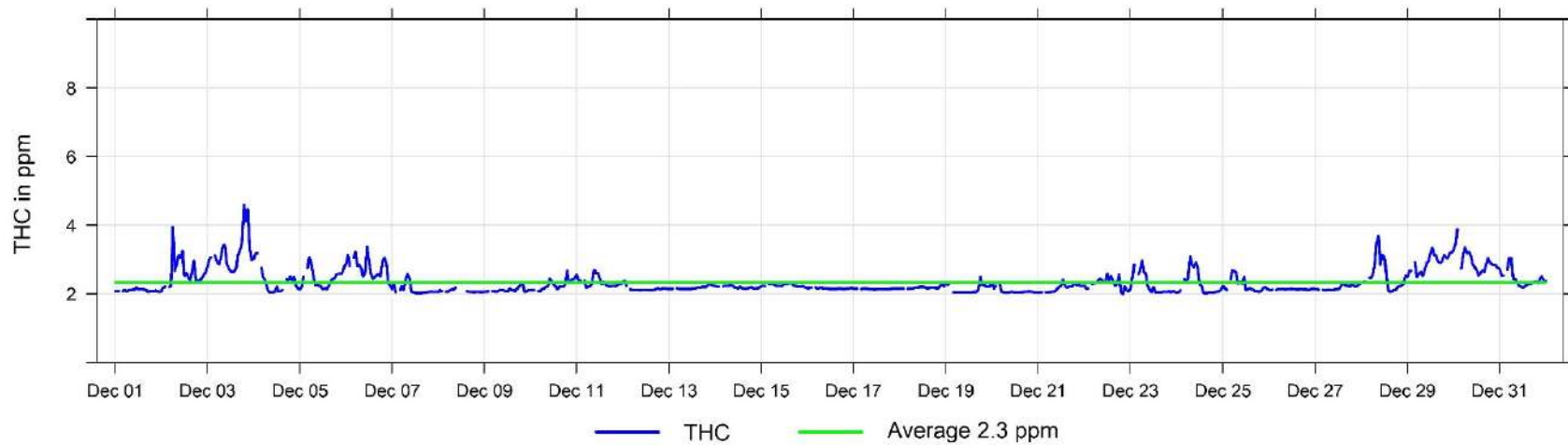
December Hourly Concentration Readings of NO₂ (in ppb) at Henry Pirker



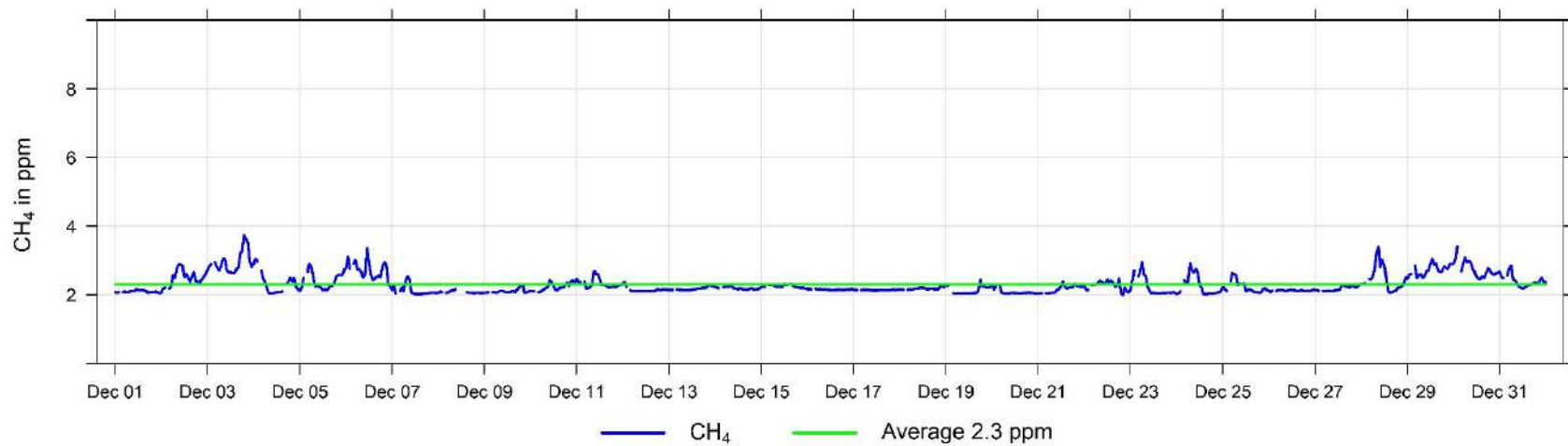
December Hourly Concentration Readings of O₃ (in ppb) at Henry Pirker



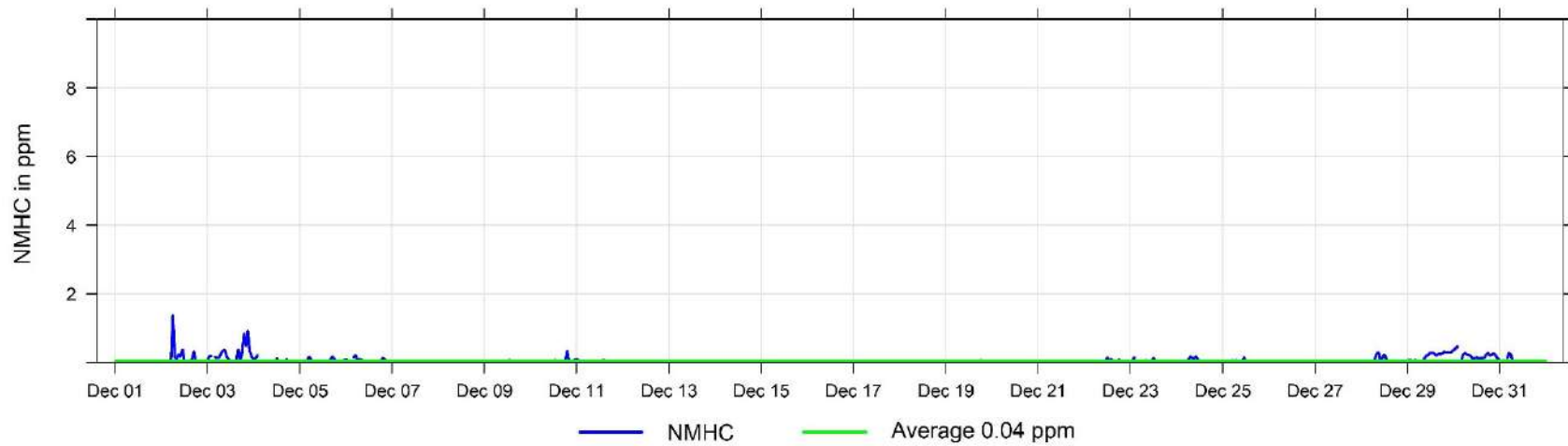
December Hourly Concentration Readings of THC (in ppm) at Henry Pirker



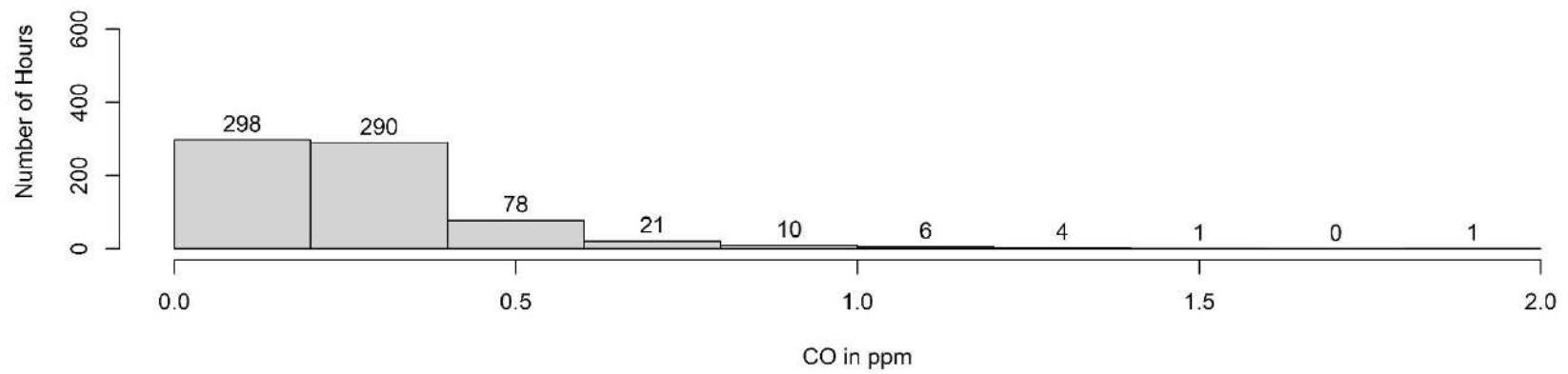
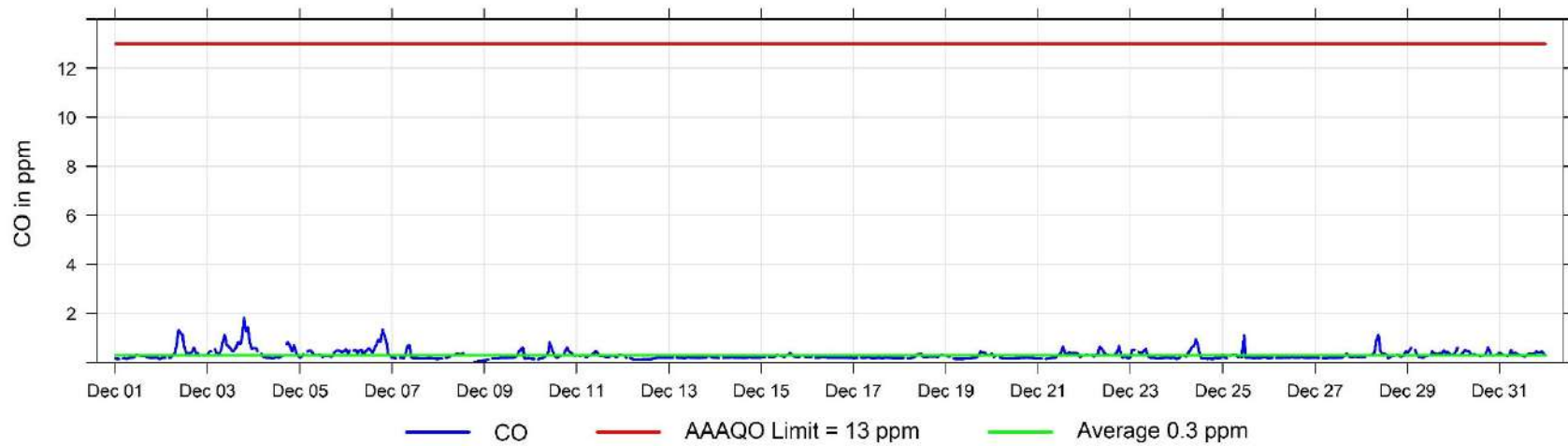
December Hourly Concentration Readings of CH₄ (in ppm) at Henry Pirker



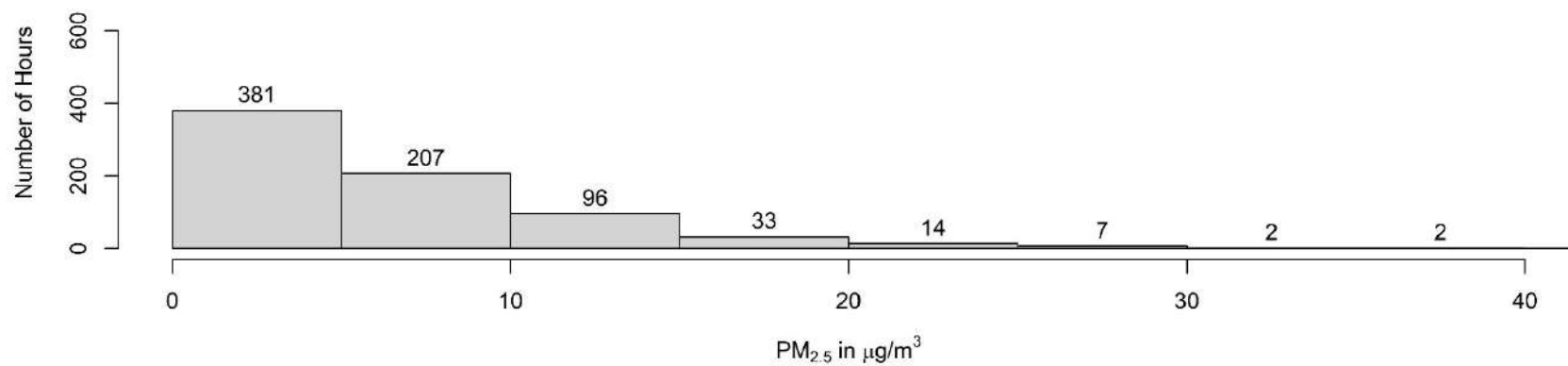
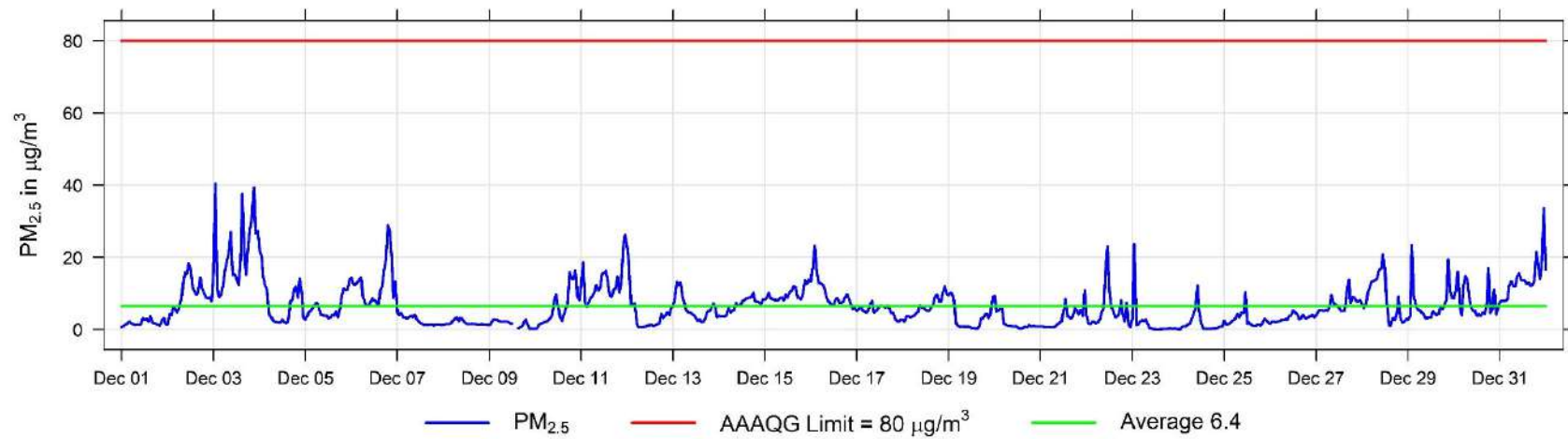
December Hourly Concentration Readings of NMHC (in ppm) at Henry Pirker



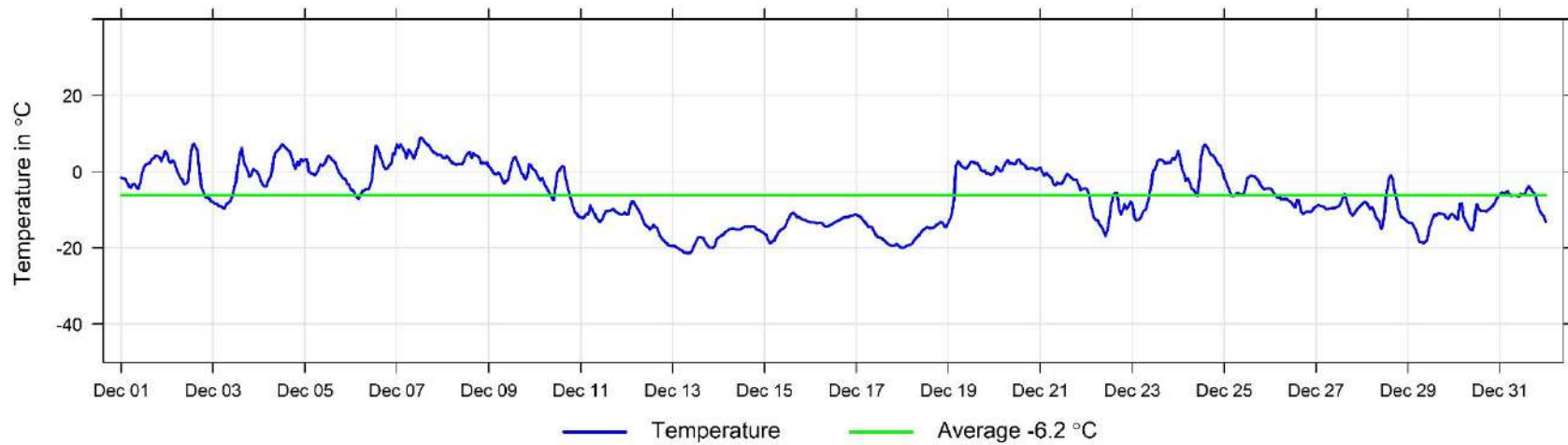
December Hourly Concentration Readings of CO (in ppm) at Henry Pirker



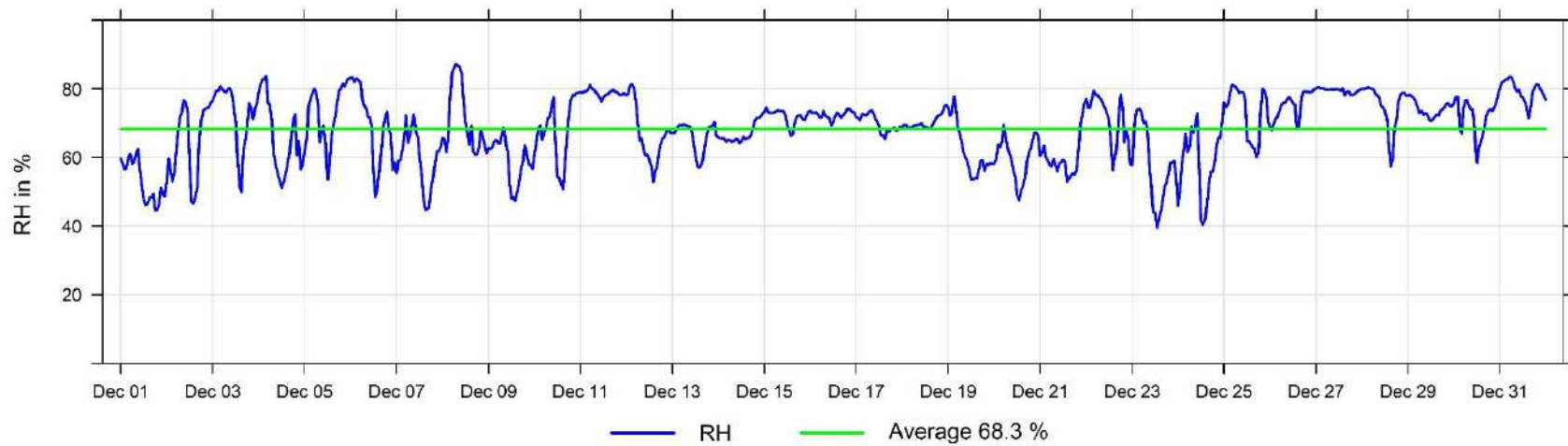
December Hourly Concentration Readings of PM_{2.5} in $\mu\text{g}/\text{m}^3$ at Henry Pirker



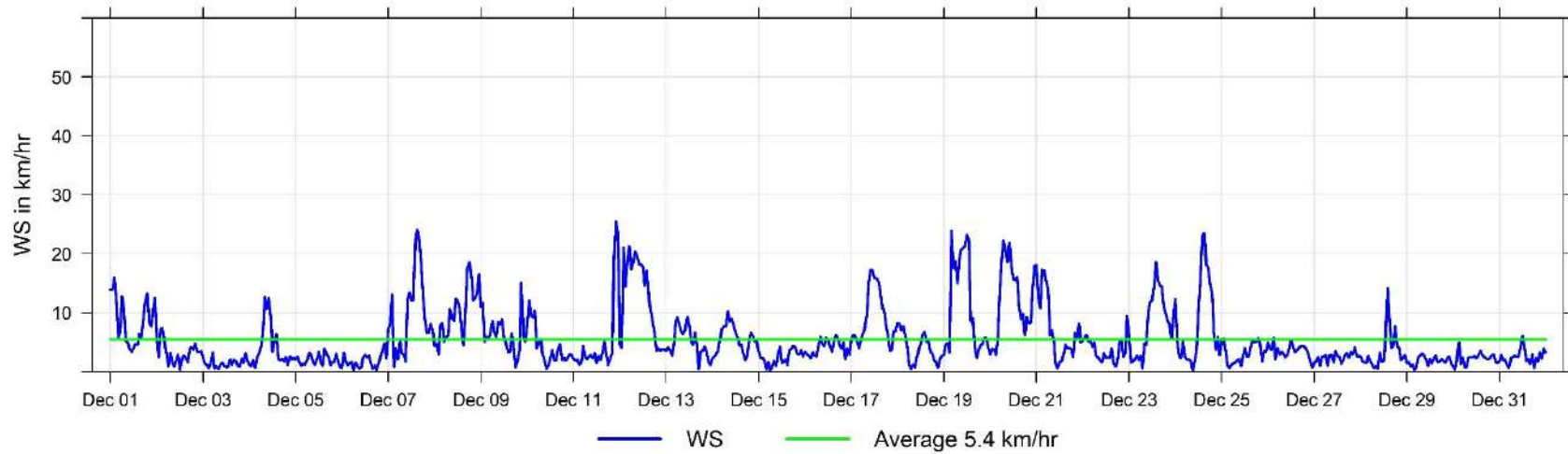
December Hourly Temperature Readings (in °C) at Henry Pirker



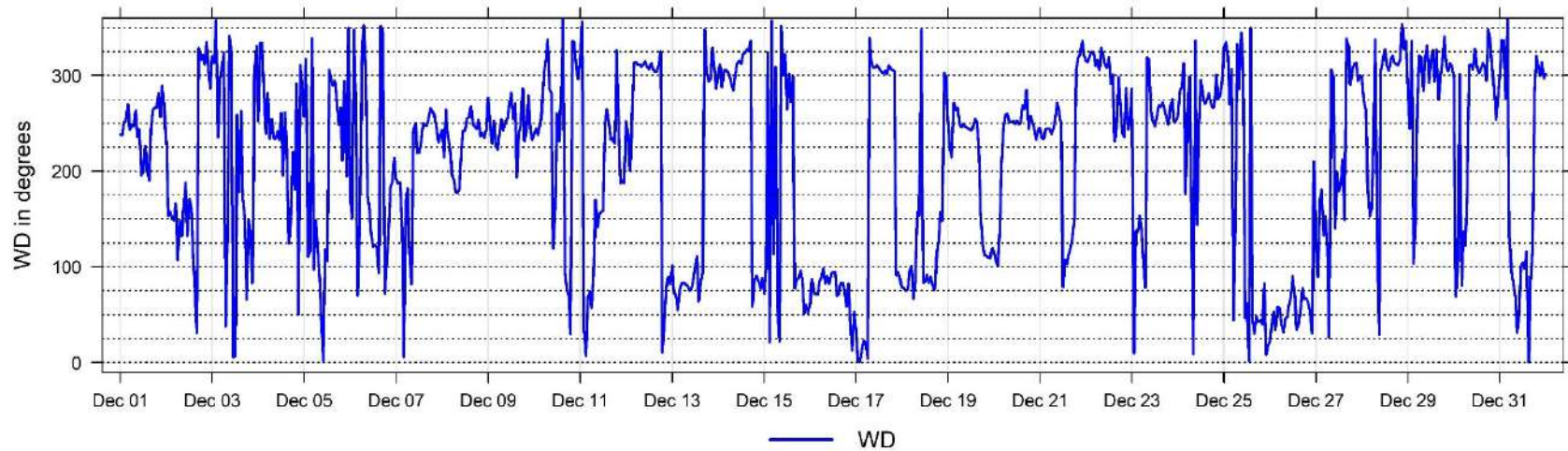
December Hourly Readings of Relative Humidity (in %) at Henry Pirker



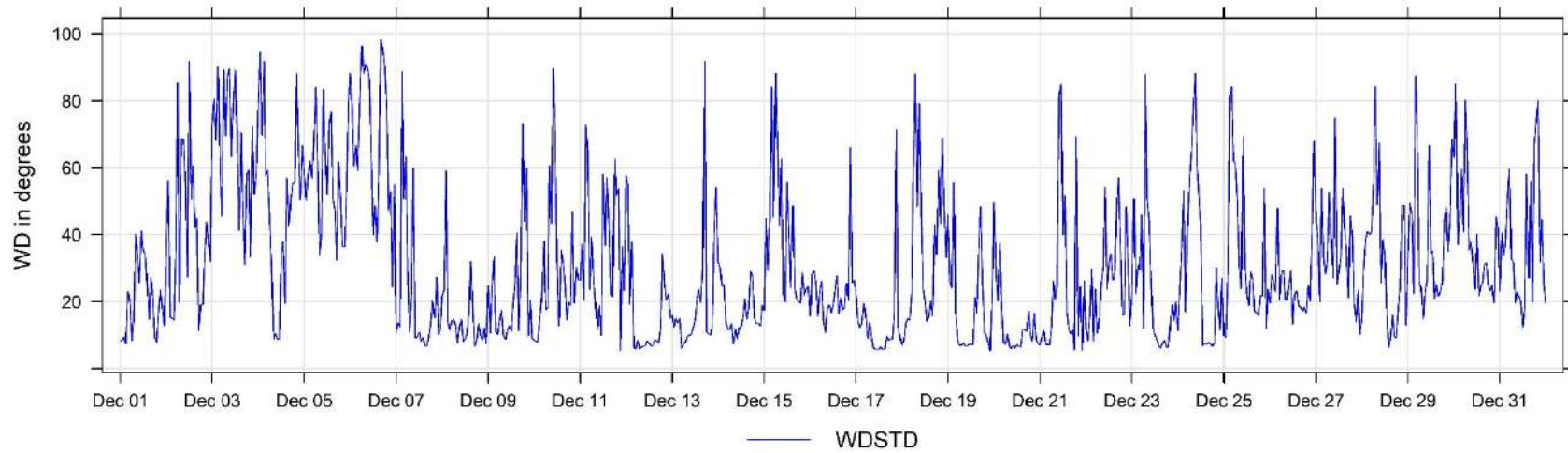
December Hourly Readings of Wind Speed (in km/hr) at Henry Pirker

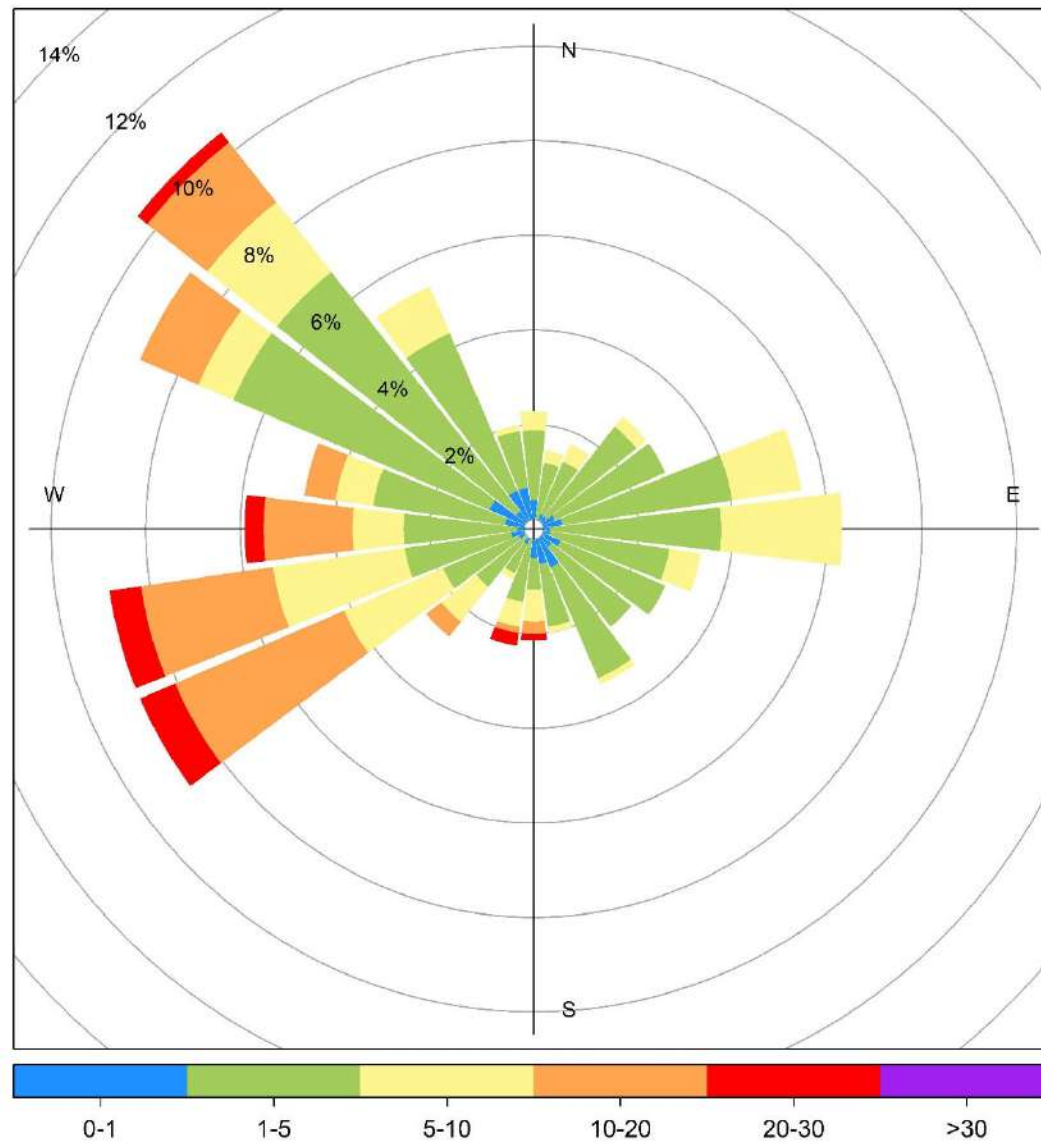


December Hourly Readings of Wind Direction (in degrees) at Henry Pirker



December Hourly Readings of Wind Direction Standard Deviation (in degrees) at Henry Pirker



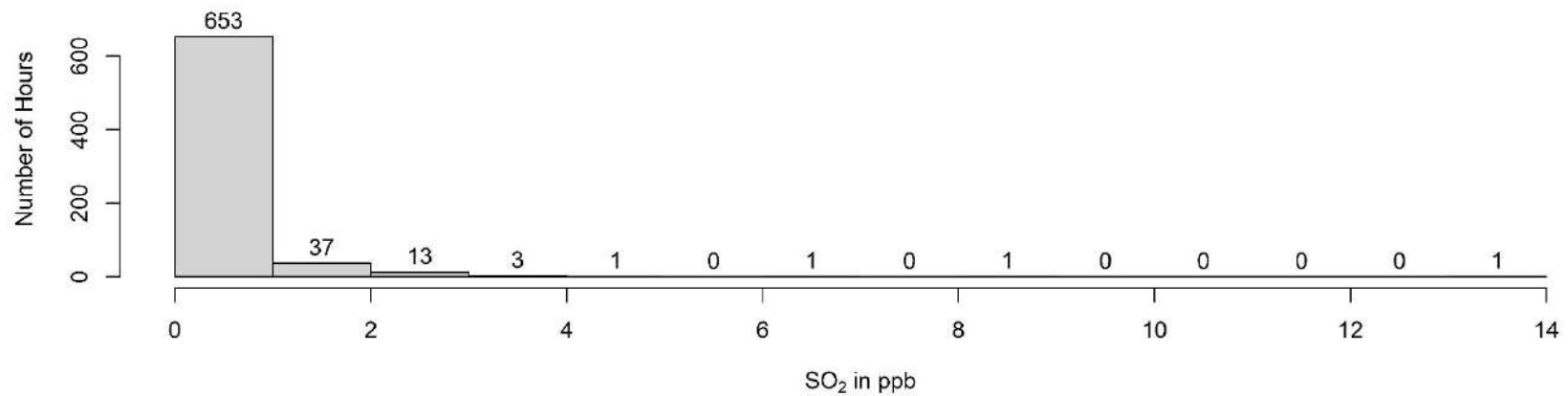
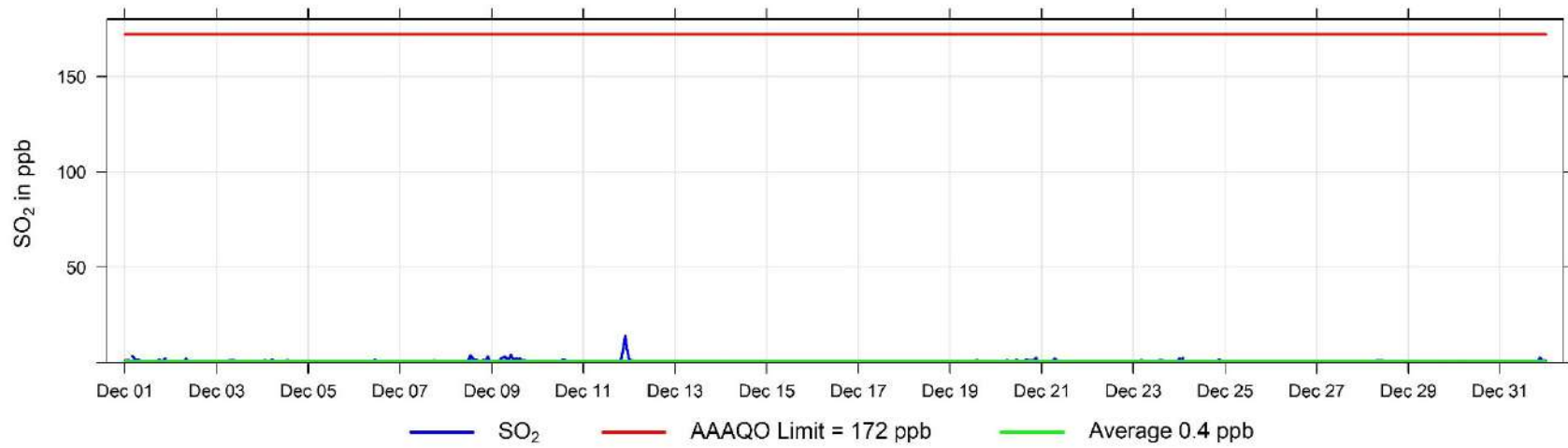


Henry Pirker December Wind Rose, wind speed in km/hr

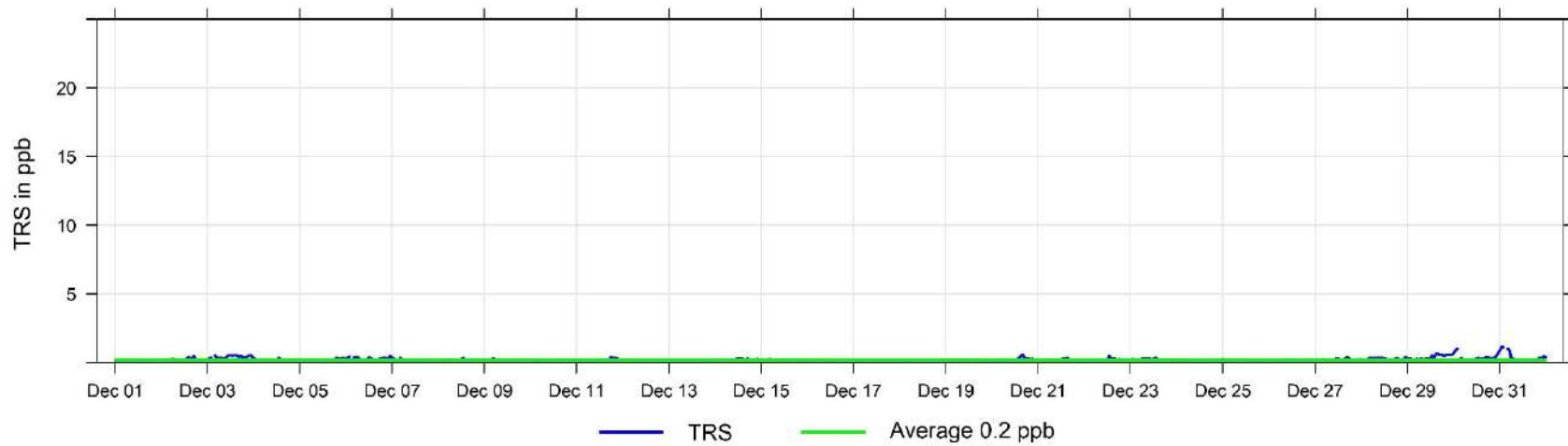
5 Smoky Heights Charts

The following pages include the charts and histograms for Smoky Heights Station

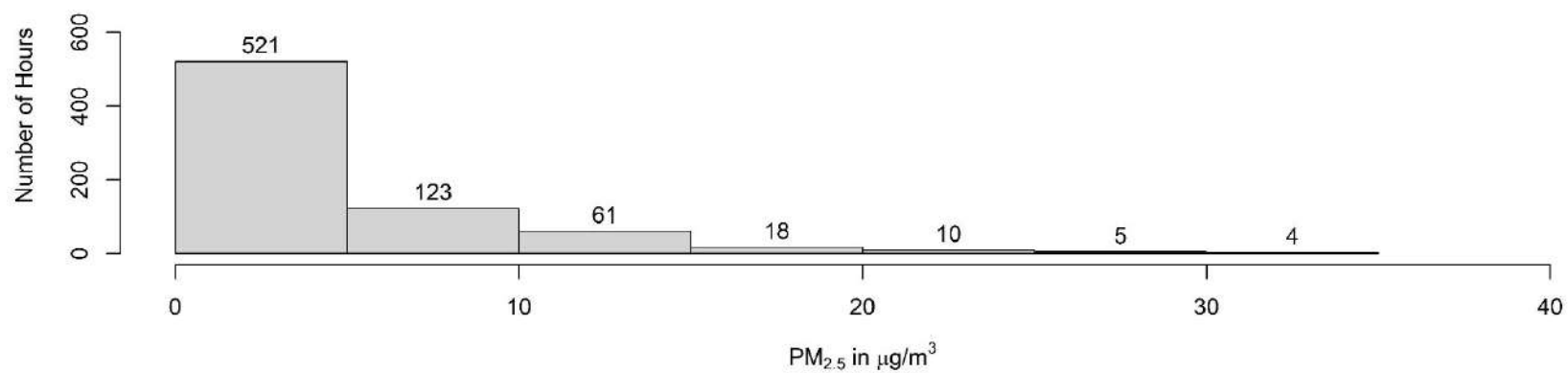
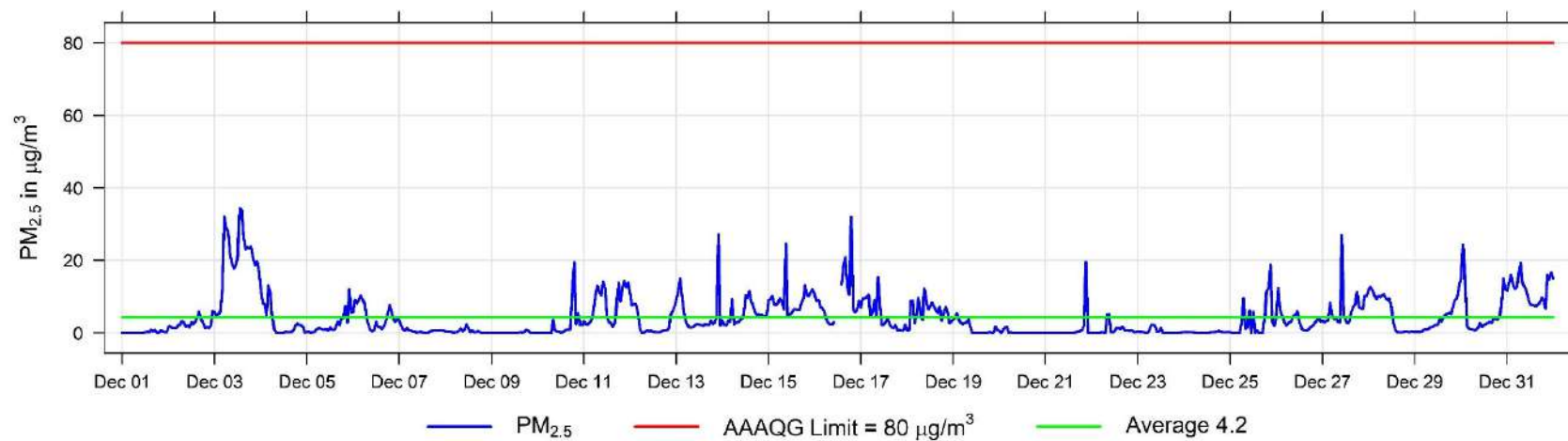
December Hourly Concentration Readings of SO₂ (in ppb) at Smoky Heights



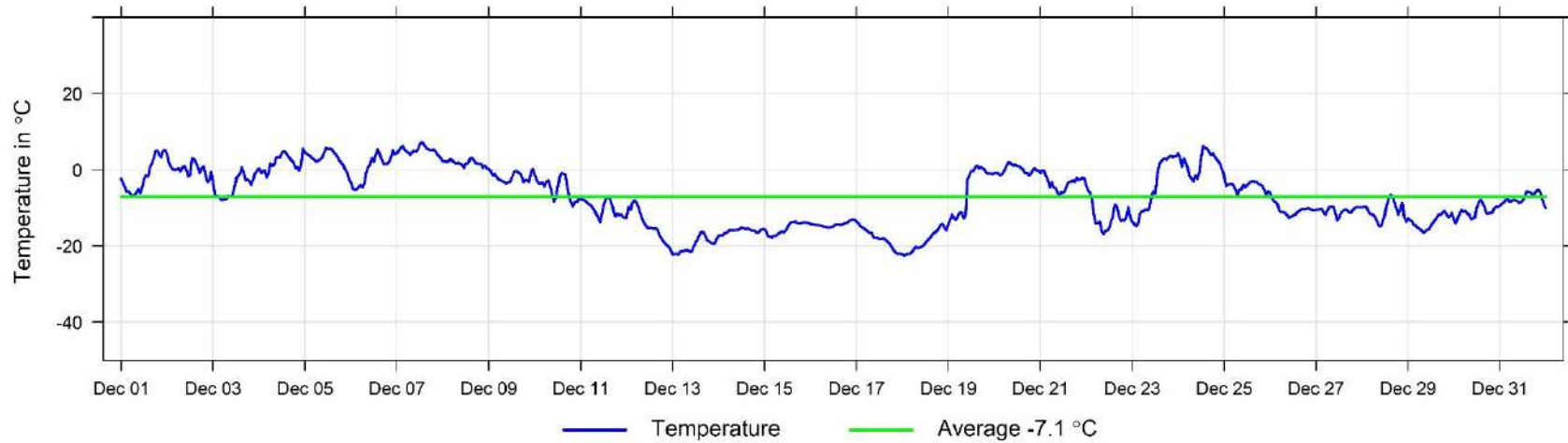
December Hourly Concentration Readings of TRS (in ppb) at Smoky Heights



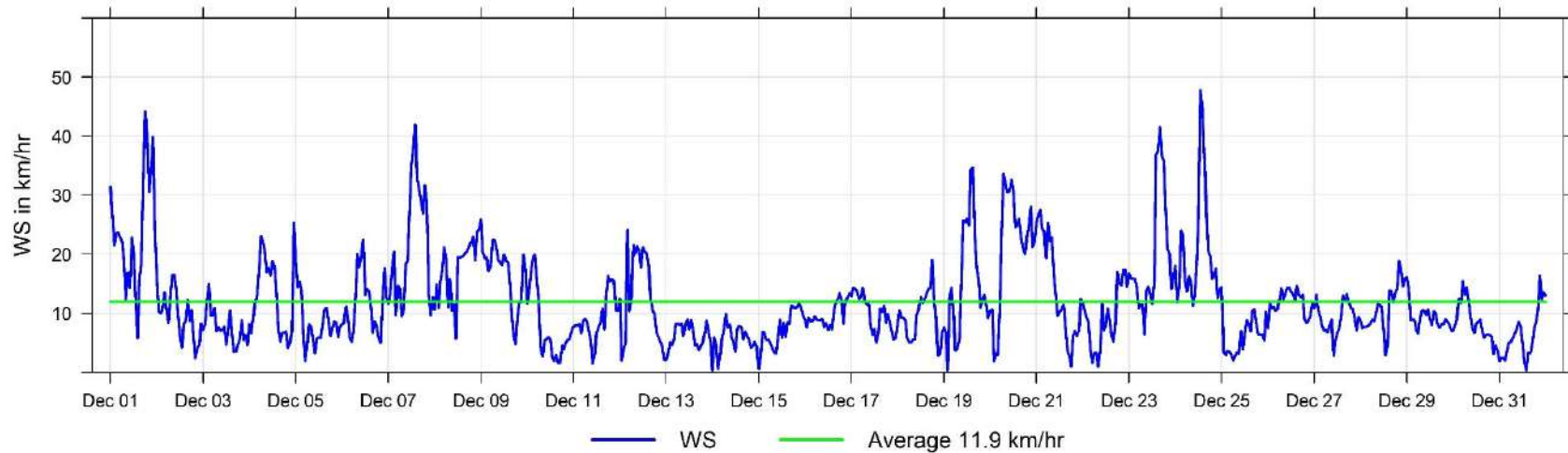
December Hourly Concentration Readings of PM_{2.5} in $\mu\text{g}/\text{m}^3$ at Smoky Heights



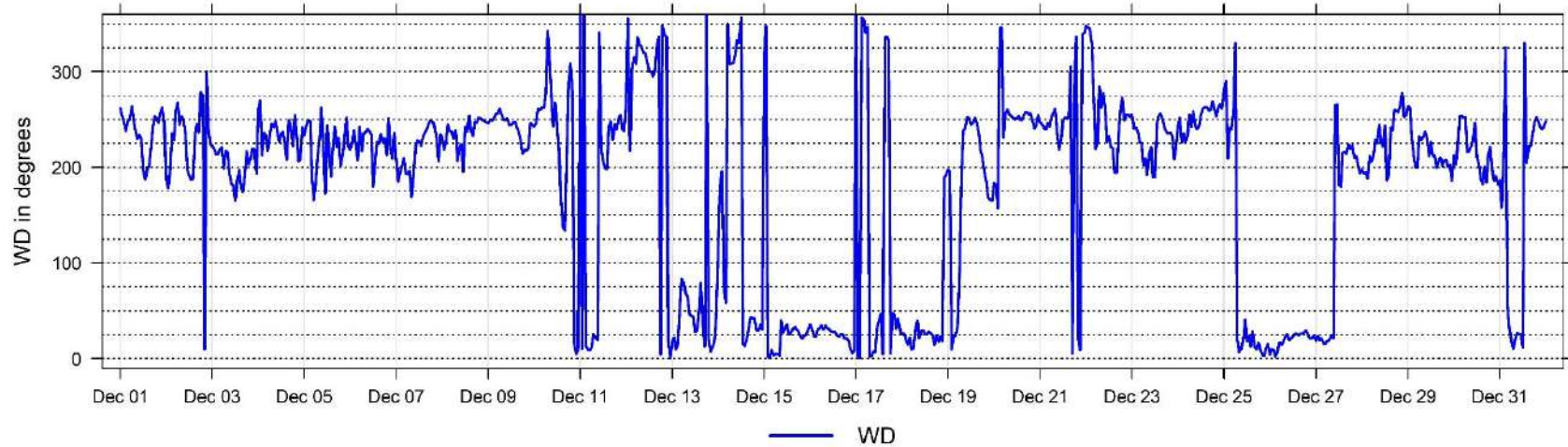
December Hourly Temperature Readings (in °C) at Smoky Heights



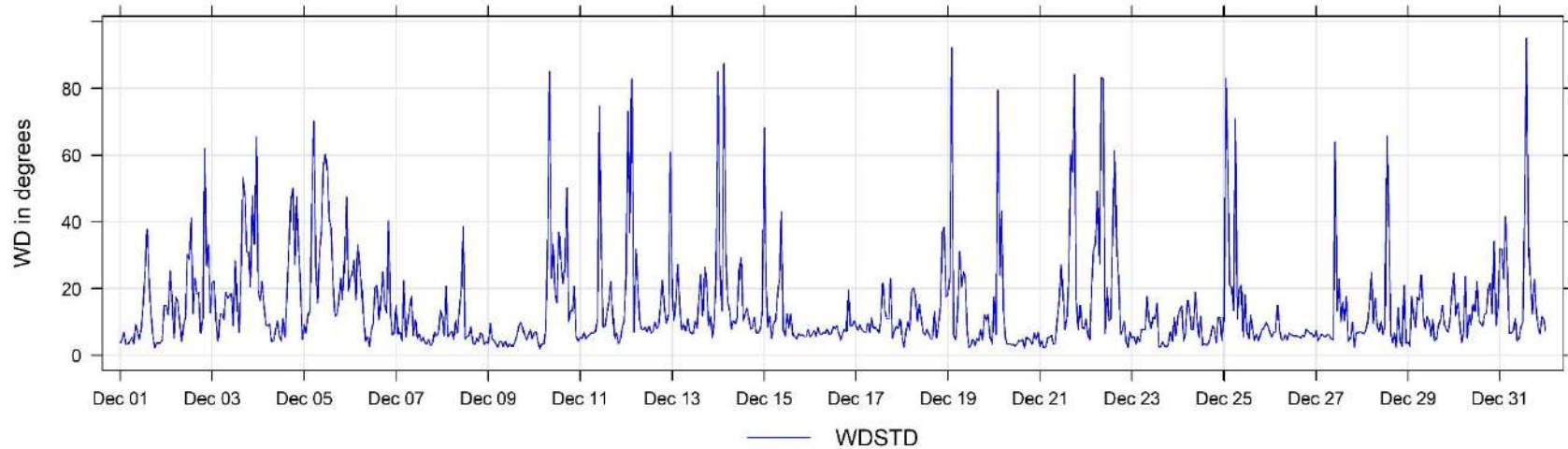
December Hourly Readings of Wind Speed (in km/hr) at Smoky Heights



December Hourly Readings of Wind Direction (in degrees) at Smoky Heights



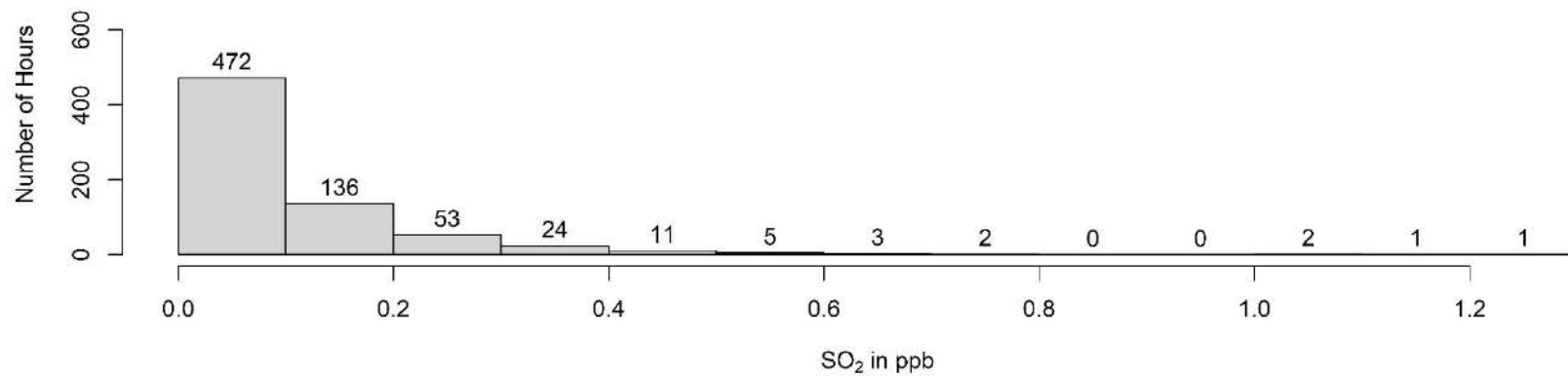
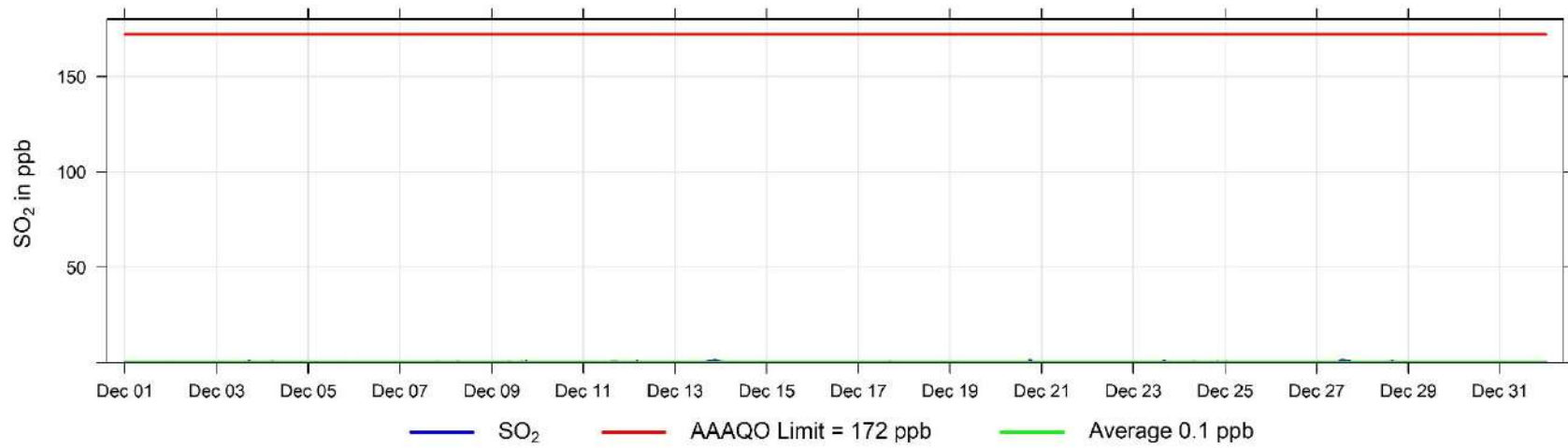
December Hourly Readings of Wind Direction Standard Deviation (in degrees) at Smoky Heights



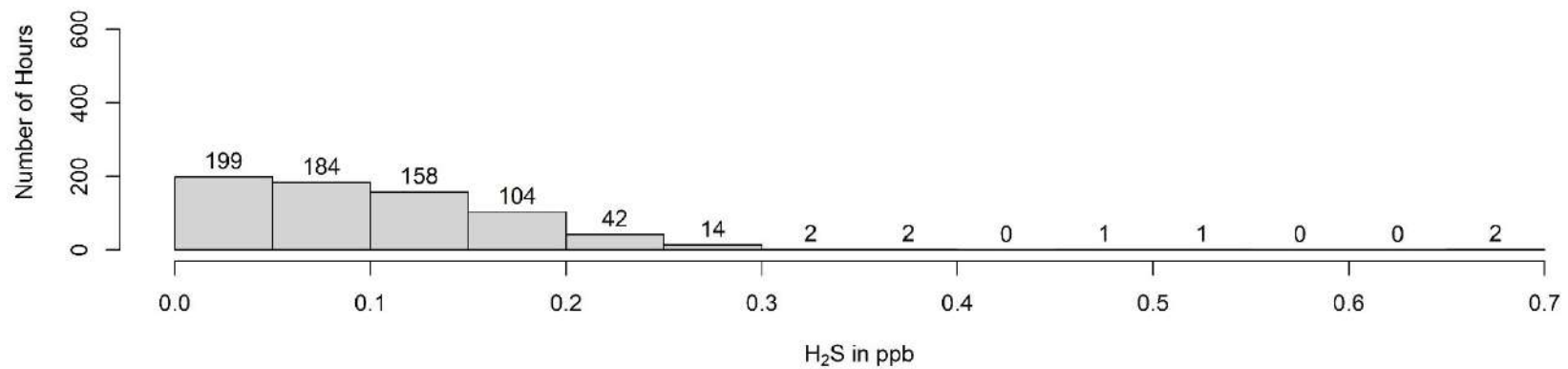
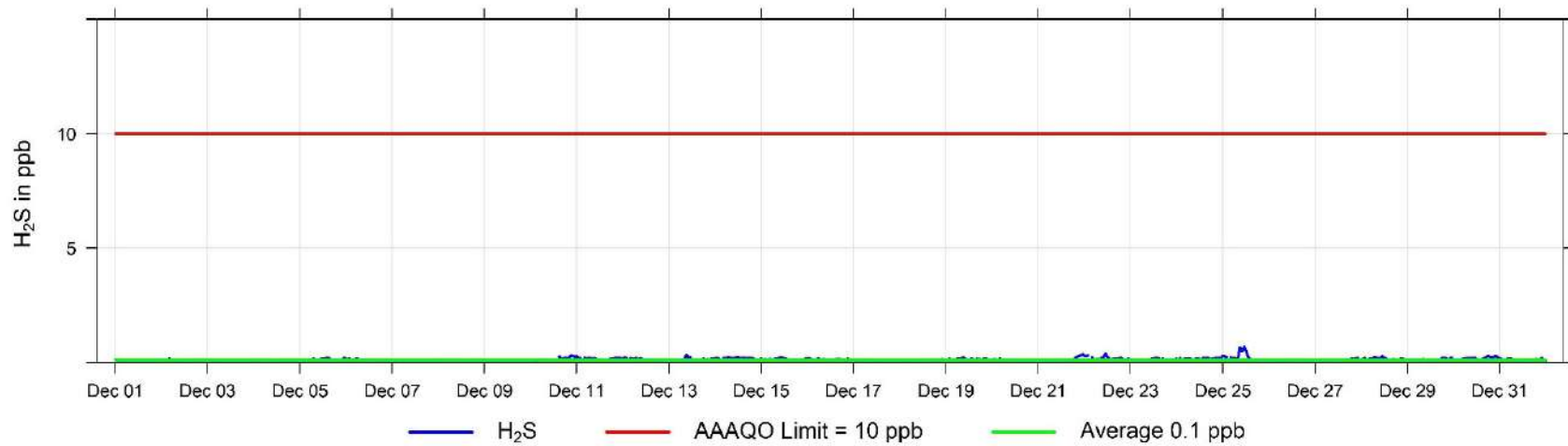
6 Valleyview Charts

The following pages include the charts and histograms for Valleyview Station

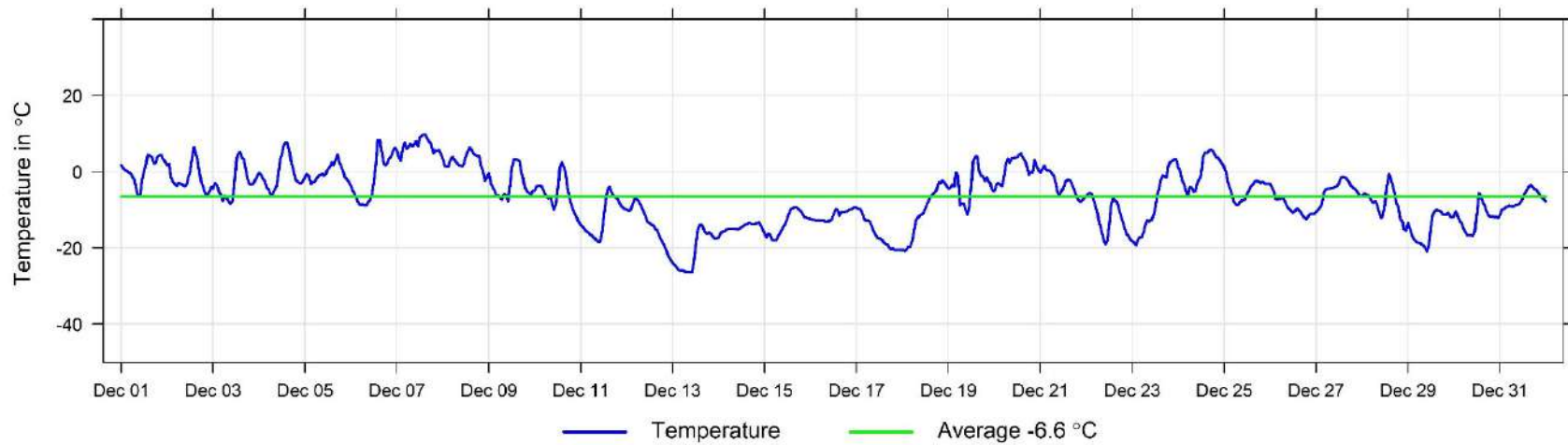
December Hourly Concentration Readings of SO₂ (in ppb) at Valleyview



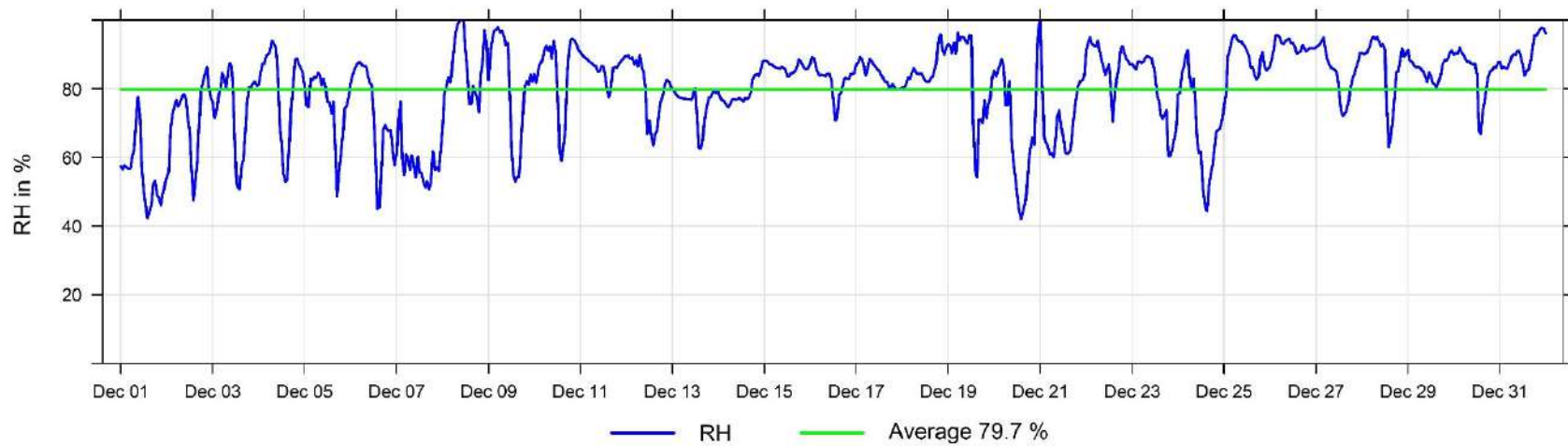
December Hourly Concentration Readings of H₂S (in ppb) at Valleyview



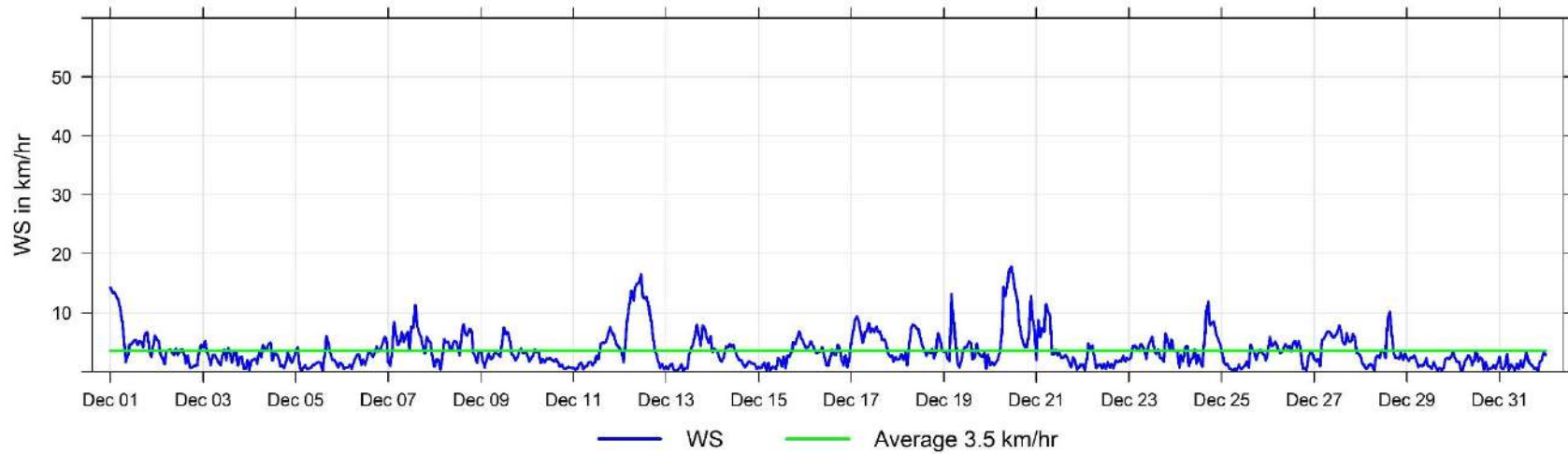
December Hourly Temperature Readings (in °C) at Valleyview



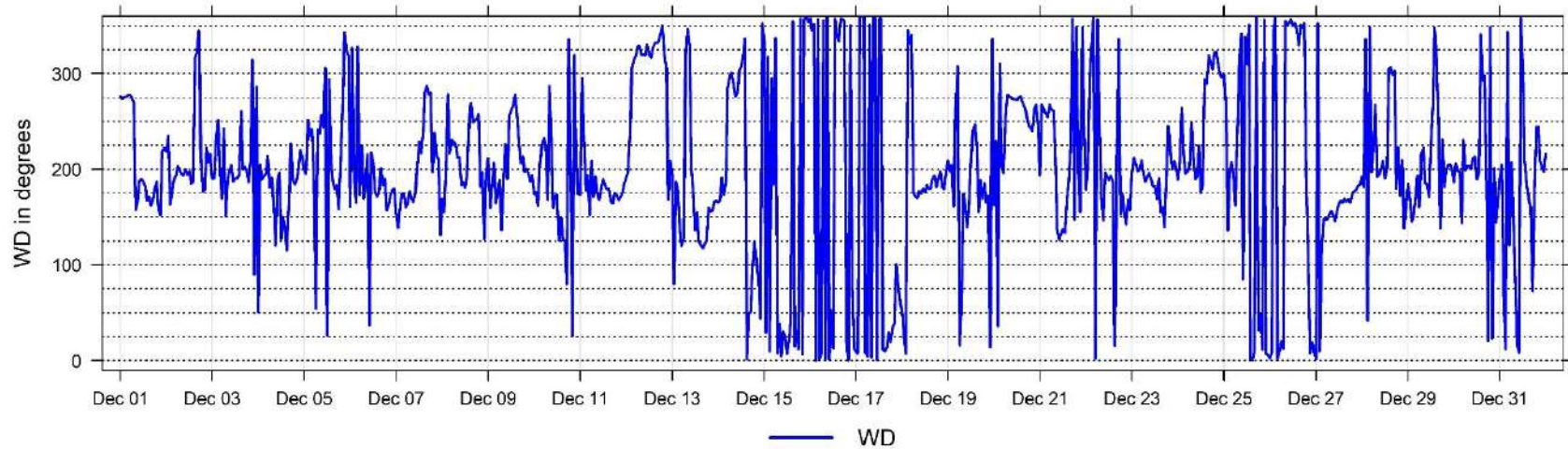
December Hourly Readings of Relative Humidity (in %) at Valleyview



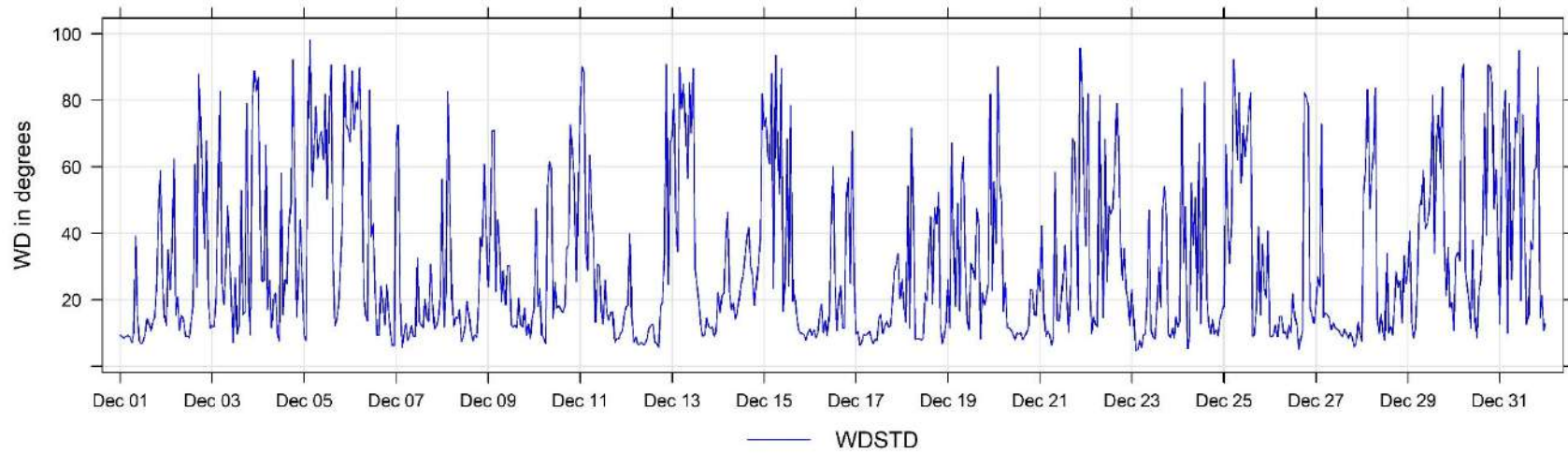
December Hourly Readings of Wind Speed (in km/hr) at Valleyview

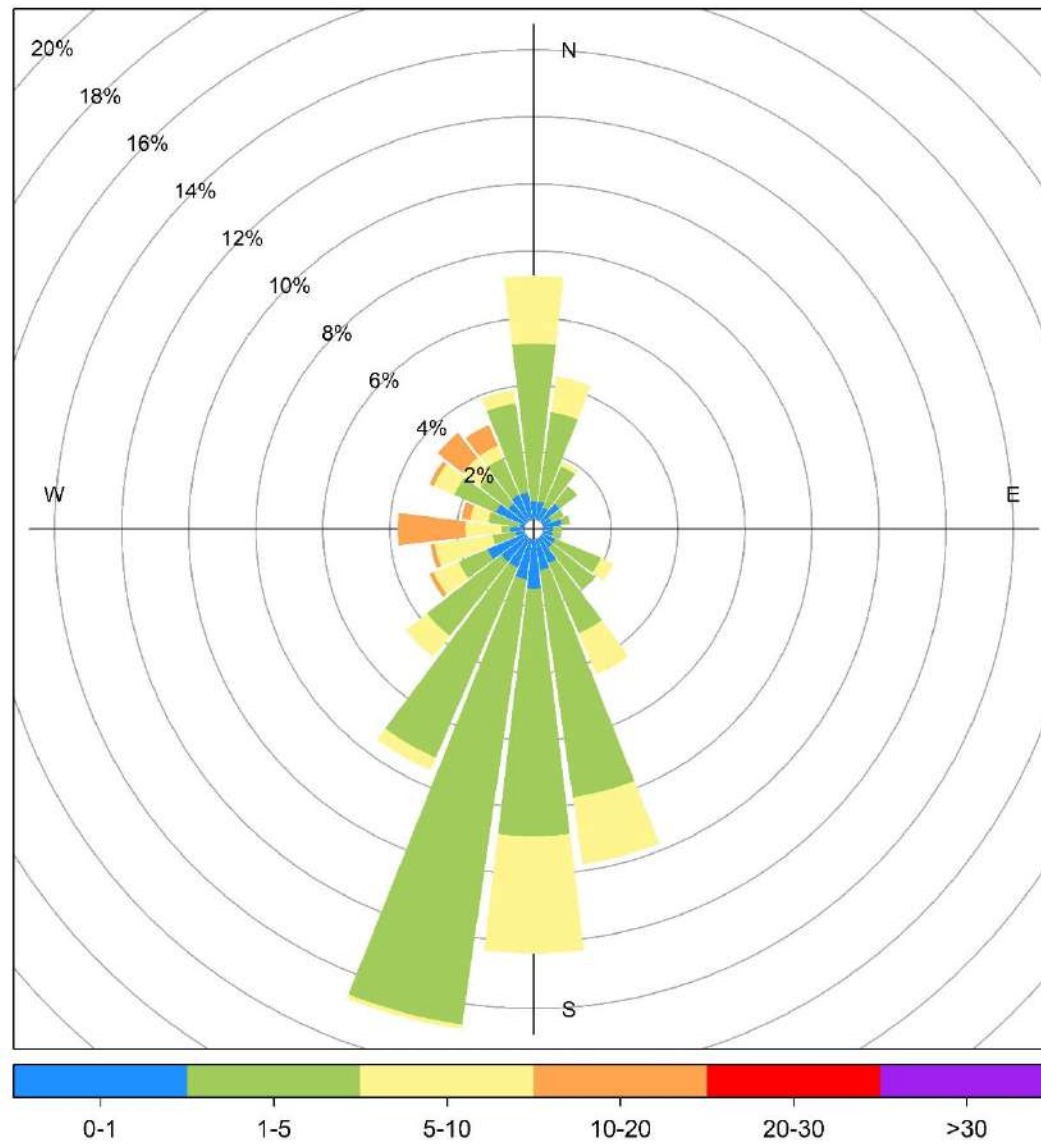


December Hourly Readings of Wind Direction (in degrees) at Valleyview



December Hourly Readings of Wind Direction Standard Deviation (in degrees) at Valleyview



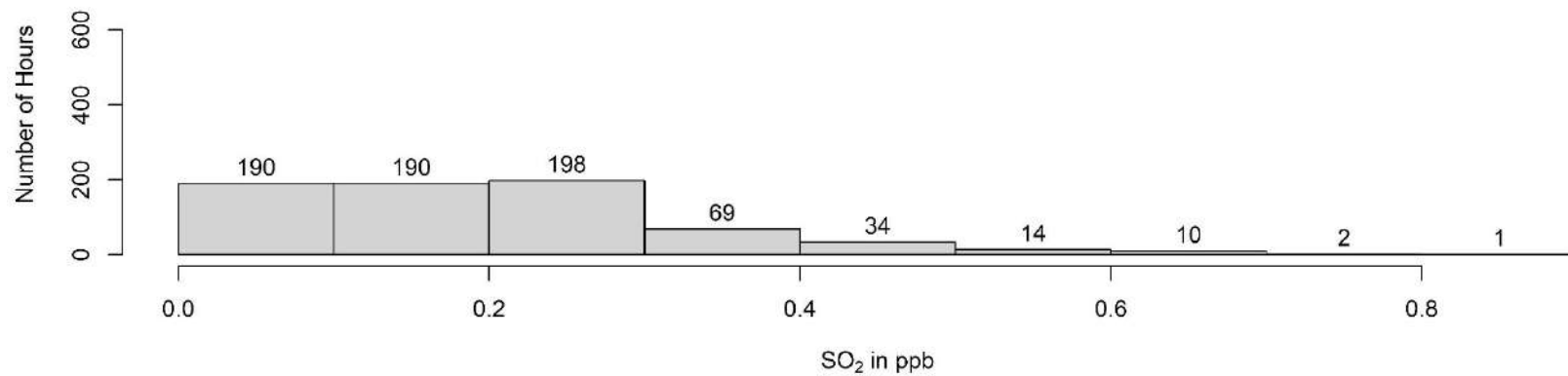
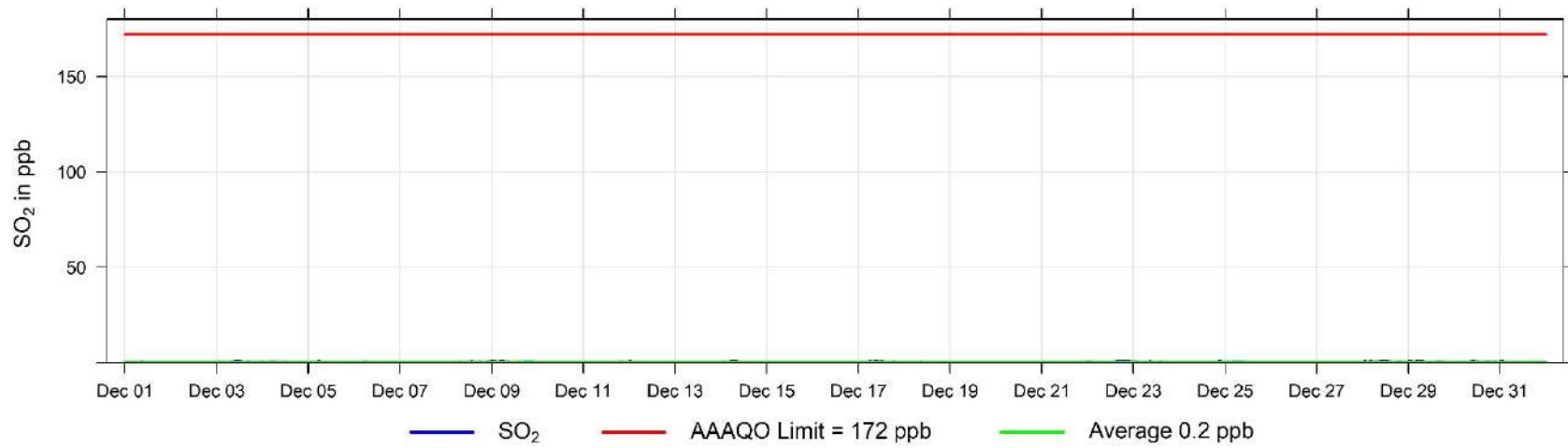


Valleyview December Wind Rose, wind speed in km/hr

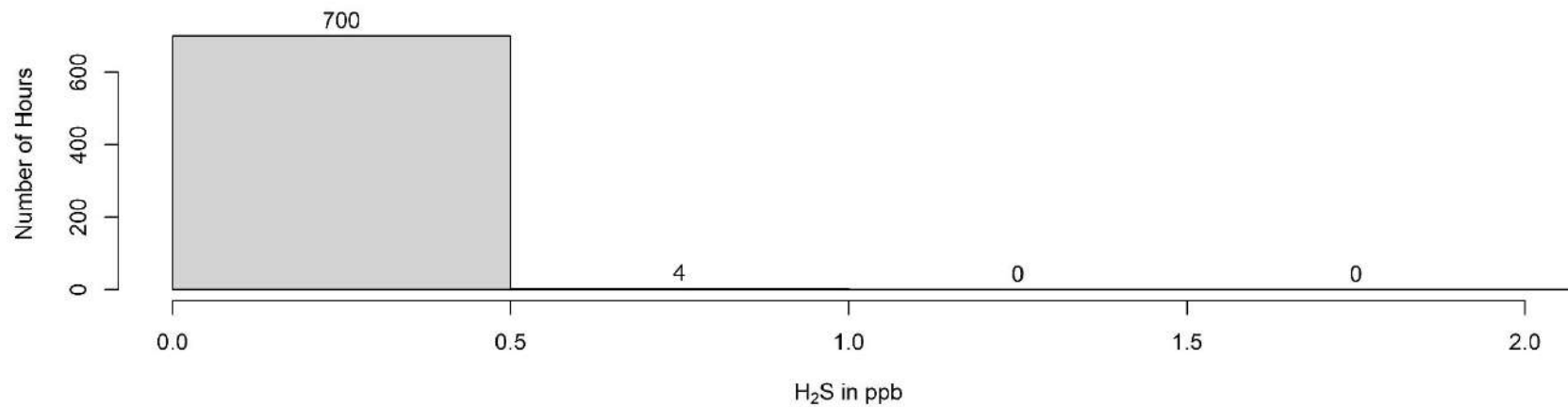
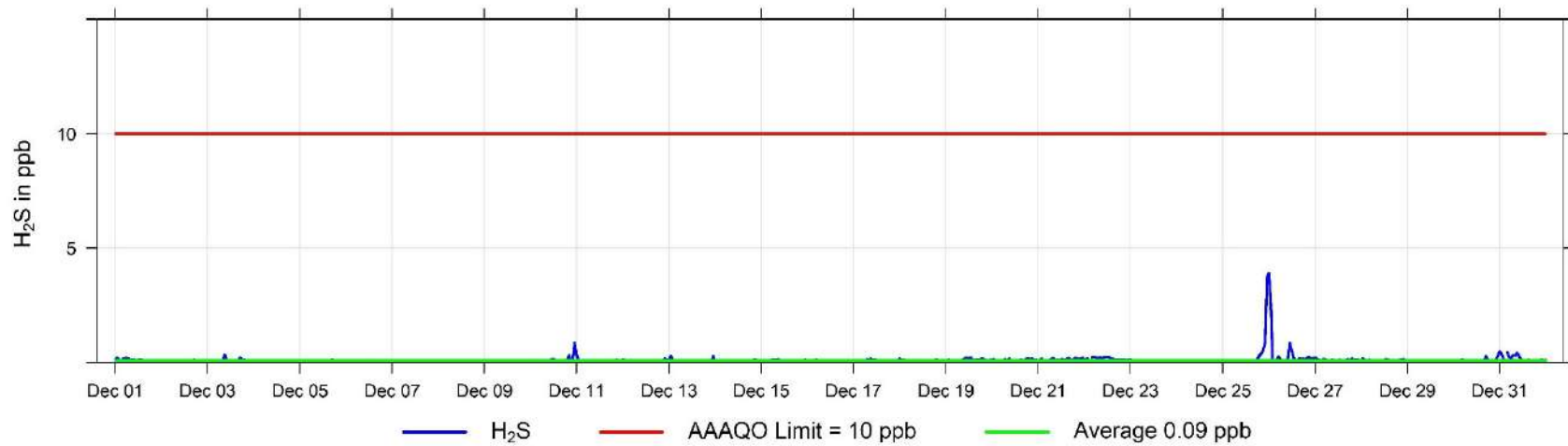
7 Donnelly Charts

The following pages include the charts and histograms for Donnelly Station

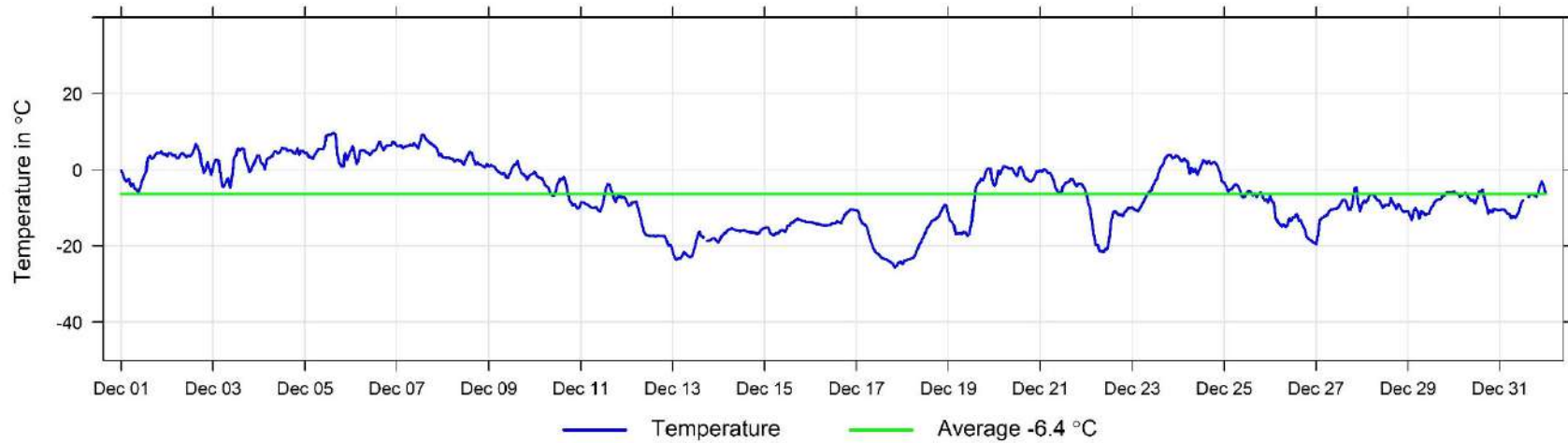
December Hourly Concentration Readings of SO₂ (in ppb) at Donnelly



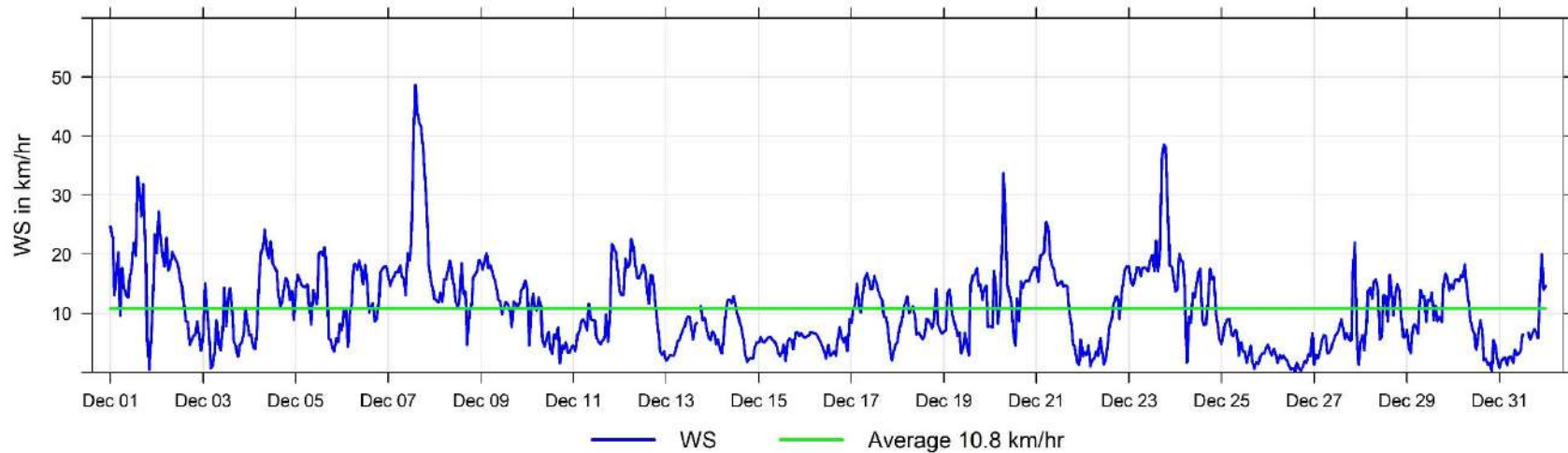
December Hourly Concentration Readings of H₂S (in ppb) at Donnelly



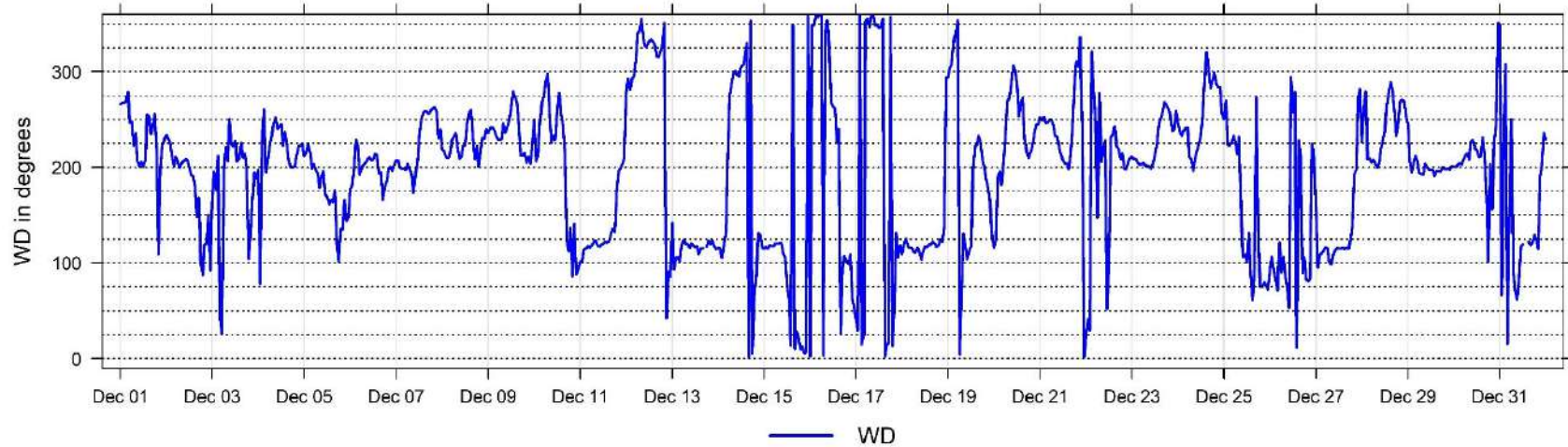
December Hourly Temperature Readings (in °C) at Donnelly



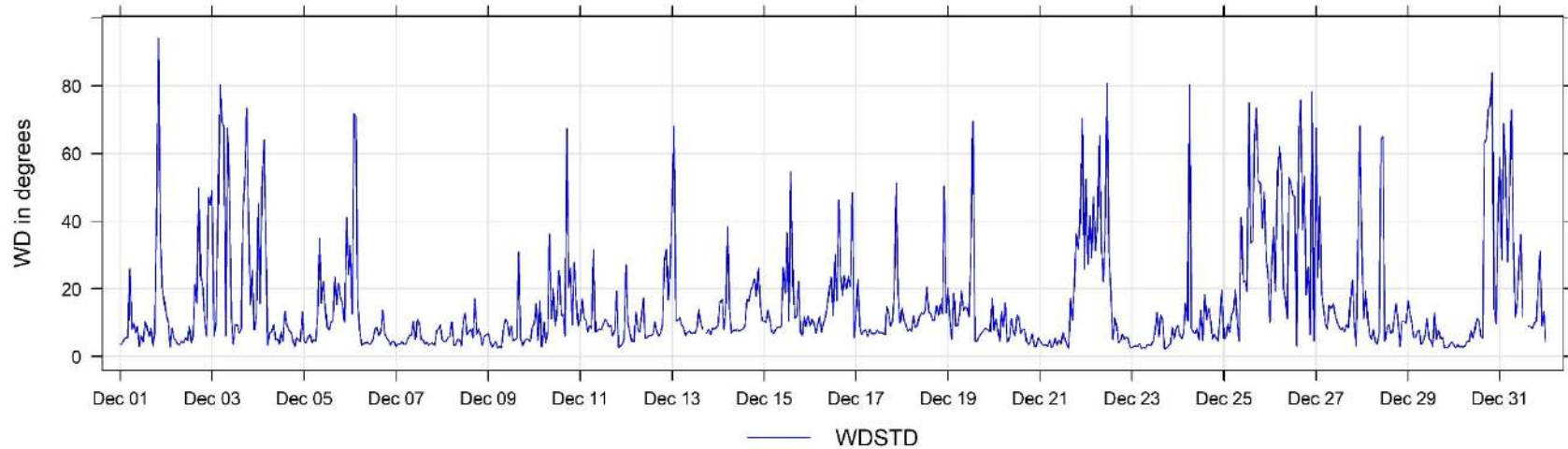
December Hourly Readings of Wind Speed (in km/hr) at Donnelly

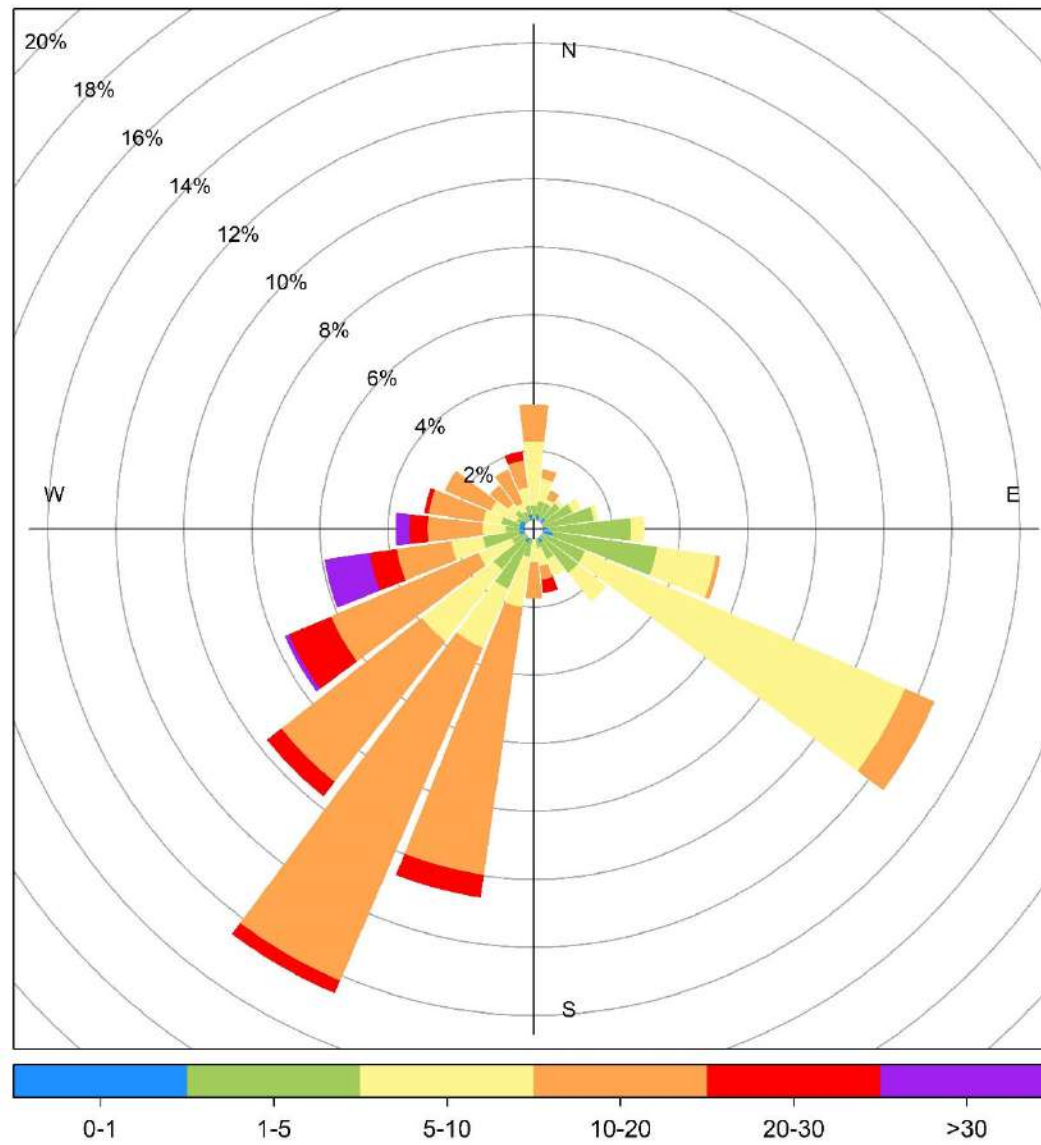


December Hourly Readings of Wind Direction (in degrees) at Donnelly



December Hourly Readings of Wind Direction Standard Deviation (in degrees) at Donnelly



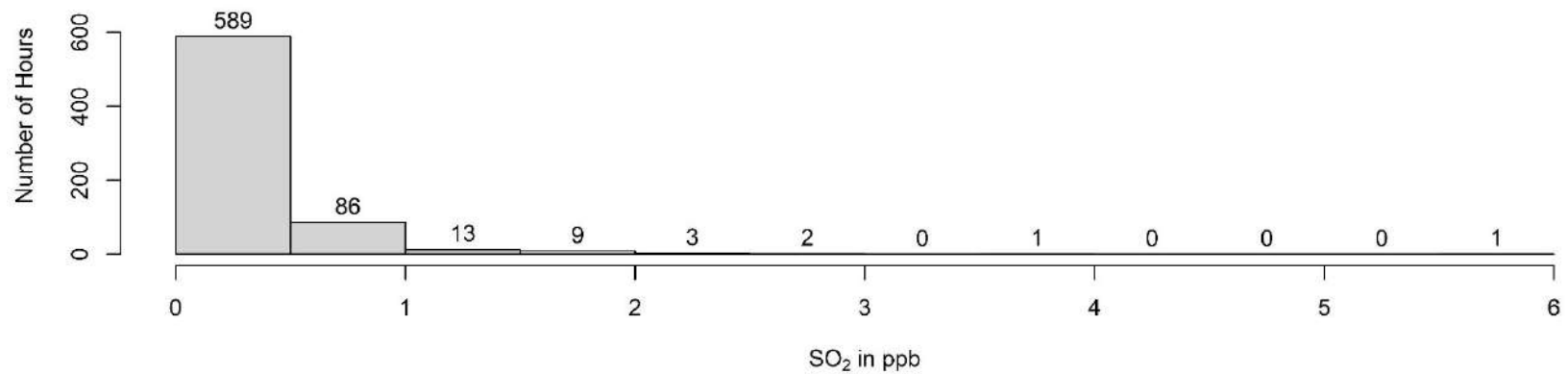
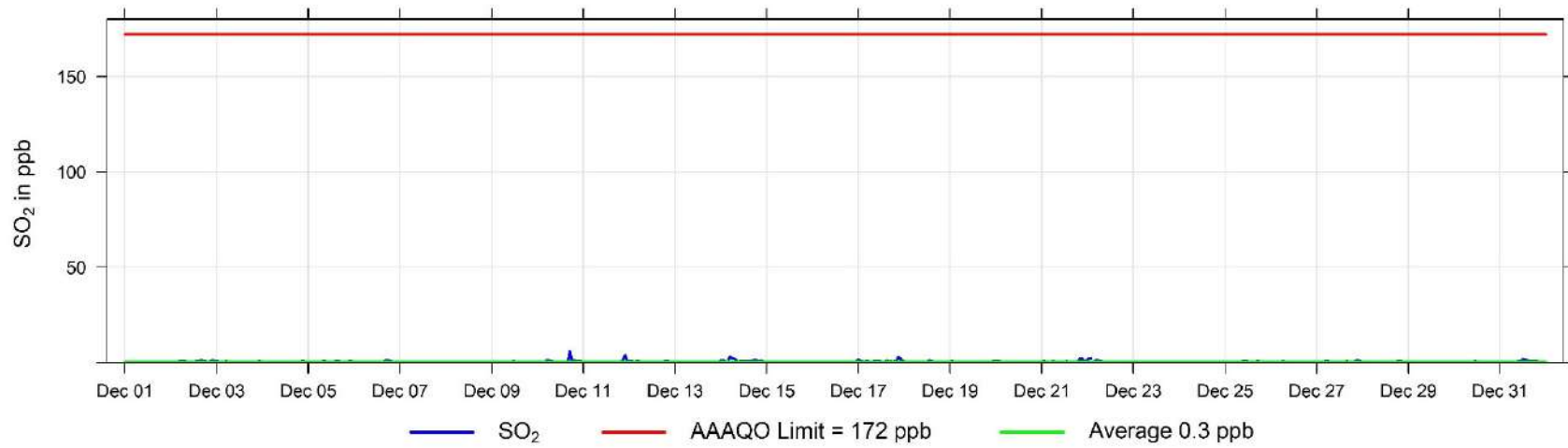


Donnelly December Wind Rose, wind speed in km/hr

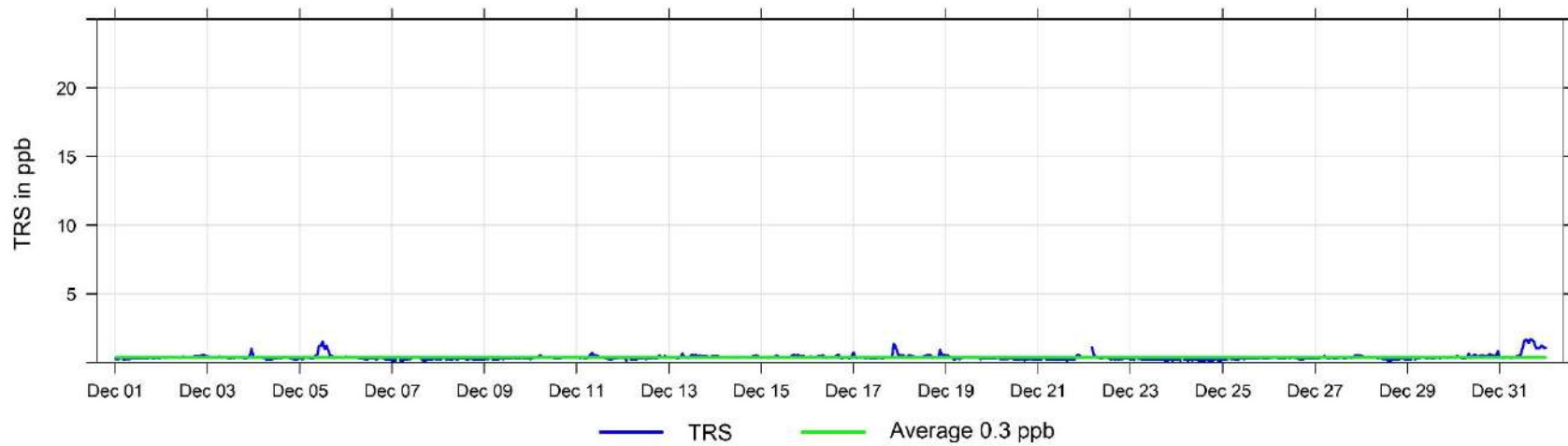
8 Wembley (Portable) Charts

The following pages include the charts and histograms for Wembley Portable Station

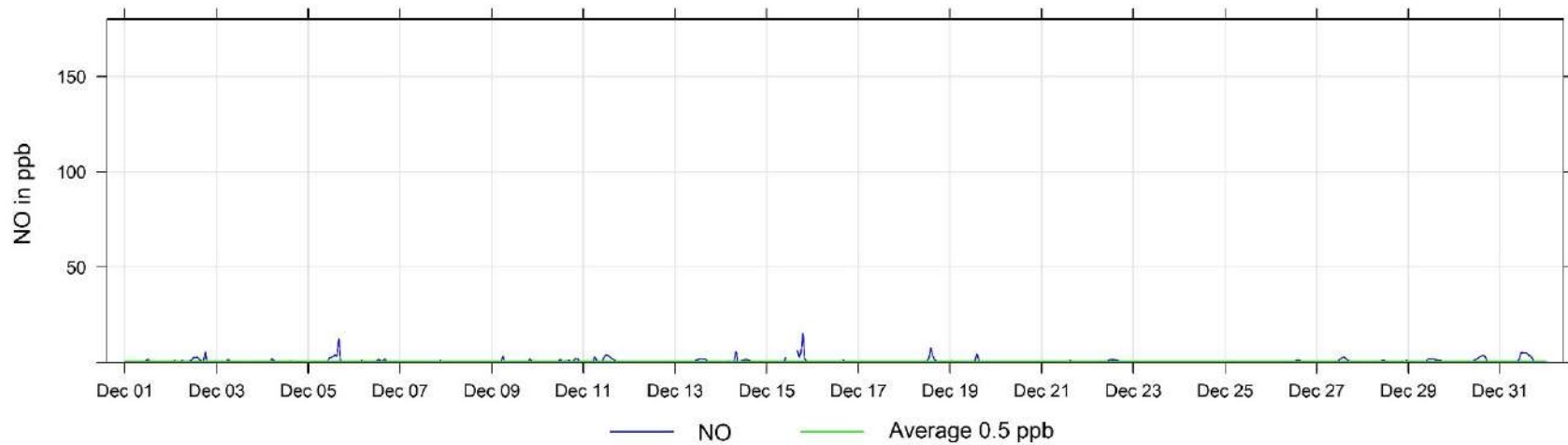
December Hourly Concentration Readings of SO₂ (in ppb) at Wembley



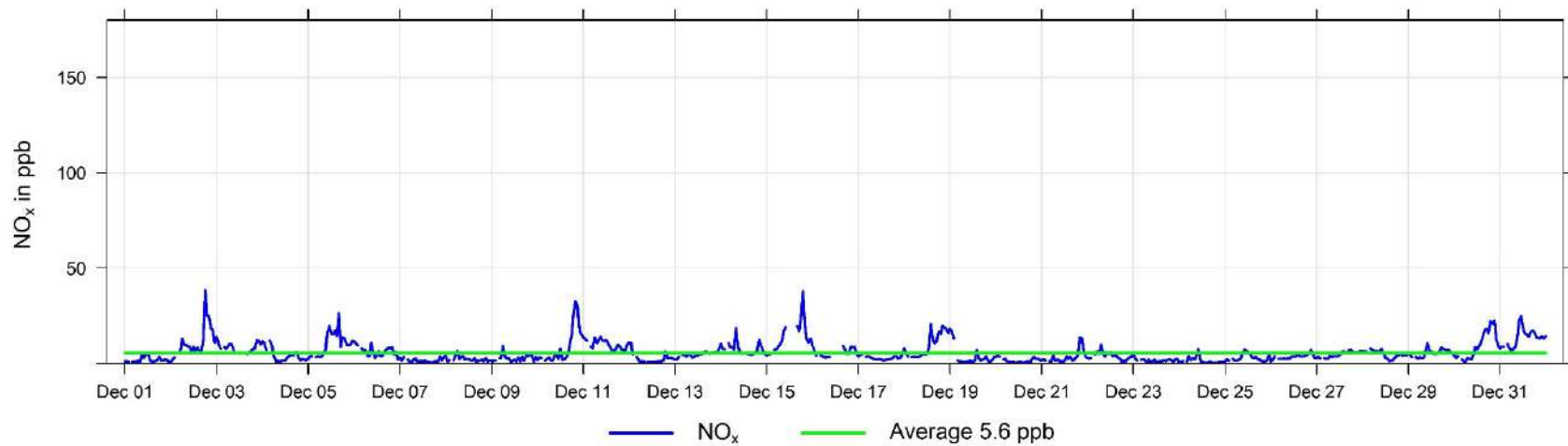
December Hourly Concentration Readings of TRS (in ppb) at Wembley



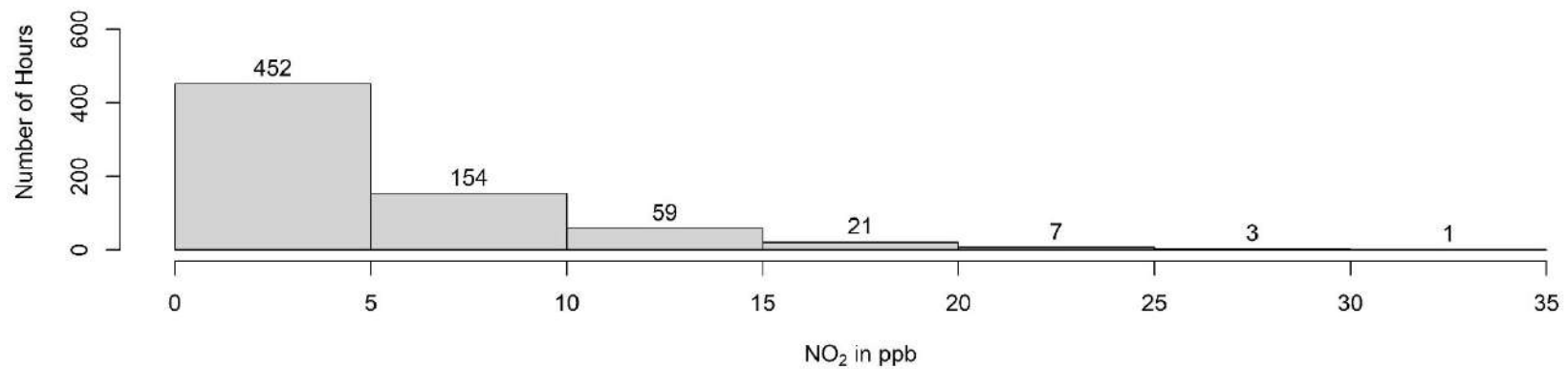
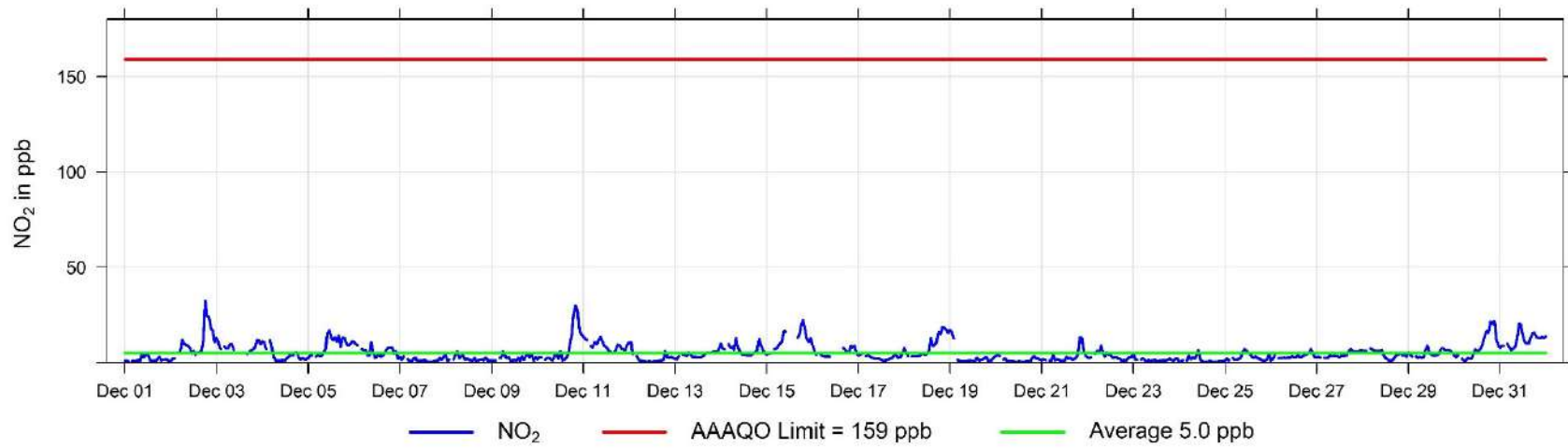
December Hourly Concentration Readings of NO (in ppb) at Wembley



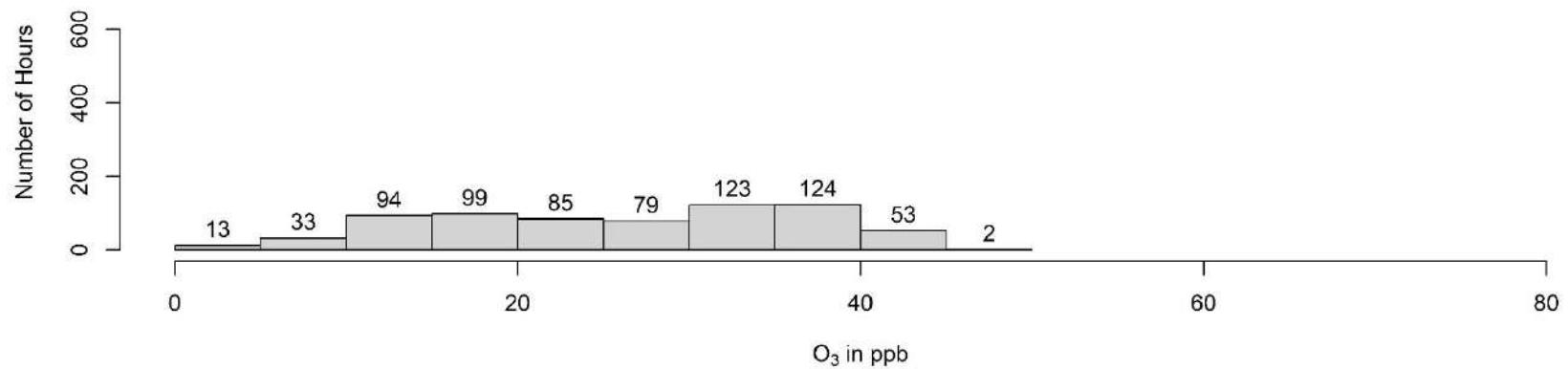
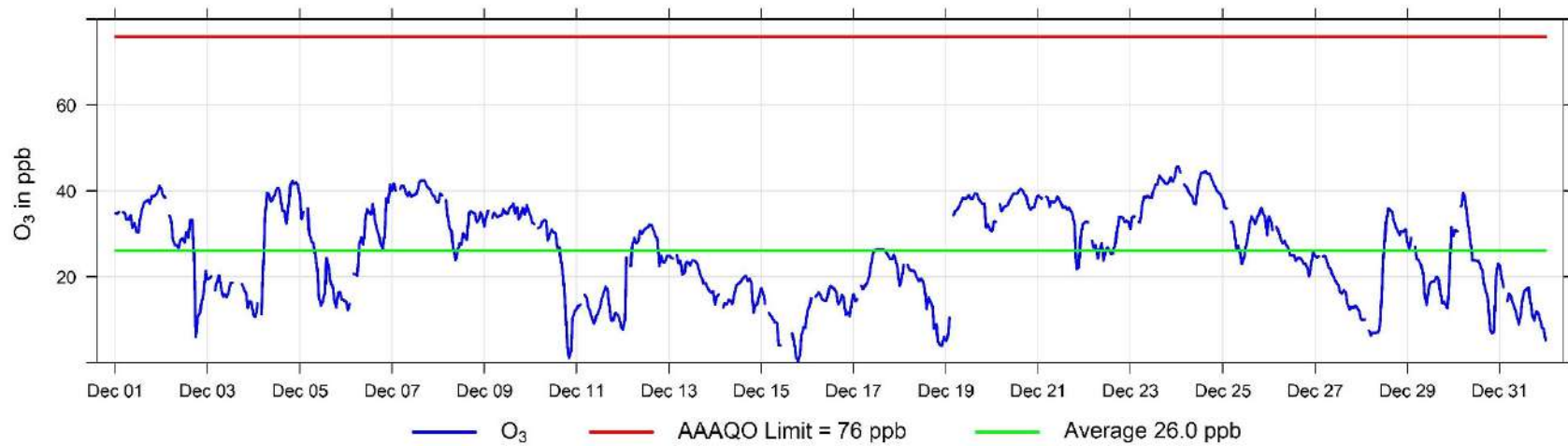
December Hourly Concentration Readings of NO_x (in ppb) at Wembley



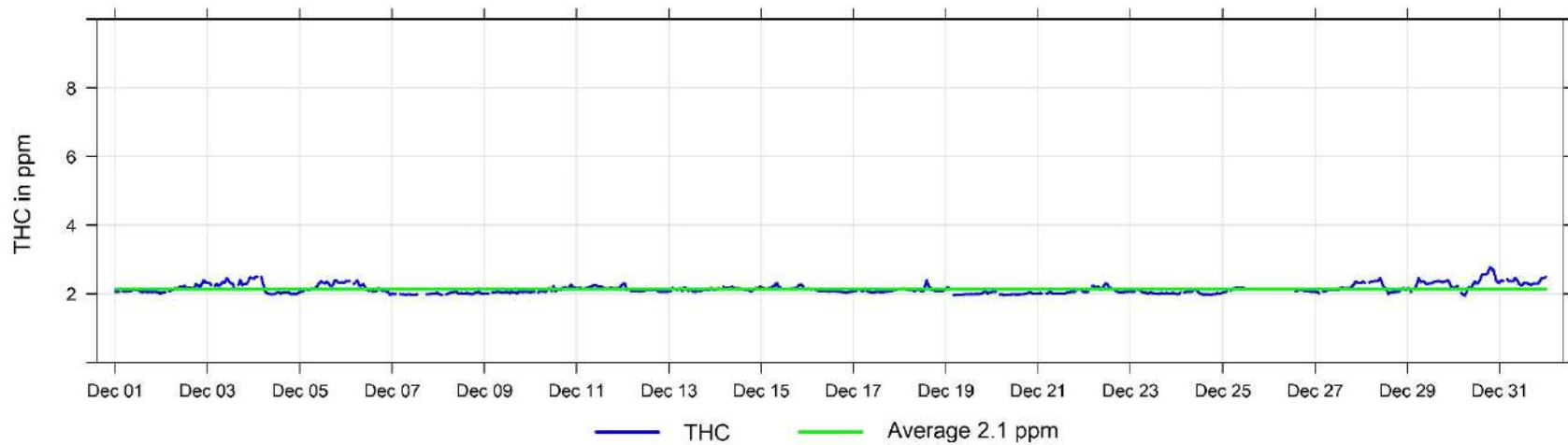
December Hourly Concentration Readings of NO₂ (in ppb) at Wembley



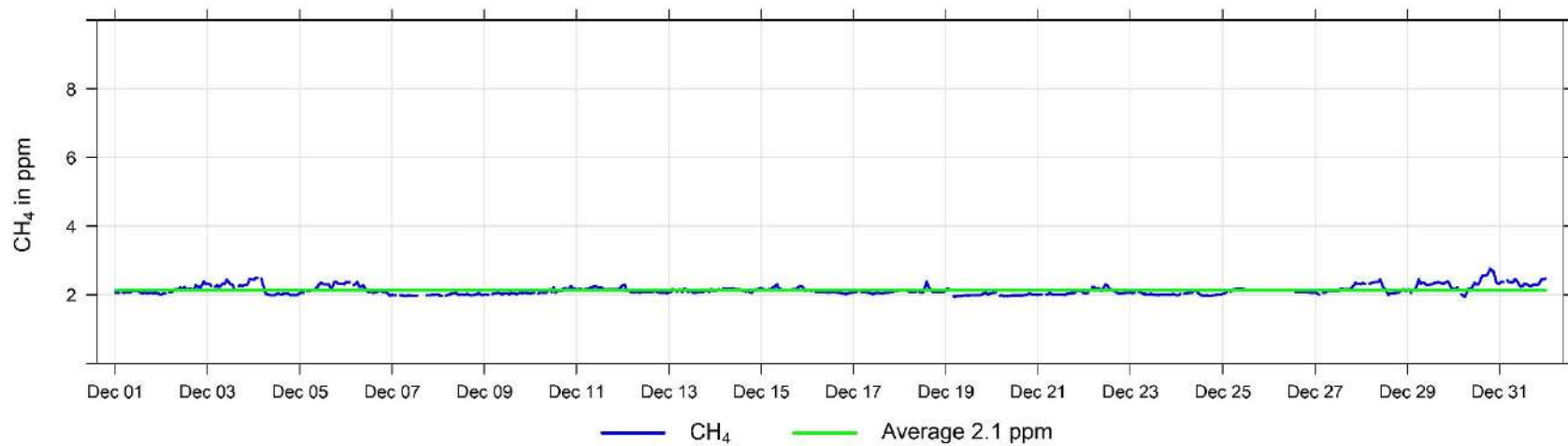
December Hourly Concentration Readings of O₃ (in ppb) at Wembley



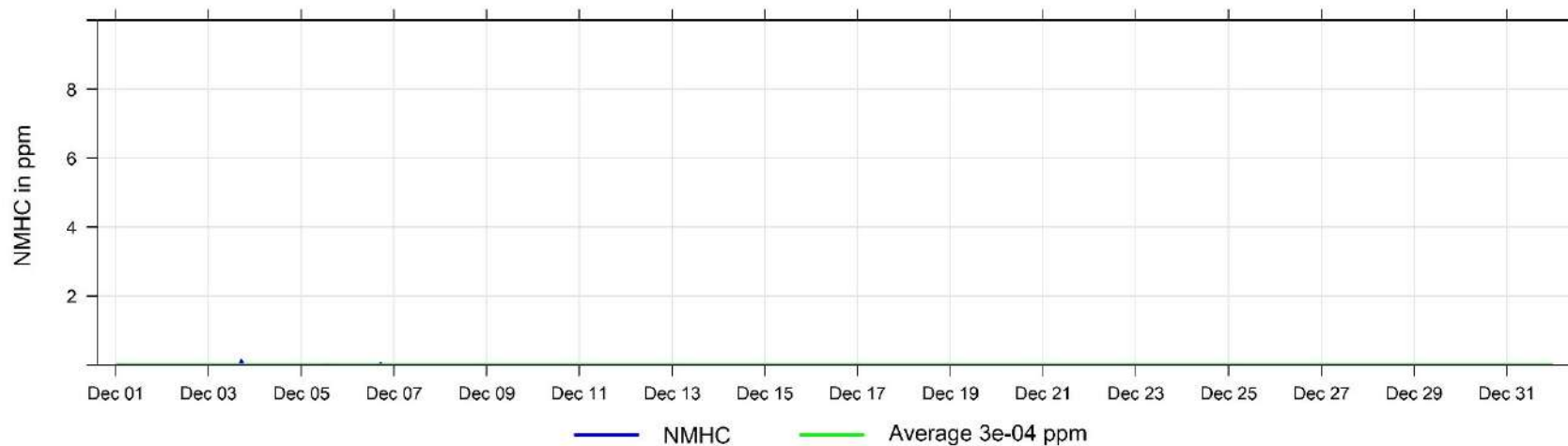
December Hourly Concentration Readings of THC (in ppm) at Wembley



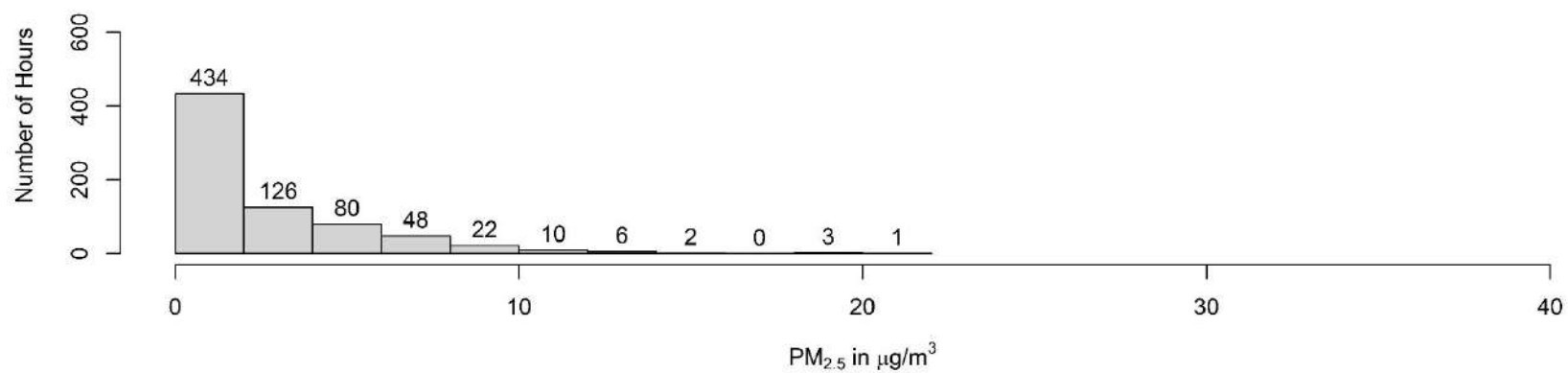
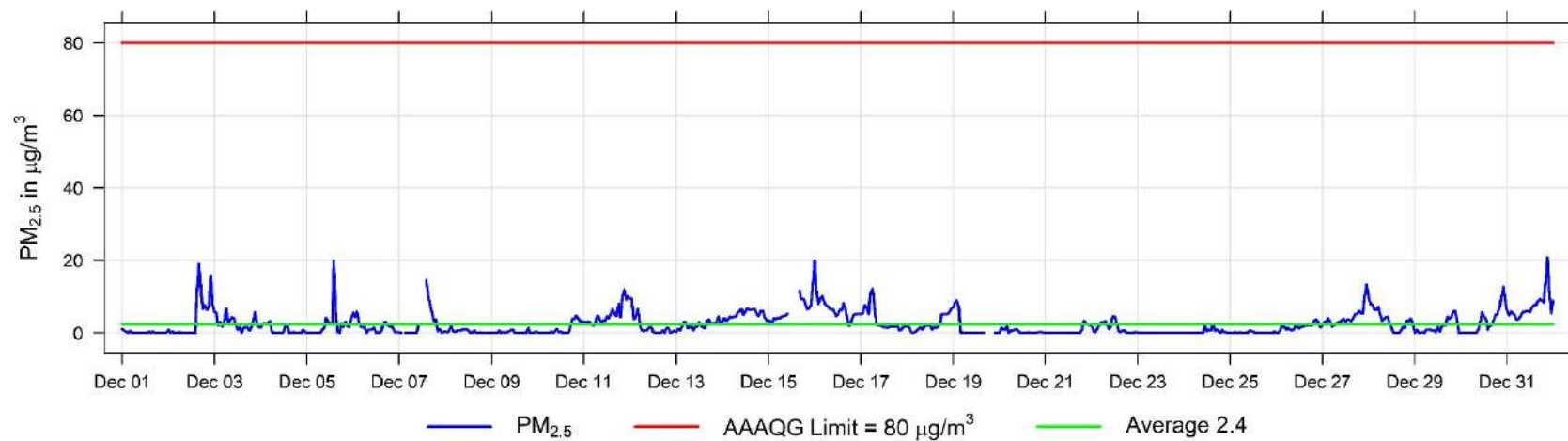
December Hourly Concentration Readings of CH₄ (in ppm) at Wembley



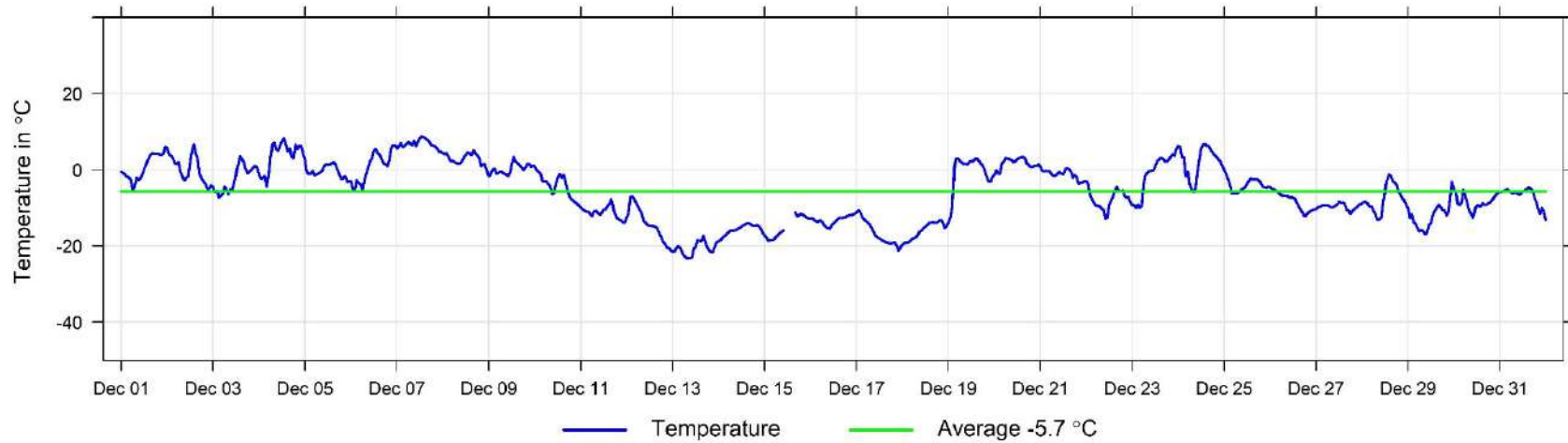
December Hourly Concentration Readings of NMHC (in ppm) at Wembley



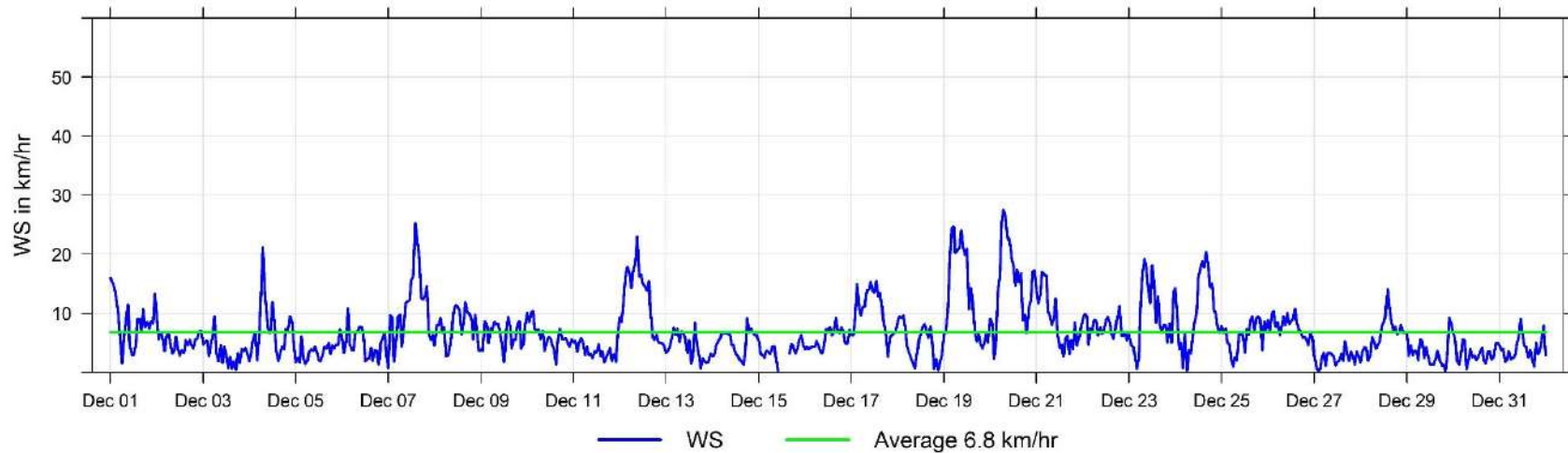
December Hourly Concentration Readings of PM_{2.5} in µg/m³ at Wembley



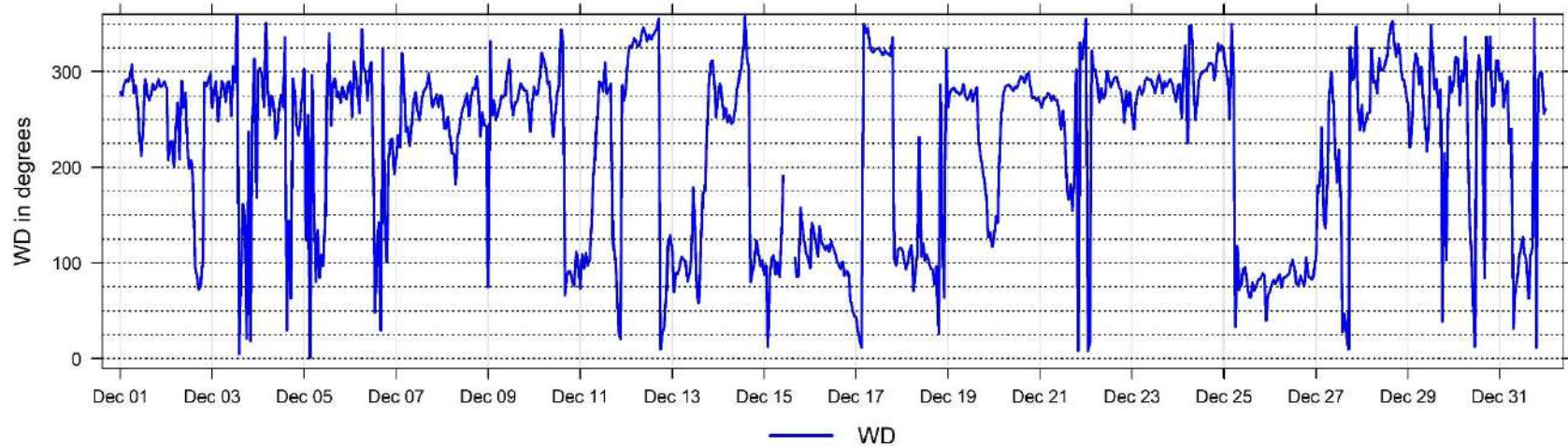
December Hourly Temperature Readings (in °C) at Wembley



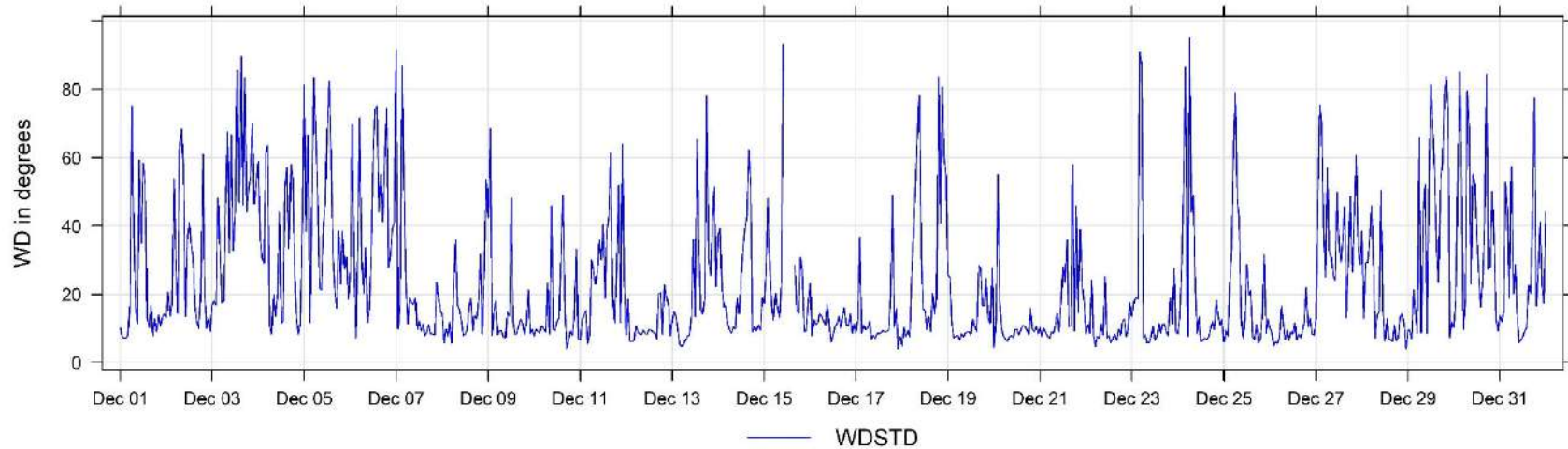
December Hourly Readings of Wind Speed (in km/hr) at Wembley

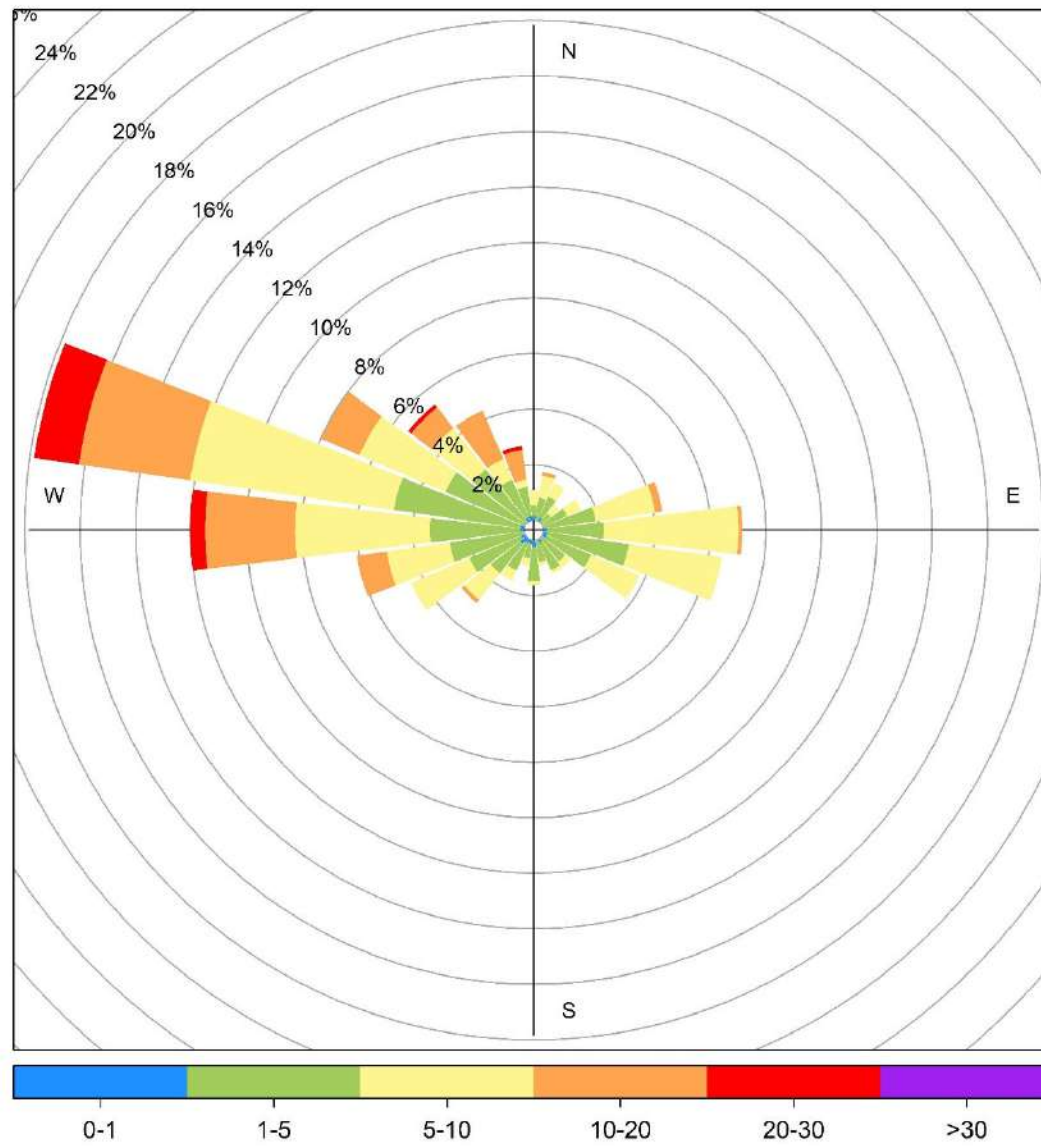


December Hourly Readings of Wind Direction (in degrees) at Wembley

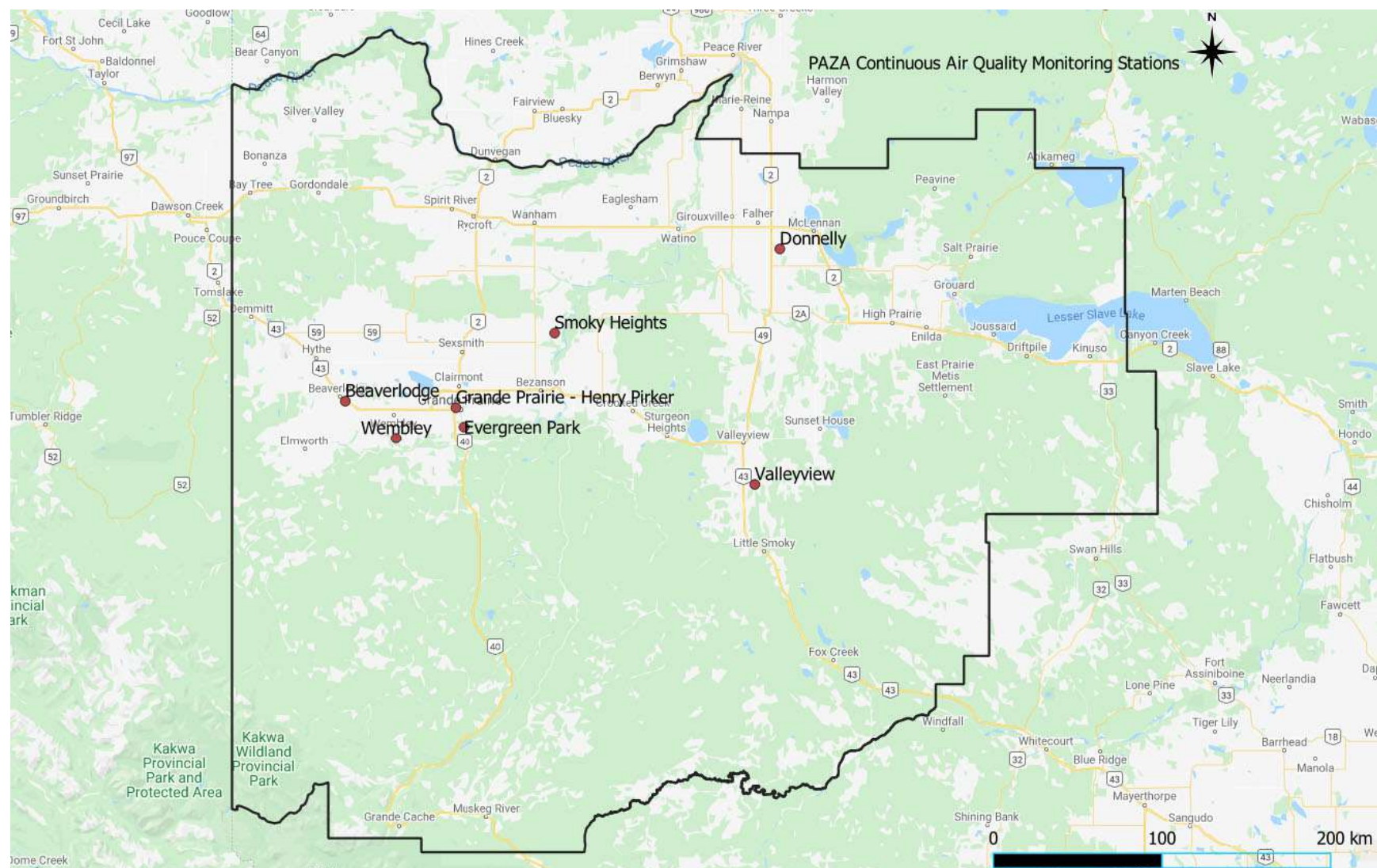


December Hourly Readings of Wind Direction Standard Deviation (in degrees) at Wembley





9 Concentration Roses for PAZA



9.1 Wind Roses

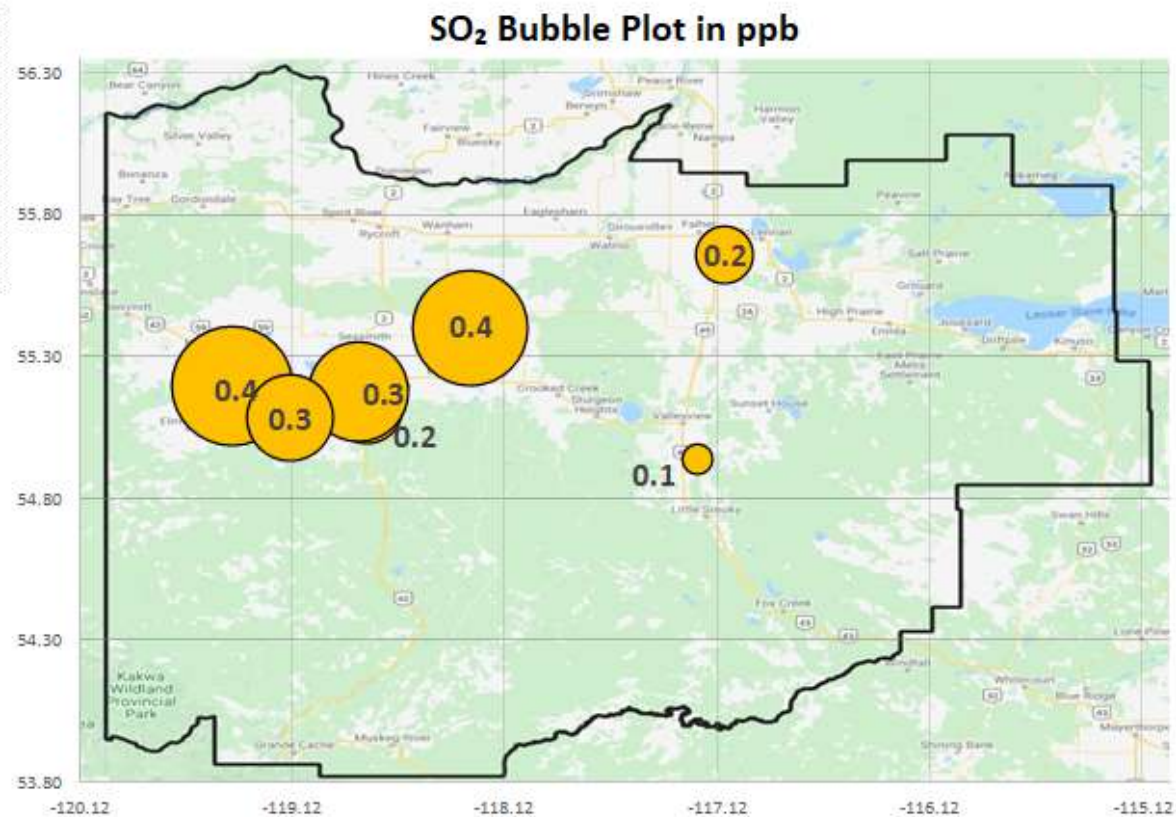
Wind Roses in km/hr



9.2 Sulphur Dioxide Plots

December 2020 SO₂ Summary

Station	Avg (ppb)
Evergreen Park	0.2
Henry Pirker	0.3
Smoky Heights	0.4
Beaverlodge	0.4
Valleyview	0.1
Donnelly	0.2
Wembley	0.3

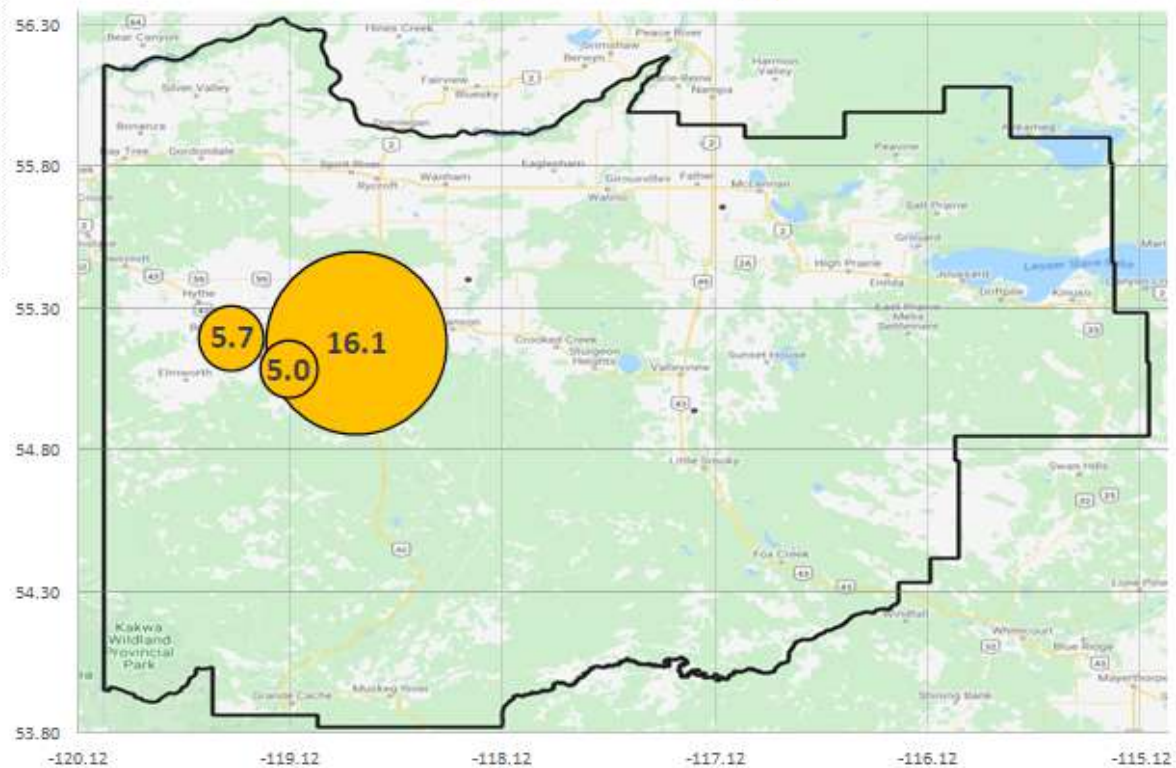


9.3 Nitrogen Dioxide Plots

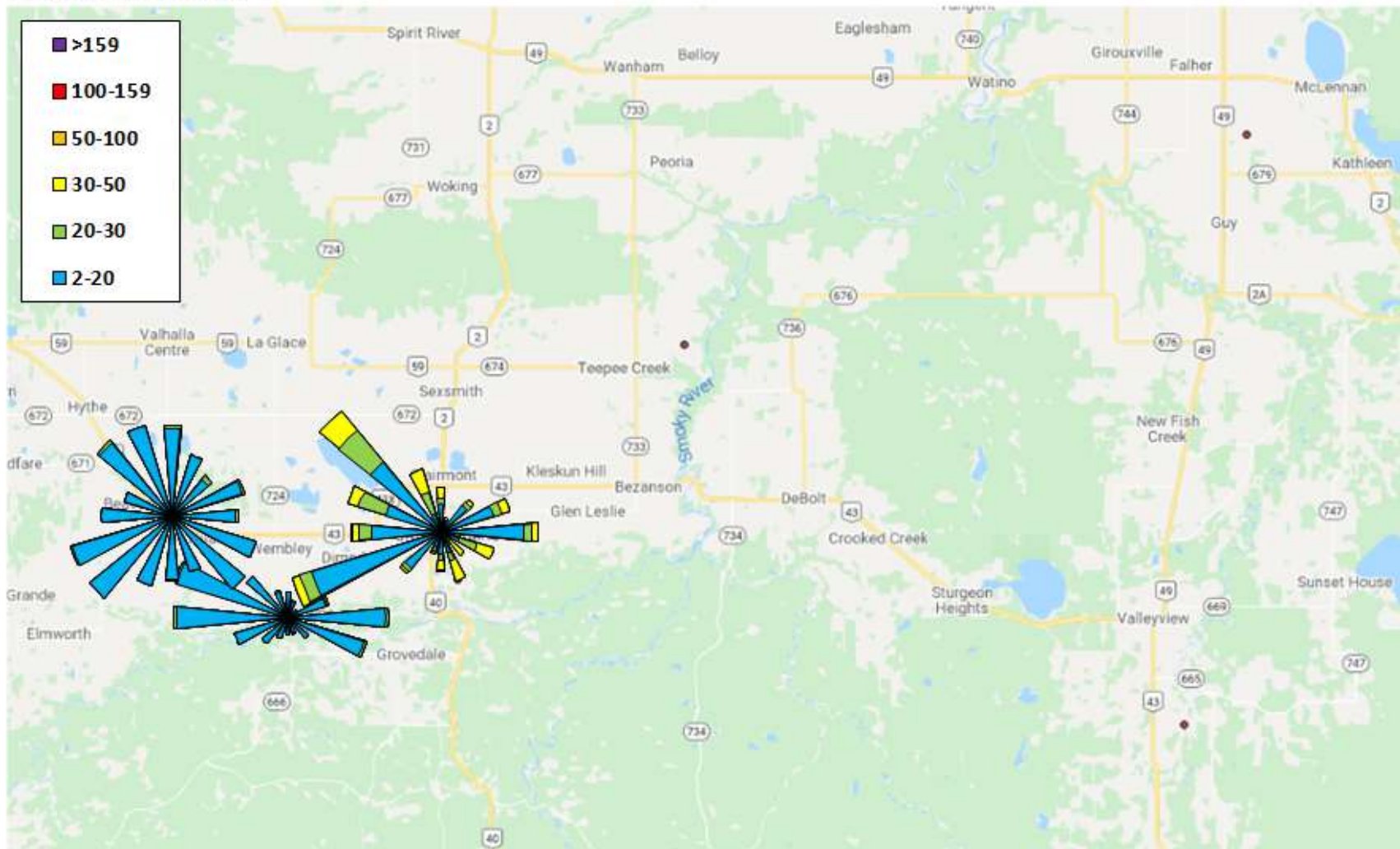
December 2020 NO₂ Summary

Station	Avg (ppb)
Evergreen Park	-
Henry Pirker	16.1
Smoky Heights	-
Beaverlodge	5.7
Valleyview	-
Donnelly	-
Wembley	5.0

NO₂ Bubble Plot in ppb

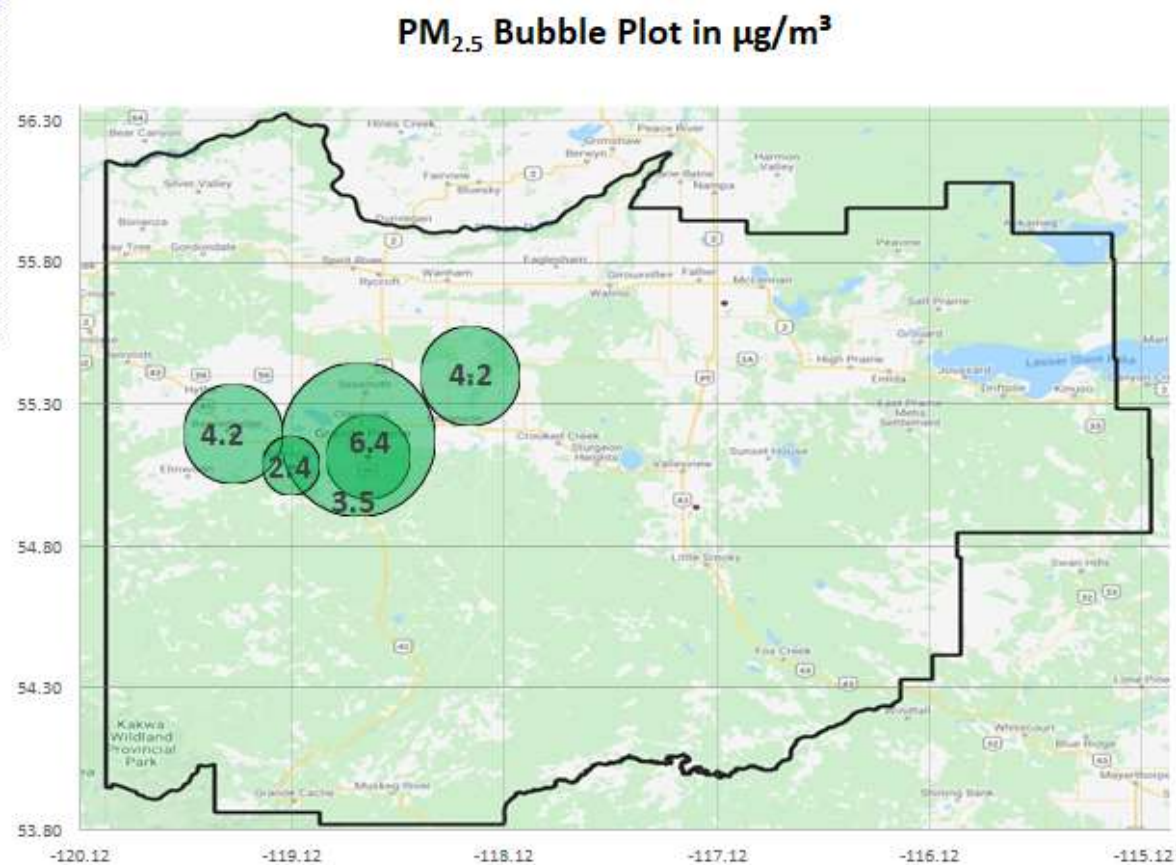


NO₂ Roses in ppb



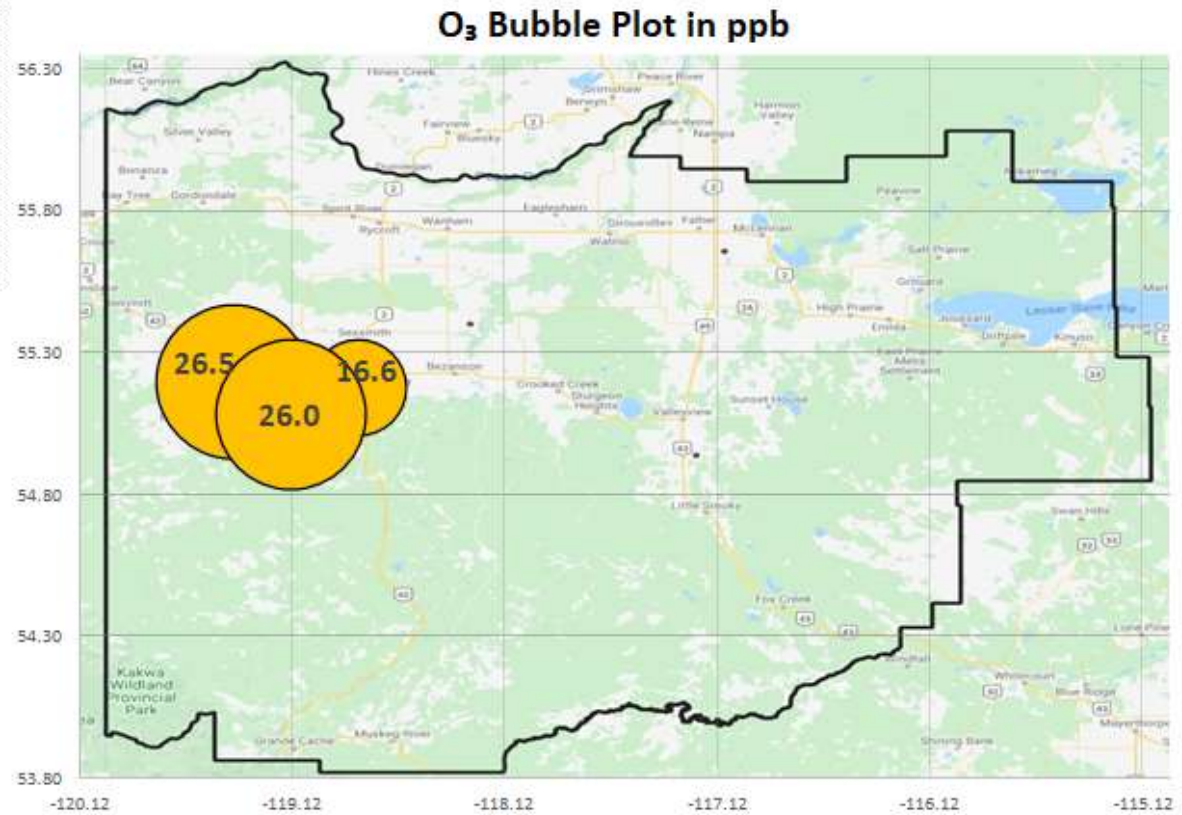
9.4 Fine Particulate Matter (PM_{2.5}) Plots

December 2020 PM _{2.5} Summary	
Station	Avg (µg/m ³)
Evergreen Park	3.5
Henry Pirkner	6.4
Smoky Heights	4.2
Beaverlodge	4.2
Valleyview	-
Donnelly	-
Wembley	2.4

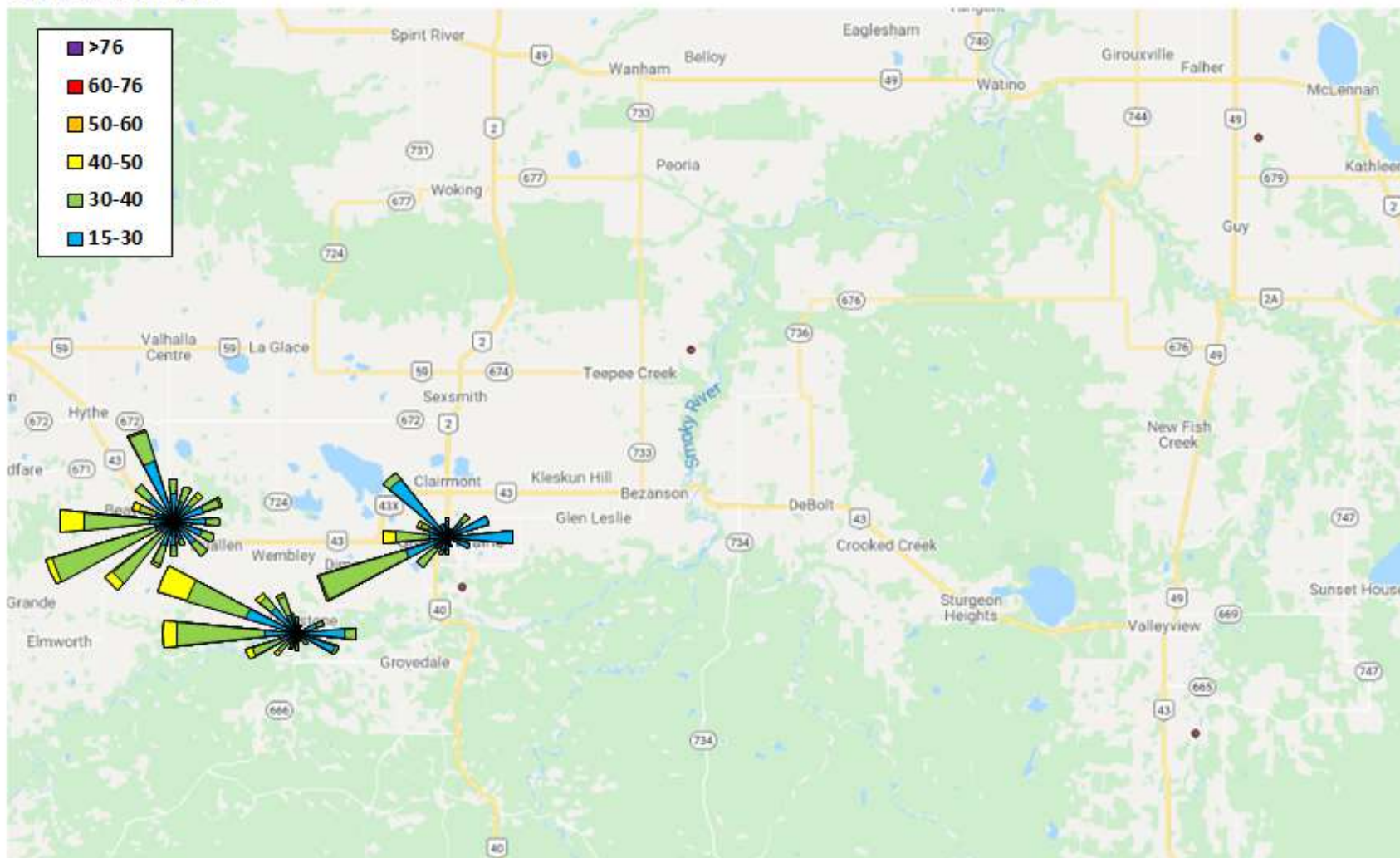


9.5 Ozone (O₃) Plots

December 2020 O ₃ Summary	
Station	Avg (ppb)
Evergreen Park	-
Henry Pirker	16.6
Smoky Heights	-
Beaverlodge	26.5
Valleyview	-
Donnelly	-
Wembley	26.0



O₃ Roses in ppb



10 Passive Monitoring Data

Peace Airshed Zone Association - PAZA Passive Stations for December 2020

Station Number	Station Name	SO2 ppb	O3 ppb	NO2 ppb	H2S ppb	LSD
Duplicates						
19a	Wanham	0.3				
19b	Wanham	0.3				
21a	Eaglesham			0.7		
21b	Eaglesham			0.0		
24a	Wembley			3.4		
24b	Wembley			5.6		
27a	Grande Prairie I	0.3				
27b	Grande Prairie I	0.4				
35a	Jean Cote			1.0		
35b	Jean Cote			0.9		
39a	Clouston Creek	0.2				
39b	Clouston Creek	0.2				
47a	Kinuso		26.4			
47b	Kinuso		29.5			
63a	Girouxville 3				0.4	
63b	Girouxville 3				0.4	

1	Silver Valley	0.2	-	1.5	-	08-27-081-11 W6M
2	Bay Tree	0.2	29.2	1.2	-	13-16-078-13 W6M
5	Boone Creek	0.4	-	1.4	-	01-23-076-11 W6M
7	Steepprock Creek	0.3	-	1.2	-	09-35-072-13 W6M
9	Spirit River	0.2	-	1.5	-	08-12-079-07 W6M
10	Woking	0.4	-	0.8	-	01-13-076-07 W6M
11	Webber Creek	0.4	-	5.6	-	09-36-074-09 W6M
12	Hythe	0.3	-	2.2	-	14-36-072-11 W6M
14	Sylvester	0.1	-	1.7	-	08-06-069-12 W6M
16	Beaverlodge	0.4	-	3.5	-	15-36-071-10 W6M
17	Poplar	0.7	-	2.4	-	13-06-073-08 W6M
18	Saddle Hills	0.3	-	1.0	-	04-25-074-07 W6M
19	Wanham	0.3	-	0.7	-	16-22-077-03 W6M
21	Eaglesham	0.1	-	0.3	-	16-21-079-25 W5M
24	Wembley	0.5	-	4.5	-	12-31-070-08 W6M
25	Pinto Creek	0.2	-	1.6	-	04-24-069-11 W6M
27	Grande Prairie I	0.3	-	13.0	-	08-15-071-06 W6M
29	Smoky Heights	0.4	-	3.3	-	04-06-075-02 W6M
32	Gold Creek	0.1	-	5.3	-	06-33-067-05 W6M
35	Jean Cote	0.2	-	0.9	-	12-35-079-21 W5M
36	Guy	0.1	-	1.1	0.2	03-04-076-22 W5M
37	Crooked Creek	0.1	28.8	0.8	-	16-01-071-26 W5M
39	Clouston Creek	0.2	-	1.3	-	12-01-073-22 W5M
40	McLennan	0.3	-	1.0	-	03-29-077-19 W5M
41	Valleyview	0.2	-	1.7	-	09-30-069-22 W5M
44	Peavine	0.1	-	0.5	-	03-05-079-15 W5M
45	Gift Lake	0.1	-	0.7	-	10-07-079-12 W5M
46	Little Smoky	0.1	-	4.0	-	12-01-065-21 W5M
47	Kinuso	0.1	28.0	1.1	-	12-10-073-10 W5M
49	Henry Pirker	0.3	-	10.9	-	17-26-071-06 W6M
50	East Prairie	0.1	-	0.6	-	11-13-079-08 W6M
63	Girouxville 3	-	-	-	0.4	14-02-077-23 W5M
64	Girouxville 4	-	-	-	0.3	04-08-077-22 W5M

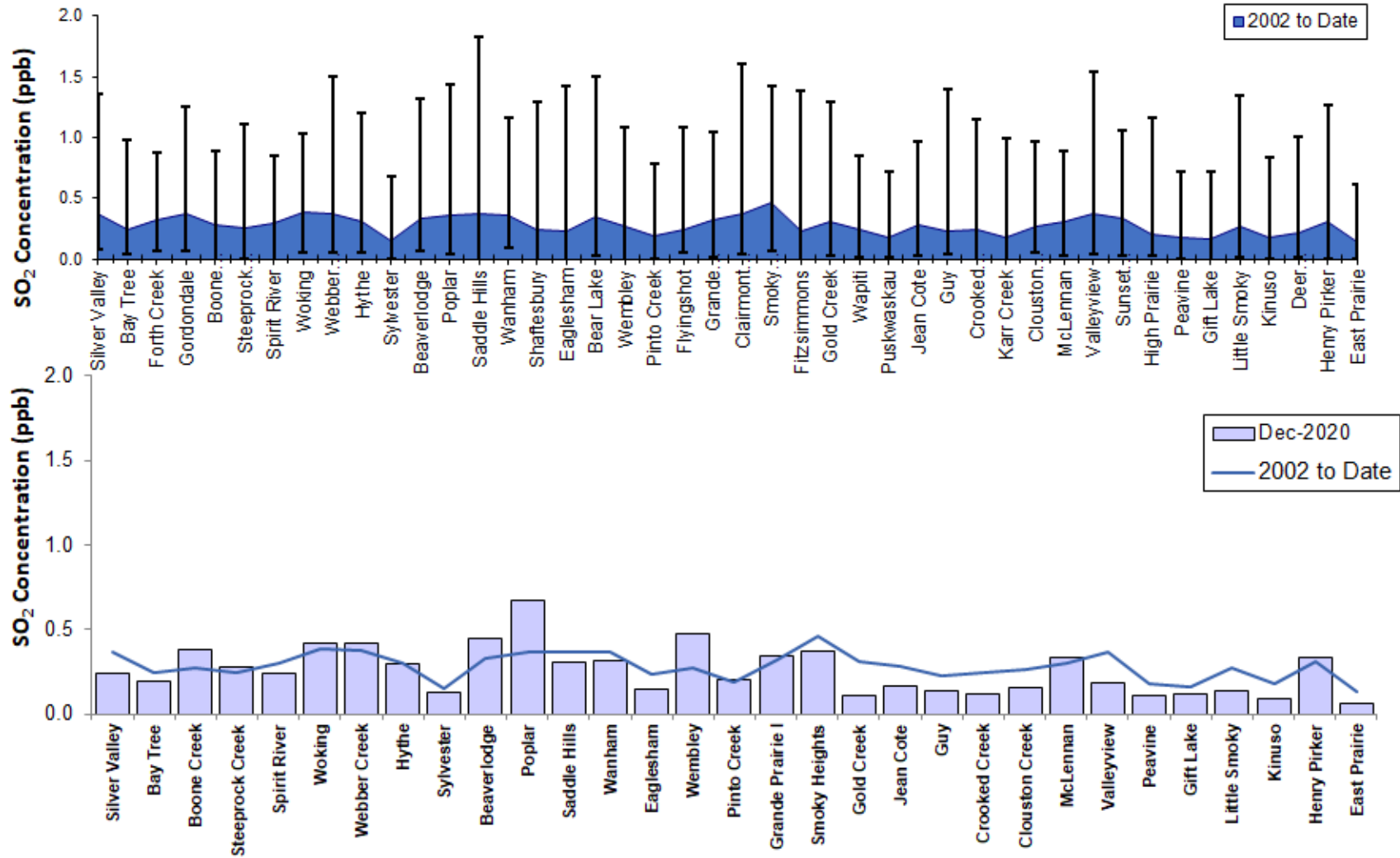
Passive Summary for December 2020

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

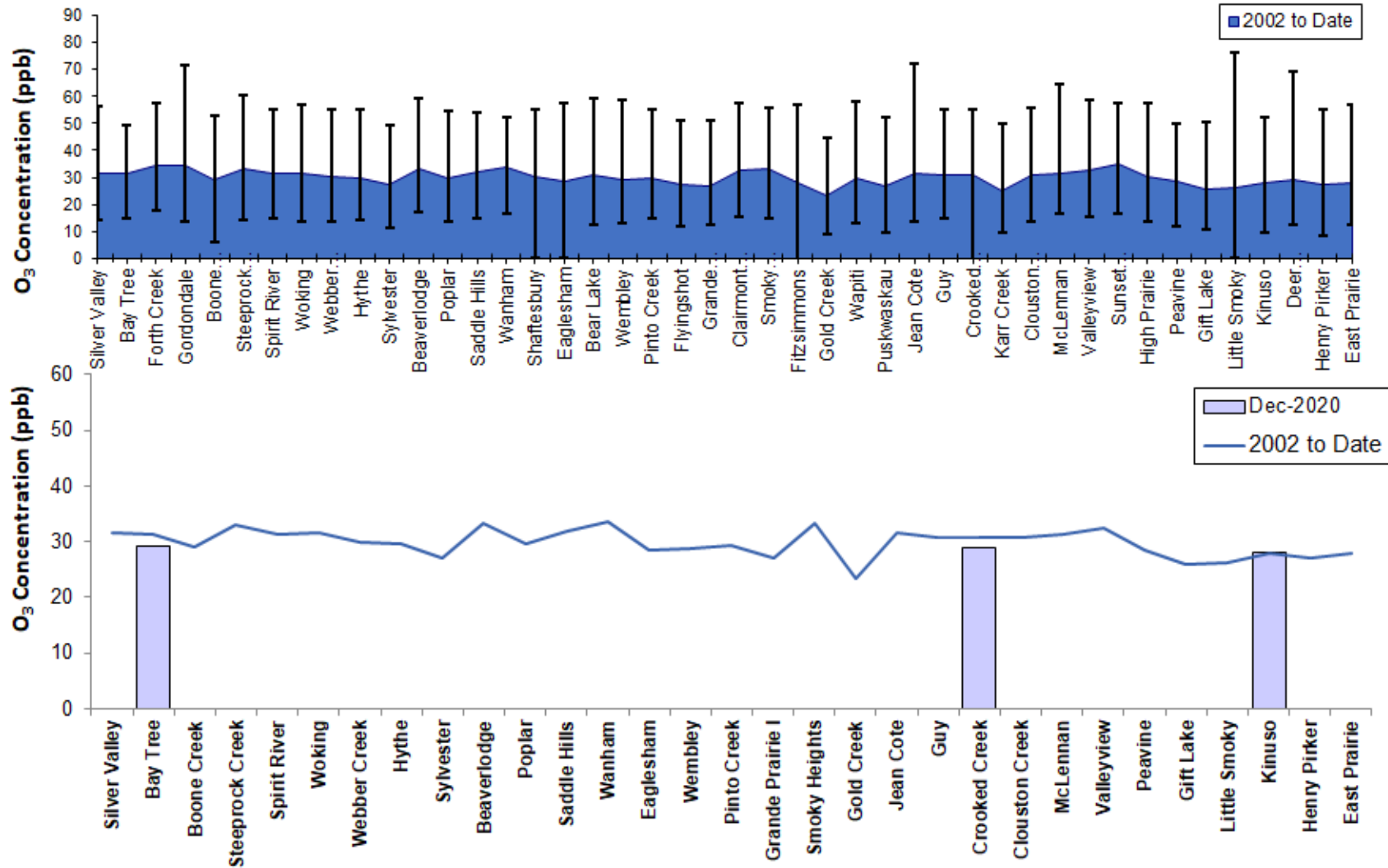
Passive Summary for December 2020 (PAZA)				
Mean	0.3	28.6	2.5	0.3
Standard Deviation	0.1	0.6	2.9	0.1
Minimum	0.1	28.0	0.3	0.2
	East Prairie (#50)	Kinuso (#47)	Eaglesham (#21)	Guy (#36)
Maximum	0.7	29.2	13.0	0.4
	Poplar (#17)	Bay Tree (#2)	Grande Prairie I (#27)	Girouxville 3 (#63)

Continuous and Passive Monitoring Comparision				
PAZA Beaverlodge Station	0.4	26.5	5.7	-
Beaverlodge Passive (#16)	0.4	-	3.5	-
PAZA Henry Pirker Station	0.3	16.6	16.1	0.3
Henry Pirker passive (#49)	0.3	-	10.9	-

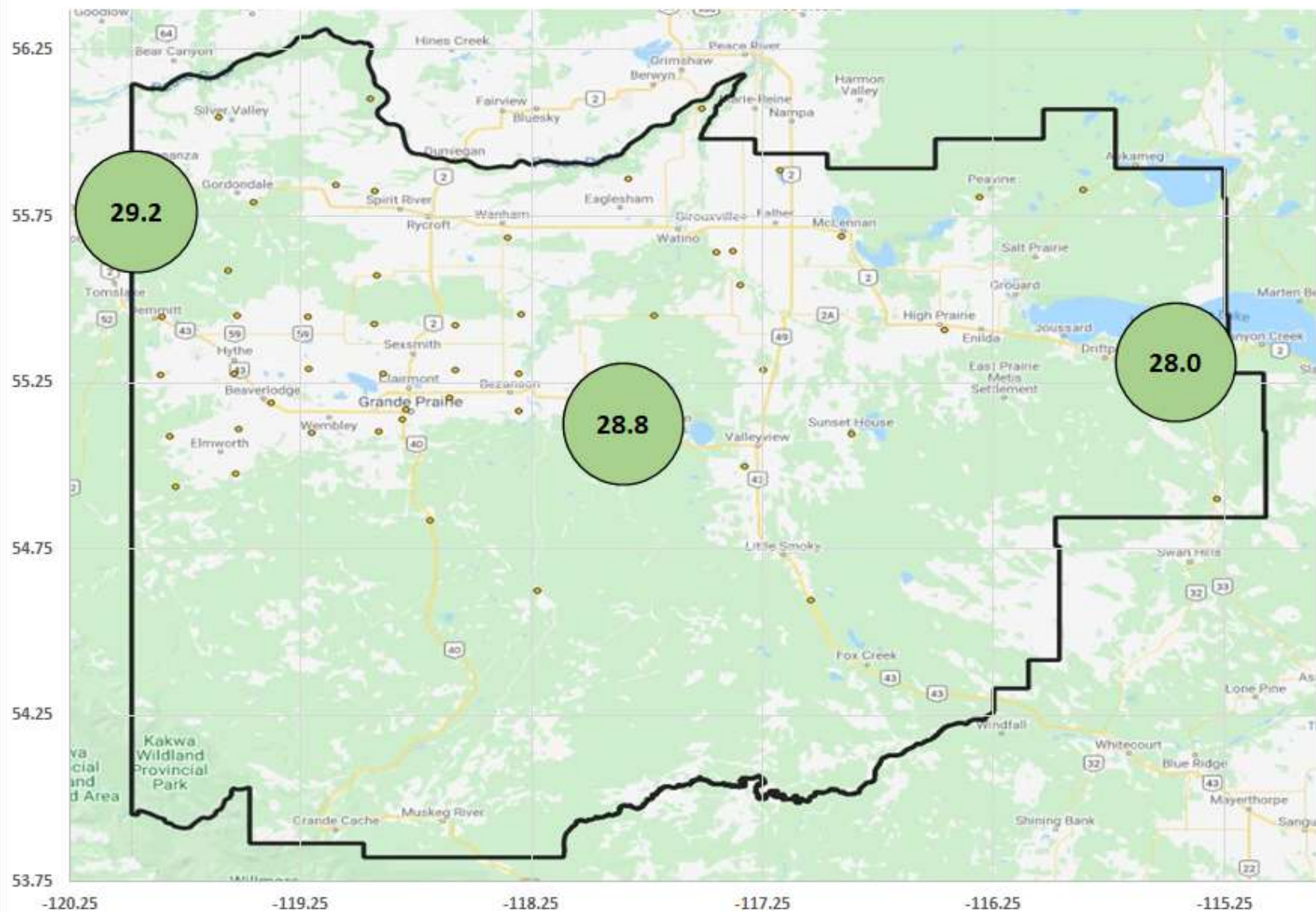
Alberta Ambient Air Quality Objective - 30-day SO₂ Objective is 11 ppb



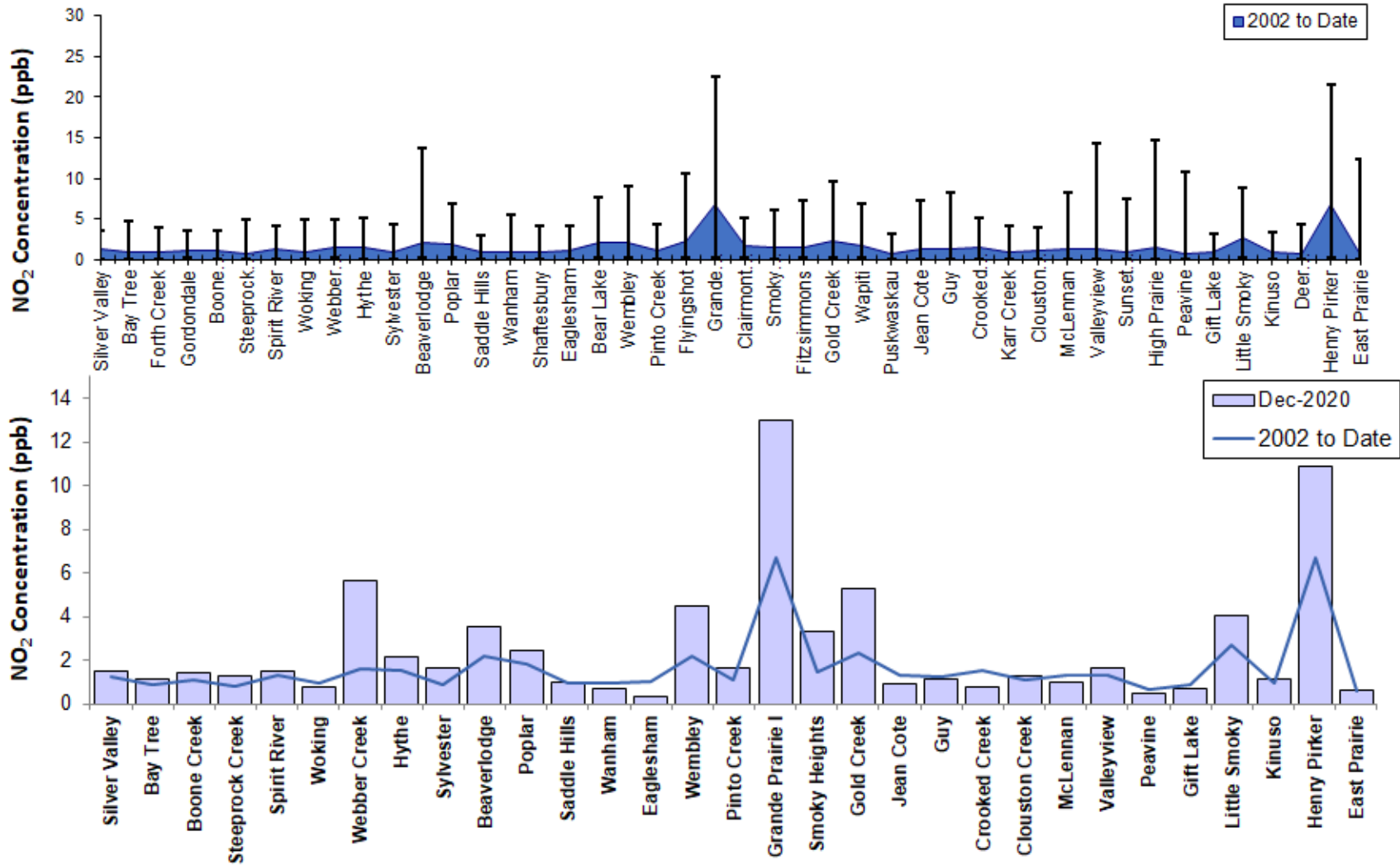
No Monthly or Annual Alberta Ambient Air Quality Objective for O₃



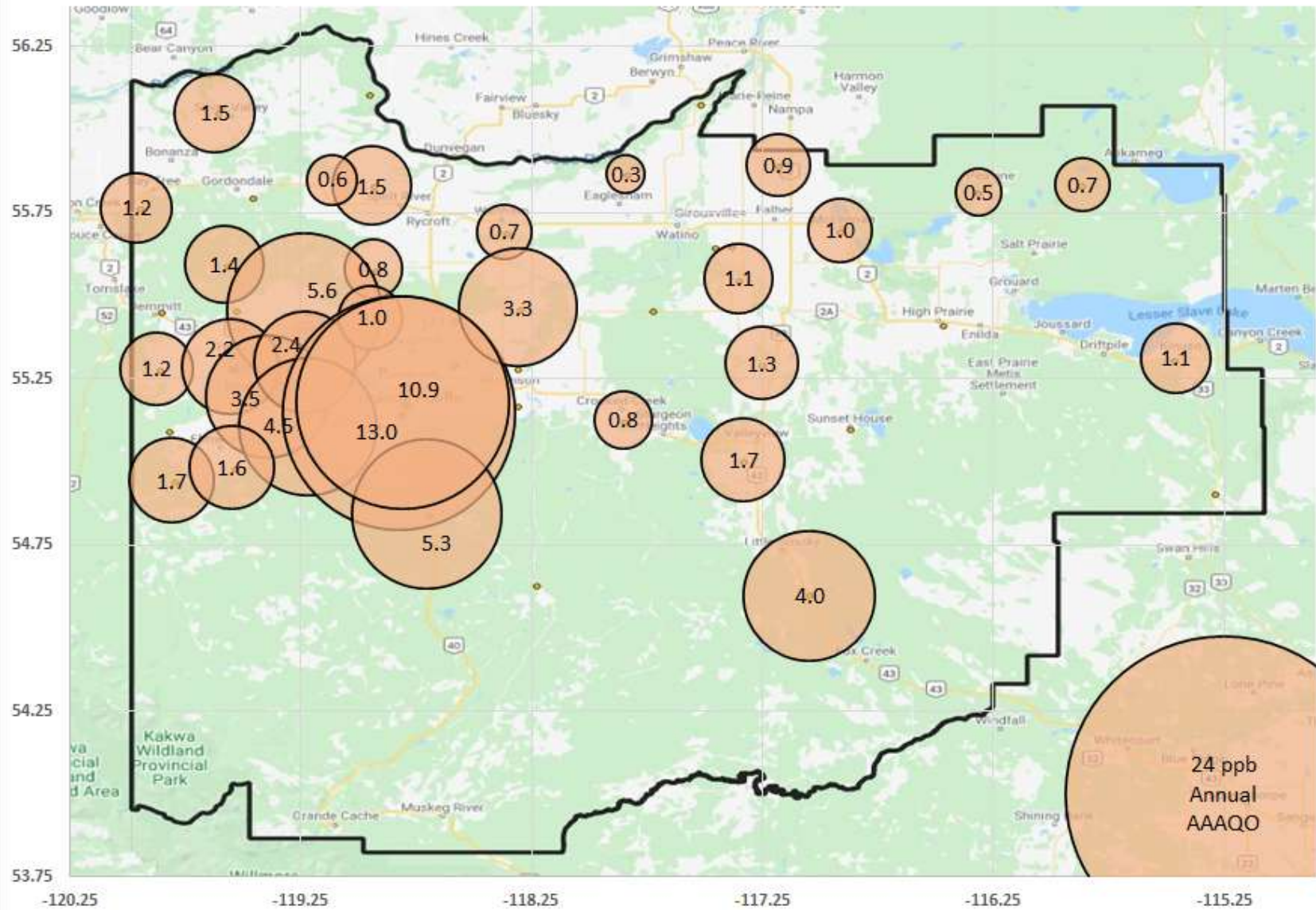
O₃ Monthly Average (units in ppb)



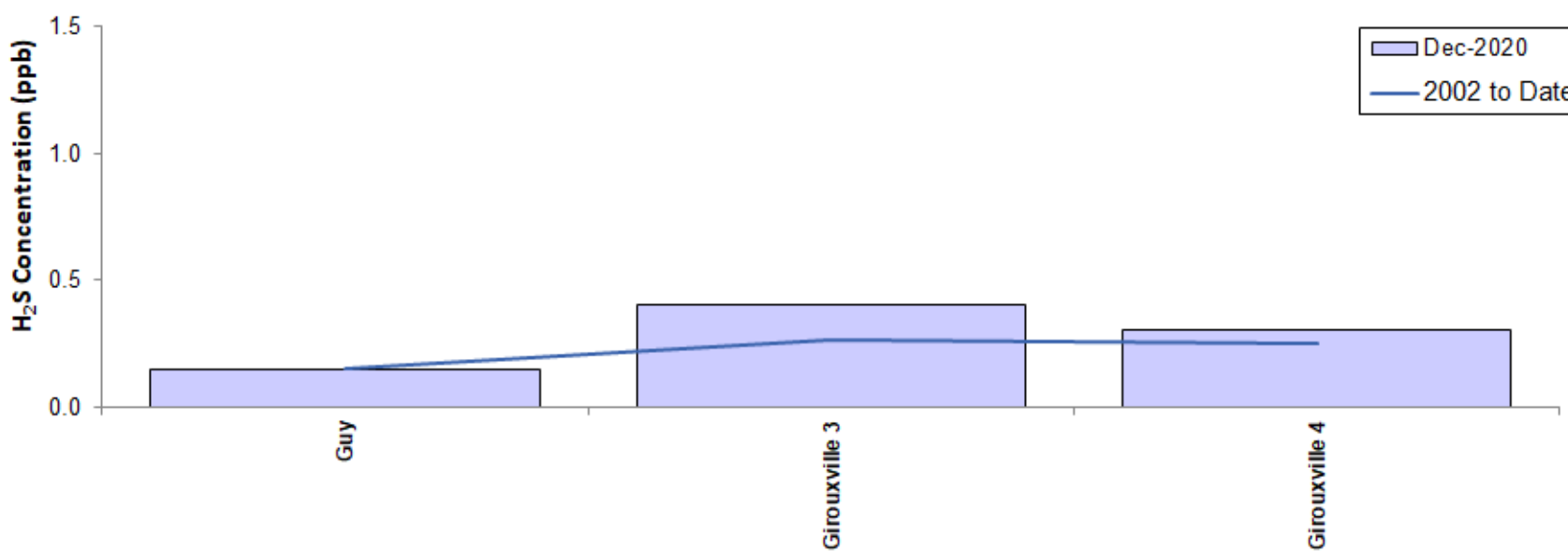
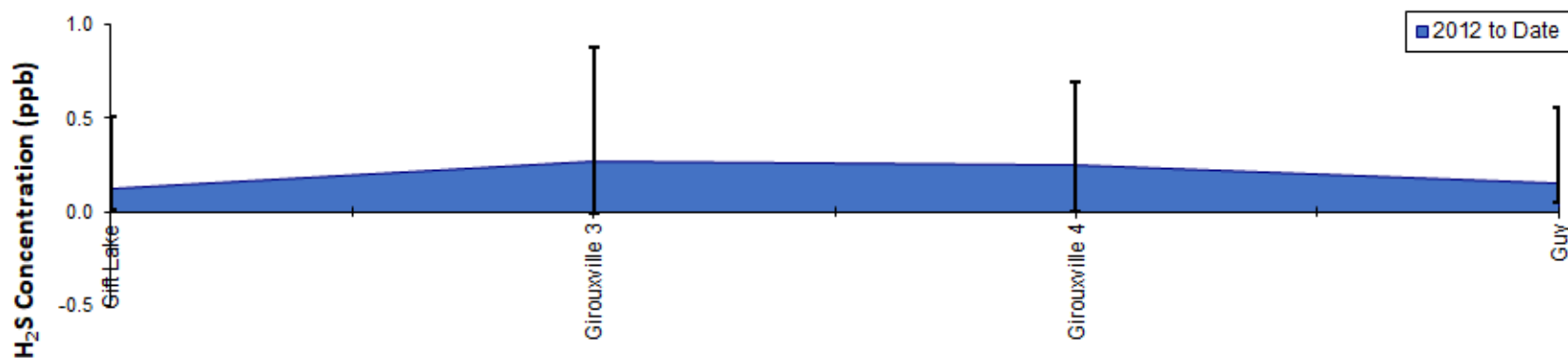
Alberta Ambient Air Quality Objective - Annual NO₂ Objective is 24 ppb



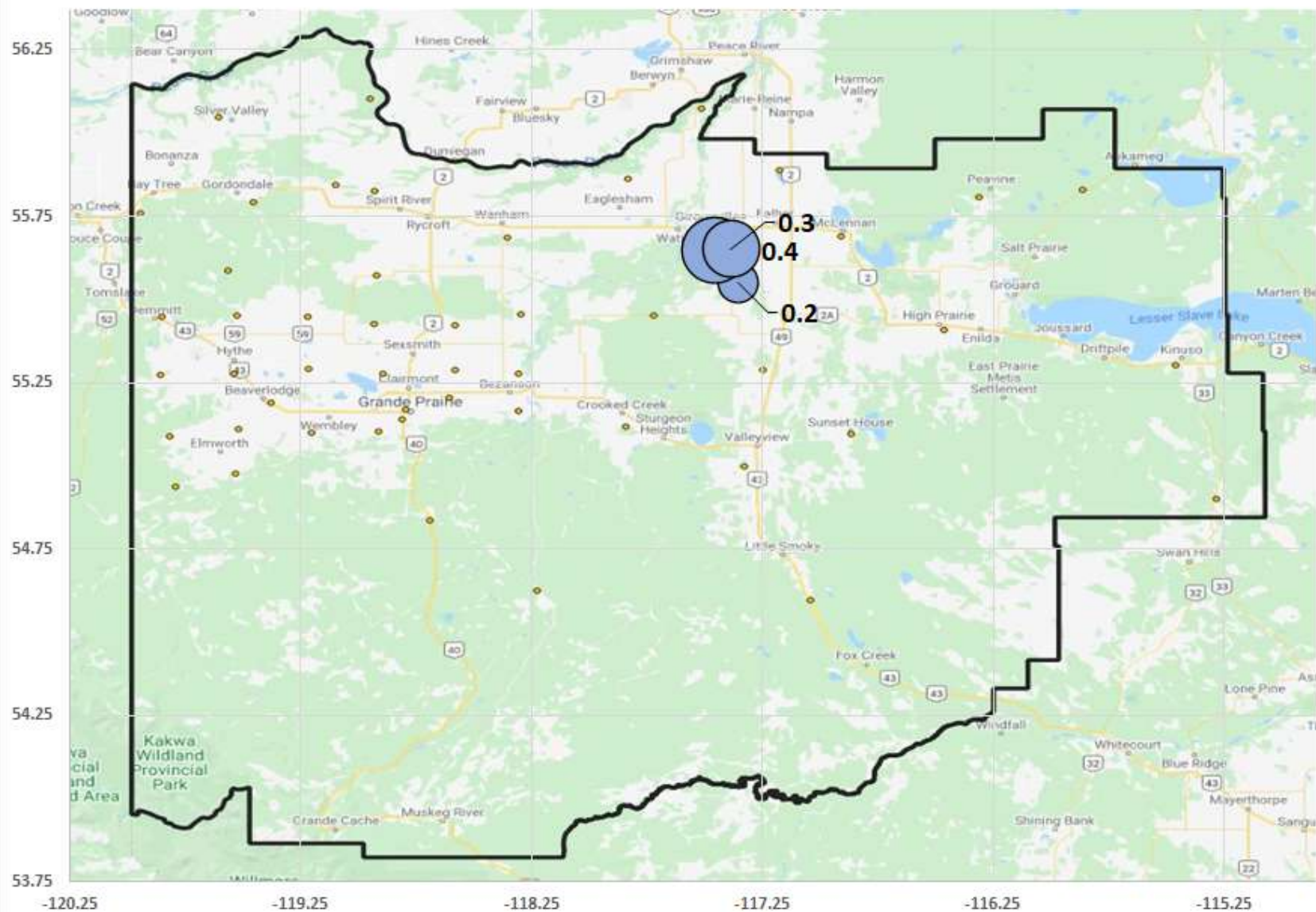
NO₂ Monthly Average (units in ppb)



No Monthly or Annual Alberta Ambient Air Quality Objective for H₂S



H₂S Monthly Average (units in ppb)



End of Report



Peace Airshed Zone Association

Ambient Air Monitoring Report

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