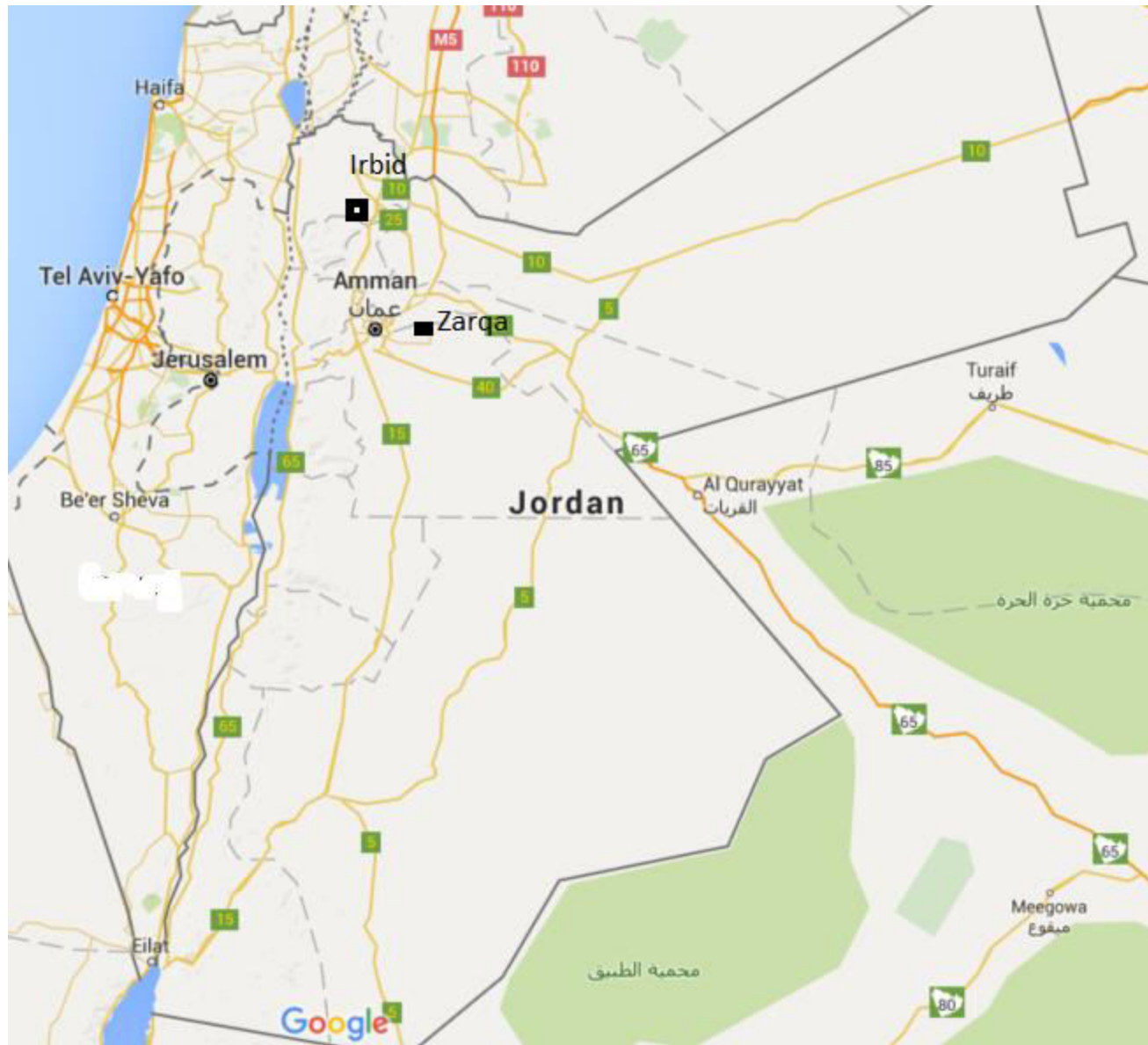


Ministry Of Environment JORDAN

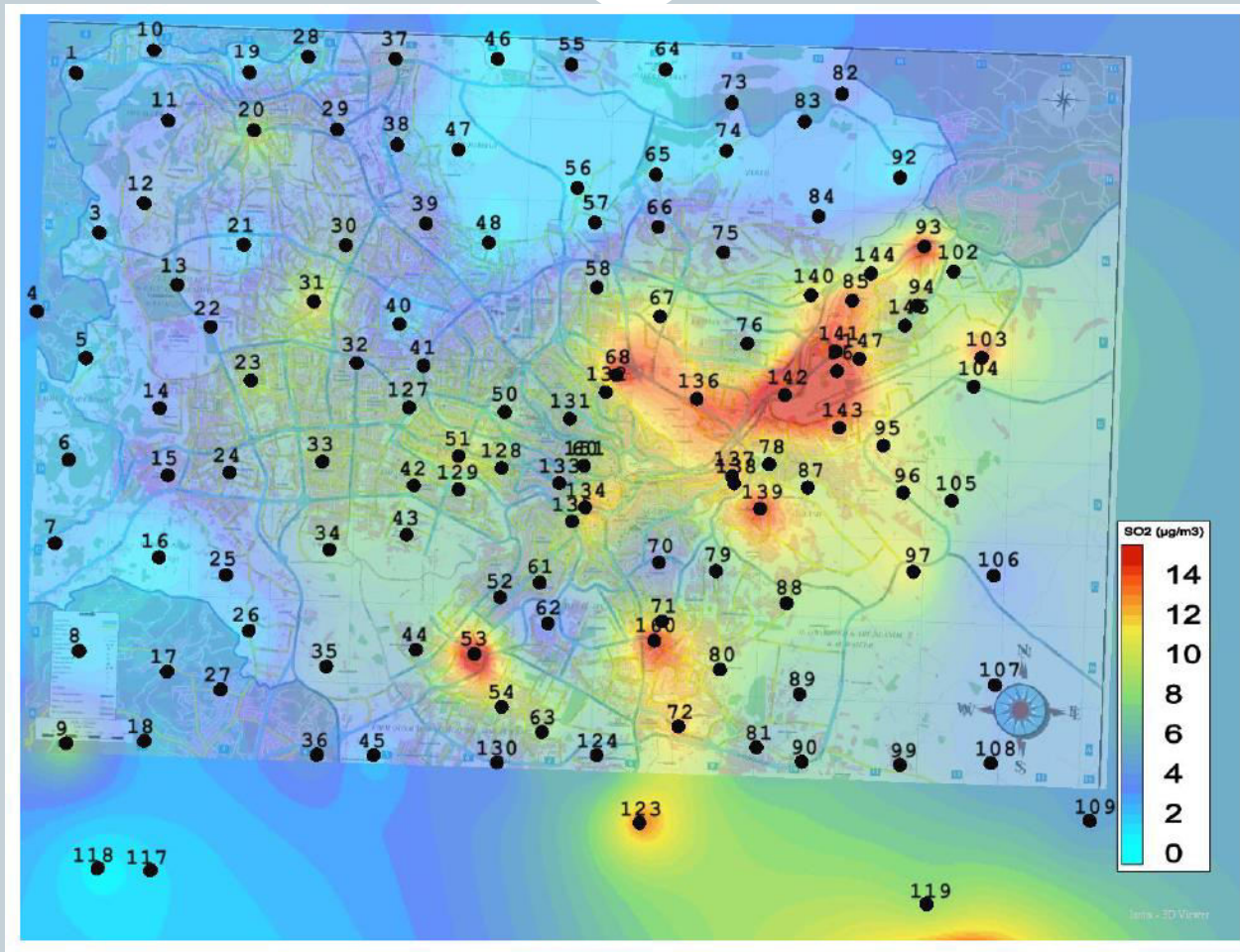
Jordan Air Quality Monitoring Network In 3 Cities: Amman, Irbid, Zarqa

**Monitoring and Assessment Directorate
Director : Eng. Jabur Daradkah**

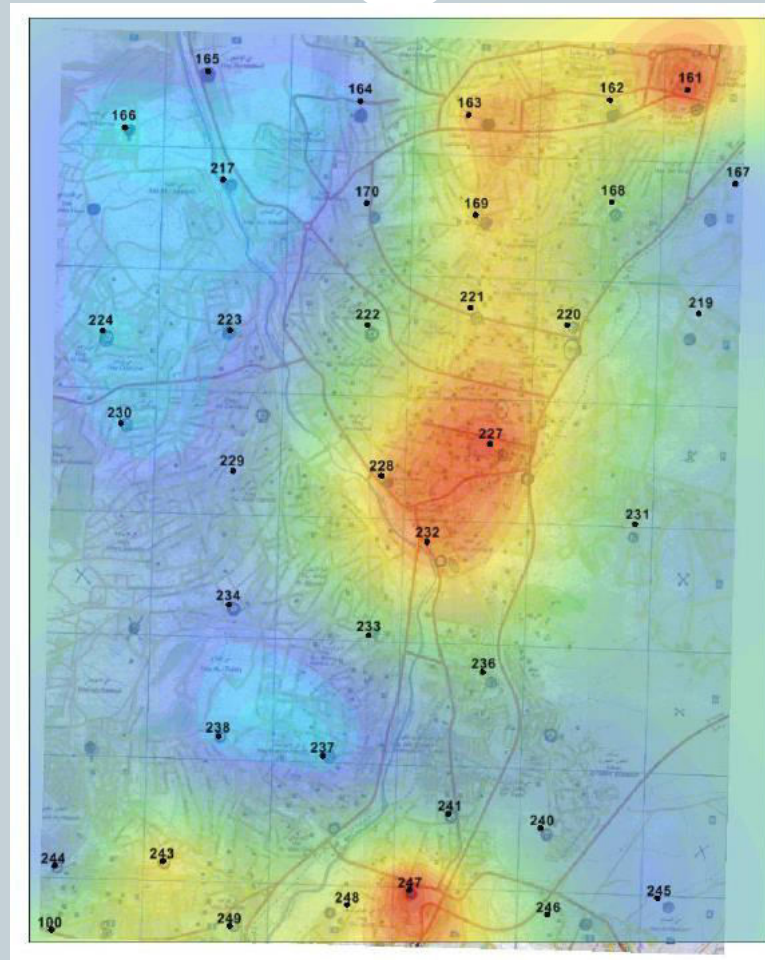
**Project Contractor:
United Technology Establishment - UniTec
Project Manager: Michael Hindeleh**



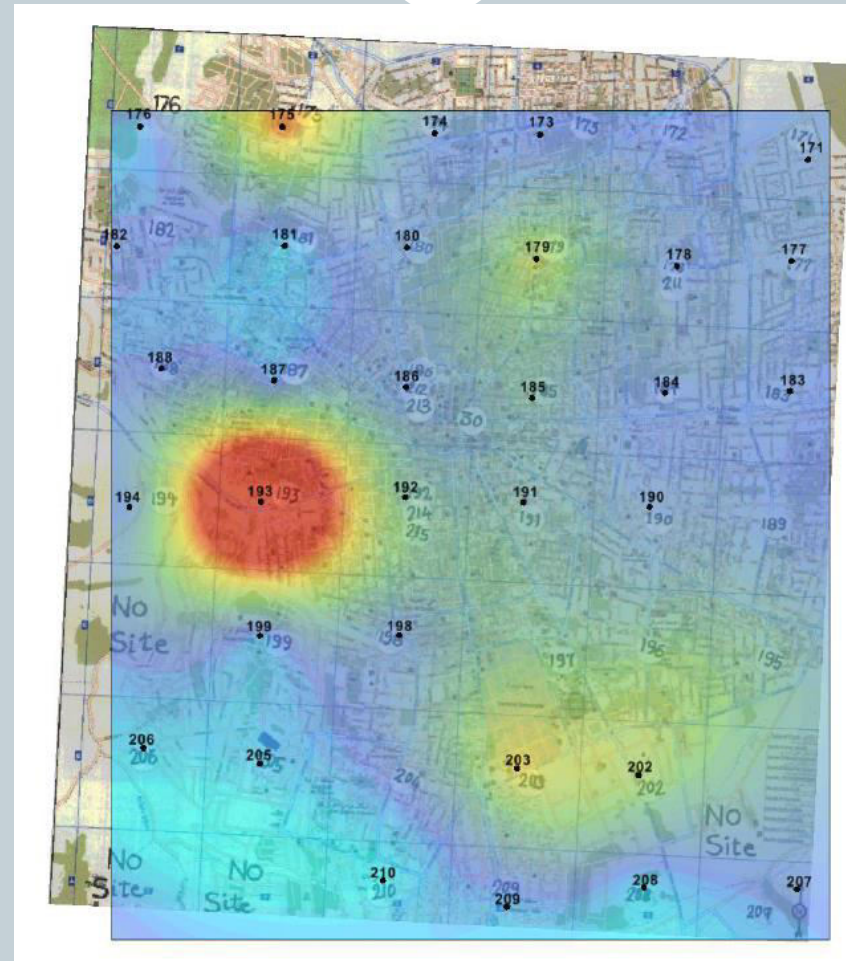
Mapping for Amman, Irbid, Zarqa



ZARQA



IRBID



Description of the AQ Network



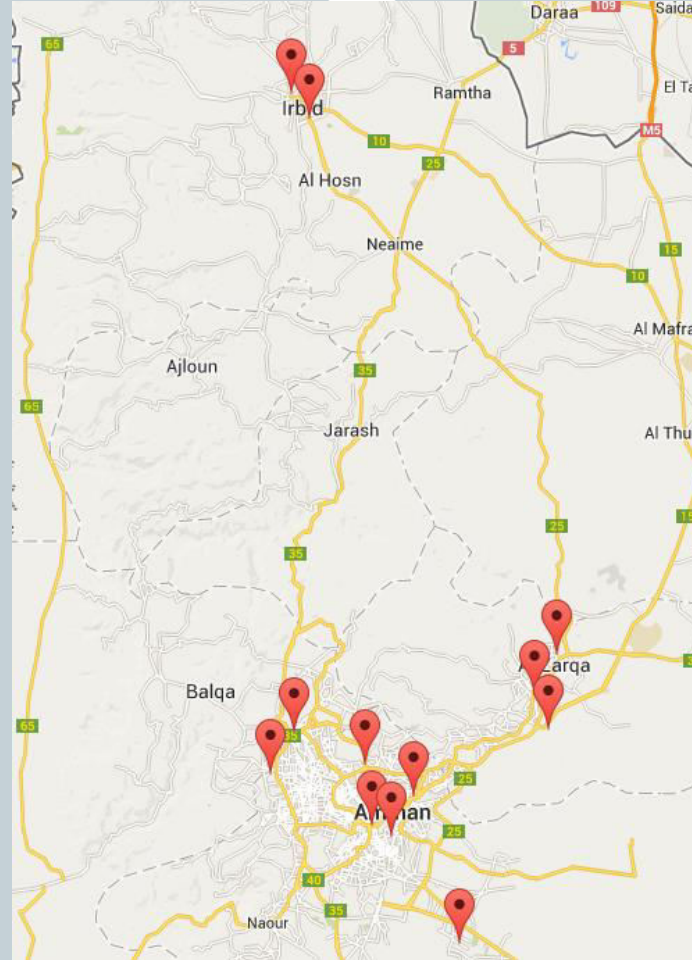
THE AIR QUALITY MONITORING NETWORK CONSISTS OF 12 STATIONS LOCATED IN AMMAN, ZARQA AND IRBID WHICH ARE CONSIDERED THE MAIN URBAN AREAS IN JORDAN.

EACH STATION HAS AUTOMATIC MEASUREMENT ANALYZERS THAT ARE IN CONTINUOUS OPERATION 24 HOURS A DAY.

AIR POLLUTANTS MEASURED ARE : PM₁₀, NO-NO₂-NOX, SO₂, CO, OZONE O₃ WITH VARIANCE IN EACH OF THE 12 STATIONS.



أماكن محطات الرصد



AQM STATIONS IN AMMAN



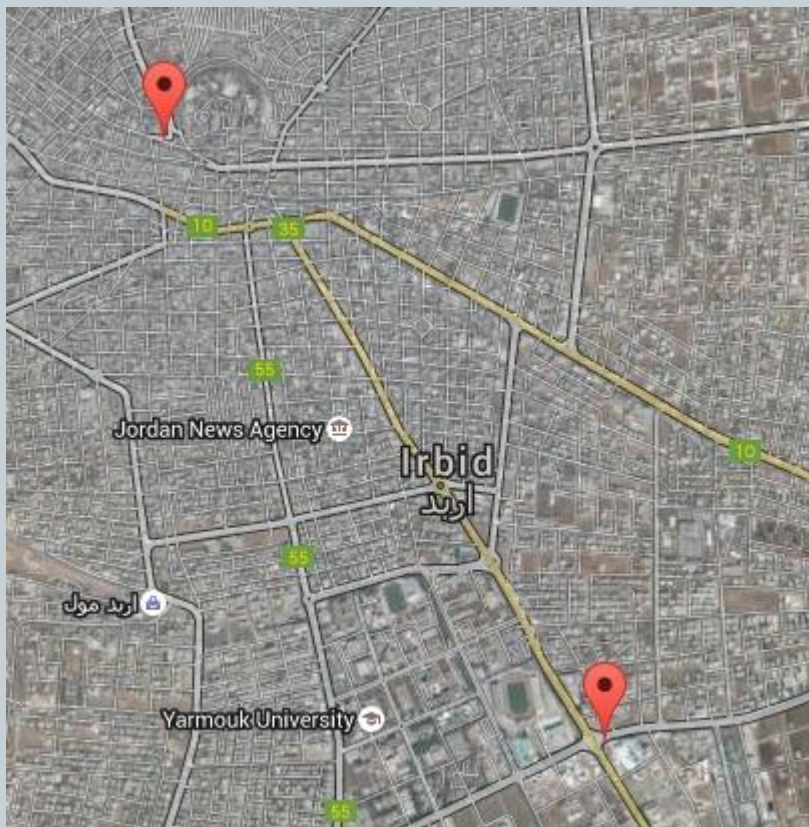
	Location	S
	<u>Amman</u>	
1	Background	King Hussein garden
2	Urban	GAM. Main building
3	Traffic	Tabarbour
4	Urban	Marka /Mahata
5	Traffic	University street
6	Industrial	King abd II Ind. City
7	Industrial	Wadi/Yarmouk

AQM STATIONS IN ZARQA



	<u>Zarqa</u>	
8	Traffic	Health Center
9	Industrial	Masane'
10	Urban	Arab Bank garden

AQM STATIONS IN IRBID



	<u>Irbid</u>	
11	Traffic	Alhassn Sport city
12	Urban	AL Barha street



محطات الرصد







JS 1140

Pollutant	Sample Duration	Maximum Allowable limit	Number of Allowable Exceeded Events
Sulfur dioxide (So ₂)	One hour	0.3 part per million (ppm)	3 times in any 12 month period per year
	24 Hour	0.14 part per million (ppm)	Once per year
	Yearly	0.04 part per million (ppm)	—
carbon monoxide (CO)	One Hour	26 part per million (ppm)	3 times in any 12 month period per year
	Eight Hour	9 part per million (ppm)	3 times in any 12 month period per year
Nitrogen dioxide (No ₂)	One hour	0.21 part per million (ppm)	3 times in any 12 month period per year
	24 Hour	0.08 part per million (ppm)	3 times in any 12 month period per year
	Yearly	0.05 part per million (ppm)	—
Ozone (O ₃)	One Hour	0.08 part per million (ppm)	—
	Eight Hour	0.12 part per million (ppm)	—
Fine particles suspended (pm ₁₀)	24 Hour	120 Microgram (µg/m ³)	3 times in any 12 month period per year
	Yearly	70 Microgram (µg/m ³)	—

Month Overview

HR-BEG HR-END DAY	00 01	01 02	02 03	03 04	04 05	05 06	06 07	07 08	08 09	09 10	10 11	11 12	12 13	13 14	14 15	15 16	16 17	17 18	18 19	19 20	20 21	21 22	22 23	23 24	AVG	MAX	MIN
1	98.8	82.1	114	117	92.2	71.3	307	430	387	208	129	120	188	357	405	334	325	221	183	130	128	187	128	91.7	199	430	71.3
2	77.8	49.4	48.9	39	38	24	45.9	83.5	145	124	99.9	70.1	75.3	87.1	78.8	108	85.8	83.7	171	102	87.1	57.5	48.8	48.5	75.7	171	24
3	88.8	35.5	30.2	40.4	41	81.8	54.7	32.7	87.4	159	173	205	198	252	289	279	238	159	141	182	338	388	342	311	188	388	30.2
4	298	185	215	199	174	182	232	190	158	290	255	358	357	457	333	271	230	179	148	209	189	277	153	53.8	231	457	53.8
5	80.8	28.8	24.1	14.8	20.1	40.8	105	110	125	181	224	214	219	190	177	132	181	148	87.8	118	108	58.1	97	124	118	224	14.8
6	109	83.5	54.3	27.2	27.7	38.5	19.5	23.8	95.8	188	158	158	180	184	128	132	138	104	83.5	58.8	55	34.9	28.9	23.5	88.5	188	19.5
7	23.3	29.7	34.5	22	25.7	37.3	41.4	109	178	185	238	283	359	300	259	215	105	14.2	85.9	37.3	30	30.5	29.9	35.9	112	359	14.2
8	98.8	25.9	18.8	2.8	0.9	1.5	9.1	23.3	32.7	34.7	120	221	225	221	238	132	128	128	108	59	35.9	148	91.4	145	91.8	235	0.9
9	184	42.3	37.4	42.3	34.7	35.8	17.8	78.3	82.3	119	118	89.8	84.8	87.9	108	103	87.9	59	50.8	48.8	58.2	48.9	37.4	38.2	88.8	184	17.8
10	48.9	59	29.7	35.2	41.5	118	128	142	330	288	212	175	178	170	218	241	247	332	279	201	184	130	83.7	48.4	183	332	29.7
11	112	91.8	113	208	187	193	235	253	518	289	101	47.3	81.7	58.3	83.8	87	88.8	87.8	211	384	318	188	181	78	187	518	47.3
12	111	251	217	342	299	224	233	402	373	311	248	137	187	288	282	311	244	212	200	174	208	304	388	402	283	402	111
13	199	183	145	98.3	88.9	79.4	140	231	328	238	179	248	284	355	287	232	353	889	889	297	243	283	283	229	271	889	88.9
14	99.9	139	277	184	198	370	371	300	408	804	389	288	225	378	307	279	274	213	238	180	148	158	197	114	284	804	99.9
15	182	135	151	117	98.8	88.7	111	207	308	213	187	137	121	175	302	270	248	198	249	203	181	91.8	78.7	109	172	308	88.7
16	250	289	210	182	218	434	384	324	408	434	229	171	208	139	122	119	109	88.3	58.8	158	218	181	112	101	213	434	58.8
17	111	109	128	172	137	183	220	339	410	381	313	359	235	340	489	389	315	281	212	288	520	513	171	284	283	520	109
18	200	178	121	113	115	187	315	453	389	379	282	355	433	428	377	342	382	323	445	480	383	198	198	199	300	480	113
19	175	118	118	111	118	152	152	341	584	518	838	843	902	872	827	858	844	594	548	433	379	249	195	192	431	902	111
20	147	158	112	113	111	102	98.3	200	328	472	455	452	457	388	408	285	285	219	213	125	82.8	75.3	80.8	58.5	223	472	58.5
21	85.1	79	58.8	57.8	88.3	131	183	258	441	380	208	288	488	382	383	348	540	483	431	789	680	342	458	528	331	789	58.8
22	250	101	83.5	78	181	205	224	238	284	384	315	301	318	322	337	344	332	289	270	297	248	239	222	174	249	384	78
23	122	101	98.3	87.8	135	158	198	215	182	237	299	348	370	341	312	288	254	198	184	142	175	221	237	215	211	370	87.8
24	175	135	108	98.5	91.3	115	189	200	242	290	347	357	322	284	247	213	83.4	117	148	187	215	188	183	158	194	357	91.3
25	132	102	92.4	90.8	115	124	99.1	112	144	115	202	845	1587	1800	1800	1820	1747	1744	1814	1424	1424	1424	924	808	829	1820	90.8
26	808	808	380	202	184	183	143	185	124	158	147	125	108	83.3	83.3	78.4	32.8	32	33.1	48.8	48.7	51.3	83.1	41.9	154	808	32
27	59.7	72.1	83.4	48.7	31.8	23.4	49.7	89.7	73.8	88.1	98.4	32	38.7	177	217	221	239	248	270	270	287	228	182	127	133	270	23.4
28	125	74.7	34.8	12.3	28.7	48.8	81.7	51.3	38.5	33.7	51	135	187	187	208	212	214	230	230	228	214	105	40.8	124	230	12.3	
29	39.3	28.2	22.8	38.4	29.3	24.1	14.2	18.7	28.7	38.7	48.9	75.1	81.4	104	138	150	144	155	105	105	108	88.7	78.9	73.7	72.4	155	14.2
30	49.5	44.2	42.5	44.4	41	38.4	27.1	22.9	49.7	79.8	99.8	121	134	115	107	138	145	137	112	107	138	180	188	152	94.5	188	22.9
31	127	117	87.1	82.4	83.1	83.7	115	120	137	149	125	137	117	111	138	78.9	81.3	131	179	218	409	388	382	272	180	409	83.1
AVG	140	118	108	97	95.3	118	148	185	238	241	218	234	288	308	311	289	274	288	258	248	249	227	189	181	208		
MAX	808	808	380	342	299	434	384	453	584	804	838	845	1587	1800	1800	1820	1747	1744	1814	1424	1424	1424	924	808		1820	
MIN	23.3	25.9	18.8	2.8	0.9	1.5	9.1	18.7	28.7	33.7	48.9	32	38.7	58.3	83.8	87	32.8	14.2	33.1	37.3	30	30.5	29.9	23.5			0.9

TOTAL HOURS = 744, NUMBER OF GOOD HOURS = 744, NUMBER OF MISSING HOURS = 0, DATA CAPTURE = 100 (PERCENT)

TYPICAL WEEKLY REPORT

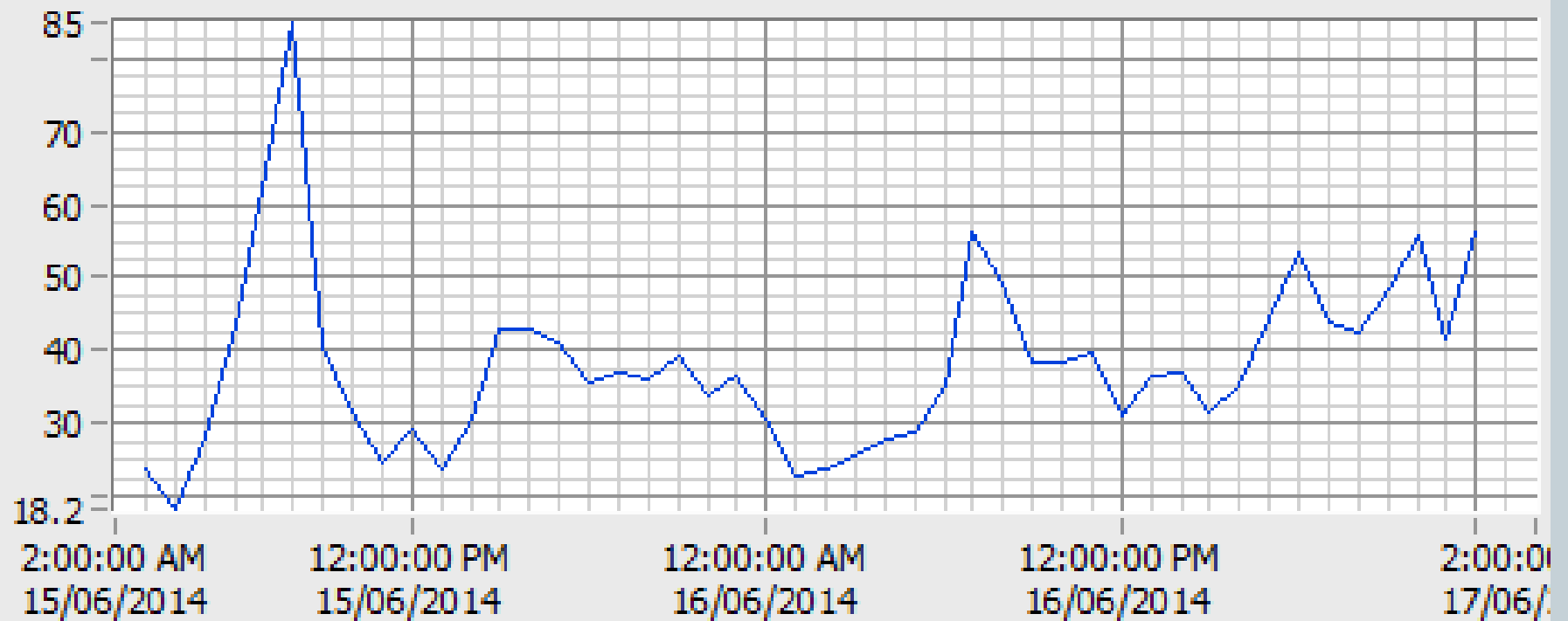


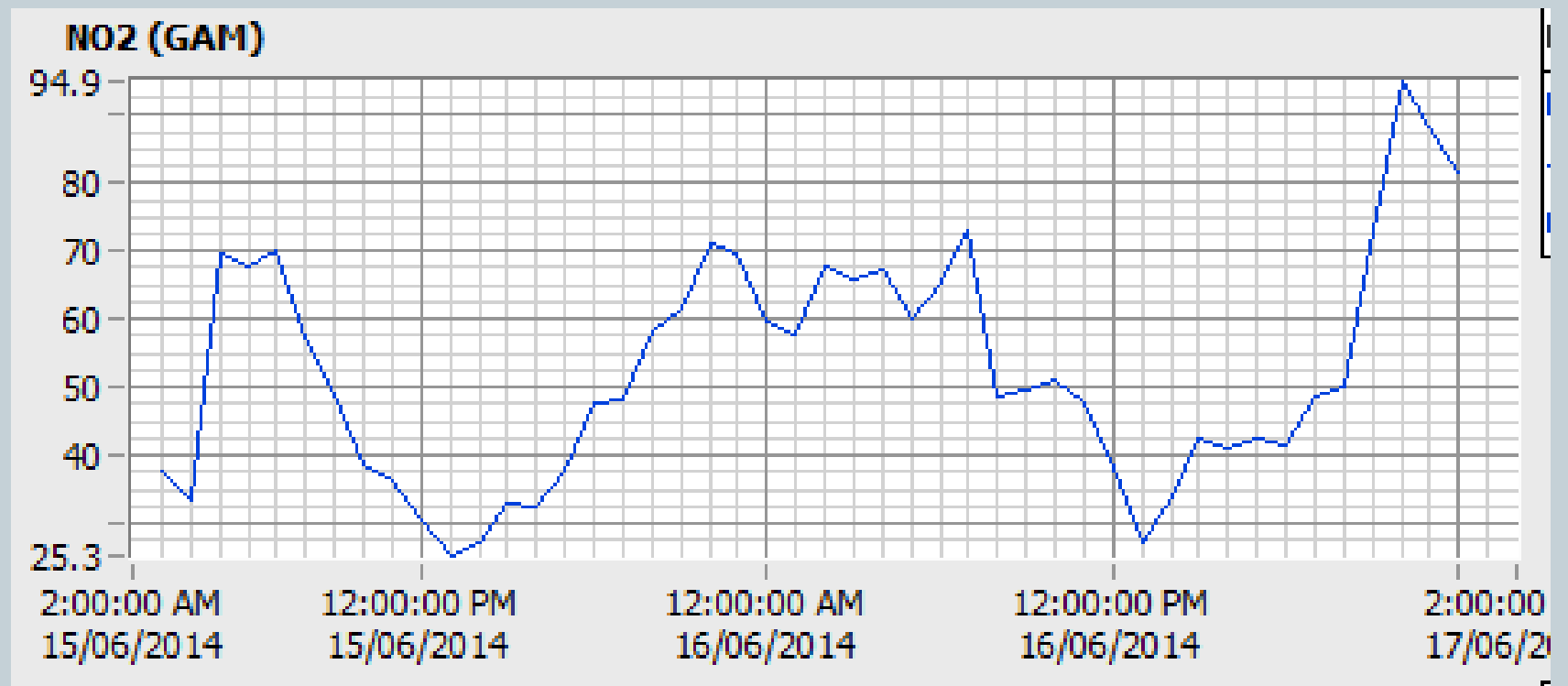
WEEK REPORT 19th – 25th MAY 2014

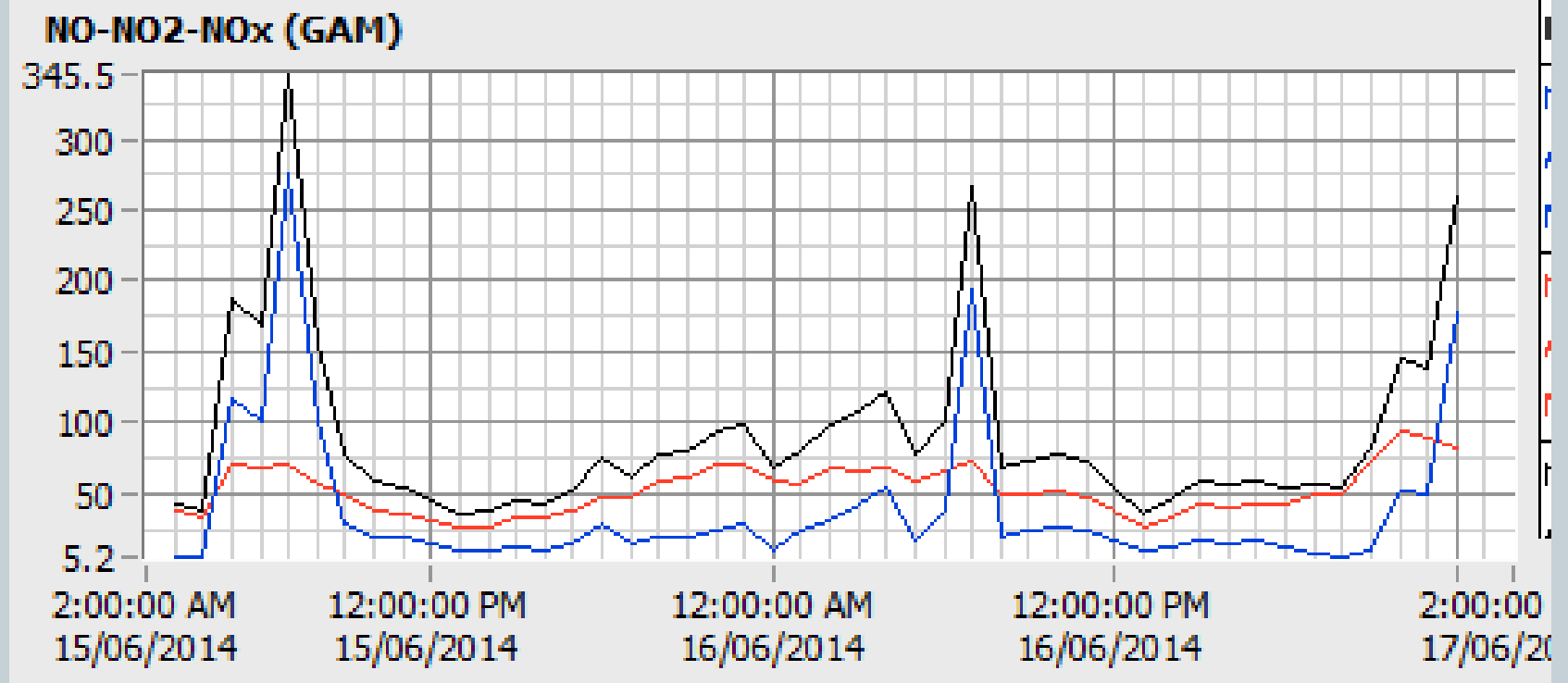
	PM10	PM10	NO2	NO2	SO2	SO2	O3	O3
JS 1140 /2006	120		80	210	140	300	80	120
Unit	µg/m ³	µg/m ³	ppb	ppb	ppb	ppb	ppb	ppb
DAY	AVG/ 24 HRS	1HR MAX/ 24 HRS	AVG /24 HRS	1HR MAX/ 24 HRS	AVG/ 24 HRS	1HR MAX/ 24 HRS	8 HR AVG MAX/24 HRS	1 HR MAX / 24 HRS
19	23.2	41.6	4.9	18.1	0.6	5.5	54.8	62.0
20	27.9	45.0	6.3	18.7	2.2	16.9	55.0	69.0
21	53.4	125.0	6.7	39.0	1.4	11.6	45.6	54.0
22	48.1	69.6	5.2	12.1	1.0	3.2	41.6	56.0
23	51.6	68.0	8.5	38.8	2.3	17.3	48.3	63.0
24	30.9	51.1	5.2	15.1	1.2	3.6	60.3	64.0
25	27.7	52.8	7.1	36.5	2.3	12.3	65.0	75.0
Week Average	37.5	64.7	6.3	25.5	1.6	10.1	52.9	63.3
Exceeded events	0	–	0	–	0	–	0	–



PM10 (GAM)

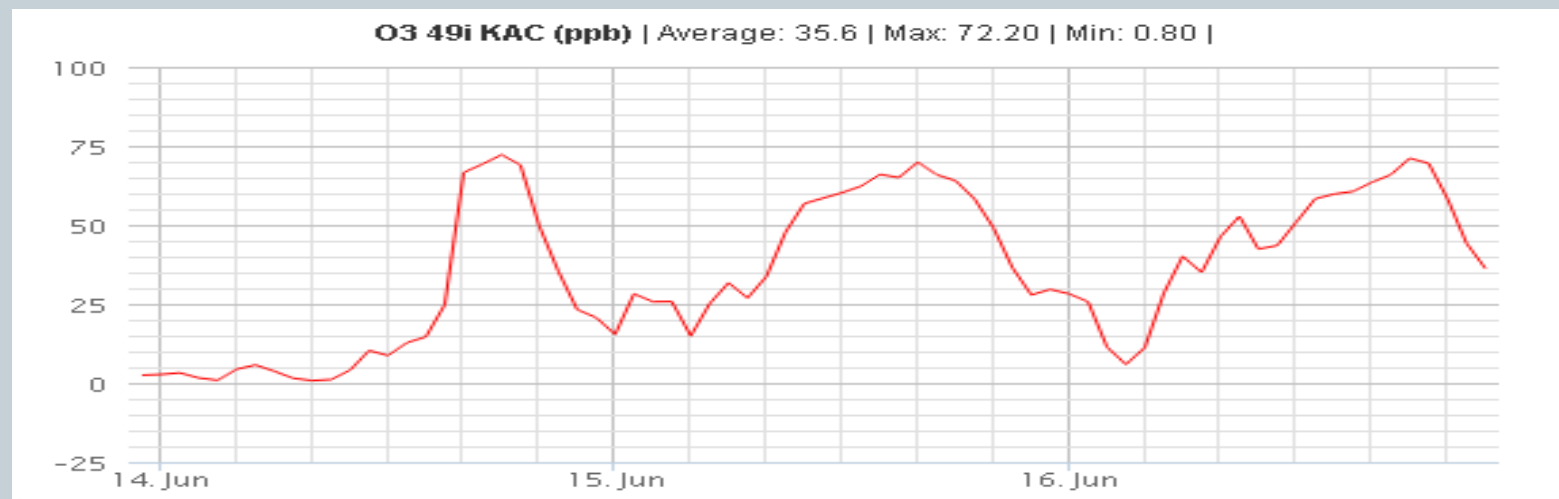








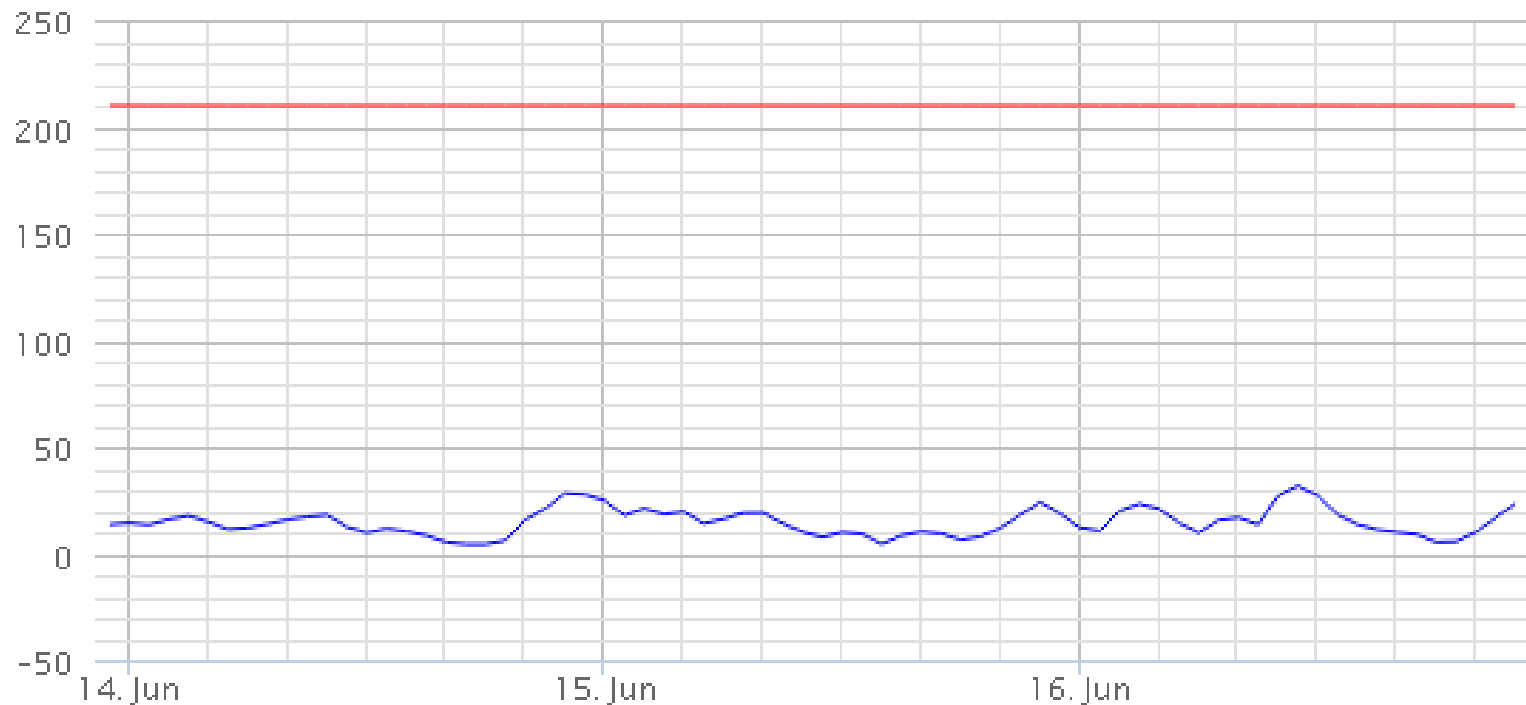
NO2 42i KAC	24.10	ppb
NO2 JS1140 1hr max	210.00	ppb
O3 49i KAC	23.20	ppb
PM10 5014i KAC	54.20	$\mu\text{g}/\text{m}^3$
PM10 JS1140 max/24hr Avg	120.00	$\mu\text{g}/\text{m}^3$
SO2 43i KAC	5.30	ppb
SO2 JS1140 1hr max	300.00	ppb



NO₂ في احدى محطات الرصد



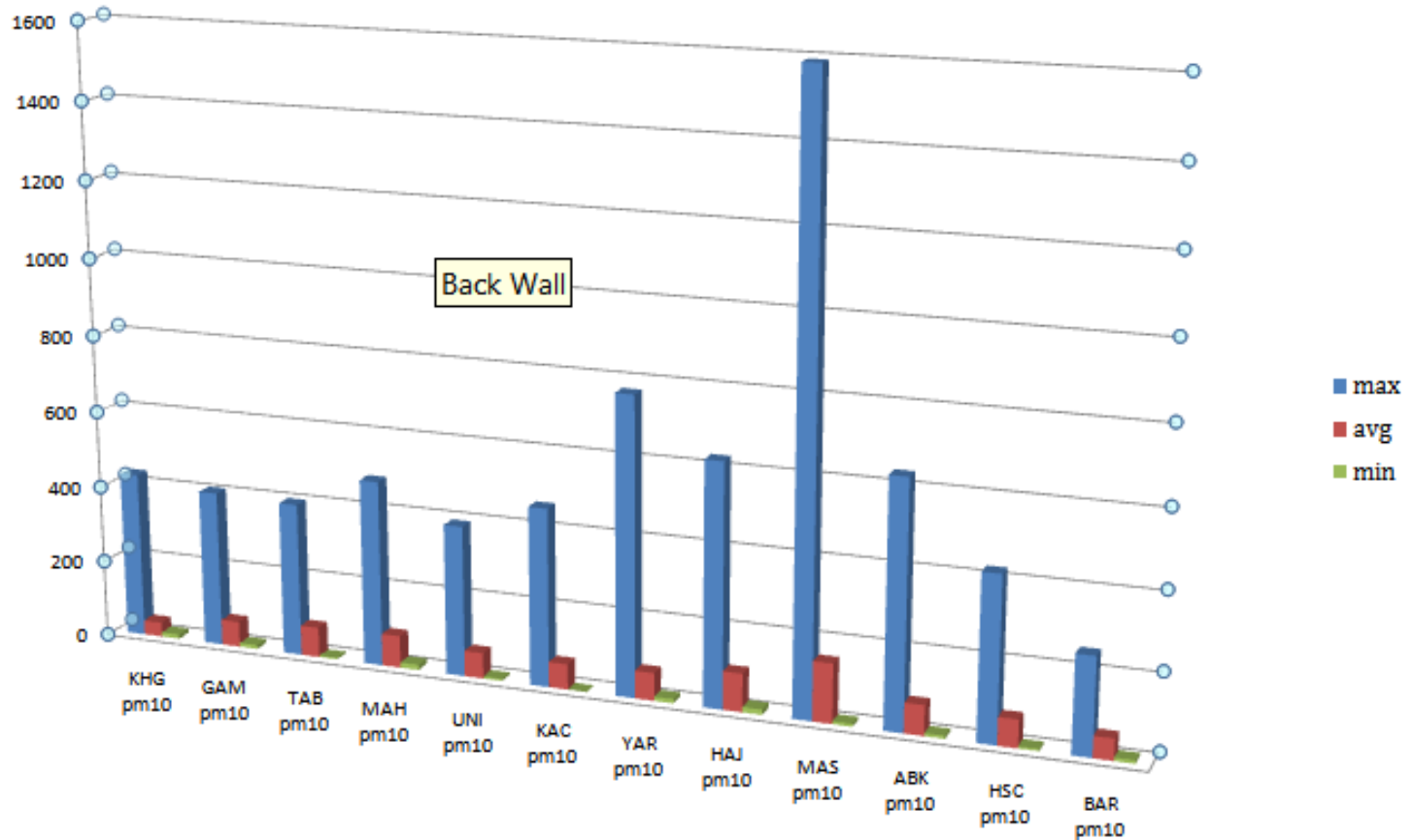
NO₂ JS1140 1hr max (ppb) | Average: 210 | Max: 210.00 | Min: 210.00 |



MONTHLY REPORTS

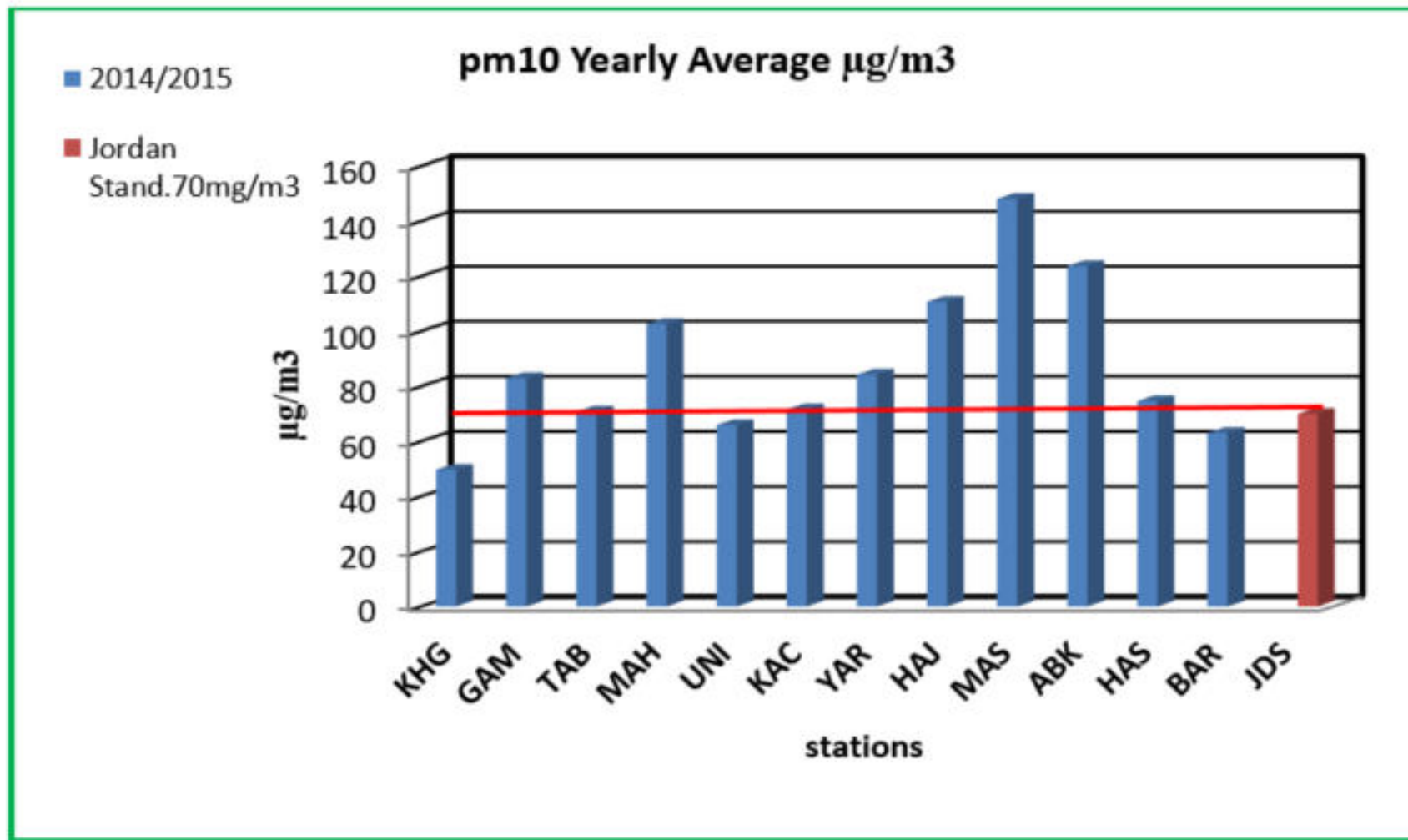


PM10 AVERAGE FOR MAY 2014



MAY 2014 - APRIL 2015

1. Fine particles suspended (pm10)



Yearly Exceeded Events (JS1140)

May 2014 - April 2015

			PM10	NO2	NO2	SO2	SO2	CO	CO	O3	O3
	Station		24 HR AVG	24 HR AVG	1HR MAX /24 HRS	24 HR AVG	1HR MAX /24 HRS	8 HR AVG MAX / 24 HRS	1 HR MAX /24 HRS	8 HR AVG MAX / 24 HRS	1 HR MA X/ 24 HRS
			120	80	210	140	300	9000	26000	80	120
			µg/m3	ppb	ppb	ppb	ppb	ppb	ppb	ppb	ppb
	Yearly Allowable Number of exceeded events		3	3	3	1	3	3	3	-	-
1	K. Hussein Garden	KHO	18	-	-	-	-	-	-	-	-
2	Greater Amman Municipality	GAM	70	-	-	-	-	4	-	-	-
3	Tasbous	TAB	37	-	-	-	-	-	-	-	-
4	Muska, Mahata	MAH	99	-	-	-	-	-	-	-	-
5	University Street	UNI	20	-	-	-	-	-	-	-	-
6	King Abdulla II Industrial city Sahab	KAC	39	-	-	-	-	-	-	-	-
7	Yarmouk Garden	YAR	61	2	4	-	-	-	-	-	-
8	Wadi Hajar-Zarqa	HAI	113	-	2	-	-	-	-	-	-
9	Masana-Zarqa	MAS	143	-	-	-	-	-	-	-	-
10	Arab Bank Garden-Zarqa	ABK	145	-	-	-	-	-	-	-	-
11	AL Hassan Sport City-Irbid	HSC	41	-	-	-	-	-	-	-	-
12	AL Barha Street-Irbid	BAR	22	-	-	-	-	-	-	-	-

Year Average (JS1140)

May 2014-April 2015



			PM10	NO2	SO2	CO	O3
	Station	Year Average Limit as per JS 1140	70	50	40	No Standard	NO Standard
			µg/m ³	ppb	ppb	ppb	ppb
1	K. Hussein Garden	KHG	49.69	10.47	5.78	–	43.87
2	Greater Amman Municipality	GAM	83.0	33.99	11.27	2363	–
3	Tbarbour	TAB	70.86	29.53	–	1961	–
4	Marika Mahata	MAH	102.	31.07	14.64	–	–
5	University Street	UNI	65.91	26.74	–	–	–
6	King Abdulla II Industrial city Sahab	KAC	71.6	15.18	8.44	–	30.64
7	Yarmouk Garden	YAR	84.2	28.34	7.46	–	–
8	Wadi Hajar- Zarqa	HAI	110.	25.53	8.74	1787	–
9	Masane-Zarqa	MAS	148.	17.62	4.28	–	–
10	Arab Bank Garden- Zarqa	ABK	123.	22.34	10.94	–	–
11	AL Hassan Sport City- Irbid	HSC	74.6	26.33	–	2391	–
12	AL Barha Street-Irbid	BAR	63.12	20.52	6.33	–	24.69



Year Average (JS1140)

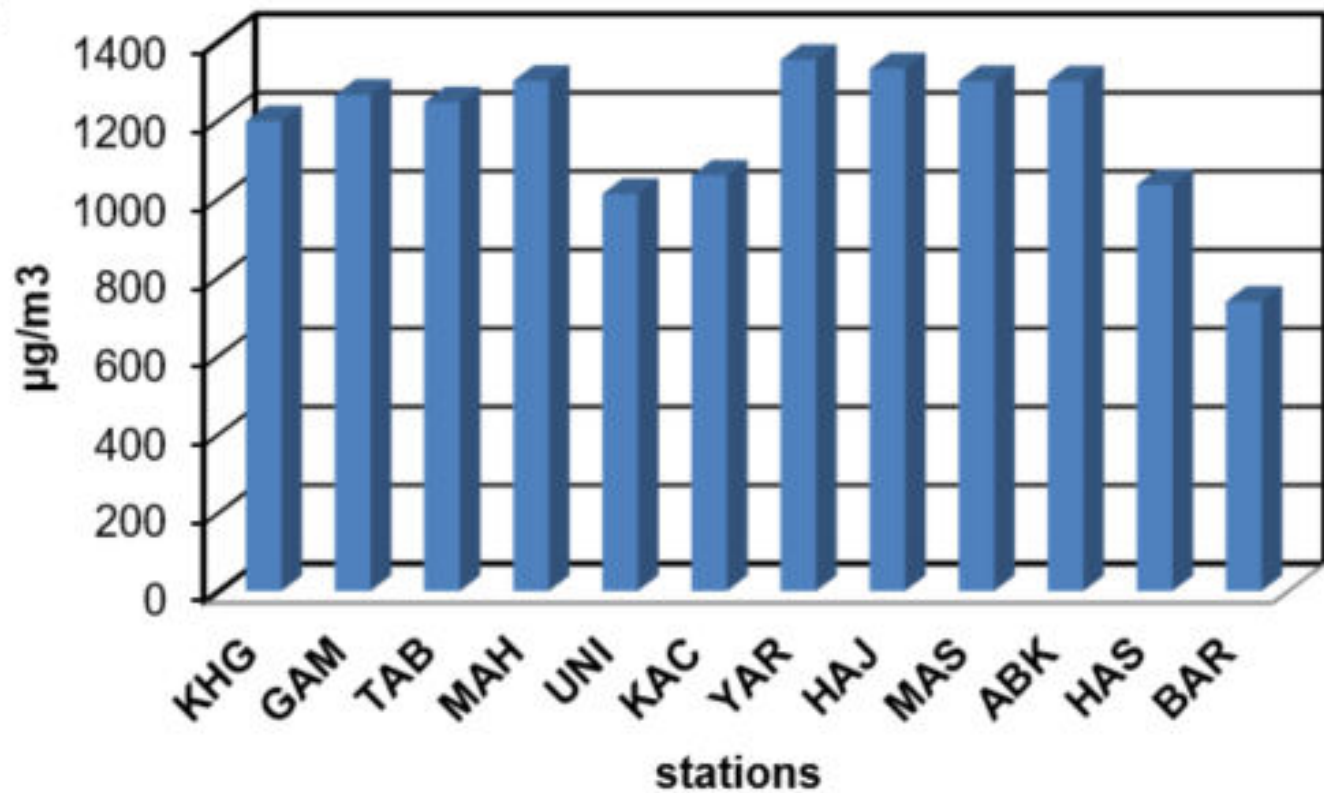
May 2014-April 2015

Taking into consideration background station

			PM10	PM10
	Station	Year Average Limit as per JS 1140	70	70
			µg/m ³	µg/m ³
1	K. Hussein Garden	KHG	49.69	0
2	Greater Amman Municipality	GAM	83	33.31
3	Tbarbour	TAB	70.86	70.86
4	Marka Mahata	MAH	102	52.31
5	University Street	UNI	65.91	65.91
6	King Abdulla II Industrial city Sahab	KAC	71.6	21.91
7	Yarmouk Garden	YAR	84.2	34.51
8	Wadi Hajar- Zarqa	HAJ	110	60.31
9	Masane-Zarqa	MAS	148	98.31
10	Arab Bank Garden- Zarqa	ABK	123	73.31
11	AL Hassan Sport City-Irbid	HSC	74.6	24.91
12	AL Barha Street-Irbid	BAR	63.12	13.43

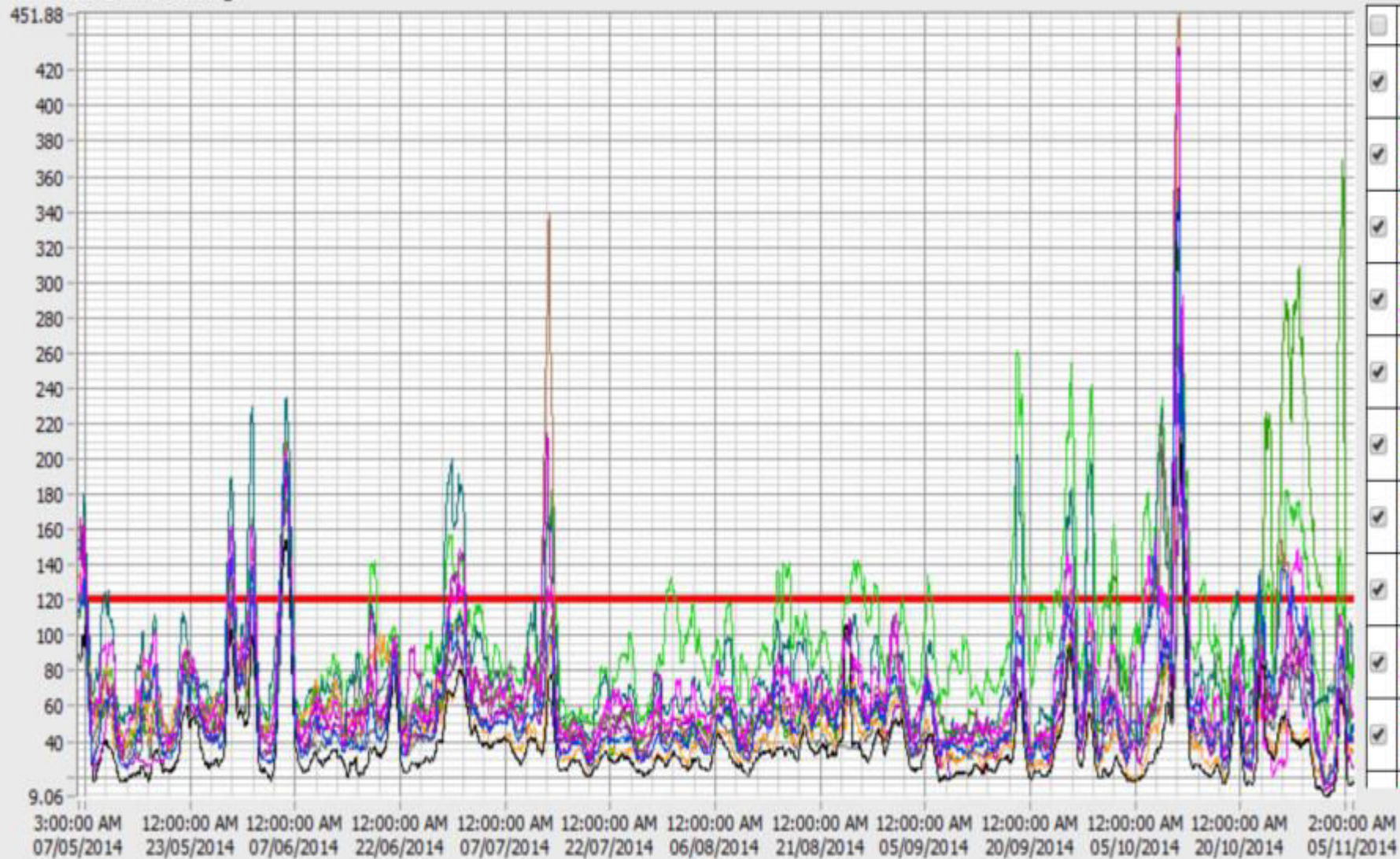
pm10 Max 24 Hour Average

■ 2014/2015



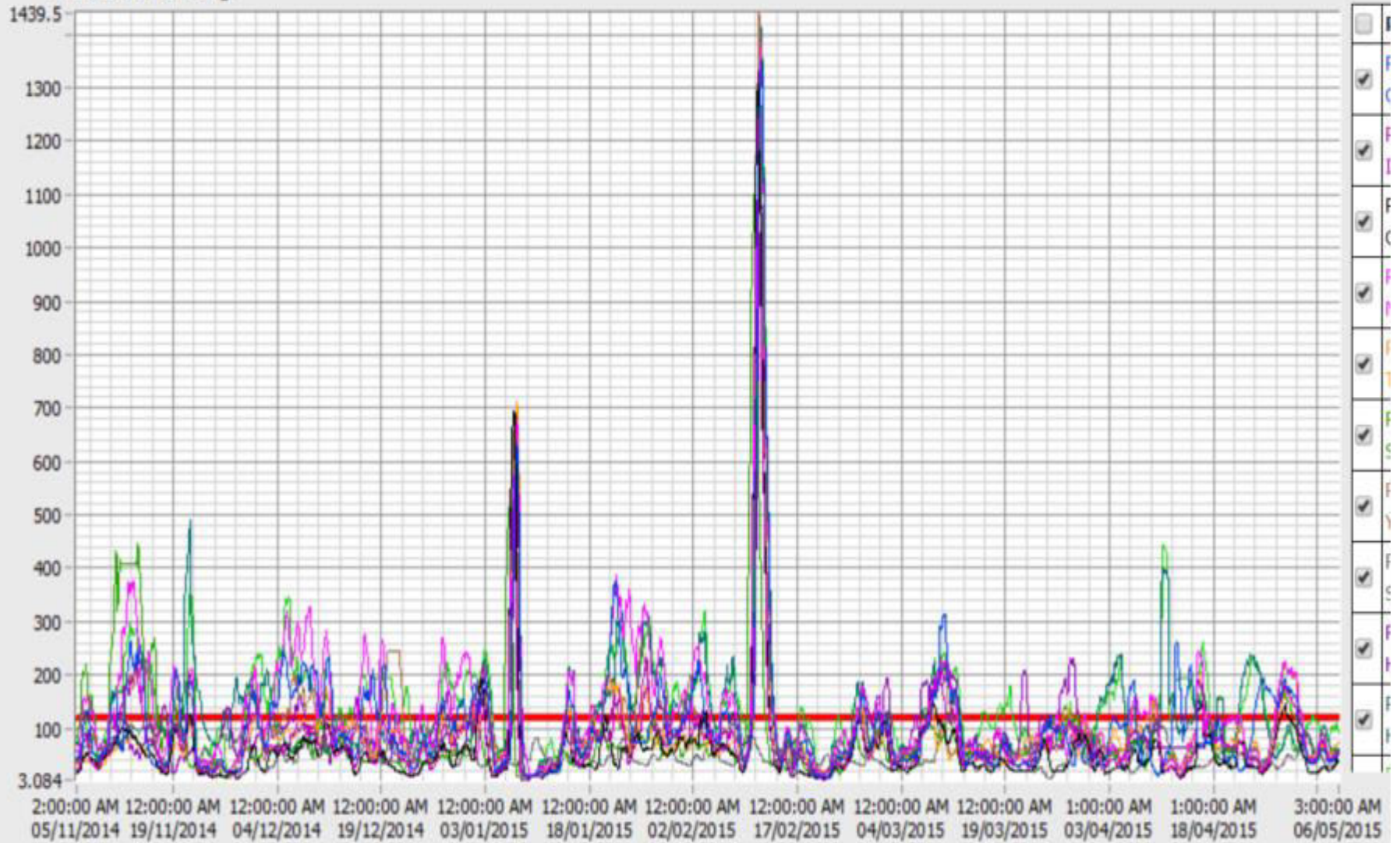
STATION PM10: ALL PM10

PM10 24Hr Mov. Avg.

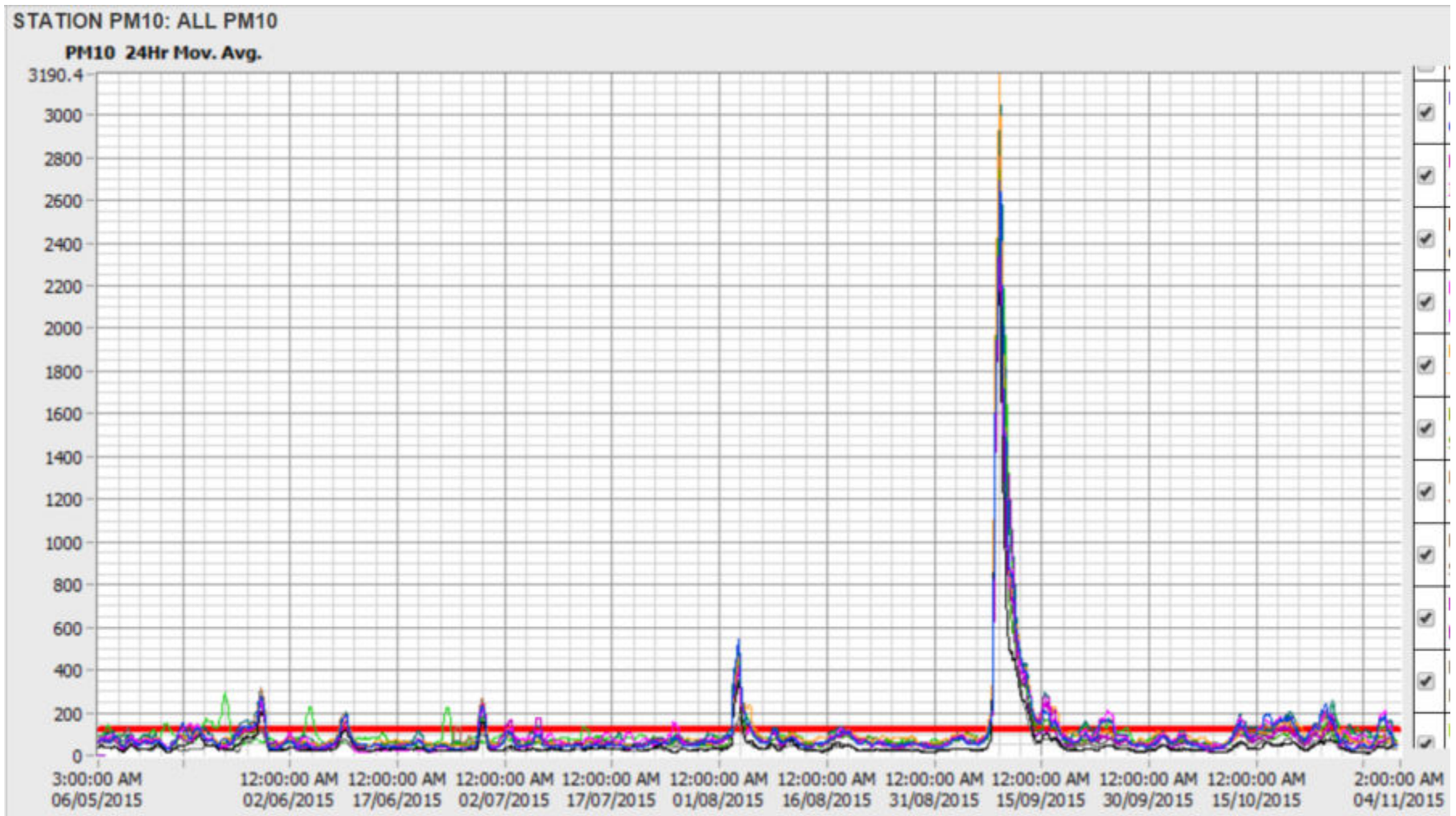


STATION PM10: ALL PM10

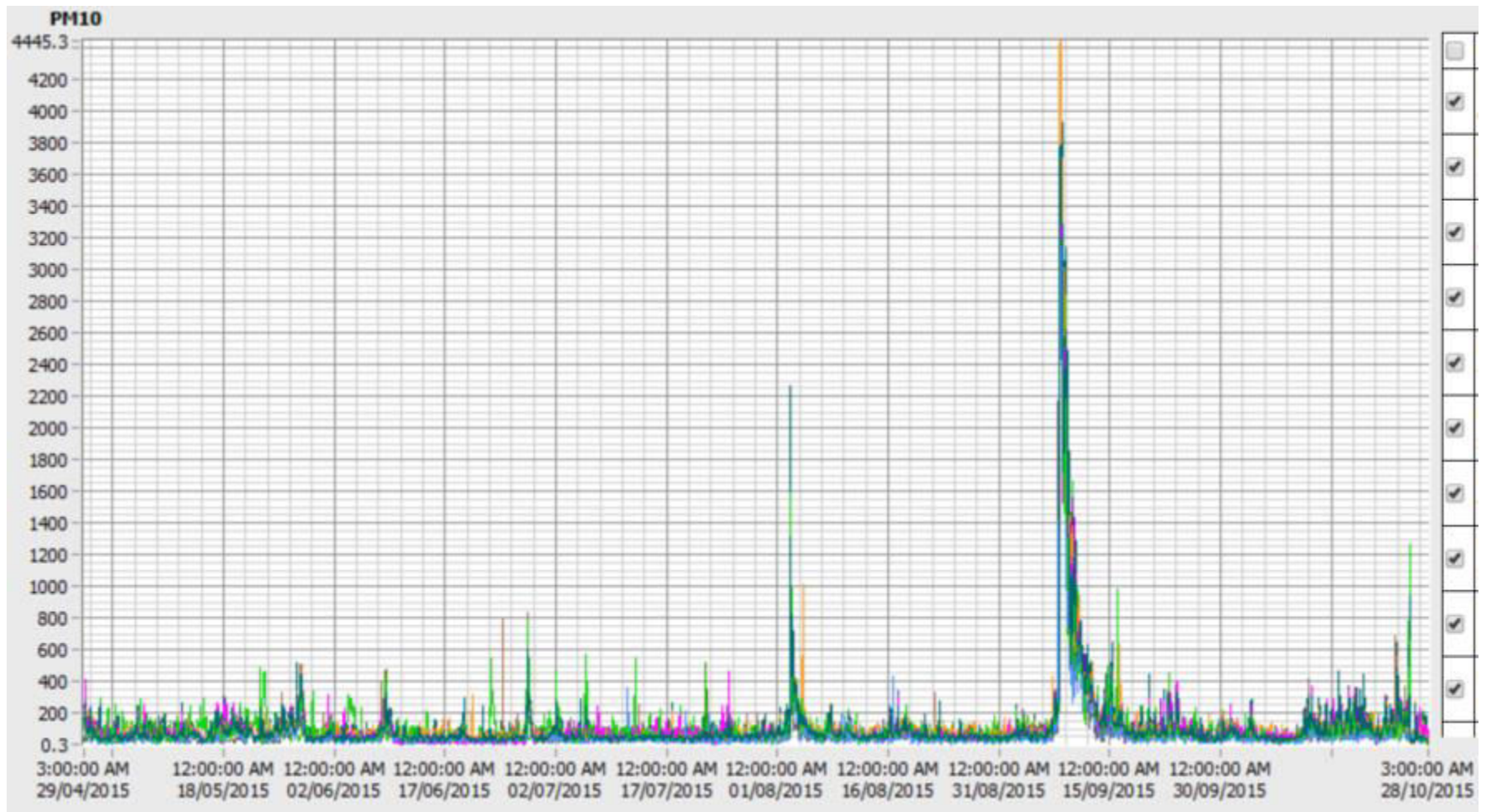
PM10 24Hr Mov. Avg.



24 HR MOVING AVERAGE – ALL STATIONS



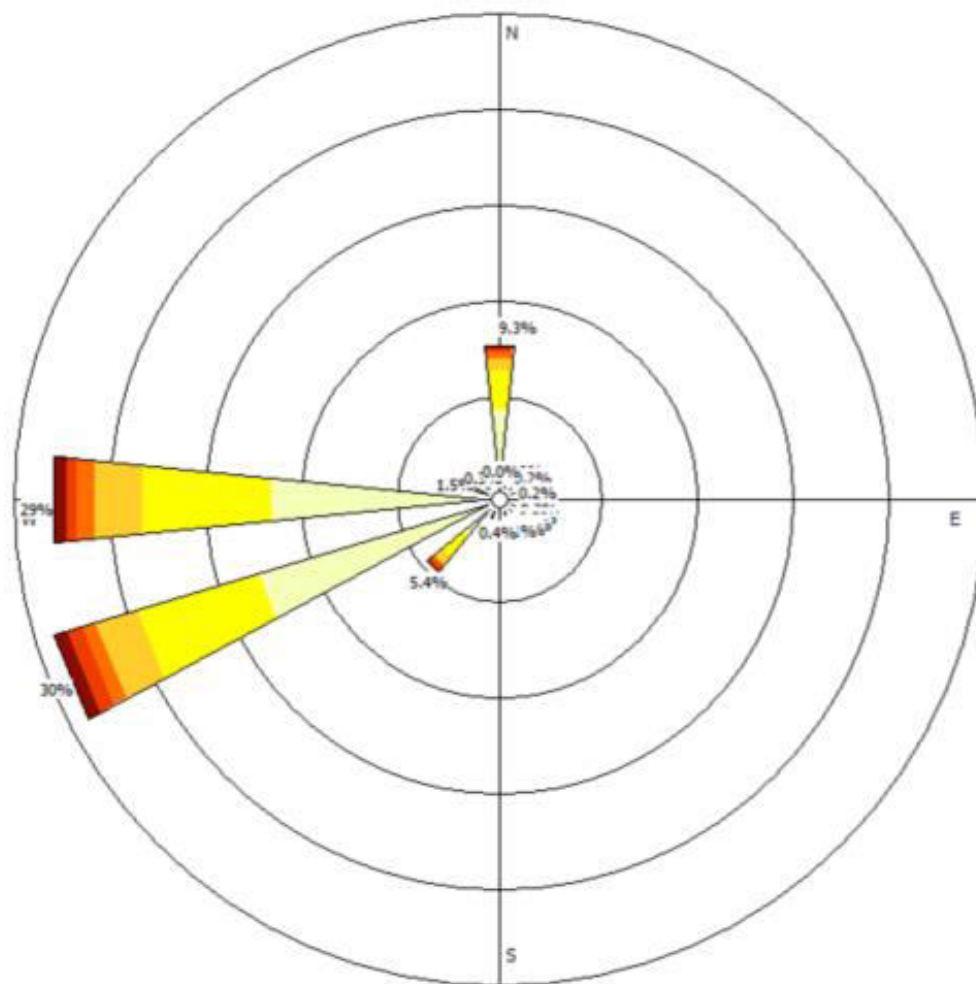
PM₁₀ HOURLY AVERAGE- ALL STATIONS





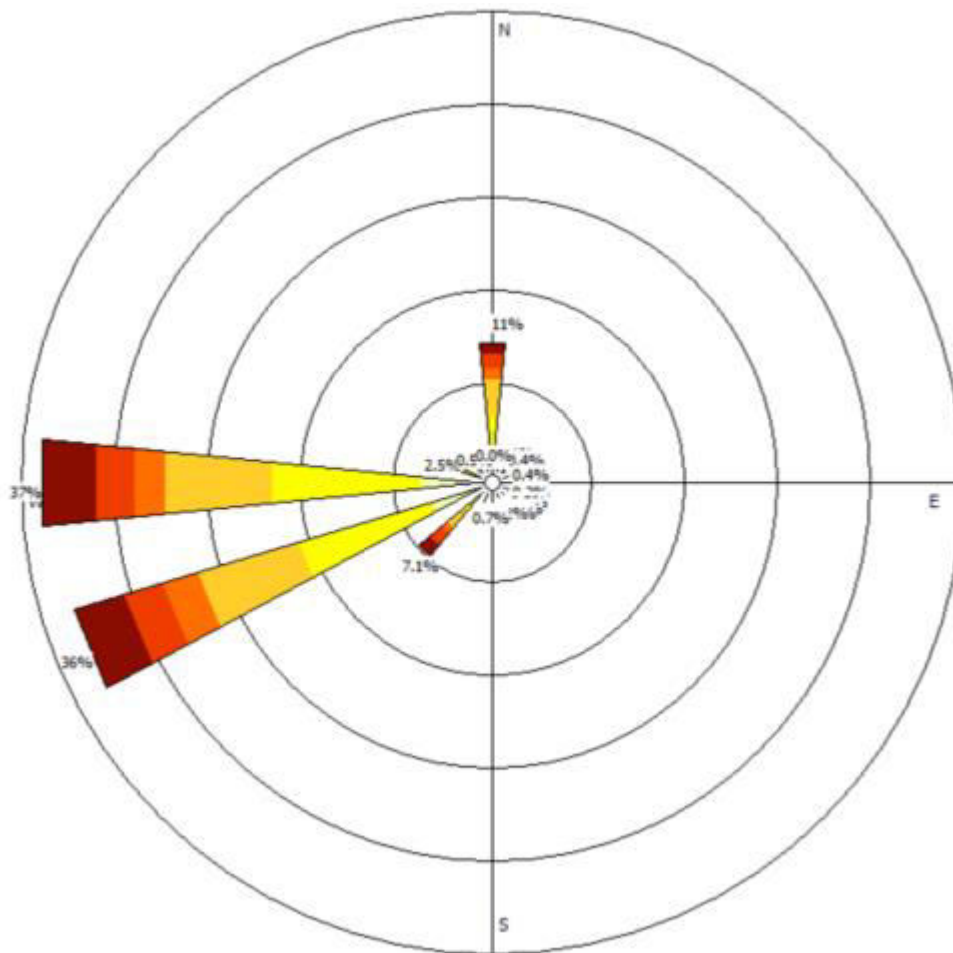


PM₁₀ CONCENTRATION IN RELATION TO WIND DIRECTION AT KHG – REFERENCE STATION MAY 2014 – APRIL 2015



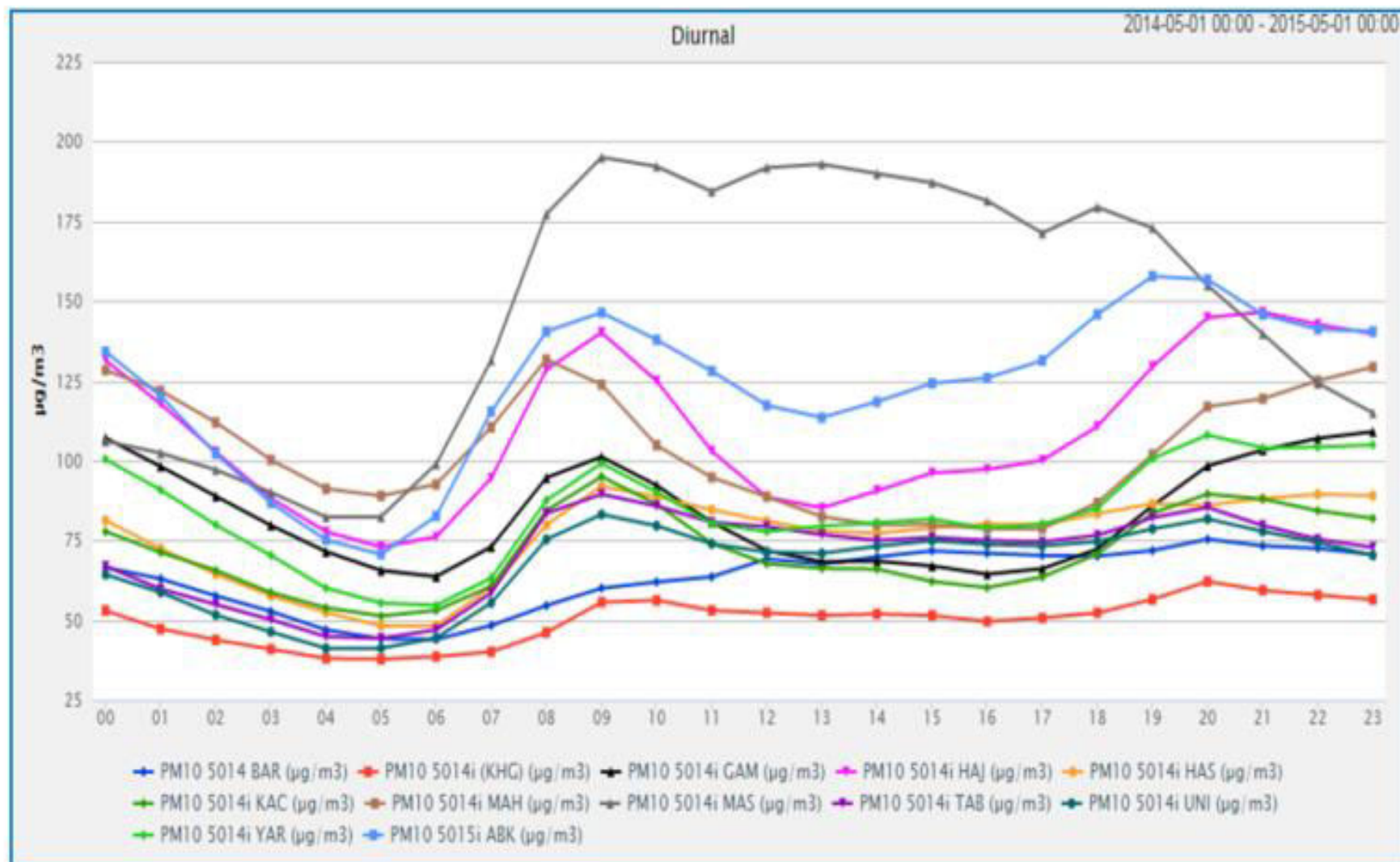
%		
2.3	> 170 µg/m ³	
2.7	120 < 170 µg/m ³	
3.0	100 < 120 µg/m ³	
7.8	70 < 100 µg/m ³	
22.2	40 < 70 µg/m ³	
38.5	20 < 40 µg/m ³	
23.5	< 20 µg/m ³	

PM₁₀ CONCENTRATION IN RELATION TO WIND DIRECTION ZARQA – INDUSTRIAL AREA MAY 2014 – APRIL 2015

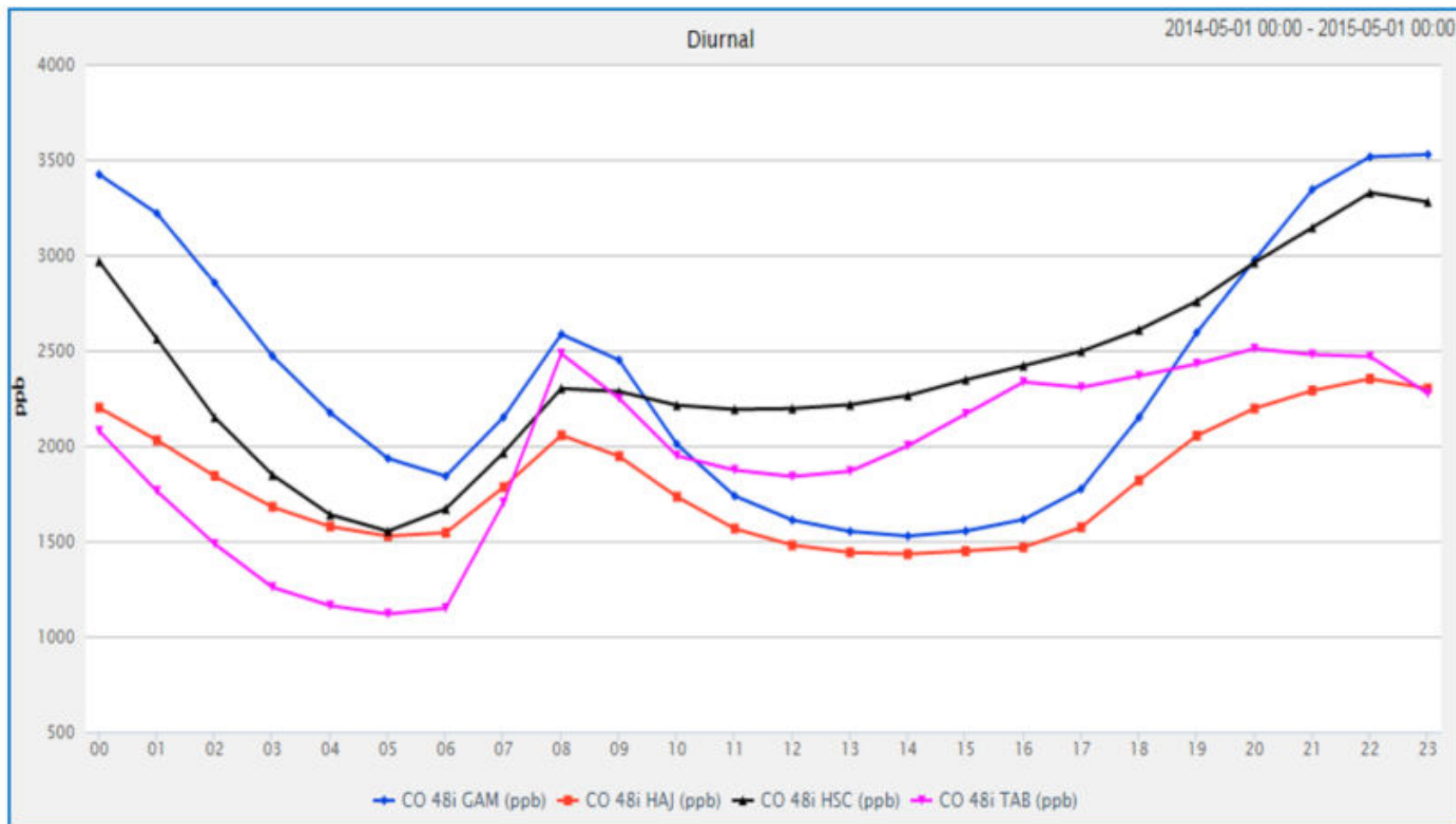


µg		
11.9	> 170 µg/m ³	
10.0	120 < 170 µg/m ³	
8.1	100 < 120 µg/m ³	
24.0	70 < 100 µg/m ³	
30.4	40 < 70 µg/m ³	
11.6	20 < 40 µg/m ³	
4.0	< 20 µg/m ³	

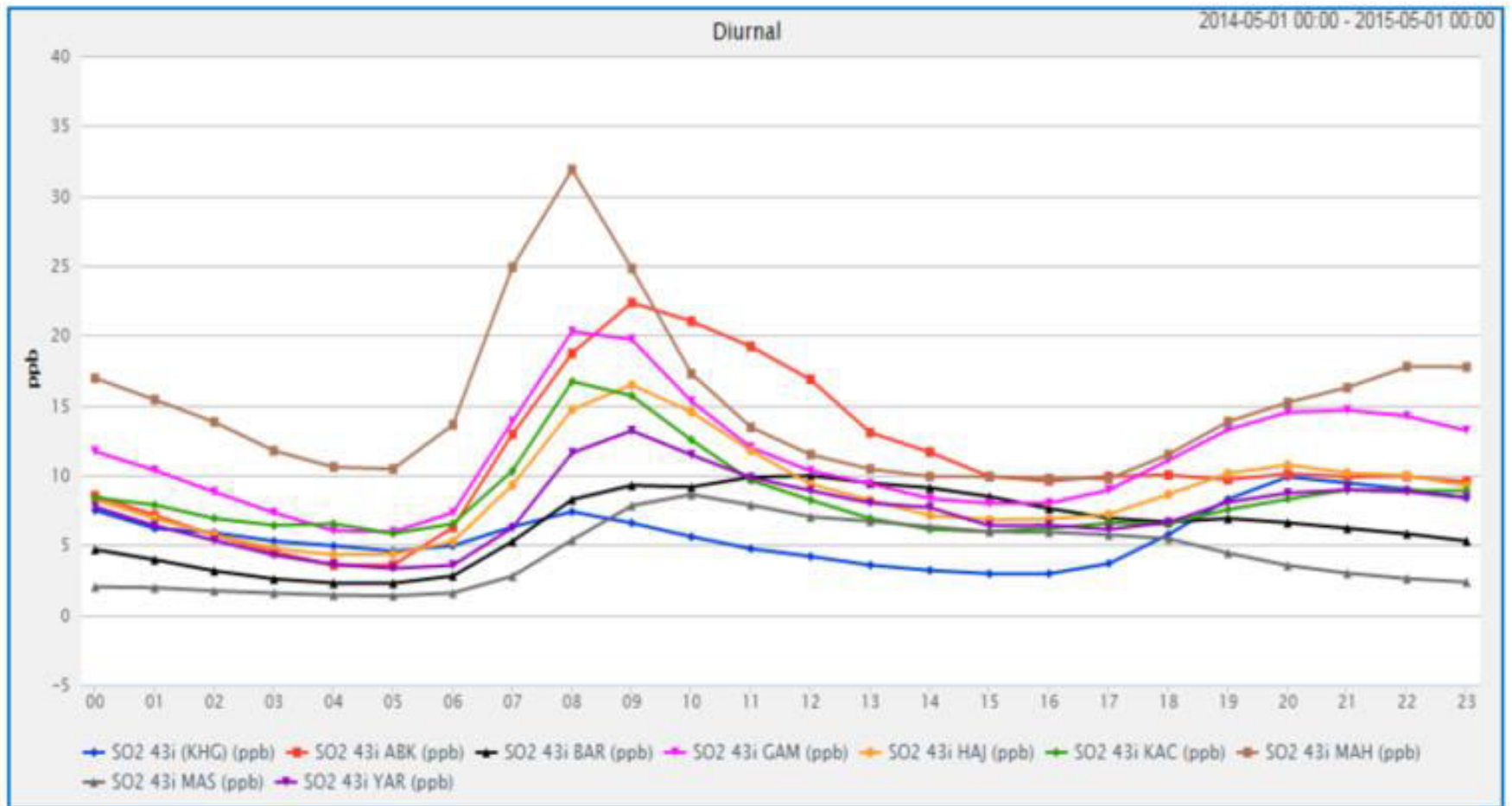
Yearly Average Diurnal concentration for pm10



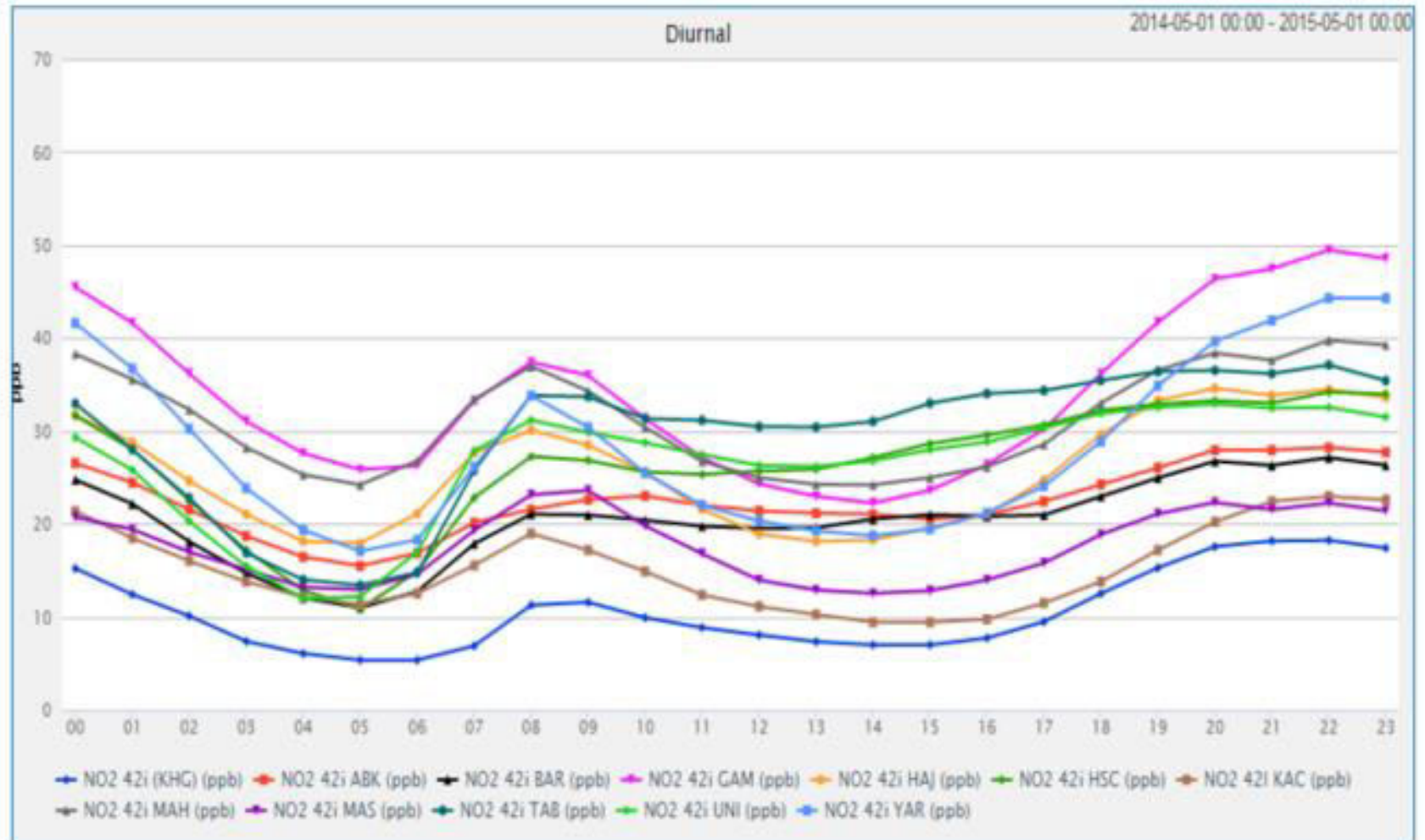
Yearly Average Diurnal concentration for CO



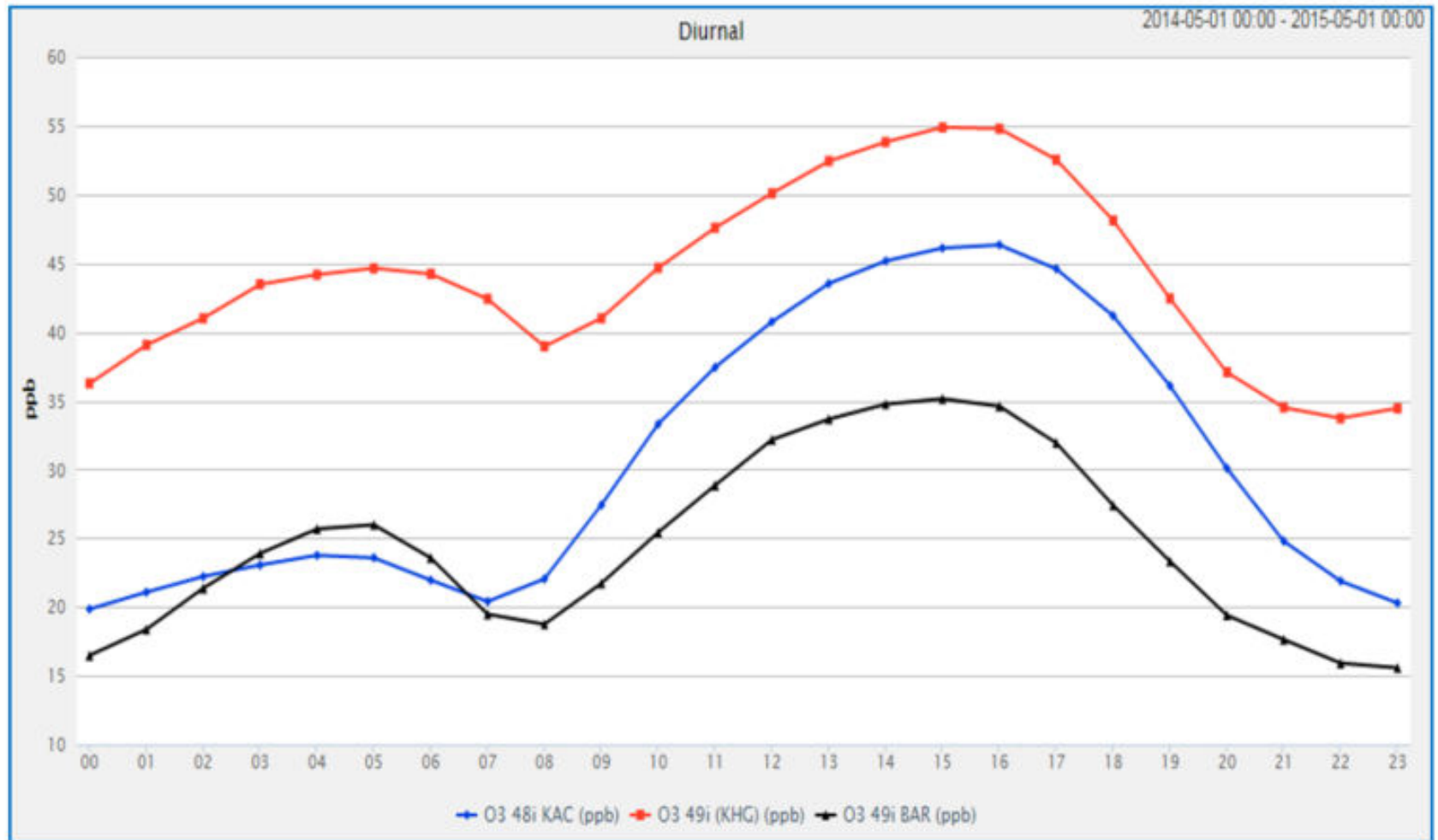
Yearly Average Diurnal concentration for SO₂



Yearly Average Diurnal concentration for NO₂

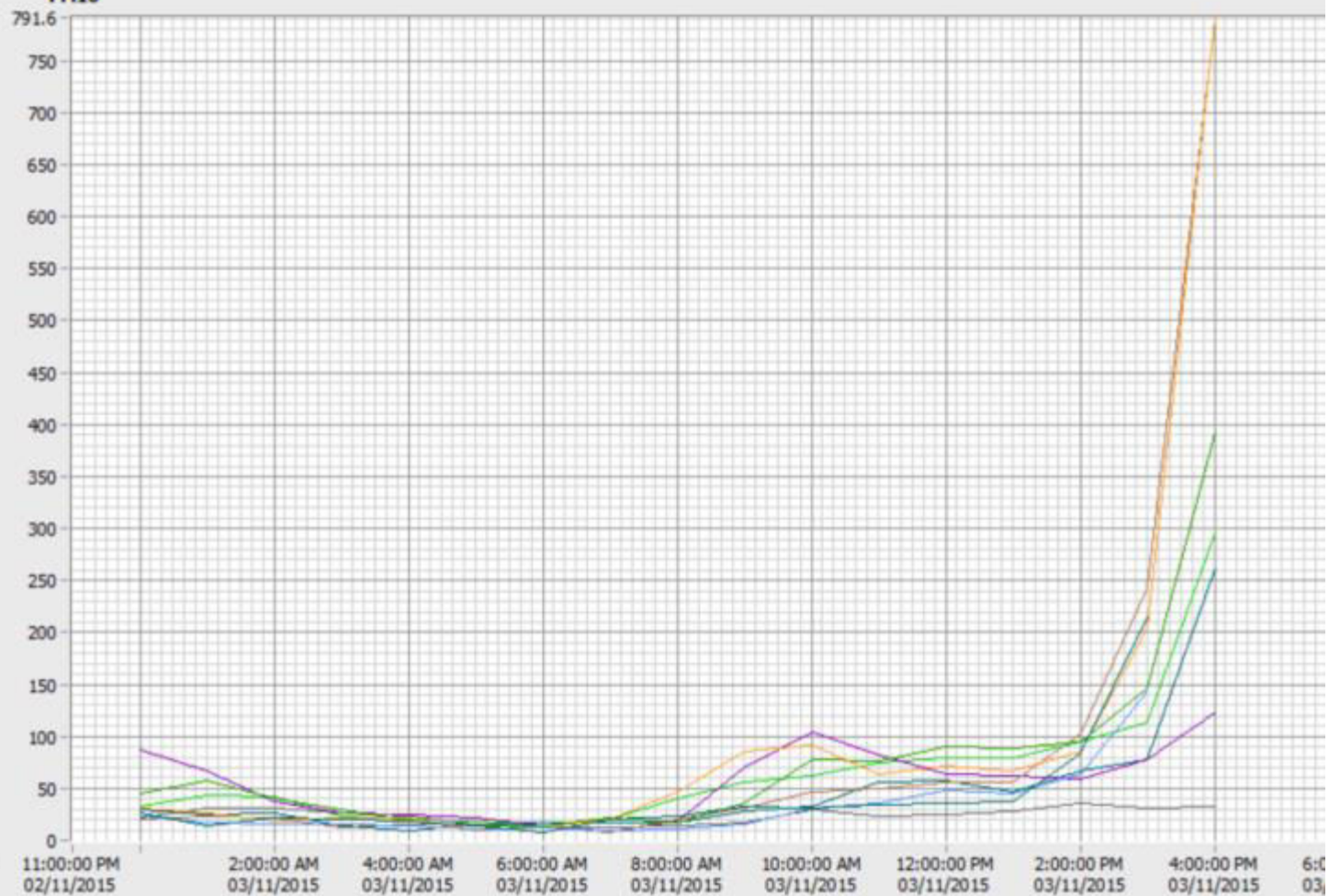


Yearly Average Diurnal concentration for O3



MOE ENV DATA: PM10

PM10



<input type="checkbox"/>	Plot	Latest	Unit
<input checked="" type="checkbox"/>	PM10 5014i GAM: AMM - G.AMM.MUN.(GAM)	215.0	µg/m3
<input type="checkbox"/>	PM10 5014i (KAC): AMM - K.A.II IND CTY SAHAB (KAC)	0	µg/m3
<input checked="" type="checkbox"/>	PM10 5014i KHG: AMM - K.H. GARDENS (KHG)	143.8	µg/m3
<input checked="" type="checkbox"/>	PM10 5014i MAH: AMM - MAHATTA (MAH)	183.4	µg/m3
<input checked="" type="checkbox"/>	PM10 5014i TAB: AMM - TABARBOUR (TAB)	791.6	µg/m3
<input checked="" type="checkbox"/>	PM10 5014i UNI: AMM - UNIV. ST. (UNI)	392.4	µg/m3
<input checked="" type="checkbox"/>	PM10 5014i YAR: AMM - YARMOUK (YAR)	787.8	µg/m3
<input checked="" type="checkbox"/>	PM10 5014 BAR: IRB - AL BARHA St. (BAR)	32.80	µg/m3
<input checked="" type="checkbox"/>	PM10 5014i HAS: IRB - AL HASSAN SP. CTY. (HAS)	122.7	µg/m3
<input checked="" type="checkbox"/>	PM10 5014i HAJ: ZAR - WADI HAJJAR (HAJ)	261.6	µg/m3
<input checked="" type="checkbox"/>	PM10 5015i ABK: ZAR - ARAB BNK. GARD. (ABK)	295.3	µg/m3
<input type="checkbox"/>	PM10 5014i MAS: ZAR - MASSANE (MAS)	601.7	µg/m3