Ambient Air Quality Data of Delhi Stations

For the Month of April, 2018

केन्द्रीय प्रदूषण नियंत्रण बोर्ड

पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय,

भारत सरकार

CENTRAL POLLUTION CONTROL BOARD

Website: http://www.cpcb.nic.in

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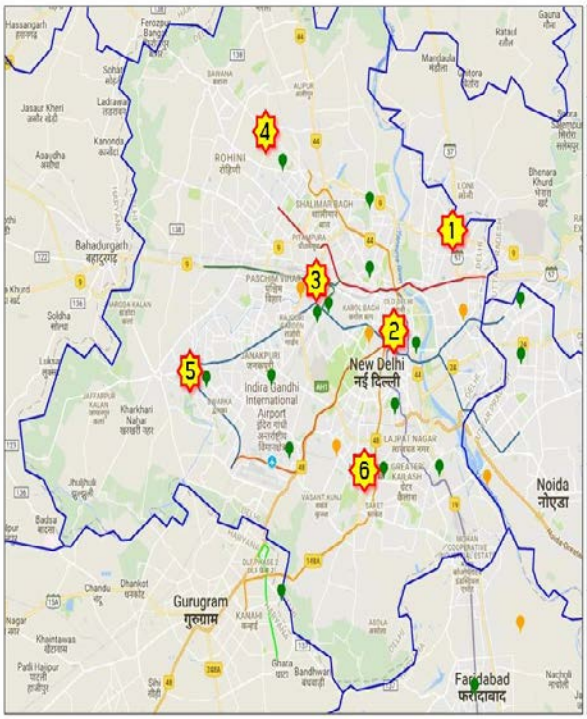
Background: Ambient Air Quality of Delhi

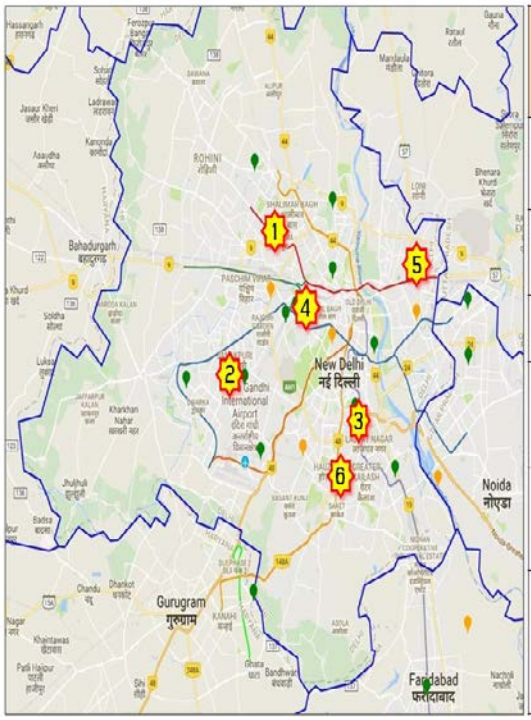
In compliance to the direction of Hon'ble National Green Tribunal, Principal Bench, New Delhi Dated: November 17, 2017 (in the matter of Vardhman Kaushik Vs. Union of India & Others vide **OA No. 44/2018** (Earlier OA No. 21/2014), the ambient air quality data monitored by Continuous Ambient Air Quality Monitoring System (CAAQMS) and Manual Stations under NAMP in Delhi (operated by CPCB) with station wise daily average values of notified parameters are compiled for the period April 01, 2018 to April 30, 2018.

Location of CAAQM & NAMP Stations operated by CPCB in Delhi

1. **CAAQM Stations:** IHBAS ,Income Tax Office, DMS Shadipur, D.T.U., NSIT Dwarka, Sirifort
2. **NAMP Stations:** Pitampura, Janakpuri , Nizamuddin, Shahzada Bagh, Shahdara, Sirifort



CPCB CAAQM Stations	
1	IHBAS
2	I.T.O.
3	DMS Shadipur
4	D.T.U.
5	NSIT Dwarka
6	Sirifort



CPCB NAMP Stations	
1	Pitampura
2	Janakpuri
3	Nizamuddin
4	Shahzada bagh
5	Shahdara
6	Sirifort

Parameter-wise data tables of CAAQM Stations

1. Particulate Matter (in µg/m^3):

i) PM_{10}

Date/Stations	ITO	DTU	Sirifort
1-Apr-18	160	308	NA
2-Apr-18	192	381	NA
3-Apr-18	213	346	NA
4-Apr-18	300	409	NA
5-Apr-18	201	314	NA
6-Apr-18	171	206	NA
7-Apr-18	103	168	NA
8-Apr-18	100	186	NA
9-Apr-18	137	194	NA
10-Apr-18	160	275	NA
11-Apr-18	102	125	141
12-Apr-18	136	142	158
13-Apr-18	196	243	263
14-Apr-18	190	266	279
15-Apr-18	254	317	304
16-Apr-18	286	361	359
17-Apr-18	184	255	277
18-Apr-18	216	317	351
19-Apr-18	246	339	396
20-Apr-18	443	451	459
21-Apr-18	314	415	433
22-Apr-18	146	247	240
23-Apr-18	185	NA	309
24-Apr-18	209	NA	357
25-Apr-18	247	NA	368
26-Apr-18	340	452	451
27-Apr-18	265	361	364
28-Apr-18	233	356	NA
29-Apr-18	200	323	NA
30-Apr-18	164	NA	NA
Maximum	**443**	**452**	**459**
Minimum	**100**	**125**	**141**
Average	**210**	**298**	**324**

Maximum values are reported in RED for all respective stations & Minimum values are reported in GREEN for all respective stations

Note: NA denotes Data is not available for the day

ii) $PM_{2.5}$

Date/Stations	IHBAS	ITO	DMS	DTU	Sirifort	NSIT
1-Apr-18	73	83	67	NA	NA	101
2-Apr-18	96	97	83	NA	NA	81
3-Apr-18	86	105	86	133	NA	85
4-Apr-18	119	197	158	159	NA	118
5-Apr-18	119	140	121	121	NA	101
6-Apr-18	79	76	74	86	NA	84
7-Apr-18	46	52	59	48	NA	65
8-Apr-18	52	52	53	55	NA	61
9-Apr-18	63	73	84	84	NA	81
10-Apr-18	76	71	90	83	NA	105
11-Apr-18	63	43	41	39	36	52
12-Apr-18	89	72	68	64	52	71
13-Apr-18	79	93	113	130	73	118
14-Apr-18	83	86	96	127	74	103
15-Apr-18	131	124	68	NA	92	99
16-Apr-18	106	107	112	NA	89	99
17-Apr-18	105	59	86	59	56	91
18-Apr-18	105	65	70	68	71	107
19-Apr-18	103	87	98	84	82	99
20-Apr-18	152	92	152	75	102	167
21-Apr-18	141	62	115	72	71	139
22-Apr-18	90	45	55	65	49	99
23-Apr-18	64	72	78	NA	70	127
24-Apr-18	97	92	110	NA	92	137
25-Apr-18	126	94	124	NA	100	132
26-Apr-18	154	130	137	143	114	162
27-Apr-18	95	78	100	80	77	102
28-Apr-18	89	77	76	81	NA	93
29-Apr-18	94	88	80	92	NA	98
30-Apr-18	70	68	53	NA	NA	73
Maximum	**154**	**197**	**158**	**159**	**114**	**167**
Minimum	**46**	**43**	**41**	**39**	**36**	**52**
Average	**95**	**86**	**90**	**89**	**76**	**102**

Maximum values are reported in RED for all respective stations & Minimum values are reported in GREEN for all respective stations

Note: NA denotes Data is not available for the day

2.SO_2 (in µg/m^3)

Date/Stations	IHBAS	DMS	NSIT
1-Apr-18	9	10	10
2-Apr-18	21	10	12
3-Apr-18	14	14	11
4-Apr-18	20	16	17
5-Apr-18	24	13	17
6-Apr-18	10	11	6
7-Apr-18	8	7	5
8-Apr-18	9	5	5
9-Apr-18	8	9	11
10-Apr-18	12	7	8
11-Apr-18	7	5	5
12-Apr-18	13	9	8
13-Apr-18	14	15	13
14-Apr-18	11	10	11
15-Apr-18	19	9	12
16-Apr-18	19	12	10
17-Apr-18	14	11	11
18-Apr-18	9	15	6
19-Apr-18	21	21	12
20-Apr-18	18	14	2
21-Apr-18	16	15	2
22-Apr-18	16	17	7
23-Apr-18	17	25	24
24-Apr-18	28	26	16
25-Apr-18	28	24	34
26-Apr-18	25	19	14
27-Apr-18	12	10	9
28-Apr-18	13	8	10
29-Apr-18	9	9	8
30-Apr-18	14	8	9
Maximum	28	26	34
Minimum	7	5	2
Average	15	13	11

Maximum values are reported in RED for all respective stations & Minimum values are reported in GREEN for all respective stations

Note: NA denotes Data is not available for the day

3. NO_2 (in µg/m^3)

Date/Stations	DMS	NSIT	ITO	IHBAS
1-Apr-18	56	29	75	37
2-Apr-18	62	35	89	59
3-Apr-18	63	33	102	53
4-Apr-18	73	37	90	53
5-Apr-18	59	32	93	54
6-Apr-18	50	28	94	47
7-Apr-18	43	26	100	34
8-Apr-18	34	24	82	32
9-Apr-18	55	31	97	54
10-Apr-18	47	30	NA	42
11-Apr-18	37	26	NA	30
12-Apr-18	53	40	205	49
13-Apr-18	68	47	218	49
14-Apr-18	70	47	243	49
15-Apr-18	53	43	216	70
16-Apr-18	68	51	292	70
17-Apr-18	50	40	178	70
18-Apr-18	52	45	188	70
19-Apr-18	55	43	203	70
20-Apr-18	43	33	NA	59
21-Apr-18	42	31	NA	59
22-Apr-18	40	35	NA	43
23-Apr-18	48	44	NA	62
24-Apr-18	60	48	NA	81
25-Apr-18	55	57	NA	112
26-Apr-18	55	58	237	78
27-Apr-18	35	35	205	40
28-Apr-18	33	29	182	36
29-Apr-18	48	29	194	60
30-Apr-18	34	41	181	37
Maximum	73	58	292	112
Minimum	33	24	75	30
Average	51	37	162	55

Maximum values are reported in RED for all respective stations & Minimum values are reported in GREEN for all respective stations

Note: NA denotes Data is not available for the day

4. Benzene & Ozone (in µg/m^3)

Date/Stations	Benzene		Ozone	
	DMS	NSIT	DMS	NSIT
1-Apr-18	2.2	1.9	48	49
2-Apr-18	3.9	2.2	41	48
3-Apr-18	3.2	2.8	48	53
4-Apr-18	4.9	5.0	42	49
5-Apr-18	3.4	3.5	25	36
6-Apr-18	1.5	1.4	23	35
7-Apr-18	1.8	1.5	27	38
8-Apr-18	1.0	1.1	36	39
9-Apr-18	3.2	3.6	16	20
10-Apr-18	2.1	1.8	33	40
11-Apr-18	1.4	1.2	19	32
12-Apr-18	2.1	2.0	24	28
13-Apr-18	3.4	3.5	25	30
14-Apr-18	3.3	2.4	26	26
15-Apr-18	2.1	2.8	24	33
16-Apr-18	3.3	3.3	33	39
17-Apr-18	1.5	1.9	22	24
18-Apr-18	1.8	1.9	25	27
19-Apr-18	1.3	2.8	26	33
20-Apr-18	1.5	1.1	24	30
21-Apr-18	2.5	1.1	30	37
22-Apr-18	2.5	1.2	42	43
23-Apr-18	4.7	3.1	38	35
24-Apr-18	6.6	2.5	35	37
25-Apr-18	8.1	5.6	27	27
26-Apr-18	6.0	3.4	41	42
27-Apr-18	2.7	5.0	40	45
28-Apr-18	2.1	3.5	39	55
29-Apr-18	1.9	1.3	40	48
30-Apr-18	1.9	1.4	53	51
Maximum	8.1	5.6	53	55
Minimum	1.0	1.1	16	20
Average	2.9	2.5	32	38

Maximum values are reported in RED for all respective stations & Minimum values are reported in GREEN for all respective stations

Note: NA denotes Data is not available for the day

5. CO (in mg/m^3)

Date/Stations	NSIT	DMS	IHBAS
1-Apr-18	0.6	0.9	0.5
2-Apr-18	0.7	0.9	0.8
3-Apr-18	0.8	1.0	0.7
4-Apr-18	0.8	1.5	1.2
5-Apr-18	0.9	0.9	1.1
6-Apr-18	0.5	0.7	0.5
7-Apr-18	0.5	0.7	0.5
8-Apr-18	0.5	0.6	0.6
9-Apr-18	0.8	1.2	0.7
10-Apr-18	0.7	0.8	0.6
11-Apr-18	0.4	0.6	0.4
12-Apr-18	0.4	0.8	0.7
13-Apr-18	0.4	1.1	0.7
14-Apr-18	0.4	0.8	0.7
15-Apr-18	0.4	0.8	1.2
16-Apr-18	0.4	1.1	0.9
17-Apr-18	0.3	0.6	0.7
18-Apr-18	0.3	0.7	0.5
19-Apr-18	0.4	0.9	0.9
20-Apr-18	0.3	0.7	0.4
21-Apr-18	0.3	0.6	0.7
22-Apr-18	0.4	0.7	1.1
23-Apr-18	0.4	0.9	1.0
24-Apr-18	0.5	1.8	1.1
25-Apr-18	0.7	1.9	1.5
26-Apr-18	0.5	1.6	1.1
27-Apr-18	0.4	0.7	0.5
28-Apr-18	0.4	0.3	0.7
29-Apr-18	0.4	0.3	0.7
30-Apr-18	0.4	0.2	0.6
Maximum	0.9	1.9	1.5
Minimum	0.3	0.2	0.4
Average	0.5	0.9	0.8

Maximum values are reported in RED for all respective stations & Minimum values are reported in GREEN for all respective stations

Note: NA denotes Data is not available for the day

6. NH_3 (in µg/m^3)

Date/Stations	IHBAS	ITO
1-Apr-18	48	58
2-Apr-18	54	65
3-Apr-18	52	72
4-Apr-18	69	82
5-Apr-18	68	28
6-Apr-18	49	25
7-Apr-18	46	31
8-Apr-18	48	24
9-Apr-18	48	39
10-Apr-18	66	NA
11-Apr-18	48	NA
12-Apr-18	51	45
13-Apr-18	45	73
14-Apr-18	55	70
15-Apr-18	77	72
16-Apr-18	75	86
17-Apr-18	52	40
18-Apr-18	50	40
19-Apr-18	52	44
20-Apr-18	41	NA
21-Apr-18	43	NA
22-Apr-18	51	NA
23-Apr-18	50	NA
24-Apr-18	68	NA
25-Apr-18	77	NA
26-Apr-18	69	79
27-Apr-18	74	52
28-Apr-18	59	36
29-Apr-18	62	44
30-Apr-18	48	38
Maximum	77	86
Minimum	41	24
Average	57	52

Maximum values are reported in RED for all respective stations & Minimum values are reported in GREEN for all respective stations

Note: NA denotes Data is not available for the day

Parameter-wise data tables of Manual Stations under NAMP

Date	Pitampura				Sirifort				Shahdara			
	SO_2	NO_2	PM_{10}	$PM_{2.5}$	SO_2	NO_2	PM_{10}	$PM_{2.5}$	SO_2	NO_2	PM_{10}	$PM_{2.5}$
02.04.2018	33	88	247	128	4	49	210	NA	21	73	225	106
04.04.2018	13	99	329	161	5	75	244	NA	11	76	297	165
06.04.2018	4	63	213	50	4	44	279	NA	4	47	431	NA
10.04.2018	30	67	308	129	4	25	186	NA	7	56	214	NA
12.04.2018	4	24	196	NA	5	73	177	NA	5	50	198	NA
16.04.2018	13	69	395	NA	4	69	271	NA	5	67	270	NA
18.04.2018	12	18	240	90	4	58	338	NA	5	36	369	NA
20.04.2018	4	14	610	208	4	35	916	NA	6	49	617	NA
24.04.2018	9	46	352	106	4	49	891	NA	12	82	458	NA
26.04.2018	41	98	617	167	11	123	441	NA	31	87	435	NA

Date	Janakpuri				Nizamuddin				Shahzada Bagh			
	SO_2	NO_2	PM_{10}	$PM_{2.5}$	SO_2	NO_2	PM_{10}	$PM_{2.5}$	SO_2	NO_2	PM_{10}	$PM_{2.5}$
03.04.2018	11	65	163	71	11	69	241	98	8	69	212	NA
05.04.2018	8	74	187	60	10	118	250	75	5	123	211	NA
09.04.2018	4	65	137	66	4	35	141	38	4	59	148	NA
11.04.2018	4	37	93	49	4	43	99	49	6	60	70	NA
13.04.2018	12	65	225	73	5	72	235	106	4	92	153	NA
17.04.2018	12	36	418	61	5	61	212	118	6	68	188	NA
19.04.2018	6	49	220	37	13	67	295	NA	5	73	201	NA
23.04.2018	7	41	283	55	4	55	371	NA	6	63	242	NA
25.04.2018	9	56	259	61	4	75	302	NA	6	89	248	NA

Note: NA denotes Data is not available for the day

Daily Meteorological data - April 2018

Meteorological parameters	31 March-01 April 2018	(01-02) April 2018	(02-03) April 2018	(03-04) April 2018	(04-05) April 2018	(05-06) April 2018	(06-07) April 2018	(07-08) April 2018	(08-09) April 2018	(09-10) April 2018
Mixing Height (m)	874	848 ↓	805 ↓	687 ↓	690 ↑	655 ↓	973 ↑	917 ↓	712 ↓	827 ↑
Wind Speed (m/s)	2.9	2.4 ↓	2.2 ↓	1.9 ↓	1.9	2.1 ↑	3.9 ↑	3.0 ↓	3.9 ↑	1.9 ↓
Temperature (^{o}C)	27.4	28.8 ↑	30.2 ↑	31.8 ↑	31.8	31.8	27.2 ↓	28.8 ↑	27.1 ↓	27.5 ↑
Relative Humidity(%)	44.8	42.7 ↓	39.4 ↓	38.3 ↓	40.6 ↑	34.4 ↓	46.2 ↑	45.0 ↓	54.0 ↑	53.1 ↓
Wind Direction	E	E	E	SE, E	NE	N, NE	SE	E, SE	E	Varies

Meteorological parameters	(10-11) April 2018	(11-12) April 2018	(12-13) April 2018	(13-14) April 2018	(14-15) April 2018	(15-16) April 2018	(16-17) April 2018	(17-18) April 2018	(18-19) April 2018	(19-20) April 2018
Mixing Height (m)	790	800 ↑	625 ↓	615 ↓	644 ↑	563 ↓	644 ↑	764 ↑	713 ↓	655 ↓
Wind Speed (m/s)	3.2	3.6 ↑	2.3 ↓	2.6 ↑	2.6	2.1 ↓	2.7 ↑	3.7 ↑	3.2 ↓	3.4 ↑
Temperature (^{o}C)	27.7	25.8 ↓	29.2 ↑	30.3 ↑	31.8 ↑	33.1 ↑	32.1 ↓	32.6 ↑	33.2 ↑	33.3 ↑
Relative Humidity(%)	51.0	51.9 ↑	33.5 ↓	24.0 ↓	27.9 ↑	27.9	32.6 ↑	25.7 ↓	26.1 ↑	24.7 ↓
Wind Direction	NE	Varies	NW	NW & N	NW	Varies	NE	NW	NW	NW, S

Meteorological parameters	(20-21) April 2018	(21-22) April 2018	(22-23) April 2018	(23-24) April 2018	(24-25) April 2018	(25-26) April 2018	(26-27) April 2018	(27-28) April 2018	(28-29) April 2018	(29-30) April 2018	Average
Mixing Height (m)	706	775 ↑	697 ↓	611 ↓	524 ↓	626 ↑	722 ↑	800 ↑	726 ↓	700 ↓	799
Wind Speed (m/s)	3.9	4.4 ↑	3.8 ↓	2.8 ↓	2.3 ↓	2.3	3.0 ↑	3.5 ↑	2.7 ↓	2.4 ↓	2.6
Temperature (^{o}C)	30.7	29.0 ↓	29.9 ↑	31.9 ↑	33.8 ↑	35.7 ↑	33.0 ↓	33.0	33.1 ↑	33.1	29.2
Relative Humidity(%)	32.2	26.4 ↓	21.0 ↓	20.4 ↓	19.0 ↓	18.0 ↓	36.7 ↑	42.4 ↑	43.9 ↑	39.2 ↓	43.9
Wind Direction	NW	NW	NW	NW	W	Varies	E, NE	SE, E	E	Varies	NW,E

*Inadequate data/Data not available

Daily mean values are compared with the previous value

Daily AQI values of Delhi-NCR (April, 2018)

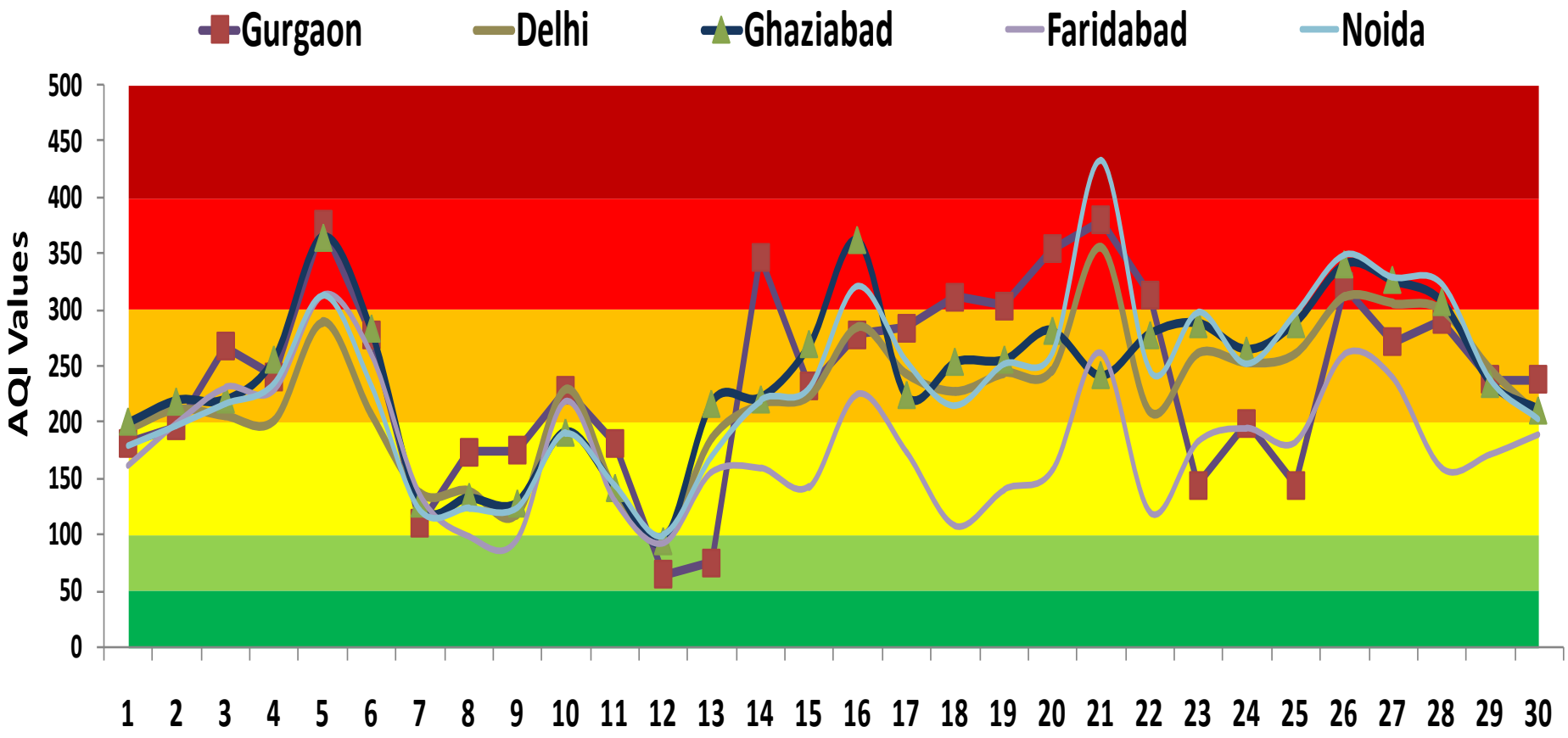
Dates/ Cities	Delhi	Gurgaon	Ghaziabad	Faridabad	Noida	Bhiwadi	Alwar
1-Apr-18	195	182	201	162	180	238	59
2-Apr-18	212	197	220	199	198	NA	51
3-Apr-18	207	268	221	231	217	273	97
4-Apr-18	203	241	257	228	235	331	60
5-Apr-18	290	376	365	314	314	351	60
6-Apr-18	208	279	284	261	232	NA	130
7-Apr-18	137	110	128	136	122	151	NA
8-Apr-18	139	174	134	98	124	134	NA
9-Apr-18	118	175	129	96	125	NA	NA
10-Apr-18	230	229	192	219	191	347	96
11-Apr-18	141	182	143	131	144	136	*
12-Apr-18	99	65	95	93	100	NA	45
13-Apr-18	186	76	218	155	170	NA	68
14-Apr-18	217	348	222	159	220	NA	72
15-Apr-18	224	232	270	143	230	NA	85
16-Apr-18	285	279	362	225	321	NA	92
17-Apr-18	244	285	224	174	254	304	74
18-Apr-18	228	312	254	109	216	378	NA
19-Apr-18	244	304	256	141	252	NA	NA
20-Apr-18	246	355	282	157	262	NA	NA
21-Apr-18	356	380	242	262	434	NA	NA
22-Apr-18	211	314	279	120	246	289	NA
23-Apr-18	160	382	182	150	176	NA	NA
24-Apr-18	254	200	265	195	253	NA	NA
25-Apr-18	262	145	289	183	298	302	79
26-Apr-18	312	321	341	261	349	344	85
27-Apr-18	306	272	327	240	330	322	91
28-Apr-18	301	291	308	160	324	314	46
29-Apr-18	247	238	235	172	239	332	55
30-Apr-18	206	238	212	190	204	270	146
Max	356	382	365	314	434	378	146
Min	99	65	95	93	100	134	45
Average	222	248	238	179	232	283	78

Good	Satisfactory	Moderate	Poor	Very Poor	Severe
(0–50)	(51–100)	(101–200)	(201–300)	(301–400)	(>401)

Note: Prominent Pollutant is Particulate Matter in Delhi-NCR

AQI Trend Delhi-NCR, April 2018

Good	Satisfactory	Moderate	Poor	Very Poor	Severe
(0–50)	(51–100)	(101–200)	(201–300)	(301–400)	(>401)



Data Analysis of Ambient Air Quality:

- **Particulate Matter ($PM_{2.5}$/ PM_{10}):** The values of Particulate Matter exceeded the permissible limits in all stations across Delhi as per NAAQS 2009. Also, PM_{10} is reflecting exceedingly high values at all stations across Delhi. The stations are categorized based on the maximum daily average value observed in the month and tabulated as under:

PM $_{10}$ (Maximum 24 hours average permissible limit as per NAAQS 2009 is 100 µg/m^3)		
Maximum 24 hr Concentration in µg/m^3 (Category)	**Stations**	
	CAAQM	**Manual (under NAMP)**
Below 101 (Moderate)	None	None
Between 101-350(Moderate to poor)	None	Shahzada Bagh
Between 351-430 (Very poor)	None	NIzamuddin
Above 430 (Severe)	ITO,DTU,Sirifort	Sirifort, Shahdara, Janakpuri, Pitampura

PM $_{2.5}$ (Maximum 24 hours average permissible limit as per NAAQS 2009 is 60 µg/m^3)		
Maximum 24 hr Concentration in µg/m^3 (Category)	**Stations**	
	CAAQM	**Manual (under NAMP)**
Below 61(Moderate)	None	None
Between 61-120(Moderate to poor)	Sirifort	Janakpuri,Nizamuddin
Between 121-250 (Very poor)	IHBAS,ITO,DMS,DTU,NSIT	Pitampura, Shahdra
Above 250 (Severe)	None	None

- **Nitrogen Dioxide (NO_2):** Exceeded the permissible limits at 07 Stations in Delhi. Maximum exceedence recorded at ITO (21 days) and lowest recorded at NSIT and DMS Shadipur. The exceedence in 07 Stations (CAAQM and Manual) is as tabulated below:

NO_2 (Maximum 24 hours average permissible limit as per NAAQS 2009 is 80 µg/m^3)		
Maximum 24 hr Concentration in µg/m^3	**Stations**	
	CAAQM	**Manual (under NAMP)**
Below 80	DMS Shadipur, NSIT Dwarka	Janakpuri
Above 80	ITO, IHBAS	Nizamuddin, sirifort, Shahzadabagh & Pitampura, , Shahdara

- Benzene: Standard for this parameter is defined annually in NAAQS 2009, therefore it's exceedence cannot be determined based on 24 hr or monthly data, but slightly high values were recorded at DMS and NSIT for three and one day respectively.
- Sulphur Dioxide (SO_2): Recorded within permissible limit in all stations across Delhi as per NAAQS 2009 standards.
- Ammonia: Observed within the permissible limits in all stations across Delhi as per NAAQS 2009 Standard.
- Carbon Monoxide (CO): Observed within the permissible limits in all stations across Delhi as per NAAQS 2009 Standard.
- Ozone (O_3): Observed within the permissible limits in all stations across Delhi as per NAAQS 2009 Standard.

Concentration range of Ambient Air Quality Parameters of Delhi Stations

The concentration ranges for pollutants of CAAQM and Manual stations having 24 hourly standard limits are presented in Table-1 and Table-2, respectively based on detailed tabulated data at Page 02—09.

Table-1 Range of 24-hourly Averages for All Standard Parameters in April 2018 Delhi

Parameters	IHBAS		ITO		DMS		DTU		SIRIFORT		NSIT	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
$PM_{2.5}$ (µg/m³)	46	154	43	197	41	158	39	159	36	114	52	167
PM_{10} (µg/m³)	*	*	100	443	*	*	125	452	141	459	*	*
SO_2 (µg/m³)	7	28	*	*	5	26	*	*	*	*	2	34
NO_2 (µg/m³)	30	112	75	292	33	73	*	*	*	*	24	58
NH_3 (µg/m³)	41	77	24	86	*	*	*	*	*	*	*	*

Note: '*'indicate Insufficient data or parameter not measured

CO, Ozone and Benzene not included as there is no 24 hourly permissible limits in NAAQS

Table-2 Range of 24-hourly Averages for All Standard Parameters in April 2018 Delhi

Parameters	Pitampura		Sirifort		Shahdara		Janakpuri		Nizammudin		Shahzada Bagh	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
$PM_{2.5}$ (µg/m³)	50	208	*	*	106	165	37	73	38	118	*	*
PM_{10} (µg/m³)	196	617	177	916	198	617	93	418	99	371	70	248
SO_2 (µg/m³)	4	41	4	11	4	31	4	12	4	13	4	8
NO_2 (µg/m³)	14	99	25	123	36	87	36	74	35	118	59	123

Note: '*'indicate Insufficient data or parameter not measured

Air Quality Index

Daily City wise AQI values for Delhi-NCR for the month of April is presented in Table-2. AQI of Delhi was found largely lying between moderate to poor category. However, Ghaziabad Gurgaon & Noida has recorded 18, 12 & 14 very poor days respectively. In other areas, majority of the days were in Moderate to poor category. The AQI values categorizations are presented in Table-3, based on detailed tabulated data and graphical variation at Page 11-12.

Table-3 AQI Values of Delhi-NCR for the month of April 2018

AQI Categories	Range	Delhi	Faridabad	Ghaziabad	Gurgaon	Noida	Bhiwadi	Alwar
Good	(0–50)	*	*	*	*	*	*	2
Satisfactory	(51–100)	1	1	1	2	*	*	15
Moderate	(101–200)	7	18	6	7	10	3	2
Poor	(201–300)	18	8	18	12	14	4	*
Very Poor	(301–400)	4	3	5	9	5	10	*
Severe	(>401)	*	*	*	*	1	*	*

Meteorological Parameters

Monthly average mixing height was 723 meters. The range for daily average mixing height was observed from 524 meters to 973 meters. Daily average wind speed was observed in the range 1.9 m/s – 4.4 m/s. Monthly average temperature was 30.8 ˚C with minimum daily average as 25.8˚C and maximum as 35.7˚C recorded. Monthly average relative humidity was 35.4% with maximum daily average as 54 % and minimum as 18 % recorded. Prominent wind direction in April 2018 was North- west followed by East.

Table-4 Range of Monthly Average for Metrological Parameters in Delhi, April 2018

Parameters(Unit)	MAX	MIN
Mixing Height (m)	973	524
Wind Speed(m/s)	4.4	1.9
Temperature(°C)	35.7	25.8
Relative Humidity (%)	54.0	18.0

Critical Observations:

- Particulates ($PM_{2.5}$/PM_{10}) are the main issue of concern, necessary steps to control dust emission from roads, construction activity, traffic and industries may be strictly adopted.
- Increase in NO_2 may also be attributed to vehicle and high ambient temperature.
- Particulate Matter recorded maximum concentration values on days when meteorological parameters such as wind speed was found minimum coupled with relatively low humidity.
- The resuspension of dust and transport of Particulate from outside areas of Delhi during dust storms also resulted in higher concentration of particulate matter specially coarse fraction in Ambient Air.

Recommendations:

For prevention, control and abatement of air pollution and improvement of Ambient Air Quality in Delhi and NCR, six major areas defined as under:

A) Control of Vehicular Emissions;
B) Control of Road Dust/Re-suspension of dust and other fugitive emission;
C) Control of Air Pollution from Bio-Mass Burning;
D) Control of Industrial Air Pollution;
E) Control of Air Pollution from Construction and Demolition Activities; and
F) Other Steps to control Air Pollution.

Detailed action required for defined areas are as under:

A) Control of Vehicular Emissions

1. Launch extensive awareness drive against polluting vehicles;
2. Ensure Strict action against visibly polluting vehicles;
3. Take steps to prevent parking of vehicles in the non-designated areas;
4. Introduce early alarm system for benefit of commuters related to traffic congestion on major routes for route diversion;
5. Consider introducing plan for Flexi/staggered timings to minimize peak movement of vehicles on the road;
6. De-congest pathways;
7. Synchronize traffic movements / introduce intelligent traffic systems for lane-driving;
8. Install vapour recovery system in fuelling stations
9. Strengthening of public transport on CNG mode;
10. Undertake road widening and improvement of infrastructure for decongestion of road and
11. Take steps to expedite early completion of Western and Eastern peripheral expressway.

B) Control of Road Dust/Re-suspension of dust and other fugitive emission:

1. Formulate action plan for creation of green buffers along the traffic corridors;
2. Introduce wet/mechanized vacuum sweeping of roads;
3. Maintain pot holes' free roads for free-flow of traffic to reduce emissions and dust;
4. Introduce water fountains at major traffic intersection, wherever feasible;
5. Undertake greening of open areas, gardens, community places, schools and housing societies; and
6. Take steps for blacktopping / pavement of road shoulders to avoid road dust.

C) Control of Air Pollution from Bio-Mass Burning:

1. Take stringent action against open burning of bio-mass/leaves etc. to control such activities;
2. Ensure proper management of horticulture waste (bio-mass)
3. Ensure strict enforcement of ban on burning of agriculture waste and crop residues;

D) Control of Industrial Air Pollution

1. Ensure strict action against unauthorized brick kilns;
2. Ensure strict action against industrial units not complying with standards;
3. Enforce strict compliance of conversion brick kilns on zig zag technology; and
4. Launch action plan for switching over to natural gas by industries, wherever feasible;
5. Ensure use of only permitted fuels.

E) Control of Air Pollution from Construction and Demolition Activities:

1. Control dust pollution at construction sites through appropriate cover;
2. Undertake control measures for fugitive emissions from material handling, conveying and screening operations through water sprinkling, curtains, barriers and dust suppression units; and
3. Ensure carriage of construction material in closed/covered vessels;

F) Other Steps to control Air Pollution

1. Set-up helpline in States/UT for taking action against reported non-compliance;
2. Evolve a system of reporting of garbage/municipal solid waste burning through mobile based applications and other social media platform linked with Central and State Level Control Rooms;
3. Establish Standard Operating procedure to provide quick and effective response to complaints;
4. Ensure DG sets meeting the standards only be allowed to operate;
5. Promote use of LPG instead of coal in restaurants / dhabas / road side eateries;

ANNEXURE - I

NATIONAL AMBIENT AIR QUALITY STANDARD (2009)

Pollutant	Time Weighted Average	Concentration in Ambient Air		
		Industrial, Residential, Rural and Other Area	Ecologically Sensitive Area (notified by Central Government)	Methods of Measurement
SO_2, µg/m^3	Annual*	50	20	• Improved West and Gaeke • Ultraviolet fluorescence
	24 hours**	80	80	
NO_2, µg/m^3	Annual*	40	30	• Modified Jacob &Hochheiser (Na-Arsenite) • Chemiluminescence
	24 hours**	80	80	
PM_{10}, µg/m^3	Annual*	60	60	• Gravimetric • TOEM • Beta attenuation
	24 hours**	100	100	
$PM_{2.5}$, µg/m^3	Annual*	40	40	• Gravimetric • TOEM -------- • Beta attenuation
	24 hours**	60	60	
O_3, µg/m^3	8 hours**	100	100	• UV photometric • Chemiluminescence • Chemical Method
	1 hour**	180	180	
Lead (Pb), µg/m^3	Annual*	0.50	0.50	• AAS/ICP method after sampling on EMP 2000 or equivalent filter paper • ED-XRF using Teflon filter
	24 hours**	1	1	
CO, mg/m^3	8 hours**	2	2	• Non Dispersive Infra Red (NDIR) spectrosopy
	1 hour**	4	4	
Ammonia (NH_3) µg/m^3	Annual*	100	100	• Chemiluminescence • Indophenol blue method
	24 hours**	400	400	
Benzene	Annual*	5	5	• Gas chromatography based on continuous analyzer • Adsorption and Desorption followed by GC analysis
Benzopyrene (BaP) - particulate phase only, ng/m^3	Annual*	1	1	• Solvent extraction followed by HPLC/GC analysis
Arsenic (As), ng/m^3	Annual*	6	6	• AAS/ICP method after sampling on EMP 2000 or equivalent filter paper
Nickel (Ni), ng/m^3	Annual*	20	20	• AAS/ICP method after sampling on EMP 2000 or equivalent filter paper

* Annual arithmetic mean of minimum 104 measurements in a year at a particular site taken twice a week 24 hourly at uniform intervals.
** 24 hourly or 8 hourly or 1 hourly monitored values, as applicable, shall be compiled with 98% of the time in a year. 2% of the time, theymay exceed the limits but not on two consecutive days of monitoring.
Note - Whenever and wherever monitoring results on two consecutive days of monitoring exceed the limits specified above for the respective category, it shall be considered adequate reason to institute regular or continuous monitoring and further investigation.

ANNEXURE -II

CAAQM STATIONS

Sr. No.	Stations	Types of activities around location (Residential/ Commercial/Traffic/ Industrial)	Parameters Monitored
1.	Income Tax Office	Traffic Intersection	NO_2, $PM_{2.5}$, NH_3, PM_{10}
2.	DCE	Residential & Industrial	NO_2, $PM_{2.5}$, NH_3, PM_{10}
3.	Shadipur	Mixed	SO_2, NO_2, $PM_{2.5}$, CO, O_3, Benzene
4.	IHBAS	Residential & Industrial	SO_2, NO_2, $PM_{2.5}$, CO, NH_3
5.	NSIT Dwarka	Residential	SO_2, NO_2, $PM_{2.5}$, CO, O_3 , Benzene
6.	Sirifort	Mixed	NO_2, $PM_{2.5}$, NH_3, PM_{10}

DETAILS OF MANUAL STATIONS IN DELHI UNDER NAMP

Sr. No.	Monitoring station	Types of activities around location (Residential/ Commercial/Traffic/ Industrial)	Parameters Monitored
01.	Pitampura	Residential	SO_2, NO_2, PM_{10}, $PM_{2.5}$
02.	Sirifort	Residential	SO_2, NO_2, PM_{10}, $PM_{2.5}$
03.	Janakpuri	Residential	SO_2, NO_2, PM_{10}, $PM_{2.5}$
04.	Nizamuddin	Residential	SO_2, NO_2, PM_{10}, $PM_{2.5}$
05.	Shahzada Bagh	Industrial	SO_2, NO_2, PM_{10}, $PM_{2.5}$
06.	Shahdara	Industrial	SO_2, NO_2, PM_{10}, $PM_{2.5}$