

**Guangdong-Hong Kong-Macao
Pearl River Delta
Regional Air Quality Monitoring Network**

July to September 2017

**Statistical Summary of the Third Quarter
Monitoring Results**

Report Number : PRDAIR-2017-3

**Report Prepared by : Guangdong Provincial Environmental
Monitoring Centre
Environmental Protection Department,
Hong Kong SARG
Environmental Protection Bureau,
Macao SARG
Meteorological and Geophysical Bureau,
Macao SARG**

**Approved by : Quality Management Committee of
Guangdong-Hong Kong-Macao Pearl River
Delta Regional Air Quality Monitoring
Network**

Security Classification : Unrestricted

Contents

	<u>Page</u>
1. Foreword	3
2. Introduction to Guangdong-Hong Kong-Macao Pearl River Delta Regional Air Quality Monitoring Network	3
3. Operation of the Network	4
4. Statistical Results of Pollutant Concentrations	5
Annex A : Site Information of Monitoring Stations	21
Annex B : Measurement Methods of Air Pollutant Concentration	22

List of Tables

	<u>Page</u>
Table 4.1a : The monthly maxima and minima of hourly averages of SO ₂	5
Table 4.1b : The monthly maxima and minima of daily averages of SO ₂	6
Table 4.1c : The monthly averages of SO ₂	7
Table 4.2a : The monthly maxima and minima of hourly averages of NO ₂	8
Table 4.2b : The monthly maxima and minima of daily averages of NO ₂	9
Table 4.2c : The monthly averages of NO ₂	10
Table 4.3a : The monthly maxima and minima of hourly averages of O ₃	11
Table 4.3b : Daily maximum 8-hour averages of O ₃ (the monthly maxima, minima and the 90 th percentile)	12
Table 4.3c : The monthly averages of O ₃	13
Table 4.4a : The monthly maxima and minima of hourly averages of CO	14
Table 4.4b : Daily averages of CO (the monthly maxima, minima and the 95 th percentile)	15
Table 4.4c : The monthly averages of CO	16
Table 4.5a : The monthly maxima and minima of daily averages of PM ₁₀	17
Table 4.5b : The monthly averages of PM ₁₀	18
Table 4.6a : The monthly maxima and minima of daily averages of PM _{2.5}	19
Table 4.6b : The monthly averages of PM _{2.5}	20

List of Figures

	<u>Page</u>
Figure 2.1 : Spatial Distribution of Monitoring Stations in the Network	4

1. Foreword

Since the Pearl River Delta (PRD) Regional Air Quality Monitoring Network came into operation on 30 November 2005, the PRD Regional Air Quality Index (RAQI) was reported to the public on a daily basis. Starting from 2006, half-yearly and annual air quality monitoring reports were also published every year. The network was subsequently enhanced and expanded in September 2014 and renamed to “Guangdong-Hong Kong-Macao Pearl River Delta Regional Air Quality Monitoring Network” (the “Network”).

To cope with the enhancement of the network, the update of the national ambient air quality standards as well as the need for improving the reporting frequency of monitoring results, starting from 2014, the real-time hourly monitoring data was reported on a new internet platform to replace the daily RAQI, the half-yearly report was also replaced by a quarterly report while the annual air quality monitoring report was maintained. The quarterly report is a brief statistical summary of the regional air quality monitoring results in a quarter. The annual report, in addition to the reporting of the monitoring data, provides a more detailed analysis and comparison of the air quality in the year. From the fourth quarter of 2014, the statistical results of carbon monoxide (CO) and fine suspended particulates (PM_{2.5} or FSP) were added to the report in addition to those of respirable suspended particulates (PM₁₀ or RSP), sulphur dioxide (SO₂), nitrogen dioxide (NO₂), and ozone (O₃).

This report is the statistical summary of the monitoring results of the PRD Regional Air Quality Monitoring Network in the third quarter of 2017. It is the fifteenth report published in the form of a quarterly report and the twelfth report with the statistical summaries of the six pollutants (i.e. PM₁₀, PM_{2.5}, SO₂, NO₂, O₃ and CO).

2. Introduction to Guangdong-Hong Kong-Macao Pearl River Delta Regional Air Quality Monitoring Network

The PRD Regional Air Quality Monitoring Network was jointly established by the Guangdong Provincial Environmental Monitoring Centre (GDEMC) and the Environmental Protection Department of the Hong Kong Special Administrative Region (HKEPD) from 2003 to 2005, and commenced its operation to report the Regional Air Quality Index (RAQI) on 30 November 2005.

With the growing concerns of air pollution control and economic development of the region, the GDEMC and HKEPD had worked in collaboration with the environmental protection cum meteorological authorities of Macao to enhance the network by extending the coverage of monitoring area to Guangdong, Hong Kong and Macao in September 2014. The enhancements included the addition of monitoring stations from 16 to 23 to further improve the spatial distribution and the inclusion of two new monitoring parameters, i.e. carbon monoxide (CO) and fine suspended particulates (PM_{2.5}), to enrich the air quality monitoring information. At the same time, the network was renamed to “Guangdong-Hong Kong-Macao Pearl River Delta Regional Air Quality Monitoring Network” (the “Network”) while the “Quality Management Committee of Guangdong-Hong Kong-Macao Pearl River Delta Regional Air Quality Monitoring Network”, which was jointly established by the GDEMC, HKEPD, Environmental Protection Bureau of Macao SARG and Meteorological and Geophysical Bureau of Macao SARG, was responsible for quality management of the Network and dissemination of information.

The Network comprises 23 automatic air quality monitoring stations (see Figure 2.1) across the PRD region. Ten city stations are operated either by the Environmental Monitoring Centres of the individual cities in Guangdong or the operation-cum-maintenance agencies commissioned by the State. Eight regional stations are operated by the GDEMC, the four stations located in Hong Kong are managed by the HKEPD and the remaining one in Macao is operated by Meteorological and Geophysical Bureau of Macao SARG.

All stations are installed with monitoring equipment to measure the ambient concentrations of PM₁₀, PM_{2.5}, SO₂, NO₂, O₃ and CO.

Annexes A and B show the site information of the monitoring stations in the Network and the methods used for measuring air pollutant concentrations respectively.



Figure 2.1 : Spatial Distribution of Monitoring Stations in the Network

Remark: For the boundary of the administrative division of the Macao Special Administrative Region, according to the Decree n.º665 of the State Council of the People's Republic of China, "the map of the administrative division of the Macao Special Administrative Region" was approved at the 116th Executive Meeting of the State Council on 16 December 2015.

3. Operation of the Network

The operation of the Network was smooth in the third quarter of 2017, but owing to the influence of Typhoon Hato, the operation of the PM₁₀ and PM_{2.5} monitoring equipment were temporarily suspended at the Taipa Grande monitoring station in Macao from 23 August 2017. The average data capture rate of hourly air pollutant monitoring data measured at all monitoring stations was 95.2%.

4. Statistical Results of Pollutant Concentrations

Tables 4.1a to 4.6b list the detailed statistical results of the ambient concentrations of the six air pollutants (SO₂, NO₂, O₃, CO, PM₁₀ and PM_{2.5}) from July to September 2017.

Table 4.1a : The monthly maxima and minima of hourly averages of SO₂

Monitoring Station	July 2017		August 2017		September 2017	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	2	27	2	31	3	31
Modiesha (Guangzhou)	3	29	3	30	1	38
Wanqingsha (Guangzhou)	8	44	7	43	0	22
Tianhu (Guangzhou)	4	29	2	27	3	28
Zhudong (Guangzhou)	5	50	7	59	8	70
Liyuan (Shenzhen)	5	20	6	23	4	12
Jinjuzui (Foshan)	4	43	4	54	5	42
Huijingcheng (Foshan)	0	61	0	66	1	75
Tangjia (Zhuhai)	1	69	1	35	1	59
Donghu (Jiangmen)	2	32	1	33	1	62
Duanfen (Jiangmen)	3	39	3	17	3	27
Huaguoshan (Jiangmen)	7	53	7	58	8	92
Chengzhong (Zhaoqing)	7	65	4	248	4	115
Xiapu (Huizhou)	3	38	5	51	2	91
Xijiao (Huizhou)	8	38	6	46	4	38
Jinguowan (Huizhou)	3	21	4	18	5	32
Zimaling (Zhongshan)	1	31	1	49	4	40
Nanchengyuanling (Dongguan)	5	66	6	47	6	56
Tap Mun (Hong Kong)	0	12	4	18	4	25
Tsuen Wan (Hong Kong)	5	47	5	53	6	52
Yuen Long (Hong Kong)	6	46	6	35	6	38
Tung Chung (Hong Kong)	3	37	4	73	3	62
Taipa Grande (Macao)	0	34	0	59	0	48

Remark : All concentration units are in micrograms per cubic metre (µg/m³).

Table 4.1b : The monthly maxima and minima of daily averages of SO₂

Monitoring Station	July 2017		August 2017		September 2017	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	4	16	4	11	4	14
Modiesha (Guangzhou)	7	14	3	13	2	18
Wanqingsha (Guangzhou)	9	17	8	20	7	12
Tianhu (Guangzhou)	4	11	3	13	3	11
Zhudong (Guangzhou)	9	17	11	24	10	26
Liyuan (Shenzhen)	5	13	7	13	5	7
Jinjuzui (Foshan)	6	13	5	24	5	20
Huijingcheng (Foshan)	2	27	1	24	3	27
Tangjia (Zhuhai)	3	25	3	18	2	17
Donghu (Jiangmen)	4	15	2	12	4	22
Duanfen (Jiangmen)	3	10	3	7	3	9
Huaguoshan (Jiangmen)	9	18	8	24	11	36
Chengzhong (Zhaoqing)	10	21	6	29	11	33
Xiapu (Huizhou)	6	13	6	20	4	23
Xijiao (Huizhou)	9	21	6	25	5	17
Jinguowan (Huizhou)	5	10	6	11	6	12
Zimaling (Zhongshan)	3	11	1	16	5	17
Nanchengyuanling (Dongguan)	8	23	7	23	9	25
Tap Mun (Hong Kong)	1	8	4	7	6	10
Tsuen Wan (Hong Kong)	6	21	6	21	7	29
Yuen Long (Hong Kong)	6	20	6	19	6	22
Tung Chung (Hong Kong)	4	20	5	21	5	21
Taipa Grande (Macao)	0	7	0	20	0	11

Remark : All concentration units are in micrograms per cubic metre (µg/m³).

Table 4.1c : The monthly averages of SO₂

Monitoring Station	July 2017	August 2017	September 2017
Luhu (Guangzhou)	10	6	8
Modiesha (Guangzhou)	10	8	8
Wanqingsha (Guangzhou)	11	10	9
Tianhu (Guangzhou)	6	8	7
Zhudong (Guangzhou)	12	16*	19
Liyuan (Shenzhen)	7	9	6
Jinjuzui (Foshan)	10	9	12
Huijingcheng (Foshan)	11	7	11
Tangjia (Zhuhai)	7	4*	7
Donghu (Jiangmen)	8	7	10
Duanfen (Jiangmen)	5	4	5
Huaguoshan (Jiangmen)	14	13	20
Chengzhong (Zhaoqing)	14	16	18
Xiapu (Huizhou)	7	9	9
Xijiao (Huizhou)	15	16*	11
Jinguowan (Huizhou)	6	7	8
Zimaling (Zhongshan)	7	6	9
Nanchengyuanling (Dongguan)	13	13	15
Tap Mun (Hong Kong)	5	6	7
Tsuen Wan (Hong Kong)	8	11	12
Yuen Long (Hong Kong)	8	10	11
Tung Chung (Hong Kong)	7	8	11*
Taipa Grande (Macao)	2	4	4

Remark : All concentration units are in micrograms per cubic metre (µg/m³).

* The capture rate of validated daily data per month is below 85%.

Table 4.2a : The monthly maxima and minima of hourly averages of NO₂

Monitoring Station	July 2017		August 2017		September 2017	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	11	119	6	165	11	180
Modiesha (Guangzhou)	8	152	9	135	13	191
Wanqingsha (Guangzhou)	2	112	2	170	0	114
Tianhu (Guangzhou)	0	47	0	47	0	31
Zhudong (Guangzhou)	2	77	4	252	5	87
Liyuan (Shenzhen)	6	115	4	91	1	81
Jinjuzui (Foshan)	0	89	0	77	4	104
Huijingcheng (Foshan)	8	154	3	149	7	194
Tangjia (Zhuhai)	4	86	1	74	1	151
Donghu (Jiangmen)	4	107	5	92	8	99
Duanfen (Jiangmen)	1	38	0	37	1	34
Huaguoshan (Jiangmen)	2	100	5	57	7	84
Chengzhong (Zhaoqing)	10	120	5	89	8	114
Xiapu (Huizhou)	4	52	6	96	7	104
Xijiao (Huizhou)	2	134	1	41	0	40
Jinguowan (Huizhou)	4	56	4	132	5	127
Zimaling (Zhongshan)	1	79	1	67	1	76
Nanchengyuanling (Dongguan)	1	138	6	129	9	112
Tap Mun (Hong Kong)	0	60	0	45	0	62
Tsuen Wan (Hong Kong)	7	177	4	207	5	246
Yuen Long (Hong Kong)	3	120	0	130	2	145
Tung Chung (Hong Kong)	5	90	4	162	5	124
Taipa Grande (Macao)	1	51	0	88	0	109

Remark : All concentration units are in micrograms per cubic metre (µg/m³).

Table 4.2b : The monthly maxima and minima of daily averages of NO₂

Monitoring Station	July 2017		August 2017		September 2017	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	28	62	22	59	29	74
Modiesha (Guangzhou)	25	66	24	68	30	84
Wanqingsha (Guangzhou)	14	55	9	60	12	54
Tianhu (Guangzhou)	0	19	1	23	1	12
Zhudong (Guangzhou)	15	38	18	115	17	44
Liyuan (Shenzhen)	10	58	10	54	5	50
Jinjuzui (Foshan)	7	37	6	46	15	62
Huijingcheng (Foshan)	26	72	22	67	30	80
Tangjia (Zhuhai)	11	44	5	33	2	49
Donghu (Jiangmen)	11	48	13	43	15	58
Duanfen (Jiangmen)	6	17	1	17	3	15
Huaguoshan (Jiangmen)	10	36	8	33	19	38
Chengzhong (Zhaoqing)	18	55	13	46	24	68
Xiapu (Huizhou)	10	26	13	45	18	45
Xijiao (Huizhou)	5	37	3	24	4	15
Jinguowan (Huizhou)	8	36	6	50	9	45
Zimaling (Zhongshan)	3	35	3	32	2	31
Nanchengyuanling (Dongguan)	17	56	19	53	28	59
Tap Mun (Hong Kong)	1	23	4	21	2	22
Tsuen Wan (Hong Kong)	28	86	16	110	22	105
Yuen Long (Hong Kong)	14	68	10	84	16	70
Tung Chung (Hong Kong)	7	57	7	73	11	73
Taipa Grande (Macao)	3	26	2	41	6	47

Remark : All concentration units are in micrograms per cubic metre (µg/m³).

Table 4.2c : The monthly averages of NO₂

Monitoring Station	July 2017	August 2017	September 2017
Luhu (Guangzhou)	41	38	54
Modiesha (Guangzhou)	41	42	59
Wanqingsha (Guangzhou)	31	26	31
Tianhu (Guangzhou)	5	10	6
Zhudong (Guangzhou)	26	31*	32
Liyuan (Shenzhen)	20	26	25
Jinjuzui (Foshan)	21*	24	34
Huijingcheng (Foshan)	42	37	53
Tangjia (Zhuhai)	27	16*	18
Donghu (Jiangmen)	26	22	30
Duanfen (Jiangmen)	9	5	7
Huaguoshan (Jiangmen)	24	17	28
Chengzhong (Zhaoqing)	39	29	42
Xiapu (Huizhou)	18	30	30
Xijiao (Huizhou)	16*	13*	9
Jinguowan (Huizhou)	14	22	25
Zimaling (Zhongshan)	17	11	13
Nanchengyuanling (Dongguan)	34	34	43
Tap Mun (Hong Kong)	5	9	9
Tsuen Wan (Hong Kong)	42	46	56
Yuen Long (Hong Kong)	28	32	40
Tung Chung (Hong Kong)	22	25	36
Taipa Grande (Macao)	13	15	19

Remark : All concentration units are in micrograms per cubic metre (µg/m³).

* The capture rate of validated daily data per month is below 85%.

Table 4.3a : The monthly maxima and minima of hourly averages of O₃

Monitoring Station	July 2017		August 2017		September 2017	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	2	263	2	248	2	338
Modiesha (Guangzhou)	2	276	1	213	1	329
Wanqingsha (Guangzhou)	4	413	7	357	6	411
Tianhu (Guangzhou)	3	168	3	219	2	204
Zhudong (Guangzhou)	4	264	6	288	5	316
Liyuan (Shenzhen)	4	291	4	420	4	386
Jinjuzui (Foshan)	4	325	3	282	4	356
Huijingcheng (Foshan)	3	287	5	264	4	336
Tangjia (Zhuhai)	7	279	7	296	1	318
Donghu (Jiangmen)	1	318	1	278	1	319
Duanfen (Jiangmen)	5	252	5	192	5	214
Huaguoshan (Jiangmen)	3	321	3	258	2	293
Chengzhong (Zhaoqing)	5	231	5	202	5	389
Xiapu (Huizhou)	3	221	3	295	3	264
Xijiao (Huizhou)	2	150	2	308	2	267
Jinguowan (Huizhou)	2	296	1	267	2	249
Zimaling (Zhongshan)	1	343	2	373	2	372
Nanchengyuanling (Dongguan)	1	324	2	303	1	393
Tap Mun (Hong Kong)	6	324	1	264	0	381
Tsuen Wan (Hong Kong)	2	287	2	254	1	394
Yuen Long (Hong Kong)	2	379	0	437	0	425
Tung Chung (Hong Kong)	1	334	3	407	3	409
Taipa Grande (Macao)	0	223	2	323	4	454

Remark : All concentration units are in micrograms per cubic metre (µg/m³).

Table 4.3b : Daily maximum 8-hour averages of O₃ (the monthly maxima, minima and the 90th percentile)

Monitoring Station	July 2017			August 2017			September 2017		
	Min	Max	90 th per	Min	Max	90 th per	Min	Max	90 th per
Luhu (Guangzhou)	13	189	155	20	201	163	20	244	212
Modiesha (Guangzhou)	16	205	148	23	176	139	22	265	237
Wanqingsha (Guangzhou)	19	262	218	40	289	227	47	325	275
Tianhu (Guangzhou)	41	125	112	48	198	190	57	183	175
Zhudong (Guangzhou)	28	187	166	34	241	169	53	267	245
Liyuan (Shenzhen)	18	227	141	33	293	182	27	268	173
Jinjuzui (Foshan)	29	257	177	35	233	172	28	292	255
Huijingcheng (Foshan)	26	241	171	32	204	166	25	289	239
Tangjia (Zhuhai)	24	196	153	39	239	166	35	247	222
Donghu (Jiangmen)	14	259	167	36	241	157	34	263	227
Duanfen (Jiangmen)	33	212	148	35	159	120	44	190	170
Huaguoshan (Jiangmen)	25	276	189	38	218	138	33	241	231
Chengzhong (Zhaoqing)	33	208	177	52	161	144	50	343	219
Xiapu (Huizhou)	23	169	116	35	273	161	51	224	168
Xijiao (Huizhou)	19	98	72	46	229	185	54	207	162
Jinguowan (Huizhou)	27	238	130	36	230	140	41	187	152
Zimaling (Zhongshan)	22	278	176	48	282	185	43	308	230
Nanchengyuanling (Dongguan)	31	231	188	28	259	206	39	329	255
Tap Mun (Hong Kong)	36	239	117	40	231	141	44	260	187
Tsuen Wan (Hong Kong)	7	216	73	15	155	94	17	275	158
Yuen Long (Hong Kong)	11	272	111	21	274	139	25	293	201
Tung Chung (Hong Kong)	26	235	93	23	252	149	21	258	213
Taipa Grande (Macao)	19	182	117	25	305	147	32	378	204

Remark : All concentration units are in micrograms per cubic metre (µg/m³).

Table 4.3c : The monthly averages of O₃

Monitoring Station	July 2017	August 2017	September 2017
Luhu (Guangzhou)	37	47	57
Modiesha (Guangzhou)	36	41	58
Wanqingsha (Guangzhou)	44	59	83
Tianhu (Guangzhou)	52	76	88
Zhudong (Guangzhou)	51	58*	80
Liyuan (Shenzhen)	35	44	62
Jinjuzui (Foshan)	48	52	77
Huijingcheng (Foshan)	45	52	72
Tangjia (Zhuhai)	42	52*	67
Donghu (Jiangmen)	45	49	69
Duanfen (Jiangmen)	49	51	67
Huaguoshan (Jiangmen)	47	47	67
Chengzhong (Zhaoqing)	53	52	73
Xiapu (Huizhou)	37	58	64
Xijiao (Huizhou)	26	58*	54
Jinguowan (Huizhou)	36	47	52
Zimaling (Zhongshan)	47	57	77
Nanchengyuanling (Dongguan)	50	68	79
Tap Mun (Hong Kong)	47	48	75
Tsuen Wan (Hong Kong)	23	27	42
Yuen Long (Hong Kong)	28	34	52
Tung Chung (Hong Kong)	34	39	57
Taipa Grande (Macao)	38	44	67

Remark : All concentration units are in micrograms per cubic metre (µg/m³).

* The capture rate of validated daily data per month is below 85%.

Table 4.4a : The monthly maxima and minima of hourly averages of CO

Monitoring Station	July 2017		August 2017		September 2017	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	0.4	1.4	0.5	1.7	0.5	2.6
Modiesha (Guangzhou)	0.2	1.1	0.3	1.2	0.3	1.5
Wanqingsha (Guangzhou)	0.1	1.3	0.3	1.1	0.4	1.4
Tianhu (Guangzhou)	0.4	1.4	0.1	1.2	0.0	1.6
Zhudong (Guangzhou)	0.0	0.9	0.0	1.3	0.1	1.0
Liyuan (Shenzhen)	0.5	1.4	0.5	1.3	0.4	1.3
Jinjuzui (Foshan)	0.3	1.6	0.5	1.5	0.6	1.8
Huijingcheng (Foshan)	0.2	1.5	0.2	1.3	0.3	1.3
Tangjia (Zhuhai)	0.2	1.1	0.1	1.0	0.2	1.1
Donghu (Jiangmen)	0.3	1.7	0.3	1.5	0.5	2.3
Duanfen (Jiangmen)	0.2	0.9	0.3	0.8	0.1	1.2
Huaguoshan (Jiangmen)	0.1	1.4	0.1	1.3	0.0	1.4
Chengzhong (Zhaoqing)	0.5	1.8	0.6	1.6	0.6	2.2
Xiapu (Huizhou)	0.4	1.2	0.3	1.6	0.4	1.2
Xijiao (Huizhou)	0.2	1.0	0.2	0.9	0.2	1.2
Jinguowan (Huizhou)	0.1	1.2	0.3	1.0	0.0	1.6
Zimaling (Zhongshan)	0.1	1.1	0.3	1.3	0.1	1.7
Nanchengyuanling (Dongguan)	0.5	1.5	0.4	1.6	0.7	1.7
Tap Mun (Hong Kong)	0.2	1.0	0.3	1.0	0.4	1.1
Tsuen Wan (Hong Kong)	0.4	1.2	0.2	1.1	0.2	1.2
Yuen Long (Hong Kong)	0.2	1.0	0.1	0.9	0.2	1.0
Tung Chung (Hong Kong)	0.2	1.0	0.3	1.2	0.2	1.3
Taipa Grande (Macao)	0.3	1.8	0.0	1.6	0.2	1.1

Remark : All concentration units are in milligrams per cubic metre (mg/m³).

Table 4.4b : Daily averages of CO (the monthly maxima, minima and the 95th percentile)

Monitoring Station	July 2017			August 2017			September 2017		
	Min	Max	95 th per	Min	Max	95 th per	Min	Max	95 th per
Luhu (Guangzhou)	0.6	1.0	0.9	0.6	1.0	1.0	0.7	1.3	1.1
Modiesha (Guangzhou)	0.4	0.7	0.7	0.4	0.8	0.7	0.4	1.0	1.0
Wanqingsha (Guangzhou)	0.4	0.8	0.8	0.3	0.7	0.7	0.4	1.0	0.9
Tianhu (Guangzhou)	0.4	1.0	1.0	0.5	1.1	1.1	0.1	1.3	1.3
Zhudong (Guangzhou)	0.3	0.7	0.6	0.1	0.6	0.6	0.3	0.7	0.7
Liyuan (Shenzhen)	0.5	1.1	1.0	0.6	0.9	0.9	0.5	1.1	1.0
Jinjuzui (Foshan)	0.4	1.2	1.1	0.6	1.1	1.1	0.7	1.3	1.3
Huijingcheng (Foshan)	0.4	0.9	0.9	0.3	0.7	0.7	0.4	0.8	0.8
Tangjia (Zhuhai)	0.3	1.0	0.9	0.2	0.8	0.8	0.4	0.8	0.8
Donghu (Jiangmen)	0.5	1.1	0.9	0.4	0.9	0.9	0.6	1.2	1.1
Duanfen (Jiangmen)	0.3	0.6	0.5	0.3	0.6	0.6	0.3	0.7	0.7
Huaguoshan (Jiangmen)	0.5	0.9	0.9	0.2	0.6	0.6	0.4	0.9	0.8
Chengzhong (Zhaoqing)	0.5	1.1	1.1	0.7	1.1	1.0	0.7	1.3	1.3
Xiapu (Huizhou)	0.5	0.8	0.7	0.4	0.9	0.9	0.5	0.9	0.8
Xijiao (Huizhou)	0.4	0.7	0.6	0.4	0.7	0.6	0.3	0.8	0.8
Jinguowan (Huizhou)	0.4	1.0	0.8	0.4	0.8	0.8	0.2	1.0	1.0
Zimaling (Zhongshan)	0.2	0.8	0.7	0.5	0.9	0.8	0.4	1.1	1.0
Nanchengyuanling (Dongguan)	0.6	1.1	1.0	0.6	1.2	1.1	0.8	1.3	1.3
Tap Mun (Hong Kong)	0.2	0.8	0.6	0.3	0.8	0.8	0.5	0.9	0.9
Tsuen Wan (Hong Kong)	0.5	1.1	0.8	0.3	0.9	0.8	0.4	1.0	0.7
Yuen Long (Hong Kong)	0.2	0.8	0.6	0.2	0.7	0.6	0.3	0.9	0.7
Tung Chung (Hong Kong)	0.3	0.9	0.7	0.4	0.8	0.8	0.3	0.9	0.8
Taipa Grande (Macao)	0.4	0.9	0.7	0.3	0.9	0.8	0.3	0.7	0.7

Remark : All concentration units are in milligrams per cubic metre (mg/m³).

Table 4.4c : The monthly averages of CO

Monitoring Station	July 2017	August 2017	September 2017
Luhu (Guangzhou)	0.7	0.8	0.9
Modiesha (Guangzhou)	0.5	0.5	0.7
Wanqingsha (Guangzhou)	0.6	0.5	0.7
Tianhu (Guangzhou)	0.7	0.8	0.7
Zhudong (Guangzhou)	0.4	0.3*	0.4
Liyuan (Shenzhen)	0.7	0.7	0.7
Jinjuzui (Foshan)	0.7	0.8	1.0
Huijingcheng (Foshan)	0.6	0.5	0.6
Tangjia (Zhuhai)	0.5	0.5*	0.5
Donghu (Jiangmen)	0.7	0.7	0.8
Duanfen (Jiangmen)	0.4	0.4	0.5
Huaguoshan (Jiangmen)	0.6	0.4	0.6
Chengzhong (Zhaoqing)	0.9	0.9	1.0
Xiapu (Huizhou)	0.6	0.6	0.7
Xijiao (Huizhou)	0.5	0.5*	0.6
Jinguowan (Huizhou)	0.6	0.6	0.6
Zimaling (Zhongshan)	0.5	0.6	0.7
Nanchengyuanling (Dongguan)	0.8	0.8	1.0
Tap Mun (Hong Kong)	0.3	0.5	0.7
Tsuen Wan (Hong Kong)	0.6	0.6	0.5
Yuen Long (Hong Kong)	0.4	0.4	0.5
Tung Chung (Hong Kong)	0.5	0.5	0.5
Taipa Grande (Macao)	0.5	0.5	0.5

Remark : All concentration units are in milligrams per cubic metre (mg/m³).

* The capture rate of validated daily data per month is below 85%.

Table 4.5a : The monthly maxima and minima of daily averages of PM₁₀

Monitoring Station	July 2017		August 2017		September 2017	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	15	75	12	61	23	94
Modiesha (Guangzhou)	18	77	12	76	29	124
Wanqingsha (Guangzhou)	13	83	11	73	16	112
Tianhu (Guangzhou)	9	58	8	62	17	70
Zhudong (Guangzhou)	15	68	16	69	27	104
Liyuan (Shenzhen)	10	76	10	81	14	76
Jinjuzui (Foshan)	10	78	9	63	19	87
Huijingcheng (Foshan)	18	84	12	68	29	96
Tangjia (Zhuhai)	9	91	5	60	13	111
Donghu (Jiangmen)	18	95	14	67	26	115
Duanfen (Jiangmen)	5	53	9	44	13	58
Huaguoshan (Jiangmen)	15	87	19	72	18	97
Chengzhong (Zhaoqing)	14	77	14	64	26	108
Xiapu (Huizhou)	14	77	10	85	17	76
Xijiao (Huizhou)	11	67	8	58	13	61
Jinguowan (Huizhou)	6	176	5	240	16	120
Zimaling (Zhongshan)	6	77	7	64	12	82
Nanchengyuanling (Dongguan)	15	78	10	75	28	97
Tap Mun (Hong Kong)	10	65	14	44	13	62
Tsuen Wan (Hong Kong)	7	77	8	65	13	107
Yuen Long (Hong Kong)	8	75	7	64	12	90
Tung Chung (Hong Kong)	5	75	6	73	6	79
Taipa Grande (Macao)	7	64	10	53	-	-

Remark : All concentration units are in micrograms per cubic metre (µg/m³).

“ - ” The operation of the PM₁₀ monitoring equipment at the Taipa Grande monitoring station in Macao were temporarily suspended from 23 August 2017 owing to the influence of Typhoon Hato and hence the data in September are not available.

Table 4.5b : The monthly averages of PM₁₀

Monitoring Station	July 2017	August 2017	September 2017
Luhu (Guangzhou)	35	38	56
Modiesha (Guangzhou)	43	47	68
Wanqingsha (Guangzhou)	30	31	44
Tianhu (Guangzhou)	24	34	37
Zhudong (Guangzhou)	37	40*	59*
Liyuan (Shenzhen)	19	27	35
Jinjuzui (Foshan)	31	32	46
Huijingcheng (Foshan)	38	38	54
Tangjia (Zhuhai)	25	25*	39
Donghu (Jiangmen)	40	38	56
Duanfen (Jiangmen)	23	22	28
Huaguoshan (Jiangmen)	39	32*	55
Chengzhong (Zhaoqing)	45	39	59
Xiapu (Huizhou)	29	41	45
Xijiao (Huizhou)	28	34*	35
Jinguowan (Huizhou)	45	46	54
Zimaling (Zhongshan)	22	26	35
Nanchengyuanling (Dongguan)	35	38	51
Tap Mun (Hong Kong)	19	23*	29
Tsuen Wan (Hong Kong)	16	21	32
Yuen Long (Hong Kong)	16	23	32
Tung Chung (Hong Kong)	16	19	26
Taipa Grande (Macao)	17	19*	-

Remark : All concentration units are in micrograms per cubic metre (µg/m³).

* The capture rate of validated daily data per month is below 85%.

“ - ” The operation of the PM₁₀ monitoring equipment at the Taipa Grande monitoring station in Macao were temporarily suspended from 23 August 2017 owing to the influence of Typhoon Hato and hence the data in September are not available.

Table 4.6a : The monthly maxima and minima of daily averages of PM_{2.5}

Monitoring Station	July 2017		August 2017		September 2017	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	9	46	7	36	10	58
Modiesha (Guangzhou)	9	47	4	37	7	64
Wanqingsha (Guangzhou)	8	60	6	48	7	79
Tianhu (Guangzhou)	5	47	5	43	10	50
Zhudong (Guangzhou)	8	52	8	58	17	84
Liyuan (Shenzhen)	5	58	5	50	6	56
Jinjuzui (Foshan)	8	54	6	36	9	59
Huijingcheng (Foshan)	9	63	7	42	11	71
Tangjia (Zhuhai)	3	55	6	41	2	74
Donghu (Jiangmen)	4	63	6	45	12	81
Duanfen (Jiangmen)	2	36	1	26	3	37
Huaguoshan (Jiangmen)	9	70	11	63	11	77
Chengzhong (Zhaoqing)	8	51	10	35	14	79
Xiapu (Huizhou)	6	47	6	52	9	51
Xijiao (Huizhou)	8	53	7	46	9	47
Jinguowan (Huizhou)	5	59	4	50	8	47
Zimaling (Zhongshan)	5	56	6	45	7	57
Nanchengyuanling (Dongguan)	9	52	9	47	11	58
Tap Mun (Hong Kong)	4	49	4	19	6	39
Tsuen Wan (Hong Kong)	4	56	5	48	8	82
Yuen Long (Hong Kong)	6	54	4	41	6	58
Tung Chung (Hong Kong)	1	55	2	49	1	55
Taipa Grande (Macao)	0	48	3	34	-	-

Remark : All concentration units are in micrograms per cubic metre (µg/m³).

“ - ” The operation of the PM_{2.5} monitoring equipment at the Taipa Grande monitoring station in Macao were temporarily suspended from 23 August 2017 owing to the influence of Typhoon Hato and hence the data in September are not available.

Table 4.6b : The monthly averages of PM_{2.5}

Monitoring Station	July 2017	August 2017	September 2017
Luhu (Guangzhou)	18	20	33
Modiesha (Guangzhou)	20	20	33
Wanqingsha (Guangzhou)	19	19	29
Tianhu (Guangzhou)	16	21	25
Zhudong (Guangzhou)	26	28*	46
Liyuan (Shenzhen)	12	17	24
Jinjuzui (Foshan)	20	20	30
Huijingcheng (Foshan)	24	23	37
Tangjia (Zhuhai)	14	12*	23
Donghu (Jiangmen)	22	19	33
Duanfen (Jiangmen)	11	10	16
Huaguoshan (Jiangmen)	27	24	42
Chengzhong (Zhaoqing)	27	21	39
Xiapu (Huizhou)	13	21	25
Xijiao (Huizhou)	19*	27*	26
Jinguowan (Huizhou)	16	20	25
Zimaling (Zhongshan)	14	16	23
Nanchengyuanling (Dongguan)	21	22	31
Tap Mun (Hong Kong)	10	11*	17
Tsuen Wan (Hong Kong)	10	13	23
Yuen Long (Hong Kong)	12	14	20
Tung Chung (Hong Kong)	10	12	16
Taipa Grande (Macao)	9	10*	-

Remark : All concentration units are in micrograms per cubic metre (µg/m³).

* The capture rate of validated daily data per month is below 85%.

“ - ” The operation of the PM_{2.5} monitoring equipment at the Taipa Grande monitoring station in Macao were temporarily suspended from 23 August 2017 owing to the influence of Typhoon Hato and hence the data in September are not available.

Annex A: Site Information of Monitoring Stations

Monitoring Stations	Address	Area Type	Sampling Height (Above P.D.)	Above Ground	Date Commenced Operation
Luhu (Guangzhou)	Jufong Garden of Luhu Park (Big yard, No. 11 Luhu Park)	City	30m	9m	1993
Modiesha (Guangzhou)	Modiesha Street, Haizhu District	City	95m	45m	Dec 2011
Wanqingsha (Guangzhou)	HKUST Fok Ying Tung Research Institute, Nansha	Mixed educational/ commercial and residential/industrial	54m	28m	Oct 2004
Tianhu (Guangzhou)	Tianhu Park, Conghua	Background : rural	251m	13m	Oct 2004
Zhudong (Guangzhou)	Zhudong Village Committee, Chini Town, Huadu District	Rural	19m	10m	Dec 2011
Liyuan (Shenzhen)	Shennan Zhong Road, Futian District	City	38m	12m	Sep 1997
Jinjuzui (Foshan)	Foshan City Communist Party School, Jinjuzui, Shunde District	Tourist and cultural /educational	27m	17m	Oct 1999
Huijingcheng (Foshan)	No. 127, Fenjiang Nan Road, Chancheng District	Urban: mixed residential/commercial/ industrial	24m	14m	Feb 2000
Tangjia (Zhuhai)	Qiao Island Mangrove Monitoring Station, Tangjia Town	Mixed educational/ commercial and residential/industrial	13m	13m	Jan 2010
Donghu (Jiangmen)	Donghu Park, Jiangmen	City	17.5m	5m	Nov 2001
Duanfen (Jiangmen)	Duanfen Middle School, Taishan	Rural	15m	12m	Dec 2011
Huaguoshan (Jiangmen)	Huaguoshan, Taoyuan, Heshan	Rural	25m	15m	Feb 2012
Chengzhong (Zhaoqing)	No. 63, Zhengdong Road, Duanzhou District	Urban: mixed residential/commercial	38m	16m	Jun 2001
Xiapu (Huizhou)	No. 4 Xiabuhengjiang Road No. 3, Huicheng District	Urban: commercial	49m	20m	Dec 1999
Xijiao (Huizhou)	Xijiao Village Committee, Boluo County	Rural	39m	12m	Dec 2011
Jinguowan (Huizhou)	Jinguowan Ecological Farm, Huizhou	Residential	77m	8m	Oct 2004

Monitoring Stations	Address	Area Type	Sampling Height (Above P.D.)	Above Ground	Date Commenced Operation
Zimaling (Zhongshan)	Zimaling Park, Zhongshan	Mixed residential/ commercial	45 m	7m	Aug 2002
Nancheng-yuanling (Dongguan)	Nanchengyuanling Community, Dongguan	Mixed residential/ commercial/industrial	33 m	18m	Sep 2010
Tap Mun (Hong Kong)	Tap Mun Police Station	Background: rural	26m	11m	Apr 1998
Tsuen Wan (Hong Kong)	60 Tai Ho Road, Tsuen Wan	Urban: mixed residential/commercial/ industrial	21m	17m	Aug 1988
Yuen Long (Hong Kong)	Yuen Long District Office, 269 Castle Peak Road, Yuen Long	New Town: residential	31m	25m	Jul 1995
Tung Chung (Hong Kong)	6 Fu Tung Street, Tung Chung	New Town: residential	34.5m	27.5m	Apr 1999
Taipa Grande (Macao)	Rampa do Observatorio, Taipa Grande	Rural	120m	10m	Mar 1999

Annex B : Measurement Methods of Air Pollutant Concentration

Pollutants	Measuring Principles
Sulphur dioxide (SO ₂)	UV fluorescence / Differential Optical Absorption Spectroscopy
Nitrogen dioxide (NO ₂)	Chemiluminescence / Differential Optical Absorption Spectroscopy
Ozone (O ₃)	UV absorption / Differential Optical Absorption Spectroscopy
Respirable suspended particulates (PM ₁₀)	Oscillating microbalance (TEOM) / Beta particulate monitor
Fine suspended particulates (PM _{2.5})	Oscillating microbalance (TEOM) / Beta particulate monitor / Hybrid nephelometric / radiometric particulate mass monitor
Carbon monoxide (CO)	Gas filter correlation infrared absorption method / Non-dispersive infrared absorption method