

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

October to December 2019

**Statistical Summary of the Fourth quarter
Monitoring Results**

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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), sulfur 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 fourth quarter of 2019. It is the twenty-fourth report published in the form of a quarterly report and the twenty-first 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 the 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 overall operation of the Network was smooth in the fourth quarter of 2019. The average data capture rate of hourly air pollutant monitoring data measured at all monitoring stations was 98.5% in the fourth quarter.

4. Statistical Results of Pollutant Concentrations

Tables 4.1a to 4.6b list the detailed statistical results of the six air pollutants (SO₂, NO₂, O₃, CO, PM₁₀ and PM_{2.5}) from October to December 2019. Per the amended *GB 3095-2012: Ambient Air Quality Standards*, starting from 2019, the concentrations of gaseous pollutants are calculated at a reference temperature of 298.15K and a pressure of 101.325 kPa, while the concentrations of PM₁₀ and PM_{2.5} are measured at real-time temperature and atmospheric pressure during monitoring.

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

Monitoring Station	October 2019		November 2019		December 2019	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	5	24	6	17	5	24
Modiesha (Guangzhou)	7	20	9	26	8	27
Nansha-HKUST (Guangzhou)	5	41	6	72	6	31
Tianhu (Guangzhou)	2	18	4	23	1	25
Zhudong (Guangzhou)	6	42	6	36	7	35
Tongxinling (Shenzhen)	5	13	5	12	5	16
Jinjuzui (Foshan)	3	28	4	27	4	23
Huijingcheng (Foshan)	5	83	7	58	7	55
Tangjia (Zhuhai)	1	18	1	24	2	24
Donghu (Jiangmen)	4	35	4	51	4	49
Duanfen (Jiangmen)	5	23	5	32	5	47
Huaguoshan (Jiangmen)	2	159	2	108	5	95
Chengzhong (Zhaoqing)	5	134	4	37	1	57
Xiapu (Huizhou)	4	34	5	38	6	48
Xijiao (Huizhou)	1	28	1	43	1	40
Jinguowan (Huizhou)	7	21	8	22	7	27
Zimaling (Zhongshan)	2	23	3	26	2	25
Nanchengyuanling (Dongguan)	3	33	4	38	6	36
Tap Mun (Hong Kong)	1	19	4	16	1	18
Tsuen Wan (Hong Kong)	3	22	0	11	0	40
Yuen Long (Hong Kong)	1	16	2	15	2	23
Tung Chung (Hong Kong)	1	35	1	16	1	30
Taipa Grande (Macao)	0	10	1	15	1	18

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	October 2019		November 2019		December 2019	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	7	13	8	12	7	14
Modiesha (Guangzhou)	8	13	10	16	10	18
Nansha-HKUST (Guangzhou)	6	18	8	19	9	20
Tianhu (Guangzhou)	4	11	4	14	3	15
Zhudong (Guangzhou)	9	19	9	18	9	21
Tongxinling (Shenzhen)	5	9	6	10	5	10
Jinjuzui (Foshan)	5	13	5	14	7	16
Huijingcheng (Foshan)	7	34	10	25	10	31
Tangjia (Zhuhai)	4	11	3	10	5	13
Donghu (Jiangmen)	4	14	6	18	7	26
Duanfen (Jiangmen)	6	13	6	16	6	17
Huaguoshan (Jiangmen)	5	25	6	20	8	29
Chengzhong (Zhaoqing)	7	25	5	20	4	24
Xiapu (Huizhou)	5	14	8	17	8	19
Xijiao (Huizhou)	2	12	3	11	1	10
Jinguowan (Huizhou)	8	12	9	15	8	16
Zimaling (Zhongshan)	3	15	5	13	4	11
Nanchengyuanling (Dongguan)	6	16	7	19	8	22
Tap Mun (Hong Kong)	4	11	6	10	3	13
Tsuen Wan (Hong Kong)	3	14	1	6	1	9
Yuen Long (Hong Kong)	3	9	4	9	4	12
Tung Chung (Hong Kong)	2	8	3	7	4	10
Taipa Grande (Macao)	1	6	2	8	1	9

Remark : All concentration units are in micrograms per cubic metre ($\mu\text{g}/\text{m}^3$).

Table 4.1c : The monthly averages of SO₂

Monitoring Station	October 2019	November 2019	December 2019
Luhu (Guangzhou)	9	9	10
Modiesha (Guangzhou)	11*	13	14
Nansha-HKUST (Guangzhou)	11	12	13
Tianhu (Guangzhou)	6	9	7
Zhudong (Guangzhou)	13	13	14
Tongxinling (Shenzhen)	6	7	7
Jinjuzui (Foshan)	7	9	10
Huijingcheng (Foshan)	13	15	16
Tangjia (Zhuhai)	6	7	9
Donghu (Jiangmen)	9	12	12
Duanfen (Jiangmen)	8	10	11
Huaguoshan (Jiangmen)	12	15	16
Chengzhong (Zhaoqing)	14	12	12
Xiapu (Huizhou)	8	12	12
Xijiao (Huizhou)	5	6*	5
Jinguowan (Huizhou)	9	11	11
Zimaling (Zhongshan)	7	9	7
Nanchengyuanling (Dongguan)	9	12	14
Tap Mun (Hong Kong)	6	7	8
Tsuen Wan (Hong Kong)	8	3	3
Yuen Long (Hong Kong)	5	6	7
Tung Chung (Hong Kong)	4	5	6
Taipa Grande (Macao)	3	4	4

Remark : All concentration units are in micrograms per cubic metre ($\mu\text{g}/\text{m}^3$).

* 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	October 2019		November 2019		December 2019	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	9	144	16	211	13	187
Modiesha (Guangzhou)	14	178	9	214	14	203
Nansha-HKUST (Guangzhou)	8	108	2	136	6	174
Tianhu (Guangzhou)	3	31	5	51	4	108
Zhudong (Guangzhou)	7	103	8	141	8	127
Tongxinling (Shenzhen)	1	86	1	121	6	148
Jinjuzui (Foshan)	4	127	16	156	14	196
Huijingcheng (Foshan)	9	173	14	266	15	399
Tangjia (Zhuhai)	3	80	7	107	10	197
Donghu (Jiangmen)	4	105	8	149	11	168
Duanfen (Jiangmen)	5	51	11	78	3	112
Huaguoshan (Jiangmen)	6	110	17	123	16	176
Chengzhong (Zhaoqing)	6	130	10	171	9	201
Xiapu (Huizhou)	6	80	10	126	11	134
Xijiao (Huizhou)	3	27	4	31	3	32
Jinguowan (Huizhou)	2	59	6	57	5	61
Zimaling (Zhongshan)	4	102	13	123	14	188
Nanchengyuanling (Dongguan)	11	109	14	137	14	161
Tap Mun (Hong Kong)	1	51	2	55	6	48
Tsuen Wan (Hong Kong)	1	123	12	144	13	189
Yuen Long (Hong Kong)	9	116	11	161	12	180
Tung Chung (Hong Kong)	6	92	5	121	0	175
Taipa Grande (Macao)	1	73	7	120	9	138

Remark : All concentration units are in micrograms per cubic metre ($\mu\text{g}/\text{m}^3$).

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

Monitoring Station	October 2019		November 2019		December 2019	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	23	76	29	122	27	129
Modiesha (Guangzhou)	21	60	31	121	25	126
Nansha-HKUST (Guangzhou)	15	45	24	75	22	109
Tianhu (Guangzhou)	6	19	8	23	10	47
Zhudong (Guangzhou)	24	54	26	70	16	78
Tongxinling (Shenzhen)	6	34	9	56	15	71
Jinjuzui (Foshan)	12	60	33	98	28	126
Huijingcheng (Foshan)	17	82	32	135	27	204
Tangjia (Zhuhai)	7	40	16	58	22	83
Donghu (Jiangmen)	7	65	24	84	27	121
Duanfen (Jiangmen)	8	36	16	47	15	52
Huaguoshan (Jiangmen)	12	65	33	67	29	87
Chengzhong (Zhaoqing)	18	72	21	87	12	118
Xiapu (Huizhou)	14	40	17	55	17	67
Xijiao (Huizhou)	8	13	7	15	6	19
Jinguowan (Huizhou)	8	21	13	24	10	35
Zimaling (Zhongshan)	7	64	26	75	28	98
Nanchengyuanling (Dongguan)	17	52	24	70	19	92
Tap Mun (Hong Kong)	3	24	5	19	9	22
Tsuen Wan (Hong Kong)	20	58	39	83	42	114
Yuen Long (Hong Kong)	25	60	38	73	40	107
Tung Chung (Hong Kong)	14	54	24	62	15	108
Taipa Grande (Macao)	8	43	18	72	27	96

Remark : All concentration units are in micrograms per cubic metre ($\mu\text{g}/\text{m}^3$).

Table 4.2c : The monthly averages of NO₂

Monitoring Station	October 2019	November 2019	December 2019
Luhu (Guangzhou)	44	59	66
Modiesha (Guangzhou)	43*	58	67
Nansha-HKUST (Guangzhou)	28	40	59
Tianhu (Guangzhou)	9	12	18
Zhudong (Guangzhou)	34	42	42
Tongxinling (Shenzhen)	18	27	37
Jinjuzui (Foshan)	36	57	72
Huijingcheng (Foshan)	46	71	88*
Tangjia (Zhuhai)	16	29	45
Donghu (Jiangmen)	32	50	59
Duanfen (Jiangmen)	18	29	31
Huaguoshan (Jiangmen)	34	50	54
Chengzhong (Zhaoqing)	36	53	57
Xiapu (Huizhou)	23	33	39
Xijiao (Huizhou)	10	10*	11
Jinguowan (Huizhou)	14	18	20
Zimaling (Zhongshan)	30	44	58
Nanchengyuanling (Dongguan)	33	44	54
Tap Mun (Hong Kong)	8	11	14
Tsuen Wan (Hong Kong)	36	57	63
Yuen Long (Hong Kong)	45	53	62
Tung Chung (Hong Kong)	33	41	51
Taipa Grande (Macao)	21	35	48

Remark : All concentration units are in micrograms per cubic metre ($\mu\text{g}/\text{m}^3$).

* 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	October 2019		November 2019		December 2019	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	3	266	2	267	2	192
Modiesha (Guangzhou)	1	262	1	237	1	185
Nansha-HKUST (Guangzhou)	4	319	2	334	1	332
Tianhu (Guangzhou)	28	220	12	212	4	176
Zhudong (Guangzhou)	1	256	6	264	6	218
Tongxinling (Shenzhen)	4	298	5	227	5	195
Jinjuzui (Foshan)	4	249	4	270	3	289
Huijingcheng (Foshan)	3	289	3	302	1	218
Tangjia (Zhuhai)	23	244	2	289	11	200
Donghu (Jiangmen)	2	288	2	343	1	226
Duanfen (Jiangmen)	10	193	3	294	3	222
Huaguoshan (Jiangmen)	4	248	3	298	3	195
Chengzhong (Zhaoqing)	3	265	1	268	1	226
Xiapu (Huizhou)	7	218	2	205	3	164
Xijiao (Huizhou)	3	206	3	183	2	142
Jinguowan (Huizhou)	3	254	1	206	2	171
Zimaling (Zhongshan)	2	270	3	286	2	178
Nanchengyuanling (Dongguan)	2	335	1	272	1	243
Tap Mun (Hong Kong)	16	307	19	198	8	177
Tsuen Wan (Hong Kong)	4	239	4	152	1	177
Yuen Long (Hong Kong)	1	257	1	210	1	164
Tung Chung (Hong Kong)	6	248	5	280	0	168
Taipa Grande (Macao)	13	280	10	254	9	174

Remark : All concentration units are in micrograms per cubic metre ($\mu\text{g}/\text{m}^3$).

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

Monitoring Station	October 2019			November 2019			December 2019		
	Min	Max	90 th per	Min	Max	90 th per	Min	Max	90 th per
Luhu (Guangzhou)	25	212	209	66	207	177	11	147	123
Modiesha (Guangzhou)	19	232	206	62	190	167	10	160	126
Nansha-HKUST (Guangzhou)	38	282	238	82	259	222	41	254	204
Tianhu (Guangzhou)	72	202	174	67	202	178	33	163	140
Zhudong (Guangzhou)	21	216	196	58	217	180	12	164	125
Tongxinling (Shenzhen)	91	257	187	75	176	164	50	126	114
Jinjuzui (Foshan)	30	222	192	56	231	177	17	201	127
Huijingcheng (Foshan)	24	230	217	47	221	199	12	148	131
Tangjia (Zhuhai)	88	211	192	87	228	177	48	166	117
Donghu (Jiangmen)	50	247	217	56	288	231	33	170	154
Duanfen (Jiangmen)	66	177	150	75	228	206	54	161	132
Huaguoshan (Jiangmen)	33	213	184	49	266	205	14	149	109
Chengzhong (Zhaoqing)	42	236	187	62	243	202	39	181	150
Xiapu (Huizhou)	58	199	162	59	160	154	49	130	108
Xijiao (Huizhou)	56	176	154	50	158	144	35	127	112
Jinguowan (Huizhou)	51	218	190	61	165	146	41	149	121
Zimaling (Zhongshan)	42	232	222	112	239	206	40	141	131
Nanchengyuanling (Dongguan)	46	292	258	92	230	199	47	198	153
Tap Mun (Hong Kong)	94	256	181	96	178	172	66	152	137
Tsuen Wan (Hong Kong)	38	189	143	45	125	117	13	103	84
Yuen Long (Hong Kong)	59	201	172	65	163	152	23	117	97
Tung Chung (Hong Kong)	55	180	162	72	189	151	6	116	92
Taipa Grande (Macao)	82	257	194	92	209	181	38	152	118

Remark : All concentration units are in micrograms per cubic metre ($\mu\text{g}/\text{m}^3$).

Table 4.3c : The monthly averages of O₃

Monitoring Station	October 2019	November 2019	December 2019
Luhu (Guangzhou)	77	73	43
Modiesha (Guangzhou)	82*	73	46
Nansha-HKUST (Guangzhou)	105	101	66
Tianhu (Guangzhou)	108	118	85
Zhudong (Guangzhou)	74	71	46
Tongxinling (Shenzhen)	105	93	56
Jinjuzui (Foshan)	88	78	47
Huijingcheng (Foshan)	89	79	42
Tangjia (Zhuhai)	105	100	65
Donghu (Jiangmen)	100	94	50
Duanfen (Jiangmen)	86	96	66
Huaguoshan (Jiangmen)	76	82	46
Chengzhong (Zhaoqing)	86	84	52
Xiapu (Huizhou)	92	83	54
Xijiao (Huizhou)	64	62*	43
Jinguowan (Huizhou)	85	82	64
Zimaling (Zhongshan)	98	94	47
Nanchengyuanling (Dongguan)	114	91	58
Tap Mun (Hong Kong)	117	111	83
Tsuen Wan (Hong Kong)	83	64	41
Yuen Long (Hong Kong)	81	72	44
Tung Chung (Hong Kong)	92	81	48
Taipa Grande (Macao)	112	105	64

Remark : All concentration units are in micrograms per cubic metre ($\mu\text{g}/\text{m}^3$).

* 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	October 2019		November 2019		December 2019	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	0.5	2.0	0.5	2.1	0.3	1.8
Modiesha (Guangzhou)	0.3	1.6	0.4	1.8	0.2	1.9
Nansha-HKUST (Guangzhou)	0.3	1.3	0.1	1.6	0.3	1.3
Tianhu (Guangzhou)	0.4	1.2	0.5	1.2	0.3	1.4
Zhudong (Guangzhou)	0.4	1.4	0.5	1.8	0.5	1.5
Tongxinling (Shenzhen)	0.4	1.2	0.3	1.2	0.4	1.5
Jinjuzui (Foshan)	0.4	1.2	0.3	1.6	0.4	2.1
Huijingcheng (Foshan)	0.2	1.3	0.3	2.1	0.1	3.1
Tangjia (Zhuhai)	0.4	1.1	0.4	1.0	0.1	1.6
Donghu (Jiangmen)	0.4	1.5	0.4	2.7	0.2	3.5
Duanfen (Jiangmen)	0.1	1.1	0.1	1.3	0.1	1.2
Huaguoshan (Jiangmen)	0.5	1.4	0.2	1.6	0.2	1.8
Chengzhong (Zhaoqing)	0.6	1.5	0.5	1.5	0.5	2.5
Xiapu (Huizhou)	0.4	1.1	0.4	1.4	0.4	1.9
Xijiao (Huizhou)	0.4	1.1	0.2	1.1	0.3	1.6
Jinguowan (Huizhou)	0.0	1.1	0.2	1.8	0.0	1.1
Zimaling (Zhongshan)	0.3	1.2	0.2	1.2	0.1	1.9
Nanchengyuanling (Dongguan)	0.4	1.2	0.5	1.6	0.3	1.6
Tap Mun (Hong Kong)	0.3	1.1	0.4	1.1	0.4	1.3
Tsuen Wan (Hong Kong)	0.2	1.2	0.4	1.2	0.4	1.4
Yuen Long (Hong Kong)	0.4	1.2	0.4	1.2	0.3	1.7
Tung Chung (Hong Kong)	0.4	1.2	0.2	1.1	0.1	1.4
Taipa Grande (Macao)	0.4	1.3	0.3	1.2	0.3	1.7

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	October 2019			November 2019			December 2019		
	Min	Max	95 th per	Min	Max	95 th per	Min	Max	95 th per
Luhu (Guangzhou)	0.6	1.1	1.0	0.6	1.1	1.1	0.3	1.3	1.3
Modiesha (Guangzhou)	0.5	1.1	1.1	0.6	1.2	1.0	0.4	1.2	1.1
Nansha-HKUST (Guangzhou)	0.4	1.0	0.9	0.3	1.0	1.0	0.4	1.2	1.0
Tianhu (Guangzhou)	0.6	1.1	1.0	0.7	1.0	0.9	0.4	1.2	1.1
Zhudong (Guangzhou)	0.6	1.2	1.1	0.7	1.2	1.1	0.6	1.3	1.3
Tongxinling (Shenzhen)	0.5	0.9	0.9	0.4	1.0	0.9	0.5	1.2	1.1
Jinjuzui (Foshan)	0.5	0.9	0.9	0.5	0.9	0.9	0.5	1.4	1.3
Huijingcheng (Foshan)	0.3	0.8	0.8	0.4	1.0	1.0	0.3	1.3	1.3
Tangjia (Zhuhai)	0.4	1.0	0.9	0.4	0.8	0.8	0.3	1.2	1.1
Donghu (Jiangmen)	0.6	1.0	1.0	0.6	1.1	1.1	0.4	1.4	1.3
Duanfen (Jiangmen)	0.2	0.7	0.7	0.3	0.7	0.7	0.2	1.1	1.0
Huaguoshan (Jiangmen)	0.7	1.2	1.2	0.4	0.9	0.9	0.5	1.3	1.2
Chengzhong (Zhaoqing)	0.8	1.2	1.2	0.7	1.1	1.1	0.6	1.7	1.5
Xiapu (Huizhou)	0.5	1.0	0.9	0.5	0.8	0.8	0.5	1.2	1.1
Xijiao (Huizhou)	0.5	0.9	0.8	0.3	0.6	0.6	0.4	0.9	0.8
Jinguowan (Huizhou)	0.2	1.0	1.0	0.3	0.9	0.8	0.2	0.8	0.8
Zimaling (Zhongshan)	0.4	0.9	0.8	0.3	0.8	0.7	0.3	1.2	1.2
Nanchengyuanling (Dongguan)	0.5	1.0	0.9	0.6	1.0	1.0	0.5	1.1	1.1
Tap Mun (Hong Kong)	0.4	0.9	0.8	0.5	0.8	0.8	0.5	1.2	1.0
Tsuen Wan (Hong Kong)	0.3	0.8	0.8	0.5	0.9	0.9	0.6	1.2	1.1
Yuen Long (Hong Kong)	0.5	0.9	0.9	0.5	0.8	0.8	0.5	1.2	1.2
Tung Chung (Hong Kong)	0.4	1.0	0.9	0.3	0.9	0.8	0.2	1.2	1.1
Taipa Grande (Macao)	0.5	1.2	1.0	0.4	0.9	0.9	0.4	1.5	1.3

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

Table 4.4c : The monthly averages of CO

Monitoring Station	October 2019	November 2019	December 2019
Luhu (Guangzhou)	0.8	0.8	0.9
Modiesha (Guangzhou)	0.8*	0.8	0.8
Nansha-HKUST (Guangzhou)	0.7	0.7	0.7
Tianhu (Guangzhou)	0.9	0.8	0.8
Zhudong (Guangzhou)	0.9	0.9	1.0
Tongxinling (Shenzhen)	0.7	0.7	0.8
Jinjuzui (Foshan)	0.7	0.7	1.0
Huijingcheng (Foshan)	0.6	0.7	0.9
Tangjia (Zhuhai)	0.7	0.6	0.7
Donghu (Jiangmen)	0.8	0.9	0.9
Duanfen (Jiangmen)	0.4	0.5	0.6
Huaguoshan (Jiangmen)	0.9	0.7	0.9
Chengzhong (Zhaoqing)	1.0	0.9	1.1
Xiapu (Huizhou)	0.7	0.7	0.8
Xijiao (Huizhou)	0.7	0.5*	0.6
Jinguowan (Huizhou)	0.6	0.6	0.6
Zimaling (Zhongshan)	0.6	0.6	0.8
Nanchengyuanling (Dongguan)	0.7	0.8	0.8
Tap Mun (Hong Kong)	0.6	0.6	0.7
Tsuen Wan (Hong Kong)	0.5	0.7	0.8
Yuen Long (Hong Kong)	0.7	0.7	0.8
Tung Chung (Hong Kong)	0.7	0.7	0.6
Taipa Grande (Macao)	0.7	0.6	0.7

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	October 2019		November 2019		December 2019	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	35	97	33	113	41	147
Modiesha (Guangzhou)	43	96	40	136	44	159
Nansha-HKUST (Guangzhou)	30	87	41	99	34	116
Tianhu (Guangzhou)	21	82	19	88	19	59
Zhudong (Guangzhou)	30	95	26	131	37	133
Tongxinling (Shenzhen)	25	98	50	98	38	131
Jinjuzui (Foshan)	32	80	33	105	34	107
Huijingcheng (Foshan)	32	93	27	117	34	146
Tangjia (Zhuhai)	22	100	39	92	33	127
Donghu (Jiangmen)	37	105	40	125	42	174
Duanfen (Jiangmen)	8	116	47	120	42	150
Huaguoshan (Jiangmen)	35	115	35	142	45	203
Chengzhong (Zhaoqing)	30	95	25	109	27	149
Xiapu (Huizhou)	34	99	31	99	34	119
Xijiao (Huizhou)	24	66	27	59	27	61
Jinguowan (Huizhou)	26	80	32	71	33	71
Zimaling (Zhongshan)	29	103	40	98	37	109
Nanchengyuanling (Dongguan)	33	100	36	106	30	131
Tap Mun (Hong Kong)	23	74	28	68	15	57
Tsuen Wan (Hong Kong)	21	64	22	69	12	78
Yuen Long (Hong Kong)	28	88	44	92	33	89
Tung Chung (Hong Kong)	15	58	24	67	23	83
Taipa Grande (Macao)	20	79	36	98	27	106

Remark : All concentration units are in micrograms per cubic metre ($\mu\text{g}/\text{m}^3$).

Table 4.5b : The monthly averages of PM₁₀

Monitoring Station	October 2019	November 2019	December 2019
Luhu (Guangzhou)	60	74	76
Modiesha (Guangzhou)	68*	85	85
Nansha-HKUST (Guangzhou)	57	70	66
Tianhu (Guangzhou)	46	49	40
Zhudong (Guangzhou)	60	71	70
Tongxinling (Shenzhen)	54	74	74
Jinjuzui (Foshan)	50	67	63
Huijingcheng (Foshan)	59	77	73
Tangjia (Zhuhai)	50	66	67
Donghu (Jiangmen)	63	85	83
Duanfen (Jiangmen)	50	85	86
Huaguoshan (Jiangmen)	68	89	92
Chengzhong (Zhaoqing)	59	72	73
Xiapu (Huizhou)	60	73	72
Xijiao (Huizhou)	45	47*	45
Jinguowan (Huizhou)	48	53	48
Zimaling (Zhongshan)	55	72	65
Nanchengyuanling (Dongguan)	64	77	78
Tap Mun (Hong Kong)	44	49	40
Tsuen Wan (Hong Kong)	38	45	38
Yuen Long (Hong Kong)	53	65	58
Tung Chung (Hong Kong)	33	41	42
Taipa Grande (Macao)	43	61	59

Remark : All concentration units are in micrograms per cubic metre ($\mu\text{g}/\text{m}^3$).

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

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

Monitoring Station	October 2019		November 2019		December 2019	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	19	63	14	66	19	76
Modiesha (Guangzhou)	15	46	12	59	15	67
Nansha-HKUST (Guangzhou)	17	58	17	58	20	71
Tianhu (Guangzhou)	14	50	11	51	14	40
Zhudong (Guangzhou)	17	61	16	84	22	82
Tongxinling (Shenzhen)	18	68	19	52	21	73
Jinjuzui (Foshan)	15	49	13	61	16	68
Huijingcheng (Foshan)	19	62	17	77	20	92
Tangjia (Zhuhai)	14	56	19	55	20	85
Donghu (Jiangmen)	17	52	12	66	10	92
Duanfen (Jiangmen)	5	46	23	88	23	112
Huaguoshan (Jiangmen)	19	59	16	108	25	121
Chengzhong (Zhaoqing)	5	55	7	62	16	84
Xiapu (Huizhou)	17	59	11	53	18	72
Xijiao (Huizhou)	18	52	18	44	18	47
Jinguowan (Huizhou)	17	55	12	42	17	48
Zimaling (Zhongshan)	16	52	12	54	11	73
Nanchengyuanling (Dongguan)	15	56	12	76	17	70
Tap Mun (Hong Kong)	13	51	12	36	10	34
Tsuen Wan (Hong Kong)	12	47	15	40	11	57
Yuen Long (Hong Kong)	16	51	18	40	14	38
Tung Chung (Hong Kong)	12	41	15	40	13	59
Taipa Grande (Macao)	10	47	14	41	11	64

Remark : All concentration units are in micrograms per cubic metre ($\mu\text{g}/\text{m}^3$).

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

Monitoring Station	October 2019	November 2019	December 2019
Luhu (Guangzhou)	38	41	39
Modiesha (Guangzhou)	33*	36	34
Nansha-HKUST (Guangzhou)	34	38	37
Tianhu (Guangzhou)	32	31	27
Zhudong (Guangzhou)	40	42	43
Tongxinling (Shenzhen)	36	38	41
Jinjuzui (Foshan)	33	38	36
Huijingcheng (Foshan)	40	46	45
Tangjia (Zhuhai)	32	39	41
Donghu (Jiangmen)	35	44	40
Duanfen (Jiangmen)	21	50	53
Huaguoshan (Jiangmen)	40	56	55
Chengzhong (Zhaoqing)	35	40	41
Xiapu (Huizhou)	35	40	41
Xijiao (Huizhou)	34	33*	31
Jinguowan (Huizhou)	32	32	29
Zimaling (Zhongshan)	33	38	34
Nanchengyuanling (Dongguan)	35	39	41
Tap Mun (Hong Kong)	25	24	22
Tsuen Wan (Hong Kong)	25	27	26
Yuen Long (Hong Kong)	28	28	25
Tung Chung (Hong Kong)	23	25	27
Taipa Grande (Macao)	23	27	28

Remark : All concentration units are in micrograms per cubic metre ($\mu\text{g}/\text{m}^3$).

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

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
Nansha-HKUST ⁽¹⁾ (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
Tongxinling ⁽²⁾ (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 ⁽³⁾ (Huizhou)	Zhangbei Yaowei She Nationality Primary School, Henghe Town	Rural	44m	10m	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
Nanchengyuanling (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

Remarks:

- (1) Nansha HKUST Station was originally named as Wanqingsha prior to 2019.
- (2) Tongxinling Station was originally named as Liyuan prior to 2019.
- (2) Xijiao Station was relocated to Zhangbei Yaowei She Nationality Primary School, Henghe Town, Boluo County, in the fourth quarter of 2019. The distance of the old and new location is about 200 metres.

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

