

Guangdong-Hong Kong-Macao
Pearl River Delta
Regional Air Quality Monitoring Network
January to March 2022
Statistical Summary of the First 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 first quarter of 2022. It is the thirty-third report published in the form of a quarterly report and the thirtieth 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 Centre¹ (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 GDEMC¹ 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 Ecological and Environmental Monitoring Centre of Guangdong (GDEEMC), HKEPD, Environmental

¹ Guangdong Provincial Environmental Monitoring Centre was renamed as Ecological and Environmental Monitoring Centre of Guangdong in December 2020.

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 Ecological and 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 GDEEMC, 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.

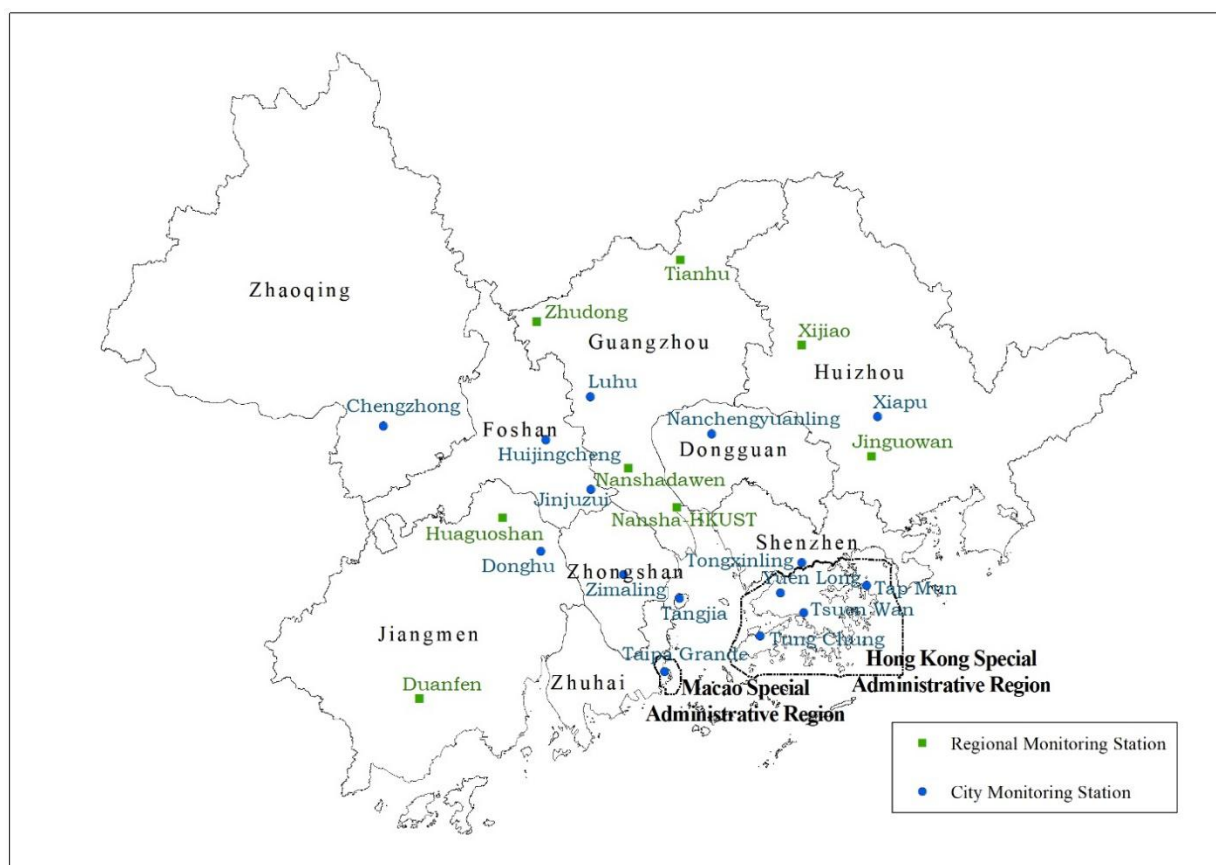


Figure 2.1: Spatial Distribution of Monitoring Stations in the Network

Remark: The above map was drawn with reference to the China National Standard Map "Map of the Pearl River Delta Region" (approval number: 粤S (2021) No. 169), and was re-submitted and approved for release. The approval number is GS粤 (2022) No. 378.

3. Operation of the Network

The overall operation of the Network was smooth in the first quarter of 2021. The average data capture rate of hourly air pollutant monitoring data measured at all monitoring stations was 97.9% in the first 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 January to March 2021. 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	January 2022		February 2022		March 2022	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	2	14	5	14	5	16
Nanshadawen (Guangzhou)	5	18	5	18	4	34
Nansha-HKUST (Guangzhou)	6	20	5	18	5	18
Tianhu (Guangzhou)	6	19	5	15	5	14
Zhudong (Guangzhou)	6	16	6	17	6	18
Tongxinling (Shenzhen)	1	5	2	6	1	5
Jinjuzui (Foshan)	1	7	1	17	1	11
Huijingcheng (Foshan)	4	22	5	26	4	17
Tangjia (Zhuhai)	6	15	6	22	7	20
Donghu (Jiangmen)	4	16	4	22	4	16
Duanfen (Jiangmen)	1	16	1	17	1	16
Huaguoshan (Jiangmen)	2	48	2	26	2	45
Chengzhong (Zhaoqing)	5	72	3	22	2	119
Xiapu (Huizhou)	1	10	1	6	2	10
Xijiao (Huizhou)	2	15	1	6	2	9
Jinguowan (Huizhou)	3	10	3	8	4	17
Zimaling (Zhongshan)	3	16	3	18	1	25
Nanchengyuanling (Dongguan)	3	15	3	12	5	13
Tap Mun (Hong Kong)	7	15	6	10	6	11
Tsuen Wan (Hong Kong)	4	19	3	27	4	23
Yuen Long (Hong Kong)	3	9	3	10	3	13
Tung Chung (Hong Kong)	2	16	6	18	1	20
Taipa Grande (Macao)	1	11	1	11	1	14

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	January 2022		February 2022		March 2022	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	3	8	5	9	6	9
Nanshadawen (Guangzhou)	6	12	6	11	7	13
Nansha-HKUST (Guangzhou)	6	12	6	10	6	10
Tianhu (Guangzhou)	6	14	6	8	6	11
Zhudong (Guangzhou)	6	11	6	9	6	10
Tongxinling (Shenzhen)	1	4	3	6	2	4
Jinjuzui (Foshan)	1	6	1	7	2	6
Huijingcheng (Foshan)	5	10	5	14	4	10
Tangjia (Zhuhai)	7	11	6	10	8	10
Donghu (Jiangmen)	5	11	5	9	5	10
Duanfen (Jiangmen)	2	8	1	5	2	6
Huaguoshan (Jiangmen)	2	14	2	12	3	12
Chengzhong (Zhaoqing)	6	20	3	13	4	26
Xiapu (Huizhou)	3	6	2	4	4	6
Xijiao (Huizhou)	2	5	2	3	2	4
Jinguowan (Huizhou)	4	6	4	6	5	7
Zimaling (Zhongshan)	4	10	4	9	2	10
Nanchengyuanling (Dongguan)	4	12	4	8	6	10
Tap Mun (Hong Kong)	7	10	6	8	6	8
Tsuen Wan (Hong Kong)	4	9	4	8	4	9
Yuen Long (Hong Kong)	3	5	3	5	3	6
Tung Chung (Hong Kong)	3	9	7	10	2	13
Taipa Grande (Macao)	1	5	2	5	1	5

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	January 2022	February 2022	March 2022
Luhu (Guangzhou)	6	6	7
Nanshadawen (Guangzhou)	8	7	9
Nansha-HKUST (Guangzhou)	8	7	7
Tianhu (Guangzhou)	8	7	8
Zhudong (Guangzhou)	8	7	8
Tongxinling (Shenzhen)	3	4	3
Jinjuzui (Foshan)	2	2	4
Huijingcheng (Foshan)	6	7	6
Tangjia (Zhuhai)	9	7	8
Donghu (Jiangmen)	7	6	7
Duanfen (Jiangmen)	4	2	4
Huaguoshan (Jiangmen)	7	4	7
Chengzhong (Zhaoqing)	10	7	11
Xiapu (Huizhou)	4	3	5
Xijiao (Huizhou)	3	2	3
Jinguowan (Huizhou)	5	4	6
Zimaling (Zhongshan)	6	5	6
Nanchengyuanling (Dongguan)	7	6	8
Tap Mun (Hong Kong)	8	7	7
Tsuen Wan (Hong Kong)	5	5	6
Yuen Long (Hong Kong)	4	4	4
Tung Chung (Hong Kong)	6	8	9
Taipa Grande (Macao)	2	2	3

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

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

Monitoring Station	January 2022		February 2022		March 2022	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	8	148	6	116	12	136
Nanshadawen (Guangzhou)	13	211	11	205	8	145
Nansha-HKUST (Guangzhou)	4	135	4	126	8	154
Tianhu (Guangzhou)	4	45	3	20	6	41
Zhudong (Guangzhou)	9	96	6	75	9	86
Tongxinling (Shenzhen)	2	64	2	80	1	76
Jinjuzui (Foshan)	8	135	5	129	9	108
Huijingcheng (Foshan)	6	141	5	129	9	114
Tangjia (Zhuhai)	6	98	4	66	4	68
Donghu (Jiangmen)	10	146	5	136	8	79
Duanfen (Jiangmen)	9	77	3	44	1	57
Huaguoshan (Jiangmen)	12	109	8	66	3	63
Chengzhong (Zhaoqing)	11	158	10	89	9	93
Xiapu (Huizhou)	8	102	5	104	8	115
Xijiao (Huizhou)	2	26	2	24	2	27
Jinguowan (Huizhou)	2	49	1	31	2	40
Zimaling (Zhongshan)	8	142	5	89	2	72
Nanchengyuanling (Dongguan)	8	137	4	162	10	131
Tap Mun (Hong Kong)	3	50	1	32	1	57
Tsuen Wan (Hong Kong)	10	150	8	151	7	192
Yuen Long (Hong Kong)	11	122	8	126	6	111
Tung Chung (Hong Kong)	9	100	4	119	1	118
Taipa Grande (Macao)	8	100	5	113	2	90

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	January 2022		February 2022		March 2022	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	12	89	9	71	24	64
Nanshadawen (Guangzhou)	15	109	14	110	23	72
Nansha-HKUST (Guangzhou)	7	75	6	68	24	63
Tianhu (Guangzhou)	5	26	3	10	8	22
Zhudong (Guangzhou)	11	51	8	35	18	54
Tongxinling (Shenzhen)	5	35	3	40	3	41
Jinjuzui (Foshan)	11	94	9	80	20	52
Huijingcheng (Foshan)	9	99	7	86	24	78
Tangjia (Zhuhai)	8	58	6	31	9	43
Donghu (Jiangmen)	13	96	8	66	16	50
Duanfen (Jiangmen)	13	51	4	23	3	38
Huaguoshan (Jiangmen)	14	75	10	40	11	40
Chengzhong (Zhaoqing)	13	81	12	45	15	56
Xiapu (Huizhou)	10	49	6	50	13	49
Xijiao (Huizhou)	4	15	3	10	7	16
Jinguowan (Huizhou)	3	22	2	15	6	20
Zimaling (Zhongshan)	11	74	8	46	7	38
Nanchengyuanling (Dongguan)	9	69	5	75	14	55
Tap Mun (Hong Kong)	4	19	2	11	4	18
Tsuen Wan (Hong Kong)	28	73	20	77	22	85
Yuen Long (Hong Kong)	20	69	16	72	18	61
Tung Chung (Hong Kong)	22	57	13	46	6	58
Taipa Grande (Macao)	11	54	10	58	7	41

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	January 2022	February 2022	March 2022
Luhu (Guangzhou)	46	28	40
Nanshadawen (Guangzhou)	56	35	42
Nansha-HKUST (Guangzhou)	40	26	38
Tianhu (Guangzhou)	12	6	14
Zhudong (Guangzhou)	29	17	32
Tongxinling (Shenzhen)	20	13	15
Jinjuzui (Foshan)	50	28	34
Huijingcheng (Foshan)	48	27	37
Tangjia (Zhuhai)	33	19	21
Donghu (Jiangmen)	46	25	26
Duanfen (Jiangmen)	27	14	14
Huaguoshan (Jiangmen)	39	21	24
Chengzhong (Zhaoqing)	41	24	35
Xiapu (Huizhou)	28	16	23
Xijiao (Huizhou)	9	5	10
Jinguowan (Huizhou)	14	6	11
Zimaling (Zhongshan)	38	21	21
Nanchengyuanling (Dongguan)	37	23	31
Tap Mun (Hong Kong)	11	7	9
Tsuen Wan (Hong Kong)	48	37	43
Yuen Long (Hong Kong)	51	36	39
Tung Chung (Hong Kong)	38	27	27
Taipa Grande (Macao)	34	25	24

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

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

Monitoring Station	January 2022		February 2022		March 2022	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	2	186	3	248	3	243
Nanshadawen (Guangzhou)	1	300	2	214	1	245
Nansha-HKUST (Guangzhou)	1	286	1	281	1	303
Tianhu (Guangzhou)	21	151	8	134	15	233
Zhudong (Guangzhou)	1	223	2	245	1	342
Tongxinling (Shenzhen)	1	148	1	247	1	195
Jinjuzui (Foshan)	1	230	1	184	1	243
Huijingcheng (Foshan)	2	250	2	268	2	284
Tangjia (Zhuhai)	3	223	3	234	3	264
Donghu (Jiangmen)	2	231	2	243	2	292
Duanfen (Jiangmen)	4	153	4	207	4	221
Huaguoshan (Jiangmen)	2	222	2	184	1	250
Chengzhong (Zhaoqing)	2	259	4	188	3	201
Xiapu (Huizhou)	4	147	3	138	2	220
Xijiao (Huizhou)	4	170	4	179	5	234
Jinguowan (Huizhou)	1	165	6	152	1	237
Zimaling (Zhongshan)	2	212	2	254	2	211
Nanchengyuanling (Dongguan)	5	210	5	306	5	277
Tap Mun (Hong Kong)	5	161	22	160	6	174
Tsuen Wan (Hong Kong)	1	97	1	134	1	154
Yuen Long (Hong Kong)	1	129	1	211	1	155
Tung Chung (Hong Kong)	2	140	2	157	2	229
Taipa Grande (Macao)	1	160	1	167	1	258

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	January 2022			February 2022			March 2022		
	Min	Max	90 th per	Min	Max	90 th per	Min	Max	90 th per
Luhu (Guangzhou)	10	144	98	14	191	107	8	189	154
Nanshadawen (Guangzhou)	23	213	119	13	180	112	14	187	174
Nansha-HKUST (Guangzhou)	20	181	159	7	213	136	17	184	157
Tianhu (Guangzhou)	37	132	103	36	122	100	43	190	165
Zhudong (Guangzhou)	14	184	113	15	187	104	9	255	171
Tongxinling (Shenzhen)	29	118	109	24	172	105	25	131	120
Jinjuzui (Foshan)	7	157	113	10	140	85	8	179	138
Huijingcheng (Foshan)	4	199	111	12	202	116	6	244	171
Tangjia (Zhuhai)	17	174	135	11	191	112	27	195	136
Donghu (Jiangmen)	26	181	138	13	192	121	12	217	172
Duanfen (Jiangmen)	26	130	119	21	183	119	19	174	124
Huaguoshan (Jiangmen)	15	183	117	18	160	111	7	214	147
Chengzhong (Zhaoqing)	16	218	109	15	163	103	25	174	145
Xiapu (Huizhou)	34	121	100	33	123	98	31	176	136
Xijiao (Huizhou)	35	149	102	33	145	116	40	189	143
Jinguowan (Huizhou)	19	140	112	27	124	104	25	193	128
Zimaling (Zhongshan)	12	149	121	9	194	111	15	171	140
Nanchengyuanling (Dongguan)	42	171	151	19	215	137	38	233	214
Tap Mun (Hong Kong)	52	152	134	34	147	124	30	164	142
Tsuen Wan (Hong Kong)	28	83	72	19	101	84	8	115	88
Yuen Long (Hong Kong)	23	100	91	14	154	86	21	121	102
Tung Chung (Hong Kong)	11	108	93	5	118	93	15	124	105
Taipa Grande (Macao)	11	122	106	7	126	92	19	157	112

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	January 2022	February 2022	March 2022
Luhu (Guangzhou)	31	38	53
Nanshadawen (Guangzhou)	33	37	55
Nansha-HKUST (Guangzhou)	48	46	56
Tianhu (Guangzhou)	64	58	86
Zhudong (Guangzhou)	36	40	55
Tongxinling (Shenzhen)	56	51	64
Jinjuzui (Foshan)	28	33	51
Huijingcheng (Foshan)	33	36	61
Tangjia (Zhuhai)	54	48	68
Donghu (Jiangmen)	38	42	65
Duanfen (Jiangmen)	48	55	67
Huaguoshan (Jiangmen)	36	39	50
Chengzhong (Zhaoqing)	39	40	53
Xiapu (Huizhou)	50	49	68
Xijiao (Huizhou)	48	48	60
Jinguowan (Huizhou)	48	47	61
Zimaling (Zhongshan)	40	43	59
Nanchengyuanling (Dongguan)	53	52	77*
Tap Mun (Hong Kong)	81	66	80
Tsuen Wan (Hong Kong)	42	39	49
Yuen Long (Hong Kong)	39	39	50
Tung Chung (Hong Kong)	40	36	48
Taipa Grande (Macao)	51	42	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 4.4a: The monthly maxima and minima of hourly averages of CO

Monitoring Station	January 2022		February 2022		March 2022	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	0.6	1.6	0.3	1.5	0.5	1.7
Nanshadawen (Guangzhou)	0.6	1.9	0.6	2.2	0.5	1.9
Nansha-HKUST (Guangzhou)	0.6	1.5	0.4	1.1	0.3	1.0
Tianhu (Guangzhou)	0.5	1.9	0.2	1.6	0.1	1.0
Zhudong (Guangzhou)	0.6	1.3	0.6	1.3	0.4	1.3
Tongxinling (Shenzhen)	0.4	1.1	0.4	1.3	0.4	1.1
Jinjuzui (Foshan)	0.4	1.6	0.4	1.4	0.3	1.5
Huijingcheng (Foshan)	0.5	2.5	0.4	2.3	0.3	2.0
Tangjia (Zhuhai)	0.3	1.2	0.2	1.0	0.1	1.0
Donghu (Jiangmen)	0.5	2.9	0.2	2.2	0.2	1.7
Duanfen (Jiangmen)	0.3	1.4	0.3	1.2	0.2	1.1
Huaguoshan (Jiangmen)	0.6	1.8	0.5	1.2	0.3	1.2
Chengzhong (Zhaoqing)	0.4	1.5	0.4	1.4	0.3	1.6
Xiapu (Huizhou)	0.4	1.3	0.3	1.7	0.3	1.6
Xijiao (Huizhou)	0.5	1.1	0.6	1.0	0.5	1.0
Jinguowan (Huizhou)	0.5	1.1	0.3	1.1	0.4	1.0
Zimaling (Zhongshan)	0.4	1.2	0.1	0.9	0.2	1.3
Nanchengyuanling (Dongguan)	0.5	1.6	0.6	1.9	0.2	1.7
Tap Mun (Hong Kong)	0.3	1.3	0.3	0.6	0.3	0.8
Tsuen Wan (Hong Kong)	0.5	1.4	0.3	1.2	0.4	1.2
Yuen Long (Hong Kong)	0.6	1.7	0.7	1.4	0.3	1.3
Tung Chung (Hong Kong)	0.4	1.2	0.3	1.0	0.3	1.0
Taipa Grande (Macao)	0.5	1.3	0.6	1.1	0.4	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	January 2022			February 2022			March 2022		
	Min	Max	95 th per	Min	Max	95 th per	Min	Max	95 th per
Luhu (Guangzhou)	0.7	1.2	1.2	0.5	0.9	0.9	0.6	1.1	1.1
Nanshadawen (Guangzhou)	0.7	1.3	1.1	0.7	1.5	1.2	0.6	0.9	0.9
Nansha-HKUST (Guangzhou)	0.7	1.4	1.3	0.5	1.0	1.0	0.4	0.9	0.9
Tianhu (Guangzhou)	0.6	1.2	1.1	0.4	0.8	0.8	0.4	0.9	0.9
Zhudong (Guangzhou)	0.8	1.2	1.1	0.7	1.0	0.9	0.4	1.0	0.9
Tongxinling (Shenzhen)	0.5	0.9	0.9	0.5	0.9	0.8	0.4	0.8	0.8
Jinjuzui (Foshan)	0.5	1.2	1.2	0.5	0.9	0.9	0.4	0.9	0.8
Huijingcheng (Foshan)	0.7	1.3	1.2	0.5	1.3	0.9	0.4	1.2	1.0
Tangjia (Zhuhai)	0.4	1.1	1.0	0.3	0.9	0.9	0.2	0.7	0.7
Donghu (Jiangmen)	0.7	1.3	1.2	0.4	1.0	1.0	0.3	0.9	0.9
Duanfen (Jiangmen)	0.5	1.4	1.1	0.4	0.9	0.9	0.3	0.9	0.9
Huaguoshan (Jiangmen)	0.7	1.2	1.2	0.5	1.0	1.0	0.5	1.0	1.0
Chengzhong (Zhaoqing)	0.6	1.2	1.1	0.5	0.9	0.9	0.4	1.0	0.9
Xiapu (Huizhou)	0.6	0.9	0.9	0.4	0.7	0.7	0.4	0.8	0.7
Xijiao (Huizhou)	0.6	1.1	1.0	0.6	0.8	0.8	0.6	0.9	0.8
Jinguowan (Huizhou)	0.6	1.0	1.0	0.4	0.9	0.9	0.5	0.9	0.9
Zimaling (Zhongshan)	0.5	1.0	1.0	0.2	0.8	0.8	0.4	0.8	0.8
Nanchengyuanling (Dongguan)	0.8	1.2	1.2	0.7	1.2	1.2	0.4	1.1	1.1
Tap Mun (Hong Kong)	0.4	1.0	0.8	0.3	0.5	0.5	0.3	0.7	0.7
Tsuen Wan (Hong Kong)	0.7	1.2	1.2	0.4	1.1	1.0	0.5	0.9	0.9
Yuen Long (Hong Kong)	0.7	1.2	1.1	0.8	1.1	1.0	0.4	1.1	1.0
Tung Chung (Hong Kong)	0.4	1.0	0.9	0.4	0.9	0.7	0.4	0.9	0.9
Taipa Grande (Macao)	0.5	1.1	1.1	0.6	1.1	0.9	0.4	0.9	0.8

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

Table 4.4c: The monthly averages of CO

Monitoring Station	January 2022	February 2022	March 2022
Luhu (Guangzhou)	1.0	0.7	0.9
Nanshadawen (Guangzhou)	1.0	0.9	0.8
Nansha-HKUST (Guangzhou)	1.0	0.8	0.6
Tianhu (Guangzhou)	0.9	0.6	0.6
Zhudong (Guangzhou)	1.0	0.8	0.7
Tongxinling (Shenzhen)	0.7	0.7	0.6
Jinjuzui (Foshan)	0.9	0.7	0.6
Huijingcheng (Foshan)	1.0	0.7	0.7
Tangjia (Zhuhai)	0.7	0.6	0.5
Donghu (Jiangmen)	1.0	0.7	0.6
Duanfen (Jiangmen)	0.8	0.7	0.6
Huaguoshan (Jiangmen)	1.0	0.8	0.7
Chengzhong (Zhaoqing)	0.9	0.7	0.6
Xiapu (Huizhou)	0.7	0.5	0.6
Xijiao (Huizhou)	0.8	0.7	0.7
Jinguowan (Huizhou)	0.8	0.6	0.7
Zimaling (Zhongshan)	0.8	0.6	0.6
Nanchengyuanling (Dongguan)	1.0	0.9	0.8
Tap Mun (Hong Kong)	0.6	0.4	0.5
Tsuen Wan (Hong Kong)	0.9	0.7	0.7
Yuen Long (Hong Kong)	0.9	0.9	0.9
Tung Chung (Hong Kong)	0.7	0.6	0.6
Taipa Grande (Macao)	0.8	0.8	0.6

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

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

Monitoring Station	January 2022		February 2022		March 2022	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	9	117	3	95	7	80
Nanshadawen (Guangzhou)	10	137	4	128	10	79
Nansha-HKUST (Guangzhou)	9	88	3	58	10	61
Tianhu (Guangzhou)	7	70	3	41	5	61
Zhudong (Guangzhou)	12	134	7	69	11	139
Tongxinling (Shenzhen)	9	65	3	52	7	53
Jinjuzui (Foshan)	13	143	3	91	10	73
Huijingcheng (Foshan)	7	151	2	124	9	123
Tangjia (Zhuhai)	11	89	3	65	13	68
Donghu (Jiangmen)	11	153	4	88	11	76
Duanfen (Jiangmen)	11	72	3	48	8	39
Huaguoshan (Jiangmen)	11	157	2	78	10	83
Chengzhong (Zhaoqing)	8	149	1	56	3	68
Xiapu (Huizhou)	10	76	3	61	8	65
Xijiao (Huizhou)	9	47	2	32	9	54
Jinguowan (Huizhou)	8	56	2	37	7	53
Zimaling (Zhongshan)	14	107	4	74	10	69
Nanchengyuanling (Dongguan)	8	100	1	93	7	72
Tap Mun (Hong Kong)	6	60	2	38	5	47
Tsuen Wan (Hong Kong)	5	64	3	46	5	55
Yuen Long (Hong Kong)	11	80	2	70	8	53
Tung Chung (Hong Kong)	8	76	1	54	8	68
Taipa Grande (Macao)	8	84	2	58	6	66

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	January 2022	February 2022	March 2022
Luhu (Guangzhou)	49	23	43
Nanshadawen (Guangzhou)	57	31	46
Nansha-HKUST (Guangzhou)	43	22	32
Tianhu (Guangzhou)	28	11	32
Zhudong (Guangzhou)	52	21	55
Tongxinling (Shenzhen)	36	21	28
Jinjuzui (Foshan)	56	28	42
Huijingcheng (Foshan)	69	30	52
Tangjia (Zhuhai)	45	26	31
Donghu (Jiangmen)	66	31	44
Duanfen (Jiangmen)	39	19	26
Huaguoshan (Jiangmen)	67	32	45
Chengzhong (Zhaoqing)	51	20	41
Xiapu (Huizhou)	42	20	38
Xijiao (Huizhou)	25	14	28
Jinguowan (Huizhou)	32	16	30
Zimaling (Zhongshan)	50	27	37
Nanchengyuanling (Dongguan)	47	24	36
Tap Mun (Hong Kong)	30	15	21
Tsuen Wan (Hong Kong)	31	22	23
Yuen Long (Hong Kong)	40	22	25
Tung Chung (Hong Kong)	39	21	23
Taipa Grande (Macao)	41	22	31

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

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

Monitoring Station	January 2022		February 2022		March 2022	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	7	66	2	56	4	42
Nanshadawen (Guangzhou)	4	62	2	68	4	41
Nansha-HKUST (Guangzhou)	6	55	2	43	6	40
Tianhu (Guangzhou)	5	63	3	33	4	43
Zhudong (Guangzhou)	9	93	7	49	8	96
Tongxinling (Shenzhen)	4	44	2	31	4	33
Jinjuzui (Foshan)	8	89	4	63	6	42
Huijingcheng (Foshan)	5	92	3	50	6	71
Tangjia (Zhuhai)	4	56	2	49	4	52
Donghu (Jiangmen)	2	72	2	53	6	43
Duanfen (Jiangmen)	9	51	5	38	6	31
Huaguoshan (Jiangmen)	8	108	2	58	2	60
Chengzhong (Zhaoqing)	5	106	2	40	2	41
Xiapu (Huizhou)	5	52	2	31	3	37
Xijiao (Huizhou)	6	26	6	14	7	23
Jinguowan (Huizhou)	6	38	3	28	4	35
Zimaling (Zhongshan)	5	53	4	38	8	34
Nanchengyuanling (Dongguan)	5	58	2	56	5	44
Tap Mun (Hong Kong)	4	40	2	21	3	34
Tsuen Wan (Hong Kong)	4	50	3	36	3	40
Yuen Long (Hong Kong)	8	59	3	58	8	38
Tung Chung (Hong Kong)	6	64	2	43	7	49
Taipa Grande (Macao)	3	53	2	38	4	42

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	January 2022	February 2022	March 2022
Luhu (Guangzhou)	30	15	22
Nanshadawen (Guangzhou)	27	15	19
Nansha-HKUST (Guangzhou)	29	16	19
Tianhu (Guangzhou)	23	9	20
Zhudong (Guangzhou)	35	16	34
Tongxinling (Shenzhen)	24	13	16
Jinjuzui (Foshan)	34	19	22
Huijingcheng (Foshan)	42	16	23
Tangjia (Zhuhai)	29	18	21
Donghu (Jiangmen)	31	18	22
Duanfen (Jiangmen)	28	15	18
Huaguoshan (Jiangmen)	48	23	29
Chengzhong (Zhaoqing)	34	14	24
Xiapu (Huizhou)	26	12	18
Xijiao (Huizhou)	12	8	11
Jinguowan (Huizhou)	22	12	19
Zimaling (Zhongshan)	25	15	18
Nanchengyuanling (Dongguan)	29	16	20
Tap Mun (Hong Kong)	20	10	13
Tsuen Wan (Hong Kong)	22	15	14
Yuen Long (Hong Kong)	29	16	17
Tung Chung (Hong Kong)	30	15	15
Taipa Grande (Macao)	22	11	16

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

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
Nanshadawen ⁽¹⁾ (Guangzhou)	Shinan Road, Dongchong Town, Nansha	City	23m	10m	Jan 2021
Nansha-HKUST ⁽²⁾ (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 ⁽³⁾ (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 ⁽⁴⁾ (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
Nancheng-yuanling ⁽⁵⁾ (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) Modiesha station closed permanently owing to insufficient space after the extensive renovation work at station, whereas Nanshadawen station joined the network in the 1st quarter of 2021.
- (2) Wanqingsha station was renamed as Nansha-HKUST station in the 1st quarter of 2019.
- (3) Liyuan station was renamed as Tongxinling station in the 1st quarter of 2019.
- (4) Xijiao station was relocated to Zhangbei Yaowei She Nationality Primary School, Henghe Town, Boluo County, in the 4th quarter of 2019. The distance between the old and new sites is about 200 metres.
- (5) Nancheng-yuanling station was relocated to Dongguan administration center in May 2021. The distance between the old and new sites is about 600 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