

Guangdong-Hong Kong-Macao
Pearl River Delta
Regional Air Quality Monitoring Network
January to March 2023
Statistical Summary of the First quarter
Monitoring Results

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Delta Regional Air Quality Monitoring
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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 January to March, the first quarter of 2023. It is the thirty-sixth report published in the form of a quarterly report and the thirty-fourth 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 Former 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”,

¹ In 2003, when the network was established, the unit was named Guangdong Provincial Environmental Protection Monitoring Centre, which was renamed as Guangdong Provincial Environmental Monitoring Centre in 2008, and was renamed again as Ecological and Environmental Monitoring Centre of Guangdong in December 2020.

which was jointly established by the Ecological and Environmental Monitoring Centre of Guangdong (GDEEMC), 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 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.

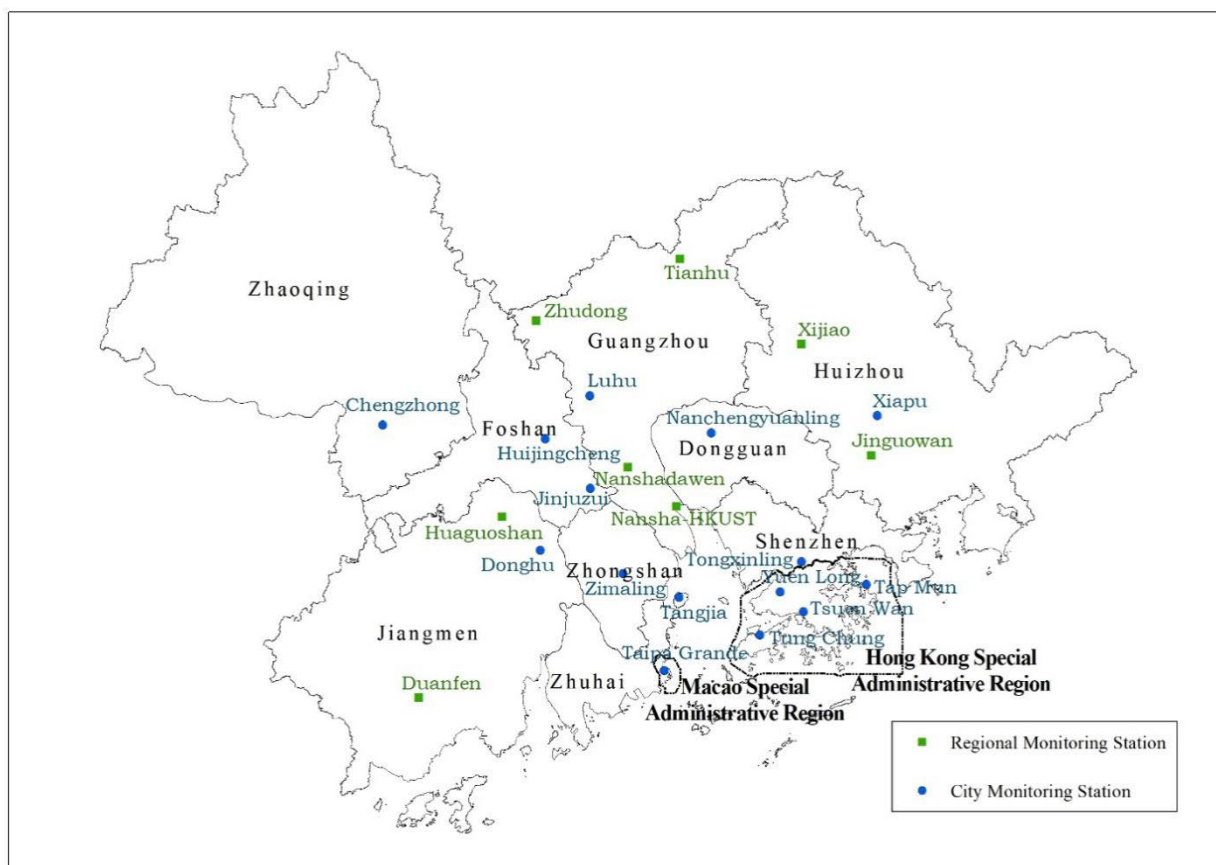


Figure 2.1: Spatial Distribution of Monitoring Stations in the Network²

² The map was drawn with reference to the China National Standard Map "Map of the Pearl River Delta Region" (approval number: 粵S (2021) No. 169), and was re-submitted and approved for release. The approval number is GS粵 (2022) No. 378.

3. Operation of the Network

The overall operation of the Network was smooth in the first quarter of 2023. The average data capture rate of hourly air pollutant monitoring data measured at all monitoring stations was 97.7% 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 2023. 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 SO₂³

Monitoring Station	January 2023		February 2023		March 2023	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	2	8	3	20	3	16
Nanshadawen (Guangzhou)	5	35	1	17	1	20
Nansha-HKUST (Guangzhou)	5	54	5	19	1	25
Tianhu (Guangzhou)	3	13	3	14	3	21
Zhudong (Guangzhou)	3	48	3	17	3	22
Tongxinling (Shenzhen)	1	8	2	6	2	8
Jinjuzui (Foshan)	2	9	1	14	2	14
Huijingcheng (Foshan)	3	13	1	29	1	22
Tangjia (Zhuhai)	6	12	3	11	3	12
Donghu (Jiangmen)	5	12	4	18	4	18
Duanfen (Jiangmen)	3	19	3	19	3	15
Huaguoshan (Jiangmen)	2	22	2	19	2	21
Chengzhong (Zhaoqing)	4	16	4	51	5	75
Xiapu (Huizhou)	2	12	3	13	3	24
Xijiao (Huizhou)	--	--	--	--	--	--
Jinguowan (Huizhou)	4	29	2	11	4	10
Zimaling (Zhongshan)	1	21	3	14	4	15
Nanchengyuanling (Dongguan)	6	14	6	18	6	25
Tap Mun (Hong Kong)	3	25	3	11	3	13

³ All pollutants, except for carbon monoxide, are measured in micrograms per cubic meter (µg/m³). The unit for carbon monoxide concentration is milligrams per cubic meter (mg/m³).

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

-- No monitoring for the corresponding period.

No data is available for Xijiao Station. Please refer to Appendix A for the reason.

The above also applies to all the pollutant monitoring mentioned below.

Tsuen Wan (Hong Kong)	7	18	2	24	1	15
Yuen Long (Hong Kong)	3	16	3	10	3	12
Tung Chung (Hong Kong)	5	16	0	18	0	14
Taipa Grande (Macao)	3	9	4	11	4	25

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

Monitoring Station	January 2023		February 2023		March 2023	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	3	7	3	9	3	9
Nanshadawen (Guangzhou)	7	15	2	14	1	9
Nansha-HKUST (Guangzhou)	5	11	6	11	1	11
Tianhu (Guangzhou)	3	7	4	10	3	10
Zhudong (Guangzhou)	3	8	4	10	4	11
Tongxinling (Shenzhen)	2	4	2	5	3	6
Jinjuzui (Foshan)	2	6	3	7	2	7
Huijingcheng (Foshan)	3	8	3	13	2	9
Tangjia (Zhuhai)	7	10	4	8	3	6
Donghu (Jiangmen)	5	8	4	9	5	10
Duanfen (Jiangmen)	3	7	3	7	3	8
Huaguoshan (Jiangmen)	2	8	3	8	2	10
Chengzhong (Zhaoqing)	7	11	6	20	6	20
Xiapu (Huizhou)	2	9	3	8	4	11
Xijiao (Huizhou)	--	--	--	--	--	--
Jinguowan (Huizhou)	4	8	4	8	5	8
Zimaling (Zhongshan)	2	10	3	9	5	9
Nanchengyuanling (Dongguan)	7	11	7	12	7	11
Tap Mun (Hong Kong)	4	8	4	7	4	7
Tsuen Wan (Hong Kong)	7	11	4	14	1	10
Yuen Long (Hong Kong)	3	7	3	5	4	8
Tung Chung (Hong Kong)	7	9	1	13	0	5
Taipa Grande (Macao)	3	7	4	8	4	7

Table 4.1c : The monthly averages of SO₂

Monitoring Station	January 2023	February 2023	March 2023
Luhu (Guangzhou)	4	5	5
Nanshadawen (Guangzhou)	9	6	4
Nansha-HKUST (Guangzhou)	7	7	4
Tianhu (Guangzhou)	5	5	6
Zhudong (Guangzhou)	5	6	6
Tongxinling (Shenzhen)	3	4	4
Jinjuzui (Foshan)	4	5	4
Huijingcheng (Foshan)	5	7	4
Tangjia (Zhuhai)	8	6	4
Donghu (Jiangmen)	7	7	6
Duanfen (Jiangmen)	4	5	5
Huaguoshan (Jiangmen)	4	5	5
Chengzhong (Zhaoqing)	8	9	13
Xiapu (Huizhou)	5	5	6
Xijiao (Huizhou)	--	--	--
Jinguowan (Huizhou)	5	6	6
Zimaling (Zhongshan)	4	6	6
Nanchengyuanling (Dongguan)	9	9	9
Tap Mun (Hong Kong)	5	5	5
Tsuen Wan (Hong Kong)	9	8	6
Yuen Long (Hong Kong)	4	4	5
Tung Chung (Hong Kong)	7	4	2
Taipa Grande (Macao)	5	6	5

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

Monitoring Station	January 2023		February 2023		March 2023	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	4	95	10	171	10	153
Nanshadawen (Guangzhou)	7	125	10	170	10	188
Nansha-HKUST (Guangzhou)	2	102	4	130	2	130
Tianhu (Guangzhou)	4	20	5	37	6	45
Zhudong (Guangzhou)	4	58	12	99	10	101
Tongxinling (Shenzhen)	3	79	3	69	3	112
Jinjuzui (Foshan)	4	89	9	120	5	121
Huijingcheng (Foshan)	9	104	16	159	10	168
Tangjia (Zhuhai)	4	77	5	82	5	66
Donghu (Jiangmen)	7	66	8	109	8	118
Duanfen (Jiangmen)	5	60	6	45	5	54
Huaguoshan (Jiangmen)	7	80	8	95	6	108
Chengzhong (Zhaoqing)	4	105	8	141	4	129
Xiapu (Huizhou)	5	78	8	88	5	100
Xijiao (Huizhou)	--	--	--	--	--	--
Jinguowan (Huizhou)	1	35	2	32	6	40
Zimaling (Zhongshan)	2	92	2	90	1	70
Nanchengyuanling (Dongguan)	7	107	10	162	8	211
Tap Mun (Hong Kong)	2	45	2	43	3	43
Tsuen Wan (Hong Kong)	7	128	8	169	8	137
Yuen Long (Hong Kong)	7	145	8	126	10	137
Tung Chung (Hong Kong)	4	78	4	117	0	121
Taipa Grande (Macao)	6	93	9	78	5	68

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

Monitoring Station	January 2023		February 2023		March 2023	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	5	55	19	78	21	84
Nanshadawen (Guangzhou)	9	67	21	67	26	78
Nansha-HKUST (Guangzhou)	6	52	17	68	10	59
Tianhu (Guangzhou)	5	11	7	23	8	25
Zhudong (Guangzhou)	5	36	17	52	19	52
Tongxinling (Shenzhen)	4	39	7	28	7	53
Jinjuzui (Foshan)	6	55	12	60	13	44
Huijingcheng (Foshan)	12	58	23	96	20	87
Tangjia (Zhuhai)	6	46	16	38	9	45
Donghu (Jiangmen)	9	46	16	66	12	51
Duanfen (Jiangmen)	8	39	12	25	8	39
Huaguoshan (Jiangmen)	9	49	15	59	9	60
Chengzhong (Zhaoqing)	7	48	13	65	13	71
Xiapu (Huizhou)	6	30	12	34	12	38
Xijiao (Huizhou)	--	--	--	--	--	--
Jinguowan (Huizhou)	4	27	6	17	11	23
Zimaling (Zhongshan)	4	58	9	36	4	43
Nanchengyuanling (Dongguan)	8	47	12	69	15	78
Tap Mun (Hong Kong)	3	20	6	14	6	19
Tsuen Wan (Hong Kong)	19	59	25	66	25	70
Yuen Long (Hong Kong)	13	61	16	72	21	86
Tung Chung (Hong Kong)	10	44	17	60	6	67
Taipa Grande (Macao)	11	55	17	51	11	56

Table 4.2c: The monthly averages of NO₂

Monitoring Station	January 2023	February 2023	March 2023
Luhu (Guangzhou)	24	41	41
Nanshadawen (Guangzhou)	31	41	45
Nansha-HKUST (Guangzhou)	25	36	30
Tianhu (Guangzhou)	7	13	16
Zhudong (Guangzhou)	15	28	34
Tongxinling (Shenzhen)	17	15	19
Jinjuzui (Foshan)	24	31	28
Huijingcheng (Foshan)	29	45	39
Tangjia (Zhuhai)	22	24	23
Donghu (Jiangmen)	23	31	27
Duanfen (Jiangmen)	19	19	18
Huaguoshan (Jiangmen)	24	36	32
Chengzhong (Zhaoqing)	21	37	32
Xiapu (Huizhou)	17	20	21
Xijiao (Huizhou)	--	--	--
Jinguowan (Huizhou)	11	12	16
Zimaling (Zhongshan)	21	22	21
Nanchengyuanling (Dongguan)	20	35	35
Tap Mun (Hong Kong)	10	9	10
Tsuen Wan (Hong Kong)	41	43	43
Yuen Long (Hong Kong)	37	36	44
Tung Chung (Hong Kong)	29	34	29
Taipa Grande (Macao)	28	27	24

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

Monitoring Station	January 2023		February 2023		March 2023	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	2	163	2	216	2	278
Nanshadawen (Guangzhou)	1	155	1	249	1	268
Nansha-HKUST (Guangzhou)	1	179	1	280	1	244
Tianhu (Guangzhou)	26	146	2	211	17	244
Zhudong (Guangzhou)	1	145	1	249	3	278
Tongxinling (Shenzhen)	1	123	1	174	1	271
Jinjuzui (Foshan)	2	115	2	181	2	244
Huijingcheng (Foshan)	1	146	1	203	1	248
Tangjia (Zhuhai)	2	180	4	247	1	294
Donghu (Jiangmen)	1	153	2	282	2	356
Duanfen (Jiangmen)	1	128	2	197	1	169
Huaguoshan (Jiangmen)	4	134	3	221	2	236
Chengzhong (Zhaoqing)	4	163	5	218	5	250
Xiapu (Huizhou)	3	113	4	165	5	223
Xijiao (Huizhou)	--	--	--	--	--	--
Jinguowan (Huizhou)	1	119	2	170	1	196
Zimaling (Zhongshan)	1	153	1	237	1	265
Nanchengyuanling (Dongguan)	5	162	5	223	5	276
Tap Mun (Hong Kong)	1	137	8	174	15	205
Tsuen Wan (Hong Kong)	0	93	1	215	1	129
Yuen Long (Hong Kong)	1	130	1	211	4	235
Tung Chung (Hong Kong)	2	133	1	252	2	287
Taipa Grande (Macao)	2	182	2	268	2	248

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

Monitoring Station	January 2023			February 2023			March 2023		
	Min	Max	90 th per	Min	Max	90 th per	Min	Max	90 th per
Luhu (Guangzhou)	5	132	106	7	175	159	6	229	200
Nanshadawen (Guangzhou)	8	126	109	15	196	166	4	213	171
Nansha-HKUST (Guangzhou)	15	139	124	21	202	166	7	229	176
Tianhu (Guangzhou)	38	125	107	20	202	151	33	225	191
Zhudong (Guangzhou)	8	138	105	10	212	163	11	219	197
Tongxinling (Shenzhen)	21	98	96	40	137	119	23	210	128
Jinjuzui (Foshan)	7	95	85	7	160	143	3	202	169
Huijingcheng (Foshan)	4	123	100	4	166	138	3	194	166
Tangjia (Zhuhai)	15	135	111	42	183	174	5	240	166
Donghu (Jiangmen)	10	129	109	9	227	193	5	290	204
Duanfen (Jiangmen)	10	112	108	46	176	134	7	154	145
Huaguoshan (Jiangmen)	19	106	93	9	192	142	24	195	155
Chengzhong (Zhaoqing)	11	150	111	21	192	170	19	237	175
Xiapu (Huizhou)	33	101	97	30	148	133	21	176	166
Xijiao (Huizhou)	--	--	--	--	--	--	--	--	--
Jinguowan (Huizhou)	20	103	98	24	146	132	13	175	153
Zimaling (Zhongshan)	10	116	103	28	195	170	2	229	183
Nanchengyuanling (Dongguan)	27	141	104	29	198	165	15	223	192
Tap Mun (Hong Kong)	25	125	112	55	157	147	41	190	171
Tsuen Wan (Hong Kong)	11	80	71	19	148	97	17	121	117
Yuen Long (Hong Kong)	19	100	92	14	154	86	32	186	139
Tung Chung (Hong Kong)	11	91	80	12	169	117	41	191	142
Taipa Grande (Macao)	13	146	107	44	177	156	13	208	170

Table 4.3c: The monthly averages of O₃

Monitoring Station	January 2023	February 2023	March 2023
Luhu (Guangzhou)	47	52	61
Nanshadawen (Guangzhou)	50	55	56
Nansha-HKUST (Guangzhou)	51	64	68
Tianhu (Guangzhou)	70	79	92
Zhudong (Guangzhou)	48	52	63
Tongxinling (Shenzhen)	51	68	73
Jinjuzui (Foshan)	43	55	66
Huijingcheng (Foshan)	45	49	59
Tangjia (Zhuhai)	56	75	78
Donghu (Jiangmen)	53	71	78
Duanfen (Jiangmen)	52	68	68
Huaguoshan (Jiangmen)	45	51	62
Chengzhong (Zhaoqing)	54	58	69
Xiapu (Huizhou)	56	71	83
Xijiao (Huizhou)	--	--	--
Jinguowan (Huizhou)	53	66	64
Zimaling (Zhongshan)	48	69	72
Nanchengyuanling (Dongguan)	59	70	72
Tap Mun (Hong Kong)	64	83	96
Tsuen Wan (Hong Kong)	37	53	62
Yuen Long (Hong Kong)	45	39	65
Tung Chung (Hong Kong)	40	60	70
Taipa Grande (Macao)	57	81	90

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

Monitoring Station	January 2023		February 2023		March 2023	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	0.3	1.1	0.4	1.4	0.4	1.1
Nanshadawen (Guangzhou)	0.3	1.1	0.4	1.7	0.0	1.2
Nansha-HKUST (Guangzhou)	0.1	0.8	0.1	1.1	0.0	2.3
Tianhu (Guangzhou)	0.0	1.0	0.4	1.5	0.2	1.6
Zhudong (Guangzhou)	0.6	1.4	0.0	1.2	0.2	1.2
Tongxinling (Shenzhen)	0.4	1.2	0.4	1.0	0.3	1.2
Jinjuzui (Foshan)	0.0	1.1	0.2	1.5	0.3	1.2
Huijingcheng (Foshan)	0.4	1.6	0.4	1.9	0.4	1.9
Tangjia (Zhuhai)	0.3	0.9	0.1	0.7	0.2	0.9
Donghu (Jiangmen)	0.4	1.7	0.3	1.6	0.4	1.8
Duanfen (Jiangmen)	0.4	1.0	0.4	1.1	0.4	1.1
Huaguoshan (Jiangmen)	0.3	1.4	0.4	1.5	0.2	1.4
Chengzhong (Zhaoqing)	0.3	1.4	0.4	1.4	0.3	1.2
Xiapu (Huizhou)	0.5	1.4	0.2	1.4	0.3	1.1
Xijiao (Huizhou)	--	--	--	--	--	--
Jinguowan (Huizhou)	0.1	1.0	0.3	1.2	0.1	0.8
Zimaling (Zhongshan)	0.3	1.0	0.2	1.1	0.2	1.2
Nanchengyuanling (Dongguan)	0.1	1.6	0.0	1.2	0.4	1.6
Tap Mun (Hong Kong)	0.2	0.9	0.2	0.7	0.2	0.6
Tsuen Wan (Hong Kong)	0.3	1.5	0.3	1.0	0.2	1.1
Yuen Long (Hong Kong)	0.4	1.3	0.7	1.3	0.5	1.2
Tung Chung (Hong Kong)	0.3	1.1	0.2	0.8	0.3	0.8
Taipa Grande (Macao)	0.4	1.2	0.4	1.0	0.3	1.1

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

Monitoring Station	January 2023			February 2023			March 2023		
	Min	Max	95 th per	Min	Max	95 th per	Min	Max	95 th per
Luhu (Guangzhou)	0.4	0.9	0.9	0.5	1.1	1.0	0.5	1.0	0.9
Nanshadawen (Guangzhou)	0.4	0.9	0.9	0.5	1.2	1.1	0.1	1.1	0.9
Nansha-HKUST (Guangzhou)	0.2	0.7	0.7	0.4	0.8	0.8	0.2	0.9	0.8
Tianhu (Guangzhou)	0.1	0.6	0.6	0.5	1.2	1.1	0.3	1.2	0.8
Zhudong (Guangzhou)	0.7	1.0	1.0	0.1	1.0	1.0	0.3	1.0	1.0
Tongxinling (Shenzhen)	0.5	0.8	0.7	0.4	0.9	0.9	0.4	0.8	0.8
Jinjuzui (Foshan)	0.2	0.8	0.7	0.3	1.0	0.9	0.3	1.0	0.9
Huijingcheng (Foshan)	0.5	1.0	1.0	0.5	1.3	1.3	0.5	1.1	1.0
Tangjia (Zhuhai)	0.3	0.7	0.6	0.2	0.6	0.6	0.2	0.7	0.6
Donghu (Jiangmen)	0.5	0.9	0.8	0.4	1.1	1.0	0.4	1.0	1.0
Duanfen (Jiangmen)	0.4	0.8	0.8	0.5	0.9	0.9	0.5	1.0	0.9
Huaguoshan (Jiangmen)	0.5	0.8	0.8	0.5	1.1	1.1	0.3	1.0	1.0
Chengzhong (Zhaoqing)	0.5	0.8	0.8	0.5	1.0	1.0	0.4	1.0	0.9
Xiapu (Huizhou)	0.6	0.9	0.8	0.3	1.0	0.9	0.4	0.7	0.6
Xijiao (Huizhou)	--	--	--	--	--	--	--	--	--
Jinguowan (Huizhou)	0.2	0.7	0.7	0.4	1.0	1.0	0.3	0.7	0.7
Zimaling (Zhongshan)	0.3	0.8	0.7	0.3	0.8	0.8	0.3	1.0	0.9
Nanchengyuanling (Dongguan)	0.3	0.9	0.9	0.2	0.8	0.8	0.5	1.0	0.9
Tap Mun (Hong Kong)	0.3	0.6	0.6	0.3	0.7	0.6	0.3	0.6	0.5
Tsuen Wan (Hong Kong)	0.4	0.9	0.9	0.5	0.8	0.7	0.3	0.9	0.9
Yuen Long (Hong Kong)	0.5	0.8	0.8	0.8	1.1	1.0	0.6	0.9	0.9
Tung Chung (Hong Kong)	0.3	0.7	0.6	0.3	0.6	0.6	0.3	0.7	0.6
Taipa Grande (Macao)	0.4	0.9	0.8	0.4	0.9	0.9	0.4	1.0	0.9

Table 4.4c: The monthly averages of CO

Monitoring Station	January 2023	February 2023	March 2023
Luhu (Guangzhou)	0.6	0.8	0.7
Nanshadawen (Guangzhou)	0.6	0.9	0.5
Nansha-HKUST (Guangzhou)	0.4	0.6	0.5
Tianhu (Guangzhou)	0.4	0.8	0.5
Zhudong (Guangzhou)	0.9	0.7	0.7
Tongxinling (Shenzhen)	0.6	0.7	0.6
Jinjuzui (Foshan)	0.5	0.6	0.6
Huijingcheng (Foshan)	0.8	0.9	0.7
Tangjia (Zhuhai)	0.5	0.4	0.4
Donghu (Jiangmen)	0.6	0.7	0.6
Duanfen (Jiangmen)	0.7	0.7	0.7
Huaguoshan (Jiangmen)	0.6	0.8	0.6
Chengzhong (Zhaoqing)	0.6	0.7	0.7
Xiapu (Huizhou)	0.7	0.6	0.6
Xijiao (Huizhou)	--	--	--
Jinguowan (Huizhou)	0.5	0.7	0.5
Zimaling (Zhongshan)	0.6	0.5	0.5
Nanchengyuanling (Dongguan)	0.7	0.6	0.7
Tap Mun (Hong Kong)	0.4	0.5	0.4
Tsuen Wan (Hong Kong)	0.8	0.6	0.6
Yuen Long (Hong Kong)	0.7	0.9	0.8
Tung Chung (Hong Kong)	0.5	0.4	0.5
Taipa Grande (Macao)	0.6	0.6	0.6

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

Monitoring Station	January 2023		February 2023		March 2023	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	9	80	16	97	8	118
Nanshadawen (Guangzhou)	8	72	17	74	7	125
Nansha-HKUST (Guangzhou)	9	62	17	65	10	106
Tianhu (Guangzhou)	5	74	12	69	5	132
Zhudong (Guangzhou)	11	99	19	95	12	126
Tongxinling (Shenzhen)	15	66	13	60	14	102
Jinjuzui (Foshan)	10	77	20	81	13	120
Huijingcheng (Foshan)	15	85	16	134	11	135
Tangjia (Zhuhai)	14	71	17	70	16	87
Donghu (Jiangmen)	12	80	20	88	15	124
Duanfen (Jiangmen)	8	71	17	58	13	104
Huaguoshan (Jiangmen)	14	83	16	96	17	118
Chengzhong (Zhaoqing)	11	91	11	97	8	131
Xiapu (Huizhou)	10	72	12	71	7	108
Xijiao (Huizhou)	--	--	--	--	--	--
Jinguowan (Huizhou)	7	65	11	49	6	97
Zimaling (Zhongshan)	11	71	15	71	12	110
Nanchengyuanling (Dongguan)	11	81	14	92	10	117
Tap Mun (Hong Kong)	6	60	10	67	7	75
Tsuen Wan (Hong Kong)	14	51	10	61	9	76
Yuen Long (Hong Kong)	12	58	2	70	11	85
Tung Chung (Hong Kong)	8	59	13	65	8	74
Taipa Grande (Macao)	18	86	21	76	20	115

Table 4.5b: The monthly averages of PM₁₀

Monitoring Station	January 2023	February 2023	March 2023
Luhu (Guangzhou)	42	51	55
Nanshadawen (Guangzhou)	41	46	51
Nansha-HKUST (Guangzhou)	36	38	42
Tianhu (Guangzhou)	34	33	45
Zhudong (Guangzhou)	41	53	67
Tongxinling (Shenzhen)	38	34	41
Jinjuzui (Foshan)	45	49	53
Huijingcheng (Foshan)	50	63	63
Tangjia (Zhuhai)	43	39	43
Donghu (Jiangmen)	45	54	55
Duanfen (Jiangmen)	36	36	41
Huaguoshan (Jiangmen)	46	56	61
Chengzhong (Zhaoqing)	43	56	58
Xiapu (Huizhou)	42	42	50
Xijiao (Huizhou)	--	--	--
Jinguowan (Huizhou)	34	30	39
Zimaling (Zhongshan)	42	41	43
Nanchengyuanling (Dongguan)	41	51	57
Tap Mun (Hong Kong)	31	28	30
Tsuen Wan (Hong Kong)	32	29	31
Yuen Long (Hong Kong)	34	22	34
Tung Chung (Hong Kong)	29	30	26
Taipa Grande (Macao)	50	45	49

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

Monitoring Station	January 2023		February 2023		March 2023	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	6	64	9	59	5	54
Nanshadawen (Guangzhou)	3	55	5	38	10	48
Nansha-HKUST (Guangzhou)	8	43	6	41	6	40
Tianhu (Guangzhou)	4	56	9	50	3	48
Zhudong (Guangzhou)	6	84	12	64	11	76
Tongxinling (Shenzhen)	7	40	6	41	8	47
Jinjuzui (Foshan)	6	53	9	47	7	50
Huijingcheng (Foshan)	8	59	10	86	8	62
Tangjia (Zhuhai)	3	48	4	43	8	45
Donghu (Jiangmen)	5	46	3	53	7	61
Duanfen (Jiangmen)	8	45	12	43	10	40
Huaguoshan (Jiangmen)	5	53	5	69	5	68
Chengzhong (Zhaoqing)	7	75	6	59	5	64
Xiapu (Huizhou)	8	57	4	44	4	47
Xijiao (Huizhou)	--	--	--	--	--	--
Jinguowan (Huizhou)	5	58	7	31	3	43
Zimaling (Zhongshan)	6	61	9	44	12	55
Nanchengyuanling (Dongguan)	8	66	7	45	6	49
Tap Mun (Hong Kong)	4	36	6	37	5	32
Tsuen Wan (Hong Kong)	10	33	9	35	8	42
Yuen Long (Hong Kong)	9	39	3	58	9	49
Tung Chung (Hong Kong)	3	38	9	40	3	35
Taipa Grande (Macao)	5	45	8	38	5	40

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

Monitoring Station	January 2023	February 2023	March 2023
Luhu (Guangzhou)	28	30	29
Nanshadawen (Guangzhou)	23	22	25
Nansha-HKUST (Guangzhou)	24	23	23
Tianhu (Guangzhou)	20	23	23
Zhudong (Guangzhou)	28	34	37
Tongxinling (Shenzhen)	24	19	22
Jinjuzui (Foshan)	27	26	25
Huijingcheng (Foshan)	29	36	31
Tangjia (Zhuhai)	27	24	24
Donghu (Jiangmen)	27	28	26
Duanfen (Jiangmen)	27	24	23
Huaguoshan (Jiangmen)	33	37	34
Chengzhong (Zhaoqing)	28	35	32
Xiapu (Huizhou)	27	25	25
Xijiao (Huizhou)	--	--	--
Jinguowan (Huizhou)	25	19	23
Zimaling (Zhongshan)	29	24	25
Nanchengyuanling (Dongguan)	26	27	27
Tap Mun (Hong Kong)	19	16	16
Tsuen Wan (Hong Kong)	21	18	19
Yuen Long (Hong Kong)	24	16	22
Tung Chung (Hong Kong)	18	18	15
Taipa Grande (Macao)	24	19	19

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 ⁴ (Guangzhou)	Shinan Road, Dongchong Town, Nansha	City	23m	10m	Jan 2021
Nansha-HKUST ⁵ (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 ⁶ (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	Touristl/ eco-protected	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

⁴ Modiesha (Guangzhou) station closed permanently owing to insufficient space after the extensive renovation work at station, whereas Nanshadawen (Guangzhou) station joined the network in the 1st quarter of 2021.

⁵ Wanqingsha (Guangzhou) station was renamed as Nansha-HKUST (Guangzhou) station in the 1st quarter of 2019.

⁶ Liyuan (Shenzhen) station was renamed as Tongxinling (Shenzhen) station in the 1st quarter of 2019.

Xiapu (Huizhou)	No. 4 Xiabuhengjiang Road No. 3, Huicheng District	Urban: commercial	49m	20m	Dec 1999
Xijiao ⁷ (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
Zimaling (Zhongshan)	Zimaling Park, Zhongshan	Mixed residential/ commercial	45 m	7m	Aug 2002
Nancheng- yuanling ⁸ (Dongguan)	Dongguan administration center	Mixed residential/ commercial/industrial	40 m	19m	May 2021
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	3m (gaseous pollutants) ⁹ / 5m (particulate matter)	Mar 1999

⁷ Xijiao (Huizhou) station was relocated to Zhangbei Yaowei She Nationality Primary School, Henghe Town, Boluo County, in the 4th quarter of 2019. Due to potential safety hazards of site load-bearing issue, the station is out of service from 00:00 on August 23, 2022. The new station completed reconstruction and resumed operation on the evening of April 18, 2023, which relocated to Shixia town, Boluo County, and renamed as "Shixia (Huizhou)".

⁸ Nancheng-yuanling (Dongguan) station was relocated to Dongguan administration center in May 2021. The distance between the old and new sites is about 600 metres.

⁹ Gaseous pollutants include Sulphur dioxide (SO₂), Nitrogen dioxide (NO₂), Ozone (O₃) and Carbon monoxide (CO).

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