

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

April to June 2023

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

Report Number : PRDAIR-2023-2

**Report Prepared by : Ecological and Environmental Monitoring
Centre of Guangdong
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	5
4. Statistical Results of Pollutant Concentrations	5
Annex A: Site Information of Monitoring Stations	22
Annex B: Measurement Methods of Air Pollutant Concentration	24

List of Tables

	<u>Page</u>
Table 4.1a: The monthly maxima and minima of hourly averages of SO ₂	6
Table 4.1b: The monthly maxima and minima of daily averages of SO ₂	8
Table 4.1c : The monthly averages of SO ₂	9
Table 4.2a: The monthly maxima and minima of hourly averages of NO ₂	10
Table 4.2b: The monthly maxima and minima of daily averages of NO ₂	11
Table 4.2c: The monthly averages of NO ₂	12
Table 4.3a: The monthly maxima and minima of hourly averages of O ₃	13
Table 4.3b: Daily maximum 8-hour averages of O ₃ (the monthly maxima, minima and the 90 th percentile)	14
Table 4.3c: The monthly averages of O ₃	15
Table 4.4a: The monthly maxima and minima of hourly averages of CO	16
Table 4.4b: Daily averages of CO (the monthly maxima, minima and the 95 th percentile)	17
Table 4.4c: The monthly averages of CO	18
Table 4.5a: The monthly maxima and minima of daily averages of PM ₁₀	19
Table 4.5b: The monthly averages of PM ₁₀	20
Table 4.6a: The monthly maxima and minima of daily averages of PM _{2.5}	21
Table 4.6b: The monthly averages of PM _{2.5}	22

List of Figures

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 April to June, the second quarter of 2023. It is the thirty-eighth report published in the form of a quarterly report and the thirty-fifth 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

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.

Quality Monitoring Network", 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 Guangdong-Hong Kong-Macao PRD region. Among these, eighteen stations are in the PRD, four stations in Hong Kong and one station in Macau.

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.

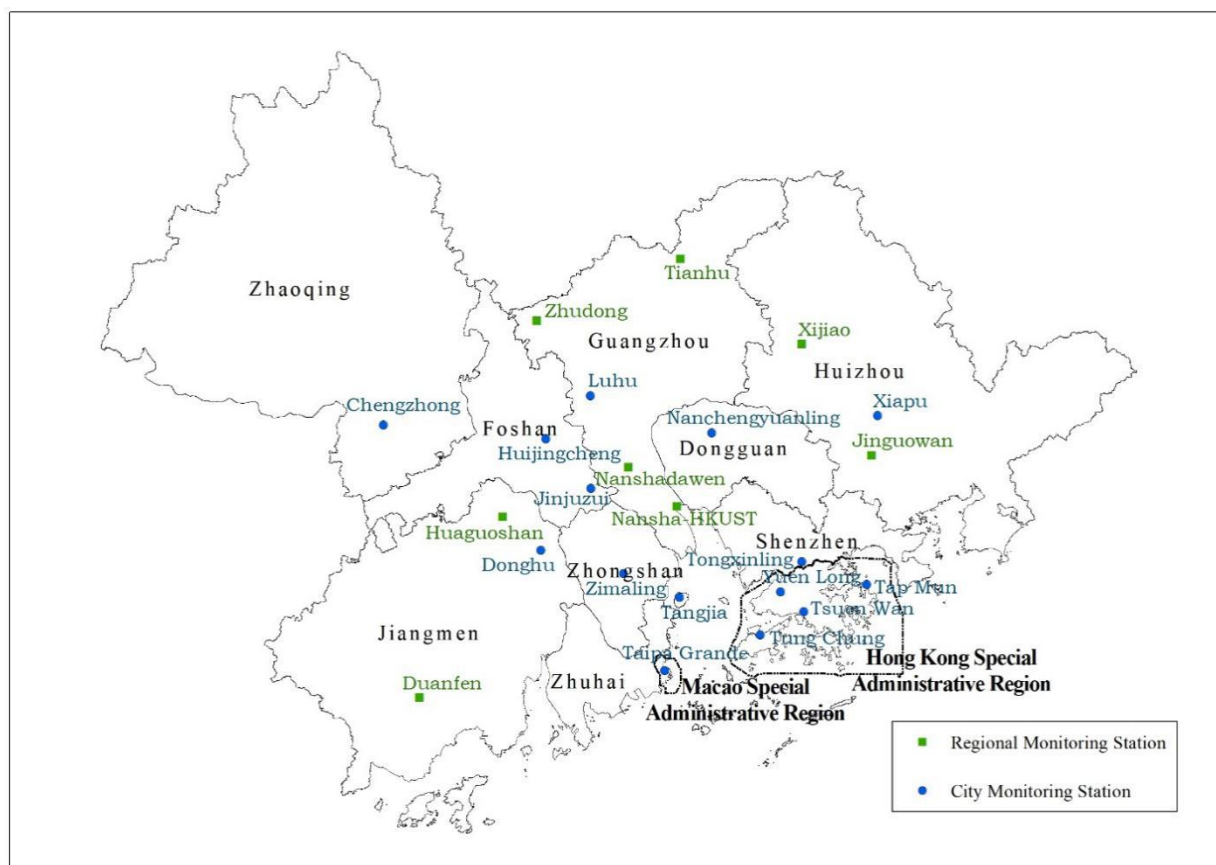


Figure 2.1: Spatial Distribution of Monitoring Stations in the Network²

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 97.5% in the second 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 April to June 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	April 2023		May 2023		June 2023	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	3	16	3	15	4	9
Nanshadawen (Guangzhou)	1	14	5	18	6	18
Nansha-HKUST (Guangzhou)	1	13	1	11	1	8
Tianhu (Guangzhou)	3	9	2	11	3	7
Zhudong (Guangzhou)	1	13	1	10	1	11
Tongxinling (Shenzhen)	2	5	2	9	2	13
Jinjuzui (Foshan)	1	8	1	18	2	8
Huijingcheng (Foshan)	1	16	3	34	4	18
Tangjia (Zhuhai)	3	14	4	12	5	9
Donghu (Jiangmen)	4	16	3	12	3	7
Duanfen (Jiangmen)	5	18	6	17	5	14
Huaguoshan (Jiangmen)	4	28	7	33	5	22
Chengzhong (Zhaoqing)	7	39	6	113	7	94
Xiapu (Huizhou)	2	14	3	16	2	9
Shixia (Huizhou)	5	13	3	17	2	20
Jinguowan (Huizhou)	4	13	5	31	5	10
Zimaling (Zhongshan)	3	13	2	33	2	16
Nanchengyuanling (Dongguan)	7	26	5	17	6	13
Tap Mun (Hong Kong)	4	10	4	11	3	9

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.

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

Tsuen Wan (Hong Kong)	1	11	2	26	2	10
Yuen Long (Hong Kong)	3	9	3	13	3	8
Tung Chung (Hong Kong)	0	12	1	7	2	7
Taipa Grande (Macao)	4	10	4	15	5	9

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

Monitoring Station	April 2023		May 2023		June 2023	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	4	7	4	7	5	6
Nanshadawen (Guangzhou)	1	7	5	9	7	9
Nansha-HKUST (Guangzhou)	1	8	1	6	1	3
Tianhu (Guangzhou)	3	6	3	6	3	6
Zhudong (Guangzhou)	2	8	1	4	1	5
Tongxinling (Shenzhen)	3	4	3	5	2	4
Jinjuzui (Foshan)	1	5	2	5	2	4
Huijingcheng (Foshan)	2	7	4	14	4	9
Tangjia (Zhuhai)	3	6	4	7	6	7
Donghu (Jiangmen)	5	10	4	8	4	5
Duanfen (Jiangmen)	6	11	7	10	5	9
Huaguoshan (Jiangmen)	5	12	8	16	6	13
Chengzhong (Zhaoqing)	8	17	8	24	9	30
Xiapu (Huizhou)	3	8	4	7	3	5
Shixia (Huizhou)	6	10	3	12	3	10
Jinguowan (Huizhou)	5	7	5	11	6	7
Zimaling (Zhongshan)	4	10	2	8	3	5
Nanchengyuanling (Dongguan)	8	12	6	11	7	9
Tap Mun (Hong Kong)	4	7	4	6	4	7
Tsuen Wan (Hong Kong)	1	5	2	8	2	5
Yuen Long (Hong Kong)	4	6	4	9	4	6
Tung Chung (Hong Kong)	1	4	2	3	3	4
Taipa Grande (Macao)	4	7	4	7	5	6

Table 4.1c : The monthly averages of SO₂

Monitoring Station	April 2023	May 2023	June 2023
Luhu (Guangzhou)	5	5	6
Nanshadawen (Guangzhou)	3	7	8
Nansha-HKUST (Guangzhou)	2	2	2
Tianhu (Guangzhou)	4	4	4
Zhudong (Guangzhou)	4	2	3
Tongxinling (Shenzhen)	4	3	3
Jinjuzui (Foshan)	3	4	3
Huijingcheng (Foshan)	4	5	5
Tangjia (Zhuhai)	4	5	6
Donghu (Jiangmen)	7	6	4
Duanfen (Jiangmen)	8	8	7
Huaguoshan (Jiangmen)	9	11	9
Chengzhong (Zhaoqing)	11	13	14
Xiapu (Huizhou)	5	5	4
Shixia (Huizhou)	8*	7	7
Jinguowan (Huizhou)	6	6	6
Zimaling (Zhongshan)	6	5	4
Nanchengyuanling (Dongguan)	9	9	8
Tap Mun (Hong Kong)	5	5	5
Tsuen Wan (Hong Kong)	3	3	4
Yuen Long (Hong Kong)	5	5	4
Tung Chung (Hong Kong)	2	3	3
Taipa Grande (Macao)	5	5	5

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

Monitoring Station	April 2023		May 2023		June 2023	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	8	90	6	107	5	70
Nanshadawen (Guangzhou)	3	104	1	100	1	77
Nansha-HKUST (Guangzhou)	3	88	1	84	1	67
Tianhu (Guangzhou)	4	40	3	27	2	23
Zhudong (Guangzhou)	7	66	7	71	3	50
Tongxinling (Shenzhen)	3	64	1	68	1	52
Jinjuzui (Foshan)	4	84	1	67	1	65
Huijingcheng (Foshan)	11	106	8	79	5	65
Tangjia (Zhuhai)	3	65	1	42	1	40
Donghu (Jiangmen)	6	75	3	65	2	44
Duanfen (Jiangmen)	3	41	2	40	1	20
Huaguoshan (Jiangmen)	5	80	1	75	1	42
Chengzhong (Zhaoqing)	8	105	5	90	5	85
Xiapu (Huizhou)	4	58	3	38	3	32
Shixia (Huizhou)	6	38	2	36	3	49
Jinguowan (Huizhou)	5	50	6	49	5	33
Zimaling (Zhongshan)	3	61	2	64	1	30
Nanchengyuanling (Dongguan)	7	113	2	70	1	68
Tap Mun (Hong Kong)	1	43	1	41	0	22
Tsuen Wan (Hong Kong)	7	172	7	153	6	120
Yuen Long (Hong Kong)	6	90	8	105	7	103
Tung Chung (Hong Kong)	0	111	1	94	1	64
Taipa Grande (Macao)	4	61	2	52	2	34

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

Monitoring Station	April 2023		May 2023		June 2023	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	17	48	12	46	9	36
Nanshadawen (Guangzhou)	15	56	8	42	6	27
Nansha-HKUST (Guangzhou)	15	65	8	45	6	28
Tianhu (Guangzhou)	6	30	5	15	3	13
Zhudong (Guangzhou)	14	54	12	31	7	26
Tongxinling (Shenzhen)	5	29	4	29	3	23
Jinjuzui (Foshan)	10	51	4	40	3	28
Huijingcheng (Foshan)	18	59	14	56	10	34
Tangjia (Zhuhai)	8	34	3	23	3	17
Donghu (Jiangmen)	11	48	8	36	7	25
Duanfen (Jiangmen)	6	29	3	28	3	10
Huaguoshan (Jiangmen)	10	49	5	36	6	21
Chengzhong (Zhaoqing)	14	68	10	47	11	44
Xiapu (Huizhou)	8	28	7	24	6	14
Shixia (Huizhou)	9	23	7	22	6	17
Jinguowan (Huizhou)	8	21	10	25	9	19
Zimaling (Zhongshan)	5	38	4	36	2	16
Nanchengyuanling (Dongguan)	15	60	9	43	7	29
Tap Mun (Hong Kong)	4	16	4	14	2	10
Tsuen Wan (Hong Kong)	24	77	22	69	20	65
Yuen Long (Hong Kong)	18	49	16	60	15	56
Tung Chung (Hong Kong)	9	61	5	45	6	37
Taipa Grande (Macao)	8	36	5	32	4	20

Table 4.2c: The monthly averages of NO₂

Monitoring Station	April 2023	May 2023	June 2023
Luhu (Guangzhou)	31	28	24
Nanshadawen (Guangzhou)	35	24	19
Nansha-HKUST (Guangzhou)	32	26	16
Tianhu (Guangzhou)	11	9	7
Zhudong (Guangzhou)	28	21	18
Tongxinling (Shenzhen)	14	12	11
Jinjuzui (Foshan)	27	18	15
Huijingcheng (Foshan)	32	28	23
Tangjia (Zhuhai)	19	13	8
Donghu (Jiangmen)	21	17	13
Duanfen (Jiangmen)	13	9	6
Huaguoshan (Jiangmen)	24	16	13
Chengzhong (Zhaoqing)	32	25	24
Xiapu (Huizhou)	15	12	11
Shixia (Huizhou)	15*	13	10
Jinguowan (Huizhou)	13	14*	12
Zimaling (Zhongshan)	17	13	5
Nanchengyuanling (Dongguan)	30	23	18
Tap Mun (Hong Kong)	8	8	4
Tsuen Wan (Hong Kong)	42	40	36
Yuen Long (Hong Kong)	34	32	30
Tung Chung (Hong Kong)	24	20	17
Taipa Grande (Macao)	20	14	9

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

Monitoring Station	April 2023		May 2023		June 2023	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	1	270	1	263	2	263
Nanshadawen (Guangzhou)	1	253	1	256	1	272
Nansha-HKUST (Guangzhou)	1	289	1	281	1	236
Tianhu (Guangzhou)	22	236	27	221	21	174
Zhudong (Guangzhou)	2	246	1	248	1	262
Tongxinling (Shenzhen)	2	176	9	332	1	191
Jinjuzui (Foshan)	2	246	2	209	2	210
Huijingcheng (Foshan)	1	254	1	245	3	278
Tangjia (Zhuhai)	2	202	2	261	6	192
Donghu (Jiangmen)	2	312	4	246	3	225
Duanfen (Jiangmen)	7	261	6	199	1	175
Huaguoshan (Jiangmen)	2	275	2	197	1	205
Chengzhong (Zhaoqing)	5	204	5	175	5	196
Xiapu (Huizhou)	5	189	9	220	4	187
Shixia (Huizhou)	4	189	1	201	1	232
Jinguowan (Huizhou)	2	170	1	248	1	196
Zimaling (Zhongshan)	1	227	1	265	3	226
Nanchengyuanling (Dongguan)	5	287	6	269	5	266
Tap Mun (Hong Kong)	11	184	3	234	5	189
Tsuen Wan (Hong Kong)	0	171	0	193	1	138
Yuen Long (Hong Kong)	0	186	5	358	1	204
Tung Chung (Hong Kong)	2	191	3	291	4	146
Taipa Grande (Macao)	4	226	6	227	15	191

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

Monitoring Station	April 2023			May 2023			June 2023		
	Min	Max	90 th per	Min	Max	90 th per	Min	Max	90 th per
Luhu (Guangzhou)	27	229	141	35	224	170	32	239	180
Nanshadawen (Guangzhou)	28	211	146	44	214	188	15	219	207
Nansha-HKUST (Guangzhou)	25	236	170	52	254	183	35	198	163
Tianhu (Guangzhou)	47	205	148	59	183	138	50	156	136
Zhudong (Guangzhou)	21	184	175	34	196	169	34	201	174
Tongxinling (Shenzhen)	10	148	114	47	270	134	23	158	109
Jinjuzui (Foshan)	28	189	119	42	183	167	28	194	149
Huijingcheng (Foshan)	23	209	138	38	205	175	36	221	176
Tangjia (Zhuhai)	33	183	164	58	241	131	35	165	139
Donghu (Jiangmen)	36	236	146	48	218	155	34	203	172
Duanfen (Jiangmen)	35	213	148	33	183	131	39	137	131
Huaguoshan (Jiangmen)	24	240	158	35	154	133	24	187	135
Chengzhong (Zhaoqing)	20	184	123	57	153	140	48	190	144
Xiapu (Huizhou)	36	165	133	60	185	148	39	175	145
Shixia (Huizhou)	28	157	149	43	186	157	44	212	145
Jinguowan (Huizhou)	16	140	113	43	205	127	24	173	115
Zimaling (Zhongshan)	33	200	150	58	231	166	34	190	161
Nanchengyuanling (Dongguan)	25	221	171	60	237	154	35	240	173
Tap Mun (Hong Kong)	38	171	137	47	172	154	27	158	97
Tsuen Wan (Hong Kong)	11	125	104	21	153	111	12	104	59
Yuen Long (Hong Kong)	8	166	114	39	289	129	11	156	83
Tung Chung (Hong Kong)	7	125	112	24	234	118	19	90	74
Taipa Grande (Macao)	31	205	152	52	200	154	38	159	122

Table 4.3c: The monthly averages of O₃

Monitoring Station	April 2023	May 2023	June 2023
Luhu (Guangzhou)	55	63	58
Nanshadawen (Guangzhou)	54	61	60
Nansha-HKUST (Guangzhou)	65	79	52
Tianhu (Guangzhou)	81	80	71
Zhudong (Guangzhou)	54	64	63
Tongxinling (Shenzhen)	66	67	46
Jinjuzui (Foshan)	54	61	53
Huijingcheng (Foshan)	57	67	64
Tangjia (Zhuhai)	75	73	59
Donghu (Jiangmen)	68	71	59
Duanfen (Jiangmen)	78*	67	52
Huaguoshan (Jiangmen)	60	53	47
Chengzhong (Zhaoqing)	53	63	57
Xiapu (Huizhou)	76	75	57
Shixia (Huizhou)	69*	66	52
Jinguowan (Huizhou)	60	58	39
Zimaling (Zhongshan)	70	72	58
Nanchengyuanling (Dongguan)	71	75	61
Tap Mun (Hong Kong)	88	79	51
Tsuen Wan (Hong Kong)	54	49	28
Yuen Long (Hong Kong)	61	61	37
Tung Chung (Hong Kong)	58	59	37
Taipa Grande (Macao)	86	80	63

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

Monitoring Station	April 2023		May 2023		June 2023	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	0.4	1.2	0.3	1.1	0.2	2.0
Nanshadawen (Guangzhou)	0.2	1.7	0.0	1.0	0.1	0.7
Nansha-HKUST (Guangzhou)	0.2	1.1	0.0	1.0	0.1	1.1
Tianhu (Guangzhou)	0.3	1.0	0.2	0.7	0.3	1.0
Zhudong (Guangzhou)	0.2	0.9	0.1	1.1	0.2	0.8
Tongxinling (Shenzhen)	0.4	1.0	0.4	1.0	0.4	1.1
Jinjuzui (Foshan)	0.4	1.2	0.3	1.1	0.4	1.2
Huijingcheng (Foshan)	0.4	1.3	0.2	1.1	0.4	1.0
Tangjia (Zhuhai)	0.1	0.8	0.2	0.7	0.0	0.7
Donghu (Jiangmen)	0.4	1.2	0.3	1.5	0.2	1.1
Duanfen (Jiangmen)	0.2	0.9	0.4	1.0	0.5	1.0
Huaguoshan (Jiangmen)	0.3	1.0	0.2	1.1	0.2	1.0
Chengzhong (Zhaoqing)	0.3	1.3	0.3	0.9	0.3	0.9
Xiapu (Huizhou)	0.2	0.8	0.4	1.0	0.4	1.2
Shixia (Huizhou)	0.2	0.9	0.2	0.9	0.3	1.1
Jinguowan (Huizhou)	0.3	0.9	0.3	0.8	0.3	0.9
Zimaling (Zhongshan)	0.2	1.0	0.1	0.9	0.1	0.8
Nanchengyuanling (Dongguan)	0.4	1.3	0.3	1.2	0.4	1.0
Tap Mun (Hong Kong)	0.3	0.7	0.3	0.8	0.2	0.7
Tsuen Wan (Hong Kong)	0.2	1.0	0.2	1.0	0.2	0.9
Yuen Long (Hong Kong)	0.3	0.9	0.3	1.0	0.4	1.0
Tung Chung (Hong Kong)	0.4	1.2	0.3	0.8	0.2	0.7
Taipa Grande (Macao)	0.2	0.9	0.3	0.9	0.3	0.8

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

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

Table 4.4c: The monthly averages of CO

Monitoring Station	April 2023	May 2023	June 2023
Luhu (Guangzhou)	0.7	0.7	0.7
Nanshadawen (Guangzhou)	0.7	0.4	0.4
Nansha-HKUST (Guangzhou)	0.6	0.5	0.5
Tianhu (Guangzhou)	0.6	0.5	0.6
Zhudong (Guangzhou)	0.5	0.5	0.5
Tongxinling (Shenzhen)	0.6	0.6	0.6
Jinjuzui (Foshan)	0.6	0.6	0.5
Huijingcheng (Foshan)	0.7	0.6	0.7
Tangjia (Zhuhai)	0.4	0.3	0.3
Donghu (Jiangmen)	0.6	0.6	0.6
Duanfen (Jiangmen)	0.5*	0.6	0.6
Huaguoshan (Jiangmen)	0.6	0.6	0.5
Chengzhong (Zhaoqing)	0.7	0.5	0.6
Xiapu (Huizhou)	0.5	0.6	0.7
Shixia (Huizhou)	0.5*	0.5	0.5
Jinguowan (Huizhou)	0.6	0.5	0.5
Zimaling (Zhongshan)	0.5	0.4	0.3
Nanchengyuanling (Dongguan)	0.7	0.6	0.6
Tap Mun (Hong Kong)	0.5	0.5	0.4
Tsuen Wan (Hong Kong)	0.5	0.5	0.5
Yuen Long (Hong Kong)	0.6	0.6	0.6
Tung Chung (Hong Kong)	0.6	0.5	0.4
Taipa Grande (Macao)	0.5	0.5	0.5

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

Monitoring Station	April 2023		May 2023		June 2023	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	18	71	19	64	14	47
Nanshadawen (Guangzhou)	15	75	22	68	16	49
Nansha-HKUST (Guangzhou)	20	67	17	44	7	49
Tianhu (Guangzhou)	11	73	11	79	10	42
Zhudong (Guangzhou)	13	112	18	78	18	49
Tongxinling (Shenzhen)	18	64	13	56	10	33
Jinjuzui (Foshan)	17	78	21	55	11	40
Huijingcheng (Foshan)	18	83	20	62	12	47
Tangjia (Zhuhai)	21	66	15	60	7	33
Donghu (Jiangmen)	22	85	21	60	14	37
Duanfen (Jiangmen)	20	82	15	45	9	28
Huaguoshan (Jiangmen)	22	93	23	53	16	38
Chengzhong (Zhaoqing)	12	134	9	72	13	55
Xiapu (Huizhou)	16	73	14	66	12	43
Shixia (Huizhou)	16	41	15	48	18	50
Jinguowan (Huizhou)	13	61	13	54	11	40
Zimaling (Zhongshan)	19	70	17	61	10	33
Nanchengyuanling (Dongguan)	16	78	18	56	13	43
Tap Mun (Hong Kong)	13	51	9	49	6	23
Tsuen Wan (Hong Kong)	16	50	12	53	6	29
Yuen Long (Hong Kong)	15	47	11	54	7	29
Tung Chung (Hong Kong)	12	62	10	54	6	28
Taipa Grande (Macao)	24	93	15	75	11	33

Table 4.5b: The monthly averages of PM₁₀

Monitoring Station	April 2023	May 2023	June 2023
Luhu (Guangzhou)	40	38	26
Nanshadawen (Guangzhou)	37	41	28
Nansha-HKUST (Guangzhou)	35	29	23
Tianhu (Guangzhou)	33	30	19
Zhudong (Guangzhou)	51	43	29
Tongxinling (Shenzhen)	34	30	16
Jinjuzui (Foshan)	40	35	23
Huijingcheng (Foshan)	48	41	27
Tangjia (Zhuhai)	36	32	16
Donghu (Jiangmen)	44	38	24
Duanfen (Jiangmen)	39	26	17
Huaguoshan (Jiangmen)	44	37	27
Chengzhong (Zhaoqing)	50	40	27
Xiapu (Huizhou)	39	34	21
Shixia (Huizhou)	31*	34*	24
Jinguowan (Huizhou)	30	30	18
Zimaling (Zhongshan)	35	33	18
Nanchengyuanling (Dongguan)	41	36	23
Tap Mun (Hong Kong)	27	24	10
Tsuen Wan (Hong Kong)	27	25	13
Yuen Long (Hong Kong)	25	25	12
Tung Chung (Hong Kong)	26	24	12
Taipa Grande (Macao)	46	38	19

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

Monitoring Station	April 2023		May 2023		June 2023	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	10	37	8	37	7	30
Nanshadawen (Guangzhou)	7	33	11	42	9	31
Nansha-HKUST (Guangzhou)	8	37	6	41	5	29
Tianhu (Guangzhou)	6	32	7	25	5	28
Zhudong (Guangzhou)	14	69	12	44	10	35
Tongxinling (Shenzhen)	8	36	7	36	4	20
Jinjuzui (Foshan)	10	34	10	29	5	22
Huijingcheng (Foshan)	9	44	7	33	7	28
Tangjia (Zhuhai)	7	37	9	36	4	21
Donghu (Jiangmen)	10	45	8	35	5	24
Duanfen (Jiangmen)	10	42	6	25	4	16
Huaguoshan (Jiangmen)	13	43	13	40	9	26
Chengzhong (Zhaoqing)	6	74	7	43	6	36
Xiapu (Huizhou)	5	35	9	29	5	23
Shixia (Huizhou)	9	23	10	31	7	34
Jinguowan (Huizhou)	8	33	9	37	5	31
Zimaling (Zhongshan)	9	37	9	42	4	25
Nanchengyuanling (Dongguan)	8	38	8	43	7	27
Tap Mun (Hong Kong)	7	25	5	24	2	15
Tsuen Wan (Hong Kong)	10	30	9	38	4	22
Yuen Long (Hong Kong)	11	29	7	37	4	22
Tung Chung (Hong Kong)	9	35	8	38	3	22
Taipa Grande (Macao)	8	32	4	34	2	14

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

Monitoring Station	April 2023	May 2023	June 2023
Luhu (Guangzhou)	22	21	14
Nanshadawen (Guangzhou)	17	23	16
Nansha-HKUST (Guangzhou)	20	18	12
Tianhu (Guangzhou)	17	16	10
Zhudong (Guangzhou)	32	26	17
Tongxinling (Shenzhen)	18	17	8
Jinjuzui (Foshan)	19	17	11
Huijingcheng (Foshan)	23	15	14
Tangjia (Zhuhai)	20	18	9
Donghu (Jiangmen)	21	19	12
Duanfen (Jiangmen)	20*	13	8
Huaguoshan (Jiangmen)	26	23	18
Chengzhong (Zhaoqing)	28	23	17
Xiapu (Huizhou)	18	16	9
Shixia (Huizhou)	18*	20*	12
Jinguowan (Huizhou)	18	18	11
Zimaling (Zhongshan)	20	20	10
Nanchengyuanling (Dongguan)	21	19	13
Tap Mun (Hong Kong)	14	12	5
Tsuen Wan (Hong Kong)	17	16	9
Yuen Long (Hong Kong)	16	16	8
Tung Chung (Hong Kong)	16	15	8
Taipa Grande (Macao)	17	14	5

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	Jan 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	Tourist/ 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
Shixia ⁷ (Huizhou)	Community Service Center, Shixiatun Village, Changning 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 a monitoring station located in Shixiatun Village, Changning Town, Boluo County, Huizhou City in the 2nd quarter of 2023, and changed its name to " 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