

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

October to December 2021

**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 2021. It is the thirty-second report published in the form of a quarterly report and the twenty-ninth 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 Center¹ (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 Guangdong Ecological and Environmental Monitoring Center (GDEEMC), HKEPD, Environmental Protection Bureau of Macau SARG and the Meteorological

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

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 Centers 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.

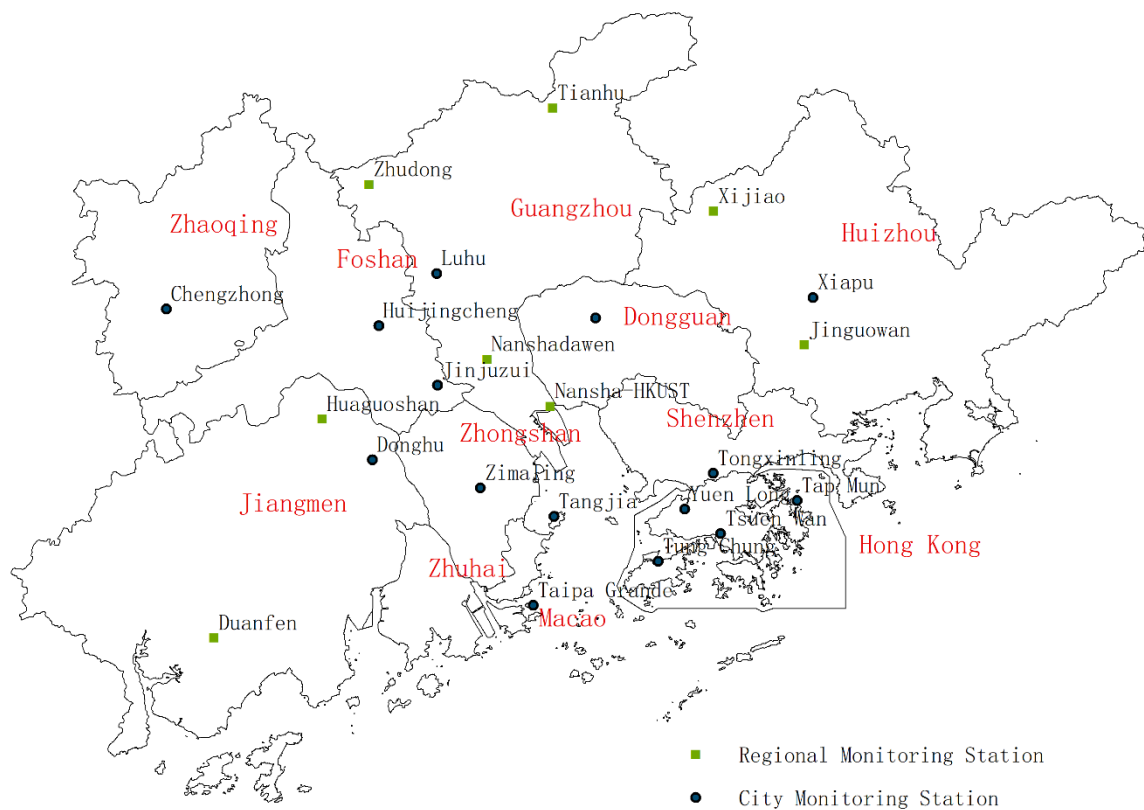


Figure 2.1: Spatial Distribution of Monitoring Stations in the Network

Remark: 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 2021. The average data capture rate of hourly air pollutant monitoring data measured at all monitoring stations was 98.0% 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 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	October 2021		November 2021		December 2021	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	4	11	6	13	4	16
Nanshadawen (Guangzhou)	5	26	7	31	6	28
Nansha-HKUST (Guangzhou)	6	21	6	19	6	20
Tianhu (Guangzhou)	6	16	6	24	6	19
Zhudong (Guangzhou)	5	15	5	18	6	17
Tongxinling (Shenzhen)	4	8	4	9	1	9
Jinjuzui (Foshan)	1	12	1	12	2	11
Huijingcheng (Foshan)	4	22	4	22	4	37
Tangjia (Zhuhai)	4	13	4	17	7	15
Donghu (Jiangmen)	4	20	5	22	5	21
Duanfen (Jiangmen)	1	15	2	19	2	26
Huaguoshan (Jiangmen)	2	82	2	52	3	45
Chengzhong (Zhaoqing)	5	75	5	54	4	54
Xiapu (Huizhou)	6	28	6	66	2	17
Xijiao (Huizhou)	2	9	2	10	2	9
Jinguowan (Huizhou)	3	10	3	10	4	10
Zimaling (Zhongshan)	1	13	3	19	3	19
Nanchengyuanling (Dongguan)	5	14	7	17	5	15
Tap Mun (Hong Kong)	5	10	5	13	6	14
Tsuen Wan (Hong Kong)	3	14	3	12	3	14
Yuen Long (Hong Kong)	8	13	9	18	1	20
Tung Chung (Hong Kong)	1	12	0	7	1	14
Taipa Grande (Macao)	4	12	5	14	0	17

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 2021		November 2021		December 2021	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	5	8	6	11	5	11
Nanshadawen (Guangzhou)	6	12	8	17	7	16
Nansha-HKUST (Guangzhou)	6	10	7	13	7	13
Tianhu (Guangzhou)	6	10	7	13	7	14
Zhudong (Guangzhou)	6	12	6	12	6	11
Tongxinling (Shenzhen)	5	6	5	7	1	7
Jinjuzui (Foshan)	1	8	2	7	2	6
Huijingcheng (Foshan)	5	9	5	12	5	13
Tangjia (Zhuhai)	4	7	6	10	8	11
Donghu (Jiangmen)	5	11	5	13	5	11
Duanfen (Jiangmen)	2	8	3	13	3	11
Huaguoshan (Jiangmen)	2	19	4	16	5	13
Chengzhong (Zhaoqing)	6	22	6	21	5	17
Xiapu (Huizhou)	7	13	8	21	2	11
Xijiao (Huizhou)	2	5	2	5	2	5
Jinguowan (Huizhou)	3	6	4	7	4	7
Zimaling (Zhongshan)	2	8	4	11	5	10
Nanchengyuanling (Dongguan)	6	10	8	12	7	11
Tap Mun (Hong Kong)	6	8	6	11	7	11
Tsuen Wan (Hong Kong)	4	6	4	7	4	8
Yuen Long (Hong Kong)	8	11	10	14	1	15
Tung Chung (Hong Kong)	2	8	2	4	2	7
Taipa Grande (Macao)	5	8	5	10	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 2021	November 2021	December 2021
Luhu (Guangzhou)	6	8	8
Nanshadawen (Guangzhou)	8	11	12
Nansha-HKUST (Guangzhou)	8	10	10
Tianhu (Guangzhou)	7	9	10
Zhudong (Guangzhou)	8	9	9
Tongxinling (Shenzhen)	5	6	5
Jinjuzui (Foshan)	3	5	4
Huijingcheng (Foshan)	7	8	8
Tangjia (Zhuhai)	6	8	10
Donghu (Jiangmen)	7	9	8
Duanfen (Jiangmen)	4	7	7
Huaguoshan (Jiangmen)	7	10	10
Chengzhong (Zhaoqing)	10	12	10
Xiapu (Huizhou)	8	12	6
Xijiao (Huizhou)	3	3	3
Jinguowan (Huizhou)	4	5	5
Zimaling (Zhongshan)	5	7	7
Nanchengyuanling (Dongguan)	7	9	9
Tap Mun (Hong Kong)	7	8	9
Tsuen Wan (Hong Kong)	5	5	6
Yuen Long (Hong Kong)	10	12	5
Tung Chung (Hong Kong)	6	3	4
Taipa Grande (Macao)	6	7	5

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	October 2021		November 2021		December 2021	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	9	135	11	116	13	132
Nanshadawen (Guangzhou)	6	123	12	143	21	168
Nansha-HKUST (Guangzhou)	2	103	6	105	10	133
Tianhu (Guangzhou)	1	30	5	27	5	34
Zhudong (Guangzhou)	6	63	7	72	10	78
Tongxinling (Shenzhen)	2	46	6	110	6	104
Jinjuzui (Foshan)	1	122	10	119	14	146
Huijingcheng (Foshan)	7	104	8	109	11	160
Tangjia (Zhuhai)	5	98	8	98	9	93
Donghu (Jiangmen)	5	99	10	110	14	145
Duanfen (Jiangmen)	4	52	7	63	15	67
Huaguoshan (Jiangmen)	3	72	4	80	11	111
Chengzhong (Zhaoqing)	9	118	9	117	13	136
Xiapu (Huizhou)	6	94	8	95	8	113
Xijiao (Huizhou)	2	17	4	20	4	26
Jinguowan (Huizhou)	2	39	4	33	5	50
Zimaling (Zhongshan)	4	101	5	116	10	123
Nanchengyuanling (Dongguan)	6	97	7	98	9	157
Tap Mun (Hong Kong)	1	28	3	55	4	77
Tsuen Wan (Hong Kong)	3	135	9	131	10	220
Yuen Long (Hong Kong)	4	122	10	173	15	202
Tung Chung (Hong Kong)	0	82	5	113	9	110
Taipa Grande (Macao)	2	81	4	106	8	105

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 2021		November 2021		December 2021	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	17	50	21	57	25	81
Nanshadawen (Guangzhou)	16	68	23	77	30	99
Nansha-HKUST (Guangzhou)	9	50	21	66	23	61
Tianhu (Guangzhou)	3	14	6	14	6	16
Zhudong (Guangzhou)	9	40	14	44	18	46
Tongxinling (Shenzhen)	3	25	10	62	15	57
Jinjuzui (Foshan)	10	68	17	67	25	87
Huijingcheng (Foshan)	15	47	15	69	20	100
Tangjia (Zhuhai)	9	45	15	56	16	60
Donghu (Jiangmen)	12	51	19	70	24	98
Duanfen (Jiangmen)	5	32	11	38	21	46
Huaguoshan (Jiangmen)	13	37	13	55	22	70
Chengzhong (Zhaoqing)	14	46	14	67	21	86
Xiapu (Huizhou)	10	31	11	41	14	46
Xijiao (Huizhou)	4	11	6	13	7	17
Jinguowan (Huizhou)	5	13	6	22	8	24
Zimaling (Zhongshan)	8	49	17	68	28	67
Nanchengyuanling (Dongguan)	11	36	12	47	16	61
Tap Mun (Hong Kong)	1	16	6	22	8	30
Tsuen Wan (Hong Kong)	6	46	29	69	28	93
Yuen Long (Hong Kong)	8	53	29	82	30	104
Tung Chung (Hong Kong)	4	47	17	65	23	64
Taipa Grande (Macao)	3	49	13	74	26	76

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 2021	November 2021	December 2021
Luhu (Guangzhou)	31	41	46
Nanshadawen (Guangzhou)	34	53	60
Nansha-HKUST (Guangzhou)	22	39	43
Tianhu (Guangzhou)	7	9	11
Zhudong (Guangzhou)	21	28	28
Tongxinling (Shenzhen)	16	31	33
Jinjuzui (Foshan)	25	43	52
Huijingcheng (Foshan)	27	39	49
Tangjia (Zhuhai)	22	32	35
Donghu (Jiangmen)	26	41	52
Duanfen (Jiangmen)	16	26	33
Huaguoshan (Jiangmen)	23	33	42
Chengzhong (Zhaoqing)	25	38	47
Xiapu (Huizhou)	17	23	28
Xijiao (Huizhou)	7	8	10
Jinguowan (Huizhou)	9	12	15
Zimaling (Zhongshan)	25	42	48
Nanchengyuanling (Dongguan)	20	30	36
Tap Mun (Hong Kong)	8	12	14
Tsuen Wan (Hong Kong)	32	48	51
Yuen Long (Hong Kong)	34	54	56
Tung Chung (Hong Kong)	24	38	42
Taipa Grande (Macao)	25	36	44

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	October 2021		November 2021		December 2021	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	3	197	3	176	2	186
Nanshadawen (Guangzhou)	2	236	2	219	1	197
Nansha-HKUST (Guangzhou)	1	271	1	242	1	261
Tianhu (Guangzhou)	40	236	20	183	7	152
Zhudong (Guangzhou)	3	236	2	240	1	171
Tongxinling (Shenzhen)	1	158	1	208	1	216
Jinjuzui (Foshan)	1	231	1	201	1	207
Huijingcheng (Foshan)	3	315	2	219	2	227
Tangjia (Zhuhai)	1	248	1	240	1	299
Donghu (Jiangmen)	2	230	2	188	2	246
Duanfen (Jiangmen)	10	206	6	200	4	230
Huaguoshan (Jiangmen)	2	197	2	179	1	219
Chengzhong (Zhaoqing)	5	230	5	157	3	188
Xiapu (Huizhou)	4	158	4	197	4	142
Xijiao (Huizhou)	3	218	4	181	5	144
Jinguowan (Huizhou)	1	142	2	199	1	151
Zimaling (Zhongshan)	2	234	2	220	1	269
Nanchengyuanling (Dongguan)	5	215	5	209	5	183
Tap Mun (Hong Kong)	28	179	9	174	12	198
Tsuen Wan (Hong Kong)	6	130	0	169	1	180
Yuen Long (Hong Kong)	1	145	1	187	1	172
Tung Chung (Hong Kong)	6	220	3	203	2	181
Taipa Grande (Macao)	11	227	10	206	1	202

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 2021			November 2021			December 2021		
	Min	Max	90 th per	Min	Max	90 th per	Min	Max	90 th per
Luhu (Guangzhou)	18	154	147	27	140	131	10	145	114
Nanshadawen (Guangzhou)	29	193	188	41	145	136	15	145	112
Nansha-HKUST (Guangzhou)	28	217	168	48	191	164	19	203	191
Tianhu (Guangzhou)	62	207	130	60	168	148	30	140	125
Zhudong (Guangzhou)	36	213	163	26	168	130	28	152	137
Tongxinling (Shenzhen)	36	135	130	45	153	135	14	174	140
Jinjuzui (Foshan)	26	182	168	35	132	117	8	155	99
Huijingcheng (Foshan)	24	218	189	35	178	134	10	164	122
Tangjia (Zhuhai)	30	215	159	49	194	175	20	216	150
Donghu (Jiangmen)	28	207	188	50	155	138	7	194	140
Duanfen (Jiangmen)	39	173	158	53	178	161	27	184	154
Huaguoshan (Jiangmen)	23	176	157	39	143	117	10	178	130
Chengzhong (Zhaoqing)	41	198	167	46	135	118	14	155	124
Xiapu (Huizhou)	33	130	122	63	157	115	22	125	109
Xijiao (Huizhou)	40	181	125	61	143	120	37	124	120
Jinguowan (Huizhou)	23	125	114	68	153	110	27	136	111
Zimaling (Zhongshan)	28	210	158	45	171	144	12	193	167
Nanchengyuanling (Dongguan)	30	192	144	62	169	135	28	155	145
Tap Mun (Hong Kong)	47	169	140	65	156	146	27	152	142
Tsuen Wan (Hong Kong)	28	117	95	37	112	101	10	111	91
Yuen Long (Hong Kong)	25	126	111	38	133	120	13	133	109
Tung Chung (Hong Kong)	20	157	123	33	131	121	15	123	108
Taipa Grande (Macao)	42	200	150	51	161	157	13	150	129

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 2021	November 2021	December 2021
Luhu (Guangzhou)	53	51	44
Nanshadawen (Guangzhou)	56	42	33
Nansha-HKUST (Guangzhou)	64	66	59
Tianhu (Guangzhou)	89	88	80
Zhudong (Guangzhou)	63	53	50
Tongxinling (Shenzhen)	63	70	56
Jinjuzui (Foshan)	53	48	39
Huijingcheng (Foshan)	65	57	45
Tangjia (Zhuhai)	65	79	59
Donghu (Jiangmen)	66	61	50
Duanfen (Jiangmen)	68	76	61
Huaguoshan (Jiangmen)	55	52	46
Chengzhong (Zhaoqing)	66	55	47
Xiapu (Huizhou)	64	70	56
Xijiao (Huizhou)	59	57	54
Jinguowan (Huizhou)	55	67	55
Zimaling (Zhongshan)	61	57	49
Nanchengyuanling (Dongguan)	63	65	56
Tap Mun (Hong Kong)	78	94	80
Tsuen Wan (Hong Kong)	55	58	47
Yuen Long (Hong Kong)	55	55	45
Tung Chung (Hong Kong)	58	59	48
Taipa Grande (Macao)	73	84	57

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

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

Monitoring Station	October 2021		November 2021		December 2021	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	0.2	1.2	0.2	1.3	0.3	1.3
Nanshadawen (Guangzhou)	0.4	1.2	0.3	1.4	0.3	1.5
Nansha-HKUST (Guangzhou)	0.4	1.0	0.4	1.1	0.5	1.3
Tianhu (Guangzhou)	0.3	1.0	0.3	1.1	0.3	1.3
Zhudong (Guangzhou)	0.4	1.1	0.4	1.2	0.3	1.4
Tongxinling (Shenzhen)	0.4	1.0	0.3	1.1	0.2	1.3
Jinjuzui (Foshan)	0.3	1.3	0.2	0.9	0.3	1.5
Huijingcheng (Foshan)	0.4	1.5	0.2	1.1	0.3	2.4
Tangjia (Zhuhai)	0.3	1.2	0.3	1.2	0.2	1.0
Donghu (Jiangmen)	0.3	1.6	0.2	1.3	0.3	2.3
Duanfen (Jiangmen)	0.4	1.1	0.3	1.0	0.4	1.2
Huaguoshan (Jiangmen)	0.4	1.2	0.4	1.1	0.5	2.2
Chengzhong (Zhaoqing)	0.3	1.1	0.2	1.4	0.2	1.6
Xiapu (Huizhou)	0.4	1.2	0.3	1.1	0.2	1.4
Xijiao (Huizhou)	0.4	0.9	0.2	1.0	0.3	1.0
Jinguowan (Huizhou)	0.4	1.0	0.4	1.0	0.5	1.3
Zimaling (Zhongshan)	0.3	1.3	0.0	1.1	0.2	1.3
Nanchengyuanling (Dongguan)	0.3	1.0	0.1	1.1	0.3	1.3
Tap Mun (Hong Kong)	0.2	1.0	0.2	0.7	0.4	1.1
Tsuen Wan (Hong Kong)	0.1	1.1	0.3	1.0	0.3	1.0
Yuen Long (Hong Kong)	0.3	0.9	0.3	1.2	0.3	2.1
Tung Chung (Hong Kong)	0.2	0.6	0.1	0.7	0.0	1.0
Taipa Grande (Macao)	0.7	1.3	0.3	1.1	0.4	1.0

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 2021			November 2021			December 2021		
	Min	Max	95 th per	Min	Max	95 th per	Min	Max	95 th per
Luhu (Guangzhou)	0.4	0.9	0.9	0.3	0.8	0.8	0.3	1.0	0.9
Nanshadawen (Guangzhou)	0.5	0.9	0.9	0.4	1.0	1.0	0.5	1.2	1.1
Nansha-HKUST (Guangzhou)	0.4	0.8	0.8	0.5	0.9	0.9	0.6	1.1	1.0
Tianhu (Guangzhou)	0.4	0.9	0.9	0.4	0.9	0.9	0.3	1.1	1.1
Zhudong (Guangzhou)	0.5	0.9	0.9	0.5	1.0	1.0	0.5	1.1	1.1
Tongxinling (Shenzhen)	0.4	0.8	0.7	0.4	0.8	0.7	0.4	0.9	0.8
Jinjuzui (Foshan)	0.4	0.8	0.8	0.2	0.8	0.8	0.4	1.0	1.0
Huijingcheng (Foshan)	0.4	0.8	0.7	0.3	0.8	0.8	0.4	1.1	1.1
Tangjia (Zhuhai)	0.4	0.9	0.8	0.3	0.9	0.7	0.3	0.8	0.8
Donghu (Jiangmen)	0.3	0.8	0.8	0.3	0.8	0.8	0.4	1.1	1.1
Duanfen (Jiangmen)	0.5	0.8	0.8	0.5	0.9	0.9	0.5	1.0	1.0
Huaguoshan (Jiangmen)	0.5	0.9	0.9	0.5	0.9	0.9	0.5	1.1	1.0
Chengzhong (Zhaoqing)	0.4	0.8	0.7	0.3	0.9	0.8	0.2	1.0	1.0
Xiapu (Huizhou)	0.5	0.7	0.7	0.4	0.7	0.7	0.2	0.9	0.9
Xijiao (Huizhou)	0.4	0.9	0.7	0.3	0.8	0.8	0.3	0.9	0.8
Jinguowan (Huizhou)	0.5	0.9	0.7	0.4	0.7	0.6	0.5	1.0	1.0
Zimaling (Zhongshan)	0.4	0.8	0.8	0.2	0.8	0.8	0.4	1.0	0.8
Nanchengyuanling (Dongguan)	0.5	0.8	0.8	0.2	0.8	0.7	0.4	0.9	0.9
Tap Mun (Hong Kong)	0.4	0.9	0.8	0.3	0.6	0.6	0.4	1.0	0.9
Tsuen Wan (Hong Kong)	0.3	0.9	0.9	0.4	0.7	0.7	0.4	0.8	0.8
Yuen Long (Hong Kong)	0.4	0.7	0.6	0.4	0.9	0.8	0.4	1.0	0.9
Tung Chung (Hong Kong)	0.2	0.5	0.4	0.2	0.4	0.4	0.1	0.9	0.8
Taipa Grande (Macao)	0.7	1.2	1.1	0.4	0.9	0.8	0.5	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	October 2021	November 2021	December 2021
Luhu (Guangzhou)	0.7	0.5	0.6
Nanshadawen (Guangzhou)	0.7	0.7	0.9
Nansha-HKUST (Guangzhou)	0.7	0.7	0.8
Tianhu (Guangzhou)	0.6	0.6	0.7
Zhudong (Guangzhou)	0.7	0.7	0.9
Tongxinling (Shenzhen)	0.6	0.6	0.6
Jinjuzui (Foshan)	0.6	0.5	0.7
Huijingcheng (Foshan)	0.6	0.6	0.8
Tangjia (Zhuhai)	0.6	0.5	0.6
Donghu (Jiangmen)	0.6	0.6	0.8
Duanfen (Jiangmen)	0.7	0.7	0.7
Huaguoshan (Jiangmen)	0.7	0.7	0.8
Chengzhong (Zhaoqing)	0.6	0.6	0.7
Xiapu (Huizhou)	0.6	0.5	0.6
Xijiao (Huizhou)	0.6	0.6	0.6
Jinguowan (Huizhou)	0.6	0.6	0.7
Zimaling (Zhongshan)	0.5	0.6	0.6
Nanchengyuanling (Dongguan)	0.6	0.6	0.7
Tap Mun (Hong Kong)	0.7	0.4	0.7
Tsuen Wan (Hong Kong)	0.6	0.6	0.6
Yuen Long (Hong Kong)	0.5	0.7	0.7
Tung Chung (Hong Kong)	0.3	0.3	0.5
Taipa Grande (Macao)	0.9	0.6	0.7

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	October 2021		November 2021		December 2021	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	9	58	16	69	15	89
Nanshadawen (Guangzhou)	11	85	19	88	18	103
Nansha-HKUST (Guangzhou)	7	65	17	68	14	74
Tianhu (Guangzhou)	8	43	12	47	5	56
Zhudong (Guangzhou)	16	80	16	88	14	72
Tongxinling (Shenzhen)	7	49	23	74	15	77
Jinjuzui (Foshan)	9	74	19	73	20	101
Huijingcheng (Foshan)	5	73	16	82	19	164
Tangjia (Zhuhai)	10	68	19	80	23	93
Donghu (Jiangmen)	8	84	19	86	16	142
Duanfen (Jiangmen)	4	58	17	69	10	95
Huaguoshan (Jiangmen)	9	90	19	96	24	143
Chengzhong (Zhaoqing)	4	71	5	71	11	94
Xiapu (Huizhou)	7	60	21	70	9	72
Xijiao (Huizhou)	8	44	12	40	6	42
Jinguowan (Huizhou)	8	44	18	58	6	56
Zimaling (Zhongshan)	7	73	18	80	19	85
Nanchengyuanling (Dongguan)	11	63	11	64	11	87
Tap Mun (Hong Kong)	11	39	13	46	15	68
Tsuen Wan (Hong Kong)	4	40	17	50	7	71
Yuen Long (Hong Kong)	4	49	23	64	16	98
Tung Chung (Hong Kong)	8	42	22	64	13	80
Taipa Grande (Macao)	6	62	19	82	11	90

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 2021	November 2021	December 2021
Luhu (Guangzhou)	32	47	52
Nanshadawen (Guangzhou)	41	57	65
Nansha-HKUST (Guangzhou)	34	47	51
Tianhu (Guangzhou)	24	30	32
Zhudong (Guangzhou)	39	46	46
Tongxinling (Shenzhen)	30	46	49
Jinjuzui (Foshan)	35	51	59
Huijingcheng (Foshan)	38	54	71
Tangjia (Zhuhai)	30	49	55
Donghu (Jiangmen)	41	58	73
Duanfen (Jiangmen)	27	46	50
Huaguoshan (Jiangmen)	44	60	74
Chengzhong (Zhaoqing)	32	41	46
Xiapu (Huizhou)	34	48	48
Xijiao (Huizhou)	20	27	27
Jinguowan (Huizhou)	25	37	39
Zimaling (Zhongshan)	35	52	60
Nanchengyuanling (Dongguan)	32	46	49
Tap Mun (Hong Kong)	25	29	35
Tsuen Wan (Hong Kong)	22	29	37
Yuen Long (Hong Kong)	27	41	49
Tung Chung (Hong Kong)	24	39	44
Taipa Grande (Macao)	32	51	55

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	October 2021		November 2021		December 2021	
	Min	Max	Min	Max	Min	Max
Luhu (Guangzhou)	5	42	7	41	10	53
Nanshadawen (Guangzhou)	4	46	5	39	6	46
Nansha-HKUST (Guangzhou)	4	42	3	42	8	50
Tianhu (Guangzhou)	4	29	6	30	4	39
Zhudong (Guangzhou)	9	47	9	50	11	51
Tongxinling (Shenzhen)	2	35	7	42	9	54
Jinjuzui (Foshan)	5	50	9	41	13	59
Huijingcheng (Foshan)	3	38	7	38	12	91
Tangjia (Zhuhai)	2	34	6	44	13	58
Donghu (Jiangmen)	4	49	5	44	10	66
Duanfen (Jiangmen)	5	48	11	53	12	69
Huaguoshan (Jiangmen)	7	68	7	60	16	106
Chengzhong (Zhaoqing)	3	48	3	41	7	69
Xiapu (Huizhou)	5	34	4	32	7	40
Xijiao (Huizhou)	6	17	8	16	9	36
Jinguowan (Huizhou)	8	38	7	36	5	38
Zimaling (Zhongshan)	4	40	4	37	7	49
Nanchengyuanling (Dongguan)	6	39	4	36	7	49
Tap Mun (Hong Kong)	3	29	7	30	9	54
Tsuen Wan (Hong Kong)	4	32	8	34	6	56
Yuen Long (Hong Kong)	3	34	9	40	14	75
Tung Chung (Hong Kong)	4	32	18	45	13	60
Taipa Grande (Macao)	2	30	5	39	6	57

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 2021	November 2021	December 2021
Luhu (Guangzhou)	19	25	30
Nanshadawen (Guangzhou)	18	22	28
Nansha-HKUST (Guangzhou)	21	25	30
Tianhu (Guangzhou)	14	16	21
Zhudong (Guangzhou)	24	24	28
Tongxinling (Shenzhen)	16	23	27
Jinjuzui (Foshan)	20	25	33
Huijingcheng (Foshan)	18	24	38
Tangjia (Zhuhai)	17	24	32
Donghu (Jiangmen)	21	26	34
Duanfen (Jiangmen)	21	32	37
Huaguoshan (Jiangmen)	29	36	48
Chengzhong (Zhaoqing)	20	22	29
Xiapu (Huizhou)	17	22	25
Xijiao (Huizhou)	9	12	18
Jinguowan (Huizhou)	18	23	24
Zimaling (Zhongshan)	18	24	30
Nanchengyuanling (Dongguan)	19	24	28
Tap Mun (Hong Kong)	13	16	22
Tsuen Wan (Hong Kong)	15	18	25
Yuen Long (Hong Kong)	17	24	31
Tung Chung (Hong Kong)	16	27	31
Taipa Grande (Macao)	15	20	26

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)	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	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