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

A Report of Monitoring Results in 2024

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Report Prepared by	**:**	**Guangdong Ecological and Environmental Monitoring Centre** **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**
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Purpose of the Report

This report provides the 2024 monitoring results from the Guangdong-Hong Kong-Macao Pearl River Delta Regional Air Quality Monitoring Network and their statistical analysis.

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1. Foreword

Since the Pearl River Delta (PRD) Regional Air Quality Monitoring Network came into operation on 30 November 2005, a half-yearly and an annual air quality monitoring reports were published every year since 2006.

With the growing concerns of air pollution control and economic development of the region, the environmental protection departments of Guangdong and Hong Kong 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").

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 Regional Air Quality Index (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.

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 Ecological and Environmental Monitoring Centre of Guangdong [1] and the Environmental Protection Department of the Hong Kong Special Administrative Region (HKEPD) from 2003 to 2005. The network came into operation on 30 November 2005 and its data had been used for reporting Regional Air Quality Index (RAQI) to the public. At that time, the network comprised 16 automatic air quality monitoring stations (see Figure 1) across the PRD region in Guangdong and Hong Kong. Thirteen monitoring stations are located within the territory of Guangdong Province, three stations located in Hong Kong. All stations were installed with equipment to measure the ambient concentrations of respirable suspended particulates (PM_{10} or RSP), sulphur dioxide (SO_2), nitrogen dioxide (NO_2) and ozone (O_3).

The network was enhanced in September 2014 and renamed "Guangdong-Hong Kong-Macao Pearl River Delta Regional Air Quality Monitoring Network". The number of monitoring stations was increased from 16 to 23. Guangdong, on its original 13 stations, added five stations, including Modiesha[2] and Zhudong in Guangzhou, Duanfen and

[1] When the Monitoring Network was established in 2003, 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.

[2] Owing to insufficient space after the extensive renovation work at Modiesha monitoring station in Guangzhou, this station closed permanently in 2021, whereas a new Nanshadawen monitoring station in Guangzhou joined the network.

Huaguoshan in Jiangmen, and Xijiao[3] in Huizhou. Hong Kong added Yuen Long monitoring station on the basis of its original three stations and Macao joined in with the monitoring station at Taipa Grande. As regards the monitoring parameters, the Network continued to monitor the original four air pollutants with the addition of two new monitoring parameters, i.e. carbon monoxide (CO) and fine suspended particulates ($PM_{2.5}$ or FSP). After the network came into operation, the Xijiao (Huizhou) and Modiesha (Guangzhou) stations were relocated to Shixia (Huizhou) and Nanshadawen (Guangzhou), respectively, due to site constraints. Figure 2 shows the latest spatial distribution of the monitoring stations after the enhancement of the network.

Based on the previous "Standard Operating Procedures on Quality Assurance and Quality Control of the PRD Air Quality Monitoring System for Guangdong and Hong Kong", the Network employs a revised "Standard Operating Procedures on Quality Assurance and Quality Control of the PRD Air Quality Monitoring System for Guangdong, Hong Kong and Macau" (QA/QC Operating Procedures) jointly developed by Guangdong, Hong Kong and Macau to ensure that the air quality monitoring results attain a high degree of accuracy and reliability, and meet the respective quality management policies of the three places. The design and operation of the Network comply with the requirements set out in the QA/QC Operating Procedures. In light of the development of the Network, the QA/QC Operating Procedures will be revised as and when necessary.

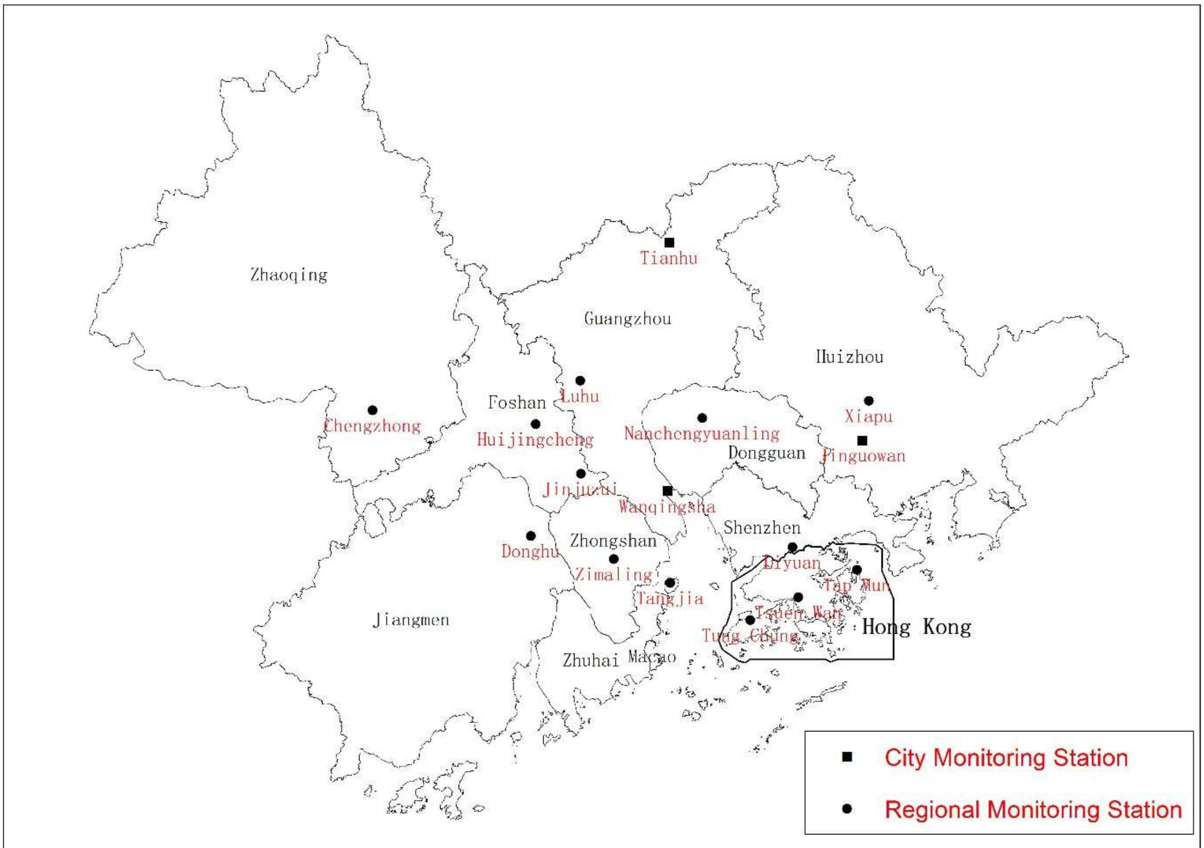

Figure 1：Spatial distribution of monitoring stations (Nov 2005 to Aug 2014)[4]

[3] Xijiao 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 "Boluo Shixia".

[4] The Figures 1 & 2 were 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.

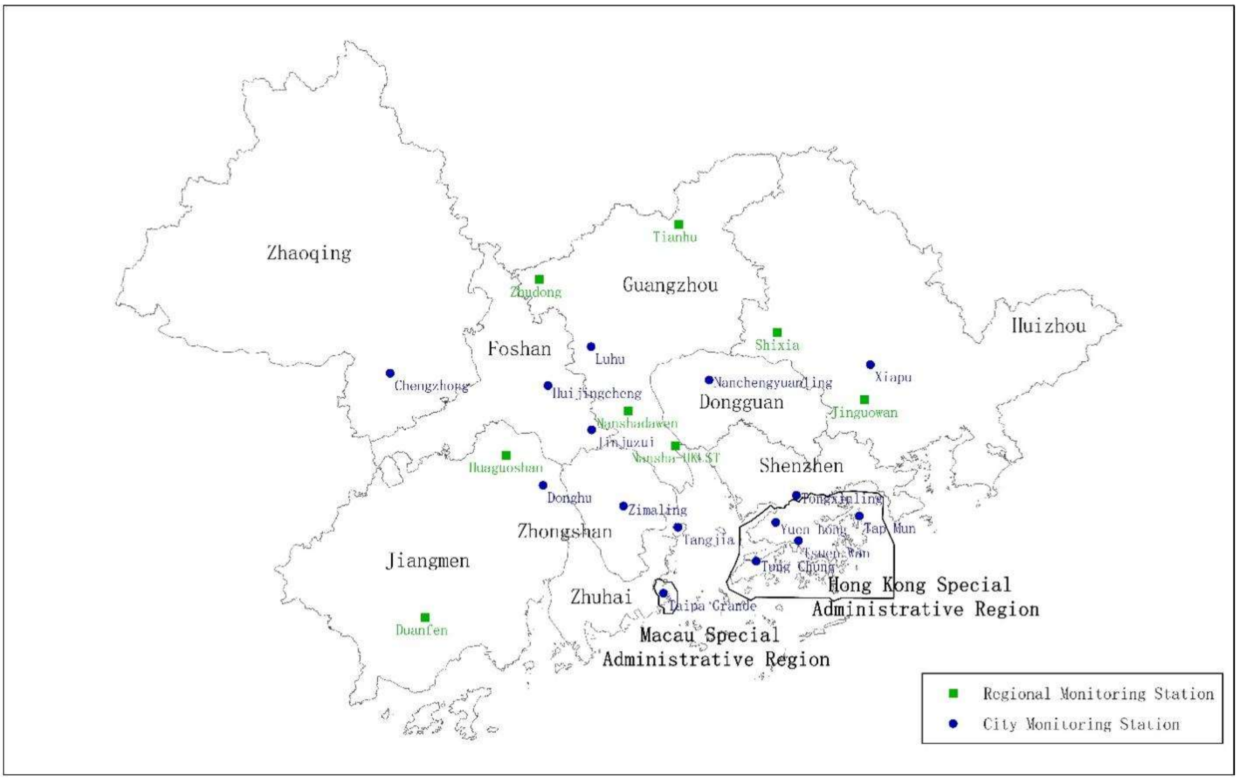

Figure 2：Spatial Distribution of Monitoring Stations in the Network (from Sept 2014)

To cope with the enhancement of the Network and the update of national ambient air quality standards, the internet platform has increased the data reporting frequency by replacing the previous RAQI that was published once a day to hourly dissemination of real time air quality monitoring information of each monitoring station.

The objectives of the Network are to:

- provide accurate air quality data to assist the governments of Guangdong, Hong Kong and Macao in understanding the air quality situation and pollution problems in the PRD region for formulating appropriate control measures;
- evaluate the effectiveness of the air pollution control measures through long-term monitoring;
- provide the public with information on the air quality of different areas in the region.

This is an annual report on the monitoring results for 2024. From 2015 onwards, the annual report covers the monitoring results of six monitoring parameters recorded at 23 monitoring stations of the Network.

Annexes A and B set out the site information of the monitoring stations and the methods used for measuring air pollutant concentrations respectively.

3. Operation of the Network

The overall operation of the Network was smooth in 2024. The average hourly data capture rate for the six air pollutants measured at all monitoring stations was 98.0%.

3.1 Quality Control (QC) and Quality Assurance (QA) Activities

The governments of Guangdong, Hong Kong, and Macao have fully implemented the agreed QC works, which include zero/span checks, precision checks, dynamic calibration, etc. The QA/QC works are carried out in accordance with the QA/QC Operating Procedures so as to ensure that the air quality data from the monitoring stations are highly accurate and reliable. To ensure the operation of the Network is in compliance with the QA/QC requirements, the GDEEMC, HKEPD, Environmental Protection Bureau of Macau SARG and Meteorological and Geophysical Bureau of Macao SARG[5] jointly established the "Quality Management Committee of Guangdong-Hong Kong-Macao Pearl River Delta Regional Air Quality Monitoring Network" (Quality Management Committee, "QMC") to review and evaluate, on a quarterly basis, the performance of equipment, QA/QC works, data transmission system and operation of the Network. The QMC also conducts a system audit every year to evaluate the effectiveness of the quality management system. Based on the audit results, a report will be prepared to summarize any corrective measures and recommendations and the QMC will take appropriate follow-up actions.

3.2 Accuracy and Precision

The accuracy of the Network is evaluated by means of performance audits. The performance goals set for the gaseous pollutants and particulates (PM_{10} and $PM_{2.5}$) are ±20% and ±15% respectively. In 2024, we had carried out 414 audit checks on the analyzers and particulate samplers at the monitoring stations of the Network. The results showed that, based on the 95% probability limits, the accuracy of the Network ranged from -9.4% to 9.7%, which were within the required performance goals (see Figure 3).

Precision is a measure of repeatability and is calculated in accordance with the QA/QC Operating Procedures. The performance goals adopted for the gaseous pollutants and particulates (PM_{10} and $PM_{2.5}$) are ±15%. In 2024, we had carried out 4456 precision checks on the analyzers and samplers at the monitoring stations of the Network. The results showed that, based on the 95% probability limits, the precision of the Network ranged from -9.6% and 10.4%, which were within the required performance goals (see Figure 4). In 2024, the overall QA/QC performance of the Network was satisfactory and met all the requirements specified in the QA/QC Operating Procedures.

[5] In 2014, when the monitoring network was expanded to cover Guangdong, Hong Kong and Macao, the unit's name was "Meteorological and Geophysical Bureau,Macao SAR". In December 2023, the unit's name was changed to "Meteorological and Geophysical Bureau, Macao SARG".

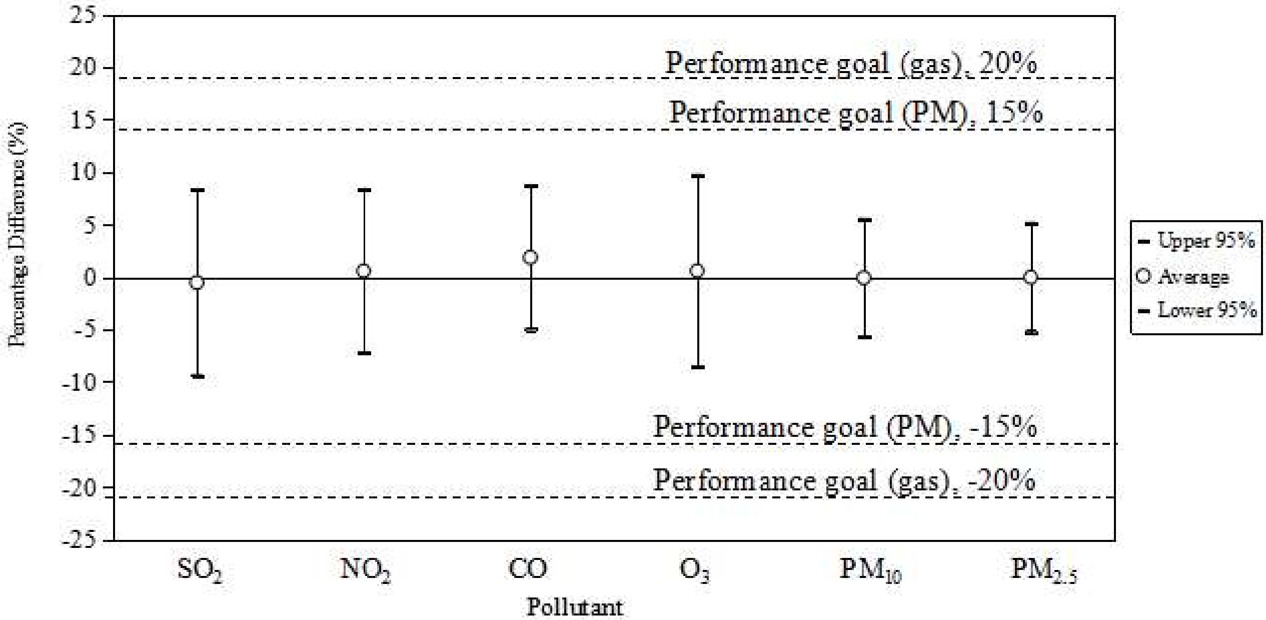

Figure 3：Accuracy of the monitoring network in 2024

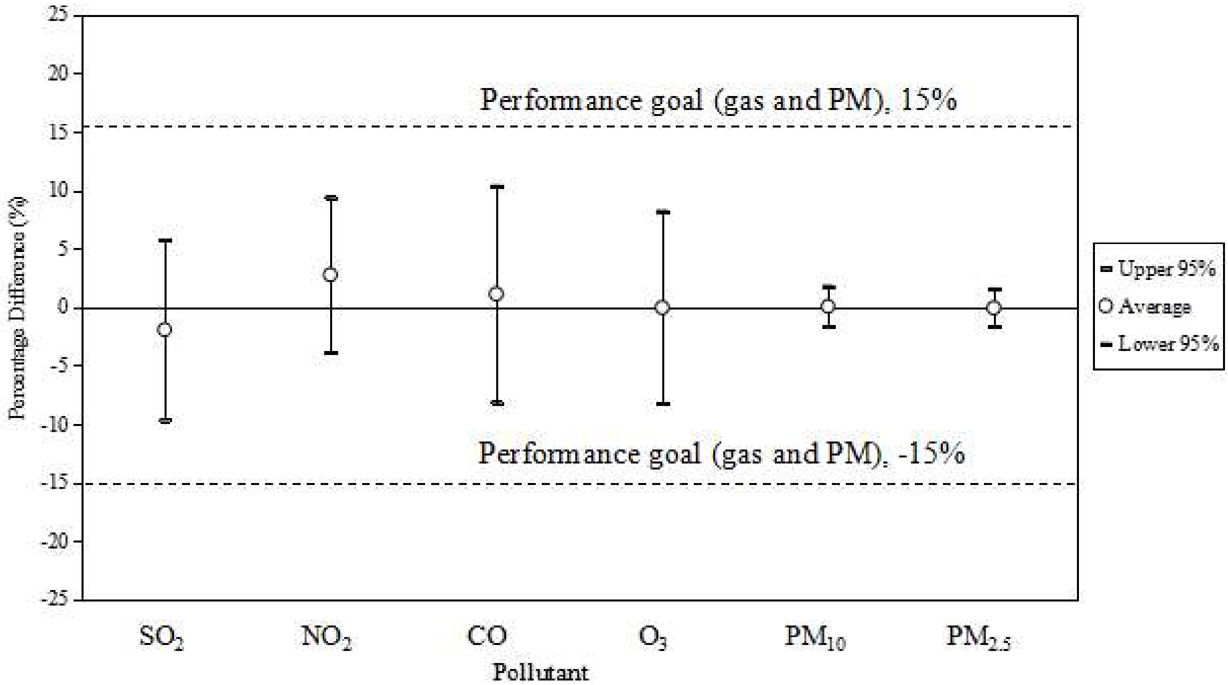

Figure 4：Precision of the monitoring network in 2024

4. Statistical Analysis of Pollutant Concentrations

Starting from 2014 annual report, the air quality assessment is conducted based on the class II limits of the national "Ambient Air Quality Standards" (NAAQS) (GB3095-2012). Per the amended version of the 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 PM_{10} and $PM_{2.5}$ are measured at real-time temperature and atmospheric pressure during monitoring.

4.1 Sulphur Dioxide (SO_2)

Sulphur dioxide (SO_2) comes mainly from the combustion of sulphur-containing fossil fuel. Its major sources of emissions include power plants, fuel combustion plants, vehicles and vessels. Apart from its impact on the human respiratory system, SO_2 can also be oxidized in the air to form sulphate, which has significant impact on the levels of particulate matters, acid rain and visibility in the region.

In 2024, the annual average of SO_2 recorded at each monitoring station in the Network ranged from 2 to 9 $\mu g/m^3$, and all stations were in compliance with the national annual average concentration limit (60 $\mu g/m^3$). As shown in Figure 5, the annual average concentrations of SO_2 recorded at all the monitoring stations were generally at a low level. During the year, all monitoring stations in the Network could comply with the national 24-hour average concentration limit (150 $\mu g/m^3$) and 1-hour average concentration limit (500 $\mu g/m^3$) of SO_2.

Tables 4.1a to 4.1c list the monthly maxima of hourly averages, the monthly maxima of daily averages with the 98th percentile of the year, the monthly and annual averages of SO_2 at each station respectively.

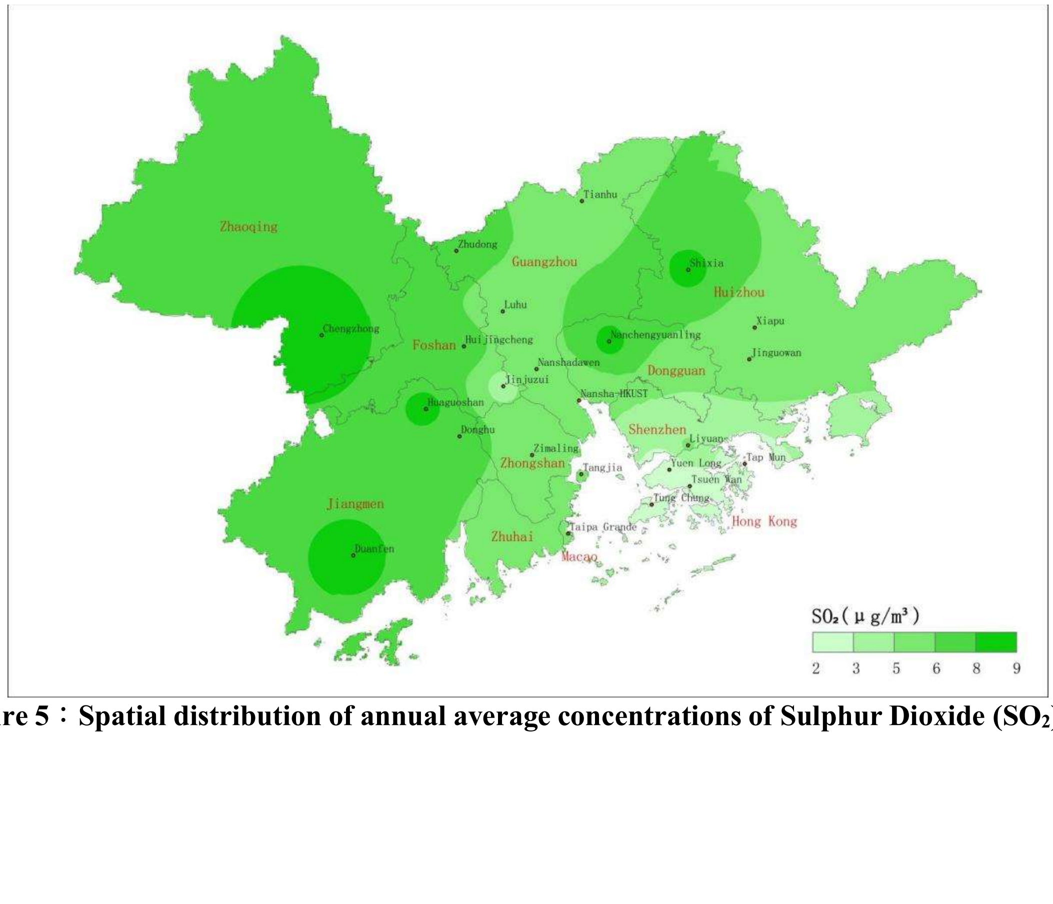

Figure 5：Spatial distribution of annual average concentrations of Sulphur Dioxide (SO_2)

Table 4.1a：Hourly averages concentration of Sulphur Dioxide (monthly maxima)[6]

[Class II limit[7]: 500 μg/m³]

Monitoring Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Luhu (Guangzhou)	12	18	9	11	10	6	9	11	17	12	11	16
Nanshadawen (Guangzhou)	31	20	14	11	20	8	12	15	17	10	18	24
Nansha-HKUST (Guangzhou)	16	10	9	11	11	11	9	12	11	13	11	20
Tianhu (Guangzhou)	14	8	12	9	8	12	10	10	34	14	17	12
Zhudong (Guangzhou)	21	17	23	19	18	18	19	20	13	23	23	21
Tongxinling (Shenzhen)	7	7	7	14	8	7	8	21	14	17	11	11
Jinjuzui (Foshan)	11	20	10	14	10	8	14	18	13	12	13	16
Huijingcheng (Foshan)	20	17	17	8	14	13	11	19	18	17	20	30
Tangjia (Zhuhai)	10	9	10	10	9	7	11	10	11	12	8	10
Donghu (Jiangmen)	18	15	16	10	11	9	9	10	10	14	15	28
Duanfen (Jiangmen)	24	19	13	12	17	13	18	10	21	20	20	23
Huaguoshan (Jiangmen)	18	23	17	17	30	29	15	16	16	17	23	33
Chengzhong (Zhaoqing)	42	12	39	33	29	38	42	60	31	21	20	18
Xiapu (Huizhou)	18	13	20	12	13	18	13	8	7	18	12	15
Shixia (Huizhou)	22	64	18	20	14	16	16	15	17	13	16	25
Jinguowan (Huizhou)	10	37	17	11	9	9	10	14	9	11	10	20
Zimaling (Zhongshan)	10	16	10	10	9	9	10	11	9	12	12	12
Nanchengyuanling (Dongguan)	19	14	14	12	14	9	10	8	15	23	27	13
Tap Mun (Hong Kong)	6	5	3	4	5	3	3	5	4	5	6	8
Tsuen Wan (Hong Kong)	12	11	19	21	11	17	10	13	9	9	16	10
Yuen Long (Hong Kong)	11	7	5	8	7	7	5	5	6	6	8	7
Tung Chung (Hong Kong)	16	12	9	8	8	4	4	7	7	7	6	12
Taipa Grande (Macao)	12	12	8	9	6	6	7	8	7	10	9	11

[6] 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). This also applies to all the pollutant monitoring mentioned below.

[7] "Class II limit" is the abbreviation of the Class II limit values of the Ambient Air Quality Standard (GB3095-2012). This also applies to all the pollutant monitoring mentioned below.

Table 4.1b：Daily averages concentration of Sulphur Dioxide (monthly maxima and the 98th percentile of the year)

[Class II limit: 150 μg/m³]

Monitoring Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Compliance	98th percentile
Luhu (Guangzhou)	8	7	6	6	7	4	7	7	7	8	8	10	100.0%	8
Nanshadawen (Guangzhou)	15	11	10	7	10	5	7	9	9	6	9	9	100.0%	11
Nansha-HKUST (Guangzhou)	7	7	6	6	6	5	5	5	6	7	8	11	100.0%	9
Tianhu (Guangzhou)	7	5	6	6	7	7	8	7	8	10	12	7	100.0%	10
Zhudong (Guangzhou)	9	9	12	11	11	9	11	12	7	13	11	11	100.0%	11
Tongxinling (Shenzhen)	5	5	6	9	6	6	6	6	6	10	7	10	100.0%	9
Jinjuzui (Foshan)	6	5	4	6	5	5	5	6	8	8	8	9	100.0%	8
Huijingcheng (Foshan)	16	11	11	5	6	6	7	10	9	13	13	15	100.0%	14
Tangjia (Zhuhai)	7	7	7	7	8	6	6	7	8	10	6	8	100.0%	9
Donghu (Jiangmen)	10	9	10	7	7	7	7	7	7	10	10	10	100.0%	10
Duanfen (Jiangmen)	11	9	10	8	10	10	11	6	7	13	13	15	100.0%	13
Huaguoshan (Jiangmen)	11	10	11	11	14	8	8	9	8	11	13	10	100.0%	12
Chengzhong (Zhaoqing)	15	9	15	15	13	17	21	17	12	12	13	13	100.0%	15
Xiapu (Huizhou)	13	7	9	7	9	8	9	5	5	14	9	10	100.0%	12
Shixia (Huizhou)	10	12	12	11	11	9	10	12	9	11	9	8	100.0%	11
Jinguowan (Huizhou)	7	9	8	7	7	7	8	9	7	8	8	10	100.0%	9
Zimaling (Zhongshan)	8	8	8	8	6	7	9	10	5	7	8	9	100.0%	8
Nanchengyuanling (Dongguan)	12	11	11	10	10	7	8	7	9	10	11	11	100.0%	11
Tap Mun (Hong Kong)	4	3	2	2	4	3	3	3	2	5	5	6	100.0%	5
Tsuen Wan (Hong Kong)	8	4	7	9	7	7	7	5	4	3	4	4	100.0%	7
Yuen Long (Hong Kong)	8	3	3	4	3	4	2	3	3	4	4	4	100.0%	5
Tung Chung (Hong Kong)	10	6	4	3	3	1	1	5	3	5	3	5	100.0%	6
Taipa Grande (Macao)	11	9	6	7	4	4	4	4	5	8	7	9	100.0%	10

Table 4.1c：The monthly and annual averages concentration of Sulphur Dioxide[8]

[Class II limit: 60 μg/m^3]

Monitoring Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average
Luhu (Guangzhou)	6	5	5	5	5	3	4	5	5	6	5	7	5
Nanshadawen (Guangzhou)	10	8	7	5	7	3	6	8	6	4	5	6	6
Nansha-HKUST (Guangzhou)	6	5	5	4	5	4	4	4	5	5	6	8	5
Tianhu (Guangzhou)	3	3	3	5	5	5	6	6	6	8	8	5	5
Zhudong (Guangzhou)	6	6	9	9	7	7	9	5	5	5	6	7	7
Tongxinling (Shenzhen)	4	3	4	5	5	5	5	5	4	4	5	7	5
Jinjuzui (Foshan)	3	2	2	3	4	4	4	4	5	6	6	7	4
Huijingcheng (Foshan)	10	9	7	3	4	3	4	5	6	8	9	12	7
Tangjia (Zhuhai)	5	5	6	6	6	4	5	6	7	8	5	6	6
Donghu (Jiangmen)	7	7	7	6	6	6	5	6	4	7	8	9	7
Duanfen (Jiangmen)	8	7	8	7	9	10	7	5	6	10	11	12	8
Huaguoshan (Jiangmen)	9	8	7	9	9	6	7	7	7	7	8	8	8
Chengzhong (Zhaoqing)	10	6	9	10	9	8	10	10	8	9	9	9	9
Xiapu (Huizhou)	9	5	6	6	7	6	7	4	4	6	7	8	6
Shixia (Huizhou)	7	7	8	8	8	7	9	9	8	7	7	6	8
Jinguowan (Huizhou)	6	6	6	6*	5	5	6	6	6	7	7	8	6
Zimaling (Zhongshan)	6	6	7	5	5	6	7	4	3	6	6	7	6
Nanchengyuanling (Dongguan)	9	8	8	7	8	6	6	6	7	8	9	9	8
Tap Mun (Hong Kong)	3	1	1	1	2	2	2	2	2	3	3	4	2
Tsuen Wan (Hong Kong)	4	2	3	6	3	4	4	3	2	2	2	3	3
Yuen Long (Hong Kong)	3	2	2	2	2	2	1	1	2	2	2	3	2
Tung Chung (Hong Kong)	4	3	2	1	1	0	0	3	2	2	2	3	2
Taipa Grande (Macao)	9	7	5	5	3	3	3	3	3	3	6	7	5

[8] "*" The capture rate of validated daily data per month is below 85%. This also applies to all the pollutant monitoring mentioned below.

4.2 Nitrogen Dioxide (NO_2)

Nitrogen Dioxide (NO_2) is mainly formed from oxidization of nitric oxide (NO) emitted in the process of combustion. Its major emission sources include power plants, fuel combustion plants, vehicles and vessels. Apart from its impact on human respiratory system, NO_2 can also be oxidized in the air to form nitrate, which has significant impact on the levels of particulate matters, acid rain and visibility in the region.

In 2024, the annual average of NO_2 recorded at each monitoring station in the Network ranged from 8 to 39 $\mu g/m^3$, among them, the monitoring station having the highest annual average value of NO_2 was located in the urban area. During the year, 15 monitoring stations in the Network recorded no exceedance of the national 24-hour average concentration limit (80 $\mu g/m^3$) while the corresponding compliance rates in the Network ranged from 95.9% to 100.0%; 22 monitoring stations recorded no exceedance of national 1-hour average concentration limit of NO_2 (200 $\mu g/m^3$).

Tables 4.2a to 4.2c list the monthly maxima of hourly averages, the monthly maxima of daily averages with the 98th percentile of the year, the monthly and annual averages of NO_2 at each station respectively.

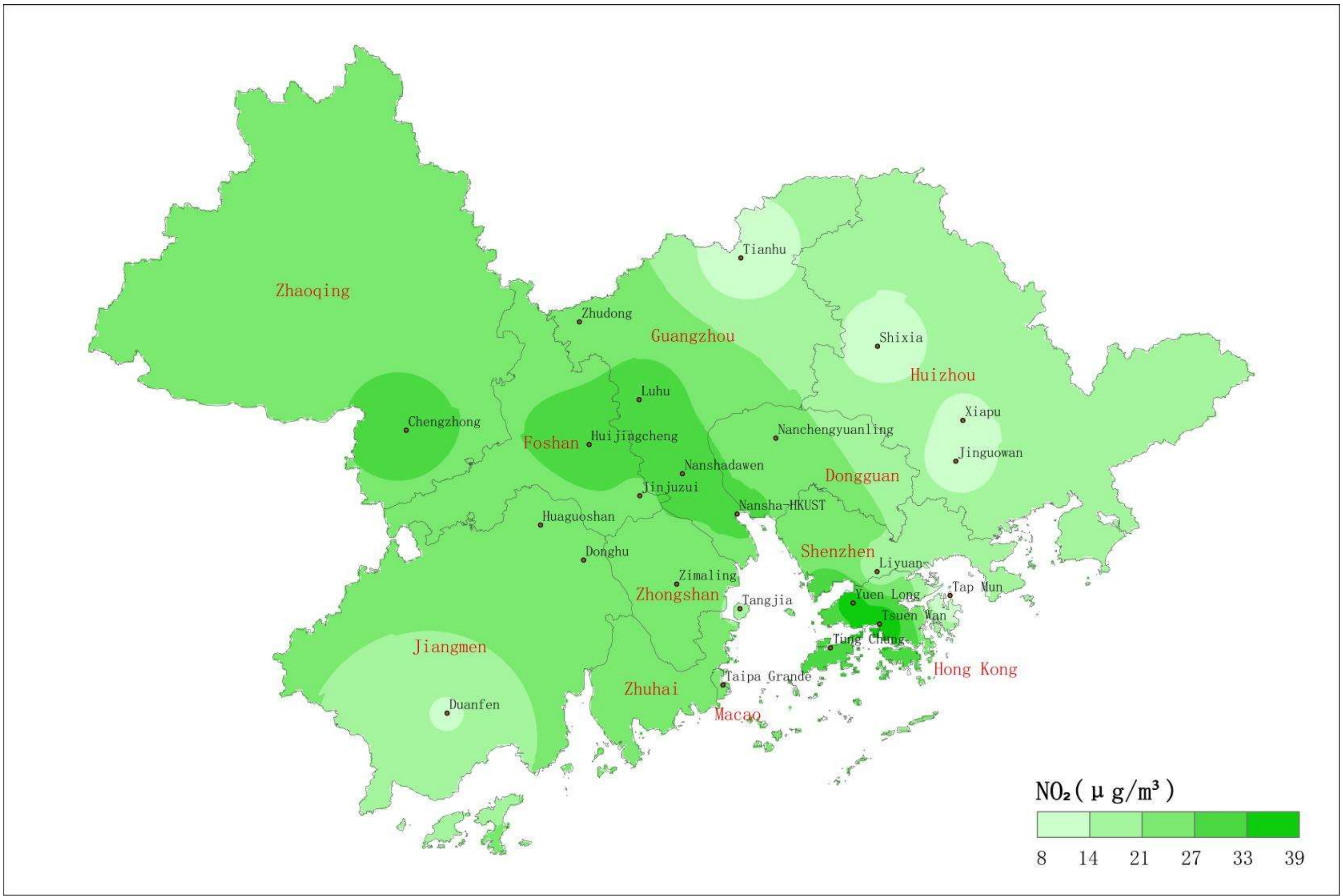

Figure 6：Spatial distribution of annual average concentrations of Nitrogen Dioxide (NO_2)

Table 4.2a：Hourly averages concentration of Nitrogen Dioxide (monthly maxima)

[Class II limit: 200 μg/m^3]

Monitoring Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Luhu (Guangzhou)	139	64	145	76	110	50	48	89	89	96	82	147
Nanshadawen (Guangzhou)	166	68	107	85	100	79	57	89	83	87	121	149
Nansha-HKUST (Guangzhou)	155	78	126	149	84	81	49	76	71	65	93	141
Tianhu (Guangzhou)	40	26	40	36	31	26	21	39	18	18	15	45
Zhudong (Guangzhou)	107	55	82	55	50	44	40	49	42	63	57	84
Tongxinling (Shenzhen)	80	82	61	65	59	32	29	48	53	55	79	135
Jinjuzui (Foshan)	126	64	94	66	78	55	48	77	69	86	100	148
Huijingcheng (Foshan)	169	64	113	74	80	66	47	79	90	88	118	224
Tangjia (Zhuhai)	96	71	70	65	61	67	36	53	38	47	68	122
Donghu (Jiangmen)	141	55	89	53	68	51	46	48	57	56	104	131
Duanfen (Jiangmen)	75	49	67	42	46	40	16	24	28	35	50	74
Huaguoshan (Jiangmen)	100	46	99	49	66	65	38	45	53	60	90	116
Chengzhong (Zhaoqing)	165	82	138	87	191	80	68	78	124	112	97	152
Xiapu (Huizhou)	108	51	66	37	43	38	31	32	42	32	65	102
Shixia (Huizhou)	62	48	42	38	42	33	43	35	32	26	48	58
Jinguowan (Huizhou)	51	41	48	34	30	34	26	37	40	21	26	36
Zimaling (Zhongshan)	98	82	90	66	61	60	32	43	42	58	105	141
Nanchengyuanling (Dongguan)	148	58	107	65	80	44	45	60	76	80	88	128
Tap Mun (Hong Kong)	38	61	40	33	39	27	23	44	42	21	38	47
Tsuen Wan (Hong Kong)	123	125	119	146	125	98	99	109	152	129	119	194
Yuen Long (Hong Kong)	128	100	93	123	97	83	59	92	88	91	108	188
Tung Chung (Hong Kong)	131	102	120	105	135	86	54	105	104	97	137	144
Taipa Grande (Macao)	108	77	72	74	62	60	34	63	52	61	74	106

Table 4.2b：Daily averages concentration of Nitrogen Dioxide (monthly maxima and the 98th percentile of the year) **[Class II limit: 80 μg/m³]**

Monitoring Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Compliance	98th percentile
Luhu (Guangzhou)	80	44	68	52	48	33	26	59	42	43	52	84	99.5%	69
Nanshadawen (Guangzhou)	94	48	64	60	46	42	30	52	48	43	59	84	98.9%	70
Nansha-HKUST (Guangzhou)	77	52	63	61	44	43	28	45	34	33	43	69	100.0%	63
Tianhu (Guangzhou)	23	17	21	18	16	14	13	19	8	12	12	25	100.0%	20
Zhudong (Guangzhou)	60	38	42	33	33	27	20	28	23	31	28	54	100.0%	45
Tongxinling (Shenzhen)	43	45	29	38	21	16	15	30	36	21	38	60	100.0%	38
Jinjuzui (Foshan)	97	42	64	47	45	33	24	37	38	44	59	84	99.4%	71
Huijingcheng (Foshan)	112	37	73	41	36	34	26	42	45	47	73	147	97.0%	96
Tangjia (Zhuhai)	59	47	44	34	33	28	20	19	21	25	40	59	100.0%	48
Donghu (Jiangmen)	86	36	62	37	45	37	23	27	33	32	63	81	99.5%	66
Duanfen (Jiangmen)	52	31	44	32	25	22	8	11	14	23	35	40	100.0%	35
Huaguoshan (Jiangmen)	63	30	64	31	32	37	19	23	28	37	50	73	100.0%	62
Chengzhong (Zhaoqing)	77	46	88	47	59	38	34	42	46	60	56	86	99.2%	72
Xiapu (Huizhou)	47	24	27	23	20	17	15	19	19	15	27	46	100.0%	39
Shixia (Huizhou)	24	17	21	23	20	22	17	17	12	14	24	32	100.0%	23
Jinguowan (Huizhou)	24	24	28	23	17	17	20	23	16	7	15	21	100.0%	23
Zimaling (Zhongshan)	58	53	58	47	37	39	17	20	25	28	51	67	100.0%	52
Nanchengyuanling (Dongguan)	69	27	52	39	38	24	22	36	38	27	39	62	100.0%	57
Tap Mun (Hong Kong)	19	13	23	12	9	9	12	17	14	10	16	24	100.0%	19
Tsuen Wan (Hong Kong)	82	62	67	68	60	48	47	60	58	54	55	92	99.2%	67
Yuen Long (Hong Kong)	84	70	49	51	48	39	36	52	53	46	67	97	99.4%	67
Tung chung (Hong Kong)	74	67	60	63	68	55	28	59	53	63	59	74	100.0%	64
Taipa Grande (Macao)	71	57	49	39	37	31	18	25	28	35	44	69	100.0%	56

Table 4.2c：The monthly and annual averages concentration of Nitrogen Dioxide

[Class II limit: 40 μg/m^3]

Monitoring Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average
Luhu (Guangzhou)	44	21	35	29	31	21	18	30	29	26	28	44	30
Nanshadawen (Guangzhou)	50	22	38	32	31	22	17	26	30	25	32	47	31
Nansha-HKUST (Guangzhou)	47	24	39	27	31	26	18	23	21	19	25	40	28
Tianhu (Guangzhou)	14	7	10	10	8	9	9	10	6	8	9	15	10
Zhudong (Guangzhou)	33	14	28	24	21	16	15	18	15	19	18	29	21
Tongxinling (Shenzhen)	21	12	18	16	13	9	9	15	17	13	22	30	16
Jinjuzui (Foshan)	47	18	33	23	23	14	12	23	23	19	29	46	26
Huijingcheng (Foshan)	52	18	41	29	24	19	15	27	28	27	31	56	31
Tangjia (Zhuhai)	34	22	25	15	20	10	8	9	13	18	26	35	19
Donghu (Jiangmen)	42	17	30	19	24	14	11	15	19	21	31	45	24
Duanfen (Jiangmen)	24	12	15	9	10	7	5	6	9	16	24	28	14
Huaguoshan (Jiangmen)	37	15	29	16	17	10	12	14	18	23	31	46	22
Chengzhong (Zhaoqing)	41	15	38	27	34	21	21	25	27	24	24	39	28
Xiapu (Huizhou)	24	11	17	14	12	10	9	14	10	11	13	23	14
Shixia (Huizhou)	16	8	13	13*	13	12	11	13	8	8	11	16	12
Jinguowan (Huizhou)	18	10	18	16*	14	10	11	14	10	5	11	13	12
Zimaling (Zhongshan)	37	18	26	16	22	11	9	12	15	20	30	41	21
Nanchengyuanling (Dongguan)	36	13	25	21	21	15	13	22	19	14	16	32	21
Tap Mun (Hong Kong)	12	7	9	7	5	4	4	9	6	6	10	14	8
Tsuen Wan (Hong Kong)	46	42	42	42	37	33	29	41	34	31	36	51	39
Yuen Long (Hong Kong)	45	35	34	30	30	25	24	33	34	30	40	51	35
Tung Chung (Hong Kong)	40	32	31	21	32	16	14	27	32	32	42	50	31
Taipa Grande (Macao)	42	30	28	17	22	12	10	11	16	22	30	40	23

4.3 Ozone (O_3)

Ozone (O_3) is not directly emitted from emission sources. It is formed by the photochemical reaction of oxygen, nitrogen oxides (NOx) and volatile organic compounds (VOCs) in the air under sunlight, and is one of the main components of photochemical smog. Ozone can cause irritation to the eyes, nose and throat. At elevated levels, it can increase a person's susceptibility to respiratory diseases and aggravate pre-existing respiratory diseases such as asthma.

In 2024, the annual average of O_3 recorded at each monitoring station in the Network ranged from 45 to 76 $\mu g/m^3$ with higher average values being recorded in rural areas such as Tap Mun in Hong Kong, Tianhu in Guangzhou and Xiapu in Huizhou. During the year, the compliance rates of the daily maximum 8-hour averages of O_3 in the Network ranged from 84.5% to 98.9%.All other monitoring stations recorded exceedance of the national 1-hour average concentration limit (200 $\mu g/m^3$),with the exception of the Tianhu in Guangzhou.

Tables 4.3a to 4.3c list the monthly maxima of hourly averages, the monthly maxima of daily maximum 8-hour averages with the 90th percentile of the year, the monthly and annual averages of O_3 at each station respectively.

Figure 7：Spatial distribution of annual average concentrations of Ozone (O_3)

Table 4.3a：Hourly averages concentration of Ozone (monthly maxima)

[Class II limit: 200 μg/m³]

Monitoring Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Luhu (Guangzhou)	230	142	189	225	247	164	191	253	232	203	163	227
Nanshadawen (Guangzhou)	253	160	233	209	307	181	223	287	284	233	208	265
Nansha-HKUST (Guangzhou)	288	135	200	203	299	164	206	264	266	257	179	254
Tianhu (Guangzhou)	195	128	200	167	173	140	187	189	122	129	125	157
Zhudong (Guangzhou)	234	157	187	273	275	166	227	260	228	275	173	224
Tongxinling (Shenzhen)	281	113	259	142	195	184	181	235	310	206	176	201
Jinjuzui (Foshan)	226	114	164	130	220	117	168	195	251	199	160	200
Huijingcheng (Foshan)	248	141	212	232	320	177	191	217	298	242	187	201
Tangjia (Zhuhai)	312	129	276	162	256	139	164	186	280	259	216	239
Donghu (Jiangmen)	256	147	207	172	245	158	149	212	268	240	208	255
Duanfen (Jiangmen)	190	136	198	157	204	105	75	122	155	239	236	221
Huaguoshan (Jiangmen)	248	127	206	137	218	94	92	153	163	198	184	221
Chengzhong (Zhaoqing)	251	150	169	181	278	126	160	208	196	252	165	250
Xiapu (Huizhou)	187	113	199	237	209	174	231	213	246	155	140	161
Shixia (Huizhou)	250	135	191	202	162	147	197	214	192	154	125	170
Jinguowan (Huizhou)	175	109	136	196	168	188	232	259	209	145	132	140
Zimaling (Zhongshan)	292	136	242	148	268	145	137	196	233	227	231	242
Nanchengyuanling (Dongguan)	233	147	219	238	289	209	236	278	233	182	157	204
Tap Mun (Hong Kong)	201	132	209	184	231	139	180	207	247	216	212	204
Tsuen Wan (Hong Kong)	139	98	138	151	187	109	152	184	245	156	171	134
Yuen Long (Hong Kong)	187	105	209	140	207	181	144	251	292	189	181	172
Tung Chung (Hong Kong)	214	117	235	126	199	109	176	226	285	345	221	215
Taipa Grande (Macao)	256	125	290	156	225	155	107	173	224	333	220	191

Table 4.3b：Daily maximum 8-hour averages concentration of Ozone (monthly maxima and the 90^{th} percentile of the year) **[Class II limit: 160 $\mu g/m^3$]**

Monitoring Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Compliance	90^{th} percentile
Luhu (Guangzhou)	187	123	146	173	218	133	160	180	189	164	151	188	94.1%	152
Nanshadawen (Guangzhou)	195	132	187	163	284	160	168	212	220	217	163	225	84.5%	169
Nansha-HKUST (Guangzhou)	231	114	176	133	253	136	169	199	234	222	157	213	87.6%	167
Tianhu (Guangzhou)	160	124	191	150	154	121	154	174	114	126	121	143	98.9%	130
Zhudong (Guangzhou)	191	136	149	224	250	146	190	228	207	231	158	174	91.2%	154
Tongxinling (Shenzhen)	204	110	175	138	183	150	152	166	256	181	165	163	95.2%	138
Jinjuzui (Foshan)	175	101	133	106	206	112	141	160	211	177	136	166	94.9%	139
Huijingcheng (Foshan)	200	126	162	179	290	146	152	177	255	210	159	140	90.4%	158
Tangjia (Zhuhai)	254	115	250	135	205	115	133	162	235	235	190	189	91.5%	154
Donghu (Jiangmen)	203	125	175	149	228	115	123	172	234	217	183	208	87.5%	169
Duanfen (Jiangmen)	155	119	141	149	188	99	67	114	136	214	192	189	93.8%	141
Huaguoshan (Jiangmen)	206	112	175	117	190	78	79	122	138	179	157	182	96.5%	136
Chengzhong (Zhaoqing)	211	133	140	140	253	97	126	190	167	223	152	179	94.1%	143
Xiapu (Huizhou)	162	106	160	209	179	159	192	191	207	151	135	134	96.0%	140
Shixia (Huizhou)	201	116	148	173	144	125	183	188	180	135	121	135	95.0%	135
Jinguowan (Huizhou)	142	95	113	153	154	146	212	203	156	137	124	113	98.9%	120
Zimaling (Zhongshan)	212	116	211	127	214	128	123	163	216	199	187	197	90.6%	154
Nanchengyuanling (Dongguan)	202	120	188	179	223	179	192	213	201	167	130	160	89.6%	160
Tap Mun (Hong Kong)	168	127	177	172	213	135	151	177	189	186	188	182	91.2%	153
Tsuen Wan (Hong Kong)	120	89	124	136	178	99	70	117	200	140	123	103	98.9%	114
Yuen Long (Hong Kong)	148	99	154	128	195	136	120	178	236	160	152	126	97.3%	127
Tung Chung (Hong Kong)	135	106	160	118	193	106	140	171	242	194	163	134	94.9%	133
Taipa Grande (Macao)	210	114	237	143	185	122	93	147	199	239	207	155	94.6%	141

Table 4.3c：The monthly and annual averages concentration of Ozone

Monitoring Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average
Luhu (Guangzhou)	48	38	41	40	61	42	50	55	54	76	55	60	52
Nanshadawen (Guangzhou)	52	42	48	40	72	41	44	59	71	86	48	63	56
Nansha-HKUST (Guangzhou)	57	39	46	35	67	38	38	58	72	88	55	67	55
Tianhu (Guangzhou)	83	62	75	68	75	57	59	73	55	86	74	92	72
Zhudong (Guangzhou)	50	42	48	49	66	51	60	62	60	87	68	74	60
Tongxinling (Shenzhen)	67	50	65	48	76	47	37	48	60	89	62	78	61
Jinjuzui (Foshan)	49	36	41	35	59	38	39	48	61	78	51	63	50
Huijingcheng (Foshan)	51	40	43	47	79	47	51	61	73	86	60	62	58
Tangjia (Zhuhai)	63	41	62	51	74	47	39	53	70	94	67	75	61
Donghu (Jiangmen)	57	42	52	48	75	47	45	53	74	95	60	66	60
Duanfen (Jiangmen)	60	43	30	51	72	46	34	45	59	89	65	77	56
Huaguoshan (Jiangmen)	46	36	41	38	56	36	33	33	46	72	52	57	45
Chengzhong (Zhaoqing)	54	47	45	51	72	48	46	51	64	93	67	74	59
Xiapu (Huizhou)	69	53	69	62	79	50	51	72	66	90	64	77	67
Shixia (Huizhou)	69	49	57	44*	63	38	48	64	59	78	58	75	59
Jinguowan (Huizhou)	61	43	49	47*	57	40	37	52	43	70	52	63	51
Zimaling (Zhongshan)	56	42	59	50	72	49	41	57	68	93	55	63	59
Nanchengyuanling (Dongguan)	64	46	58	50	79	45	44	60	66	84	57	75	61
Tap Mun (Hong Kong)	85	65	83	67	98	57	48	54	70	101	81	98	76
Tsuen Wan (Hong Kong)	59	36	53	50	74	32	21	28	48	72	52	58	49
Yuen Long (Hong Kong)	54	34	57	44	74	43	25	39	52	78	50	62	50
Tung Chung (Hong Kong)	53	38	60	45	67	39	35	59	70	97	65	76	59
Taipa Grande (Macao)	69	41	62	50	76	50	38	50	66	93	61	78	61

4.4 Carbon Monoxide (CO)

Carbon Monoxide (CO) is formed when the fuel is not completely burned. Except for methane conversion, plant emissions, forest fires and other natural sources, deforestation, grassland and waste incineration, and the use of fossil fuels and civilian fuel are the main anthropogenic sources of CO. In most urban areas, the major emission source of CO is automobiles.

In 2024, the annual average of CO recorded at each monitoring station in the Network ranged from 0.4 to 0.8 mg/m^3. During the year, all monitoring stations in the Network were in compliance with the national 1-hour and 24-hour average concentration limits (10 mg/m^3 and 4 mg/m^3).

Tables 4.4a to 4.4c list the monthly maxima of hourly and daily averages, the maxima of daily averages with the 95th percentile of the year, the monthly and annual averages of CO at each station respectively.

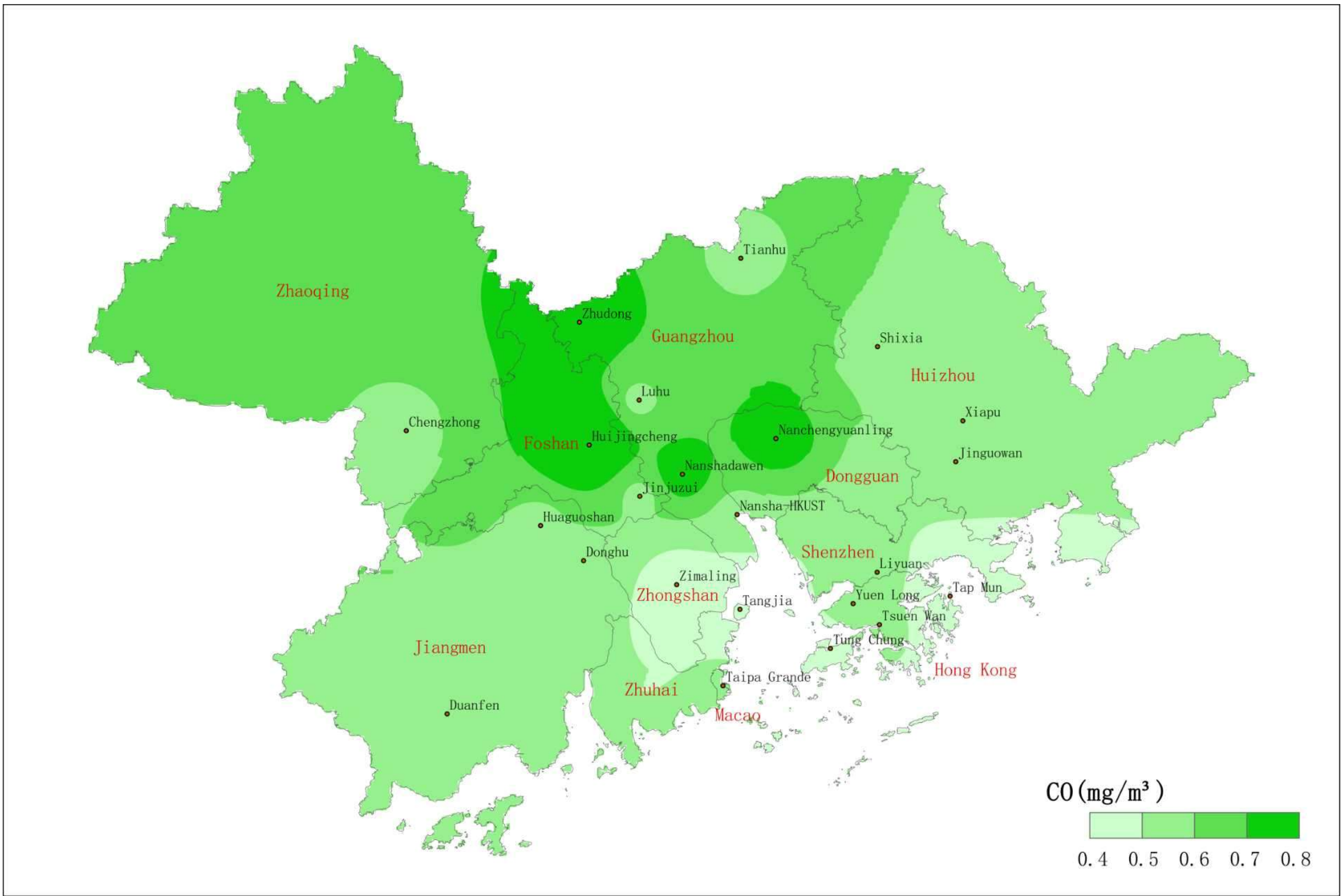

Figure 8：Spatial distribution of annual average concentrations of Carbon Monoxide (CO)

Table 4.4a：Hourly averages concentration of Carbon Monoxide (monthly maxima)

[Class II limit: 10 mg/m³]

Monitoring Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Luhu (Guangzhou)	1.5	1.2	1.6	1.1	1.3	1.5	0.9	1.3	1.5	1.6	1.0	1.1
Nanshadawen (Guangzhou)	2.8	1.2	1.6	1.1	1.1	1.0	0.9	1.0	1.3	1.1	1.1	1.6
Nansha-HKUST (Guangzhou)	1.2	1.2	0.9	0.9	0.9	0.8	1.0	1.0	2.3	0.9	0.9	1.3
Tianhu (Guangzhou)	0.9	1.1	0.9	1.0	0.8	1.0	1.0	1.0	1.0	1.1	1.1	1.1
Zhudong (Guangzhou)	1.2	1.0	1.1	1.0	1.2	1.1	1.0	1.1	1.1	1.1	1.0	1.5
Tongxinling (Shenzhen)	1.0	1.1	1.0	1.1	1.0	1.0	0.9	1.2	1.1	0.8	1.1	1.5
Jinjuzui (Foshan)	1.8	1.1	1.5	1.2	1.3	0.9	0.7	1.0	1.1	1.1	0.9	1.3
Huijingcheng (Foshan)	2.1	1.3	2.0	1.1	1.6	1.2	1.0	1.1	1.1	1.2	1.6	2.2
Tangjia (Zhuhai)	0.9	0.9	0.9	0.8	0.7	0.8	0.6	0.9	0.8	0.7	0.7	1.1
Donghu (Jiangmen)	2.0	1.4	1.7	1.2	1.1	1.1	0.8	1.1	1.0	0.9	1.4	2.4
Duanfen (Jiangmen)	1.0	1.2	1.0	1.1	1.1	1.0	0.8	1.0	1.2	1.1	0.9	1.2
Huaguoshan (Jiangmen)	1.6	1.0	1.2	1.2	1.2	1.0	0.9	1.1	1.0	1.0	1.0	1.5
Chengzhong (Zhaoqing)	1.4	1.6	1.5	1.1	1.2	0.8	0.8	1.2	0.9	1.0	1.0	1.2
Xiapu (Huizhou)	1.7	1.1	1.5	1.0	1.4	0.9	0.7	0.9	1.0	0.9	1.1	1.4
Shixia (Huizhou)	1.3	1.1	1.1	1.1	1.0	1.0	0.8	1.0	0.9	0.9	0.7	0.7
Jinguowan (Huizhou)	1.2	1.0	0.9	0.8	0.8	1.1	0.6	0.8	0.9	0.9	1.0	1.2
Zimaling (Zhongshan)	1.1	0.9	1.0	1.1	0.8	0.8	0.6	0.8	0.8	0.9	0.8	1.0
Nanchengyuanling (Dongguan)	1.6	1.3	1.6	1.2	1.3	1.1	0.8	1.0	1.2	1.0	1.2	1.8
Tap Mun (Hong Kong)	0.9	0.9	0.6	0.5	0.6	0.6	0.7	0.6	0.7	0.8	1.0	0.8
Tsuen Wan (Hong Kong)	1.1	1.1	1.5	1.1	0.8	0.8	0.9	0.8	0.8	0.9	0.9	1.2
Yuen Long (Hong Kong)	1.3	1.1	1.2	1.1	0.9	0.7	0.7	0.9	1.0	0.9	1.0	1.9
Tung Chung (Hong Kong)	1.2	1.6	0.8	0.9	0.8	0.7	0.5	0.7	0.8	0.7	0.8	1.1
Taipa Grande (Macao)	1.0	1.2	1.1	1.2	1.2	0.9	1.0	1.4	0.9	1.0	0.9	1.0

Table 4.4b：Daily averages concentration of Carbon Monoxide (monthly maxima and the 95th percentile of the year) **[Class II limit: 4 mg/m³]**

Monitoring Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Compliance	95th percentile
Luhu (Guangzhou)	1.0	1.1	1.0	0.9	0.8	1.1	0.7	0.9	0.8	0.9	0.7	0.9	100.0%	0.9
Nanshadawen (Guangzhou)	1.2	1.1	1.0	0.8	0.9	0.8	0.7	0.8	1.0	0.8	0.8	1.1	100.0%	1.0
Nansha-HKUST (Guangzhou)	1.0	1.1	0.7	0.8	0.8	0.6	0.9	0.9	0.8	0.8	0.8	1.0	100.0%	0.9
Tianhu (Guangzhou)	0.8	0.9	0.7	0.7	0.7	0.9	0.9	0.8	0.8	0.7	0.8	0.9	100.0%	0.8
Zhudong (Guangzhou)	1.0	0.9	1.0	0.9	1.0	1.0	0.9	0.9	0.8	0.9	0.9	1.1	100.0%	0.9
Tongxinling (Shenzhen)	0.9	0.9	0.9	0.8	0.8	0.8	0.7	0.7	0.7	0.8	0.8	1.0	100.0%	0.8
Jinjuzui (Foshan)	1.2	1.0	1.0	1.0	0.9	0.7	0.5	0.8	0.9	0.8	0.8	1.0	100.0%	0.9
Huijingcheng (Foshan)	1.4	1.1	1.2	1.0	1.3	1.1	0.8	0.9	0.9	1.1	1.0	1.4	100.0%	1.1
Tangjia (Zhuhai)	0.8	0.8	0.7	0.5	0.6	0.5	0.4	0.6	0.6	0.7	0.6	0.7	100.0%	0.7
Donghu (Jiangmen)	1.0	0.9	1.1	0.8	0.9	0.7	0.5	0.6	0.7	0.6	0.7	1.1	100.0%	0.8
Duanfen (Jiangmen)	0.9	1.0	0.9	0.9	1.0	0.9	0.6	0.9	1.0	0.8	0.7	0.9	100.0%	0.9
Huaguoshan (Jiangmen)	0.9	0.9	1.1	1.0	0.8	0.9	0.6	0.8	0.8	0.7	0.8	1.0	100.0%	0.8
Chengzhong (Zhaoqing)	1.1	0.9	1.1	0.8	0.9	0.7	0.6	0.9	0.6	0.8	0.7	0.9	100.0%	0.9
Xiapu (Huizhou)	1.0	0.9	0.9	0.8	0.8	0.8	0.6	0.7	0.8	0.8	0.9	0.9	100.0%	0.8
Shixia (Huizhou)	1.1	1.0	0.8	0.9	0.9	0.8	0.6	0.7	0.9	0.7	0.6	0.5	100.0%	0.9
Jinguowan (Huizhou)	1.1	0.9	0.8	0.8	0.7	0.9	0.5	0.7	0.8	0.9	0.9	1.0	100.0%	0.9
Zimaling (Zhongshan)	0.8	0.9	0.8	0.8	0.6	0.6	0.5	0.6	0.5	0.7	0.6	0.8	100.0%	0.7
Nanchengyuanling (Dongguan)	1.1	1.1	1.1	1.0	1.0	1.0	0.7	0.9	0.9	0.9	0.9	1.1	100.0%	1.0
Tap Mun (Hong Kong)	0.8	0.8	0.5	0.5	0.5	0.5	0.6	0.5	0.6	0.7	0.8	0.7	100.0%	0.7
Tsuen Wan (Hong Kong)	0.9	1.0	1.0	0.9	0.6	0.6	0.7	0.6	0.6	0.8	0.7	0.9	100.0%	0.9
Yuen Long (Hong Kong)	1.0	0.9	0.9	0.8	0.7	0.5	0.5	0.7	0.8	0.7	0.8	1.3	100.0%	0.9
Tung Chung (Hong Kong)	0.9	1.1	0.7	0.6	0.7	0.6	0.4	0.6	0.6	0.7	0.7	0.9	100.0%	0.8
Taipa Grande (Macao)	0.9	1.0	0.8	0.8	0.7	0.6	0.6	0.7	0.7	0.7	0.8	0.9	100.0%	0.8

Table 4.4c: The monthly and annual averages concentration of Carbon Monoxide

Monitoring Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average
Luhu (Guangzhou)	0.7	0.7	0.7	0.7	0.6	0.5	0.5	0.7	0.7	0.6	0.6	0.7	0.6
Nanshadawen (Guangzhou)	0.9	0.7	0.7	0.6	0.7	0.6	0.6	0.7	0.7	0.6	0.6	0.8	0.7
Nansha-HKUST (Guangzhou)	0.8	0.7	0.4	0.5	0.5	0.5	0.6	0.7	0.6	0.4	0.6	0.7	0.6
Tianhu (Guangzhou)	0.6	0.6	0.5	0.5	0.6	0.6	0.6	0.5	0.5	0.5	0.7	0.7	0.6
Zhudong (Guangzhou)	0.8	0.6	0.8	0.6	0.7	0.6	0.8	0.7	0.6	0.6	0.6	0.6	0.7
Tongxinling (Shenzhen)	0.6	0.6	0.7	0.5	0.7	0.6	0.5	0.5	0.6	0.6	0.7	0.7	0.6
Jinjuzui (Foshan)	0.8	0.7	0.6	0.5	0.6	0.5	0.4	0.5	0.6	0.6	0.6	0.7	0.6
Huijingcheng (Foshan)	1.0	0.7	0.8	0.7	0.8	0.6	0.7	0.7	0.7	0.9	0.8	1.0	0.8
Tangjia (Zhuhai)	0.5	0.5	0.4	0.3	0.4	0.3	0.3	0.4	0.4	0.5	0.4	0.5	0.4
Donghu (Jiangmen)	0.7	0.6	0.6	0.5	0.6	0.5	0.4	0.5	0.5	0.5	0.6	0.7	0.6
Duanfen (Jiangmen)	0.6	0.6	0.6	0.6	0.7	0.6	0.5	0.7	0.7	0.6	0.6	0.6	0.6
Huaguoshan (Jiangmen)	0.7	0.6	0.7	0.7	0.7	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.6
Chengzhong (Zhaoqing)	0.8	0.6	0.7	0.6	0.5	0.5	0.5	0.6	0.5	0.6	0.6	0.7	0.6
Xiapu (Huizhou)	0.8	0.7	0.7	0.7	0.6	0.6	0.5	0.6	0.6	0.7	0.6	0.6	0.6
Shixia (Huizhou)	0.7	0.7	0.7	0.8*	0.6	0.6	0.5	0.6	0.7	0.6	0.4	0.4	0.6
Jinguowan (Huizhou)	0.8	0.7	0.7	0.7*	0.6	0.5	0.4	0.6	0.6	0.7	0.6	0.7	0.6
Zimaling (Zhongshan)	0.6	0.5	0.5	0.4	0.4	0.3	0.3	0.5	0.4	0.5	0.5	0.6	0.5
Nanchengyuanling (Dongguan)	0.9	0.8	0.8	0.8	0.8	0.7	0.6	0.7	0.7	0.7	0.7	0.8	0.7
Tap Mun (Hong Kong)	0.5	0.5	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.6	0.5	0.4
Tsuen Wan (Hong Kong)	0.8	0.8	0.8	0.5	0.5	0.4	0.5	0.5	0.5	0.6	0.6	0.7	0.6
Yuen Long (Hong Kong)	0.7	0.7	0.7	0.6	0.5	0.4	0.4	0.5	0.6	0.6	0.6	0.9	0.6
Tung Chung (Hong Kong)	0.7	0.7	0.5	0.4	0.4	0.3	0.3	0.5	0.5	0.6	0.5	0.7	0.5
Taipa Grande (Macao)	0.7	0.6	0.7	0.6	0.5	0.4	0.5	0.5	0.5	0.6	0.6	0.7	0.6

4.5 Respirable Suspended Particulates (PM_{10})

Respirable suspended particulates (PM_{10} or RSP) in the atmosphere come from a great variety of emission sources, such as power plants, vehicles, vessels, cement and pottery manufacturing, fugitive dust, etc. while some are products of oxidization of gaseous pollutants in the air (e.g. sulphate formed from oxidation of SO_2) or formed from photochemical reactions. PM_{10} can penetrate deeply into human lungs and cause impact on human respiratory system. Furthermore, finer particles in PM_{10} have significant effect on visibility.

In 2024, the annual average of PM_{10} recorded at each monitoring station in the Network ranged from 21 to 42 $\mu g/m^3$, and all monitoring stations met the national annual average concentration limit (70 $\mu g/m^3$). During the year, all monitoring stations in the Network were in compliance with the national 24-hour average concentration limit (150 $\mu g/m^3$), with the exception of the Huijingcheng in Foshan.

Tables 4.5a and 4.5b list the monthly maxima of daily averages with the 95th percentile of the year, the monthly and annual averages of PM_{10} at each station respectively.

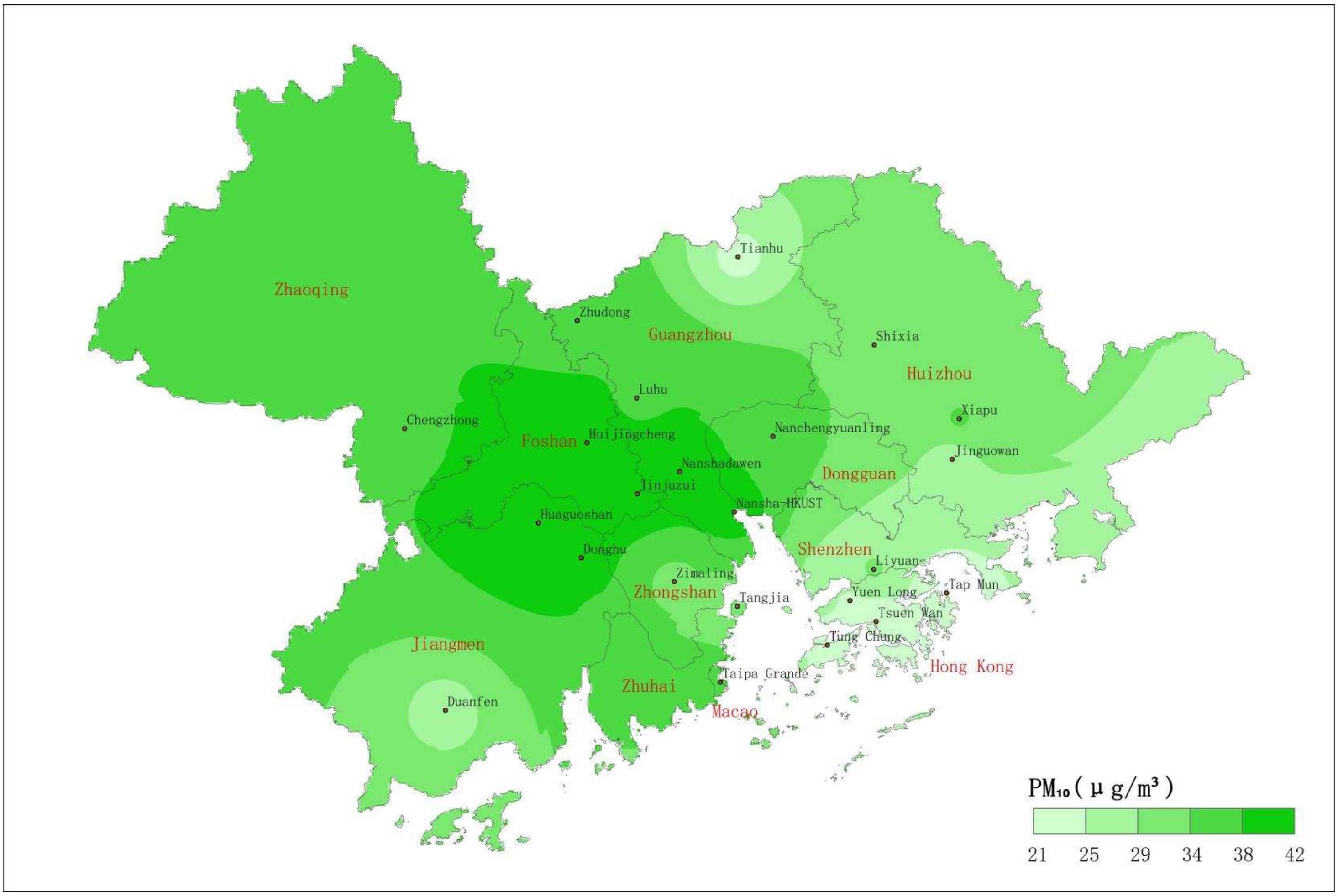

Figure 9：Spatial distribution of annual average concentrations of Respirable Suspended Particulates (PM_{10})

Table 4.5a：Daily averages concentration of PM_{10} (monthly maxima and the 95^{th} percentile of the year) **[Class II limit: 150 $\mu g/m^3$]**

Monitoring Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Compliance	95th percentile
Luhu (Guangzhou)	119	56	85	56	61	31	40	53	58	74	55	93	100.0%	72
Nanshadawen (Guangzhou)	114	91	99	60	60	43	39	59	55	65	66	117	100.0%	84
Nansha-HKUST (Guangzhou)	109	59	104	68	67	57	49	65	54	64	58	111	100.0%	80
Tianhu (Guangzhou)	70	41	54	48	55	31	36	43	23	50	41	51	100.0%	46
Zhudong (Guangzhou)	107	85	107	63	69	34	38	48	47	63	47	90	100.0%	73
Tongxinling (Shenzhen)	73	63	77	44	41	27	30	38	36	47	55	77	100.0%	62
Jinjuzui (Foshan)	134	67	100	59	58	37	34	45	53	73	59	127	100.0%	87
Huijingcheng (Foshan)	153	93	116	62	65	37	34	53	62	78	68	162	98.9%	99
Tangjia (Zhuhai)	99	80	77	57	51	44	23	39	34	53	56	97	100.0%	65
Donghu (Jiangmen)	110	64	137	58	63	46	30	44	51	75	72	127	100.0%	83
Duanfen (Jiangmen)	58	45	70	40	35	23	20	23	30	60	53	79	100.0%	57
Huaguoshan (Jiangmen)	112	50	133	52	62	41	35	49	57	76	68	121	100.0%	92
Chengzhong (Zhaoqing)	116	79	146	59	72	60	32	44	48	73	47	91	100.0%	84
Xiapu (Huizhou)	91	72	76	67	52	30	48	58	46	51	52	92	100.0%	68
Shixia (Huizhou)	86	63	96	73	51	32	47	52	45	46	51	76	100.0%	59
Jinguowan (Huizhou)	68	55	68	43	44	30	38	46	49	44	48	69	100.0%	55
Zimaling (Zhongshan)	73	65	71	53	41	40	27	36	38	60	61	94	100.0%	63
Nanchengyuanling (Dongguan)	103	54	98	58	70	44	47	57	53	65	57	108	100.0%	76
Tap Mun (Hong Kong)	64	35	65	28	38	20	18	24	29	36	42	65	100.0%	48
Tsuen Wan (Hong Kong)	60	53	58	33	33	20	21	32	34	36	39	61	100.0%	47
Yuen Long (Hong Kong)	71	77	59	37	31	18	23	34	39	38	48	73	100.0%	52
Tung Chung (Hong Kong)	67	59	54	32	31	19	17	31	36	43	46	82	100.0%	51
Taipa Grande (Macao)	88	92	82	50	50	33	26	35	44	52	58	98	100.0%	77

Table 4.5b：The monthly and annual averages concentration of PM_{10}

[Class II limit: 70 μg/m³]

Monitoring Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average
Luhu (Guangzhou)	56	30	46	34	32	23	22	32	33	40	33	60	37
Nanshadawen (Guangzhou)	63	34	51	35	34	24	23	34	27	40	39	67	40
Nansha-HKUST (Guangzhou)	65	33	48	38	41	21	21	36	35	44	36	68	41
Tianhu (Guangzhou)	33	21	30	22	21	16	16	23	16	25	22	37	24
Zhudong (Guangzhou)	55	30	46	33	32	24	23	31	27	38	33	55	36
Tongxinling (Shenzhen)	45	30	41	26	24	16	13	21	22	34	33	54	30
Jinjuzui (Foshan)	74	31	50	32	32	20	18	29	32	43	38	73	40
Huijingcheng (Foshan)	74	33	56	35	37	23	19	30	34	43	39	84	42
Tangjia (Zhuhai)	50	33	44	30	30	17	12	19	20	35	35	60	32
Donghu (Jiangmen)	62	33	51	34	35	21	16	26	30	42	42	74	39
Duanfen (Jiangmen)	40	26	35	23	20	12	11	16	20	35	37	56	28
Huaguoshan (Jiangmen)	65	29	52	33	36	22	21	31	34	49	48	81	42
Chengzhong (Zhaoqing)	60	29	56	36	39	22	21	26	26	36	32	60	37
Xiapu (Huizhou)	53	31	44	32	28	19	20	31	24	34	31	58	34
Shixia (Huizhou)	48	30	40	30	26	22	21	30	24	30	28	46	32
Jinguowan (Huizhou)	39	24	35	24*	23	18	17	25	23	29	25	47	28
Zimaling (Zhongshan)	45	30	40	28	27	18	14	23	25	37	39	60	32
Nanchengyuanling (Dongguan)	58	29	46	31	33	22	22	33	29	37	32	61	36
Tap Mun (Hong Kong)	33	19	29	15	19	10	7	13	17	23	22	38	21
Tsuen Wan (Hong Kong)	35	24	30	20	19	12	10	17	17	23	22	39	22
Yuen Long (Hong Kong)	38	24	32	20	19	11	10	17	19	28	28	48	25
Tung Chung (Hong Kong)	36	26	29	18	19	10	8	15	17	27	25	47	23
Taipa Grande (Macao)	59	41	49	31	31	21	17	19	23	37	36	64	36

4.6 Fine Suspended Particulates ($PM_{2.5}$)

Fine suspended particulates ($PM_{2.5}$) in the atmosphere come from a great variety of combustion sources, such as the emissions from power plants and diesel vehicles exhaust while some are products of oxidization of gaseous pollutants in the air (e.g. sulphate formed from oxidation of SO_2) or formed from photochemical reactions. $PM_{2.5}$ have significant effect on visibility.

In 2024, the annual average of $PM_{2.5}$ recorded at each monitoring station in the Network ranged from 12 to 25 μg/m^3, and all monitoring stations met the national annual average concentration limit (35 μg/m^3). During the year, 18 monitoring stations in the Network recorded no exceedance of the national 24-hour average concentration limit (75 μg/m^3) while the corresponding compliance rates in the Network ranged from 98.9% to 100.0%.

Tables 4.6a and 4.6b list the monthly maxima of daily averages with the 95th percentile of the year, the monthly and annual averages of $PM_{2.5}$ at each station respectively.

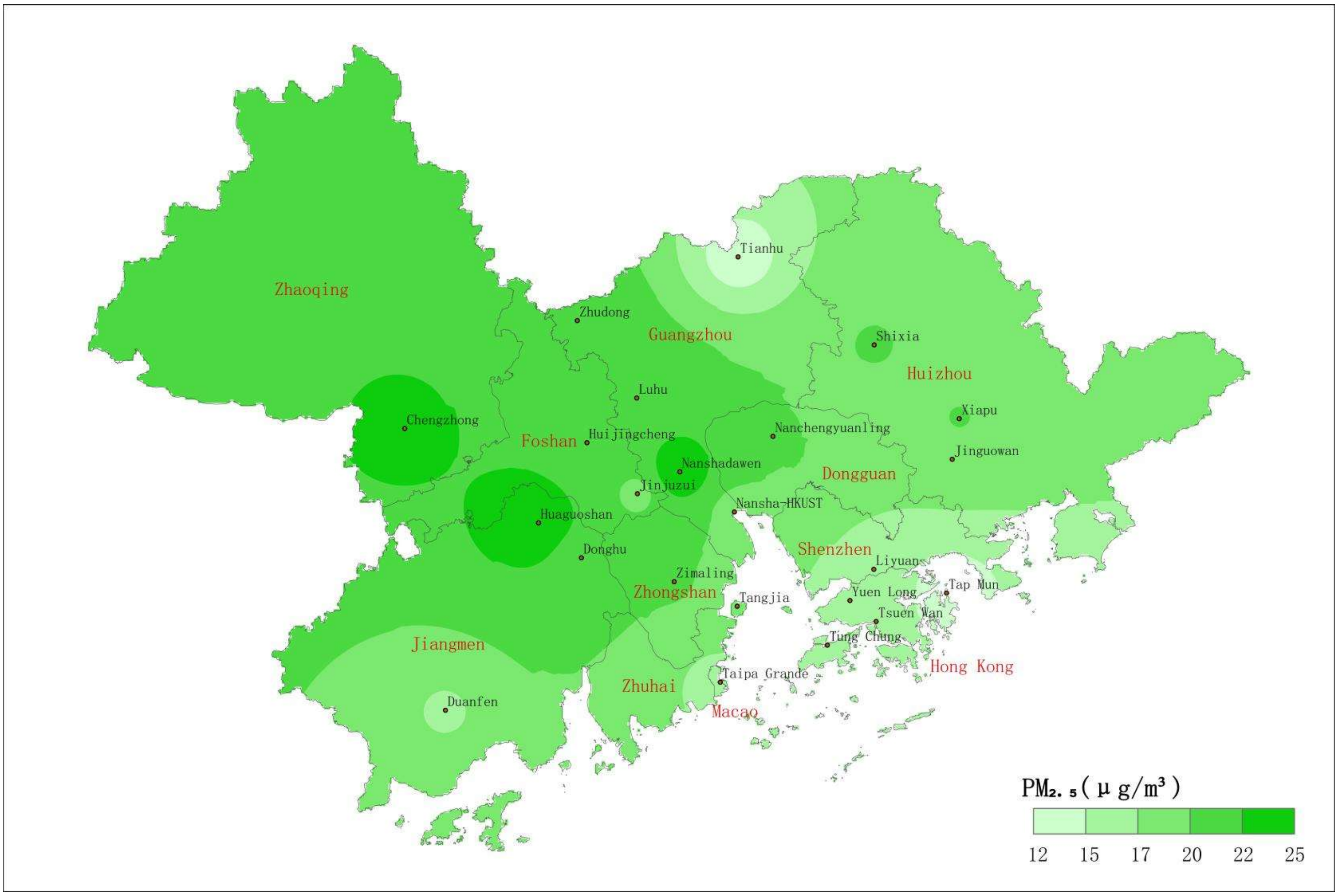

Figure 10：Spatial distribution of annual average concentrations of Fine Suspended Particulates ($PM_{2.5}$)

Table 4.6a：Daily averages concentration of $PM_{2.5}$ (monthly maxima and the 95th percentile of the year) **[Class II limit: 75 μg/m³]**

Monitoring Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Compliance	95th percentile
Luhu (Guangzhou)	69	44	42	35	34	20	24	32	32	52	39	64	100.0%	45
Nanshadawen (Guangzhou)	68	72	53	36	39	34	24	36	40	49	44	83	99.7%	51
Nansha-HKUST (Guangzhou)	51	42	39	32	32	26	17	27	31	37	36	54	100.0%	40
Tianhu (Guangzhou)	54	35	39	41	24	10	11	17	14	36	27	41	100.0%	33
Zhudong (Guangzhou)	71	71	40	37	39	20	24	29	31	50	35	60	100.0%	47
Tongxinling (Shenzhen)	46	56	37	35	25	19	16	29	24	29	36	50	100.0%	38
Jinjuzui (Foshan)	52	58	39	28	27	20	17	25	25	42	33	72	100.0%	43
Huijingcheng (Foshan)	72	58	61	31	34	25	17	28	36	49	33	98	99.2%	51
Tangjia (Zhuhai)	68	51	42	34	22	21	14	30	27	39	38	65	100.0%	45
Donghu (Jiangmen)	63	49	65	31	32	23	15	23	31	47	42	83	99.7%	48
Duanfen (Jiangmen)	40	40	33	27	22	20	14	17	18	47	34	51	100.0%	38
Huaguoshan (Jiangmen)	63	41	67	34	35	28	22	28	37	54	42	76	99.7%	55
Chengzhong (Zhaoqing)	79	54	97	41	50	44	18	27	31	49	31	57	98.9%	50
Xiapu (Huizhou)	57	56	40	39	28	20	26	35	28	32	36	58	100.0%	43
Shixia (Huizhou)	57	53	41	42	30	16	28	36	31	33	35	51	100.0%	41
Jinguowan (Huizhou)	45	47	35	29	25	20	24	37	33	33	37	49	100.0%	36
Zimaling (Zhongshan)	55	54	39	33	31	29	19	25	28	43	43	65	100.0%	43
Nanchengyuanling (Dongguan)	59	43	52	34	37	24	23	31	31	36	35	63	100.0%	42
Tap Mun (Hong Kong)	39	32	29	19	18	10	12	18	18	21	29	48	100.0%	31
Tsuen Wan (Hong Kong)	42	36	33	28	25	15	13	22	25	24	30	48	100.0%	33
Yuen Long (Hong Kong)	49	41	33	26	24	14	13	23	28	27	35	56	100.0%	38
Tung Chung (Hong Kong)	48	46	36	28	23	17	12	22	26	27	37	67	100.0%	39
Taipa Grande (Macao)	45	46	40	33	19	18	10	23	23	29	35	61	100.0%	41

Table 4.6b：The monthly and annual averages concentration of $PM_{2.5}$

[Class II limit: 35 μg/m³]

Monitoring Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average
Luhu (Guangzhou)	34	19	25	20	19	13	11	19	18	23	20	40	22
Nanshadawen (Guangzhou)	38	22	28	22	22	14	11	20	22	25	24	45	25
Nansha-HKUST (Guangzhou)	29	18	21	16	16	10	8	14	16	21	24	36	19
Tianhu (Guangzhou)	26	16	19	13	12	6	6	8	7	12	11	24	13
Zhudong (Guangzhou)	36	21	25	19	19	13	12	19	17	25	22	38	22
Tongxinling (Shenzhen)	26	19	21	17	13	8	6	12	12	18	19	33	17
Jinjuzui (Foshan)	30	19	22	16	16	9	8	14	15	20	19	39	19
Huijingcheng (Foshan)	31	15	27	19	19	11	7	16	18	21	20	49	21
Tangjia (Zhuhai)	32	21	24	16	13	9	5	11	14	20	22	38	19
Donghu (Jiangmen)	33	20	27	18	18	11	8	14	17	22	22	39	21
Duanfen (Jiangmen)	25	16	19	15	12	8	7	10	12	22	22	36	17
Huaguoshan (Jiangmen)	38	19	29	21	21	14	12	17	22	29	28	49	25
Chengzhong (Zhaoqing)	41	19	33	25	23	13	11	15	16	23	19	38	23
Xiapu (Huizhou)	32	20	23	19	16	10	9	18	14	21	20	37	20
Shixia (Huizhou)	33	22	23	19*	16	11	11	19	15	20	18	32	20
Jinguowan (Huizhou)	25	18	21*	15*	15	11	10	18	15	21	18	32	18*
Zimaling (Zhongshan)	31	20	22	18	16	9	8	14	16	22	23	38	20
Nanchengyuanling (Dongguan)	32	17	23	19	19	11	9	18	16	20	19	36	20
Tap Mun (Hong Kong)	21	12	15	9	9	5	4	7	10	15	14	27	12
Tsuen Wan (Hong Kong)	24	17	19	14	12	7	6	11	12	16	15	29	15
Yuen Long (Hong Kong)	26	17	19	14	13	7	6	12	14	19	20	34	17
Tung Chung (Hong Kong)	26	17	18	13	13	7	5	11	12	18	18	34	16
Taipa Grande (Macao)	27	18	19	13	11	6	5	10	12	18	18	37	16

4.7 Monthly Variations of Pollutant Concentrations

Figure 11 shows the monthly variations of the major pollutants (Sulphur Dioxide (SO_2), Nitrogen Dioxide (NO_2), Ozone (O_3), Respirable Suspended Particulates (PM_{10}), Fine Suspended Particulates ($PM_{2.5}$), and Carbon Monoxide (CO)) recorded by the Network in 2024. In general, the monthly average concentrations of SO_2, NO_2, PM_{10}, $PM_{2.5}$, and CO were higher during the winter season (first and fourth quarters of the year) and relatively lower in the summer months. The lower pollutant levels in summer were mainly due to the cleaner maritime air stream prevailed in the PRD region under the influence of southern monsoon, together with heavier rainfall and higher mixing layer that favoured the dispersion of pollutants. The ozone concentration was higher in May, October and December, it was mainly due to the fact that there were increased in light intensity, temperature, decreased in humidity, reduced of cloud coverage, wind field convergence, etc. The unfavorable meteorological conditions caused the rapid formation of ozone. However, from June to September, the relatively low ozone formation was related to the increase in precipitation within the region, the prevailing summer monsoon, the enhanced atmospheric dispersion and the relatively good moisture removal conditions.

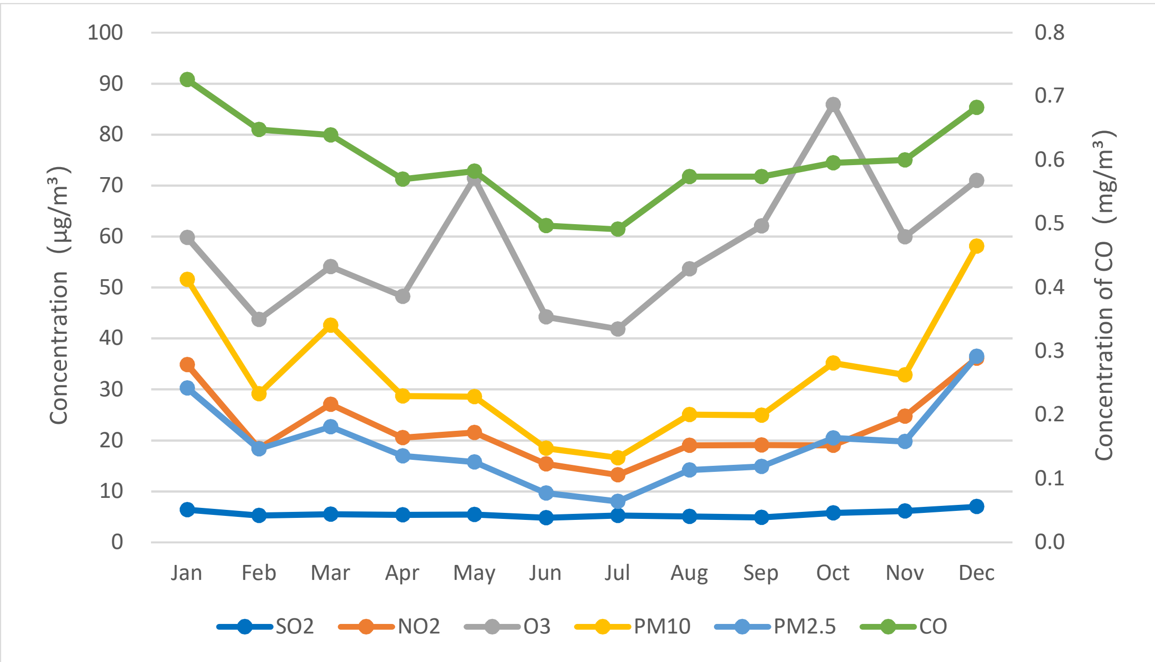

Figure 11：Monitoring network monthly variations of air pollutant concentrations

4.8 Annual Variations of Pollutant Concentrations (2006-2024)

Table 4.8 shows the annual average concentrations of air pollutants recorded by the Network from 2006 to 2024, while Figure 12 shows the trend of rate of changes in the annual pollutant concentrations.

From 2006 to 2024, the annual averages recorded by the Network for SO_2, NO_2, and PM_{10} decreased by 86%, 48% and 51% respectively, which exhibited a discernible downward trend with a descending rate of about 2.1, 1.1 and 1.9 μg/m^3 per year respectively. As for CO and $PM_{2.5}$, these two parameters had been added to the Network in September 2014 and their annual averages decreased by 18% and 34% respectively between 2015 and 2024. These reductions indicate that the measures implemented in recent years by concerted or individual effort of Guangdong, Hong Kong and Macao, including requiring power plants to implement ultra-low emission upgrades, continuously raising atmospheric pollutant emission standards for key industries, conducting volatile organic compound treatment, phasing out coal-fired boilers and highly polluting vehicles, improving motor vehicle emission standards, improving fuel quality, and regulating non-road mobile machinery , etc., have improved the overall air quality in the region. Compared with 2006, the annual average of O_3 in 2024 increased by 33%, reflecting the photochemical smog problem in the region has not yet been resolved. The Guangdong, Hong Kong and Macao governments will continue to implement emission reduction measures to further improve the air quality in the region and tackle the photochemical pollution problem.

Table 4.8: Annual averages of the pollutants in the monitoring network [9]

Year	SO_2 (μg/m^3)	NO_2 (μg/m^3)	O_3 (μg/m^3)	PM_{10} (μg/m^3)	$PM_{2.5}$ (μg/m^3)	CO (mg/m^3)
2006	43	42	44	67	-	-
2007	44	41	46	72	-	-
2008	36	40	46	65	-	-
2009	26	38	51	64	-	-
2010	23	39	49	59	-	-
2011	21	37	53	59	-	-
2012	17	35	49	52	-	-
2013	17	37	49	59	-	-
2014	14	34	52	50	-	-

[9] All Tap Mun's pollutants data are excluded from the calculation of the annual averages of pollutants in 2016 owing to its low hourly data capture rate in 2016.

Taipa Grande's PM_{10} and Tap Mun's PM_{10} data are excluded from the calculation of the annual averages of pollutants in 2017 owing to its low daily data capture rate in 2017.

All Tap Mun's pollutants and Jinguowan's O_3 data are excluded from the calculation of the annual averages of pollutants in 2018 owing to its low daily data capture rate in 2018.

All Modiesha, Zhudong, Duanfenm Xijiao and Nanchengyuanling's pollutants data are excluded from the calculation of the annual averages of pollutants in 2020 owing to its low daily data capture rate in 2020.

Ozone data at Xijiao station in Huizhou, and $PM_{2.5}$ data at Xijiao station in Huizhou are excluded from the calculation of the annual averages of pollutants in 2021 owing to its low daily data capture rate in 2021

Data at Xijiao station in Huizhou are excluded from the calculation of the annual averages of pollutants in 2022 owing to its low data capture rate in 2022.

Year	SO_2 (μg/m³)	NO_2 (μg/m³)	O_3 (μg/m³)	PM_{10} (μg/m³)	$PM_{2.5}$ (μg/m³)	CO (mg/m³)
2015	12	30	47	44	29	0.730
2016	11	32	44	41	26	0.728
2017	10	31	52	45	28	0.665
2018	9	29	53	42	25	0.611
2019	7	30	60	42	25	0.700
2020	6	24	56	34	20	0.611
2021	7	25	59	37	21	0.600
2022	6	23	61	32	18	0.614
2023	6	23	59	35	19	0.605
2024	6	22	58	33	19	0.598

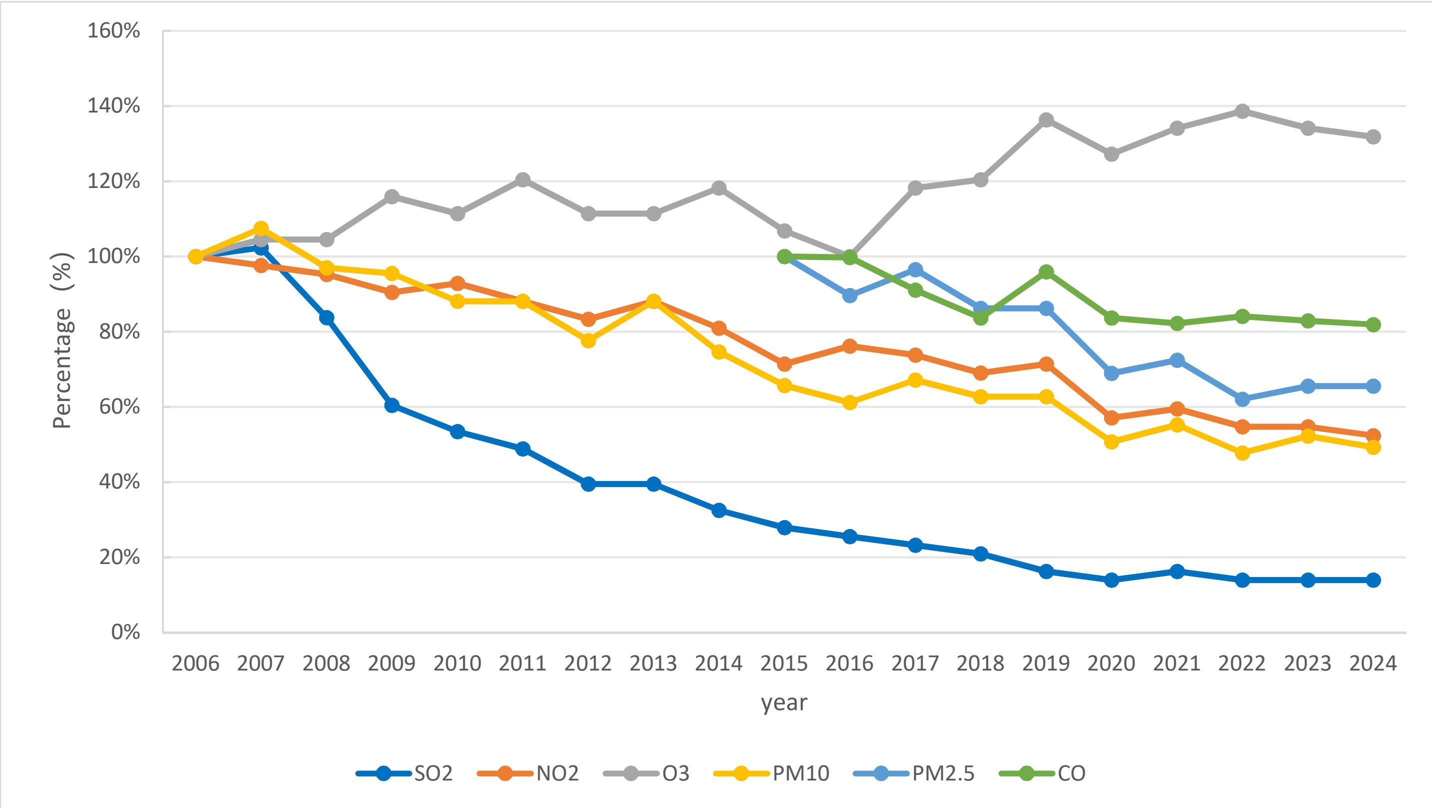

Figure 12：Trend of rates of changes in pollutant's annual averages in the monitoring network[10]

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[10] All Tap Mun's pollutants data are excluded from the calculation of the annual averages of pollutants in 2016 owing to its low hourly data capture rate in 2016.

Taipa Grande's PM_{10} and $PM_{2.5}$, Tap Mun's PM_{10} and Xijiao's $PM_{2.5}$ data are excluded from the calculation of the annual averages of pollutants in 2017 owing to its low daily data capture rate in 2017.

All Tap Mun's pollutants and Jinguowan's O_3 data are excluded from the calculation of the annual averages of pollutants in 2018 owing to its low daily data capture rate in 2018.

Zhudong's $PM_{2.5}$ data is excluded from the calculation of the annual averages of pollutants in 2019 owing to its low daily data capture rate in 2019.

All Modiesha, Zhudong, Xijiao and Nanchengyuanling's pollutants data and Duanfen's SO_2, NO_2, O_3 and PM_{10} data are excluded from the calculation of the annual averages of pollutants in 2020 owing to its low daily data capture rate in 2020.

Ozone data at Xijiao station in Huizhou, and $PM_{2.5}$ data at Xijiao station in Huizhou are excluded from the calculation of the annual averages of pollutants in 2021 owing to its low daily data capture rate in 2021.

Data at Xijiao station in Huizhou are excluded from the calculation of the annual averages of pollutants in 2022 owing to its low data capture rate in 2022.

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,Yuexiu District (Big yard, No. 11 Luhu Park)	City	30m	9m	Jan 1993
Nanshadawen[11] (Guangzhou)	Shinan Road, Dongchong Town, Nansha District	City	23m	10m	Jan 2021
Nansha-HKUST[12] (Guangzhou)	HKUST Fok Ying Tung Research Institute, Nansha District	Mixed educational/ commercial and residential/industrial	54m	28m	Oct 2004
Tianhu (Guangzhou)	Tianhu Park, Conghua District	Background : rural	251m	13m	Oct 2004
Zhudong (Guangzhou)	Zhudong Village Committee, Chini Town, Huadu District	Rural	19m	10m	Dec 2011
Tongxinling[13] (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,Xiangzhou District	Mixed educational/ commercial and residential/industrial	13m	13m	Jan 2010
Donghu (Jiangmen)	Donghu Park,Pengjiang District	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

[11] 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

[12] Wanqingsha station was renamed as Nansha-HKUST station in the 1st quarter of 2019.

[13] Liyuan station was renamed as Tongxinling station in the 1st quarter of 2019.

Monitoring Stations	Address	Area Type	Sampling Height (Above P.D.)	Above Ground	Date Commenced Operation
Shixia[14] (Huizhou)	Community Service Center, Shixiatun Village, Changning Town, Boluo County	Rural	44m	10m	Dec 2011
Jinguowan (Huizhou)	Jinguowan Ecological Farm,Yonghu Town, Huiyang District	Residential	77m	8m	Oct 2004
Zimaling (Zhongshan)	Zimaling Park,Bo'ai Road No.6, East District	Mixed residential/ commercial	45m	7m	Aug 2002
Nancheng-yuanling[15] (Dongguan)	Dongguan Administration Center, Nancheng Street, Urban District	Mixed residential/ commercial/industrial	40m	19m	May 2021
Tap Mun (Hong Kong)	Tap Mun Police Station, Tai Po District, New Territories	Background: rural	26m	11m	Apr 1998
Tsuen Wan (Hong Kong)	60 Tai Ho Road, Tsuen Wan, Tsuen Wan District, New Territories	Urban: mixed residential/commercial/ industrial	21m	17m	Aug 1988
Yuen Long (Hong Kong)	Yuen Long District Office, 269 Castle Peak Road, Yuen Long District, New Territories	New Town: residential	31m	25m	Jul 1995
Tung Chung (Hong Kong)	6 Fu Tung Street, Tung Chung, Islands District, NewTerritories	New Town: residential	34.5m	27.5m	Apr 1999
TaipaGrande[16] (Macao)	Rampa do Observatorio, Taipa Grande,Taipa Island	Rural	113.1m	3m (gaseous pollutants)[17]/ 5m (particulate matter)	Mar 1999

[14] 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)"

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

[16] Taipa Grande station was relocated to SMG observing station in September 2022. The distance between the old and new sites is about 100 meters.

[17] Gaseous pollutants include Sulphur dioxide (SO_2), Nitrogen dioxide (NO_2), Ozone (O_3) 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