

Pearl River Delta
Regional Air Quality Monitoring Network

A Report of Monitoring Results in 2006

Report Number : **PRDAIR-2006-2**

Report Prepared by : **Guangdong Provincial
Environmental Protection
Monitoring Centre**

**Environmental Protection
Department, HKSAR**

Approved by : **Pearl River Delta Air Quality
Management and Monitoring
Special Panel**

Security Classification : **Unrestricted**

Purpose of the Report

This report provides the 2006 monitoring results from the Pearl River Delta Regional Air Quality Monitoring Network and their statistical analysis.

Contents

	<u>Page</u>
1. Introduction to the Pearl River Delta Regional Air Quality Monitoring Network	1
2. Operation of the Network	2
2.1 Quality Control (QC) and Quality Assurance (QA) Activities	2
2.2 Accuracy and Precision	2
3. Statistical Analysis of Pollutant Concentrations	4
3.1 Sulphur Dioxide (SO₂)	4
3.2 Nitrogen Dioxide (NO₂)	7
3.3 Ozone (O₃)	10
3.4 Respirable Suspended Particulates (PM₁₀)	13
3.5 Monthly Variations of Pollutant Concentrations	16
4. Statistical Analysis of the Regional Air Quality Index (RAQI)	17
4.1 Statistics on RAQI Grades	18
4.2 Spatial Distribution of Average RAQI Grades	19
4.3 Monthly Variations of Average RAQI	20
Annex A : Site Information of Monitoring Stations	21
Annex B : Measurement Methods of Air Pollutant Concentration	22

List of Tables

	<u>Page</u>
Table 3.1 a : The monthly maxima and minima of hourly averages of Sulphur Dioxide	5
Table 3.1 b : The monthly maxima and minima of daily averages of Sulphur Dioxide	5
Table 3.1 c : The monthly and annual averages of Sulphur Dioxide	6
Table 3.2 a : The monthly maxima and minima of hourly averages of Nitrogen Dioxide	8
Table 3.2 b : The monthly maxima and minima of daily averages of Nitrogen Dioxide	8
Table 3.2 c : The monthly and annual averages of Nitrogen Dioxide	9
Table 3.3 a : The monthly maxima and minima of hourly averages of Ozone	11
Table 3.3 b : The monthly maxima and minima of daily averages of Ozone	11
Table 3.3 c : The monthly and annual averages of Ozone	12
Table 3.4 a : The monthly maxima and minima of hourly averages of Respirable Suspended Particulates	14
Table 3.4 b : The monthly maxima and minima of daily averages of Respirable Suspended Particulates	14
Table 3.4 c : The monthly and annual averages of Respirable Suspended Particulates	15
Table 4.1 a : Statistics on RAQI grades of individual monitoring stations	18

List of Figures

	<u>Page</u>
Figure 1 : Spatial distribution of the PRD Regional Air Quality Monitoring Stations	1
Figure 2 : Accuracy of the PRD Regional Air Quality Monitoring Network in 2006	3
Figure 3 : Precision of the PRD Regional Air Quality Monitoring Network in 2006	3
Figure 4 : Spatial distribution of average concentrations of Sulphur Dioxide (SO₂) in the Network	4
Figure 5 : Spatial distribution of average concentrations of Nitrogen Dioxide (NO₂) in the Network	7
Figure 6 : Spatial distribution of average concentrations of Ozone (O₃) in the Network	10
Figure 7 : Spatial distribution of average concentrations of Respirable Suspended Particulates (PM₁₀) in the Network	13
Figure 8 : Monthly variations of average pollutant concentrations measured by the Network	16
Figure 9 : Stacked column chart of RAQI grades of individual monitoring stations	18
Figure 10 : Distribution of RAQI grades in the Network	19
Figure 11 : Spatial distribution of average RAQI grades in the Network	19
Figure 12 : The average RAQI of individual monitoring stations	20
Figure 13 : Monthly variations in average RAQI	20

1. Introduction to the Pearl River Delta Regional Air Quality Monitoring Network

The Pearl River Delta (PRD) Regional Air Quality Monitoring Network (the Network) was jointly established by the Guangdong Provincial Environmental Protection Monitoring Centre (GDEMC) and the Environmental Protection Department of the HKSAR (HKEPD) from 2003 to 2005. It came into operation on 30 November 2005 and has been providing data for reporting of Regional Air Quality Index (RAQI) to the public since then.

The Network comprises 16 automatic air quality monitoring stations (see Figure 1) across the PRD region. Ten of these stations are operated by the Environmental Protection Monitoring Centres of the individual cities in Guangdong while the 3 stations located in Hong Kong are managed by the HKEPD. The remaining 3 regional stations in the Network are operated by the GDEMC. The objectives of the Network are to :

- provide accurate air quality data that can help the Guangdong Provincial and HKSAR governments to appraise 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 various places in the region.

In order to ensure the air quality monitoring results attain a high degree of accuracy and reliability, the two governments had jointly developed a set of “Standard Operational Procedures on Quality Assurance and Quality Control of the PRD Air Quality Monitoring System for Hong Kong and Guangdong” (QA/QC Operating Procedures). The design and operation of the Network comply with the requirements set out in the QA/QC Operating Procedures.

All stations are installed with equipment to measure the ambient concentrations of respirable suspended particulate (PM₁₀ or RSP), sulphur dioxide (SO₂), nitrogen dioxide (NO₂) and ozone (O₃).

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

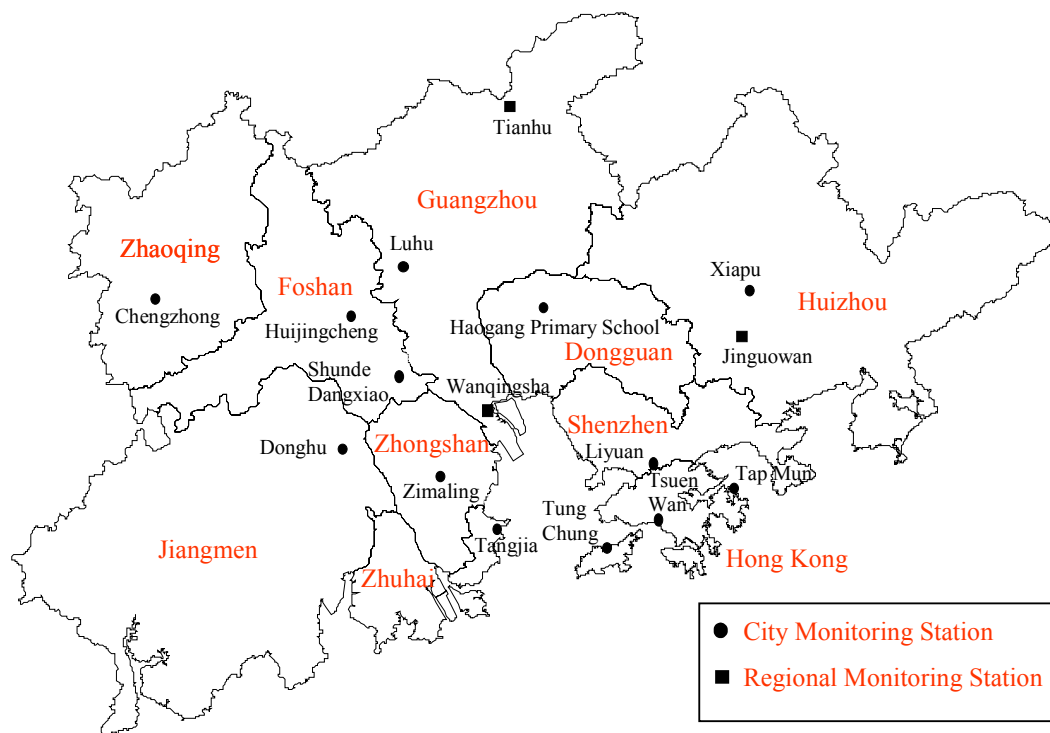


Figure 1 : Spatial distribution of the PRD Regional Air Quality Monitoring Stations

2. Operation of the Network

The Network was generally in smooth operation during 2006. Except for Haogang Primary School in Dongguan where monitoring had been interrupted because of equipment upgrading works, the data capture rates of all other monitoring stations in the Network were high in the year, averaging 92%.

In order to provide the public in both Guangdong and HKSAR with daily air quality information in different parts of the PRD region, the GDEMC and HKEPD established a daily reporting system of the Regional Air Quality Index (RAQI). The two Governments have been issuing the RAQI to the public at 4pm every day through the Internet since 30 November 2005.

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

The two governments have fully carried out the agreed QA/QC activities, which include zero/span checks, precision checks, dynamic calibration, etc., 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 complies continuously with the QA/QC requirements, the GDEMC and HKEPD have jointly set up the Guangdong-Hong Kong Quality Management Committee for the PRD Regional Air Quality Monitoring Network (the Quality Management Committee, QMC) to review, on a quarterly basis, the set-up of the network, its performance in QA/QC and the operation status of its data transmission system. The QMC will also conduct system audit once a year to evaluate the effectiveness of the quality management system. The findings of the system audit will be reported. The deficiency found and corrective measures suggested will be listed and followed by the QMC.

2.2 Accuracy and Precision

The accuracy of the Network is assessed by means of performance audits. The control limits set for the gaseous pollutants and respirable suspended particulates (PM₁₀) are $\pm 15\%$ and $\pm 10\%$ respectively, these limits are similar to those of the United States Environmental Protection Agency and other international standards. In 2006, the GDEMC and HKEPD jointly carried out 320 audit checks on the analysers and samplers at the monitoring stations of the Network. The results showed that, based on the 95% probability limits, the accuracy of the Network varied between -13% to 11% and was within the specified control limits (see Figure 2).

Precision is a measure of repeatability and is calculated in accordance with the QA/QC Operating Procedures. The control limits adopted for the gaseous pollutants and respirable suspended particulates (PM₁₀) are $\pm 20\%$ and $\pm 10\%$ respectively. In 2006, the GDEMC and HKEPD jointly carried out 914 precision checks on the analysers and samplers at the monitoring stations of the Network. The results showed that, based on the 95% probability limits, the precision of the Network varied between -17% and 21% (see Figure 3). The precision of nitrogen dioxide slightly exceeded the control limit in 2006 because operation in some monitoring stations had not reached the anticipated performance level in the first half of the year. The QC performance, nonetheless, improved significantly in the second half of the year after the implementation of preventive maintenance measures. It is anticipated that the overall precision of the Network will eventually meet all the requirements specified in the QA/QC Operating Procedures.

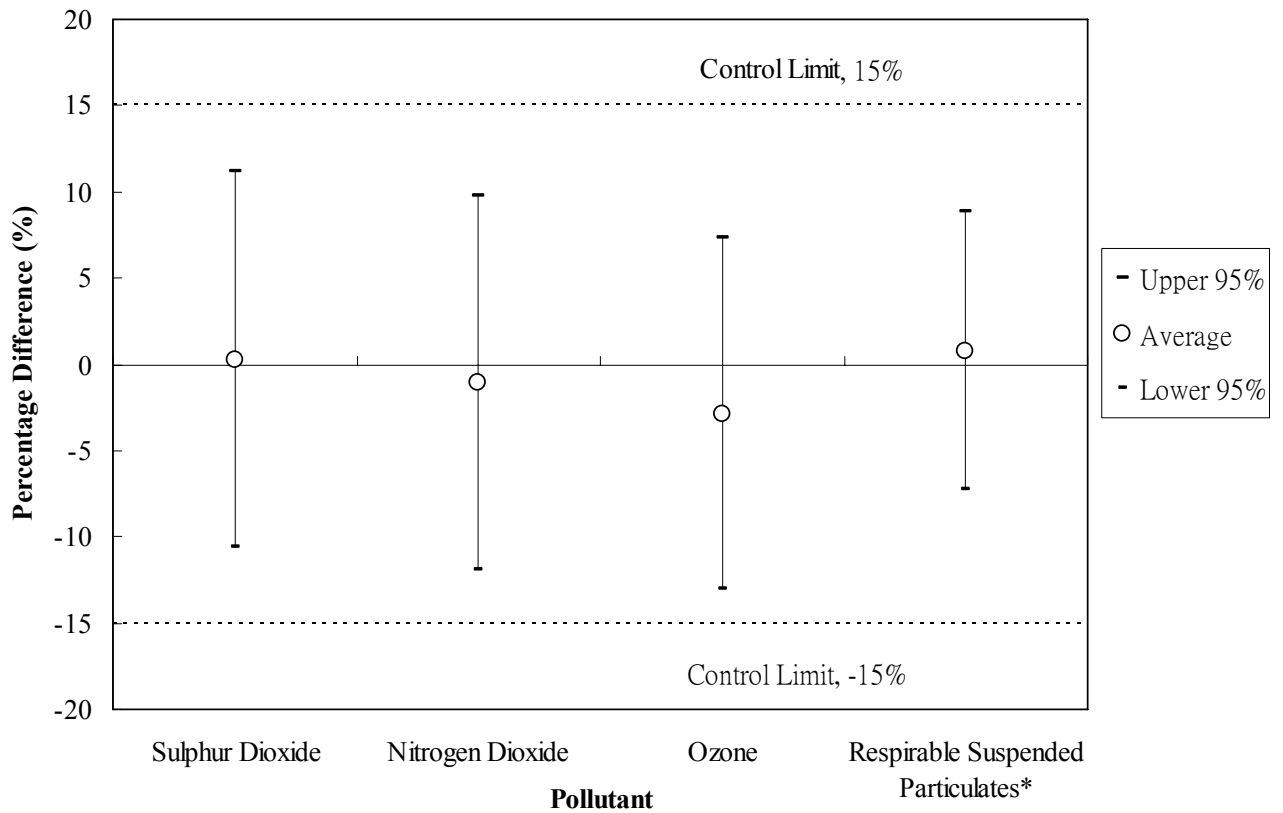


Figure 2 : Accuracy of the PRD Regional Air Quality Monitoring Network in 2006

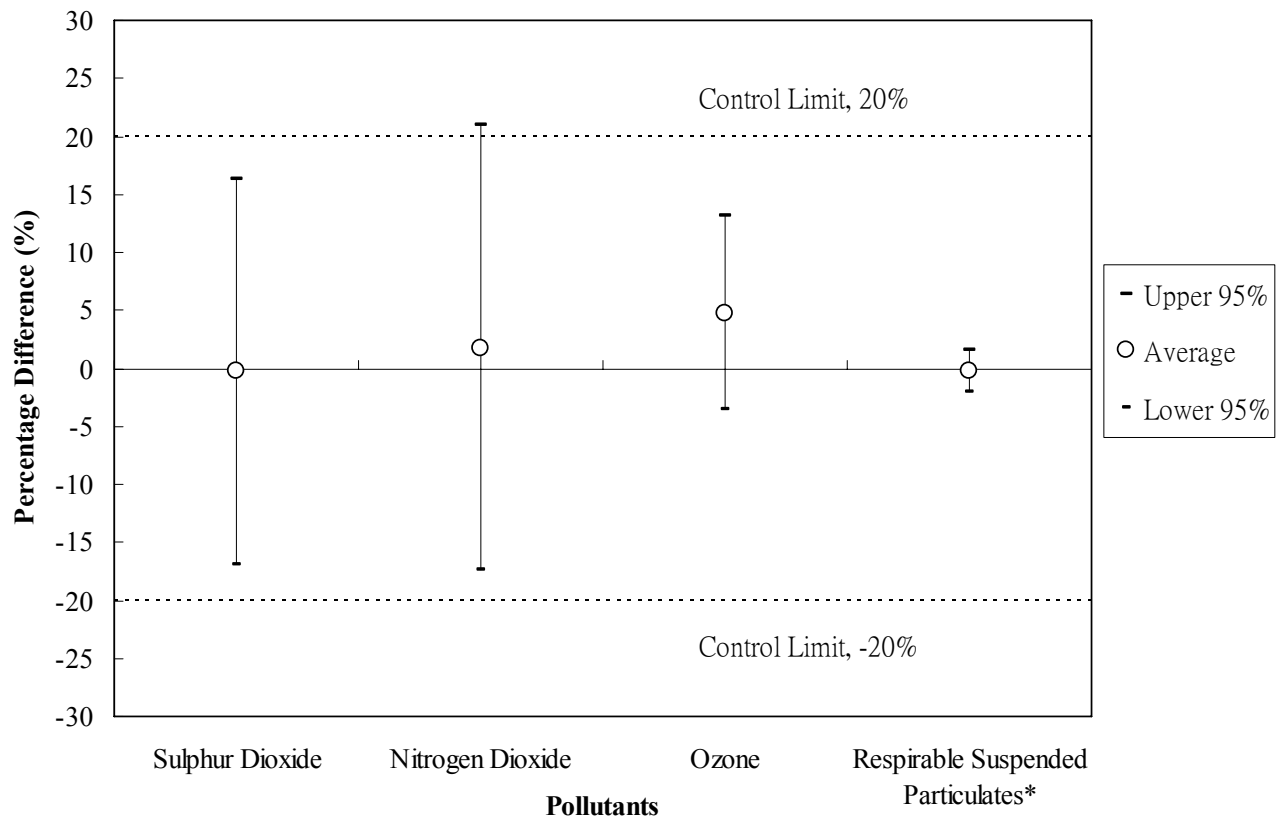


Figure 3 : Precision of the PRD Regional Air Quality Monitoring Network in 2006

* Both the accuracy and precision of the respirable suspended particulates (PM₁₀) adopt a control limit of $\pm 10\%$.

3. Statistical Analysis of Pollutant Concentrations

3.1 Sulphur Dioxide (SO₂)

SO₂ 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 human respiratory system, SO₂ contributes to acid rain. It can also be oxidized in the air to form sulphate which has a significant impact on the levels of respirable suspended particulates (PM₁₀) and visibility in the region.

The annual averages of SO₂ at various monitoring stations in the Network ranged from 0.014 mg/m³ to 0.108 mg/m³ in 2006, with values at 4 stations exceeding the national annual air quality standard[#] (0.06 mg/m³). As shown in Figure 4, the average levels of SO₂ at the north-western part of PRD and the Pearl River Estuary region were in general higher than those of other areas. Summary of the monthly and annual averages of SO₂ at various stations are in Table 3.1c.

During the year, 13 monitoring stations in the Network had recorded exceedance of the national daily air quality standard (0.15 mg/m³) of SO₂ while the corresponding national hourly standard (0.50 mg/m³) was exceeded at 4 monitoring stations. Details are in Table 3.1a and Table 3.1b.

Distribution of average SO₂
from Jan 2006 to Dec 2006

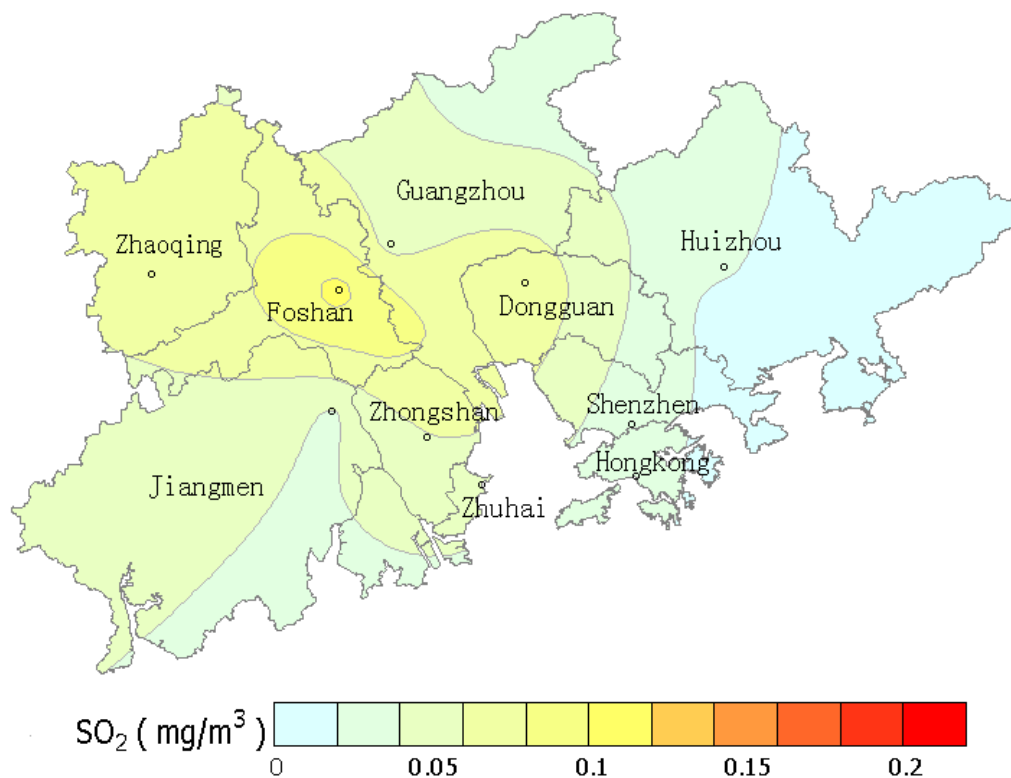


Figure 4 : Spatial distribution of average concentrations of Sulphur Dioxide (SO₂) in the Network

National Standards refer to Class 2 of the “National Ambient Air Quality Standards (GB 3095 – 1996 – revised version)” [NAAQS], which are applicable to residential, mixed commercial/residential, cultural, industrial and village areas.

Table 3.1 a : The monthly maxima and minima of hourly averages of Sulphur Dioxide

[Class 2 NAAQS (Hourly) : 0.50 mg/m³]

Monitoring Stations	Mth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Exceed- ance Hours	Exceed- ance Rate
Luhu Park (Guangzhou)	Max	0.391	0.379	0.339	0.250	0.263	0.266	0.249	0.275	0.241	0.246	0.284	0.223	0	0.00%
	Min	0.006	0.005	0.001	0.000	0.001	0.003	0.001	0.000	0.003	0.005	0.007	0.008		
Wanqingsha (Guangzhou)	Max	0.339	0.451	0.401	0.362	0.303	0.241	0.182	0.407	0.358	0.311	0.288	0.482	0	0.00%
	Min	0.011	0.007	0.012	0.005	0.001	0.000	0.000	0.000	0.000	0.009	0.011	0.000		
Tianhu (Guangzhou)	Max	0.244	0.315	0.269	0.412	0.177	0.245	0.222	0.241	0.241	0.257	0.280	0.153	0	0.00%
	Min	0.010	0.010	0.010	0.003	0.003	0.001	0.001	0.002	0.001	0.006	0.004	0.005		
Liyuan (Shenzhen)	Max	0.182	0.288	0.457	0.177	0.194	0.288	0.164	0.194	0.187	0.130	0.176	0.160	0	0.00%
	Min	0.003	0.003	0.000	0.002	0.000	0.000	0.000	0.000	0.000	0.008	0.008	0.000		
Tangjia (Zhuhai)	Max	0.367	0.440	0.539	0.281	0.392	0.139	0.080	0.329	0.247	0.258	0.326	0.399	1	0.01%
	Min	0.000	0.000	0.010	0.000	0.000	0.000	0.000	0.007	0.008	0.011	0.016	0.008		
Shunde Dangxiao (Foshan)	Max	0.471	0.560	0.503	0.468	0.307	0.196	0.245	0.214	0.245	0.394	0.378	0.452	2	0.03%
	Min	0.017	0.000	0.001	0.017	0.006	0.002	0.001	0.002	0.004	0.022	0.008	0.013		
Huijingcheng (Foshan)	Max	0.747	0.817	0.647	0.402	0.365	0.261	0.249	0.411	0.264	0.648	0.700	0.683	51	0.66%
	Min	0.021	0.025	0.018	0.008	0.005	0.001	0.001	0.002	0.010	0.019	0.017	0.021		
Donghu (Jiangmen)	Max	0.219	0.259	0.341	0.140	0.182	0.206	0.092	0.199	0.168	0.153	0.284	0.353	0	0.00%
	Min	0.003	0.007	0.004	0.000	0.000	0.001	0.002	0.003	0.005	0.005	0.008	0.016		
Chengzhong (Zhaoqing)	Max	0.196	0.248	0.420	0.222	0.286	0.365	0.206	0.159	0.415	0.407	0.498	0.448	0	0.00%
	Min	0.010	0.009	0.001	0.001	0.017	0.010	0.005	0.004	0.006	0.006	0.013	0.009		
Xiapu (Huizhou)	Max	0.111	0.116	0.122	0.154	0.108	0.077	0.193	0.232	0.129	0.055	0.102	0.102	0	0.00%
	Min	0.004	0.001	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001		
Jinguowan (Huizhou)	Max	0.226	0.103	0.119	0.149	0.132	0.047	0.228	0.121	0.191	0.084	0.104	0.064	0	0.00%
	Min	0.003	0.003	0.004	0.002	0.001	0.000	0.001	0.001	0.002	0.005	0.006	0.004		
Haogang (Dongguan) #	Max	--	--	--	--	--	--	--	0.581	0.409	0.396	0.429	0.460	3	0.11%
	Min	--	--	--	--	--	--	--	0.006	0.006	0.009	0.013	0.006		
Zimaling Park (Zhongshan)	Max	0.424	0.351	0.491	0.308	0.331	0.165	0.400	0.328	0.346	0.364	0.300	0.370	0	0.00%
	Min	0.002	0.006	0.002	0.000	0.000	0.001	0.000	0.001	0.003	0.002	0.002	0.007		
Tsuen Wan (HKSAR)	Max	0.136	0.255	0.284	0.150	0.166	0.179	0.214	0.227	0.139	0.115	0.303	0.125	0	0.00%
	Min	0.005	0.004	0.004	0.002	0.006	0.006	0.003	0.004	0.006	0.009	0.004	0.005		
Tap Mun (HKSAR)	Max	0.153	0.161	0.243	0.120	0.135	0.067	0.181	0.205	0.110	0.080	0.126	0.156	0	0.00%
	Min	0.005	0.005	0.005	0.005	0.005	0.006	0.006	0.000	0.006	0.008	0.008	0.010		
Tung Chung (HKSAR)	Max	0.175	0.429	0.286	0.150	0.246	0.257	0.136	0.335	0.122	0.154	0.183	0.172	0	0.00%
	Min	0.005	0.000	0.000	0.004	0.004	0.003	0.000	0.003	0.003	0.008	0.008	0.013		

Table 3.1 b : The monthly maxima and minima of daily averages of Sulphur Dioxide

[Class 2 NAAQS (Daily) : 0.15 mg/m³]

Monitoring Stations	Mth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Exceed- ance Days	Exceed- ance Rate
Luhu Park (Guangzhou)	Max	0.177	0.164	0.136	0.096	0.104	0.100	0.093	0.111	0.110	0.112	0.129	0.076	4	1.15%
	Min	0.018	0.008	0.009	0.009	0.004	0.034	0.017	0.012	0.004	0.010	0.013	0.015		
Wanqingsha (Guangzhou)	Max	0.197	0.202	0.287	0.138	0.143	0.106	0.087	0.139	0.113	0.133	0.161	0.171	19	5.38%
	Min	0.029	0.016	0.035	0.012	0.014	0.000	0.001	0.003	0.005	0.033	0.040	0.065		
Tianhu (Guangzhou)	Max	0.143	0.086	0.074	0.194	0.072	0.104	0.120	0.079	0.086	0.117	0.118	0.062	2	0.59%
	Min	0.015	0.010	0.011	0.005	0.003	0.001	0.002	0.002	0.006	0.008	0.006	0.007		
Liyuan (Shenzhen)	Max	0.061	0.098	0.190	0.070	0.049	0.039	0.076	0.091	0.071	0.036	0.076	0.069	1	0.30%
	Min	0.009	0.009	0.010	0.004	0.005	0.003	0.002	0.009	0.013	0.012	0.014	0.018		
Tangjia (Zhuhai)	Max	0.190	0.168	0.338	0.118	0.169	0.048	0.030	0.099	0.139	0.151	0.204	0.182	16	4.76%
	Min	0.001	0.007	0.025	0.006	0.001	0.000	0.001	0.010	0.016	0.018	0.023	0.038		
Shunde Dangxiao (Foshan)	Max	0.303	0.248	0.285	0.208	0.129	0.106	0.098	0.125	0.120	0.204	0.191	0.228	36	10.68%
	Min	0.031	0.039	0.018	0.048	0.026	0.021	0.022	0.017	0.029	0.053	0.052	0.052		
Huijingcheng (Foshan)	Max	0.371	0.301	0.335	0.259	0.127	0.125	0.121	0.180	0.162	0.326	0.391	0.277	62	19.14%
	Min	0.039	0.043	0.036	0.059	0.030	0.032	0.027	0.044	0.043	0.066	0.066	0.059		
Donghu (Jiangmen)	Max	0.093	0.096	0.142	0.062	0.075	0.056	0.032	0.061	0.079	0.077	0.116	0.162	1	0.29%
	Min	0.010	0.011	0.009	0.002	0.002	0.002	0.003	0.004	0.008	0.013	0.023	0.028		
Chengzhong (Zhaoqing)	Max	0.144	0.140	0.184	0.157	0.162	0.176	0.091	0.087	0.158	0.189	0.291	0.163	16	4.79%
	Min	0.018	0.015	0.020	0.017	0.033	0.018	0.012	0.013	0.015	0.016	0.044	0.047		
Xiapu (Huizhou)	Max	0.046	0.051	0.064	0.064	0.035	0.026	0.090	0.129	0.046	0.025	0.038	0.063	0	0.00%
	Min	0.009	0.002	0.006	0.004	0.002	0.002	0.002	0.000	0.001	0.005	0.001	0.006		
Jinguowan (Huizhou)	Max	0.074	0.047	0.070	0.064	0.035	0.021	0.065	0.056	0.082	0.030	0.039	0.030	0	0.00%
	Min	0.006	0.004	0.005	0.003	0.003	0.001	0.001	0.001	0.002	0.009	0.008	0.007		
Haogang (Dongguan) #	Max	--	--	--	--	--	--	--	0.242	0.159	0.165	0.216	0.168	9	8.91%
	Min	--	--	--	--	--	--	--	0.021	0.013	0.030	0.027	0.027		
Zimaling Park (Zhongshan)	Max	0.199	0.173	0.375	0.145	0.149	0.075	0.095	0.127	0.155	0.155	0.152	0.184	16	5.03%
	Min	0.007	0.012	0.007	0.000	0.002	0.002	0.002	0.002	0.009	0.014	0.004	0.012		
Tsuen Wan (HKSAR)	Max	0.059	0.084	0.198	0.056	0.058	0.048	0.099	0.083	0.047	0.055	0.076	0.043	1	0.28%
	Min	0.007	0.007	0.007	0.009	0.007	0.010	0.007	0.006	0.008	0.014	0.008	0.007		
Tap Mun (HKSAR)	Max	0.036	0.034	0.042	0.029	0.030	0.025	0.094	0.066	0.041	0.028	0.036	0.037	0	0.00%
	Min	0.007	0.008	0.010	0.008	0.007	0.007	0.008	0.000	0.009	0.011	0.010	0.013		
Tung Chung (HKSAR)	Max	0.103	0.133	0.229	0.069	0.072	0.102	0.042	0.072	0.067	0.050	0.082	0.071	1	0.28%
	Min	0.014	0.005	0.009	0.005	0.006	0.005	0.002	0.007	0.009	0.013	0.015	0.020		

Table 3.1 c : The monthly and annual averages of Sulphur Dioxide

[Class 2 NAAQS (Annual) : 0.06 mg/m³]

Monitoring Stations	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual Average
Luhu Park (Guangzhou)	0.067	0.061	0.063	0.049	0.037	0.062	0.053	0.062	0.043	0.054	0.052	0.032	0.053
Wanqingsha (Guangzhou)	0.091	0.104	0.102	0.059	0.053	0.033	0.027	0.043	0.066	0.079	0.099	0.123	0.073
Tianhu (Guangzhou)	0.041	0.030	0.030	0.051	0.020	0.036	0.037	0.026	0.028	0.034	0.026	0.023	0.032
Liyuan (Shenzhen)	0.028	0.036	0.033	0.020	0.016	0.016	0.022	0.026	0.032	0.024*	0.034	0.043	0.027
Tangjia (Zhuhai)	0.054	0.071	0.084	0.031	0.040	0.015	0.012	0.028	0.048	0.042	0.089	0.099	0.051
Shunde Dangxiao (Foshan)	0.104	0.114	0.125	0.099	0.057	0.056	0.045	0.059	0.064	0.101	0.094	0.109	0.086
Huijingcheng (Foshan)	0.126	0.138	0.181	0.127	0.062	0.065	0.054	0.079	0.083	0.130	0.123	0.130	0.108
Donghu (Jiangmen)	0.036	0.050	0.056	0.021	0.016	0.019	0.010	0.027	0.037	0.041	0.062	0.075	0.037
Chengzhong (Zhaoqing)	0.061	0.050	0.073	0.056	0.072	0.067	0.033	0.049	0.067	0.066	0.099	0.105	0.067
Xiapu (Huizhou)	0.027	0.023	0.021	0.026	0.016	0.014	0.027	0.026	0.012	0.014	0.017	0.030	0.021
Jinguowan (Huizhou)	0.014	0.015	0.013	0.015	0.009	0.006	0.014	0.012	0.018	0.015	0.022*	0.018	0.014
Haogang (Dongguan) #	--	--	--	--	--	--	--	0.087	0.078	0.083*	0.065	0.062*	Insufficient Data
Zimaling Park (Zhongshan)	0.062	0.084	0.090	0.039	0.051	0.022	0.018	0.040	0.059	0.064	0.074	0.107	0.059
Tsuen Wan (HKSAR)	0.025	0.037	0.029	0.026	0.025	0.022	0.029	0.025	0.022	0.026	0.023	0.023	0.026
Tap Mun (HKSAR)	0.018	0.018	0.018	0.016	0.013	0.011	0.020	0.016	0.018	0.017	0.021	0.025	0.018
Tung Chung (HKSAR)	0.039	0.043	0.039	0.021	0.023	0.016	0.015	0.026	0.019	0.025	0.034	0.034	0.028

Remark : 1. All concentration units are in milligrams per cubic metre.
3. “#” denotes that validated data started from August 1.

2. “--” denotes lack of data due to equipment upgrading works.
4. “*” denotes that the data capture rate does not meet the minimum requirements for determining a representative value.

3.2 Nitrogen Dioxide (NO₂)

Nitrogen Dioxide (NO₂) is mainly formed from oxidization of nitrogen monoxide (NO) emitted in the process of combustion. Its major emission sources include power plants, vehicles, industrial combustion plants, etc. Apart from the impact on human respiratory system, it can also be oxidized in the air to form nitrate, which has significant impact on the levels of particulates, acid rain and visibility in the region.

The annual averages of NO₂ at various monitoring stations in the Network ranged from 0.013 mg/m³ to 0.079 mg/m³ in 2006; all are in compliance with the national annual air quality standard (0.08 mg/m³). During the period, 11 monitoring stations in the Network had recorded exceedance of the national daily air quality standard (0.12 mg/m³) of NO₂ while the corresponding national hourly standard (0.24 mg/m³) was exceeded at 9 monitoring stations. Please refer to Figures 5 and Tables 3.2a to 3.2c for details.

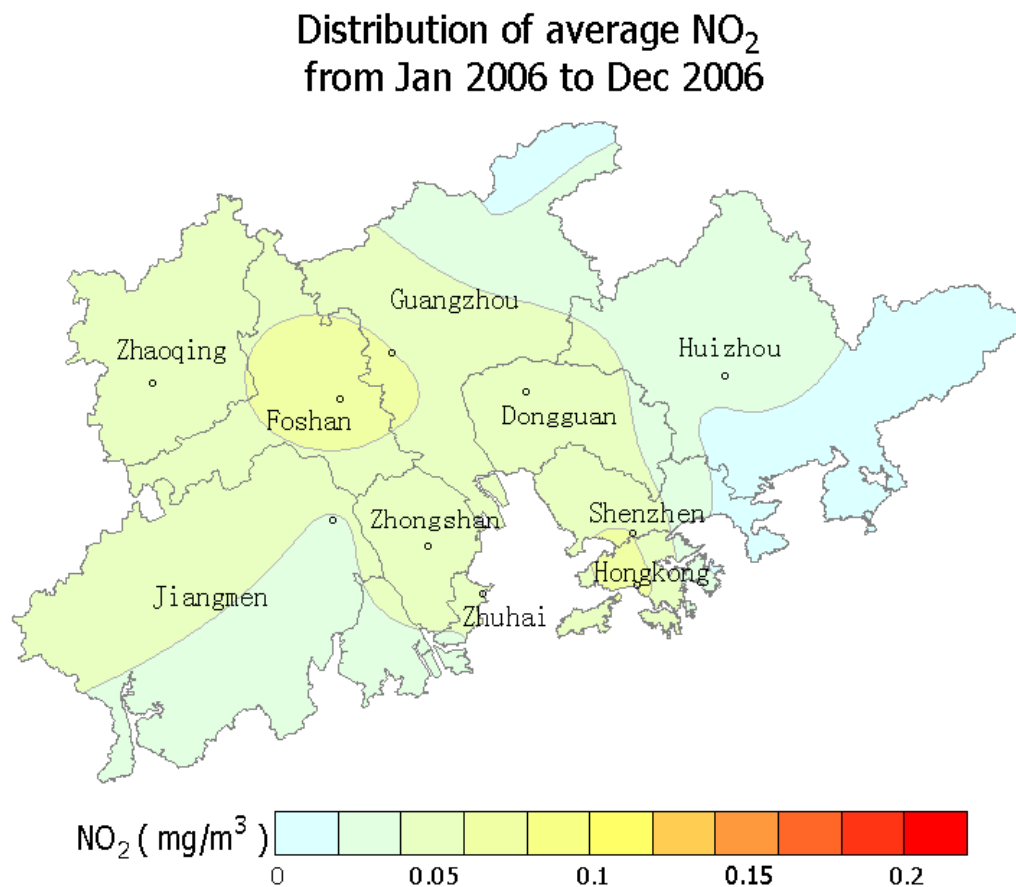


Figure 5 : Spatial distribution of average concentrations of Nitrogen Dioxide (NO₂) in the Network

Table 3.2 a : The monthly maxima and minima of hourly averages of Nitrogen Dioxide

[Class 2 NAAQS (Hourly) : 0.24 mg/m3]

Monitoring Stations	Mth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Exceed- ance Hours	Exceed- ance Rate
Luhu Park (Guangzhou)	Max	0.331	0.266	0.249	0.161	0.139	0.113	0.102	0.220	0.266	0.246	0.271	0.215	16	0.19%
	Min	0.018	0.000	0.002	0.011	0.010	0.009	0.007	0.009	0.014	0.019	0.014	0.013		
Wanqingsha (Guangzhou)	Max	0.159	0.191	0.237	0.192	0.145	0.159	0.120	0.141	0.137	0.142	0.160	0.257	1	0.01%
	Min	0.015	0.018	0.014	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.013		
Tianhu (Guangzhou)	Max	0.203	0.182	0.138	0.142	0.067	0.134	0.115	0.103	0.128	0.102	0.137	0.092	0	0.00%
	Min	0.002	0.001	0.001	0.002	0.000	0.001	0.001	0.001	0.001	0.003	0.003	0.002		
Liyuan (Shenzhen)	Max	0.294	0.302	0.290	0.185	0.163	0.143	0.247	0.216	0.166	0.174	0.234	0.189	22	0.27%
	Min	0.007	0.004	0.000	0.003	0.003	0.005	0.003	0.011	0.000	0.032	0.033	0.000		
Tangjia (Zhuhai)	Max	0.176	0.219	0.232	0.111	0.120	0.143	0.123	0.123	0.118	0.145	0.172	0.254	2	0.03%
	Min	0.000	0.011	0.011	0.000	0.000	0.001	0.000	0.000	0.000	0.000	0.019	0.006		
Shunde Dangxiao (Foshan)	Max	0.176	0.153	0.148	0.130	0.140	0.108	0.146	0.172	0.200	0.210	0.231	0.194	0	0.00%
	Min	0.016	0.011	0.012	0.010	0.008	0.009	0.006	0.002	0.000	0.016	0.011	0.000		
Huijingcheng (Foshan)	Max	0.380	0.294	0.366	0.252	0.216	0.221	0.178	0.226	0.292	0.290	0.284	0.219	53	0.69%
	Min	0.017	0.023	0.015	0.019	0.014	0.016	0.018	0.019	0.021	0.024	0.023	0.016		
Donghu (Jiangmen)	Max	0.181	0.157	0.205	0.162	0.152	0.139	0.055	0.105	0.126	0.143	0.149	0.145	0	0.00%
	Min	0.015	0.012	0.000	0.002	0.001	0.000	0.000	0.000	0.000	0.001	0.006	0.000		
Chengzhong (Zhaoqing)	Max	0.240	0.193	0.200	0.206	0.122	0.165	0.148	0.103	0.123	0.120	0.154	0.176	0	0.00%
	Min	0.012	0.015	0.009	0.013	0.016	0.015	0.008	0.005	0.008	0.002	0.017	0.019		
Xiapu (Huizhou)	Max	0.233	0.133	0.118	0.182	0.092	0.091	0.129	0.102	0.107	0.100	0.326	0.162	1	0.01%
	Min	0.002	0.004	0.004	0.009	0.000	0.005	0.006	0.000	0.005	0.009	0.000	0.000		
Jinguowan (Huizhou)	Max	0.141	0.118	0.116	0.093	0.106	0.057	0.094	0.068	0.103	0.131	0.035	0.062	0	0.00%
	Min	0.004	0.007	0.004	0.004	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Haogang (Dongguan) #	Max	--	--	--	--	--	--	--	0.168	0.150	0.133	0.205	0.222	0	0.00%
	Min	--	--	--	--	--	--	--	0.016	0.008	0.007	0.010	0.001		
Zimaling Park (Zhongshan)	Max	0.187	0.194	0.272	0.183	0.139	0.182	0.086	0.110	0.171	0.149	0.231	0.232	4	0.05%
	Min	0.001	0.013	0.010	0.003	0.002	0.000	0.000	0.002	0.004	0.009	0.012	0.026		
Tsuen Wan (HKSAR)	Max	0.202	0.248	0.275	0.181	0.179	0.176	0.276	0.285	0.209	0.181	0.213	0.240	16	0.19%
	Min	0.018	0.016	0.013	0.018	0.005	0.010	0.009	0.005	0.009	0.012	0.016	0.020		
Tap Mun (HKSAR)	Max	0.072	0.114	0.134	0.081	0.093	0.085	0.123	0.105	0.080	0.065	0.113	0.060	0	0.00%
	Min	0.000	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.005	0.007		
Tung Chung (HKSAR)	Max	0.179	0.228	0.277	0.172	0.215	0.201	0.167	0.170	0.203	0.195	0.208	0.240	5	0.06%
	Min	0.011	0.009	0.009	0.000	0.001	0.000	0.000	0.001	0.006	0.010	0.013	0.014		

Table 3.2 b : The monthly maxima and minima of daily averages of Nitrogen Dioxide

[Class 2 NAAQS (Daily) : 0.12 mg/m3]

Monitoring Stations	Mth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Exceed- ance Days	Exceed- ance Rate
Luhu Park (Guangzhou)	Max	0.194	0.158	0.131	0.102	0.046	0.056	0.052	0.113	0.159	0.138	0.144	0.131	19	5.49%
	Min	0.028	0.027	0.028	0.017	0.018	0.017	0.015	0.016	0.036	0.045	0.028	0.027		
Wanqingsha (Guangzhou)	Max	0.125	0.123	0.142	0.082	0.082	0.096	0.050	0.071	0.070	0.068	0.093	0.135	7	2.15%
	Min	0.025	0.031	0.042	0.013	0.012	0.007	0.002	0.006	0.004	0.015	0.034	0.056		
Tianhu (Guangzhou)	Max	0.106	0.055	0.054	0.080	0.038	0.050	0.047	0.033	0.049	0.042	0.053	0.044	0	0.00%
	Min	0.005	0.003	0.003	0.003	0.001	0.002	0.002	0.001	0.002	0.003	0.004	0.003		
Liyuan (Shenzhen)	Max	0.116	0.128	0.207	0.107	0.094	0.080	0.119	0.106	0.105	0.100	0.153	0.114	5	1.48%
	Min	0.028	0.018	0.025	0.021	0.020	0.019	0.011	0.023	0.041	0.055	0.060	0.035		
Tangjia (Zhuhai)	Max	0.111	0.117	0.160	0.073	0.053	0.033	0.027	0.049	0.069	0.084	0.104	0.112	3	0.88%
	Min	0.022	0.025	0.031	0.010	0.005	0.005	0.004	0.001	0.008	0.002	0.040	0.025		
Shunde Dangxiao (Foshan)	Max	0.127	0.091	0.097	0.078	0.080	0.065	0.071	0.080	0.123	0.122	0.142	0.142	6	1.78%
	Min	0.031	0.025	0.029	0.017	0.018	0.019	0.023	0.015	0.034	0.047	0.038	0.042		
Huijingcheng (Foshan)	Max	0.205	0.158	0.181	0.130	0.099	0.116	0.096	0.114	0.180	0.151	0.195	0.145	37	11.46%
	Min	0.028	0.047	0.039	0.034	0.036	0.032	0.038	0.041	0.048	0.051	0.048	0.044		
Donghu (Jiangmen)	Max	0.092	0.101	0.120	0.069	0.077	0.069	0.031	0.042	0.076	0.078	0.073	0.089	0	0.00%
	Min	0.025	0.023	0.024	0.011	0.014	0.004	0.004	0.003	0.006	0.002	0.016	0.004		
Chengzhong (Zhaoqing)	Max	0.142	0.122	0.133	0.120	0.083	0.096	0.074	0.057	0.061	0.083	0.103	0.109	5	1.47%
	Min	0.025	0.023	0.022	0.024	0.025	0.024	0.022	0.020	0.024	0.023	0.030	0.033		
Xiapu (Huizhou)	Max	0.086	0.052	0.064	0.065	0.046	0.045	0.063	0.051	0.062	0.045	0.118	0.078	0	0.00%
	Min	0.010	0.012	0.012	0.017	0.016	0.021	0.016	0.015	0.014	0.022	0.001	0.011		
Jinguowan (Huizhou)	Max	0.066	0.046	0.069	0.040	0.043	0.024	0.043	0.017	0.020	0.035	0.015	0.026	0	0.00%
	Min	0.008	0.011	0.007	0.006	0.007	0.000	0.000	0.000	0.000	0.002	0.005	0.001		
Haogang (Dongguan) #	Max	--	--	--	--	--	--	--	0.100	0.100	0.079	0.135	0.122	2	1.82%
	Min	--	--	--	--	--	--	--	0.037	0.016	0.028	0.027	0.033		
Zimaling Park (Zhongshan)	Max	0.107	0.111	0.170	0.098	0.082	0.075	0.038	0.064	0.079	0.095	0.122	0.130	4	1.26%
	Min	0.020	0.022	0.026	0.008	0.009	0.004	0.003	0.005	0.014	0.023	0.041	0.053		
Tsuen Wan (HKSAR)	Max	0.113	0.152	0.193	0.106	0.093	0.101	0.120	0.128	0.098	0.110	0.140	0.122	7	1.95%
	Min	0.041	0.043	0.042	0.046	0.031	0.027	0.027	0.024	0.039	0.057	0.055	0.049		
Tap Mun (HKSAR)	Max	0.022	0.022	0.035	0.047	0.024	0.033	0.069	0.044	0.037	0.021	0.034	0.031	0	0.00%
	Min	0.003	0.002	0.012	0.003	0.003	0.003	0.002	0.002	0.003	0.005	0.008	0.009		
Tung Chung (HKSAR)	Max	0.130	0.145	0.172	0.090	0.098	0.096	0.071	0.088	0.101	0.088	0.135	0.125	9	2.56%
	Min	0.036	0.021	0.030	0.006	0.008	0.005	0.005	0.007	0.015	0.027	0.030	0.039		

Table 3.2 c : The monthly and annual averages of Nitrogen Dioxide

[Class 2 NAAQS (Annual) : 0.08 mg/m3]

Monitoring Stations	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual Average
Luhu Park (Guangzhou)	0.084	0.078	0.065	0.049	0.030	0.027	0.032	0.074	0.075	0.081	0.068	0.061	0.060
Wanqingsha (Guangzhou)	0.061	0.070	0.075	0.044	0.037*	0.029	0.021	0.030	0.033	0.040	0.062	0.092	0.049
Tianhu (Guangzhou)	0.027	0.020	0.021	0.023	0.012	0.023	0.022	0.013	0.014	0.015	0.014	0.009	0.018
Liyuan (Shenzhen)	0.056	0.057	0.062	0.047	0.041	0.041	0.051	0.061	0.078	0.075*	0.086	0.071	0.061
Tangjia (Zhuhai)	0.047	0.059	0.072	0.034	0.021	0.014	0.012	0.013	0.035	0.026	0.074	0.076	0.040
Shunde Dangxiao (Foshan)	0.058	0.056	0.062	0.042	0.041	0.037	0.038	0.046	0.061	0.071	0.071	0.077	0.055
Huijingcheng (Foshan)	0.087	0.088	0.099	0.070	0.065	0.065	0.055	0.074	0.085	0.089	0.088	0.084	0.079
Donghu (Jiangmen)	0.048	0.056	0.053	0.032	0.035	0.023	0.017	0.023	0.036	0.044	0.043	0.039	0.037
Chengzhong (Zhaoqing)	0.061	0.055	0.065	0.055	0.044	0.042	0.033	0.036	0.041	0.040	0.056	0.067	0.050
Xiapu (Huizhou)	0.033	0.029	0.037	0.037	0.033	0.033	0.033	0.028	0.033	0.031	0.042	0.037	0.034
Jinguowan (Huizhou)	0.020	0.024	0.021	0.017*	0.014	0.011	0.014	0.005	0.009	0.007	0.009	0.009	0.013
Haogang (Dongguan) #	--	--	--	--	--	--	--	0.060	0.054	0.045*	0.063	0.066	Insufficient Data
Zimaling Park (Zhongshan)	0.042	0.059	0.070	0.038	0.043	0.023	0.015	0.036	0.046	0.055	0.082	0.089	0.050
Tsuen Wan (HKSAR)	0.076	0.081	0.079	0.068	0.059	0.046	0.053	0.058	0.066	0.083	0.082	0.083	0.069
Tap Mun (HKSAR)	0.013	0.012	0.019	0.015	0.011	0.011	0.014	0.015	0.013	0.010	0.016	0.020	0.014
Tung Chung (HKSAR)	0.069	0.068	0.069	0.038	0.040	0.025	0.025	0.036	0.048	0.061	0.064	0.073	0.051

Remark : 1. All concentration units are in milligrams per cubic metre.

3. “#” Validated data started from August 18.

2. “--” denotes lack of data due to equipment upgrading works.

4. “*” denotes that the data capture rate does not meet the minimum requirements for determining a representative value.

3.3 Ozone (O₃)

Ozone (O₃) is not directly emitted from emission sources. It is formed by the photochemical reaction of oxygen, nitrogen oxides (NO_x) and volatile organic compounds (VOCs) in the air under sunlight, and is the main component of photochemical smog. Ozone can cause irritation to the eye, nose and throat. At elevated levels, O₃ can increase a person's susceptibility to respiratory diseases and aggravate pre-existing respiratory diseases such as asthma.

The precursors (NO_x and VOCs) of O₃ mainly originate from pollution sources in urban areas. However, as it usually takes several hours for O₃ to be formed and rise to its peak level, and O₃ and its precursors can be transported to rural areas downwind of their sources during this period, the concentrations of O₃ in rural areas are therefore often higher than in the urban areas. The annual averages of O₃ recorded by the Network ranged from 0.026 mg/m³ to 0.079 mg/m³ in 2006, with higher average values measured in rural areas such as Tianhu of Guangzhou, Tap Mun of Hong Kong and Jinguowan of Huizhou. During the year, all 16 monitoring stations in the Network had recorded exceedance of the national hourly standard (0.2 mg/m³) of ozone. Please refer to Figures 6 and Tables 3.3a to 3.3c for details.

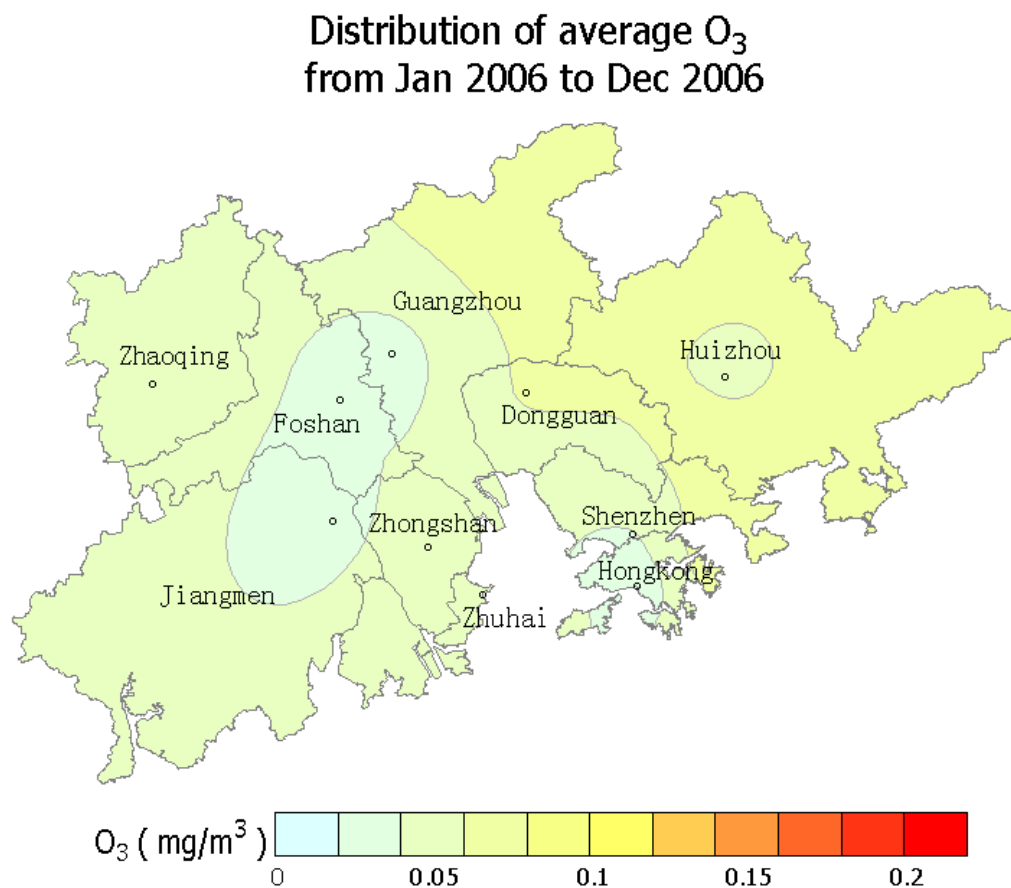


Figure 6 : Spatial distribution of average concentrations of Ozone (O₃) in the Network

Table 3.3 a : The monthly maxima and minima of hourly averages of Ozone

[Class 2 NAAQS (Hourly) : 0.20mg/m3]

Monitoring Stations	Mth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Exceed- ance Hours	Exceed- ance Rate
Luhu Park (Guangzhou)	Max	0.139	0.250	0.235	0.180	0.286	0.266	0.260	0.248	0.217	0.254	0.255	0.178	57	0.69%
	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000		
Wanqingsha (Guangzhou)	Max	0.215	0.196	0.240	0.257	0.314	0.317	0.289	0.458	0.366	0.334	0.338	0.219	199	2.44%
	Min	0.001	0.001	0.001	0.001	0.001	0.000	0.001	0.002	0.001	0.001	0.000	0.000		
Tianhu (Guangzhou)	Max	0.223	0.172	0.255	0.259	0.210	0.257	0.277	0.202	0.250	0.261	0.256	0.188	143	1.83%
	Min	0.004	0.005	0.004	0.002	0.004	0.000	0.001	0.001	0.001	0.004	0.009	0.011		
Liyuan (Shenzhen)	Max	0.105	0.177	0.153	0.163	0.144	0.177	0.274	0.278	0.224	0.232	0.257	0.284	44	0.54%
	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.008	0.000		
Tangjia (Zhuhai)	Max	0.138	0.216	0.206	0.156	0.216	0.121	0.291	0.399	0.416	0.431	0.381	0.289	190	2.51%
	Min	0.000	0.009	0.000	0.000	0.000	0.000	0.001	0.001	0.000	0.001	0.000	0.002		
Shunde Dangxiao (Foshan)	Max	0.200	0.249	0.224	0.241	0.220	0.226	0.292	0.319	0.384	0.272	0.311	0.167	173	2.18%
	Min	0.006	0.008	0.004	0.002	0.003	0.001	0.002	0.003	0.002	0.002	0.000	0.000		
Huijingcheng (Foshan)	Max	0.263	0.286	0.254	0.268	0.251	0.258	0.228	0.326	0.321	0.311	0.226	0.196	112	1.46%
	Min	0.004	0.000	0.000	0.001	0.002	0.002	0.003	0.002	0.002	0.003	0.002	0.003		
Donghu (Jiangmen)	Max	0.131	0.214	0.171	0.185	0.262	0.234	0.152	0.263	0.331	0.255	0.252	0.213	99	1.24%
	Min	0.000	0.002	0.001	0.002	0.002	0.000	0.000	0.002	0.003	0.001	0.000	0.002		
Chengzhong (Zhaoqing)	Max	0.139	0.193	0.173	0.186	0.200	0.286	0.173	0.255	0.279	0.272	0.230	0.142	57	0.73%
	Min	0.004	0.005	0.005	0.002	0.001	0.001	0.001	0.003	0.003	0.004	0.002	0.003		
Xiapu (Huizhou)	Max	0.215	0.226	0.177	0.271	0.263	0.235	0.304	0.299	0.226	0.230	0.320	0.140	69	0.83%
	Min	0.002	0.002	0.000	0.000	0.002	0.003	0.003	0.002	0.000	0.001	0.000	0.001		
Jinguowan (Huizhou)	Max	0.267	0.257	0.273	0.319	0.212	0.209	0.312	0.318	0.276	0.243	0.292	0.162	94	1.21%
	Min	0.004	0.002	0.000	0.000	0.003	0.001	0.001	0.001	0.001	0.012	0.004	0.017		
Haogang (Dongguan) #	Max	--	--	--	--	--	--	--	0.356	0.218	0.272	0.373	0.250	115	4.16%
	Min	--	--	--	--	--	--	--	0.000	0.000	0.000	0.007	0.010		
Zimaling Park (Zhongshan)	Max	0.251	0.222	0.172	0.207	0.261	0.183	0.249	0.325	0.333	0.308	0.309	0.222	179	2.53%
	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.003	0.002	0.000		
Tsuen Wan (HKSAR)	Max	0.077	0.061	0.122	0.128	0.180	0.082	0.278	0.250	0.199	0.156	0.231	0.118	9	0.11%
	Min	0.001	0.000	0.001	0.002	0.003	0.003	0.002	0.002	0.003	0.003	0.003	0.004		
Tap Mun (HKSAR)	Max	0.182	0.223	0.184	0.179	0.206	0.170	0.355	0.405	0.248	0.237	0.214	0.210	57	0.67%
	Min	0.005	0.006	0.003	0.003	0.002	0.002	0.003	0.004	0.003	0.016	0.006	0.009		
Tung Chung (HKSAR)	Max	0.120	0.160	0.148	0.138	0.246	0.095	0.330	0.330	0.273	0.313	0.330	0.185	53	0.63%
	Min	0.000	0.003	0.000	0.002	0.002	0.001	0.000	0.002	0.000	0.000	0.001	0.000		

Table 3.3 b : The monthly maxima and minima of daily averages of Ozone

Monitoring Stations	Mth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Luhu Park (Guangzhou)	Max	0.055	0.055	0.059	0.053	0.091	0.095	0.074	0.090	0.071	0.090	0.101	0.065
	Min	0.002	0.002	0.000	0.002	0.003	0.003	0.003	0.001	0.004	0.012	0.002	0.003
Wanqingsha (Guangzhou)	Max	0.075	0.080	0.067	0.093	0.113	0.086	0.116	0.133	0.141	0.135	0.131	0.065
	Min	0.003	0.003	0.002	0.004	0.010	0.006	0.016	0.021	0.010	0.044	0.006	0.004
Tianhu (Guangzhou)	Max	0.161	0.105	0.133	0.158	0.118	0.106	0.132	0.128	0.116	0.145	0.165	0.143
	Min	0.025	0.028	0.041	0.027	0.043	0.025	0.026	0.040	0.060	0.060	0.033	0.050
Liyuan (Shenzhen)	Max	0.045	0.066	0.080	0.068	0.065	0.037	0.087	0.109	0.104	0.099	0.120	0.166
	Min	0.000	0.003	0.002	0.001	0.001	0.001	0.013	0.011	0.021	0.059	0.022	0.021
Tangjia (Zhuhai)	Max	0.063	0.088	0.086	0.067	0.099	0.038	0.135	0.152	0.150	0.174	0.134	0.096
	Min	0.002	0.013	0.000	0.000	0.007	0.005	0.025	0.029	0.006	0.054	0.004	0.009
Shunde Dangxiao (Foshan)	Max	0.065	0.096	0.061	0.081	0.083	0.066	0.112	0.113	0.128	0.124	0.095	0.052
	Min	0.009	0.010	0.006	0.007	0.010	0.007	0.011	0.019	0.009	0.031	0.002	0.004
Huijingcheng (Foshan)	Max	0.078	0.073	0.061	0.089	0.092	0.066	0.081	0.115	0.107	0.109	0.090	0.062
	Min	0.005	0.003	0.002	0.010	0.007	0.007	0.012	0.015	0.008	0.022	0.005	0.006
Donghu (Jiangmen)	Max	0.068	0.079	0.059	0.042	0.101	0.069	0.050	0.116	0.106	0.116	0.105	0.056
	Min	0.004	0.005	0.003	0.004	0.009	0.002	0.008	0.015	0.007	0.046	0.005	0.004
Chengzhong (Zhaoqing)	Max	0.079	0.083	0.073	0.077	0.088	0.108	0.084	0.123	0.130	0.128	0.125	0.066
	Min	0.010	0.013	0.013	0.011	0.014	0.007	0.017	0.028	0.027	0.044	0.007	0.020
Xiapu (Huizhou)	Max	0.073	0.106	0.091	0.091	0.098	0.081	0.103	0.107	0.096	0.127	0.136	0.080
	Min	0.017	0.016	0.003	0.013	0.013	0.012	0.024	0.019	0.020	0.054	0.016	0.027
Jinguowan (Huizhou)	Max	0.099	0.135	0.119	0.112	0.112	0.093	0.126	0.118	0.118	0.134	0.148	0.117
	Min	0.024	0.033	0.023	0.022	0.020	0.019	0.029	0.027	0.032	0.071	0.030	0.047
Haogang (Dongguan) #	Max	--	--	--	--	--	--	--	0.107	0.088	0.094	0.124	0.092
	Min	--	--	--	--	--	--	--	0.015	0.009	0.027	0.022	0.022
Zimaling Park (Zhongshan)	Max	0.056	0.085	0.086	0.088	0.122	0.064	0.086	0.130	0.147	0.138	0.108	0.065
	Min	0.000	0.001	0.000	0.001	0.008	0.008	0.015	0.018	0.007	0.045	0.005	0.003
Tsuen Wan (HKSAR)	Max	0.046	0.034	0.066	0.059	0.074	0.038	0.060	0.072	0.089	0.078	0.106	0.047
	Min	0.003	0.003	0.004	0.005	0.005	0.004	0.004	0.007	0.006	0.023	0.005	0.009
Tap Mun (HKSAR)	Max	0.105	0.124	0.133	0.134	0.128	0.099	0.120	0.181	0.146	0.167	0.152	0.116
	Min	0.024	0.027	0.031	0.022	0.014	0.017	0.024	0.032	0.019	0.077	0.023	0.037
Tung Chung (HKSAR)	Max	0.067	0.092	0.097	0.081	0.102	0.048	0.115	0.095	0.117	0.098	0.106	0.063
	Min	0.000	0.010	0.007	0.005	0.013	0.008	0.015	0.012	0.005	0.026	0.002	0.002

Table 3.3 c : The monthly and annual averages of Ozone

Monitoring Stations	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual Average
Luhu Park (Guangzhou)	0.023	0.027	0.016	0.017	0.031	0.023	0.029	0.036	0.035	0.051	0.035	0.030	0.029
Wanqingsha (Guangzhou)	0.033	0.041	0.024	0.035	0.042	0.032	0.038	0.060	0.066	0.078	0.054	0.039	0.045
Tianhu (Guangzhou)	0.077	0.069	0.075	0.072	0.076	0.057	0.067	0.074	0.093	0.102	0.095	0.095	0.079
Liyuan (Shenzhen)	0.020	0.028	0.029	0.023	0.022	0.011	0.037	0.043	0.058	0.073*	0.057	0.064	0.039
Tangjia (Zhuhai)	0.034	0.046	0.028	0.029*	0.031	0.019*	0.048	0.058	0.074	0.101	0.061	0.052	0.048
Shunde Dangxiao (Foshan)	0.034	0.040	0.027	0.029	0.036	0.025	0.042	0.048	0.064	0.069	0.041	0.026	0.040
Huijingcheng (Foshan)	0.031	0.030	0.019	0.029	0.040	0.029	0.039	0.051	0.048	0.066	0.044	0.033	0.038
Donghu (Jiangmen)	0.031	0.035	0.025	0.019	0.033	0.017	0.027	0.046	0.055	0.074	0.047	0.035	0.037
Chengzhong (Zhaoqing)	0.039	0.049	0.034	0.033	0.044	0.033	0.036	0.062	0.069	0.075	0.053	0.040	0.047
Xiapu (Huizhou)	0.047	0.056	0.043	0.049	0.053	0.035	0.047	0.056	0.065	0.082	0.061	0.051	0.054
Jinguowan (Huizhou)	0.068	0.073	0.073	0.066	0.069	0.040	0.056	0.065	0.080	0.097	0.085	0.079	0.071
Haogang (Dongguan) #	--	--	--	--	--	--	--	0.061	0.048	0.070*	0.070	0.065*	Insufficient Data
Zimaling Park (Zhongshan)	0.030	0.034*	0.026*	0.044*	0.046	0.034	0.045	0.057	0.064	0.080	0.046	0.035	0.045
Tsuen Wan (HKSAR)	0.018	0.015	0.029	0.020	0.027	0.012	0.017	0.022	0.040	0.045	0.039	0.031	0.026
Tap Mun (HKSAR)	0.068	0.081	0.080	0.063	0.067	0.042	0.050	0.067	0.082	0.108	0.094	0.080	0.074
Tung Chung (HKSAR)	0.028	0.039	0.041	0.038	0.040	0.027	0.039	0.038	0.052	0.060	0.049	0.035	0.040

Remark : 1. All concentration units are in milligrams per cubic metre.
3. “#” Validated data started from August 18.

2. “--” denotes lack of data due to equipment upgrading works.
4. “*” denotes that the data capture rate does not meet the minimum requirements for determining a representative value.

3.4 Respirable Suspended Particulates (PM₁₀)

The respirable suspended particulates (PM₁₀ or RSP) in the atmosphere come from a great variety of emission sources, such as power plants, vehicles, 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 SO₂) or from photochemical reactions. PM₁₀ can penetrate deeply into human lungs and cause impact on human respiratory system. Furthermore, finer particles in PM₁₀ have significant effect on visibility.

The annual averages of PM₁₀ at various monitoring stations in the Network ranged from 0.041 mg/m³ to 0.123 mg/m³ in 2006, with values at 3 stations exceeding the national annual air quality standard (0.10 mg/m³). As shown in Figure 7, the average levels of PM₁₀ in the central and northern parts of PRD were generally higher than those in the coastal areas in the south. All monitoring stations except Tangjia had recorded exceedance of the national daily standard (0.15mg/m³) of PM₁₀. Please refer to Tables 3.4a to 3.4c for details.

**Distribution of average PM10
from Jan 2006 to Dec 2006**

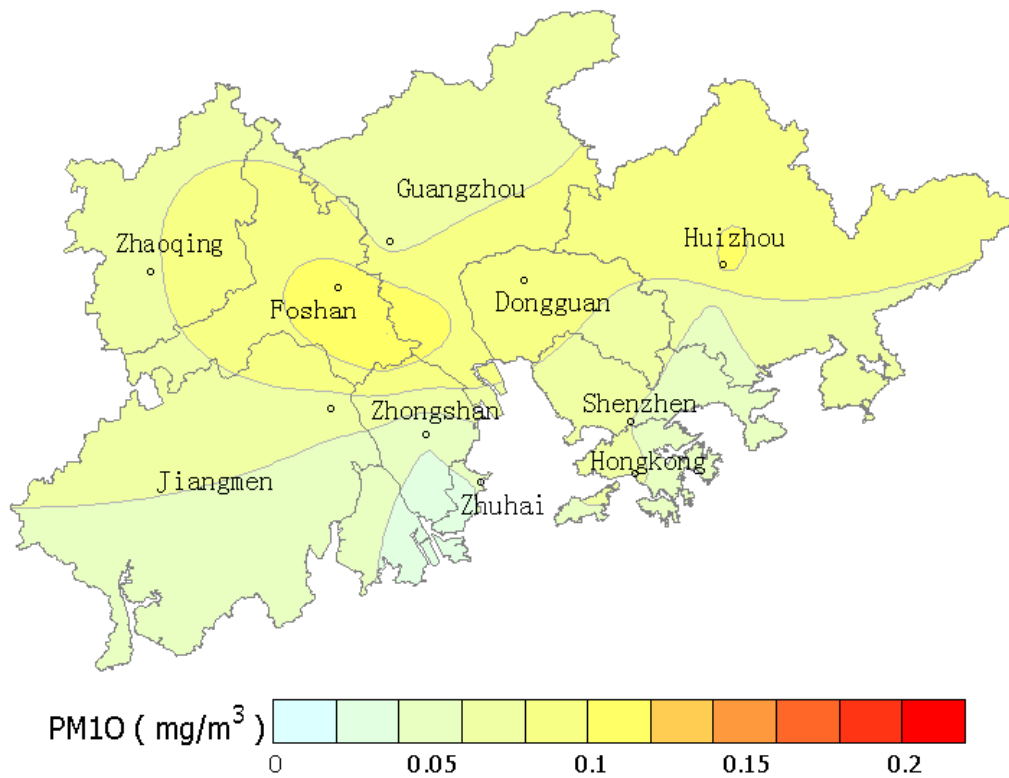


Figure 7 : Spatial distribution of average concentrations of Respirable Suspended Particulates (PM₁₀) in the Network

Table 3.4 a : The monthly maxima and minima of hourly averages of Respirable Suspended Particulates

Monitoring Stations	Mth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Luhu Park (Guangzhou)	Max	0.346	0.344	0.307	0.255	0.160	0.138	0.226	0.276	0.178	0.175	0.376	0.227
	Min	0.013	0.004	0.002	0.001	0.003	0.012	0.002	0.002	0.000	0.012	0.001	0.000
Wanqingsha (Guangzhou)	Max	0.422	0.378	0.530	0.462	0.297	0.208	0.342	0.280	0.422	0.308	0.337	0.406
	Min	0.000	0.016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Tianhu (Guangzhou)	Max	0.353	0.227	0.254	0.279	0.165	0.174	0.213	0.233	0.182	0.242	0.256	0.250
	Min	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.000
Liyuan (Shenzhen)	Max	0.198	0.295	0.380	0.170	0.219	0.172	0.237	0.248	0.166	0.188	0.285	0.298
	Min	0.006	0.006	0.000	0.000	0.001	0.000	0.000	0.001	0.000	0.010	0.000	0.002
Tangjia (Zhuhai)	Max	0.155	0.162	0.180	0.123	0.121	0.179	0.209	0.160	0.116	0.142	0.142	0.177
	Min	0.004	0.005	0.002	0.000	0.000	0.001	0.000	0.002	0.002	0.000	0.000	0.002
Shunde Dangxiao (Foshan)	Max	0.565	0.489	0.564	0.547	0.264	0.213	0.260	0.266	0.378	0.658	0.368	0.376
	Min	0.041	0.045	0.016	0.043	0.000	0.000	0.001	0.017	0.000	0.038	0.000	0.022
Huijingcheng (Foshan)	Max	0.444	0.373	0.432	0.558	0.264	0.221	0.342	0.347	0.419	0.576	0.749	0.766
	Min	0.020	0.010	0.018	0.026	0.000	0.000	0.000	0.016	0.000	0.042	0.011	0.021
Donghu (Jiangmen)	Max	0.253	0.319	0.330	0.375	0.347	0.212	0.168	0.278	0.289	0.367	0.305	0.439
	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.000	0.000
Chengzhong (Zhaoqing)	Max	0.561	0.391	0.563	0.396	0.266	0.234	0.214	0.213	0.232	0.304	0.282	0.244
	Min	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.003	0.002	0.003	0.002
Xiapu (Huizhou)	Max	0.376	0.279	0.401	0.491	0.180	0.187	0.293	0.467	0.260	0.371	0.334	0.401
	Min	0.013	0.007	0.011	0.000	0.002	0.000	0.013	0.018	0.000	0.069	0.010	0.017
Jinguowan (Huizhou)	Max	0.189	0.291	0.311	0.334	0.189	0.224	0.222	0.312	0.170	0.198	0.177	0.188
	Min	0.000	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.013	0.000	0.001
Haogang (Dongguan) #	Max	0.323	0.402	0.563	0.374	0.247	0.281	0.278	0.361	0.238	0.352	0.476	0.397
	Min	0.000	0.004	0.000	0.000	0.000	0.000	0.000	0.006	0.004	0.019	0.005	0.010
Zimaling Park (Zhongshan)	Max	0.262	0.182	0.254	0.136	0.113	0.128	0.116	0.123	0.182	0.148	0.178	0.174
	Min	0.004	0.000	0.002	0.004	0.001	0.001	0.001	0.003	0.004	0.011	0.005	0.003
Tsuen Wan (HKSAR)	Max	0.222	0.304	0.305	0.161	0.223	0.135	0.222	0.259	0.136	0.158	0.204	0.228
	Min	0.013	0.011	0.008	0.010	0.006	0.008	0.005	0.010	0.008	0.028	0.009	0.009
Tap Mun (HKSAR)	Max	0.152	0.226	0.218	0.175	0.116	0.081	0.227	0.206	0.133	0.178	0.184	0.175
	Min	0.013	0.009	0.010	0.013	0.009	0.008	0.007	0.006	0.007	0.021	0.008	0.004
Tung Chung (HKSAR)	Max	0.260	0.281	0.343	0.159	0.213	0.153	0.199	0.249	0.171	0.200	0.216	0.209
	Min	0.012	0.011	0.006	0.014	0.005	0.009	0.003	0.007	0.012	0.027	0.009	0.002

Table 3.4 b : The monthly maxima and minima of daily averages of Respirable Suspended Particulates**[Class 2 NAAQS (Daily) : 0.15 mg/m3]**

Monitoring Stations	Mth	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Exceed- ance Days	Exceed- ance Rate
Luhu Park (Guangzhou)	Max	0.252	0.266	0.168	0.198	0.077	0.094	0.106	0.117	0.122	0.108	0.136	0.150	20	5.62%
	Min	0.030	0.016	0.016	0.019	0.017	0.032	0.024	0.010	0.009	0.044	0.021	0.013		
Wanqingsha (Guangzhou)	Max	0.291	0.261	0.391	0.201	0.124	0.111	0.156	0.163	0.173	0.156	0.199	0.261	46	12.60%
	Min	0.047	0.036	0.035	0.029	0.024	0.018	0.012	0.023	0.001	0.066	0.047	0.040		
Tianhu (Guangzhou)	Max	0.175	0.131	0.168	0.160	0.074	0.093	0.142	0.119	0.124	0.186	0.174	0.128	12	3.31%
	Min	0.009	0.004	0.004	0.006	0.010	0.012	0.010	0.010	0.017	0.049	0.003	0.001		
Liyuan (Shenzhen)	Max	0.107	0.155	0.276	0.112	0.091	0.059	0.140	0.126	0.096	0.129	0.157	0.194	6	1.73%
	Min	0.022	0.018	0.016	0.018	0.016	0.013	0.012	0.017	0.021	0.051	0.029	0.020		
Tangjia (Zhuhai)	Max	0.082	0.071	0.120	0.062	0.044	0.091	0.088	0.081	0.060	0.084	0.068	0.109	0	0.00%
	Min	0.024	0.019	0.022	0.021	0.015	0.016	0.024	0.024	0.027	0.027	0.035	0.030		
Shunde Dangxiao (Foshan)	Max	0.453	0.302	0.417	0.349	0.142	0.116	0.158	0.164	0.173	0.290	0.207	0.250	99	27.65%
	Min	0.078	0.074	0.065	0.081	0.038	0.032	0.030	0.037	0.042	0.091	0.028	0.047		
Huijingcheng (Foshan)	Max	0.261	0.233	0.260	0.357	0.122	0.123	0.183	0.221	0.187	0.370	0.458	0.408	93	25.83%
	Min	0.048	0.041	0.039	0.054	0.032	0.024	0.030	0.042	0.037	0.095	0.046	0.051		
Donghu (Jiangmen)	Max	0.140	0.153	0.187	0.215	0.111	0.124	0.097	0.140	0.160	0.157	0.153	0.251	17	4.67%
	Min	0.019	0.030	0.022	0.020	0.023	0.020	0.017	0.015	0.020	0.058	0.025	0.021		
Chengzhong (Zhaoqing)	Max	0.284	0.184	0.319	0.236	0.127	0.121	0.139	0.146	0.161	0.214	0.182	0.138	34	9.55%
	Min	0.015	0.017	0.023	0.013	0.022	0.017	0.016	0.015	0.014	0.019	0.024	0.019		
Xiapu (Huizhou)	Max	0.202	0.184	0.217	0.239	0.103	0.116	0.156	0.246	0.169	0.212	0.218	0.223	60	16.57%
	Min	0.048	0.023	0.033	0.033	0.024	0.041	0.042	0.040	0.031	0.104	0.039	0.033		
Jinguowan (Huizhou)	Max	0.134	0.154	0.228	0.139	0.089	0.045	0.128	0.160	0.097	0.129	0.137	0.146	3	0.85%
	Min	0.023	0.011	0.017	0.011	0.013	0.000	0.006	0.000	0.012	0.059	0.017	0.010		
Haogang (Dongguan) #	Max	0.228	0.235	0.267	0.168	0.105	0.110	0.139	0.187	0.150	0.186	0.263	0.221	51	15.55%
	Min	0.029	0.025	0.020	0.029	0.032	0.033	0.001	0.046	0.027	0.098	0.035	0.031		
Zimaling Park (Zhongshan)	Max	0.139	0.109	0.162	0.081	0.059	0.040	0.062	0.073	0.082	0.091	0.115	0.113	1	0.28%
	Min	0.015	0.000	0.012	0.013	0.008	0.009	0.007	0.009	0.015	0.027	0.008	0.011		
Tsuen Wan (HKSAR)	Max	0.120	0.154	0.247	0.127	0.087	0.064	0.143	0.120	0.100	0.127	0.155	0.146	3	0.82%
	Min	0.030	0.025	0.021	0.022	0.018	0.020	0.018	0.024	0.022	0.056	0.040	0.033		
Tap Mun (HKSAR)	Max	0.108	0.110	0.148	0.142	0.086	0.042	0.151	0.118	0.088	0.114	0.142	0.140	1	0.27%
	Min	0.025	0.020	0.019	0.021	0.020	0.015	0.014	0.014	0.020	0.040	0.025	0.014		
Tung Chung (HKSAR)	Max	0.161	0.179	0.277	0.111	0.106	0.076	0.116	0.120	0.122	0.137	0.160	0.150	5	1.37%
	Min	0.031	0.026	0.024	0.020	0.018	0.015	0.014	0.014	0.018	0.050	0.031	0.020		

Table 3.4 c : The monthly and annual averages of Respirable Suspended Particulates**[Class 2 NAAQS (Annual) : 0.10 mg/m³]**

Monitoring Stations	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual Average
Luhu Park (Guangzhou)	0.106	0.097	0.100	0.068	0.041	0.050	0.055	0.066	0.058	0.077	0.077	0.075	0.072
Wanqingsha (Guangzhou)	0.105	0.117	0.126	0.078	0.059	0.044	0.046	0.065	0.070	0.112	0.120	0.131	0.089
Tianhu (Guangzhou)	0.074	0.062	0.065	0.062	0.038	0.045	0.057	0.056	0.066	0.094	0.070	0.059	0.062
Liyuan (Shenzhen)	0.052	0.062	0.079	0.061	0.041	0.029	0.038	0.041	0.050	0.088*	0.085	0.093	0.060
Tangjia (Zhuhai)	0.039	0.039	0.044	0.034	0.027	0.035	0.038	0.037	0.041	0.050	0.051	0.053	0.041
Shunde Dangxiao (Foshan)	0.178	0.176	0.214	0.162	0.063	0.057	0.064	0.082	0.086	0.147	0.104	0.138	0.123
Huijingcheng (Foshan)	0.114	0.109	0.142	0.143	0.066	0.058	0.071	0.100	0.091	0.180	0.149	0.157	0.115
Donghu (Jiangmen)	0.066	0.070	0.084	0.066	0.055	0.042	0.041	0.058	0.068	0.096	0.090	0.101	0.070
Chengzhong (Zhaoqing)	0.117	0.076	0.117	0.077	0.045	0.043	0.042	0.080	0.079	0.086	0.094	0.086	0.079
Xiapu (Huizhou)	0.107	0.096	0.115	0.107	0.061	0.073	0.087	0.089	0.101	0.144	0.130	0.127	0.103
Jinguowan (Huizhou)	0.059	0.066	0.065	0.060	0.039	0.027	0.038	0.041	0.055	0.086	0.074	0.071	0.057
Haogang (Dongguan) #	0.105	0.106	0.113	0.082	0.059	0.056	0.059	0.081	0.084	0.145	0.126	0.113	0.094
Zimaling Park (Zhongshan)	0.046	0.051	0.054	0.032	0.027	0.017	0.020	0.027	0.038	0.057	0.061	0.063	0.041
Tsuen Wan (HKSAR)	0.062	0.072	0.078	0.058	0.043	0.033	0.046	0.047	0.055	0.088	0.083	0.076	0.062
Tap Mun (HKSAR)	0.058	0.061	0.067	0.056	0.035	0.024	0.035	0.038	0.048	0.071	0.070	0.067	0.053
Tung Chung (HKSAR)	0.072	0.079	0.083	0.051	0.041	0.026	0.035	0.041	0.054	0.086	0.084	0.080	0.061

Remark : 1. All concentration units are in milligrams per cubic metre.

2. “*” denotes that the data capture rate does not meet the minimum requirements for determining a representative value.

3.5 Monthly Variations of Pollutant Concentrations

Figure 8 shows the monthly variations of the major pollutants (SO_2 , NO_2 , O_3 , and PM_{10}) recorded by the Network in 2006. The overall concentrations of SO_2 , NO_2 and PM_{10} were generally higher during the periods from January to March and October to December. Levels of these pollutants were lower in June and July due to the heavier rainfall and higher mixing layer height in these summer months. Apart from heavier rainfall and higher mixing layer which favoured the dispersion of pollutants, the relatively clean maritime air stream prevailed in the PRD region under the influence of southern monsoon also accounts for a lower level of pollution in summer time. As for ozone, the highest monthly averages occurred in October because it was relatively sunny and calm that favoured the formation and accumulation of ozone in the month. That notwithstanding, the monthly variations in concentrations of pollutants may change from year to year. Long-term monitoring is thus required before a general pattern can be established.

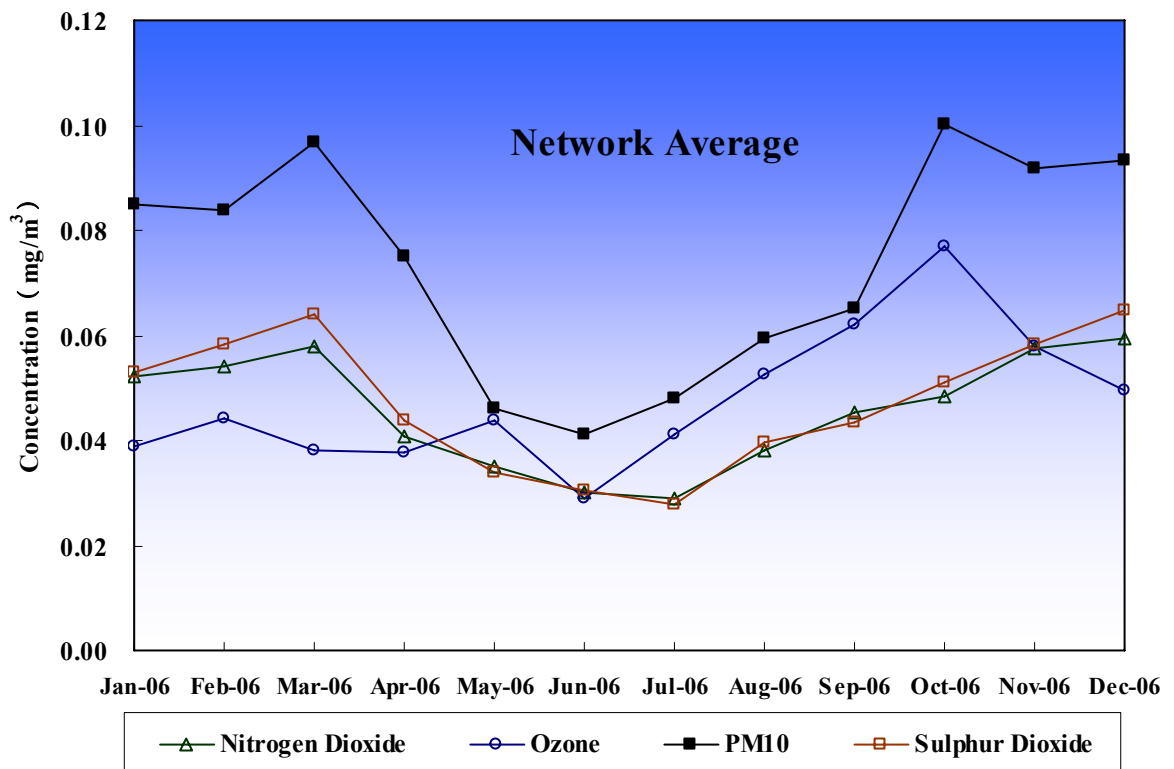


Figure 8 : Monthly variations of average pollutant concentrations measured by the Network

4. Statistical Analysis of the Regional Air Quality Index (RAQI)

The two governments of Guangdong and HKSAR jointly started reporting the RAQI since 30 November 2005 to provide the public with information about the air quality in different parts of the PRD region.

The RAQI is a composite indicator of the aggregate level of the four major regional air pollutants, namely sulphur dioxide (SO₂), nitrogen dioxide (NO₂), ozone (O₃) and respirable suspended particulates (PM₁₀). The higher the index value, the higher the regional air pollution levels. The RAQI is divided into the following five grades:

Grade	Regional Air Quality Index (RAQI) value [#]	Air Quality Condition in the Monitored Area
I	0 – 1	Concentrations of all pollutants are well within Class 2 of the National Ambient Air Quality Standards (NAAQS)
II	1 – 2	Concentrations of all pollutants are generally within Class 2 NAAQS
III	2 – 3	Concentrations of individual pollutants may approach or exceed Class 2 NAAQS
IV	3 – 4	Class 2 NAAQS are generally exceeded
V	>4	Class 2 NAAQS are significantly exceeded

The formula for calculating the RAQI is as follows:

$$I_c = \sum_{i=1}^4 \frac{C_i}{R_i}$$

where I_c stands for the RAQI, an indicator of the aggregate pollution level of four pollutants, namely, SO₂, NO₂, PM₁₀ and O₃. For SO₂, NO₂ and PM₁₀, C_i is the daily average concentration while R_i represents the daily average concentration limits of the corresponding pollutants as specified in Class 2 NAAQS. For O₃, C_i is the highest hourly average of a day while R_i represents the hourly average concentration limit in Class 2 NAAQS (refer to Class 2 NAAQS (GB 3095 – 1996) revised version).

[#] The upper limits of the range of Grades I, II, III and IV of the RAQI are inclusive.

4.1 Statistics on RAQI Grades

Table 4.1a and Figure 9 summarise the statistics on the RAQI grades of all monitoring stations in the Network from January to December 2006. As shown in the table, the percentages of days with valid RAQI at various monitoring stations were quite high, averaging 93%. With continuous improvement in the operation of the Network, the overall percentage of valid RAQI is expected to further improve in future.

Table 4.1 a : Statistics on RAQI grades of individual monitoring stations

Monitoring Stations	District	Days with valid RAQI	Distribution of RAQI grades in 2006 (%)				
			Grade I	Grade II	Grade III	Grade IV	Grade V
Luhu Park	Guangzhou	343	16.33	42.86	34.40	4.96	1.46
Wanqingsha	Guangzhou	353	17.28	31.44	33.71	13.60	3.97
Tianhu	Guangzhou	338	35.50	47.34	14.20	2.96	0.00
Liyuan	Shenzhen	339	30.97	47.20	19.47	2.36	0.00
Tangjia	Zhuhai	347	30.55	43.80	21.33	3.75	0.58
Shunde Dangxiao	Foshan	338	5.62	34.32	31.95	18.34	9.76
Huijingcheng	Foshan	325	0.92	32.62	32.31	18.77	15.38
Donghu	Jiangmen	349	31.81	41.55	22.35	4.30	0.00
Chengzhong	Zhaoqing	335	15.52	41.19	29.85	11.04	2.39
Xiapu	Huizhou	341	18.18	54.55	24.05	2.93	0.29
Jinguowan	Huizhou	322	38.20	53.73	7.45	0.62	0.00
Haogang	Dongguan	331	6.65	50.45	30.21	10.88	1.81
Zimaling Park	Zhongshan	327	28.13	39.14	23.85	8.56	0.31
Tsuen Wan	HKSAR	346	29.19	55.20	14.16	1.16	0.29
Tap Mun	HKSAR	347	39.48	55.33	4.61	0.58	0.00
Tung Chung	HKSAR	340	31.18	46.76	19.71	2.06	0.29

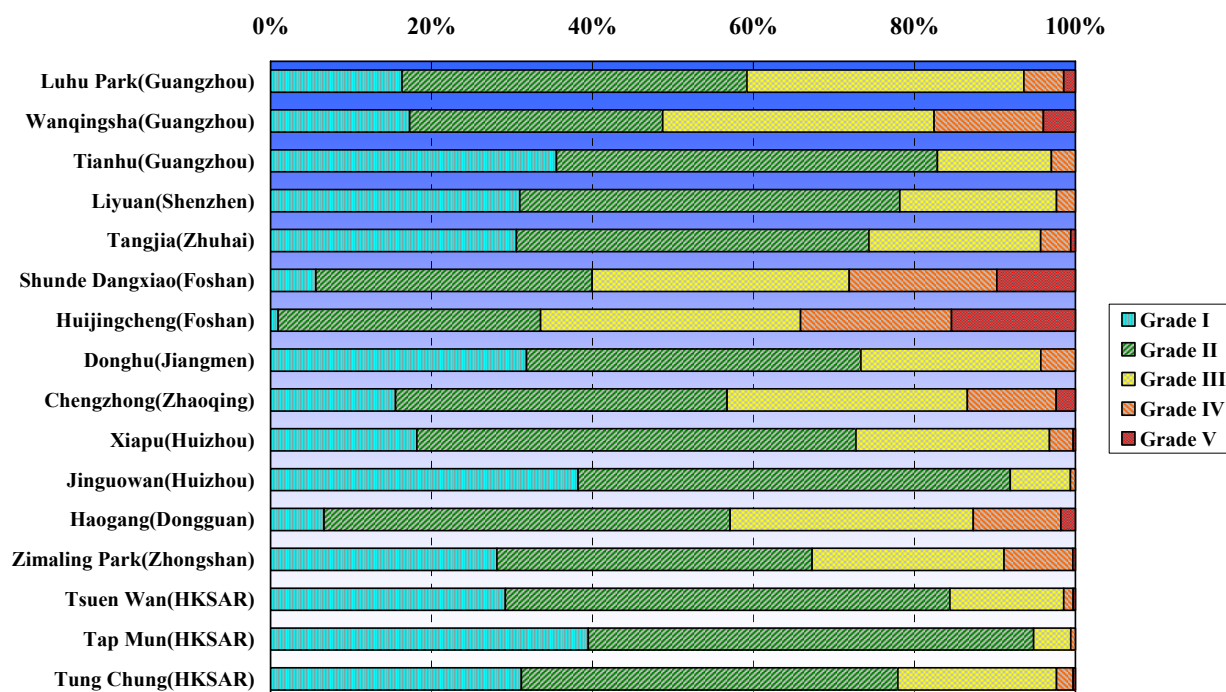


Figure 9 : Stacked column chart of RAQI grades of individual monitoring stations

Figure 10 shows the overall distribution of different RAQI grades recorded by the Network in 2006. On the whole, 68.38% of the RAQI values are in Grade I or II, meaning the pollutant concentrations

are within Class 2 NAAQS, followed by 22.73% in Grade III, 6.64% in Grade IV and 2.25% in Grade V.

**Distribution of RAQI Grades
(Jan - Dec 2006)**

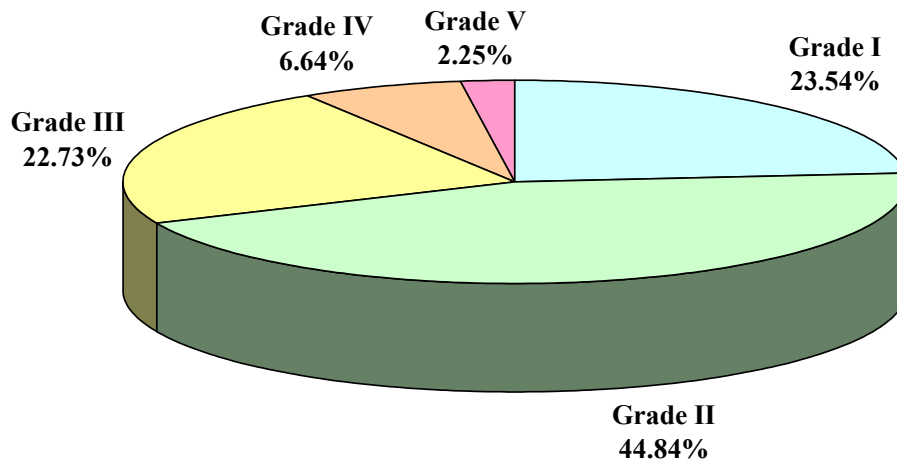


Figure 10 : Distribution of RAQI grades in the Network

4.2 Spatial Distribution of Average RAQI Grades

Figure 11 shows the spatial distribution of RAQI annual average grades in 2006. It can be seen that average RAQI values measured in most parts of the PRD region were in Grade II while the average values in the middle part of the region were in Grade III. Average RAQI values measured at individual monitoring stations in the Network are shown in Figure 12

**Distribution of average RAQI in PRD
from Jan 2006 to Dec 2006**

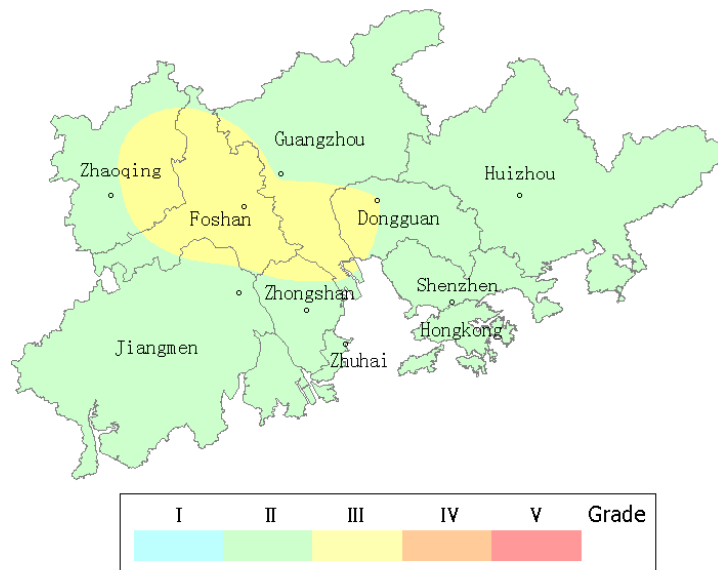


Figure 11 : Spatial distribution of average RAQI grades in the Network

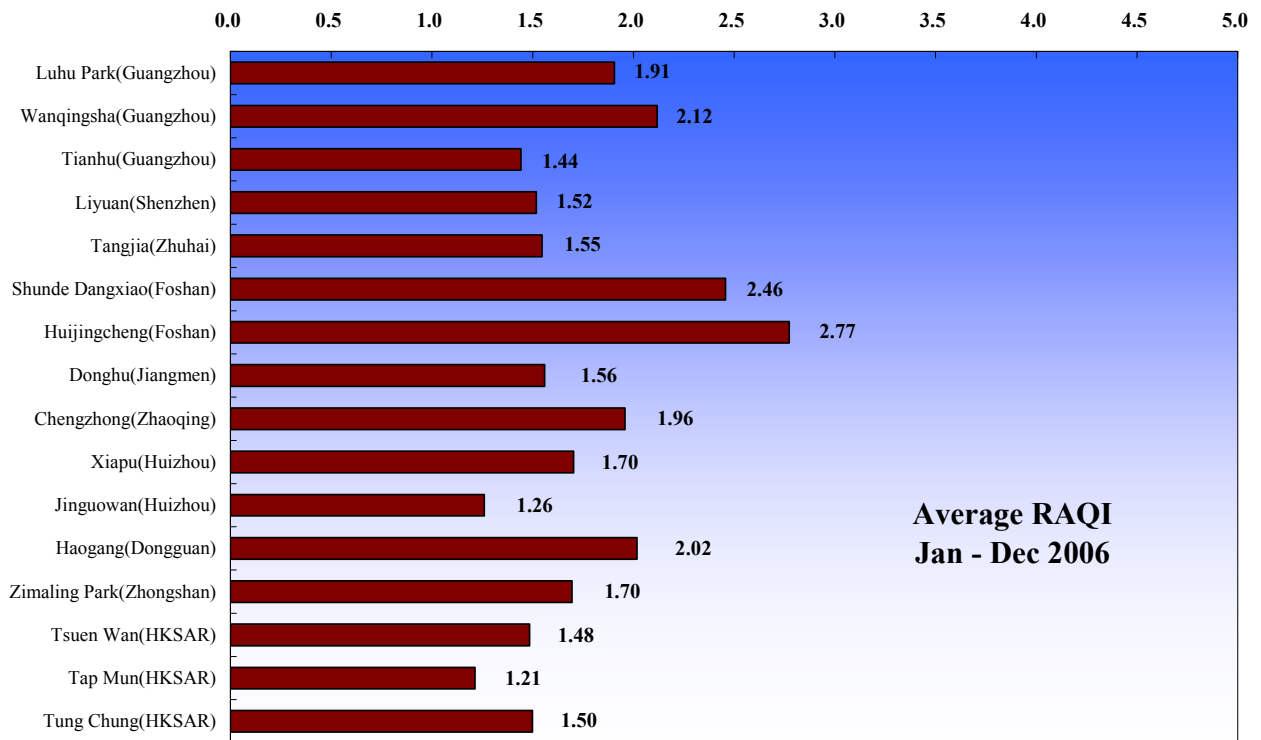


Figure 12 : The average RAQI of individual monitoring stations

4.3 Monthly Variations of Average RAQI

Figure 13 shows the monthly variations in the average RAQI values of the Network from January to December 2006. Except for October, November and December where average RAQI values reached the Grade III level, the values in other months were within the Grade II category. The maximum and minimum RAQI values were recorded in October and June respectively.

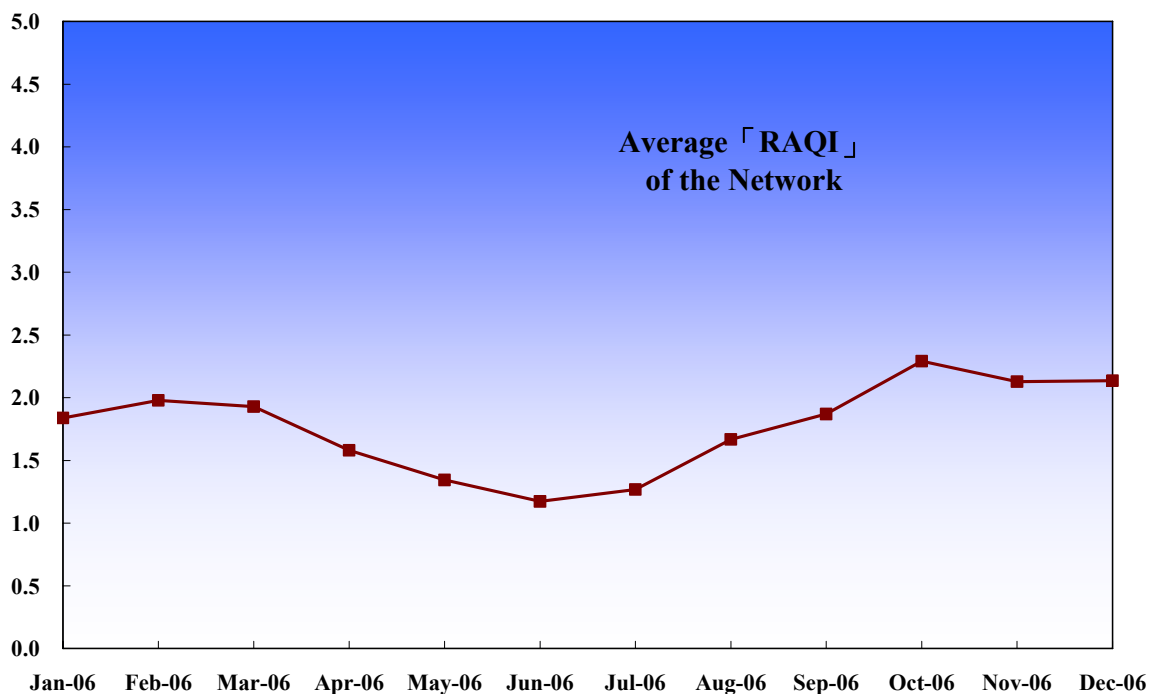


Figure 13 : Monthly variations in average RAQI

Annex A : Site Information of Monitoring Stations

Monitoring Stations	Address	Area Type	Sampling Height (Above P.D.)	Above Ground	Date Commenced Operation
Luhu Park (Guangzhou)	Inside Jufong Garden of Luhu Park (Big yard, No. 11 Luhu Park)	City	30m	9m	1993
Wanqingsha (Guangzhou)	Wanqingsha Secondary School, Nansha	Mixed educational/commercial and residential/industrial	13m	12m	Oct 2004
Tianhu (Guangzhou)	Tianhu Park, Conghua City	Background : rural	251m	13m	Oct 2004
Liyuan (Shenzhen)	Shennan Zhong Road, Shenzhen City	City	38m	12m	Sep 1997
Tangjia (Zhuhai)	Building No. 1, Rong Yuan, Zhongshan University, Tangjia, Zhuhai City	Mixed educational/commercial and residential/industrial	24m	19m	Jan 2003
Shunde Dangxiao (Foshan)	Roof-top of Educational Building, Foshan City Communist Party Shunde	Tourist and cultural/educational	27m	17m	Oct 1999
Huijingcheng (Foshan)	No. 127, Fenjiang Nan Road, Chancheng Area	Urban: mixed residential/commercial/industrial	24m	14m	Feb 2000
Donghu (Jiangmen)	Inside Donghu Park, Jiangmen City	City	17.5m	5m	Nov 2001
Chengzhong (Zhaoqing)	No. 17, Qintian Road, Zhaoqing City	Urban: mixed residential/commercial	21m	16m	Jun 2001
Xiapu (Huizhou)	No. 4 Xiabuhengjiang Road No. 3, Huicheng Area	Urban: commercial	49m	20m	Dec 1999
Jinguowan (Huizhou)	Jinguowan Ecological Farm, Huizhou City	Residential	77m	8m	Oct 2004
Haogang (Dongguan)	Haogang Primary School, NanchengQu, Dongguan City	Mixed residential/commercial/industrial	18 m	14m	1998
Zimaling Park (Zhongshan)	Zimaling Park, Zhongshan City	Mixed residential/commercial	45 m	7m	Aug 2002
Tsuen Wan (HKSAR)	60 Tai Ho Road, Tsuen Wan	Urban: mixed residential/commercial/industrial	21m	17m	Aug 1988
Tap Mun (HKSAR)	Tap Mun Police Station	Background: rural	26m	11m	Apr 1998
Tung Chung (HKSAR)	6 Fu Tung Street, Tung Chung	New Town: residential	34.5m	27.5m	Apr 1999

Annex B : Measurement Methods of Air Pollutant Concentration

Pollutants	Measuring Principles
Sulphur Dioxide	UV fluorescence / Differential Optical Absorption Spectroscopy
Nitrogen Dioxide	Chemiluminescence / Differential Optical Absorption Spectroscopy
Ozone	UV absorption / Differential Optical Absorption Spectroscopy
Respirable Suspended Particulates	Oscillating microbalance (TEOM) Beta particulate monitor