Pearl River Delta

Regional Air Quality Monitoring Network

April to June 2014

Statistical Summary of the Second Quarter Monitoring Results

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Report Prepared by	**:**	**Guangdong Provincial Environmental Monitoring Centre** **Environmental Protection Department, HKSAR**
Approved by	**:**	**Pearl River Delta Air Quality Management and Monitoring Special Panel**
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1. Foreword

Since the Pearl River Delta (PRD) Regional Air Quality Monitoring Network (the Network) came into operation on 30 November 2005, it has been reporting PRD Regional Air Quality Index (RAQI) to the public on daily basis. Starting from 2006, a half-yearly and an annual air quality monitoring reports were published every year.

In view of the needs of air pollution control and economic development of the region, the environmental protection departments of Guangdong and Hong Kong have worked in collaboration with the environmental protection cum meteorological authority of Macao to enhance the existing Network by extending the coverage of monitoring area to the 3 places, i.e. Guangdong, Hong Kong and Macao, in the second half of 2014. The enhancement include the increase of number of monitoring station from 16 to 23 to further improve the spatial distribution; and the addition of two more monitoring parameters, i.e. carbon monoxide (CO) and fine suspended particulates ($PM_{2.5}$), to enrich the air quality monitoring information.

In conjunction with the enhancement of the Network and the update of ambient air quality standards, starting from 2014, we report real time monitoring data of the Network on hourly basis through a new internet platform and publish a quarterly air quality monitoring report every quarter and an annual monitoring report in a year to increase the reporting frequency of monitoring results. The quarterly report is mainly a brief statistical summary of the monitoring results of the regional air quality in a quarter while the annual report, in addition to the reporting of the relevant data, will provide a more detailed analysis and comparison of the condition of air quality in the year.

This is the second report published in the form of quarterly report, i.e. Statistical Summary of the 2014 Second Quarter Monitoring Results of PRD Regional Air Quality Monitoring Network.

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

The Pearl River Delta (PRD) Regional Air Quality Monitoring Network was jointly established by the Guangdong Provincial Environmental Monitoring Centre (GDEMC) 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 have been used for reporting Regional Air Quality Index (RAQI) to the public since then.

The Network comprises 16 automatic air quality monitoring stations (see Figure 2.1) across the PRD region. Ten of these stations are operated by the Environmental Monitoring Centres of the individual cities in Guangdong while the three stations located in Hong Kong are managed by the HKEPD. The remaining three regional stations in the Network are operated by the GDEMC.

All stations are 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).

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 2.1：Spatial distribution of the PRD Regional Air Quality Monitoring Stations

3. Operation of the Network

Owing to the extensive renovation work at the Wanqingsha monitoring station in Guangzhou Nansha, the station was still temporarily suspended from operation in the reporting period of the second quarter 2014.

The operation of the Network was generally smooth in the reporting period. Excluding the suspended Wanqingsha station, the average data capture rates of all other monitoring stations in the Network was 95%.

4. Statistical Analysis of Pollutant Concentrations

Table 4.1a to Table 4.4b list the statistical summaries of monitoring results of the ambient concentrations of the four air pollutants (sulphur dioxide (SO_2), nitrogen dioxide (NO_2), ozone (O_3) and particulate matter PM_{10}) during the reporting period in April to June 2014, and their brief comparisons with the short-term air quality indicators of the latest national "Ambient Air Quality Standards" (NAAQS) (GB3095-2012).

Table 4.1a：The monthly maxima and minima of hourly averages of Sulphur Dioxide

[Class 2 NAAQS (Hourly): 500 ug/m^3]

Monitoring Station	April 2014		May		June		Exceedance Hours
	Min	Max	Min	Max	Min	Max	
Luhu Park (Guangzhou)	4	51	3	56	0	38	0
Wanqingsha (Guangzhou)	--	--	--	--	--	--	--
Tianhu (Guangzhou)	4	53	0	21	0	41	0
Liyuan (Shenzhen)	1	59	2	24	1	39	0
Tangjia (Zhuhai)	1	53	4	36	6	53	0
Jinjuzui (Foshan)	3	83	1	58	4	91	0
Huijingcheng (Foshan)	7	98	7	112	0	104	0
Donghu (Jiangmen)	1	115	1	72	1	95	0
Chengzhong (Zhaoqing)	5	326	4	171	1	156	0
Xiapu (Huizhou)	3	37	3	50	4	37	0
Jinguowan (Huizhou)	4	45	0	28	1	29	0
Nanchengyuanling (Dongguan)	9	157	8	86	8	70	0
Zimaling Park (Zhongshan)	6	61	4	29	5	63	0
Tsuen Wan (HKSAR)	6	90	6	139	6	58	0
Tap Mun (HKSAR)	5	40	7	23	7	28	0
Tung Chung (HKSAR)	7	58	7	48	4	45	0

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

[Class 2 NAAQS (Daily): 150 ug/m^3]

Monitoring Station	April 2014		May		June		Exceedance Days
	Min	Max	Min	Max	Min	Max	
Luhu Park (Guangzhou)	6	28	6	23	4	18	0
Wanqingsha (Guangzhou)	--	--	--	--	--	--	--
Tianhu (Guangzhou)	5	28	2	14	4	27	0
Liyuan (Shenzhen)	3	15	3	9	1	10	0
Tangjia (Zhuhai)	8	22	7	15	9	18	0
Jinjuzui (Foshan)	8	35	1	23	5	28	0
Huijingcheng (Foshan)	15	52	10	58	11	39	0
Donghu (Jiangmen)	6	33	3	31	1	29	0
Chengzhong (Zhaoqing)	15	65	8	41	10	42	0
Xiapu (Huizhou)	7	20	4	16	5	15	0
Jinguowan (Huizhou)	6	23	2	14	4	13	0
Nanchengyuanling (Dongguan)	12	53	11	41	13	29	0
Zimaling Park (Zhongshan)	7	28	5	15	6	19	0
Tsuen Wan (HKSAR)	7	43	6	32	7	27	0
Tap Mun (HKSAR)	7	18	9	11	7	12	0
Tung Chung (HKSAR)	10	27	8	14	5	18	0

Table 4.1c：The monthly averages of Sulphur Dioxide

Monitoring Station	April 2014	May	June
Luhu Park (Guangzhou)	15	11	11
Wanqingsha (Guangzhou)	--	--	--
Tianhu (Guangzhou)	12	7	11
Liyuan (Shenzhen)	7	4	4
Tangjia (Zhuhai)	13	10	12
Jinjuzui (Foshan)	16	11	12
Huijingcheng (Foshan)	27	25	20
Donghu (Jiangmen)	13	10	8
Chengzhong (Zhaoqing)	35	23	23
Xiapu (Huizhou)	9	6	7
Jinguowan (Huizhou)	13	6	6
Nanchengyuanling (Dongguan)	21	17	18
Zimaling Park (Zhongshan)	11	8	10
Tsuen Wan (HKSAR)	15	16	16
Tap Mun (HKSAR)	11	10	9
Tung Chung (HKSAR)	13	10	8

Remark : All concentration units are in micrograms per cubic metre.

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

[Class 2 NAAQS (Hourly): 200 ug/m^3]

Monitoring Station	April 2014		May		June		Exceedance Hours
	Min	Max	Min	Max	Min	Max	
Luhu Park (Guangzhou)	14	147	11	106	8	156	0
Wanqingsha (Guangzhou)	--	--	--	--	--	--	--
Tianhu (Guangzhou)	3	85	0	41	0	62	0
Liyuan (Shenzhen)	2	113	4	95	3	112	0
Tangjia (Zhuhai)	1	66	1	99	1	105	0
Jinjuzui (Foshan)	15	126	7	134	6	154	0
Huijingcheng (Foshan)	24	173	16	196	6	202	1
Donghu (Jiangmen)	12	170	7	128	4	98	0
Chengzhong (Zhaoqing)	12	190	0	166	0	167	0
Xiapu (Huizhou)	8	139	6	74	0	79	0
Jinguowan (Huizhou)	0	74	3	59	1	65	0
Nanchengyuanling (Dongguan)	9	123	0	111	0	162	0
Zimaling Park (Zhongshan)	0	88	0	66	0	83	0
Tsuen Wan (HKSAR)	10	158	7	123	3	171	0
Tap Mun (HKSAR)	1	52	1	41	0	64	0
Tung Chung (HKSAR)	7	179	1	102	0	186	0

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

[Class 2 NAAQS (Daily): 80 ug/m^3]

Monitoring Station	April 2014		May		June		Exceedance Days
	Min	Max	Min	Max	Min	Max	
Luhu Park (Guangzhou)	30	71	26	64	23	89	2
Wanqingsha (Guangzhou)	--	--	--	--	--	--	--
Tianhu (Guangzhou)	6	36	4	22	1	26	0
Liyuan (Shenzhen)	12	75	22	58	15	71	0
Tangjia (Zhuhai)	10	30	6	33	7	48	0
Jinjuzui (Foshan)	30	74	21	81	21	77	1
Huijingcheng (Foshan)	46	114	26	107	17	106	20
Donghu (Jiangmen)	17	78	9	81	10	53	1
Chengzhong (Zhaoqing)	34	80	14	93	13	56	1
Xiapu (Huizhou)	21	51	20	40	7	37	0
Jinguowan (Huizhou)	8	36	5	31	3	23	0
Nanchengyuanling (Dongguan)	27	62	8	64	10	67	0
Zimaling Park (Zhongshan)	8	51	1	44	2	44	0
Tsuen Wan (HKSAR)	47	89	33	86	28	91	6
Tap Mun (HKSAR)	4	31	3	18	2	19	0
Tung Chung (HKSAR)	29	96	9	54	7	80	2

Table 4.2c：The monthly averages of Nitrogen Dioxide

Monitoring Station	April 2014	May	June
Luhu Park (Guangzhou)	48	45	47
Wanqingsha (Guangzhou)	--	--	--
Tianhu (Guangzhou)	16	9	10
Liyuan (Shenzhen)	36	35	33
Tangjia (Zhuhai)	19	22	26
Jinjuzui (Foshan)	53	42	40
Huijingcheng (Foshan)	71	63	53
Donghu (Jiangmen)	40	27	23
Chengzhong (Zhaoqing)	51	49	30
Xiapu (Huizhou)	33	29	21
Jinguowan (Huizhou)	19	15	12
Nanchengyuanling (Dongguan)	44	36	31
Zimaling Park (Zhongshan)	23	13	12
Tsuen Wan (HKSAR)	63	50	52
Tap Mun (HKSAR)	10	9	9
Tung Chung (HKSAR)	53	27	29

Remark : All concentration units are in micrograms per cubic metre.

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

[Class 2 NAAQS (Hourly): 200 ug/m^3]

Monitoring Station	April 2014		May		June		Exceedance Hours
	Min	Max	Min	Max	Min	Max	
Luhu Park (Guangzhou)	0	221	0	255	1	247	31
Wanqingsha (Guangzhou)	--	--	--	--	--	--	--
Tianhu (Guangzhou)	0	238	1	235	5	298	45
Liyuan (Shenzhen)	1	125	5	117	1	179	0
Tangjia (Zhuhai)	1	206	2	137	5	190	1
Jinjuzui (Foshan)	4	295	3	215	4	317	55
Huijingcheng (Foshan)	2	233	2	249	1	237	17
Donghu (Jiangmen)	7	287	6	202	1	332	50
Chengzhong (Zhaoqing)	1	264	1	209	2	268	20
Xiapu (Huizhou)	0	219	0	347	0	285	18
Jinguowan (Huizhou)	4	222	1	295	1	233	21
Nanchengyuanling (Dongguan)	1	269	0	371	3	266	45
Zimaling Park (Zhongshan)	0	189	0	142	1	282	13
Tsuen Wan (HKSAR)	6	207	5	126	3	376	11
Tap Mun (HKSAR)	5	219	7	175	6	230	9
Tung Chung (HKSAR)	5	270	5	138	2	381	21

Table 4.3b：The monthly maxima and minima of maximum daily 8-hour averages of Ozone

[Class 2 NAAQS (Maximum Daily 8-hour): 160 ug/m^3]

Monitoring Station	April 2014		May		June		Exceedance Days
	Min	Max	Min	Max	Min	Max	
Luhu Park (Guangzhou)	13	184	3	187	13	193	9
Wanqingsha (Guangzhou)	--	--	--	--	--	--	--
Tianhu (Guangzhou)	69	205	59	211	83	264	16
Liyuan (Shenzhen)	26	99	22	91	2	145	0
Tangjia (Zhuhai)	24	171	25	89	29	167	2
Jinjuzui (Foshan)	14	220	27	178	42	253	12
Huijingcheng (Foshan)	16	180	9	194	25	193	7
Donghu (Jiangmen)	51	232	28	123	25	279	8
Chengzhong (Zhaoqing)	7	209	6	156	34	216	8
Xiapu (Huizhou)	48	182	39	249	44	168	7
Jinguowan (Huizhou)	18	191	9	232	51	199	7
Nanchengyuanling (Dongguan)	46	204	40	282	42	201	14
Zimaling Park (Zhongshan)	21	161	30	121	37	248	5
Tsuen Wan (HKSAR)	10	152	10	113	10	299	3
Tap Mun (HKSAR)	57	194	43	164	44	182	10
Tung Chung (HKSAR)	12	182	33	131	32	298	6

Table 4.3c：The monthly averages of Ozone

Monitoring Station	April 2014	May	June
Luhu Park (Guangzhou)	34	25	44
Wanqingsha (Guangzhou)	--	--	--
Tianhu (Guangzhou)	92	64	85
Liyuan (Shenzhen)	46	33	34
Tangjia (Zhuhai)	40	29	39
Jinjuzui (Foshan)	48	38	57
Huijingcheng (Foshan)	38	28	44
Donghu (Jiangmen)	58	38	54
Chengzhong (Zhaoqing)	34	26	52
Xiapu (Huizhou)	67	45	58
Jinguowan (Huizhou)	61	57	64
Nanchengyuanling (Dongguan)	65	51	59
Zimaling Park (Zhongshan)	39	33	55
Tsuen Wan (HKSAR)	51	25	30
Tap Mun (HKSAR)	96	60	58
Tung Chung (HKSAR)	55	45	50

Remark : All concentration units are in micrograms per cubic metre.

Table 4.4a：The monthly maxima and minima of daily averages of PM_{10}

[Class 2 NAAQS (Daily): 150 ug/m^3]

Monitoring Station	April 2014		May		June		Exceedance Days
	Min	Max	Min	Max	Min	Max	
Luhu Park (Guangzhou)	43	112	18	98	30	115	0
Wanqingsha (Guangzhou)	--	--	--	--	--	--	--
Tianhu (Guangzhou)	17	88	7	44	13	115	0
Liyuan (Shenzhen)	26	84	15	48	15	80	0
Tangjia (Zhuhai)	25	72	10	38	12	84	0
Jinjuzui (Foshan)	33	95	17	84	24	131	0
Huijingcheng (Foshan)	30	79	16	90	23	128	0
Donghu (Jiangmen)	40	120	25	97	21	127	0
Chengzhong (Zhaoqing)	48	200	36	112	28	127	2
Xiapu (Huizhou)	30	88	17	63	23	82	0
Jinguowan (Huizhou)	30	72	11	100	19	82	0
Nanchengyuanling (Dongguan)	32	93	19	90	20	89	0
Zimaling Park (Zhongshan)	26	72	7	66	12	97	0
Tsuen Wan (HKSAR)	18	58	12	48	18	94	0
Tap Mun (HKSAR)	17	78	14	62	11	67	0
Tung Chung (HKSAR)	19	77	7	40	9	86	0

Table 4.4b：The monthly averages of PM_{10}

Monitoring Station	April 2014	May	June
Luhu Park (Guangzhou)	70	45	54
Wanqingsha (Guangzhou)	--	--	--
Tianhu (Guangzhou)	51	24	42
Liyuan (Shenzhen)	46	31	38
Tangjia (Zhuhai)	43	22	27
Jinjuzui (Foshan)	60	40	48
Huijingcheng (Foshan)	49	44	53
Donghu (Jiangmen)	64	43	46
Chengzhong (Zhaoqing)	88	63	62
Xiapu (Huizhou)	54	34	43
Jinguowan (Huizhou)	51	30	37
Nanchengyuanling (Dongguan)	55	38	41
Zimaling Park (Zhongshan)	43	24	34
Tsuen Wan (HKSAR)	43	28	35
Tap Mun (HKSAR)	47	25	28
Tung Chung (HKSAR)	38	17	24

Remark： All concentration units are in micrograms per cubic metre.

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)	Qiao Island Mangrove Monitoring Station, Tangjia County	Mixed educational/ commercial and residential/industrial	13m	13m	Jan 2010
Jinjuzui (Foshan)	Roof-top of Educational Building, Foshan City Communist Party Shunde Jinjuzui	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
Nancheng-yuanling (Dongguan)	Nanchengyuanling Community, Dongguan City	Mixed residential/ commercial/industrial	33 m	18m	Sep 2010
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