

## Supplementary data for

# Progress of Air Pollution Control in China and Its Challenges and Opportunities in the Ecological Civilization Era

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**Table S1.**

The trend in annual PM<sub>2.5</sub> concentrations and 90th percentiles in maximum daily average 8-hour O<sub>3</sub> concentrations in 2013-2017 for the cities in the BTH region and the key 74 cities nationwide, respectively. The mean value and two quartiles (Q1 and Q3) of the cities are listed for each year.

Year	City-specific annual PM <sub>2.5</sub> concentrations (μg·m <sup>-3</sup> )						City-specific daily maximum 8-h O <sub>3</sub> concentrations (μg·m <sup>-3</sup> )					
	BTH			74 cities			BTH			74 cities		
	Mean	Q1	Q3	Mean	Q1	Q3	Mean	Q1	Q3	Mean	Q1	Q3
2013	106.0	81.5	135.7	72.0	52.3	80.5	155.0	142.9	166.2	139.0	123.0	158.2
2014	93.0	74.1	116.5	64.0	46.8	71.6	162.0	151.5	176.0	145.0	127.6	163.0
2015	77.0	64.5	92.9	55.0	41.3	64.1	162.0	147.2	178.2	150.0	135.7	165.3
2016	71.0	61.7	88.5	50.0	38.3	57.8	172.0	159.7	179.7	154.0	141.6	168.1
2017	64.0	53.8	80.8	47.0	36.9	56.0	193.0	187.1	203.7	167.0	150.6	184.5

**Note:** The PM<sub>2.5</sub> and O<sub>3</sub> data were obtained from the China National Environmental Monitoring Centre<sup>†</sup>

**Table S2.**

Registered population, GDP, and monthly PM<sub>2.5</sub> concentrations for the 74 cities in China in 2013.

City	PM <sub>2.5</sub> concentrations (μg·m <sup>-3</sup> )												Population	GDP
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	(10 000 persons)	(100 million CNY)
Beijing	150.0	99.8	120.1	53.1	73.0	105.1	65.9	57.8	71.0	91.0	73.7	78.4	1316.3	19500.6
Tianjin	152.7	108.2	108.9	61.6	78.3	99.4	74.7	76.8	76.4	81.5	97.1	119.3	1004.0	14370.2
Shijiazhuang	294.4	229.4	134.2	79.5	97.0	119.8	73.8	74.1	124.9	177.7	116.8	236.2	1003.2	4863.7
Tangshan	219.1	123.3	150.4	67.4	91.9	113.2	79.6	86.5	98.4	109.1	122.5	125.9	738.7	6121.2
Handan	278.6	202.5	79.3	87.6	96.3	116.8	92.0	63.8	106.8	130.6	117.2	236.5	994.0	3061.5
Zhangjiakou	63.9	51.6	44.4	31.3	37.5	45.0	31.8	35.2	36.3	40.7	42.9	40.5	466.9	1317.0

<sup>†</sup> <http://106.37.208.233:20035/>

Baoding	259.5	178.4	148.3	62.9	77.6	117.8	80.3	75.0	87.4	145.3	142.5	200.8	1163.9	2904.3
Cangzhou	185.0	135.1	109.1	59.3	81.5	105.9	68.2	70.2	79.0	93.0	104.7	138.5	754.3	3013.0
Qinhuangdao	111.8	76.9	90.8	44.6	52.6	51.8	46.5	65.0	55.8	68.0	78.6	67.1	292.7	1168.8
Xingtai	309.6	224.6	127.8	87.4	100.9	128.6	104.4	103.1	136.4	185.8	128.0	260.8	762.9	1604.6
Langfang	245.3	130.7	147.7	68.6	80.8	107.2	71.5	70.6	85.4	102.8	92.7	145.8	422.4	1943.1
Chengde	85.0	66.5	73.7	35.4	44.1	56.1	39.3	41.5	39.5	54.1	42.4	47.3	378.1	1272.1
Hengshui	228.9	162.1	108.1	63.2	75.6	114.3	79.9	84.5	100.7	122.2	103.4	217.4	447.5	1070.2
Taiyuan	122.9	121.8	96.7	59.8	50.8	64.7	45.5	47.5	53.3	87.8	73.9	90.9	367.5	2412.9
Hohhot	121.4	50.0	62.8	41.8	72.1	54.1	38.8	43.5	37.2	62.9	62.2	76.2	234.0	2710.4
Shenyang	190.3	68.0	87.5	50.5	60.9	49.3	36.7	47.4	41.4	77.2	72.8	114.4	727.1	7158.6
Dalian	94.8	58.3	68.7	41.3	44.8	37.7	34.8	39.1	35.0	45.6	52.7	59.2	591.5	7650.8
Changchun	191.4	67.4	54.6	45.7	42.2	38.6	27.2	38.2	31.4	106.7	73.0	109.0	752.7	5003.2
Harbin	205.4	77.9	55.1	42.9	39.2	42.8	22.8	31.5	29.4	140.7	87.5	153.0	995.2	5017.0
Shanghai	97.7	54.8	72.7	61.8	61.2	55.5	43.3	34.6	28.8	32.6	78.7	126.4	1432.3	21602.1
Nanjing	135.9	75.8	72.3	63.4	63.6	59.3	32.3	42.7	51.8	64.4	97.8	155.5	643.1	8011.8
Wuxi	142.5	70.8	80.2	72.8	63.9	60.7	33.8	37.8	50.5	57.2	95.4	158.7	472.2	8070.2
Xuzhou	120.2	92.4	68.6	51.6	59.8	95.6	29.5	32.9	48.7	85.1	82.6	139.4	1006.9	4435.8
Changzhou	139.2	78.2	87.9	73.3	65.4	56.8	33.9	38.3	42.8	49.9	91.1	148.8	365.9	4360.9
Suzhou	110.8	57.3	70.7	68.9	62.9	56.8	38.2	39.6	44.7	53.2	85.5	147.5	653.8	13015.7
Nantong	122.7	62.5	83.5	67.2	71.2	59.8	52.1	43.2	41.8	51.4	93.5	133.3	766.5	5038.9
Lianyungang	86.3	70.1	59.0	55.5	56.3	68.3	47.9	39.3	53.0	59.6	80.3	136.9	520.2	1785.4
Huaian	138.3	93.4	58.8	58.3	62.4	87.3	38.3	39.4	43.4	60.2	105.0	190.6	553.0	2155.9
Yancheng	122.7	73.3	72.3	61.2	55.0	49.7	40.4	37.2	33.0	51.2	80.1	136.8	823.8	3475.5
Yangzhou	110.5	85.7	82.6	53.4	61.2	61.1	28.3	30.2	30.7	54.6	85.6	150.7	459.8	3252.0
Zhenjiang	115.7	69.9	75.1	59.4	60.0	60.5	38.2	46.7	46.4	55.4	86.6	116.9	271.8	2927.3
Taizhou	133.7	72.0	79.3	71.4	65.2	70.8	43.7	50.2	49.7	61.0	100.7	146.1	507.8	3006.9
Suqian	77.0	89.2	65.2	62.4	61.2	97.6	40.7	42.3	56.8	58.4	74.3	149.9	572.1	1706.3
Hangzhou	113.6	60.5	63.8	62.4	47.6	45.9	30.2	34.5	43.7	53.9	82.3	141.0	706.6	8343.5
Jiaxing	148.1	69.5	80.0	73.1	59.0	48.4	40.0	35.9	42.3	46.6	90.1	151.9	345.9	3147.7
Huzhou	129.6	64.3	78.6	68.4	54.2	46.1	29.0	38.6	43.9	57.2	90.0	169.9	262.5	1803.2
Zhoushan	56.0	28.9	33.0	34.0	27.0	20.0	17.3	15.2	15.0	21.9	44.0	72.3	97.3	930.8
Jinhua	104.6	61.5	76.4	65.9	52.7	42.2	33.9	36.8	57.0	70.2	86.0	158.4	473.4	2958.8

Shaoxing	130.0	60.4	69.3	64.7	48.2	44.2	29.1	31.8	42.2	60.9	94.4	186.6	441.7	3967.3
Wenzhou	83.4	68.0	78.9	78.5	44.1	28.2	28.6	23.8	31.6	42.5	55.2	82.7	807.2	4003.9
Taizhou	87.8	57.3	67.3	66.2	43.9	39.3	23.9	27.6	30.1	38.3	60.3	104.1	594.0	3153.3
Lishui	80.8	45.6	60.9	53.8	33.6	24.3	23.2	25.1	36.7	49.5	52.5	84.3	263.9	983.1
Quzhou	109.4	50.7	59.9	68.7	51.9	40.2	34.0	34.6	48.9	67.2	80.2	136.2	254.2	1056.6
Ningbo	87.8	42.0	49.4	50.2	42.8	38.4	25.7	24.9	27.5	37.4	67.2	135.1	580.2	7128.9
Hefei	144.3	80.9	64.8	58.9	70.7	68.0	37.0	46.6	63.8	102.9	111.8	174.1	711.5	4672.9
Fuzhou	53.0	38.8	45.1	46.9	28.2	27.3	19.5	19.6	20.8	29.7	33.5	58.0	655.5	4678.5
Xiamen	38.9	32.4	44.2	44.1	25.5	21.3	18.0	22.9	22.6	30.7	33.0	46.8	196.8	3018.2
Nanchang	122.0	76.2	76.5	70.1	58.2	42.1	41.7	40.5	46.2	78.9	76.2	102.7	510.1	3336.0
Qingdao	137.2	74.4	72.1	50.5	45.9	39.7	48.3	34.2	31.3	47.3	56.5	102.0	773.7	8006.6
Jinan	221.7	153.9	98.1	73.8	84.8	92.1	83.3	65.1	85.9	99.2	97.9	151.7	613.3	5230.2
Zhengzhou	215.2	155.0	80.3	71.2	84.4	91.3	72.0	58.7	87.1	153.9	79.1	138.3	919.1	6201.9
Wuhan	187.8	106.5	78.2	71.4	64.4	43.8	28.3	37.2	61.7	117.7	101.8	180.2	822.1	9051.3
Changsha	164.2	76.5	91.0	70.8	51.0	37.6	27.5	34.1	58.9	137.7	91.9	132.1	662.8	7153.1
Guangzhou	82.2	57.0	71.5	60.1	38.8	26.6	26.2	33.0	40.5	69.1	55.0	83.3	832.3	15420.1
Shenzhen	62.8	35.6	44.7	44.8	25.1	17.4	14.2	21.8	30.2	60.8	45.3	74.3	310.5	14500.2
Zhuhai	71.7	38.9	43.6	41.5	15.8	11.8	7.8	17.6	28.4	66.2	46.9	82.5	108.6	1662.4
Foshan	83.3	48.5	55.2	49.5	30.6	23.3	23.6	31.8	41.6	78.3	61.9	96.7	381.6	7010.2
Huizhou	65.4	34.5	43.8	36.7	20.8	17.8	14.0	21.8	30.9	58.3	47.0	74.9	343.4	2678.4
Dongguan	80.5	38.7	57.3	47.0	25.3	21.3	21.9	28.8	39.3	69.4	56.1	84.4	188.9	5490.0
Zhongshan	81.4	46.7	48.3	46.3	27.6	20.8	15.5	30.1	39.2	84.2	56.4	87.8	154.1	2638.9
Jiangmen	80.6	48.2	50.7	56.3	26.2	21.8	18.7	28.5	41.8	83.9	63.6	88.2	393.0	2000.2
Zhaoqing	66.4	55.5	64.1	72.0	36.5	27.0	27.8	33.5	45.9	78.5	65.4	89.0	429.8	1660.1
Nanning	97.4	40.2	64.9	49.3	31.1	27.5	20.1	31.2	46.1	86.5	67.6	112.4	724.4	2803.5
Haikou	46.7	21.7	25.4	19.8	13.7	13.6	7.3	10.7	17.9	50.7	30.3	62.5	163.2	904.6
Chongqing	63.4	92.2	107.0	54.7	43.9	42.7	35.3	43.4	50.6	82.7	52.1	99.1	3358.4	12656.7
Chengdu	166.0	140.9	162.8	94.3	60.9	49.1	48.0	60.7	58.3	90.5	66.4	138.5	1188.0	9108.9
Guiyang	86.0	43.4	81.0	51.8	39.9	33.9	15.4	27.8	42.8	64.5	45.5	89.5	379.1	2085.4
Kunming	56.8	36.8	57.6	51.4	25.3	27.0	18.5	30.9	37.9	38.9	36.1	50.6	546.8	3415.3
Lhasa	36.9	25.0	22.2	26.3	28.4	22.5	15.4	21.1	18.9	21.1	24.7	34.7	60.1	304.9
Xi'an	210.9	207.9	128.4	76.8	50.6	42.9	49.7	57.6	74.9	114.8	68.5	201.5	806.9	4884.1

Lanzhou	98.4	73.4	134.0	76.8	63.6	50.5	51.3	45.7	41.5	60.3	92.6	82.2	368.6	1776.3
Xining	97.5	84.2	138.6	79.3	50.5	44.6	50.7	54.1	51.7	47.1	66.4	79.4	226.8	978.5
Yinchuan	98.1	50.8	49.8	38.9	31.1	29.0	21.5	22.9	29.6	44.9	58.0	82.5	172.6	1289.0
Urumqi	207.1	184.0	110.5	44.9	48.2	43.6	50.2	46.4	52.5	70.9	130.9	107.5	262.9	2202.9

Note: The observed PM<sub>2.5</sub> concentrations were obtained from the China National Environmental Monitoring Centre<sup>†</sup>. The population and GDP data were obtained from the National Bureau of Statistics of China. The values for the top 20 most populated cities in China are highlighted in red.

**Table S3.**

Registered population, GDP, and monthly PM<sub>2.5</sub> concentrations for the 74 cities in China in 2014.

City	PM <sub>2.5</sub> concentration (µg·m <sup>-3</sup> )												Population (10 000 persons)	GDP (100 million CNY)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Beijing	97.7	140.1	96.3	89.9	61.0	55.0	90.0	68.3	68.2	122.8	84.9	59.2	1333.4	21330.8
Tianjin	113.6	93.4	113.9	84.5	70.7	59.0	75.7	57.3	57.4	99.2	110.2	110.7	1016.7	15726.9
Shijiazhuang	241.2	218.6	139.2	107.0	76.9	84.8	92.8	75.3	66.4	141.6	116.2	119.0	1024.9	5170.3
Tangshan	138.2	138.1	127.0	93.5	77.5	73.8	96.3	63.7	64.1	107.3	118.1	112.0	753.2	6225.3
Handan	196.5	172.6	119.7	100.2	66.4	78.0	89.2	76.1	77.9	135.0	123.8	125.5	1029.5	3080.0
Zhangjiakou	55.3	115.6	37.0	29.8	20.5	17.8	22.8	23.0	20.9	26.4	30.5	29.3	468.6	1349.0
Baoding	220.4	192.1	130.8	88.4	70.2	72.1	85.7	76.6	82.8	158.2	170.2	188.2	1196.6	3035.2
Cangzhou	139.7	110.0	103.9	79.7	69.2	63.1	78.1	52.7	53.9	93.8	109.7	102.3	768.4	3133.4
Qinhuangdao	81.6	98.1	81.2	63.8	38.2	39.3	43.5	35.7	33.2	84.5	86.2	71.8	295.1	1200.0
Xingtai	248.6	237.9	151.2	117.8	85.3	84.0	81.8	69.7	78.8	167.7	134.4	119.8	772.9	1646.9
Langfang	150.5	147.1	111.5	85.2	66.2	69.1	78.3	62.8	64.2	133.1	111.8	88.3	450.4	2176.0
Chengde	62.7	109.4	58.7	43.2	35.5	36.0	62.2	36.7	35.9	77.5	57.3	42.6	380.7	1342.6
Hengshui	192.0	146.5	121.8	86.7	66.5	69.7	80.8	77.6	87.0	115.2	128.4	116.6	452.6	1149.1
Taiyuan	88.5	100.5	61.6	62.4	51.8	46.6	45.8	40.0	47.6	95.7	91.1	86.7	369.7	2531.1

<sup>†</sup> <http://106.37.208.233:20035/>

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Hohhot	61.3	59.0	45.5	39.9	36.9	27.3	32.8	25.6	29.0	50.9	51.5	72.6	237.9	2894.1
Shenyang	83.6	95.1	79.8	64.8	46.7	48.0	53.0	49.0	42.7	110.5	105.0	85.9	730.8	7098.7
Dalian	71.4	70.4	69.4	56.8	37.7	41.0	46.0	47.4	30.3	48.4	71.7	51.5	594.3	7655.6
Changchun	87.4	86.5	69.4	55.2	33.3	38.0	53.0	40.1	26.5	140.5	80.2	83.6	754.6	5342.4
Harbin	124.1	113.6	58.1	48.3	27.9	29.0	50.9	25.4	21.9	130.5	144.8	104.0	987.3	5340.1
Shanghai	79.4	50.4	56.6	54.8	61.0	42.0	43.0	40.4	36.3	40.1	53.3	74.3	1438.7	23567.7
Nanjing	129.2	74.8	75.1	61.4	83.9	86.8	65.0	41.3	49.4	67.1	82.7	65.7	648.7	8820.8
Wuxi	107.8	69.4	69.3	63.6	68.6	61.5	52.0	51.1	45.7	58.4	80.3	82.9	477.1	8205.3
Xuzhou	135.3	86.3	79.9	67.3	61.2	81.9	42.1	35.0	30.6	43.3	74.1	85.3	1023.5	4963.9
Changzhou	109.8	66.2	71.7	64.2	72.7	64.1	52.3	46.1	43.4	59.7	69.6	76.4	368.6	4901.9
Suzhou	103.6	64.1	69.3	64.2	72.5	61.0	56.0	54.8	41.7	54.0	71.3	81.2	661.1	13760.9
Nantong	96.3	58.8	70.9	57.5	72.9	66.3	53.0	42.4	37.5	51.5	67.1	76.7	767.6	5652.7
Lianyungang	118.4	71.4	77.2	59.2	62.9	60.4	42.1	41.8	24.8	37.5	63.5	92.4	526.5	1965.9
Huaian	127.7	86.2	85.9	56.2	62.9	69.2	49.7	49.5	33.5	50.0	71.5	91.0	560.3	2455.4
Yancheng	100.1	65.4	74.9	54.2	68.0	50.5	44.0	39.9	27.9	44.5	59.8	78.1	828.5	3835.6
Yangzhou	118.9	68.3	78.8	66.5	79.2	82.7	66.9	42.0	33.3	36.0	56.2	66.4	461.3	3697.9
Zhenjiang	99.8	64.3	76.7	65.5	71.2	74.6	65.1	46.7	36.8	52.1	65.9	71.3	272.1	3252.4
Taizhou	118.3	65.0	79.4	65.7	82.3	79.4	66.3	52.6	42.9	62.0	79.0	84.0	508.5	3370.9
Suqian	104.0	89.2	87.5	67.0	68.9	84.1	58.3	48.4	36.5	48.7	68.5	75.0	580.7	1930.7
Hangzhou	101.0	58.6	58.5	61.2	58.0	54.7	41.7	47.5	44.3	59.1	75.8	73.6	715.8	9206.2
Jiaxing	98.3	57.7	60.7	49.9	69.4	49.3	44.0	43.0	38.7	48.6	64.5	79.3	348.1	3352.6
Huzhou	119.0	71.2	66.7	59.8	66.4	52.6	48.5	39.8	38.3	53.3	73.3	79.0	263.8	1956.0
Zhoushan	45.0	29.8	29.8	28.7	39.7	25.5	21.7	18.9	22.8	23.4	26.6	43.9	97.5	1015.3
Jinhua	132.7	62.0	63.3	64.4	57.5	54.2	37.9	45.6	54.1	67.8	63.4	68.4	475.1	3208.2

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Shaoxing	112.1	63.1	61.2	63.3	55.5	51.1	42.9	47.1	45.0	58.9	81.0	76.2	443.0	4265.9
Wenzhou	75.6	39.3	54.0	50.1	53.3	37.8	26.5	31.5	31.2	46.9	47.2	59.7	813.7	4303.0
Taizhou	77.4	41.7	53.0	45.7	52.6	37.3	27.7	30.3	34.9	44.6	49.5	61.9	597.1	3387.4
Lishui	74.3	37.1	46.6	42.4	39.6	34.1	21.2	28.8	33.1	51.5	53.1	64.5	265.7	1051.8
Quzhou	131.6	56.7	63.5	62.9	53.5	49.4	33.7	36.3	38.9	50.5	51.5	56.8	255.7	1115.1
Ningbo	74.5	46.1	46.2	43.6	46.9	32.7	25.0	30.1	32.0	38.8	55.1	74.5	583.8	7610.3
Hefei	157.6	83.2	76.7	68.2	73.4	94.0	58.0	56.1	53.1	74.4	93.1	70.7	712.8	5180.6
Fuzhou	54.7	26.2	39.0	36.0	31.7	26.0	20.0	23.1	23.6	32.4	31.6	37.1	674.9	5169.2
Xiamen	50.4	26.6	37.9	38.4	36.0	28.0	21.0	24.3	26.3	35.2	34.2	39.6	203.4	3273.6
Nanchang	105.8	36.4	42.7	40.5	56.5	47.4	34.6	31.4	41.5	76.1	56.1	49.6	517.7	3668.0
Qingdao	95.8	61.3	65.7	52.5	52.6	38.8	42.5	37.2	31.7	43.5	71.5	70.4	780.6	8692.1
Jinan	156.3	115.4	89.4	92.6	66.1	79.6	72.0	74.4	75.9	80.7	101.4	86.9	621.6	5770.6
Zhengzhou	129.7	113.8	90.8	79.9	68.3	75.4	50.5	57.4	56.6	108.9	127.7	94.0	937.8	6777.0
Wuhan	184.5	110.4	83.5	63.8	74.6	82.7	45.3	43.9	45.0	90.8	77.3	86.7	827.3	10069.5
Changsha	162.0	76.8	64.8	61.6	65.5	73.9	49.2	47.1	50.0	100.0	73.1	81.0	671.4	7824.8
Guangzhou	91.9	45.8	56.9	49.4	32.7	31.5	35.4	28.8	36.1	59.5	49.6	56.5	842.4	16706.9
Shenzhen	59.9	31.3	37.6	31.9	17.5	20.0	20.0	13.7	26.7	45.9	43.3	50.9	332.2	16001.8
Zhuhai	70.9	33.3	32.7	30.7	13.5	17.2	14.6	11.1	25.5	47.2	49.8	62.8	110.2	1867.2
Foshan	86.6	38.1	45.4	41.1	31.7	34.6	26.9	22.7	30.9	65.3	53.6	59.2	385.6	7441.6
Huizhou	68.2	35.6	39.6	31.9	21.1	22.8	24.0	20.1	25.8	44.4	41.9	49.7	348.5	3000.4
Dongguan	84.9	45.6	52.8	42.4	27.2	28.5	29.8	25.8	33.6	56.8	48.3	57.5	191.4	5881.3
Zhongshan	69.7	38.7	44.2	34.9	19.1	23.4	20.6	14.4	30.6	52.5	47.4	61.9	156.1	2823.0
Jiangmen	75.5	44.8	51.4	40.1	25.5	27.9	22.9	17.7	30.1	62.0	57.6	70.8	393.4	2082.8
Zhaoqing	118.4	59.6	71.7	61.3	39.5	36.1	31.6	27.3	33.9	68.5	61.4	44.2	433.7	1845.1

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Nanning	108.6	50.5	49.4	38.6	32.9	31.2	24.0	22.6	32.9	70.5	49.1	72.9	729.7	3148.3
Haikou	52.8	21.3	19.9	17.2	13.6	14.0	10.0	10.9	16.2	34.3	23.3	35.6	165.3	1091.7
Chongqing	133.5	83.9	54.6	43.2	48.0	36.8	27.5	33.3	38.5	71.2	87.4	97.0	3375.2	14262.6
Chengdu	182.7	108.6	83.2	59.7	75.6	39.5	34.9	37.8	40.6	65.0	52.8	85.8	1210.7	10056.6
Guiyang	92.5	50.0	44.1	43.0	44.8	37.2	22.6	24.5	28.5	54.9	38.5	66.7	382.9	2497.3
Kunming	45.4	29.1	47.5	52.1	30.1	22.0	22.0	22.6	22.5	36.3	27.6	40.4	550.5	3713.0
Lhasa	24.9	23.4	21.6	29.8	26.5	21.0	14.0	12.6	16.1	23.9	32.8	37.9	52.7	347.5
Xi'an	150.9	169.9	85.8	65.5	55.5	46.8	35.4	44.8	38.2	79.6	83.4	67.9	815.3	5492.6
Lanzhou	80.3	66.3	51.5	60.9	58.9	51.6	45.0	45.8	44.7	51.0	67.4	82.1	374.7	2000.9
Xining	82.9	80.3	61.6	69.3	61.8	48.9	47.4	50.7	47.8	52.4	73.9	70.5	202.6	1065.8
Yinchuan	66.8	66.1	47.7	47.1	28.7	27.0	35.0	39.8	35.1	46.8	71.1	60.3	196.0	1388.6
Urumqi	111.7	81.8	93.9	52.5	39.0	35.9	30.7	35.9	46.1	55.8	52.2	140.7	266.9	2461.5

Note: The observed PM<sub>2.5</sub> concentrations were obtained from the China National Environmental Monitoring Centre (<http://106.37.208.233:20035/>). The population and GDP data were obtained from the National Bureau of Statistics of China. The values for the top 20 most populated cities in China are highlighted in red.

**Table S4.**

Registered population, GDP, and monthly PM<sub>2.5</sub> concentrations for the 74 cities in China in 2015.

City	PM <sub>2.5</sub> concentration( $\mu\text{g}\cdot\text{m}^{-3}$ )												Population (10 000 persons)	GDP (100 million CNY)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Beijing	97.2	93.3	86.8	71.1	55.7	64.2	61.9	44.6	48.4	70.9	115.9	148.3	1345.2	23014.6
Tianjin	98.5	80.4	72.7	72.4	50.9	60.7	50.0	52.1	46.5	55.2	87.6	128.7	1026.9	16538.2
Shijiazhuang	143.8	112.6	94.4	77.0	61.2	65.1	73.2	67.5	41.9	47.2	110.3	155.3	1028.8	5440.6
Tangshan	107.5	95.9	94.0	92.0	83.6	70.2	69.8	51.9	38.4	70.5	102.6	137.3	755.0	6103.1
Handan	149.4	110.9	83.9	72.0	62.6	72.9	77.6	74.0	58.7	64.7	89.2	174.8	1049.7	3145.4
Zhangjiakou	34.6	26.5	42.9	32.5	31.9	33.2	41.2	26.6	27.1	34.3	41.6	37.7	469.0	1363.5
Baoding	194.6	160.1	111.3	81.5	64.3	62.6	67.1	69.0	61.4	80.6	111.4	212.1	1202.2	3000.3
Cangzhou	92.2	79.6	69.0	61.0	53.3	59.6	52.8	52.7	36.2	53.5	93.2	137.9	774.4	3320.6

Qinhuangdao	76.3	70.0	64.7	54.7	43.4	38.2	41.2	31.6	14.7	25.7	39.2	73.9	295.6	1250.4
Xingtai	171.0	140.3	95.0	69.4	60.5	73.7	91.5	72.6	56.2	65.3	118.8	195.1	780.4	1764.7
Langfang	103.0	100.0	86.7	76.1	58.2	61.2	53.0	54.4	52.2	78.6	128.3	164.4	461.1	2473.9
Chengde	52.0	51.6	51.0	35.8	34.0	39.9	34.6	25.4	27.0	33.0	48.7	68.5	382.4	1358.7
Hengshui	144.1	115.6	87.3	70.5	62.4	69.0	79.6	76.9	71.7	89.3	112.3	205.1	452.3	1220.0
Taiyuan	84.1	65.9	60.7	52.1	49.6	49.5	44.3	38.3	43.0	56.0	72.0	97.4	367.4	2735.3
Hohhot	59.2	51.4	37.1	28.1	25.8	22.4	27.7	20.8	25.9	38.4	75.7	101.1	238.6	3090.5
Shenyang	112.7	102.2	73.3	64.4	43.3	38.2	37.2	31.7	36.4	67.9	142.4	100.8	730.4	7272.3
Dalian	54.9	59.3	56.3	46.2	31.2	31.7	25.4	36.3	24.0	34.4	94.6	80.4	593.6	7731.6
Changchun	105.4	84.0	54.7	53.1	37.8	39.1	38.6	27.3	27.2	77.6	124.3	98.5	753.8	5530.0
Harbin	120.6	115.8	63.2	51.9	27.6	34.2	31.3	23.3	21.7	56.0	142.2	135.6	961.4	5751.2
Shanghai	84.3	64.4	54.1	54.9	41.3	44.1	40.2	40.4	34.3	48.8	58.6	82.6	1443.0	25123.5
Nanjing	97.7	73.1	56.3	50.9	51.4	48.1	35.7	33.8	30.6	57.1	57.5	94.8	653.4	9720.8
Wuxi	102.2	74.4	59.7	58.6	49.4	45.2	42.1	41.5	40.7	59.2	61.0	98.5	480.9	8518.3
Xuzhou	101.8	89.5	69.8	57.6	64.6	49.4	38.3	35.3	35.2	64.4	68.5	93.1	1028.7	5319.9
Changzhou	109.3	79.3	65.2	60.8	46.0	41.2	36.9	35.4	30.8	49.4	52.8	100.9	370.9	5273.2
Suzhou	97.8	70.0	58.1	54.8	41.1	47.1	42.6	37.0	34.8	57.8	55.5	86.1	667.0	14504.1
Nantong	88.7	76.3	42.8	42.8	39.1	42.5	35.3	37.6	30.4	54.6	56.6	102.9	766.8	6148.4
Lianyungang	93.6	86.1	59.4	50.7	41.9	42.8	37.2	37.9	31.0	56.0	58.8	99.4	530.6	2160.6
Huaian	82.3	68.4	44.3	42.0	31.0	41.2	37.0	29.3	24.3	48.0	54.8	89.7	564.5	2745.1
Yancheng	81.3	65.3	62.3	50.2	52.6	49.8	38.3	34.9	31.3	49.6	51.5	89.5	828.0	4212.5
Yangzhou	88.1	68.0	56.3	51.4	49.3	52.8	43.1	41.6	38.3	62.4	61.5	98.4	461.1	4016.8
Zhenjiang	97.5	73.2	60.8	59.8	51.4	53.8	47.3	37.3	35.0	63.6	57.2	90.1	271.7	3502.5
Taizhou	89.5	78.4	67.9	56.5	44.7	36.9	40.1	41.0	37.3	69.6	64.4	101.5	507.9	3687.9
Suqian	90.5	64.6	53.6	53.5	53.6	40.8	30.5	37.1	42.0	53.8	49.1	85.3	586.3	2126.2
Hangzhou	90.9	63.6	50.2	51.2	43.6	38.9	33.2	39.0	38.7	48.7	57.3	91.6	723.6	10050.2
Jiaxing	102.1	69.1	56.1	53.9	46.3	44.4	35.9	37.5	37.0	47.5	46.0	77.2	349.5	3517.8
Huzhou	52.2	40.0	25.3	29.7	22.1	23.3	21.1	19.8	20.5	27.2	28.2	48.4	263.7	2084.3
Zhoushan	93.3	56.1	49.6	50.9	52.3	39.4	34.6	40.0	50.6	56.5	49.4	78.5	97.4	1092.8
Jinhua	93.4	59.0	49.2	49.2	50.0	41.0	32.7	38.9	45.1	54.3	54.0	88.7	478.1	3402.3
Shaoxing	74.1	51.9	44.9	53.4	46.4	40.9	26.8	29.8	33.4	39.7	39.1	44.2	443.1	4466.0
Wenzhou	73.9	61.4	38.2	54.4	39.2	34.1	22.8	25.8	32.7	38.4	36.6	47.6	811.2	4618.1



Taizhou	70.8	49.0	38.4	40.5	37.3	24.0	20.2	25.9	33.0	39.8	35.8	45.8	597.5	3553.9
Lishui	69.3	50.6	37.2	44.3	47.0	29.0	26.7	34.8	40.9	47.0	34.0	53.9	266.4	1103.3
Quzhou	83.2	59.6	38.9	41.9	31.7	30.8	24.0	27.1	33.3	43.1	47.5	78.7	256.4	1146.1
Ningbo	104.0	83.7	63.6	58.3	61.7	45.3	39.2	39.6	41.2	70.3	65.0	112.0	586.6	8003.6
Hefei	48.7	38.6	31.9	35.4	30.3	21.9	18.6	21.6	21.2	25.5	22.1	26.9	717.7	5660.3
Fuzhou	45.5	37.6	33.9	28.0	32.7	23.4	20.9	20.8	26.8	27.3	23.5	27.6	678.4	5618.1
Xiamen	68.3	52.5	34.3	34.0	46.1	24.3	27.1	29.2	30.9	51.0	30.6	67.3	211.2	3466.0
Nanchang	73.5	67.5	52.9	48.6	35.8	34.4	30.6	35.6	24.7	45.4	59.5	104.8	520.4	4000.0
Qingdao	113.6	97.0	82.2	77.4	74.9	73.2	77.9	57.7	69.5	92.3	113.4	156.8	783.1	9300.1
Jinan	160.7	132.3	108.3	86.6	91.6	75.7	60.7	59.5	66.1	68.5	95.0	141.8	625.7	6100.2
Zhengzhou	131.1	107.7	68.3	59.5	66.0	40.7	36.0	41.4	47.7	71.3	57.3	107.3	810.5	7311.5
Wuhan	120.7	91.2	55.2	50.5	59.5	31.1	37.5	38.9	51.7	69.0	42.7	77.5	829.3	10905.6
Changsha	60.5	55.7	34.3	39.4	26.9	20.9	28.0	37.7	41.0	43.9	37.2	40.7	680.4	8510.1
Guangzhou	50.0	47.9	31.7	27.6	16.5	11.5	19.5	24.2	29.3	37.4	31.3	31.8	854.2	18100.4
Shenzhen	59.3	59.1	30.6	27.7	12.7	9.8	17.9	23.1	25.5	41.1	33.1	34.5	355.0	17502.9
Zhuhai	59.1	52.5	36.2	33.9	24.3	20.3	31.6	40.1	38.0	52.7	42.4	43.8	112.5	2025.4
Foshan	39.2	37.5	23.3	26.1	18.2	13.2	21.4	25.0	30.0	34.6	30.9	29.4	389.0	8003.9
Huizhou	61.5	52.2	33.3	33.0	23.1	16.3	23.2	31.3	38.3	45.9	41.5	38.4	357.1	3140.0
Dongguan	53.0	55.7	32.6	28.7	15.5	10.8	19.8	24.8	29.5	43.5	40.1	35.0	195.0	6275.1
Zhongshan	68.1	59.6	41.0	29.2	16.0	12.7	20.8	28.1	31.9	39.6	34.0	34.0	158.7	3010.0
Jiangmen	60.3	65.0	42.2	38.0	28.4	19.5	25.1	35.0	40.1	39.8	39.9	33.7	391.4	2240.0
Zhaoqing	71.2	73.6	39.5	43.4	28.1	19.0	29.4	33.0	29.1	52.6	33.4	41.2	438.3	1970.0
Nanning	38.4	38.7	17.6	20.3	13.7	9.9	15.2	16.8	16.1	31.7	15.6	21.9	740.2	3410.1
Haikou	120.9	82.2	50.8	46.7	40.5	36.2	46.6	41.7	34.6	47.6	45.2	65.0	164.8	1162.0
Chongqing	126.3	86.0	67.5	54.1	49.1	38.5	45.2	41.9	33.1	59.3	46.6	86.9	3371.8	15717.3
Chengdu	66.8	53.9	44.4	41.5	31.1	20.6	29.1	26.7	28.3	42.4	31.9	41.5	1228.1	10801.2
Guiyang	34.2	31.8	39.0	33.4	29.9	19.4	29.7	21.3	22.9	27.2	23.5	30.6	391.8	2891.2
Kunming	23.5	22.4	18.0	22.8	24.7	20.0	23.9	19.7	18.1	29.3	36.2	40.4	555.6	3968.0
Lhasa	95.3	65.8	59.7	40.5	40.2	35.5	41.8	43.0	39.9	63.2	57.8	111.9	53.0	376.7
Xi'an	63.5	51.7	51.2	46.0	44.9	39.7	43.9	35.6	35.5	39.5	60.8	75.5	815.7	5801.2
Lanzhou	62.2	60.5	53.6	45.8	43.8	37.7	31.5	33.9	32.5	41.8	65.0	77.9	321.9	2096.0
Xining	81.0	48.6	39.1	38.9	33.9	35.8	44.2	40.4	32.3	34.1	75.4	71.0	201.2	1131.6

Yinchuan	114.4	128.6	66.5	47.7	41.8	30.0	36.3	32.4	27.3	51.9	75.1	164.8	179.2	1493.9
Urumqi	111.7	81.8	93.9	52.5	39.0	35.9	30.7	35.9	46.1	55.8	52.2	140.7	266.8	2631.6

Note: The observed PM<sub>2.5</sub> concentrations were obtained from the China National Environmental Monitoring Centre<sup>†</sup>. The population and GDP data were obtained from the National Bureau of Statistics of China. The values for the top 20 most populated cities in China are highlighted in red.

**Table S5.**

Registered population, GDP, and monthly PM<sub>2.5</sub> concentrations for the 74 cities in China in 2016.

City	PM <sub>2.5</sub> concentration( $\mu\text{g}\cdot\text{m}^{-3}$ )												Population (10 000 persons)	GDP (100 million CNY)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Beijing	66.9	42.8	91.8	68.4	54.8	57.9	68.1	45.8	55.0	84.4	98.0	128.9	1363.0	25669.1
Tianjin	77.9	52.0	82.8	64.8	53.2	54.5	54.5	41.7	53.2	65.4	107.2	136.7	1044.0	17885.4
Shijiazhuang	126.0	70.6	82.1	60.7	54.1	47.1	65.7	27.8	85.0	109.7	156.8	251.0	1038.0	5927.7
Tangshan	78.7	59.1	85.1	61.3	50.5	69.8	55.3	34.0	65.2	72.9	110.1	146.4	760.0	6354.9
Handan	108.9	72.4	75.4	79.4	42.7	49.0	54.5	41.3	57.6	51.7	108.9	234.2	1055.0	3337.1
Zhangjiakou	27.6	29.0	35.8	28.1	26.4	23.8	40.7	25.1	23.7	39.8	45.5	40.4	470.0	1466.0
Baoding	149.3	83.5	76.6	68.6	66.7	53.6	71.1	37.6	68.2	94.7	144.7	189.8	1207.0	3477.1
Cangzhou	85.3	56.6	67.1	57.3	46.2	47.4	55.8	41.2	44.6	72.8	104.2	144.9	780.0	3544.7
Qinhuangdao	40.4	38.2	64.0	39.4	35.4	43.0	40.0	27.6	37.3	39.7	66.0	85.0	298.0	1349.4
Xingtai	129.9	82.0	88.5	66.6	51.7	54.9	67.1	39.4	69.6	83.4	125.3	189.8	788.0	1975.7
Langfang	87.3	50.9	73.2	46.3	41.0	49.6	57.7	44.3	42.2	55.9	90.8	151.9	470.0	2706.3
Chengde	41.6	37.5	51.3	36.2	28.9	27.4	39.3	27.0	28.1	41.3	48.8	54.6	383.0	1438.6
Hengshui	133.9	91.6	94.6	73.0	56.5	58.2	83.6	56.2	48.7	75.4	115.9	161.3	455.0	1420.2
Taiyuan	60.8	37.7	62.7	45.0	48.0	44.3	45.9	35.4	46.3	66.9	127.8	144.4	370.0	2955.6
Hohhot	59.7	46.0	48.6	28.7	33.3	24.0	23.7	18.2	24.2	37.2	73.4	65.1	241.0	3173.6
Shenyang	76.9	54.1	66.7	44.7	38.8	35.3	36.9	29.3	37.2	51.5	73.7	95.7	734.0	5546.4
Dalian	53.7	39.1	47.6	45.8	37.4	30.1	23.9	18.8	27.9	31.2	50.3	58.1	596.0	6810.2
Changchun	72.6	45.4	59.1	34.1	27.5	28.5	26.2	24.3	26.9	52.5	73.2	82.4	753.0	5986.4
Harbin	94.7	65.5	54.7	39.3	26.5	23.6	23.5	22.3	22.9	42.5	99.3	90.8	962.0	6101.6
Shanghai	70.4	55.5	53.7	56.9	50.3	40.1	38.9	20.0	34.5	23.2	45.1	58.8	1450.0	28178.7
Nanjing	79.3	69.4	77.7	45.2	42.9	37.0	31.3	26.2	35.9	25.9	42.6	64.6	663.0	10503.0

<sup>†</sup> <http://106.37.208.233:20035/>

Wuxi	79.8	66.8	69.0	57.8	53.7	41.3	36.7	28.2	40.8	31.4	53.9	73.0	486.0	9210.0
Xuzhou	96.1	77.5	65.5	58.7	40.8	37.0	32.7	32.4	44.4	43.6	75.3	120.0	1041.0	5808.5
Changzhou	82.1	74.3	77.1	49.8	45.5	37.9	35.4	28.8	40.3	30.4	55.7	79.8	375.0	5773.9
Suzhou	72.7	64.2	58.4	49.8	46.0	34.1	34.1	22.0	34.8	23.1	51.6	67.3	678.0	15475.1
Nantong	92.0	58.7	56.0	52.9	42.8	30.5	26.2	20.1	36.3	28.3	58.7	79.2	767.0	6768.2
Lianyungang	86.9	84.1	73.8	59.2	44.1	37.9	33.9	22.6	37.8	28.7	52.7	79.2	534.0	2376.5
Huaian	76.3	71.5	53.7	40.0	36.0	32.4	29.1	18.8	28.6	21.1	46.2	61.5	568.0	3048.0
Yancheng	78.1	66.4	63.1	50.6	50.1	39.0	31.7	21.8	33.1	30.5	61.1	85.6	831.0	4576.1
Yangzhou	81.9	79.9	68.4	44.6	39.8	33.7	35.1	29.2	39.0	26.1	49.4	71.8	462.0	4449.4
Zhenjiang	80.4	85.6	73.6	57.8	46.9	37.9	39.6	24.9	41.6	30.0	58.3	78.2	272.0	3833.8
Taizhou	98.2	90.1	68.3	52.0	37.3	34.8	31.5	27.2	43.1	33.1	63.9	89.2	508.0	4101.8
Suqian	75.1	61.1	68.7	43.6	44.4	34.1	30.9	25.4	33.2	30.8	48.8	65.9	592.0	2351.1
Hangzhou	76.1	62.0	58.3	41.8	42.9	33.9	33.7	24.4	32.5	29.7	45.7	58.5	736.0	11313.7
Jiaxing	69.3	62.0	72.0	46.1	36.8	33.4	27.9	22.8	28.4	25.3	47.5	64.4	352.0	3862.1
Huzhou	42.1	37.9	27.1	27.3	28.8	17.1	19.0	13.7	18.7	14.2	21.9	34.7	265.0	2284.4
Zhoushan	67.5	61.6	67.6	40.8	42.6	33.3	30.1	30.2	35.4	34.9	46.4	63.1	97.0	1241.2
Jinhua	72.4	57.3	61.8	42.5	42.7	32.9	30.2	28.0	31.2	33.0	52.8	68.1	481.0	3684.9
Shaoxing	50.8	44.4	52.2	48.2	42.8	32.2	27.7	22.7	27.6	26.1	39.8	46.4	445.0	4789.0
Wenzhou	52.3	49.4	47.6	41.2	38.1	25.4	23.9	23.0	26.1	23.0	34.8	42.8	818.0	5101.6
Taizhou	44.5	44.9	46.5	27.9	28.1	20.3	19.4	21.6	27.1	25.7	35.7	51.9	600.0	3898.7
Lishui	51.0	56.4	59.6	38.2	38.3	28.7	25.8	26.9	32.8	33.2	48.1	61.6	268.0	1210.2
Quzhou	61.0	46.2	41.3	37.5	41.0	25.3	24.3	20.0	30.4	27.5	44.0	59.8	257.0	1251.6
Ningbo	88.5	79.5	87.2	50.4	48.1	41.5	35.9	36.8	46.2	34.2	51.7	84.1	591.0	8686.5
Hefei	35.1	31.7	39.0	28.9	28.6	19.7	20.3	19.0	19.9	17.3	24.7	32.7	730.0	6274.4
Fuzhou	32.5	31.7	41.3	35.3	26.4	18.0	19.0	23.4	21.9	20.6	32.2	36.4	687.0	6197.6
Xiamen	58.5	63.7	67.8	34.0	29.0	21.3	23.0	22.7	34.3	28.5	41.8	73.5	221.0	3784.3
Nanchang	83.7	58.8	48.7	51.5	40.5	27.5	26.7	17.7	32.4	30.3	52.0	70.7	523.0	4355.0
Qingdao	124.2	81.6	79.3	82.2	57.1	51.4	61.6	41.1	61.3	58.2	80.4	126.6	791.0	10011.3
Jinan	155.2	82.3	80.7	69.8	48.8	45.1	41.4	40.0	60.9	46.6	108.3	164.5	633.0	6536.1
Zhengzhou	105.7	79.2	84.1	47.0	43.3	31.3	24.7	33.6	45.0	35.6	59.4	92.3	827.0	8114.0
Wuhan	81.5	69.9	68.9	44.5	39.3	32.6	30.6	37.0	53.0	43.8	54.6	84.2	834.0	11912.6
Changsha	34.2	35.7	46.3	37.1	29.2	22.6	25.7	35.6	34.4	29.3	39.7	49.7	696.0	9356.9

Guangzhou	29.5	30.3	34.9	25.9	22.0	12.9	17.3	24.3	27.0	24.5	30.4	44.4	870.0	19547.4
Shenzhen	30.4	30.3	33.0	24.6	20.3	11.2	14.5	21.4	24.8	26.8	31.0	48.7	385.0	19492.6
Zhuhai	37.0	36.6	46.6	32.6	28.8	21.2	25.8	37.5	40.0	36.6	51.6	64.1	115.0	2226.4
Foshan	26.8	29.9	34.6	25.1	21.4	14.1	19.7	24.9	26.2	23.9	31.0	44.6	400.0	8630.0
Huizhou	34.7	33.7	47.5	35.1	29.9	21.5	24.2	34.5	34.5	32.2	40.0	53.7	364.0	3412.2
Dongguan	30.8	26.6	36.4	29.4	23.6	12.7	15.6	25.3	28.7	29.8	35.2	54.9	201.0	6827.7
Zhongshan	31.4	27.2	32.1	32.2	27.4	18.3	21.1	32.1	37.9	35.6	47.0	63.4	161.0	3202.8
Jiangmen	33.9	30.9	47.6	42.5	33.1	23.7	22.9	34.9	35.3	34.8	52.0	57.2	394.0	2418.8
Zhaoqing	42.3	59.8	46.5	37.8	26.5	16.8	18.7	26.9	38.3	36.2	29.7	56.3	444.0	2084.0
Nanning	20.7	30.8	23.5	22.9	17.1	11.0	11.9	13.9	19.7	22.4	17.8	34.6	752.0	3703.3
Haikou	69.6	70.5	56.8	43.9	48.0	41.3	33.4	40.6	68.4	38.7	52.1	72.1	167.0	1257.7
Chongqing	78.8	65.6	72.1	62.0	55.8	42.7	31.4	39.6	43.1	43.9	79.9	111.9	3392.0	17740.6
Chengdu	38.7	53.6	41.2	34.7	29.6	21.1	16.0	28.8	41.0	30.9	33.5	57.4	1399.0	12170.2
Guiyang	29.1	37.3	35.2	30.6	24.8	14.2	15.6	21.7	27.1	25.7	23.8	33.2	401.0	3157.7
Kunming	28.1	20.9	24.9	32.0	25.6	19.0	16.3	19.6	17.3	23.1	47.8	57.1	560.0	4300.1
Lhasa	116.1	70.0	78.7	55.2	45.1	32.2	27.3	36.5	51.9	53.2	124.8	176.9	54.0	425.0
Xi'an	61.8	59.5	46.2	35.4	44.6	37.3	30.3	29.9	37.6	43.0	84.1	90.1	825.0	6257.2
Lanzhou	65.2	60.8	56.9	36.6	38.5	31.7	33.6	36.5	34.9	41.5	71.3	95.5	324.0	2264.2
Xining	69.3	64.9	60.1	42.6	46.0	34.2	27.1	28.8	29.2	44.7	60.3	86.9	203.0	1248.2
Yinchuan	186.8	210.7	85.8	27.4	27.2	27.3	25.7	28.4	32.5	45.6	81.4	143.5	184.0	1617.7
Urumqi	111.7	81.8	93.9	52.5	39.0	35.9	30.7	35.9	46.1	55.8	52.2	140.7	268.0	2459.0

Note: The observed PM<sub>2.5</sub> concentrations were obtained from the China National Environmental Monitoring Centre<sup>†</sup>. The population and GDP data were obtained from the National Bureau of Statistics of China. The values for the top 20 most populated cities in China are highlighted in red.

**Table S6.**

Monthly PM<sub>2.5</sub> concentrations for the 74 cities in China in 2017.

City	PM <sub>2.5</sub> concentration(μg·m <sup>-3</sup> )											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Beijing	108.7	68.6	62.4	52.8	59.6	42.0	52.0	37.9	54.4	56.8	45.5	43.1
Tianjin	106.4	84.7	71.0	65.0	60.8	46.5	51.9	36.9	53.7	62.3	54.6	69.7

<sup>†</sup> <http://106.37.208.233:20035/>

Shijiazhuang	184.2	133.6	74.9	57.7	65.9	53.6	56.7	49.3	67.3	75.4	73.5	91.3
Tangshan	118.3	95.9	70.0	65.9	59.3	48.7	45.9	36.5	53.7	69.9	61.9	74.4
Handan	169.7	105.6	49.6	76.4	68.0	68.1	65.3	62.5	73.8	83.5	90.6	116.8
Zhangjiakou	48.5	38.2	40.0	26.3	36.8	31.2	39.1	23.8	26.3	36.0	31.7	29.3
Baoding	186.2	146.9	84.7	67.1	67.3	53.3	54.0	48.2	65.5	63.2	74.8	99.0
Cangzhou	116.5	93.8	68.7	57.8	57.3	50.2	47.8	38.8	48.9	64.3	62.8	90.2
Qinhuangdao	70.5	67.7	55.3	42.9	36.0	33.7	33.2	23.0	32.3	47.5	37.8	45.8
Xingtai	183.6	120.8	63.2	56.1	61.6	51.8	55.8	49.4	65.5	79.1	80.5	101.3
Langfang	122.9	87.2	62.5	52.4	54.6	43.9	50.6	32.6	49.2	51.7	52.6	57.6
Chengde	54.9	41.7	37.5	28.5	32.7	24.3	32.1	21.7	28.2	33.8	36.1	39.4
Hengshui	153.9	109.2	74.5	62.9	56.9	57.1	62.7	50.0	54.0	73.3	73.4	97.8
Taiyuan	127.3	84.1	53.2	47.9	47.3	41.4	46.2	44.6	58.2	65.0	78.6	82.9
Hohhot	68.9	63.2	40.3	29.0	40.7	26.4	28.6	25.3	30.0	57.0	57.6	57.5
Shenyang	85.2	65.1	80.8	47.0	40.1	32.9	30.5	23.9	30.6	51.2	39.5	65.2
Dalian	51.7	49.4	49.9	39.6	30.2	29.0	27.1	16.4	25.8	26.6	28.4	33.4
Changchun	89.4	60.7	60.9	50.8	27.6	23.6	23.7	14.5	17.3	68.6	56.1	60.7
Harbin	120.5	71.9	54.8	63.7	31.6	24.4	21.6	15.3	20.1	92.3	92.9	74.7
Shanghai	45.9	50.8	44.9	44.9	32.4	38.9	33.8	31.9	26.6	24.4	42.5	55.3
Nanjing	58.4	60.2	47.1	42.3	35.8	32.1	19.6	17.8	26.0	31.4	49.6	77.6
Wuxi	60.1	61.2	53.2	49.7	37.6	37.9	26.6	27.0	30.6	32.6	52.2	74.7
Xuzhou	105.7	90.0	67.4	60.4	62.2	47.7	32.7	37.2	52.1	68.3	77.6	115.4
Changzhou	67.5	73.0	55.2	49.0	42.9	39.6	29.4	28.3	32.8	32.2	54.4	83.6
Suzhou	58.0	60.7	46.2	41.4	34.4	31.4	33.2	28.2	24.3	20.9	39.6	59.8
Nantong	62.9	62.6	50.7	46.3	47.6	33.2	32.5	29.8	29.8	33.9	47.8	71.6
Lianyungang	68.9	69.2	51.9	54.1	44.9	45.7	30.5	28.5	39.6	42.8	57.9	84.2
Huaian	58.9	71.6	53.4	49.3	40.0	32.7	31.5	23.3	29.0	26.1	46.3	69.7
Yancheng	76.8	83.7	65.2	55.1	47.5	44.0	34.7	29.3	34.3	35.0	62.8	82.9
Yangzhou	67.2	80.2	63.9	52.3	47.8	45.6	34.0	35.0	45.0	41.9	65.0	88.7
Zhenjiang	67.9	78.6	58.8	57.2	47.9	46.8	33.5	28.9	34.1	33.5	58.6	80.5
Taizhou	81.8	81.8	52.7	52.2	51.1	46.5	31.8	33.9	40.6	49.8	67.7	96.2
Suqian	61.1	64.9	52.1	45.6	39.9	28.7	26.2	22.3	30.7	31.7	47.0	71.6
Hangzhou	48.3	55.5	49.2	45.7	36.3	30.0	31.6	27.5	28.7	28.4	46.9	74.5

Jiaxing	57.4	64.5	52.6	46.9	37.2	31.4	24.9	23.2	27.6	27.1	42.3	71.9
Huzhou	29.6	35.2	29.0	29.2	20.6	20.3	18.6	22.6	16.0	14.6	24.1	38.0
Zhoushan	59.8	60.1	45.6	40.8	34.1	25.8	25.5	23.8	28.9	34.3	48.6	76.0
Jinhua	61.2	61.9	50.8	43.0	37.9	28.4	26.8	27.9	33.5	33.8	54.7	81.2
Shaoxing	41.7	49.2	51.1	48.0	33.0	35.5	25.9	26.7	25.0	26.8	36.9	56.3
Wenzhou	41.4	43.8	36.6	36.6	26.9	26.5	20.0	23.6	22.7	26.1	36.3	56.4
Taizhou	39.6	43.5	35.1	33.7	28.6	19.9	20.5	19.3	24.8	32.2	38.0	62.7
Lishui	58.4	52.7	40.0	39.6	37.1	25.2	27.9	24.8	30.1	36.3	57.0	73.1
Quzhou	44.0	48.0	43.9	41.6	29.0	29.1	22.9	23.9	23.1	24.2	44.7	68.7
Ningbo	85.7	85.5	62.3	51.8	49.0	42.8	32.8	26.8	35.5	40.2	65.6	93.5
Hefei	35.7	33.0	30.5	31.7	23.7	18.1	19.6	24.2	21.4	20.5	25.6	34.1
Fuzhou	37.0	34.5	38.6	30.0	25.2	16.6	14.7	20.4	23.8	20.7	22.5	31.6
Xiamen	70.4	61.6	36.0	37.9	36.5	17.5	26.8	18.2	27.6	32.0	64.4	59.3
Nanchang	67.9	53.6	43.6	41.1	36.7	22.9	28.3	18.2	22.4	26.5	38.9	57.1
Qingdao	129.4	82.4	66.8	61.7	58.5	53.4	51.5	37.0	39.2	56.7	55.0	87.8
Jinan	154.3	110.8	78.3	56.5	63.9	49.1	39.9	42.3	45.0	49.2	72.1	93.7
Zhengzhou	88.6	72.7	63.0	42.9	48.3	31.4	23.0	23.0	29.7	34.4	75.7	95.2
Wuhan	99.2	64.2	49.2	40.6	43.8	25.5	26.3	24.0	35.5	46.5	86.6	88.5
Changsha	52.7	43.1	40.3	33.9	33.6	18.3	20.6	22.7	34.6	31.4	38.3	51.3
Guangzhou	37.9	31.7	30.7	27.1	27.4	12.3	13.9	17.6	25.7	30.1	36.9	47.3
Shenzhen	41.0	34.4	32.7	26.1	27.1	9.9	13.6	15.8	23.5	33.0	43.9	55.7
Zhuhai	67.0	48.8	45.5	39.8	39.9	19.5	23.8	21.8	36.3	35.6	42.6	59.0
Foshan	40.9	33.1	29.6	29.8	27.4	14.1	14.9	20.3	25.3	30.2	39.0	50.5
Huizhou	52.3	41.7	38.2	38.9	39.4	19.3	23.0	23.6	34.5	35.9	43.8	56.1
Dongguan	50.6	40.8	37.7	27.8	30.7	11.2	15.4	16.7	27.0	35.2	47.0	60.0
Zhongshan	58.3	40.5	41.7	33.4	34.9	15.4	21.3	18.8	32.0	37.0	48.8	63.1
Jiangmen	60.1	48.1	50.0	41.1	35.8	20.1	27.3	22.0	39.3	36.7	41.3	58.2
Zhaoqing	57.1	47.3	32.4	32.1	27.6	18.6	23.2	18.5	24.9	35.6	47.5	58.4
Nanning	28.0	24.9	23.5	20.0	15.1	11.4	9.2	11.1	12.4	23.7	27.8	33.0
Haikou	86.5	62.5	43.9	34.4	35.6	34.5	27.1	22.9	23.2	26.4	54.3	81.9
Chongqing	129.7	76.8	46.9	32.4	43.1	42.0	27.4	20.8	29.4	34.7	64.9	99.1
Chengdu	45.5	41.7	37.1	32.7	26.9	19.7	18.7	18.8	21.4	23.8	46.7	53.6

Guiyang	23.8	33.4	37.7	30.9	26.9	17.0	21.0	19.8	19.7	21.6	36.1	42.8
Kunming	25.8	25.7	20.5	21.7	18.9	13.4	9.3	9.7	10.7	13.8	24.3	38.4
Lhasa	184.1	130.9	68.7	49.3	45.2	33.3	32.8	35.8	44.0	50.5	93.6	112.8
Xi'an	72.9	58.0	46.7	48.9	52.8	34.8	28.2	26.9	35.7	42.7	56.6	76.1
Lanzhou	68.8	53.0	40.5	32.3	23.9	20.4	23.4	22.7	21.5	25.7	53.8	86.5
Xining	73.7	68.6	47.1	37.0	49.1	33.0	31.7	28.9	31.0	45.4	46.7	56.8
Yinchuan	241.3	193.2	105.3	29.4	26.3	25.9	22.9	20.5	24.7	48.6	75.3	95.6
Urumqi	111.7	81.8	93.9	52.5	39.0	35.9	30.7	35.9	46.1	55.8	52.2	140.7

Note: The observed PM<sub>2.5</sub> concentrations were obtained from the China National Environmental Monitoring Centre<sup>†</sup>. The values for the top 20 most populated cities in China are highlighted in red.

<sup>†</sup> <http://106.37.208.233:20035/>