

Table S1. Interannual variation characteristics of API of 67 cities during 2005—2012.

City	2005	2006	2007	2008	2009	2010	2011	2012	Mean
Beijing	98.51	110.31	100.68	87.12	85.13	85.74	81.19	78.50	90.90
Tianjin	83.00	84.64	74.96	73.48	78.34	75.69	72.51	77.73	77.54
Shijiazhuang	91.67	98.36	89.07	83.46	77.51	74.62	75.51	74.09	83.04
Qinhuangdao	67.26	69.03	66.22	61.86	58.78	57.74	55.34	54.19	61.30
Taiyuan	97.11	98.51	89.64	76.93	81.80	73.36	69.78	67.60	81.84
Datong	108.03	106.07	81.09	77.95	62.91	62.00	60.72	63.47	77.78
Shenyang	84.64	84.29	85.56	85.36	81.24	76.66	74.90	72.52	80.65
Fushun	89.30	83.05	80.67	71.80	75.18	71.87	72.34	66.58	76.35
Dalian	70.27	75.19	69.77	61.93	60.01	55.76	60.79	59.01	64.09
Anshan	89.09	90.92	93.90	81.15	82.92	80.02	79.64	70.68	83.54
Changchun	74.71	74.76	74.75	73.48	66.63	69.19	70.95	67.16	71.45
Harbin	76.97	77.01	76.54	76.59	75.26	75.95	75.15	72.05	75.69
Mudanjiang	70.19	62.92	65.52	56.21	54.71	59.07	58.57	56.87	60.51
Qiqihar	68.65	74.35	64.50	65.54	61.66	64.67	62.12	60.83	65.29
Chifeng	86.89	95.59	83.27	73.46	70.12	72.10	83.76	69.19	79.30
Hohhot	71.43	74.98	72.70	59.92	63.01	59.41	64.42	70.81	67.09
Yinchuan	71.59	74.97	72.24	69.08	72.42	72.50	72.62	75.52	72.62
Shizuishan	81.05	81.28	77.12	76.72	73.07	73.33	68.03	63.18	74.22
Xining	82.47	93.46	82.71	84.23	96.08	89.10	77.74	77.33	85.39
Urumqi	90.13	112.08	98.90	104.67	101.50	95.48	95.66	101.71	100.02
Karamay	46.64	52.72	57.94	61.66	50.93	48.21	57.74	56.36	54.03
Lhasa	58.51	54.28	50.54	44.70	45.55	43.62	37.83	45.28	47.54
Jinan	90.62	82.73	85.55	90.06	87.24	84.76	77.22	77.17	84.42
Qingdao	75.65	76.43	75.58	75.49	74.29	74.86	69.17	62.07	72.94
Rizhao	49.58	49.20	52.40	52.53	66.73	68.37	68.16	61.82	58.60
Taian	62.27	63.55	64.69	65.72	72.38	74.15	74.02	71.73	68.56
Weifang	70.98	75.15	70.98	86.04	78.21	74.99	70.48	74.52	75.17
Yantai	56.18	53.61	59.64	64.37	65.41	64.10	54.53	56.64	59.31
Kaifeng	90.19	81.87	81.52	69.41	72.69	80.75	74.15	74.34	78.12
Zhengzhou	79.72	81.25	78.92	74.46	75.06	81.43	76.97	77.65	78.18
Pingdingshan	101.13	97.57	84.23	74.82	73.76	73.75	69.67	74.31	81.15
Hefei	72.01	73.63	82.75	92.37	80.61	81.01	81.23	73.56	79.65
Wuhu	66.44	58.13	60.72	61.66	55.26	60.33	67.07	58.19	60.98
Nanjing	79.85	80.27	79.06	75.09	74.40	81.38	73.18	75.74	77.37
Nantong	71.35	68.19	67.69	68.12	61.01	73.15	62.20	66.11	67.23
Lianyungang	73.30	72.77	72.73	67.81	69.65	70.55	68.08	71.91	70.85
Suzhou	74.88	72.15	71.36	72.69	68.25	68.59	69.03	63.32	70.03
Shanghai	69.09	67.27	68.67	66.63	63.95	62.88	63.78	58.19	65.06
Hangzhou	80.66	80.33	78.59	79.88	72.68	73.67	70.87	68.05	75.59
Ningbo	65.72	68.44	70.53	69.97	66.71	72.07	71.69	61.84	68.37
Fuzhou	59.04	59.10	55.65	58.40	54.32	58.70	57.56	51.44	56.78
Xiamen	54.02	57.96	60.29	59.41	51.56	55.10	54.20	49.81	55.29
Quanzhou	63.50	55.76	55.62	54.02	49.10	56.28	57.34	52.03	55.46

Nanchang	69.02	68.61	67.16	66.77	65.64	70.24	69.99	68.82	68.28
Jiujiang	73.15	70.78	64.37	63.77	53.88	55.87	58.88	54.98	61.96
Jingzhou	64.24	62.85	63.26	69.02	66.87	68.55	65.71	71.02	66.44
Wuhan	84.77	85.87	86.64	81.41	77.57	78.24	73.90	72.87	80.16
Changsha	87.70	83.07	78.55	73.66	70.43	65.23	65.41	68.33	74.05
Changde	71.78	72.94	77.61	82.49	73.33	72.58	70.33	66.57	73.45
Chongqing	85.23	81.22	78.98	77.70	77.41	75.31	70.50	69.33	76.96
Chengdu	88.97	87.11	81.08	80.61	81.26	76.99	74.31	84.18	81.81
Mianyang	60.33	73.96	66.97	55.85	61.69	65.50	53.43	64.85	62.82
Luzhou	86.25	90.32	84.43	68.73	61.78	67.43	67.85	67.95	74.34
Guiyang	66.54	69.49	67.74	68.37	64.32	62.67	64.04	60.60	65.47
Kunming	66.71	70.93	64.89	58.39	57.72	60.64	56.40	57.32	61.62
Yuxi	60.16	57.53	55.66	59.42	68.11	64.78	54.10	58.81	59.82
Qujing	69.84	72.55	70.19	68.07	65.23	68.01	58.35	55.17	65.93
Guilin	37.54	43.92	40.91	42.23	47.46	56.06	61.37	58.07	48.45
Nanning	58.56	59.24	58.19	49.18	45.06	57.13	58.81	56.72	55.36
Liuzhou	63.59	69.93	59.22	58.99	57.41	65.02	65.74	60.94	62.61
Beihai	39.05	40.86	36.14	43.42	47.22	49.25	51.87	47.41	44.40
Guangzhou	69.26	63.02	64.17	59.71	58.23	57.98	57.62	57.29	60.91
Shantou	49.73	55.10	55.99	54.42	51.19	51.73	51.22	46.24	51.95
Shaoguan	62.92	64.16	57.43	54.52	56.93	61.54	57.43	50.50	58.18
Shenzhen	53.48	54.34	54.46	52.86	50.07	49.68	49.96	46.67	51.44
Zhanjiang	47.01	48.30	47.32	46.45	43.28	44.91	43.00	40.82	45.14
Haikou	39.32	39.54	41.30	40.50	37.01	37.84	38.60	33.03	38.39

Table S2. Seasonal variation characteristics of API of 67 cities during 2005—2012.

City	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Mean
Beijing	87.58	87.07	98.82	111.03	103.16	87.88	77.96	74.24	78.39	86.99	100.26	97.74	90.90
Tianjin	90.73	75.88	74.58	81.93	81.12	74.03	66.10	63.77	67.40	75.37	88.07	91.48	77.54
Shijiazhuang	97.79	81.20	83.16	90.60	82.58	77.01	74.07	66.21	67.40	80.55	91.74	103.96	83.04
Qinhuangdao	73.09	68.30	64.64	64.22	63.17	58.16	52.20	51.14	54.34	56.29	61.07	69.50	61.30
Taiyuan	104.46	83.80	83.02	85.35	79.73	72.61	70.36	62.47	64.15	73.98	98.23	104.37	81.84
Datong	114.03	86.41	91.12	91.17	80.93	66.14	58.46	54.86	57.49	64.33	78.41	90.49	77.78
Shenyang	101.02	81.92	81.23	85.39	76.47	72.07	72.17	69.73	72.20	76.19	78.95	100.26	80.65
Fushun	99.53	79.53	73.98	80.29	71.67	66.53	68.21	62.73	66.84	77.60	78.78	90.46	76.35
Dalian	72.83	66.58	67.25	73.29	67.87	55.85	52.66	53.36	59.19	61.30	68.73	70.49	64.09
Anshan	105.89	90.28	84.32	86.46	81.14	75.08	72.60	75.27	80.71	78.44	83.17	89.49	83.54
Changchun	88.81	77.31	72.68	76.39	69.94	60.44	58.50	57.22	60.20	69.43	75.33	91.42	71.45
Harbin	96.29	78.19	69.00	76.38	74.92	65.06	61.27	60.81	63.87	77.92	84.54	99.92	75.69
Mudanjiang	89.64	70.31	60.29	55.82	47.26	44.72	45.24	44.30	47.04	61.26	74.01	86.57	60.51
Qiqihar	75.96	65.78	62.70	66.02	69.97	63.21	57.63	61.10	56.70	61.29	70.86	72.18	65.29
Chifeng	94.84	86.70	89.33	94.70	82.86	68.57	62.70	62.71	64.49	69.62	80.79	94.74	79.30
Hohhot	86.73	71.65	69.17	78.81	72.74	54.75	51.33	52.58	51.12	56.43	70.88	88.95	67.09
Yinchuan	86.20	78.68	80.63	85.66	75.31	66.26	60.58	57.30	56.48	64.05	75.77	84.87	72.62
Shizuishan	97.07	92.63	92.14	84.91	74.86	61.62	53.13	50.43	53.25	64.06	80.52	87.35	74.22
Xining	95.63	89.21	106.79	110.45	78.28	69.90	67.23	68.75	63.14	72.45	95.25	107.96	85.39
Urumqi	194.12	154.30	97.68	84.23	63.62	57.72	58.13	63.96	67.66	76.36	116.03	168.98	100.02
Karamay	56.37	52.87	54.47	54.27	49.38	48.51	52.26	54.13	55.60	57.38	55.47	57.51	54.03
Lhasa	58.18	57.43	56.99	57.64	46.44	42.28	35.11	33.01	36.12	45.09	49.47	53.60	47.54
Jinan	98.08	87.22	91.68	87.57	76.61	78.48	78.60	69.55	73.91	76.26	93.21	102.15	84.42
Qingdao	88.39	77.49	80.15	80.52	75.74	60.45	56.52	55.34	61.34	68.68	77.21	93.61	72.94
Rizhao	64.05	56.64	61.36	60.03	56.73	53.33	48.14	43.93	54.65	67.25	67.43	69.46	58.60
Taian	79.32	69.98	68.69	67.50	62.76	64.92	64.58	60.88	59.69	65.06	71.37	87.79	68.56
Weifang	84.58	76.68	81.14	77.96	74.08	68.58	64.06	62.42	71.06	80.56	79.29	81.73	75.17
Yantai	64.47	62.40	65.97	63.93	64.56	56.72	50.90	46.83	54.72	58.39	60.85	62.28	59.31
Kaifeng	99.87	77.31	77.83	78.32	72.88	73.26	64.68	59.81	63.65	84.01	87.16	98.30	78.12
Zhengzhou	91.75	74.06	81.07	85.77	74.50	74.00	69.88	63.00	67.05	80.55	83.37	92.79	78.18
Pingdingshan	103.53	77.64	79.57	79.88	77.06	82.99	69.78	70.56	71.77	82.69	78.78	99.13	81.15
Hefei	83.49	75.31	83.66	84.31	89.29	74.56	60.42	63.17	70.78	90.98	90.49	89.12	79.65
Wuhu	69.09	61.59	64.12	59.46	58.46	55.94	47.80	50.58	58.60	65.98	71.25	69.06	60.98
Nanjing	78.65	70.24	84.36	83.65	84.92	79.30	60.58	60.76	66.01	84.13	89.14	86.45	77.37
Nantong	71.06	63.79	72.96	75.33	76.12	69.00	57.50	50.65	49.31	65.17	80.64	75.10	67.23
Lianyungang	78.23	65.44	74.30	75.87	77.70	86.99	56.02	48.69	55.51	72.19	81.04	78.45	70.85
Suzhou	73.69	61.95	75.23	78.15	76.45	66.64	60.25	55.17	57.81	69.77	83.85	81.11	70.03
Shanghai	71.17	60.35	70.66	75.70	71.93	56.75	54.90	51.86	50.39	62.41	75.35	78.83	65.06
Hangzhou	84.90	69.50	84.00	82.91	76.65	66.05	58.63	61.05	66.19	79.23	88.44	89.20	75.59
Ningbo	81.92	67.25	73.29	74.55	67.56	56.11	50.84	50.82	55.93	67.93	83.41	90.74	68.37
Fuzhou	58.81	56.03	69.85	69.59	60.00	51.47	50.67	45.39	47.46	53.88	55.61	62.47	56.78
Xiamen	61.34	54.58	70.29	65.33	54.44	37.55	39.69	45.46	52.40	58.02	59.03	65.24	55.29
Quanzhou	54.68	53.32	65.77	62.91	57.74	51.81	56.81	51.25	50.85	49.81	53.69	56.59	55.46

Nanchang	72.57	64.58	74.34	71.10	65.79	57.48	57.43	58.39	64.99	74.21	78.60	79.62	68.28
Jiujiang	70.30	60.45	62.86	62.99	65.05	59.64	53.56	54.52	57.77	63.91	64.15	68.22	61.96
Jingzhou	80.36	72.25	68.89	64.75	70.85	59.22	45.65	50.57	63.26	72.27	70.88	78.70	66.44
Wuhan	93.85	78.46	86.26	86.15	80.54	73.99	57.95	60.50	69.71	88.80	89.41	96.27	80.16
Changsha	86.42	71.75	77.93	78.37	69.81	65.69	61.30	61.76	71.99	82.70	78.92	81.93	74.05
Changde	87.77	78.32	77.37	71.85	73.15	66.30	57.65	57.37	68.06	74.66	78.62	90.63	73.45
Chongqing	93.63	88.48	83.22	76.73	70.06	71.07	60.27	62.32	65.46	64.82	86.89	101.53	76.96
Chengdu	95.84	86.12	88.26	84.43	82.19	70.69	69.50	68.91	70.92	72.47	87.18	105.35	81.81
Mianyang	72.75	60.18	67.11	64.45	75.06	58.87	52.75	53.74	54.18	57.19	65.77	71.31	62.82
Luzhou	95.85	92.63	81.73	74.20	69.91	58.25	56.05	61.38	66.90	67.97	81.60	86.95	74.34
Guiyang	71.52	68.52	67.30	69.83	62.69	61.30	52.95	62.27	60.15	60.03	70.97	78.49	65.47
Kunming	66.91	60.41	70.13	66.01	58.57	51.58	50.82	58.11	58.59	60.06	68.29	69.94	61.62
Yuxi	65.08	63.56	72.67	68.78	57.38	47.88	48.39	56.94	57.33	55.44	61.15	63.42	59.82
Qujing	67.11	62.88	74.09	71.24	65.17	61.72	59.50	65.91	66.92	63.64	67.00	65.79	65.93
Guilin	49.63	45.60	47.99	47.79	42.44	43.34	43.92	45.90	48.28	53.49	55.00	57.66	48.45
Nanning	64.18	57.74	59.74	55.28	46.69	39.94	35.89	45.22	53.58	66.43	67.67	72.17	55.36
Liuzhou	72.32	63.67	70.68	63.86	55.23	50.93	46.02	53.73	58.13	66.47	72.70	77.54	62.61
Beihai	55.10	50.54	50.43	43.48	39.00	30.39	24.82	30.67	40.43	51.57	55.79	60.91	44.40
Guangzhou	67.42	63.72	68.76	63.53	53.08	50.87	48.79	54.24	58.11	65.64	64.91	72.04	60.91
Shantou	60.02	54.26	66.48	59.12	48.23	33.16	34.75	41.02	49.76	56.43	56.52	63.75	51.95
Shaoguan	62.86	57.04	63.60	63.61	54.71	49.80	54.97	53.16	51.92	60.72	61.23	64.23	58.18
Shenzhen	61.27	49.47	58.80	51.94	43.07	35.65	34.07	40.60	49.43	60.94	61.70	70.14	51.44
Zhanjiang	47.53	46.08	46.21	44.31	42.86	42.70	42.08	42.05	44.34	47.62	46.73	49.19	45.14
Haikou	45.83	39.80	42.51	38.51	33.49	30.21	28.36	28.84	36.28	43.98	44.12	48.86	38.39

Table S3. Variation characteristics of dominant pollutants of 67 cities during 2005—2012.

City	Statistics days	No pollutants		Particulate matter		SO ₂		NO ₂	
		Days	Percentage	Days	Percentage	Days	Percentage	Days	Percentage
Beijing	2918	417	14.29	2425	83.10	76	2.60	0	0.00
Tianjin	2918	303	10.38	2073	71.04	542	18.57	0	0.00
Shijiazhuang	2918	256	8.77	2507	85.92	155	5.31	0	0.00
Qinhuangdao	2918	672	23.03	1743	59.73	503	17.24	0	0.00
Taiyuan	2918	359	12.30	2002	68.61	557	19.09	0	0.00
Datong	2918	514	17.61	2134	73.13	270	9.25	0	0.00
Shenyang	2918	196	6.72	2438	83.55	284	9.73	0	0.00
Fushun	2918	251	8.60	2586	88.62	81	2.78	0	0.00
Dalian	2918	796	27.28	1584	54.28	538	18.44	0	0.00
Anshan	2918	167	5.72	2208	75.67	543	18.61	0	0.00
Changchun	2918	326	11.17	2577	88.31	15	0.51	0	0.00
Harbin	2918	276	9.46	2603	89.20	27	0.93	12	0.41
Mudanjiang	2918	1018	34.89	1872	64.15	25	0.86	3	0.10
Qiqihar	2918	532	18.23	2249	77.07	137	4.69	0	0.00
Chifeng	2918	250	8.57	2243	76.87	424	14.53	1	0.03
Hohhot	2918	851	29.16	1609	55.14	456	15.63	2	0.07
Yinchuan	2918	351	12.03	2246	76.97	320	10.97	1	0.03
Shizuishan	2918	516	17.68	1590	54.49	811	27.79	1	0.03
Xining	2918	168	5.76	2748	94.17	2	0.07	0	0.00
Urumqi	2918	349	11.96	2151	73.71	417	14.29	1	0.03
Karamay	2918	1057	36.22	1858	63.67	3	0.10	0	0.00
Lhasa	2918	1736	59.49	1182	40.51	0	0.00	0	0.00
Jinan	2918	82	2.81	2688	92.12	148	5.07	0	0.00
Qingdao	2918	502	17.20	2162	74.09	254	8.70	0	0.00
Rizhao	2918	1080	37.01	1801	61.72	36	1.23	1	0.03
Taian	2918	387	13.26	2293	78.58	236	8.09	2	0.07
Weifang	2918	182	6.24	2332	79.92	400	13.71	4	0.14
Yantai	2918	896	30.71	1727	59.18	295	10.11	0	0.00
Kaifeng	2918	224	7.68	2524	86.50	168	5.76	2	0.07
Zhengzhou	2918	152	5.21	2549	87.35	217	7.44	0	0.00
Pingdingshan	2918	218	7.47	2458	84.24	240	8.22	2	0.07
Hefei	2918	370	12.68	2548	87.32	0	0.00	0	0.00
Wuhu	2918	751	25.74	2151	73.71	16	0.55	0	0.00
Nanjing	2918	370	12.68	2435	83.45	112	3.84	1	0.03
Nantong	2918	749	25.67	2161	74.06	7	0.24	1	0.03
Lianyungang	2918	579	19.84	2222	76.15	117	4.01	0	0.00
Suzhou	2918	561	19.23	2349	80.50	7	0.24	1	0.03
Shanghai	2918	892	30.57	1913	65.56	107	3.67	6	0.21
Hangzhou	2918	423	14.50	2460	84.30	33	1.13	2	0.07
Ningbo	2918	703	24.09	2180	74.71	23	0.79	12	0.41
Fuzhou	2918	1056	36.19	1853	63.50	4	0.14	5	0.17
Xiamen	2918	1117	38.28	1776	60.86	1	0.03	24	0.82

Quanzhou	2918	1204	41.26	1710	58.60	3	0.10	1	0.03
Nanchang	2918	500	17.14	2212	75.81	206	7.06	0	0.00
Jiujiang	2918	551	18.88	2179	74.67	188	6.44	0	0.00
Jingzhou	2918	568	19.47	2319	79.47	31	1.06	0	0.00
Wuhan	2918	317	10.86	2580	88.42	21	0.72	0	0.00
Changsha	2917	429	14.71	2275	77.99	213	7.30	0	0.00
Changde	2918	316	10.83	2172	74.43	430	14.74	0	0.00
Chongqing	2918	383	13.13	2427	83.17	108	3.70	0	0.00
Chengdu	2918	307	10.52	2572	88.14	39	1.34	0	0.00
Mianyang	2918	662	22.69	2103	72.07	153	5.24	0	0.00
Luzhou	2918	473	16.21	2108	72.24	336	11.51	1	0.03
Guiyang	2918	666	22.82	1774	60.80	478	16.38	0	0.00
Kunming	2918	634	21.73	2030	69.57	254	8.70	0	0.00
Yuxi	2918	651	22.31	2007	68.78	260	8.91	0	0.00
Qujing	2918	336	11.51	2353	80.64	229	7.85	0	0.00
Guilin	2918	1673	57.33	847	29.03	398	13.64	0	0.00
Nanning	2918	1235	42.32	1395	47.81	276	9.46	12	0.41
Liuzhou	2918	686	23.51	714	24.47	1518	52.02	0	0.00
Beihai	2918	1818	62.30	1099	37.66	1	0.03	0	0.00
Guangzhou	2918	890	30.50	1791	61.38	142	4.87	95	3.26
Shantou	2918	1310	44.89	1606	55.04	2	0.07	0	0.00
Shaoguan	2918	832	28.51	1620	55.52	466	15.97	0	0.00
Shenzhen	2918	1410	48.32	1457	49.93	3	0.10	48	1.64
Zhanjiang	2918	2334	79.99	584	20.01	0	0.00	0	0.00
Haikou	2918	2320	79.51	598	20.49	0	0.00	0	0.00

Table S4. PCCs between API and five meteorological parameters in each season.

Spring

CITY	T	AP	RH	P	W	API
Jiujiang	0.216***	0.039	-0.037	-0.023	0.015	63.634
Shaoguan	0.314***	0.259***	0.016	-0.063	0.009	60.642
Urumqi	-0.334***	-0.164***	-0.177***	0.012	0.046	81.842
Mudanjiang	-0.233***	-0.045	-0.099**	-0.064	-0.111**	54.458
Haikou	-0.188***	0.091*	-0.160***	-0.157***	0.044*	38.170
Shizuishan	-0.186***	-0.155***	-0.163***	-0.011	-0.014	83.969
Changsha	-0.178***	-0.176***	-0.095*	0.005	-0.100**	75.370
Jinan	-0.158***	-0.144***	-0.046	-0.101**	0.021	85.289
Qijing	-0.079*	0.180***	-0.176***	-0.120**	0.015	70.167
Zhanjiang	0.098	0.187***	0.090*	-0.158***	0.024*	44.458
Beihai	0.095*	0.240***	-0.080*	-0.069	-0.109**	44.304
Beijing	-0.134***	-0.287***	0.059	-0.116**	0.049*	104.339
Taiyuan	-0.068	-0.263***	-0.062	-0.092*	0.182***	82.703
Luzhou	0.007	-0.244***	-0.094*	-0.072	0.087*	75.281
Karamay	-0.175***	-0.222***	-0.110**	-0.085*	0.051	52.704
Hohhot	-0.073*	-0.212***	-0.083*	-0.006	0.106**	73.573
Shijiazhuang	-0.089*	-0.190***	0.053	-0.119**	0.037	85.449
Tianjin	-0.033	-0.190***	-0.068	-0.093*	0.044	79.211
Qinhuangdao	-0.053	-0.164***	-0.030	-0.163***	0.027	64.009
Pingdingshan	-0.085*	-0.138***	-0.079*	-0.083*	-0.039	78.836
Harbin	0.036	-0.091*	-0.083*	0.013	0.002	73.434
Yuxi	0.000	0.008	-0.414***	-0.146***	-0.109**	66.275
Guiyang	0.070	0.003	-0.345***	-0.102**	-0.262***	66.606
Nantong	0.018	-0.091*	-0.317***	0.010	-0.128**	74.805
Kunming	-0.012	0.183***	-0.296***	-0.073*	-0.075*	64.904
Qingdao	-0.054	-0.127**	-0.295***	-0.086*	-0.002	78.803
Xining	-0.159***	-0.023	-0.288***	0.062	0.201***	98.505
Ningbo	-0.060	-0.042	-0.277***	-0.028	-0.109**	71.800
Shanghai	-0.068	-0.106**	-0.256***	-0.045	-0.132***	72.761
Suzhou	-0.020	-0.087*	-0.256***	-0.019	-0.108**	76.607
Shenzhen	-0.073*	0.045	-0.254***	-0.102**	-0.238***	51.271
Fushun	-0.044	-0.084*	-0.251***	-0.021	0.019	75.312
Nanchang	-0.029	-0.080*	-0.242***	-0.056	-0.114**	70.409
Weifang	-0.144***	-0.179***	-0.240***	-0.083*	-0.146***	77.728
Hefei	0.086*	-0.031	-0.236***	0.070	-0.166***	85.753
Yantai	-0.019	-0.095*	-0.228***	-0.049	-0.164***	64.819
Zhengzhou	-0.141	-0.207***	-0.219***	-0.077*	0.003	80.447
Lianyungang	0.012	-0.099**	-0.215***	-0.108**	-0.042	75.957
Nanjing	0.036	-0.061	-0.214***	0.002	-0.094*	84.310
Rizhao	0.020	-0.024	-0.204***	-0.133***	-0.109**	59.373
Wuhan	0.016	-0.048	-0.202***	-0.054	-0.098**	84.319
Chengdu	0.015	-0.123**	-0.198***	-0.036	-0.109**	84.963

Dalian	-0.018	-0.105**	-0.195***	-0.068	0.056	69.471
Shenyang	0.005	-0.032	-0.186***	-0.055	-0.023	81.029
Anshan	0.031	0.015	-0.183***	-0.015	-0.085*	83.974
Hangzhou	-0.028	-0.059	-0.172***	-0.097**	-0.048	81.187
Lhasa	-0.084*	0.035	-0.170***	-0.047	0.111**	53.688
Changchun	-0.052	-0.076*	-0.164***	-0.028	0.102**	73.004
Mianyang	0.134***	-0.046	-0.159***	0.012	0.100**	68.872
Fuzhou	0.042	-0.051	-0.133***	-0.120**	-0.105**	66.479
Wuhu	-0.047	-0.047	-0.120**	-0.033	-0.088	60.680
Kaifeng	0.044	0.017	-0.110**	-0.068	0.066	76.346
Chongqing	0.123**	-0.017	-0.115**	-0.168***	-0.041	76.672
Guangzhou	0.137***	0.141***	0.033	-0.146***	-0.103**	61.788
Tai'an	0.066	-0.038	-0.090*	-0.112**	-0.021	66.315
Qiqihar	0.078*	-0.060	-0.068	0.055	0.150***	66.231
Yinchuan	-0.101**	-0.141***	-0.145***	0.048	0.181***	80.532
Chifeng	-0.077*	-0.117**	-0.110**	0.025	0.202***	88.964
Datong	-0.102**	-0.192***	-0.104**	-0.022	0.224***	87.737
Guilin	0.066	0.087*	-0.052	-0.062	-0.364***	46.074
Liuzhou	0.034	0.129***	-0.043	-0.115**	-0.328***	63.258
Nanning	0.116**	0.233***	-0.130***	-0.155***	-0.317***	53.903
Xiamen	0.037	0.048	-0.207***	-0.045	-0.241***	63.352
Quanzhou	0.066	0.055	0.064	-0.109**	-0.217***	62.139
Shantou	-0.002	0.021	-0.209***	-0.006	-0.215***	57.944
Jingzhou	0.078*	0.005	-0.050	0.024	-0.154***	68.162
Changde	0.056	-0.012	-0.080*	-0.005	-0.082*	74.125

Summer

CITY	T	AP	RH	P	W	API
Shaoguan	0.082*	0.034	0.041	-0.029	-0.003	52.643
Karamay	0.123***	-0.015	-0.028	-0.053	0.097**	51.635
Hohhot	0.144***	-0.090*	0.040	-0.043	0.067	52.888
Tai'an	0.146***	-0.051	0.026	-0.079*	-0.096	63.460
Shijiazhuang	0.156***	-0.082*	0.071	-0.143***	0.040	72.428
Datong	0.162***	-0.130***	-0.076*	0.011	-0.058	59.820
Luzhou	0.178***	0.007	0.031	0.025	0.012	58.559
Beijing	0.224***	0.053	0.216***	-0.188***	0.126**	80.027
Mudanjiang	0.231***	-0.066	-0.100**	0.048	-0.099**	44.752
Fushun	0.253***	-0.070	-0.167***	-0.042	-0.169***	65.824
Anshan	0.262***	0.128***	-0.180***	-0.115**	-0.150***	74.317
Chifeng	0.280***	-0.022	0.120**	-0.042	0.132***	64.659
Tianjin	0.283***	-0.033	-0.066	-0.040	-0.012	67.964
Zhanjiang	0.303***	0.042	0.220***	-0.061	-0.048	42.279
Shenyang	0.332***	-0.009	-0.172***	-0.024	-0.135***	71.319
Qiqihar	0.342***	0.052	0.011	0.015	0.088	60.650
Changchun	0.431***	0.039	-0.115**	0.003	0.018	58.720
Harbin	0.451***	0.055	-0.189***	-0.048	-0.095*	62.381
Changde	-0.158***	-0.102**	-0.157***	-0.117**	0.059	60.439

Shenzhen	0.031	-0.370***	-0.192***	-0.005	-0.312***	36.772
Changsha	-0.106**	-0.122***	0.001	-0.034	-0.089*	62.915
Xiamen	-0.252***	-0.237***	-0.447***	0.003	-0.383***	40.900
Nantong	-0.097**	0.059***	-0.433***	0.014	-0.251***	59.051
Suzhou	-0.165**	-0.168	-0.422***	0.020	-0.418***	60.687
Yantai	0.043***	-0.093***	-0.419***	0.024	-0.225***	51.484
Shantou	-0.114	-0.341*	-0.413***	-0.073	-0.267***	36.308
Nanjing	-0.160***	-0.038	-0.382***	-0.086*	-0.245***	66.878
Shizuishan	-0.126***	-0.110**	-0.350***	0.017	0.073*	55.061
Qingdao	-0.015	-0.155***	-0.333***	-0.098**	-0.089*	57.438
Lhasa	-0.035	0.003	-0.328***	0.004	0.113**	36.801
Rizhao	0.098**	-0.107**	-0.324***	-0.079*	-0.254***	48.465
Lianyungang	-0.104**	-0.121**	-0.317***	-0.031	-0.058	63.899
Hefei	0.021	0.043	-0.297***	-0.081*	-0.216***	66.048
Kaifeng	-0.003	-0.095*	-0.278***	0.031	-0.159***	65.918
Dalian	0.151***	-0.058	-0.261***	-0.110**	-0.073*	53.957
Pingdingshan	-0.043	-0.044	-0.244***	-0.085*	-0.135***	74.443
Guilin	-0.080	-0.164*	-0.241***	-0.004	-0.230***	44.387
Weifang	0.122**	0.012	-0.238***	-0.085*	-0.063	65.020
Jiujiang	-0.088*	-0.112**	-0.232***	-0.017	-0.089*	55.908
Yinchuan	0.078*	-0.055	-0.188***	0.022	-0.043	61.381
Chongqing	-0.066	-0.031	-0.182***	-0.063	-0.123***	64.553
Jingzhou	-0.113**	0.006	-0.163***	-0.050	0.030	51.813
Urumqi	0.083*	-0.039	-0.154***	-0.019	-0.018	59.936
Xining	0.144***	-0.016	-0.148***	-0.039	0.089*	68.628
Mianyang	0.083*	-0.001	-0.109**	-0.008	-0.067	55.121
Qinhuangdao	0.111**	-0.034	-0.112**	-0.224***	0.114**	53.834
Quanzhou	0.042	-0.002	0.156***	-0.177***	-0.136***	53.292
Taiyuan	0.157***	-0.180***	0.131***	-0.137***	0.222***	68.482
Liuzhou	-0.015	-0.055	-0.113**	-0.088*	-0.550***	50.226
Shanghai	-0.044	-0.234***	-0.299***	0.066	-0.474***	54.500
Guiyang	-0.170***	-0.047	-0.398***	-0.064	-0.453***	58.841
Nanning	-0.212***	-0.185***	-0.314***	-0.074*	-0.398***	40.349
Yuxi	-0.071	0.006	-0.205***	-0.095*	-0.396***	51.070
Ningbo	-0.143***	-0.178***	-0.223***	-0.050	-0.393***	52.590
Guangzhou	-0.100**	-0.206***	-0.203***	-0.093*	-0.370***	51.301
Wuhan	-0.140***	-0.130***	-0.291***	-0.110**	-0.363***	64.148
Hangzhou	-0.072	-0.037	-0.162***	-0.102**	-0.330***	61.911
Kunming	0.114**	0.076*	-0.049	-0.034	-0.286***	53.504
Fuzhou	0.087*	-0.027	-0.066	-0.120**	-0.259***	49.174
Qijing	-0.144***	0.030	-0.151***	-0.038	-0.257***	62.380
Zhengzhou	0.130***	-0.102**	-0.184***	-0.054	-0.227***	68.961
Haikou	-0.048	-0.217***	-0.172***	-0.113**	-0.224***	29.138
Chengdu	0.187***	0.001	0.017	-0.052	-0.209***	69.700
Nanchang	0.092*	-0.032	-0.179***	-0.062	-0.207***	57.766
Beihai	-0.144***	-0.109**	-0.157***	-0.148***	-0.183***	28.626
Wuhu	-0.153***	-0.043	-0.115**	-0.073	-0.154***	51.440

Jinan	0.118**	-0.092*	0.003	-0.075*	-0.121**	75.543
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Autumn

CITY	T	AP	RH	P	W	API
Jiujiang	0.182***	0.124***	-0.101**	0.008	-0.088*	61.944
Shizuishan	-0.454***	-0.216***	-0.148***	-0.050	0.018	65.943
Yinchuan	-0.442***	-0.341***	-0.130***	-0.084*	-0.126***	65.433
Mudanjiang	-0.434***	-0.061	0.001	-0.018	-0.165***	60.767
Hohhot	-0.420***	-0.389***	-0.032	-0.131***	-0.145***	59.474
Urumqi	-0.390***	-0.281***	-0.092*	-0.124***	0.046	86.683
Ningbo	-0.389***	-0.051	-0.216***	-0.103**	-0.360***	69.089
Taiyuan	-0.362***	-0.208***	0.141***	-0.257***	0.021	78.789
Tianjin	-0.321***	-0.276***	0.244***	-0.227***	-0.105**	76.948
Shijiazhuang	-0.265***	-0.176***	0.189***	-0.210***	-0.038	79.893
Changsha	-0.262***	-0.157***	-0.044	0.023	-0.234***	77.87
Datong	-0.231***	-0.228***	-0.132***	-0.082*	-0.147***	66.744
Qingdao	-0.203***	-0.134***	-0.062	-0.111**	-0.160***	69.074
Chifeng	-0.161***	-0.028	0.022	-0.110**	-0.021	71.633
Jinan	-0.107**	0.018***	0.043	-0.057	-0.044	81.124
Zhanjiang	0.108**	0.177***	-0.074*	-0.087*	0.058	46.231
Karamay	-0.219***	-0.248***	-0.198***	0.015	-0.035	56.150
Shaoguan	-0.149***	-0.166	-0.120**	-0.149***	-0.152***	57.955
Harbin	-0.123***	0.042*	0.132***	-0.128***	-0.107**	75.444
Fushun	0.009	0.087*	0.196***	-0.124***	0.074*	74.403
Qinhuangdao	-0.154***	-0.086***	0.227***	-0.041	0.060	57.232
Beijing	-0.293***	-0.275	0.366***	-0.269***	0.008	88.546
Shenzhen	-0.051	0.034***	-0.458***	-0.028	-0.252***	57.355
Haikou	-0.122***	0.022	-0.422***	-0.036	0.012	41.460
Guiyang	-0.137***	-0.129***	-0.382***	-0.121**	-0.274***	63.715
Shantou	-0.074*	-0.021	-0.373***	-0.128***	-0.155***	54.236
Xining	-0.317***	-0.175***	-0.330***	-0.062	-0.095*	76.944
Yuxi	-0.036	0.046	-0.295***	-0.215***	-0.268***	57.974
Lhasa	-0.132***	-0.193***	-0.295***	-0.052	-0.151***	43.559
Beihai	-0.067	0.069	-0.254***	-0.023	-0.206***	49.264
Chongqing	-0.117**	-0.046	-0.213***	-0.134***	-0.016	72.388
Changde	-0.091*	-0.095*	-0.208***	-0.072	-0.140***	73.778
Zhengzhou	-0.218***	-0.230***	-0.007	-0.284***	-0.098**	76.992
Pingdingshan	-0.012	-0.049	0.102**	-0.229***	-0.048	77.747
Weifang	-0.149***	-0.129***	-0.021	-0.218***	-0.177***	76.970
Dalian	-0.103**	-0.103**	0.142***	-0.197***	-0.084*	63.072
Kaifeng	-0.140***	-0.114**	-0.090*	-0.191***	-0.028	78.274
Luzhou	-0.025	-0.118**	0.015	-0.176***	0.002	72.158
Qiqihar	-0.084*	-0.029	0.115**	-0.144***	0.033	62.949
Changchun	0.010	0.096	0.108**	-0.113**	-0.014	68.321
Nanning	-0.119**	-0.049	-0.242*	-0.049*	-0.424***	62.560
Liuzhou	-0.034	0.074*	-0.085*	-0.083*	-0.360***	65.765
Xiamen	-0.085*	-0.040	-0.298***	-0.029	-0.347***	56.485

Nanjing	-0.148***	-0.153***	-0.050	-0.140***	-0.336***	79.760
Wuhan	-0.110**	-0.113**	-0.188***	-0.065	-0.333***	82.639
Yantai	-0.150***	-0.144***	-0.107**	-0.102**	-0.321***	57.986
Guilin	-0.018	-0.030	-0.125***	-0.100**	-0.312***	52.256
Hefei	-0.061	-0.052	-0.135***	-0.081*	-0.312***	84.086
Quanzhou	0.043	0.093*	-0.109**	-0.014	-0.308***	51.449
Fuzhou	-0.097**	-0.090*	-0.251***	-0.027	-0.304***	52.319
Hangzhou	-0.088*	-0.023	-0.222***	-0.060	-0.303***	77.957
Nanchang	-0.074*	-0.081*	-0.246***	-0.064	-0.302***	72.599
Shanghai	-0.190***	-0.076*	-0.142***	-0.076*	-0.296***	62.715
Suzhou	-0.010	0.166***	-0.155***	-0.033	-0.280***	70.476
Kunming	-0.158***	0.059	-0.240***	-0.165***	-0.274***	62.311
Rizhao	-0.197***	-0.134***	-0.061	-0.089*	-0.270***	63.109
Chengdu	-0.176***	-0.133***	-0.217***	-0.173***	-0.230***	76.853
Lianyungang	-0.212***	-0.118**	-0.114**	-0.101**	-0.227***	69.580
Guangzhou	0.168***	0.147***	0.041	-0.098**	-0.223***	62.890
Anshan	0.108**	0.070	0.038	-0.022	-0.208***	80.773
Mianyang	-0.110***	-0.089*	-0.051	-0.076*	-0.201***	59.048
Nantong	-0.175***	-0.070	-0.156***	-0.070	-0.199***	65.041
Wuhu	-0.056	-0.011	-0.058	-0.051	-0.181***	65.276
Qijing	0.031	0.159***	-0.055	-0.127***	-0.180***	65.855
Jingzhou	0.001	-0.041	0.059	-0.113**	-0.174***	68.803
Tai'an	-0.048	-0.131***	-0.081*	-0.118**	-0.139***	65.376
Shenyang	0.059	0.058	0.106**	-0.077*	-0.122**	75.777

Winter

CITY	T	AP	RH	P	W	API
Qingdao	0.122**	0.088*	-0.017	-0.119**	-0.057	86.496
Changde	0.181***	0.114**	-0.003	-0.081*	-0.147***	85.573
Tai'an	0.189***	0.004	-0.023	-0.043	-0.011	79.029
Zhanjiang	0.306***	0.204***	-0.194***	-0.036	-0.015	47.598
Shantou	0.321***	0.034	-0.268***	-0.092*	-0.195***	59.344
Guangzhou	0.333***	0.022	-0.079*	-0.095*	-0.222***	67.725
Lhasa	0.333***	-0.198***	0.062	0.021	0.064	56.403
Shaoguan	0.347***	0.019	-0.161***	-0.087*	-0.251***	61.378
Jiujiang	0.357***	0.236***	-0.006	-0.098**	-0.085*	66.323
Chongqing	0.399***	0.011	-0.042	-0.012	-0.034	94.546
Qijing	0.007	0.160***	0.134***	-0.055	-0.103**	65.262
Luzhou	0.006	-0.208***	0.104**	-0.167***	0.049	91.810
Rizhao	0.039	-0.192***	-0.140***	-0.135***	-0.154***	63.380
Shizuishan	-0.044	-0.156***	0.075*	-0.041	0.061	92.349
Karamay	0.022	-0.111**	-0.046	-0.110**	-0.013	55.583
Changsha	0.070	0.035	0.086*	0.033	-0.075*	80.033
Yinchuan	-0.019	-0.162***	0.194***	-0.098**	-0.020	83.248
Chifeng	0.183***	0.099**	0.204***	-0.057	-0.078*	92.092
Pingdingshan	0.008	0.028	0.227***	-0.162***	-0.055	93.434
Kaifeng	-0.044	-0.037	0.232***	-0.143***	-0.053	91.825

Zhengzhou	0.028	-0.059	0.239***	-0.221***	-0.025	86.201
Qinhuangdao	0.133***	-0.117**	0.249***	-0.139***	0.043	70.296
Anshan	0.040	0.048	0.263***	-0.114**	-0.225***	95.216
Jinan	0.089*	-0.076*	0.275***	-0.073	-0.144***	95.816
Taiyuan	-0.017	-0.158***	0.275***	-0.163***	-0.119**	97.543
Harbin	0.123**	0.064	0.286***	-0.116**	-0.195***	91.467
Qiqihar	0.115**	-0.077*	0.288***	-0.039	-0.152***	71.305
Changchun	0.188***	0.077*	0.313***	-0.103**	-0.171***	85.845
Tianjin	0.026	-0.125**	0.322***	-0.113**	-0.039	86.032
Hohhot	0.006	-0.180***	0.325***	-0.068	-0.083*	82.445
Datong	0.081*	-0.086*	0.327***	-0.129**	-0.074*	96.977
Mudanjiang	0.150***	0.052	0.339***	-0.102**	-0.063	82.174
Shijiazhuang	0.044	-0.115**	0.346***	-0.187***	-0.002	94.318
Fushun	-0.032	-0.007	0.364***	-0.154***	-0.052	89.841
Shenyang	0.009	-0.006	0.382***	-0.111**	-0.108**	94.396
Beijing	0.143***	-0.183***	0.440***	-0.113**	0.120**	90.795
Shenzhen	0.241***	0.089*	-0.433***	-0.009	-0.296***	60.293
Fuzhou	0.241***	-0.138***	-0.301***	-0.058	-0.158***	59.101
Xiamen	0.268***	-0.044	-0.298***	-0.053	-0.182***	60.386
Haikou	-0.020	0.219***	-0.232***	-0.169***	-0.013	44.828
Suzhou	0.091*	-0.115**	-0.226***	-0.161***	-0.186***	72.248
Hefei	0.206***	-0.081*	-0.213***	-0.156***	-0.203***	82.639
Nanchang	0.166***	-0.084*	-0.201***	-0.138***	-0.188***	72.257
Mianyang	0.118**	0.002	0.176***	-0.184***	-0.045	68.081
Jingzhou	0.124**	-0.056	0.070	-0.178***	0.010	77.104
Wuhu	0.100**	-0.105**	-0.137***	-0.140***	-0.138***	66.581
Xining	0.065	-0.063	-0.005	-0.088*	0.051	97.602
Nanning	0.174***	0.107**	-0.154***	-0.113**	-0.399***	64.698
Guiyang	0.219***	0.037	-0.188***	-0.132***	-0.380***	72.846
Beihai	0.017	0.077*	-0.169***	-0.054	-0.298***	55.519
Liuzhou	0.123**	0.062	-0.097**	0.026	-0.284***	71.177
Dalian	0.182***	0.028	0.035	-0.004	-0.273***	69.968
Guilin	0.128**	0.004	-0.102**	-0.063	-0.262***	50.966
Quanzhou	0.140***	-0.100**	-0.241***	-0.078*	-0.257***	54.864
Wuhan	0.225***	-0.025	-0.097*	-0.212***	-0.254***	89.527
Nantong	0.057	-0.198***	-0.227***	-0.210***	-0.253***	69.983
Yuxi	0.026	0.092*	-0.248***	-0.151***	-0.249***	64.022
Shanghai	-0.015	-0.162***	-0.241***	-0.119**	-0.245***	70.114
Ningbo	-0.036	-0.128**	-0.178***	-0.186***	-0.241***	79.971
Nanjing	0.120**	-0.143***	-0.155***	-0.169***	-0.234***	78.443
Hangzhou	0.205***	-0.023	-0.177***	-0.139***	-0.229***	81.200
Weifang	0.034	-0.067	-0.013	-0.140***	-0.228***	80.996
Lianyungang	0.072	-0.110**	-0.130***	-0.211***	-0.224***	74.036
Yantai	0.116**	-0.179***	-0.016	-0.110**	-0.222***	63.048
Kunming	0.116**	0.171***	0.024	-0.158***	-0.211***	65.753
Urumqi	-0.016	-0.104**	-0.104**	-0.091*	-0.210***	172.466
Chengdu	0.130***	-0.029	0.114**	-0.142***	-0.152***	95.770

Note:

 PCC 	Color	Correlation
> 0.300	Dark	Strong
0.150 ~ 0.300	Light	Moderate
< 0.150	None	Weak

Significance test results: * ($p < 0.05$), ** ($p < 0.01$), *** ($p < 0.001$)