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Uncovering the impact of urban functional zones on air quality in China

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Table S1. Variation differences in pollutant concentrations among different urban scale (low density-high density).

	$PM_{2.5}$	PM_{10}	SO_2	NO_2	O_3	CO
Residential	0.23%	1.01%	4.17%	0.19%	-1.28%	-0.43%
Commercial	2.33%	1.66%	4.65%	1.75%	-1.53%	1.22%
Industrial	1.76%	1.25%	6.26%	2.10%	-0.92%	0.93%
Transportation	-0.33%	1.63%	2.73%	4.59%	-0.33%	1.10%
Public management and service	4.47%	3.77%	5.28%	3.88%	-2.04%	0.39%

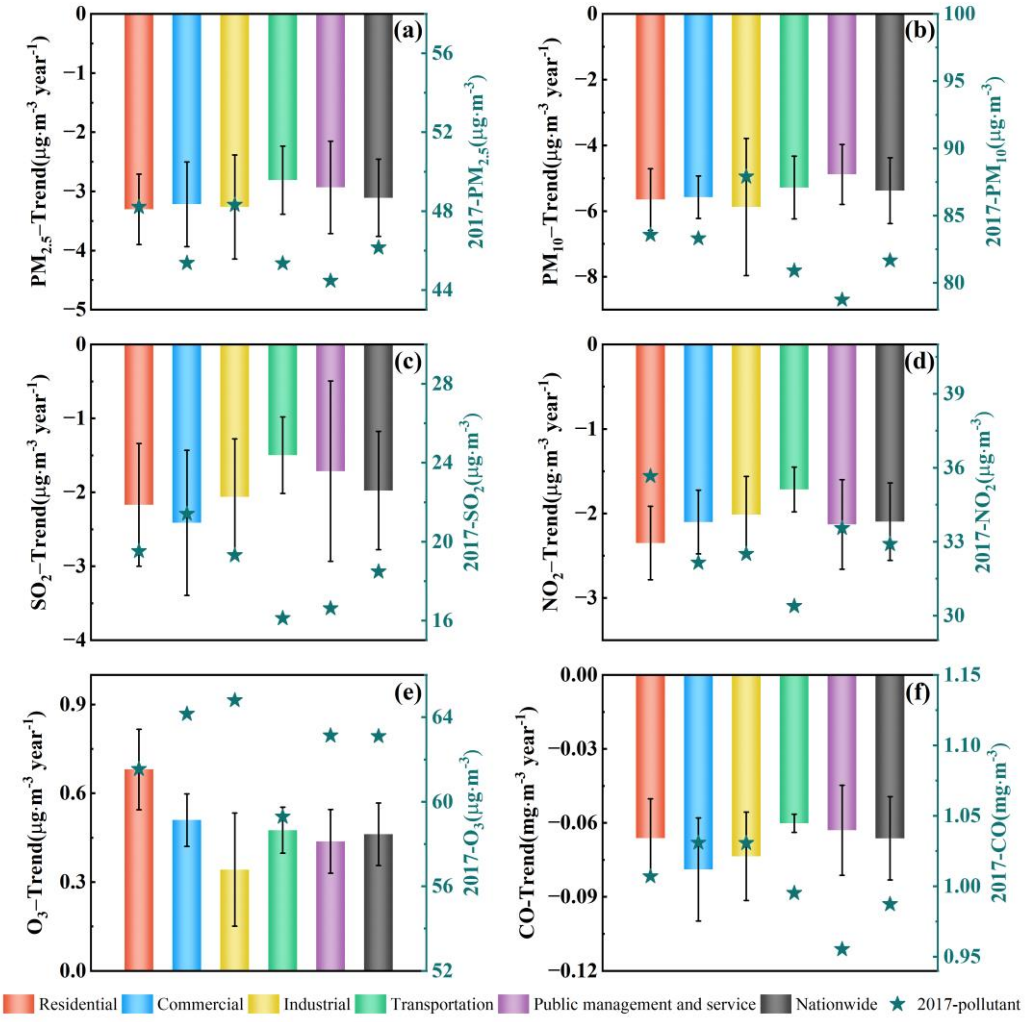
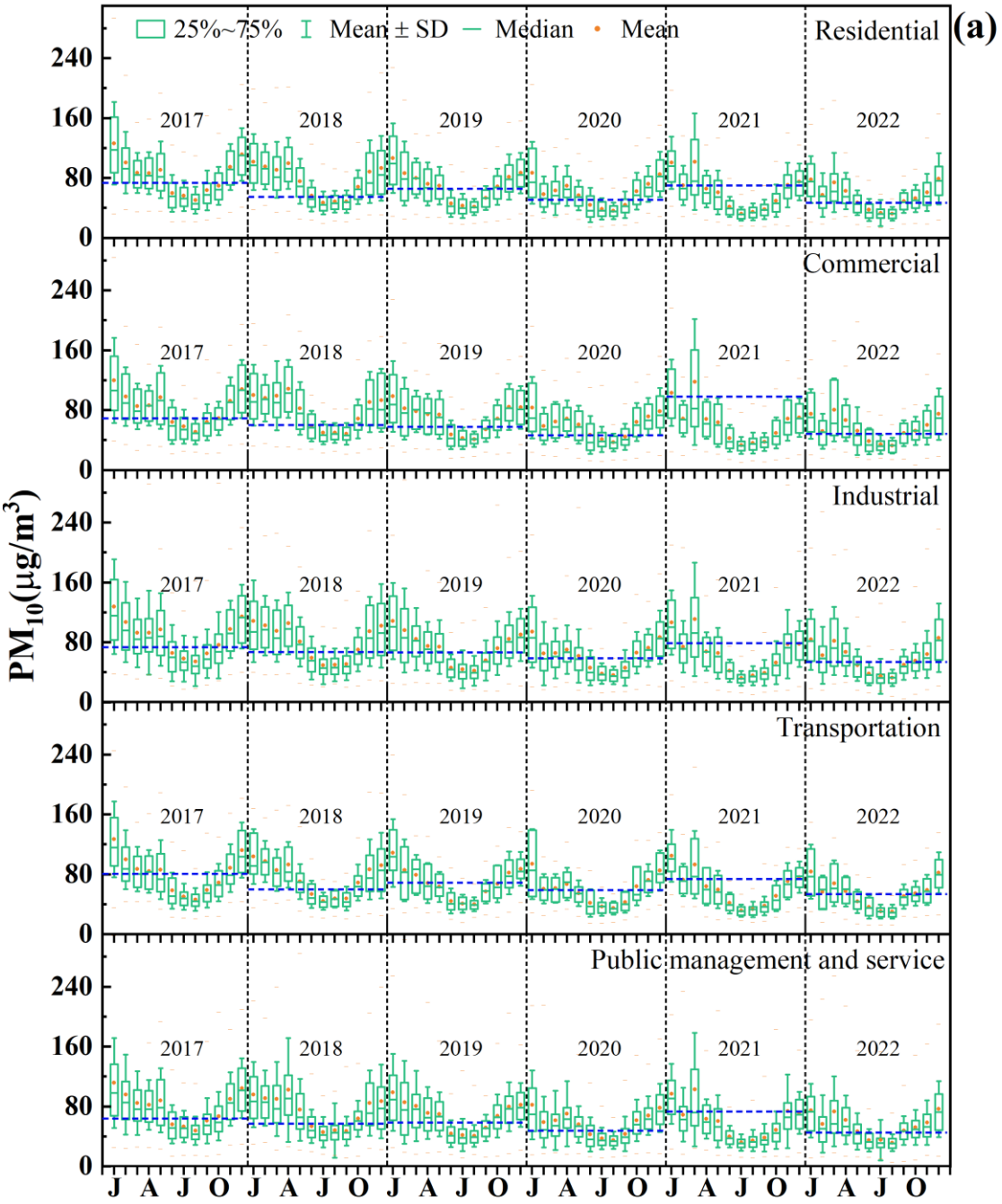
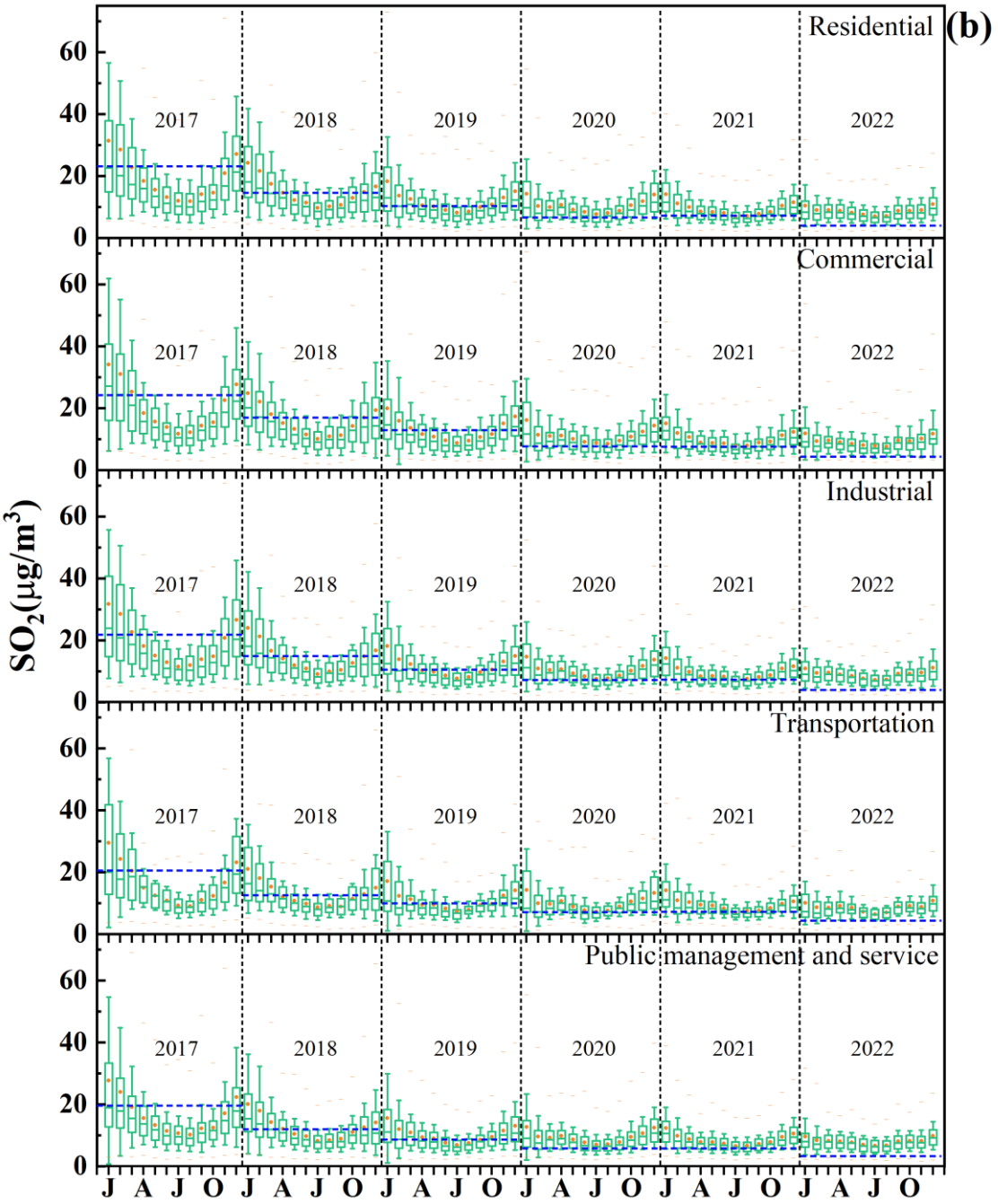
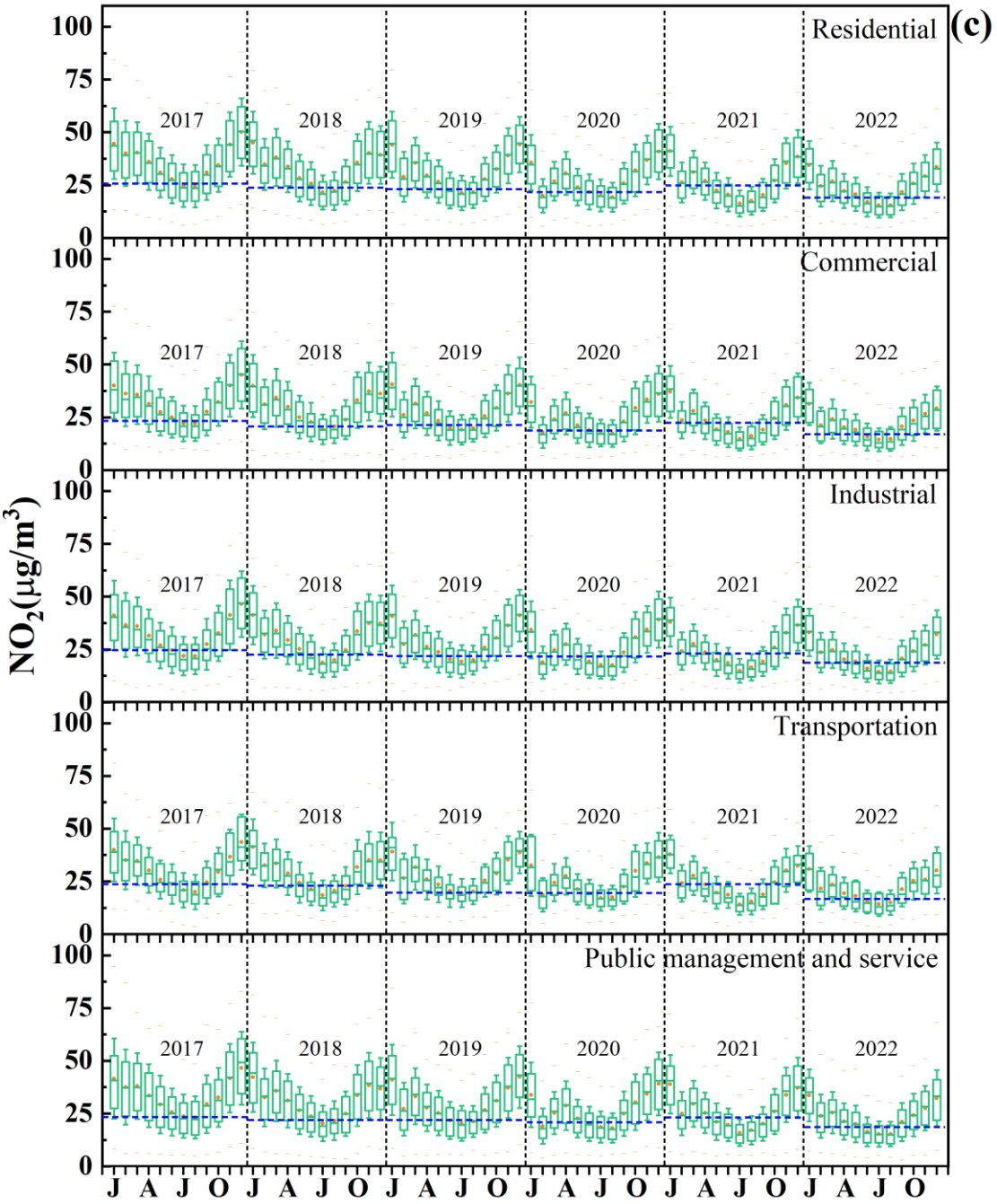


Figure S1. Average annual variation of $PM_{2.5}$ (a), PM_{10} (b), SO_2 (c), NO_2 (d), O_3 (e), and CO (f) concentrations in various functional zones of Chinese cities.


(a)
25%~75%
Mean ± SD
Median
Mean
Residential
Commercial
Industrial
Transportation
Public management and service
2017
2018
2019
2020
2021
2022
PM10(μg/m3)
0
80
160
240
J
A
J
O


(b)
Residential
Commercial
Industrial
Transportation
Public management and service
2017
2018
2019
2020
2021
2022
0
20
40
60
J
A
J
O
$SO_2(\mu g/m^3)$


(c)
Residential
Commercial
Industrial
Transportation
Public management and service
2017
2018
2019
2020
2021
2022
NO2(μg/m3)
0
25
50
75
100
J A J O J A J O J A J O J A J O J A J O J A J O

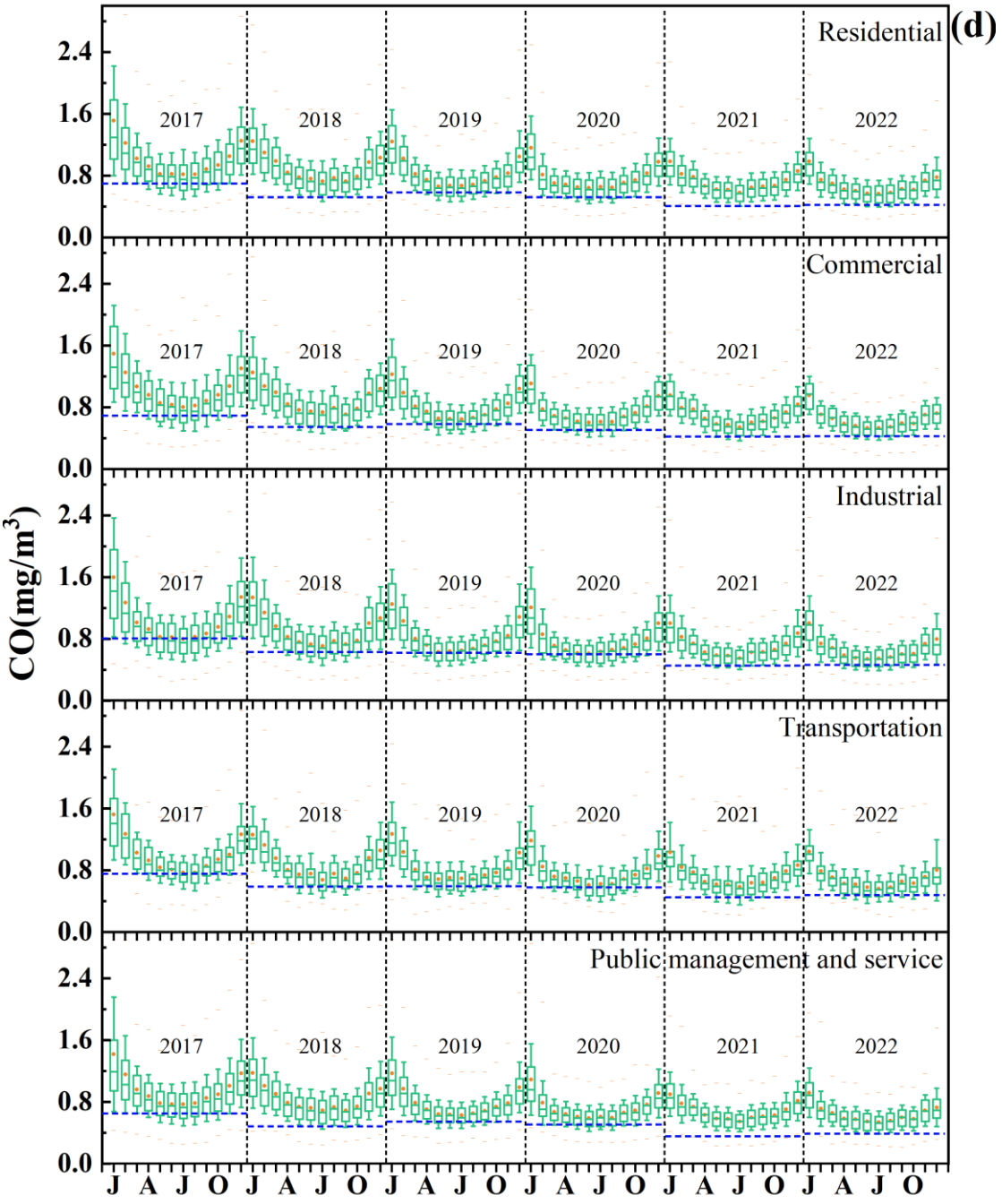


Figure S2. Seasonal variation trend of PM_{10} (a), SO_2 (b), NO_2 (c), and CO (d) concentrations in various functional zones of Chinese cities. The dashed lines indicate the difference between the highest and lowest monthly mean concentration in the corresponding year.

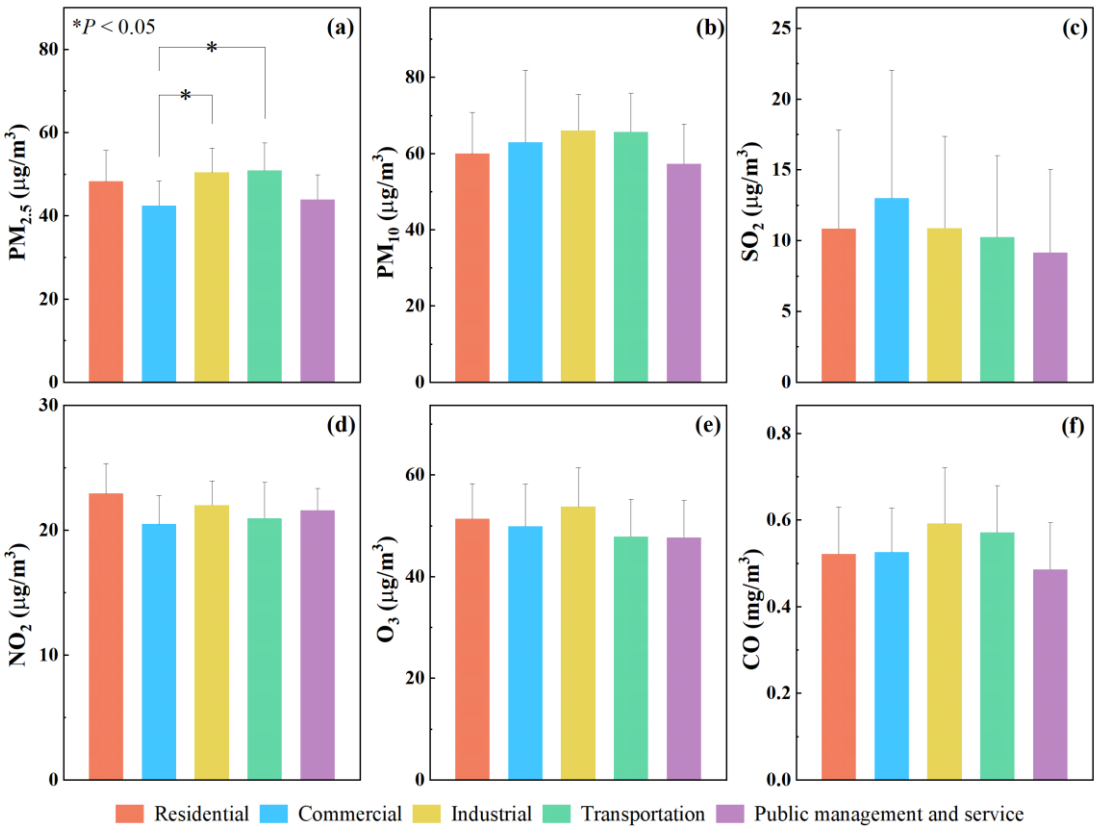
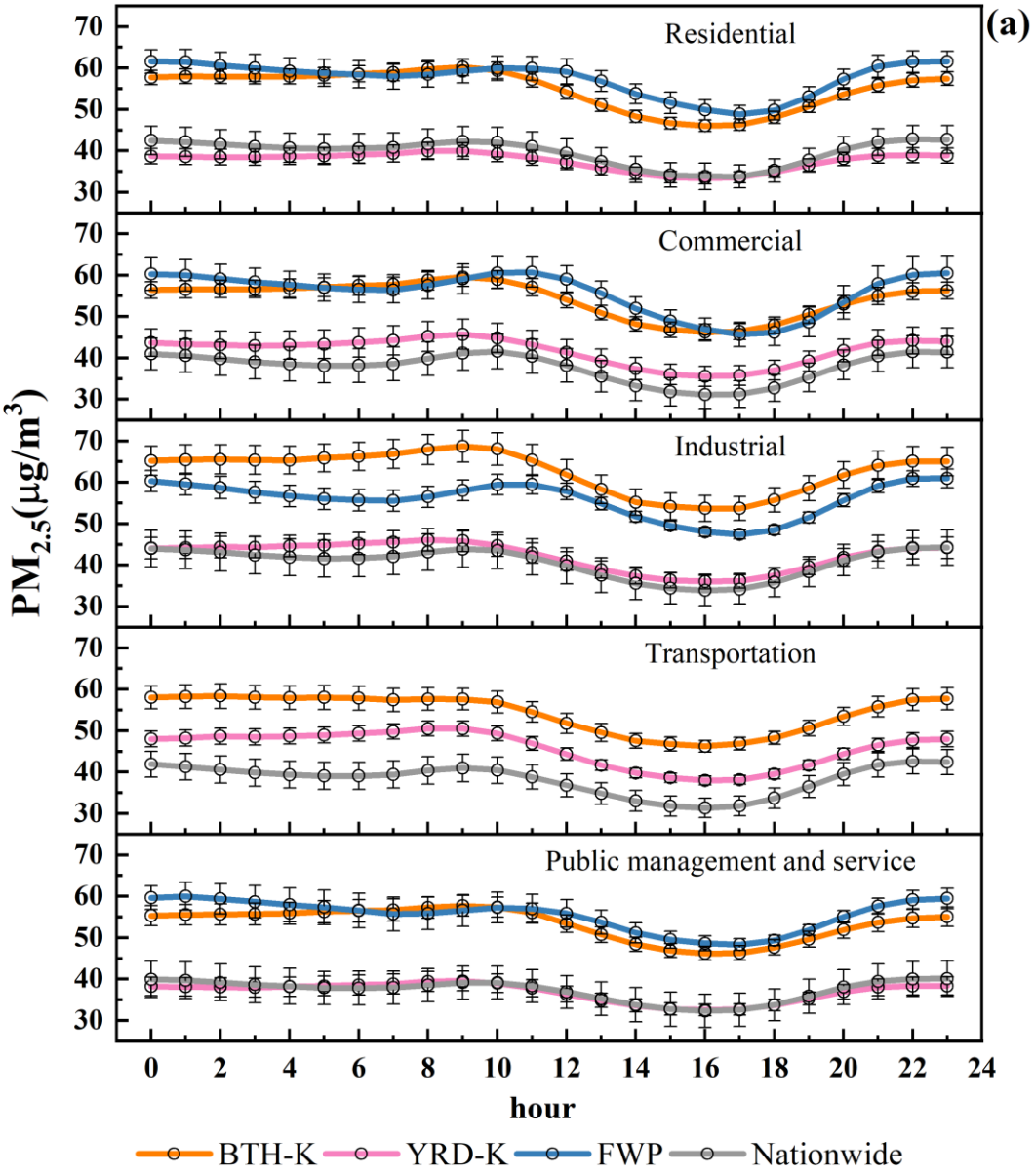
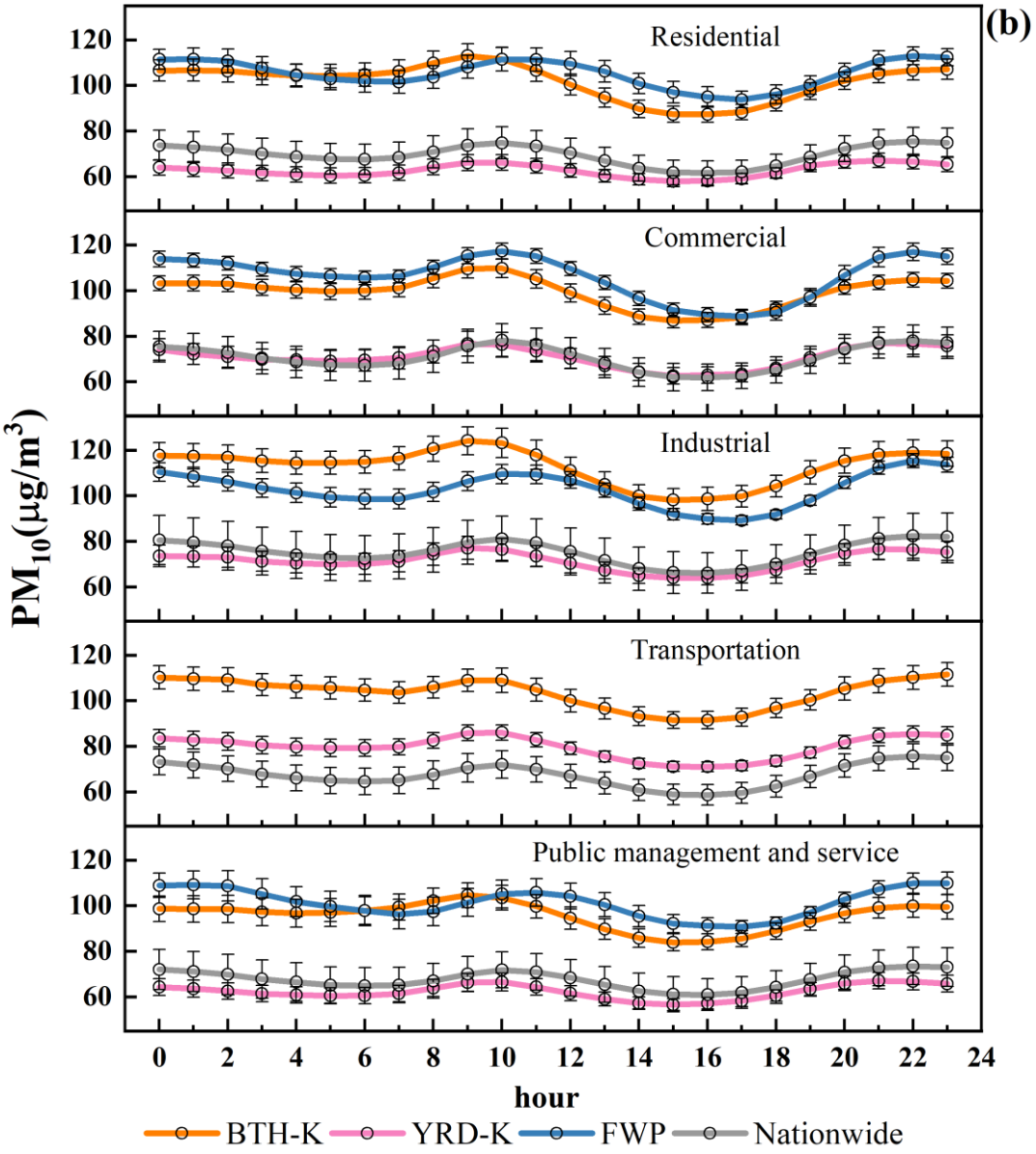
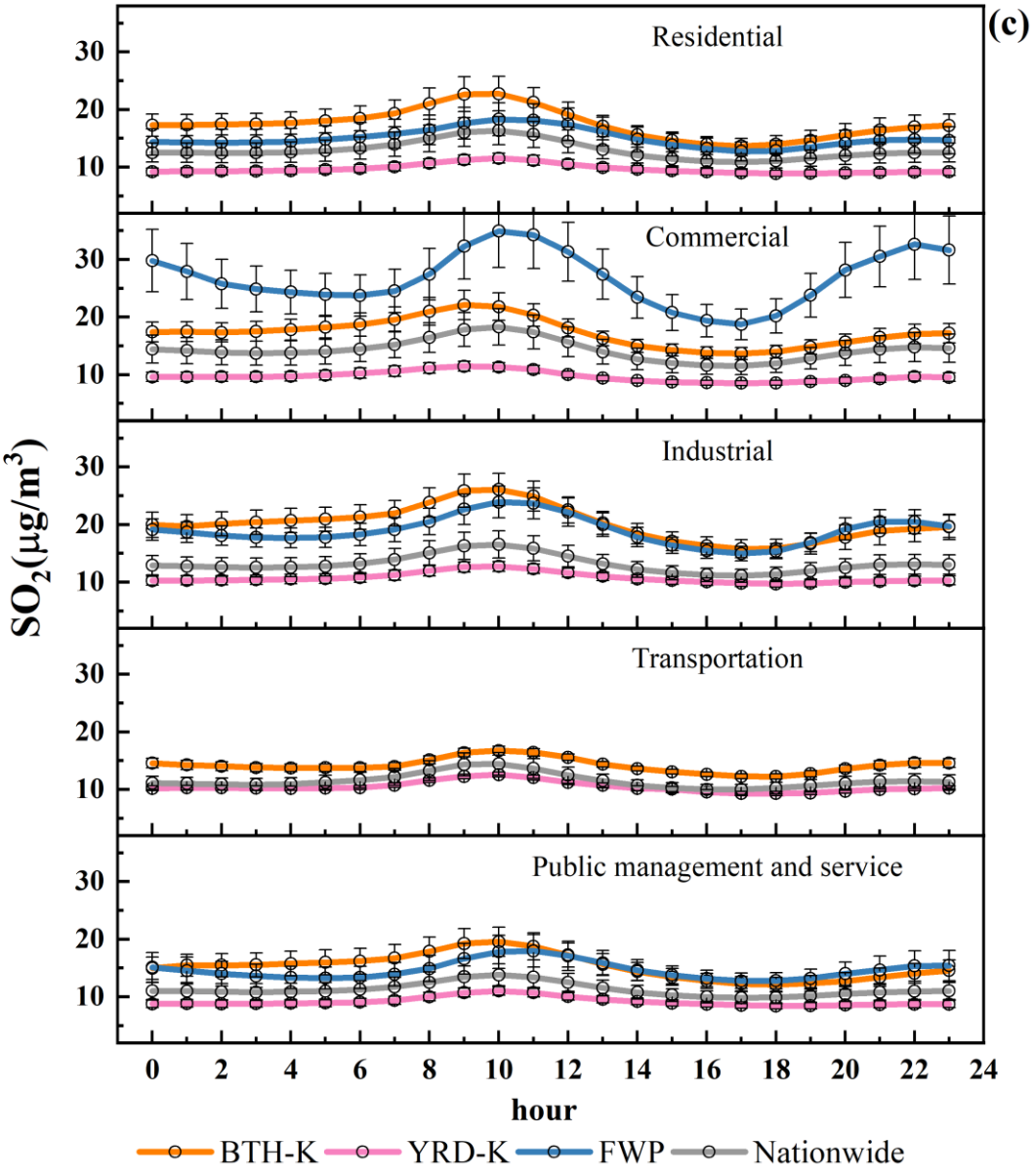
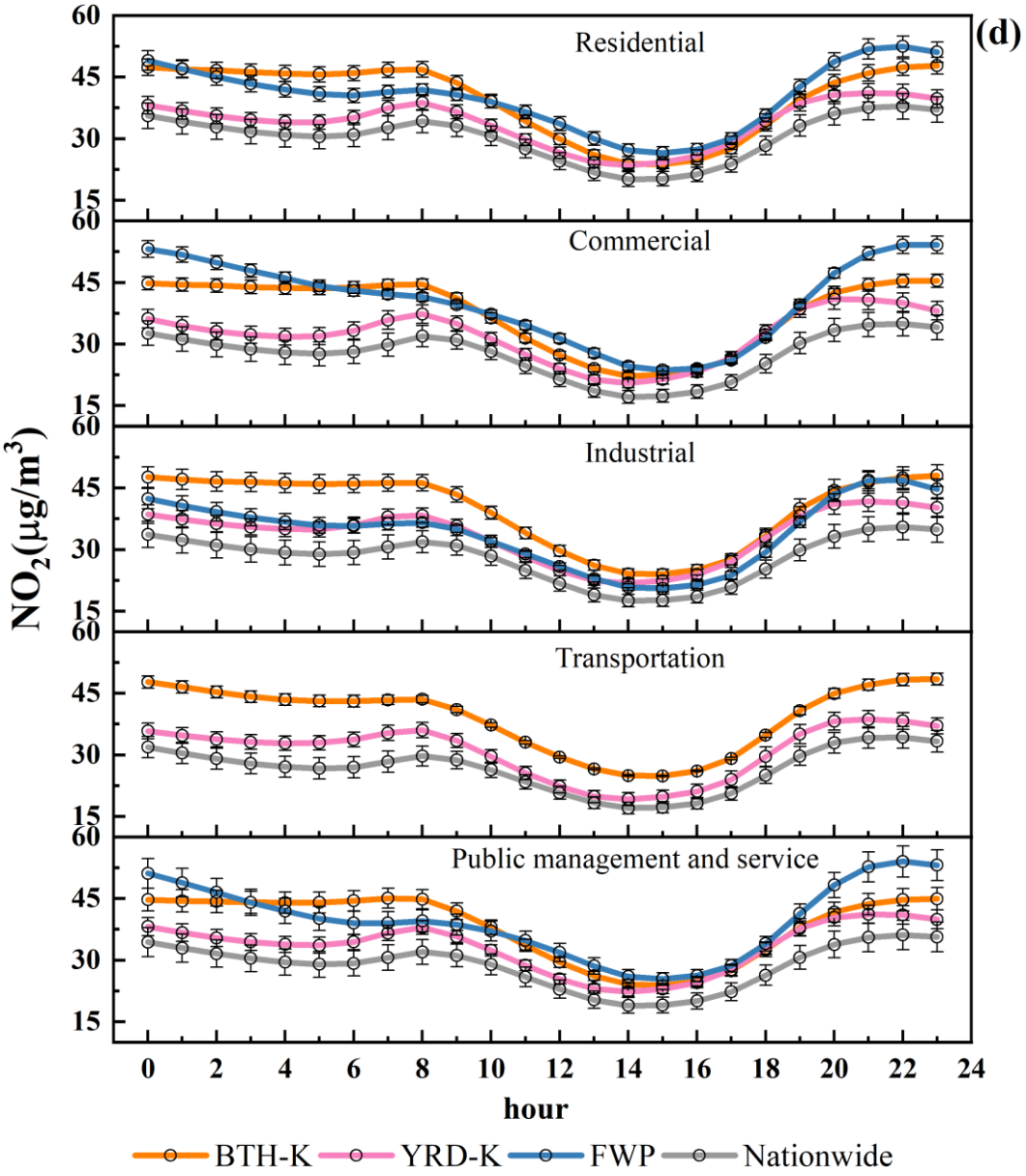


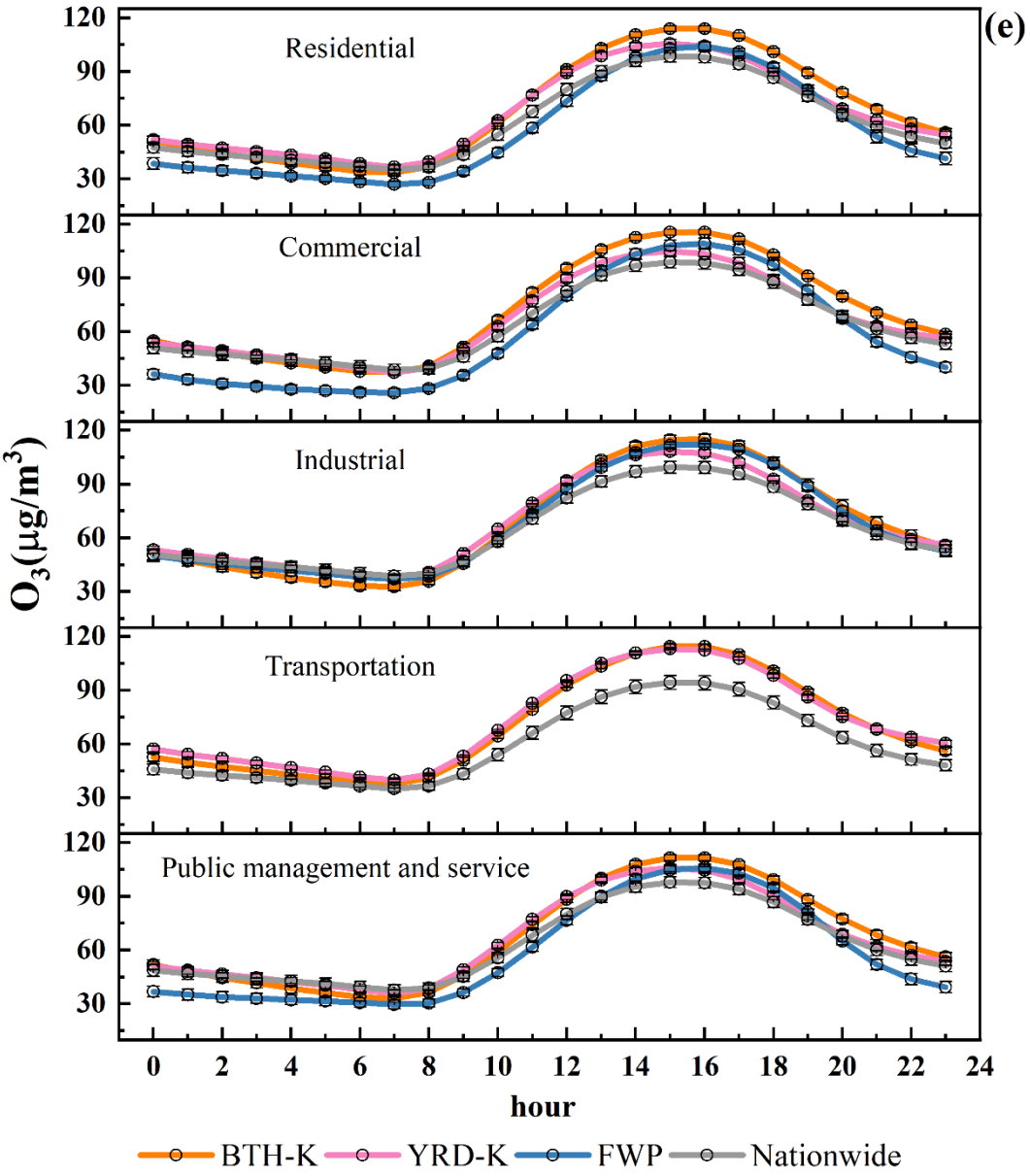
Figure S3. Statistical significance test of seasonal fluctuations of $PM_{2.5}$ (a), PM_{10} (b), SO_2 (c), NO_2 (d), O_3 (e), and CO (f) in various functional zones of Chinese cities.


(a)
Residential
Commercial
Industrial
Transportation
Public management and service
PM2.5(μg/m3)
hour
BTH-K
YRD-K
FWP
Nationwide


(b)
Residential
Commercial
Industrial
Transportation
Public management and service
PM10(μg/m3)
120
100
80
60
0
2
4
6
8
10
12
14
16
18
20
22
24
hour
BTH-K
YRD-K
FWP
Nationwide


(c)
Residential
Commercial
Industrial
Transportation
Public management and service
SO2(μg/m3)
30
20
10
0
2
4
6
8
10
12
14
16
18
20
22
24
hour
BTH-K
YRD-K
FWP
Nationwide


(d)
Residential
Commercial
Industrial
Transportation
Public management and service
NO2(μg/m3)
hour
BTH-K
YRD-K
FWP
Nationwide


(e)
Residential
Commercial
Industrial
Transportation
Public management and service
120
90
60
30
$O_3(\mu g/m^3)$
0
2
4
6
8
10
12
14
16
18
20
22
24
hour
BTH-K
YRD-K
FWP
Nationwide

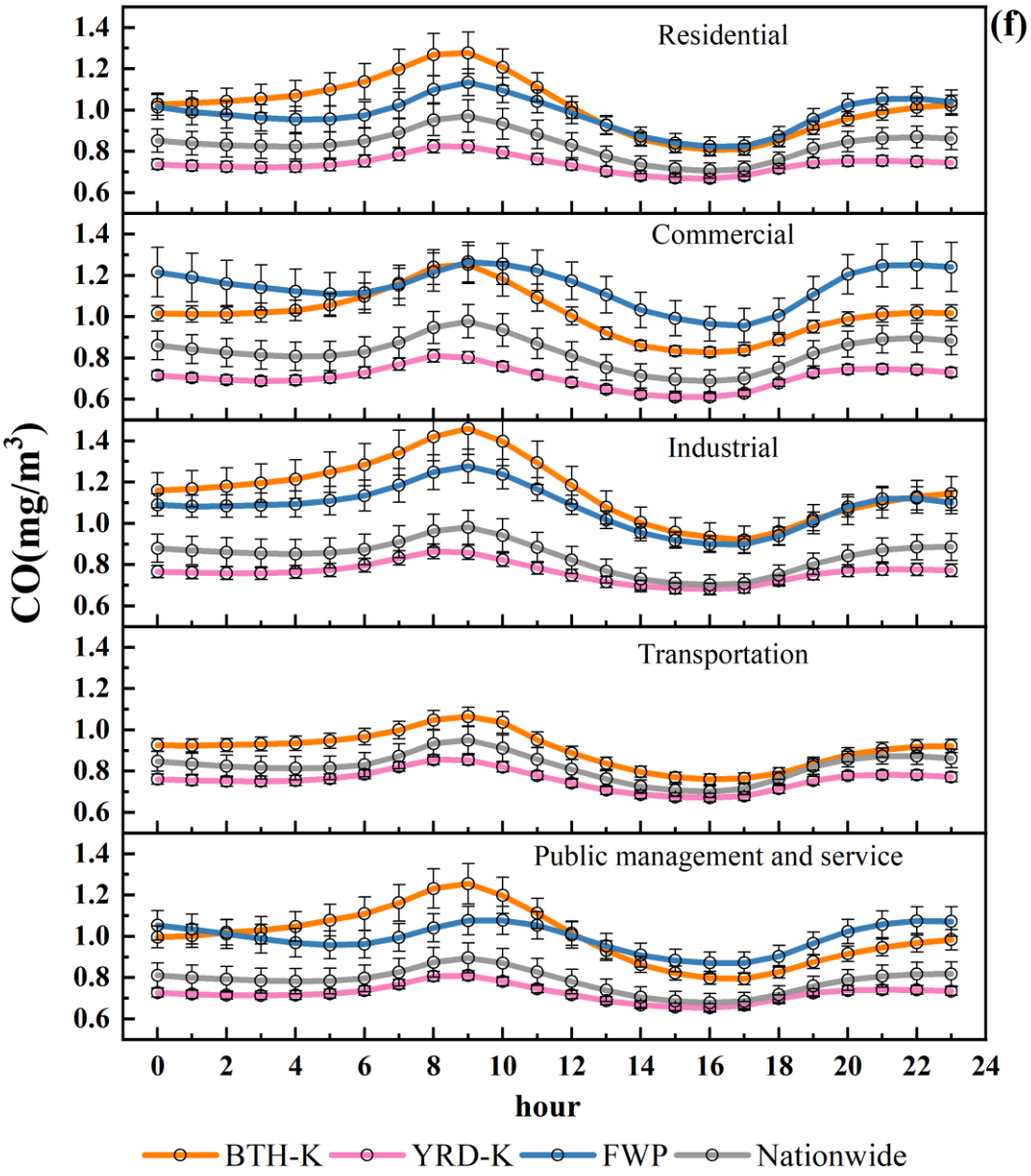
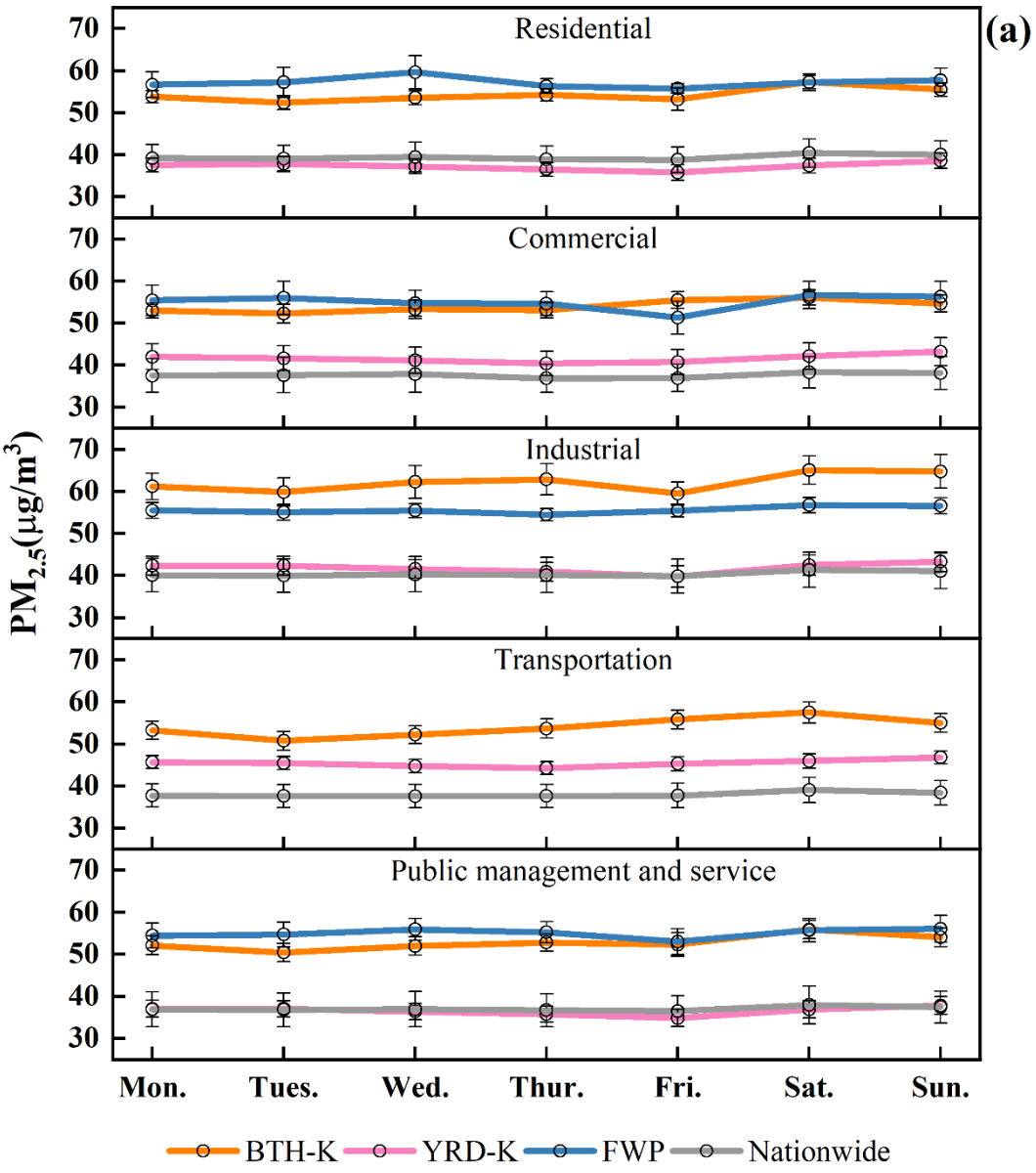
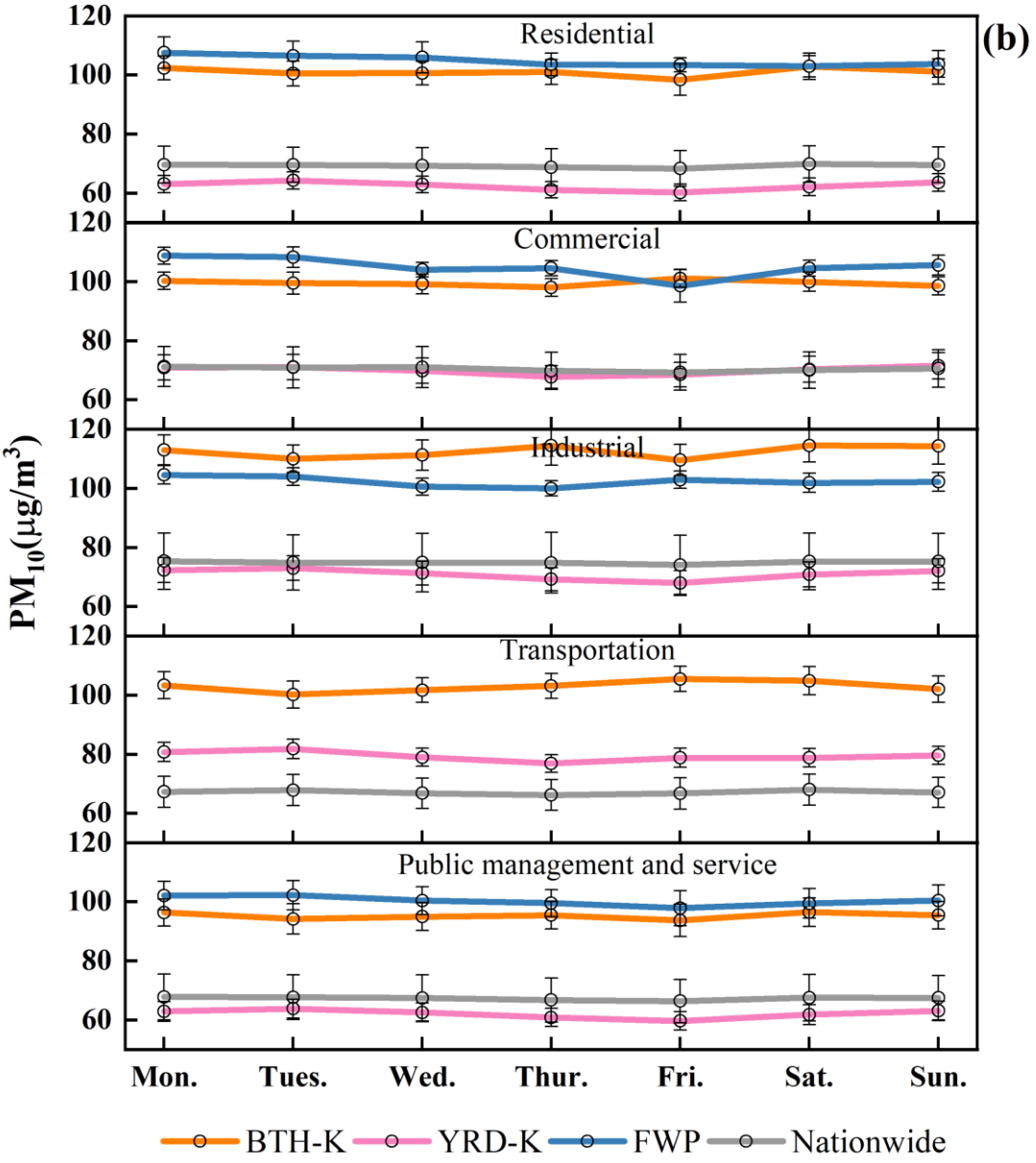
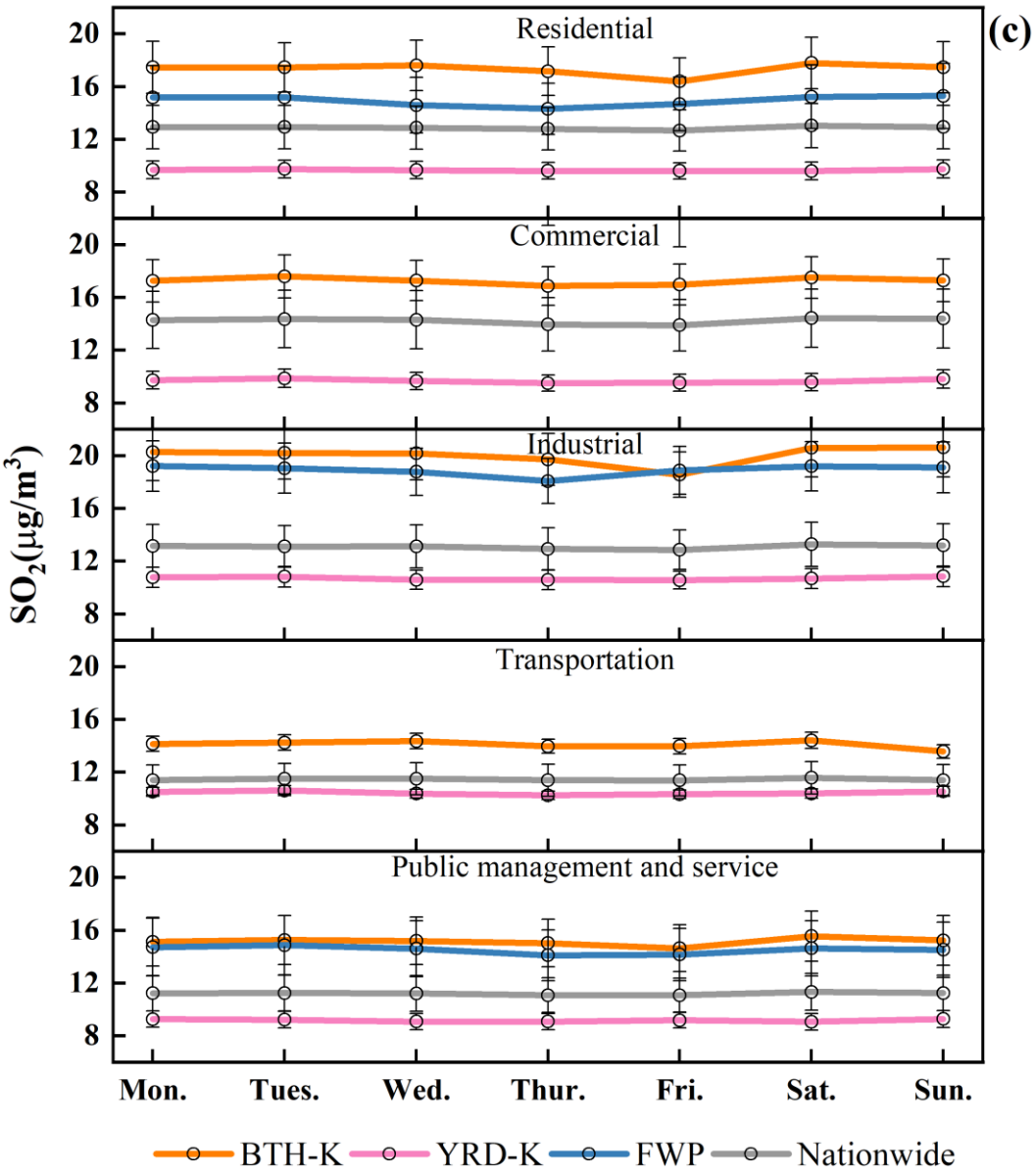
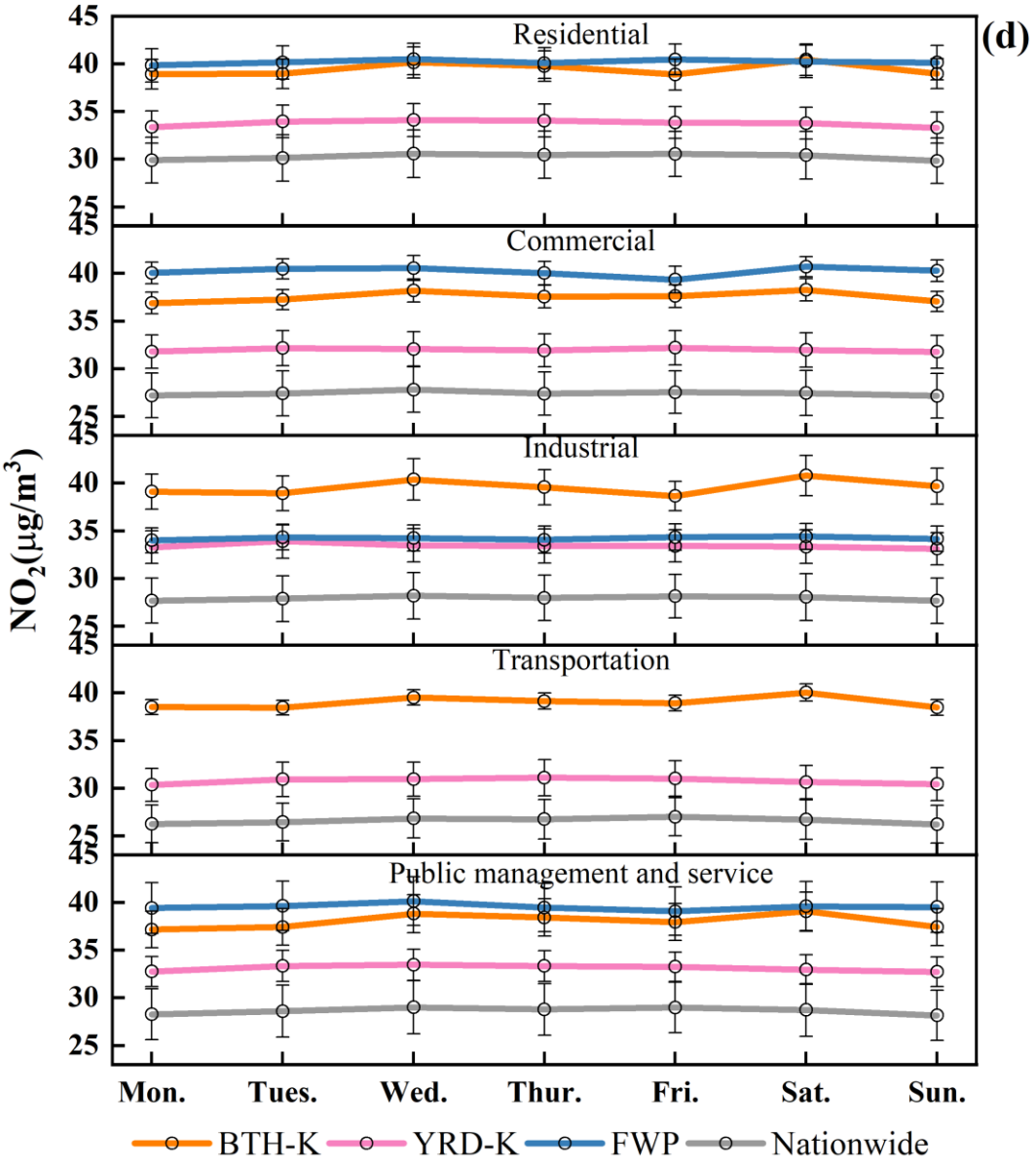


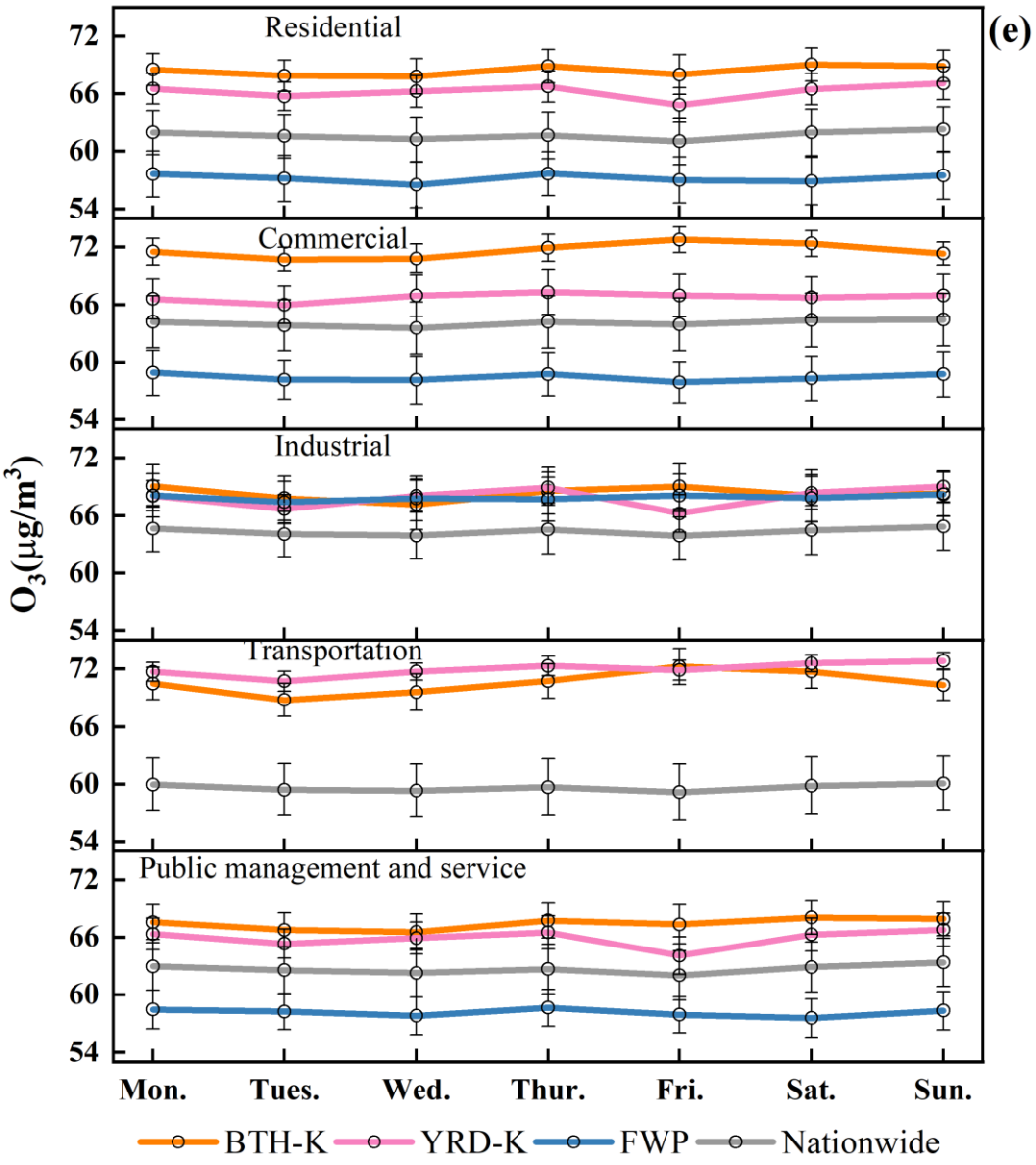
Figure S4. Daily variation curve of $PM_{2.5}$ (a), PM_{10} (b), SO_2 (c), NO_2 (d), O_3 (e), and CO (f) concentrations in various functional zones of Chinese cities. BTH-K: Beijing-Tianjin-Hebei region and its surrounding areas; YRD-K: Yangtze River Delta region; FWP: Fen-Wei Plain.


(a)
Residential
Commercial
Industrial
Transportation
Public management and service
PM2.5(μg/m3)
70
60
50
40
30
Mon.
Tues.
Wed.
Thur.
Fri.
Sat.
Sun.
BTH-K
YRD-K
FWP
Nationwide


(b)
Residential
Commercial
Industrial
Transportation
Public management and service
PM10(μg/m3)
120
100
80
60
Mon.
Tues.
Wed.
Thur.
Fri.
Sat.
Sun.
BTH-K
YRD-K
FWP
Nationwide


(c)
Residential
Commercial
Industrial
Transportation
Public management and service
SO2(μg/m3)
20
16
12
8
Mon.
Tues.
Wed.
Thur.
Fri.
Sat.
Sun.
BTH-K
YRD-K
FWP
Nationwide


(d)
Residential
Commercial
Industrial
Transportation
Public management and service
NO2(μg/m3)
45
40
35
30
25
Mon.
Tues.
Wed.
Thur.
Fri.
Sat.
Sun.
BTH-K
YRD-K
FWP
Nationwide


(e)
Residential
Commercial
Industrial
Transportation
Public management and service
$O_3(\mu g/m^3)$
72
66
60
54
Mon.
Tues.
Wed.
Thur.
Fri.
Sat.
Sun.
BTH-K
YRD-K
FWP
Nationwide

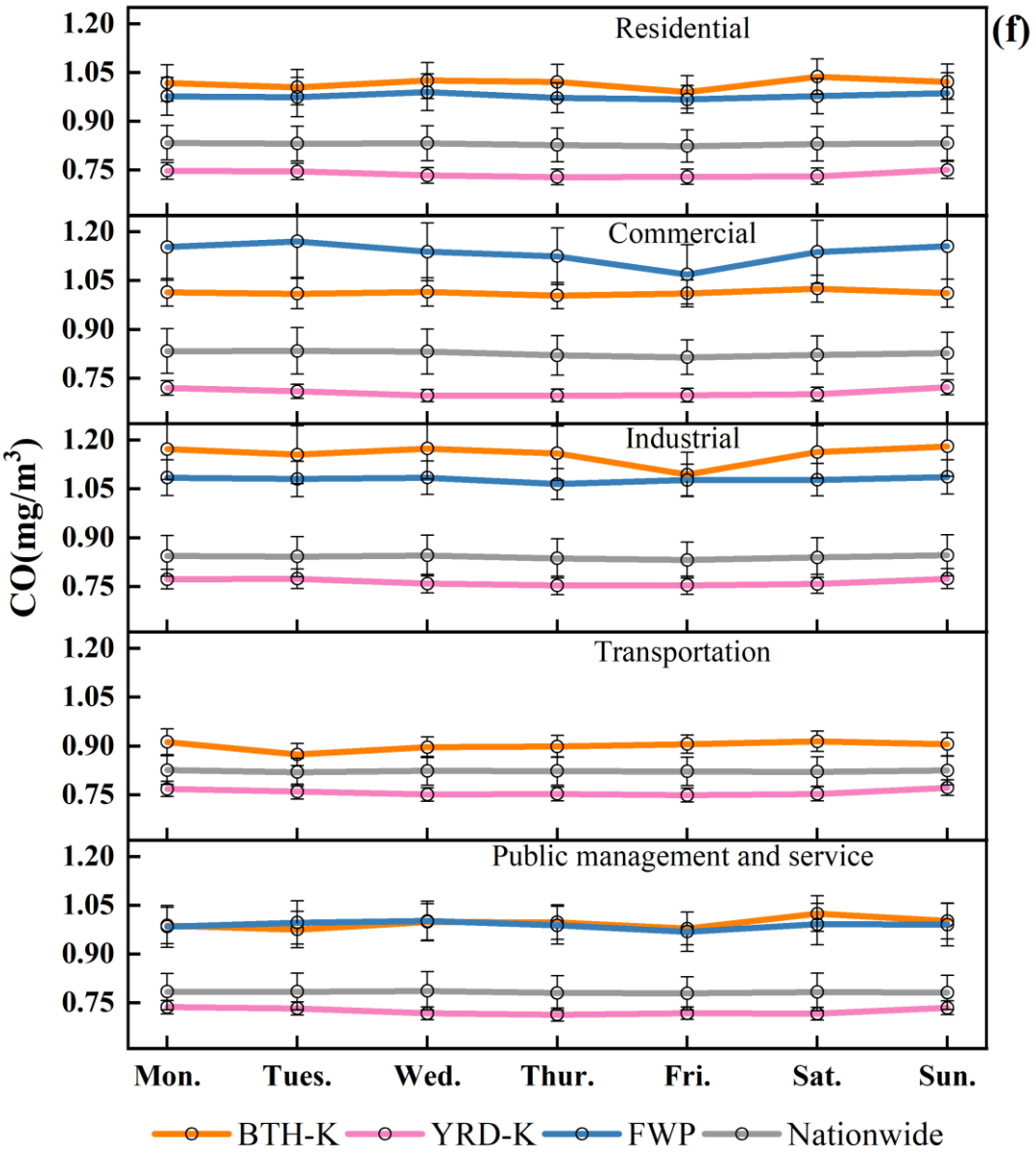


Figure S5. Weekly variation curve of $PM_{2.5}$ (a), PM_{10} (b), SO_2 (c), NO_2 (d), O_3 (e), and CO (f) concentrations in various functional zones of Chinese cities. BTH-K: Beijing-Tianjin-Hebei region and its surrounding areas; YRD-K: Yangtze River Delta region; FWP: Fen-Wei Plain.

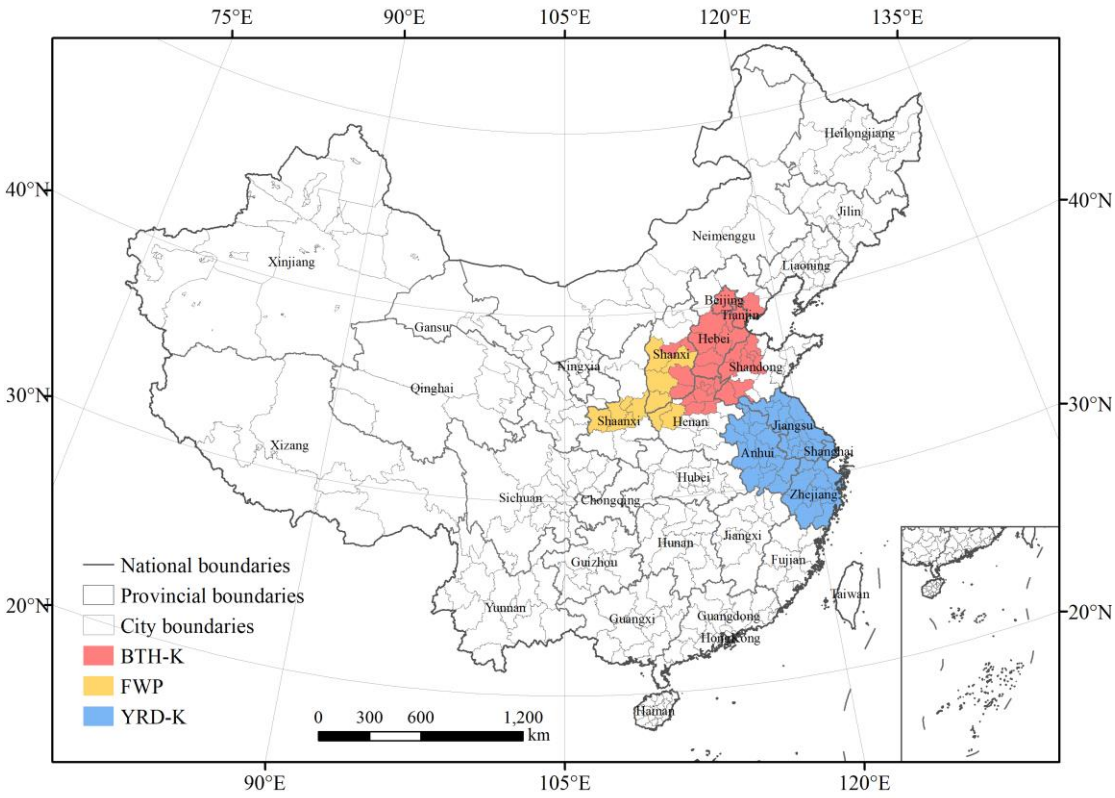


Figure S6. Three key areas for air pollution control in China: the Beijing-Tianjin-Hebei region and its surrounding areas (BTH-K), the Fen-Wei Plain (FWP), and the Yangtze River Delta region (YRD-K).