atmosphere

MDPI

Supplementary Materials

Spatiotemporal Distribution Characteristics and Inventor Analysis of Near-Road Traffic Pollution in Urban Areas

Bingbing Li, Jiaren Li, Jiang Lu and Zhenyi Xu

Table S1. Atmospheric Sampler Parameters.

parameters	realm	resolution (of a photo)	allowable error
sampling ow	0.1-1.0L/min	0.01L/min	≤ ±2%
sampling time	1min-99h59	1min	≤ ±0.1%
Thermostatic range	15-30_C	0.1_C	≤ ±2_C

Table S2. Testing Instruments and Reagents.

Ion chromatograph (Thermo Fisher, ICS-600)		Inductively coupled plasma mass spectrometer (Agilent, 7900)	
baseline noise	≤ 0.005_S or ≤ 2%FS	Mass axis stability	± 0.05 amu/24 hours
baseline drift	≤ 0.10_S/30min or ≤ 20%FS/30min	Detection of light mass elements	<0.5ppt
Minimum Detection Concentration	≤ 0.02_g/ml	Detection of medium mass number elements	<0.1ppt
Qualitative Repeatability	≤ 1.5%	Detecting high mass count elements	<0.1ppt
Quantitative Repeatability	≤ 3%	Short-term stability 10min(RSD)	<1.5%
		Long-term stability 2 hr (RSD)	<3%

Table S3. Meteorological Statistics of Anqing City, 2020.

Month	Temperature/_C	Humidity/%	Month	Temperature/_C	Humidity/%
1	4.5	67	7	26.5	77
2	9	71	8	29.5	75
3	13	70	9	24	76
4	16.5	69	10	17	67
5	23.5	71	11	13	67
6	26.5	78	12	5.5	64

Table S4. Average annual pollutant emissions per vehicle (Gasoline).

Vehicle type	Control type	CO(kg)	HC(kg)	NOx(kg)	PM2:5(kg)	PM10(kg)
Mini bus	National I	412	28.94	8.66	0.59	0.65
	National II	94	16.72	11.07	0.25	0.27
	National III	49	6.55	3.26	0.16	0.18
	National IV	24	2.54	0.82	0.07	0.07
	_National V	16	1.90	0.44	0.07	0.07
Medium bus	National II	944	88.31	67.51	0.70	0.78
	National III	244	20.08	19.73	0.43	0.47
	National IV	124	6.30	10.02	0.23	0.27
	National V	124	6.30	7.51	0.23	0.27
Large bus	National II	1894	224.53	219.39	5.22	5.80
	National III	862	86.69	117.23	3.19	3.55
	National IV	437	45.60	73.40	3.19	3.55
Light truck	National I	1521	178393	81.78	2.25	2.50
	National II	1268	129.63	72.3	0.68	0.75
	National III	303	31.48	21.00	0.41	0.45
	National IV	142	9.54	11.06	0.23	0.26
	National V	142	9.54	8.31	0.23	0.26

Table S5. Average annual pollutant emissions per vehicle (Diesel).

Vehicle type	Control type	CO(kg)	HC(kg)	NOx(kg)	PM2:5(kg)	PM10(kg)
Mini bus	National III	5.83	0.77	29.88	0.55	0.62
	National IV	3.91	0.36	16.11	0.33	0.36
	National V	3.91	0.40	17.54	0.33	0.36
Medium bus	National III	117	18.15	148	4.28	4.74
	National IV	97	15.76	135	2.14	2.38
	National V	97	15.76	115	1.07	1.19
Large bus	National III	692	26.15	810	21.16	23.51
	National IV	318	8.58	923	9.41	10.46
	National V	158	4.33	806	4.71	5.23
Light truck	National II	174	107	345	7.10	7.89
	National III	130	19.49	222	3.33	3.69
	National IV	74	7.72	113	1.04	1.14
	National V	74	7.72	96	0.21	0.23
Medium truck	National III	129	11.32	308	5.53	6.14
	National IV	97	4.99	245	2.23	2.48
	National V	97	4.99	208	0.45	0.50
Large truck	National III	370	30.47	841	16.83	18.70
	National IV	278	13.38	670	6.67	7.39
	National V	278	13.38	569	1.30	1.45

Table S6. Concentrations of 15 Substances with Insigni_cant Changes.

substance	concentration	substance	concentration	substance
Methyl mercaptan	0.026_0.026 ppbv	Dimethyl disulde	0.064_0.061 ppbv	Undecane
N-Propanol	0.133_0.137 ppbv	Diethylenetriamine chlorobenzene	0.220_0.218 ppbv	Dodecane
Methyl Sulphide (ethanethiol)	0.033_0.039 ppbv	Butyl acetate	0.235_0.240 ppbv	N-Tridecane
Ethyl chloride	0.025_0.027 ppbv	N-decane	0.165_0.054 ppbv	1,2-Dibromoethane
Ethyl sulphide(butanethiol)	0.029_0.032 ppbv	Diethylaniline	0.304_0.302 ppbv	Hexachloro-1,3-butadiene

Table S7. Concentration of 8 Substances.

substance	concentration	substance	concentration
Hexanethiol	0.080_0.046 ppbv	Methyl benzoate	0.068_0.092 ppbv
Triethylamine	0.207_0.219 ppbv	Trimethyl phosphate	0.636_0.296 ppbv
N-Propyl acetate	0.213_0.218 ppbv	1,1,2,2-Tetrachloroethane	0.314_0.169 ppbv
1,3-Dichloropropene	0.563_0.204 ppbv	1,3-Butadiene	0.224_0.238 ppbv

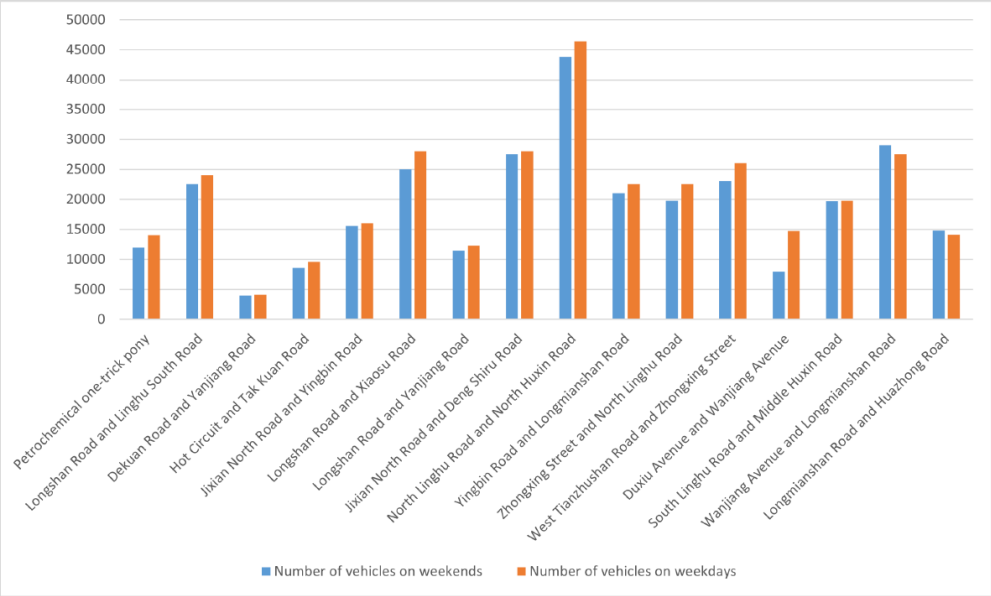
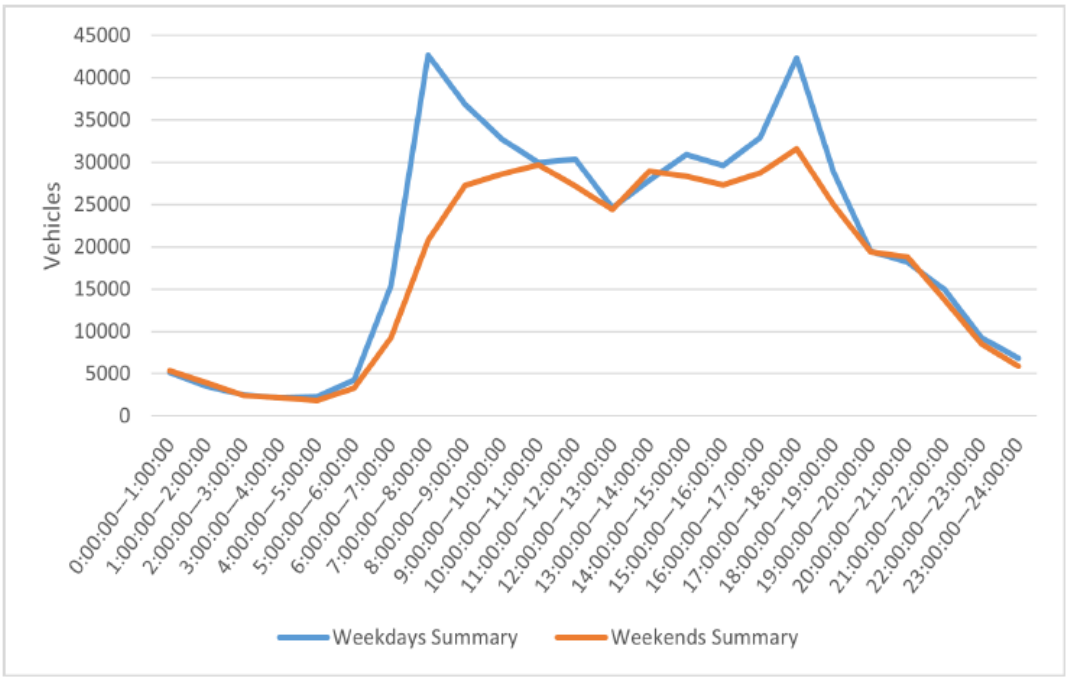


Figure S1. Distribution of traffic flow at different traffic junctions.

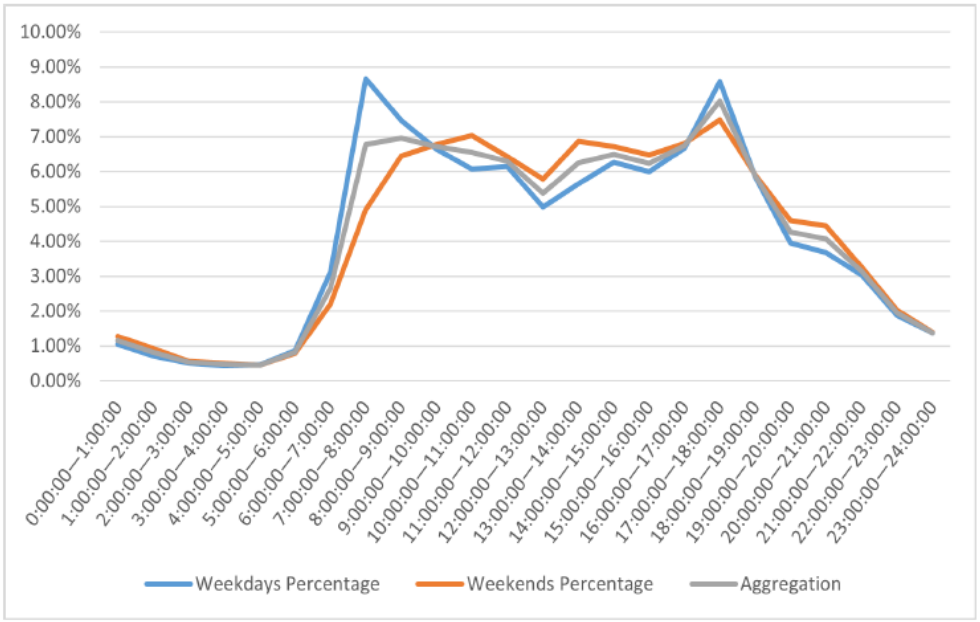
(a)

(b)

Figure S2. Visualization of mid-week and weekend traffic data: (a) Forecast of traffic flow on different major. transportation routes in mid-week; (b) Weekend traffic volume forecasts for different key traffic corridors.

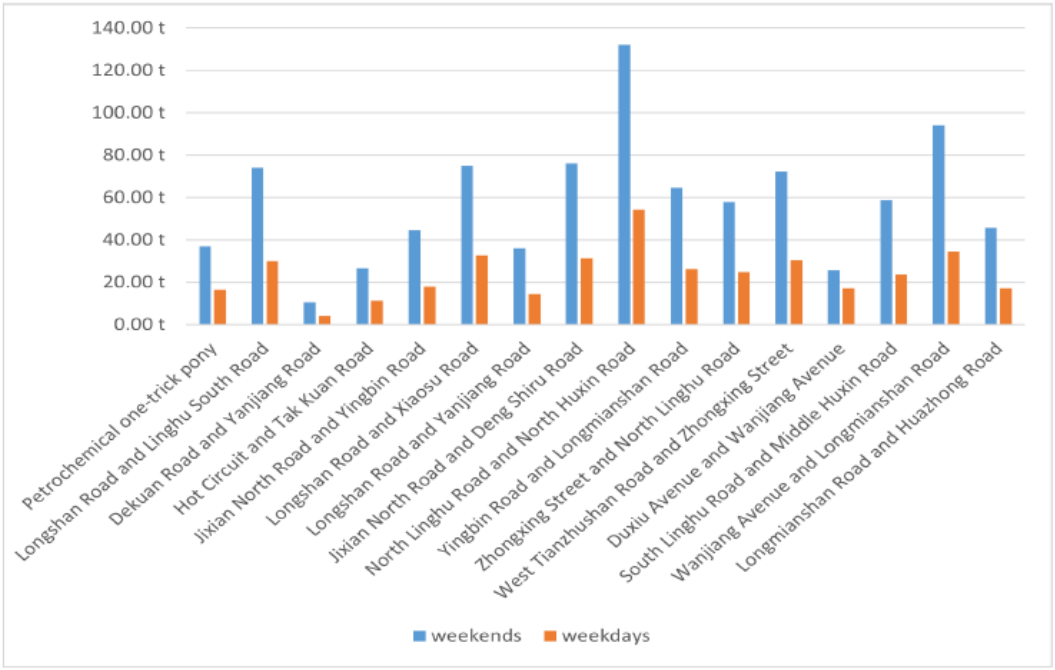


(a)

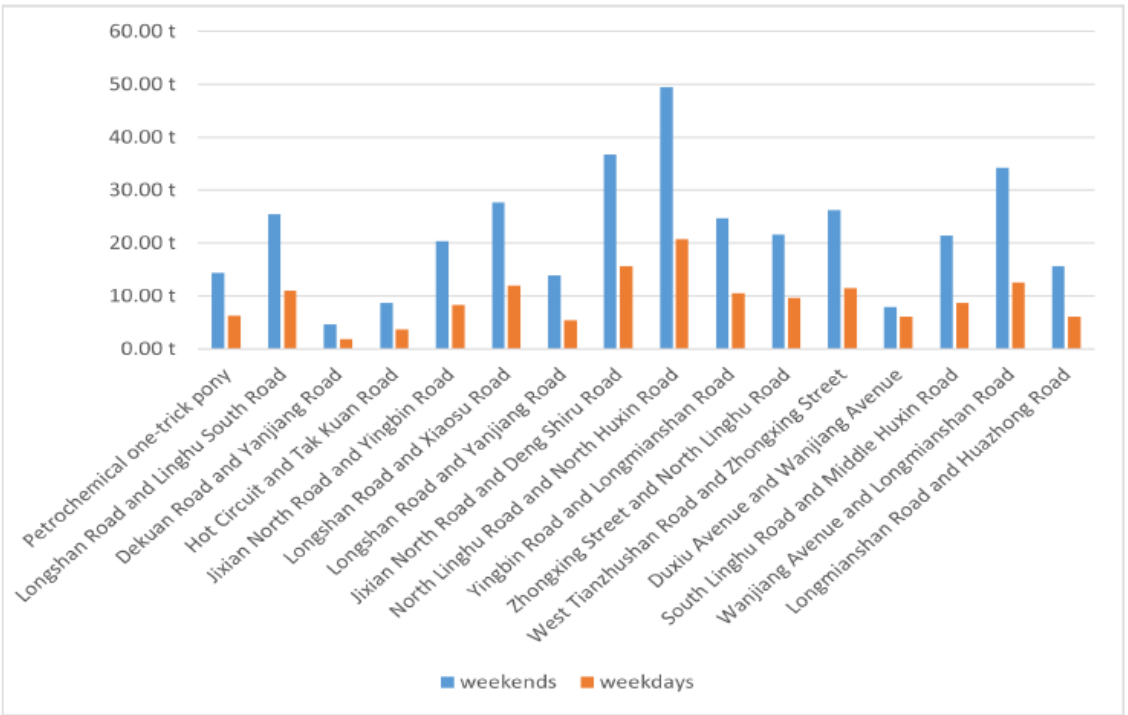


(b)

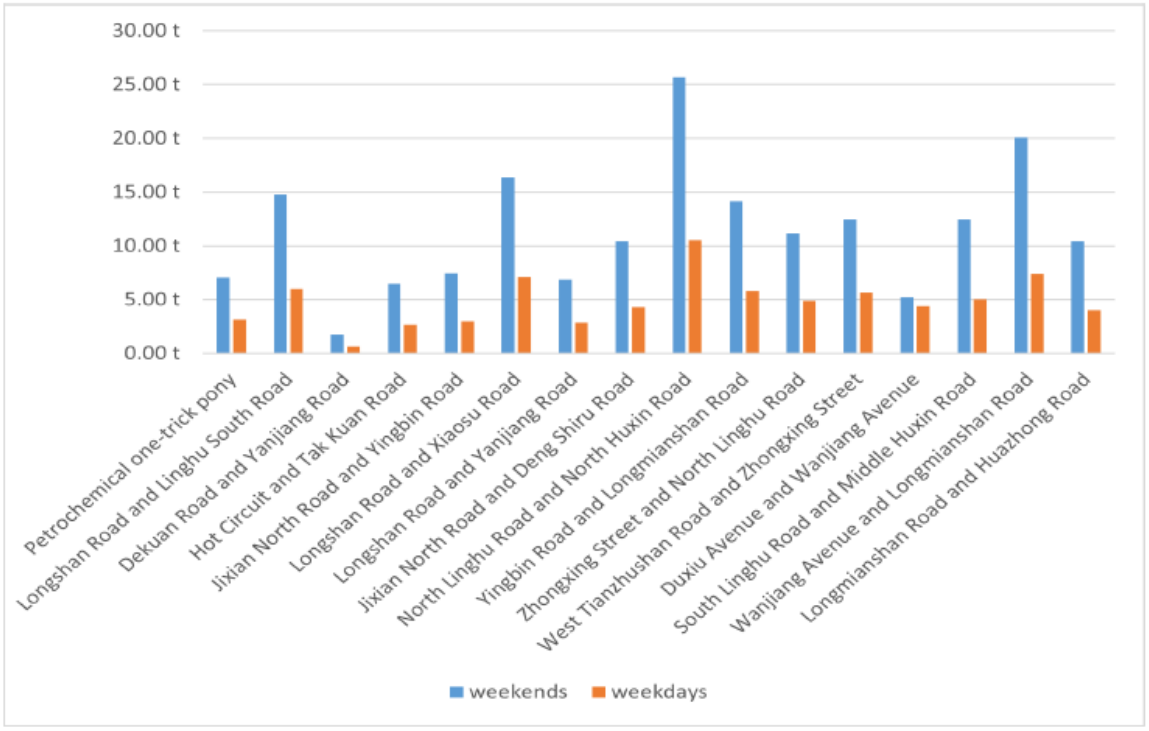
Figure S3. Characteristics of the temporal distribution of traffic flow data (a) Daily variation of traffic volume at key traffic intersections; (b) Percentage daily change in traffic volume at key traffic intersections.


140.00 t
120.00 t
100.00 t
80.00 t
60.00 t
40.00 t
20.00 t
0.00 t
Petrochemical one-trick pony
Longshan Road and Linghu South Road
Dekuan Road and Yanjiang Road
Hot Circuit and Tak Kuan Road
Jixian North Road and Yingbin Road
Longshan Road and Xiaosu Road
Longshan Road and Yanjiang Road
Jixian North Road and Deng Shiru Road
North Linghu Road and North Huxin Road
Yingbin Road and Longmianshan Road
Zhongxing Street and North Linghu Road
West Tianzhushan Road and Zhongxing Street
Duxiu Avenue and Wanjiang Avenue
South Linghu Road and Middle Huxin Road
Wanjiang Avenue and Longmianshan Road
Longmianshan Road and Huazhong Road
weekends
weekdays

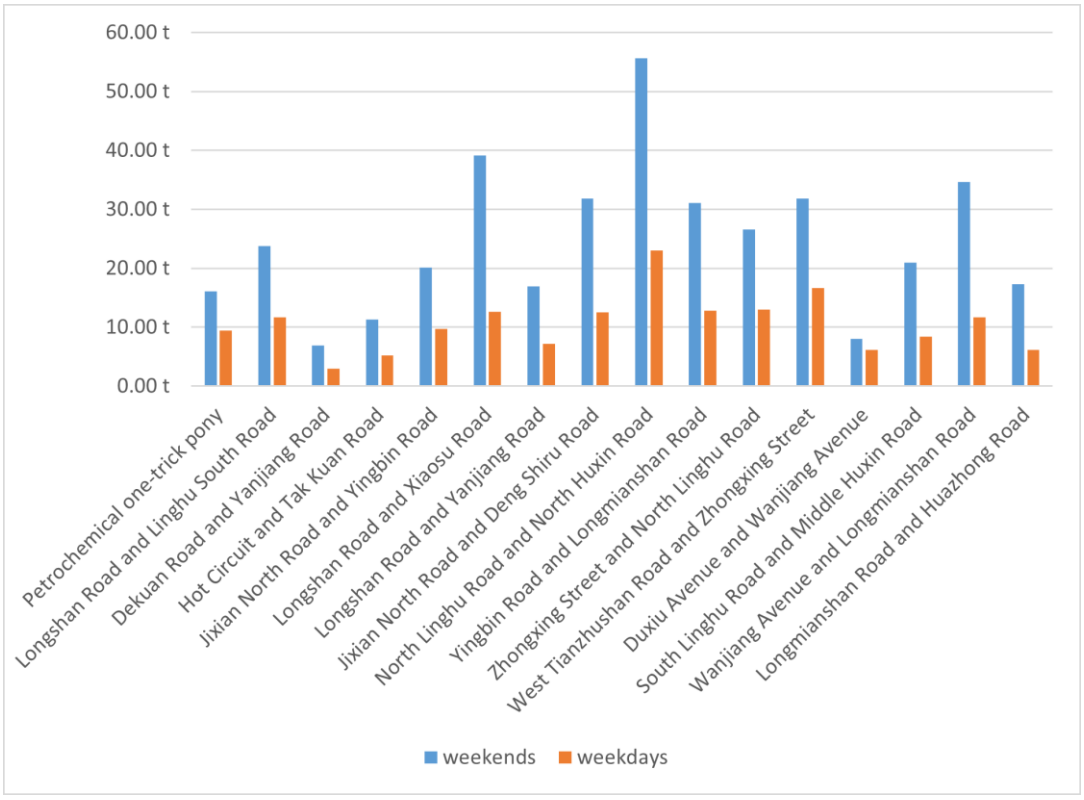
(a)


60.00 t
50.00 t
40.00 t
30.00 t
20.00 t
10.00 t
0.00 t
Petrochemical one-trick pony
Longshan Road and Linghu South Road
Dekuan Road and Yanjiang Road
Hot Circuit and Tak Kuan Road
Jixian North Road and Yingbin Road
Longshan Road and Xiaosu Road
Longshan Road and Yanjiang Road
Jixian North Road and Deng Shiru Road
North Linghu Road and North Huxin Road
Yingbin Road and Longmianshan Road
Zhongxing Street and North Linghu Road
West Tianzhushan Road and Zhongxing Street
Duxiu Avenue and Wanjiang Avenue
South Linghu Road and Middle Huxin Road
Wanjiang Avenue and Longmianshan Road
Longmianshan Road and Huazhong Road
weekends
weekdays

(b)



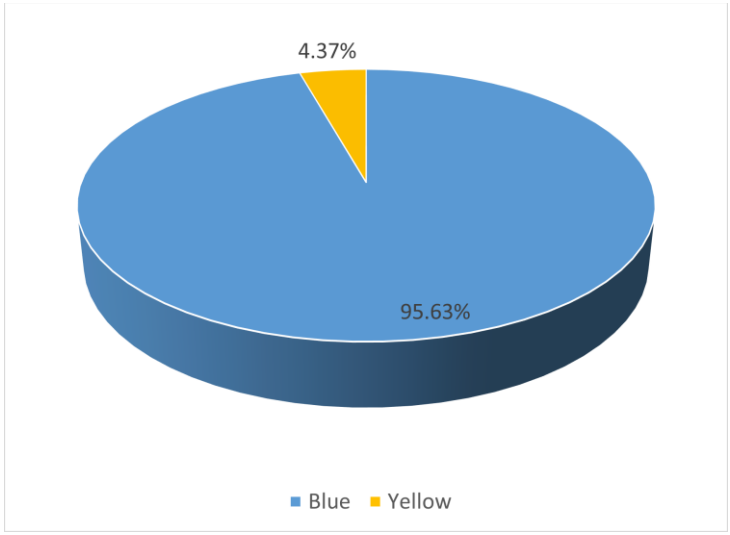
(c)



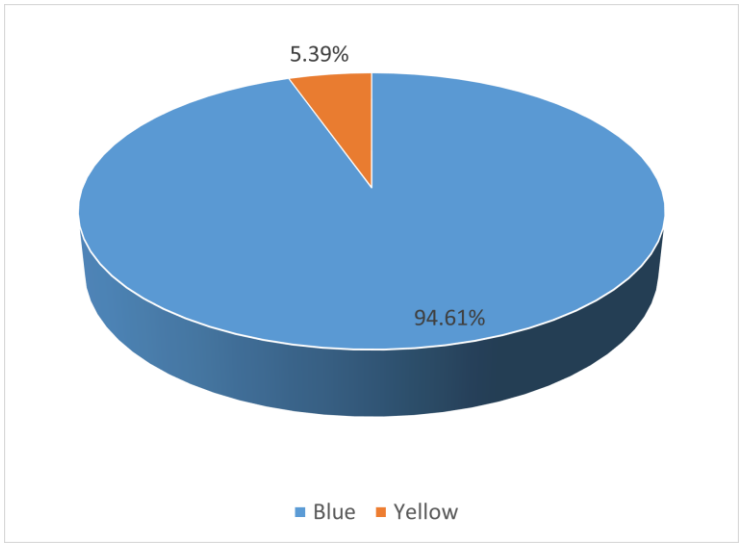
(d)

Figure S4. Characterization of the distribution of pollutant emissions from passing vehicles at intersections (a) Estimation of CO2 emissions at traffic junctions(b) Estimation of CO emissions at traffic

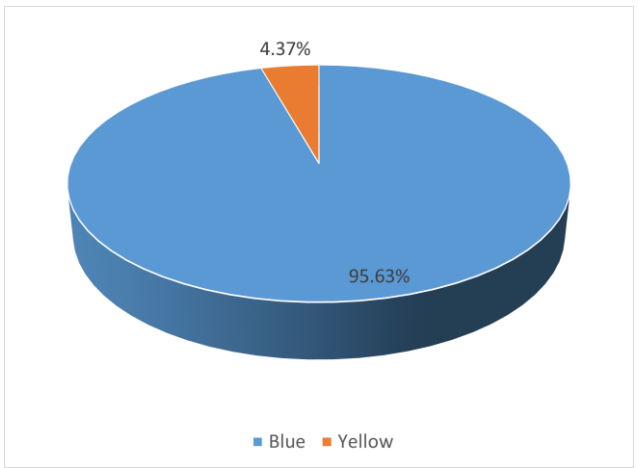
junctions (c) Estimation of NO emissions at traffic junctions (d) Estimation of HC emissions at traffic junctions.



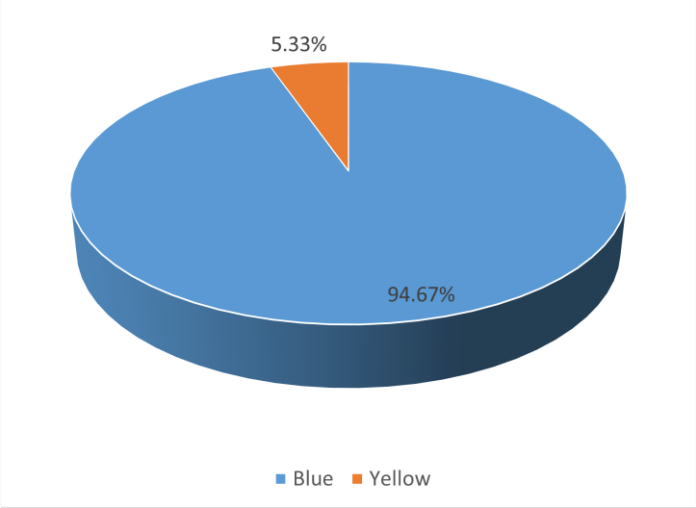
(a) Distribution of CO_2 emissions



(b) Distribution of CO emissions

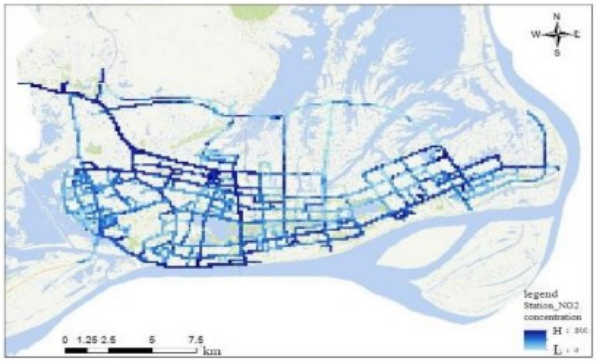


(c) Distribution of NO emissions junctions

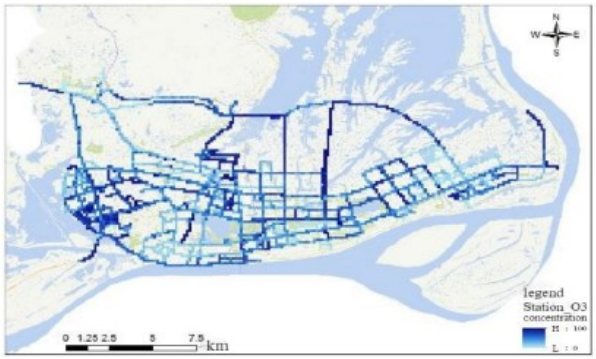


(d) Distribution of HC emissions

Figure S5. Distribution of Di_erent Emissions.



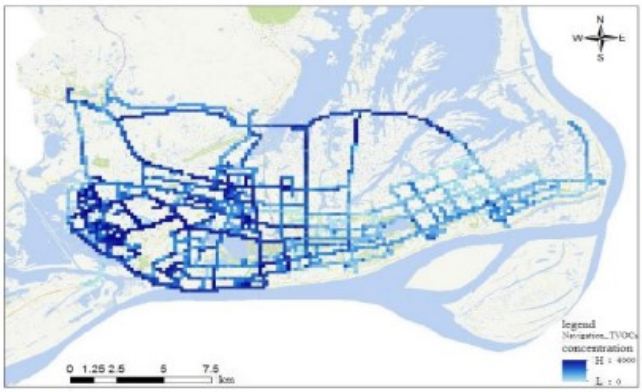
(a) Visualization of NO2 emissions



(b) Visualization of O3 emissions

(c) Visualization of PM2.5 emissions

(d) Visualization of PM10 emissions



(e) Visualization of TVOCs emissions

Figure S6. Visualization of Emissions.

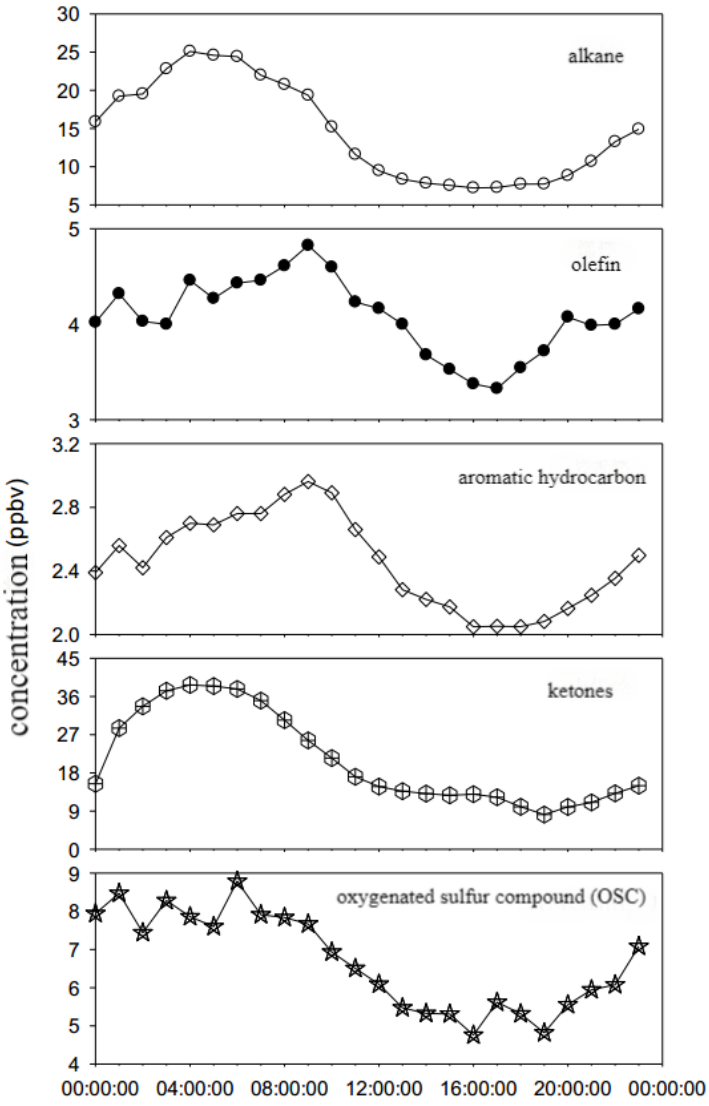


Figure S7. Daily trends of different types of VOCs.

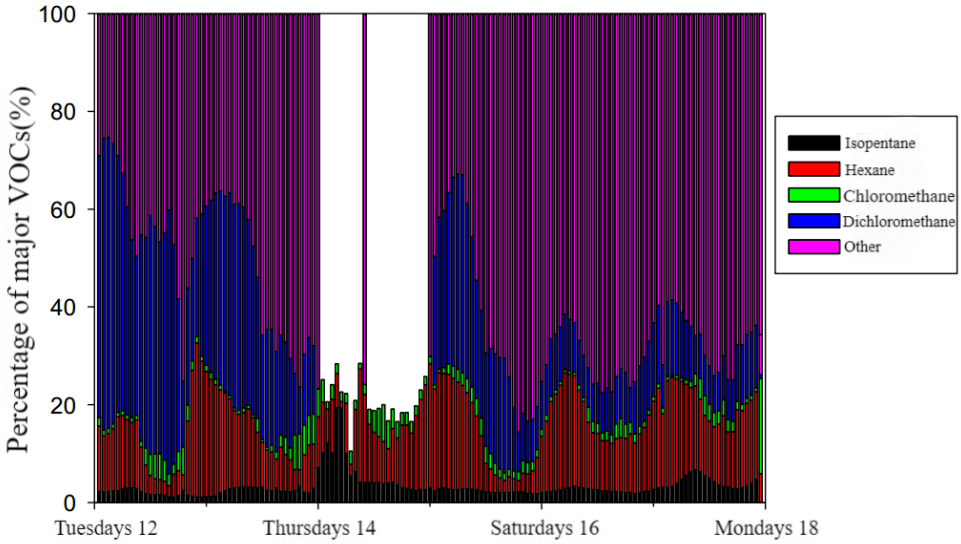


Figure S8. Major VOCs percentage of TVOCs.