atmosphere

Supplementary Materials:

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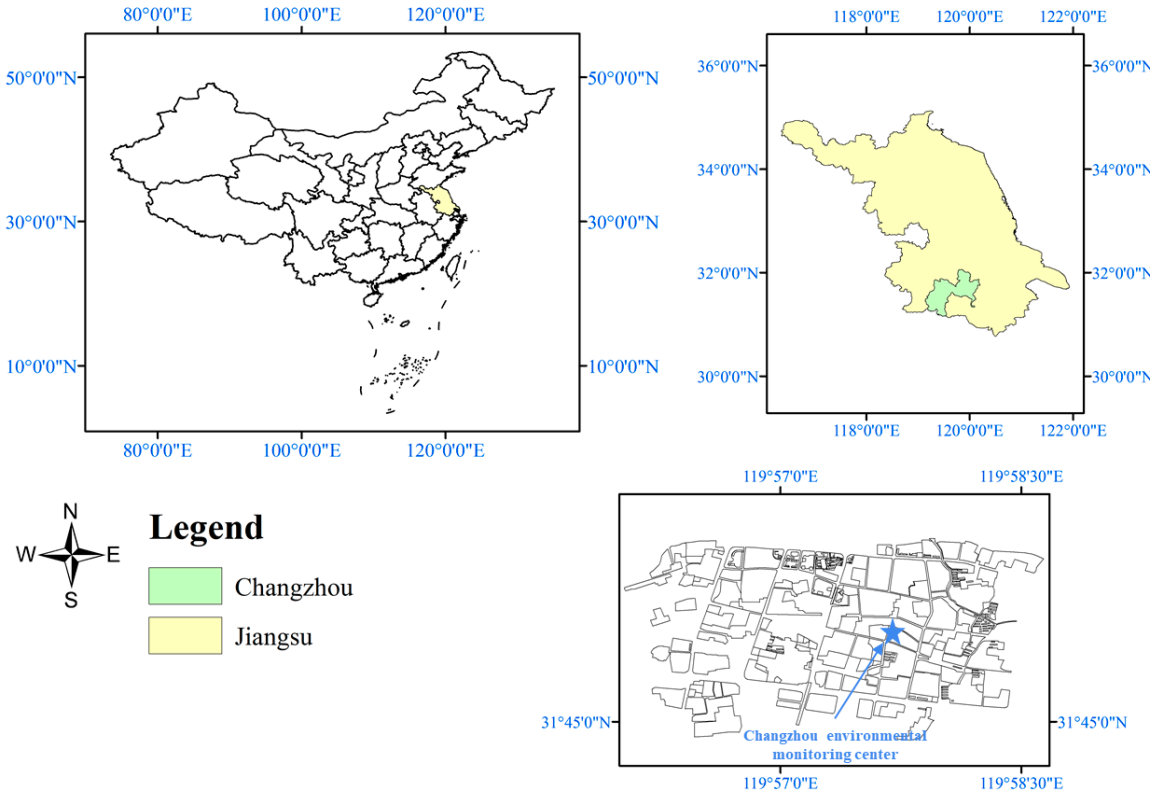

Figure S1. Location of observation sites in Changzhou from 2nd November 2020 to 30th November 2020.

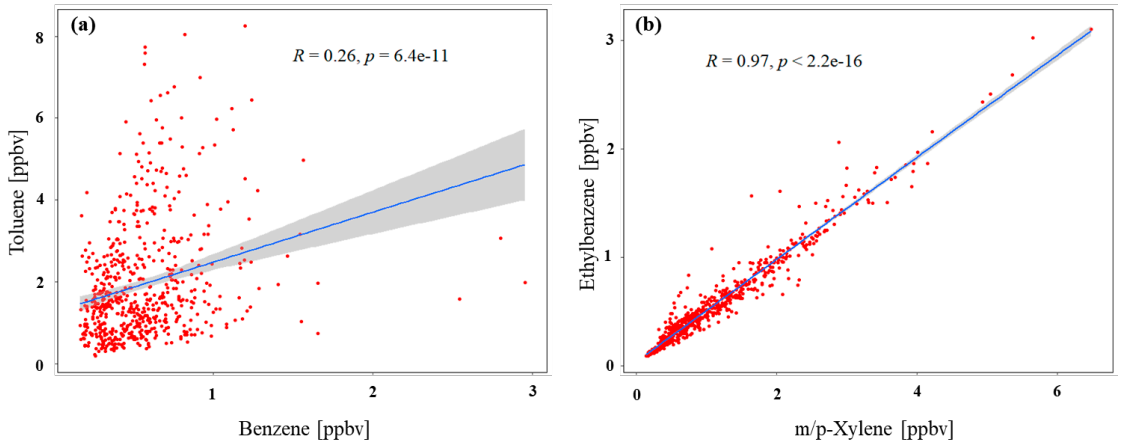

Figure S2. Scatterplot of (a) toluene and benzene and (b) ethylbenzene and m/p-xylene.

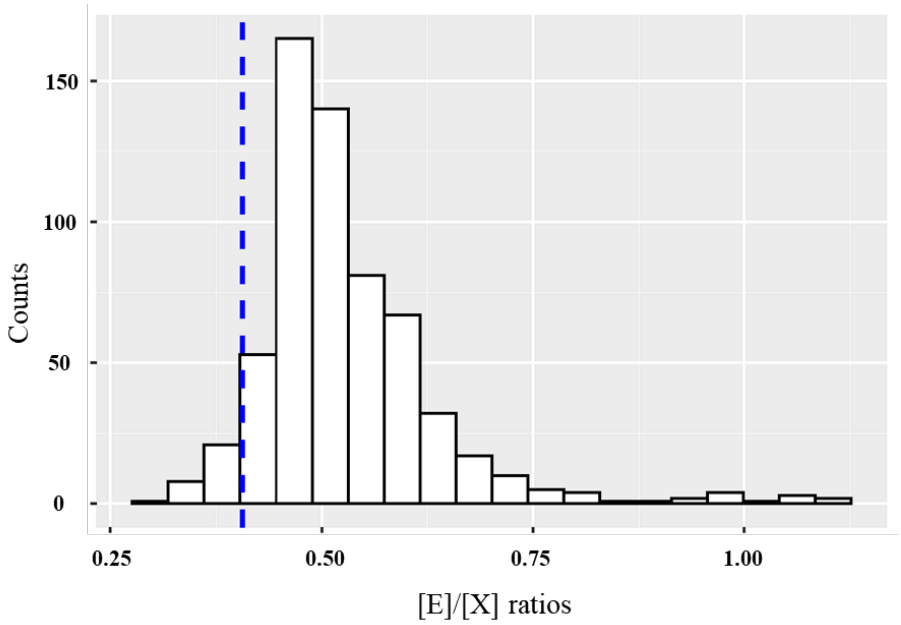

Figure S3. The distribution of measured ethylbenzene to m/p-xylene ratios during the observation.

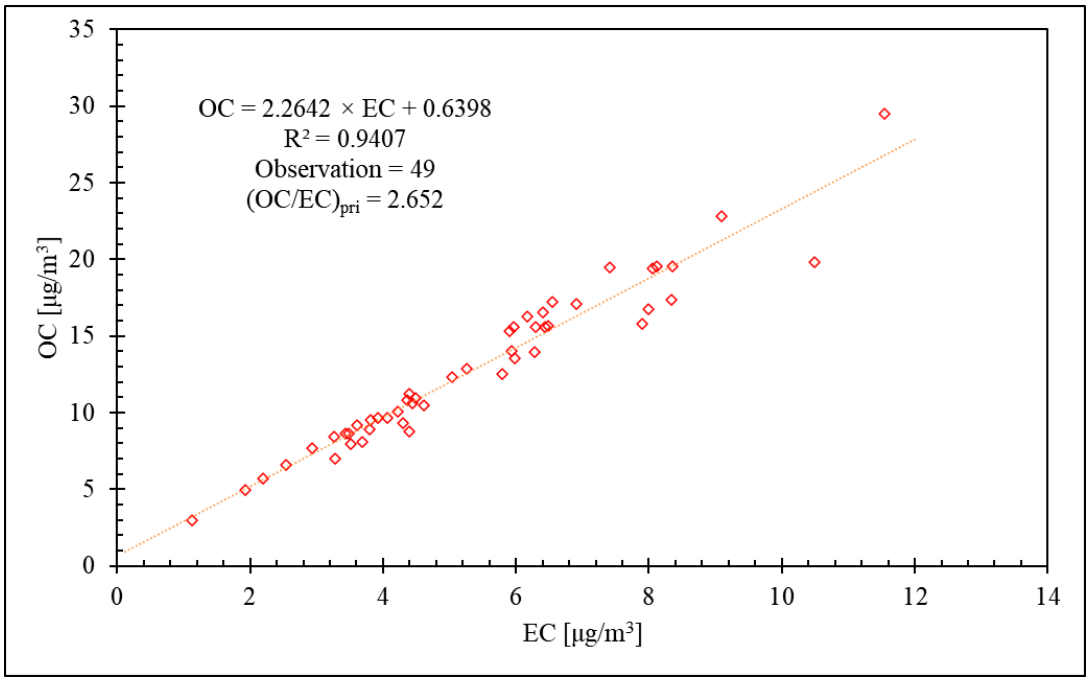

Figure S4. The regression line between OC and EC of the dataset with the lowest 0–10% percentile OC/EC ratios.

Figure S5. Source profiles of measured VOCs in the observation.

Factor 1 has a high content of light halogenated hydrocarbons (commonly used industrial raw materials or media), so we infer it as an industrial factor. Factor 2 has a high content of oxygenated organic, so we infer it as secondary formation. Factor 3 has a high content of C_2-C_6 alkanes, ethylene, and propylene, etc., so we infer it as vehicle emissions.

In factor 4, the dominant species are isopentane and n-pentane, and some methyl tert-butyl ether, which are typical tracers of oil and gas volatilization, so we infer it as gasoline volatilization. In factor 5, the concentration of chloromethane (tracer of biomass combustion) is high, so factor 5 is inferred as biomass burning. Factor 6 has a high content of benzene series, and dichloromethane, etc., so we infer it as the solvent volatilization.

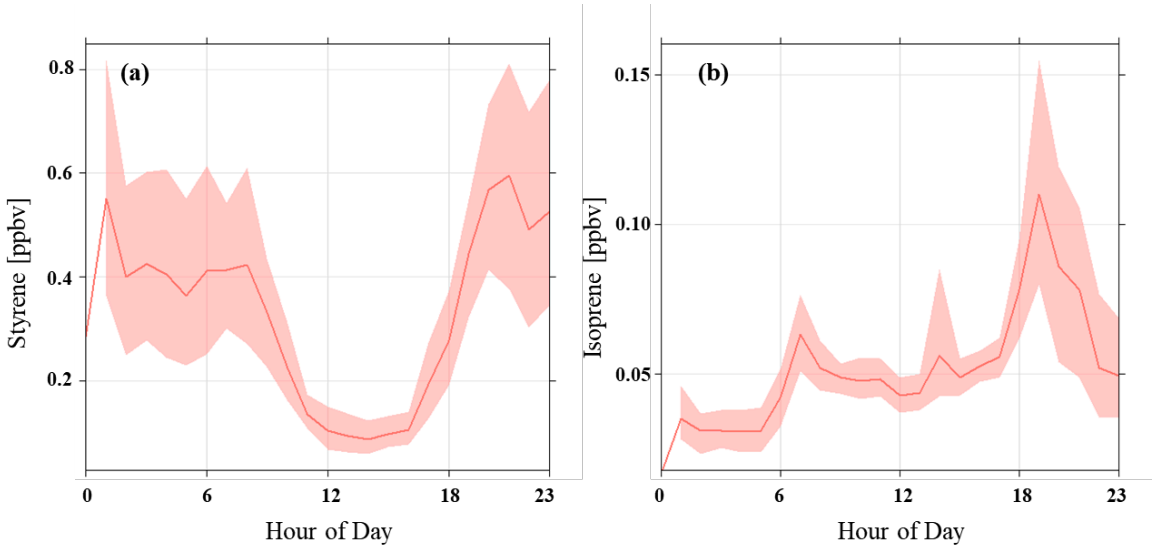

Figure S6. The diurnal variation of (a) styrene and (b) isoprene. The pink area represents the 95%confidence interval.

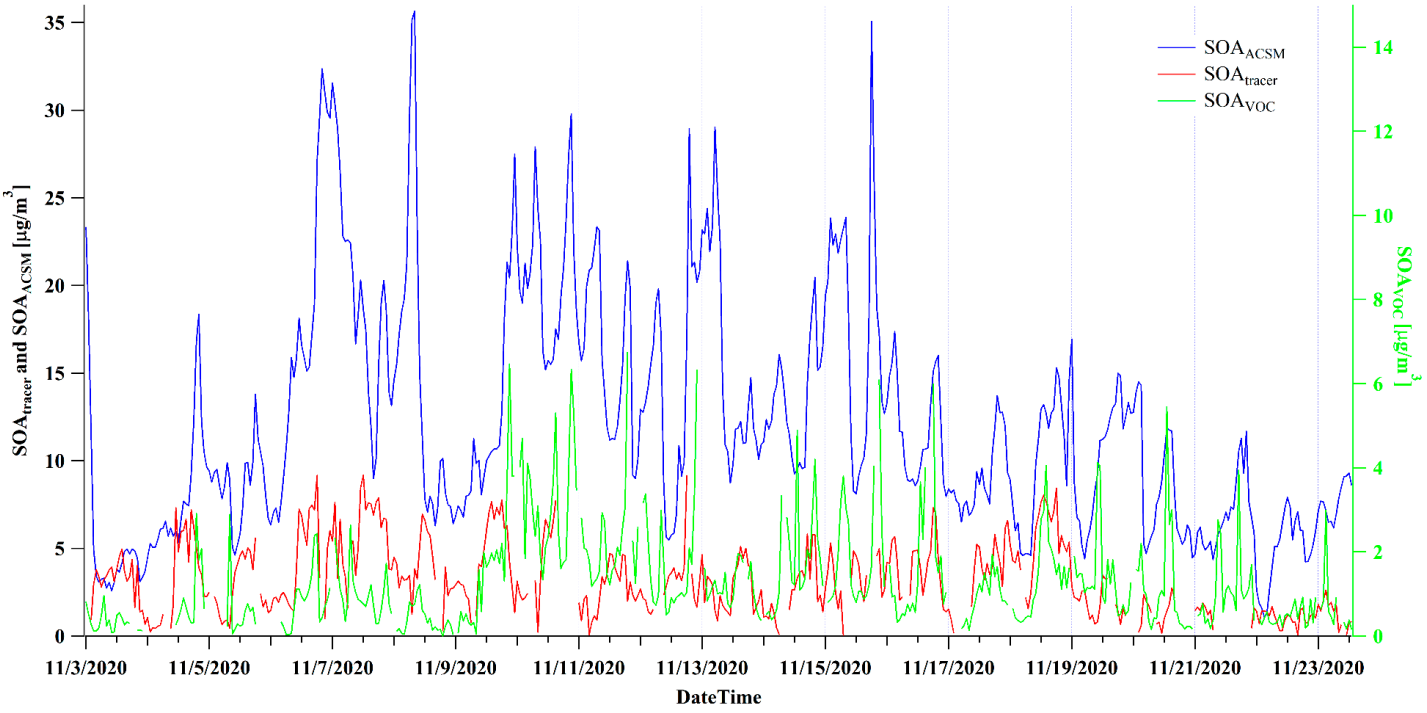

Figure S7. The time series of SOA estimated by different approaches.

Table S1. Summary of the concentrations of VOCs during the observation (Unit: ppbv).

Species	Mean	Median	Species	Mean	Median
Ethane	3.576	3.244	2-Methylhexane	0.100	0.079
Ethylene	1.836	1.599	Cyclohexane	0.166	0.095
Propane	5.649	4.517	2,3-Dimethylpentane	0.046	0.035
Propylene	0.485	0.408	3-Methylhexane	0.114	0.088
Isobutane	1.032	0.860	Carbontetrachloride	0.132	0.130
n-Butane	1.257	1.111	Benzene	0.553	0.502
Acetylene	1.534	1.269	2,2,4-Trimethylpentane	0.024	0.021
trans-2-Butene	0.021	0.018	1,2-Dichloroethane	1.492	1.246
1-Butene	0.119	0.085	*n*-Heptane	0.155	0.115
cis-2-Butene	0.074	0.068	Trichloroethylene	0.184	0.112
Cyclopentane	0.024	0.021	Methylcyclohexane	0.179	0.097
Isopentane	1.161	0.856	2-Pentanone	0.035	0.034
n-Pentane	0.942	0.682	1,2-Dichloropropane	0.413	0.298
Freon114	0.055	0.047	*n*-Pentanal	0.121	0.100
Chloromethane	0.340	0.288	3-pentanone	0.024	0.021
Vinylchloride	0.059	0.022	Bromodichloromethane	0.003	0.003
1,3-Butadiene	0.037	0.029	2,3,4-Trimethylpentane	0.015	0.014
Acetaldehyde	2.747	2.287	2-Methylheptane	0.035	0.028
Bromomethane	0.023	0.018	3-Methylheptane	0.027	0.021
Chloroethane	0.083	0.048	trans-1,3-Dichloropropene	0.002	0.001
Freon11	0.337	0.342	Toluene	1.937	1.509
1-Pentene	0.037	0.033	*n*-octane	0.057	0.048
trans-2-Pentene	0.019	0.014	cis-1,3-Dichloropropene	0.001	0.000
Isoprene	0.052	0.042	1,1,2-Trichloroethane	0.057	0.046
Acrolein	0.212	0.201	Tetrachloroethylene	0.077	0.043
cis-2-Pentene	0.012	0.010	*n*-Hexanal	0.324	0.279
Propanal	0.396	0.360	1,2-Dibromoethane	0.000	0.000
1,1-Dichloroethene	0.003	0.002	Chlorobenzene	0.033	0.021
Freon113	0.104	0.099	Ethylbenzene	0.592	0.459
2,2-Dimethylbutane	0.037	0.035	*n*-Nonane	0.065	0.048
Acetone	4.104	3.858	*m*/*p*-Xylene	1.175	0.880
Acetonitrile	0.427	0.380	*o*-Xylene	0.445	0.346
Dichloromethane	4.786	2.091	Styrene	0.319	0.193
2,3-Dimethylbutane	0.061	0.052	iso-Propylbenzene	0.024	0.016
2-Methylpentane	0.250	0.214	*n*-Propylbenzene	0.024	0.020
3-Methylpentane	0.203	0.182	*m*-Ethyltoluene	0.057	0.044
MTBE	0.331	0.277	*p*-Ethyltoluene	0.029	0.023
1-Hexene	0.029	0.024	*n*-Decane	0.040	0.030
n-Hexane	0.281	0.242	1,3,5-Trimethylbenzene	0.027	0.021
Methacrolein	0.054	0.047	*o*-Ethyltoluene	0.031	0.025
1,1-Dichloroethane	0.022	0.015	1,2,4-Trimethylbenzene	0.085	0.066
2,4-Dimethylpentane	0.026	0.021	1,3-Dichlorobenzene	0.003	0.002
n-Butanal	0.228	0.200	1,4-Dichlorobenzene	0.015	0.012
Methylvinylketone	0.065	0.059	1,2,3-Trimethylbenzene	0.031	0.024
Methylcyclopentane	0.120	0.099	Benzylchloride	0.002	0.002
cis-1,2-Dichloroethene	0.003	0.003	*m*-Diethylbenzene	0.010	0.008
Methylethylketone	1.260	0.904	*p*-Diethylbenzene	0.033	0.024

Species	Mean	Median	Species	Mean	Median
Chloroform	0.282	0.216	1,2-Dichlorobenzene	0.005	0.004
1,1,1-Trichloroethane	0.004	0.004	*n*-Undecane	0.054	0.040