Table S1. VOC species detected in this study.

Species	DL	MIR	M/Z
Aromatics			
Benzene	0.39	0.72	78.0
Toluene	0.29	4	92.1
Ethylbenzene	0.32	6.57	106.1
M-xylene	0.35	9.75	106.1
Paraxylene	0.26	5.84	106.1
Styrene	0.43	1.73	104.1
O-xylene	0.28	7.64	106.1
Cumene	0.04	2.52	105.1
N-propylbenzene	0.02	2.03	91.1
Mesitylene	0.05	11.76	105.1
Tert-butylbenzene	0.06	1.95	119.1
1,2,4-trimethylbenzene	0.04	8.87	105.1
Isobutylbenzene	0.03		105.1
P-isopropyl toluene	0.05		119.1
N-butylbenzene	0.05	2.36	91.1
Naphthalene	0.04	3.34	128.1
Halohydrocarbons			
Trichlorofluoromethane	0.26		100.9
O-chlorotoluene	0.02	2.92	91.1
Chlorobenzene	0.04	0.32	112.0
1,2-dichlorobenzene	0.06	0.178	146
1,3-dichlorbenzene	0.06		146
Para-dichlorobenzene	0.06	0.178	146
1,2,4-trichlorobenzene	0.13		179.9
1,2,3-trichlorobenzene	0.15		179.9
Bromobenzene	0.11		155.9
4-chlorotoluene	0.06		91.1
Vinylidene chloride	1.78	1.79	95.9
Iodomethane	0.23		141.9
Dichloromethane	0.17	0.041	83.9
Trans-1,2-Dichloroethylene	2.24	1.7	95.9
1,1-dichloroethane	0.24	0.069	63
Cis-1,2-Dichloroethene	0.83	1.7	95.9
2,2-dichloropropane	11.02		77
Bromochloromethane	2.39		127.9
Chloroform	0.20	0.022	82.9
1,1,1-trichloroethane	0.51	0.0049	96.9
1,2-dichloroethane	0.26	0.21	62
1,1-dichloropropene	0.33		75
Carbon tetrachloride	0.37		116.9
Trichloroethylene	0.40	0.64	94.9
1,2-dichloropropane	0.25	0.29	63
Dibromomethane	0.40		92.9
Bromodichloromethane	0.24		82.9
1,1,2-trichloroethane	0.22	0.086	82.9
1,3-dichloropropane	0.14		76
Dibromochloromethane	0.17		128.9
Perchloroethylene	0.13	0.031	163.9
1,2-dibromoethane	0.18	0.102	106.9
1,1,2,2-tetrachloroethane	0.16		130.9
Bromoform	0.16		172.8
1,1,1,2-tetrachloroethane	0.10		82.9
1,2-Dibromo-3-chloropropane	3.73		75
Hexachloro-1,3-butadiene	0.12		224.8
Ovocs			
Acetone	0.73	0.36	58.0
2-butanone	0.13		72.0
4-Methyl-2-pentanone	0.21	3.88	100.1
2-hexanone	0.22		43.0
Sulfur compounds			
Carbon disulfide	0.17	0.25	75.9

MDL: Method detection limit (μg m^{-3}); MIR: Maximum incremental reactivity; M/Z: Quantitative ion.

Table S2. Positive matrix factorization (PMF) receptor model input data information (category and S/N).

Species	Category	S/N
Acetone	Strong	1.2
4-Methyl-2-pentanone	Strong	0.5
2-hexanone	Strong	9.9
Dichloromethane	Strong	6.8
Carbon disulfide	Strong	6.0
1,2-Dichloroethane	Strong	1.2
1,2-Dichloropropane	Strong	0.7
Carbon tetrachloride	Strong	0.2
Trichloroethylene	Strong	0.1
Bromodichloromethane	Strong	0.2
Perchloroethylene	Strong	0.1
O-Chlorotoluene	Strong	2.5
4-Chlorotoluene	Strong	2.9
1,2-dichlorobenzene	Strong	0.1
1,2-Dibromo-3-chloropropane	Strong	1.2
Benzene	Strong	0.3
Toluene	Strong	3.1
Ethylbenzene	Strong	0.4
m-Xylene	Weak	0.1
Paraxylene	Strong	0.1
O-Xylene	Strong	0.2
Cumene	Strong	0.5
N-propylbenzene	Strong	2.4
Mesitylene	Strong	0.8
1,2,4-Trimethylbenzene	Strong	1.3
Isobutylbenzene	Strong	0.7
P-isopropyl toluene	Strong	1.0
N-butylbenzene	Strong	4.9
Naphthalene	Strong	0.8

Table S3. Top ten VOCs during the heating seasons in 2020 and 2021

Species	2020		Species	2021	
	μg·m^{-3}	fractions %		μg·m^{-3}	fractions %
1,2-Dibromo-3-chloropropane	11.90	30.81	Carbon disulfide	2.90	8.83
2-hexanone	7.17	18.55	2-hexanone	1.08	3.30
Vinylidene chloride	2.82	7.31	O-Chlorotoluene	0.99	3.02
Carbon disulfide	2.67	6.91	4-Chlorotoluene	0.93	2.83
Acetone	2.34	6.05	n-butylbenzene	0.89	2.71
Dichloromethane	2.10	5.45	n-propylbenzene	0.83	2.53
Toluene	1.76	4.56	Cumene	0.79	2.40
1,2-Dichloropropane	0.62	1.61	Acetone	0.72	2.18
1,2-Dichloroethane	0.60	1.56	Benzene	0.71	2.16
Benzene	0.60	1.55	2-Butanone	0.70	2.13

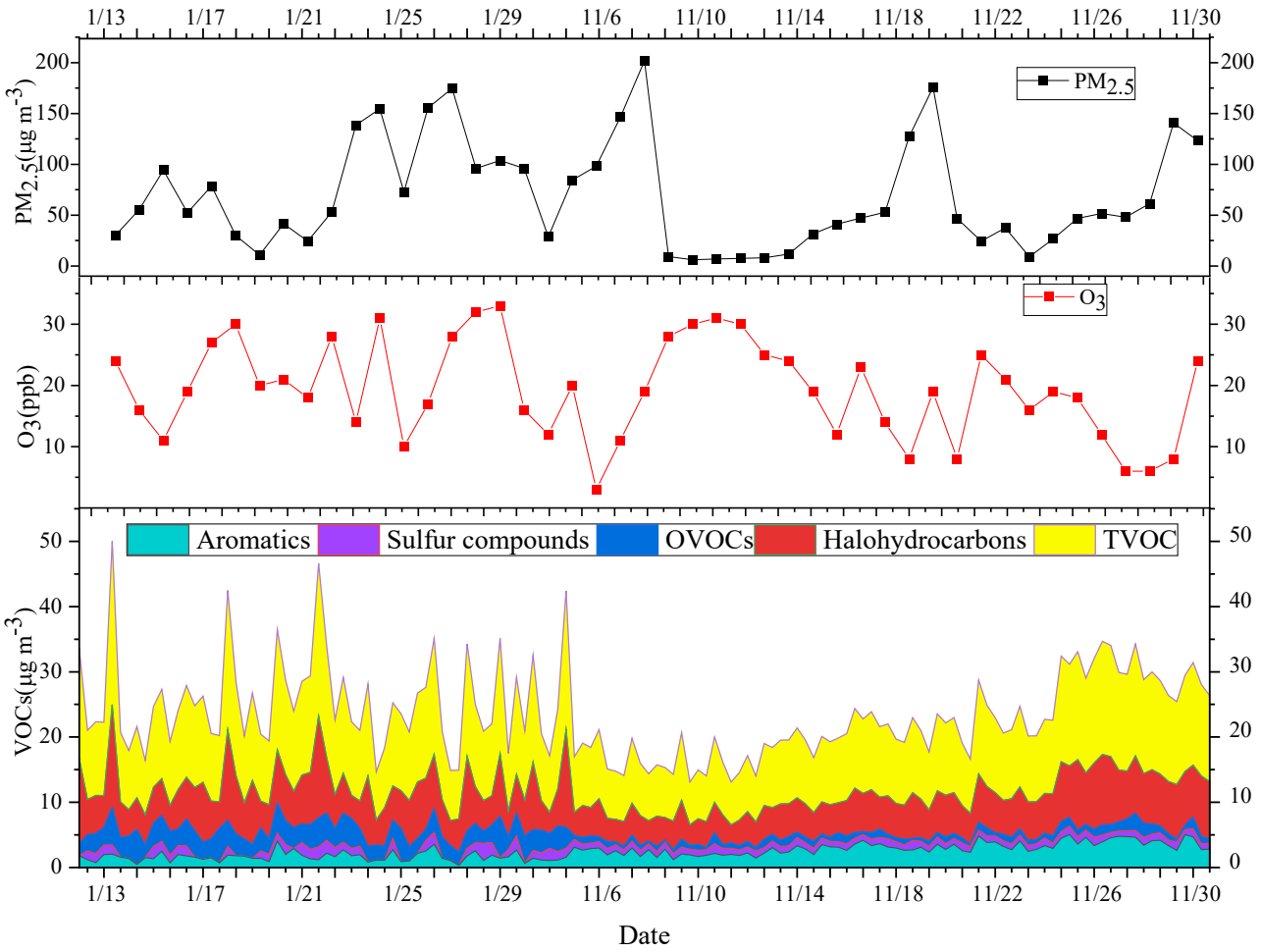

Fig. S1. Time serious of O_3 and VOCs in the heating season of 2020.

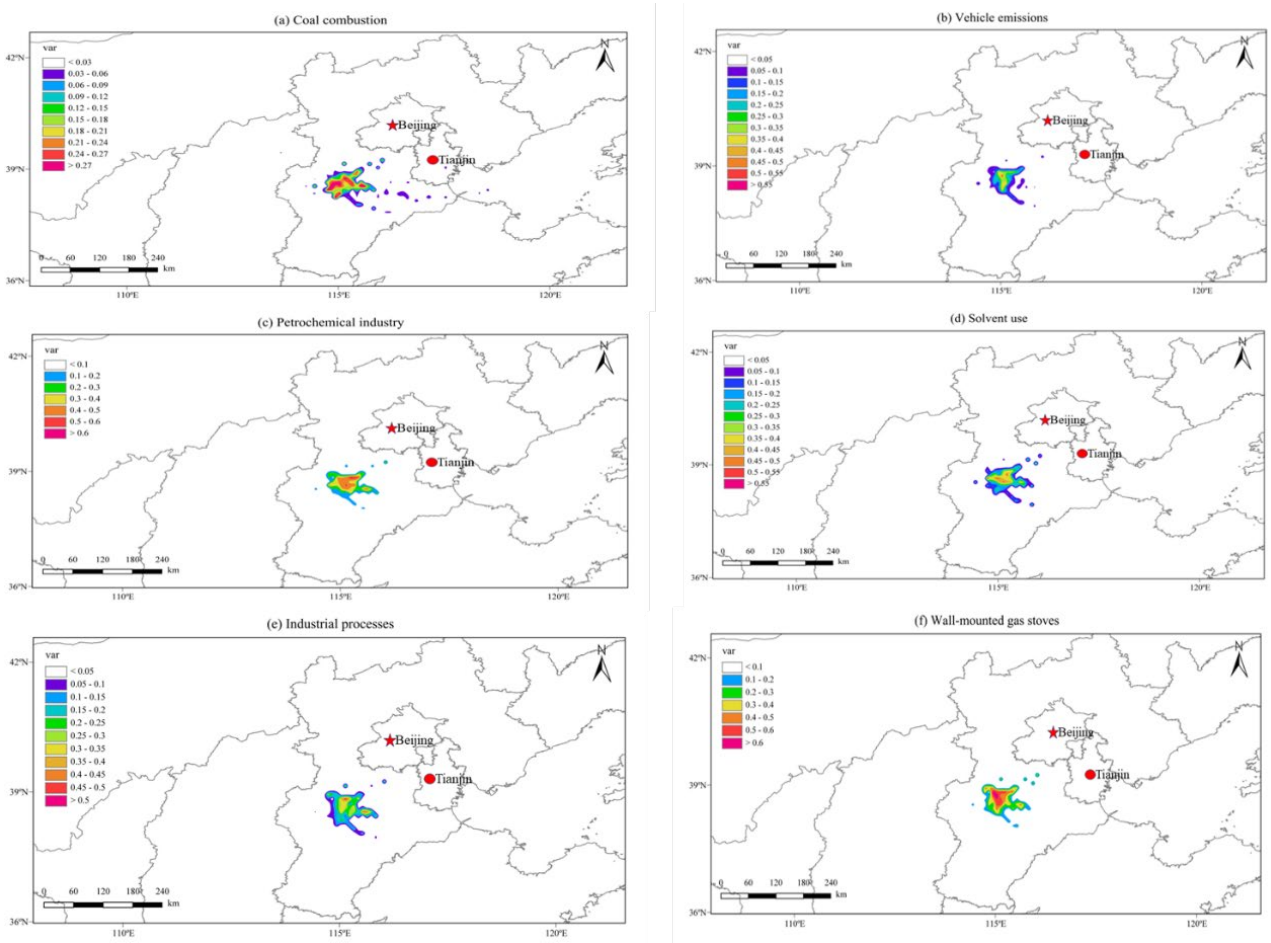

Fig. S2. PSCF analysis for different VOC sources.