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Insights into ozone pollution control in urban areas by decoupling meteorological factors based on machine learning

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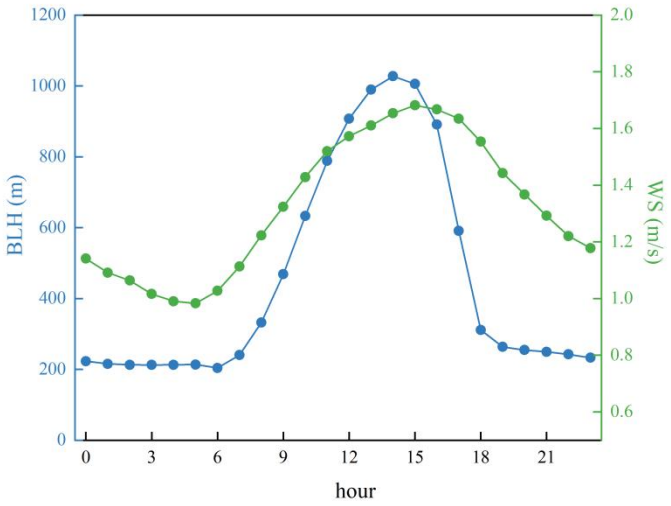


Figure S1: Mean diurnal variations of WS and BLH.

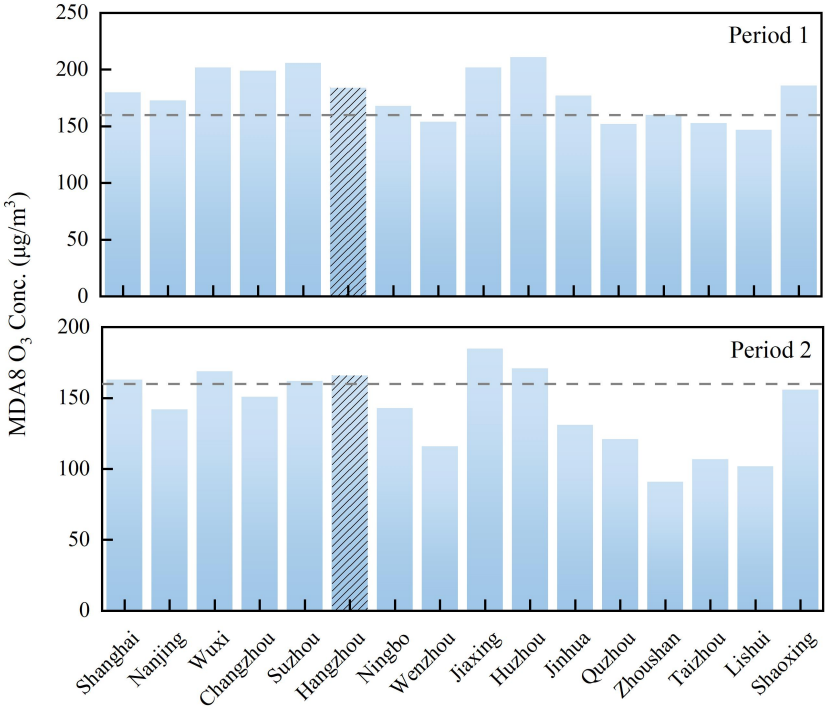


Figure S2: The MDA8 O_3 concentration in Hangzhou and surrounding cities in the Period 1 and Period 2.

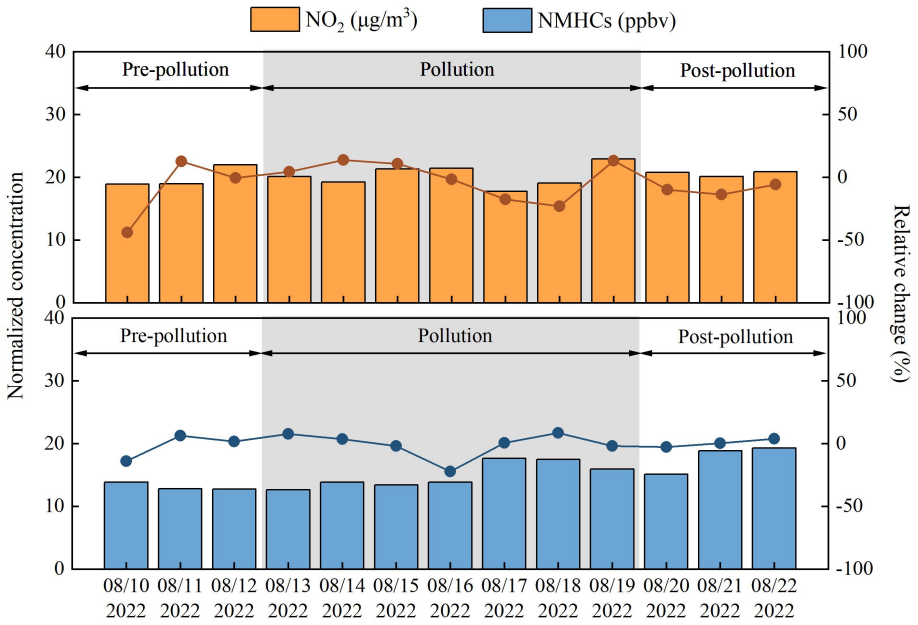
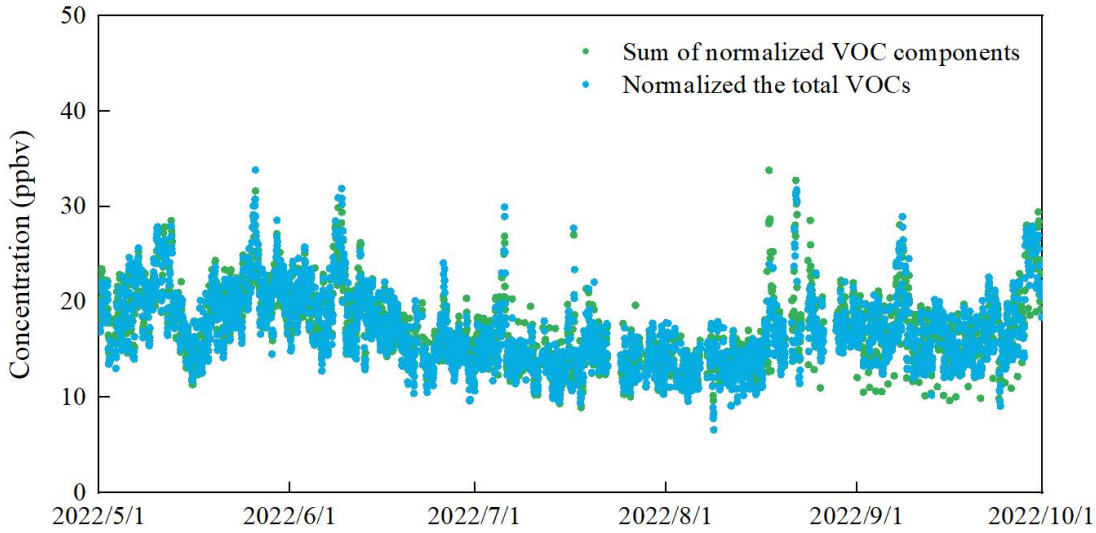


Figure S3: Variation of the normalized concentrations of precursors and relative contribution of dispersion in the Period 2. The histogram represented the NO_2 and NMHCs concentrations after meteorological normalization, and the dot plot represented the relative change caused by dispersion.



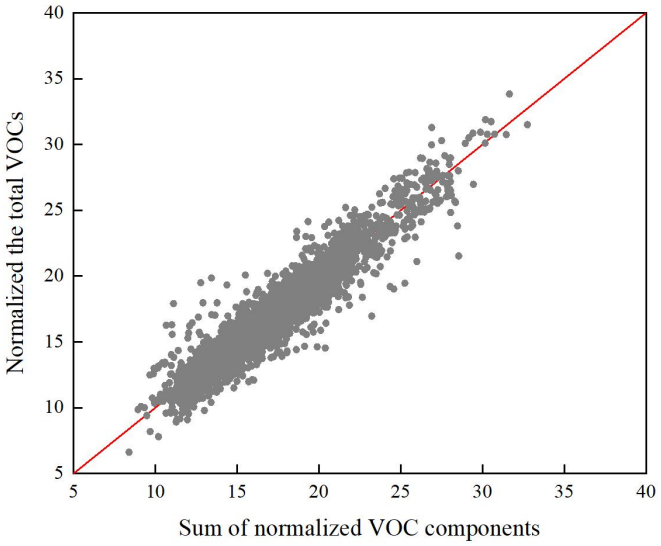


Figure S4: Time series and correlation of the sum of normalized VOC species and normalized total VOCs.

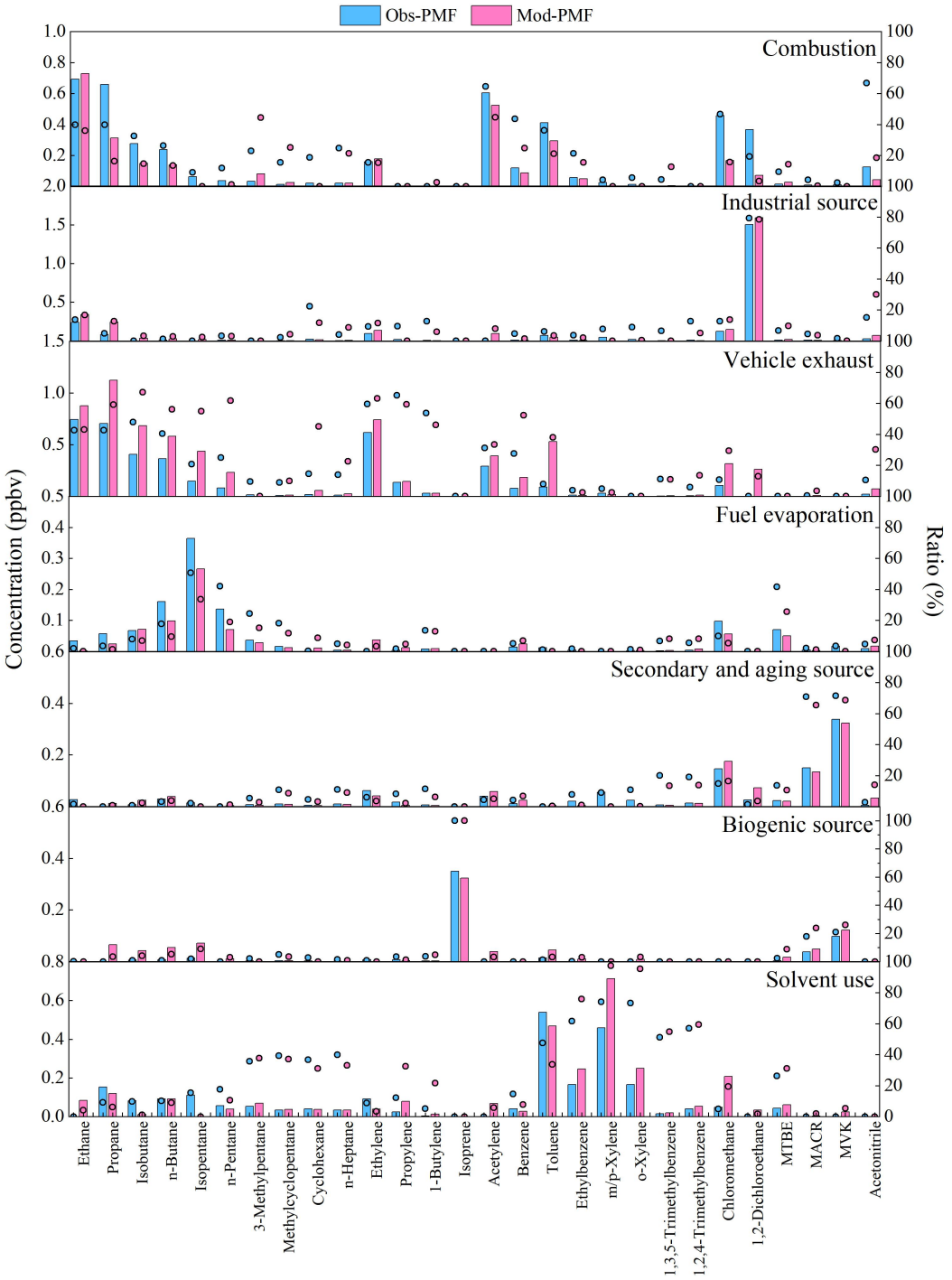


Figure S5: Source profiles and contributions of VOCs based on observed and normalized concentrations from May to September in 2022 . Bars represented the concentration of each species apportioned to the factor, dots represented the percent of each species apportioned to the factor.

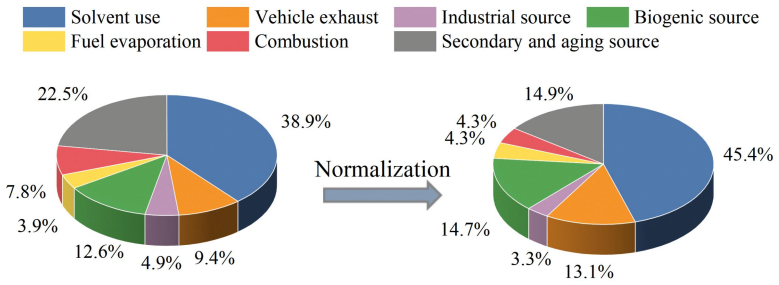


Figure S6: Contribution of emission sources to OFP before and after meteorological normalization during the pollution periods in the Period 2.

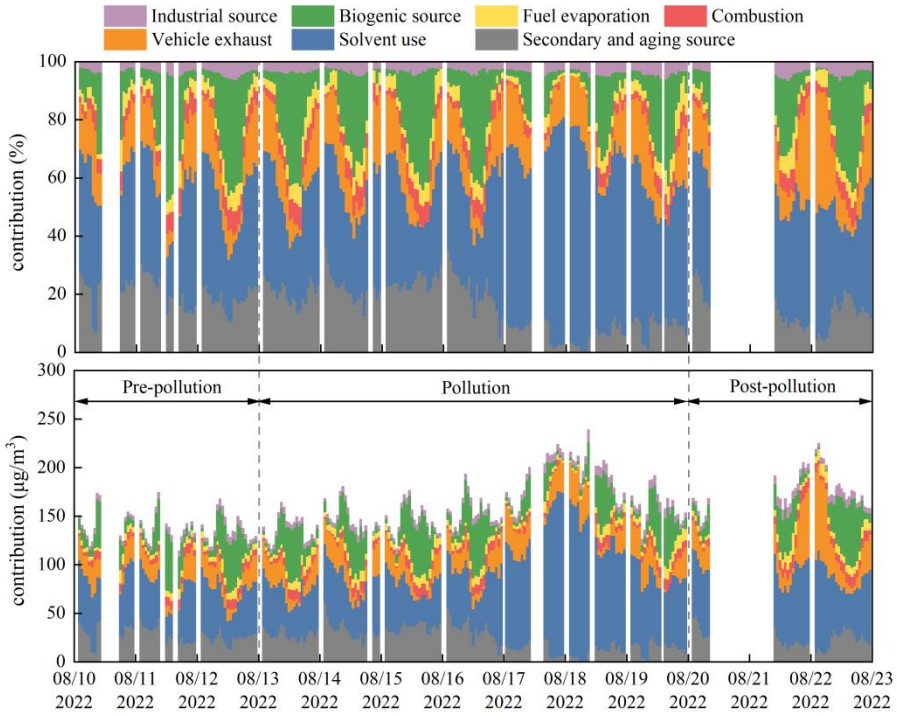


Figure S7: Temporal variation of emission sources contributions to OFP after meteorological normalization in the Period 2.

Table S1. The list of VOC species in this study.

Species name	Species name	Species name
Alkanes	cis-2-Butene	Dichloromethane
Ethane	1,3-Butadiene	1,1-Dichloroethane
Propane	1-Pentene	cis-1,2-Dichloroethylene
Isobutane	trans-2-Pentene	Chloroform
n-Butane	cis-2-Pentene	1,1,1-Trichloroethane
Isopentane	1-Hexene	Tetrachloromethane
n-Pentane	Isoprene	1,2-Dichloroethane
cyclopentane	**Alkyne**	Trichloroethylene
2,2-Dimethylbutane	Acetylene	1,2-Dichloropropane

2,3-Dimethylbutane	**Aromatics**	Bromodichloromethane
2-Methylpentane	Benzene	trans-1,3-Dichloropropene
3-Methylpentane	Toluene	cis-1,3-Dichloropropene
n-Hexane	Ethylbenzene	1,1,2-Trichloroethane
Cyclohexane	m,p-Xylene	Tetrachloroethylene
Methylcyclopentane	o-Xylene	1,2-Dibromoethane
2,3-Dimethylpentane	Styrene	Chlorobenzene
2,4-Dimethylpentane	Isopropylbenzene	1,3-Dichlorobenzene
2-Methylhexane	n-Propylbenzene	1,4-Dichlorobenzene
3-Methylhexane	2-Ethyltoluene	Benzylchloride
n-Heptane	3-Ethyltoluene	1,2-Dichlorobenzene
Methylcyclohexane	4-Ethyltoluene	**OVOCs**
2,2,4-Trimethylpentane	1,3,5-Trimethylbenzene	Acrolein
2,3,4-Trimethylpentane	1,2,4-Trimethylbenzene	Acetone
2-Methylheptane	1,2,3-Trimethylbenzene	Propanal
3-Methylheptane	1,3-Diethylbenzene	Methacrolein
Octane	1,4-Diethylbenzene	Methylethylketone
n-Nonane	**Halohydrocarbons**	n-Butanal
n-Decane	Freon114	n-Pentanal
Undecane	Chloromethane	n-Hexanal
Dodecane	VinylChloride	MTBE
Alkenes	Bromomethane	Methylvinylketone
Ethylene	Chloroethane	2-Pentanone
Propene	Freon11	3-Pentanone
1-Butene	1,1-Dichloroethylene	**Others**
trans-2-Butene	Freon113	Acetonitrile

Table S2. RF model performance for testing data set .

Pollutants	r^2	RMSE	FAC2	MB	MGE	NMB	NMGE	COE	IOA
O_3	0.88	17.33	0.80	-0.34	12.70	-0.01	0.22	0.68	0.84
NO_2	0.83	9.43	0.97	0.11	6.85	0.00	0.18	0.62	0.81
NMHCs	0.76	6.41	0.99	-0.11	4.60	0.00	0.20	0.54	0.77