

Supplementary Materials:

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Table S1. Mean values of different meteorological variables in different seasons.

	Spring				Summer				Autumn				Winter			
	Min	Max	Mean	Std ^a	Min	Max	Mean	Std	Min	Max	Mean	Std	Min	Max	Mean	Std
Wind Speed(m·s ⁻¹)	0.10	7.20	2.14a	1.05	0.10	7.70	1.91b	0.92	0.10	5.10	1.86b	0.87	0.10	6.10	1.89b	1.01
Temperature(°C)	0.40	31.70	16.0c	6.85	15.2	36.4	26.1a	3.67	2.30	30.8	17.9b	5.49	-5.10	17.3	5.13d	3.87
Relative Humidity(%)	0	98.00	60.5c	24.7	20.0	98.0	74.4a	17.6	18.0	97.0	72.4b	18.4	14.0	96.0	59.9c	21.6

^a represents the Standard deviation of different variables.

same lowercase letters indicate non-significant differences between years for the same species ($P > 0.05$); different lowercase letters indicate a significant level of difference ($P < 0.05$).

Table S2. Comparisons of TVOC measured in Nanjing and other cities in China (unit: ppbv).

	This study	Beijing	Shanghai	Wuhan	Guangzhou
Sampling Period	2014.9–2015.8	2016.1,3,7,10	2017.5.20–30	2016.11–2017.8	2011.5–2012.6
TVOC	38.6±21.4	44.0 ± 28.9	42.7	34.7	42.7
Alkanes	18.4±10.0	16.2 ± 10.9	15.2	15.9	26.2
Alkenes	7.05±6.04	5.24 ± 5.77	2.96	4.19	7.33
Alkynes	3.75±2.37	3.13 ± 3.43	1.20	2.35	
Aromatics	9.36±7.73	3.39 ± 3.08	12.67	3.23	11.0
Reference		[77]	[82]	[63]	[83]

Table S3. Correlation between pollutants and meteorological variables.

	TVOC	NO	NO ₂	NO _x	O ₃	SO ₂	CO	PM _{2.5}	Wind Speed	Temperature	Relative Humidity
TVOC	1										
NO	0.545**	1									
NO ₂	0.577**	0.672**	1								
NO _x	0.615**	0.895**	0.932**	1							
O ₃	-0.216**	-0.273**	-0.043	-0.160**	1						
SO ₂	0.418**	0.624**	0.753**	0.759**	-0.029	1					
CO	0.555**	0.662**	0.738**	0.769**	-0.152**	0.722**	1				
PM _{2.5}	0.488**	0.457**	0.455**	0.497**	-0.049	0.300**	0.502**	1			
Wind Speed	-0.201**	-0.258**	-0.357**	-0.342**	0.091	-0.085	-0.208**	-0.251**	1		
Temperature	-0.032	-0.270**	0.012	-0.124*	0.331**	-0.066	0.004	-0.284**	0.018	1	
Relative Humidity	0.082	-0.225**	-0.312**	-0.298**	-0.100	-0.491**	-0.165**	-0.071	-0.028	0.296**	1

** represents significant at 99% confidence level.

* represents significant at 95% confidence level.

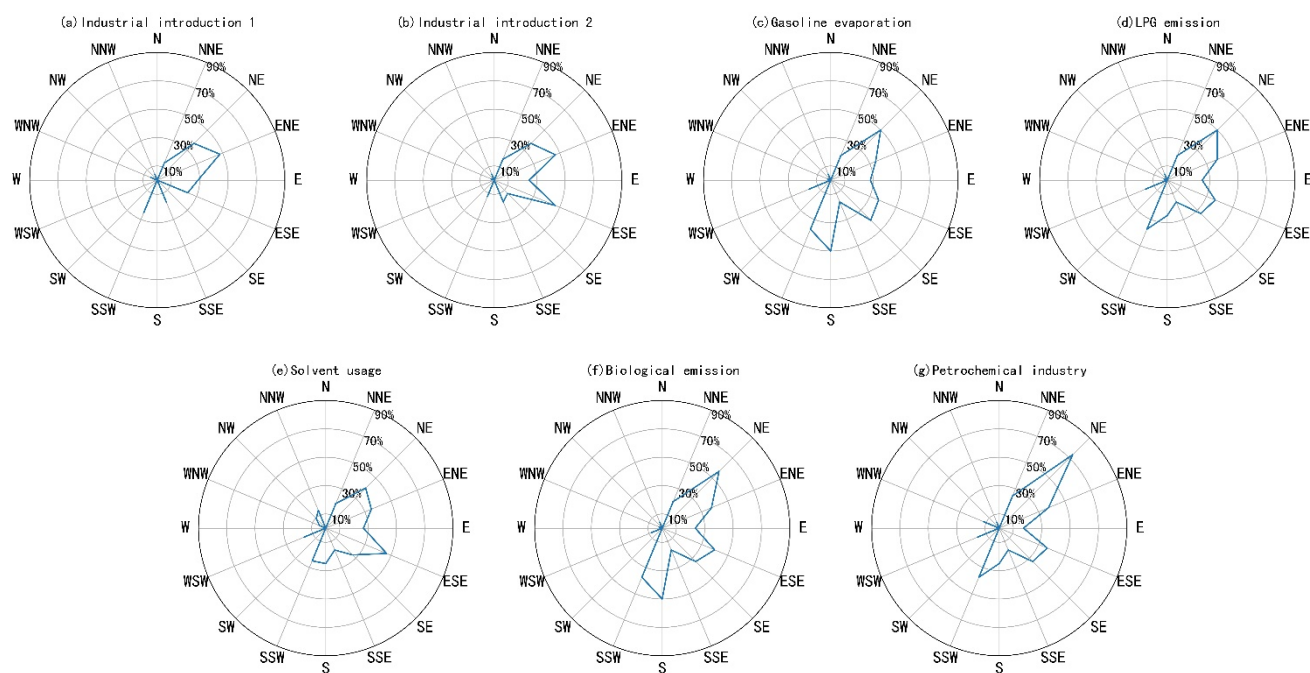


Figure S1. CPF plots of the PMF source profiles in Autumn. (a) Industrial introduction 1; (b) Industrial introduction 2; (c) Gasoline evaporation; (d) LPG emission; (e) Solvent usage; (f) Biological emission; (g) Petrochemical industry.

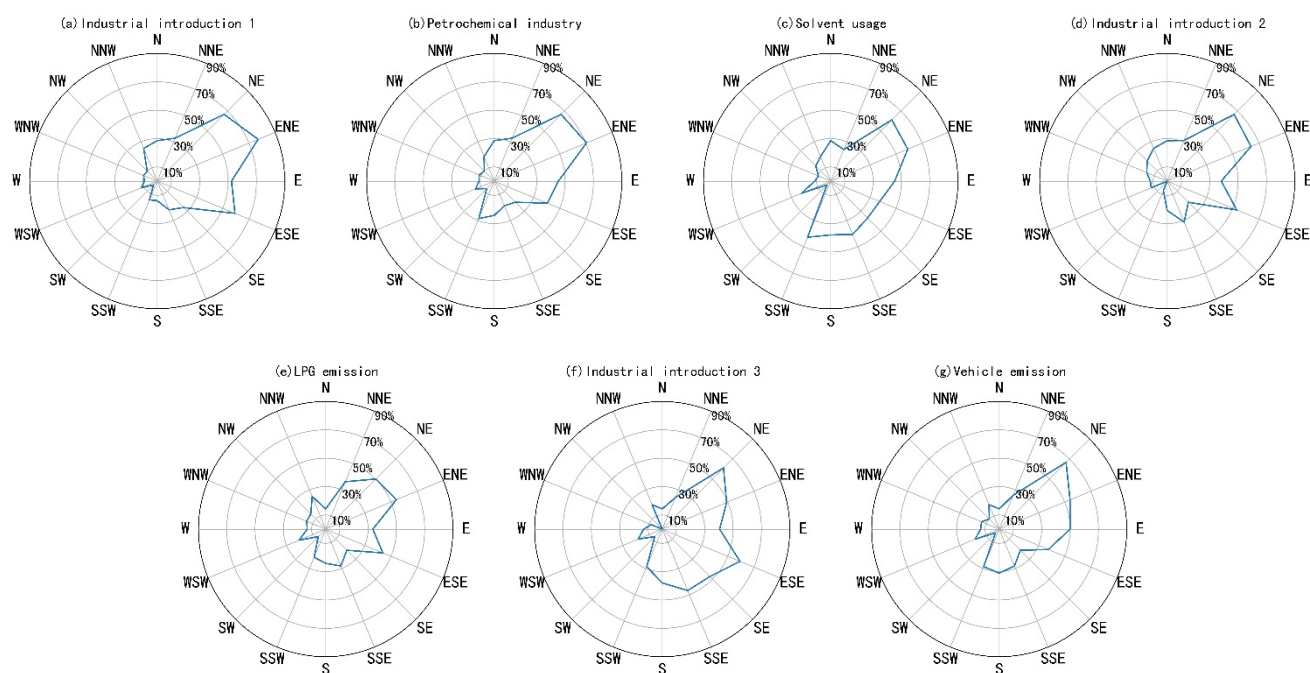


Figure S2. CPF plots of the PMF source profiles in Winter. (a) Industrial introduction 1; (b) Petrochemical industry; (c) Solvent usage; (d) Industrial introduction 2; (e) LPG emission; (f) Industrial introduction 3; (g) Vehicle emission.

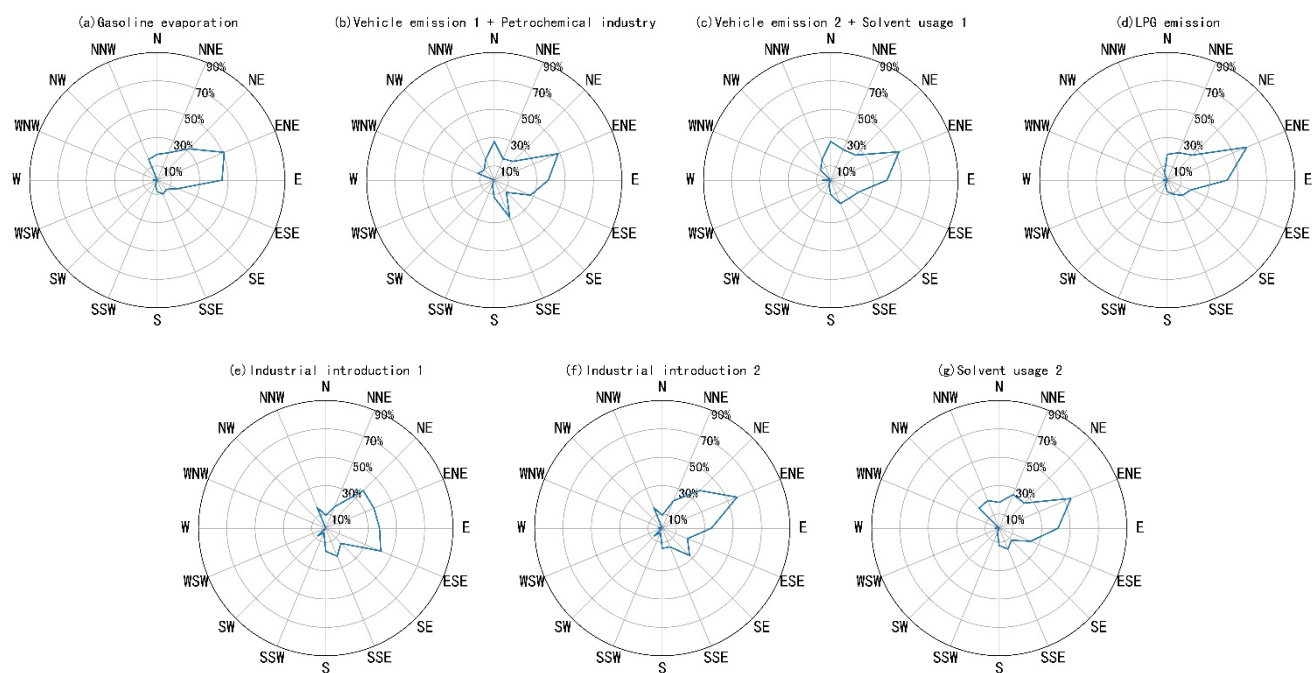
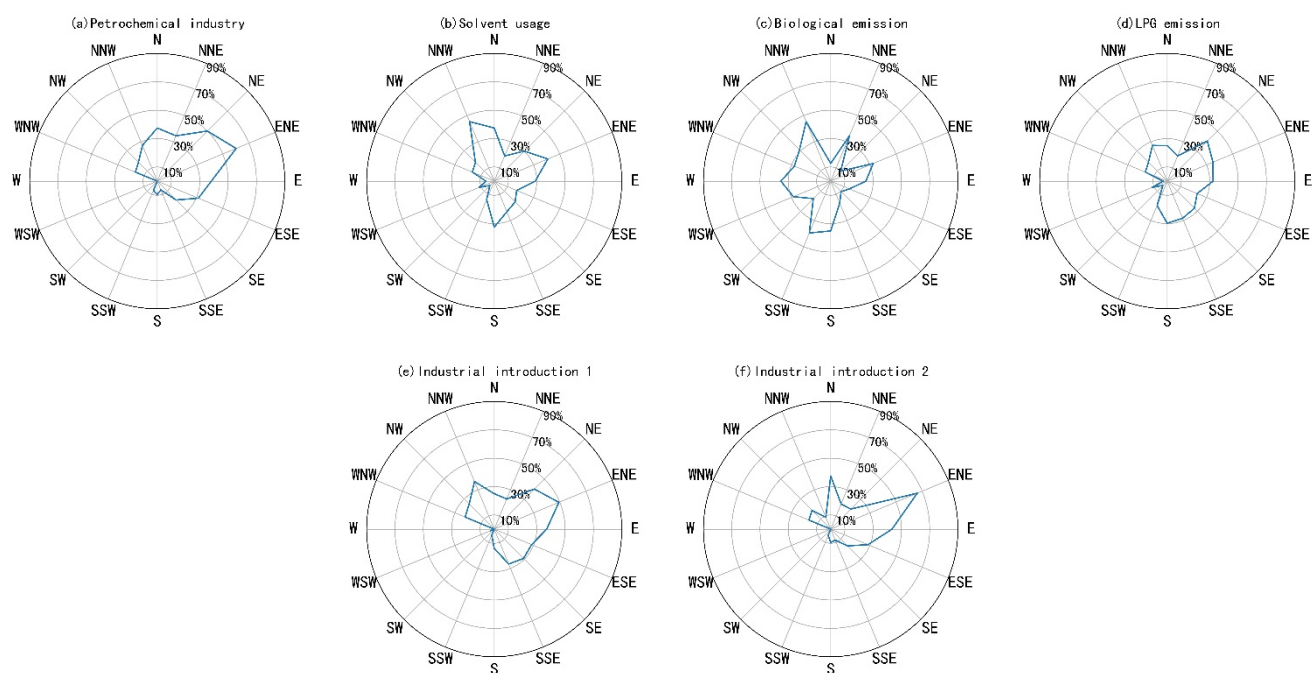


Figure S3. CPF plots of the PMF source profiles in Spring. (a) Gasoline evaporation; (b) Vehicle emission 1 + Petrochemical industry; (c) Vehicle emission 2 + Solvent usage 1; (d) LPG emission; (e) Industrial introduction 1; (f) Industrial introduction 2; (g) Solvent usage 2.



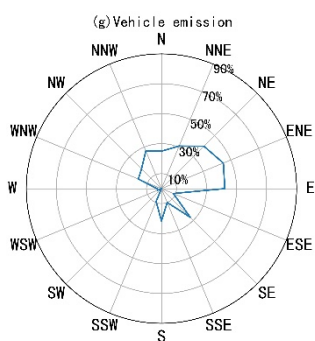
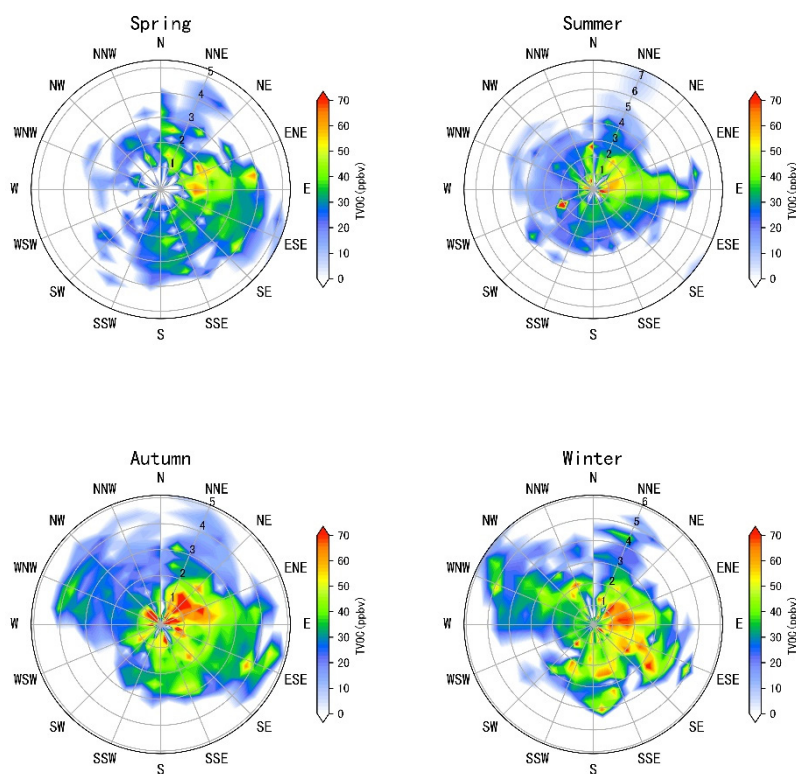
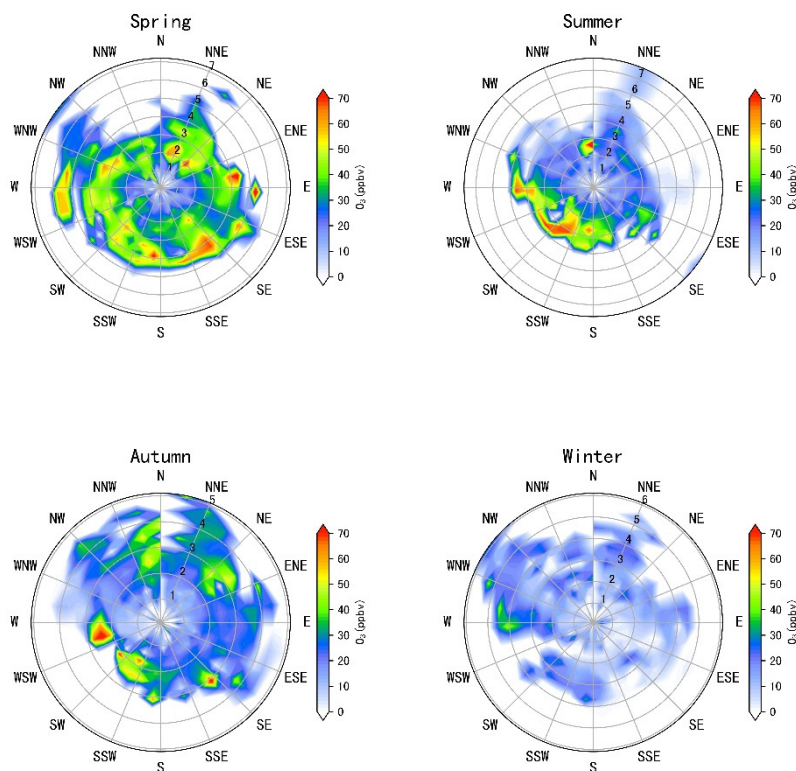


Figure S4. CPF plots of the PMF source profiles in Summer. (a) Petrochemical industry; (b) Solvent usage; (c) Biological emission; (d) LPG emission; (e) Industrial introduction 1; (f) Industrial introduction 2; (g) Vehicle emission.



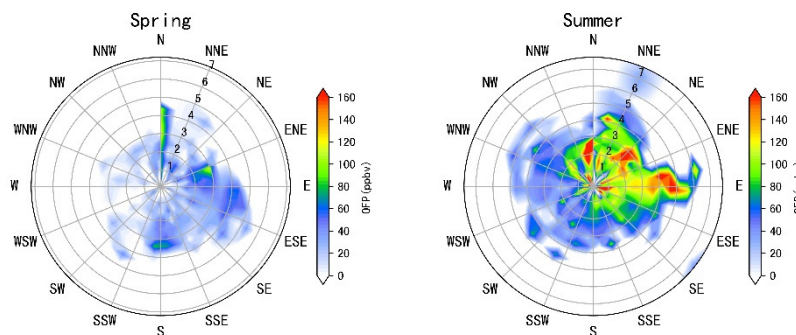
Note: The value on the circle indicates the wind speed (unit: $\text{m}\cdot\text{s}^{-1}$)

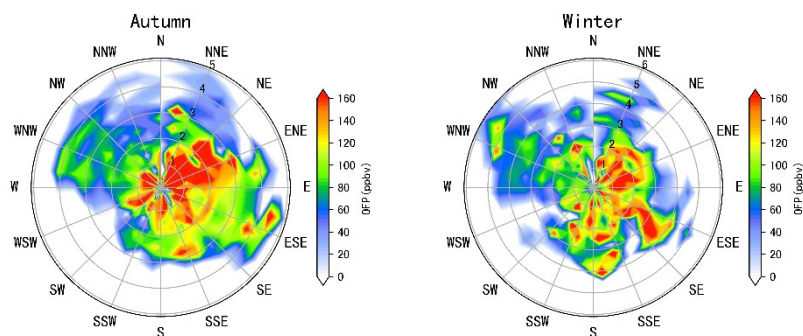
Figure S5. Windrose of the TVOC in different seasons.



Note: The value on the circle indicates the wind speed (unit: $\text{m}\cdot\text{s}^{-1}$)

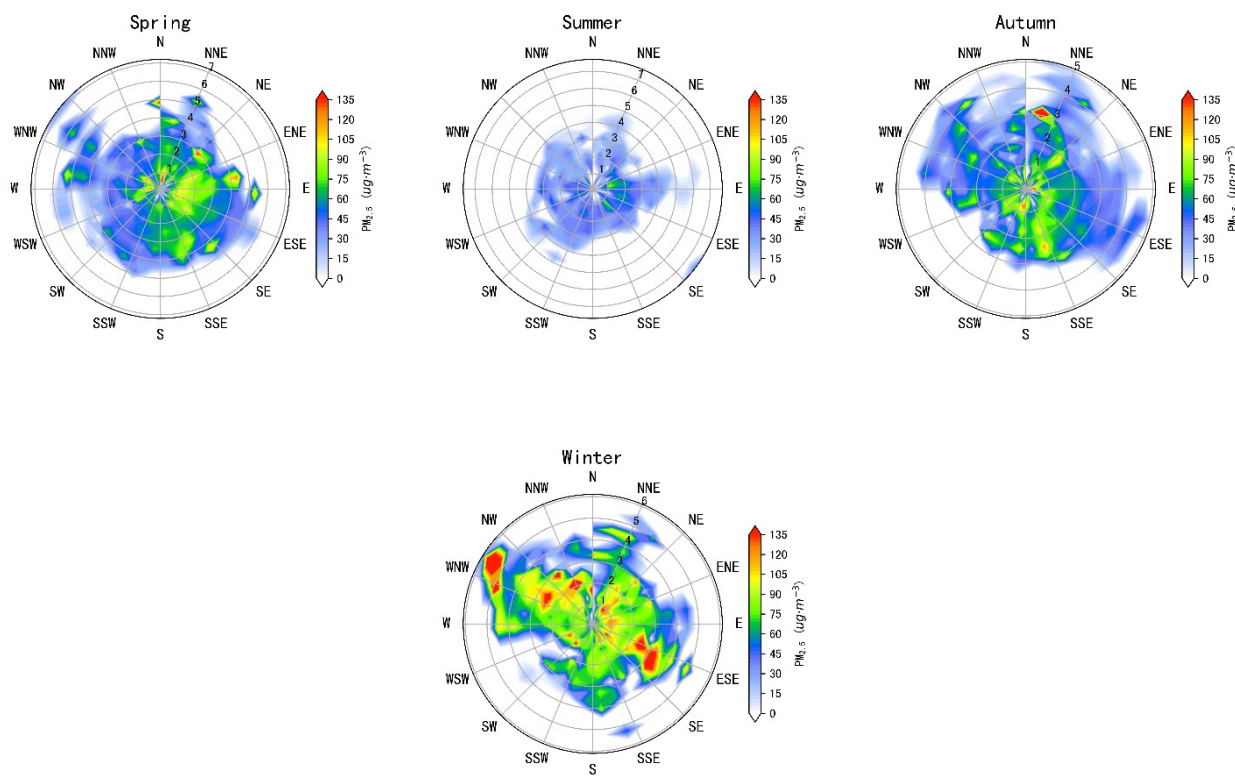
Figure S6. Windrose of the O₃ in different seasons.





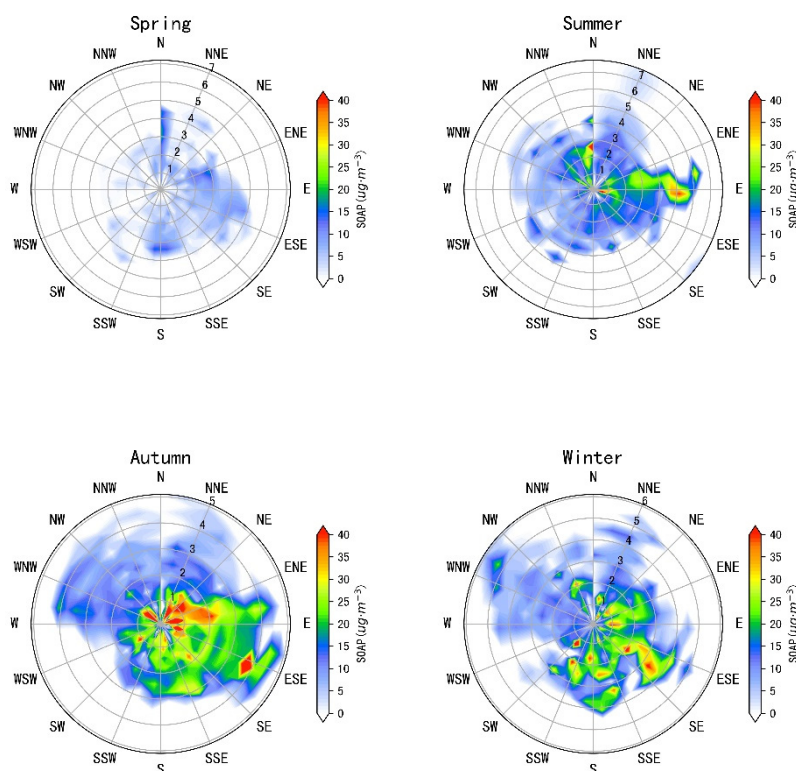
Note: The value on the circle indicates the wind speed (unit: $\text{m}\cdot\text{s}^{-1}$)

Figure S7. Windrose of the OFP in different seasons.



Note: The value on the circle indicates the wind speed (unit: $\text{m}\cdot\text{s}^{-1}$)

Figure S8. Windrose of the $\text{PM}_{2.5}$ in different seasons.



Note: The value on the circle indicates the wind speed (unit: $\text{m}\cdot\text{s}^{-1}$)

Figure S9. Windrose of the SOAP in different seasons.

References

82. Liu, Y.; Wang, H.; Jing, S.; Gao, Y.; Peng, Y.; Lou, S.; Cheng, T.; Tao, S.; Li, L.; Li, Y.; et al. Characteristics and sources of volatile organic compounds (VOCs) in Shanghai during summer: Implications of regional transport. *Atmos. Environ.* **2019**, *215*, 116902. <https://doi.org/10.1016/j.atmosenv.2019.116902>.
83. Yang, Y.; Liu, X.; Zheng, J.; Tan, Q.; Feng, M.; Qu, Y.; An, J. and Cheng, N., 2019. Zou, Y., Deng, X., Zhu, D., Gong, D., Wang, H., Li, F., Tan, H., Deng, T., Mai, B., Liu, X. and Wang, B., 2015. Characteristics of 1 year of observational data of VOCs, NO_x and O₃ at a suburban site in Guangzhou, China. *Atmospheric Chemistry and Physics*, 15(12), pp.6625-6636. <https://doi.org/10.5194/acp-15-6625-201>