

Supplement of Atmos. Chem. Phys., 18, 4567–4595, 2018
<https://doi.org/10.5194/acp-18-4567-2018-supplement>
© Author(s) 2018. This work is distributed under
the Creative Commons Attribution 4.0 License.



Atmospheric
Chemistry
and Physics
Open Access
EGU

Supplement of

Monitoring of volatile organic compounds (VOCs) from an oil and gas station in northwest China for 1 year

Huang Zheng et al.

Correspondence to: Shaofei Kong (kongshaofei@cug.edu.cn) and Xinli Xing (xingxinli5300225@163.com)

The copyright of individual parts of the supplement might differ from the CC BY 4.0 License.

Table S1. Contributions of the top ten species to ozone formation potential based on the Propy-Equiv and MIR scales.

Propy-Equiv (ppbC)			MIR (ppbv)		
Compounds	Mean	SD	Compounds	Mean	SD
1-Pentene	16.7	25.1	<i>o</i> -Xylene	40.4	60.7
1-Hexene	7.16	14.5	<i>n</i> -Heptane	30.2	56.1
Cyclopentane	5.10	9.47	Cyclopentane	19.4	26.4
<i>n</i> -Heptane	4.67	35.0	<i>n</i> -Pentane	18.5	27.5
<i>n</i> -Pentane	4.24	5.96	1-Hexene	18.2	25.5
Styrene	4.12	26.7	<i>n</i> -Nonane	15.5	83.8
<i>i</i> -Pentane	3.94	5.85	Styrene	13.7	19.3
<i>cis</i> -2-butene	3.76	11.0	2,2-Dimethylbutane	11.8	31.7
<i>n</i> -Butane	3.66	4.98	Benzene	10.4	21.1
<i>trans</i> -2-butene	3.66	8.13	1-Pentene	10.0	14.7

Table S2 Pearson correlation between VOCs, meteorological parameters and trace gases (O_3 and NO_2)

Species	Temperature	Wind speed	BLH	O_3	NO_2
Ethane	-0.393**	-0.436**	-0.524**	-0.414**	0.633**
Ethylene	-0.590**	-0.530**	-0.653**	-0.500**	0.642**
Acetylene	-0.541**	-0.370**	-0.481**	-0.197**	0.321**
Benzene	-0.440**	-0.392**	-0.473**	-0.377**	0.418**
VOCs	-0.286**	-0.391**	-0.444**	-0.361**	0.603**

**. Correlation is significant at the 0.01 level (2-tailed).

Table S3. Pearson coefficients between VOCs, source contributions, meteorological parameters and other air pollutants.

	F1	F2	F3	F4	F5	T	Re	P	WS	BLH	VOCs	SO ₂	NO ₂	CO	O ₃	PM _{2.5}	PM ₁₀
F1	1																
F2	0.49**	1															
F3	0.29**	0.67**	1														
F4	0.47**	0.15**	0.04	1													
F5	0.50**	0.80**	0.65**	0.14*	1												
T	0.05	-0.31**	-0.57**	0.11**	-0.38**	1											
Re	-0.01	0.30**	0.53**	-0.17**	0.37**	-0.86**	1										
P	-0.05	0.25**	0.46**	0.18**	0.32**	-0.92**	0.76**	1									
WS	-0.12*	-0.39**	-0.44**	0.03	-0.37**	0.51**	-0.51**	-0.48**	1								
BLH	-0.08	-0.42**	-0.55**	0.04	-0.40**	0.81**	-0.68**	-0.76**	0.64**	1							
VOCs	0.48**	0.74**	0.58**	0.07	0.72**	-0.26**	0.20**	0.17**	-0.39**	-0.45**	1						
SO ₂	0.15**	0.15**	0.12*	-0.04	0.15**	0.09	-0.16**	-0.14**	-0.06	-0.003	0.15*	1					
NO ₂	0.33**	0.45**	0.49**	0.12*	0.37**	-0.36**	0.34**	0.39**	-0.45**	-0.54**	0.46**	0.10	1				
CO	0.21**	0.44**	0.59**	0.041	0.35**	-0.48**	0.48**	0.44**	-0.44**	-0.50**	0.34**	0.11*	0.61**	1			
O ₃	-0.17**	-0.27**	-0.33**	-0.02	-0.28**	0.63**	-0.58**	-0.66**	0.29**	0.55**	-0.18**	0.24**	-0.60**	-0.48**	1		
PM _{2.5}	0.13*	0.43**	0.77**	0.04	0.44**	-0.59**	0.54**	0.47**	-0.48**	-0.54**	0.39**	0.22**	0.50**	0.60**	-0.28**	1	
PM ₁₀	0.23**	0.43**	0.71**	0.09	0.42**	-0.36**	0.30**	0.24**	-0.36**	-0.43**	0.49**	0.28**	0.48**	0.53**	-0.19**	0.86**	1

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

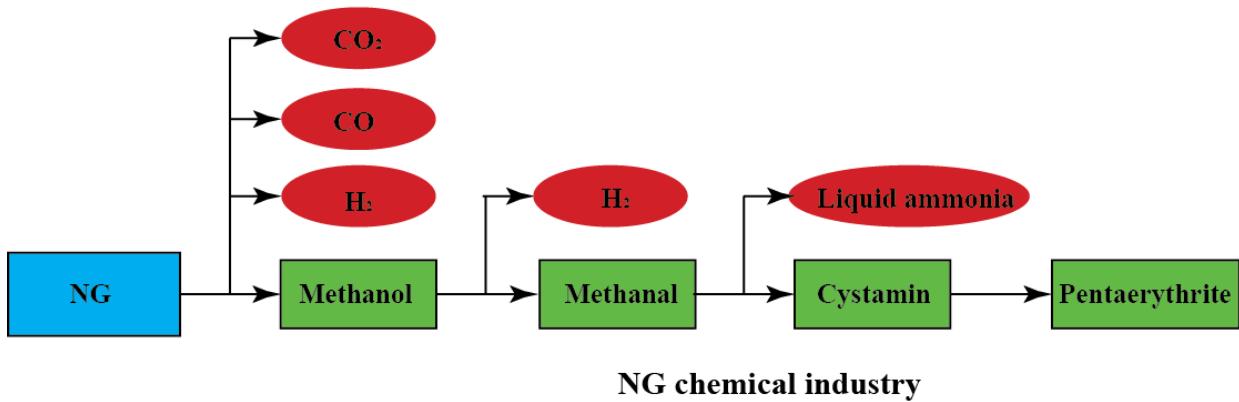
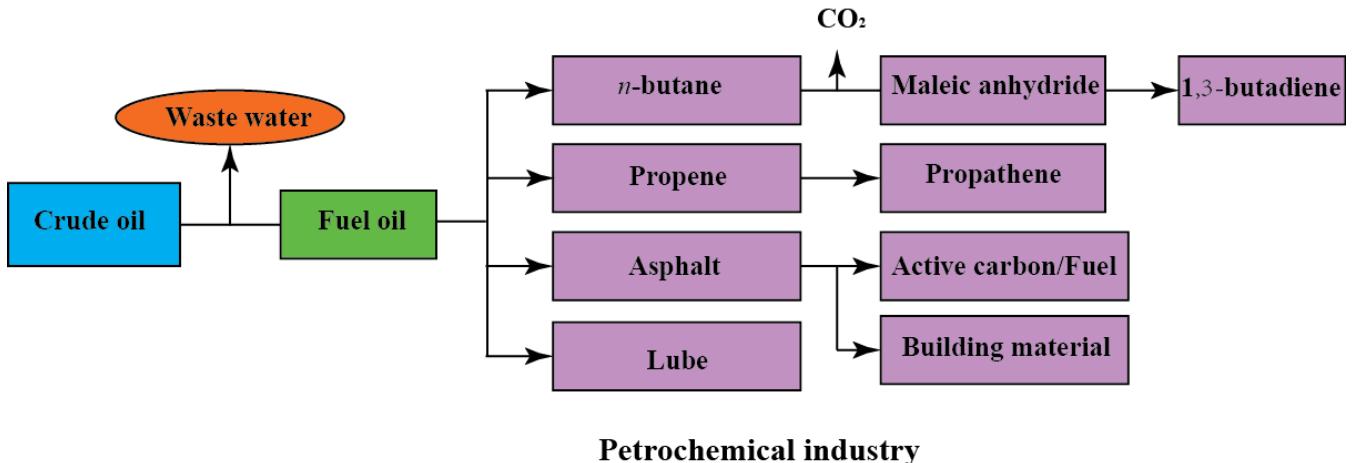
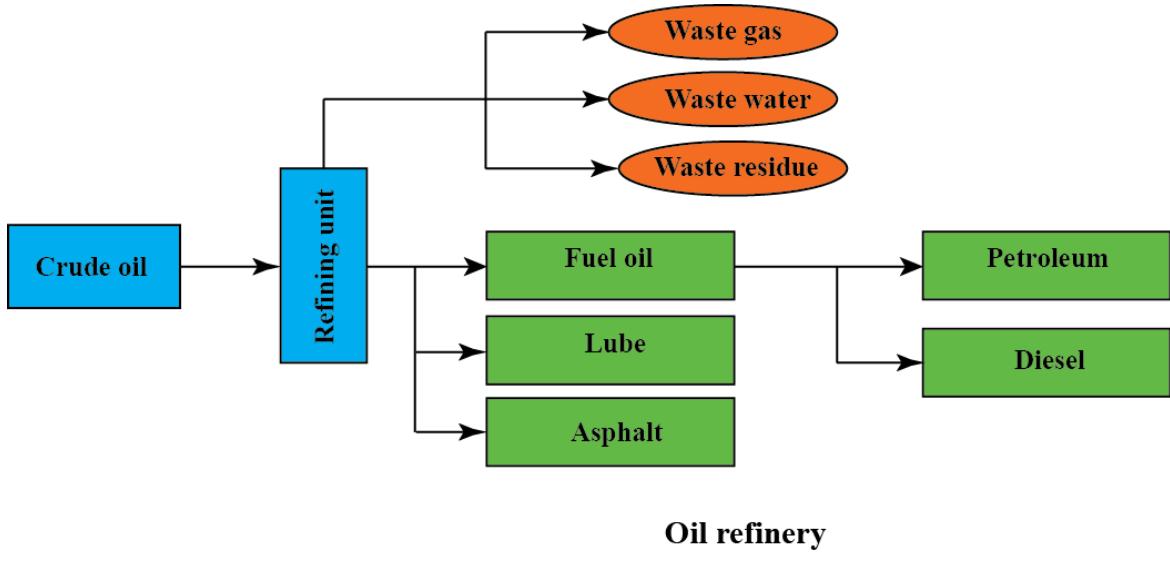


Figure S1. Flow charts of the main petrochemical industrial processes in the study area.

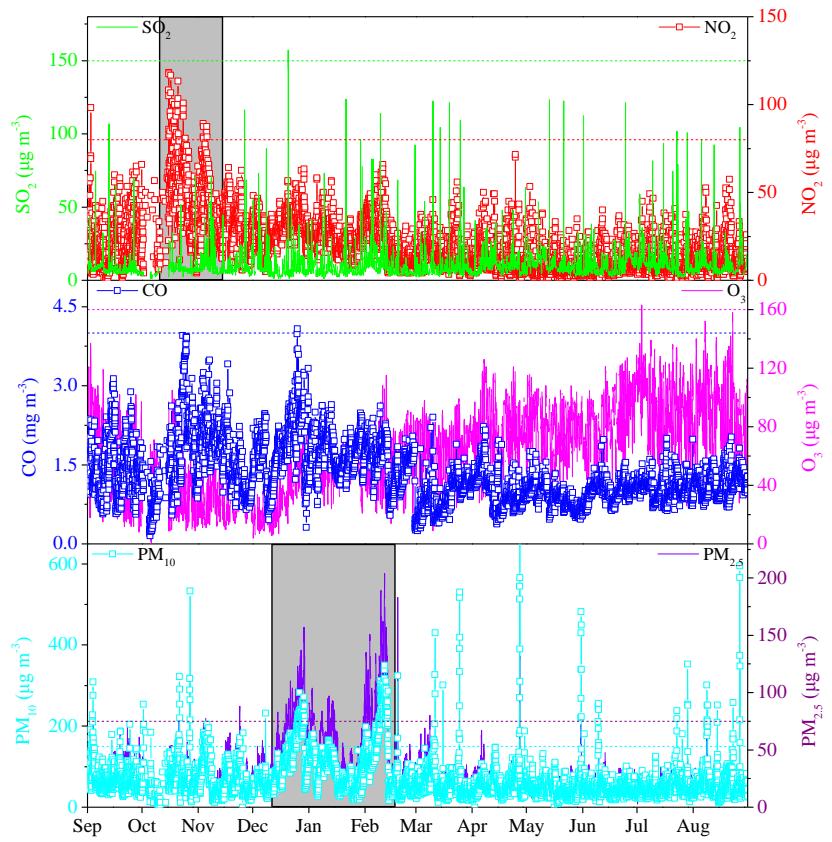


Figure S2. Hourly air pollutant concentrations during the whole sampling period from September 2014 to August 2015. The horizon dash lines represent the Ambient Air Quality Standard II (GB3095-2012).

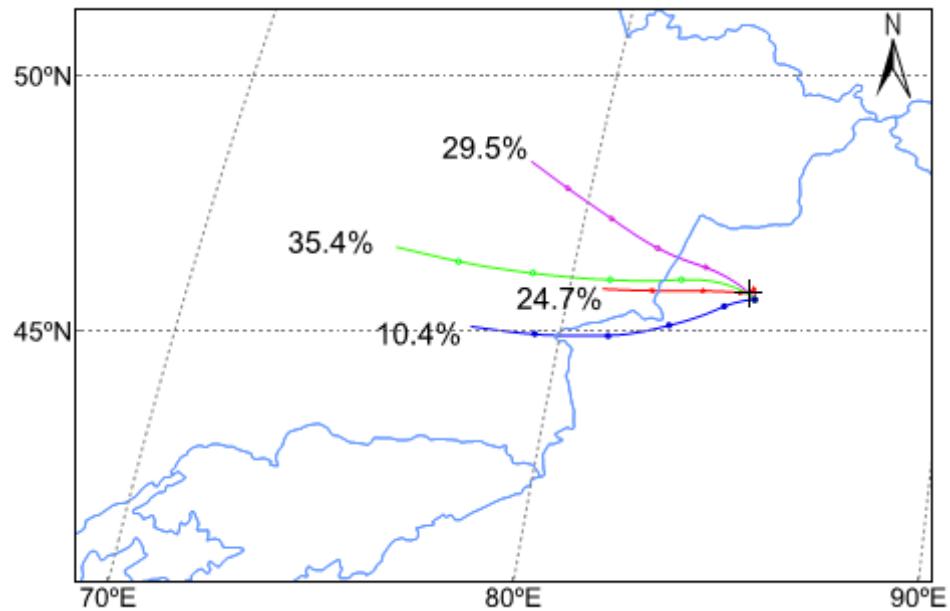


Figure S3. Clustered trajectories (%) from different directions during the sampling period from September 2014 to August 2015.

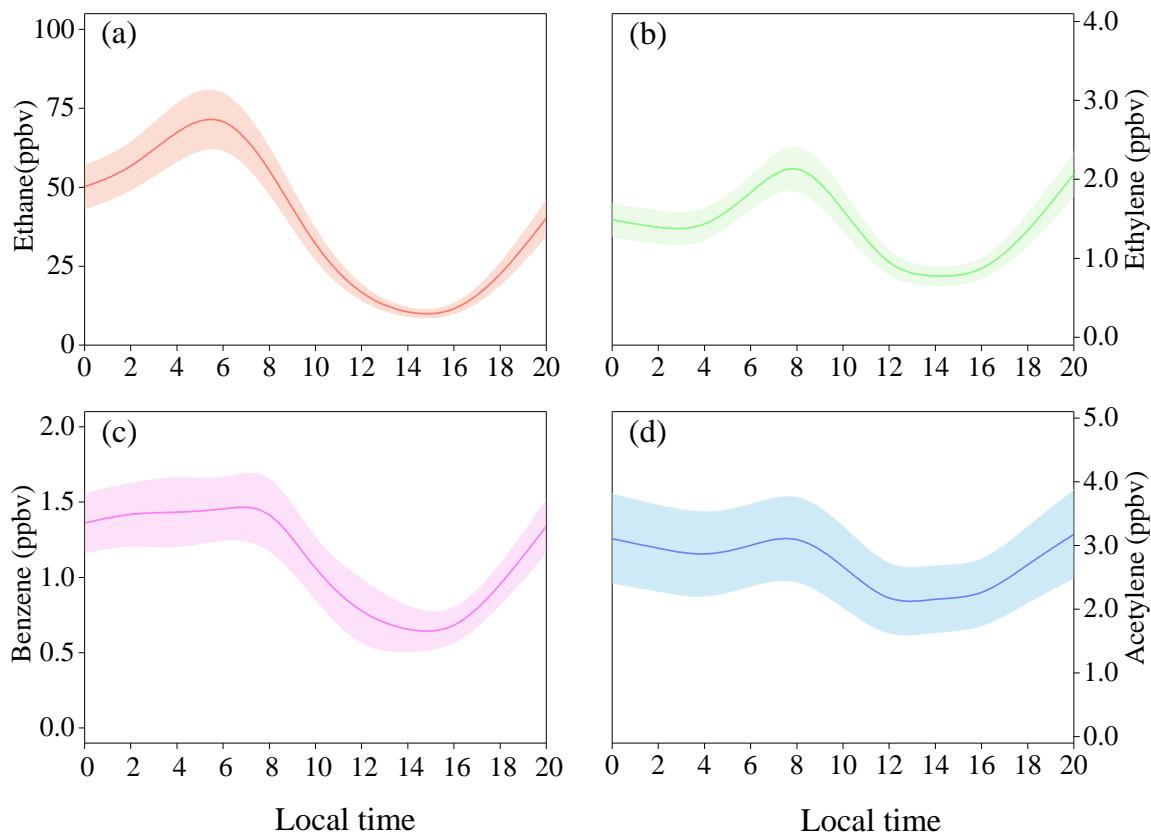


Figure S4. Diurnal variations of ethane (a), ethylene (b), benzene (c) and acetylene (d). Solid line represents the average value and filled area indicates the 95th confidence intervals of the mean.

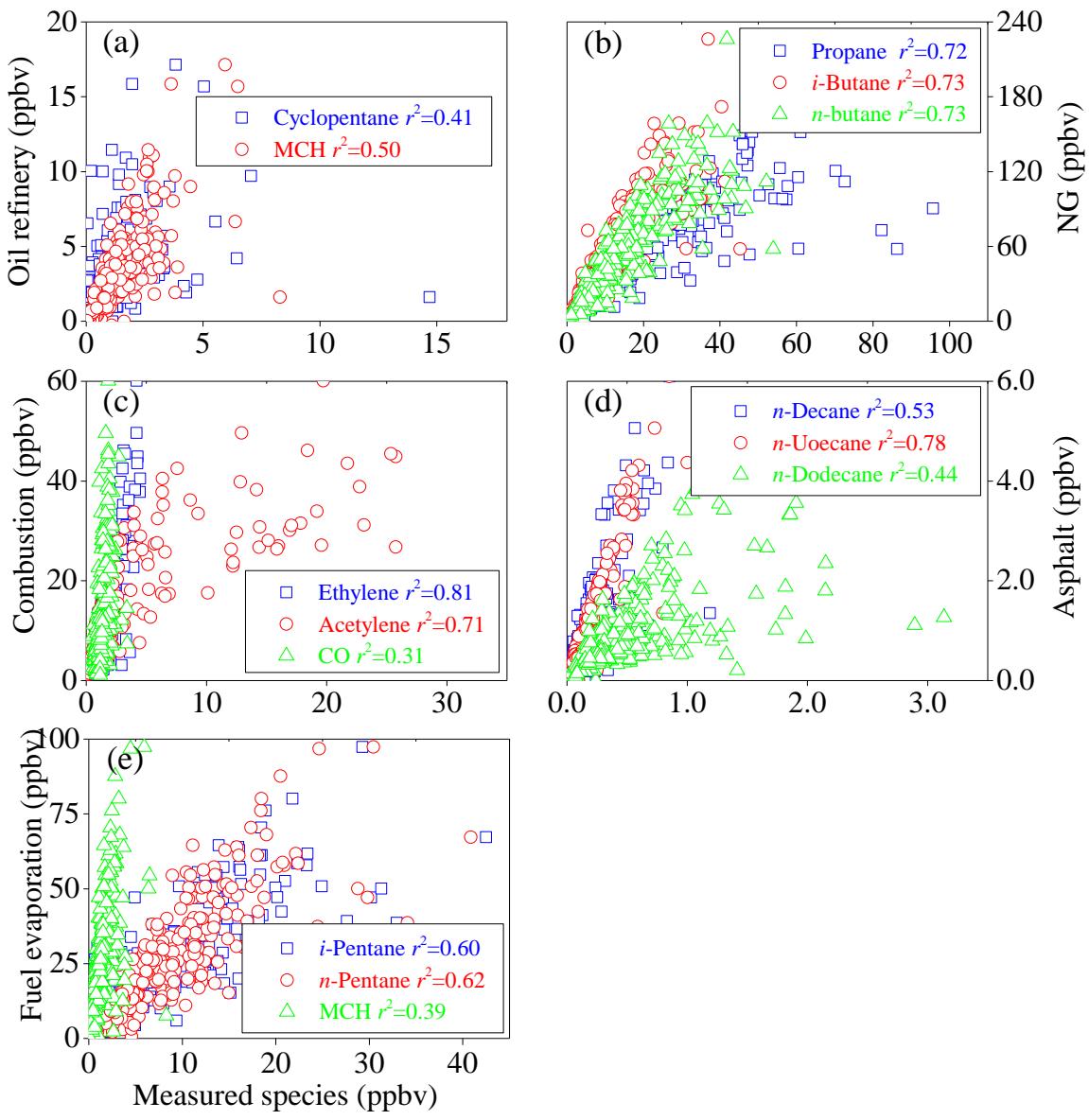


Figure S5. Scatter plots between five identified VOC source contributions and their high loading species in their corresponding source profiles. Oil refinery (a), NG (b), combustion (c), asphalt (d), and fuel evaporation (e).

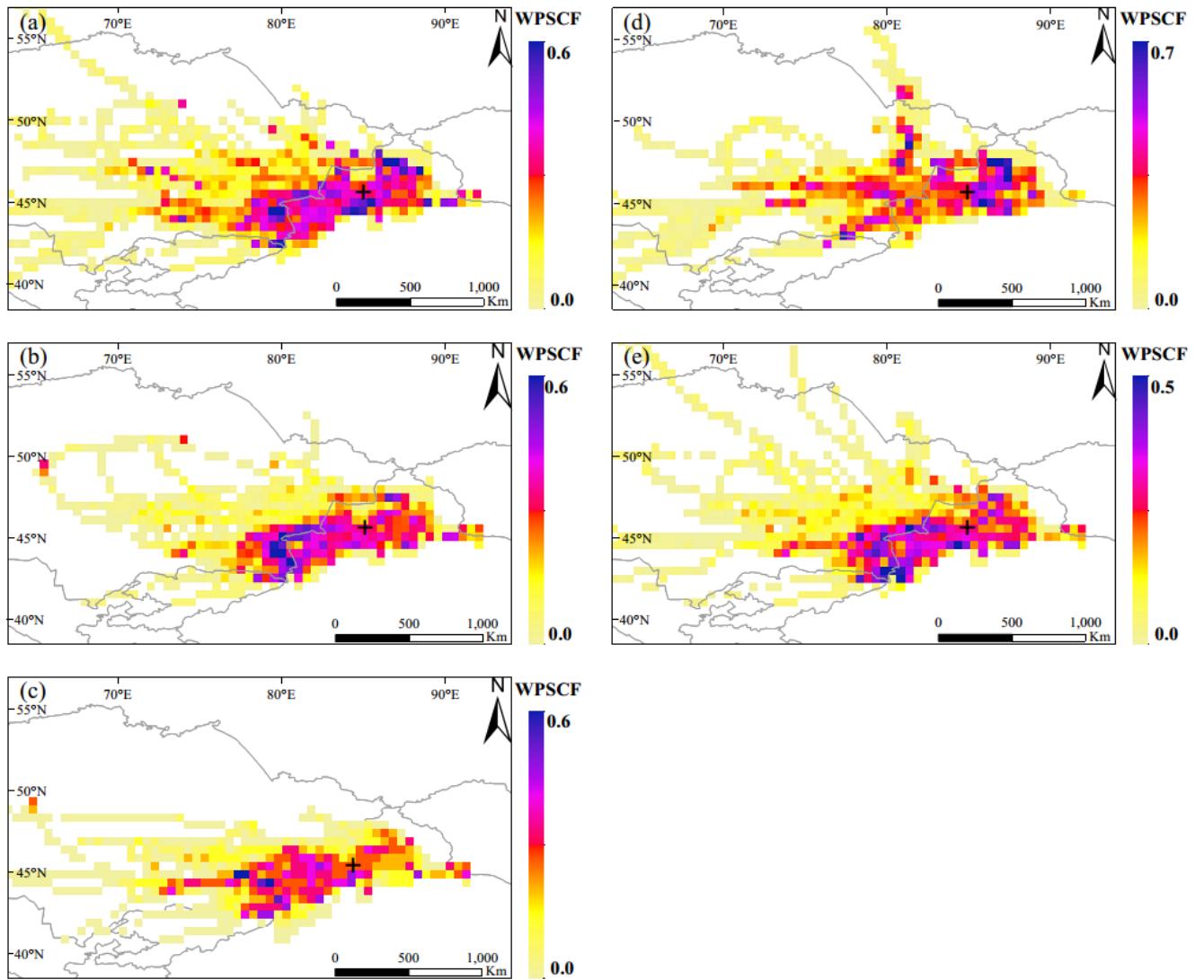


Figure S6. The WPSCF maps for five identified sources derived from PMF analysis: oil refinery (a), NG (b), combustion source (c), asphalt (d), and fuel evaporation (e) in autumn. The black cross represents the sampling site.

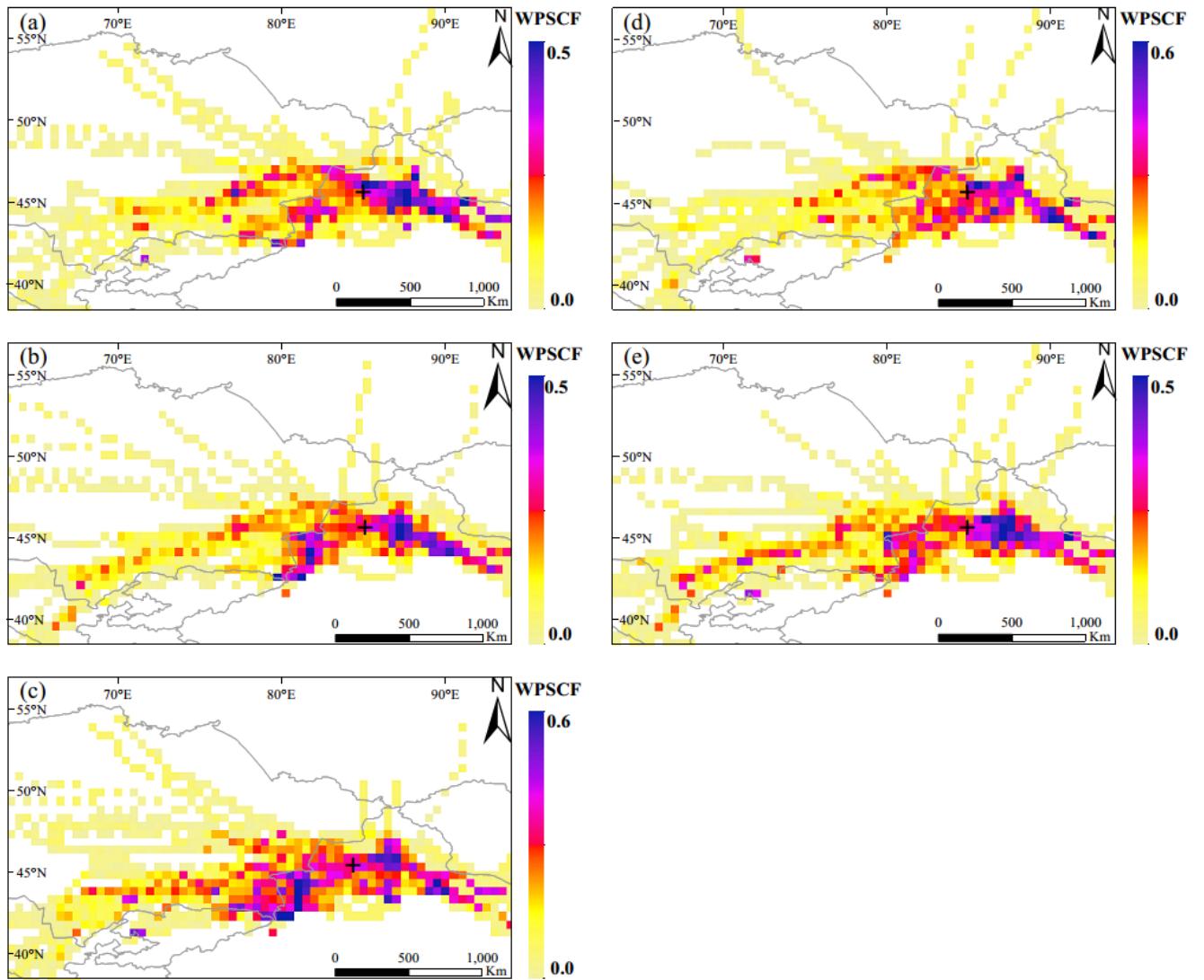


Figure S7. The WPSCF maps for five identified sources derived from PMF analysis: oil refinery (a), NG (b), combustion source (c), asphalt (d), and fuel evaporation (e) in winter. The black cross represents the sampling site.

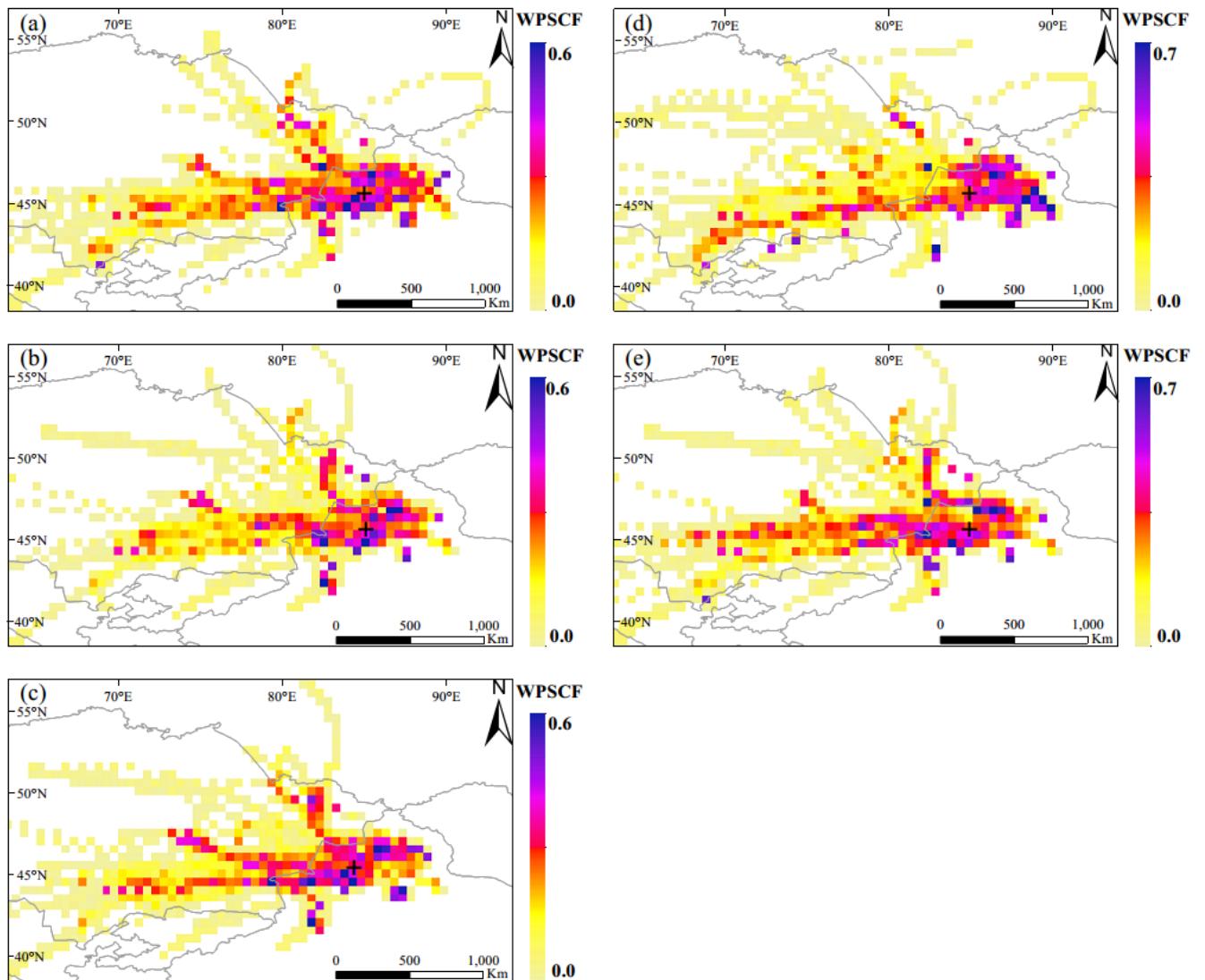


Figure S8. The WPSCF maps for five identified sources derived from PMF analysis: oil refinery (a), NG (b), combustion source (c), asphalt (d), and fuel evaporation (e) in spring. The black cross represents the sampling site.

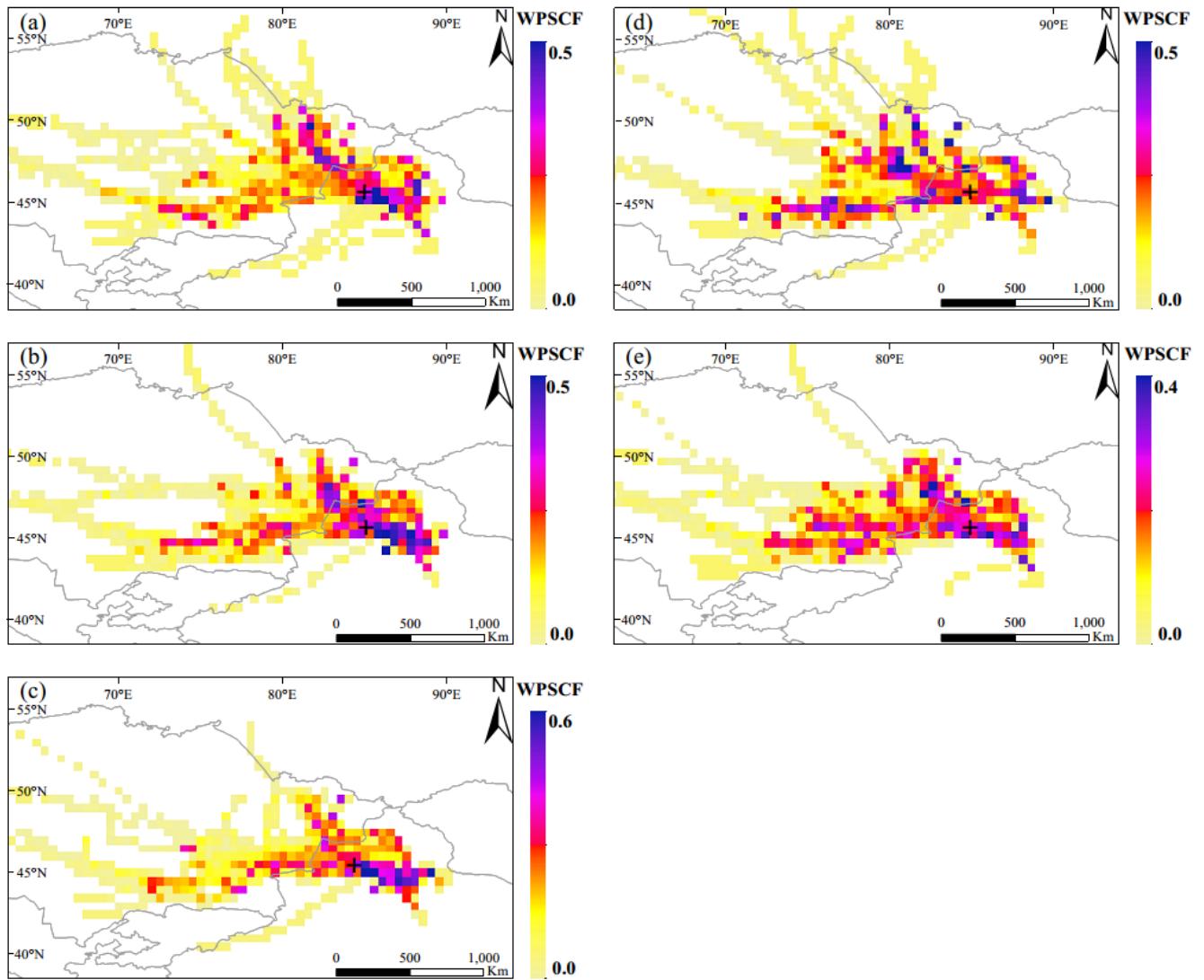


Figure S9. The WPSCF maps for five identified sources derived from PMF analysis: oil refinery (a), NG (b), combustion source (c), asphalt (d), and fuel evaporation (e) in summer. The black cross represents the sampling site.

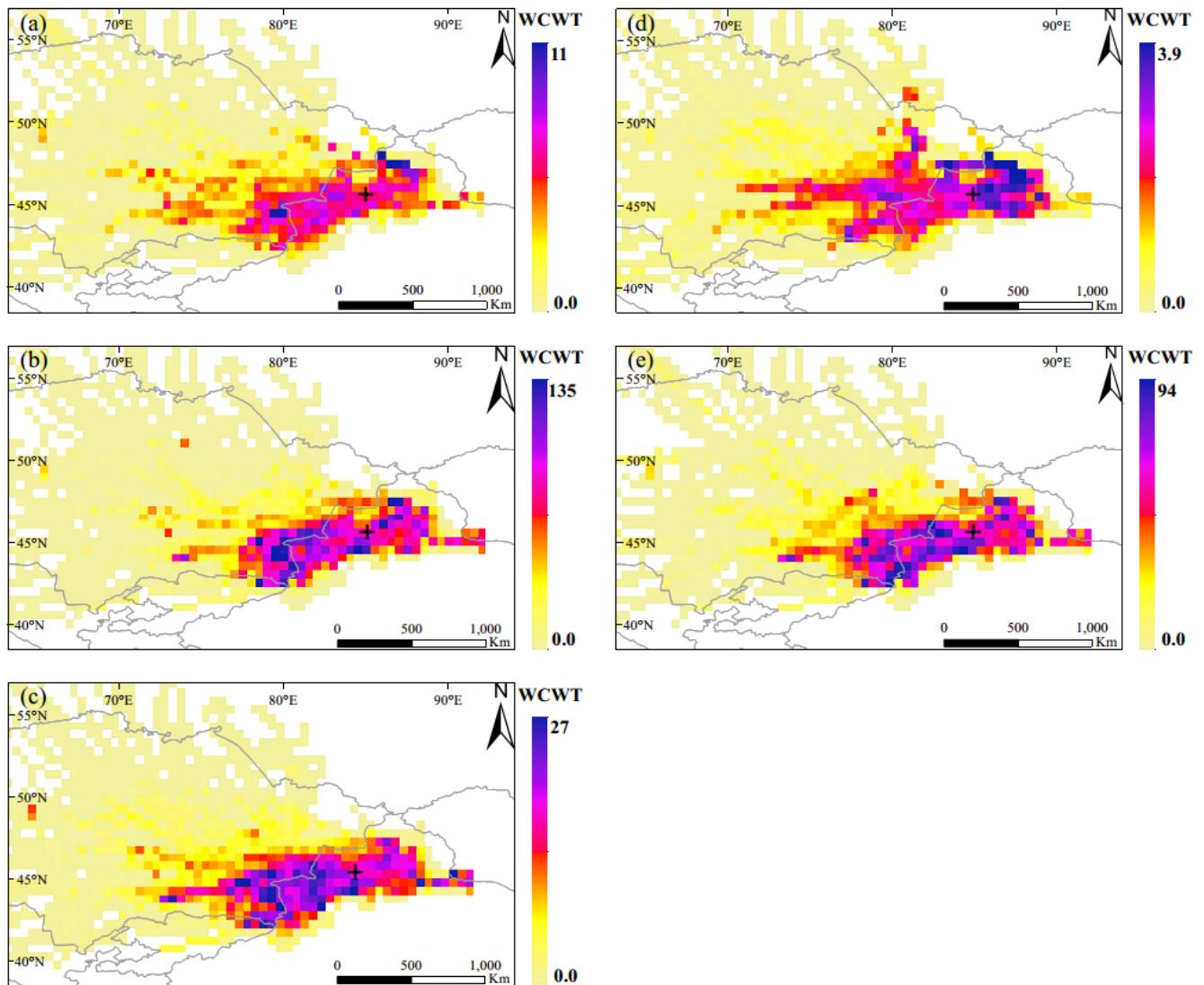


Figure S10. The WCWT maps for five identified sources derived from PMF analysis: oil refinery (a), NG (b), combustion source (c), asphalt (d), and fuel evaporation (e) in autumn. The black cross represents the sampling site.

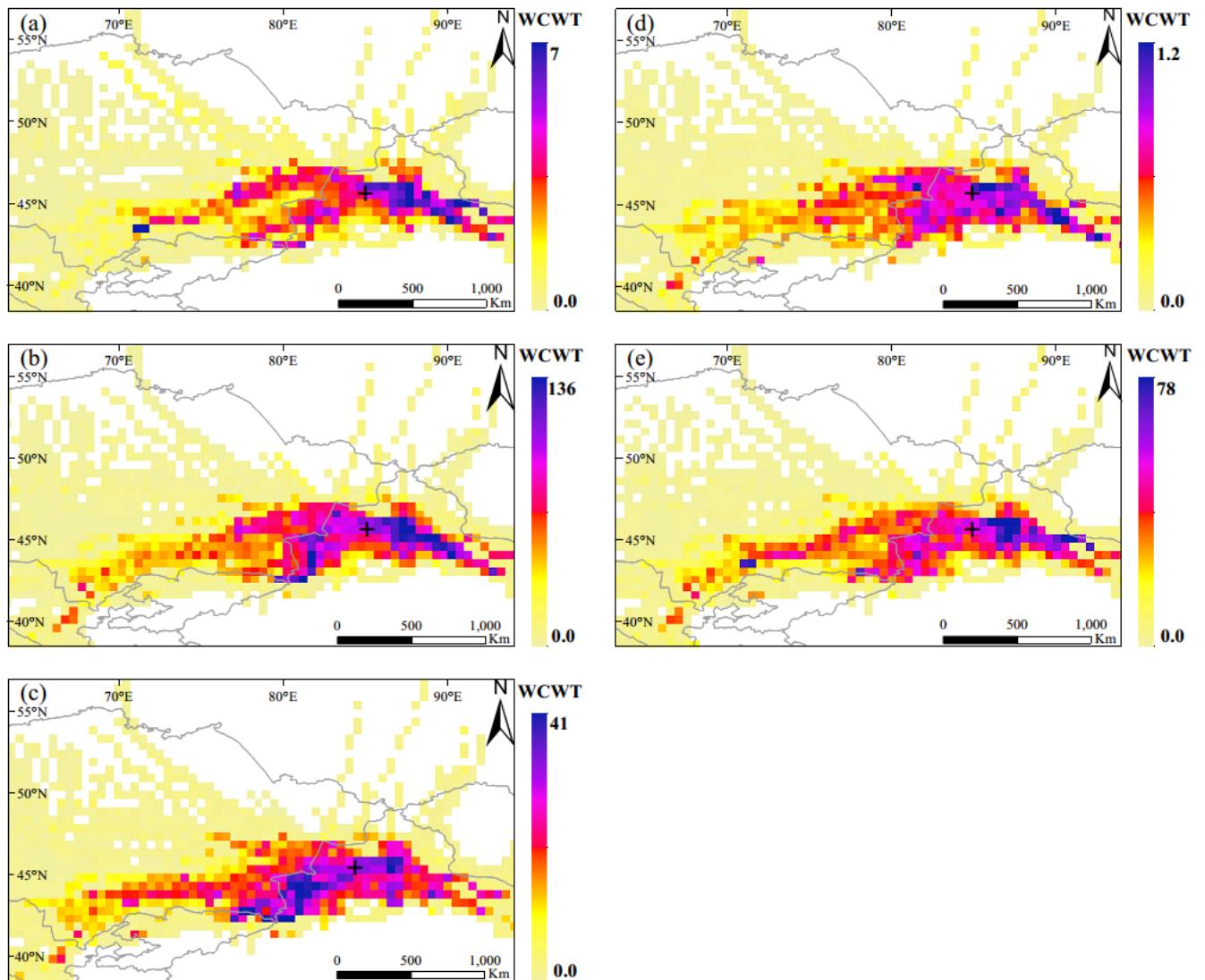


Figure S11. The WCWT maps for five identified source derived from PMF analysis: oil refinery (a), NG (b), combustion source (c), asphalt (d), and fuel evaporation (e) in winter. The black cross represents the sampling site.

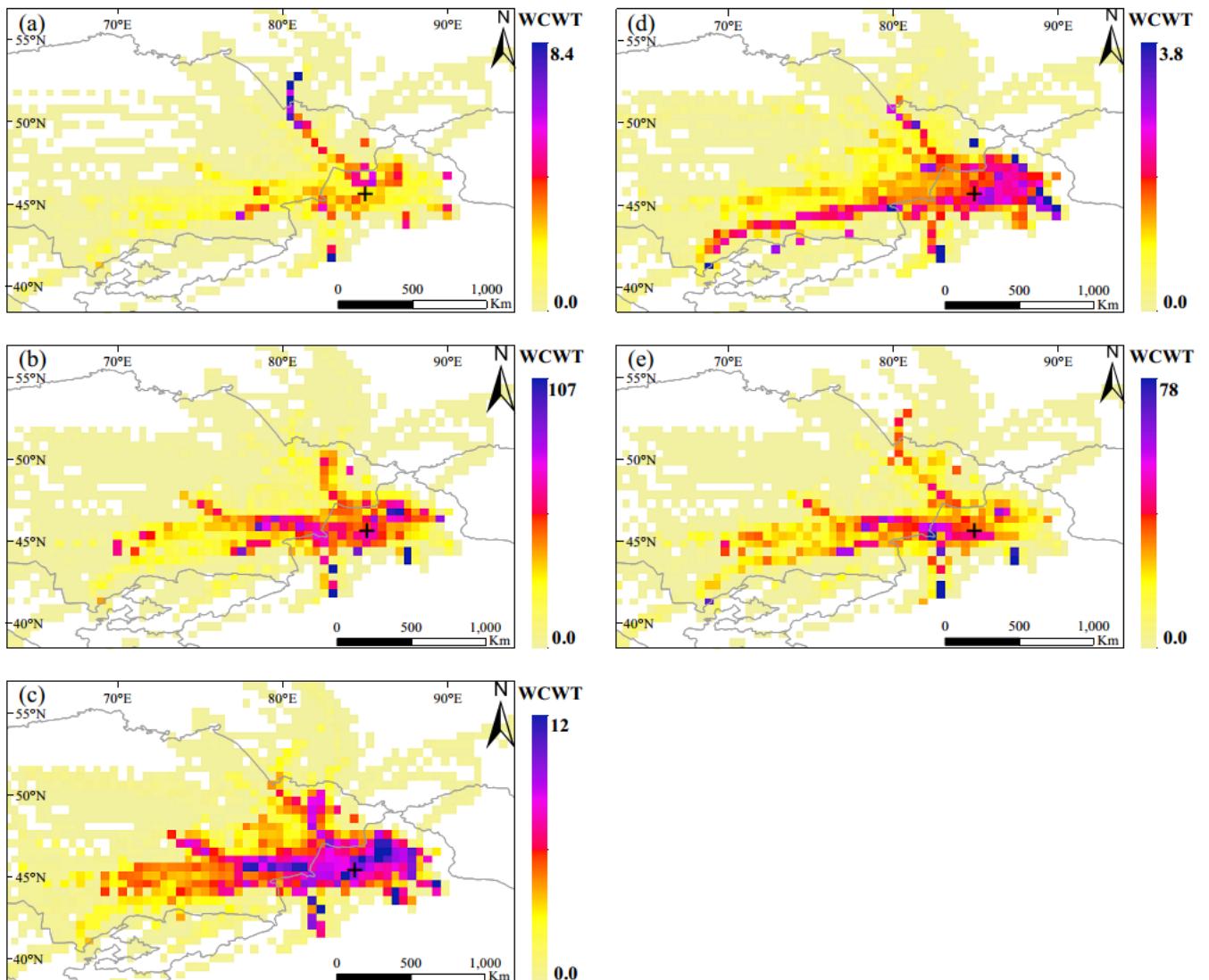


Figure S12. The WCWT maps for five identified source derived from PMF analysis: oil refinery (a), NG (b), combustion source (c), asphalt (d), and fuel evaporation (e) in spring. The black cross represents the sampling site.

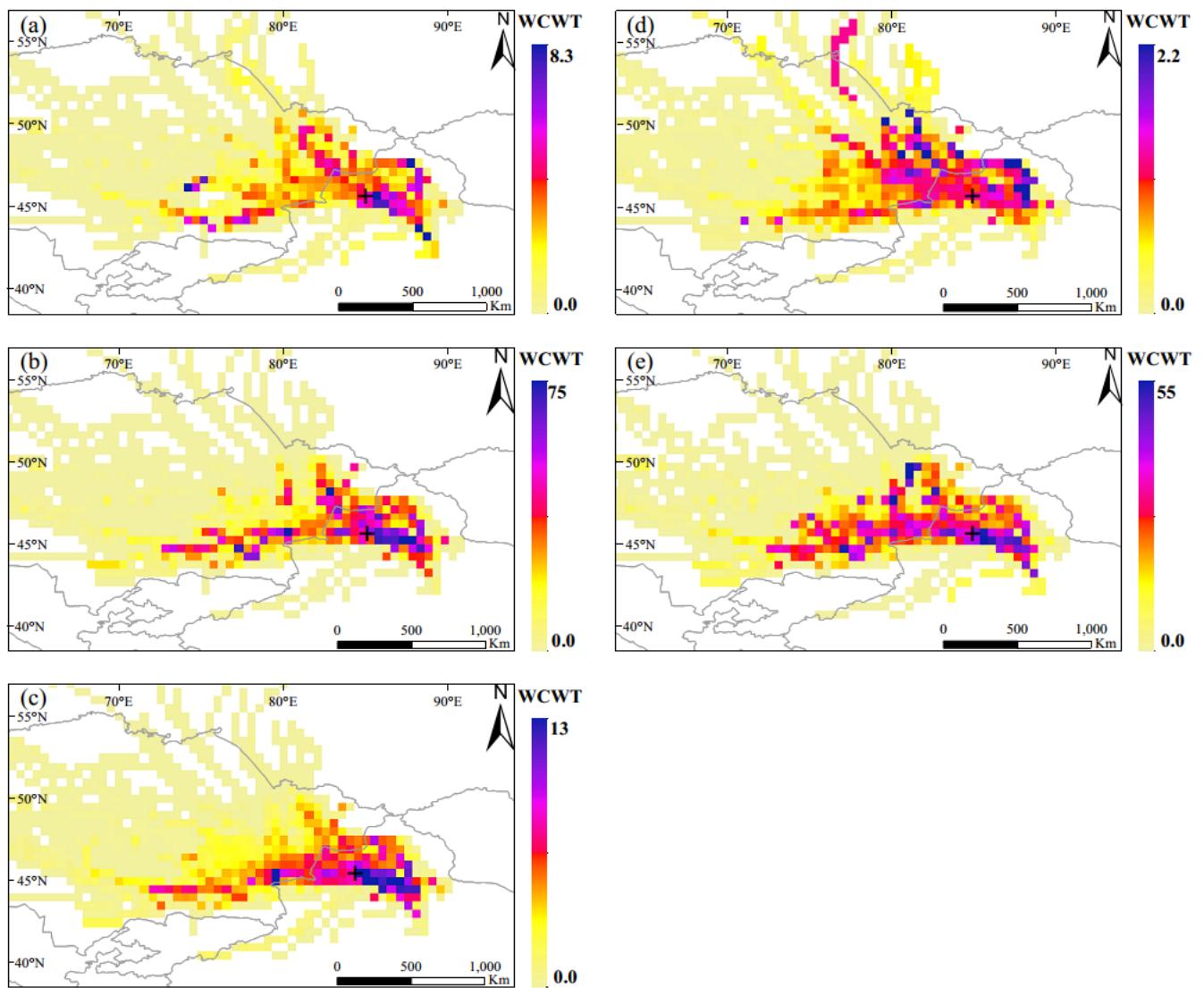


Figure S13. The WCWT maps for the five identified sources derived from PMF analysis: oil refinery (a), NG (b), combustion source (c), asphalt (d) and fuel evaporation (e) in summer. The black cross represents the sampling site.