The following tables show the results of the applications of the PCA for the measurements of VOCs for each station for two time periods of summer and winter 2018. According to table S1, the station of Lynchburg Ferry site contains more components.

Table S1a. PCA results for the measured VOCs at the Channelview site

Summer (#0026)	eigenvalue	percentage of variance	cumulative percentage of variance
comp 1	17.02	48.63	48.63
comp 2	4.65	13.29	61.93
comp 3	2.10	6.00	67.92
comp 4	1.58	4.51	72.44
comp 5	1.39	3.98	76.41
comp 6	1.11	3.17	79.58
Comp 7	1.04	2.97	82.55

Winter (#0026)	Eigenvalue	percentage of variance	cumulative percentage of variance
comp 1	18.91	54.02	54.02
comp 2	2.29	6.55	60.57
comp 3	1.88	5.38	65.95
comp 4	1.84	5.25	71.20
comp 5	1.40	4.08	75.21
comp 6	1.11	3.17	78.38
Comp 7	1.03	2.94	81.38

Table S1b. PCA results for the measured VOCs at the Wallisville site

Summer (#0617)	eigenvalue	percentage of variance	cumulative percentage of variance
comp 1	13.56	38.74	38.74
comp 2	2.90	8.27	47.02
comp 3	2.68	7.65	54.67
comp 4	2.43	6.94	61.61
comp 5	1.83	5.22	66.83
comp 6	1.33	3.80	70.63
Comp 7	1.29	3.70	74.33

Winter (#0617)	eigenvalue	percentage of variance	cumulative percentage of variance
comp 1	19.82	56.64	56.64
comp 2	3.08	8.80	65.44
comp 3	1.81	5.16	70.60
comp 4	1.59	4.54	75.14
comp 5	1.27	3.62	78.75
comp 6	1.18	3.37	82.12

Table S1c. PCA results for the measured VOCs at the HRM#3 site

Summer (#0803)	eigenvalue	percentage of variance	cumulative percentage of variance
comp 1	11.24	32.11	32.11
comp 2	6.27	17.92	50.03
comp 3	3.78	10.79	60.82
comp 4	1.93	5.53	66.35
comp 5	1.79	5.12	71.47
comp 6	1.15	3.29	74.75
comp 7	1.13	3.23	77.99

Winter (#0803)	eigenvalue	percentage of variance	cumulative percentage of variance
comp 1	15.64	44.69	44.69
comp 2	3.71	10.59	55.28
comp 3	2.48	7.09	62.37
comp 4	2.00	5.73	68.09
comp 5	1.51	4.31	72.41
comp 6	1.18	3.37	75.78
comp 7	1.15	3.29	79.06

Table S1d. PCA results for the measured VOCs at the Lynchburg Ferry site

Summer (#1015)	eigenvalue	percentage of variance	cumulative percentage of variance
comp 1	12.44	35.55	35.55
comp 2	4.06	11.61	47.15
comp 3	2.40	6.85	54.00
comp 4	1.89	5.41	59.41
comp 5	1.32	3.77	63.18
comp 6	1.25	3.57	66.75
comp 7	1.22	3.49	70.24
comp 8	1.10	3.13	73.37

Winter (#1015)	eigenvalue	percentage of variance	cumulative percentage of variance
comp 1	13.76	39.31	39.31
comp 2	4.10	11.71	51.03
comp 3	3.44	9.83	60.86
comp 4	1.79	5.12	65.98
comp 5	1.48	4.23	70.21
comp 6	1.34	3.83	74.04
comp 7	1.17	3.34	77.38

Table S1e. PCA results for the measured VOCs at the Clinton site

Summer (#1035)	eigenvalue	percentage of variance	cumulative percentage of variance
comp 1	18.07	51.64	51.64
comp 2	3.98	11.38	63.02
comp 3	2.43	6.93	69.95
comp 4	1.52	4.35	74.30
comp 5	1.34	3.84	78.14
comp 6	1.01	2.87	81.01

Winter (#1035)	eigenvalue	percentage of variance	cumulative percentage of variance
comp 1	19.19	54.84	54.84
comp 2	3.90	11.14	65.98
comp 3	2.14	6.11	72.09
comp 4	1.75	4.99	77.07
comp 5	1.26	3.61	80.68
comp 6	1.16	3.31	83.99

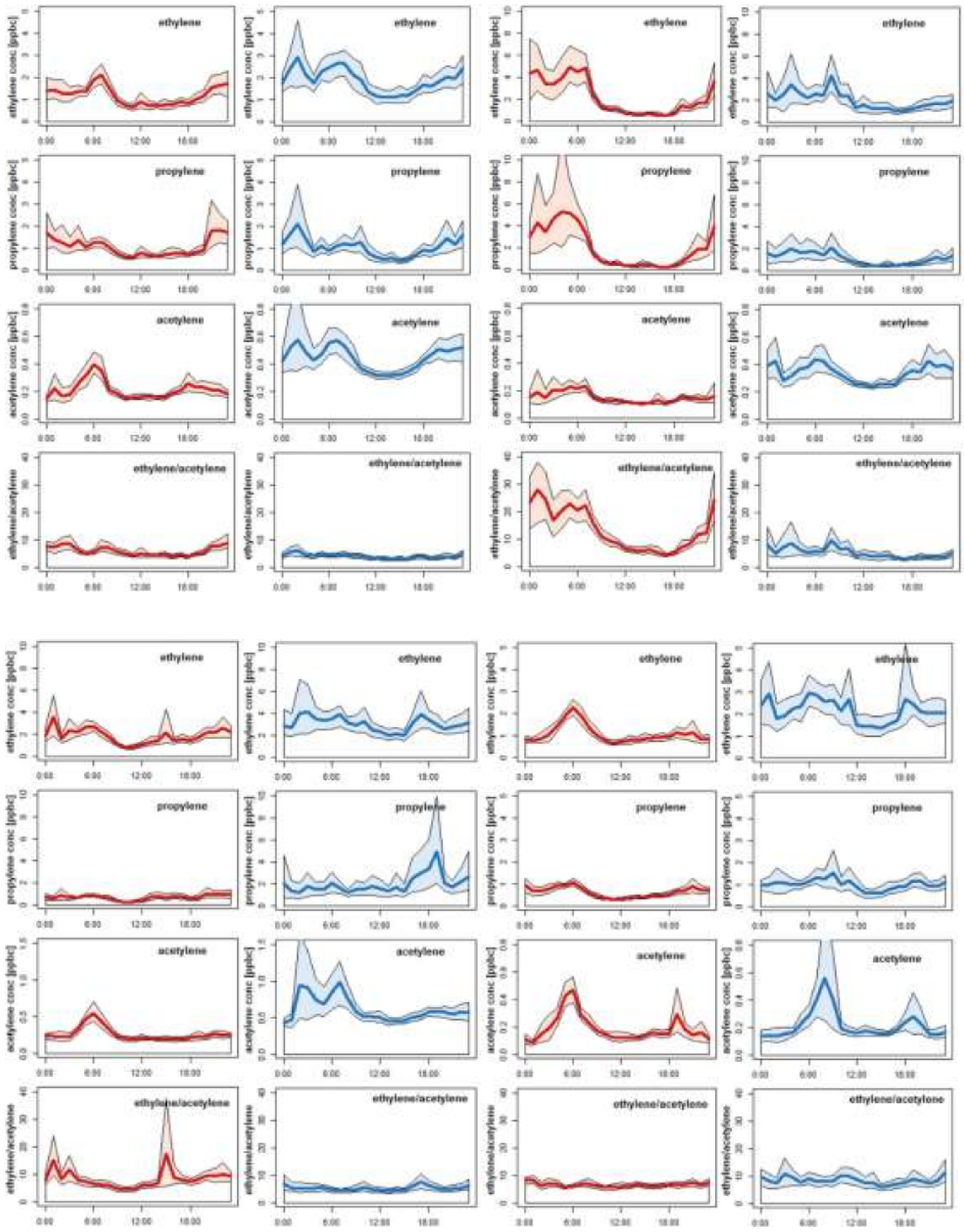

Fig. S1. Ratios of the average diurnal values of the ethylene, propylene, acetylene, and ethylene/acetylene over Channelview (top-left), Wallisville (top-right), HRM#3 (bottom-left), and Clinton (bottom-right) during summertime and wintertime 2018.

Table S2. Relative contributions (%) to ozone formation by all VOCs species of this study based on the Propyl-Equiv and MIR for summer and winter seasons 2018 at Lynchburg Ferry site

OH Reactivity Rank				MIR Rank			
Summer		winter		summer		Winter	
Compound	%	Compound	%	Compound	%	Compound	%
Propylene	40.19	Propylene	29.38	Propylene	40.68	Propylene	30.72
Isoprene	18.04	Ethylene	9.28	Ethylene	32.89	Ethylene	23.11
Ethylene	13.64	Styrene	8.26	Isoprene	4.20	n_Butane	6.11
Isopentane	3.32	n_Butane	5.14	Isopentane	2.90	Propane	5.20
1.3_Butadiene	2.59	1.3_Butadiene	4.88	n_Butane	2.00	Ethane	4.84
n_Hexane	2.21	Propane	4.68	Isobutane	1.99	Isopentane	4.11
n_Pentane	2.20	Isopentane	4.56	n_Pentane	1.78	Isobutane	3.86
n_Butane	1.74	Isoprene	4.15	Propane	1.39	n_Pentane	2.54
m.p_Xylene	1.73	m.p_Xylene	3.24	Toluene	1.28	Toluene	2.53
cis_2_Butene	1.62	n_Pentane	3.04	m.p_Xylene	1.26	m.p_Xylene	2.44
Isobutane	1.60	Isobutane	3.00	n_Hexane	1.23	1.3_Butadiene	2.10
trans_2_Butene	1.47	trans_2_Butene	2.29	Ethane	1.22	trans_2_Butene	1.28
Propane	1.29	n_Hexane	1.89	1.3_Butadiene	1.08	n_Hexane	1.09
Methylcyclopentane	1.06	Ethane	1.70	cis_2_Butene	0.93	Isoprene	1.00
trans_2_Pentene	0.97	cis_2_Butene	1.67	trans_2_Butene	0.79	cis_2_Butene	1.00
Toluene	0.84	Toluene	1.61	Methylcyclopentane	0.75	Methylcyclopentane	0.86
Styrene	0.65	trans_2_Pentene	1.42	Benzene	0.64	1.2.4_Trimethylbenzene	0.72
1_Pentene	0.62	Methylcyclopentane	1.17	trans_2_Pentene	0.35	O.Xylene	0.67
Benzene	0.52	Methylcyclohexane	1.17	O.Xylene	0.33	Benzene	0.63
Methylcyclohexane	0.48	1.2.4_Trimethylbenzene	1.17	1_Pentene	0.33	2.2.4_Trimethylpentane	0.56
cis_2_Pentene	0.48	1.3.5_Trimethylbenzene	0.83	Cyclopentane	0.31	Styrene	0.54
Ethane	0.44	1_Pentene	0.74	1.2.4_Trimethylbenzene	0.21	trans_2_Pentene	0.53
1.2.4_Trimethylbenzene	0.35	2.2.4_Trimethylpentane	0.62	2.2.4_Trimethylpentane	0.20	Methylcyclohexane	0.49
Cyclopentane	0.28	cis_2_Pentene	0.61	Methylcyclohexane	0.20	Cyclopentane	0.45
O.Xylene	0.27	O.Xylene	0.53	cis_2_Pentene	0.17	Acetylene	0.43
1.3.5_Trimethylbenzene	0.26	n_Octane	0.50	Acetylene	0.15	1_Pentene	0.40
2.2.4_Trimethylpentane	0.23	Benzene	0.49	Ethylbenzene	0.13	1.3.5_Trimethylbenzene	0.39
n_Octane	0.22	Cyclopentane	0.40	1.3.5_Trimethylbenzene	0.12	Ethylbenzene	0.24
n_Decane	0.17	n_Decane	0.39	3_Methylhexane	0.11	cis_2_Pentene	0.23
Ethylbenzene	0.13	2.3.4_Trimethylpentane	0.29	n_Octane	0.06	3_Methylhexane	0.21
n_Nonane	0.10	n_Nonane	0.29	Isopropylbenzene	0.05	n_Octane	0.13
2.3.4_Trimethylpentane	0.06	Ethylbenzene	0.25	Styrene	0.04	2.3.4_Trimethylpentane	0.11
Acetylene	0.06	Acetylene	0.17	2.2_Dimethylbutane	0.04	2_Methylheptane	0.08
Isopropylbenzene	0.06	n_Propylbenzene	0.06	2.3_Dimethylpentane	0.03	3_Methylheptane	0.07
2.4_Dimethylpentane	0.04	2.4_Dimethylpentane	0.05	2.4_Dimethylpentane	0.03	2.3_Dimethylpentane	0.06
2.2_Dimethylbutane	0.03	2.2_Dimethylbutane	0.04	2_Methylheptane	0.03	n_Decane	0.06
n_Propylbenzene	0.02	Isopropylbenzene	0.03	n_Decane	0.02	n_Nonane	0.06
3_Methylhexane	0.00	3_Methylhexane	0.00	3_Methylheptane	0.02	2.2_Dimethylbutane	0.05
3_Methylheptane	0.00	3_Methylheptane	0.00	2.3.4_Trimethylpentane	0.02	n_Propylbenzene	0.05
2.3_Dimethylpentane	0.00	2.3_Dimethylpentane	0.00	n_Nonane	0.02	2.4_Dimethylpentane	0.04
2_Methylheptane	0.00	2_Methylheptane	0.00	n_Propylbenzene	0.01	Isopropylbenzene	0.03

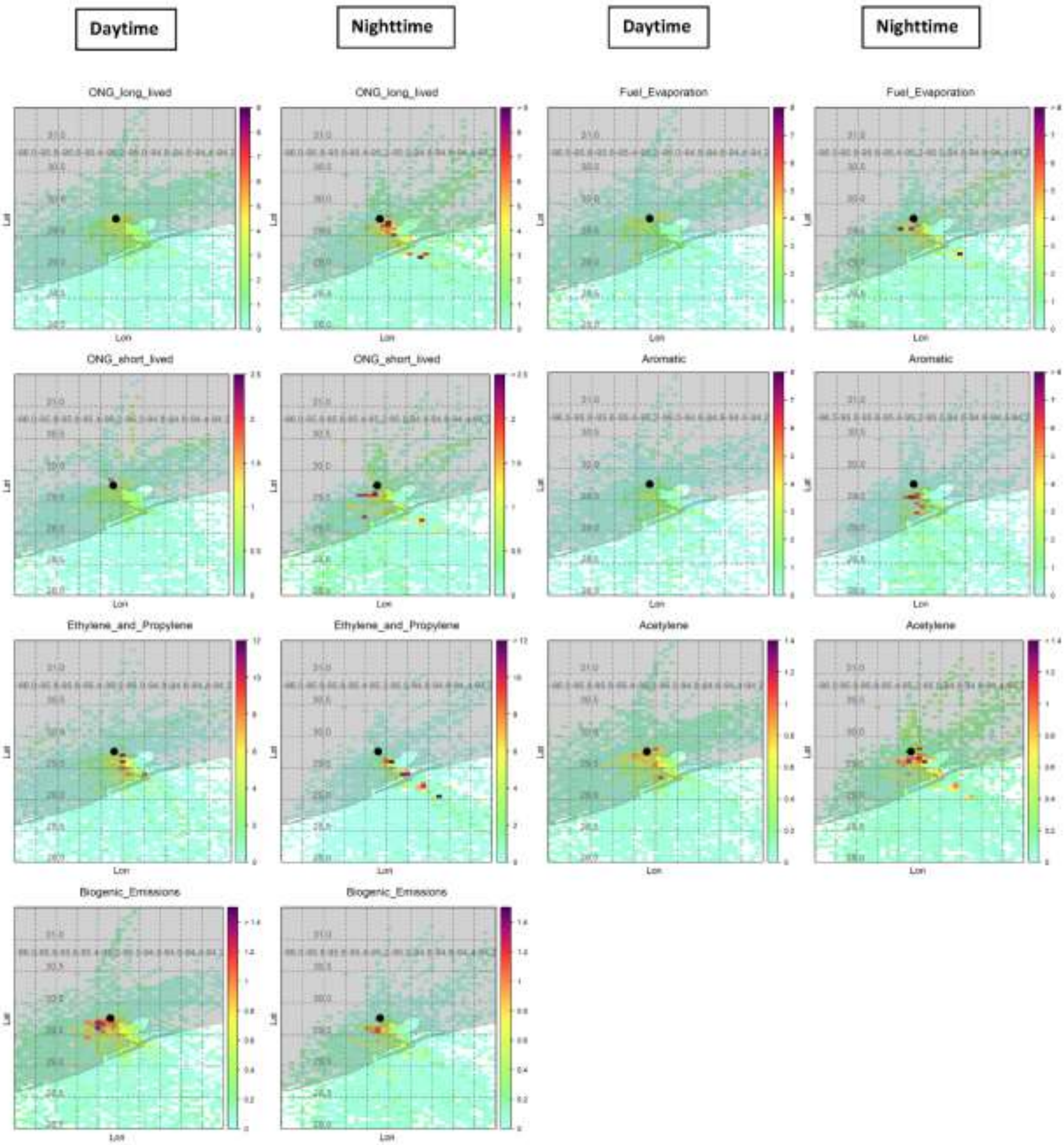

Fig. S2. Daytime and nighttime plots of concentration-weighted trajectories for seven sources derived from the PMF analysis for the summertime. The black dot represents the Lynchburg Ferry site.

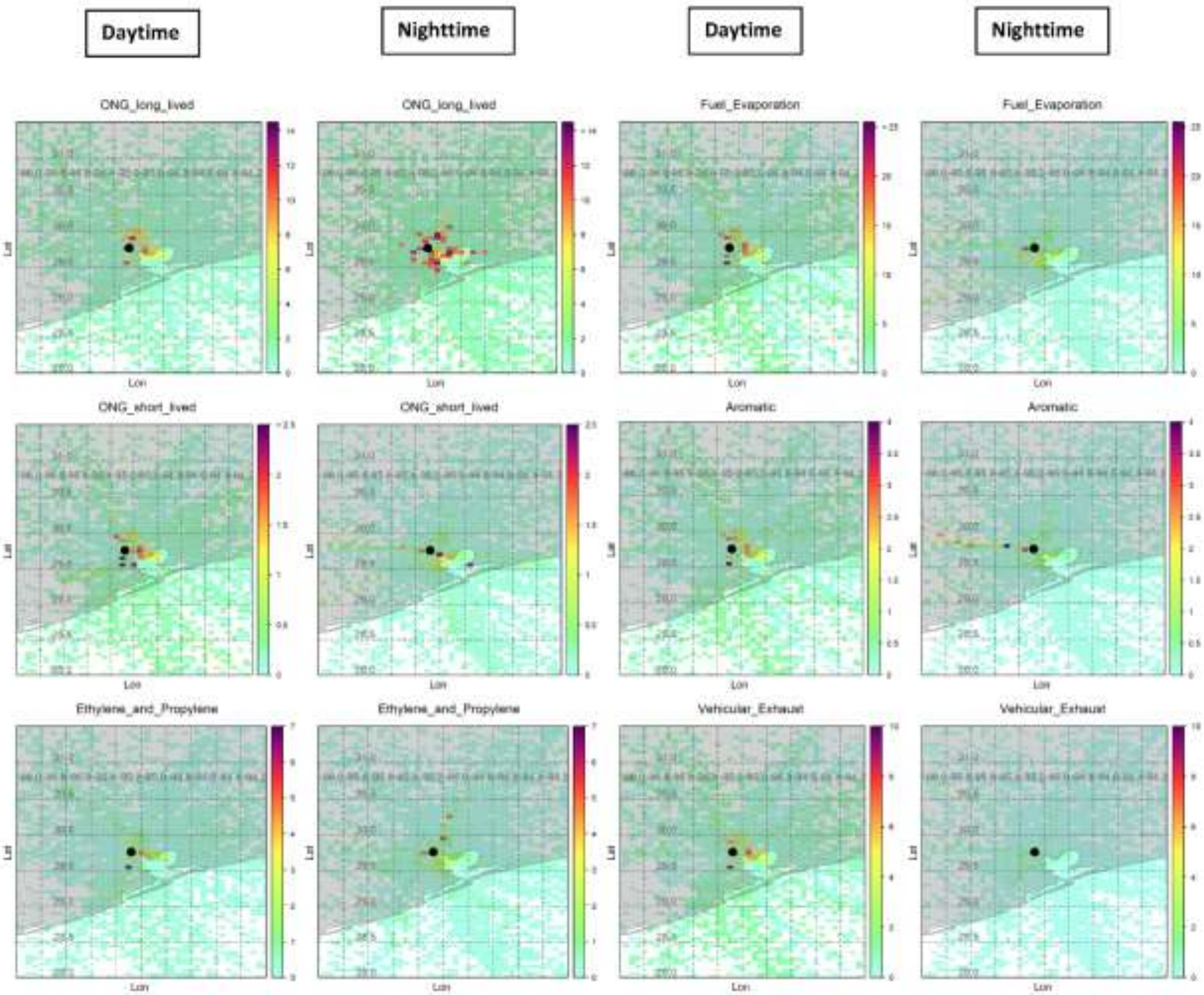

Fig. S3. Daytime and nighttime plots of concentration-weighted trajectories for six sources derived from the PMF analysis for the wintertime. The black dot represents the Lynchburg Ferry site.

The following plots show the CWT results for different altitudes (50m, 100m, 200m, 350m, and 500 m) in daytime summer. The plots indicate that height doesn't have much impact on CWT results, and 100m is suitable for our analysis.

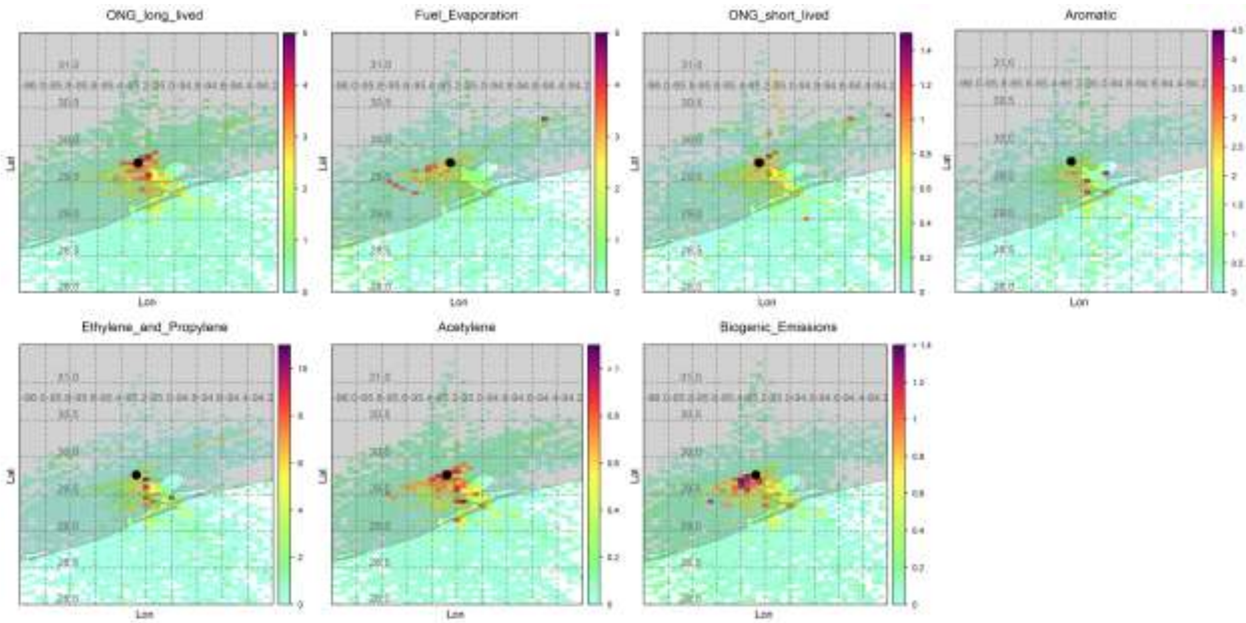

Fig. S4a. Concentration-weighted trajectories in daytime summer at the 50 m height. The black dot represents the Lynchburg Ferry site.

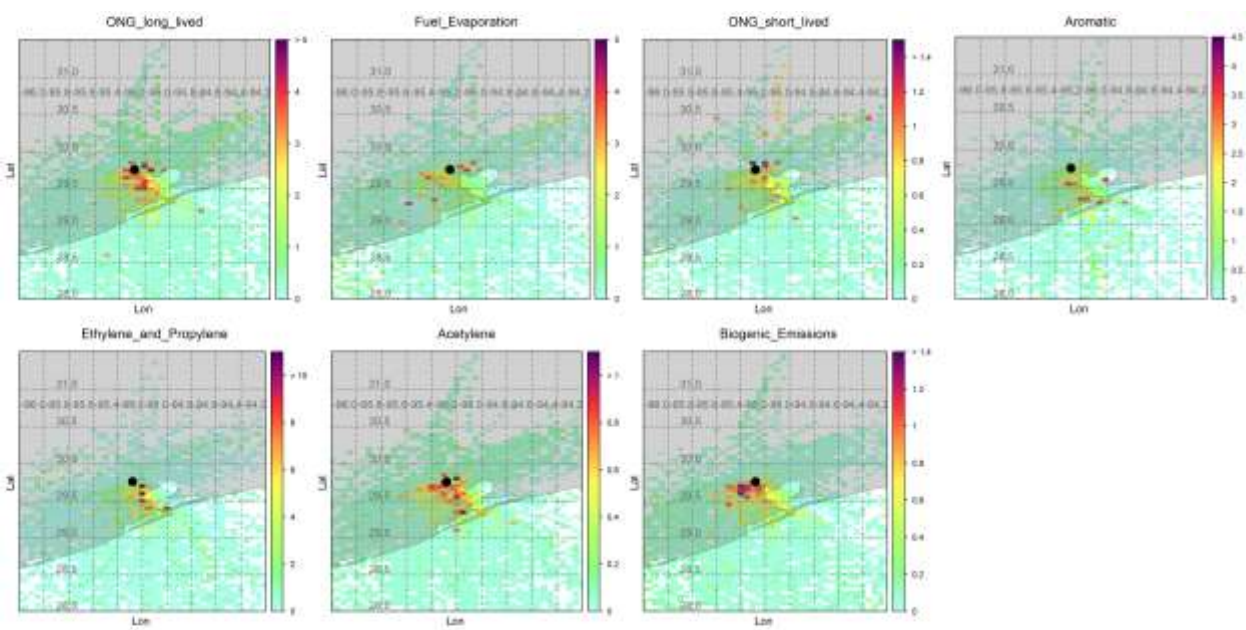

Fig. S4b. Concentration-weighted trajectories in daytime summer at the 100 m height. The black dot represents the Lynchburg Ferry site.

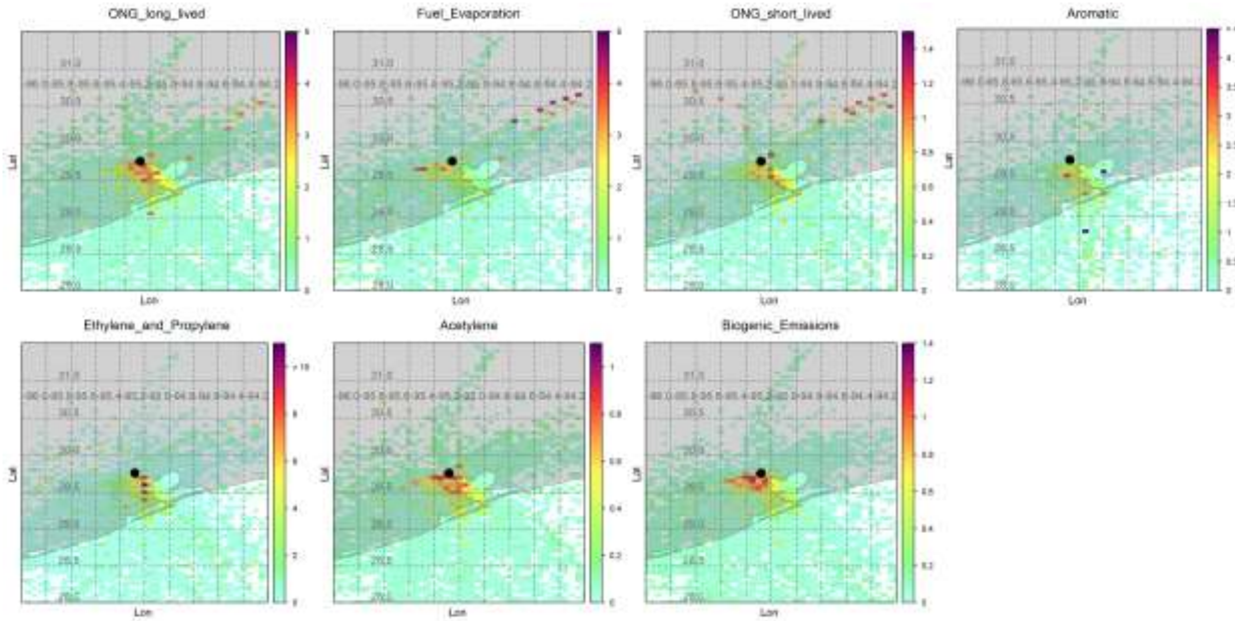

Fig. S4c. Concentration-weighted trajectories in daytime summer at the 200 m height. The black dot represents the Lynchburg Ferry site.

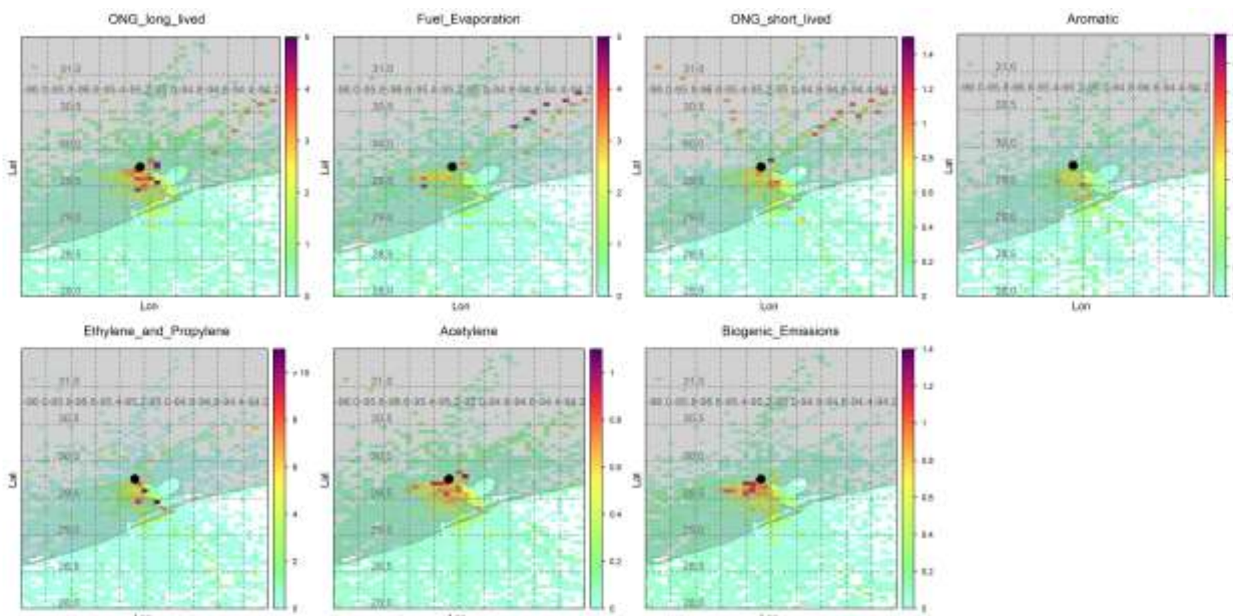

Fig. S4d. Concentration-weighted trajectories in daytime summer at the 350 m height. The black dot represents the Lynchburg Ferry site.

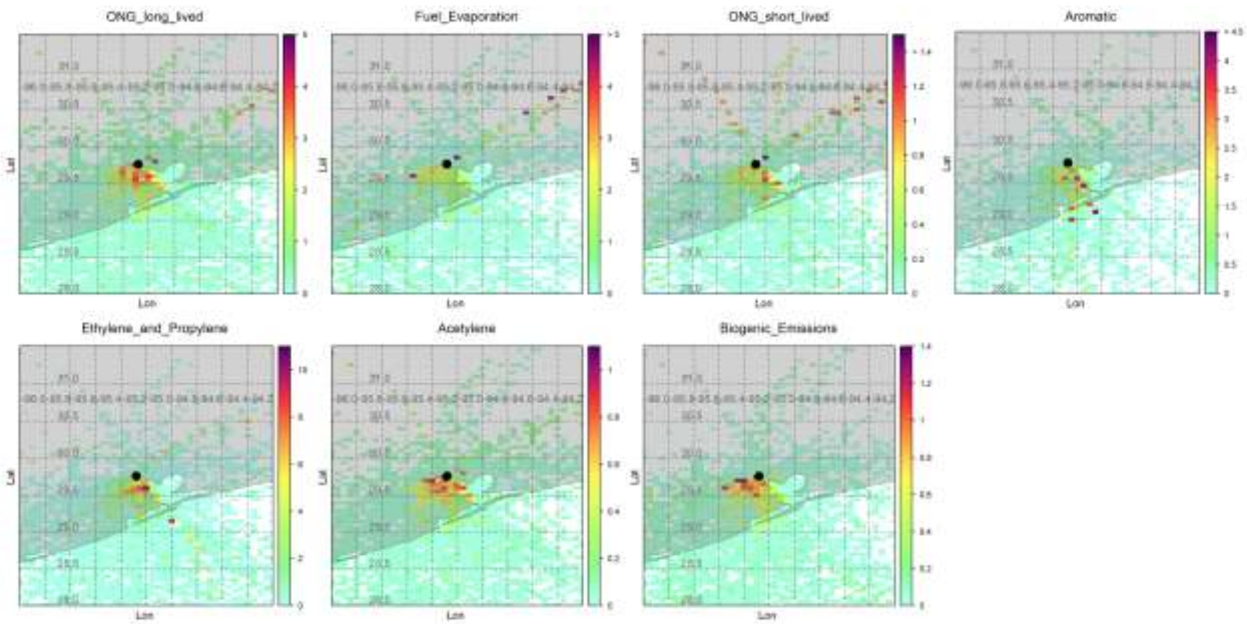

Fig. S4e. Concentration-weighted trajectories in daytime summer at the 500 m height. The black dot represents the Lynchburg Ferry site.