

Seasonal and Spatial Variation of volatile organic compounds in ambient air of Almaty city, Kazakhstan

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Table S1. Coordinates of Kazhydromet and PM_{2.5} sampling sites.

“Kazhydromet” stations			
No.	Coordinates	Crossroad	Closest VOCs sampling sites
PNZ 31	N43°10' 48.5574" E76°53' 22.5348"	Al-Farabi av.	S1
PNZ 1	N43°14' 16.6128" E76°56' 0.3048"	Amangeldy str. – Satpaeva str.	S2
PNZ 12	N43°16' 9.9618" E76°56' 3.4044"	Raiymbek av. - Nauryzbay batur str.	S3
PNZ 26	N43° 15' 1.047" E76°52' 31.8858"	Tole bi str. – Brusilovsky str.	S5, S6
PM _{2.5} stations			
6	N 43°12'50.2" E76°53'35.2"	Rozybakieva str. – Baikadamova str.	S1
2	N 43°13'26.0" E76°56'17.2"	Al-Farabi av. – Markova str.	S2
108	N 43°18'43.5" E77°00'03.8"	Zhana Kairat microdistrict	S4
5	N 43°15'09.8" E76°54'40.6"	Tole bi str. – Baizakova str.	S6

Table S2. Air sampling periods and meteorological parameters.

Date	Time	Temperature, °C	Humidity, %	Wind speed, m/s	Precipitation, mm	Pressure, mm Hg
01/15/2020	9:00 AM	-6.7	91	0	0	774.3
	9:00 PM	-1.9	72	0	0	775.6
01/17/2020	9:00 AM	-9.7	88	1	0	782.2
	9:00 PM	-6.2	87	0	0	780.0
01/19/2020	9:00 AM	-9.1	80	0	0	769.1
	9:00 PM	-0.5	52	1	0	767.2
04/03/2020	9:00 AM	9.3	90	0	1	766.8
	9:00 PM	11.0	81	1	0	766.4
04/05/2020	9:00 AM	15.4	30	0	0	762.5
	9:00 PM	17.0	36	1	0	762.1
04/07/2020	9:00 AM	13.7	55	0	0	760.5
	9:00 PM	17.4	47	0	0	761.8
04/28/2020	9:00 AM	22.4	49	0	0	752.7
	9:00 PM	24.6	43	0	0	754.9
04/30/2020	9:00 AM	13.2	94	1	3	765.7
	9:00 PM	14.0	79	0	2	767.3
05/03/2020	9:00 AM	18.0	57	0	0	756.6
	9:00 PM	13.1	91	1	6	762.4
07/22/2020	9:00 AM	25.2	36	1	0	752.3
	9:00 PM	22.6	44	1	0.3	756.7
07/24/2020	9:00 AM	29.0	39	0	0	751.0
	9:00 PM	19.2	78	5	2	761.4
07/26/2020	9:00 AM	26.8	40	1	0	755.8
	9:00 PM	22.9	65	1	0.3	757.0
10/21/2020	9:00 AM	17.7	21	0	0	761.3
	9:00 PM	14.5	30	0	0	763.9
10/23/2020	9:00 AM	6.2	79	0	0	766.2
	9:00 PM	5.1	90	1	4	771.7
10/25/2020	9:00 AM	4.3	69	0	0	773.4
	9:00 PM	7.9	50	0	0	772.6

Table S3. Pearson correlation between the concentration of pollutants and meteorological parameters..

No.	Compounds	Correlation coefficients																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	Benzene	1.0***	0.5***	0.0	0.08	0.15	0.43***	0.16	0.08	0.46***	0.05	-0.44***	0.28	0.65***	0.43**	0.43*	0.64***	0.61***	0.69***
2	Toluene	0.5***	1.0***	0.54***	0.49***	0.61***	0.64***	0.51***	0.43**	-0.02	0.44***	0.12	0.5***	0.25	-0.26	0.51***	0.07	-0.01	0.05
3	Ethylbenzene	0.0	0.54***	1.0***	0.89***	0.95***	0.7***	0.68***	0.4**	0.11	0.34*	0.67***	0.58***	0.27	-0.04	0.39	-0.11	-0.21	-0.01
4	<i>m</i> -Xylene	0.08	0.49***	0.89***	1.0***	0.91***	0.81***	0.76***	0.72***	0.29	0.57***	0.53***	0.41***	0.51***	0.07	0.29	0.01	-0.07	0.19
5	<i>p</i> -Xylene																		
6	<i>o</i> -Xylene	0.15	0.61***	0.95***	0.91***	1.0***	0.76***	0.69***	0.48***	0.19	0.35**	0.53***	0.57***	0.39***	-0.0	0.4	0.01	-0.12	0.1
7	1,2,4-Trimethylbenzene	0.43***	0.64***	0.7***	0.81***	0.76***	1.0***	0.76***	0.64***	0.41***	0.54***	0.23	0.64***	0.76***	0.12	0.36	0.13	0.13	0.38
8	1,3,5-Trimethylbenzene	0.16	0.51***	0.68***	0.76***	0.69***	0.76***	1.0***	0.63***	0.26	0.54***	0.4***	0.29	0.51***	0.04	0.2	0.02	0.01	0.19
9	Propylbenzene	0.08	0.43**	0.4**	0.72***	0.48***	0.64***	0.63***	1.0***	0.08	0.95***	0.24	-0.06	0.46***	-0.1	0.1	-0.04	-0.02	0.13
10	Phenol	0.46***	-0.02	0.11	0.29	0.19	0.41***	0.26	0.08	1.0***	0.06	-0.1	0.31	0.75***	0.64***	0.0	0.41***	0.53***	0.67***
11	Chlorobenzene	0.05	0.44***	0.34*	0.57***	0.35**	0.54***	0.54***	0.95***	0.06	1.0***	0.31	-0.08	0.38**	-0.16	0.07	-0.07	-0.03	0.09
12	Benzaldehyde	-0.44***	0.12	0.67***	0.53***	0.53***	0.23	0.4***	0.24	-0.1	0.31	1.0***	0.19	-0.13	-0.17	0.13	-0.34*	-0.43***	-0.32
13	3-Picoline	0.28	0.5***	0.58***	0.41***	0.57***	0.64***	0.29	-0.06	0.31	-0.08	0.19	1.0***	0.44***	0.28	0.54**	0.12	-0.35*	0.11
14	Naphthalene	0.65***	0.25	0.27	0.51***	0.39***	0.76***	0.51***	0.46***	0.75***	0.38**	-0.13	0.44***	1.0***	0.61***	0.17	0.47***	0.56***	0.71***
15	Fluorene	0.43**	-0.26	-0.04	0.07	-0.0	0.12	0.04	-0.1	0.64***	-0.16	-0.17	0.28	0.61***	1.0***	-0.09	0.58***	0.58***	0.42
16	1,2-Dichloroethane	0.43*	0.51***	0.39	0.29	0.4	0.36	0.2	0.1	0.0	0.07	0.13	0.54**	0.17	-0.09	1.0***	-0.12	-0.18	-0.02
17	Methylene chloride	0.64***	0.07	-0.11	0.01	0.01	0.13	0.02	-0.04	0.41***	-0.07	-0.34*	0.12	0.47***	0.58***	-0.12	1.0***	0.66***	0.48**
18	<i>n</i> -Decane	0.61***	-0.01	-0.21	-0.07	-0.12	0.13	0.01	-0.02	0.53***	-0.03	-0.43***	-0.35*	0.56***	0.58***	-0.18	0.66***	1.0***	0.7***
19	<i>n</i> -Heptane	0.69***	0.05	-0.01	0.19	0.1	0.38	0.19	0.13	0.67***	0.09	-0.32	0.11	0.71***	0.42	-0.02	0.48**	0.7***	1.0***
20	CO	0.38	0.35	0.35	0.39	0.47*	0.75***	0.29	-0.09	0.48**	-0.07	-0.08	0.62***	0.6***	0.52	-0.35	0.22	0.18	0.3
21	SO ₂	0.55***	-0.08	0.04	0.11	0.08	0.38	0.07	-0.32	0.54***	-0.21	-0.26	0.08	0.61***	0.54	-0.25	0.61***	0.61***	0.56
22	NO ₂	0.24	0.15	0.06	0.08	0.2	0.15	0.0	-0.18	0.08	-0.03	-0.13	0.19	0.14	-0.01	0.09	0.28	0.21	-0.09
23	PM _{2.5}	0.62***	0.02	-0.01	0.09	0.08	0.31	0.15	-0.05	0.57***	-0.07	-0.41*	0.68***	0.64***	0.73***	0.08	0.59***	0.8***	0.65***
24	Temperature, °C	-0.55***	0.08	0.27	0.11	0.17	-0.27	0.04	0.04	-0.51***	0.08	0.59***	-0.36*	-0.63***	-0.55***	0.01	-0.51***	-0.57***	-0.56***
25	Humidity, %	0.01	-0.31*	-0.28	-0.08	-0.21	0.02	-0.06	0.11	0.27	0.07	-0.32*	-0.2	0.28	0.19	-0.1	0.05	0.2	0.35
26	Wind speed, m s ⁻¹	-0.24	-0.2	0.12	0.23	0.18	-0.19	-0.03	0.04	0.03	-0.08	0.18	-0.28	-0.15	0.08	-0.08	0.06	-0.08	0.02
27	Precipitation, mm	-0.44***	-0.21	-0.09	-0.1	-0.14	-0.22	-0.13	-0.03	-0.24	0.01	0.1	-0.15	-0.32*	-0.23	-0.09	-0.37**	-0.36**	-0.24
28	Pressure, mm Hg	0.5***	0.02	-0.19	-0.05	-0.09	0.31*	-0.03	-0.03	0.51***	-0.08	-0.55***	0.41***	0.57***	0.34	0.11	0.33	0.38**	0.54***

Statistically significant:

***p<0.01

**p<0.05

*p<0.1

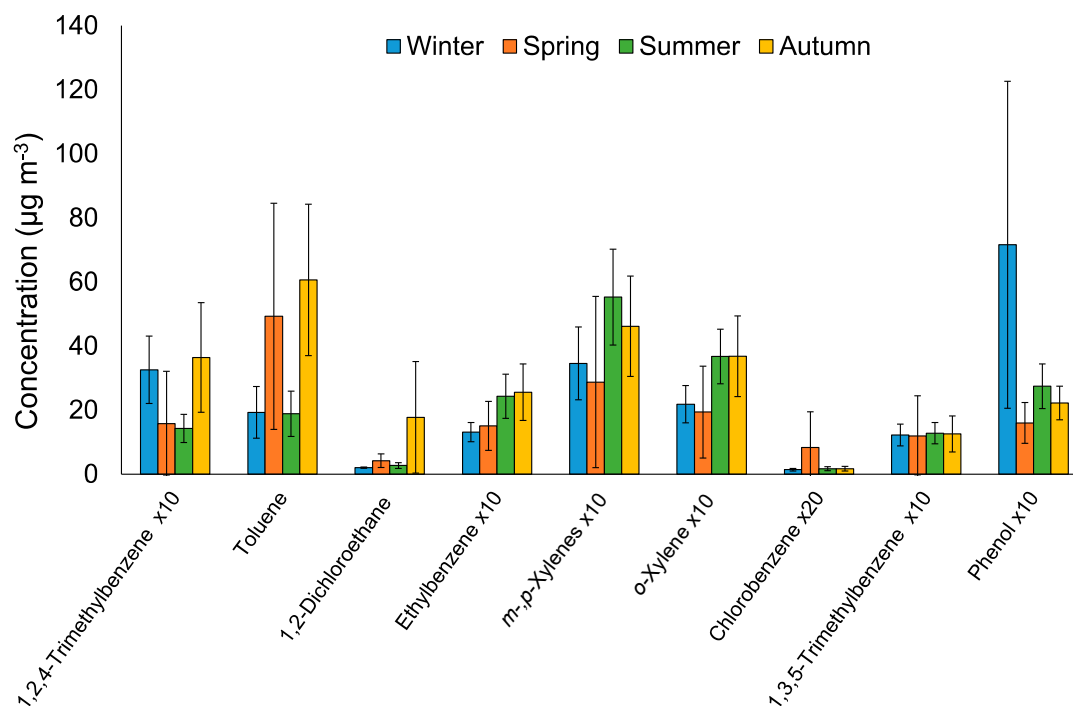


Figure S1. Seasonal variations of the mean VOCs concentrations (mean of the sampling days in each season \pm SD).

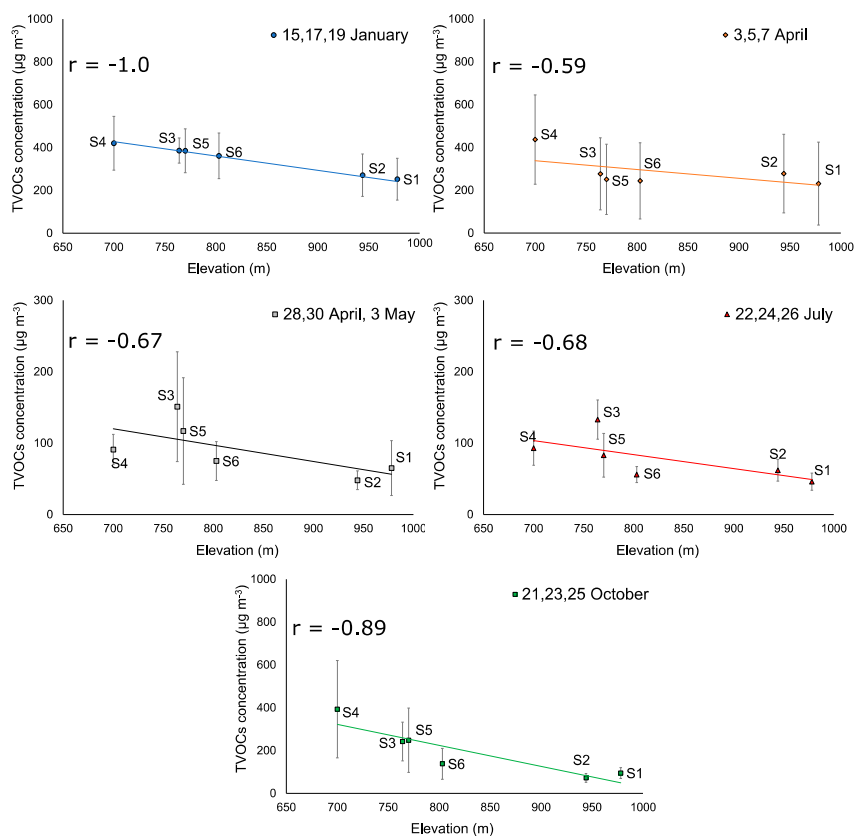


Figure S2. TVOCs concentrations and sampling site's (S1-S6) elevation above the sea level during sampling periods.