

Characteristics analysis and health risk assessment of PM_{2.5} and VOCs in Tianjin based on high resolution online data

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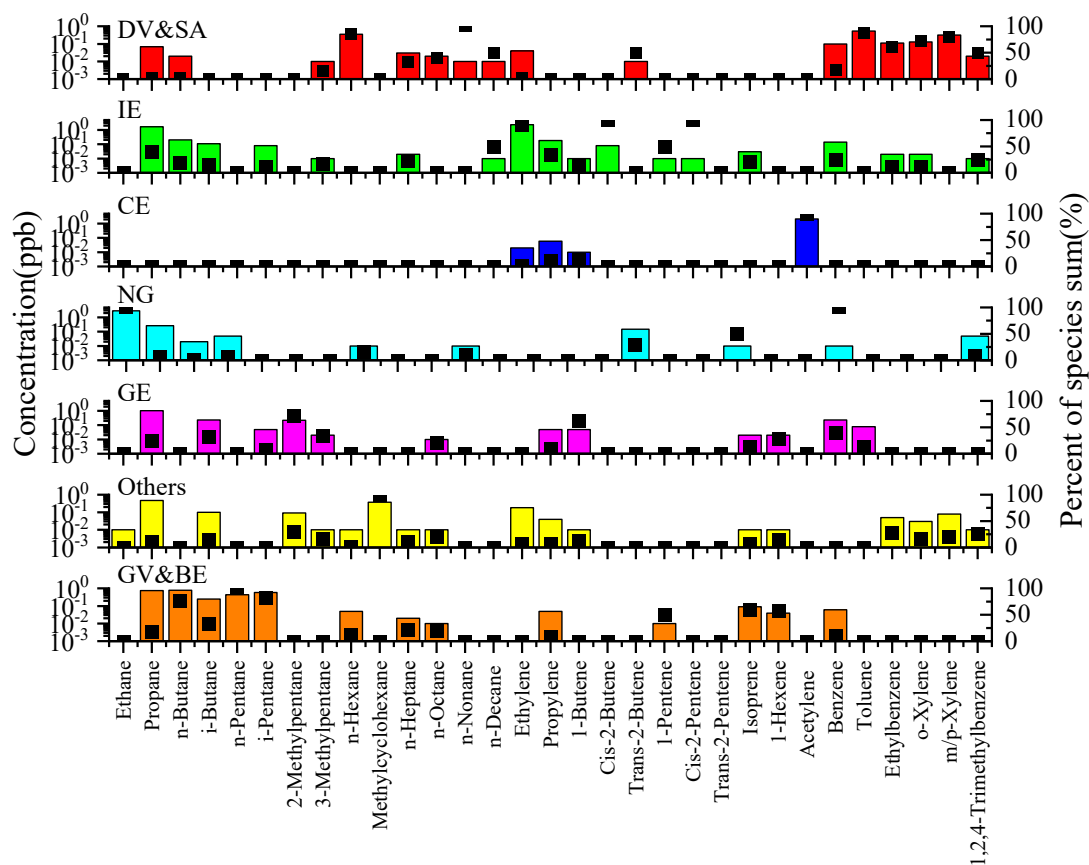


Figure.S1 Factor profile of VOCs.

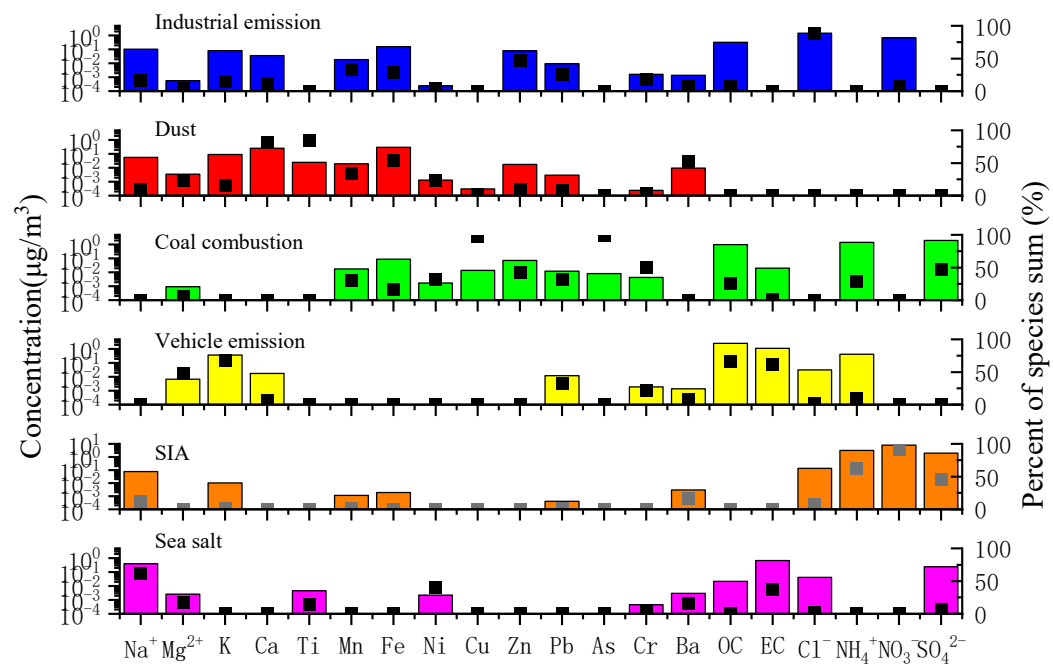


Figure.S2 Factor profile of PM_{2.5}

Table S1 The value of RfC, IUR of VOCs.

Species	RfC (mg/m ³)	IUR (m ³ /μg)
Cyclohexane	6	-
n-Hexane	7.0×10 ⁻¹	-
Benzene	5	7.80×10 ⁻⁶
Toluene	3.0×10 ⁻²	-
1,2,3-Trimethylbenzene	6.0×10 ⁻²	-
1,2,4-Trimethylbenzene	6.0×10 ⁻²	-
1,3,5-Trimethylbenzene	6.0×10 ⁻²	-
o-Xylene	0.1	-
Ethylbenzene	1	-
m/p-Xylene	1.0×10 ⁻¹	-

* Inhalation unit risk (IUR) (μg/m³) and reference concentrations (RfCs, mg/m³). All the parameters in TableS1 were obtained from the Integrated Risk Information System (IRIS), United States Agency for Toxic Substances and Disease Registry, or California Office of Environmental Health Hazard Assessment (OEHHA)

Table S2 The value of RfD, CSF of trace metals.

Species	RfD (mg/kg·d)	CSF (mg/kg·d) ⁻¹
As	3.0×10 ⁻⁴	15.1
Cr	2.8×10 ⁻⁵	42
Ni	2.0×10 ⁻²	8.4×10 ⁻¹
Cu	4.0×10 ⁻²	-
Pb	3.5×10 ⁻³	-
Zn	3.0×10 ⁻¹	-
Mn	2.4×10 ⁻²	-

* RfD (mg/kg·day) is daily reference dose; CSF (kg·day/mg)⁻¹ is the cancer slope factor. All the parameters in TableS2 were obtained from U.S. EPA.

Table S3 The concentrations and percentages of VOC species.

Species	AC (ppbv)	SD (ppbv)	Per (%)	Min (ppbv)	Max (ppbv)
Alkanes	14.9	14.9	61.8	0.5	176.5
Ethane	2.9	4.0	11.8	0.0	71.9
Propane	4.6	4.6	18.9	0.2	53.2
n-Butane	1.2	1.7	4.8	0.0	19.7
i-Butane	0.9	0.9	3.6	0.0	9.2
2,2-Dimethylbutae	0.1	0.2	0.3	0.0	5.8
2,3-Dimethylbutane	0.1	0.4	0.4	0.0	7.1
n-Pentane	0.5	0.8	2.0	0.0	7.7
i-Pentane	0.8	1.1	3.4	0.0	13.6
Cyclopentane	1.2	4.0	4.8	0.0	78.4
2-Methylpentane	0.4	0.7	1.8	0.0	21.9

3-Methylpentane	0.1	0.1	0.3	0.0	3.1
Methylcyclopentane	0.8	1.8	3.2	0.0	20.2
2,4-Dimethylpentane	0.1	0.4	0.4	0.0	5.7
2,3-Dimethylpentane	0.0	0.1	0.1	0.0	0.9
2,3,4-Trimethylpentane	0.1	0.1	0.4	0.0	1.6
2,2,4-Trimethylpentane	0.1	0.2	0.6	0.0	3.2
n-Hexane	0.5	0.7	2.0	0.0	7.4
3-Methylhexane	0.1	0.1	0.3	0.0	1.8
2-Methylhexane	0.0	0.1	0.2	0.0	2.0
Cyclohexane	0.1	0.1	0.3	0.0	2.5
Methylcyclohexane	0.4	1.4	1.7	0.0	19.3
n-Heptane	0.1	0.1	0.4	0.0	2.0
2-Methylheptane	0.0	0.2	0.1	0.0	10.6
3-Methylheptane	0.0	0.3	0.2	0.0	9.5
n-Octane	0.1	0.1	0.2	0.0	4.9
n-Nonane	0.0	0.0	0.1	0.0	1.0
n-Decane	0.0	0.2	0.2	0.0	3.5
Alkenes	4.8	5.0	19.8	0.1	39.9
Propene	2.6	3.5	10.9	0.0	27.2
trans-2-Butene	0.8	1.2	3.1	0.0	14.6
1-Butene	0.1	0.1	0.4	0.0	2.5
cis-2-Butene	0.2	0.6	0.9	0.0	6.6
trans-2-Pentene	0.1	0.3	0.2	0.0	10.4
1-Pentene	0.0	0.1	0.1	0.0	1.1
cis-2-Pentene	0.0	0.1	0.1	0.0	4.1
Isoprene	0.0	0.1	0.1	0.0	1.4
1-Hexene	0.5	1.4	2.1	0.0	22.3
Ethylene	0.5	1.4	1.9	0.0	22.1
Aromatic hydrocarbons	2.3	2.6	9.5	0.0	22.0
Benzene	0.7	0.6	2.7	0.0	4.3
Toluene	0.7	0.9	2.8	0.0	11.7
Ethylbenzene	0.2	0.3	0.9	0.0	3.2
m,p-Xylene	0.2	0.3	0.8	0.0	3.1
Styrene	0.5	0.7	1.9	0.0	8.3
o-Xylene	0.0	0.0	0.0	0.0	0.6
i-Propylbenzene	0.0	0.0	0.0	0.0	0.2
n-Propylbenzene	0.0	0.1	0.0	0.0	5.1
m-Ethyltoluene	0.0	0.1	0.1	0.0	1.1
p-Ethyltoluene	0.0	0.0	0.0	0.0	2.1
1,3,5-Trimethylbenzene	0.0	0.0	0.0	0.0	0.5
o-Ethyltoluene	0.0	0.1	0.1	0.0	1.1
1,2,4-Trimethylbenzene	0.0	0.0	0.0	0.0	0.6
1,2,3-Trimethylbenzene	0.0	0.0	0.0	0.0	0.5
m-Diethylbenzene	0.0	0.0	0.0	0.0	0.5

p-Diethylbenzen	2.3	2.6	9.5	0.0	22.0
Acetylene	2.2	3.5	9.0	0.0	79.2
TVOC	24.1	22.6	-	0.9	209.4

* AC is the average con concentrations of VOCs, SD represents the standard deviation, Per refers to the percentage of species in TVOCs. Min and Max represent the minimum and maximum values of VOCs. All the data in TableS3 were obtained from Nankai University Air Quality Research Supersite (NKAQRS).