

Supplementary materials for

**Distribution, genesis and human health risks of
groundwater heavy metals impacted by the typical setting
of Songnen Plain of NE China**

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Supplementary Tables

Table S1 Measuring methods of parameters and detectable accuracy

Heavy metal	Measuring method	Detectable limit (µg/L)	Relative standard deviation (%)	Relative error (%)	Recovery efficiencies (%)
As	ICP-MS	0.002	2.85	1.78	91.3 - 102.2
Ba	ICP-AES	0.2	3.43	3.59	95.7 – 105.5
Cd	ICP-MS	0.0004	5.12	4.24	91.2 – 108.1
Co	ICP-MS	0.0003	6.77	2.28	88.7 – 103.5
Cr	ICP-MS	0.00008	1.48	2.20	85.5 – 107.3
Cu	ICP-MS	0.00002	2.35	2.08	96.4 – 110.5
Fe	ICP-AES	0.01	8.87	6.23	96.4 – 112.1
Mn	ICP-AES	0.5	6.46	3.33	90.7 – 107.5
Ni	ICP-MS	0.0001	2.21	3.42	93.6 – 108.5
Pb	ICP-MS	0.0003	1.05	5.21	89.4 – 112.3
Zn	ICP-MS	0.005	1.04	5.17	90.1 – 110.2

Table S2 Parameters and their corresponding values in human health risks assessment

Risk coefficient of carcinogenic heavy metals (q _i)				Risk coefficient of carcinogenic heavy metals (R _{fdj})						
As	Cd	Cr	Ba	Co	Cu	Fe	Mn	Ni	Pb	Zn
1.5	6.1	41	0.02	0.02	0.005	0.3	0.046	0.02	0.0014	0.003
Per capita drinking water intake per unit weight (L/(kg·d))										
Child	Young	Adult	Elder							
0.073	0.027	0.018	0.017							

Table S3 Health risks of each heavy metal to different populations

Parameter	Child		Young		Adult		Elder	
	Wet season	Dry season	Wet season	Dry season	Wet season	Dry season	Wet season	Dry season
As	4.46E-05	3.82E-05	1.66E-05	1.41E-05	1.11E-05	9.43E-06	1.05E-05	8.91E-06
Cd	2.89E-07	1.14E-07	1.07E-07	7.61E-08	7.13E-08	7.18E-08	6.73E-08	6.09E-08
Cr	0.013146	0.006913	0.012399	0.005012	0.011316	0.003992	0.01112	0.00385
Ba	5.33E-10	3.77E-10	2.08E-09	1.4E-10	1.31E-10	9.3E-11	1.24E-10	8.78E-11
Co	1.55E-10	1.19E-10	9.61E-12	4.41E-11	3.82E-11	2.94E-11	3.61E-11	2.78E-11
Cu	3.36E-10	1.45E-10	1.97E-10	5.38E-11	8.28E-11	3.59E-11	7.82E-11	3.39E-11
Fe	8.9E-09	4.81E-09	1.62E-08	1.78E-09	2.19E-09	1.19E-09	2.07E-09	1.12E-09
Mn	5.61E-09	4.18E-09	3.29E-09	1.55E-09	1.38E-09	1.03E-09	1.31E-09	9.73E-10
Ni	3.3E-10	1.81E-10	5.74E-11	6.71E-11	8.14E-11	4.47E-11	7.69E-11	4.22E-11
Pb	3.3E-10	9.31E-11	1.24E-10	3.44E-11	8.14E-11	2.3E-11	7.69E-11	2.17E-11
Zn	2.6E-11	2.46E-11	1.22E-10	9.11E-12	6.4E-12	6.07E-12	6.05E-12	5.74E-12

Supplementary Figures

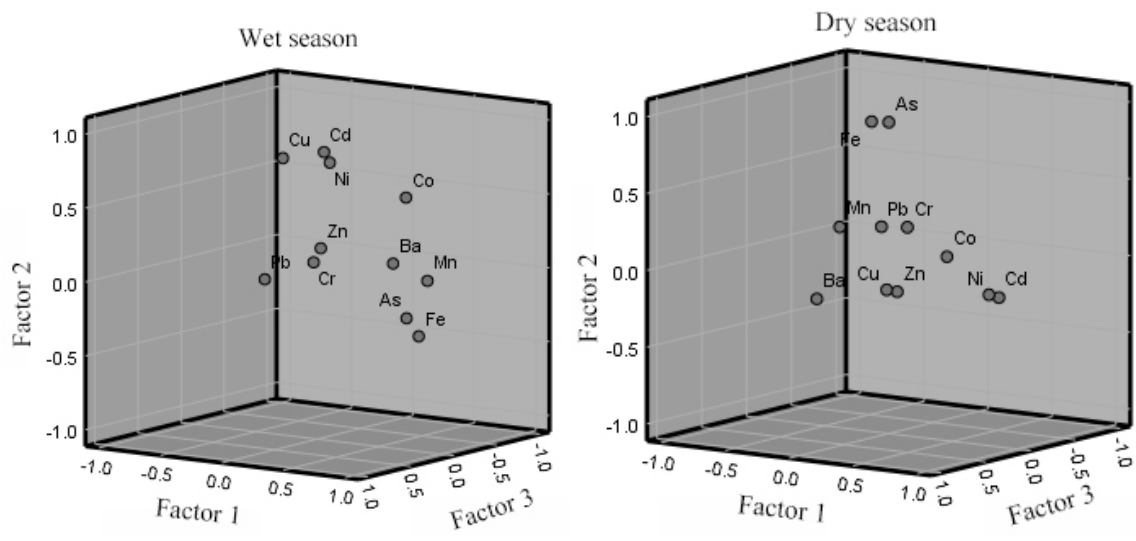


Figure S1 Loading diagram of heavy metals in groundwater

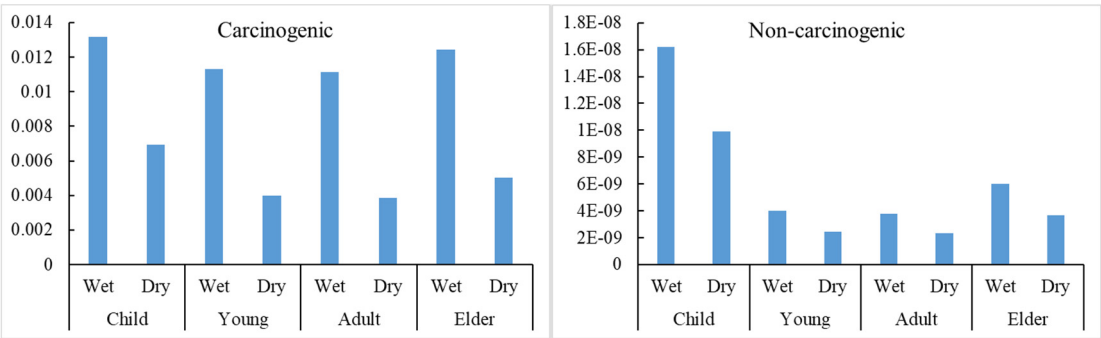


Figure S2 Bar chart of average R value caused by carcinogenic and non-carcinogenic

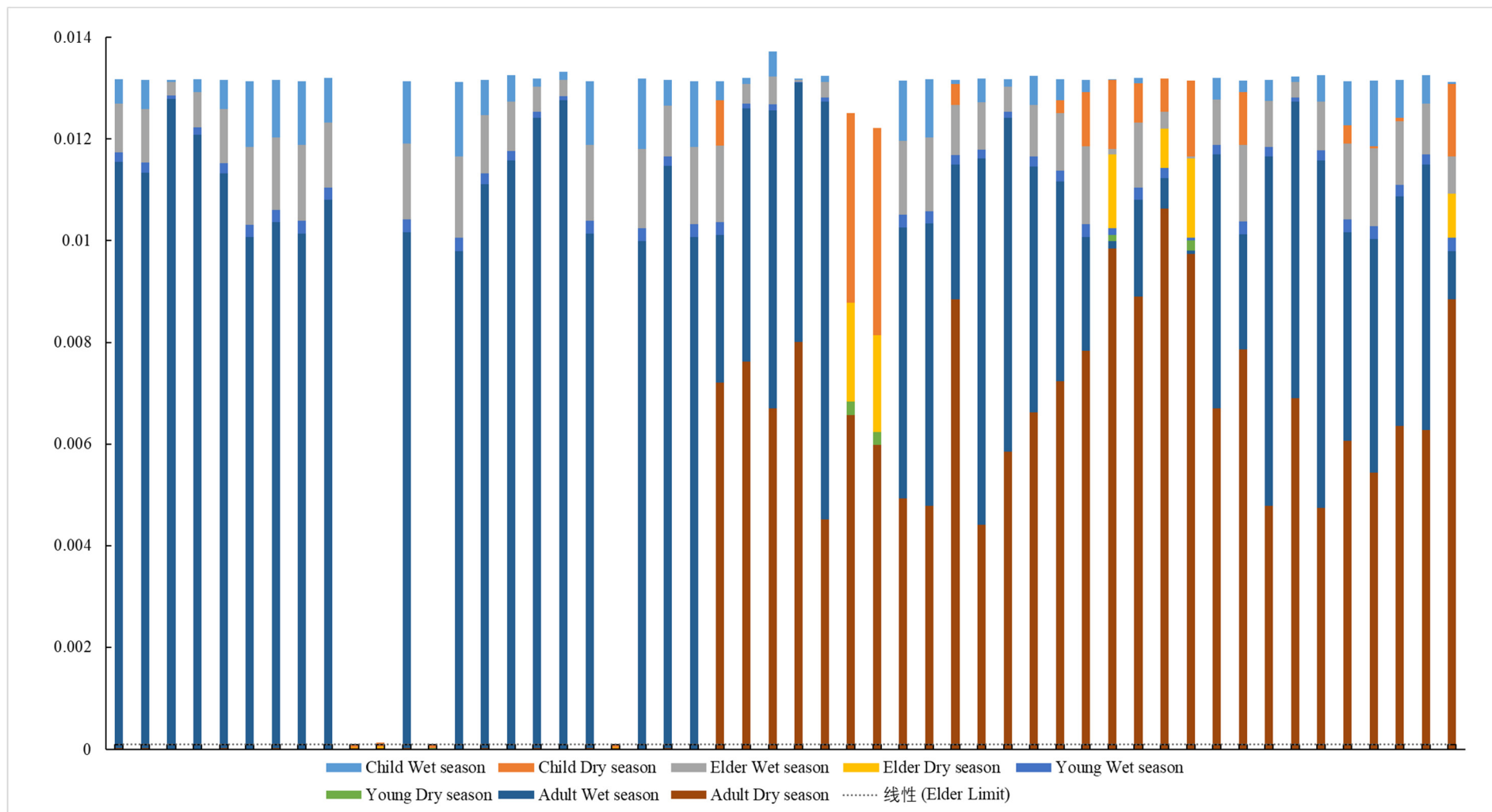


Figure S3 R value of each sample