Updated spatial distribution and health risk assessment of heavy metals in soils of the Yangtze River Basin, China

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Table S1 The grading standard of single factor index [1–4]

Level	P_i	Pollution degree
1	<1.0	No pollution
2	1.0~<2.0	Minor pollution
3	2.0~<3.0	Mild pollution
4	3.0~<5.0	Moderate pollution
5	>5.0	Serious pollution

Table S2 The grading standard of Nemerow's synthetic pollution index [1–4]

Level	PI	Pollution degree
1	< 0.7	Safety
2	0.7 ~< 1.0	Guard
3	1.0 ~< 2.0	Mild pollution
4	2.0 ~< 3.0	Moderate pollution
5	> 3.0	Serious pollution

Table S3 Parameters related to human health risk assessment of heavy metals in soils

Parameters		Reference value		Unit	References
		Adult	Children		
Soil ingestion rate IR_{ing}		20	50	mg/d	[5]
Soil inhalation rate IR_{inh}		16	7.6	m^3/d	[5]
Exposed surface area of skin (SA)		5 700	2 800	cm^2	[6]
Adherence factor (AF)		$2*10^{-7}$	$1*10^{-6}$	$kg/cm^2/d$	[5]
Dermal absorption factor (ABS)	Hg	0.051	0.051	/	[7]
	Pb	0.006	0.006	/	
	Cr	0.044	0.044	/	
	Cu	0.10	0.10	/	
	As	0.032	0.032	/	
	Ni	0.35	0.35	/	

	Cd	0.14	0.14	/	
	Zn	0.021	0.021	/	
Emission factor (PEF)		1.36E+09	1.36E+09	m^3/kg	[6]
Exposure frequency (EF)		350	350	d/a	[8]
Exposure duration (ED)		24	6	a	[5, 9, 10]
Body weight (BW)		65	29	kg	[11]
Average exposure time (AT)		24*365	6*365	d	[11]

Table S4 The RfD and SF of different exposure pathways for heavy metals

Heavy metal	RfD（mg/kg/d）			SF [12,13]
	Ingestion	Dermal absorption	Inhalation	
As	3.00E-04	1.23E-04	3.00E-03[77]	1.5
Cd	1.00E-03	1.00E-05	1.00E-03	6.3
Cr	1.50E+00	6.00E-05	2.86E-05	0.5
Cu	4.00E-02	1.20E-02	4.02E-02	/
Hg	3.00E-04	2.10E-05	8.57E-05	/
Ni	2.00E-02	5.40E-03	2.06E-02	/
Pb	3.50E-03	5.25E-04	3.52E-03	0.0085
Zn	3.00E-01	6.00E-02	3.00E-01	/

Table S5 The grading standard for carcinogenic health risk [6]

Level	TCR	Degree
1	$<1\times10^{-5}$	No risk
2	1×10^{-5}~$<5\times10^{-5}$	Low risk
3	5×10^{-5}~$<1\times10^{-4}$	Medium risk
4	$>1\times10^{-4}$	High risk

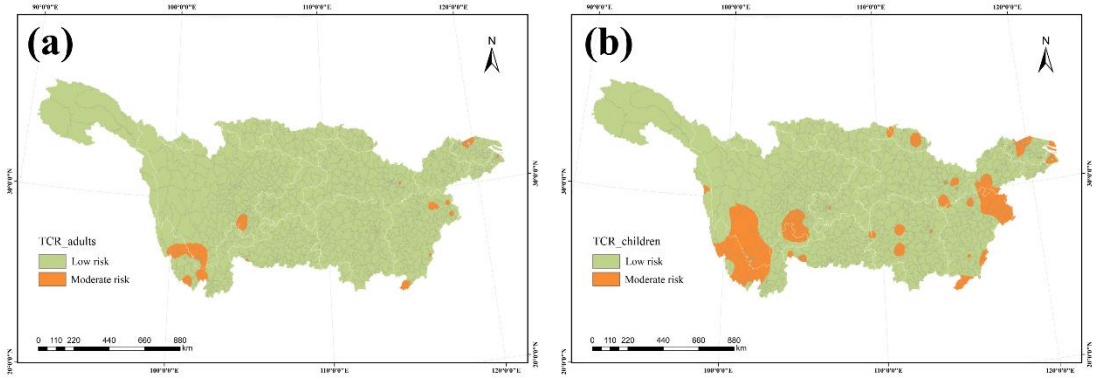

Fig. S1 Distribution of soil carcinogenic risk of heavy metals in the Yangtze River Basin for (a) adults and (b) children.

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