

## Supplementary Materials

**Table S1.** Relative weight of chemical parameters.

Parameters	Weight (wi)	Relative Weight (Wi)
Na(mg/L)	2	0.068965517
Mg(mg/L)	2	0.068965517
Ba(mg/L)	2	0.068965517
Co(ug/L)	1	0.034482759
Cu(mg/L)	2	0.068965517
Fe(mg/L)	4	0.137931034
Mn(mg/L)	5	0.172413793
Ca(mg/L)	2	0.068965517
Hg (ug/L)	5	0.172413793
PH	4	0.137931034
$\Sigma wi = 29$		$\Sigma Wi = 1$

**Table S2.** The parameter values.

RfDingestion (ug/kg/day)		RfDdermal (ug/kg/day)	K <sub>p</sub>	ABS <sub>GI</sub>
Na			$1 \times 10^{-3}$	
Mg			$1 \times 10^{-3}$	
Li	20	10	$1 \times 10^{-3}$	0.001
Sr	600	120	$1 \times 10^{-3}$	0.001
Ba	70	14	$1 \times 10^{-3}$	0.001
Co	0.3	0.06	$4 \times 10^{-4}$	0.001
Cu	40	12	$1 \times 10^{-3}$	0.001
Fe	300	45	$1 \times 10^{-3}$	0.001
Mn	20	0.8	$1 \times 10^{-3}$	0.001
Sc			$1 \times 10^{-3}$	
Ca			$1 \times 10^{-3}$	
Hg	0.3	0.021	$1 \times 10^{-3}$	0.001

**Table S3.** The total hardness (TH) analysis of the Yangtze River samples.

Station	Mg (mg/L)		Ca (mg/L)		TH (mg/L)	Average Value
	Mean	SD	Mean	SD		
XJ (Minjiang)	11.48	0.05	41.13	0.20	149.89	181.65
DC (Daninghe)	8.94	0.29	45.84	0.13	151.25	
GY (Xiaojiang)	9.66	0.94	48.54	0.50	160.93	
TPX (Taipingxi)	10.29	0.08	48.37	0.84	163.11	
HJ (Hejiang)	13.67	0.80	43.28	0.08	164.26	
CS (Chishuihe)	8.78	0.17	51.77	0.75	165.44	
XK (Xiangxihe)	11.09	0.03	49.15	0.30	168.36	
WS (Wushan)	10.68	0.16	51.40	0.62	172.31	
YC (Yichang)	10.99	0.10	51.15	0.41	172.93	
JA (Jiangan)	13.32	0.22	48.04	0.20	174.71	
FD (Fengdu)	14.12	0.26	49.19	0.38	180.88	
WL (Wujiang)	10.60	0.19	55.26	0.11	181.61	
XZ (Jinshajiang)	17.65	0.19	43.92	0.60	182.16	
YY (Yunyang)	15.12	0.54	49.01	0.21	184.53	

BN (Banan)	13.34	0.22	58.29	0.91	200.44
MD (Mudong)	12.80	0.22	60.64	0.32	204.10
HC (Jialingjiang)	16.82	0.21	54.08	0.15	204.16
BN (Jantanhe)	11.02	0.18	70.22	0.69	220.76
HS (Tuojiang)	17.47	0.05	71.17	0.21	249.55

Table S4. The WQI value for each sampling location.

Station/Parameters	Ba	Co	Cu	Fe	Mn	Hg	Na	Mg	Ca	Ph	WQI
JA	0.0035	0.0006	0.0002	0.0268	0.0150	0.0018	0.0021	0.0306	0.0442	0.0000	12.4867
HJ	0.0031	0.0007	0.0001	0.0209	0.0031	0.0013	0.0017	0.0314	0.0398		10.2182
BN	0.0029	0.0008	0.0002	0.0562	0.0554	0.0010	0.0017	0.0307	0.0536		20.2556
MD	0.0038	0.0010	0.0002	0.0203	0.0317	0.0015	0.0014	0.0294	0.0558		14.5152
FD	0.0040	0.0012	0.0002	0.0206	0.0018	0.0010	0.0016	0.0325	0.0453		10.8095
YY	0.0038	0.0017	0.0003	0.0245	0.0029	0.0011	0.0018	0.0348	0.0451		11.6037
WS	0.0041	0.0005	0.0002	0.0187	0.0000	0.0033	0.0012	0.0246	0.0473		9.9877
TPX	0.0039	0.0009	0.0002	0.0189	0.0000	0.0027	0.0012	0.0237	0.0445		9.5946
YC	0.0042	0.0018	0.0003	0.0218	0.0000	0.0030	0.0013	0.0253	0.0471		10.4748
XZ (Jinshajiang)	0.0034	0.0006	0.0002	0.0177	0.0000	0.0011	0.0023	0.0406	0.0404		10.6376
XJ (Minjiang)	0.0030	0.0006	0.0002	0.0233	0.0063	0.0016	0.0013	0.0264	0.0378		10.0523
HS (Tuojiang)	0.0064	0.0007	0.0002	0.0198	0.0215	0.0028	0.0026	0.0402	0.0655		15.9605
CS (Chishuihe)	0.0036	0.0007	0.0002	0.0305	0.0087	0.0012	0.0010	0.0202	0.0476		11.3818
BN (Jiantanhe)	0.0029	0.0008	0.0002	0.0562	0.0554	0.0010	0.0017	0.0307	0.0536		20.2556
HC (Jialingjiang)	0.0052	0.0006	0.0002	0.0260	0.0061	0.0000	0.0014	0.0387	0.0498		12.7923
WL (Wujiang)	0.0027	0.0011	0.0001	0.0187	0.0000	0.0022	0.0009	0.0244	0.0508		10.0849
GY (Xiaojiang)	0.0055	0.0013	0.0003	0.0306	0.0000	0.0019	0.0017	0.0222	0.0447	0.1500	25.8230
DC (Daninghe)	0.0035	0.0023	0.0003	0.0218	0.0005	0.0191	0.0015	0.0206	0.0422	0.1409	25.2681
XK (Xiangxihe)	0.0046	0.0006	0.0002	0.0224	0.0000	0.0074	0.0013	0.0255	0.0452		10.7267