

## Supplementary materials

### Annual characteristics, source analysis, and health risk assessment of heavy metals in PM<sub>1</sub> from a low-latitude, high-altitude city-A case study Kunming city

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Table S1. Classification of pollution levels based on enrichment factor (EF)

EF	$EF \leq 1$	$1 < EF \leq 10$	$10 < EF \leq 100$	$100 < EF \leq 1000$	$EF > 1000$	References
Degree of enrichment	No enrichment or trace enrichment	Mild enrichment	Moderately enriched	Highly enriched	Hyperaccumulation	[54]
Class	1	2	3	4	5	
Source	Crustal or soil source	Natural sources and anthropogenic	Artificial pollution source	Artificial pollution	Artificial pollution source	

		nic sources act together		source		
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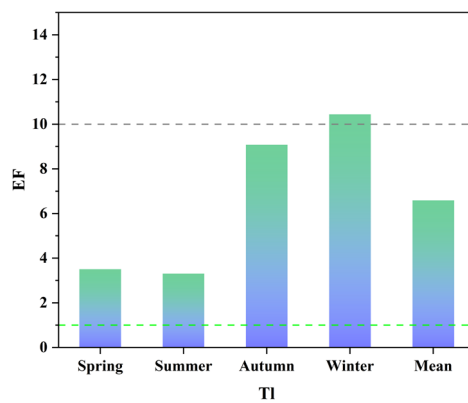
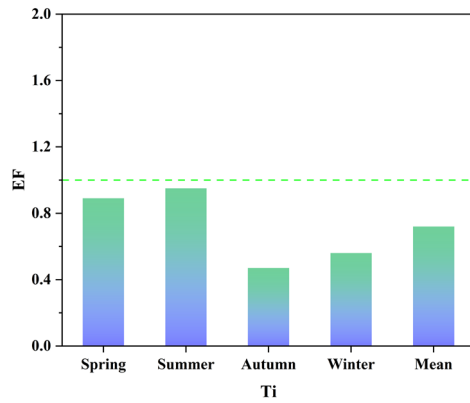
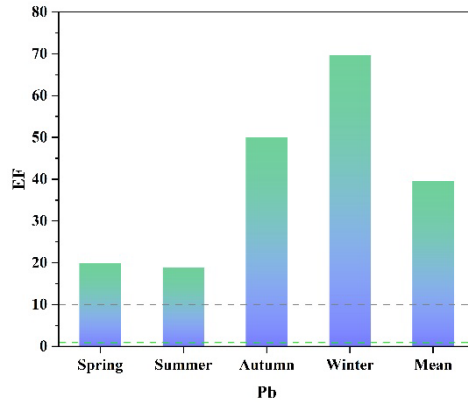
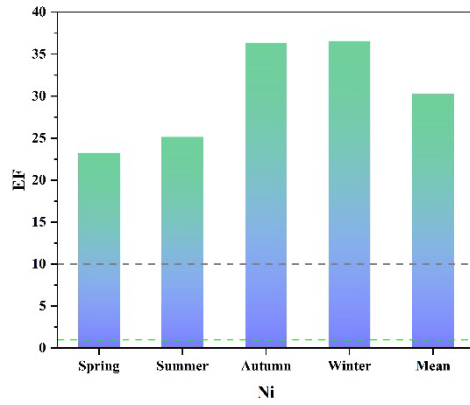
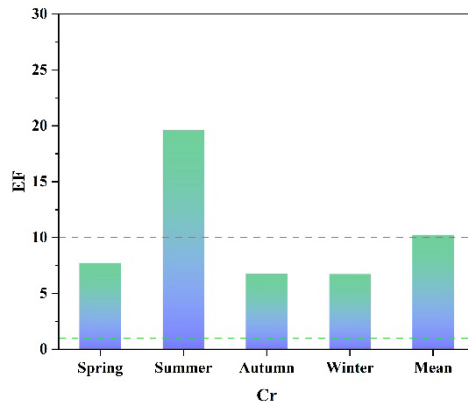
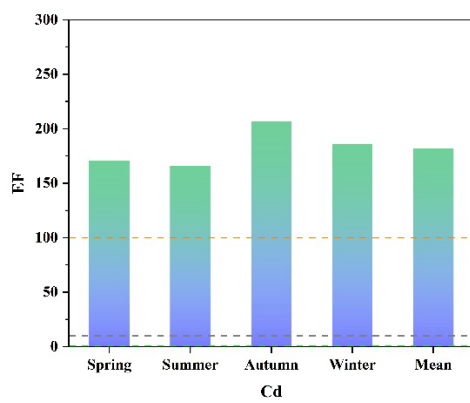
Table S2. The parameters and units used for calculating human exposure and health risks

Description	Value	Unites	Reference
EF	350	days/year	[26, 55]
ED	6 (Children), 30(Aldults)	years	
ET	24	h/day	
AT	ED*24*365 70*24*365(Cancer)	years	
<i>RfC</i>	Cd $1.5 \times 10^1$ Cr(VI) $1.0 \times 10^2$ Ni $9.0 \times 10^1$ Pb -	ng/m <sup>3</sup>	
IUR	Cd $1.8 \times 10^{-6}$ Cr(VI) $8.4 \times 10^{-5}$ Ni $2.6 \times 10^{-7}$ Pb $1.2 \times 10^{-8}$	m <sup>3</sup> /ng	

Table S3. Total variance explained and component matrices for the heavy metals.

Variables	Factor		
	1	2	3
Cd	0.609	0.602	-0.241
Cr	-0.239	-0.480	0.956
Ni	0.734	-0.201	0.109

Pb	0.904	0.148	-0.020
Ti	-0.359	0.885	0.036
Tl	0.866	-0.121	-0.201
Zn	0.856	-0.067	-0.035
% of variance	48.52	17.55	14.67
Explained % of cumulative	48.52	66.07	80.74



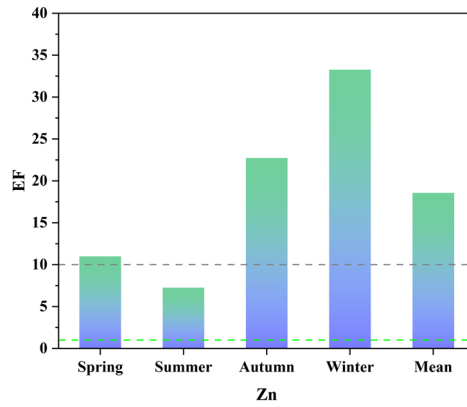


Fig. S1 The EF values of heavy metals in PM<sub>1</sub> from Kunming City in different seasons

### References

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55. RAIS, The Risk Assessment Information System [EB/OL]. <http://rais.ornl.gov>. **2013**.