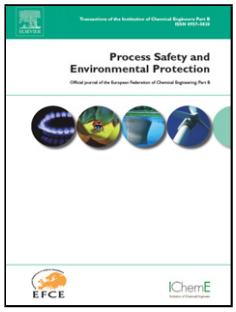

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Authors: Yixian Chen, Xiaosan Jiang, Yong Wang, Dafang Zhuang

PII: S0957-5820(17)30343-9
DOI: https://doi.org/10.1016/j.psep.2017.10.008
Reference: PSEP 1205

To appear in: *Process Safety and Environment Protection*

Received date: 17-6-2017
Revised date: 5-10-2017
Accepted date: 9-10-2017

Please cite this article as: Chen, Yixian, Jiang, Xiaosan, Wang, Yong, Zhuang, Dafang, Spatial characteristics of heavy metal pollution and the potential ecological risk of a typical mining area: A case study in China.Process Safety and Environment Protection https://doi.org/10.1016/j.psep.2017.10.008

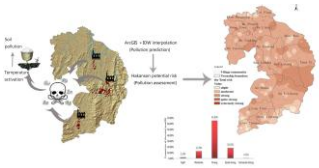
Spatial characteristics of heavy metal pollution and the potential ecological risk of a typical mining area: A case study in China

Yixian Chen[a], Xiaosan Jiang[a], Yong Wang[b,*], Dafang Zhuang[b]

[a] College of Resources and Environmental Science, Nanjing Agricultural University, Nanjing, China

[b] State Key Laboratory of Resources and Environmental Inforamtion System, Institute of Geographical Sciences and Natural Resources Research, Chinese Academy of Sciences, Beijing 100101, China

Graphical abstract



Highlights:

- Using potential ecological risk assessment method to evaluate heavy metals pollution from a small-scale perspective and accurately locate the high risk regions.
- The assessment domain of the Hakanson method is adjusted in this research that could obtain
- more precise evaluation results .
- Inverse distance weighted(IDW) interpolation effectively predicts the distribution of pollution
- characteristics for five different heavy metals.
- The combination of IDW and Hnkanson risk assessment is applied to evaluate the pollution situation in Suxian.

Abstract: The goal of the presented research was to evaluate the possible heavy metal pollution in soil by applying Hakanson risk evaluation method with adjusting assessment domain combined with ArcGIS technology. The assessment standards were adjusted based on the amount and types of studied heavy metals. Topsoil samples in mining area were collected and tested the content of five kinds of heavy metals, Arsenic (As), mercury (Hg), copper (Cu), lead (Pb) and zinc (Zn). The area of different risk levels and the area ratio in each township were accurately calculate, and the regions with high pollution risk were further precisely located. The results indicate the following:(1)It was observed that the accuracy of soil-heavy metal assessment in Suxian was evidently improved by using Hakanson potential ecological risk with assessment domain adjustment. (2) The single factor and Nemero pollution indexes showed an evident contamination of five types of heavy metals in Suxian. (3) There is a high index of comprehensive ecological risk in Suxian; approximately 82.9% of Suxian is at a strong (level 3 or higher) risk level, demonstrating serious soil pollution. The quite strong risk region with the portion of 18.33% of total area is primarily concentrated in the area of the large Polymetallic Mine and coal mining area. Using the single factor ecological risk index, the distribution of large areas of As and Pb high-risk pollution were explored. More than half