## Accepted Manuscript

Research papers

Coupled S and Sr isotope evidences for elevated arsenic concentrations in groundwater from the world's largest antimony mine, central China

Bing Wen, Aiguo Zhou, Jianwei Zhou, Cunfu Liu, Yuliu Huang, Ligang Li

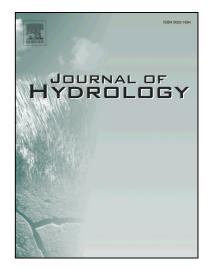
PII: S0022-1694(17)30831-4

DOI: https://doi.org/10.1016/j.jhydrol.2017.12.013

Reference: HYDROL 22424

To appear in: Journal of Hydrology

Received Date: 8 November 2016 Revised Date: 6 November 2017 Accepted Date: 3 December 2017



Please cite this article as: Wen, B., Zhou, A., Zhou, J., Liu, C., Huang, Y., Li, L., Coupled S and Sr isotope evidences for elevated arsenic concentrations in groundwater from the world's largest antimony mine, central China, *Journal of Hydrology* (2017), doi: https://doi.org/10.1016/j.jhydrol.2017.12.013

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

## **ACCEPTED MANUSCRIPT**

- 1 Coupled S and Sr isotope evidences for elevated arsenic concentrations in
- 2 groundwater from the world's largest antimony mine, central China
- 3 Bing Wen<sup>a,c</sup>, Aiguo Zhou<sup>b</sup>, Jianwei Zhou<sup>b,\*</sup>, Cunfu Liu<sup>b</sup>, Yuliu Huang<sup>a</sup>, Ligang Li<sup>b,c</sup>
- <sup>a</sup>Geological Survey, China University of Geosciences, 430074 Wuhan, China
- 5 bSchool of Environmental Studies, China University of Geosciences, 430074 Wuhan, China
- 6 "State Key Laboratory of Biogeology and Environmental Geology, China University of Geosciences, 430074
- 7 Wuhan, China

8

9

#### Abstract

10 The Xikuangshan(XKS) mine, the world's largest antimony mine, was chosen for a detailed arsenic 11 hydrogeochemical study because of the elevated arsenic in bedrock aquifers used by local residents. 12 Hydrochemical data,  $\delta^{34}$ S values of dissolved SO<sub>4</sub><sup>2</sup> and  $^{87}$ Sr/ $^{86}$ Sr ratios have been analyzed to identify the 13 predominant geochemical processes that control the arsenic mobilization within the aquifers. Groundwater samples can be divided into three major types: low arsenic groundwater (0-50 µg/L), high arsenic groundwater (50-1000 14 15 μg/L) and anomalous high arsenic groundwater (>1000 μg/L). Arsenic occurs under oxidizing conditions at the 16 XKS Sb mine as the HAsO<sub>4</sub><sup>2-</sup> anion. The Ca/Na ratio correlates significantly with HCO<sub>3</sub>-/Na and Sr/Na ratios, 17 indicating that carbonate dissolution and silicate weathering are the dominant processes controlling groundwater 18 hydrochemistry. The  $\delta^{34}$ S values of the groundwater indicate that dissolved  $SO_4^{2-}$  in groundwater is mainly 19 sourced from the oxidation of sulfide minerals, and elevated As concentrations in groundwater are influenced by 20 the mixing of mine water and surface water. Furthermore, the  $\delta^{34}$ S values are not correlated with dissolved As 21 concentrations and Fe concentrations, suggesting that the reduction dissolution of Fe(III) hydroxides is not the 22 dominant process controlling As mobilization. The 87Sr/86Sr ratios imply that elevated As concentrations in

### Download English Version:

# https://daneshyari.com/en/article/8895009

Download Persian Version:

https://daneshyari.com/article/8895009

<u>Daneshyari.com</u>