Desalination and Water Treatment
www.deswater.com

doi: 10.5004/dwt.2018.22331

123 (2018) 20–26
August

A multivariate matrix model of analysing mine water bursting and its application

Qingliang Chang[a,b], Xikui Sun[c,d], Huaqiang Zhou[e,*], Xianyuan Shi[c,d]

[a]*Key Laboratory of Deep Coal Resource Mining, Ministry of Education of China, School of Mines, China University of Mining and Technology, Xuzhou 221116, China*
[b]*Post-doctoral Mobile Stations, Zibo Mining Group Co., Ltd., Zibo 255000, China*
[c]*Shandong Energy Zibo Mining Group Co., Ltd., Zibo 272175, China*
[d]*Shandong Provincial Research Center of Backfill Mining Engineering and Technology, Zibo 255000, China*
[e]*State Key Laboratory of Coal Resources and Safe Mining, School of Mines, China University of Mining and Technology, Xuzhou 221116, China, email: zkdcql@cumt.edu.cn*

Received 7 November 2017; Accepted 4 February 2018

ABSTRACT

Identifying mine water bursting sources accurately and quickly is the important condition of controlling mine water disasters. In the paper, seven hydrochemistry indexes: Mg^{2+}, Ca^{2+}, Na^{+} + K^{+}, HCO_3^-, SO_4^{2-}, Cl^- and TDS were regarded as the evaluation indexes for identifying mine water bursting sources, combined with the importance of hydrochemistry index to water source's identification. Then, ternary mixture model was established based on 28 groups of water sample data collected in the Xinzhuangzi Coal Mine. Furthermore, to test the model's reliability, the model was used to identify the water bursting sources of six groups of water samples in Xuchang Coal Mine under the similar hydrogeological conditions in Xinzhuangzi Coal Mine. The results show that multivariate matrix model for identifying mine water-gushing sources is reliable and practical. Moreover, it can be applied to the actual engineering as well.

Keywords: BP; Water chemistry; DDA; GA-SVM; Coal mine

* Corresponding author.