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

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ABSTRACT

Identifying mine water bursting sources accurately and quickly is the important condition of controlling mine water disasters. In the paper, seven hydrochemistry indexes: Mg²⁺, Ca²⁺, Na⁺ + K⁺, HCO₃⁻, SO₄²⁻, 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 the 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

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