

## 岩体破坏突水模型研究现状及突水预测预报研究发展趋势

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**摘要** 在收集整理国内外相关资料的基础上, 从岩体渗流损伤耦合方程、突水试验监测等方面总结目前岩体破坏突水模型及预测预报研究现状, 认为破坏诱发渗透性演化方程和破坏引起有效应力方程的修正是建立描述破坏渗流机制的关键。通过现场实例分析及提出的数值模型的讨论, 提出“采动压力和水压力扰动应力场诱发岩体破裂(微震活动性)是矿山突水前兆本质特征”这一学术思路, 认为突水预测预报研究发展趋势为依托实例工程, 采用渗流耦合力学理论、计算科学技术和高新微震测量技术手段, 在深层次上对采动岩层破坏突水通道形成特征、突水岩层微震活动前兆信息和并行渗流耦合数值仿真结果进行综合反演, 通过微震活动信息来基准标定突水模型, 达到揭示岩层破断突水前兆规律及定位突水通道的目标, 为建立矿山突水灾害预测预报奠定理论基础。

**关键词** [岩石力学; 突水模型; 基准标定; 数值模拟; 微震监测](#)

分类号

## STATE OF THE ART OF INRUSH MODELS IN ROCK MASS FAILURE AND DEVELOPING TREND FOR PREDICTION AND FORECAST OF GROUNDWATER INRUSH

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### Abstract

Based on extensive literature review, the state of the art of coupled hydromechanical models and in-situ monitoring for groundwater inrush predictions are summarized in detail, based on which, it is proposed that the key issues for describing the seepage characteristics during groundwater inrush are to calibrate the equations for damage-induced evolution of permeability and of effective stress. Depending on in-situ experiments and numerical simulations, a new academic idea, i.e. "the rock microseismicity induced by mining processes and water pressure disturbance is in essence the index of groundwater inrush", is put forward. Based on case studies, coupled hydro-mechanical theory, high-performance computing technology and microseismic monitoring. The authors propose that the tendency for analyzing and predicting the groundwater inrush is to synthetically inverse the inrush pathway formation, strata microseismic precursor and high performance computing results. And relying on the microseismic monitoring events, the groundwater inrush models are calibrated, which could be used to clarify the precursory characteristics and to locate the inrush pathway. This study will lay theoretical basis for establishing the models to predict the groundwater inrush in underground mining.

**Key words** [rock mechanics; groundwater inrush](#)

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