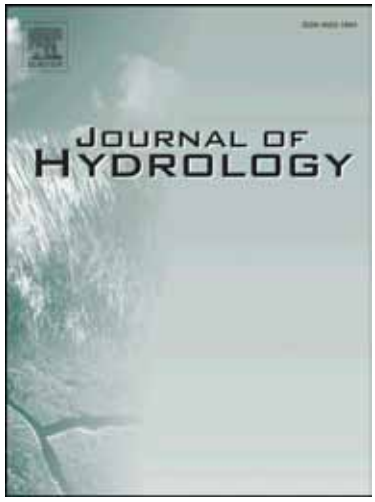

Research papers

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A GIS-based model of potential groundwater yield zonation for a sandstone aquifer in the Juye Coalfield, Shangdong, China

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Abstract Resolving the potential groundwater yield zonation of sandstone aquifers occurring at depths of several hundred meters has been an important and challenging objective of the hydrogeological research focused on preventing flood hazards in coal mines. Using accessible geological exploration data we put forward a g method of predicting the spatial distribution of groundwater storage potential in sandstone aquifers from Permian-age coal deposits in Juye Coalfield, Shangdong, China. A Geological, Tectonic and Lithological Composition Index (GTLCI) model was created using the following parameters: sandstone depth and thickness, faults length density (FaLD), faults density (FaD), fault frequency density (FaFD), fault scale density (FaSD), variation coefficient of the slope (VCS) of the coal seam, intensity index of folds in horizontal direction (IIFoH), and lithological composition index (LCI). Each of these factors was subsequently divided into 5 classes. The analytic hierarchy process (AHP) and trapezoidal fuzzy number (TFN) method was applied to calculate the weight of the conditioning factor and their respective sub-classes. Groundwater yield potential contour map, which was initially constructed using the GTLCI values revealed four groundwater abundance zones. The map was further refined by taking into account hydrogeologic data collected during mining activities. The GTLCI model predictive success rate of 80% was explained by the limited number of boreholes