



Application of GRAM model for estimating groundwater rebound after mine closure: a case study at abandoned underground mines in Korea

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Cessation of dewatering usually results in groundwater rebound after closing an underground mine because the mine voids and surrounding strata flood up to the levels of decant points such as shafts and drifts. The objective of this study was to develop a program for analyzing groundwater rebound in abandoned underground mines. Several numerical models have been developed to predict the timing, magnitude and location of discharges resulting from groundwater rebound. This study reviewed the numerical models such as MODFLOW, GRAM and MINEDW, and compares their scopes of assessment at different spatial and time scales. In addition, a GRAM(Groundwater Rebound in Abandoned Mine workings) model-based program, named GRAM for Windows, was developed using Visual Studio.NET 2012. The program, GRAM for Windows, is comprised of the graphic user interface and the simulation engine modules. Input and output files of the program were designed by considering the characteristics of GRAM model. Some case studies were performed to analyze groundwater rebound at abandoned underground mines in Korea. The comparisons of simulated and observed groundwater levels at the shaft of underground mine showed that the developed program can be used effectively to analyze and estimate the groundwater rebound in the abandoned underground mine.