

493 - RECESSION CURVE ANALYSIS IN FRACTURED ROCK MEDIA

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The Water-Table Fluctuation (WTF) method is the most widely used approach for estimating recharge. Application of the WTF method requires identification of the water-level rises attributed to the recharge period. The water-level rise is estimated as the difference between the peak of a water-level rise and the value of the extrapolated antecedent recession curve at the time of the peak. However, extrapolation of the recession curve is not categorical at all time. This involves the prediction of the slope of the hydrograph (or called recession rate) in the absence of recharge. The recession rate values may provide information on hydrogeological parameters (e.g., permeability, water storage capacity) of the saturated zone. For fractured rock media, the recession rate may change with lithology and fracture properties, including fracture aperture and frequency, fracture length, fracture orientation and angle, fracture interconnectivity, filling materials, and fracture plane features. This paper deals with a recession curve analysis aimed at (1) computing recession rate using a linear best-fit-to-data method for each individual storm from the groundwater-level data at two fractured rock aquifer monitoring sites, and then examining all computed data to find correlations with water-table elevation; (2) predicting the recession rate using a novel method. The result from the first objective showed that the recession rate data can be classified into different groups varied with different water-table elevation range, and the recession rate is related to the permeability of rock mass which was proved by introducing a quantitative technique employed to evaluate rock mass permeability called as the HC model proposed by Hsu et al. (2011). The HC model can perform numerical assessment of the rock mass permeability to produce HC values. Regression analysis was performed to estimate the dependence of HC on the recession rate. The regression results indicated that a linear relationship exists between the recession rate and HC values with a coefficient of determination of 0.85. Consequently, the empirical linear equation can be used to predict the recession rate which helps estimate the water-level rise in the WTF method.