Investigating the Reproducibility of Hydraulic Tomography Estimates with Time-Variable Boundary Conditions

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In recent years, the hydraulic tomography (HT) is a popular method for the delineation of the spatial distributions of hydraulic properties in the groundwater aquifer. Previous researches investigated the spatial distributions of hydraulic properties by the HT survey using the constant head boundary condition. However, the constant head is not the real condition in the boundary condition at the field. The study purpose is the case studies of two years at the same site using the time-variable boundary conditions to delineate the reproducibility of hydraulic properties.

The study area is located in National Yunlin University of Science and Technology (NYSUT) campus in Taiwan. The sequential pumping test is carried in 2010 and 2012 were used for the inverse modeling effort to estimate the hydraulic properties. The boundary condition is applied to the HT method using the sensitivity equation method (SEM) to calibrate the time-variable heads. Then, the reproducibility of estimates and prediction were analyzed in two different years. The results show that the more heterogeneity of hydraulic properties. The HT method can be improved using the time-variable boundary conditions.

Keywords: Sensitivity equation method, Boundary condition, Hydraulic tomography, Sequential pumping test, Heterogeneity, Hydraulic property

