Estimation of Specific Yield Using Gravity Observations: A Case Study in MinZhu Basin

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Abstract

We use gravimetry technique to estimate the specific yield value at Xinmin area in Minzhu Basin. The methodology is based on terrain correction method. From September 2016 to September 2017, six gravity survey missions were carried out in the study area. For these gravity survey missions, the FG-5 absolute gravimeter was used to collect gravity observations at the office of the Xinmin village, the Sheliao junior high school, and the Xinmin pumping station. In addition, we used the gravity integral technique to simulate the gravity effect caused by the change of groundwater level and soil moisture in the unsaturated layer. The result of the specific yield estimation was well compared to that from the pumping test conducted by the Xinmin pumping well. This study shows that the estimated specific yield is 22.7% in a stable weather condition, and 47.3% in a rainy weather condition. However, the estimated specific yield in a rainy weather condition is reduced to 27% to 30% if the soil moisture change is corrected by 15%~20%.

Keywords: Gravity; Specific Yield; Terrain Correction