45.The Estimation of the Water Table and the Specific Yield with 2D Electrical Resistivity Tomography in the Minzu Basin of Central Taiwan

Hsin-Ju Yao*, Ping-Yu Chang

Department of Earth Sciences, National Central University

*Corresponding Author: may890153@gmail.com

Abstract

The Minzu Basin is located at the central part of Taiwan, which is bounded by the Changhua fault in the west and the Chelungpu thrust fault in its east. The Chuoshui river flows through the basin and brings in thick unconsolidated gravel layers deposited over the Pleistocene rocks and gravels. Thus, the area has a great potential for groundwater developments. However, there are not enough observation wells in the study area for a further investigation of groundwater characteristics. Therefore, we tried to use the electrical resistivity Tomography (ERT) method for estimating the depth of the groundwater table and the specific yield of the unconfined aquifer in dry and wet seasons. We have deployed 13 survey lines with the Wenner-Schlumberger array in the study area from December 2016 to March 2018. Based on the data from the ERT measurements and the nearby Xinming observation well, we turned the resistivity into the relative saturation with respect to the saturated background based on the Archie's Law. With the depth distribution curve of the relative saturation, we found that the curve exhibits a similar shape to the Soil-Water Characteristic Curve. Hence we attempted to use the Van-Genuchten model for characterizing the depth of the water table. we also tried to calculated the specific yield by taking the difference between the saturated and residual water contents. According to the results, we can depict the the water level distribution in the study area. In general, the ground water in upriver is higher than downriver, slightly raise near the river and the groundwater equipotential lines is vertical to the river. The specific yield in the study area is 0.16 to 0.26 which in downriver is small because the stratum has more clay material. Therefore, the water table in downstream raise higher than upstream.