Estimating the Hydraulic Conductivity and Heat Capacity of the Aquifer between the River and Well Site Using Joint Inversion Approach

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This study continued to measure the water temperature and pressure at the riverbed, agricultural waterway, and groundwater monitoring well from Oct. to Nov. 2018. These observations were then used to estimate the hydraulic conductivity (K) and flux between the river and the aquifer of the well site. The water pressure data reveal that the correlation coefficient between river and groundwater level reaches 0.9 and that between the agricultural waterway and groundwater level is almost 0. This reveals that the groundwater head variation mainly affected by the river stage of the nearby river. The temperature data show that the groundwater temperature is correlated to the temperature of the river water and is uncorrelated to the air temperature. Accordingly, the temperature and head data of the groundwater and river water were used to estimate K and heat capacity of the aquifer between the river and well site using a joint inversion approach. The results show that the estimated K and heat capacity are 67.53 m ⁄ day and 4485000 J ⁄ (m^3–℃), respectively.

Keywords: Hydraulic conductivity, Soil heat capactiy , Joint inversion, Temperature, Groundwater head , Interaction between groundwater and river water