

# Groundwater recharge estimation by using empirical orthogonal function method

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Groundwater recharge estimation has been challenging due to the limited knowledge of the hydrogeological heterogeneity. This issue is particularly important in the areas with high dependence on groundwater resources. This study proposed a data-driven approach along with a simple ODE model to estimate the groundwater recharge in our study area, Cho-shui river aquifer which is one of the most water-abundant aquifers in Taiwan; however, is suffered from the water overdraft. We analyzed the daily groundwater level observations during 2004-2010 from all wells across the entire study area. Based upon our proposed method, we identified two major recharge areas, i.e., proximal fan of the aquifer and Min-Chu basin at its upstream. The two areas obtained about 181.9 million and 78.8million tons of recharge water annually, respectively, in which about 131 million tons of water flowing from Min-Chu basin into Cho-shui aquifer annually. In summary, this study proposed a novel method for the groundwater recharge estimation.

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