Geophysical Research Abstracts
Vol. 18, EGU2016-17575, 2016
EGU General Assembly 2016

A method to filter out the effect of river stage fluctuation on groundwater level using time series models

Heesung Yoon (1), Eungyu Park (2), Pilsun Yoon (1), Eunhee Lee (1), and Gyoo-Bum Kim (3)

(1) Korea Institute of Geoscience and Mineral Resources, Daejeon, South Korea (hyoon@kigam.re.kr), (2) Kyungpook National University, Daegu, South Korea, (3) Daejeon University, Deajeon, South Korea

A method to filter out the effect of river stage fluctuations on groundwater level was designed using an artificial neural network-based time series model of groundwater level prediction. The designed method was applied to daily groundwater level data near the Gangjeong-Koryeong Barrage in the Nakdong river, South Korea. First, one-step ahead direct prediction time series models were successfully developed for both cases of before and after the barrage construction using past measurement data of rainfall, river stage, and groundwater level as inputs. The correlation coefficient values between observed and predicted data were over 0.97. Based on the direct prediction models, recursive prediction models for the simulation of groundwater level fluctuations were designed. The effect of river stage fluctuation on groundwater level data was filtered out by setting a constant value for river stage inputs of the recursive time series models. The hybrid water table fluctuation method was employed to estimate the groundwater recharge using the filtered data. The calculated ratios of groundwater recharge to precipitation before and after the barrage construction were 11.0% and 4.3%, respectively. It is expected that the proposed method can be a useful tool for groundwater level prediction and recharge estimation in the riverside area.