

# **Predicting groundwater level using Machine learning**

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## **Abstract**

Groundwater is required for agricultural, domestic and industrial uses. In the last 10 years, there are six times of meteorological drought in South Korea, locally or nationally. Drought can affect decrease of groundwater level. And then, The depleted groundwater can lead to environmental side effects including drying up of wells, increased pumping costs, land subsidence, decreased well yields, reduction of water in streams and lakes and water quality degradation. So, groundwater should be managed to respond to climate change and drought.

To manage groundwater, prediction of groundwater level is essential. However, this is difficult because climate, groundwater extraction and surface water flows, affecting groundwater level, have complex nonlinear relationships with groundwater level. Many researchers are trying the prediction by using machine learning, which is empirical model and demands less parameters than numerical models. So, they think that machine learning methods can provide a more effective approach in dynamic and highly uncertain system.

In this study, we focus on groundwater level as input variable. Groundwater level was used without considering its characteristic in many researches. Groundwater level is affected by the rotation and revolution of the earth, the revolution of the moon, evapotranspiration effect, and precipitation etc. So, we will use FFT (Fast Fourier Transform) or Hilbert-Huang transform to divide their signal, respectively. And then, these signal will be input variables. A new approach, considered in this study, is expected to make more accurate prediction of groundwater level, and then groundwater management would be effective.

**Keywords: Groundwater level prediction, Machine learning, Drought, Groundwater management**