Determination of relationship between hardness and groundwater quality parameters by neural networks

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ABSTRACT

All life forms on the earth contain water and water is crucial for any life form on the earth. Apart from being the essential ingredient if living organisms, water has numerous other uses and benefits. Groundwaters form a circle of the natural hydrologic chain like surface waters and the other water in the atmosphere. Hydrologic, hydraulic and geologic processes play important roles during underground water's formation, storage, underground flow and coming up to the surface of the earth. In this study, groundwater hardness quality at Samsun Incesu-Derekoy region was modeled by the use of artificial neural network (ANN) structure. In the data set arrangement effective input variables are the five different water quality parameters (pH, chlorine, calcium, magnesium and total hardness) concentrations in the time t, and the output variable (total hardness) is the concentrations in the time $t + 1$. For the model 10,000 epochs were performed and the learning rate is equal to 0.1, and correlation coefficient (r) that achieved in this study was found 0.591. As a result, we conclude that ANN is the effective modeling technique on estimation of environmental complex water quality problems.

Keywords: Artificial neural network (ANN); Groundwater quality; Hardness

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