Assessing the qualitative changes of groundwater using geostatistical methods (Case study: Borkhar plain, Isfahan province)

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Abstract

Groundwater is one of the main sources of drinking water, industry and agriculture in Iran's arid and semi-arid regions. Improper harvesting and entry of pollutants into these waters have caused changes in the quality of these waters in different regions. The purpose of this study is to compare definitive introspection and statistical methods for zoning qualitative data of Borkhar plain in Isfahan province. In this study, the qualitative information of 29 groundwater wells was used to evaluate the qualitative parameters including: EC, TDS, Cl, SAR, SO4, Na, Mg and HCO3 in 2006 and 2016. GS + software and GIS environment were used to determine and map zoning maps using different introspection methods. Then, the qualitative parameters were evaluated using definitive internalization methods and zoning statistics and using error evaluation criteria, the best method for each qualitative parameter in each period was determined and their zoning map in the GIS was drawn. The results showed that in definitive internalization methods in all qualitative parameters, the RBF method provided less error. However, in the geo-statistical method, the results of fitting the models to the mutual variogram showed that different qualitative elements in 2006 and 2016 follow different models. Also, a map of qualitative characteristics was drawn during the study period and the results showed that the average qualitative characteristics of EC, TDS, Cl, SAR, SO4, Na, Mg and HCO3 in 2006 were equal to 942, 281.7, 27.28, 6.428, 10.409, 22.602, 8.936 and 4.178, which in 2016, this amount is equal to 1002, 352.4, 21.604, 6.059, 10.645, 18.869, 5.185 and 7.126, which indicates a decrease in water quality.

Keywords: Borkhar plain, Geostatistical method, Groundwater, Qualitative parameter.