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Geostatistical simulation and the health risk assessment of groundwater quality in south west of Iran

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ABSTRACT

A study was conducted on the health risk of nitrate in groundwater resources (e.g., wells and springs) of an area in south west of Iran using two data records gathered in 2010 and 2011 years. It was concluded that at the moment, children are more exposed to higher than normal values of nitrate due to consumption of drinking water. In order to estimate the health risk of nitrate, a risk curve was constructed indicating that the number of residents exposed to groundwater with higher than 45 mg/L nitrate level fluctuated between 7,868 and 15,024 people with a mean value of 11,213 people. Geostatistical simulation of nitrate was implemented by sequential Gaussian simulation (SGS) and collocated co-kriging simulation (CCS) of nitrate in 2011 using the data of 2010 as the secondary information. It was concluded that uncertainty in predictions can be reduced using CCS; however, it is less exact than its SGS counterpart.

Keywords: Health risk assessment; Risk curve; Sequential Gaussian simulation; Collocated co-simulation; Remote sensing