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Spatio-temporal Distribution of the Groundwater Quality in the El Milia Plain, Kebir Rhumel Basin, Algeria

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Abstract : In this research, we analyzed the groundwater quality index in the El Milia plain, Kebir Rhumel Basin, Algeria. Thirty-three groundwater samples were collected from wells in the El Milia plain during April 2015. In this study, pH and electrical conductivity (EC) were conducted at each sampling well. Eight hydrochemical parameters such as calcium (Ca), magnesium (Mg), sodium (Na), potassium (K), chlorid (Cl), sulfate (SO4), bicarbonate (HCO3), and Nnitrate (NO3) were analysed. The entropy water quality index (EWQI) method was employed to evaluate the groundwater quality in the study area. Moran's I and the ordinary kriging (OK) interpolation technique were used to examine the spatial distribution pattern of the hydrochemical parameters in the groundwater. It was found that the hydrochemical parameters Ca, Cl, and HCO3 showed strong spatial autocorrelation in the El Milia plain, indicating a spatial dependence and clustering of these parameters in the groundwater. The groundwater quality was evaluated using the entropy water quality index (EWQI). The results showed that approximately 86% of the total groundwater samples in the study area fall within the moderate groundwater quality category. The spatial map of the EWQI values indicated an increasing trend from the south-west to the northeast, following the direction of groundwater flow. The highest EWQI values were observed near El Milia city in the center of the plain. This spatial pattern suggests variations in groundwater quality across the study area, with potentially higher risks near the city center. Therefore, the results obtained in this research provide very useful information to decision-makers.

Keywords : entropy water quality index (EWQI), moran's i, ordinary kriging interpolation, el milia plain
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