Assessment of groundwater risk to Plio-quaternary aquifer’s contamination: semi-arid climate case (central Tunisia)

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\textbf{A B S T R A C T}

In the Sidi Bouzid plain in Tunisia, the use of chemical fertilizers in irrigated perimeters is commonly accentuated. However, in the absence of regular monitoring in this region, the pollution affected the water table. Here, we aimed to reduce the danger of fertilizer usage through a qualitative water management tool using geographic information system (GIS) and to create a pollution risk map. A model evaluating groundwater risk index to pollution was established, using vulnerability index of pesticide DRASTIC and SI models modified applying weighting parameter techniques such as Single-parameter sensitivity analysis (SPSA) and linear regression (LR). These techniques were validated using chemical pollutant (nitrate concentrations). Our calculations demonstrate that the coupling of two models is much more effective than either each used alone. In conclusion, our study shows three risk classes (moderate, high and very high), the high class occupies the majority part of the study area. According to risk map, there are considerations to be taken into account: making sure to avoid leakage or spillage of contaminants. In addition to regular inspections and maintenance, well water must be analyzed and ensured containment of pesticides. These models coupling helps decision-making in areas occupied by irrigated perimeters.

\textit{Keywords:} Risk index; Vulnerability; Pollution; Geographic information system; Tunisia

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