

## Contamination of Groundwater by Nitrates, Nitrites, Ammonium and Phosphate in the Guelma-boucheougouf Irrigated Area (Northeastern Algeria)

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**Abstract :** The Guelma-Boucheougouf irrigated area is located in the northeast of Algeria, and it extends about 80 km. It was commissioned in 1996, with an irrigable area of 9250 ha, it spreads on both banks of the Seybouse Wadi and it is subdivided into five autonomous distribution sectors. In order to assess the state of groundwater quality, the results of the chemical analyzes were plotted on the Piper diagram, which shows that the chemical facies are sulfate-calcium chloride and sulfate-calcium with a slight tendency to migrate to chlorinated sulphate - sodium. The predominance of sulphates in the waters of the region is geologically explained by the existence in the Guelma Basin of evaporitic deposits, which are mainly represented by rock salt and gypsum. In addition to this natural origin, we can mention the anthropogenic origin, following the use of chemical fertilizers in the Guelma-Boucheougouf irrigated area.  $\text{Na}^+$  and  $\text{Mg}^{2+}$  show moderate to significant mineralization of water, closely correlated with very high conductivities. The values of the recorded conductivities vary from 1360  $\mu\text{s} / \text{cm}$  (P3) to 4610  $\mu\text{s} / \text{cm}$  (P10). These important values are due to dissolved salts on the one hand and the leaching of fertilizers by irrigation water on the other hand.  $\text{NO}_3^-$  and  $\text{NH}_4^+$  show little to significant pollution throughout the study area. Phosphate represents significant pollution, with excessive values far exceeding the allowable standard. With respect to ammonium, 87% of the sampling points present little pollution and 13 % significant pollution. Regarding phosphates, in the form of  $\text{PO}_4^{3-}$ , groundwater in the study area represents significant pollution; all values far exceed the allowable standard.

**Keywords :** groundwater, organic parameters, standards, Pollution

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