Origin of the mineralization of the groudwater of low valley of Medjerda , Northern Tunisia

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Abstract

Groundwater resources are affected by diverse factors such as irrigation activities, urbanization and industralization. These causes result mineralization and degradation of its hydrochimical quality and salinization. The objective of this study is the characterization of the aquifer by different approaches: Piezometric, hydrochimic and isotopic studies to determinate the salinity and its origins.

Introduction

The aquifer of the low valley of Medjerda is located in North- East of Tunisia and extended from Ghar el Melah to Mediterranean Sea.**(Fig. 1)** It is Characterized by a semi aride climate. The annual averge precipitation is about 417 mm. The main geologic features of this study area are the trias, the upper cretaceaous, the quaternary and the mio-pliocene.

Materials and methods

50 water samples were collected for geochemical and isotopic analyses. Measurement of temperature, conductivity and PH were measured in the field. Major elements were analysed by ion liquid chromatography (HPLC). The total alkalinity was determined by titration. ten samples were used for isotopic analyses.

Conclusion

Hdrochemical tracers in conjunction with isotope methods were used to explore the origin of mineralization processes of groudwater.
Agricultural activities and irrigation with salt water contribute to salinization
The phenomen of salinity is controlled by the dissolution of salts
All this contributes to the increase of mineralization.

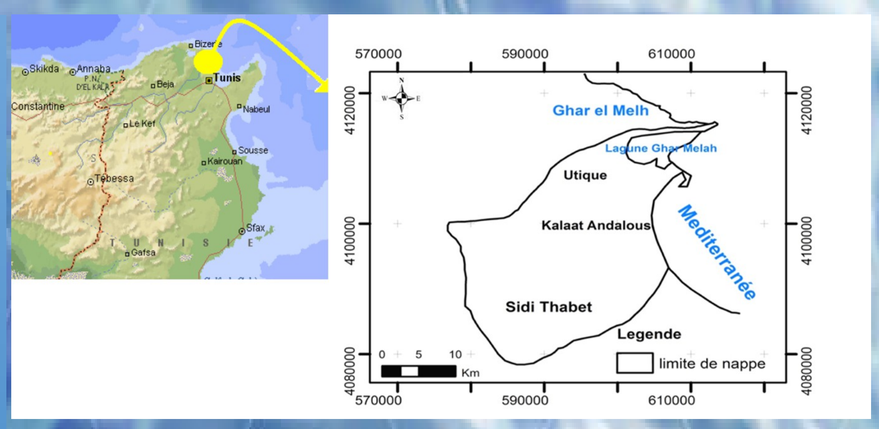

Fig. 1 Location of studied area

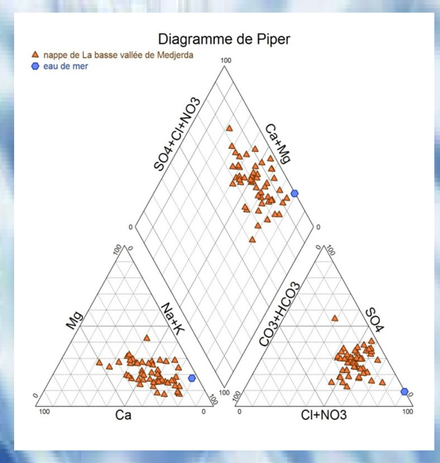

Fig. 2 Piper Diagram

Results/ discussion

Pipier diagram

It show that groundwater samples are characterized by a mixed facies dominates by Sodium, Magnesium and Potassium for cations, Sulfates and Chlorides for anions.**(Fig. 2)**

Ion Ratio

The Na versus Cl diagram suggests that the predominance of sodium can be explained by the proximity of the sea.
The sodium in the aquifer system to interaction between water and rock and exchange of ions.(Fig. 3)

More than two-thirds of the groudwater were found above the right side of the sea water, except for a few points. This proximitycan be explained by the pressure of continental water mixed with seawater.**(Fig. 4)**
Ca versus Mg diagram shows a predominance Ca relative to Mg. Ca/Mg <1 shows that there is a mixing with seawater. It shows the presence of gypsum which can be can be considered as a source of calcium. (Fig.5)

Stable isotopes

10 samples were analyzed to determine the origin of the water of the Lower Valley.
Most of the points lie below the DML and DMM which indicates the presence of an evaporation **(Fig .6)**

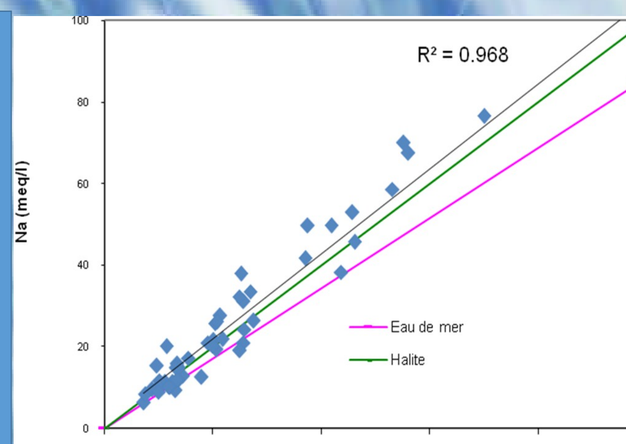

Fig. 3 Na/ Cl diagram

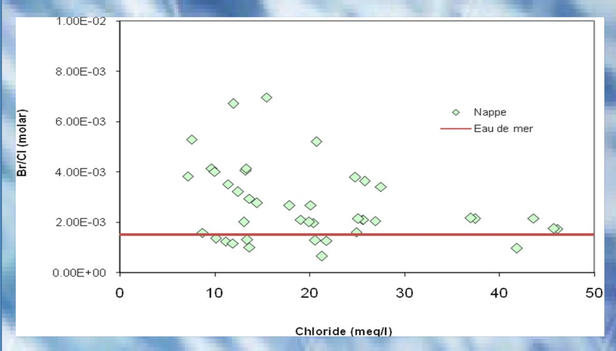

Fig. 4 Br versus Cl

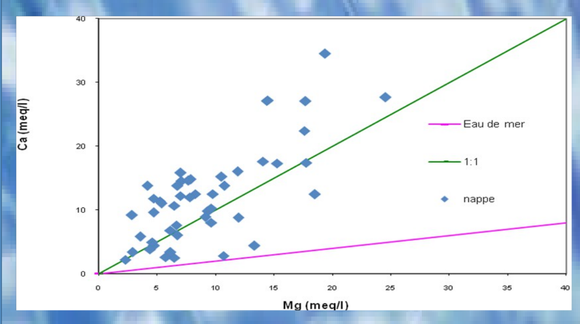

Fig. 5 Ca versus Mg

Fig. 6 Stable isotope

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