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Management of groundwater salinization under a climate change scenario in an arid area

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Most future scenarios for water resources are predicting water scarcity, with a decrease in the amount

of precipitation and limitation on groundwater recharge for the next five decades. In arid and semi-

arid areas, the water quality is a great problem and groundwater salinization is one of the principal

causes of degradation of water resources worldwide.

Menzel Habib aquifer is located in the northwest of Gabès region (southeastern Tunisia), included in

the arid Mediterranean bioclimatic area, with dry hot summers and relatively warm winters.

Groundwater geochemistry from the study area shows a Na-Cl and Ca-Mg-Cl-SO₄ 4 dominant facies.

The high groundwater mineralization and its correlation between total dissolved solids and major ions

suggest a contribution of SO₄, Cl, Na, Ca and Mg in groundwater salinization processes.

The salinization of groundwater is mainly associated with the Triassic evaporites, with the dissolution

of halite, anhydrite and gypsum, occurring in the area, and related to the tectonic context of the region. Additionally, other geochemical processes occurred, such as the cation exchange mechanisms.

Changes in precipitation patterns and intensity, with water scarcity, low recharge and excessive pumping have affected groundwater quantity and quality. Nowadays, the occurrence of climate changes scenarios is a major drawback for water use for irrigation and drinking water supply in arid

and semi-arid regions, such as Menzel Habib aquifer.