"Hydrogeochemical and isotopic study and assessment of groundwater quality of the aquifers in Djeffara Medenine (Southeastern-Tunisia)"

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Abstract

The objective of this study is to identify the hydrogeochemical and isotopic characteristics and groundwater quality aptitude for irrigation and drinking water uses in arid and semi-arid areas. The study area is the Djeffara of Medenine, in southeastern Tunisia. This region is facing increasing drinking water needs due to a rapidly growing population, increased urbanization and touristic activities. Fresh groundwater is the main source of water supply.

The methodology used a hydrogeological survey as well as periodic sampling campaigns and interpretation of geochemical and isotopic groundwater data in the study area.

Results demonstrated that the mineralization increase from upstream to downstream and its origins is the dissolution of sulphated salts (gypsum, anhydrite, epsomite, burkeite, thenardite and mirabilite) and chloride (halite and magnesium chloride) associated with the crust. Results approve hydrogeological communication between Zeuss Koutine (ZK) and Sahel El Ababsa Triassic sandstone (TSE) aquifers and the rainwater direct recharge of the two aquifers of the Djeffara groundwater system. Furthermore, the groundwater quality map shows three water types: suitable, moderate and unsuitable water for irrigation purposes. While, results for drinking purposes demonstrate that the ZK aquifer is more favorable for drinking than Triassic SE aquifer. Which 86 percent of resources really used for drinking water by the National Company of Drinking Water Supply (SONEDE) and rural water supply by Regional Commissary for Agricultural Development (CRDA) (Sahal 2020).

Keywords: Hydrogeochimical, Origin, Groundwater system, Communication, Djeffara.