

Geochemical and Geostructural Characteristics of the Groundwater System and the Role of Faults in Groundwater Movement at the Hammamet Basin, Tebessa Area (Northeast of Algeria)

Authors : iklass hamaili, Fehdi Chemseddine

Abstract : Morphostructural, hydrogeological and hydrochemical approaches were applied in this study to characterize the groundwater system of Hammamet Plain, Eastern part of Algeria and its potential for exploitation. The analysis of the fractures in several Mountains forming the natural boundaries of Hammamet plain, with faults of markedly different sizes and joints measured at 21 stations, demonstrate the presence of two principal directions of fractures (NNW-SSE and NNE-SSW). From a hydrogeological standpoint, these two mountains constitute a unit limited by faults-oriented ENE-WSW, NNW-SSE and NNE-SSW. Specifically, fractures of the latter two directions influence the compartmentalization and the hydrogeological functioning of this unit. According to the degree of fracturing and/or karstification, two basic types of aquiferous behavior have been distinguished: fissured aquifer (Essen Mountain and Troubia Mountain), and porous aquifer (Hammamet basin). After sampling and measurement operations, the quantity of chemical components was determined. Thus, the study of the hydrochemical characteristics of this groundwater shows on Piper's diagram that the majority of them are mainly HCO₃⁻ and Ca²⁺ water types. The ionic speciation and mineral dissolution/precipitation were calculated by PHREEQC package software. The chemical composition of the water is influenced by the dissolution and/or precipitation processes during the water-rock interaction and by the cationic exchange reactions between groundwater and alluvial sediments. The high content of CO₂ in the water samples suggests that they circulate in a geochemical opened system.

Keywords : aquifer, hydrogeology, hydrochemistry, Hammamet, Tebessa, Algeria

Conference Title : ICGG 2025 : International Conference on Geology and Geophysics

Conference Location : Montreal, Canada

Conference Dates : May 24-25, 2025