

Evaluation of Groundwater and Seawater Intrusion at Tajoura Area, NW, Libya

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Abstract : Water quality is an important factor that determines its usage for domestic, agricultural and industrial uses. This study was carried out through the Tajoura Area, Jifarah Plain, Northwest Libya. Chemical and physical parameters were measured and analyzed for groundwater samples collected in 2021 from twenty-six wells distributed throughout the investigation area. Overexploitation of groundwater caused considerable deterioration in the water quality, especially at Tajoura Town (20 Km east of Tripoli). The aquifer shows an increase in salinization, which has reached an alarming level in many places during the past 25 years as a result of the seawater intrusion. The chemical composition of the water samples was compared with the drinking water standards of WHO and Libyan Standards. Groundwater from this area was not suitable to be a source for direct drinking based on Total Dissolved Solids. The dominant cation is sodium, while the dominant anion is chloride. Based on the Piper trilinear diagram, most of the groundwater samples (90%) were identified as sodium chloride type. The best groundwater quality exists at the southern part of the study area. Serious degradation in the water quality, expressed in salinity increase, occurs as we go towards the coastline. The abundance of NaCl waters is strong evidence to attribute the successive deterioration of the water quality to the seawater intrusion. Considering the values of Cl⁻ concentration and the ratio of Cl⁻/HCO₃⁻, about 70% of the groundwater samples were strongly affected by the saline water. Car wash stations in the study area as well as the unlined disposal pond used for the collection of untreated wastewater, contribute significantly to the deterioration of water quality. The water quality in this area needs to be monitored regularly and it is crucial to treat the water before consumption.

Keywords : Tajoura, groundwater, seawater intrusion, water quality

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