

A Study on Hydrogeochemical Characteristics and Groundwater Quality, West El Minia District, Egypt

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The present work used major and trace element chemistry to assess the hydrogeochemical characteristics and groundwater quality for drinking and irrigation uses in the West El-Minia District. To achieve this purpose, 88 groundwater samples were collected from the study area. The collected samples were analyzed for pH, electrical conductivity (EC), total dissolved solids (TDS), major cations, major anions and trace metals. Microbiological and microscopic studies of water samples were carried out to determine the micro-organisms to confirm safety for human consumption. Statistical analysis and hydrogeochemical modeling were applied for the collected data. The study revealed that all the studied water samples have alkaline earth metals values higher than alkalies and are meteoric in origin. The highest linear correlation is shown between total dissolved solids and electric conductivity, between carbonate substances, between Na^+ and K^+ and Ca^{2+} and Mg^{2+} , all macro-components and chlorides as well as between boron with chrome, cobalt and lead. All sampled waters were classified as waters of $\text{Ca}-\text{HCO}_3$ type and calcite will precipitate in all collected water samples. 98 % of the collected samples are suitable for drinking due to their low levels of salinity ($<1200 \text{ mg/l}$). Concerning trace elements 49 % of studied water samples are not suitable for drinking and irrigation purposes. Among the irrigation quality parameters, according Na content half the water samples is of good quality and the other half is of permissible quality. According to the boron concentration, SAR and permeability index, all the collected samples are suitable for irrigation.