HYDROGEOPHYSICAL STUDIES FOR EXPLORING GROUNDWATER AROUND EL-FAYOUM DEPRESSION, WESTERN DESERT, EGYPT

By

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Abstract

Desert area around El Fayoum depression considered as one of the most important places in Egypt for the reclamation process that depends mainly on the groundwater. On the other hand, studies which relates to the exploration and evaluation of groundwater in this area are considered rare. Vertical electrical sounding and hydrogeochemical analysis had been performed for evaluation and understanding the relation between Quaternary and Eocene aquifers in the study area. Eighty-seven vertical electrical soundings (VES) were carried out as well as 60 water samples were collected in the study area. The electrical data was interpreted by using IX1D V3 software where the true resistivity and thickness of each layer was calculated. Based on the inversion results, a set of geoelectrical cross-sections have been constructed. From the interpreted electrical data the Quaternary aquifer is composed from sand to sandy clay deposits and exhibit low thickness and resistivity ranges. The upper most part of the Eocene aquifer was detected and consists of marly limestone with low groundwater potentiality. The collected water samples were chemically analyzed in the water quality central laboratory of Fayoum Drinking Water and Sanitation Company. The chemical analysis of the water samples revealed that the salinity increase toward El-Fayoum Lakes. 37.5 % samples of Quaternary aquifer aresuitable for irrigation use while 62.5 % samples of Quaternary aquifer and water samples collected from Eocene are not suitable for irrigation under ordinary condition due to its high salinity, but special management for salinity control may be required and salt tolerantplants should be selected.