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Evaluation of Sea water intrusion using the Electrical Resistivity and Transient Electromagnetic survey at Fan of Wadi Feiran, Sinai, Egypt

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The fan of Wadi Feiran at the south western part of Sinai, Egypt overlooking at the Gulf of Suez is very talented area for Oil industry and agricultural activities. This area depends on underground water in its agricultural activities. Quaternary aquifer in the plain area has suitable thickness to be used as the main water source for different purposes. Due to the presence of the main aquifer in the area in contact with the sea water of the Gulf of Suez, the fresh coastal water is contaminated towards the eastern direction. The present study concerns with the application of surface geophysical techniques to study the spreading out of sea water intrusion and put forward the suitable locations for futures digging wells. One-dimensional numerical inversion of individual DC resistivity (ER) and Time domain electromagnetic (TDEM) and 2-D resistivity tomography are used to enhance the results of processing and achieve the aim of the study. The results revealed that the area of study is concerning three geoelectrical layers. The first geoelectrical layer is represented by alluvial and gravel deposits. The second layer with low resistivity is represented as clayey sand which is saturated by sea water. The third layer is sandy clay with higher resistivity than the second layer. The sea water intrusion is very appear near the shore line of the Gulf and extended eastward into the Wadi Feiran.