

## **Assessment the Infiltration of the Wastewater Ponds and Its Impact on the Water Quality of Pleistocene Aquifer at El Sadat City Using 2-D Electrical Resistivity Tomography and Water Chemistry**

**Authors :** Abeer A. Kenawy, Usama Massoud, El-Said A. Ragab, Heba M. El-Kosery

**Abstract :** 2-D Electrical Resistivity Tomography (ERT) and hydrochemical study have been conducted at El Sadat industrial city. The study aims to investigate the area around the wastewater ponds to determine the possibility of water percolation from the wastewater ponds to the Pleistocene aquifer and to inspect the effect of this seepage on the groundwater chemistry. Pleistocene aquifer is the main groundwater reservoir in this area, where El Sadat city and its vicinities depend totally on this aquifer for water supplies needed for drinking, agricultural, and industrial activities. In this concern, seven ERT profiles were measured around the wastewater ponds. Besides, 10 water samples were collected from the ponds and the nearby groundwater wells. The water samples have been chemically analyzed for major cations, anions, nutrients, and heavy elements. Also, the physical parameters (pH, Alkalinity, EC, TDS) of the water samples were measured. Inspection of the ERT sections shows that they exhibit lower resistivity values towards the water ponds and higher values in opposite sides. In addition, the water table was detected at shallower depths at the same sides of lower resistivity. This could indicate a wastewater infiltration to the groundwater aquifer near the oxidation ponds. Correlation of the physical parameters and ionic concentrations of the wastewater samples with those of the groundwater samples indicates that; the ionic levels are randomly varying and no specific trend could be obtained. In addition, the wastewater samples shows some ionic levels lower than those detected in other groundwater samples. Besides, the nitrate level is higher in samples taken from the cultivated land than the wastewater samples due to the over using of nitrogen fertilizers. Then, we can say that the infiltrated water from wastewater ponds are not the main controller of the groundwater chemistry in this area, but rather the variable ionic concentrations could be attributed to local, natural, and anthropogenic processes.

**Keywords :** El Sadat city, ERT, hydrochemistry, percolation, wastewater ponds

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