

## **Application of Numerical Modeling and Field Investigations for Groundwater Recharge Characterization at Abydos Archeological Site, Sohag, Egypt**

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**Abstract :** Groundwater modeling is the way and tool for assessing and managing groundwater resources efficiently. The present work was carried out in the ancient Egyptian archeological site (Abydos) from Dynasty I and II. The area is located about 13km west of the River Nile course, Upper Egypt. The main problem in this context is that the ground water level rise threatens and damages fragile carvings and paintings of the ancient buildings. The main objective of the present work is to identify the sources of the groundwater recharge in the site, further more, equally important there is to control the ground water level rise. Numerical modeling combined with field water level measurements was implemented to understand the ground water recharge sources. However, building a conceptual model was an important step in the groundwater modeling to phase to satisfy the modeling objectives. Therefore, boreholes, crosssections, and a high-resolution digital elevation model were used to construct the conceptual model. To understand the hydrological system in the site, the model was run under both steady state and transient conditions. Then, the model was calibrated against the observation of the water level measurements. Finally, the results based on the modeling indicated that the groundwater recharge is originating from an indirect flow path mainly from the southeast. Besides, there is a hydraulic connection between the surface water and groundwater in the study site. The decision-makers and archeologists could consider the present work to understand the behavior of groundwater recharge and water table level rise.

**Keywords :** numerical modeling, archeological site, groundwater recharge, egypt

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