

## An integrated study of hard rock aquifers in the Eastern Desert, Egypt

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It has become imperative that we need to adopt techniques for quantifying the available groundwater resources for sustainable development and management keeping in mind the scarcity of available water resources versus its demand in the Eastern Desert, Egypt. In the Eastern Desert of Egypt, the hard rock aquifers are still neglected as a possible source of groundwater as well as there is no enough research considering such kind of aquifers due to the lack of data and the complexity of this fractured aquifer system. Groundwater is very important in the arid and semi-arid environment. The apparent heterogeneities and complexities present in the hard rock aquifers makes it a challenging research to tackle groundwater problems. Therefore, an exploration and investigation of the hard rock aquifers in the Eastern desert is the main purpose of this work. Remote sensing data, GIS, and geophysical data as well as detailed field work have been integrated to understand hydraulic characteristics of hard rock aquifers at Eastern desert in order to conserve and manage such fractured aquifers. It was found that there is a strong relationship between the fractures in the hard rocks and the surface drainage system and consequently its effect on the dynamic behavior of such hard rock aquifers in the studied region. Structural analysis has been carried out to analyze the main rock discontinuities which are representing in foliation, fractures (joints), faults and lineaments. Digitally enhanced color composites and panchromatic images of landSat TM and Spot were interpreted and thematic map on lithology and lineaments have been prepared. Structural feature were measured in the field and orientations compared with lineaments derived from both remote sensing data and a DEM. Hydro-geological setting of selected springs and wells were investigated in the field work and from pumping wells data which presence in the study area. All thematic layers were integrated and analyzed in a GIS. Results show that high yielding wells and sprinters are often related to large lineament and corresponding structural features. Fractures in hydraulic connection with hard rock aquifers, weathered bedrock constitute best aquifers and the relation between tectonic settings of the area with groundwater potentiality.

### Biography

Dr. Mohamed Saber has completed his Ph.D at the age of 35 years from Kyoto University, Japan. He was working as teaching assistant in Kyoto University for three months; he followed his doctoral degree by postdoctoral studies from Kyoto University, faculty of Engineering. He is currently working as Assistant Professor, at Geology Department Faculty of Science, Assiut University, Egypt. He is a supervisor of about 8 Master students.

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