ARTICLE IN PRESS

NRIAG Journal of Astronomy and Geophysics xxx (2017) xxx-xxx



Contents lists available at ScienceDirect

NRIAG Journal of Astronomy and Geophysics

journal homepage: www.elsevier.com/locate/nrjag



Full length article

Integrated geoelectrical and hydrogeological studies on Wadi Qena, Egypt

Ahmed G. Abd El_Hameed a,*, Hassan M. El-Shayeb b, Nahed A. El-Araby c, Mostafa G. Hegab d

- ^a Survey of Natural Resources Department, ESRI, University of El-Sadat City, Egypt
- ^b Head of Geology Department, Faculty of Science, Menofiya University, Egypt
- ^c National Water Research Center (NWRC), Egypt
- ^d Research Institute for Groundwater (RIGW), National Water Research Center, Egypt

ARTICLE INFO

Article history: Received 23 October 2016 Revised 7 February 2017 Accepted 17 March 2017 Available online xxxx

Keywords: Wadi Qana Vertical electrical soundings Hydrogeological Studies

ABSTRACT

The study of ground water resources in the arid regions has a great importance to the scarcity of water resources. So, the present work aims to identify the main aquifers in south Wadi Qana area. Wadi Qana is a wide valley in western desert and extending southwards for some 170 km from the South Galala Plateau to its broad fanning delta located on the Nile Valley plain east of Qena town. Fifty-four Vertical Electrical Soundings (VES) were measured in the study area by using AB/2 ranging from 1.5 to 1000 m. The quantitative interpretations of the field curves exhibited four geoelectrical successions and each succession is formed of seven geoelectrical units and there are two main water-bearing units act as aquifers, where the third geoelectrical unit appears in the south of the study area act as Quaternary aquifer and the sixth geoelectrical unit appears in the north of the study area act as Nubian aquifers. Ten water samples have been analyzed for different water quality parameters. The results reveal that TDS values are more than 1000 ppm where groundwater becomes unsuitable for drinking and other domestic uses and could be used for irrigation and some industrial activities under certain precautions.

© 2017 Production and hosting by Elsevier B.V. on behalf of National Research Institute of Astronomy and Geophysics. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

1. Introduction

The population density in Egypt is concentrated in the Nile Valley and Delta, which represents 10% of the land of Egypt while it decreases in Desert parts of Egypt. The existence of groundwater potentialities permit to the execution of reclamation projects, Therefore, the study of groundwater resources in the arid regions of the western desert has a great importance to the scarcity of water resources.

Wadi Qena is a wide valley extending southwards for some 170 km from the South Galala Plateau to its broad fanning delta

* Corresponding author.

E-mail address: ahmed.esri@gmail.com (Ahmed G. Abd El_Hameed).

Peer review under responsibility of National Research Institute of Astronomy and Geophysics.



Production and hosting by Elsevier

located on the Nile Valley plain, east of Qena town. The width of Wadi Qena ranges from 30 km to less than 5 km. The wadi is characterized by many ridges and high terraces with their longer axes parallel to the main course. These features represent several stages in the down-cutting of the wadi. They are mostly covered by fine silt and capped by dark desert-varnished gravels. A measure of the large sediment load carried by the Qena River during its active history is given by the area of its delta (600 km2), which may have extended also to the silt deposits west of the Nile there (Issawi, 1983).The studyarea lies in the southern part of wadi Qena between Latitudes 26°15′00″ and 27°14′00″N and Longitudes 32°41′00″ and 33°08′00″E (Fig. 1).

The present work deals with the use of geoelectrical and hydrogeological methods to study groundwater aquifer in the southern part of Wadi Qena area located in the Eastern Desert.

1.1. Geological setting

Several geologic, hydrogeological and geophysical studies were carried out by many authors such as Said (1981), Abu El-Ella (2004), Elewa et al. (2006), Elmalt (2008), El-,Shami (1988),

http://dx.doi.org/10.1016/j.nrjag.2017.03.003

2090-9977/© 2017 Production and hosting by Elsevier B.V. on behalf of National Research Institute of Astronomy and Geophysics. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

Please cite this article in press as: El_Hameed, A.G.A., et al. Integrated geoelectrical and hydrogeological studies on Wadi Qena, Egypt. NRIAG Journal of Astronomy and Geophysics (2017), http://dx.doi.org/10.1016/j.nrjag.2017.03.003

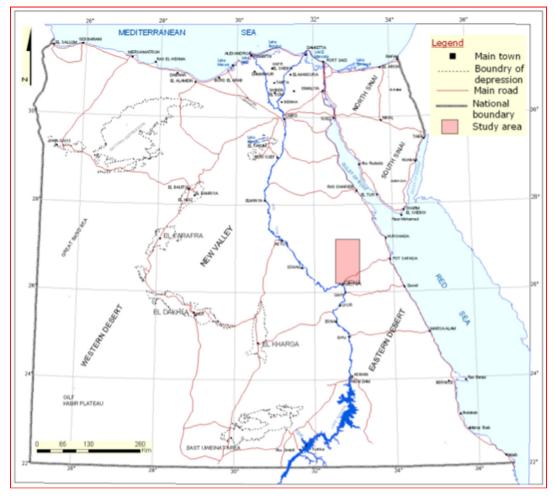


Fig. 1. The study area location map.

Aggour (1997) Hassan (1985) El-Hussaini et al. (1994), Galal (2005), Abdel Gowad (2010), Wilmsen et al., 2012, Seleem et al. (2013), Seleem (2014) and Abdel Moneim et al. (2015)

1.2. Geomorphology

Elewa et al. (2000) pointed out that the area of Wadi Qena basin divided into the following main landforms:

1. Platforms.

- (a) Limestone Plateau is dissected and consists mainly of beds of hard, jointed and fractured limestone. A flat-topped surface at Gebel Aras (524 m a.s.l.) represents a hard, massive, structurally controlled landform and provides a suitable catchment area.
- (b) Plateau of Nubian Sandstone is mainly composed of hard, massive sandstone beds forming dissected patches. These patches contain some beds of clay sand iron oxides that highly affect the groundwater conditions and quality. Also, This plateau is cut by few main faults.
- 2. At the northeast corner of the investigated area, Tors is appear as a small part and represents Precambrian basement rocks exposures. Also, they are highly weathered and represent a part of the groundwater aquifers catchment areas
- 3. Fault Scarps: The area is affected by structural disturbances that created major fault scarps with steep slopes (38° 75°). These scarps moderate to trend NW-SE and N-S.

4. Alluvial Deposits

- (a) Alluvial Fans which are dispersed in the area of investigation due to the presence of fault scarps inducing topographic difference between the plateaus and the wadis. These fans are composed mainly of sands, clay and gravels.
- (b) Flood Plains which are nearly flat and completely cultivated. It belongs to the Pre-Nile and is of Quaternary age (Said, 1981) and is composed mainly of mud, silt and clay with some sands.

1.3. Stratigraphy

The area under investigation is formed of a sedimentary succession composed simply of Nubia Sandstone (at the base) overlain by a shaly sequence (Quseir Shale) intercalated in its lower part with two phosphorite horizons at Gabal Abu Had and by a phosphatic oyster bed in the southern part at Wadi Hamama. The Duwi Formation conformably overlies the Quseir Shale, and constituted of three phosphorite beds intercalated with shale, marl and sandstone. It is overlain by a succession of siliciclastics divided by the Tarawan Chalk (6 m thick) into Dakhla Shale (below) and Esna Shale (above). The Esna Shale is capped by Lower Eocene limestone which forms the surface of the plateau (Ahmed, 1983).

Dealing with the sedimentary succession present at Wadi Qena area, Ahmed (1983) established the following lithostratigraphic units which he compiled from the proposed lithostratigraphic classifications of Ghorab (1956), Youssef (1957), and said (1961, 1962):

Download English Version:

https://daneshyari.com/en/article/8141712

Download Persian Version:

https://daneshyari.com/article/8141712

<u>Daneshyari.com</u>