

Electromagnetic Study on The tenth of Ramadan City, Eastern Desert, Egypt

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SUMMARY

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The main object of our study is evaluate the layers that contain fresh water at the tenth Ramadan City, Eastern Desert. Audio Magnetotelluric (AMT) were carried out on profile using G- EM3D instrument of Geometrics, USA.

The results of AMT show three layers that contain watre during Quaternary (shallow aquifer), Eocene (intermediate Aquifer) and Olgocene ((deep Aquifer). The results of 1D and 2D AMT are comparing with hydrogeological model near the stufy area.

Keywords: Audio Magnetotelluric (AMT), 1D and 2D AMT, tenth Ramadan City . Eastern Desert.

INTRODUCTION

The study area is located at an altitude of about 180 to 200 meters above sea level and is characterized by its flat where the factors of weathering in particular air play important role over thousands of years other than the water weathering, rain ages and wind weathering in the dry ages. However, some medium-height hills have been observed on the eastern border of the site as well as low-lying areas west and south of the site and are factors of topographical change due to human activity. The geological map and the location of the study area is showing in the (Figure 1).

Method

We apply the AMT magnetotellric profile using G-EM3D instrument of Geometrics, USA. The location map showing the elevation and AMT stations on the study area is showing in (Figure 2). The station separation is approximately 100 m. Every station has duration about 2 hours of the frequencies 10K, 4k, 1k until 0.1 Hz. The results are processed to remove cultural noise using appropriate filter to enhance the AMT data see (Figure 3). The AMT data seem good and have some

large error bars especially at low frequency.

Results

The 1DMT results using (Bostick & Occam) codes and best fitting of Resistivities and phases are shown **Figure (3)**. It shows the three layers of low resistivity wet surface layers, shallow aquifer and deep aquifer, belonging to Quaternary, Eocene and Oligocene ages.

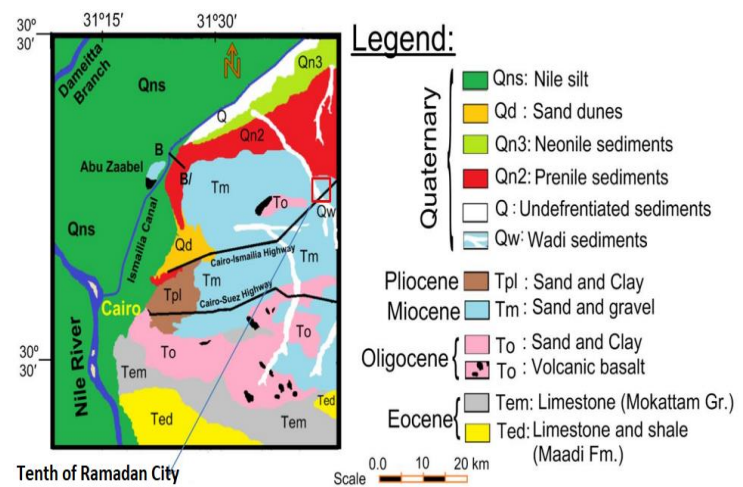


Figure 1: Geology map of the study area

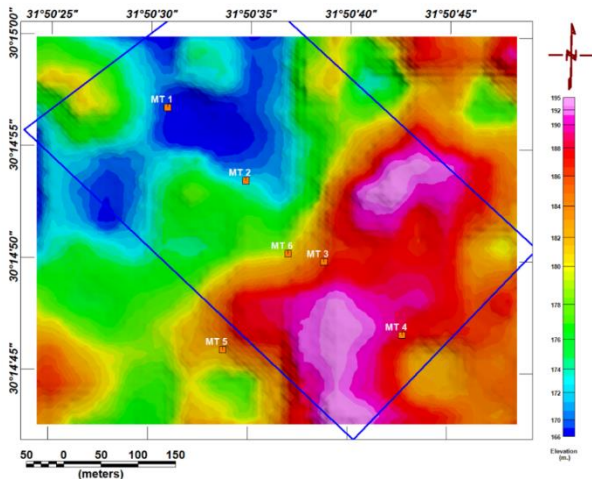


Figure 2. Location map showing the elevation and AMT stations on the study area.

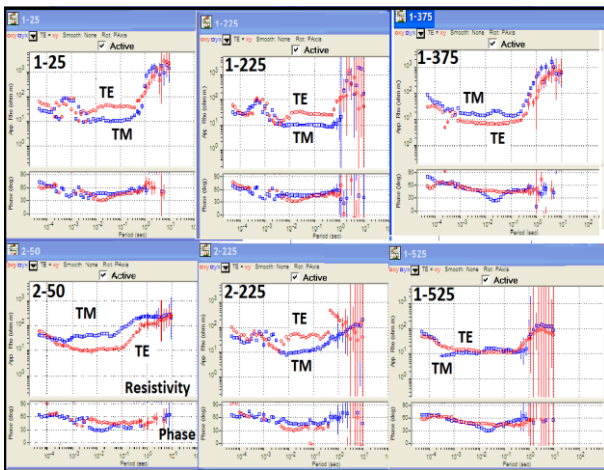


Figure 2: showing the results of G-EM3D

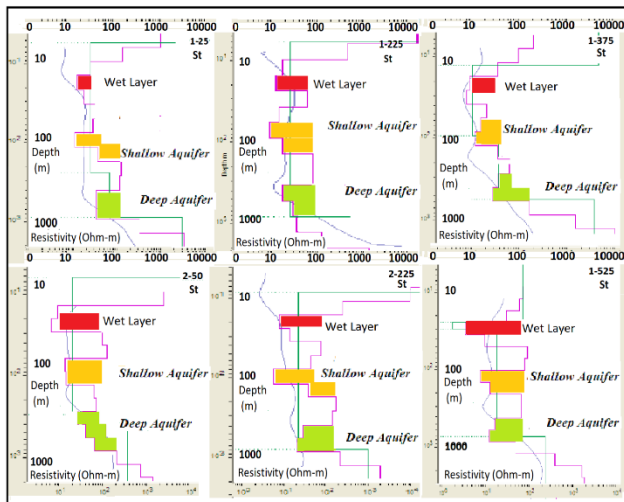


Figure (3): The results of 1D inversion of AMT.

Summary and Conclusion

In order to choose best place to drill well in the study area, 2DMT smoothing method (Rebocc code) is applied to see the horizontal and vertical change of resistivity in the study area (Figure 4). The result is correlated with the hydrological result near the study area which are good agreement with AMT result.. Aquifer water-model interpretation is required to compare with drilling data..

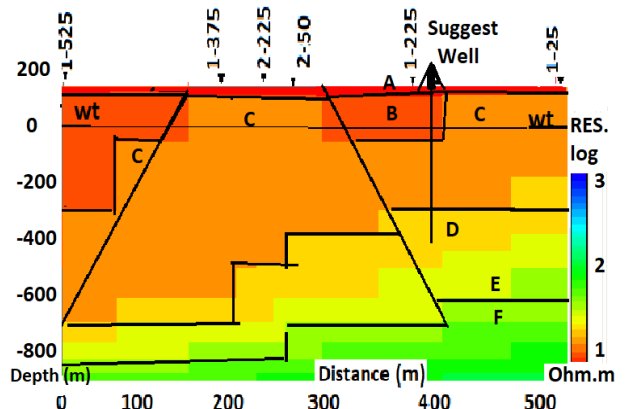


Figure 4. 2DMT results and suitable place for drill well.