سامية محمد مصطفى

شبكة المعلومات الجامعية

بسم الله الرحمن الرحيم

سامية محمد مصطفى

شبكة المعلومات الجامعية

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التوثيق الالكتروني والميكروفيلم

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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

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شبكة المعلومات الجامعية

بعض الوثائق الأصلية تالفة

سامية محمد مصطفى

بالرسالة صفحات لم ترد بالأصل

AIN SHAMS UNIVERSITY
FACULTY OF SCIENCE

Geophysical study of Wadi El-Natrun area in the Western Desert of Egypt

A Thesis

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by

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Abstract

Wadi El - Natrun area is located between Latitudes 30° 15`& 30° 30` N, and Longitudes 30°09'`& 30° 30' E, covering an area of about 700 sq Kms with distance about 90 Kms northwest Cairo, 40 Km from Rosseta branch. This area is characterized by low relief, arid land form, also contains a large number of lakes and drainage lines.

The purposes of this study (i) Delineate the structural frame work of the study area (ii) Show the role of the separation methods in the resolution of the multisources magnetic implications (iii) Evaluate the study area from the geophysical view (iv) Illustrate the role of the subsurface tectonics in controlling of subsurface water reservoir.

In this respect the available geological and geophysical data are interpreted. These include (i) RTP magnetic anomaly map prepared by the author, (ii) Bouguer anomaly map after GPC (1977), (iii) Compiled geological map (mainly after Conoco and EGPC, 1987) and (iv) Seismic data after EGPC, (1990).

A detailed land magnetic survey was made for measuring the total magnetic field using Proton magnetometer, and more than 550 points were taken. The distance between these stations ranges from 250 m to about 1 Km, and a magnetic map was deduced for the area.

The deduced magnetic map was reduced to the daily variations and Latitudes corrections. After that, it was reduced to North Magnetic Pole, using **Baranov (1957)** method. Also, a bouguer anomaly map between Latitudes 30°00` & 30°30` N and Longitudes 29°40` & 30° 30` E, comprising the surveyed area was used.

The qualitative interpretations have been performed to the anomalies of the RTP magnetic and bouguer anomaly maps. The results show that most of the anomalies of these maps are trending NW - SE, NE - SW and E - W directions.

The regional-residual methods were applied to the potential data using the least square technique with four order of coeffecients.The intensive analysis of the least square maps shows that the least square maps of the second order represent the best fitted maps with the original. On the other hand, the filtering technique was applied to the potential data. This technique was applied with of three units of coefficients (2.7 - unit, 4 - unit, and 5.3 - unit). The inspection of the filtered magnetic maps revealed that the maps with 4-unit residual, 4-5.3 unit band-pass, and 5.3-unit regional filtered maps are the best maps that represent the magnetic anomalies at shallow, intermediate and deep levels. Furthermore the downward continuation technique has been applied to the potential data. The results show that the downward continued maps at interval 4 Kms gives the highest fluctuation which give indications as it was measured on/or near the basement surface.

The quantitative interpretations have been operated using trend analysis and showed that the RTP magnetic anomaly map indicates that the area under study is affected by fault lines, arranged in six main tectonic trends namely, the Suez N 35° - 45° W, the Syrian Arc trend N 45° - 65° E, N 65° W, The Aqaba trend N 15° - 25° E, and N 75°W arranged according to their decreasing order of predominance in the area. These directions agree in a great limit with the results obtained from the bouguer anomaly map, where the fault lines taking the direction N 35°-45° W is coming in the first order of the predominance.

The depth estimation methods have been performed using two types 1-The most advanced methods (spectral analysis and Werner deconvolution methods) and 2- The traditional methods (tangent, halfwidth, and Pawell methods). The results show that the depth to the basement is about 4 Kms and increases towards the west of the study area. Furthermore, the fault and dike parameters method were applied to the magnetic and gravity maps. The results show that the depth ranges between 3.3 Km and 4 km and the angle of inclination ranges between 30° and 40°. The modeling technique has been applied to the potential data for illustrating the configuration of the basement surface. These models show the depth increase towards the west direction , the magnetic susceptibility ranges between 0.00033 and 0.00044 cgs unit and the density contrast about 0.3 gm/cm^3.

An intensive study have been performed to El-Hamra area in order to illustrate the role of the magnetic interpretation in detection of

the subsurface tectonics that controlling the subsurface water reservoir and the surface salt lakes in the area. This study had been performed using separation method of filtering technique, trend analysis, **Walter and Mark (1993)** technique after modifications, two - dimensional modeling technique and seismic interpretations. The results show a great correlation between the results deduced from the magnetic data, the seismic data and hydrogeologic previous work by other authors. This correlation has proved that the out through carried on of fresh water inside El-Hamra Lake is due to the fault trending NW - SE and extending from the basement and shearing the reservoir rocks. Moreover, the correlation between the deduced tectonic trends and the locations of the lakes present in the area reflects that these lakes are structurally controlled especially by faults taking NW direction.

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