AIN SHAMS UNIVERSITY
FACULTY OF SCIENCE
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Three Dimensional Seismic Attributes And Density Models Of The Hydrocarbon Plays Inferred From Deep Seismic Reflection And Bouguer Gravity Data At Fayum Area, Western Desert, Egypt.

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(B. Sc. In Geophysics)

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السمات السيزمية ونماذج الكثافة ثلاثية الابعاد فى التكوينات الهيدروكربونية المستدلة من البيانات السيزمية المنعكسة العميقة والتثاقلية (البوجير) بمنطقة الفيوم- الصحراء الغربية مصر

رسالة مقدمة من

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(بكالوريوس العلوم)

لاستكمال متطلبات الحصول
على درجة الماجستير في العلوم
في الجيوفيزياء

تحت اشراف

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ABSTRACT

The area under study is located in the central part of El-Fayum area, Western Desert, Egypt, where twenty wells have been drilled by Merlon El-Fayum and Petrosilah Petroleum Companies it is located between latitude 29˚10’N, 29˚20'N and longitudes 30˚50'E ,31˚00'E 0

The present work is devoted to study the subsurface geologic structural features of the tops of Abu Roash, Bahariya and Kharita Formations, Dahab Member and Bsement Relif at central part of El-Fayum concession, Western Desert, Egypt.

A detailed gravity stripping technique is applied on selected profile. From the interpretation of this profile, The abrupt decrease in density of Abu Roash A, B, C, D and E Members gives an indication of high porosity values which suggest carbonate built-up at these localities.

The 2D depth map and the 3D view of the basement relief in addition to the structural orientation were studied and interpreted in the ranges of 2 km and 6 km to obtain the northeast southwest and northwest southeast main structural trends.

The seismic interpretation indicates the structurally highs and lows in the study area that are inferred from the constructed seismic (time and depth) structural maps that show many prospective closures. These structural maps are matched with the thickness variations in the 3D isochrones maps for all the picked formations horizons.

The study area is affected by the compressional forces of the Syrian Arc System of folding that took place during Santonian-Middle Eocene, resulted in the Formation of inverted structures that are pronounced at the Khoman level in the study area.

Nine horizons (Basement, Dahab, Kharita, Upper Bahariya, Abu Ruash "G", Abu Ruash "F", Abu Ruash "E", Abu Ruash "B", and Khoman) are picked and mapped.

The structures shown on the 3D seismic maps indicated the presence of different fault trends. Most of these faults are normal.

Geometric attributes like curvature, continuity, similarity, dip of maximum similarity, shale indicator … etc., have helped us to detect anticlinal and synclinal folds, local and regional fault trend, fault drags and heaves, unconformity, reflection configuration, and sand channel body.Instantaneous attributes like trace envelope, instantaneous frequency, thin bed indicator, phase dominant frequency, relative acoustic impedance … etc. have enabled us to indicate large variations in sand channel thickness, edges between thin and thick sand channel body, unconformity surfaces, marker events, and absorption characteristics of beds.

The central area of El-Fayum Concession is the most favorable for hydrocarbon entrapment style due to the following reasons: it represents structural high, lower shale content, higher sandstone content Based on the structural models of the study area, 5 wells were recommended to be drilled in the described prospects (drillable prospects) at Dahab target, to evaluate the oil potentialities of the deep Cretaceous and Jurassic zones.

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