بسم الله الرحمن الرحيم

شبكة المعلومـــــات الجامعية

التوثيق الالكتروني والميكروفيلم

شبكة المعلومات الجامعية

جامعة عين شمس

التوثيق الالكتروني والميكروفيلم

﴿ قـــسـم ﴾

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد اعدت دون آية تغيرات

يجب أن

تحفظ هذه الأفلام بعيداً عن الغبار

في درجة حرارة من 15 – 20 مئوية ورطوبة نسبية من 20-40 %

To be kept away from dust in dry cool place of
15 – 25c and relative humidity 20-40 %

بعض الوثائق الأصلية تالفة

بالرسالة صفحات

لم ترد بالأصـــل

AIN SHAMS UNIVERSITY
FACULTY OF SCIENCE
GEOPHYSICS DEPARTMENT

GEOPHYSICAL LABORATORY STUDY OF THE DEPOSITS OF THE BLACK SANDS OF ABU KHASHABA BEACH, ROSETTA DISTRICT, EGYPT.

A THESIS SUBMITTED TO THE GEOPHYSICS DEPARTMENT, FACULTY OF SCIENCE, AIN SHAMS UNIVERSITY IN PARTIAL FULFILMENT FOR THE DEGREE OF MASTER OF SCIENCE IN APPLIED GEOPHYSICS

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PREFACE

The present thesis is submitted to the Faculty of Science, Ain Shams University in partial fulfillment for the requirements of Master of Science in Geophysics.

Beside the research work presented in this thesis, the candidate attended ten post graduate courses for one academic year in the following topics :-

1- Field geology and geologic maps.
2- Statistical geology and computer.
3- Potential theory.
4- Electric methods.
5- Magnetic methods.
6- Gravimetric methods.
7- Basement complex.
8- Middle east basins.
9- Structural geology.
10- Geotectonics.

She has successfully passed the final examination of these courses, besides an English language course.

Approved

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ABSTRACT

The present research work is considered as a part of the Nuclear Materials Authority comprehensive exploration and assessment program of the Egyptian black sands. This work deals essentially with the study of some physical properties of the black-sand deposits using geophysical laboratory methods. These methods included the electromagnetic conductivity, magnetic susceptibility and gamma-ray spectrometry. This work aims mainly to define the most efficient geophysical technique that can be used to explore these deposits in the field. It aims also to establish a set of standard curves that can provide a reliable quantitative tool to determine the total heavy mineral content of unknown black-sand samples from their measured geophysical responses.

The various laboratory geophysical measurements were carried out on 416 samples represent the black-sand deposits of Abu Khashaba area (located in the extreme northwestern corner of the Nile Delta). Among these samples, 272 represent the surficial deposits, and collected from a total surface area of 2.4 km^2. The remaining 144 samples represent the subsurface deposits, and collected from the exploratory drilled boreholes in the area, with maximum depth of 10 m. Results of the different measurements have been presented in the form of contour maps and subjected to conventional statistical methods of analysis to facilitate and enhance their interpretation.

Qualitative interpretation of the various contour maps and results of statistical analysis of the data indicated that the black-sand deposits in the studied area are distributive in a pattern of repetitional zones of high and low heavy mineral content; striking approximately in the east-west direction, more or less parallel to the present shore line.

The study indicated that the surficial black-sand deposits represent one considerable layer of high productivity with respect to the underlying deposits. This should be taken into consideration when planning for the assessment of the mineral potentiality of these deposits. The surficial deposits displayed

statistically significant anomalous areas of potential high heavy mineral content, that are largely occurred in the northwestern part of the studied area.

Application of the principal component analysis on the different geophysical measurements indicated that, about 83 % of the differences between the black-sand deposits are related to heavy mineral concentration differences, whereas about only 13 % of these differences are related to light mineral concentration differences. Interpretation of the various geophysical responses of the black-sands demonstrated that the magnetic minerals behave the same manner as the radioactive minerals.

Four standard curves were established to show the relationship between the measured electromagnetic conductivity, magnetic susceptibility and concentrations of the two radioelements thorium and uranium versus the total heavy mineral contents in 21 standard sample of total heavy mineral contents range from 0 to 100 %. These standard curves were provide a reliable approach for semi-quantitative determination of the total heavy mineral contents of unknown black-sand samples. These characteristic curves demonstrated also that the magnetic and spectrometric methods are capable to detect both low- and high-grade black-sand deposits. Consequently, the two methods are highly recommended for exploring these deposits. The electromagnetic conductivity method was found to be ineffective tool in the case of low-grad deposits (less than 22 % total heavy mineral content).

Statistical treatments of the collected spectral radiometric measurements indicated that, the mean background terrestrial gamma-radiation level is about 11.4 μR/h. Gamma-radiation dose received by people in the area due to this natural exposure was computed as 95 millirems/year. This value remains within the maximum permissible limit without harm to the individual. Periodical systematic radiometric measurements are highly recommended to evaluate the actual dose rate received by people in the area of Abu Khashaba beach and to determine the amount and extent of any future variations in the environmental radioactivity level in this area of Egypt.

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