INVESTIGATIONS OF THE SECONDARY DISPERSION OF U AND Mo IN WADI SEDIMENTS OF GABAL GATTAR-ABU HARBA AREA AND IT'S APPLICATION TO GEOCHEMICAL PROSPECTION IN ARID ZONES

By

Samy Mikhael Helmy Sadek El Bouhy

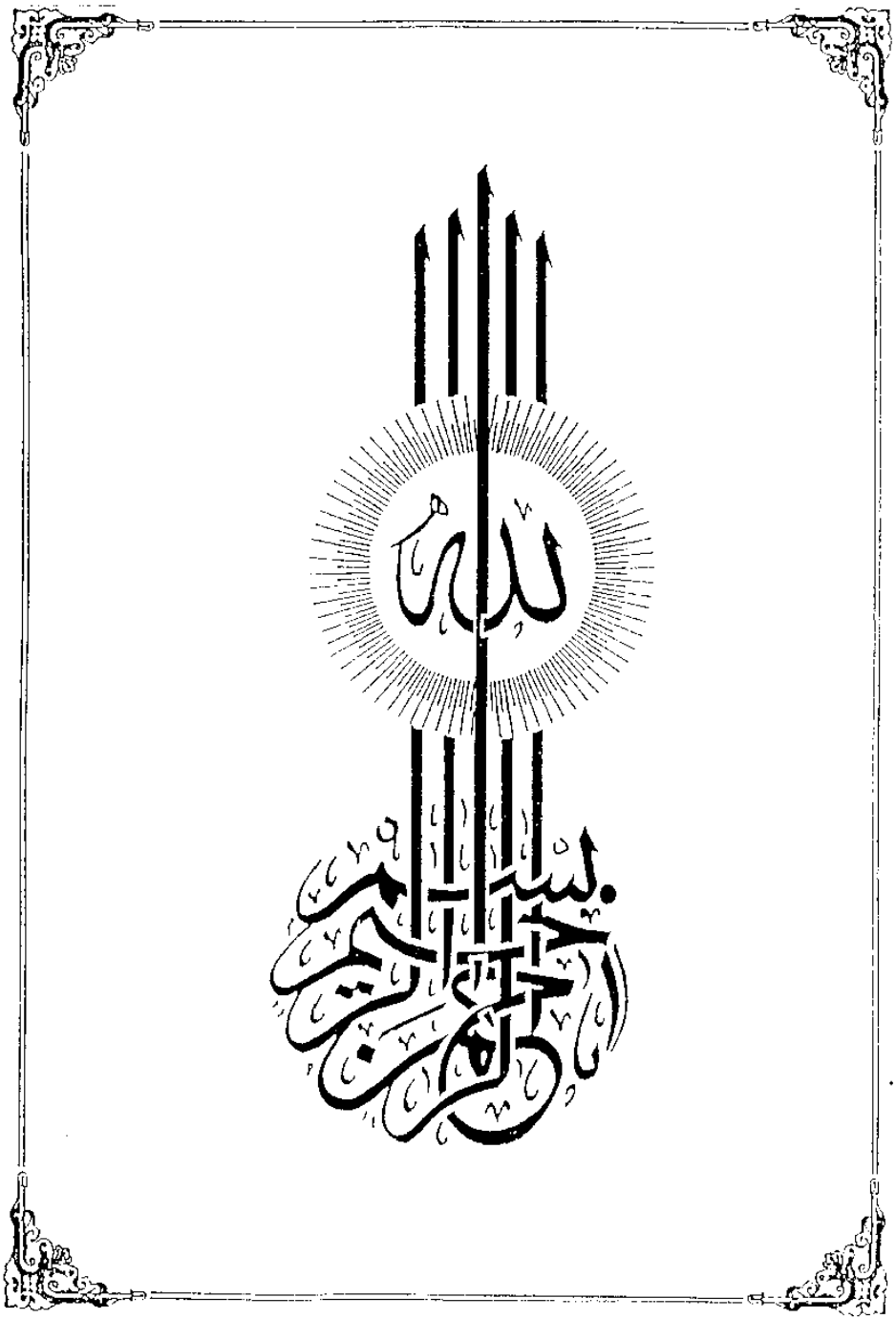
Nuclear Materials Authority

Submitted to

Geology Department
Faculty of Science
Ain shams University

In
partial fulfillment of the requirements
of the degree of Master of Science
(Geology)

1997



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Note

The present thesis is submitted to Ain Shams University in partial fulfilment of the requirements for master degree of science in geology. Beside the researche work materialized in the thesis, the candidate **Samy Mikhael Helmy Sadek El Bouhy** has attended to post graduate courses for one year in the following topics.

1- Mineralogy.
2- Geochemistry.
3- Igneous Petrology.
4- Metamorphic Petrology.
5- Sedimentary Petrology.
6- Sedimentation.
7- Structural Geology.
8- Lithostratigraphy.
9- Field Geology and Mapping.
10- Geostatistics and Basic Language Programming.
11- English Language.

He has successfully passes the final exam in the above mentioned courses..

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ABSTRACT

Investigations of the secondary dispersion of U and Mo in wadi sediments of Gebel Gattar-Abu Harba area, and its application to geochemical prospection in arid zones.

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The present study is an investigation of the secondary dispersion of U and Mo in wadi sediments of Gebel Gattar-Abu Harba area and its application to geochemical prospection in arid zones.

A total of 53 stream sediment samples were collected from the floors of the selected four major wadis in the studied area. They were taken from relatively high radioactivity areas and along the flow direction. The drainage system of the area was studied by constructing the rose diagrams illustrating the directions, length, width and frequencies of the different trends of the drainage lines, recorded on the aerial photographs with scale 1:40,000 for G. Gattar-Abu Harba area.

The grain size analysis of the studied wadi sediments revealed that they were loose and vary from pebble to very fine clay sizes, where the sand size fraction constitutes from 70% to 90% of these sediments. Within the grades of sand size grades the very coarse and coarse sand size grades are the dominant constituents of the studied wadi sediments. The sediments are poorly to moderately sorted, strongly fine skewed and fine skewed also they are classified as very platy kurtic, platy kurtic and lepto kurtic.

From the quantitative and qualitative mineralogical studies, about twelve heavy minerals were identified and described. These minerals include, magnetite, ilmenite, leucoxene, hematite, zircon, rutile, staurolite, biotite and spinel. The study of the relation between the grain size and the recorded heavy minerals showed that these minerals were mainly concentrated in the fine and very fine sand size fractions.

It was found that there is a positive relation between U and the total heavy content of the wadi sediments.

The study of the radioactivity of the wadi sediments showed that the radioactive elements U, Th, eU(Ra) and K are enriched in the studied wadi sediements forming geochemical anomalies as they have higher values than the corresponding concentrations in the crustal rocks and soils.

Indicator elements e.g. Th, V, Zr, Y, Nb, Pb, Ni and Zn were selected as pathfinders for U and Mo mineralization as they show high positive correlations with both elements.

The study of the secondary dispersion coefficient, showed that the relative sequence of element mobilities in the superficial zones across the ore sight is Zn>Pb>Y>V>Ni>Mo>U>Zr>Nb>Th. Accordingly these elements specially the first five ones, can be usedf as pathfinders for U and Mo mineralizations under arid intermountain conditions prevailing in the Eastern Desert of Egypt.