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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سامية محمد مصطفى

جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

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بعض الوثائق الأصلية تالفة

سامية محمد مصطفى

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بالرسالة صفحات لم ترد بالأصل

PETROLOGY AND STRUCTURE OF THE BARRAMIYA AREA WITH SPECIAL EMPHASIS ON THE GOLD MINERALIZATION, EASTERN DESERT, EGYPT.

THESIS

Submitted to the Faculty of Science
Cairo University

By

Amir Mohamed Hassan Said
(B.Sc.)

In Partial Fulfillment of the Requirements for the Degree of
Master of Science*, in *Geology

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APPROVAL SHEET

TITLE OF THE M.Sc. THESIS

PETROLOGY AND STRUCTURE OF THE BARRAMIYA AREA WITH SPECIAL EMPHASIS ON THE GOLD MINERALIZATION, EASTERN DESERT, EGYPT.

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Note

The present thesis is submitted to Faculty of Science, Cairo University in partial fulfillment for the requirements of the degree of Master of Science in Geology.

Beside the research work materialized in this thesis, the candidate attended eleven postgraduate courses for one academic year in the following topics:

1. Ore mineralogy.
2. Ore deposits.
3. Rock-forming minerals.
4. Isotope geology.
5. Geochemistry.
6. Igneous petrology.
7. Metamorphic petrology.
8. Plate tectonics and mineralizations.
9. X-ray diffraction and other techniques.
10. Statistics.
11. German Language.

The candidate successfully passed the final examination in these courses held in October 2001.

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To my mother

ABSTRACT

The present study deals mainly with the petrology and structures of the basement rock units outcropping nearby the Barramiya old gold mine between latitudes 25° 02` 36" and 25° 06` 20" N and longitudes 33° 44` 30" and 33° 50` 05" E. This thesis aims at studying the genesis of the gold deposit in the Barramiya mine (25° 04` 24"N - 33° 47` 15"E) as well as the role of structures affecting the mine site in the process of mineralization.

Comprehensive field, petrographical and geochemical studies revealed that the study area is generally covered by assorted rock units which mainly include; serpentinites and talc-carbonates including quartz – carbonate dyke-like bodies, metagabbros, metapyroclastics, granodiorites, perthitic leucogranites and dykes. In the mine, quartz – feldspar porphyry dyke-like bodies were also recorded.

Major folding affects most of the basement rock units encountered in the area except granitic intrusions. Five alternating syn- and antiforms were encountered extending for about ° km. The axial planes of these folds strike N70°E and the limbs dip steeply 70°-80°. They are plunging >80° in N70°E direction. Major faults can be classified into older ductile and younger brittle faults. The ductile faults are mainly represented by the major thrust faults that are related to early stages of subduction and collision tectonics during the formation of the ancient oceanic crust and volcanic island arcs. Major brittle faults in the study area are mainly represented by inferred NNE left-lateral strike-slip faults recorded in the mine site. Major ductile shear zones of E-W to ENE strike occur in the central part of the study area. They reactivate older thrust faults by convergent right lateral movement (transpression) as indicated from the shear sense indicators which comprises S-C fabric, sheath folding, sigmoidal tension veins filled by quartz, asymmetry of boudinaged quartz veins and anastomosing shear planes. These transpressional ductile shear zones were formed during the later stages of collision. The study area is mainly cut by numerous types of dykes; the most important types are the quartz – carbonate dykes and the quartz – feldspar dyke-like bodies. Quartz – carbonate dykes have a general major E-W trend with various length and thickness, mainly associated with serpentinites. Quartz – feldspar porphyry dyke-like bodies, recorded only in the mine site, occur in four main trends E-W to ENE, NE, WNW and NW. The dykes of the first three trends are thinner than that of the fourth trend. The E-W to ENE trending dykes are affected by strong shearing whereas the NW trending dykes are affected by extension fracturing and still show most of their primary textures. The rock units of the study area have undergone a polyphase deformation history. Each single deformational event is defined by a group of structures showing the same strain axis, the same bulk kinematics and the same igneous and/or metamorphic event (s). Three successive deformations called D1, D2 and D3 have been recognized. The P-T conditions of each deformational event were concerned.

The country rocks of the Barramiya old gold deposit are mainly graphite-bearing sheared serpentinites and sheared actinolite-graphite-serpentine rocks as well as quartz carbonate dyke-like bodies, all are injected by quartz – feldspar porphyry dyke-like bodies and quartz veins of different degrees of shearing and deformation. Numerous gold-bearing quartz veins are found cutting across the sheared serpentinites. These veins have different scales (From microscopic to 1m in width), trends (E-W, ENE-WSW, NE-SW, WNW-ESE and NW-SE directions), colors (black, gray and milky) and degree of deformation which are reflected on the color of the vein;

the darker the color of the vein, the higher the degree of deformation. The distribution of gold in both the country rocks and veins was concerned. The genesis of the gold mineralization in the Barramiya mine was discussed and it was thought that the source rock for the gold mineralization is apparently the gold and sulphide rich serpentinites that occur in the mine site and that gold was mainly introduced into the gold-bearing quartz – carbonates and quartz veins found in the mine site in three successive stages. The first stage is mainly during serpentinization process (ocean floor setting), where gold may be introduced in the contemporaneously developed quartz – carbonate dykes via silica liberated in the serpentinization process and CO_2 in the sea water. The second stage is mainly occurred in the earlier phase of the prolonged transpressional event (D2 deformation). The third stage is the most important stage and of the most effective contribution in the mineralization process in the Barramiya old gold mine where it also derives some gold from the above mentioned stages. This stage is mainly related to the intrusion of syn-collisional granitic pluton which is intruded during the prolonged transpressional event (D2 deformation) but mainly after the second stage discussed above. This granitic pluton does not exposed in the mine site, but the presence of the quartz – feldspar porphyry dyke-like bodies (off-shoots) indicates the presence and the shallowness of such pluton.

Contents