CHAPTER ONE

INTRODUCTION

1.1 - Delimitation of the area

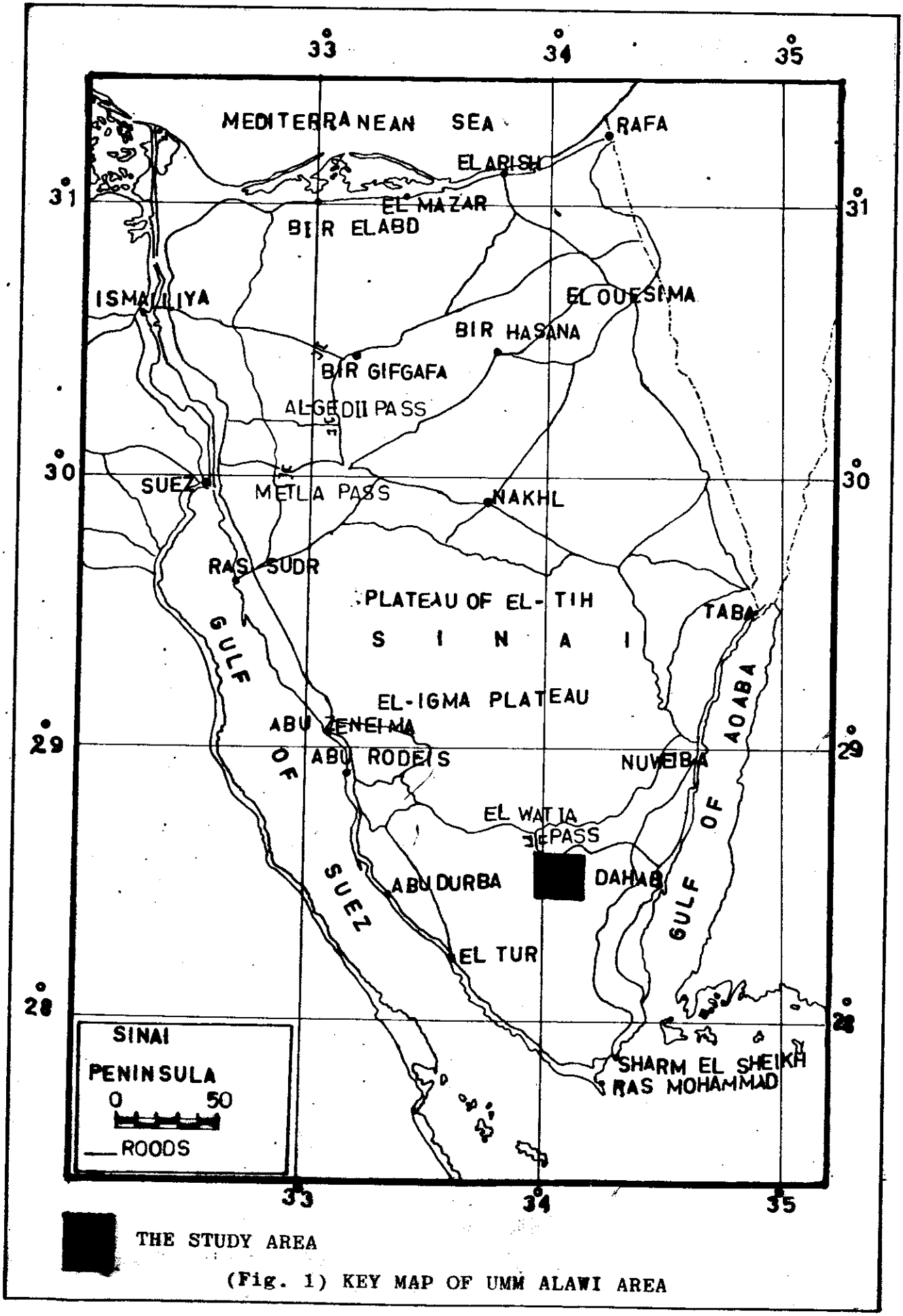
Umm Alawi area, which forms the subject of the present study, is located at the central part of southern Sinai between latitudes 28° 27′ and 28° 35′ N and longitudes 33° 58′ and 34° 10′ E ,(Fig.1) . The area under investigation covers about 500 $Km^2$and consists of Precambrian rocks. It has 22.4 Km in length and 22.4 Km in width . It is bounded northward by Wadi Sannad; southward by Wadi El Rahaba and the upstream of Wadi El Nasb, eastward by the downstream of Wadi El Nasb and westward by Wadi Isbaiya (Fig.2).

1.2 - Physical features

The studied area is drained by numerous Wadis (see Table 1), some of them drain west towards Wadi Isbaiya, while others drain east especially towards Wadi El Nasb . However , there are several trends of Wadis, most of them have NW-SE,ENE-WSW,NNE-SSW,N-S,E-W and NNW-SSE trends.

Umm Alawi is a low mountaneous area, except at its western side where it is highly mountaneous and rise up to about 2646 m a.s.l. The most conspicuous mountains of the district are shown in Fig.(2) and Table (1) . Most of the floor of Wadis are covered by alluvial deposits with some boulders of country rocks.

Water wells and underground water are fairly



(Fig. 1) KEY MAP OF UMM ALAWI AREA

Table (1): The most important mountains and Wadis at the Umm Alawi area, Central/south Sinai, Egypt.

Mountains		Wadis
Name	High m.a.s.l.	
Gebel Katherina*	2646	Wadi El Rasis
Gebel Nakhila	2042	Wadi ed Deir
Gebel Sheikh El Arab	2190	Wadi Sidud
Gebel El Azraq	2297	Wadi Abu Khshieb
Gebel Hodied	2041	Wadi Seifari
Gebel Musa*	2250	Wadi Umm Goreirate
Gebel Moneiga	1854	Wadi Hezeima
Gebel Oger	2055	Wadi El Nasb*
Gebel Khizeimiya	1938	Wadi Erabia
Gebel Umm Alawi	2141	Wadi El Rahaba
Gebel Abu Khshieb	1784	Wadi Umm Alawi
Gebel Gau	1644	Wadi El Namaana
Gebel Kharban	1780	Wadi Khermaa
Gebel Hezeima	1885	Wadi Umm Sweikate
Gebel Hadid or (Feringi)	1500	Wadi Umm Goraf
		Wadi El Hasa
		Wadi Umm Qeisum
		Wadi Isbaiya
		Wadi El Malaz
		Wadi Frosh
		Wadi Waara
		Wadi Rutig

* Most part outside of the studied area.

m.a.s.l. : meter above sea level.

encountered in the studied area, e.g. Bir Pikbak at the entrance of Wadi Umm Alawi, Bir El Rahaba at El Rahaba plain and some wells along Wadi El Nasb.

1.3- Communications

Umm Alawi area can be reached from the Gulf of Suez using the road through Wadi Feiran, Wadi El Sheikh up to St.Katherina,then using a desert track into Wadi Isbaiya, Wadi El Rahaba and Wadi El Nasb. The total distance is about 35 Km from St.Katherina. It can also be reached from the Gulf of Aqaba through Sharm El Sheikh along the Dahab-Taba high way via Wadi El Nasb to Bir El Nasb (Fig.2).

1.4- Previous work

The area under consideration has been previously investigated by the early staff of the Geological Survey of Egypt for reconnaissance survey. *Hume*(1906) studied the riebekite granite of Sinai, and noticed that it plays an important part further north in the traditional Mount Sinai (Gebel Musa), and in the Haimar-Aad range. He also described the graphic granite in southeast Sinai, at El Rahaba plain as consisting of light biotite granite traversed by parallel dykes. *Barron*(1907) divided the grey granite of southwest Sinai into three types; coarse granite, porphyritic granite and grey biotite granite.

Akaad et al .(1957) found that the Feiran-Solaf gneiss belt was intruded by a number of granitic intrusions, metadiorite dyke like bodies and several pegmatitic and dyke swarm. They classified the intrusions and dyke swarm

according to their probable genetic relations and relative ages into synorogenic plutonites and younger granites. *Sadek* (1957) found some quartzose bodies in Wadi Wardan, central Sinai.

Said (1962) listed the faults in the central and eastern parts of Sinai and demonstrated that they were contemporaneous with the Gulf of Suez ,while the NNE-SSW trending faults which determine the Gulf of Aqaba were younger , and presumably of Pleistocene age. *De Sitter*(1964) described several types of crypto-volcanic structures at the western margin of the Gulf of Aqaba which was associated with Neogene basaltic dykes and described some elongated grabens, sandstone dykes, breccia dykes and quartzose discordant bodies.

Freund et al.(1970) noticed that the faults described by *Said* (1962) are left lateral shear with displacements ranging from several meters to few kilometers. *Bartove* (1974) mapped the dykes in north and central Sinai and considered them as basalts of Early Miocene time . *Siender* (1973) and *Steintz et al.*(1978) dated these dykes as 19-24 m .y. *Bartove*(1974) and *Steintz et al.* (1978) have noticed some dextral movements(up to 2km) at central Sinai and Negev zone and gave them an age of post 20 m.y based on set of dykes .

Bentor et al. (1974) and *Eyal* (1976) stated that the basement complex of Sinai consists , in chronological sequence, of metamorphic complex, an intermediate to acidic volcanics,a calc-alkaline intrusive complex and finally alkaline extrusive and intrusive rocks. *Eyal* (1975) has studied a considrable part of Sinai (2300 km^2) including the

present area and considered the granite plutons (18 plutons) of intrusive magmatic origin and that the bulk of them belong to calc-alkali suite except for two plutons which pertain to alkaline suite.

Bielask et al. (1979) determined the Rb/Sr age of two plutons of the Iqna granite at Wadi Iqna and Wadi Kid, as 580 $\pm$23 m.y consequently they considered that the alkaline granite was emplaced during the last magmatic phase which affected the Arabo-Nubian massif exposed in southern Sinai.

Eyal and *Hezhiyahu* (1980) considered the Katherina pluton except the dykes, as the youngest magmatic activity in the area because it intrudes a wide variety of country rocks including the following units , arranged from oldest to youngest : Rutig volcanics,calc-alkaline magmatic intrusive phase, Katherina volcanics and ring dyke.

Shimron(1980) studided the Proterozoic island arc volcaism and sedimentation in Sinai, and recognized three cycles of volcanism, sedimentation and magmatism. He considered these cycles as responsible for the growth of Proterozoic crust in Sinai . *El-Tochy* (1983) in his work at southern part of Wadi El Sheikh area, noticed that it was mainly formed of the following lithostratigraphic units, arranged from oldest to youngest : quartz diorite , quartz monzonite , granite and dykes. *Hassan* (1987) studied the northern part of the studied area (Regita area)and noticed that it was mainly formed of the following rock units, arranged from oldest to youngest; metavolcanics, quartz diorite, quartz monzonite and granodiorite, pegmatitic

granite, basaltic, doleritic, gabbroid, andesitic and rhyolitic dykes, quartz syenites and related rocks forming a ring dykes, alkali feldspar granite, basaltic, felsitic, aplitic and pegmatitic dykes, albitite granite, sandstone fracture filling and Wadi deposits.

1.5 - Objective and methods of study

This work deals with the geology and radioactivity of Umm Alawi area, in the central part of south Sinai. The main objective of this research is to study the Precambrian rocks of the area, in order to determine the different rock units and intensity of radiation in each rock unit to assess the economic potintial of radioactive minerals, if present. Detailed mapping has been carried out using aerial photographs(1:40,000)during several field trips from July 1984 to January 1985.

About 305 hand specimens were collected covering the different rock units of the area, of which 101 representative thin sections were prepared for petrographic study, and 13 samples were chemically analyzed to study geochemical behaviour of trace elements in different units. The intensity of radioactivity for different rock varieties was measured using the four channels spectrometer (GAD-6)and the scintillation counter GR-101A, was used to determine the total gamma intensity of different rocks which were measured in both the field and laboratory.