The Basement Rocks Of The Northern Eastern Desert Of Egypt

The Egyptian basement complex is considered to represent part of the Arabian-Nubian Shield (ANS) or the northeastern extension of the Nubian Shield fig. The Neoproterozic basement complex rocks of the (ANS) through Egyptian province mostly consist of gneisses, volcanics and metasediments which are intruded by granites, granodiorites and a suite of dolerite dykes, and they occupy the southern part of Sinai, and cover a huge area of the Eastern Desert forming the Red Sea mountain ranges, the northern tip of this mountain chain initiate at about latitude 28° 40' north; and the chain extends about 830 km southward into the Sudan, gradually increasing in width from a few kilometers to almost 400 km along the Sudan border. Also, the basement rocks are present covering limited areas in the Nile valley at Aswan, in addition to the southern part of the Western Desert at G. Uweinat. The Eastern Desert was divided into three provinces; Northern Eastern Desert (NED), Central Eastern Desert (CED) and Southern Eastern Desert (SED). These three domains reflect the following: (1) There is a much higher concentration of granitoids in the NED and SED than in the CED; (2) Ophiolites and serpentinites are missing from the NED;(3) gneisses are most abundant in the SED; and 4) The CED holds the greatest concentration of rocks with strong oceanic affinities, such as ophiolites and Banded Iron Formation (BIF). The investigated area is Northern Eastern Desert province whose basement rocks are largely composed of granitic rocks together with limited outcrops of high-grade gneiss, Dokhan volcanics, and Hammamat sediments or their equivalents. Here, ophiolitic mélange is very limited compared with its occurrences in the central and southern parts of the Eastern Desert of Egypt. The basement rocks of the northern Eastern Desert of Egypt were previously described and investigated by many authors.

The granitic rocks constitute about 60% of the total Neoproterozoic outcrops of the Eastern Desert of Egypt. Their wide distribution and clear identification in the field pushed many authors for their classification and description as El Ramly and Akaad (1960); Akaad and Noweir who classed granitoids in terms as grey and pink granites as well as older and younger granites. And El Gaby (1975) first classified the granitic rocks of Egypt into two groups: (a) syn-orogenic granitoids, which comprise Grey granites representing older granites and (b) the post-orogenic granitoids which comprise pink and red granites and represent younger granites, while (Akaad et al., 1979) classified the granites in Egypt into older (Grey) granites and younger (pink) granites. The older granites are mainly diorites, quartz diorites, tonalities and granodiorites. The younger granites are mainly monzogranites, syenogranites and alkali feldspar granites. On the other hand, Greenberg (1981) classified granitoids according to their geological setting and petrography into three phases (Phases I, II, and III). I is mainly granodiorites with minor

monzogranites, whereas phase II is mainly monzogranites and syenogranites. Phase III is mainly alkali feldspar granites.

The four focused areas may be geologically described as following; Ras Gharib area represents a coastal region covered with Pliocene-Recent alluvial deposits represented mainly by sand and gravels. The most distinct surface exposures involve the granitic and metamorphic masses of the Pre-Cambrian basement complex which crop out on the southwestern corner of the area. Also, Strata of different geologic ages may be remarkable throughout the area those belong to Cretaceous, Eocene and Miocene systems, with the Plio.-Pleistocene and Recent deposits generally covering its eastern and northern portions. While Wadi Dara area is mostly characterized by sands and gravels cover, while boulders and stone-blocks derived from the country rocks are accumulated at the foothills. The basement complex rocks in this area form relatively high and rugged mountains as is the case of Gabal Dara (899 m above sea level). On another hand, some researchers thought that the presence of basement complex (both igneous and metamorphic rocks) dominates to gabal Dara area with the exception of its northeastern corner, which is mainly covered by sedimentary rocks. These exposed basement rocks belong mostly to the Late Precambrian, except the Phanerozoic Volcanics which are Mesozoic age. These rocks are cut off by several wadis filled with Quaternary alluvial deposits. And Gabal Dokhan area is considered a result of a period of great volcanic activity producing andesites and porphyrites including the Dokhan purple Imperial Porphyry. Dokhan Volcanic is of a sequence of acidic to intermediate lava flows, pyroclastics, ignimbrites, and hypabyssal porphyries that grade downwards into epizonal A-type granite plutons the Dokhan purple Imperial Porphyry, Said (1962).

At Northern Eastern Desert and Sinai, the Dokhan Volcanics are registered widely and indicated that the DVs postdate the calc-alkaline syn-tectonic older granitoids and are predate the molasse-type Hammamat Group of sediments, forming unconformity surface over the Dokhan volcanics, and the Younger Granite. Gebel Gattar area is mainly covered by the Precambrian basement complex as a result of a great period of plutonic activity, these basement rocks form rugged mountainous peaks of mainly pink to red medium-grained granite and isolated masses of older diorite and granodiorite. A number of acidic to basic dikes cut the older basement rocks as well as the Gattarian granites and mark a period of volcallicity in post-Gattarian time. Gebel Gattar (1963 m) granitic rocks are called as the Gattarian granites and expressed in three phases G1(syn-tectonic), G2(late-tectonic) and the youngest phase G3 (post-tectonic).