

Geology of the area around Gebel Urf with special emphasis on the volcano-sedimentary succession, north Eastern Desert, Egypt

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The basement complex of the Eastern Desert of Egypt represents the north-western part of the Arabian–Nubian Shield (ANS) which in turn is part of the Pan-African orogenic belt of NE Africa that took place towards the end of Proterozoic. The Dokhan Volcanics and Hammamat sediments units represent late Neoproterozoic volcano-sedimentary successions. The Dokhan Volcanics are younger than the calc-alkaline syn-tectonic older granitoids and older than the molasse-type Hammamat Group of sediments and the Younger Granites. Other studies, however, proved the presence of interfingering relationship between the Hammamat Group and the Dokhan Volcanics.

New consumption about the field relations of volcano-sedimentary unit:

In Fig. 1 the stratigraphic sequence of basement rocks of Gebel Urf area is compared to the current stratigraphic model for the Proterozoic of Egypt. The detailed study of the Gebel Urf area indicated that each of the Dokhan, Hammamat and Younger Granites took more than one phase during the formation and sometimes has contemporaneous formation. Field work revealed the presence of at least two sedimentary units and further sedimentary intercalations within volcanic successions. Furthermore, two generations of “younger granites” had been distinguished on the base of field relation. All the sedimentary units that were formed either before or after the eruptions of volcanic rocks as well as the associated volcanic succession have the same direction of dip with slightly difference in the angle.

Studying the depositional environments and the evolution of the volcanic and sedimentary successions in the area has been carried out through three geological profiles in the volcano-sedimentary successions of Gebel Urf. The profiles show the interfingering “intercalation” of Hammamat sediments with the Dokhan Volcanic succession. The profiles indicate that the deposition of Hammamat sediments took place by fluvial and lacustrine environments before, during and after the volcanic eruption.

El Gaby 2005			Gebel Urf area		
	Rock unit	Description	Rock unit	Description	
Pan-African (late to early Proterozoic)		Dykes intrusion		Dykes intrusions	
	Late Intrusive	Younger granite	Younger granites II	Biotite Monzogranite	
				Hammamat II	Metamorphosed Hammamat
	Hammmamat Group	Molasse type sediments			
				Dokhan volcanics	Andesitic to rhyolitic lavas and subvolcanic bodies and pyroclastic deposits
	Calc-Alkaline assemblage		Dokhan volcanics	Intercalation	Dokhan + Hammamat
			Arc Granitoid	Hammamat I	Normal Hammamat
			Metavolcanics	Younger granites I	Alkali feldspar granite
				Arc Granitoids	Quartz diorite- tonalite
			Metavolcanics	Acid to intermediate Metavolcanics. Basic to intermediate Metavolcanics.	

Fig. 1: The observed succession of basement rocks in the Gebel Urf area on the basis of field relations, correlated with the model published by El Gaby (2005).
