

# Late Neoproterozoic volcanism in the southern Eastern Desert, Egypt: petrological, structural and geochemical constrains on the tectonic-magmatic evolution of the Allaqi Dokhan volcanic suite

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## **Abstract**

The Dokhan volcanic rocks, most abundantly occurring in the northern part of Eastern Desert of Egypt, represent late Neoproterozoic products of Pan-African volcanism in the Arabian-Nubian Shield. The Dokhan volcanic rocks in Wadi Allaqi of the southern Eastern Desert of Egypt comprise two rock units: (1) a mafic volcanic unit (MVU) of mostly basalts, basaltic-andesites and andesites and (2) a felsic volcanic unit (FVU) of mostly dacites. The investigated Dokhan volcanic rocks are characterized by a wide range of major and trace elements. They range from low-K variety for the MVU to medium-K calc-alkaline character for the FVU. They define a continuous composition with respect to  $\text{SiO}_2$ ,  $\text{MgO}$ ,  $\text{CaO}$ ,  $\text{TiO}_2$ ,  $\text{Fe}_2\text{O}_3^*$ , Cr, V and Y, and all lithologies are considered co-magmatic. The low Mg#, Ni and Cr contents of the Allaqi Dokhan volcanic rocks, together with the curvilinear trends displayed by some major and trace element variations indicate that the rocks evolved by fractional crystallization processes. The fractionated phases were pyroxene, amphibole, plagioclase, titanomagnetite and apatite. Their wide variations in the Rb/Sr ratios indicate that they have randomly assimilated crustal rocks during their evolution.

Eruption of the Dokhan volcanics coincided with the late stages of the Pan-African events and it was probably synchronous with deposition of the basal sediments of the Hammamat Group and emplacement of the post-orogenic A-type younger granitoids. We propose that the synchronous timing of the Dokhan volcanics and post-orogenic A-type younger granitoids with the Najd strike-slip fault system and their undeformed character preclude a subduction-related (compressional) tectonic setting at the time of the Dokhan volcanics formation. Thus, the Dokhan volcanics were produced during post-orogenic transpression-/extensional-related tectonics.