Geophysical Research Abstracts
Vol. 16, EGU2014-6156, 2014
EGU General Assembly 2014

Late Neoproterozoic Nuqara Dokhan Volcanics, Central Eastern Desert, Egypt: Geochemistery and petrogenesis

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The Nuqara volcanic is one of the northernmost outcrops of the Arabian-Nubian Shield Dokhan volcanics. The origin and tectonic setting of the late Neoproterozoic Dokhan volcanics (ca. 610-560 Ma) in the Egyptian Eastern Desert is highly debated. The debate concerns the tectonic setting where they formed during transition between convergent to extensional regime or after the East- and the West-Gondwana collision ($\sim$600Ma). In order to solve this problem, lavas from Nuqara area were studied geologically and geochemically. Nuqara Dokhan volcanics comprises two main rock suites: (a) an intermediate volcanic suite, consisting of basaltic andesite, andesite and their associated pyroclastics rocks; and (b) a felsic volcanic suite composed of dacite, rhyolite and ignimbrites. The two suites display well-defined major and trace element trends and continuum in composition with wide ranges in SiO_2 (52-75.73%), CaO (9.19-0.22%), MgO (5.29-0.05%), Sr (1367-7.4 ppm), Zr (688.5-172.7 ppm), Cr (207-0.4 ppm), and Ni (94.3-0.2 ppm). The Nuqara Dokhan volcanics are characterized by strong enrichment in LILE relative to HFSE and affiliated to the calc-alkaline subducted – related magmatism. Geochemical Modeling displays that the evolution of these rocks was governed by fractional crystallization of plagioclase, amphiboles, pyroxene, magnetite and apatite in the intermediate varieties and plagioclase, amphibole, magnetite, apatite and zircon in the felsic varieties. The obtained mineral chemistry of these volcanics reveals: (a) Plagioclase range in composition from An_{55} to An_{40} in basaltic andesite and from An_{39} to An_{24} in andesite. (b) Alkali feldspars have sanidine composition. (c) Clinopyroxenes have augite composition. The low Al_2O_3 contents (1.94-5.588 wt %) indicate that clinopyroxene crystallized at low – pressure conditions. (d) Amphiboles have magnesio- hornblende composition.