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Intrusive Rocks of the Wadi Hamad Area, North Eastern Desert, Egypt: Change of Magma Composition with Maturity of Neoproterozoic Continental Island Arc and the Role of Collisional Plutonism in the Differentiation of Arc Crust

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Abstract

The igneous rocks of the Wadi Hamad area are exposed in the northernmost segment of the Arabian-Nubian Shield (ANS). These rocks represent part of crustal section of Neoproterozoic continental island arc which is intruded by late to post-collisional alkali feldspar granites. The subduction-related intrusives comprise earlier gabbro-diorites and later granodiorites-granites. Subduction setting of these intrusives is indicated by medium- to high-K calc-alkaline affinity, Ta-Nb troughs on the spider diagrams and pyroxene and biotite compositions similar to those crystallized from arc magmas. The collisional alkali feldspar granites have high-K highly fractionated calc-alkaline nature and their spider diagrams almost devoid of Ta-Nb troughs. The earlier subduction gabbro-diorites have lower alkalis, LREE, Nb, Zr and Hf values compared with the later subduction granodiorites-granites, which display more LILE-enriched spider diagrams with shallower Ta-Nb troughs, reflecting

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