PETROSTRUCTURAL AND GEOCHEMICAL STUDIES OF ARCHAEAN GRANITOIDS OF EBOLOWA-AMBAM REGION, CONGO CRATON, SOUTH CAMEROON

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Although partly covered by younger sediments of the Congo basin, the Congo craton is widely exposed in central Africa from Angola, D.R. Congo and extends further north to Gabon and Cameroon. It is surrounded by Mesoproterozoic to Pan-African mobile belts and has been correlated with San Francisco terrains of Brazil (e.g. IGCP 450).

The Ntem Complex constitutes the Archaean cratonic basement of southern Cameroon and the north-western extension of Congo craton. It has undergone three major tectonothermal events; the oldest between 2.9 and 2.8 Ga, records the granulite facies metamorphism and sets the charnockitic rocks. The reactivation around 2.6-2.5 Ga puts in place the potassic granitoids. The third event is bracketed between 2.4 and 2.35 Ga, corresponding to a granulite to amphibolite facies metamorphism. The finite strain exhibits indicate that these rocks were affected by polyphase deformation, but the P-T-t conditions of these geological events are still unconstrained. The Ntem Complex has undergone three deformation events; the oldest produced an E-W-trending ductile foliation, followed by the WSW-ENE schistosity. These two deformational fabrics are overprinted by NE-SW schistosity. Structural data coupled with field observations, radar images and geochemistry, show that the Ntem Complex is made up of two main petrologic units: (1) the Sangmelima-Ngoulemakong unit is composed of granodioritic to tonalitic gneisses, charnockites and metamorphosed mafic-ultramafic rocks associated with Banded Iron Formation (BIF) lensoids. (2) The Ebolowa-Ambam unit made up of para- and orthogneisses affected by amphibolite to granulite facies metamorphism, including the Meyo Centre granitic complex and associated aplitic and pegmatitic bodies with fewer charnockitic enclaves. These granitoids display a wide variation of silica content (67 to 77 wt %), are peraluminous to metaluminous, portraying two major trends; a potassic calk-alkaline differentiation affinity and a sodic trondhjemitic trend characteristic of charnockitic TTG. The more acidic components are enriched in Ba, Rb, Sr and Nb where as the less acidic components are enriched in Cr, Ni, V, Zn and Y reflecting their greater proportion of magnetite, amphibole and plagioclase. Sr/Y ratios define Archaean TTG and arc igneous rocks with Nb-Ta and Ti anomalies indicating a subduction setting for these rocks. The overall data coupled with field observations support the derivation of potassic calk-alkaline rocks from partial melting of sodic trondhjemitic TTG, suggesting a post-emplacement reheating of the latter. Thus marking an important event in the crustal growth of the Congo craton.