

Geochemical and Sr-Nd isotopic constraints on the petrogenesis of Paleoproterozoic alkaline rocks from Kiemou, Ninakri and Okrouyo (Ivory Coast, West African Craton)

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The Paleoproterozoic lands of the West African Craton (WAC) have a weak occurrence in alkaline pluton. In Côte d'Ivoire, most of these geological formations are distributed along the leucogranite batholith of Ferkessédougou. Samples studied here come from the localities of Kiemou, Ninakri and Okrouyo. They are generally nepheline syenites, quartz syenites and alkaline granites. Syenitic bodies have a shoshonitic, metaluminous affinity while the granites are strongly potassic and weakly peraluminous. We also note a moderate Na₂O/K₂O ratio, a high MgO contents (up to 2.05%), a high content of incompatible elements, in particular LILE (Rb, Cs, K, Th) and LREE, high splits of LREE/HREE, negative Nb-Ta anomalies, small Eu anomalies for syenitic facies, and more pronounced anomalies for granites.

The mineralogical assemblage is made of diopside, augite, magnesio-hornblende, biotite, alkali feldspars, plagioclase, apatite, zircon, sphene, allanite, fluorite and magnetite. The differentiation of these alkaline rocks was controlled by a fractional crystallization process. Initial ⁸⁷Sr/⁸⁶Sr ratios are low (0.6902-0.7006), Sm / Nd isotopic data (positive εNd 0.86 to 3.14) indicate juvenile character; these values being also close to zero show a slight crustal contamination. These plutons are usually originated from a depleted mantle. All the rock formations from Kiemou, Ninakri and Okrouyo display geotectonic signatures of A2-type (IAB) granites, i.e. post-collision. We can therefore say that the alkaline magmatism manifested itself in a single phase in this part of the WAC. Therefore all these alkaline plutons are late-orogenic and non-anorogenic.

Keywords: pluton, alkaline, Paleoproterozoic, Côte d'Ivoire, WAC