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Abstract title

ON THE PAN-AFRICAN CRUSTAL EVOLUTION OF WEST CAMEROON: NEW PETROLOGICAL, ISOTOPE GEOCHEMICAL AND GEOCHRONOLOGICAL EVIDENCE FROM THE BAFOUSSAM-MAKENENE REGION

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Abstract

The territory of Cameroon includes the northern part of the Congo Craton and its boundaries with the very large area of the Trans-Saharan belt, affected in the Neoproterozoic by the Pan-African orogeny. The position of the main suture zones and the character of the different tectonic units are still matters of debate. In this work we present new petrological, geochronological and isotope geochemical data from rocks of the Bafoussam-Makenene region of West Cameroon, that are critical for a better understanding of the regional crustal evolution. In this area, a large elongated zone trending NE-SW occurs, where numerous small bodies (2-4 km) of mafic rocks are described, mainly pyroxenites and pyroxene-amphibolites. It separates two very distinct geotectonic domains, the northwestern one made up of K-rich granitoid rocks, and the southeastern one made up by calc-alkaline granulites.

In the northwestern domain, between Bafoussam and Tonga, orthogneisses predominate. The rocks exhibit a poorly constrained and imprecise Rb-Sr isochron of Neoproterozoic age. Their Sm-Nd TDM model ages are between 1500 and 2000 Ma, indicating that their protoliths were formed by crustal reworking, possibly with some mixing with juvenile Pan-African material. This domain may represent the possible continuation of the Adamawa block. In the central part of the area, the intrusion of the Bangangte Syenite is localized, with an age of about 580 Ma indicated by precise and concordant Ar-Ar measurements in biotite and amphibole.

In the southeastern domain, the high grade gneisses and granulites occurring near Makenene yielded an early Proterozoic Rb-Sr isochron of about 2050 Ma, and Archean Sm-Nd TDM model ages close to 3000 Ma. These rocks can be correlated with the granulites of the Ntem Group that characterize the northern part of the Congo Craton.

In our view, the more important conclusion of this work is that the mafic rocks tectonic zone can be considered an important suture separating the reworked border of the Congo Craton from the main area of the Pan-African Trans-Saharan belt. In addition, 18 Ar-Ar measurements were carried out on biotite and amphibole from rocks belonging to both tectonic domains. With one exception, they were all comprised in the 550-610 Ma interval, indicating that, although rock formation may be quite old, the entire region was heated to more than 500 °C in the latest Neoproterozoic, during a high temperature event of the Pan-African orogeny.

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