

Mafic and Felsic magmatic mingling in the Paleoproterozoic formations of the Mako sector (Kédougou-Kéniéba Inlier, Senegal): geodynamic implications

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The Mako area is composed of a wide variety of greenschist facies metamorphosed rocks (Bassot, 1966; Dabo et al., 2017). These rocks are of mafic, ultramafic, intermediate and felsic nature associated with low sedimentary levels (Ngom, 1995). This ensemble is intersected by Eburnean granitoids which locally contain mafic enclaves.

In the Mako sector these granitoids are composed of Niéméniké pink granite, Lamé microgranite, Soukourtou granodiorite (Bananeraie), Niéméniké leucocratic diorite and mesocratic quartz diorite. The mafic enclaves trapped in these granitoids present varied petrographic and structural characteristics. Indeed, they show microlitic to granular textures, millimetric to multi-centimetric dimensions with elongated, ovoid or even ellipsoidal shapes. Most of the enclaves observed, generally have curvilinear boundaries which are crenulated in the detail. Some rare cases show straight boundaries with their host rock.

The mineralogy of the enclaves is dominated by primary minerals (plagioclase, amphibole, pyroxene) associated with secondary minerals resulting from the uralitization of pyroxenes and the saussuritization of plagioclase.

In view of all these characteristics, it appears that most of these mafic enclaves, which essentially correspond to metagabbros and metabasalts, were not at solid state when incorporated into the granitoids. We argue in this respect that the granitoids and the majority of the enclaves are derived from two contemporaneous magmatic liquids. These liquids have taken the same path during their ascent with one more mafic giving the enclaves and the other more felsic giving the granitoids. In this case, the mafic magma would be less important than the felsic magma. However, the well-defined straight-line enclaves would be linked to an already consolidated magma before being fragmented, ripped and carried away as enclaves in the granitoids.

In the latter case, the mafic enclaves result from the surrounding outcrops of metabasalts and metagabbros, which are locally cross-cut by granitoids (leucocratic diorite of Niéméniké). The alteration of some of these enclaves reveals empty cavities within the granitoids.

The existence of at least two generations of mafic enclaves (ante- and syn-granitoids) within the granitoids suggests a recurrence of at least two mafic magmatism events in the Paleoproterozoic formations of the Kédougou-Kéniéba Inlier.

Keywords: Mako, granitoids, mafic enclaves, magmatic mingling

References

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