Petrology, geochemistry, and emplacement model of Tiébélé granite pluton, Burkina Faso (West-Africa): what capacity to build up metal?

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Work undertaken on Paleoproterozoic granite based on combined field and chemistry data allows defining two facies without any genetic relation, and among which the most important is the Tiébélé granite pluton (TGP). Initially described as granite, new data based on CIPW normative Ab-An-Or diagram and K-Ca-Na are in agreement with a "granodiorite" composition. The latter is part of the most abundant rocks of continental crust. The TGP with ΣREE 89-165 ppm is relatively enriched in LREE (La to Eu), 10-100 times the chondrite compared to HREE (Gd to Lu), 3-20 times the chondrite with a weak Eu anomaly (Eu/Eu*~1), more or less parallel to the pattern of the average of the upper crust which show moderate negative anomaly in Eu (Eu/Eu*~ 0.81). The TGP is I-type granite, from partial melting of basalt and andesite in oxidizing magma. The igneous nature is also supported with high values in Ba and Sr. Geotectonically, the pluton shows a diapiric emplacement, in volcanic arc setting as most rocks in Burkina Faso. This category of granite related oxidized magma is important sources for metallic mineral resources as their redox state primarily controls the types of metals concentrated in given ore deposit. Finally, the granite is more appropriate to build up metal such as Mo, Cu, Zn, Pb. So, this new information is essential as it helps to better understanding the potential of the area in such a mineralization.

Keywords: Burkina Faso, Paleoproterozoic, granodiorite, partial melting, oxidized magma, metal