Kourki molybdenum porphyry and copper system (Liptako, North Niger)

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Kourki's molybdenum-copper porphyry is located in the Birimian Liptako-Nigerian formations (Téra region) (Fig. 1). This deposit was discovered by Machens (1964). In geochemistry, it assembles molybdenum mineralization which is an original style in the Middle Precambrian (Gravesteijn, 1966; Jeambrun, 1967; Machens, 1973).

Thus, on the basis of successive trenches, the kourki deposit has large volumes of rocks (estimated at 160 million tons) (Machens 1964); the genetic and spatial linkage of intrusions-related mineralization with a porphyry texture. Machens (1964) characterizes this deposit as being of molybdenum and copper porphyry.

The objective of this work was to better describe these mineralizations and compare them with Phanerozoic porphyry systems.

The Kourki geology shows a granodiorite tonalite pluton in contact with dioritic intrusions in the north, clastic sediments in the east, and volcaniclastic rocks in the southeast. The pluton is intersected by porphyry intrusions, in the form of dykes and irregular bodies that have been observed in outcrop and boreholes (Ranc, 1975). The lithogeochemical study shows that it is a calc-alkaline plutonic series characteristic of an arc environment. Field relationships have identified large areas of quartz hydrothermal breccias within the pluton. They were set up by hydraulic fracturing along areas of weakness. The wide openings sometimes allowed tilts and some corrosion of the fragments. Mineralization in Mo-Cu is exclusively hosted in the Kourki granitoid, whose composition varies from tonalite to granodiorite and porphyry intrusions (Fig. 2). It is composed of pyrite, molybdenite, and chalcopyrite, with some chalcocite. Molybdenite occurs in association with quartz breccia, in the form of stockworks and veinlets, and disseminated mineralization. The alterations include a potassium alteration, with biotite and K-feldspars, and an intense hematization. Phyllic alteration is poorly developed (Ranc, 1975).

Kourki's porphyry system probably appears as Birimian. Re-Os isotope dating on pyrite-molybdenite provides ages around 2141 ± 17 Ma.

All these data show that Kourki porphyry represents a characteristic system of an arc environment, quite comparable to those of the Cordillera.

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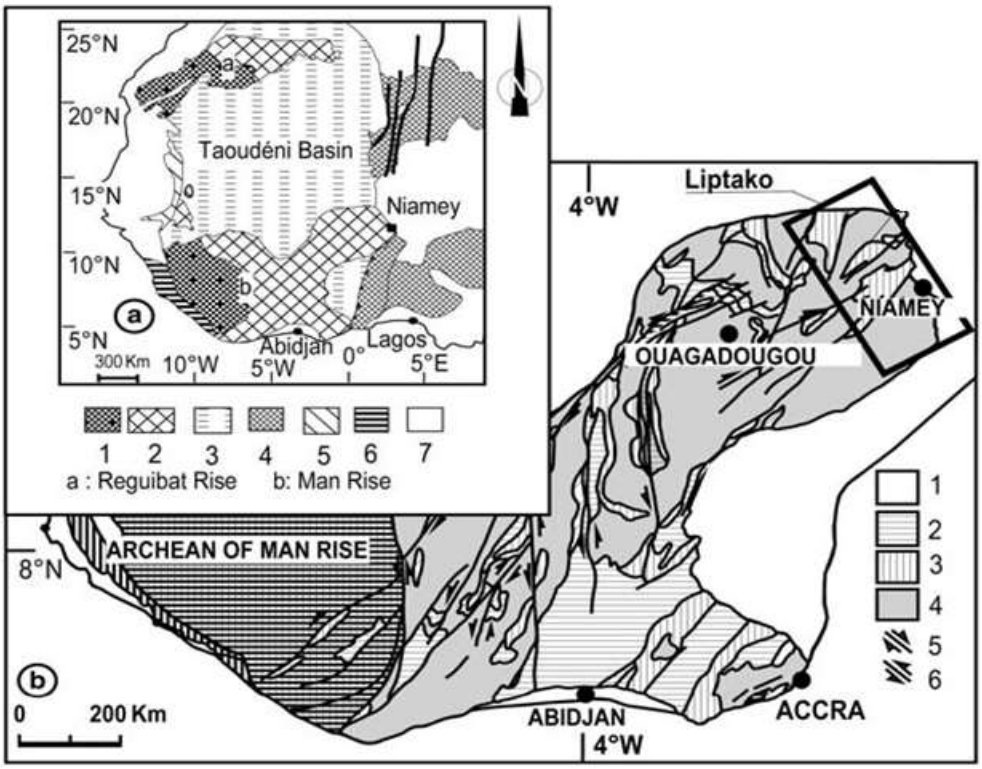

Fig. 1. (a) Main geological features of the West African Craton. 1, Archean rocks; 2, Birimian rocks; 3, Precambrian sedimentary basins; 4, pan-African chain; 5, Hercynian chain; 6, reactivated basement; 7, Phanerozoic sedimentary basins. (b) Geological map of the Man Rise (Milesi et al., 1989, modified) and location of Liptako. 1, Phanerozoic cover; 2, Birimian sedimentary and volcano-sedimentary rocks; 3, Birimian greenbelts; 4, granitoids; 5, dextral faults; 6, sinistral faults.

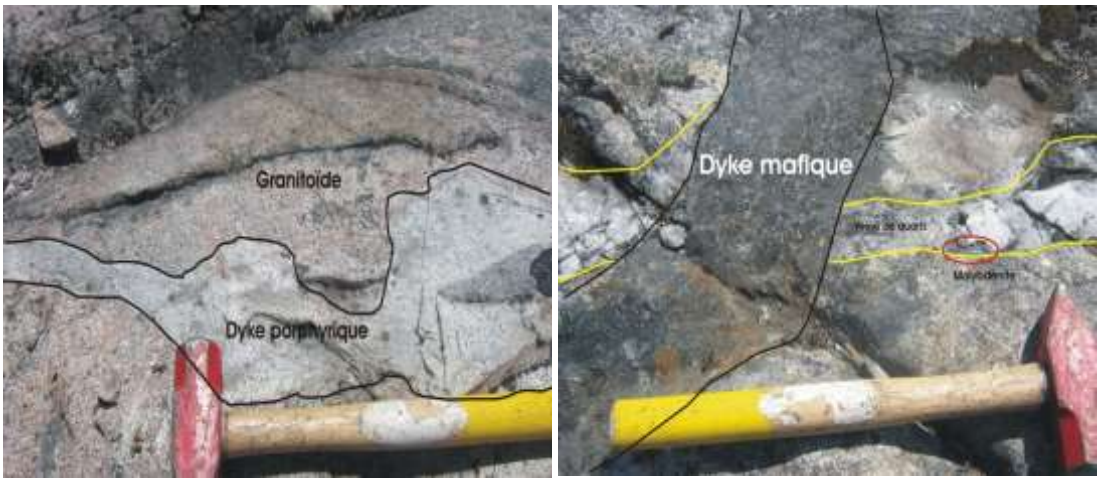

Fig. 2. (a) QP-type porphyry dyke intersecting the granitoid, molybdenum index, (b) mafic dyke intersecting a mineralized quartz vein.