Geology and ore localizations in the Bonikro gold deposit, Fettékre greenstone belt, Côte d’Ivoire*

Corresponding author: Zié Ouattara, University Félix Houphouet-Boigny, ziegbana@hotmail.fr

Co-authors:
Yacouba Coulibaly, University Félix Houphouet-Boigny, yacoulib@hotmail.fr

The intensive exploration through the Palaeoproterozoic rocks in West Africa, locally termed Birimian, has revealed numerous deposits. The Bonikro gold project is part of these successes and is located in the southern part of the Fettékre greenstone belt. This portion is also known as the Omé-Hiré gold district, regroups the deposits of Agbahou, Hiré and Bonikro aligned in a linear distance of 40 kilometers.

The Bonikro geology is made of three rocks groups as followed: felsic rocks, mafic rocks, and sedimentary rocks associated with volcanosedimentary deposits; and a major structure: the Bonikro Shear Zone (BSZ). The felsic group is composed of granodiorite, pegmatite, felsic lava, and aplite. The rocks appear in the centre of the pit and strikes north-east. This group is locally affected by sericitization, chloritization, the silicification, and albitization. The mafic group is widespread at the deposit scale and is composed of the porphyritic basalt, and the mafic lava. The basalt is locally autobrecciated and associated with hyaloclasts. In its relations with the felsic or the Bonikro Shear Zone, the basalt appears without its porphyritic texture and affected by the chloritization, veining, and carbonization. The sedimentary and volcano-sedimentary rocks occupy the western part of the deposit. They are made of siltstone, black shales, and various pyroclasts. The geology suggests that these Birimian mafic and volcano-sedimentary rocks have been affected by a greenschist facies metamorphism. This is confirmed by the presence of sericite, epidote, and chlorite. Then, they have been intruded by the granodiorite. As a result, we have a remarkable deposit which is associating gold with pyrite and molybdenite, but lacks arsenopyrite in a Birimian volcanic arc.

The gold is observed in the granodiorite but also in relation with three single veins: sheeted, planar, and transversal. The sheeted veins are earlier: thick (1cm) and sub-parallel sets of quartz and feldspar veins: milky quartz (70 to 80 %), albite (5-10 %), scheelite (up to 15%), and pyrite (up to 5%). They are characterized in the granodiorite by the fluorescent scheelite and rarely pyrite. Most of the deposit visible gold is located in the sheeted veins. The planar veins support the powellite minerals. The transversal veins are late and composed of: milky quartz (40 %), calcite (30 %), albite (10 %), biotite (15 %), and sulfide minerals (5 %). The molydenite is the principal sulfide mineral. These mineralized veins are consistent with the influence of the hydrothermal activity in the formation of the deposit.