

Characterization of the pan-African mobile belt basement deformation in southern Maradi (south Niger), relationship with gold mineralization

I.S. Baraou*, M. Konaté, Y. Ahmed

¹Department of Geology, Abdou Moumouni University, BP 10662, Niamey, Niger

*E-mail : souleybaraou2@gmail.com

The southern Maradi Basement belongs to the pan-African mobile belt located eastward from the West African Craton (Fig. 1). In this region, the basement outcrops discontinuously over an E-W striking and long about 80 km, covering an area of approximately 633 km². In the study area the basement, consisting mainly of schists, metavolcano-sediments, gneiss and more or less mylonitized granitoids, which age is ranging from 2000 Ma to 560 Ma.

Structural analysis of the South Maradi basement highlights the existence of at least four phases of deformation noted D₁, D₂, D₃ and D₄. Correlations with northern Nigeria basement formations used to assign a Birimian to Kibarian age (2000 to 1064 Ma, Ogezi, 1977; Danbatta, 1999) to the D₁ deformation phase. A Pan-African age was assigned to the second phase of deformation D₂ (610-560 Ma, Bremen, 1977; Ferré, 2001). D₃ and D₄ deformation phases would be likely post Pan-African.

The D₁ phase includes three stages (D_{1a}, D_{1b} and D_{1c}). The D_{1a}, ductile episode, NW-SE shortening, is responsible for the development of a cleavage / foliation orientation average of N50° trend. The D_{1b} stage also ductile, is characterized by dextral reactivation of large-shear zone of N50° trending. In these shear zones, the foliation has a dextral sigmoidal geometry consistent with a mylonitization (Soumaila and Konaté, 2005). The D_{1c} episode, relatively semi-ductile, is marked by sinistral reactivation of large-shear zones.

The D₂ pan-African deformation phase has two stages D_{2a} and D_{2b}. The D_{2a} stage is marked by a pure flattening foliation N15° to N25° trending, recovered strongly connected to a mean shortening N110° trend (Konaté, 1996). The D_{2b} episode is characterized by simple shear mylonite foliation, N-S to N15° trending.

The D₃ and D₄ deformation phases are characterized by S₃ cleavages fracture subvertical orientated N80° to N120°, dextrally shifted by another cleavage S₄, slightly inclined with N40° trend.

Rock samples were taken from the alluvial deposits and the basement formations in both shear zones and in less deformed areas. Preliminary results of geochemical analysis of the samples show that all the samples have varying gold values (Table 1). The highest values were observed in the shear zones samples or close to them.

Keywords: Schist, granitoids, Birimian, Pan-African, Tectonics, Niger

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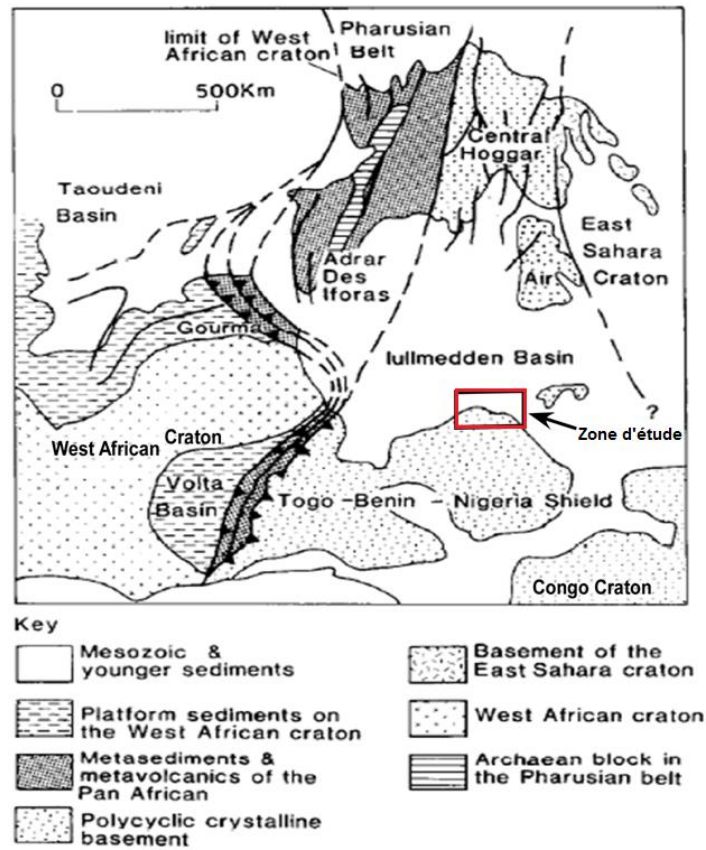


Figure 1. The eastern pan-African domain of West Africa showing the study area (Ajibade and Wright, 1988).