

Late orogenic structural evolution of auriferous formations of Atacora unit from the Natitingou area (Pan-African Dahomeyides Belt, West Africa)

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Along the eastern margin of West African Craton (WAC), the Dahomeyides Belt is made from West to the East by external suture and internal zones. It resulted from the continental collision between the WAC and the Benino-Nigerian block after the closure of oceanic domain. The external zone of this belt is made by the called Buem and Atacora lithostructural units.

In order to better understand the structural evolution of the external zone and the stage of emplacement of auriferous quartz veins and dykes, field structural observations and measurements and petrographic studies have been performed in Natitingou area that know gold exploitation.

The Atacora structural unit is made of auriferous geological formations consisted in quartzites associated with chlorite-sericite schist, micaschist and quartzo-feldspathic amphibolite. These lithologies are crosscut by generations of quartz as veins, lenses and dykes.

Structural study reveals four compressional events (D₁, D₂, D₃, and D₄) during the late Pan-African orogeny. The first D₁ phase is expressed by P₁ isoclinal folds, an S₁ foliation or schistosity plane which bears an L₁ stretching lineation. The centimetric to decimetric-scale auriferous quartz veins and lenses genetically associated to the schists and micaschists were formed during this phase. The D₂ deformation episode is characterized by the refolding of the S₁ and asymmetric P₂ folds with lightly plunging axis. To this phase is also associated an S₂ schistosity and C₂ dextral shear planes generated by NW-SE stresses. P₃ upright open folds with SW-NE axes and a low northwards plunge have been recorded during the compressional D₃ phase. This third deformation showing NNW-SSE stress, took back P₁ and P₂ folds in quartzite and their geometric relations revealed they are almost coaxial. The decametric to metric thickness dykes and veins of quartz crosscutting the quartzite, schist and micaschist are related to the D₂-D₃ phases. The D₄ folding phase is represented by large scale virgations, materialised by kilometric structures with NW-SE trending axial plane. All these rocks and quartz veins and dykes underwent late fracturing episodes localized along fault zones.

Keywords: Benin, structures, auriferous formations, Atacora unit, Dahomeyides Belt