Open Journal of Geology, 2026, 16(9), 591-605
https://www.scirp.org/journal/ojg
ISSN Online: 2161-7589
ISSN Print: 2161-7570

Structural Analysis of Deformation in the Metasediments of the Dimbokro-Abengourou Trough, Central-Eastern Côte D'Ivoire

Diakite Sekou[1*], Allialy Marc Ephrem[2], Pria Koffi Kossonou Jean-Marie[3], Adingra Martial Pohn Koffi[2], Koffi Yao Augustin[2]

[1]Laboratory of Science, Mineral Resources and Energy (LSRME), Doctoral School of Science, Technology and Sustainable Agriculture (ED-STAD), Félix Houphouët-Boigny University, Abidjan, Côte d'Ivoire
[2]Laboratory of Geology, Mineral and Energy Resources (LGRME), Faculty of Earth Science and Mineral Resources, Félix Houphouët Boigny University, Abidjan, Côte d'Ivoire
[3]Laboratory of Environmental Science and Technology (LSTE), University of Jean Lorougnon Guede, Daloa, Côte d'Ivoire
Email: *diakitesekou07@gmail.com

How to cite this paper: Sekou, D., Ephrem, A.M., Jean-Marie, P.K.K., Koffi, A.M.P. and Augustin, K.Y. (2026) Structural Analysis of Deformation in the Metasediments of the Dimbokro-Abengourou Trough, Central-Eastern Côte D'Ivoire. *Open Journal of Geology*, **16**, 591-605.
https://doi.org/10.4236/ojg.2026.169030

Received: August 17, 2026
Accepted: September 18, 2026
Published: September 21, 2026

Abstract

The Dimbokro-Abengourou Birimian Trough is a volcano-sedimentary unit in the central-eastern part of Côte d'Ivoire, forming part of the Proterozoic domain of the West African craton. It consists mainly of metasediments, schists, metagrauwackes and quartzites, intruded by granitoids. This study aims to characterise, using teleanalytical data and field structural analysis, the deformation mechanisms and phases recorded in these formations, particularly in the Dimbokro area. Interpretation of satellite imagery and the digital elevation model has enabled the mapping of the structural lineaments of the rift, dominated by a NE-SW to NNE-SSW trend, parallel to the extension of the belt. In the field, the metasediments show an initial ductile deformation phase D1, transpressive, marked by S1 flow schistosity oriented N00˚-N15˚ and dipping subvertically to the east, associated with left-lateral C1 shear planes oriented N170˚ forming S/C structures, as well as symmetrical sinuses oriented N00˚-N10˚. A second, more subtle phase D2 develops a crenulation schistosity S2 oriented N110˚, which overlies and folds S1 in the finest-grained facies. These two ductile phases are followed by a brittle deformation phase D3, manifested by E-W-trending joints, left-lateral and right-lateral detachments, and the left-lateral detaching Dimbokro fault oriented N10˚ with a subvertical dip, as well as by quartz veins oriented N-S to NNE-SSW or E-W to ENE-WSW. Late-stage E-W doleritic veins mark the conclusion of the region's tectono-magmatic history. These results, when compared with those obtained in other Birimian belts in the southern part of the West African craton, fit within the regional pattern of the Éburnian orogeny and confirm the polyphasic nature of the deformation in the Dimbokro-Abengourou trough.

Keywords

Dimbokro, Bassin of Comoe, Dimbokro-Abengourou, Metasediments, Deformation, West African Craton

1. Introduction

The eastern part of the Precambrian crust of Côte d'Ivoire belongs to the Proterozoic domain of the West African craton (**Figure 1**) [1], which was structured during the Éburnaian cycle between 2.25 and 2.05 Ga [2]-[5]. This domain, also known as the Baoulé-Mossi domain, comprises Birimian volcano-sedimentary belts oriented generally NE-SW to NNE-SSW, alongside extensive syn- to late-tectonic granitoid massifs [6] [7]. The Dimbokro-Abengourou Trough, the subject of this study, forms part of this group of belts. It extends for several tens of kilometres across the central-eastern part of the country, between the Dimbokro and Abengourou regions, and continues into neighbouring Ghana. The overall geology of the graben has been known since regional mapping studies [8] [9], but its internal deformation, the mechanisms that produced it and their chronological sequence remain poorly documented. This study aims to provide new data on this subject by combining a teleanalytical analysis of the major structures of the rift with a field structural study of the metasediments that comprise it, namely schists, metagrauwackes and quartzites. The aim is to identify the mechanisms of ductile and brittle deformation observed in these rocks and to propose a sequence of tectonic phases consistent with the regional framework of the Éburnaean orogeny.

2. Geological Context

The West African craton is traditionally subdivided into an Archean domain to the west and a Proterozoic domain to the east, separated by the Sassandra fault zone [10]. The Proterozoic domain, to which the Dimbokro-Abengourou trough belongs, resulted from Birimian crustal accretion dated between 2.2 and 2.1 Ga [11]. It comprises belts of greenstone, consisting of basaltic to andesitic lavas and their associated volcanic-detrital rocks, and predominantly sandstone-pelite sedimentary basins, all intruded by several generations of granitoids [2] [6] [12]-[17]. In the central-eastern part of Côte d'Ivoire (**Figure 2**) [8], the Dimbokro-Abengourou trough corresponds to an elongated NE-SW-trending belt of volcano-sedimentary formations, flanked to the west and east by massifs of undifferentiated granitoids [8] [18]-[20]. Sedimentary formations are largely dominant here and consist mainly of schists, metagrauwackes and, more locally, quartzites, which are the subject of this study. These formations are associated with volcanic and volcaniclastic layers, as well as basic to intermediate veins and massifs. The trough shares with the other Birimian belts in the southern part of the craton, such as Fettêkro-Toumodi or the Haute-Comoé, a multi-phase structural evolution, characterised by Eburnaian ductile deformation followed by later brittle deformation [21]-[23].

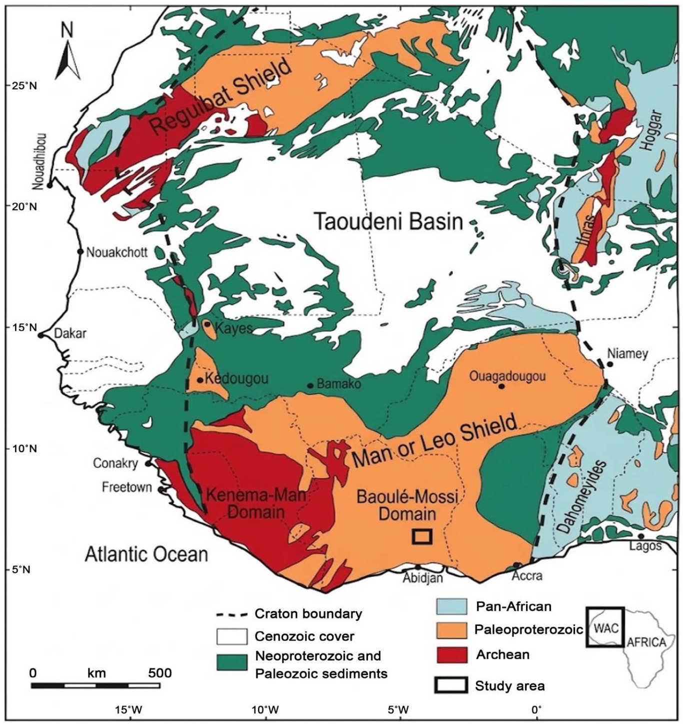

Figure 1. Geological map of the West African craton, showing the location of the study area (adapted from [1]).

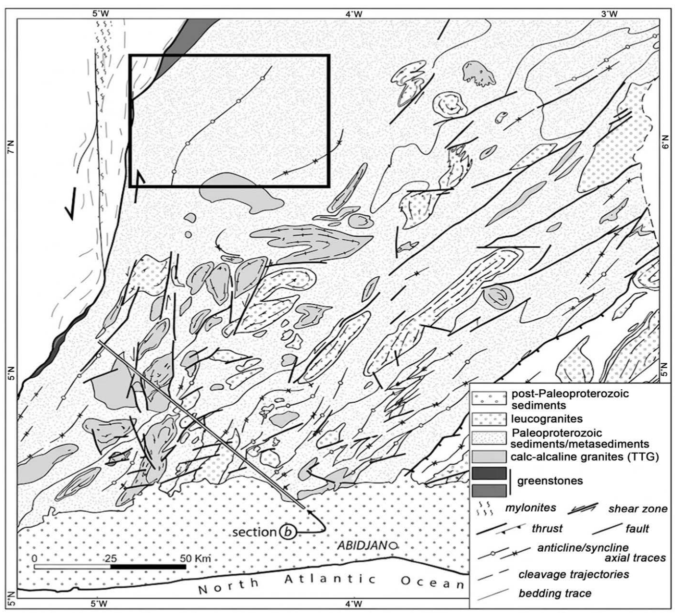

Figure 2. Geological map of the Dimbokro-Abengourou trough, showing the location of the study area (adapted from [8]).

3. Methodology

This study is based on two complementary approaches. The first is a teleanalytic analysis, conducted using a Landsat 8 OLI/TIRS satellite image acquired on January 14, 2022, and a 30-meter-resolution SRTM digital elevation model, both downloaded from the USGS (Earth Explorer) website. Image processing was performed using ENVI 5.3. Several image enhancements were tested to highlight the furrow structure: band ratios (3/4, 4/5, 4/6, and 4/7), RGB color composites (7-5-2, 7-3-1, and 7-4-2), as well as a principal component analysis (PCA) applied to bands OLI2 through OLI7. A Sobel directional filter (7 × 7 window) combined with the Yésou filter was then applied to enhance linear discontinuities. The main lineaments, corresponding to topographic breaks, drainage alignments, or lithological contacts, were manually digitized on these enhanced images and then plotted on a map of the structural lineaments of the trough (**Figure 3**). Their orientation was then processed as a directional rose diagram to highlight the major structural directions.

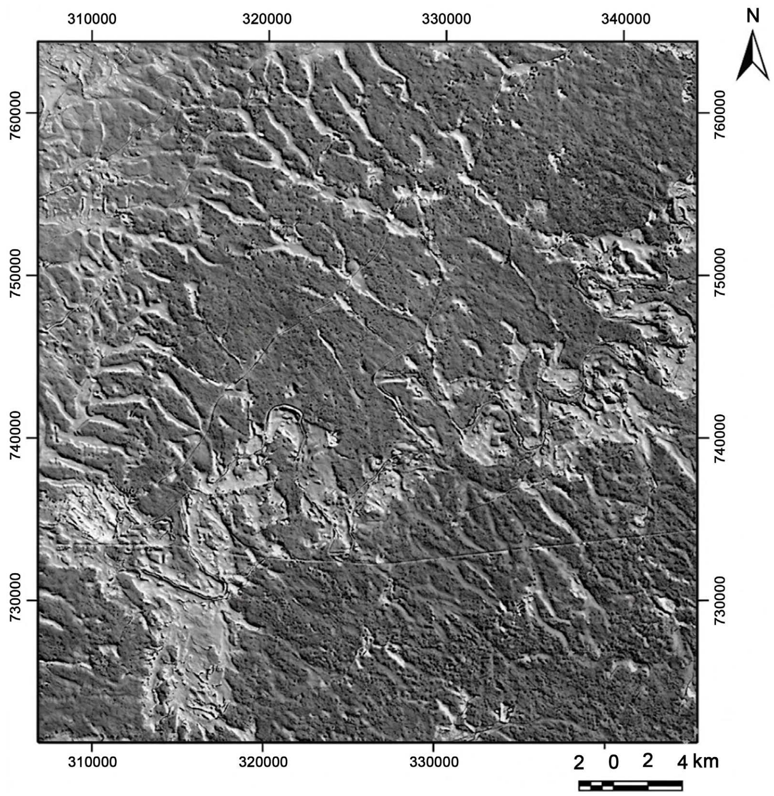

Figure 3. Digital elevation model with shaded relief (SRTM, 30 m), covering the central-eastern part of the Dimbokro-Abengourou trough.

The second approach is a field structural analysis conducted at the outcrop scale in the metasediments of the rift valley. It involved identifying and describing the various deformation structures flow schistosity, crenulations, shear bands, sills, fractures, and veins measuring their orientation (direction, strike, or dip) using a

Sylva-type compass, and photographing the most representative structures. In total, more than 450 outcrops, including fresh to slightly weathered rocks as well as saprolites, were described along the entire length of the trough, supplemented by the observation of about 100 gold-panning pits. Since outcrops of fresh rock proved to be infrequent, 35 samples of unaltered rock were collected to characterize the macroscopic and microscopic petrography of the main facies encountered (**Figure 4**), and were prepared as 35 thin sections. All structural measurements (direction, dip, or dip angle) 320 in total were analyzed using rose diagrams to discuss the deformation mechanisms and their chronological sequence. The direction of the principal shortening ($\sigma 1$) associated with each deformation phase was determined using the bisector method for the acute angle formed by the conjugate shear planes measured in the field (shear zones C1 for D1, schistosity S2 for D2, faults and joints for D3), plotted as directional rosettes.

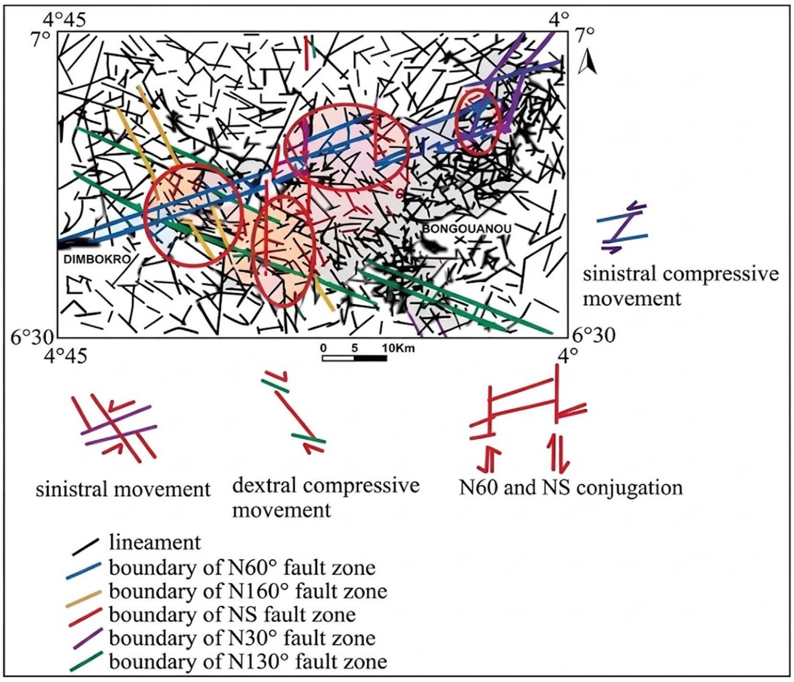

Figure 4. Map of the structural lineaments of the Dimbokro-Abengourou trough.

4. Results

4.1. Remote Sensing Data

Analysis of satellite imagery and the digital elevation model has enabled the identification of a dense network of lineaments within the Dimbokro-Abengourou trough (**Figure 4**). These lineaments, most of which correspond to zones of ductile shear or brittle fractures, form a structural grid organised around a main NE-SW to NNE-SSW trend, parallel to the general elongation of the rift and its contact with the surrounding granitoids. This major trend encompasses most of the longest-extending lineaments, which traverse the entire belt for several kilometres.

Associated with this main trend are secondary families of lineaments, which are less numerous but clearly distinct, oriented generally NW-SE and E-W. These secondary lineaments intersect the main structural fabric and are generally shorter and less continuous, suggesting that they correspond to later-stage structures. The lineament map also highlights, near the contacts between metasediments and granitoids, a concentration of structures that emphasises the role of these lithological boundaries in the localisation of deformation.

4.2. Macroscopic Petrography

Three main metasedimentary facies have been identified in the Dimbokro-Abengourou trough: schists, metagrauwackes and quartzites (**Figure 5**). Schists form the most widespread facies. These are fine-grained rocks, ranging in colour from greenish-grey to dark grey, exhibiting a distinct schistose texture (**Figure 5(a)**). They consist mainly of sericite, chlorite and quartz, with varying proportions of opaque minerals. Under a thin section, these minerals exhibit a distinct preferential orientation, which gives rise to the macroscopic schistosity (**Figure 5(b)**).

Metagrauwackes occur as more massive beds, ranging in colour from bluish-grey to greenish-grey (**Figure 5(c)**). They exhibit a subtle grain sorting and a heterogeneous composition comprising quartz grains, feldspar and lithic fragments embedded in a fine sericite-chlorite matrix. Microscopic examination reveals subangular to subrounded grains, weakly to moderately sorted, separated in places by fine recrystallisation zones (**Figure 5(d)**).

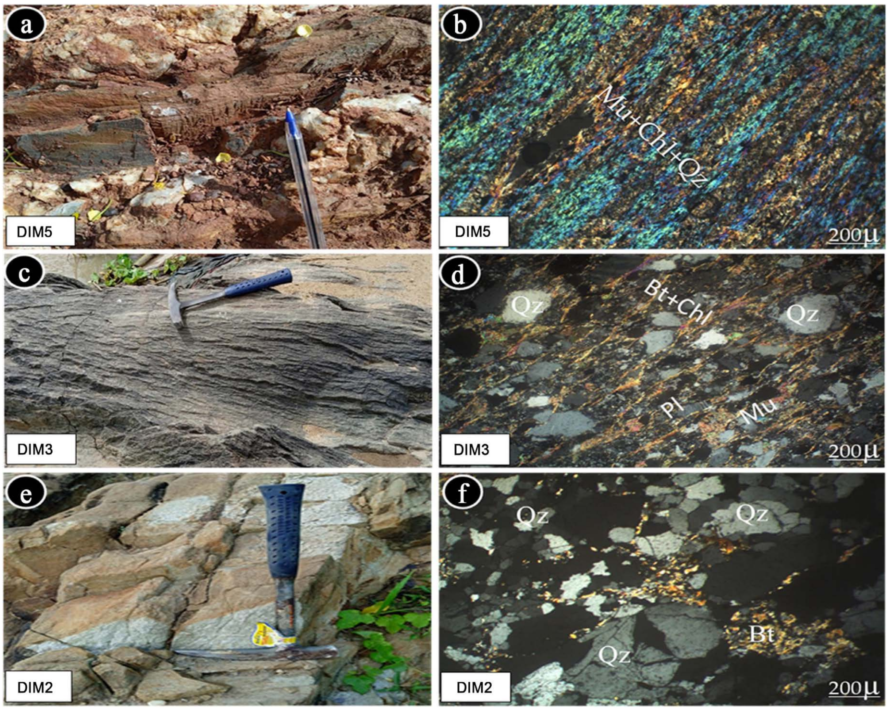

Figure 5. Macroscopic and microscopic features of the metasediments of the Dimbokro-Abengourou trough. (a), (b): Schist; (c), (d): Metagrauwacke; (e), (f): Quartzite.

The quartzites, which are less abundant, form more resistant layers, ranging in colour from whitish to greyish, with a splintery fracture (**Figure 5(e)**). They consist almost exclusively of quartz, organised into a mosaic of grains with sutured joints, indicating dynamic recrystallisation (**Figure 5(f)**). Locally, these quartzite layers form topographical ridges that highlight the structure of the rill on the ground.

4.3. Structural Analysis

The metasediments of the Dimbokro-Abengourou trough show evidence of polyphasic deformation, combining an early ductile component with a later brittle component.

4.3.1. Ductile Deformation

The ductile the ductile deformation observed in the metasediments of the Dimbokro-Abengourou trough resulted from two successive phases, designated D1 and D2 (**Figure 6**). Phase D1 is the oldest and most developed. At the outcrop scale, the S0 stratification is defined by centimetre- to decimetre-thick beds, oriented N-S to NNE-SSW (N05˚-N15˚), with a subvertical dip of approximately 70˚ to the east. This stratification is distorted by the development of a flow schistosity S1 that runs parallel to it (**Figure 6(a)**). At the outcrop scale, S0 and S1 are distinguished on the basis of the alternation in grain size and composition that characterises the metasedimentary beds. The micaceous quartzite layers, which are coarser-grained and up to a centimetre thick, exhibit only slight S1 schistosity and retain their original bedding structure (0.2 to 1.5 mm) of angular to subrounded grains, characteristic of the S0 stratification. Conversely, the fine-grained, interstratified greiso-pelitic layers are characterised by intense, penetrating S1 schistosity, defined by the alignment of muscovite, chlorite and biotite, which almost completely obscures the original bedding. It is this contrast in behaviour between the two facies S0, well preserved in the coarse-grained layers, and S1, dominant in the fine-grained layers that allows the two structures to be distinguished despite their parallel orientation (NNE-SSW, subvertical dip at 70˚E). S1 schistosity is particularly well expressed in the mica schists and metapelites, where the alignment of muscovite and biotite defines a continuous, penetrating foliation plane. Its orientation is not perfectly uniform across the entire trough: in the northern sectors, S1 is oriented NS to N10˚, with a subvertical dip of close to 70˚ to the east, whilst towards the south the orientations deviate slightly from this direction and the dips become more variable. This geometry is consistent with transpressive deformation, as is typically observed in the Éburnian corridors of Côte d'Ivoire. The D1 phase is also characterised by left-lateral shear planes C1, oriented NNW-SSE (N170˚). The juxtaposition of plane C1 and the schistosity plane S1 leads to the formation of S/C structures in the mica schists of the Dimbokro area (**Figure 6(c)** and **Figure 6(e)**). These two contemporaneous planes were established by the same deformation event. The acute angle formed between S1 and C1 is consistent with a left-lateral shear direction, in line with the regional Eburnean tectonic regime; this kinematic interpretation is based on the S/C geometry observed in the field, as no measure-ments of lineations or striations could be carried out to confirm it quantitatively. In addition to these structures, there are symmetrical, centimetre-thick bands, interstratified with quartz veins, which are common in the mica schists of the Dimbokro region (**Figure 6(d)**). Lacking any slip movement at their interface, these bands are oriented N00˚ to N10˚, and are therefore parallel to S1; they reflect constrictive deformation, which confirms the transpressive regime of the D1 phase.

The S1 schistosity is followed by a second deformation phase, D2, characterised by the development of an S2 crenulation schistosity oriented N110˚ (**Figure 6(b)**). This crenulation schistosity has been observed in the fine-grained facies of the sandstone-pelite formations in the Dimbokro area. It folds and crenulates the pre-existing S1 schistosity and develops an axial plane oriented WNW-ESE. Phase D2 thus corresponds to a ductile deformation occurring after D1, inducing a partial rotation of the early structures and marking a change in tectonic regime, with the direction of shortening shifting from a WNW-ESE orientation to an NNE-SSW orientation. This deformation, which is less intense and less widespread than D1, remains confined to the most ductile facies, in particular the fine-grained mica schists.

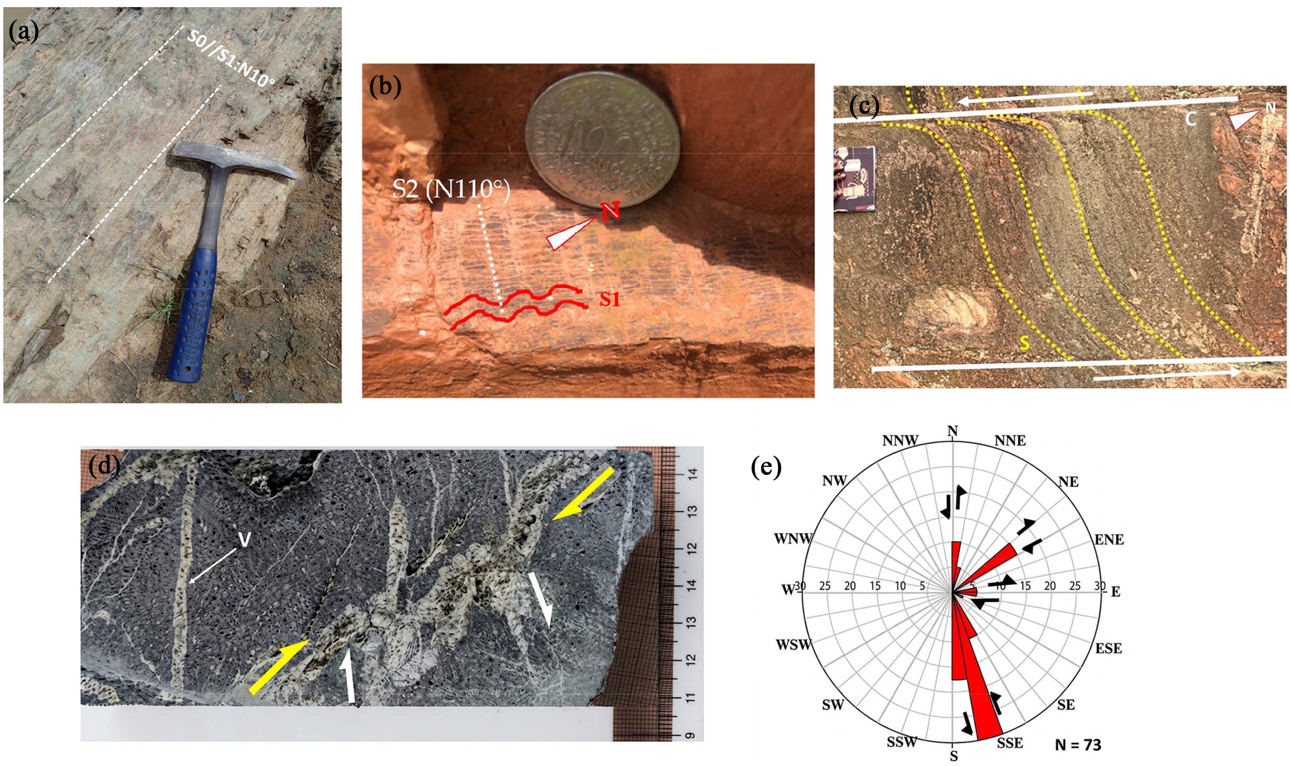

Figure 6. Photographs of the ductile structures observed in the Dimbokro-Abengourou trough. (a): S1 flow schistosity parallel to S0 (N10˚); (b): S2 crenulation schistosity (N110˚) cutting across S1; (c): S/C structure associated with the C1 shear plane (N170˚); (d): Symmetrical quartz vein band (N00˚-N10˚); (e): Directional rosette of ductile shear features.

4.3.2. Brittle Deformation

Brittle deformation corresponds to a single, late-stage phase, designated D3, which cuts across all the ductile structures described previously (Figure 7). It is characterised by the development of brittle, left-lateral and right-lateral detachments, as well as by E-W-trending joints that cut across the S1 schistosity. These detachments and joints affect all lithologies within the trough indiscriminately (Figure 7(a) and Figure 7(b)).

This D3 phase is also characterised by a regional left-lateral strike-slip fault, trending NNE-SSW to N10˚ with a subvertical dip, the plane of which has been identified in the mica schists of the study area: the Dimbokro Fault. This structure cuts through both the metasediments and the plutonic intrusions and constitutes the main expression of the late fracturing phase within the rift.

Finally, the D3 deformation is associated with the intrusion of quartz veins (Figure 7(c) and Figure 7(d)). These veins are generally oriented N-S to NNE-SSW, in concordance with the main schistosity S1, or exhibit E-W to ENE-WSW orientations, indicating that they were formed late during the D3 phase. Their thickness varies from a few centimetres to several decimetres. E-W-trending doleritic veins, which are younger than all the structures described, mark the end of the tectono-magmatic history of the rift and may be associated with a more recent episode of crustal extension.

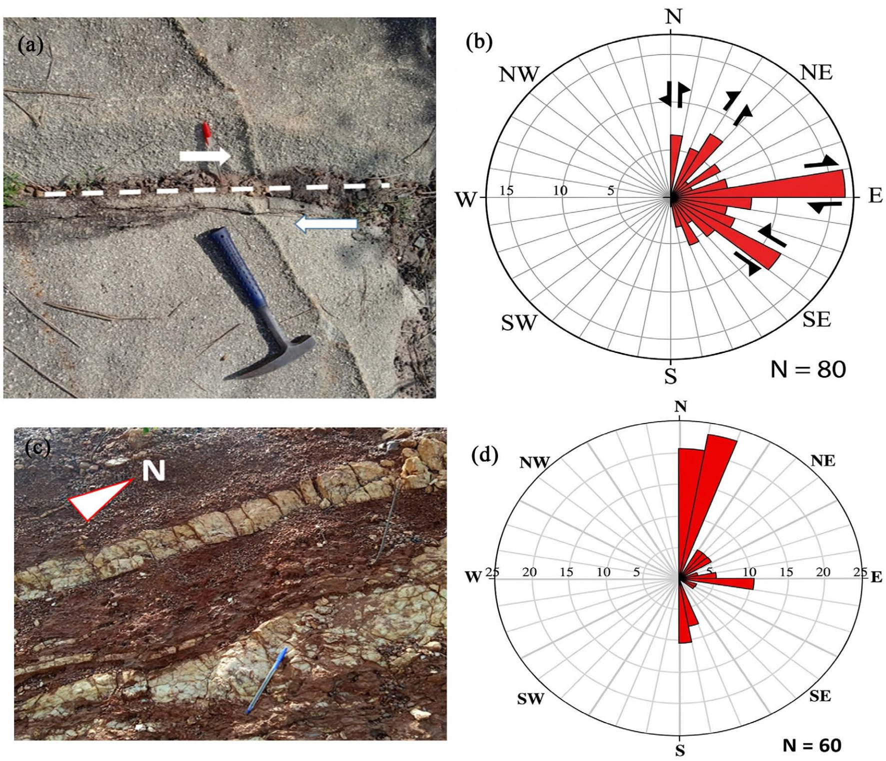

Figure 7. Photographs of brittle structures of the D3 phase observed in the Dimbokro-Abengourou trough. (a): Brittle step associated with the Dimbokro fault (N10˚); (b): Rosette of E-W-trending joints; (c): Quartz vein trending N-S to NNE-SSW; (d): Rosette of quartz veins, predominantly trending N-S to NNE-SSW.

5. Discussion

The structural observations carried out in the Dimbokro-Abengourou trough, supplemented by data from drill cores, make it possible to reconstruct a multiphase tectonic history involving at least three successive phases of deformation, D1, D2 and D3, comparable in their mechanisms to those described in other Birimian belts in the south of the West Africa craton, notably in the Kan granito-gneiss complex situated further to the west [24].

Phase D1 is the oldest and most developed of the phases recognised in the rift valley. It accounts for the major ductile structures observed throughout the lithological units: an S1 flow schistosity oriented N00˚-N15˚, with a subvertical dip to the east; left-lateral shear planes C1 oriented N170˚, which, together with S1, form characteristic S/C structures in the mica schists; and symmetrical sinuses affecting quartz banks and veins in a N00˚-N10˚ direction.

These observations suggest that D1 corresponds to a WNW-ESE shortening phase, associated with a likely left-lateral transpressive regime. This kinematic interpretation is based primarily on the geometry of the S/C structures and on the geometry of the symmetrical bands, in the absence of systematic measurements of lineations, thin-section shear criteria or fault striation data. It is further supported by the reconstruction of the direction of the principal shortening $\sigma 1$, deduced from the bisector of the acute angle formed by the C1 shear planes measured in the field (**Figure 8**), which indicates a WNW-ESE shortening direction consistent with the proposed transpressive regime for D1. This geometric approach, although based solely on the angular distribution of the measured shear planes, provides additional evidence to the S/C geometry and supports the interpretation of WNW-ESE shortening associated with D1. Further measurements of lineations and striations would enable the direction and intensity of the shear to be quantitatively confirmed, and offer a prospect for future work on the trough. The NNE-SSW trend of S1 is similar to that of the major trans-striking shear zones described in the Birimian domain of Côte d'Ivoire, such as the Brobo shear zone [25] or the Wango-Fitini shear zone [26], suggesting that the Dimbokro-Abengourou trough could, on a regional scale, constitute a link or an extension of this transcurrent system.

The D2 phase affects and incorporates the pre-existing D1 structures. It is characterised by an S2 crenulation schistosity oriented at 110˚ (WNW-ESE), which folds and crenulates the S1 schistosity within the finest-grained facies of the metasedimentary formations. This phase marks a change in the tectonic regime: the direction of shortening shifts to NNE-SSW, suggesting a reorientation of stresses at the end of the Éburnian orogeny. Less intense and less widespread than D1, this deformation remains mainly visible in the most ductile facies, particularly fine-grained mica schists.

Phase D3, which is predominantly fragile and late in development, is represented by E-W-trending joints that cut across all earlier structures, and above all by the left-lateral NNE-SSW-trending fault known as the Dimbokro Fault, which

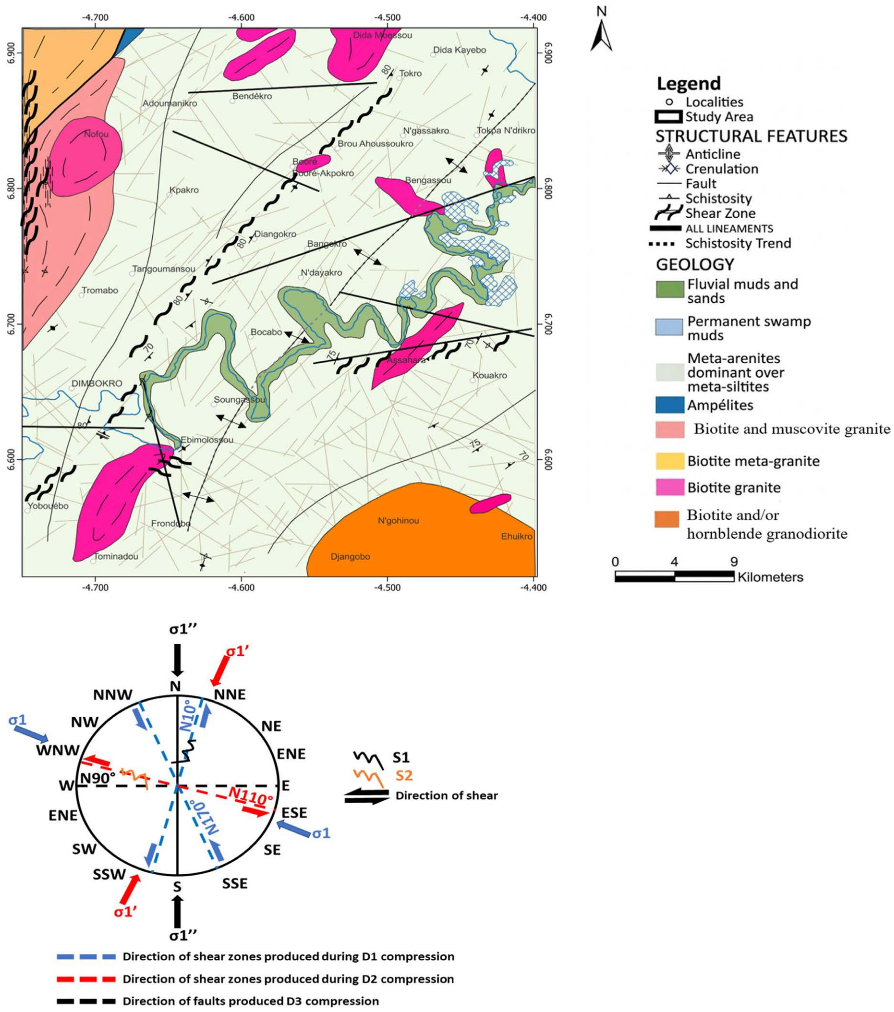

Figure 8. Summary of structural data for the study area in the Dimbokro-Abengourou trough and the main directions of ductile and brittle deformation.

is oriented N10˚ and has a subvertical dip. This fault cuts through both the metasediments and the plutonic intrusions and constitutes the main expression of the late brittle phase of the rift. It is comparable, in terms of its late occurrence and brittle nature, to the D4 phase identified in the Kan complex [24] and to the post-Eburnean movements generally described at the craton scale [22]. The injection of E-W-trending doleritic veins, which occurred after all the structures described, marks the end of the region's tectono-magmatic history and may be associated with a more recent episode of crustal extension (**Figure 8**).

These results confirm that the Dimbokro-Abengourou graben underwent a multi-phase structural evolution, initially ductile and subsequently brittle, which forms part of the broader context of the Éburnaean orogeny recognised across the West African craton [6] [17] [27]-[31]. The localisation of deformation along the contacts between metasediments and granitoids-already suggested by teleanalytical analysis-as well as along the Dimbokro Fault, could be of interest for understanding the structural control of gold mineralisation recognised in this type of

Birimian setting; this is an issue that warrants further investigation through additional research.

6. Conclusion

The structural study carried out in the Dimbokro-Abengourou trough, combining teleanalytical analysis and field observations, has made it possible to reconstruct a multi-phase tectonic history involving three successive phases of deformation. Phase D1, the oldest and most developed, corresponds to a WNW-ESE shortening under a left-lateral transpressive regime, characterised by S1 flow schistosity oriented N00˚-N15˚, C1 shear planes oriented N170˚ forming S/C structures, and symmetrical folds oriented N00˚-N10˚. This is followed by a more subtle D2 phase, characterised by S2 crenulation schistosity oriented N110˚, reflecting a reorientation of the shortening towards an NNE-SSW direction. Finally, phase D3, which is predominantly brittle and late-stage, is characterised by E-W-trending joints, detachments and the left-lateral Dimbokro fault oriented N10˚, as well as by the formation of quartz veins and, at a later stage, E-W-trending doleritic veins. This sequence, comparable to that described in other Birimian belts in the southern part of the West African craton, forms part of the regional context of the Éburnian orogeny and opens up prospects for future work on the relationship between this structural evolution and the gold mineralisation associated with the Dimbokro-Abengourou trough.

Author Contributions

Conceptualization: Diakite Sekou, Pr. Allialy Marc Ephrem

Methodology: Diakite Sekou, Pr. Allialy Marc Ephrem

Data Collection: Diakite Sekou, Dr. Pria Koffi Kossonou Jean-Marie

Formal Analysis: Dr. Pria Koffi Kossonou Jean-Marie, Dr. Adingra Martial Pohn Koffi, Dr. Koffi Yao Augustin

Software Analysis: Diakite Sekou, Dr. Adingra Martial Pohn Koffi

Validation: Diakite Sekou, Pr. Allialy Marc Ephrem, Dr. Pria Koffi Kossonou Jean-Marie, Dr. Adingra Martial Pohn Koffi, Dr. Koffi Yao Augustin

Writing Original Draft Preparation: Diakite Sekou

Writing-Review and Editing: Diakite Sekou, Pr. Allialy Marc Ephrem, Dr. Pria Koffi Kossonou Jean-Marie, Dr. Adingra Martial Pohn Koffi, Dr. Koffi Yao Augustin

Visualisation: Diakite Sekou

Supervision: Pr. Allialy Marc Ephrem

Project Administration: Diakite Sekou

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

References

[1] Berger, J., Diot, H., Lo, K., Ohnenstetter, D., Féménias, O., Pivin, M., *et al.* (2013) Petrogenesis of Archean PGM-Bearing Chromitites and Associated Ultramafic-Mafic-Anorthositic Rocks from the Guelb El Azib Layered Complex (West African Craton, Mauritania). *Precambrian Research*, **224**, 612-628. https://doi.org/10.1016/j.precamres.2012.10.005

[2] Block, S., Jessell, M., Aillères, L., Baratoux, L., Bruguier, O., Zeh, A., *et al.* (2016) Lower Crust Exhumation during Paleoproterozoic (Eburnean) Orogeny, NW Ghana, West African Craton: Interplay of Coeval Contractional Deformation and Extensional Gravitational Collapse. *Precambrian Research*, **274**, 82-109. https://doi.org/10.1016/j.precamres.2015.10.014

[3] Diatta, F., Ndiaye, P.M., Diène, M., Amponsah, P.O. and Ganne, J. (2017) The Structural Evolution of the Dialé-Daléma Basin, Kédougou-Kéniéba Inlier, Eastern Senegal. *Journal of African Earth Sciences*, **129**, 923-933. https://doi.org/10.1016/j.jafrearsci.2017.02.033

[4] McFarlane, H.B., Ailleres, L., Betts, P., Ganne, J., Baratoux, L., Jessell, M.W., *et al.* (2019) Episodic Collisional Orogenesis and Lower Crust Exhumation during the Palaeoproterozoic Eburnean Orogeny: Evidence from the Sefwi Greenstone Belt, West African Craton. *Precambrian Research*, **325**, 88-110. https://doi.org/10.1016/j.precamres.2019.02.012

[5] Koffi, G.R., Kouamelan, A.N., Allialy, M.E., Coulibaly, Y. and Peucat, J. (2020) Re-evaluation of Leonian and Liberian Events in the Geodynamical Evolution of the Man-Leo Shield (West African Craton). *Precambrian Research*, **338**, Article 105582. https://doi.org/10.1016/j.precamres.2019.105582

[6] Baratoux, L., Metelka, V., Naba, S., Jessell, M.W., Grégoire, M. and Ganne, J. (2011) Juvenile Paleoproterozoic Crust Evolution during the Eburnean Orogeny (2.2-2.0 Ga), Western Burkina Faso. *Precambrian Research*, **191**, 18-45. https://doi.org/10.1016/j.precamres.2011.08.010

[7] Sawadogo, S., Naba, S., Ilboudo, H., Traoré, A.S., Nakolendoussé, S. and Lompo, M. (2018) The Belahourou Granite Pluton (Djibo Greenstone Belt, Burkina Faso): Emplacement Mechanism and Implication for Gold Mineralization along a Shear Zone. *Journal of African Earth Sciences*, **148**, 59-68. https://doi.org/10.1016/j.jafrearsci.2018.04.009

[8] Delor, C., Siméon, Y., Vidal, M., Zéadé, Z., Koné, Y., Adou, M., *et al.* (1995) Carte géologique de la Côte d'Ivoire 1/200000, feuille de Nassian. Ministère des Mines et de l'Energie. DMG.

[9] Vidal, M., Gumiaux, C., Cagnard, F., Pouclet, A., Ouattara, G. and Pichon, M. (2009) Evolution of a Paleoproterozoic "Weak Type" Orogeny in the West African Craton (Ivory Coast). *Tectonophysics*, **477**, 145-159. https://doi.org/10.1016/j.tecto.2009.02.010

[10] Bessoles, B. (1977) Géologie de l'Afrique. Vol 1: Le Craton Ouest Africain. Bureau de Recherches Géologiques et Minières, 402.

[11] Abouchami, W., Boher, M., Michard, A. and Albarede, F. (1990) A Major 2.1 Ga Event of Mafic Magmatism in West Africa: An Early Stage of Crustal Accretion. *Journal of Geophysical Research*: *Solid Earth*, **95**, 17605-17629. https://doi.org/10.1029/jb095ib11p17605

[12] Milési, J.P., Feybesse, J.L., Ledru, P., Dommanget, A., Ouédraogo, M.F., Marcoux, E., *et al.* (1989) Les minéralisations aurifères de l'Afrique de l'Ouest. Leur évolution

litho-structurale au protérozoïque inférieur. *Chronique de la Recherche Minière*, **497**, 3-98.

[13] Feybesse, J.-L. and Milési, J.-P. (1994) The Archaean/Proterozoic Contact Zone in West Africa: A Mountain Belt of Décollement Thrusting and Folding on a Continental Margin Related to 2.1 Ga Convergence of Archaean Cratons? *Precambrian Research*, **69**, 199-227. https://doi.org/10.1016/0301-9268(94)90087-6

[14] Feybesse, J., Billa, M., Guerrot, C., Duguey, E., Lescuyer, J., Milesi, J., *et al.* (2006) The Paleoproterozoic Ghanaian Province: Geodynamic Model and Ore Controls, Including Regional Stress Modeling. *Precambrian Research*, **149**, 149-196. https://doi.org/10.1016/j.precamres.2006.06.003

[15] Perrouty, S., Aillères, L., Jessell, M.W., Baratoux, L., Bourassa, Y. and Crawford, B. (2012) Revised Eburnean Geodynamic Evolution of the Gold-Rich Southern Ashanti Belt, Ghana, with New Field and Geophysical Evidence of Pre-Tarkwaian Deformations. *Precambrian Research*, **204**, 12-39. https://doi.org/10.1016/j.precamres.2012.01.003

[16] Lebrun, E., Thébaud, N., Miller, J., Ulrich, S., Bourget, J. and Terblanche, O. (2016) Geochronology and Lithostratigraphy of the Siguiri District: Implications for Gold Mineralisation in the Siguiri Basin (Guinea, West Africa). *Precambrian Research*, **274**, 136-160. https://doi.org/10.1016/j.precamres.2015.10.011

[17] Masurel, Q., Thébaud, N., Miller, J. and Ulrich, S. (2017) The Tectono-Magmatic Framework to Gold Mineralisation in the Sadiola-Yatela Gold Camp and Implications for the Paleotectonic Setting of the Kédougou-Kénieba Inlier, West Africa. *Precambrian Research*, **292**, 35-56. https://doi.org/10.1016/j.precamres.2017.01.017

[18] Alric, G., Guibert, P. and Vidal, M. (1987) Le problème des grauwackes birrimiennes de Côte d'Ivoire: Une revue et des données nouvelles. Le cas de l'unité de la Comoé. *Comptes Rendus de l'Académie des Sciences*, *Paris*, **304**, 289-294.

[19] Daouda, Y.B. (1998) Lithostratigraphy and Petrology of the Birimian Formations of Toumodi-Fètêkro: Implications for the Palaeoproterozoic Crustal Evolution of the West African Craton. Ph.D. Thesis, University of Orléans, 191 p.

[20] Sekou, D., Jean-Marie, P.K.K., Koffi, A.M.P., Blanchard, G.C. and Ephrem, A.M. (2026) Petrographic and Geochemical Characters of the Metasediments and Granitoids in the Dimbokro Region (Centre-East Côte d'ivoire). *Open Journal of Geology*, **16**, 197-213. https://doi.org/10.4236/ojg.2026.164011

[21] Mortimer, J. (1992) Lithostratigraphy of the Early Proterozoic Toumodi Volcanic Group in Central Côte d'ivoire: Implications for Birrimian Stratigraphic Models. *Journal of African Earth Sciences* (*and the Middle East*), **14**, 81-91. https://doi.org/10.1016/0899-5362(92)90057-j

[22] Vidal, M. and Alric, G. (1994) The Palaeoproterozoic (Birimian) of Haute-Comoé in the West African Craton, Ivory Coast: A Transtensional Back-Arc Basin. *Precambrian Research*, **65**, 207-229. https://doi.org/10.1016/0301-9268(94)90106-6

[23] Vidal, M., Delor, C., Pouclet, A., Siméon, Y. and Alric, G. (1996) Geodynamic evolution of West Africa between 2.2 Ga and 2 Ga: The Archaean Style of the Green Belts and Birimian Sedimentary Complexes of North-Eastern Côte d'Ivoire. *Bulletin de la Société Géologique de France*, **167**, 307-319.

[24] Pria, K.K.J.M., Coulibaly, Y., Houssou, N.N., Allialy, M.E., Boya, T.K.L.D., Tayebi, M., *et al.* (2019) Structures, Deformation Mechanisms and Tectonic Phases, Recorded in Paleoproterozoic Granitoids of West African Craton, Southern Part: Example of Kan's Complex (Central of Côte d'ivoire). *European Scientific Journal ESJ*, **15**, Article No. 315. https://doi.org/10.19044/esj.2019.v15n18p315

[25] Lemoine, S. (1982) Le décrochement ductile de Brobo, un linéament éburnéen majeur, son rôle possible dans l'orogenèse éburnéenne en Côte d'Ivoire. *Comptes Rendus de l'Académie des Sciences*, *Paris*, **295**, 601-606.

[26] Vidal, M. and Guibert, P. (1984) A New North-South Ductile Fault Zone in the Birimian of West Africa: The Left-Lateral Wango-Fitini Shear Zone (Côte d'Ivoire). *Comptes Rendus de l'Académie des Sciences*, *Paris*, **299**, 1085-1090.

[27] Milési, J.P., Ledru, P., Feybesse, J.L., Dommanget, A. and Marcoux, E. (1992) Early Proterozoic Ore Deposits and Tectonics of the Birimian Orogenic Belt, West Africa. *Precambrian Research*, **58**, 305-344. https://doi.org/10.1016/0301-9268(92)90123-6

[28] Dabo, M. and Aïfa, T. (2011) Late Eburnean Deformation in the Kolia-Boboti Sedimentary Basin, Kédougou-Kéniéba Inlier, Sénégal. *Journal of African Earth Sciences*, **60**, 106-116. https://doi.org/10.1016/j.jafrearsci.2011.02.005

[29] Baratoux, L., Metelka, V., Naba, S., Ouiya, P., Siebenaller, L., Jessell, M.W., *et al.* (2015) Tectonic Evolution of the Gaoua Region, Burkina Faso: Implications for Mineralization. *Journal of African Earth Sciences*, **112**, 419-439. https://doi.org/10.1016/j.jafrearsci.2015.10.004

[30] Grenholm, M., Jessell, M. and Thébaud, N. (2019) A Geodynamic Model for the Paleoproterozoic (Ca. 2.27-1.96 Ga) Birimian Orogen of the Southern West African Craton—Insights into an Evolving Accretionary-Collisional Orogenic System. *Earth-Science Reviews*, **192**, 138-193. https://doi.org/10.1016/j.earscirev.2019.02.006

[31] Ephrem, A.M., Sekou, D., Nestor, H.N., Jean-Luc, K.F. and Koffi, A.M.P. (2023) Mapping and Petro-Structural Study of the Geological Formations of the Alépé Region (South-East of Côte d'ivoire). *International Journal of Geosciences*, **14**, 187-208. https://doi.org/10.4236/ijg.2023.142009