

Geophysical data analysis and interpretation of the Tiawa prospect: Samira, Libiri and Boulon Djounga sectors (Liptako, West Niger)

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The gold mineralization exploited in the study area is located in the Sirba Birimian Greenstone Belt, closely to the Torodi Pluton, in the western part of the Liptako Province of Niger (Fig. 1). The study area is composed of metabasites, metavolcanoclastites, metasediments and acid magmatic rocks (Ama-Salah et al., 1996 ; Soumaila, 2000 ; Soumaila et al., 2004).

The methodology implemented consisted of a compilation of geophysical and cartographic data, followed by a field analysis of tectonic structures.

The results obtained show five types of geophysical domains (Fig. 2) related to different lithofacies :

- The first D-1 domain, corresponds to mafic volcanic rocks ;
- The second D-2 domain has been attributed to more or less graphitic metasediments, which seem to be the gold mineralization-bearing rocks ;
- The D-3 domain represents a massive magnetic structure interpreted as granitic intrusions ;
- The fourth domain comprises some linear magnetic structures, oriented NNE-SSW, that cross-cut the three previous domains. They have been attributed to mafic dykes.
- The last domain (D-5) concerns the northern part of the study area. It has been assimilated to volcano-sedimentary rocks.

Structural analysis shows that the study area is marked by two deformation phases. The first one, ductile, is characterized by the development of a schistosity/foliation NE-SW trending, associated with boudinages, particularly in the ductile shear zones characterized by S/C fabric (Fig. 3). The second phase of deformation rather brittle, consists of fractures, strike-slip faults and brittle shearing zones with RRC' fabric. This phase of deformation is at the origin of the emplacement of the doleritic dykes (Soumaila and Konaté, 2005).

Keywords: Liptako Province of Niger, Birimian Greenstone Belt, Sirba, gold mineralization, Torodi Pluton, Linear magnetic structures

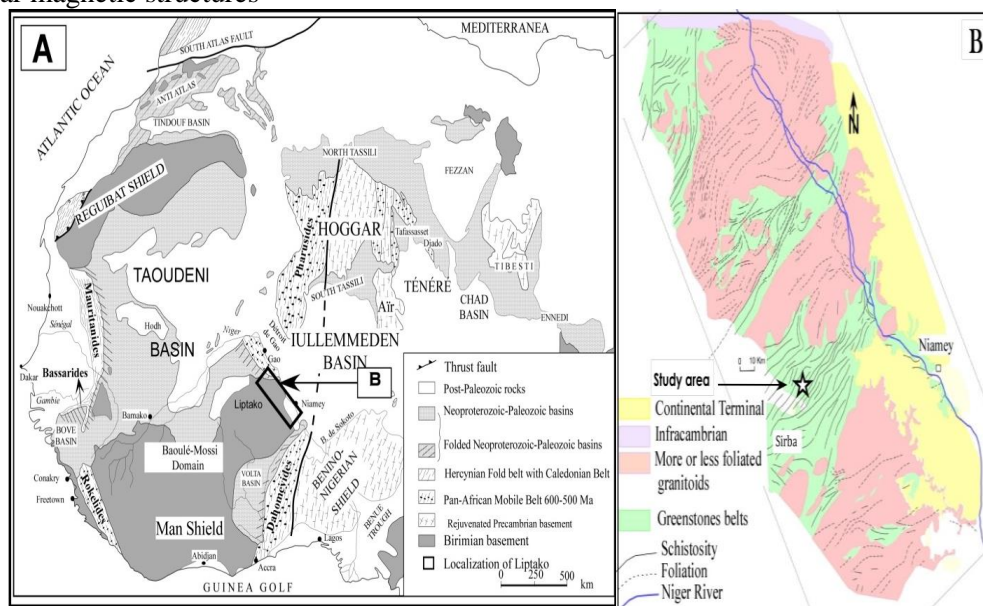


Figure 1. (A) Structural map of West African Craton (d'après Trompette, 1973). (B) Geological map of Liptako Province of Niger (Machens, 1967).

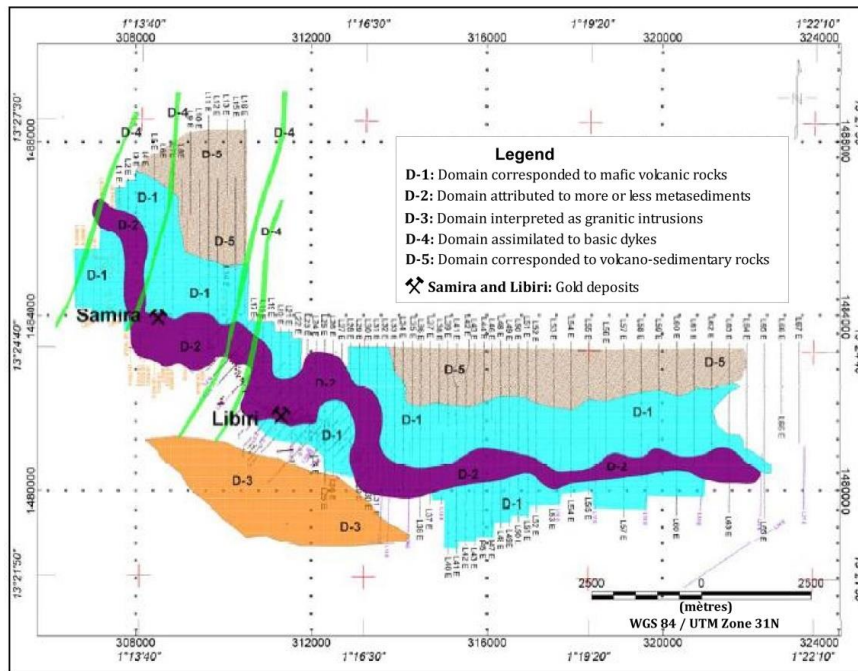


Figure 2. Geophysical map with the distribution of the five domains (Sagax Maghreb, 2007)

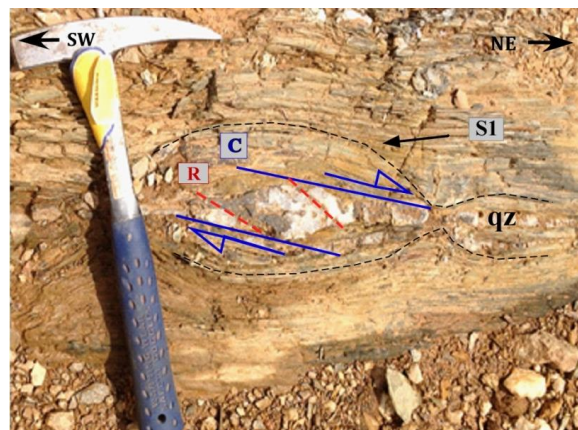


Figure 3. Outcrop of D-2 domain rocks showing S/C fabric in a micro shear zone.

References

- Ama-Salah, I., Liegeois, J.P., Pouclet, A., 1996. Evolution d'un arc insulaire océanique birimien précoce au Liptako nigérien (Sirba) : géologie, géochronologie et géochimie. *Journal of African Earth Sciences*, 22, 235-254.
- Machens, E., 1967. Notice explicative sur la carte géologique du Niger occidental, Carte géol. 1/200000ème, *Dir. Mines Géol.*, Niger.
- Soumaila, A., 2000. Etude structurale, pétrographique et géochimique de la ceinture de Diagorou-Darbani, Liptako, Niger Occidental (Afrique de l'Ouest). *Thèse Univ. Franche-Comté*, 56-203p.
- Soumaila, A., Henry, P., Rossy, M., 2004. Contexte de mise en place des roches basiques de la ceinture de roches vertes birimienne de Diagorou-Darbani (Liptako, Niger, Afrique de l'Ouest) : plateau océanique ou environnement d'arc/bassin arrière-arc océanique. *C.R. Geoscience*, 336, 1137-1147.
- Soumaila, A., Konate, M., 2005. Caractérisation de la déformation dans la ceinture birimienne (paléoprotérozoïque) de Diagorou-Darbani (Liptako nigérien, Afrique de l'Ouest). *Africa Geoscience Review*, 13(3), 161-178.
- Trompette, R., 1973. Le Précambrien supérieur et le Paléozoïque inférieur de l'Adrar mauritanien (bordure occidentale du bassin de Taoudenni et Afrique de l'Ouest) : un exemple de sédimentation du craton—Etude stratigraphique et sédimentologique. *Trav. Lab. Sci. Terre*, 7 (B), 702 p.
- Sagax Maghreb, 2007. Rapport sur le Levé de polarisation provoquée effectué dans le cadre du projet de Samira Hill.