



Late Eburnean deformation in the Kolia-Boboti sedimentary basin, Kédougou-Kéniéba Inlier, Sénégal

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ABSTRACT

New structural data obtained within the Birimian formations of the Kolia-Boboti sedimentary basin evidenced a third D₃ Eburnean phase (2075–1980 Ma) of deformation in the Daléma supergroup of the Kédougou-Kéniéba Inlier (KKI). The D₃ phase is well exposed in the sedimentary rocks (quartzites, sandstones, greywackes, ...). It is expressed by a NW and EW fracture and shear foliation with oblique dips towards the south, southeast and southwest. This foliation is associated with asymmetric “Z-shaped” folds and with NW–SE or SW–NE dextral shear bands. The NW–SE and SW–NE dextral shear bands, which could be R and P respectively, are associated with sinistral N80°–90° trended shear bands which represent R'. The general architecture of the different structures related to the D₃ phase is characteristic of a dextral transcurrent deformation, affecting a large NS Sénégal-Malian tectonic corridor. Locally, the D₃ phase produced a moderate dextral reactivation of NS–N20° sinistral shear bands related to the D₂ Eburnean phase. The D₃ deformation phase is less significant than the D₂ phase and D₃ structures deform and intersect structures developed during the D₂ phase. The main stress responsible for the D₃ deformation, deduced from field observations, would be oriented EW to NE–SW.

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1. Introduction

The West African Craton (WAC) is made up of Archean and Paleoproterozoic (Birimian) rocks exposed respectively westward and eastward, in the Réguibat rise at the north and Léo rise in the south (Fig. 1a). The Birimian formations of the WAC are also located in the Kédougou-Kéniéba and Kayes inliers (Fig. 1a). Birimian terrains of the WAC are formed by high-grade gneisses and lower-grade metasedimentary and metavolcanic rocks intruded by granitoid plutons. The formation of these Paleoproterozoic supracrustal rocks and associated synvolcanic and syn- to late-kinematic intrusives marks a major juvenile crust-forming event that is loosely referred to as the ‘Eburnean orogeny’. Geochronological studies indicate that these rocks were formed over a maximum time interval of 2.27–1.9 Ga (Abouchami et al., 1990; Liégeois et al., 1991; Boher et al., 1992; Davis et al., 1994; Hirdes and Davis, 1998; Hirdes et al., 1992, 1996; Kouamelan et al., 1997; Doumbia et al., 1998; Gueye et al., 2008). Based on the detailed age relationships within and between eastern and western subprovinces of the Paleoproterozoic of the WAC, Hirdes and Davis (2002) define a general northwest-directed diachroneity in crustal development and regional deformation. The Eburnean orogen is characterized by a complex tectono-magmatic evolution (Ledru et al., 1989, 1991;

Milési et al., 1992; Feybesse and Milési, 1994; Pons et al., 1995; Dabo and Aïfa, 2010; Lompo, 2010; Vidal et al., 2010).

In the Kédougou-Kéniéba Inlier (KKI), and particularly in the Dialé and Daléma supergroups, Ledru et al. (1989, 1991) evidenced two Eburnean tectonic phases: (i) a D₁ phase, fairly high crustal level tectonic activity with a tendency towards thrusting; (ii) a D₂ phase related to the major sinistral shear zones and the emplacement of granitic intrusions (Pons et al., 1992). This second phase is responsible for large submeridian sinistral shear corridors, where the most important are: The Main Transcurrent Shear Zone (MTZ), separating Mako and Dialé supergroups (Ledru et al., 1989; Milési et al., 1989) and the Sénégal-Malian fault (SMF), along the western Falémé bank (Bassot and Dommange, 1986) (Fig. 1b). The D₃ Eburnean tectonic phase has never been characterized in the Birimian formations of the KKI.

Therefore, the aim of this paper is to characterize the tectonic style of the D₃ phase from the analyses of the structural features that it induced within the Birimian formations in the Kolia-Boboti Basin (KBB), at the eastern part of the KKI.

2. Geological setting

The Kolia-Boboti area corresponds to the eastern part of the KKI (Fig. 1b) where Birimian formations crop out. The KKI Birimian formations are subdivided into three supergroups (Bassot, 1987).

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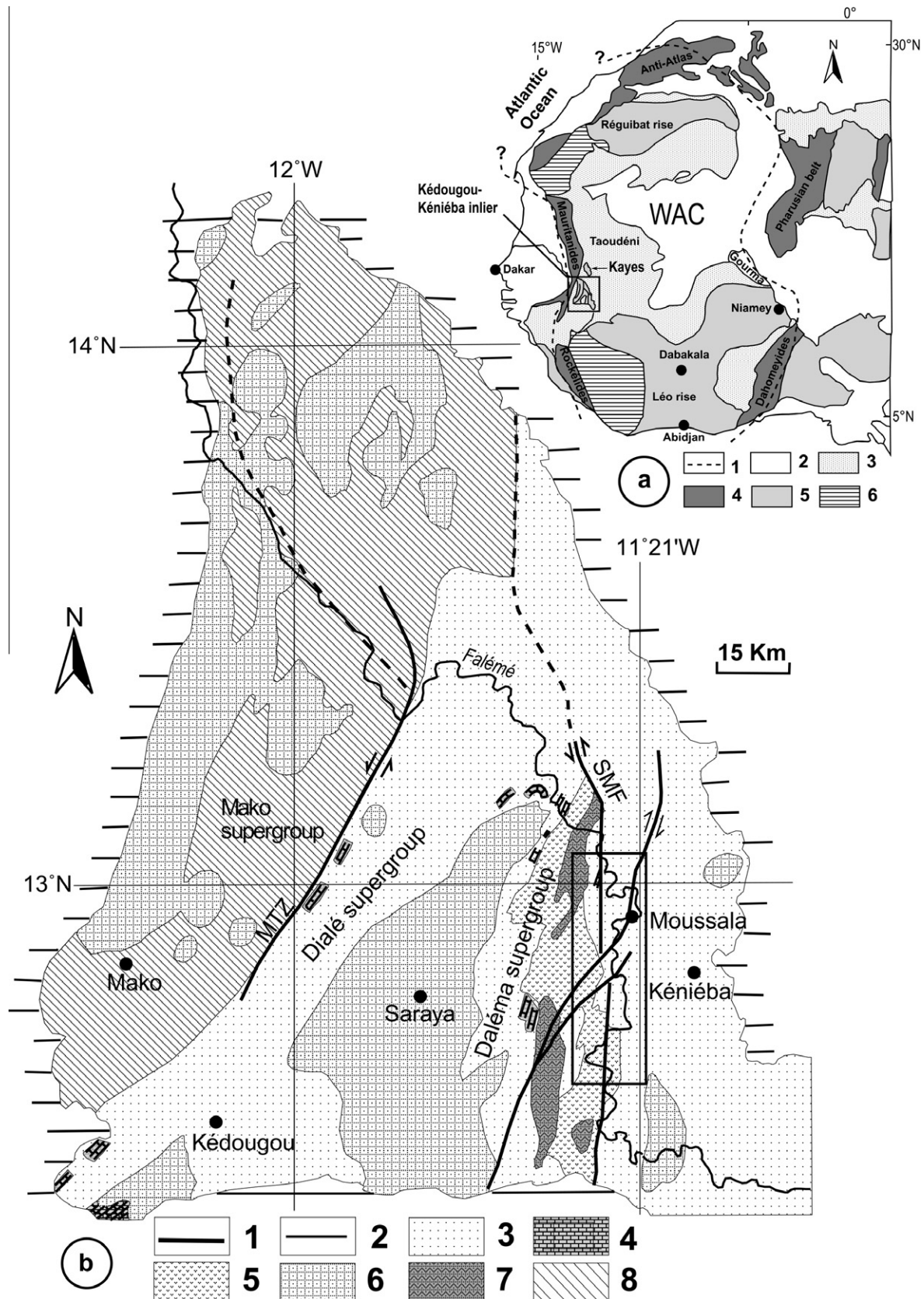


Fig. 1. Location map of Kédougou-Kéniéba Inlier (KKI) within the West African Craton (WAC). (a) Schematic map of the major Precambrian shields of the WAC (simplified from Gueye et al., 2008). (1) Limits of the WAC. (2) Post-Paleozoic cover. (3) Neoproterozoic and Paleozoic. (4) Pan-African and Hercynian belts. (5) Lower Proterozoic. (6) Archean. (b) Schematic geological map of the KKI, locating the study area (modified after Bassot (1997)). (1) D₂ major shear zones. (2) Neoproterozoic and Paleozoic. (3) Dialé and Daléma supergroups (DDS). (4) Carbonates. (5) Calc-alkaline volcanic rocks. (6) Saraya and Badon-Kakadian batholiths. (7) Boboti clinopyroxene bearing granitoid. (8) Mako supergroup.

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