

Re-orientation of a NE-SW F_1 fold during a retrograde F_2 deformation in Southwestern Nigeria: Further signature of Pan-African tangential deformation

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Introduction

The study area, Okedare/Babanloma locality, north east of Ilorin, falls within the south-western segment of the Basement Complex of Nigeria. The structural grain within the Basement Complex of Nigeria is generally N-S (Adedoyin, 2015) and constitutes the thermo-tectonic imprint of the Pan African orogenic event. The terrain evolved as a result of the several crustal remobilizations which occurred between about 3.0 to 0.45 Ga and lies within the southern part of the Trans Saharan Belt (Cahen *et al.*, 1984) of North Africa. Imprints of four orogenic events have been identified within it but the dominant of the events is the Pan African, which post-dates the three other events: Liberian, Eburnean and Kibaran. Regardless of the polyphase deformations, the N-S structural trend is widely acknowledged and other fabrics contrary to that have been feebly reported (Affaton, 1991; Okonkwo, 2006; Adedoyin, 2015). The study area presents another scenario which supports possible imprints which developed as a result of deformation that were essentially tangential to those of the Pan African event.

Materials and Methods

Geological field mapping was carried out on scale 1:25,000 with special attentions on small scale structures. Big, fresh representative rock samples were taken for petrographic and structural studies. Sampling was based on the method of Paschier and Trouw, 2005.

Results and Discussion

The lithologies identified on the field include variably migmatized to banded gneisses, mica-schist and quartzite, which are all essentially inter-banded and constitute the background rocks into which granite, diorite and minor pegmatites were intruded. Mineralogical assemblages indicate a high-grade, low pressure amphibolite facies metamorphism, which occurred under a high geothermal gradient within the upper level of the crust. The strike and dip of the tectonites varies significantly between NE –SW and NW-SE while minor folds indicate NE-SW, NW-SE and E-W axial traces with plunges at moderate angles towards the NE.

The dominant structure in the area is a large-scale, open antiform with an E-W axis, which plunges north-easterly, also at moderate angles. This fold, which has apparently refolded an earlier N-S fold, is hereby assigned F_2 while the other is the F_1 . The F_1 fold is an isoclinal synform, which becomes tighter in the northern part. Older structural fabrics are considered to have been obliterated or re-oriented during the Pan African period. It becomes imperative to report any structural trend of such significance within the Basement Complex. Appearance of white mica (muscovite) within an assemblage which depicts high grade, low- pressure, amphibolite facies indicates a period of metamorphic retrogression to a high-medium grade interface. The original N-S trend of the F_1 synform is concordant with the Pan African fabrics but that of F_2 antiform is tangential to it. We therefore posit that the F_2 fold, being younger, is essentially a product of late- to post-Pan African tangential deformation during which process a metamorphic retrogression set in.

References

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