

## Abstract

The Kakamega - Kapsabet study area located in western Kenya, occurs at the tectonic contact zone between the Archaean Nyanza Cratonic Segment (NCS) an extensive segment of the larger Tanzanian Craton (TC), and the Neoproterozoic Mozambique Mobile Belt (MB). The area covering about 1330km<sup>2</sup>, and lying between latitudes 0005'N and 0025'N, and longitudes 34°45'E and 35°05'E, is marked in the middle by the NNW-SSE oriented Nandi fault escarpment. This escarpment also marks the middle of the approximately 7 to 15 km wide Neoproterozoic Nandi Fault and Shear Zone (NFSZ) which constitutes the tectonic boundary between the craton and the mobile belt. The NCS of the Tanzanian craton in the study area is predominantly composed of Archaean granite-greenstone lithologies. The greenstones include both metavolcanics and metasediments. The metavolcanics consist of andesites, rhyolites, agglomerates and tuffs with a conspicuous absence of basalts in the study area. Through petrological studies the metavolcanics are interpreted to be Archaean island arc volcanics. The metasediments comprising basal polymictic conglomerates, greywackes, sandstones, shales and mudstones are interpreted to be Archaean back-arc and fore-arc turbiditic shallow and deep marine sediments. Stratigraphic classification of the lithologies has led to the establishment of new lithostratigraphic units and lithodemic classes in the study area. The metavolcanics and metasediments have been assigned to the Nyanzian Supergroup and to the unconformably overlying Kavirondian Supergroup respectively. The portion of the Neoproterozoic Mozambique Mobile Belt consists of biotite gneisses, augen gneisses, banded gneisses, migmatites and granitoid gneisses, all of medium to high grade regional metamorphism. Regional metamorphism in the Archaean terrane was largely within the greenschist facies. Towards the end of the Archaean epoch thermal metamorphism was superimposed on the earlier low grade regional metamorphism around the granitoid plutons. The highest grade attained within the metamorphic aureoles was in the pyroxene hornfels facies where sillimanite, cordierite and andalusite are the characteristic index minerals. The Kakamega-Kapsabet area has experienced a complex tectonic history spanning from the Archaean to the Cenozoic. One depositional (DAD) and seven deformational (DAX, DAD, DA1, DA2, DP1, DP2, DP3, DT1) events of different ages (Archaean, Neoproterozoic and Tertiary) have been distinguished in the study area. DAD is the Archaean Kavirondian depositional event. The DAX is the pre-Kavirondian deformational event which affected the older Nyanzian lithologies. DA1 and DA2 are folding events caused by Archaean granitoid diapirism. DP1 is the Neoproterozoic folding event associated with the Mozambiquian

orogenic event. Dp2 and Dp3 are later Neoproterozoic crustal extensional events associated with post-collisional release of strain in the region. DTI is the Nandi escarpment hinge faulting event during Tertiary/Quaternary period. It is interpreted as the last tectonic event in the area and mainly affecting NFSZ. Rock blocks of the western side of the Nandi escarpment experienced a downthrow while those to the east underwent a tectonic uplift during DTI. This study has established the presence of intra-granitoid and inter-granitoid multi-episodic plutonism in the area. Detailed geochronological works, still will need to be carried out to investigate and confirm the proper timing of these plutonic events. Kavirondian turbidite-hosted gold mineralization in the study area is associated with smoky quartz veins mainly in the NCS. Sulphide mineralisation has been identified proximal to the granitoid plutons and is hosted by both the Nyanzian volcanics as well as by the Kavirondian turbidites. Iron oxide bearing cherts form a marker bed along the stratigraphic horizon capping the youngest members of the Nyanzian Group. These iron rich cherts mark the waning of sub-marine volcanism in the area. The lithological and tectonic evidence in this study has established that the Archaean Kavirondian marine basin was shallowest to the east in the Nandi fault region and was progressively deepening towards the west (or westwards).