

Architecture of transpressional shear zone systems in the Mako Belt (SE-Senegal): implication for gold mineralization

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The Mako Belt is a segment of a Paleoproterozoic accretionary belt that developed on the western margin of the West African Craton. It is represented by a series of volcanic, volcanosedimentary, sedimentary and igneous assemblages, which belong to the Kedougou-Kenieba Inlier (KKI) of the western Eburnean orogen. This belt is dominantly characterized by folded low grade metamorphic rocks and preserves a polyphase deformation history that is intimately associated with orogeny-parallel sinistral transpressive shear and emplacement of various granitic and mafic intrusions. Major linear fault such as the MTZ also approximates a north-easterly trend from the eastern boundaries. Transpressional deformation focussed the wrench component along these pre-existing major tectonic boundary. The Mako Belt hosts several orogenic gold occurrences. Two main gold corridors are distinguished and include Sabadala-Niakafiry-Sofia, and Massawa-Deliya-Mandinka. In the Sabodala area, gold occurrences are aligned along the major Sabodala fault and the gold occurs within a complex wrench dominated, sinistral fault array and associated veins and alteration haloes. The development of this brittle to ductile oblique wrench fault system was associated with the majority of gold mineralization in the Mako Belt. The wrench-dominated transpression strain during D₃-phase, accommodated by the major structures and subsidiary fault zones, is well documented by the geometry and pattern of the associated mesoscale deformation. Structural data confirm that the D₃-deformation postdates the emplacement of late granitic suite (Saraya, Mamakono, Boboti, etc.) and mafic dykes. As with other districts, there is also local evidence of changes in kinematics from dominantly strike slip to more constrictional strain with associated vertical stretching and reverse displacement along mineralized structures, characteristic of progressive strain accommodation during transpressional deformation.

The structural data presented here may have certain implications for exploration of shear-hosted gold deposits in the KKI. We demonstrated that the gold deposits are best interpreted in terms of syn-kinematic genesis of gold attributed to D₃-wrench dominated transpression throughout the Eburnean evolution.

Keywords: Mako Belt, Birimian, transpression, gold mineralization, wrenching