

Structural Evolution and Constraints on Gold Mineralisation of the North-East Section of the Kibi-Winneba Gold Belt

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The structural evolution of the northeastern section of the Kibi-Winneba Gold Belt significantly influences gold mineralisation. This study examines geological structures through detailed field mapping, drill-core logging, and geophysical data analysis to understand their role in controlling gold deposition. The region consists of deformed metasedimentary and metavolcanic sequences affected by multiple deformation phases, which have shaped its structural architecture. Analysis reveals at least two major deformation events that produced distinct foliations, folds, and shear zones, which acted as primary pathways for mineralising fluids. Gold-bearing quartz veins occur in various orientations, including extensional, shear, and stockwork systems, with auriferous veins predominantly associated with altered diorite intrusions. The presence of sulphide minerals and deformation features such as brecciation and sigmoidal textures further suggests a complex mineralisation history. Comparative structural studies with the Ashanti and Sefwi belts indicate that the Kibi-Winneba Belt exhibits intense deformation and overprinted bedding, distinguishing it from these more extensively studied gold belts. Variations in structural styles across deposits highlight the role of localised deformation in controlling gold distribution. This research enhances the understanding of structural controls on gold mineralisation within the belt, providing a framework for more targeted exploration strategies. The findings underscore the need for further investigations to refine the structural model and assess the economic significance of gold mineralisation in the region.