

Mineralization and Ore Genesis of the Neoproterozoic Pan-African Belt, Eastern Ghana: Constraints on Lithology and Mineralogy.

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From recent field exploration programs by the Ghana Geological Survey Authority, seven distinctive mountains suspected to be mineralized have been established. Of interest to this study is the Akokrowa range which spans the areas, Akokrowa, Asukawkaw and Okanease in the eastern part of the Ghanaian Neo-Proterozoic Pan-African belt. Evidence from petrology and mineralogy makes room for three broad rock classifications: clastic sedimentary rocks, chemical sedimentary rocks and mafic rocks. Two phases of alteration are observed, a pervasive low-grade greenschist metamorphism and an overprinting pumpellyite alteration, both of which are associated with propylitic, phyllic and intermediate argillic alterations. Serpentinization and albitization are worth mentioning. The minerals of interest in these rocks are iron oxides and oxyhydroxides: magnetite, hematite, ilmenite, chamosite and goethite, which are mainly hosted in BIF and ferruginous clastic and chemical sedimentary rocks, and serpentine (including cronstedtite) with associated Cr-spinel (Mg-Al-Cr-Fe and Mg-Si-Cr-Fe), greenalite-Ni, birnessite, and minnesotaite that are mainly hosted by the mafic rocks. Associated sulphides include pyrite, chalcopyrite and pentlandite. Apatite, florencite, barite, talc, manganese oxides and manganese carbonates are common accessory minerals. Mineralization is mainly structurally controlled and disseminated. The studied BIF intercalated with iron rich shales, sandstones and cherts, and mafic intrusions may have formed in restricted basins associated with widespread volcanic and hydrothermal activities of cyclic pulses in spreading centers and/or developing continental rifts, where Fe-rich oxyhydroxide minerals are precipitated from hydrothermal fluids which are later diagenetically transformed to hematite and magnetite whereas, the interbedded chert bands may have precipitated from sea water, hydrothermal vent fluids, or as a result of secondary replacement. The deposition of these precipitates may have occurred distally from the hydrothermal vent source, with its associated ferruginous clastic rocks forming from the reworking of BIF in shallow waters.