

Petrography and Economical Potential of Banded Iron Formations of the Neoproterozoic-Age Buem Formation, Ghana

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Historically, Ghana has relied mostly on gold, bauxite, and manganese as the major contributors to the domestic economy. Further investigation into other minerals to transform the mining sector in Ghana focused on detailed geologic field mapping and sampling. The Buem Formation of eastern Ghana, previously unrecognized as a potential source for ore deposits, was found to host banded iron formations.

The Buem Group comprises a complex series of metasedimentary, volcanoclastic, and volcanic rock units, including poorly defined banded iron formation occurrences. This study reports our initial petrographic observations and economic assessment of the Gyamurume-Wawase Range, one of the host regions for BIFs. Our petrographic studies show that stratigraphic contacts between dominantly steely hematitic ferruginous horizons and siliceous strata are distinctly sharp and abrupt. Most hematite comprises micron-scale, irregular grains interstitial to granular, undulatory-extinction quartz; crosscutting coarse quartz veinlets are barren of iron oxides. Although some BIF strata show former magnetite skeletal textures, even cm-scale ferruginous strata show only trace residual or relic magnetite. Initial studies of the mineralogical composition of Buem Formation BIFs show that steely hematite is abundant, with nominal or no magnetite. No other silicate minerals are observed. Our continued studies will assess the trace element contents of Buem Formation iron minerals, with emphasis on the P and Ti contents of hematite-dominant strata as a means of distinguishing low-contaminant, potentially economic horizons.