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Characterization of the Au (gold) pathways within Chirano area of the Sefwi gold belt using geophysical datasets

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Ghana, formerly called gold coast has been the hub of the precious rock called gold. This rock has been mined over centuries therefore, the need to use new technologies and methods to identify and maximize potential yields. The Chirano gold deposit is hosted in Paleoproterozoic rocks within the Sefwi Birimian metavolcanic belt which has been metamorphosed regionally to greenschist facies. Chirano which falls within the Sefwi gold belt in the south-western part of Ghana remains an area that can be examined to ascertain its worth of gold. Aeromagnetic and airborne radiometric datasets were used to examine the Chirano area. Very important information (lithology and geological features) were acquired from the datasets. These data (aeromagnetic and airborne radiometric) were enhanced to improve on the data quality to help locate the geological boundaries and features which may be of economic importance. First vertical derivative, analytical signal and reduction in the pole were some of the mathematical algorithms used in enhancing the magnetic data. These enhancements aided in locating the folds, fractures and faults which may entrap hydrothermal fluid (deposits). The Birimian metasedimentary and metavolcanic rocks which are eminent in hosting gold mineralization and other metal ores were mapped as well in the belt. The values recorded from the radiometric survey gave the amount of the uranium (U), potassium (K) and thorium (Th) which were very useful in mapping the Birimian metavolcanics, metasediments, zones of extreme deformation (altered zones) found in the lithology and contact zones between the main geological formations (lithological boundaries). The metasediments and the belt-type granitoid (B1) were delineated to have high K, Th and U. The high resolution airborne radiometric and magnetic datasets of the study area (Chirano) gave an improved description of the major rock sequences, lithological boundaries and geological structures. This research demonstrates the worth of sets of data from geophysical surveys in mapping the possible geological structures which control the mineralization of hydrothermal gold.

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