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Combined Ground Magnetic and Very Low Frequency Electromagnetic (VLF-EM) Investigations for Gold Exploration around Ihale in Bunnu-Kabba Area of Kogi, north-central Nigeria

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This study combines ground magnetic and Very Low Frequency Electromagnetic (VLF-EM) geophysical investigation techniques to evaluate the economic potential of mineralized pegmatite veins for gold and associated metallic deposits. Twenty five carefully planned magnetic and VLF-EM profiles, each, were occupied east and west of a reference profile purposively established on an identified mineralized pegmatite vein around Ihale in Bunnu – Kabba area of Kogi, north-central Nigeria. The acquired magnetic data were filtered and transformed to remove regional field effect, cultural noise as well as focus magnetic anomaly peaks over corresponding sources. The measured raw real and raw imaginary components of the EM fields were subjected to Fraser and Karous Hjelt filtering to remove harmonic noise, make anomaly amplitudes relate directly to the causative conductors and also generate current density for characterizing the subsurface. Seven zones of relatively high current density with matching high residual positive magnetic anomalies present closely correlate-able signatures with subsurface response of the reference profile established where local mining activities indicate evidence of gold and associated metallic mineralization. The applied geophysical techniques in this study demonstrate the efficacy of geophysical tools for delineating natural/induced earth structures and artefacts whose identification are valuable in test ban verification.

Promotional text

Magnetic and VLF Electromagnetic techniques for mapping the occurrence of gold deposits within the subsurface demonstrate the use of geophysical tools for delineating natural/induced earth structures and artefacts whose identification are valuable in test ban verification.

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