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Integrating gravity and magnetic field data to delineate structurally controlled gold mineralization in the Sefwi Belt of Ghana


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Gravity and magnetic surveys were used to delineate potential gold mineralization zones in the Sefwi belt of Ghana. The study area is an intrusive dominated area that hosts pockets of smallscale mining operations locally referred to as Galamsey. These Galamsey operations are not guided by a scientific approach to back the trend of gold mineralization which is conventionally mined. The study aimed at mapping lithological units, structural setting and relating Galamsey sites to delineate potential zones of gold mineralization. A Scintrex CG5 gravimeter and GEM's Overhauser magnetometer were used for gravity and magnetic data acquisition respectively. The magnetic data were corrected and enhancing filters such as reduction to the pole (RTP), analytical signal and first vertical derivative were applied using Oasis montaj 7.1.

Gravity data were also reduced to the geoid using the Oasis montaj software to produce a complete Bouguer anomaly map. The regional/residual separation technique produced a residual gravity map. The RTP and analytical signal filters from the magnetic data and residual gravity anomaly map from the gravity data helped in mapping belt type (Dixcove) Birimian granitoids and mafic intrusive unit, interpreted as gabbro. The first vertical derivative filter was useful in mapping NE/SW minor faults and crosscutting dykes largely concentrated in the belt type Birimian granitoids. All the three mapped Galamsey sites fell on a minor fault and are associated with the belt type granitoids which were used in delineating four potential zones of gold mineralization.

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