

Subsurface structural features of the basement complex and mineralization zone investigation in the Barramiya area, Eastern Desert of Egypt, using magnetic and gravity data analysis

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Abstract

In the Barramiya area, the majority of gold deposits are generally related with the quartz veins that associated with shear zones cutting the crystalline basement rocks. The quartz vein system is controlled by shear zone and general faults. The present study is to delineate the general faults, shear zones, geological limits, and basement rock relief, using airborne magnetic and gravity data analysis at the Barramiya gold mine and surrounding area, Eastern Desert of Egypt. To achieve our goal, we have applied on magnetic and gravity data the following techniques: reduction to pole (RTP), analytical signal, tilt derivative, total horizontal derivative, 3D Euler deconvolution, downward continuation, and source parameter imagining power spectrum techniques. The analytical signal used to map the types of rock boundaries. Tilt derivative and total horizontal derivative filters helped to delineate fractures and the contact zones of the formations that host the main Barramiya shear zone. 3D Euler deconvolution techniques helped to delineate the fault trends which represented at the following direction: NNE–SSW and NNW–SSE. The average depths of both regional and residual causes have been estimated by applying downward continuation, source parameter imagining, and power spectrum techniques. According to the results of the present study, the depth of the basement rocks is relatively high (~ 80-m depth) in the western part of the study area and the basement rocks cropped out in the surface at the rest of the area. Our results are coinciding with the previous geological studies.

Keywords Magnetic . Graviry . Barramiya area . Eastern Desert of Egypt