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Integrated Geophysical study on the subsurface structural characterization of West Beni Suef area, Western Desert, Egypt

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The aim of this work is to study the subsurface structures in the west Beni Suef area of the Western Desert in Egypt and to determine their effects on surface geologic structures. A detailed land magnetic survey has been carried out for the total component of the geomagnetic field using two proton magnetometers. The necessary corrections concerning daily variation, the regional gradient and time variations have been applied. Then, the total magnetic intensity anomaly map (TMI) has been constructed and transformed to the reduced to the pole magnetic map (RTP). The reduction-to-pole magnetic and Bouguer anomaly maps were used to obtain regional extensions of this subsurface structure. Regional-residual separation is carried out using the power spectrum. Also, Edge detection techniques are applied to delineate the structure and hidden anomalies. Data analysis was performed using trend analysis, Euler deconvolution, the results indicate that the area is affected by tectonic forces in the N-S, NW-SE, NE-SW and E-W trends, which are correlated with the directions of surface geologic lineaments. In addition, depths to the basement rocks have been estimated using spectral analysis technique. The computed depths have been used to construct the basement relief map which resulted from gravity and magnetic data. They show that the depth to the basement rocks ranges from 2.3 km to 4.7 km.

KEYWORDS

Land magnetic, Gravity, Euler deconvolution, Edge detection and Spectral analysis.