

Magnetic investigation and 2½ D gravity profile modelling across the Beattie magnetic anomaly in the southeastern Karoo Basin, South Africa

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Abstract

The southeastern Karoo Basin is considered to be one of the most prospective areas for shale gas exploration in South Africa. An interesting magnetic anomaly, the Beattie magnetic anomaly (BMA), and geologic intrusions are seen on the magnetic map. To date, the source of the BMA and interconnectivity of the igneous intrusions are not well understood. In this study, we investigate the interconnectivity of the igneous intrusions and possible location of the source of the BMA using gravity and magnetic methods. The gravity model results showed that igneous intrusions are interconnected at depth, which probably pose threat by increasing the risk of fracking the Karoo for shale gas exploration. The magnetic results revealed that the BMA becomes stronger with depth. The average depths to the top of the shallow and deep magnetic sources were estimated to be approximately 0.6 and 15 km, respectively.

Key words: magnetic anomaly, igneous intrusions, gravity, models, Karoo Basin.

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