Curie depth and geothermal gradient from spectral analysis of aeromagnetic data over Upper Anambra and Lower Benue Basin, Nigeria.
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Abstract
The resent (2009) aeromagnetic data covering lower part of Benue and upper part of Anambra basins was subjected to one dimensional spectral analysis with the aim of estimating the curie depth and subsequently evaluating both the geothermal gradient and heat flow for the area. Curie point depth estimate obtained were in the range of 25 km to a maximum of 32 km, the maximum values where obtained within the regions of positive magnetic anomalies. The geothermal gradient within this area varies between 320°C/km to 800°C/km. The highest geothermal gradient is observed around Katakwa at the northern edge, which host the young granitic rocks of central Nigeria and around Lokoja which host undifferentiated old granites of western Nigeria. Heat flow values obtained are between 46mW/m² and 98 mW/m². Shallow Curie point depths, high geothermal gradient and high heat flow, located at two geometric basement highs at the western and northern parts, correlate with regions with high concentration of both potassium and Thorium concentrations as observed on the ternary map.

Keywords: Geothermal Gradient, International Geomagnetic Reference Field (IGRF), Benue Trough
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