AIRBORNE GRAVITY DATA INTERPRETATION FOR SUBSURFACE STRUCTURES AND IMPLICATIONS FOR HYDROCARBON PROSPECTS IN KOGI STAT E, NIGERIA

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ABSTRACT

Airborne gravity data of Kogi State, Nigeria, obtained from Gravimétrique International (BGI) has been interpreted for subsurface structures and implications for hydrocarbon prospects in the state. The extracted residual Bouguer gravity from the field data was enhanced with a first order filtering operation, gridded to produce a Bouguer gravity map and some selected points were modelled to obtain the desired results. These were achieved by processes of contouring, forward and inverse modelling and Euler depth estimation using the Oasis Montaj software. The results show subsurface formations with Bouguer gravity values of -13.4 mgal to 44.2 mgal within the state. Some regions in the southwestern, southeastern, northwestern and northeastern parts of the state have low gravity values which corresponds to subsurface formations with low density mass distributions. High density subsurface formations were identified in the southwestern, northern, and central parts of the state. The subsurface structural types interpreted are mostly faulted synclines and anticlines with structures trending in southwest-northwest in the northern parts of the state and east-west; north-south in the central parts of the state while in the southeastern part, structures trend in south-east directions. The sediment depths which also corresponds to depth to the basement in the state ranges from 53.7 m to 8890 m. These sediment depths have implications for hydrocarbon formation and accumulation as the sediment thickness are favorable environments for hydrocarbon formation while the structural types are suitable potential hydrocarbon reservoirs. It is recommend that more geophysical surveys be carried out to exploit the hydrocarbon potential of the state.

Keywords: Subsurface structures, formations, sedimentary thickness, hydrocarbon, modelling