

Investigation of the Litho-Structure of Ilesa Using High Resolution Aeromagnetic Data

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Abstract : The research investigated the arrangement of some geological features under Ilesa employing aeromagnetic data. The obtained data was subjected to various data filtering and processing techniques, which are Total Horizontal Derivative (THD), Depth Continuation and Analytical Signal Amplitude using Geosoft Oasis Montaj 6.4.2 software. The Reduced to the Equator -Total Magnetic Intensity (TRE-TMI) outcomes reveal significant magnetic anomalies, with high magnitude (55.1 to 155 nT) predominantly at the Northwest half of the area. Intermediate magnetic susceptibility, ranging between 6.0 to 55.1 nT, dominates the eastern part, separated by depressions and uplifts. The southern part of the area exhibits a magnetic field of low intensity, ranging from -76.6 to 6.0 nT. The lineaments exhibit varying lengths ranging from 2.5 and 16.0 km. Analyzing the Rose Diagram and the analytical signal amplitude indicates structural styles mainly of E-W and NE-SW orientations, particularly evident in the western, SW and NE regions with an amplitude of 0.0318nT/m. The identified faults in the area demonstrate orientations of NNW-SSE, NNE-SSW and WNW-ESE, situated at depths ranging from 500 to 750 m. Considering the divergence magnetic susceptibility, structural style or orientation of the lineaments, identified fault and their depth, these lithological features could serve as a valuable foundation for assessing ground motion, particularly in the presence of sufficient seismic energy.

Keywords : lineament, aeromagnetic, anomaly, fault, magnetic

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