

Analysis of High Resolution Seismic Reflection Data to Identify Different Regional Lithologies of the Zaria Batholith Located in the Basement Complex of North Central Nigeria

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Abstract : High resolution seismic reflection has recently been carried out on Zaria batholith, with the aim of characterizing the granitic Zaria batholiths in terms of its lithology. The geology of the area has revealed that the older granite outcrops in the vicinity of Zaria are exposures of a syntectonics to late-tectonic granite batholiths which intruded a crystalline gneissic basement during the Pan-African Orogeny. During the data acquisition the geophone were placed at interval of 1 m, variable offset of 1 and 10 m was used. The common midpoint (CMP) method with 12 fold coverage was employed for the survey. Analysis of the generated 3D surface of the p wave velocities from different profiles for densities and bulk modulus revealed that the rock material is more consolidated in South East part of the batholith and less consolidated in the North Western part. This was in conformity with earlier identified geology of the area, with the South Eastern part majorly of granitic outcrop, while the North Western part is characterized with the exposure of gneisses and thick overburden cover. The difference in lithology was also confirmed by the difference in seismic sections and Aerial satellite photograph. Hence two major lithologies were identified, the granitic and gneisses complex which are characterized by gradational boundaries.

Keywords : basement complex, batholith, high resolution, lithologies, seismic reflection

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