

## **Sedimentology and Structural Evolution of Outcrops in Afikpo and its Environs, Southeastern Nigeria: Implications for Petroleum Potential**

**K. N. Ugwuanyi and C. I. Okwara**

*University of Nigeria, Nsukka, Nigeria.*

The study area falls within Southeastern Nigeria in the Afikpo Basin, bounded by Long. 7 054'E to 7 059'E and Lat. 5 051'N to 5 056'N. Integrated lithofacies data were used to interpret geologic history of the Turonian-Maastrichtian sediments outcropping in the areas around Amate-Enu, Ibbi, Afikpo and Ozizza. The lithology recognized are sandstones, shales and mudrocks belonging to the Eze-Aku Group and Nkporo Formation which are believed to be deposited in a low to high energy environment. Five lithofacies associations occur (1) Lower Sandstone-Mudrock Facies (Shoreface) (2) Lower Shale Facies (Offshore) (3) Middle Sandstone Facies (Upper-Middle Shoreface) (4) Middle Shale Facies (Offshore) (5) Upper Sandstone Facies (Marginal Marine). Two periods of major deposition demarcated by the Santonian tectonic activity were observed. Statistical analyses of sand samples in some selected outcrops show sediments that are moderately to poorly sorted, generally positively skewed and platykurtic to leptokurtic, deposited in a fluvially influenced environment. This reduces the petroleum potential of the area. Reconstruction of ancient geographic and geomorphic features suggests that the sediments in the Afikpo Basin have their provenance from the nearby Oban Massif in the ENE direction, hence, the subangularity of quartz grains. Paleoclimate was typically warm and humid accounting for the abundance of clay and mica by weathering of feldspars. Sandstone in the area is thus, mineralogically mature to submature but texturally immature. Granulometric analyses suggest deposition in a fluvio-deltaic environment.