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Velocity Distribution Within the Anambra Basin, S.E. Nigeria: Implications for Hydrocarbon Exploration

The Anambra basin is a 300km NE-SW trending syncline located at the southwestern tip of the Benue trough in Southeastern Nigeria. The basin developed as a result of tectonic upheavals that occurred within the trough during the Santonian. The hydrocarbon exploration history of the basin has been an unsuccessful one. With over forty wells drilled so far only six have encountered oil and/or gas. This low success rate has greatly reduced the interest of explorationists who consider the basin a more difficult and less rewarding province than the adjacent Niger Delta.

This study assesses the petroleum potentials of the basin's Post-Santonian sedimentary units through the analyses and interpretation of seismic and logging velocity variations along profiles passing through prospects within the basin. Integrated results of Velocity Track Analysis, together with Differential Interformational Velocity (DIVA) plots generated for various formation intervals as well as Instantaneous Logging Velocity profiles generated from sonic logs reveal that significant velocity variations exist within the basin, are directly related to lithofacies variations and call for caution in their application at depth converting and migrating time data. The results also reveal possible zones of abnormal formation pressures within specific formations and diagnose the Santonian Nkporo and Maestrichtian Mamu formations as the most stratigraphically important for any hydrocarbon search targeted at the Upper-Cretaceous, and specifically, Post-Santonian sediments in the Anambra basin.