Oladipo Abimbola Victor, J Geol Geophys 2016, 5:5 (Suppl)
http://dx.doi.org/10.4172/2381-8719.C1.005

Trap identification and fluid contact mapping over 'Rainbow' field, Niger Delta

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In an oilfield exploration program, trap identification and reservoir fluid contact mapping are essential ingredients for reservoir studies in the absence of sufficient drilled wells. Trap identification and amplitude anomaly analysis of the Rainbow field, onshore Niger Delta was carried out using 3-D seismic and well log data. The objective of the study was to interpret structure maps for trap identification and extract amplitude data of such horizons in order to study hydrocarbon contacts. The method employed include well log correlation, reservoir identification, horizons interpretation, fault interpretation and amplitude extraction over the study area. Gamma ray log from 6 wells were correlated across the field to delineate the lithology and establish the continuity of reservoir sands. The tie between the reservoir tops and corresponding seismic reflections were established. Amplitudes of interpreted horizons were tracked to access the fluid contact. Results indicate 2 sand unit reservoirs II and I that are hydrocarbon bearing reservoirs and lies within depths range of (1200 m-2400 m and 2750-3300). The hydrocarbon contact could not be identified on well logs as the observed crossover of density and neutron logs signature is interpreted to be lithologic effect rather than fluid effect. In a bid to identify fluid contacts on the structure maps, amplitude was overlain with structure. Results show that amplitude did not conform to structure for reservoir I while reservoir II shows amplitude that correlates well with structure. Amplitude anomalies can be influenced by other factors including tuning effect and overpressure in shales. On the other hand, the structure maps shows the various positions and orientations of the normal growth faults and anticlinal folds. Anticline is an important structure for hydrocarbon folds. The faults are classified into major and minor faults. The major fault was continuous across the field while the minor fault terminates close to the anticlinal structure in the center of the field. The presence of these faults in the prospect areas is an indication of hydrocarbon accumulation in the fault traps, provided the fault zones are sealing. Therefore, it is interpreted that the principal structure responsible for hydrocarbon entrapment in the field is the anticlinal structure. Anticline is an important structure for hydrocarbon entrapment in the Niger Delta of Nigeria.

Biography

Oladipo Abimbola Victor has completed his BSc from University of Ilorin, Nigeria and is currently in the second year of his Post-graduate Diploma from the same university. He currently teaches Geography at Eagles College, Apata, Ibadan. He is co-author of a paper in the journal of *Environment and Natural Resources Research* 2013.

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