Depositional and Tectonic Control of Clastic Reservoir Developments: Case Study-Offshore Niger Delta Clastic Wedge

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In the research, influence of interactions between faults, mud diapirs and sedimentary processes on the size, shape, thickness, geometry and distribution of reservoir deposits during clastic reservoir developments was investigated using volume based seismic attributes, window based seismic attributes, time slices and well logs. Results obtained indicates that depositional and structural evolution of clastic reservoir developments are controlled by factors such as the type, thickness and weight of the overlying sediments, the impact of shale diapirs geometry that triggered up fault formations and mini basins, the eventual shape of the fault, the proximity of sediment load to the mobile shale layers, the rate of basin creations, deposition and destruction, and sediment transport agencies.

Evidences from structural contours and reflection intensity maps reveal the presence of several structural displacements at increasing depth and proximity to the mobile Akata shale. The impact of shale diapers in creating mini- depositional centre may have been accentuated by the formation of structural inversion at the lower part of the formation. Results from time slices and their cross sections at mapped reflectors suggests that sand depositional centre with high amplitude difference are trapped between faults F1and F7 and that the formation of faults F1 and F7 had actually created basin like depression which must have been navigated as an en-route by channels and its loads. Evidence from Window based Isochron thickness map shows that increasing thicknesses were associated with faulted depression and downthrown block side between F7 and F1, FI and F3 and grows larger within areas where there are great fault interactions.

As analyzed from RMS amplitude and maximum amplitude, higher amplitudes are mainly found between faults F1 and F7 which was identified as channel filled depositional basin and other areas confirmed by Window based Isochron thickness map to contain thicker sediment deposit. Gamma Ray and Resistivity logs of the mapped intervals, confirmed that these sedimentary fills are mainly distributaries and Channel fills, stacked vertically with an upward coarsening sequence which are generally blocky, cylindrical shaped, with sharp contact at the top and base to the shale interval.