

## Effects of Porosity Logs on Pore Connectivity and Volumetric Estimation

**Authors :** Segun S. Bodunde

**Abstract :** In Bona Field, Niger Delta, two reservoirs across three wells were analyzed. The research aimed at determining the statistical dependence of permeability and oil volume in place on porosity logs. Of the three popular porosity logs, two were used; the sonic and density logs. The objectives of the research were to identify the porosity logs that vary more with location and direction, to visualize the depth trend of both logs and to determine the influence of these logs on pore connectivity determination and volumetric analysis. The focus was on density and sonic logs. It was observed that the sonic derived porosities were higher than the density derived porosities (in well two, across the two reservoir sands, sonic porosity averaged 30.8% while density derived porosity averaged 23.65%, and the same trend was observed in other wells.). The sonic logs were further observed to have lower co-efficient of variation when compared to the density logs (in sand A, well 2, sonic derived porosity had a co-efficient of variation of 12.15% compared to 22.52% from the density logs) indicating a lower tendency to vary with location and direction. The bulk density was observed to increase with depth while the transit time reduced with depth. It was also observed that for an 8.87% decrease in porosity, the pore connectivity was observed to decrease by about 38%.

**Keywords :** pore connectivity, co-efficient of variation, density derived porosity, sonic derived porosity

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