

# **Origin and Distribution of Dual Porosity Network in Lower Cretaceous Thamama Zone D Carbonates, Abu Dhabi, UAE: Implications for the Prediction of Low Resistivity Pay Zone**

Abdulquadri Alabere

Khalifa University

## **Abstract**

Petrographic and petrophysical analyses of Lower Cretaceous Thamama Zone D carbonates, Abu Dhabi, United Arab Emirates allowed us to constrain and predict the impact of diagenesis and depositional facies on the formation and evolution of bimodal pore network and consequent implications for the recognition and prediction of low resistivity pay zone in tight carbonate reservoirs. Important near-surface diagenetic process include mainly extensive micritization, which resulted in the creation of intragranular microporosity. Burial diagenetic processes that affected the carbonates includes stylolitization along which cementation by saddle dolomite and equant calcite took place due to lateral fluid flow as result of ophiolite obduction. Subordinate volumes of depositional interparticle porosity were preserved by formation of sparse grain rimming and dog-tooth calcite cement that reduced the effect of mechanical compaction. Depositional micropores dominate in skeletal wackestones to mud-dominated packstone while macropores dominate in skeletal ooidal grainstone to rudstones. Micro and macro pore types are well connected but the moldic, isolated, fracture pores and intragrain micropores within ooids are all non-connected at both thin section and core plug scale. The research concludes that multimodal porosity network especially the abundance of micropore and nanopores is responsible for the development of observed low resistivity pay zone within lower Cretaceous Thamama group carbonates