

Deep-Water Deposits of Nigeria: Quantitative Integration of Core Data and Applications to Deepwater Exploration and Development

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A methodology has been designed that captures rock properties as observed in deepwater cores in a classification scheme that is objective and non-genetic. This classification scheme utilizes “reservoir facies” determined from lithologic properties and is highly quantified. Because such rock properties as grain size and size sorting exert a controlling influence on reservoir properties such as porosity, permeability, saturation, and relative permeability, the reservoir facies have broad application in deepwater oil-field description, development, and management. This set of reservoir facies has been specifically designed for application in deep-water deposits of the Niger Delta, but the usefulness and validity of the methodology has been demonstrated not only here, but also in the description of 10’s of thousands of feet of core and the development and management of dozens of fields world-wide.

These quantitative facies are especially useful in tying wells to seismic data and can be used to explain differences in AVA behaviour in hydrocarbon bearing deepwater reservoirs. The classification recognizes flow barrier and seal-facies, thus improving the ability to understanding trapping. And despite the fact that they are defined non-genetically, it is possible to interpret their origin and provide a link to deepwater EODs. Ultimately, the ability to consistently and reliably integrate rock data with all other scales of data, up to and including regional seismic, leads to far more robust genetic models, including tectonic, sequence stratigraphic, and depositional.