

# Evidence for Cretaceous Sedimentation in a Tertiary Basin; A Structural and Stratigraphic Case Study Evaluation from the Niger Delta Basin

**Olabode Matthew**

Sahara Group

9.29.2020 - 10.1.2020 – AAPG Annual Convention and Exhibition 2020, Online/Virtual

## Abstract

The Niger Delta geological basin is a mature basin that cuts across Nigeria, Equatorial Guinea, São Tomé and Príncipe and Cameroon with a large part of the basin lying within Nigeria. The basin is known to extend from the onshore part of Southern Nigeria and extends offshore into the deep-water terrain of the Nigerian continental shelf. Available data and information from previous studies based on extensive research work carried out on the Niger Delta confirms the age of the deltaic sediments to be predominantly of Tertiary age with little to no evidence of older rocks and sedimentation penetrated within the basin. A thorough review of available seismic and well data from the Northern depo-belt and the Greater Ughelli depo-belt was undertaken with a view of accessing the potential for Pre-Tertiary sedimentation within this part of the delta. Data from 10 wells were evaluated with their lithostratigraphy correlations established. Available biostratigraphy data from these wells were analysed and enabled the construction of a chronostratigraphic framework which aided the age dating of the study area. Sequence and seismic stratigraphic methodologies and evaluation were carried out using available 2D and 3D seismic data present in the area. These integrated evaluations were required to prove the hypothesis. Based on known and published stratigraphic framework within the delta, very limited evidence exist for the penetration of the Cretaceous within the basin. Our evaluation results however identified the presence of Cretaceous sediments encountered and correlatable to the 65ma

regional maximum flooding surface (MFS) and older sediments in multiple wells. We showcase the boundaries between the Cretaceous/Eocene basins within the Niger Delta and interplay of the Northern depobelt and the Greater Ughelli depobelt using seismic imaging and biostratigraphic data. This paper also confirms the penetration of the top of the basement complex within the Niger Delta. The regional tectonic and structural framework was delineated based on seismic image of the basin fringe hinge line with rift faults were identified. This paper presents some alternative play types requiring further evaluation and waiting to be explored in the Niger Delta and similar Tertiary basins.