

Seismic Stratigraphy of the First Deposits of the Kribi-Campo Offshore Sub-basin (Gulf of Guinea): Pre-cretaceous Early Marine Incursion and Source Rocks Modeling

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Abstract : The Kribi-Campo sub-basin belongs to the southern domain of the Cameroon Atlantic Margin in the Gulf of Guinea. It is the African homologous segment of the Sergipe-Alagoas Basin, located at the northeast side of the Brazil margin. The onset of the seafloor spreading period in the Southwest African Margin in general and the study area particularly remains controversial. Various studies locate this event during the Cretaceous times (Early Aptian to Late Albian), while others suggested that this event occurred during Pre-Cretaceous period (Palaeozoic or Jurassic). This work analyses 02 Cameroon Span seismic lines to re-examine the Early marine incursion period of the study area for a better understanding of the margin evolution. The methodology of analysis in this study is based on the delineation of the first seismic sequence, using the reflector's terminations tracking and the analysis of its internal reflections associated to the external configuration of the package. The results obtained indicate from the bottom upwards that the first deposits overlie a first seismic horizon (H1) associated to "onlap" terminations at its top and underlie a second horizon which shows "Downlap" terminations at its top (H2). The external configuration of this package features a prograded fill pattern, and it is observed within the depocenter area with discontinuous reflections that pinch out against the basement. From east to west, this sequence shows two seismic facies (SF1 and SF2). SF1 has parallel to subparallel reflections, characterized by high amplitude, and SF2 shows parallel and stratified reflections, characterized by low amplitude. The distribution of these seismic facies reveals a lateral facies variation observed. According to the fundamentals works on seismic stratigraphy and the literature review of the geological context of the study area, particularly, the stratigraphical natures of the identified horizons and seismic facies have been highlighted. The seismic horizons H1 and H2 correspond to Top basement and "Downlap Surface," respectively. SF1 indicates continental sediments (Sands/Sandstone) and SF2 marine deposits (shales, clays). Then, the prograding configuration observed suggests a marine regression. The correlation of these results with the lithochronostratigraphic chart of Sergipe-Alagoas Basin reveals that the first marine deposits through the study area are dated from Pre-Cretaceous times (Palaeozoic or Jurassic). The first deposits onto the basement represents the end of a cycle of sedimentation. The hypothesis of Mike.F. Mienlam Essi is with the Earth Sciences Department of the Faculty of Science of the University of Yaoundé I, P.O. BOX 812 CAMEROON (e-mail: Essifranck@yahoo.fr). Joseph.Q. Yene Atangana is with the Earth Sciences Department of the Faculty of Science of the University of Yaoundé I, P.O. BOX 812 CAMEROON (e-mail: jquentinyene@yahoo.fr). Mbida Yem is with the Earth Sciences Department of the Faculty of Science of the University of Yaoundé I, P.O. BOX 812 CAMEROON (e-mail: yem04@yahoo.com). Cretaceous seafloor spreading through the study area is the onset of another cycle of sedimentation. Furthermore, the presence of marine sediments into the first deposits implies that this package could contain marine source rocks. The spatial tracking of these deposits reveals that they could be found in some onshore parts of the Kribi-Campo area or even in the northern side.

Keywords : cameroon span seismic, early marine incursion, kribi-campo sub-basin, pre-cretaceous period, sergipe-alagoas basin

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