

The Journey of African Plate from Gondwana Assemblage to Present: Signatures on Sediments and Play Potential of Muglad Basin, Sudan – a Sequence Stratigraphic Preview

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The Breakup of Gondwana Super continent resulted from the interaction of a series of Hotspot/Mantle plumes impregnating on and between the cratonic regions of Gondwana. The First major Gondwanide hotspot resulted in splitting of East and West Gondwana, where initial stretching started in North, to the East of Africa, and progressed Southward, separating African plate from the super continent. As the plate started its journey northward, the relative plate motion of the main African Craton induced the development of large linear rift system.

The three distinct phases of rifting occurred in response to crustal extension, which provided the isostatic mechanism for subsidence. The subsidence, giving rise to various basins, was accomplished by normal faulting parallel and sub parallel to the major stress axis. Muglad and Melut basins are major rift basins in Sudan, Muglad rift was linked to spreading centers in the proto –south Atlantic by dextral shearing along “Central African shear zone “via Anza rift in Kenya. Each phase of rift consists of a rift initiation phase, an active rifting phase and a thermal sag phase and its impact is clearly seen on resultant lithofacies.

Authors carried out a modeling of a prolific producing field in Muglad basin with sufficient data points applying the sequence stratigraphic concepts. Cycles up to fourth order are being identified and correlated across the area of study. This study led to understanding of petroleum systems operative along with its element up to generic level and a more focused exploration efforts are delineated for identified play fairways to assess its potential.