
Single and Multi-Story Sandstone Bodies, Their Geometry, Stratal Pattern and Relevance for Identification of Facies Heterogeneity in Muglad Basin, Sudan

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Muglad basin of Sudan is evolved as one of the main component of West and Central Africa Rift System (WCARS). Located in the southwestern part of Sudan, it encompasses the largest and most important oil producing area. The basin occupies an area of about 1,20,000 km² and contains continental sedimentary succession of more than 13 km thickness, ranging from Cretaceous to Tertiary age. In present study authors investigated the facies, depositional environment, stacking pattern of single and multi storey-sandstone and shale bodies in west Kaikang trough wells. The different scales of facies heterogeneity from micro to macro were recognized in both Zarqa and Aradeiba Formations (Santonian-Campanian age). The geometry of sandstone bodies is mapped and the average W:T ratio of single story sandstone bodies is calculated as 64:1 and 17:1. The thickness range between 1-11.3m and 8-25m, width ranges from 15-33m and 110-400m for these Formations respectively. The multi-story sandstone bodies range up to 6.1-99m and 1-52m thick and over 1900 to 3000m wide in the same formations. On the basis of architectural elements, different types of reservoir settings are identified. These are clean sandstone and sandstone intercalated with mudstone - facies type 1, and sandstone intercalated with discontinuous thin layers of mudstone - facies type 2, and medium to coarse grained sandstone sheets intercalated with the lenses of over bank/flood plain - facies type 3. These reservoirs are intensively faulted by post Cretaceous tectonic episode and the major units of these reservoirs testify to environment changes in response to main tectonic pulses during the Tertiary rifting phase in Muglad basin. A process response model reacting to tectonic episode, having its signature on facies architecture and type is being identified; this will lead to better understanding of paleoenvironment and tracking the channel sands in this exploratory active acreage.
