SALT TECTONICS IN THE CONGO BASIN: 2-D SEISMIC AND POTENTIAL FIELD CONSTRAINTS

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The Congo Basin (Cuvette centrale) is one of the largest intracontinental basins of Africa. Earliest geological and geophysics works related to the "Syndicat pour l'Etude géologique et minière de la Cuvette congolaise" was indicated the presence of a vast sedimentary basin filled with infracambrian to recent series. Well logs (Samba TD at 2038 m, Dekese TD at 1856 m, Mbandaka-1 TD at 4350 m and Gilson-1 TD at 4665 m) reveal that his sedimentary fill is up to 5 km but would be more than 9 km in some location as shown by seismic interpretation. The two later wells (Mbandaka-1 and Gilson-1) penetrate an evaporite series at their bottom depth (Lawrence and Makazu, 1988; Daly et al., 1992).

Two prominent seismic markers calibrated in the in the Samba and Mbandaka-1 wells represent upper and lower unconformity surfaces corresponding to the Trias to Upper Jurassic and the Pan-African unconformities and can be used to subdivided the sedimentary section in three seismo-stratigraphic units. Locally deformation have been observed on the seismic lined affected either the basal unit only or the two below ones. The deformations features included strike-slip faults, sedimentary warping, chaotic and disrupted seismic facies as well as poor definition seismic zones. These deformation features were earlier attributed to crustal contraction and basement uplift (Daly et al., 1992). To improve them, several integrated potential field models have been run close to seismic lines to obtain 2D Gravity/Magnetic Model. Models through the sedimentary warping features reveal typically negative gravity and magnetic signature. To achieved a good fit between observed and calculated anomaly various data enhancement techniques have been applied and found particularly useful for defining lower density as well as negative magnetic susceptibility lithologies that contrast with surrounding and overlying sediments. As postulated by Priesto (1996), prominent negative magnetic anomaly through these zones gives an excellent indication to discriminate between salt and shale structures. The second normally doesn't produce significant magnetic effect. Models through intense deformation feature zones didn't require any enhancement to achieve good gravity fit between observed and calculated anomaly. Such zones have been defined as crossover zone by Priesto (1996). Meanwhile, magnetic fitting couldn't be easily achieved over these zones due to probably negative induced magnetization of chemistry or detritic origin and related to unconsolidated sediment filling. Along high gravity anomaly, minimum misfit between observed and calculated gravity anomaly is achieved with gradual lateral change in the density of the basement suggest the presence of heterogeneous basement or a basic magmatic intrusion.

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