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Determination and Distribution of Formation Thickness Using Seismic and Well Data in Baga/Lake Sub-basin, Chad Basin Nigeria

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Abstract : The Nigerian part of the Chad Basin till date has been one of the few critically studied basins, with few published scholarly works, compared to other basins such as Niger Delta, Dahomey, etc. This work was undertaken by the integration of 3D seismic interpretations and the well data analysis of eight wells fairly distributed in block A, Baga/Lake sub-basin in Borno basin with the aim of determining the thickness of Chad, Kerri-Kerri, Fika, and Gongila Formations in the sub-basin. Da-1 well (type-well) used in this study was subdivided into stratigraphic units based on the regional stratigraphic subdivision of the Chad basin and was later correlated with other wells using similarity of observed log responses. The combined density and sonic logs were used to generate synthetic seismograms for seismic to well ties. Five horizons were mapped, representing the tops of the formations on the 3D seismic data covering the block; average velocity function with maximum error/residual of 0.48% was adopted in the time to depth conversion of all the generated maps. There is a general thickening of sediments from the west to the east, and the estimated thicknesses of the various formations in the Baga/Lake sub-basin are Chad Formation (400-750 m), Kerri-Kerri Formation (300-1200 m), Fika Formation (300-2200 m) and Gongila Formation (100-1300 m). The thickness of the Bima Formation could not be established because the deepest well (Da-1) terminates within the formation. This is a modification to the previous and widely referenced studies of over forty decades that based the estimation of formation thickness within the study area on the observed outcrops at different locations and the use of few well data.

Keywords : Baga/Lake sub-basin, Chad basin, formation thickness, seismic, velocity
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