Tectonic and Sedimentation History of the Central Eastern Continental Margin of India: A Seismic Approach

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High quality multichannel seismic reflection data acquired by the oil industry along ten profiles in the Central Bay of Bengal has been analyzed. Four prominent seismic horizons have been identified in the sedimentary column. These are: top of Cretaceous (C), top of Paleocene (P), top of Miocene (M) and base of Quaternary (Q). Cretaceous sediments (4.17 - 0.06 s TWT; upto 10 km) are thickest towards shelf and minimum on the crest of the 85°E Ridge. Similarly, the Paleocene sequence thickness varies between 1.51 and 0.03 s TWT (upto 3 km), and is seen thinning towards offshore. The overlying Eocene to Miocene sediment sequence thickens towards offshore (2.07 - 0.136 s TWT; upto 3 km). The Pliocene sediment sequence thickness varies between 0.82 and 0.15 s TWT (upto 1 km), while the Quaternary sequence thickness varies from 1.54 to 0.11 s TWT (upto 1.4 km).

The nature of the underlying basement has been inferred from the reflection pattern, and the continental crust transforms into transitional crust having variable width and comprised primarily of dyke/mafic intrusive bodies. Further offshore, the crust exhibits typical characteristics of oceanic crust with a strong echo at ~10 s TWT corresponding to the Moho. Two to three strong reflectors probably representing the gabbros and lower crust are common above the Moho reflector. Integrated modeling studies reveal the extent of the continental, transitional and oceanic crust along the eastern continental margin of India, and a complex structure of the subsurface 85°E Ridge. Seismic images reveal that the ridge was developed by more than one episode of tectonic/volcanic activity. The new constraints in the form of sediment overburden thickness and crustal configuration in the Central Bay of Bengal improved the understanding of the development of the Eastern Continental margin of India with its diversified tectonic framework since Early Cretaceous.