

The Crustal Architecture and Continental Break Up of East India Passive Margin: An Integrated Study of Deep Reflection Seismic Interpretation and Gravity Modeling

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The East Indian passive margin was developed after the disintegration of eastern Gondwanaland by the break up from Antarctica in Early Cretaceous. In accordance with other passive margins, the break-up involved stretching, thinning and a probable process of mantle exhumation prior to the sea floor spreading. To understand the continental break up and margin evolution; a combined study of gravity, magnetic and seismic data focuses on determining the crustal architecture and different crustal types, such as continental, proto-oceanic and oceanic crusts, and their boundaries. The data set comprises the latest India-Span deep reflection seismic profiles acquired by GX Technology along with gravity and magnetic data, and 2D seismic data from Reliance Industries Ltd.

Six major tectonic segments composing the East Indian margin played a pivotal role in the continental break up and passive margin development. The proto-oceanic crust corridor located oceanward of them indicates the role of different rifting processes and breakup mechanisms and can be kinematically linked to above mentioned tectonic segments. The orthogonally rifted segments, e.g. the Krishna-Godavari and Cauvery rift zones, developed a hard linkage through a major dextral transfer fault called the Coromondal fault zone. The proto-oceanic corridor is narrow along the Coromondal segment and wide in segments, which were initiated by orthogonal rifting. The continental crust terminates abruptly along the Coromondal segment and thins considerably before it terminates in orthogonal-rifting segments. Outboard of proto-oceanic crust lies the oceanic crust, Outboard of proto-oceanic crust, the oceanic crust is present, where anomalies produced by geomagnetic isochrons are not yet identified due to the Late Cretaceous mantle plume activity that produced the 85E Ridge. This activity modified the thicknesses of all three crustal types in its influence zone.