

## **Seismic Geomorphology of Mass Transport Complexes (MTCs) and Its Importance in Hydrocarbon Exploration in the Forearc Deepwater Basin, Andaman, India**

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Mass transport complexes form a significant component of the stratigraphic record in ancient and modern deep water basins worldwide. One such basin, the Forearc deepwater basin of Andaman, India, situated in the SE periphery of the Bay of Bengal extending from Myanmar in the north to Indonesia in the south, is characterized by active tectonics and possible migration and sequestration of hydrocarbons. It represents a typical Island Arc system associated with converging plate boundary and is a result of the northward movement and anticlockwise rotation of the Indian plate, and its impingement beneath the SE Asian plate since Cretaceous time.

The 3D seismic surveys enable sub-seafloor interpretation of several erosional surfaces that form the boundaries of mass transport complexes (MTC). The data shows numerous episodes of MTC developments which are characterized by chaotic, mounded seismic facies and fan-like geometry. Their extent and thickness is strongly influenced by surrounding structural features associated with regional tectonics. The seismic attribute analysis shows some internal organization in MTCs. Depositional architectures identified within these units include large magnitude lateral erosional edges, internal syndepositional thrusts and kilometer-scale transported mega-blocks. An attempt has also been made to analyse the internal architecture of the mega-blocks. In addition to the larger MTCs which are in the deeper part and presumably Late Miocene in age, an important number of smaller and younger MTCs of Plio-Pleistocene have been identified in the study area.

The mechanisms of generation of the larger MTCs in the deeper part may be related to the activation / reactivation of Diligent fault to the west and West Andaman fault to the east of the study area. The smaller and younger MTCs are thought to be the result of frequent occurrence of large earthquakes in the area and mega-tsunamigenic forces.

An attempt has been made to map the vertical and lateral distribution of mass-transport-complexes (MTCs) within the subsurface of the study area of Forearc deepwater basin, Andaman, to characterise and interpret the detailed morphology and internal heterogeneity of the MTCs. The MTCs are characteristic in changing the reservoir quality and the horizontal to vertical permeability ratio. At places, the MTCs are forming structures in the study area which may be a locale for hydrocarbon entrapment.