



Influence of Sedimentary Processes and Fault Tectonics on the Evolution of Submarine Canyons in the East Andaman Basin: Insights from High-Resolution Seismic Data Analysis.

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Abstract

The Andaman Sea Basin, a well-known back-arc spreading centre and a mature petroliferous basin, presents a unique and complex scenario for understanding the interplay of sedimentary processes and fault tectonics on seafloor geomorphology evolution, particularly in the eastern shelf region. This study, using high-resolution 3D seismic data and published exploratory well-seismic interpretation results, aims to establish a comprehensive stratigraphic framework for the Tanintharyi region, spanning the Lower Miocene, Middle Miocene, Upper Miocene, Pliocene, and Quaternary. A submarine canyon system was identified and investigated along the Tanintharyi continental slope within the East Andaman Basin, comprising thirteen slope-confined canyons arranged predominantly in an east-west vertical slope orientation. By analysing seismic reflection features, five distinct seismic facies have been identified, including basal lag (BL), slump and debris-flow deposits (SDFDs), canyon confined sheets (CCSs), laterally inclined packages (LIPs), and channel-

levees (CLs). The evolution of this canyon system, a vital focus of this study, can be categorised into three phases based on the morphology and sedimentary structures observed: canyon initiation, canyon extension, and erosion-sedimentation. The findings of this study highlight the critical controlling role of faults in canyon evolution, with the intensity of fault activity displaying a negative correlation with canyon size, indicating the direct impact of faults on geomorphological changes. In addition, the geomorphological changes induced by fault activity have resulted in changes in sediment supply, dispersal, and sedimentation rates, thus significantly impacting the spatial distribution and dimensions of slope-confined canyons within the East Andaman Basin, with far-reaching implications.

Key words

The Andaman Sea Basin, Evolution of Submarine Canyons, Slope failures, Sediment Dispersal, Strike - slip Faults