

Unstable Clastic Margins: Play Fairways and Links to Deepwater Systems

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Clastic margins associated with significant petroleum provinces are typically characterized by an abundant supply of fine-grained dominated sediment. Tertiary examples include the northern Gulf of Mexico, central West Africa, Eastern Mediterranean and the North Sea. Concentration of fine-grained sediments at the top of regional slopes produces inherently unstable conditions. Failure and re-deposition of these unstable sediments imparts a suite of distinctive signatures on the resultant margin and down dip deepwater stratigraphy. The scale and frequency of failure events within clastic margins are highly variable and single episodes may impact only local architectures or have regional significance.

Investigations of both recent and ancient examples have identified regional collapses of clastic margins. These rare events, especially those that do not adhere to classic stratigraphic cyclic concepts, are commonly missing components within predictive models. Stratigraphic fabrics that are produced by regional margin failures are identifiable on well logs and are visible on both outcrop and seismic data. Petroleum systems and play fairways within and down dip of unstable clastic margins may owe much of their origins to infrequent but catastrophic collapse and stabilization episodes.

We will illustrate the importance of regional failure events at continental margins via play types and speculate on the internal and external controls on these major instabilities, including sea-level, climate and tectonics.