

Reservoir Architectural Styles across Stepped Slope Profiles: Implications for Exploration, Appraisal and Development

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Reservoirs deposited across stepped slope profiles account for over 75% of global Tertiary deepwater discoveries. Stepped slopes most commonly develop across passive margins with mobile substrates but are also described from active (convergent) and block-faulted or rifted margins. Factors such as entry ramp, step floor and exit ramp gradients, sediment flux (flow size, frequency, volume, rheology) and mobile substrate type all are key to understanding how stepped slope accommodation develops and is 'healed' over time. Structural complexity can result in varying degrees of step drainage tortuosity, local 'back-stops' and under-fit or over-fit depositional systems.

Understanding the interaction of sediment gravity flows with topographic breaks in the slope profile is critical to predict depositional architecture and ultimately reservoir performance. This study will highlight numerous examples of the variability of structural accommodation and reservoir architectural style across steps in the slope profile, and discuss the implications for reservoir modeling and drilling on exploration, appraisal and development scales.
