SHELF-MARGIN ARCHITECTURE AND SHORELINE PROCESSES AT THE SHELF-EDGE: CONTROLS ON SEDIMENT PARTITIONING AND PREDICTION OF DEEP-WATER DEPOSITION STYLE

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The Lower Barrow Group (LBG; Latest Tithonian – Early Valanginian) is a shelf-margin that prograded during a late phase of rifting under various subsidence regimes and supply-dominated conditions. A 3D semi-automatic, full-volume seismic interpretation method allow identifying high-order clinothems presenting an estimated cyclicity of ~40,000 yrs, in which a quantitative analysis of the shelf-margin architecture and shorelines processes was conducted. Overall, three and four main types of hydrodynamic regimes and deep-water systems were identified, respectively.

Falling to flat shelf-edge trajectories are associated with sediment bypass, whereas rising shelf-edge trajectories are linked with increasing sediment storage on the shelf. While fluvial to wave processes can be dominant in all A/S conditions, results show that fluvial-dominated coastlines are associated with steep high-angle slope clinoforms and short to longer run-out turbidites. Conversely, wave-dominated coastlines are linked to low-angle slope clinoforms and poor turbidite system development (occasional sheet sand and MTDs).

The short and longer run-out turbidite systems present a tripartite architecture (canyon / slope valley; channel; lobes) which mostly appear as short-lived, vertically / laterally stacked elements fed my multiple small rivers forming linear ramp systems. Due to the shallow configuration of the margin (<500m), the presence of short slopes and overall high sand-to-mud ratio, the turbidite systems are smaller scale (<50 km) and probably shorter lived than most modern turbidite systems (100-1000 km).

This study sheds new lights on the significant role of shelf-margin architecture (slope gradient, hydrodynamic regime) in predicting the deep-water sediment delivery behavior (sediment partitioning, type of deep-water system).