Facies, Architecture and Compartmentalization of Basin-Floor Deposits: Upper and Middle Kaza Groups, British Columbia, Canada

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Excellent exposures of basin-floor deposits of the proximal Upper Kaza Group and more distal Middle Kaza Group provide a unique opportunity to study terminal-splay/lobe deposits in the Windermere turbidite system. Although both the Upper and Middle Kaza groups are populated by similar architectural elements, including deep and shallow channels, sandy terminal-splays, and inter- and intra-splay turbidite sheets, it is the relative abundance of these elements that shows significant variation, and which, in turn, has a significant impact on reservoir continuity and compartmentalization estimates.

A major difference between the Upper and Middle Kaza groups is the greater abundance of fine-grained inter-/intra-splay turbidite sheets in the more distal Middle Kaza, resulting in an overall higher net-to-gross in more proximal deposits. Another difference is that both deep and shallow channels with rapid lateral facies changes are more common in the proximal Upper Kaza, but largely absent in the Middle Kaza. Finally, muddy debrites are absent in more distal deposits, but present in proximal strata. These differences result in better vertical connectivity (due to scouring and amalgamation), but significantly diminished lateral continuity (due to rapid lateral facies changes in channel fills) in sand-rich proximal basin floor reservoirs compared to seemingly similar sand-rich units deposited in more distal settings.

An understanding of the basic architectural elements and their relative abundance at different locations along a depositional transect is essential especially in cases where stratigraphic data are limited and seismic only resolves a “sheet like” geometry irrespective of local morphology. These 5-55 m thick seemingly self-similar units are, however, populated by different relative abundances of the smaller composite architectural elements, and thus despite their seismic similarity, may have very different reservoir characteristics based on location in the depositional system.