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Columbus Basin Upper Slope: Modern Depositional Environments from Seismic

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Plio-Pleistocene deposition within the Columbus Basin foredeep is dominated by the massive proto-Orinoco delta system. The eastward-prograding drainage system has deposited over 30,000 ft of sediment within the last 5 million years. With new advances in seismic imaging and drilling capability, there is now opportunity to push exploration deeper below known shelf discoveries. This talk aims to use observations of seismic geomorphology within the most recent upper slope depositional sequence as an analogue for potential upper slope reservoirs that can then be applied to the deepest sections below the shelf.

From detailed seismic mapping and using attributes such as spectral decomposition, it is observed that upper slope deposition is dominated by mass transport complexes (MTCs) and slumping, with narrow, straight channels hinting at mostly sand by-pass onto the lower slope and basin floor. However, although far less common, some potentially attractive reservoirs can be recognized in the form of channel belts, slope aprons and channel levee complexes.

Individual, long-lived, erosionally confined channel belts that are likely to be more sand prone can be recognized, with lengths greater than 20 Km and 5-7 Km wide. These align with sediment entry points into the upper slope that are controlled by the tip points of syn depositional normal faults along the edge of the shelf depositional system. Channel levee complexes and slope aprons are seen to develop where there are subtle, localized changes in slope gradient, often associated with MTC topography or structural deformation related to strike slip faulting. Some complexes can develop as large as 20 km long and 5 km wide with multiple depositional sequences compensationally stacked together.