High resolution sequence stratigraphy of the Banquereau Formation, offshore Nova Scotia

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The Late Cretaceous to Late Neogene/Early Quaternary Banquereau Formation in the Scotian Basin, offshore Nova Scotia, is a stacked series of prograding sequences that downlap onto the Wyandot Formation. The Banquereau Formation unconformably overlies the Wyandot Formation and ranges in depth from 165 to 1355 m below the seafloor, reaching the thickest point of 1500 m in the Sable Sub-basin, north of Sable Island. This paper interprets the lithostratigraphy of the Banquereau Formation within a sequence stratigraphic framework and describes the internal geometry of a section of clinoforms within the Banquereau Formation by computing a dense set of correlated 3D stratigraphic surfaces between two mappable seismic horizons. This is done by using a steering cube, which is a continuous measurement of reflection slope and azimuth throughout the seismic volume. Studying the clinoforms of the Banquereau Formation provides an in-depth understanding of the internal structure of the prograding sequences. Interpretation of seismic data demonstrates that clinoforms prograded to the southeast suggesting that the paleoflow direction of the Cenozoic deltaic system was from the northwest to the southeast. Based on analysis of cuttings and wireline logs, lithofacies of the formation show an overall coarsening upward trend from mudstone in the fore- and bottomsets into sandstone in the topsets with minor amounts of conglomerate. Sequence stratigraphic interpretation integrated with micro-paleontological studies allows a relative sea level curve to be developed for the succession. Although this formation does not have hydrocarbon occurrences in the Scotian Shelf, the method is applicable to any region (e.g., Trinidad, Brazil, West Africa) where sequence and parasequence scale stratigraphic characterization contributes to understanding petroleum accumulations.

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