

Sequence Stratigraphy of the Pearl River Deep-water Fan Systems, South China Sea

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Regional geological investigation indicates that the Baiyun Sag, a deep-water continental slope region located at the palaeo-Pearl River mouth and immediately below the current sand-rich Pearl River delta, is a favorable place for the development of large-scale deep-water fan systems. Seismic and sequence stratigraphic study of the deepwater slope region has led to the discovery of multi-sequences of overlapped Pearl River Deep-water Fan Systems, which have enormous potential for major hydrocarbon discoveries.

The sequence stratigraphic analysis of the Pearl River Deep-water Fan Systems has greatly improved our understanding on the geological evolution of the region by (1) constructing a local sea-level curve, (2) identifying chrono-horizons of seismic reflection phases, sequence boundaries and their corresponding biostratigraphic ages, (3) correlating sequence boundaries with global eustatic sea-level curve and deposition bodies within the sequence frame, (4) establishing the coupled effect between the development of the deep-water fans and sea-level changes, sediments supply and palaeo-geography, (5) identifying palaeo shelf breaks and depositional sequence types, and (6) analyzing the temporal and spatial evolution of sequences and parasequences.

The established sequence stratigraphic framework led to the discovery of Pearl River deep-water fan systems and unraveled the coupled genetic relationship between the drainage basin of Pearl River, Pearl River delta and deep-water fan systems. The development of the deep-water fan systems are also found to be strongly influenced by sea level changes and the palaeo-geography.