

Deltaic Petroleum Systems – a Different Perspective

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Many of the major accumulations of petroleum in the world occur in strata that are broadly termed “deltaic”. In reality these thick wedges of strata represent accumulation of sediment over tens of millions of years and contain strata deposited in a range of environments that may vary from terrestrial to abyssal plain. These deltaic wedges can be self-contained petroleum systems, containing both rich source rocks and excellent reservoir rocks.

In many cases, interpretations of the ancient deltaic strata use the present-day delta of the area as an analog to interpret the ancient. However, factors that control the geometry of the present-day delta (such as wave energy, tidal flux, and rate of fluvial input) almost certainly varied substantially through time and the morphology of the delta constantly evolved as those factors changed. In order to build a framework from which to predict the essential aspects of a petroleum system it is necessary to consider longer-term controls on the accumulation of the deltaic wedge. These factors include long-term sediment flux and climatic regime, the subsidence rate, and the magnitude of eustatic sea-level fluctuations over time. The character of important aspects of petroleum systems, such as condensed-interval source rocks, coaly source rocks, and reservoir geometries vary greatly and are dependant on these factors. Of particular interest are variations in strata deposited during greenhouse epochs, such as the Cretaceous, versus glacial epochs, such as the late Tertiary and Quaternary.

There is substantial potential for future discoveries in deltaic systems. Vast deltaic complexes remain to be explored, including areas within the Arctic and offshore Australia. This talk will review some of the well-known deltaic petroleum systems of the world and suggest criteria to be used in predicting the potential for petroleum resources in under-developed or frontier areas.