Geology of Subtle Gas Pools in the Yinggehai and Qiongdongnan Basins, South China Sea

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The Yinggehai and Qiongdongnan (Y-Q) basins, located in the northern part of the South China Sea, are two major Cenozoic hydrocarbon-bearing sedimentary basins. Large gas accumulations have been discovered recently in a variety of subtle traps including sandstone wedges, incised valley sandstones, delta front and pre-delta turbidite sands associated with diapir structures.

The widespread development of a variety of subtle traps in the Y-Q basins is attributed to the unique geological setting in the basins. The tectonic setting and evolution of the Y-Q basins is similar to the Atlantic passive marginal basins and is conducive for the development stratigraphic traps. Some of the second and third order sequence boundaries were associated with major regional tectonic events and provided the necessary tectonic- stratigraphic framework for the development of subtle traps. During the course the basin evolution a wide variety of depositional regimes from fluvial, through shallow marine to deep marine and associated depositional processes were present, which provided the essential sedimentary facies elements for the subtle trap development. The presence of diapir structures within the Y-Q basins also provided favourable conditions for the formation of subtle traps. Major subtle trap types discovered in the Y-Q basins can be grouped according to the tectonic evolution phases of the basins including (1) syn-rift fault block and lithologic composite traps, unconformity-stratigraphic traps, fault nose; (2) post-rift stratigraphic and lithologic traps, pre-delta and delta front turbidites; (3) passive margin shelf sandstone lithologic traps, incised valley and basin floor fan sandstone lithologic traps.