

Gulf of Thailand Reservoirs: Reassessing the “Fluvio-Deltaic” Model

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Recent Gulf of Thailand reservoir studies have favored a “fluvio-deltaic” model for sand deposition, based on a paleo Chao Phraya river system. In this concept, the Chao Phraya system extended across the Gulf of Thailand during Miocene low stand events, and a delta formed where the river terminated at the ocean. Thus, fluvial and deltaic sandstone was deposited as the shoreline advanced and retreated.

In the fluvio-deltaic model, reservoir sands are classified as either bars or channels, based on wireline log motif and vertical thickness. When used in conjunction with 3-D seismic, the fluvio-deltaic model produces accurate maps of channelized sand trends that can be used for well targeting and reserves estimates. However, the simple fluvio-deltaic model lacks the detail required to provide input for reservoir modeling and simulation. Moreover, misunderstanding of tropical, coastal processes and delta systems can lead to erroneous estimates of sand distribution when amplitude anomalies are not present.

In this paper, a tropical, paralic model for Gulf of Thailand reservoirs is presented, based on modern Thai analogs, shallow seismic data, and sequence stratigraphic concepts. Periods of low sea level had increased accommodation space and energy gradients due to stream erosion. This resulted in deposition of sharp based, relatively thick, medium to coarse-grained sand beds. These deposits are channelized and are found to down cut into flooding surfaces. The coastline rapidly prograded during highstands, but accommodation space was limited, resulting in deposition of thin, fine-grained, upward coarsening sands with relatively poor reservoir quality.