Evolution of the Mesopotamian Basin (Iraq): Campanian to Neogene

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A high-resolution biostratigraphic and sequence-stratigraphic study has been conducted to evaluate the hydrocarbon potential of the Tertiary in the Mesopotamian Basin. Results suggest that the impact of tectonism on sedimentation has been increasingly important since the Campanian.

The Turonian to Lower Campanian is regionally uniform, widespread, and dominated by deep-shelf to bathyal hemipelagic sediments. The Middle Campanian consists of mostly platform carbonates. This style of deposition is consistent throughout the Middle East, suggesting a predominant eustatic control.

From the Late Campanian to Early Maastrichtian, the platform was submerged and received deep-shelf to shallow-bathyal pelagic/hemipelagic sediments, reflecting the initial rifting of the Euphrates Graben and a eustatic sea-level rise. During the Middle to Late Maastrichtian eustatic sea-level fall, open marine condition was restricted to basin center locations, a prominent hiatus developed on the NW flank, and platform carbonates were deposited as late highstand systems set on the SE flank of the Mesopotamian Basin.

During major Cenozoic limestone-forming (Thanetian and Lutetian-Bartonian) transgressions, hemipelagic sediments became increasingly restricted to a narrow NE-SW belt, and the center of open-marine sedimentation shifted towards the NW. Deep-marine conditions did not reach farther west than Fallujah on the NW side. The SE flank of the basin received exclusively marginal-marine carbonates and evaporites for the entire Paleogene, suggesting tectonic uplift to the southeast.

In the Late Eocene, shallow-marine carbonates prograded simultaneously from the SE and NW. This bidirectional progradation led to rapid narrowing and final closure of the Mesopotamian basin. Since the Oligocene, the remnant basin was filled with evaporites and siliciclastics derived from the Zagros. Thick siliciclastics with evaporite caps may form stratigraphic traps for oil/gas migrated from the Mesozoic source rocks.