
Seismic Stratigraphy of the Cretaceous and Tertiary of the Mesopotamian Basin, Central Iraq

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The Mesopotamian Basin (MB) is a prolific hydrocarbon system with reserves of more than 100 billion barrels of oil. Large areas of the MB still have significant exploration potential. An understanding of the spatial and temporal distribution of reservoir, source rocks and seals in these areas can reduce exploration risk.

We have constructed a sequence-stratigraphic framework from the uppermost Jurassic to the Miocene based on regional seismic-stratigraphic interpretation of 2D lines in central Iraq, integrated with biostratigraphy. Two prograding wedges are observed during the Early Cretaceous and Paleogene. These prograding packages are formed by aggrading to prograding depositional sequences (Highstand Sequence Sets - HSS's).

The Lower Cretaceous HSS was deposited during the Berriasian and early Valanginian. This HSS prograded over a lower order Tithonian (latest Jurassic) maximum flooding surface associated with the Makhul Formation source rocks. Reservoirs associated with this HSS are shelf-margin carbonate buildups and shoals, and incised-valley fills. Downlapping sequence boundaries of the HSS can act as stratigraphic migration pathways linking the HSS reservoirs to the Tithonian source. This HSS is followed by a pronounced downward shift in coastal onlap, resulting in a mid-Valanginian unconformity. Upper Valanginian to Hauterivian depositional sequences lap onto this unconformity, producing a prograding to aggrading wedge (Lowstand Sequence Set).

The mid-Valanginian unconformity is associated with a marked change in the configuration of the Tethys Ocean in this area, from shallow and widespread in the Berriasian to narrow and deep in the Hauterivian, restricted to the northeastern portion of the basin. This trough (MB) broadens in the Upper Cretaceous and narrows again in the Paleogene, becoming the foredeep basin to the Zagros Foldbelt in the Miocene.
