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# The Influence of Allochtonous Salt on the Petroleum Systems in the Central Gulf of Mexico

Crude oil quality impacts the economic viability of deepwater (DW) ventures in the Gulf of Mexico (GOM) through variations in market value and well inflow rates. Oil typing studies show that the hydrocarbons can be grouped into two families: i) a Jurassic family derived from carbonaceous/marly sources, ii) a Cretaceous family, derived from siliciclastic source rocks. Most oil accumulations in the GOM are interpreted to be admixtures from both sources.

The distribution of the hydrocarbon families may at first appear to be random and difficult to explain. We have carried out an integrated basin modeling study that demonstrates that combinations of paleo-charge, remigration and active charge control the present-day distribution of hydrocarbons.

In the central GOM the distribution of Miocene and Plio-Pleistocene depocenters varies greatly over relatively short distances due to the influence of salt. Oftentimes the Miocene is separated from the Pliocene by an allochtonous mobile salt layer which may have any present-day thickness up to 30.000 ft. The spatial and temporal depocenter distribution combined with the (re)mobilization of the allochtonous salt determine the burial and temperature histories which consequently vary dramatically over relatively short distances.

The occurrence of Jurassic hydrocarbons is controlled by the presence of Miocene minibasins. Remigration of Jurassic hydrocarbons from Miocene traps into younger traps occurred not until the late Pliocene. Only the Cretaceous source rocks provide active charge and it is limited to Pliocene mini-basins underlain by thin or no Miocene. Spillage of Cretaceous hydrocarbons into remigrated oil columns results in mixing of the two crude types at the deepest pay levels.

This sequence for the evolution of petroleum systems in the central GOM demonstrates that hydrocarbon generation and migration depend in a systematic manner on the resultant effect of local sedimentation rates, allochtonous salt movement, and present day salt thickness.