# Simulation and Modeling of the Hydrocarbon Generation Migration-Mixing Processes in Louisiana Sedimentary Basins

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Mixed age Mesozoic and Ceneozoic hydrocarbons are present in many Louisiana oil and gas reservoirs. This phenomenon has added fuel to the controversy over whether the hydrocarbon source rocks underwent shallow or deep burial. Source rock generating capacities and timing of maturation, expulsion, and migration are important factors in providing potential solution(s) to the problem. The purpose of this paper is to reconstruct the dynamic processes of oil and gas generation migration mixing in Louisiana basins by using numerical simulation.

Problem solution employed a finite difference model which simulates numerically five processes on 2D vertical grids: 1) reconstruction of geological evolution as a result of sedimentation, erosion, and compaction; 2) computation of paleotemperatures based on constant crustal heat flow; 3) computation of source rock maturity based on a first order kinetic model; 4) computation of geopressure based upon the result of compaction disequilibrium; and 5) computation of hydrocarbon expulsion and migration rates based on calculated results of maturity and geopressure reconstruction. This simulation/model yields plausible results for estimating potential regional reservoir volumetric distributions

The integrated approach used in this study provides a means for analyzing the dynamic processes of oil and gas generation migration mixing in Louisiana hydrocarbon systems. It also provides a basis for designing objective oil and gas trend analyses.