

**AAPG Annual Meeting  
March 10-13, 2002  
Houston, Texas**

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## **Gas Washing of Oil Along A Regional, North-South Transect in the Gulf of Mexico, Offshore Louisiana**

Gas chromatogram data for 219 oils in a 190 km N-S transect offshore Louisiana reveal a spatially coherent pattern of molecular compositional change due to removal of relatively low-carbon number compounds into a mobile subsurface vapor phase, a process referred to as gas washing. Alteration due to this process is readily distinguishable from biodegradation and water washing, and, in the cases studied, involves very large but geologically plausible volumes of gas. The effect of this process is profound near the Louisiana shoreline, where as much as 91% of the oil's original n-alkanes have been removed. The maximum intensity of depletion due to gas washing decreases southward in a nearly regular fashion to nil at the Jolliet field 190 km offshore. The oils show a parallel change in the maximum carbon number of the removed n-alkanes, implying that the pressure at which gas washing took place also decreased in the offshore direction. Equation of state model results indicate fractionation pressure decreased from ca. 10,000 psi near the Louisiana shoreline to about 6200 psi at the South Eugene Island Block 330 field, 90 miles offshore. The systematic change in maximum extent and pressure of depletion crosscuts tectonostratigraphic boundaries as well as oil source provinces. Models of gas washing suggest that the maximum depth of washing reflects the distribution of deeply buried continuous sands, suggesting deep sands may have provided sites for efficient gas-oil interaction.