Formation of High-Frequency Sequences and Their Bounding Surfaces in a Paleogene Supply-Dominated System, Texas Gulf Coast, USA

L. D. Meckel III and **W. E. Galloway**
Department of Geological Sciences, The University of Texas at Austin, Austin, TX 78712

Short-term variations in accommodation and supply on the continental shelf cause imbalances within longer term dynamic equilibrium conditions. These imbalances result in the deposition of high-frequency sequences. The Eocene Yegua Formation of the Texas Gulf Coast is made of six such sequences, which have average durations of 0.8 million yr or less. They formed in response to distinct variations in the rate and quantity of sediment supply, increases and decreases in the average grain size carried into the basin, relative sea-level position, and the capacity of basinal energy regimes to transport and rework sediments.

Each sequence may be characterized by the mix of particular regime conditions that were dominant during its deposition. If the rate of sediment supply and the average grain size were more significant than the rate of relative sea-level change and the capacity for basinal transport, then the sequence was supply dominated and was characterized by deltaic deposition, progradation of parasequences, and river mouth bypassing onto the shelf and slope. If, instead, relative sea-level rise and basinal transport were the dominant factors, the sequence was accommodation dominated and was characterized by estuarine deposition, retrogradation of parasequences, and shoreface bypassing onto the shelf. When the accommodation and supply factors were in equilibrium, sequences containing both fluvial and estuarine deposits characterized by aggradational parasequence stacking were deposited.

No two consecutive sequences in the Yegua were dominated by the same mix of regime conditions. Therefore, the sequence boundaries are important indicators of changes in regime conditions. Significantly, all of the boundaries are highly correlatable, well-constrained regional marine flooding surfaces. Flooding of the shelf thus apparently either causes, or occurs as a result of, a fundamental readjustment in the dynamic interplay between sediment supply and accommodation.

Bioremediation as an Efficient Method to Degrade Creosote and Improve Groundwater Quality

Virginia Anne Newbern
Department of Geology, University of Southwestern Louisiana, Lafayette, LA 70504

A hydrogeologic monitoring evaluation was conducted to determine the efficiency of bioremediation on a site at which creosote is used for pressure treating and wood preservation. Initially, pentachlorophenol (PCP) and diesel fuel were incorporated with the creosote. The waste water generated from the process was disposed of in three unlined surface impoundments until 1982. Between August 1981 and the first half of 1982, 13 monitoring wells were installed where both PCP and creosote releases were found and attributed to the impoundments. A groundwater quality assessment program was initiated in April 1986 and a subsequent pilot groundwater remediation program begun in February 1987. A Corrective Action Plan (CAP) has been in operation since August 1987 to remediate groundwater from the uppermost water-bearing sand (Bentley sand), which was affected by the impoundment areas. With the CAP, a system of 21 recovery wells set in 4 lines were implemented to withdraw the groundwater. The groundwater was then treated in above-ground bioreactors where microorganisms were introduced to degrade the creosote compounds. Treated groundwater was then discharged to the public wastewater facility or injected to recharge the Bentley sands by the use of either of the two recharge trenches. Both nutrients and oxygen were added to the water prior to injection to increase the in-situ bioremediation of the creosote and PCP contaminants via two air sparging lines. The results demonstrate the reduction of creosote constituents from the groundwater with the use of bioremediation.