Coastal waters of the Late Eocene were isotopically 'heavier' than Pleistocene glacial maxima, or that *B. cetoides* incorporated 'heavier' body water than modern cetaceans.

Stable-isotopic analysis of tooth enamel samples from two modern dolphins, *Tursiops truncatus*, from the Gulf of Mexico produced $\delta^{18}O$ values of 19.799 and 20.111 0/00, which are also 'heavier' than data for other modern whales and dolphins (Yoshida and Miyazaki, 1991).

Comparison of these modern dolphin data to oxygen-isotopic values for seawater from the modern Gulf of Mexico should allow us to determine if the anomalously heavy cetacean data are caused by some local fractionation effect in the northeastern Gulf, causing ^{18}O-enriched surface waters. Alternatively, comparison of these data to previously-published phosphate isotopic values of Miocene cetaceans (Barrick and others, 1993) may indicate a long-term shift in the isotopic composition of cetacean phosphates since the Late Eocene. This could have been caused by increased exchange of environmental water and body water, with modern cetaceans retaining isotopically 'lighter' metabolic water, whereas their Archaeocete ancestors had less exchange between environmental water and body water during phosphate formation, resulting in 'heavier' tooth enamel and phosphates.

Pore-Fluid Chemistry Reveal Processes Occurring in Hydrocarbon Seeps From Deepwater Gulf Of Mexico

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Hydrocarbon seeps are common over the upper bathyal depth range of the northern Gulf of Mexico. These seeps are associated with active deposition of carbonates, and host abundant chemosynthetic biota. Although extensive investigations of the seeps were conducted over the past decade, the processes linking degradation of the hydrocarbons with the chemical carbonates and the chemosynthetic fauna are poorly understood.

Sediment cores, about 50 cm in length, were obtained from thiotrophic *Beggiato* mats (TBM) and methanotrophic mussel beds (MMB) during recent submersible dives. Distribution of pore-fluid constituents including SO_4, H_2S, DIC (Dissolved Inorganic Carbon), alkalinity, Ca, Mg, Sr, and $\delta^{13}C$ of DIC were determined in order to shed light on the processes involving carbon tranfer in seeps.

The inverse relation observed between dissolved SO_4 and H_2S indicates that microbial degradation of hydorcarbons during sulfate reduction plays a dominant control on the pore-fluid chemistry. The $\delta^{13}C$ values of $\sum CO_2$ in TMB cores, ranging form -16 to -28 0/00 (PDB), indicate that carbon is derived primarily from crude oils through sulfate reduction. In contrast, sulfate exhaustion coupled with observed enrichment of ^{13}C in DIC (+2 to -16 0/00 PDB) in MMB cores suggest that DIC is derived there from both microbial sulfate reduction and fermentation. Thermodynamic and stolchiometric estimates indicate that authigenic carbonate precipitation and active consumption of carbon by chemosynthetic biota are the two major sinks for the hydrocarbon-derived carbon in the seeps.

Toward a Method and Theory for Restoring Coastal Louisiana

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A century-long transgression of the coastal Louisiana deltaic and chenier plains has resulted in the loss of more than one million acres (404,700 hectares) of coastal wetlands and threatens human presence and activity. During the more than twenty-five years since the problem was identified, more than 25 years ago, Louisiana and the U.S. Federal Government have been struggling to develop to plan and process which, when implemented, would allow for maintenance of an infrastructure for human activity and also provide a mechanism for dynamic continuity of the coastal ecosystems. These efforts include non-structural measures (research, public education, coastal management laws and regulations, permits, mitigation, etc.) and structural measures for coastal restoration (river diversions, barrier island sand nourishment, marsh building, etc.). This paper evaluates the evolving method and theory in search of: 1) the most effective course of action, 2) reduction in the need for trial and error, and 3) application of other areas.

Restoration to historic conditions as an unattainable goal, as processes and materials now available cannot sustain deltaic and chenier plain systems as large as those which historically existed. The present level of scientific understanding regarding natural systems, engineering capabilities and technological advances is sufficient to achieve satisfactory restructuring of Louisiana's coastal area. However, several remaining obstacles are: 1) a clear statement of objectives, 2) a proper institutional framework, and 3) state and national commitment.