

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

Peter Swart¹ (1) University of Miami, Miami, FL

Recrystallization and Carbon Isotopic Composition of Pore Waters Associated with the Diagenesis of Periplatform Sediments

Periplatform sediments are mixtures of platform (aragonite and high-Mg calcite) and pelagic (low-Mg calcite) derived materials which are found adjacent to shallow water carbonate platforms. These sediments have been drilled during numerous legs of the Ocean Drilling Program, 101, 115, 133, 166, and 182. Periplatform sediments also frequently contain high amounts of organic material and even migrated thermogenic gases. These materials are readily oxidized leading to undersaturation of the pore fluids with respect to the carbonate minerals and recrystallization to low-Mg calcite and dolomite. The abundance of organic material, and in some instances high quantities of sulfate as a result of fluid flow or saline brines, can produce extremely high concentrations of CH₄ and H₂S. However, in most instances there is little influence on the carbon isotopic composition of the pore fluids and the consequent characteristic isotopic compositions associated with sulfate reduction and methanogenesis. This is a result of the consequent dissolution of large amounts of isotopically positive. Consequent diagenetic carbonates formed from these fluids can also be expected to show relatively little influence of the extreme diagenetic conditions in which they were formed. More isotopically depleted carbon isotopic signatures are found at very shallow subsurface depth, before significant amount of carbonate recrystallization has taken place and in sediments in which Fe prevents H₂S from significantly lowering the pH and enhancing the process of recrystallization. Isotopically negative signatures can also be associated with periods of non-deposition, when recrystallization under the influence of organic material deposited in burrows and borings.