HYDROCARBON TRAPS WITHIN PASSIVE MARGIN EVOLUTION OF LOUISIANA

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ABSTRACT

The evolutionary dynamics of the Louisiana continental margin as applied to the Neogene to present are sufficiently well understood that a preliminary model is presented. The external components that influence the geologic evolution are sediment input (amount, type, and transport mechanisms) and sealevel oscillations (periodicity and range). The internal dynamics are subsidence (rate, total amount, and location), salt tectonics (type and rate of motion) and sediment deposition (amount, type and mechanisms).

The model presented is restricted geographically to the offshore region, from the shelf to the Sigsbee Escarpment, and temporally during the Neogene, the past 20 my. the notion that tectonic periodicity controls the evolutionary dynamics is integral to the model. The general loci of maximal deposition and tectonics are dictated by Milankovitch fourth order cycles ranging from $1x10^4$ to $1x10^5$ years, superimposed on third order cycles, up to 1 to $2x10^6$ years.

This model suggests that there was a highly energetic phase in overall continental margin evolution during which the Sigsbee salt wedge migrates past an arbitrary fixed reference point, changing the physiography from lower slope to shelf. This energetic phase, which lasts between 2 and 4 million years, separated two much longer phases in the overall Louisiana margin evolution. The two longer phases are the drift phase, characterized by sedimentation along lower continental rises and abyssal plains, and a phase of deposition, generally minor, and erosion along the shelf, coastal plain, and interior basins. This latter phase is characterized by regional subsidence and "catch-up" deposition as equilibrium along the continent is maintained.

Hydrocarbon traps and their ephemeral nature with in the overall continental margin also discussed.