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

Patrice Imbert[1], Carlos Cramez[2], Manik Talwani[3] (1) TotalFinaElf E&P, Houston, TX (2) H.E.A.T. Consulting, Switzerland (3) Rice University, Houston, TX

Basement Morphology along a Continent-Ocean Transect in the Eastern GOM: Evidence for a Volcanic Margin

A primary input to basin modeling is the nature of the underlying crust, with its implications on heat flows and paleo-water depth. The nature of the crust in the Gulf of Mexico is approached here from the seismic facies of the basement along a SW-trending transect from continental to oceanic crust in the eastern Gulf. The seismic character of the pre-Louann salt section shows a consistent evolution from the Florida shelf to the central part of the Gulf of Mexico. The observed succession is interpreted to reflect the evolution with time of magma-water interaction at the spreading center, as a result of a progressive relative deepening. The following zonation is observed seaward of the Florida escarpment: -Long seaward-dipping reflectors representing subaerial lava flows emplaced when the spreading center was in the middle of a wide subaerially exposed zone -Shorter seaward-dipping reflectors, representing subaerial lava flows at the spreading axis ending as lava deltas in a shallow water body. -High relief mounds created by explosive volcanism when the spreading axis was in shallow water, making the spreading center an axial archipelago of the nascent ocean. -Flat, high amplitude, onlapping series resulting from lava emission in deeper water, with magma fragmentation and hyaloclastite deposition. -Hummocky basement interpreted to be the real deep-water oceanic crust, emplaced when the water was too deep to allow magma fragmentation In this interpretation, the continent-ocean boundary along the selected transect would lie beneath the first emission point of the seaward-dipping reflectors, just seaward of the Florida escarpment