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# Extensional Rafting: A New Idea for Structural Control of Shelf Margin and Slope Facies Deposition in Upper Wilcox Strata of South Texas, Northwestern Onshore Gulf of Mexico

The prevailing paradigm for Upper Wilcox deposition in South Texas is that margin sedimentation was accommodated by growth faulting and slope failure. This same general mechanism is invoked around the Gulf of Mexico but fails to explain why Upper Wilcox deltaic sediments are greatly expanded but also relatively confined compared to other Paleogene deltaic centers.

Examination of 2D seismic data in South Texas has identified what is now interpreted to be a large, rafted block of Eocene, Paleocene and Cretaceous strata, analogous to rafts identified in the Kwanza Basin of Angola. Preliminarily named the "Wilcox raft" because of its association with the Wilcox depotrough, it has been identified in the subsurface extending from Starr County on the Texas - Mexican border, northward over 200 kilometers into Live Oak County, Texas. The actual extent of rafted material may extend farther to the north and/or south. The raft's detachment surface is interpreted to be at the base of the Jurassic Louann salt.

The Wilcox raft contains one primary block more than 150 kilometers long and 15 to greater than 30 kilometers wide. The primary raft block may be segmented, and the entire rafted unit may include a number of smaller branching arms, ramps and offset fault blocks.

A proposal for rafting in this area of South Texas is not entirely new. Earlier models were predicated on large-scale salt withdrawal and incorporated more than 3 kilometers (>10,000 feet) of autochthonous salt occupying the area of the Wilcox depotrough. We believe that a much thinner autochthonous salt layer existed beneath South Texas.

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Extensional rafting is recognized along the South Atlantic margins of West Africa and Brazil, but not in South Texas. Back-filled incisions across raft structures, turbidites draped over or between rafts, and basin floor fans downdip of rafts are known exploration targets elsewhere but not recognized in South Texas. Additionally, because updip extension requires downdip contraction, contractional structures of this age could exist basinward of the raft. Employing a raft model explains why Upper Wilcox shelf margin deposition was confined and opens new exploration possibilities in this mature producing trend. ■

## Biographical Sketch

CARL FIDUK has a BS (1979) and an MS (1982) in geology, both from the University of Florida. He later received his MBA (1985) from the University of Texas of the Permian Basin and his PhD in geology from the University of Texas in Austin (1994). He has worked for the USGS, Gulf Oil, Discovery Logging, the Texas Bureau of Economic Geology, British Petroleum and the University of Colorado and as a private consultant. He is a member of the AAPG, SEG, GCSSEPM, HGS and GHS and is an AAPG Certified Petroleum Geologist. His research interests cover sequence stratigraphy, sedimentology, salt structural deformation and evolution, basin analysis, deep marine depositional processes, petroleum systems analysis and the use of three-dimensional time and depth data in petroleum exploration. Carl has authored 50+ papers and abstracts and has given several hundred presentations. Carl is presently Chief Geologist for CGG Americas, Inc. working with their depth imaging group in Houston.

