Evidence of a Large Paleo-Seismic Event in Southeast Texas – Southwest Louisiana Circa 20,000 Years Ago

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ABSTRACT

Converging lines of evidence suggest major earthquake activity within the Central Tectonic Province of the Gulf of Mexico Basin during the low sea stand interval of the last ice age (stage 2). During this interval there were: (1) fault and fracture movements; (2) a shift in the Mississippi River channel and delta from the Western Louisiana Shelf to a channel and canyon on the Eastern Louisiana Shelf; (3) massive continental shelf slumps; (4) a regional liquefaction field; and (5) volcanic eruptions in the neighboring Trans Mexican Neotectonic Belt.

Primary regional tectonic processes are related to geofracture slippage resulting from plate shifts and movement within providence level gravity slump cells with linked tectonic frameworks of onshore extensional and offshore contractional components. The geofracture grid influences cell boundaries and segments regional growth faults. Shelf edge deltas and continental slope turbidite flows, active during the stage 3 falling interval prior to the last sea level low stand, caused slope instability. Bathymetry indicates massive slope slumps. Streams were re-directed by tilting of fault-bound blocks and capture by fault and geofracture grooves.

Shallow shock waves from distant earthquakes triggered stress release along faults and fractures causing movement and secondary earthquakes. The 1964 Alaskan earthquake activated movement on regional faults from Freeport, Texas, to the Chandeleur Islands in Louisiana.

Enigmatic pimple mounds are relict earthquake induced liquefaction features whose distribution delineates the extent of intensive paleo-earthquake activity, that includes Galveston, Houston, Beaumont, and Lake Charles as well as major ports, refineries and oil fields (onshore and offshore).

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