

### **Influence of Basement Structure on Evolution of the Deepwater Gulf of Mexico**

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Deep structure at the seaward end of the Louann salt basin is divisible into four provinces (from seaward to landward): Abyssal Plain, Allochthonous Ramp, Outer Plateau, and Deep Basin. The Abyssal Plain is composed of flat-lying sediments outboard of deep salt. The Allochthonous Ramp comprises deep salt lying on a surface that cuts upsection from a Louann-aged source layer. It is interpreted as an allochthonous fringe at the seaward end of the Louann salt basin. The Outer Plateau is composed salt structures resting on acoustic basement. Scale of salt structures and withdrawal basins suggest that salt was originally thinner here than in the adjacent Deep Basin. The Deep Basin lies landward and on the downthrown side of a 1-2 km high step in acoustic basement. It contains large diapirs and withdrawal structures indicating very thick original salt.

Most published restorations place the edge of the Louann salt basin at the downdip end of the Outer Plateau. However, we suggest that plate restorations, crustal signature, and geometry of the Outer Plateau suggest that the edge of the Louann Basin was further updip, and the downdip end of the Deep Basin Province.

A map of deep-salt provinces in the deepwater Gulf of Mexico suggests that the Louann salt basin is divisible into two parts, separated by a major reentrant. In the eastern (Louisiana) subbasin, the Outer Plateau and Allochthonous Ramp form concentric bands around the edge of the Deep Basin. The western (Texas) subbasin has no Allochthonous Ramp. This structure is consistent with plate restorations, but is less clearly supported by potential fields data.

The structure of the deep salt has had a major influence on the subsequent evolution of the deepwater Gulf of Mexico. A model in which a thin-salt fringe lay outboard of a thicker-salt Deep Basin can explain observed patterns in structural style, seismic data quality, diapir location and orientation, overridden diapirs, rafted minibasins, and imbricated sutures. It may also provide suggests for areas of future subcanopy hydrocarbon prospectivity.