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Geometry, Emplacement History, and Driving Mechanisms of Major Allochthonous Salt Sheets in the Central US Gulf of Mexico

The continental slope of the US Gulf of Mexico is dominated by giant allochthonous salt bodies, which are collectively known as the Sigsbee Salt sheet. Recent seismic interpretation of the whole area on 2D and 3D data has enabled us to make a regional TWT map of the top and base of the major salt sheets, and to make a pseudo-depth map of the base salt structure. The base-salt structure is a critical tool in the understanding of the nature and evolution of the salt bodies. These form distinct families with different characteristics in different regions.

By taking sequential slices through the base allochthonous salt, we have created a movie of the sequential emplacement and spreading of the salt. This shows how a giant salt sheet in the central Gulf of Mexico margin spread progressively southwards, in contrast to the progressive growth and merging of mushroom-like bodies further east, which now form a composite canopy complex.

A deeper salt body, known as the Louann Salt, underlies the shallow Sigsbee salt allochthon. This has traditionally been considered to be autochthonous, but comparison of the geometry of this salt with the shallower Sigsbee salt demonstrates that much of the so-called "Louann" salt is also an allochthonous salt canopy, emplaced over Jurassic and Cretaceous sediments.

The majority of canopy spreading occurs during long periods of slow sedimentation; the driving force for spreading is tilting of the overall top-salt surface, either by basin subsidence, or in response to filling of updip withdrawal basins.