

The Influence of Salt Tectonics on Sedimentation and Basin Development in Block Safi Haute Mer, Offshore Morocco

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An extensive 3-D seismic survey covering an area of 1,064 km² has been used to analyze the morphology of salt and determine the emplacement history of allochthonous salt structures, and to examine the temporal changes in the interaction of structure and sedimentation in offshore Morocco. The survey area is located roughly 150 km west of the Moroccan coast, in Block Safi Haute Mer, in a water depth between about 2,500-1,500 meters. The western half of the survey lies just outside of the salt basin and is marked by relatively flat-lying strata. The eastern half of the survey lies within the salt basin and is characterized by sedimentation in and around salt structures and salt deformation of older strata.

At the distal edge of the salt basin, a thin salt sheet has been driven by sediment loading to extrude some 15 km beyond the original depositional edge of the salt basin. A series of isochron maps show changes in sediment thickness through time that allow examination of spatial and temporal changes in depocenters and assessment of the influence of salt mobilization on basin fill pattern.

In the study area, Late-Triassic to Early-Jurassic age salt is believed to have began moving in the middle Jurassic resulting in a number of different types of halokinetic structures including salt diapirs, sheets, salt-cored anticlines, and turtle structures. Up to 4000 ms of sediment have been deposited in basins created by salt evacuation and around paleo-highs since Early Jurassic time. DSDP data from the deep offshore shows the Early-Jurassic to Early-Cretaceous strata to be carbonates, while the strata younger than Early Cretaceous are dominantly siliciclastic. A detailed seismic geomorphologic study of the basin fill supports this interpretation.