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Salt Tectonics—South Oman Salt Basin

This paper presents an analysis of salt structures in the South Oman Salt Basin (SOSB), utilizing 2-D and 3-D seismic data to establish 3-D geometries of the salt structures and the effects of variable 3-D sedimentation on basin evolution.

The study area is characterized by a series of salt ridges, diapirs and associated salt withdrawal basins. The results show a complex interaction of salt and sediments, which vary along adjacent salt withdrawal basins. The salt withdrawal basins are circular to oval (3-5 km wide) encircled by narrow, elongated salt ridges. Most of these basins are NE-SW oriented, perpendicular to the basement dip. Although the basement is dissected by a series of extensional faults, none of them appear to play a significant role in the evolution of the salt structures as observed in other salt basins such as the Central Graben, North Sea. Pulses of sediment progradation from the NW sourced by an uplifted basement high are the main trigger and driving mechanism for halokinesis. Intensive sedimentation and the lack of faults both in the basement and the cover prevent further diapirism in the SOSB, in comparison to the North Oman Salt Basins where basement reactivation caused by the Hercynian event triggered further diapirism.

An understanding of the timing and 3-D geometries of salt movement gives an insight into the evolution of carbonate stringers within the Ara salt, which is the main exploration target in the SOSB.