

Salt Tectonics of the Continent-Ocean Transition, Deep-Water Angola

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The Late Cretaceous to present salt-cored fold and thrust belt at the edge of the Aptian salt basin, offshore Angola, has been interpreted based on seismic and potential field data. Tectonic processes, kinematic steps and deformation styles are discussed and demonstrated using a series of regional cross sections and restorations.

Based on salt tectonic deformation style, the study area has been divided into a northern fold belt and a southern fold and thrust belt. Shortening along the measured section in the northern fold belt is on the order of a few kilometers. In contrast, structural restoration demonstrates that to the south, in the fold and thrust belt, up to 12 km of compressional strain has been absorbed by the Tertiary section.

Salt occurs at three levels in the frontal deformation zone. At the deepest level, autochthonous salt pinches out against an outer high of oceanic basement at the western edge of the Angola salt basin. The second level comprises a deeply buried, regional salt canopy, located at the leading edge of the salt province in the northern part of the study area, which formed as a salt glacier during the Late Cretaceous. Large-scale, compressional, salt-cored anticlines and active diapir complexes developed above this Cretaceous canopy, and landward, above an inflated salt pillow in Tertiary to present times. In the southern part of the study area, outboard of the Oligo-Miocene Congo Fan depocenter, and a zone of maximum extension, large-scale, salt-cored folds and thrusts developed above interpreted oceanic crust. The third, and shallowest, level of salt is organized into a mid to late Miocene canopy belt, observed just inboard of the frontal structures.

In both the northern fold, and the southern fold and thrust belts, large-scale structures initiated in the early Tertiary and have continued to develop gradually. Large anticlines developed by downbuilding; i.e., by salt injection into the fold core and contemporaneous salt withdrawal from the adjacent synclines. Folding and thrusting have been continuous up to the present, indicating a slow, but steady, deformation of the leading edge of the salt province, offshore Angola.