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Salt Tectonics and Basement Structure in the Majunga Basin, Offshore Madagascar, as Revealed by New Shipborne Gravity and Magnetic Data

In the past two years the offshore Majunga salt basin of NW Madagascar has been the focus of an increased level of exploration activity. In 2001 approximately 4,500 km of 2D seismic data and 2,500 km of gravity and magnetic data were collected. An integrated interpretation of these seismic and potential fields data have helped to reveal the details of salt tectonics and basement structure. In the Majunga basin localized basement structural elements appear to have played a major role in determining the location and structural geometry of allochthonous salt tongues and canopies. In the eastern portion of the basin a prominent, NW-trending basement salient is coincident with a series of large toe-thrust anticlines. This fold-train is a profound feature which dominates the structural character of this part of the basin. Gravity anomaly minima correlate with deep, syn-rift basin fill areas underlying the toe-thrusts. The details of the overlying salt structures are not apparent in the gravity as a result of a lack of sufficient density contrast present between salt and the juxtaposed Cretaceous sediments. Magnetic anomaly character throughout the basin exhibits a close correlation with the depth and trend of basement structural elements. Highly linear and regionally continuous NW-trending basement elements in the vicinity of, and parallel to, massive toe-thrusts are consistent with an earlier interpretation, based only on seismic reflection data, which states that a NW-trending transform zone helped to focus basinward gravity sliding and the development of massive toe thrusts downdip into the deep-water Majunga basin.