AAPG Annual Meeting
March 10-13, 2002
Houston, Texas

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Examples of Deep-water Salt Tectonics from Africa

Deep-water structures at the basinward edge of African salt basins display very different geometries. To conduct a comparative structural analysis focusing on the salt tectonics, regional reflection seismic transects were constructed across the continental margins of Morocco, Senegal, Equatorial Guinea, Gabon, Angola and Madagascar.

All the salt-cored deep-water foldbelts are driven by gravity, where updip extension is accommodated by downdip compression using a basinwide salt detachment. Differences in the end-result are attributed to several factors: (1) basins with syn-rift salt compared to post-rift age salt basin settings generally provide a less efficient basinwide detachment; (2) narrow and steep continental margins tend to enhance the compressional structures at the toe of the slope; (3) sharp, fault-bounded termination of the original basinward depositional limit of the salt may result in the lack of a foldbelt, regardless of the tectonic position of the salt.

A qualitative classification scheme developed for the toe-thrust zone of African salt basins may have several consequences for exploration in deep-water salt basins worldwide. The toe-thrust zone generally provides very attractive structural targets as the associated fold-train contains the first structures out-of-the basin where hydrocarbons are generated. Another important exploration aspect concerns the timing of the trap formation. The toe-thrust zone in a syn-rift salt setting appears to create more dormant structures as opposed to the post-rift salt case where the structural traps tend to be continuously deforming which may lead to the loss of hydrocarbons.