

THE INFLUENCE OF THE BASEMENT ON NEOGENE CONTRACTIONAL DEFORMATION IN THE CENTRAL NIGER DELTA

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In the Niger delta, the mid-outer slope is partitioned into two large lobes on the west and east sides that converge to form a bathymetric reentrant in the center of the delta. These lobes are comprised of broadly spaced compressive anticlines, or toe thrusts, that formed in response to gravity sliding from the shelf. The fold-and-thrust belt within the lobes has a width of more than 90 km in places. In contrast, the contractional response to gravity sliding in the center of the delta is severely restricted to a zone less than 20 km wide where thrust sheets are highly imbricated. We propose that this highly imbricated zone is the result of translation over demonstrable irregular basement topography in the center of the delta that acts as a buttress to further translation. Evidence for this irregular topography comes from regional seismic data that shows a prominent deep reflector that lies at 10 - 12 km subsea on the west and east side of the delta, but that rises to less than 6 km subsea in the center of the delta underneath the most highly imbricated part of the fold-and-thrust belt. Supporting this interpretation is gravity data, which shows that the Bouguer anomaly is over 60 mgal higher in the center of the delta relative to adjacent areas where the reflector lies significantly deeper. We speculate that the substantial basement topography may be due to a buried, relic hot spot underneath the center of the Niger delta.