

Mass Transport Deposits and Their Role in Thin Skinned Tectonics - An Example from the NW Niger Delta

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2D and 3D seismic data have been used to study the deposition and subsequent structural deformation of sediments on the NW margin of the Niger Delta and its confluence with the Dahomey embayment. . The most striking feature of the studied region is the discontinuity observed between shallow complexly faulted sediments and an underlying relatively un-deformed sequence.

The shallow section is characterised by a presumed dextral strike slip fault zone which separates a series of compressional structures to the north and west of the fault zone and a predominantly extensional section to the south and east.

The interval which vertically separates the section is well imaged on the 3D data and suggests that the “filling in the sandwich” is comprised of a chaotic assembly of sediments which are interpreted to have been derived from the collapse of an unstable shelf margin in the late Cretaceous/Early Tertiary. There is little evidence that the faulting in the overburden penetrates into this melange and hence the conclusion is drawn that lateral movements at the base of the shallow section take place within laminar sediments immediately overlying the mass transport deposit.

It is assumed that thermal subsidence of the region was responsible for the initial unstable margin collapse and accompanying mega slide. Subsequent gravity driven movement of the later deposited section was accommodated entirely within the section overlying the slide.

The detachment layer is present at the same stratigraphic layer (seismic horizon) over the entire region of the NW Niger Delta and may well be present in the deeper portions of the basin, where seismic imaging is poor. If this is the case then models for hydrocarbon generation and migration may have to be revised.