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Offshore Niger Delta Pleistocene/Holocene Leveed-Channel Fans - Models for Offshore Reservoirs

Pleistocene-Holocene leveed-channel fans deposited offshore the Niger delta Nigeria, are defined by sea-bottom images and shallow reflection patterns in 2-D and 3-D seismic surveys. They make excellent analogues for interpreting older fans within the delta depocenter.

Niger delta structural trends control shelf, slope and basin depositional environments. The shelf margin is cut by canyons and gullies which are lowstand sediment paths to the basin. Upper slope areas, underlain by diapir and inner toe thrust structural trends, are zones of channel erosion and bypass. Lower slope areas, between the inner and outer thrust trends, contain leveed channels in local sags. They exhibit channel erosion and bypass in areas of active thrusts and tear faults.

The basin plain outboard of the outer thrust trend has major deposition of large leveed channel complexes. The central reentrant in the outer thrust trend is a major depocenter of leveed channels fed by a larger canyon.

The area to the far northwest contains well-developed fans in the low area between the delta and the continental margin to the north.

A 3-D grid at the mouth of the large central canyon shows details of leveed channels deposited from the canyon. The first large sinuous channel was crevassed and abandoned by a smaller, straighter distributary near the canyon mouth. Slumping and mass transport are important processes involved in the development of the channels and adjacent systems. These processes also impact analogous reservoir intervals in older fans.