

Seismic Geomorphology and Evolution of a Submarine Channel System: Western Nile Delta Slope, Egypt.

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High-resolution 3D-seismic data (acquired by BG-Group) from the western Nile Delta slope provides excellent coverage of a Plio-Pleistocene submarine channel system. The basal erosion surface of the channel system has been mapped and the internal architecture of its fill imaged using seismic attributes. The channel system has a straight-line valley length of >50 km, and can be subdivided into proximal, middle, and distal zones based on its morphological evolution downslope.

In the proximal zone, the basal erosion surface is strongly incisional, with an asymmetric form, steeper to the west. A high-amplitude facies is located above the basal erosion surface. Within this facies, vertically stacked channel bodies are imaged and channel stacking is located toward the west of the basal erosion surface. 80% of the high-amplitude facies is confined by incision of the basal erosion surface and 20% by overbank aggradation.

In the middle zone, incision of the basal erosion surface increases, its width decreases and very high-amplitude facies is located above the basal erosion surface. The ratio of fill confined by incision, to that confined by overbank aggradation changes downslope from 60:40 to 30:70. Geomorphological change is clearly influenced by the Nile Delta Offshore Anticline (NDOA) and Rosetta Fault system.

In the distal zone, two channel-levee complexes (CLC's) can be distinguished. The older eastern CLC is smaller and shows lateral migration contemporaneous with vertical stacking.

The quantitative assessment and observations of downslope changes of architectural style documents a link between development of local structure (faulting and folding) and channel evolution.