3D-Seismic Geomorphology and Evolution of a Submarine Channel System: Western Nile Delta Slope, Egypt.

Winner of best student presentation

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High-resolution 3D-seismic data from the western Nile Delta slope provides excellent coverage of a Pleistocene submarine channel system. The basal erosion surface of the channel system has been mapped and the internal architecture of channel fill imaged using seismic attributes. The channel system has a straight-line valley length of >50 km, and can be subdivided into upper, middle, and lower reaches based on its geomorphological evolution downslope.

The upper reach is located between the Nile Delta Offshore Anticline (NDOA) and the Rosetta Fault System (RFS). 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.

In the middle reach, incision of the basal erosion surface increases as it erodes the folded palaeoseafloor. Channel-form high amplitude reflections (HARs) are located above the basal erosion surface. Levees are observed for the first time and lie within the erosional conduit of the basal erosion surface. Geomorphic change across the upper and middle reaches is clearly influenced by the NDOA and RFS.

In the lower reach, two channel-levee complexes (CLCs) can be distinguished. Both CLCs show a component of lateral migration contemporaneous with vertical aggradation and are eroded by a medium-amplitude, chaotic facies interpreted to be a mass-transport complex.

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