Geophysical Research Abstracts
Vol. 15, EGU2013-7830, 2013
EGU General Assembly 2013

Geomorphology and sediment processes on the continental shelf and the submarine Akhziv canyon offshore north Galilee, eastern Mediterranean.

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The northern continental shelf of Israel is relatively steep and incised by submarine canyons. The Akhziv canyon is the largest and most developed and the southernmost in a series of canyons that formed off-shore Lebanon up to Beirut. The canyon is incised into the continental shelf 3 km from the northwestern Galilee coast to a depth of 1200 m. This study aims to understand processes responsible for the canyon morphology and the nature of sediment transport and accumulation mechanisms in the continental shelf and down the canyon to the deep sea. Moreover, the geological section in which the canyon is incised to, and the connection to the western Galilee fault system that transverse the continental shelf is explored for the regional perspective.

Akhziv canyon consists of two main channels incised in cross-section V-shape at the upper part of the canyon that connect at 700m depth to produce a U-shaped main channel. The canyon's channels orientation implies a possible connection with the region's fault system.

The high-resolution bathymetric map (the National Bathymetry Project) was used for the geomorphologic and morphometric analysis to define the connection between the canyon and the north- western Galilee streams that flow in a main east-west direction, parallel to the terrestrial fault system. Gaps in the submarine aeolian calcarenite ridge on the shallow shelf represent the continuation of terrestrial streams westward during low glacial sea level. Alluvial fans, mapped at 40m water depth, testify for sediment transport from land to the continental shelf toward the canyon head.

Shallow high-resolution seismic lines (Sparker) were carried out along the continental shelf and canyon head to reveal the sub-surface structure. The seismic interpretation indicates the presence of channel incisions at depths of 10-15 m under the seafloor, with infill of young sediments which represents phases of deposition and erosion along the continental shelf.

In addition, Piston cores (2-3 m) and short cores (30-50 cm) were sampled along the main axis of Akhziv canyon and thalweg, from depths of 40 m to 700 m. X-ray reflections of the cores showed the upper section is fine laminated while most of the core is homogenous. The change in sedimentation pattern was also evident from magnetic susceptibility measurements and grain size analysis. The differences in the sedimentation patterns along each core and between different cores represent the transport and accumulation dynamic processes from the terrestrial source along the canyon axis to the deep sea.

The geomorphological map, the sub-surface seismic interpretation, and the sedimentary results present the relation between the Akhziv sub-marine canyon and the terrestrial system at the western Galilee. Further efforts on dating the sedimentary record will reveal the connection to the glacial-interglacial cycles and their effects on the eastern Mediterranean continental shelf.