

## **The Qartaba Structure: An Active Backthrust In Central Mt-Lebanon.**

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The Qartaba structure in central Mt-Lebanon is a 15x5km box fold running parallel to the restraining bend of the sinistral Yammouneh Fault, the main fault of the central segment of the Dead Sea Transform. The Qartaba structure has long been described as a “horst” and associated with Mesozoic normal faulting. However, the Qartaba anticline is suitably oriented with the direction of maximum compression along the restraining bend. Jurassic carbonate rocks form the core of this anticline culminating at ~1953m asl to the east, of the highest structural elevation of the Mt-Lebanon range indicating important tectonic uplift rate. The fold is asymmetric. The western limb is steep and bordered by the Lebanese Flexure, a prominent continuous monocline of Upper Jurassic to Mid Cretaceous rocks, running along the western flank of Mt-Lebanon. The eastern limb of the anticline has a very steep dip, and forms a 200m high cliff well marked in the topography. Its Jurassic layers are almost vertical and end up overhanging Lower Cretaceous beds.

Our study suggest that the Qartaba structure is a growing anticline, built by active thrusting over a west dipping thrust fault that cuts the surface at the base of the eastern limb of the anticline. The fault plane can be seen dipping 30-35 degrees to the west. At depth, this thrust is likely to connect with the blind thrust ramp of the Mt-Lebanon Flexure. The Qartaba backthrust with a dip to the west, is opposite to the general vergence of similar structures in the area.

On some of the segments of the steep cliff forming the faulted eastern limb, a fresh scarp with smooth and polished surfaces bearing vertical slickensides can be followed over ~700m along the base of the cliff. It corresponds with the location of the thrust fault tip. Talus accumulation over the steep eastern limb covers most of the cliff base, and may be masking further extent of this scarp. We interpret this scarp as the freeface of a co-seismic rupture on the underlying Qartaba backthrust.

Moreover a first paleoseismic trench was opened in the loose deposits that cover the base of the eastern limb, over a topographic slope break aligned with the direction of the backthrust. The preliminary results clearly show tectonic deformation structures in C14 dated Holocene sediments, compatible with the general compressive style of the backthrust.

This new interpretation of the Qartaba structure has important, implications on the geological interpretation of the area. The Qartaba backthrust is clearly an active structure that is capable of generating  $M_w \sim 6.4$  earthquakes in central Lebanon, significantly adding to the seismic hazard of the area. Moreover, the different interpretations of the geology of this area for petroleum prospects studies should be reviewed in the light of these new results.