



80 m.y. of folding in the same direction: New perspective on the Syrian arc from Levant Basin analysis

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A series of elongated folds known as the Syrian Arc Fold Belt developed throughout the Levant region alongside the Tethys closure. Interestingly, this compressional belt followed a preexisting extensional belt that had formed 100–200 my earlier alongside the Tethys opening. Here we analyze a series of Syrian Arc type folds deeply buried in the Levant basin 50–200 km away from the onshore Syrian Arc mountain ridge. We take advantage of the continuous stratigraphic record preserved offshore in order to document folding evolution in time and space. Using >27,000 km of 2D seismic lines we interpreted axial plain of 72 folds. A detailed analysis of thickness variation across each fold was carried out, distinguishing between onlapping patterns, syn-tectonic depositional pattern, and post deposition truncation patterns. Altogether our study maps orientations, amplitudes and lengths of folds and determines the history of folding in the basin, distinguishing between episodes of activity comprising generation of new folds and reactivation older ones, and episodes of quiescence.

Our results demonstrate that folding continued 80 my in the same direction regardless of major tectonic processes that occurred in the surrounding areas. During this period Africa rotated $\sim 20^\circ$ of counterclockwise and started colliding with Eurasia, Arabia broke off Africa, and subduction initiated under Cyprus. But despite all these surrounding processes, the direction of folding in the Levant remained nearly constant (relative to Africa). We suggest that the main control on folding direction is inherited extensional structures formed along Africa's margin during Tethys opening and continuously rotate with it. However, the surrounding tectonic processes, which had minor influence on folding direction, did affect folding intensity and its spatial distribution. Folding ceased in the NW part of the basin in the Oligocene, peaked in the entire basin during Early Miocene coeval with the Red Sea-Suez rifting and convergence of Arabia with Eurasia, and gradually decreased since the Late Miocene, concurrently with the major activity along the Dead Sea Transform.