Study carried on widespread sites of the Aptian-Albian formations in Lebanon led to two paleomagnetic directions corresponding to the primary magnetization (N=37 sites, D=307.1°, I=23.7°, k=18 and $\alpha_{95}=5.5^\circ$ after bedding correction – Fig. 1) and to a post-folding remagnetization (N=18 sites, D=346.3°, I=49.2°, k=108 and $\alpha_{95}=3.2^\circ$ before bedding correction). Comparison of these data with previous paleomagnetic results for Jurassic age in Lebanon (Van Dongen et al., 1967; Gregor et al., 1974) and with expected directions from African and Arabia Apparent Polar Wander Paths (Besse and Courtillot, 2002) yields evidence of three different counter-clockwise regional rotations, of the order of 33° before Aptian deposition, of 11° during Upper Miocene times and of 18° since Miocene period (Fig. 2).

Figure 1. Declination (full arrows) obtained in the different sites for primary magnetisation. Open arrow on the bottom right indicates the expected mean declination from the African APWP for Aptian-Albian times. Inset presents regional context (DSF – Dead Sea fault, Nu – African plate, Ar – Arabia, Eu - Europa, CZ –Collision zones, RS – Red Sea).
The two last rotations are related with the relative displacement of African and Arabian plates. We propose a model of the accommodation of the differential movement of these plates in Lebanon based on the fact the deformation mechanism fundamentally evolved since the initial stage of the boundary formation between these plates, from a mainly widespread shortening and folding mode during the Upper Miocene to a mixed shortening – strike-slip mode from the Pliocene.

Our data exclude that a proto- Yammouneh fault was first aligned with the Arabia-Africa slip vector and that its present-day NNE-SSW orientation results from a later rotation. Such phenomenon would require a regional clockwise rotation of about 30° which is in contradiction with our paleomagnetic data. The bend to the right of the Yammouneh fault relative to the Jordan and Gab segments of the Dead Sea Transform system is thus original. It highlights that transform faults can propagate with an oblique trend relatively to the plate motion.

Figure 2. Declination (D) in degrees with 95% confidence values, expected at Beirut during geological times (Age in Ma), assuming no relative movements between Lebanon and Africa, calculated from African APWP (Besse and Courtillot 2002), of primary magnetisation (after bedding correction) for Aptian sites (1), Albian sites (2) and all the sites (3), and of post-folding magnetisation (4 – before bedding correction) from this study. Data (a) from Van Dongen et al. (1967) and (b) from Gregor et al. (1974).