Chaimov, T A.., Barazangi, M., Al-Saad, D., Sawaf, T. and Gebran, A., *Mesozoic and Cenozoic deformation inferred from seismic stratigraphy in the southwestern intracontinental Palmyride fold-thrust belt Syria.* Geol. Soc. Am. Bull., 104, 704-715, 1992.

Abstract:

The Palmyride fold belt in central Syria is an intracontinental northeast-trending, 400 by 100 km transpressive belt embedded in the northern Arabian platform. During the Late Paleozoic and most of the Mesozoic the region of the present-day mountains was a rift-like trough that collected over 5 km of sediments, for a total Phanerozoic thickness of over 10 km. The southwestern sector of the fold belt is bounded in the north by the Jhar fault and in the south by the south-vergent frontal thrust faults of the Palmyrides, with the broad Al-Daww depression in between. Structural features that characterize the southern and southwestern region of the Palmyrides include a short wavelength, typically 5-10 km, fold style controlled by a regional low-angle décollement within Triassic beds, and small inverted Jurassic and Early Cretaceous normal faults.

Small intermontane basins (about 10 X 30 km) whose strata can be used to document the history of Palmyride deformation flank growth fault-bend folds and are mainly a product of Cenozoic shortening in the belt. These structures are elucidated by about 2000 km of newly available seismic reflection data in the Palmyrides. Synthetic seismic traces generated solely from forward modeling of outcrop information constrain seismic stratigraphic picks in two small basins about 100 km northeast of Damascus. There, minor Late Cretaceous uplift caused local onlap, marking the first inversion phase of the Palmyride trough. Tectonic quiescence throughout the Paleogene, interrupted only in the Middle Eocene by minor tectonism, resulted in monotonous deposition of about 2500 m of mostly limestone. Marked onlap and probable downlap of Lower Miocene strata onto an Oligocene angular unconformity indicate accelerated tectonism by Late Oligocene to Early Miocene time. This marks the beginning of the major phase of inversion and uplift of the Palmyrides. Recent seismicity indicates that transpression continues today.

Despite its relative remoteness from convergent plate boundaries (the nearest, the Bitlis suture in southern Turkey, is about 300 km distant), the Late Cretaceous, Middle Eocene, and Neogene phases of deformation in the intraplate setting of the Palmyrides have a direct temporal relationship with major regional tectonism that occurred along the surrounding Arabian plate boundaries. The Palmyride trough was inverted in Late Cretaceous time and, subsequently, developed into a transpressive zone throughout Neogene and Quaternary times. Thus, the initiation of inversion in the Palmyrides, an integral part of the Syrian Arc, which extends from central Syria southward to central Sinai, apparently predates development of the Red Sea/Dead Sea plate boundary. In contrast, the intense Neogene through Quaternary deformational episode is clearly related to development of the Red Sea/Dead Sea fault system and to convergence along the northern boundary of the Arabian plate in southern Turkey.

Figure 3. A strong comparison of the Transverse Ranges and central San Andreas transform fault system of the Middle East. A mirror image of the San Andreas system is shown in order to made the comparison more direct. Only major faults are shown. The Anti-Lebanon range occupies an analogous position to the Transverse Ranges in relation to its associated continental transform fault, the Dead Sea fault system. The structures found in the Transverse Ranges and in the Anti-Lebanon range are similar; both regions are dominated by rotated, uplifted, and faulting result from tectonic inversion of a preexisting (a priori weak) basin.