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Segmentation along the Strike-slip Fault System of the Chotts Belt, Southern Tunisia

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Abstract : The Chotts belt represents the southernmost folded structure in the Tunisian Atlas domain. It is dominated by inherited deep extensional E-W trending fault zones, which are reactivated as strike-slip faults during the Cenozoic compression. By examining the geological maps at different scales and based on the fieldwork data, we propose new structural interpretations for the geometries and fault kinematics in the Chotts chain. A set of ENE-WSW right-lateral en echelon folds, with curved shapes and steeply inclined southern limbs, is visible in the map view of this belt. These asymmetric tight anticlines are affected by E-W trending fault segments linked by local bends and stepovers. The revealed kinematic indicators along one of these E-W striated faults (Tafferna segment), such as breccias and gently inclined slickenlines (N094, 80N, 15°W pitch angles), show direct evidence of dextral strike-slip movement. The calculated stress tensors from corresponding faults slip data reveal an overall strike-slip tectonic regime with reverse component and NW-trending sub-horizontal σ1 axis ranking between N130 to N150. From west to east, we distinguished several types of structures along the segmented dextral fault system of the Chotts Range. The NE-SW striking fold-thrust belt (~25 km-long) between two continuously linked E-W fault segments (NW of Tozeur town) has been suggested as a local restraining bend. The central part of the Chotts chain is occupied by the ENE-striking Ksar Asker anticlines (Taferna, Torrich, and Sif Laham), which are truncated by a set of E-W strike-slip fault segments. Further east, the fault segments of Hachichina and Sif Laham connected across the NW-verging asymmetric fold-thrust system of Bir Oum Ali, which can be interpreted as a left-stepping contractional bend (~20 km-long). The oriental part of the Chotts belt corresponds to an array of subparallel E-W oriented fault segments (i.e., Beidha, Bouloufa, El Haidoudi-Zemlet El Beidha) with similar lengths (around 10 km). Each of these individual separated segments is associated with curved ENE-trending en echelon right-stepping anticlines. These folds are affected by a set of conjugate R and R′ shear-type faults indicating a dextral strike-lip motion. In addition, the relay zones between these E-W overstepping fault segments define local releasing stepovers dominated by NW-SE subsidiary faults. Finally, the Chotts chain provides well-exposed examples of strike-slip tectonics along E-W distributed fault segments. Each fault zone shows a typical strike-slip architecture, including parallel fault segments connecting via local stepovers or bends. Our new structural interpretations for this region reveal a great influence of the E-W deep fault segments on regional tectonic deformations and stress field during the Cenozoic shortening.

Keywords : chotts belt, tunisian atlas, strike-slip fault, stepovers, fault segments
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