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Effects of the Compressive Eocene Tectonic Phase in the Bou Kornine-Ressas-Messella Structure and Surroundings (Northern Tunisia)

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Abstract : The Messalla-Ressas-Bou Kornine (MRB) and Hammamet Korbous (HK) major trending North-South fault zones provide a good opportunity to show the effects of the Eocene compressive phase in northern Tunisia. They acted as paleogeographical boundaries during the Mesozoic and belonged to a significant strike-slip corridor called the «North-South Axis,» extending from the Saharan platform at the South to the Gulf of Tunis at the North. Our study area is situated in a relay zone between two significant strike-slip faults (HK and MRB), separating the Atlas domain from the Pelagian Block. We used a multidisciplinary approach, including fieldwork, stress inversion, and geophysical profiles, to argue the shortening event that affected the study region. The MRB and HK contractional duplex is a privileged area for a local stress field and stress nucleation. The stress inversion of fault slip data reveals an Eocene compression with NW-SE trending SHmax, reactivating most of the ancient Mesozoic normal faults in the region. This shortening phase is represented in the MRB belt by an angular unconformity between the Upper Eocene over various Cretaceous strata. The stress inversion data reveal a compressive tectonic with an average NW-SE trending Shmax. The major N-S faults are reactivated under this shortening as sinistral oblique faults. The orientation of SHmax deviates from NW-SE to E-W near the preexisting deep faults of MRB and HK. This E-W stress direction generated the emerging overlap of Ressas-Messella and blind thrust faults in the Cretaceous deposits. The connection of the sub-meridian reverse faults in depth creates "flower structures" under an E-W local compressive stress. In addition, we detected a reorientation of the SHmax into an N-S direction in the central part of the MRB - HK contractional duplex, creating E-W reverse faults and overlapping zones. Finally, the Eocene compression constituted the first major tectonic phase which inverted the Mesozoic preexisting extensive fault system in Northern Tunisia.

Keywords : Tunisia, eocene compression, tectonic stress field, Bou Kornine-Ressas-Messella
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