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THE KINEMATIC ANALYSIS AND EVOLUTION OF STRESS FIELDS IN THE ZAGROS FORELAND FOLDED BELT, FARS SALIENT, IRAN

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The NW-SE trending Zagros Orogenic Belt was initiated during the convergence of the Afro-Arabian continent and the Iranian microcontinent in the Late Cretaceous. Ongoing convergence is confirmed by intense seismicity related to compressional stresses collision-related in the Zagros Orogenic Belt by reactivation of an early extensional faulting to latter compressional segmented strike-slip and dip-slip faulting. These activities are strongly related either to the deep-seated basement fault activities (deep-seated earthquakes) underlies the sedimentary cover or gently dipping shallow-seated décollement horizon of the rheological weak rocks of the Infra-Cambrian Hormuz salt.

The Compressional stress regimes in the different units plays an important role in controlling the stress conditions between the different units within the sedimentary cover and basement. A significant set of nearly N-S trending right-lateral strike-slip faults exists throughout the study area in the Fars area in the Zagros Foreland Folded Belt. Fault-slip and focal mechanism data, were analyzed using the stress inversion method to reconstruct the paleo and recent stress conditions. The results suggest that the current direction of maximum principal stress averages N19°E (Table 1), with N38°E that for the past from Cretaceous to Tertiary, (although a few sites on the Kar-e-Bas fault yield a different direction) (Figures 1 and 2). The results are consistent with the collision of the Afro-Arabian continent and the Iranian microcontinent. The difference between the current and paleo-stress directions indicates an anticlockwise rotation in the maximum principle stress direction over time. This difference resulted from changes in the continental convergence path, but was also influenced by the local structural evolution, including the lateral propagation of folds and the presence of several local décollement horizons that facilitated decoupling of the deformation between the basement and sedimentary cover.

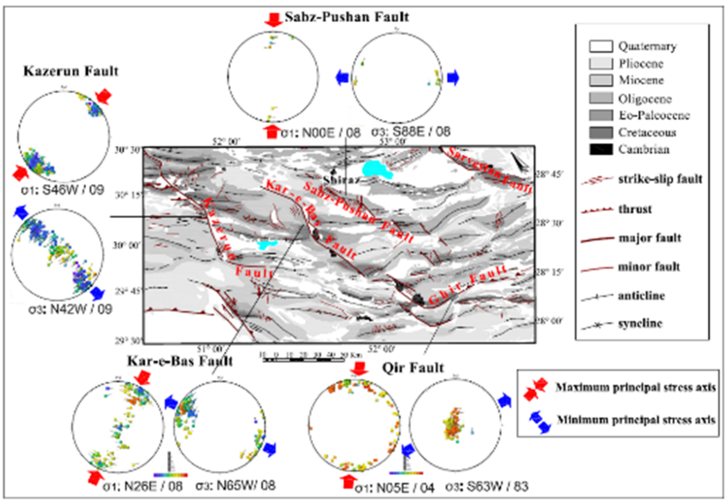

Figure 1. Geological map of the study area showing maximum and minimum principal stress orientations based on inversion of earthquake focal mechanism data for each fault zone (Sarkarinejad et al., 2018).

The obliquity of the maximum compressional stress into the fault trends reveal a typical stress partitioning of thrust and strike-slip motion in the Kazerun, Kar-e-Bas, Sabz-Pushan, and Sarvestan fault zones, that caused these fault zones behave as segmented strike-slip and dip-slip faults.

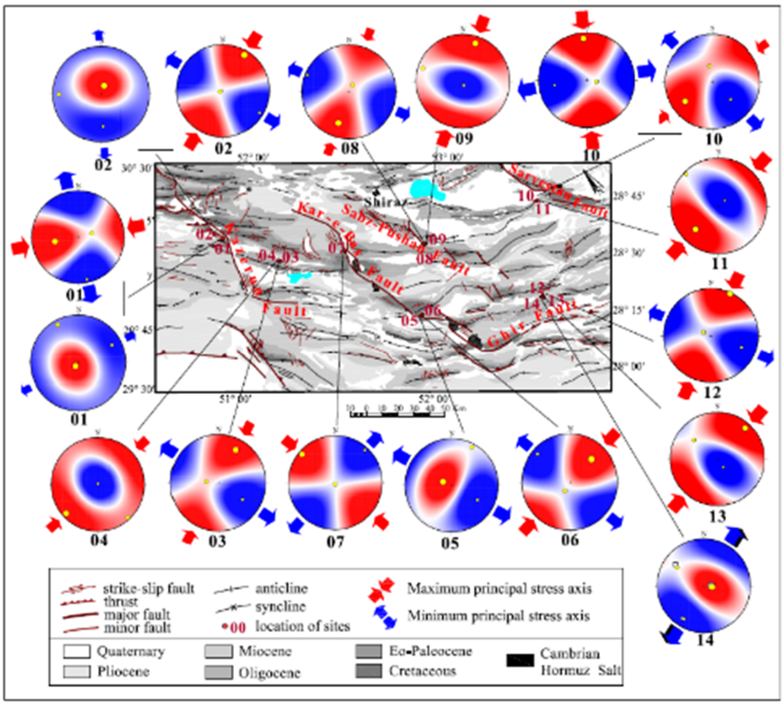

Figure 2. Stress orientations from inversion of fault slip data. Site numbers are listed below the spheres (Sarkarinejad et al., 2018).

Table 1. Results of inversion of the earthquake focal mechanisms. $T\sigma_1$ and $P\sigma_1$ indicate trend and plunge of maximum compression, and $T\sigma_3$ and $P\sigma_3$ represent trend and plunge of minimum compression. Φ is the shape ratio (Sarkarinejad et al., 2018).

location	$T\sigma_1$	$P\sigma_1$	$T\sigma_3$	$P\sigma_3$	Φ
Kazerun Fault	S46ºW	09º	N42ºW	09º	0.04
Kar-e-Bas Fault	N26ºE	08º	N65ºW	08º	0.72
SabzPushan Fault	N00ºE	08º	S88ºE	08º	0.6
Ghir fault	N05ºE	04º	S63ºW	83º	0.88

REFERENCES

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