



Kinematics of the eastern North Anatolian Fault along the Tasova, Erbaa, Niksar, Resadiye and Koyulhisar Basins, Turkey

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In eastern Anatolia, a north-south directed convergence of the Eurasian and Arabian plates result in the continental collision in late Miocene time. In this process, this collision produced two important faults border the Anatolian block in north and south. These are the right lateral North Anatolian Fault and left lateral East Anatolian Fault. In this study, we determined late Cenozoic stress states along the eastern North Anatolian Fault (NAF) in several fault-controlled formed basins. We measured 669 fault-slip vectors in 74 sites in the Tasova, Erbaa, Niksar, Resadiye and Koyulhisar Basins. Fault kinematic inversion results show Quaternary aged two distinct strike-slip stress regimes with consistent NW-trending (sigma 1) and NE-trending (sigma 3) axes. In addition to regimes, it has been observed consistent pre-Quaternary reverse faulting by a NW-trending (sigma 1) and Quaternary aged local normal faulting regime with a NE-trending (sigma 3) along the eastern NAF. The strike-slip regime characterized by the older transpressional and the younger transtensional stress regimes, respectively. A change in stress regime defined from transpressional to transtensional, having a consistent NW- and NE-trending SHmax(sigma 1) and SHmin(sigma 3) axes, respectively with field observations, cross-cutting relationships and significantly different mean stress-ratio (R_m) values. The mean arithmetic (R_m) ratios are 0.74 and 0.17. The older stress state is characterized by N137±14E trending (sigma 1) and N47±28E trending (sigma 3) axes. The younger stress regime is defined by N163±25E trending (sigma 1) and N78±7E trending (sigma 3) axes. Local and consistent NE-trending extension direction as N48±2E trending sigma 3 axes is characterized by the normal faults. Transtensional stress regime is still active on eastern NAF. The temporal change, probably in Quaternary time, within the regional stress regime, from transpressional to transtensional, resulted from the coeval influences of slab-pull and/or roll-back process in the southwest (i.e., along the Cyprus and Hellenic arc), continental collision in the east and westward escape of the Anatolian block.