



Paleoseismic history of the Malatya Fault (Malatya-Ovacık Fault Zone, Eastern Anatolian scholle) for the last 10 ka

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The kinematic interaction along the boundaries of the Eurasian (Eu), African (Af), Arabian (Ar) plates and smaller Anatolian scholle (An) has a critical role in the formation of the eastern Mediterranean tectonic setting. The North Anatolian Shear Zone and the East Anatolian Shear Zone delimit the northern and eastern boundaries and accommodate the main deformation of the An's westward extrusion as a result of the ongoing post-collisional convergence between the Eu and Ar. Furthermore, the NW and NE-striking strike-slip faults represent a remarkable intra-plate deformation within the An. The 240-km long Malatya-Ovacık Fault Zone (MOFZ) is one of the NE-striking sinistral intra-plate deformation belts of the Anatolian scholle. Although the earlier hypothesis claims that the MOFZ is not a continuous deformation zone and is inactive since 3 Ma, recent geologic and geodetic studies and micro seismic activity strongly suggest the opposite. Nevertheless, there is no or very limited knowledge on the paleoseismic history of the MOFZ. In order to have a better understanding on the earthquake behaviour of the MOFZ, we carried out paleoseismological trenching on the Malatya Fault, in the frame of the TÜBİTAK project no. 114Y580. We excavated a single, Alhas, trench in summer 2015 and two trenches, Kızık-1 and -3, in summer 2016 along two step-over segments of the 9 km-long and 2 km-wide Kızık pull-apart basin respectively. The Alhas trench was excavated on the straight scarp that prolongs between Kızık and Alhas villages where mostly braided river-related gravels and sands were exposed. The trench site of the Kızık-1 and 3 is characterized by a linear depression where the fault is clearly marked with a boundary between marshy and dry lands. We found not only the last earthquake that happened between 2780-2430 BP, but also evidence for two more paleoevents in last 10 ka. The evidence from our study suggests that the MOFZ and possibly other intra-plate fault belts are active structures and they play a major role in the internal deformation of the An.