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Preliminary geologic slip rates of the Ovacik Segment (Malatya-Ovacik Fault, Turkey) for the last 15 ka: Insights from cosmogenic 36Cl dating of offset fluvial surfaces

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Continental plate boundaries are often displayed as broadly deforming regions by parallel or sub-parallel fault systems. Understanding the behavior and interactions of the individual faults provide invaluable data not only to figure out the role of each fault sets in accommodation of the relative plate motion, but also to reveal the seismic potential of the region. Contradictory to the diffused deformation zones, the strain is mainly localized along the North Anatolian (NAF) and the East Anatolian (EAF) faults at the boundaries of the Anatolian Block. However, recent geodetic studies show considerable magnitude of strain accumulation higher than the previous expectations along the Malatya-Ovacık Fault (MOF), which is located parallel or sub-parallel with a changing distance from 40 km to 100 km to the EAF. Elastic block model slip-rates change from 1.2 to 1.8 mm/a, which are exceeded with almost factor of 7 to 8 by the modeled velocities of the EAF ($\sim$10 mm/a). Understanding both the quantitative slip partitioning and the temporal behavior of these two fault zones at the eastern boundary of the Anatolian block will provide very important data not only for this particular region, but also for plate boundaries where the deformation are broadly distributed.

In order to find answer for some of the questions raised above, we started to study the northeastern section, the Ovacık Segment, of the MOF, where faulting is clearly observed along well-preserved fault scarps, pressure ridges, and, offset alluvial fans and inset terraces. In order to reconstruct the chronology of the fan and inset terrace surfaces we collected samples for cosmogenic ^{36}Cl dating at the Köseler site (Ovacık, Tunceli). In addition, we performed rtk-GPS survey for precise offset measurements of the terrace risers. Our preliminary analyses show that at the eastern banks, the boundary between the Alluvial fan and the inner channel is displaced for 30$\pm$5 m. In addition to that, we also measured 19$\pm$3 m sinistral offset on the terrace riser, bounding the upper alluvial fan and the lower inset terrace treads at the western banks. Preliminary ^{36}Cl results from upper and lower treads yielded exposure ages of ca. 16 and 12 ka, respectively. Based on these, we calculated two independent geologic slip rates, 1.9 and 1.6 mm/a, which represent close but higher values than the block model based geodetic velocities. Our results from this study play an important role both in understanding of the temporal relationship of the MOF and the EAF and the seismic risk assessment of the region.