



## **Monitoring aseismic surface creep along the North Anatolian Fault (Turkey) using ground-based LIDAR**

Erhan Altunel (1), Volkan Karabacak (1), and Ziyadin Çakir (2)

(1) Eskişehir Osmangazi University, Geology, Eskişehir, Turkey (ealtunel@ogu.edu.tr), (2) Istanbul Technical University, Department of Geological Engineering, 34469, İstanbul, Turkey

We study the surface creep at Ismetpasa and Destek sections along the North Anatolian Fault (NAF), one of the most seismically active structures of eastern Mediterranean. The phenomenon of aseismic surface creep in Ismetpasa has been known since 1970's but it was not reported for the Destek site previously. In this study, creep movements have been monitored using a ground-based "Light Detection and Ranging" system for the first time in literature. LIDAR technology provides 3D coordinated measurements in short time and considering its high sensitivity, it would be worthy to use this new technology in monitoring aseismic slip. Three man-made walls across the fault were monitored for 3 years between June 2007 and November 2009 using LIDAR. The surveys reveal that significant amount of aseismic strain is being continuously released along these sections of the NAF;  $6.8-10.0 \pm 4.0$  mm/year and  $9.1-10.1 \pm 4.0$  mm/year at two sites near Ismetpasa and  $6.0-7.2 \pm 4.0$  mm/year in Destek. Yet these fault segments are still capable of generating large earthquakes since %50 to 70 of yearly slip (i.e. 20-25 mm/year) still accumulates on the fault as demonstrated by the well-known 20th century earthquake sequence of 1939-1999. Furthermore, we demonstrate that the LIDAR technology can be successfully applied to determination of surface creep.