Geophysical Research Abstracts
Vol. 17, EGU2015-10442, 2015
EGU General Assembly 2015


# Understanding the intraplate deformation of the Anatolian Scholle: Insights from the study of the Ovacık Fault (Eastern Turkey)

Cengiz Zabcı (1), Taylan Sançar (2), Dmitry Tikhomirov (3), Susan Ivy-Ochs (4), Christof Vockenhuber (4), Müge Yazıcı (1), Boris A. Natal'in (1), H. Serdar Akyüz (1), and Naki Akçar (3)

(1) Istanbul Teknik Universitesi, Maden Fakultesi, Jeoloji Muhendisligi Bolumu, 34469 Istanbul, Turkey (zabci@itu.edu.tr), (2) Tunceli Üniversitesi, Mühendislik Fak., Jeoloji Müh. Bölümü 62000 Tunceli, Turkey, (3) Institute of Geological Sciences, University of Bern, Baltzerstrasse 1+3, CH-3012 Bern, (4) Laboratory of Ion Beam Physics, ETH Zürich, CH-8093

The tectonic evolution of the eastern Mediterranean is mainly defined by the interaction between three major plates, Eurasia, Africa, Arabia and the smaller Anatolian 'scholle'. The Anatolia is being extruded westward along two major tectonic structures, the North Anatolian (NASZ) and the East Anatolian (EASZ) shear zones, respectively forming its northern and eastern boundaries. Although there are many geologic and geodetic studies infer that the deformation is mainly concentrated along the NASZ and the EASZ, it is also well documented that the central "ova" neotectonic province, which defines a region between the Aegean extensional regime in the west, the NASZ in the north and the EASZ in the east, is also deformed internally by a series of NW-striking dextral and NE-striking sinistral strike-slip faults. These active structures clearly fit to the passive-Prandtl cell model of an internally deforming body, which is originally suggested by Sengör (1979) to interpret the neotectonics of the central Anatolia. The Malatya-Ovacık Fault Zone (MOFZ) and it is northeastern member, the Ovacık Fault (OF), is one the sinistral faults of the "ova" province, located close to its eastern boundary.

In the framework of the TUBITAK project no. 114Y227, we started to study the (a) the geologic slip rate, (b) the palaeoseismology and (c) the cumulative displacement of the OF in order to understand not only the short and long term spatio-temporal behaviour of this 110 km-long strike slip fault, but also its role in the internal deformation of the Anatolian 'scholle'. The faulting is clearly observed along the well-preserved scarps and displaced fluvial landforms at the northern margin of the Ovacık Basin (Tunceli, Turkey), where the deformation is mainly localised along a single strand. The preliminary cosmogenic $^{36}$Cl dates of two independent terrace risers at a single site yield slip rates about 1.5 and 1.9 mm/yr (Zabcı et al. 2014), which slightly exceed the GPS-based block model velocity of 1.2$\pm$0.3 mm/yr. To the west-southwest of the Ovacık Basin the deformation is partitioned along parallel/sub-parallel branches of the OF, where the MOFZ forms a complex structural setting in response to the southward bending of the fault zone. Although, the oldest drainage of the region, Euprates Valley, was measured to have 8 km sinistral displacement, the total magnitude of slip should be larger when we consider these sub-parallel faults. During the project studies, we will precisely measure cumulative displacements not only of the drainage systems, but also across the contacts of the geological formations along the different branches of the OF. The morphological indices, such as topographic profiling, hypsometric integral, basin asymmetry and the mountain front sinuosity will support quantifying the activity of this poorly known fault. Moreover, we are planning palaeseismological trench studies on potential sites during summer, 2015. The integration of all these data will also provide information about the seismic hazard assessment of the region.

**Keywords:** Geologic slip rate, Ovacık Fault, Anatolia, cosmogenic dating, palaeoseismology, intraplate deformation

**References**

Sengör, A. M. C., 1979, The North Anatolian Transform Fault; its age, offset and tectonic significance, Journal of the Geological Society of London, v. 136, p. 269-282

Zabcı, C., Sançar, T., Tikhomirov, D., Vockenhuber, C., Ivy-Ochs, S. & Akçar, N., 2014, Understanding the intraplate deformation of the Anatolia: Insights from preliminary slip rates of the Malatya-Ovacık Fault, Eastern Turkey, during the last 16 ka, *in* Proceedings 8. International Symposium on Eastern Mediterranean Geology, Muðla.