



## **Preliminary results on the slip history of the Pazarcik Segment of the East Anatolian Fault (Turkey): Insights from the integrated analyses of ASTER T-1 and Landsat 8 OLI multi-spectral imagery-based lithological mapping**

**Erdem Kirkan**, Gülsen Uçarkuş, and Cengiz Zabcı

İstanbul Teknik Üniversitesi, Ayazağa Yerleşkesi, Maden Fakültesi Jeoloji Müh. Bölümü 34469 Maslak, İstanbul Turkey  
(kirkkan15@itu.edu.tr)

Multi-spectral satellite imagery becomes a powerful tool in analyses of the earth's surface in various aspects, including tectonic studies. There are many worldwide samples of such studies, documenting the distribution of faulting or deformation of lithological units especially in arid, semi-arid regions. The East Anatolian Shear Zone and its most prominent member, the East Anatolian Fault (EAF), is part of such a region, where the modern techniques of remote sensing can provide information on the history of this transform fault system. The EASZ and the EAF, together form the eastern boundary of the Anatolian Block, which in this study, we compare the efficiency of Advanced Space Borne Thermal Emission and Reflection Radiometer (ASTER) and Landsat-8 Operational Land Imager (OLI) images in the discrimination of lithological formations and the Pazarcik Segment of the EAF. First, we used the band combinations of 2/5/1 and 7/3/1, then 4/3-6/2-7/4 and 1/3-1/9-3/9 band ratios were independently selected in order to make an additional evaluation of the lithological discrimination for Landsat 8 OLI and ASTER T1 images, respectively. In the last stage, we used Principal Component Analysis (PCA), which provided a richer colour spectrum than the Band Combination and Band Ratio methods. The preliminary joint-analysis of these three methods allowed us to better understand the basin geometry along this part of the Pazarcik Segment. Accordingly the northern part of the Golbasi basin which hosts the Golbasi Lake, presents a rhomboidal geometry whereas the southern part is divided from the north with a wedge-shaped basin geometry. Towards southwest of the Pazarcik Segment, the Kisk River is left-laterally offset about ~4.8 km which is detectable on the band ratio images. Most critically, the image analysis highlight a geological offset along the Pazarcik Fault Segment at the Golbasi Lake side of the Hoya Formation. A left-lateral cumulative offset of ~11 km is measured along the displaced Hoya formation favouring the hypotheses of either a diachronic origin for the northern and eastern tectonic boundaries of Anatolia, among which the northern one highly exceeds the eastern boundary in terms of total slip, hence the age, or a wider shear zone where the total strain has been shared among parallel/sub-parallel segments.