



Geometry and Segmentation of the North Anatolian Fault Zone between Yedisu and Karlioiva Triple Junction; A New Seismic Gap in Eastern Turkey ?

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North Anatolian Fault Zone (NAFZ) has a length of 55 km between east of Yedisu (Bingol) and Karlioiva Triple Junction. NAFZ is separated two segments in this region. One of them is Elmali Segment, which is located between east of Yedisu Basin and Kizilcubuk village, and other one is Kargapazari Segment between Elmali Segment and Karlioiva Triple Junction. In this study, we documented geometric and geomorphic features of the most eastern segments of NAFZ. Surface rupture of 1949 Elmali Earthquake and its segmentation have been mapped. This study is based on detailed field investigation combined with data from aerial photos, digital elevation models and analysis of satellite images. Laser Imaging Detection and Ranging (LIDAR) were used to measure fault related features.

Elmali segment commences from east of the Yedisu basin and continues 30 km and it elongates with N70W / E-W orientation. Two sub-segments are defined for Elmali segment based on the surface rupture geometry. Dinarbey, the western sub-segment elongates with N70W orientation in length of 15 km. Kaynarparinar, the eastern sub-segment elongates with E-W orientation in length of 15 km. Several morphotectonic features such as 2 to 3.5 m offset ridges and channels, which occurred in 1949 Elmali Earthquake, and 10 to 250 m offset ridges and rivers, which indicate long period of fault activity, have been identified on Elmali segment. Elmali segment lies between

two important seismic gaps and thus, it is critical to understand its geometry.

The 25 km-long Kargapazari segment is oriented in N65-70 direction between Kizilcubuk village and Karlioiva Triple Junction. Our field observations and witnessing of local people strongly proved that 1949 Elmali earthquake did not create surface rupture on this segment. East and west neighboring segments ruptured with 1966 Varto earthquake and 1949 Elmali earthquake respectively. Considering that there is a seismic gap of 25 km, it is not a surprise being about M 6.5 earthquake on this part of NAFZ.