



Late Quaternary activity of the the Varto Fault Zone (VFZ) and the East Anatolian Fault Zone (EAFZ) at the Karlıova Triple Junction, NE Turkey

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Karlıova triple junction has been formed by the intersection of the North Anatolian Fault Zone (NAFZ), the East Anatolian Fault Zone (EAFZ) and the Varto Fault Zone (VFZ) at 10 km northeast of Karlıova town of Bingöl, NE Turkey. Northward convex shaped NAFZ has a length of 1500 km and locate between Aegean Sea in the west and Karlıova triple junction in the east. The EAFZ starts from Karlıova triple junction and continues southwestward along Bingöl, Palu, Sivrice until Kahramanmaraş in the SW. The VFZ has a length of 35 km between Karlıova triple junction and east of Varto Town. VFZ formed by nearly E-W trending three parallel fault branches from north to the south. Primary and secondary faults of the eastern part of NAFZ are well determined by previous studies. There is no enough information about geometry, segmentation, kinematics and history of the VFZ which produced two earthquakes ($M > 6$), 31 May 1946 ($M = 6$) and 19 August 1966 ($M = 6.9$), in the last century. The 19 August 1966 Varto earthquake ($M = 6.9$) created surface ruptures on different branches of VFZ. However, surface ruptures geometry and slip distribution of the 1966 earthquake were unclear though, our study proposes new evidences for the surface rupture distribution of this event. Field studies after the 1966 earthquake show no evidence of surface ruptures on the northernmost branch of VFZ. Moreover, local people strongly indicate that there was no sign of surface ruptures on this branch, after 19 August 1966 Varto earthquakes. Fault geometry and characteristics of the EAFZ are unclear around the junction area, although main strands to the SW are better known. The north-easternmost part of the EAFZ is known as Göynük Segment, with a length around 25 km between Karlıova triple junction and Göynük village. The surface rupture 22 May 1971 earthquake ($M = 6.8$) starts from Bingöl in the SW and terminates at Göynük village in the NE. There are no recorded or known earthquakes on the Göynük segment since A.D. 1866. This ongoing study focus on defining geometries of major and minor branches of faults along the EAFZ and the VFZ, which form two main components in vicinity of Karlıova triple junction, and investigation of Quaternary slip rate history. To this end, morphotectonic map of the region, which contain fault geometry, tectonic linearities and offset morphologic structures, produced by extensive field studies and evaluation of satellite images, aerial photos and digital elevation models. Critique regions that are determined from the map have been checked and have been detailed in the field. Although samples for OSL (Optically Stimulated Luminescence) dating from offset morphological landforms have been collected, dating process is still underway.