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Quaternary Activity of Varto Fault Zone (Eastern Anatolia) and New Ideas About 1966 Varto Earthquake

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The Varto Fault Zone (VFZ) has a length of 35 km between Karlıova Triple Junction (KTJ) and east of Varto Town. VFZ formed by nearly E-W trending three parallel fault segments which are called from north to the south, Varto segment, Mt. Leylek segment, Çayçatı segment. There is no detailed information about geometry, segmentation, kinematics and earthquake history of the VFZ which produced two earthquakes, 31 May 1946 (Ms=5.9) and 19 August 1966 (Ms=6.9), in the last century. The 19 August 1966 Varto earthquake (M=6.9) created surface ruptures on different branches of the VFZ. However, surface rupture geometry and slip distribution of the 1966 earthquake were still unclear. After 1966 Varto earthquake (Ms=6.9), Wallace (1968) proposed that faulting is right-lateral whilst McKenzie (1972) defined right-lateral movement with thrust component by fault plane solution. We defined that the character of NW-SE extended Varto Segment is right lateral strike-slip fault, whereas arc shaped Mt. Leylek and Çayçatı segments are oblique reverse strike-slip fault. Our field observations and witnessing of local people strongly indicate that 1966 Varto earthquake did not create surface rupture on Varto segment while it seen on Mt. Leylek Segment and Çayçatı Segment. Our interpretation is that 35 km long Varto segment was most probably not broken neither in 1946 nor in 1966 Varto earthquakes, therefore it constitutes a seismic gap. Several morphotectonic features such as 50 m to 2.5 km offset gullies, rivers and ridges, pressure ridges, saddle structure, morphologic lineament and hot springs are clear geological and morphological structure, which indicate long period of pure strike-slip fault activity, have been identified on Varto segment. There are no performed studies related to slip rate history of the VFZ. To examine the slip rate of the segment OSL samples were taken from terrace risers of dextrally offset rivers in two locations. Dating process of collected OSL samples are still underway. Since geodetic short term slip rate of VFZ still unclear, these data will be contribute to Quaternary activity of VFZ and KTJ.