

## Rupture History of the 1944 Bolu-Gerede Segment of the North Anatolian Fault

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Though the intensive research on the North Anatolian fault after the 1999 Kocaeli earthquake brought a lot of information on the present and past activity of the fault, our knowledge about the rupture history and the past slips along the entire length of the North Anatolian fault is still very limited. More precise data on the timing and amount of past slips along the fault is indispensable to understand the fault behavior in the past and in the future. The Ardicli trench site, 15 km east of Gerede, is one of the most promising sites for this investigation, for abundant datable material and for ideal sedimentation history to record recent earthquakes. Okumura et al. (1990, 1993) opened a trench here in 1990 and concluded 8 earthquake events in 2000 years. However, the conclusion depended mostly on indirect evidence of coseismic deformation along the fault because few master fault strands repeatedly ruptured in pure strike-slip condition and dating was not enough. The Gerede 2002 trench was opened about 18 m east of the 1990 trench, cutting into a 10 m by 10 m light-toned area on an aerial photography. The light-toned area turned out to be a small pressure ridge or dome associated with an a-few-meter-wide restraining jog of the fault. The north side of the fault in the 3-meter-deep trench consists of an anticline of ca. 1000 B.P. to 2000 B.P. lacustrine deposits underlain by 1000 B.P. and younger flood and marsh deposits. Two distinct levels of overlap indicate the timing of events that accompanied the growth of the anticline. The south side of the faults consists of 0 to ca. 1000 B.P. flood and marsh deposits. A basement of a brick kiln is cutting into the deposits and tilted conformably with the dip of the sedimentary units. Steeply north dipping oblique-reverse faults bifurcates from vertical master fault zone. There are three discrete levels of upper terminations of these subsidiary faults, beside the flower structure at the top of the master fault. These four events occurred during these 1000 years. Based on the radiocarbon dates and events from the 1990 trench, and historic earthquakes, these events are likely to be correlated with 1944, 1668 (Ambraseys and Finkel 1988), 14th century (Okumura et al., 1994), and 1050 (Ambraseys, 1970) events. This time series, yet to be confirmed by the dating under way, shows quasi-periodical recurrence of every 250 to 300 years. The offset streams around the trench may also indicate 4 to 5 meters slips have been regularly repeated during these events.