



Preliminary results of paleoseismological trenching on 1939 Erzincan and 1942 Niksar-Erbaa earthquake fault segments, the North Anatolian Fault, Turkey

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The December 26, 1939 Erzincan ($M=7.9$) and the December 20, 1942 Niksar-Erbaa ($M=7.1$) earthquakes together created a rupture zone about 400 km along the North Anatolian Fault Zone (NAFZ). Although Turkey has one of the richest records of historical seismicity in the Mediterranean, there is not enough data for reconstructing the average recurrence time of earthquakes in the catalogues. In the framework of TC DPT project no. 2006 K 120220, paleoseismological trench investigations were undertaken to learn more about recurrence of large earthquakes on the segments of the NAFZ, located between Erzincan basin in the east and Erbaa in the west. In July and September 2006, totally 4 trenches were excavated at 4 different sites. The westernmost site Alanici is located at the border between the towns Niksar and Erbaa. Here a N80E trending fault segment forms a sag-pond by a gentle releasing bend. In the trench walls structural and sedimentary relations give two paleoevents including 1942 surface rupture and a prior one. The second site Direkli is located between Buzkoy and Niksar, again on the 1942 surface rupture. One trench is excavated on a terrace surface of Kelkit river which (according to local witnesses) ruptured during the 1942 event. In previous works the average displacement due to last earthquake is between 1.5 and 2 m on this segment (Barka, 1996). In the trench walls there was no sign for faulting that reaches to the surface. Close to the bottom of the trench that is approximately at a depth of 2 m, structural relations of stratigraphic horizons show an older event prior to 1942. The last site Umurca is located at 25 km east of Resadiye on the surface rupture of 1939 earthquake. Excavation was done at the eastern edge of a ridge sub-parallel to the trend of the fault. Both walls exposed a good stratification and clear structural

relations indicating possible 4 events including 1939 Erzincan earthquake. The dating is underway to determine the occurrence time intervals of these events.

References

Barka, A.A., 1996, Slip distribution along the North Anatolian Fault associated with large earthquakes of the period 1939 to 1967: *Bulletin of the Seismological Society of America*, v. 86, s. 1238-1254