Geophysical Research Abstracts, Vol. 8, 01270, 2006
SRef-ID: 1607-7962/gra/EGU06-A-01270

Investigation of the source fault of the Eskisehir earthquake, February 20, 1956 by using attenuation equations

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Eskisehir Fault Zone (EFZ) is one of the prominent deformation zones within the Anatolian Platelet extending approximately 400 km from Bursa in the west to Sultanhan in the south-east. The only destructive ground motion in relation to EFZ namely the Eskisehir earthquake occurred on February 20, 1956. However, no agreement on “which segment of the EFZ is the source of the earthquake” exists. However, this point has ultimate significance since the Eskižehir city with her approx. 500 million populations settles on loose alluvium very nearby. In this study, the possible source of this Eskisehir earthquake was investigated. For this purpose, three different segments, namely Inonu, Tevluke-Turgutlar and Kavacik, of the EFZ that were previously assigned as source faults and the damage distributions recorded in 25 different villages of the region affected were considered. Each segment was divided into approximately 900 m length, equal pieces. Considering the beginning points of the sub-segment pieces and each village locations, ground acceleration values on the villages were calculated by using a proper attenuation equation. To assess the source potential of each segment, a simple approach, namely sensitivity to ground motion (SGM), was introduced into this study. SGM can be defined as the regression coefficient of the relation between the ground acceleration values and the damage distributions in the villages. Considering the linear relations, minimum and maximum SGM values calculated for Inonu, Tevluke-Turgutlar and Kavacik segments are 0.0000-0.0126, 0.2077-0.3812 and

0.0606-0.1037, respectively. According to SGM value distributions, it can be clearly concluded that the source fault of the February 20, 1956 Eskisehir earthquake is the Kavacik segment.