



Geological, geomorphological and archeoseismological observations along the Cibyra fault (SW Turkey) and their implications for the regional tectonic

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Western Turkey is one of the most seismically active regions in the world and this region is controlled by active fault zones in different directions. Southwestern Turkey is characterized by NE-SW-trending fault zone between Burdur and Mediterranean Sea. NNE-SSW trending Cibyra fault is one of the segments on this fault zone. Geological and geomorphological field data indicate that the Cibyra fault is about 40 km in length. Nearly horizontal slickenside on fault planes, left-laterally deflected stream beds and terraces, fault-parallel pressure ridges and abandoned stream beds along the Cibyra fault are the most clear surface evidence for faulting.

The ancient city of Cibyra which was an important city during the Roman period is located on the Cibyra fault. Detailed field observations showed that large historical earthquakes struck the city at several times. Two types of earthquake damage can be observed at Cibyra; (a) deformation associated with surface faulting and (b) destruction caused by co-seismic shaking. Damage related to shaking is characterized by systematically collapsed columns, broken monuments and tilted and rotated blocks. The most exciting evidence for the surface faulting was observed in the stadium. Deformation on rows of seats, floor and a wall in the stadium indicate clear evidence for left lateral motion with thrust component on the N20°E trending fault.

Without having paleoseismological trenches, offset features cannot be correlated with certain events. However, archaeoseismic observations reveal that Cibyra was affected by large earthquakes at least three different times in the last 2000 years. Detailed archeoseismological observations in the city centre suggest that the city was affected by 23 AD and 417 AD earthquakes which were also recorded in historical earthquake catalogs. Although there is no record for the third event, OSL dating of collapsed blocks suggests that the third large event occurred shortly after 940 ± 86 AD. On the basis of above information, it can be concluded that the Cibyra fault reactivated in 23, 417 and probably around 11th century AD and caused extensive damage in the ancient city of Cibyra. Geological, geomorphological and archeoseismological observations suggest that the NNE-SSW trending faults in southwestern Turkey are active and the motion on them is left lateral.