

## SECOND EUROPEAN CONFERENCE ON EARTHQUAKE ENGINEERING AND SEISMOLOGY, ISTANBUL AUG. 25-29, 2014



### HARBIYE AQUEDUCT: A RECORD OF PAST EARTHQUAKES

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This paper presents a detailed analysis of Harbiye aqueduct (Hatay, Turkey). The region is situated at the junction of two major faults (East Anatolian fault and the Dead Sea fault) and is well known for his important historic seismicity. The aqueduct is located close to Antioch on the Orontes (known as Antakya). The city was founded in the third century BC. Harbiye aqueduct is characterized by different stages of building (Benjelloun *et al.*, *submitted*). A phase is dated to Caligula period. After the 37 AD earthquake, the aqueduct was rebuilt. We noticed the presence of two dissociated travertine and a changing of masonry material. We also observed several damages and repair structures dating from Roman time. We assume that our observations are the results of one or more earthquakes. Since the construction of the aqueduct, historical seismic records mention 13 earthquakes that provoked severe damages in the city of Antioch (Guidoboni *et al.* 1994, Al-Tarazi, 1999, Över *et al.* 2002). The last one occurred in 1872 (M=7.2). In order to test our hypothesis, we modelled the structure of the aqueduct by using FineLg, a software developed at University of Liege. The seismic signals were chosen in the European Strong-motion database (Ambraseys *et al.*, 2002) according the following criteria: a bedrock station (to avoid site effect), a strike-slip fault mechanism and a distance between the station and the epicenter around 20-30 km. The aqueduct is located at about 25 km of the Dead Sea Fault. We tested several magnitudes for the purpose of estimate the magnitude of the earthquake(s) which destroy(s) the studied aqueduct. Our results highlight the bond between the magnitude, the damage and the weakness area of this type of structure.

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