Geophysical Research Abstracts, Vol. 9, 08496, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-08496

Repeated activity of the Malaha fault affecting a Roman to Medieval archaeological site (Granada basin, Spain).

J. M. Azañón (1), G. Booth-Rea (1), J.M. Martínez-Martínez (1), T. Teixidó (2), J.A. Peña (2)

(1) Dpt. Geodinámica, Universidad de Granada, Spain.(2) Instituto Andaluz de Geofísica, Universidad de Granada.

Southeastern Spain is a region of moderate seismic activity where earthquakes of magnitude above 5 are not frequent. From historical seismicity, we know that in south Spain large earthquakes with maximum intensities of IX or X have occurred in the past. The most active seismic areas correspond to the Granada basin with frequent shocks of m_b=3. In this basin, the most recent large earthquake occurred in 1884 (Arenas del Rey, estimated intensity of X). Around 20 km basinwards from the epicentre of this large earthquake, we have identified an active normal fault (Malahá fault) with at least 15 km length. The fault produces a topographic high with a WNW-ENE trend in the middle part of the basin where the basement outcrops. Sedimentary, geomorphic and seismological criteria indicate that the last activity of this fault is very recent. Holocene sedimentation, including human vestiges as bones, ash levels, roman and medieval ceramic fragments has been affected by this fault. We have used electrical resistivity tomography (ERT), geo-radar (GPR) and reflection seismic surveying to investigate the geometry of the Holocene sediments along two cross-sections. In order to estimate the sedimentation rates induced by this fault, we have dated by AMS-C14 several levels of the hanging-wall. The oldest level gave an age of 3010$\pm$25 BP and the younger level gave an age of 887$\pm$48 BP. This last level seals two planes of the fault zone and itself is cut by the main surface. An ash level with an age of 2230$\pm$25 BP seals a clastic wedge with an age of 2422$\pm$25 BP. All these AMS-C14 ages are congruent with the ceramic fragments found in different levels. Consequently, we conclude the fault has been active during the last three millenniums, producing sedimentation rates in its hanging-wall ranging between 0.4 and 1.7 mm/yr.