

Exhumation history of an active fault to constrain a fault-based seismic hazard scenario: the Pizzalto fault (central Apennines, Italy) example.

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A prerequisite to constrain fault-based and time-dependent earthquake rupture forecast models is to acquire data on the past large earthquake frequency on an individual seismogenic source and to compare all the recorded occurrences in the active fault-system.

We investigated the Holocene seismic history of the Pizzalto normal fault, a 13 km long fault segment belonging to the Pizzalto-Rotella-Aremogna fault system in the Apennines (Italy). We collected 44 samples on the Holocene exhumed Pizzalto fault plane and analyzed their ^{36}Cl and rare earth elements content. Conjointly used, the ^{36}Cl and REE concentrations show that at least 6 events have exhumed 4.4 m of the fault scarp between 3 and 1 ka BP, the slip per event ranging from 0.3 to 1.2 m. No major events have been detected over the last 1 ka. The Rotella-Aremogna-Pizzalto fault system has a clustered earthquake behaviour with a mean recurrence time of 1.2 ka and a low to moderate probability (ranging from 4% to 26%) of earthquake occurrence over the next 50 years. We observed similarities between seismic histories of several faults belonging to two adjacent fault systems. This could again attest that non-random processes occurring in the release of the strain accumulated on faults, commonly referred to as fault interactions and leading to apparent synchronization. If these processes were determined as being the main parameter controlling the occurrence of earthquakes, it would be crucial to take them into account in seismic hazard models.