Small faults in Southeast Spain reduce earthquake risk of larger ones

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A team of Spanish scientists, studying recent, active deformations in the Baetic mountain range, have shown that the activity of smaller tectonic structures close to larger faults in the south east of the Iberian Peninsula partially offsets the risk of earthquakes.

"There are large faults in the eastern part of the Baetic mountain range, which are active and occasionally cause moderate, low magnitude earthquakes (measuring less than 5 on the Richter scale)", Antonio Pedrera, lead author of the study and a researcher in the Department of Geodynamics at the University of Granada (UGR), tells SINC.

The team's research, published recently in the *Journal of Quaternary Science*, involved studying the La Molata sector, near Albox, in Almeria, near the southern end of the active Alhama de Murcia fault. The authors say this sector has been deformed by small faults and folds that are growing progressively.

"Although we can't exclude the possibility that these direction faults could cause earthquakes of greater magnitude, we have shown that the formation of small tectonic structures helps to partially relax the energy associated with the convergence of plates, and reduces seismic activity in these larger faults", says Pedrera.

The secrets of rodent fossils

By studying mammal fossils, Antonio Ruiz Bustos, co-author of the study and a researcher at the Andalusian Institute of Earth Sciences (UGR) has been able to date inverse faults and active folds near the town of Albox.

Some of the fossils found in the faults have included the molars of Mimomys Sabin (a small rodent that lived in wetland areas between 950,000 and 830,000 years ago), which have allowed him to measure the horizontal narrowing of the faults at 0.006 milimetres/year.

The scientists have combined the dating of deformed sediments with other surface geological data, such as geological mapping, cinematic analysis of the structures, geophysical prospecting and geomorphological analysis, in order to evaluate what role these faults have played in causing earthquakes during the Quaternary (from 1.8 million years ago to the present day).

Nine million years ago, the eastern part of the Baetic mountain range was deformed by numerous folds and faults, caused by the collision of the Eurasian and African plates.

Currently, some of these tectonic structures are still developing, but available data on the location of earthquakes suggest that their seismic activity is dispersed and moderate.

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