

# Venezuelan caves with paleoseismical record

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In natural caves some events as large rock breakdowns and angular changes in the growth directions of stalagmites, between others, can be explained by paleoseismical activity and such record can be well preserved. Several caves located at the southeast of Caracas and developed in small bodies of Late Jurassic marble contain structures that can be interpreted as paleoseismically related.

In Ricardo Zuloaga Cave (Mi.42) a thick bat guano deposit was sampled to a depth of 4 m. The strata at -1.4 m shows abundant marble angular rock fragments interpreted to have fallen down from the ceiling and walls during a major earthquake. Some bat bones found between the rock fragments were dated by AMS  $^{14}\text{C}$  having an age of 9,3 thousand years before present, now interpreted as the oldest paleoseismical evidence in central Venezuela. The 1812 earthquake, the largest from Venezuelan historical times did not leave any evidence. At the easternmost part of the Caracas Metropolitan Area in the Guanasna massif which covers an area of only 500 x 300 m, 81 tectonic caves were surveyed and 35 of them show rotated rock blocks, several generations of ruptured speleothems that had grown in different angular positions, and other suspect structures. The most important point is to make sure that such forms were generated by earthquakes and not by other phenomena such as solifluxion or large scale landslides, but several lines of evidence suggest that the paleoseismical hypothesis is the most plausible. Further field research and age determinations of the speleothems will be carried out and potentially could increase the knowledge of the paleoseismic record in the Caracas region.

On new explorations by the Venezuelan Speleological Society much care is taken to identify suspect paleoseismical related structures.